



FCC

TEST REPORT

Prepared for :

Changzhou Chaoyisheng Lighting Technology Co., Ltd
13 Zhensheng Road, Lijia Town, Wujin District, Changzhou City, Jiangsu,
China

FCC ID: 2AYAU-CYS103

Product: Ultraviolet disinfection lamp

Trade Name: N/A

Model Name: CYS-103 , CYS-101, CYS-102, CYS-104,
CYS-105, CYS-106

Date of Test: Sep. 18, 2020~Dec. 16, 2020

Date of Report: Dec. 16, 2020

Report Number: HK2009183362-E

Prepared By :

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TEST REPORT VERIFICATION

Applicant : Changzhou Chaoyisheng Lighting Technology Co., Ltd
Address : 13 Zhensheng Road, Lijia Town, Wujin District, Changzhou City, Jiangsu, China
Manufacturer : Changzhou Chaoyisheng Lighting Technology Co., Ltd
Address : 13 Zhensheng Road, Lijia Town, Wujin District, Changzhou City, Jiangsu, China
EUT Description : Ultraviolet disinfection lamp
(A) Model No. : CYS-103
(B) Serial Model : CYS-101, CYS-102, CYS-104, CYS-105, CYS-106
(C) Power Supply : AC 120V, 60Hz

Standards..... FCC Part 15 Subpart B
ANSI C63.4:2014

This device described above has been tested by HUAKE, and the test results show that the equipment under test (EUT) is in compliance with Part 15 of FCC Rules. And it is applicable only to the tested sample identified in the report.

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Test Result..... **Pass**

Date of Test: Sep. 18, 2020~Dec. 16, 2020

Testing Engineer: 
(Gary Qian)

Technical Manager: 
(Eden Hu)

Authorized Signatory: 
(Jason Zhou)



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**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Dec. 16, 2020	Jason Zhou



1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part 15 Subpart B ANSI C63.4:2014	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report
- (2) For client's request and manual description, the test will not be executed.



1.1 TEST FACILITY

Shenzhen HUAK Testing Technology Co., Ltd.

Add. : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, China

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
C01	ANSI	150 KHz ~ 30MHz	$\pm 2.71\text{dB}$	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
A01	ANSI	30MHz ~ 1000MHz	$\pm 3.90\text{dB}$	



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Ultraviolet disinfection lamp	
Model Name	CYS-103	
Serial Model	CYS-101, CYS-102, CYS-104, CYS-105, CYS-106	
Model Difference	All model's the function, software and electric circuit are the same, only with a product model named different. Test sample model: CYS-103.	
Product Description	The EUT is a Ultraviolet disinfection lamp.	
	Operating frequency:	315MHz
	Connecting I/O port:	N/A
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Power Source	AC 120V, 60Hz	
Power Rating	AC 120V, 60Hz	



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Running

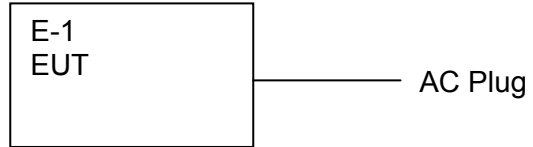
For Conducted Test	
Final Test Mode	Description
Mode 1	Running

For Radiated Test	
Final Test Mode	Description
Mode 1	Running



2.3 DESCRIPTION OF TEST SETUP

Mode 1:





2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Ultraviolet disinfection lamp	N/A	CYS-103	/	EUT
				/	

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.



2.5 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Jun. 18, 2020	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Jun. 18, 2020	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Jun. 18, 2020	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Jun. 18, 2020	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Jun. 18, 2020	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Jun. 18, 2020	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Jun. 18, 2020	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Jun. 18, 2020	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Jun. 18, 2020	1 Year
10.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Jun. 18, 2020	1 Year
11.	Pre-amplifier	EMCI	EMC05184 5SE	HKE-015	Jun. 18, 2020	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Jun. 18, 2020	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Jun. 18, 2020	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Jun. 18, 2020	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Jun. 18, 2020	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Jun. 18, 2020	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Jun. 18, 2020	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Jun. 18, 2020	1 Year



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

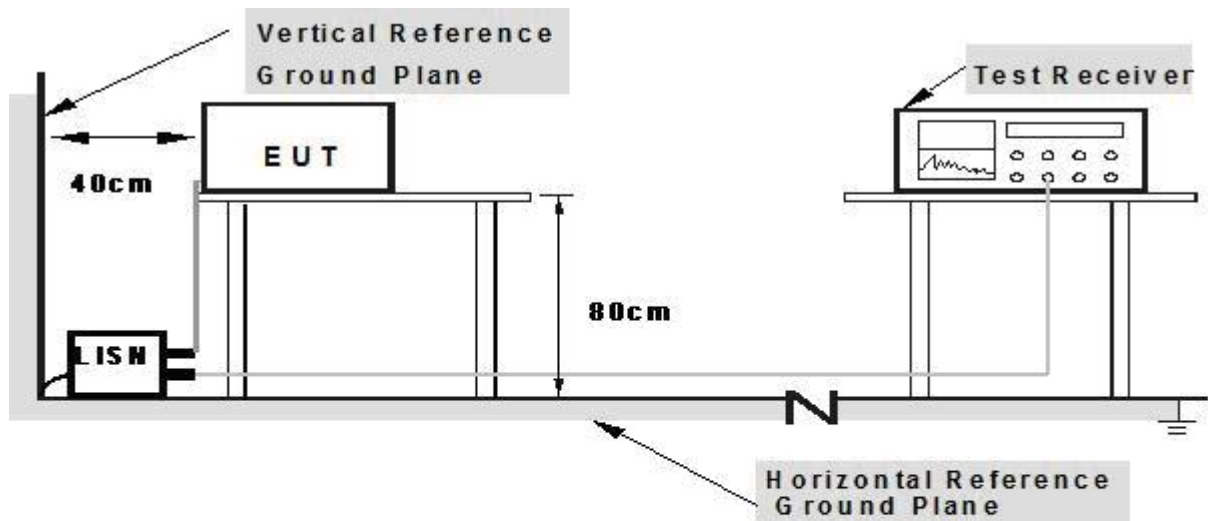
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

