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Report Template Version: V03

Report Template Revision Date: Mar.1st, 2017

RF Exposure Evaluation Report

Report No. : CQASZ20180700100E-02

Applicant: Zengge Co., Limited

Address of Applicant: F13A, The Torch Building, No.284 Jin'ou Road, Jianghai District, Jiangmen City, Guangdong Province, P.R. China,

Manufacturer: Zengge Co., Limited

Address of Manufacturer: F13A, The Torch Building, No.284 Jin'ou Road, Jianghai District, Jiangmen City, Guangdong Province, P.R. China,

Equipment Under Test (EUT):

Product: Smart Led Bulb

All Model No.: ZJ-MHBI-RGBW,ZJ-MHBI-CCT, ZJ-MHBI-W,ZJ-MHBH-RGBW, ZJ-MHBH-CCT,ZJ-MHBH-W, ZJ-MHSB-A,ZJ-MHBJ-RGBW, ZJ-MHBJ-CCT,ZJ-MHBJ-W, ZJ-BTFMH-M2,ZJ-BM-AD01, ZJ-MESH-PIR-A

Test Model No.: ZJ-MHBI-RGBW

Brand Name: ZENGGE

FCC ID: 2AGGW-ZJMHA

Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06

Date of Test: 2018-08-03 to 2018-08-27

Date of Issue: 2018-08-27

Test Result : **PASS***

Tested By:

Tiny You

(Tiny You)

Reviewed By:

Aaron Ma

(Aaron Ma)

Approved By:

Jack Ai

(Jack Ai)



* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

2 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20180700100E-02	Rev.01	Initial report	2018-08-27

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4 General Information

4.1 Client Information

Applicant:	Zengge Co., Limited
Address of Applicant:	F13A, The Torch Building, No.284 Jin'ou Road, Jianghai District, Jiangmen City, Guangdong Province, P.R. China,
Manufacturer:	Zengge Co., Limited
Address of Manufacturer:	F13A, The Torch Building, No.284 Jin'ou Road, Jianghai District, Jiangmen City, Guangdong Province, P.R. China,

4.2 General Description of EUT

Product Name:	Smart Led Bulb
All Model No.:	ZJ-MHBI-RGBW,ZJ-MHBI-CCT, ZJ-MHBI-W,ZJ-MHBH-RGBW, ZJ-MHBH-CCT,ZJ-MHBH-W, ZJ-MHSB-A,ZJ-MHBJ-RGBW, ZJ-MHBJ-CCT,ZJ-MHBJ-W, ZJ-BTFMH-M2,ZJ-BM-AD01, ZJ-MESH-PIR-A
Test Model No.:	ZJ-MHBI-RGBW
Trade Mark:	ZENGGE
Hardware Version:	V2.0
Software Version:	V1.0
Sample Type:	<input type="checkbox"/> Mobile <input type="checkbox"/> Portable <input checked="" type="checkbox"/> Fix Location
Power Supply:	AC120V

4.3 General Description of BT

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V4.0
Modulation Type:	GFSK
Number of Channel:	40
Transfer Rate:	1Mbps
Test Software of EUT:	Blue test 1.0 (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	1dBi

5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

5.1.2 Test Procedure

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

5.2 1.1.3 EUT RF Exposure Evaluation

1) For BLE

Antenna Gain: 1.0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.26 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode	
Test channel	Peak Output Power (dBm)
Lowest(2402MHz)	-6.76
Middle(2441MHz)	-6.69
Highest(2480MHz)	-5.96

GFSK mode(worst case)

Channel	Frequency (MHz)	Max Conducted average Output Power (dBm)	Output Power to Antenna (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Highest	2480	-5.96	0.254	1.0	0.000063	1.0	PASS

Note: 1) Refer to report No. CQASZ20180700100E-01 for EUT test Max Conducted Peak Output Power value.

$$2) Pd = (Pout * G) / (4 * \pi * R^2) = (0.254 * 1.26) / (4 * 3.1416 * 20^2) = 0.000063$$