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Report No.: 2309RSU028-U2 Report Version: V01 Issue Date: 2023-10-16

# **RF Exposure Evaluation Declaration**

FCC ID: T68-TTBLE

**Applicant:** Fluke Electronics

**Product:** LE Bluetooth Module

Model No.: TTBLE

FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): FCC Part 2.1091

**Evaluation Date:** 2023-10-11

Result: Complies

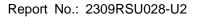
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	Sunny Sun	ilac-MRA	
Approved By:			ACCREDITED
	Robin Wu	- Williamin	TESTING LABORATORY

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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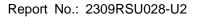
## **Revision History**

Report No.	Version	Description	Issue Date	Note
2309RSU028-U2	V01	Initial Report	2023-10-16	Valid



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#### 1. General Information

#### 1.1. Applicant

Fluke Electronics

6920 Seaway Blvd; Everett WA 98203, USA

#### 1.2. Manufacturer

Fluke Electronics

6920 Seaway Blvd; Everett WA 98203, USA

### 1.3. Testing Facility

	Test Site - MRT	Suzhou Laborator	у			
	Laboratory Location (Suzhou - Wuzhong)					
	D8 Building, No.2	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China				
	Laboratory Loca	ntion (Suzhou - SIP	')			
	4b Building, Liand	do U <u>Valley, No.200</u>	Xingpu Rd., Shengpu	u Town, Suzhou Indu	ıstrial Park, China	
	Laboratory Accre	editations				
	A2LA: 3628.01		CNAS	S: L10551		
	FCC: CN1166		ISED: CN0001			
	VCCI:	□R-20025	□G-20034	□C-20020	□T-20020	
_	VCCI.	□R-20141	□G-20134	□C-20103	□T-20104	
	Test Site - MRT	Shenzhen Laborat	ory			
	Laboratory Loca	tion (Shenzhen)				
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, C				strict, Shenzhen, China	
	Laboratory Accreditations					
	A2LA: 3628.02	CNAS: L10551				
	FCC: CN1284	: CN1284 ISED: CN0105				
	Test Site - MRT	Taiwan Laboratory	/			
	Laboratory Location (Taiwan)					
	No. 38, Fuxing 2n	ıd Rd., Guishan Dis	st., Taoyuan City 333,	Taiwan (R.O.C.)		
	Laboratory Accre	Laboratory Accreditations				
	TAF: 3261					
	FCC: 291082, TW	<b>V</b> 3261	ISED:	TW3261		



#### 1.4. Product Information

Product Name	LE Bluetooth Module	
Model No.	TTBLE	
Bluetooth Specification	V4.2 Bluetooth-LE	
Antenna Information	Refer to Section 1.5	
Working Voltage	3.3 ~ 5Vdc	
Operating Temperature	-20°C ~ 60°C	

Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.

#### 1.5. Antenna Details

Antenna Type	Frequency Band	Antenna Gain	
	(MHz)	(dBi)	
Ceramic Chip Antenna	2400 ~ 2483.5	3.00	

Note: The antenna gain is from antenna data sheet provided by the manufacturer.

#### 1.6. Device Classification

According to the user manual, this device is classified as a Mobile Device. So, the RF exposure evaluation requirements of § 2.1091 for mobile device exposure conditions subject to MPE limits.

#### 1.7. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

FCC Part 2.1091 & KDB 447498 D04 Interim General RF Exposure Guidance v01



### 2. RF Exposure Evaluation

#### 2.1. Test Limits

According to FCC §1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

Limits For Maximum Permissible Exposure (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Average Time
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm <sup>2</sup> )	(Minutes)
	(A) Limits fo	r Occupational/ Contro	l Exposures	
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	<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 Exposures				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f= frequency in MHz. \* = Plane-wave equivalent power density.



#### 2.2. MPE Exemptions

**For single RF sources** (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

**(Option A)** The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A) of this section.

Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

**(Option B)** Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P is given by:

$$P th(mW) = \{ERP_{20cm}(d / 20cm)^x d \le 20cm\}$$

$$P th(mW) = \{ERP_{20cm} 20cm < d \le 40cm\}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20cm}\sqrt{f}}\right)$$
 and f is in GHz;

and

$$ERP_{20cm}(mW) = \{2040f \ 0.3GHz \le f < 1.5GHz \}$$

$$ERP_{20cm}(mW) = \{3060 \ 1.5GHz \le f \le 6GHz \}$$

(**Option C**) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).



Table 1 to §1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1920R <sup>2</sup>
1.34-30	3450R²/f²
30-300	3.83R <sup>2</sup>
300-1,500	0.0128R <sup>2</sup> f
1,500-100,000	19.2R <sup>2</sup>

For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

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

#### Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for  $P_{th}$ , including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

 $P_i$  = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

 $P_{th,i}$  = the exemption threshold power ( $P_{th}$ ) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

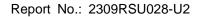
 $ERP_j$  = the ERP of fixed, mobile, or portable RF source j.



 $ERP_{th,j}$  = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least  $\lambda/2\pi$  according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

**Evaluated**<sub>k</sub> = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

**Exposure Limit**<sub>k</sub> = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from §1.1310 of this chapter.





#### 2.3. Calculated Result

Product	LE Bluetooth Module
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band	Max. Time-averaged Power
	(MHz)	(dBm)
BLE	2402 ~ 2480	-17.38

### For single RF source, Option A

The EUT available maximum time-averaged power is no more than 1 mW (0 dBm).

Therefore, the device qualifies for RF exposure exemption.

 The End	