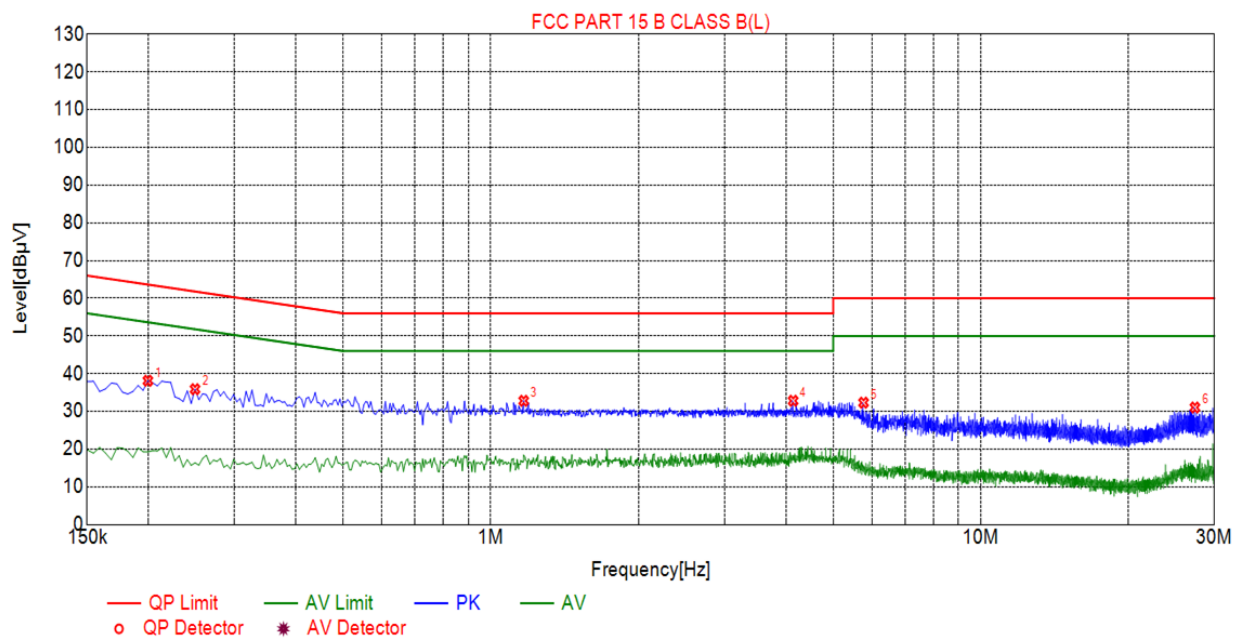


3.1.5 TEST RESULTS

Note:

All the test modes completed for test. only the worst result of was reported.
as below:

EUT :	Ultraviolet disinfection lamp	Model Name. :	CYS-103
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2020-09-21
Test Mode :	Running	Phase :	L
Test Voltage :	AC 120V, 60Hz		



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1995	38.12	20.03	63.65	25.53	18.09	PK	L
2	0.2490	35.89	20.04	61.82	25.93	15.85	PK	L
3	1.1670	32.81	20.09	56.00	23.19	12.72	PK	L
4	4.1415	32.82	20.25	56.00	23.18	12.57	PK	L
5	5.7660	32.31	20.24	60.00	27.69	12.07	PK	L
6	27.3750	31.03	20.26	60.00	28.97	10.77	PK	L

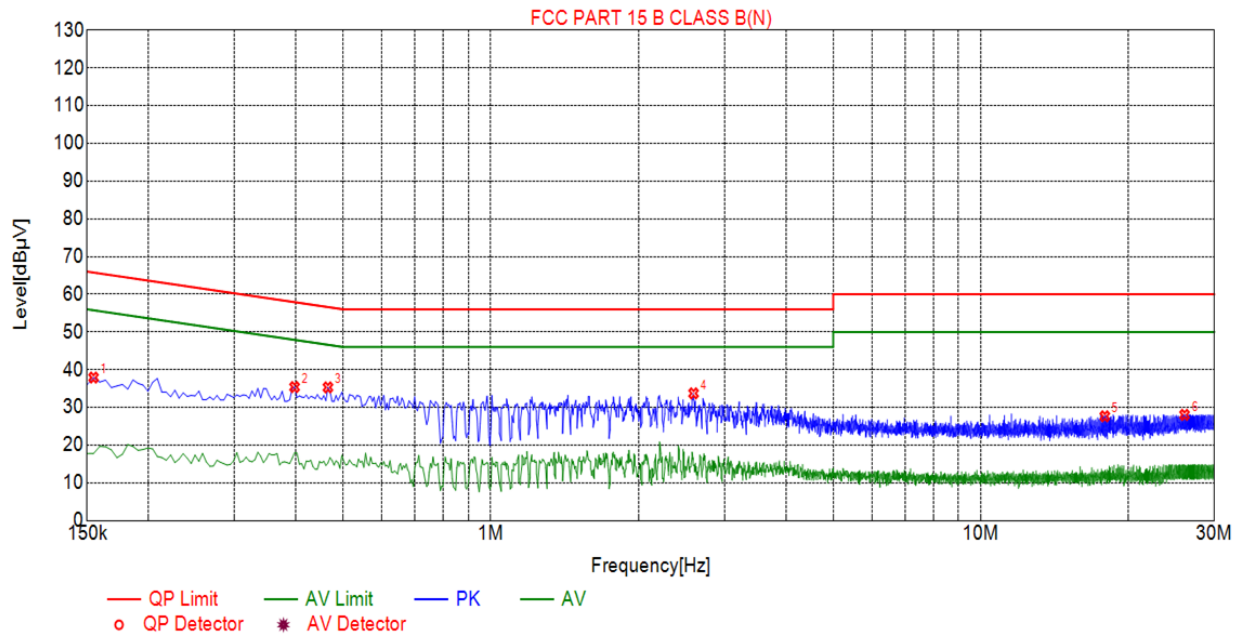
Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



EUT :	Ultraviolet disinfection lamp	Model Name. :	CYS-103
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2020-09-21
Test Mode :	Running	Phase :	N
Test Voltage :	AC 120V, 60Hz		



