



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. : CQASZ20180900011E-02

Applicant: ShenZhen YueKe Technology Co.,LTD

Address of Applicant: 12C, block C, NEO Enterprise Building No. 6009 Shennan Avenue, Futian District, Shenzhen, China

Manufacturer: ShenZhen YueKe Technology Co.,LTD

Address of Manufacturer: 12C, block C, NEO Enterprise Building No. 6009 Shennan Avenue, Futian District, Shenzhen, China

Equipment Under Test (EUT):

Product: Smart Ambient Light

Model No.: YSHL0101, YSHL0102, YSHL0103, YSHL0104, YSHL0105, YSHL0106, YSHL0107, YSHL0108, YSHL0201, YSHL0202, YSHL0203, YSHL0204, YSHL0205, YSHL0206, YSHL0207, YSHL0208

Test Model No.: YSHL0102

Brand Name: YOCTOP

FCC ID: 2ANSG-YSHL01

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

Date of Test: 2018-09-07 to 2018-09-14

Date of Issue: 2018-09-14

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.

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20180900011E-02	Rev.01	Initial report	2018-09-14

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3 General Information

3.1 Client Information

Applicant:	ShenZhen YueKe Technology Co.,LTD
Address of Applicant:	12C, block C, NEO Enterprise Building No. 6009 Shennan Avenue, Futian District, Shenzhen, China
Manufacturer:	ShenZhen YueKe Technology Co.,LTD
Address of Manufacturer:	12C, block C, NEO Enterprise Building No. 6009 Shennan Avenue, Futian District, Shenzhen, China

3.2 General Description of EUT

Product Name:	Smart Ambient Light
Model No.:	YSHL0101, YSHL0102, YSHL0103, YSHL0104, YSHL0105, YSHL0106, YSHL0107, YSHL0108, YSHL0201, YSHL0202, YSHL0203, YSHL0204, YSHL0205, YSHL0206, YSHL0207, YSHL0208
Test Model No.:	YSHL0102
Trade Mark:	YOCTOP
Hardware Version:	V1.0
Software Version:	V1.0
Sample Type:	☒ Mobile ☐ Portable ☐ Fix Location
Power Supply:	DC3.6V, 1200mAh; Charge by USB: DC 5V

3.3 General Description of WIFI

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(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Test Software of EUT:	RF test (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	2.5dBi

Note:

1. All model: YSHL0101, YSHL0102, YSHL0103, YSHL0104, YSHL0105, YSHL0106, YSHL0107, YSHL0108, YSHL0201, YSHL0202, YSHL0203, YSHL0204, YSHL0205, YSHL0206, YSHL0207, YSHL0208
2. Only the model YSHL0102 was tested, Their electrical circuit design, layout, components used and internal wiring are identical, Only the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being outer housing of appearance and model name.

4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 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.

4.1.2 Test Procedure

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

4.2 1.1.3 EUT RF Exposure Evaluation

1) For WIFI

Antenna Gain: 2.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.78 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

802.11b mode	
Test channel	Average Output Power (dBm)
Lowest(2412MHz)	14.61
Middle(2437MHz)	14.03
Highest(2462MHz)	12.88
802.11g mode	
Test channel	Average Output Power (dBm)
Lowest(2412MHz)	11.43
Middle(2437MHz)	10.8
Highest(2462MHz)	10.44
802.11n(HT20)mode	
Test channel	Average Output Power (dBm)
Lowest(2412MHz)	11.30
Middle(2437MHz)	10.52
Highest(2462MHz)	10.30

802.11b(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
Lowest	2412	14.61	28.907	2.5	0.01023	1.0	PASS

Note: 1) Refer to report No. CQASZ20180900011E-01 for EUT test Max Conducted average Output Power value.

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (28.907 * 1.78) / (4 * 3.1416 * 20^2) = 0.01023$$