

# Maximum Permissible Exposure Evaluation

## FCC ID: 2AWG6TUO-A21G1-26

### 1. Client Information

<b>Applicant</b>	:	Zero One-Eleven Technologies, Inc
<b>Address</b>	:	5719 W Grover St, Chicago IL 60630 USA
<b>Manufacturer</b>	:	Zhongshan Julun Lighting Technology Co.,Ltd
<b>Address</b>	:	6th Floor No.19 Guangle Center Road,Xiaolan Town,Zhongshan City, Guangdong Province ,China528415

### 2. General Description of EUT

<b>EUT Name</b>	:	Smart LED Bulb
<b>Models No.</b>	:	TUO-A21G1-26, TUO-A21G1-27
<b>Model Different</b>	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is the lamp holder screw thread.
<b>Brand Name</b>	:	TUO
<b>Product Description</b>	Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz
	Number of Channel:	802.11b/g/n(HT20):11 channels
	RF Output Power:	802.11b:17.64dBm 802.11g: 17.74dBm 802.11n (HT20): 17.50dBm
	Antenna Gain:	3.7 dBi PCB Antenna
<b>Power Rating</b>	:	AC100-AC240/9W
<b>Software Version</b>	:	N/A
<b>Hardware Version</b>	:	N/A
<b>Connecting I/O Port(S)</b>	:	Please refer to the User's Manual
<b>Remark</b>	:	the MPE report used the EUT(20200413-08-02).

**MPE Calculations for WIFI**

**1. Antenna Gain:**

PCB Antenna: 3.7dBi.

**2. EUT Operation Condition:**

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

**3. Exposure Evaluation:**

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=(PG)/4\pi R^2$$

Where

**S:** power density

**P:** power input to the antenna

**G:** power gain of the antenna in the direction of interest relative to an isotropic radiator.

**R:** distance to the center of radiation of the antenna

**4. Test Result:**

Worst Maximum MPE Result								
Mode	N <sub>TX</sub>	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm <sup>2</sup> ) [S]
802.11b	1	2412	17.64	18±1	19	3.7	20	0.0370
		2437	17.56	18±1	19	3.7	20	0.0370
		2462	17.32	18±1	19	3.7	20	0.0370
802.11g	1	2412	17.74	18±1	19	3.7	20	0.0370
		2437	17.48	18±1	19	3.7	20	0.0370
		2462	17.23	18±1	19	3.7	20	0.0370
802.11n(HT20)	1	2412	17.50	18±1	19	3.7	20	0.0370
		2437	17.43	18±1	19	3.7	20	0.0370
		2462	17.08	18±1	19	3.7	20	0.0370

Note:

(1) N<sub>TX</sub>= Number of Transmit Antennas

(2) RF Output power specifies that Maximum Conducted Peak Output Power.

**5. Conclusion:**

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

**Limits for General Population/ Uncontrolled Exposure**

Frequency Range (MHz)	Power density (mW/ cm <sup>2</sup> )
300-1,500	F/1500
1,500-100,000	1.0

For Bluetooth:2412~2462 MHz

MPE limit S: 1mW/ cm<sup>2</sup>

The MPE is calculated as **0.0370mW / cm<sup>2</sup> < limit 1mW / cm<sup>2</sup>**. So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b).

The RF Exposure Information page from the manual is included here for reference.

**Note**

For a more detailed features description, please refer to the RF Test Report.

**6. Conclusion:**

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

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