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1545	37.92	20.03	65.81	27.89	17.89	PK	N
2	0.3975	35.40	20.04	57.96	22.56	15.36	PK	N
3	0.4650	35.31	20.04	56.67	21.36	15.27	PK	N
4	2.5935	33.72	20.20	56.00	22.28	13.52	PK	N
5	17.9205	27.64	20.03	60.00	32.36	9.12	PK	N
6	26.0700	28.04	20.26	60.00	31.96	7.78	PK	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Notes:

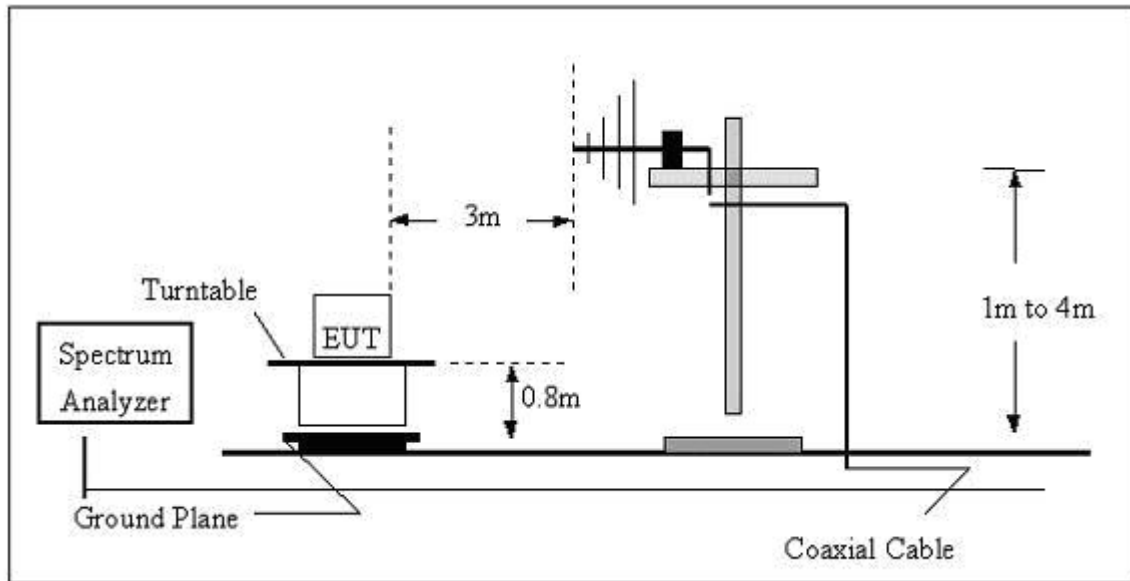
- (1) The limit for radiated test was performed according to as following:
FCC PART 15B /ICES-003.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

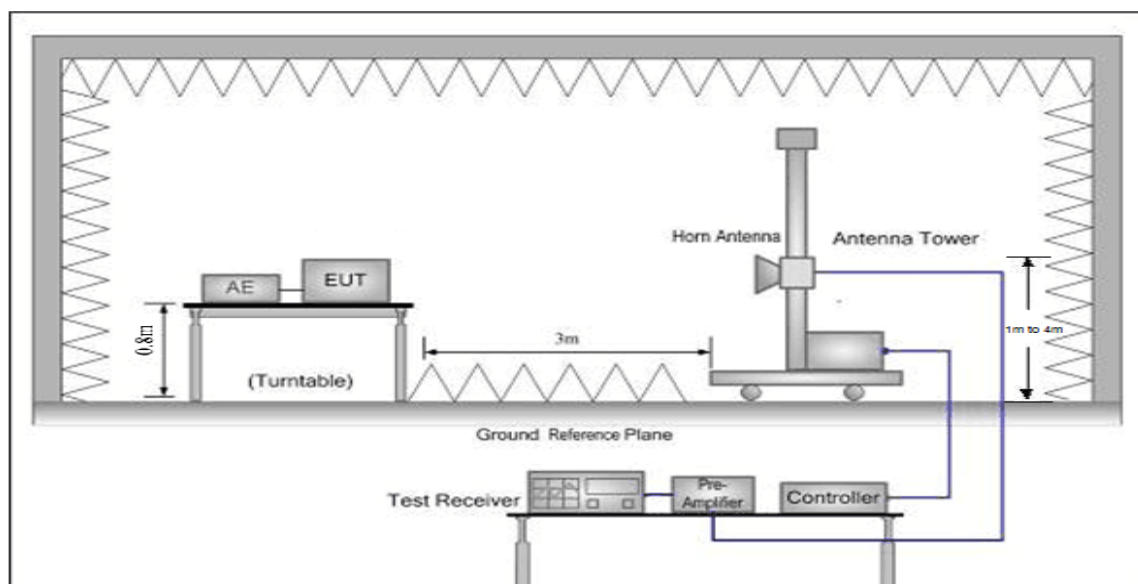
- a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

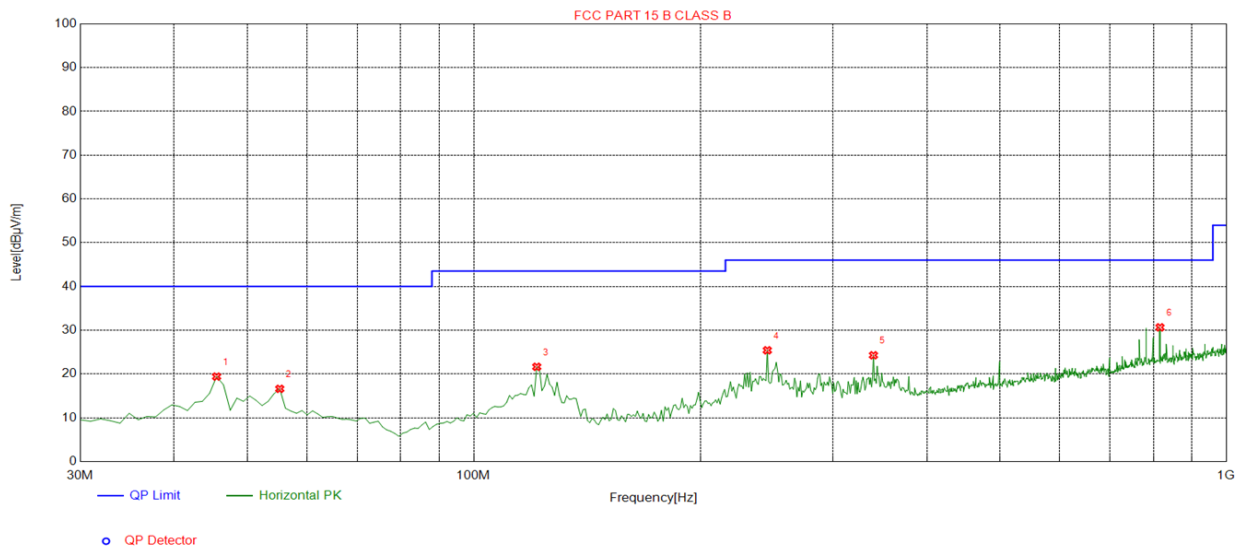


3.2.5 TEST RESULTS

Note:

