Shenzhen Huaxia Testing Technology Co., Ltd

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86-755-26648640
Fax: +86-755-26648637
Website: www.cqa-cert.com

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RF Exposure Evaluation Report

Report No. :	CQASZ20190100020E-01
Applicant:	Shenzhen Bright Lighting Technology Co.,Ltd
Address of Applicant:	Bldg 18 Shancheng Industrial Park Shiyan Town Baoan District,Shenzhen, Guangdong 518108
Manufacturer:	Shenzhen Bright Lighting Technology Co.,Ltd
Address of Manufacturer:	Bldg 18 Shancheng Industrial Park Shiyan Town Baoan District,Shenzhen, Guangdong 518108
Equipment Under Test (EUT):	
Product:	3D MOON LIGHT
All Model No.:	BRT-A180-1-0.7DW, BRT-A150-1-0.5DW
Test Model No.:	BRT-A180-1-0.7DW
Brand Name:	BRTLed
FCC ID:	2AQ22-BRTMOONLIGHT
Standards:	47 CFR Part 1.1307 47 CFR Part 1.1310 KDB447498D01 General RF Exposure Guidance v06
Date of Test:	2018-12-25 to 2019-01-08
Date of Issue:	2019-01-10
Test Result :	**PASS***

Tested By: Daisy Xin

(Martin Lee)

Reviewed By: Aaron Ma

(Aaron Ma)

Approved By:

(Jack Ai)

SHENZHEN HUAXIA TESTING TECHNOLOGY CO.,LTD 华夏准测 APPROVED

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

2 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20190100020E-02	Rev.01	Initial report	2019-01-10

3 Contents

4 General Information

4.1 Client Information

Applicant:	Shenzhen Bright Lighting Technology Co.,Ltd
Address of Applicant:	Bldg 18 Shancheng Industrial Park Shiyan Town Baoan District, Shenzhen, Guangdong 518108
Manufacturer:	Shenzhen Bright Lighting Technology Co.,Ltd
Address of Manufacturer:	Bldg 18 Shancheng Industrial Park Shiyan Town Baoan District, Shenzhen, Guangdong 518108

4.2 General Description of EUT

Product Name:	3D MOON LIGHT
Model No.:	BRT-A180-1-0.7DW, BRT-A150-1-0.5DW
Trade Mark:	BRTLed
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2472MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 13 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20) : OFDM (64QAM, 16QAM,QPSK,BPSK)
Transfer Rate:	IEEE for 802.11b: 1Mbps/2Mbps/5.5Mbps/11Mbps IEEE for 802.11g : 6Mbps/9Mbps/12Mbps/18Mbps/24Mbps/36Mbps/48Mbps/54Mbps IEEE for 802.11n(HT20) : 6.5Mbps/13Mbps/19.5Mbps/26Mbps/39Mbps/52Mbps/58.5Mbps/65Mbps
Antenna Type:	PCB antenna
Antenna Gain:	3.23dBi
Power Supply:	DC 3.7V from battery

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: $Pd = (Pout*G)/(4* Pi * R^2)$

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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

Pd id 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

Antenna Gain: 3.23dBi
Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.1 in linear scale.
Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

802.11b				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	11.73	11±1	12	15.849
Middle(2442MHz)	11.66	11±1	12	15.849
Highest(2472MHz)	10.71	11±1	12	15.849
802.11g				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	10.07	10±1	11	12.589
Middle(2442MHz)	9.89	10±1	11	12.589
Highest(2472MHz)	9.64	10±1	11	12.589
802.11n(HT20)				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	9.15	9±1	10	10
Middle(2442MHz)	9.17	9±1	10	10
Highest(2472MHz)	9.39	9±1	10	10

The worst case:

Maximum tune-up Power (mW)	**Antenna Gain (dBi)**	**Power Density at R = 20 cm (mW/cm^2)**	**Limit**	**Result**
15.849	3.23	0.007	1.0	PASS

Note: 1) Refer to report No. CQASZ20190100020E-01 for EUT test Max Conducted Peak Output Power value.
2) $Pd = (Pout*G)/(4* Pi * R^2)=(15.849*2.1)/(4*3.1416*20^2)=0.007$