

**1 Cover Page*****RF Exposure Evaluation Report***

**Application No.:** KSCR2110000184AT  
**FCC ID:** VPYLB2AB  
**IC:** 772C-LB2AB  
**Applicant:** Murata Manufacturing Co., Ltd.  
**Address of Applicant:** 1-10-1, Higashikotari, Nagaokakyo-shi, Kyoto 617-8555 Japan  
**Manufacturer:** Murata Manufacturing Co., Ltd.  
**Address of Manufacturer:** 1-10-1, Higashikotari, Nagaokakyo-shi, Kyoto 617-8555 Japan  
**Factory:** Shenzhen Murata Technology Co., Ltd.  
**Address of Factory:** 15 Cuijing Road, Shenzhen Grand Industrial Zone, Pingshan District, Shenzhen 518118 China

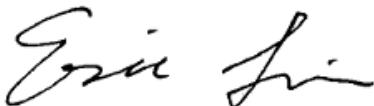
**Equipment Under Test (EUT):**

**EUT Name:** UWB+BLE Combo Module  
**Model No.:** LBKA5QJ2AB  
**Trade mark:** Murata  
**Standard(s) :** FCC Rules 47 CFR §2.1091  
 KDB447498 D01 General RF Exposure Guidance v06  
 RSS-102 Issue 5 Amendment 1 (February 2, 2021)

**Date of Receipt:** 2021-10-21**Date of Test:** 2021-10-21 to 2021-12-24**Date of Issue:** 2021-12-25

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.



Eric Lin  
EMC Lab Manager



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Revision Record			
Version	Description	Date	Remark
00	Original	2021-12-25	/

Authorized for issue by:				
		Damon Zhou		
		<b>Damon Zhou / Project Engineer</b>		
		Eric Lin		
		<b>Eric Lin / Reviewer</b>		

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### 3 General Information

#### 3.1 General Description of E.U.T.

Power supply:	DC 2.5~3.6V
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#### 3.2 Technical Specifications

##### BLE

Antenna Gain:	-4.7dBi (Provided by manufacturer)
Antenna Type:	PCB Antenna
Bluetooth Version:	V5.2 LE
Data Rate:	1Mbps &2 Mbps
Channel Spacing:	2MHz
Modulation Type:	GFSK
Data Rate:	1Mbps,2Mbps
Number of Channels:	40
Operation Frequency:	2402MHz to 2480MHz
Serial Number:	449160F719CF
Firmware Version:	Type2AB-DTM-FW-V0.1.0

##### UWB

Power supply:	DC 2.5V~3.6V
Test voltage:	DC 3V
Product category:	hand held
Antenna Gain:	Board 1: Antenna 1(RX): 1.7dBi for 6489.6MHz; -0.9dBi for 7987.2MHz(Provided by manufacturer) Antenna 2(TX/RX): 1.8dBi for 6489.6MHz; -1.5dBi for 7987.2MHz(Provided by manufacturer) Board 2: 3.9dBi for 6489.6MHz; 2.8dBi for 7987.2MHz(Provided by manufacturer)
Antenna Type:	Board 1: Antenna 1:PCB Antenna; Antenna 2:PCB Antenna Board 2:PCB Antenna
Modulation Type:	BPM+BPSK
Number of Channels:	2
Frequency range:	6489.6MHz to 7987.2MHz
Serial Number:	Board 1: 09411594 Board 2: 09425885

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Firmware Version:	Board 1: V1.0.0 Board 2: V1.0.0
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### 3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

### 3.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC (Designation Number: CN1172)**

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

- **ISED (CAB identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

CAB Identifier: CN0072.

- **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600,C-11707, T-11499, G-10216 respectively.



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## 4 Test Standards and Limits

### 4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm <sup>2</sup> )	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30

### 4.2 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For 2.4G device, the limit of worse case is 2.68 W

For UWB device above 6GHz, the limit is 5W.

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## 5 Measurement and Calculation

### 5.1 Maximum transmit power

The Power Data is based on the RF Test Report KSCR211000018401& KSCR211000018402.

BLE

Test Mode	Test Frequency (MHz)	Output Power (dBm)	Output Power (mW)
1M	2402	6.05	4.03
	2442	6.67	4.65
	2480	7.02	<b>5.04</b>
2M	2402	6.06	4.04
	2442	6.70	4.68
	2480	7.02	5.04

UWB

EUT	Test Frequency (MHz)	Field Strength@3m (dBuV/m) (F <sub>50M</sub> )	EIRP (dBm)	EIRP (mW)	Gain (dBi)	Output Power (dBm)	Output Power (mW)
Board 1	6489.6	92.83	-2.47	0.57	1.8	-4.27	0.37
	7987.2	<b>93.57</b>	-1.73	0.67	-1.5	-0.23	0.95
Board 2	6489.6	92.87	-2.43	0.57	3.9	-6.33	0.23
	7987.2	93.43	-1.87	0.65	2.8	-4.67	0.34

Remark:

- At a specified measurement distance of 3 m: EIRP(dBm) = E(dB $\mu$ V/m) - 95.3
- $F_{50M} = F_{10M} + 20\log(50MHz/10MHz) = F_{10M} + 13.98$
- $F_{50M}$ : Field Strength for fundamental @ RBW=50MHz
- $F_{10M}$ : Field Strength for fundamental @ RBW=10MHz

### 5.2 MPE Calculation

For FCC:

According to the formula  $S=P/4\pi R^2$ , we can calculate S which is MPE.

Note:

- P (mW)
- R = distance to the center of radiation of antenna (in meter) = 20cm
- MPE limit = 1mW/cm<sup>2</sup>

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## BLE

The max. antenna gain is		-4.7	dBi		
Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
5.04	0.339	20	0.00034	1	Pass

## UWB

The max. antenna gain is		-1.5	dBi		
Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
0.95	0.708	20	0.00013	1	Pass

The BLE and UWB can simultaneous transmitting. The maximum rate of MPE is  $0.00034/1.0+0.00013/1.0=0.00047 \leq 1.0$ . according to the KDB447498 section 7.2 determine the device is exclusion from SAR test.

## For IC:

BLE: Output power = 0.00504W < 2.68W

UWB: Output power = 0.00095W < 5W

The BLE and UWB can simultaneous transmitting. The maximum rate of MPE is  $0.00504/2.68+0.00095/5=0.0021 \leq 1.0$ . So the device is exclusion from SAR test.

**--End of the Report--**



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