All the test modes completed for test. only the worst result of was reported.
as below:

EUT :	Ultraviolet disinfection lamp	Model Name :	CYS-103
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2020-09-21
Test Mode :	Running	Polarization :	Horizontal
Test Power :	AC 120V, 60Hz		

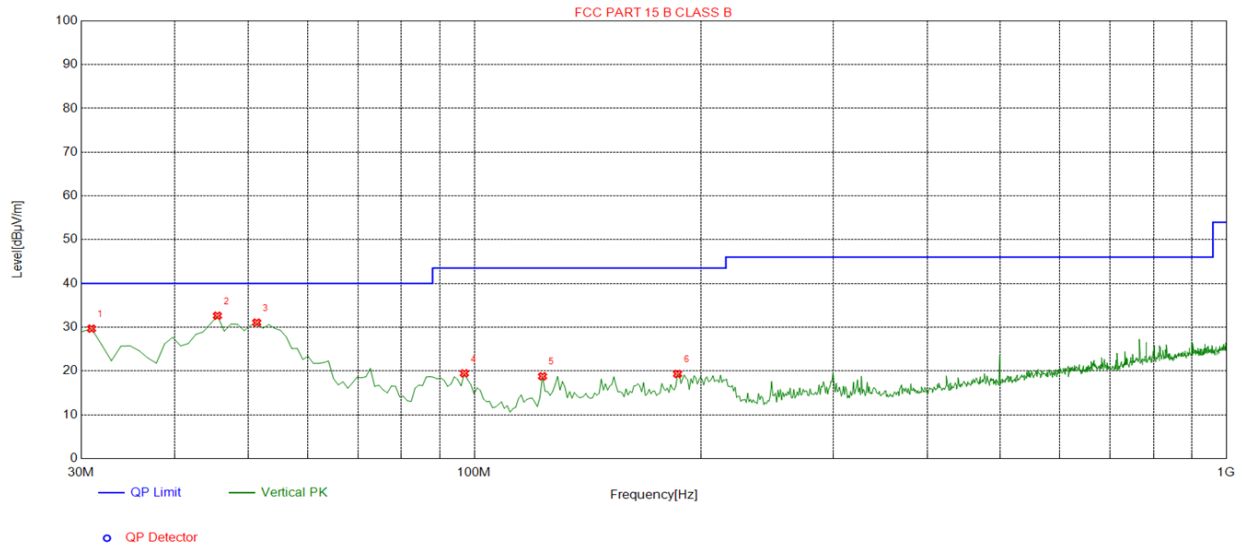


Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	45.5355	-13.65	33.05	19.40	40.00	20.60	100	287	Horizontal
2	55.2452	-14.44	31.04	16.60	40.00	23.40	100	324	Horizontal
3	121.2713	-17.29	38.93	21.64	43.50	21.86	100	41	Horizontal
4	245.5556	-13.60	39.01	25.41	46.00	20.59	100	41	Horizontal
5	339.7397	-11.64	35.91	24.27	46.00	21.73	100	63	Horizontal
6	816.4865	-2.79	33.44	30.65	46.00	15.35	100	356	Horizontal

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



EUT :	Ultraviolet disinfection lamp	Model Name :	CYS-103
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2020-09-21
Test Mode :	Running	Polarization :	Vertical
Test Power :	AC 120V, 60Hz		

**Suspected List**

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.9710	-16.30	45.97	29.67	40.00	10.33	100	146	Vertical
2	45.5355	-13.65	46.27	32.62	40.00	7.38	100	50	Vertical
3	51.3614	-13.86	44.91	31.05	40.00	8.95	100	185	Vertical
4	96.9970	-15.90	35.35	19.45	43.50	24.05	100	169	Vertical
5	123.2132	-17.57	36.35	18.78	43.50	24.72	100	300	Vertical
6	186.3263	-16.32	35.64	19.32	43.50	24.18	100	18	Vertical

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



3.2.6 TEST RESULTS(Above 1GHz)

EUT :	Ultraviolet disinfection lamp	Model Name :	CYS-103
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2020-09-24
Test Mode :	Running		
Test Power :	AC 120V, 60Hz		

Polarization : Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1221.79	57.32	-11.37	45.95	74	-28.05	peak
1872.63	57.48	-15.38	42.1	74	-31.9	peak
2568.33	56.4	-8.62	47.78	74	-26.22	peak
3830.02	57.64	-6.17	51.47	74	-22.53	peak
4758.77	55.44	-4.52	50.92	74	-23.08	peak
4957.62	56.48	-5.64	50.84	74	-23.16	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Polarization : Vertical

