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RF Exposure Evaluation Report

Report No. : CQASZ20190500021EX-02

Applicant: Shenzhen BANQ Technology Co.,Ltd

Address of Applicant: Block No.1, 3rd Industrial Zone, Shiyan Town, Bao'an District, ShenZhen, China

Manufacturer: Shenzhen BANQ Technology Co.,Ltd

Address of Manufacturer: Block No.1, 3rd Industrial Zone, Shiyan Town, Bao'an District, ShenZhen, China

Equipment Under Test (EUT):

Product: LED Lamps

All Models: WZ-SWQT01-07-001, WZ-SWQT01-09-001

Test Model No.: WZ-SWQT01-07-001

Brand Name: N/A

FCC ID: 2ATGN-SWQ0107

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

Date of Test: May 17, 2019 to Jun. 21, 2019

Date of Issue: Jun. 21, 2019

Test Result : PASS*

Tested By:

Daisy Nim

(Martin Lee)

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
CQASZ20190500021EX-02	Rev.01	Initial report	Jun. 21, 2019

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4 General Information

4.1 Client Information

Applicant:	Shenzhen BANQ Technology Co.,Ltd
Address of Applicant:	Block No.1, 3rd Industrial Zone, Shiyan Town, Bao'an District, ShenZhen, China
Manufacturer:	Shenzhen BANQ Technology Co.,Ltd
Address of Manufacturer:	Block No.1, 3rd Industrial Zone, Shiyan Town, Bao'an District, ShenZhen, China

4.2 General Description of EUT

Product Name:	LED Lamps
All Models:	WZ-SWQT01-07-001, WZ-SWQT01-09-001
Test Model No.:	WZ-SWQT01-07-001
Trade Mark:	N/A
Hardware version:	V1.0
Software version:	V2.2.3
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM IEEE for 802.11n(HT20): OFDM
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Test Software of EUT:	RF test (manufacturer declare)
Antenna Type	PCB Antenna
Antenna Gain	0dBi
Power Supply:	AC 120V 50/60Hz

Note: Please refer to the instruction manual for details.

All model: WZ-SWQT01-07-001, WZ-SWQT01-09-001, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name, the model WZ-SWQT01-07-001 was the worst case model,

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 WIFI

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.0 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)	16.318	16.5	16.5	44.668
Middle(2437MHz)	14.096	14.5	15	31.623
Highest(2462MHz)	14.842	15.0	15	31.623
802.11g				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	11.089	11.5	12	15.849
Middle(2437MHz)	11.403	11.5	12	15.849
Highest(2462MHz)	11.752	12.0	12	15.849
802.11n(HT20)				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	9.265	9.5	9.5	8.913
Middle(2437MHz)	8.347	8.5	9	7.943
Highest(2462MHz)	8.327	8.5	9	7.943

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
44.668	0	0.0089	1.0	PASS

Note: 1) Refer to report No. CQASZ20190600021EX-01 for EUT test Max Conducted Peak Output Power value.

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (44.668 * 1.0) / (4 * 3.1416 * 20^2) = 0.0089$$