

TEST REPORT

Product Name : PORTABLE LED BULB
Model Number : Sphere
FCC ID : 2A44S-SPHERE

Prepared for : Shenzhen Olight E-Commerce Technology Co., Ltd.
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1. TEST RESULT CERTIFICATION

Applicant : Shenzhen Olight E-Commerce Technology Co., Ltd.
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Manufacturer : Shenzhen Olight E-Commerce Technology Co., Ltd.
Address : 5th Floor, Building A2, Fuhai Information Harbor, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, 518000, China
EUT : PORTABLE LED BULB
Model Name : Sphere
Trademark : OLIGHT


Measurement Procedure Used:


APPLICABLE STANDARDS	
STANDARD	TEST RESULT
§ 15.247(i), § 2.1093, 1.1307(b)(1)	PASS

The above equipment was tested by EMTEK(DONGGUAN) CO., LTD. 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 FCC § 15.247(i), § 2.1093, 1.1307(b)(1).
The test results of this report relate only to the tested sample identified in this report

Date of Test : June 27, 2024 to August 14

Prepared by : 
Warren Deng /Editor

Reviewer : 
Galen Xiao /Supervisor

Approve & Authorized Signer : 
Sam Lv /Manager

Modified History

Version	Report No.	Revision Date	Summary
	EDG2406270030E01002R	/	Original Report



2. EUT Specification

Characteristics	Description
Product:	PORTABLE LED BULB
Model Number:	Sphere
Sample:	2#
Device Type:	BLE
Modulation:	GFSK
Operating Frequency Range(s) :	2402-2480 MHz
Number of Channels:	40 channels for BLE
Transmit Power Max:	4.45 dBm(0.002786 mW)
Antenna Gain:	0.22 dBi
Power supply:	DC4.2V from USB DC3.7V from BATTERY
Evaluation applied:	<input type="checkbox"/> MPE Evaluation <input checked="" type="checkbox"/> SAR Evaluation

3. Test Requirement:

SAR Evaluation

According to 447498 D01 V06, 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 level in excess of the Commission's guidelines.

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f_{(\text{GHz})}}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,²⁴ where

- $f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation²⁵
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval. One antenna is available for the EUT. The minimum separation distance is 5mm.

4. Measurement Result

Antenna gain:0.22 dBi

BLE

Mode	Transmit Frequency(MHz)	Mode	Measured Power (dBm)	E.I.R.P(dBm)	Tune upPower (dBm)	Max tune up power(dBm)	Calculation Result	1-g SAR
1M	2402	GFSK	4.34	4.56	4±1	5	0.9802041	3
	2441	GFSK	2.74	2.96	2±1	3	0.6234676	3
	2480	GFSK	2.41	2.63	2±1	3	0.6284284	3
2M	2404	GFSK	4.45	4.67	4±1	5	0.9802041	3
	2441	GFSK	2.82	3.04	3±1	4	0.7848992	3
	2478	GFSK	2.39	2.61	2±1	3	0.6284284	3

According to KDB 447498 D01 V06, no stand-alone required for BT antenna, and no simultaneous SAR measurement is required.

*** End of Report ***

According to KDB 447498 and §1.1307(b)(1), 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 level in excess of the Commission's guidelines.

- a) For 100 MHz to 6 GHz and *test separation distances* ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot \sqrt{f_{\text{(GHz)}}} \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR,}^{30} \text{ where}$$

- $f_{\text{(GHz)}}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation³¹
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as *numeric thresholds* in step b) below

The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

- b) For 100 MHz to 6 GHz and *test separation distances* > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):³²

- 1) $\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f_{\text{(MHz)}}/150)]\}$ mW, for 100 MHz to 1500 MHz
- 2) $\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$ mW, for > 1500 MHz and ≤ 6 GHz

- c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):³³

- 1) For *test separation distances* > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by $[1 + \log(100/f_{\text{(MHz)}})]$
- 2) For *test separation distances* ≤ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by $1/2$
- 3) SAR measurement procedures are not established below 100 MHz.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to quality for TCB approval. One antenna is available for the EUT. The minimum separation distance is 5mm.

According to ANSI C63.10-2013

9.5 Equations to calculate EIRP

Calculate the EIRP from the radiated field strength in the far field using Equation (22):

$$\text{EIRP} = E + 20\log(d) - 104.7 \quad (22)$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E is the field strength of the emission at the measurement distance, in dB μ V/m

d is the measurement distance, in m

NFC

Channel Freq.	Max Field Strength	peak output	Tune upPower	Max tune up power(dBm)	Calculation Result	1-g SAR
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(MHz)	(dBuV/m)	power (dBm)	(dBm)			
13.56	30.68	-64.4776	-65±1	-64	0.0000000035	3

According to KDB 447498, no stand-alone required for NFC antenna, and no simultaneous SAR measurement is required.

*** End of Report ***