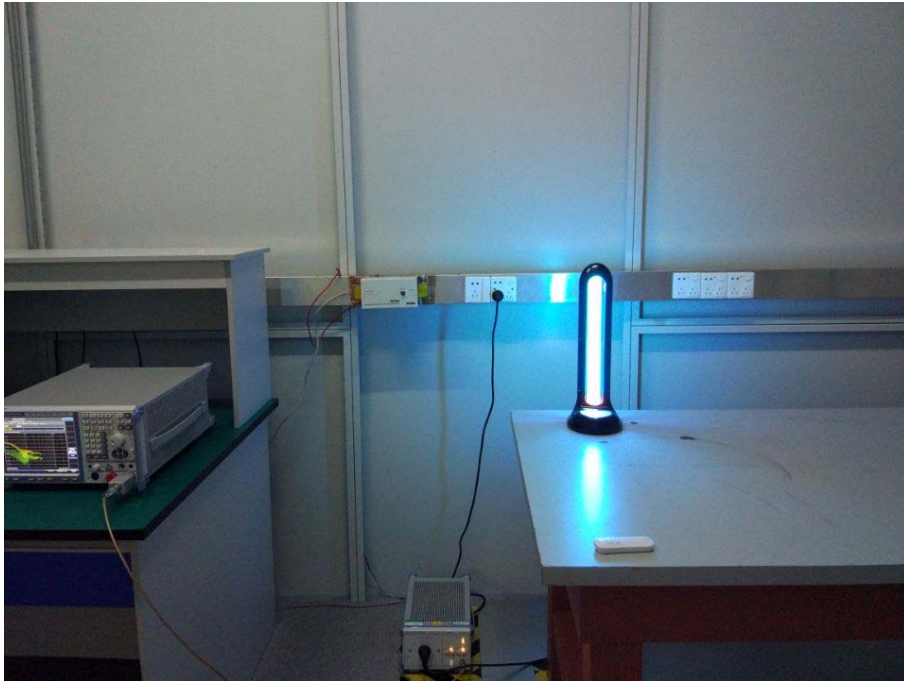
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1162.23	57.37	-12.37	45	74	-29	peak
1208.29	56.43	-10.25	46.18	74	-27.82	peak
2756.44	57.53	-8.49	49.04	74	-24.96	peak
3249.25	58.8	-5.24	53.56	74	-20.44	peak
4918.76	55.56	-5.66	49.9	74	-24.1	peak
5946.87	57.2	-6.93	50.27	74	-23.73	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Remark :

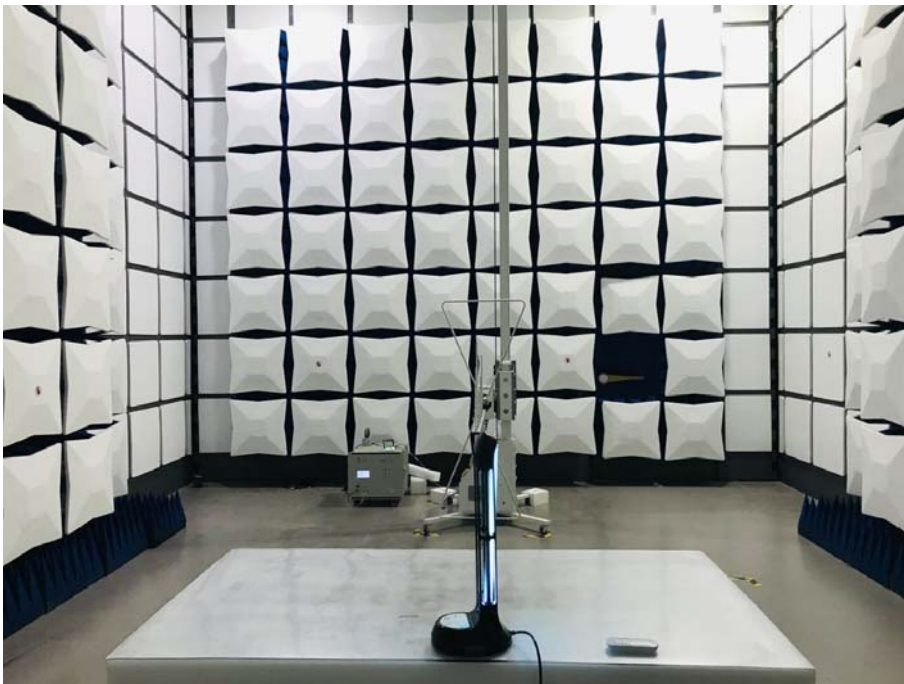
- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) The emissions are attenuated more than 20dB below the permissible limits are not recorded in the report.
- (3) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
- (4) All modes of operation were investigated and the worst-case emissions are reported.

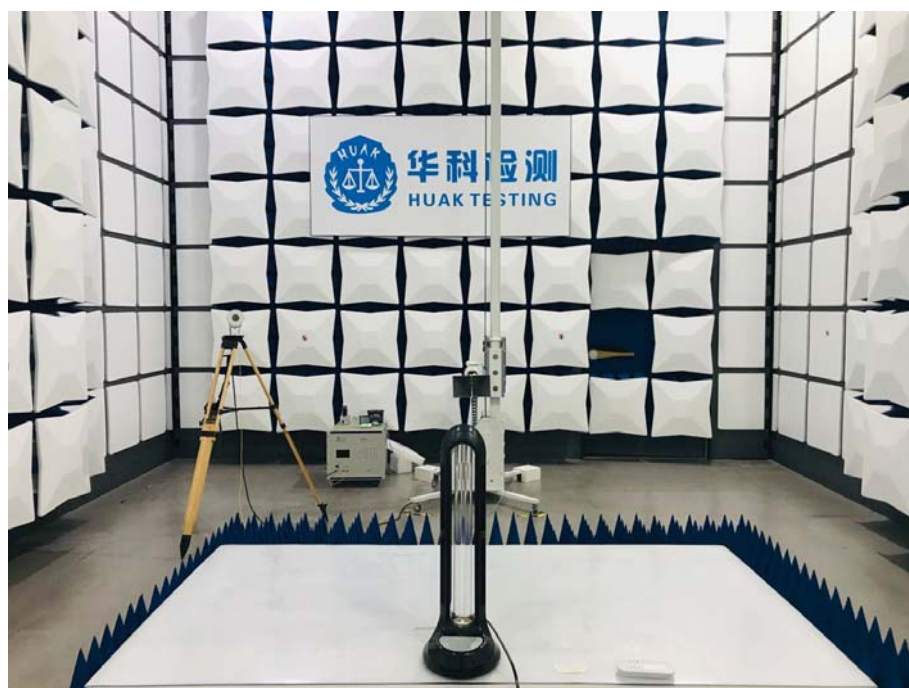
4. EUT TEST PHOTO

Conducted Emission



Radiated Emission





ATTACHMENT PHOTOGRAPHS OF EUT
Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7

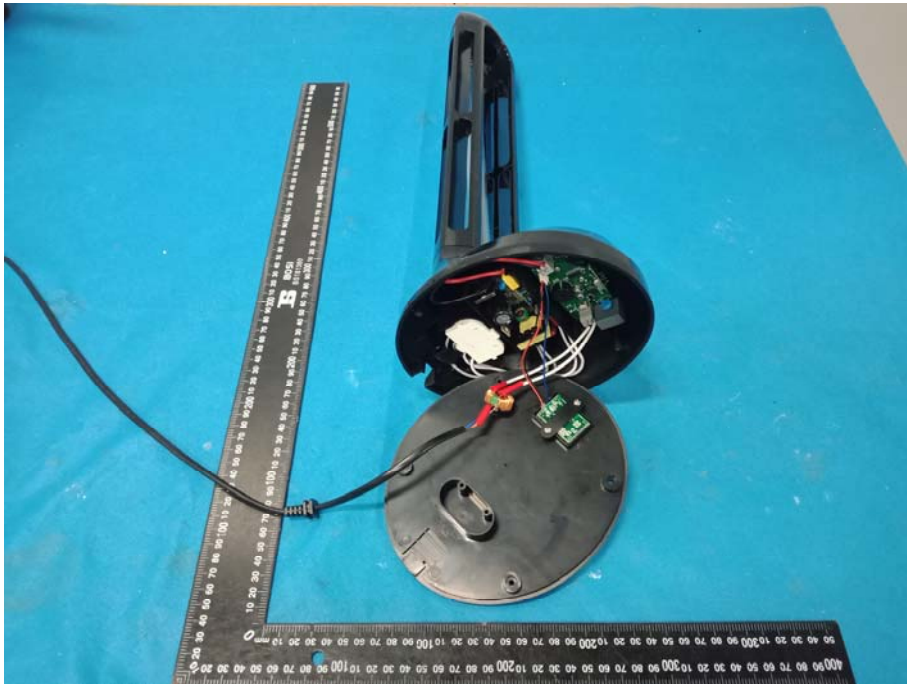


Photo 8

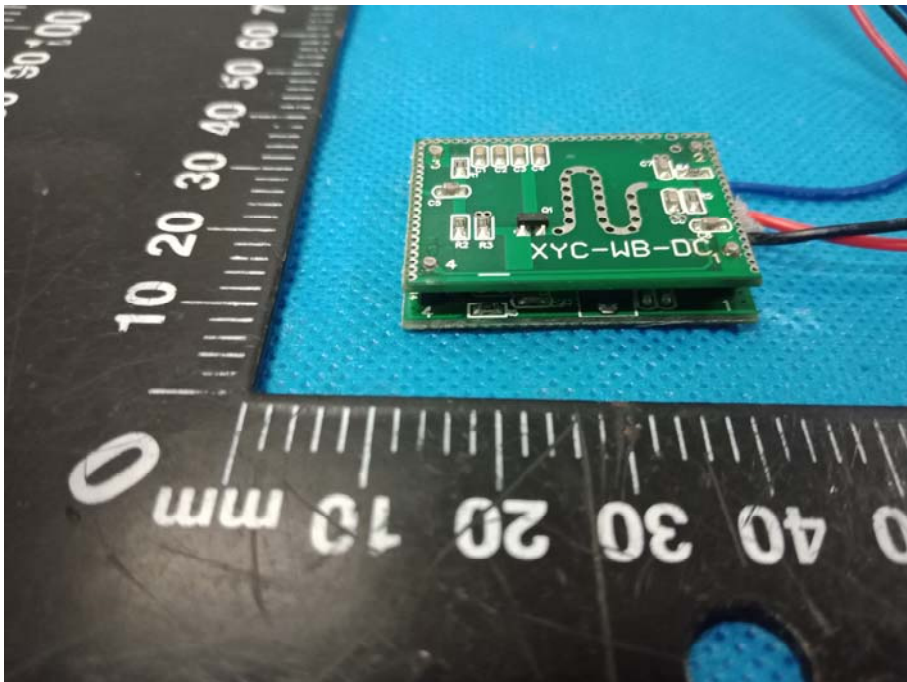




Photo 9

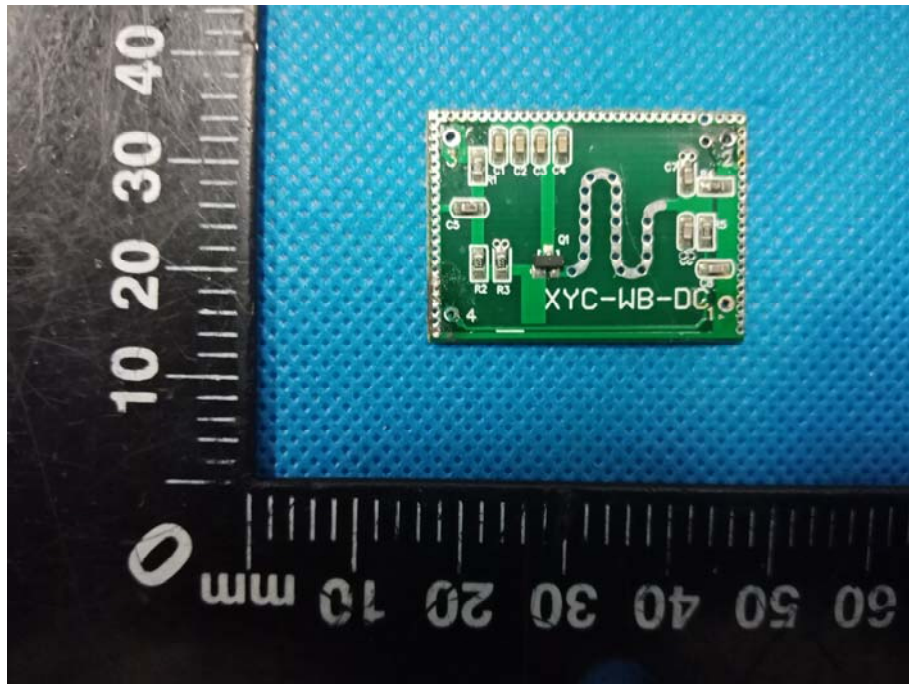


Photo 10

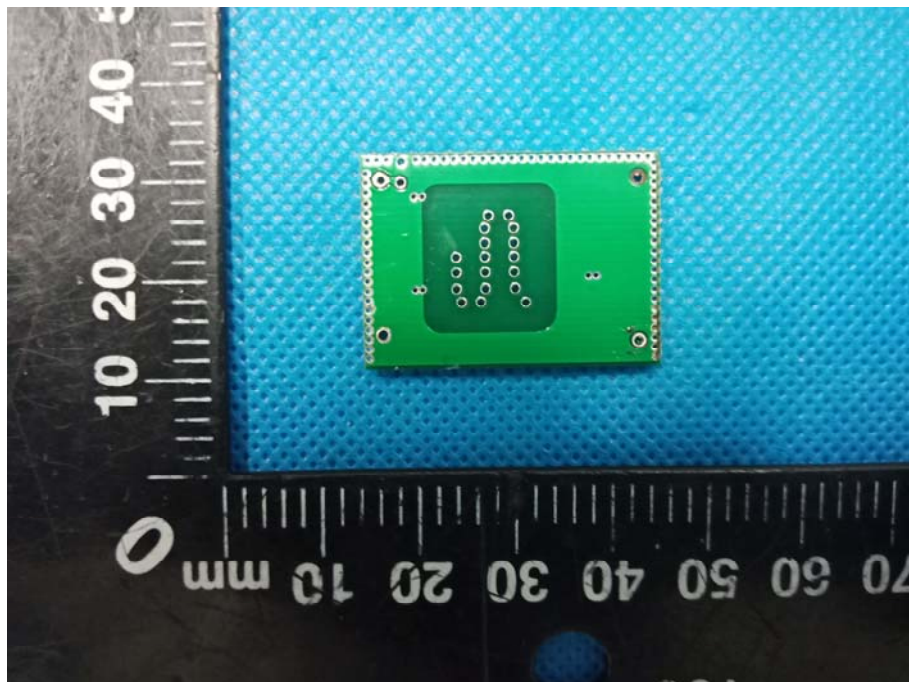


Photo 11

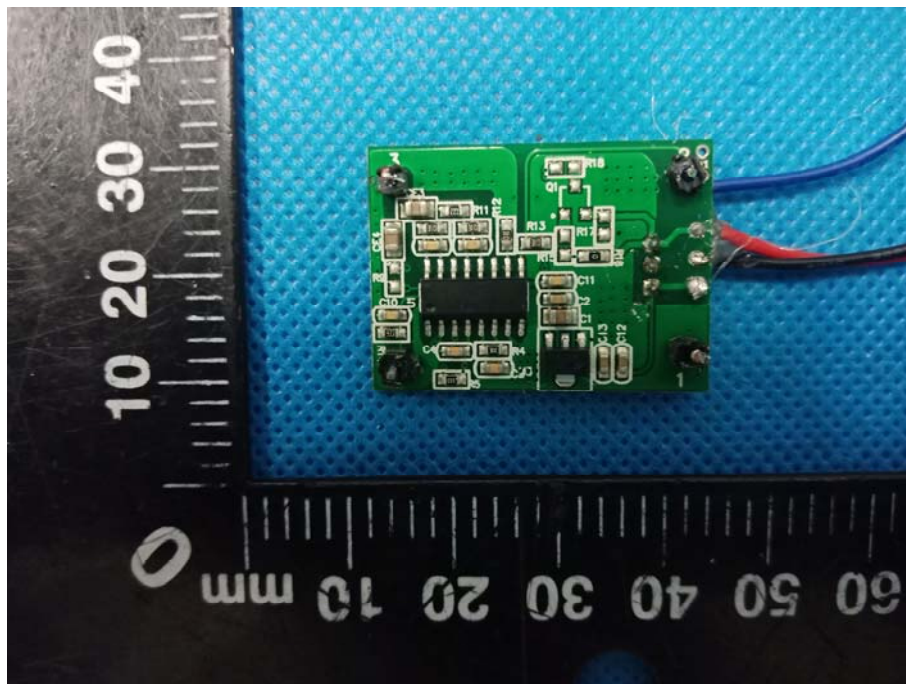


Photo 12

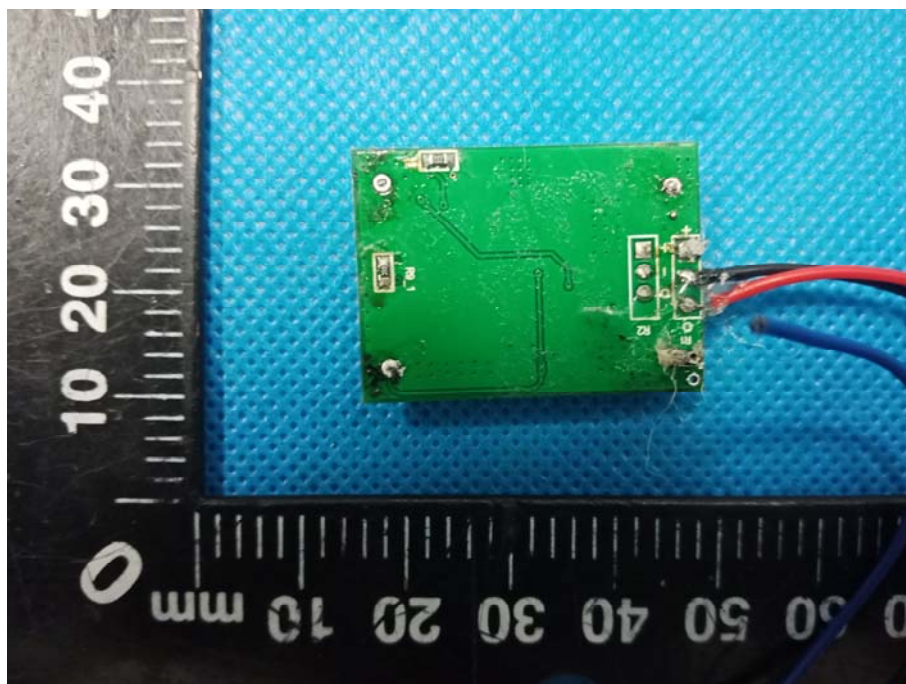


Photo 13

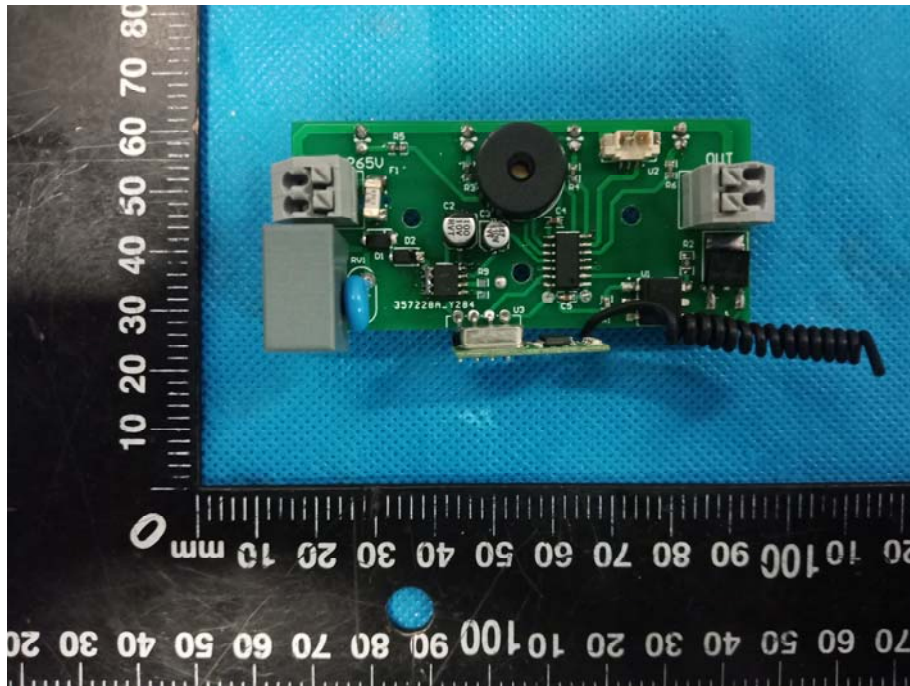


Photo 14

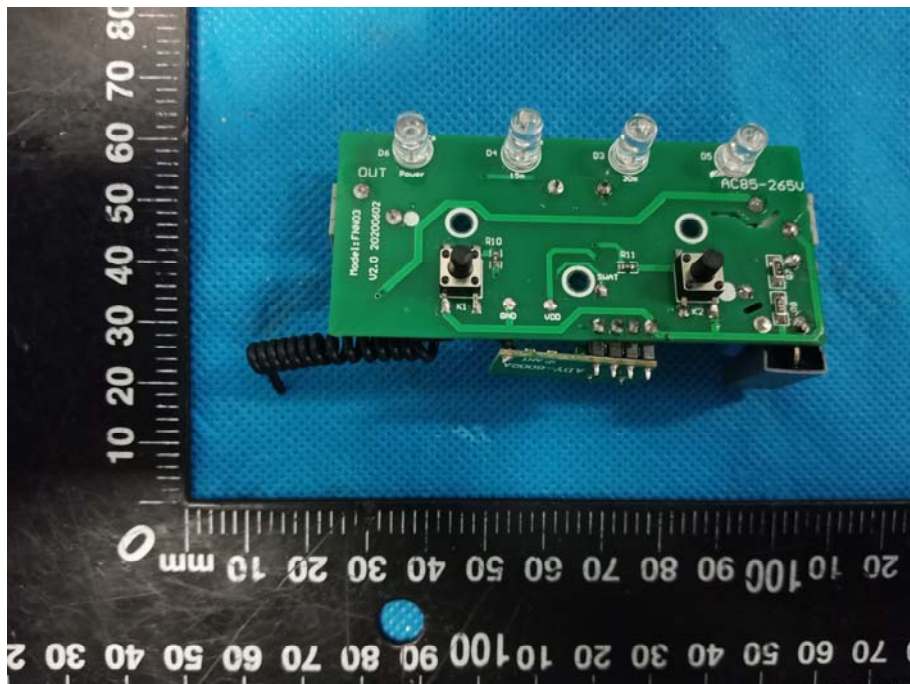


Photo 15

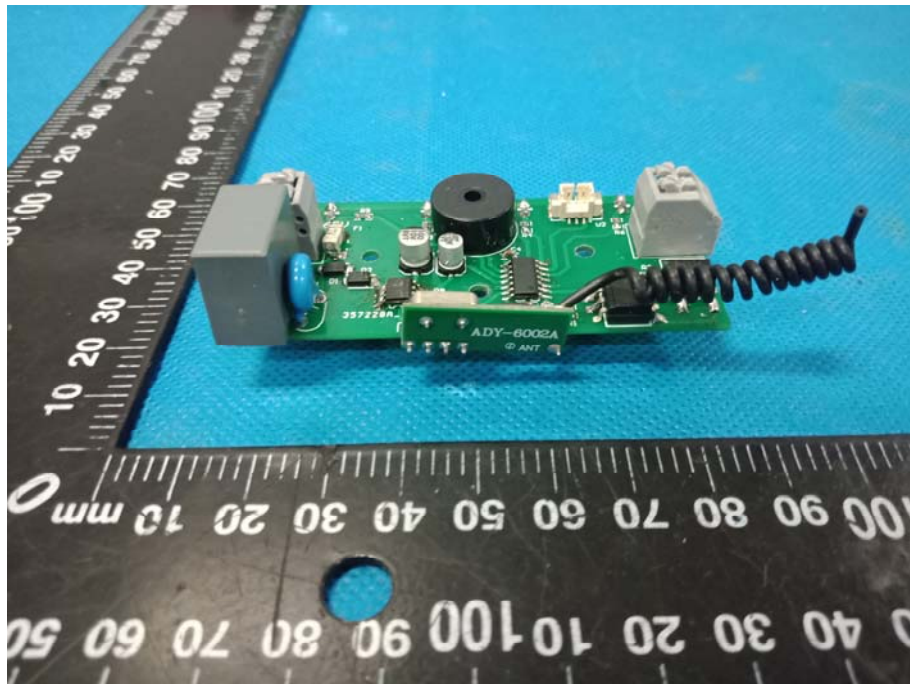


Photo 16



Photo 17

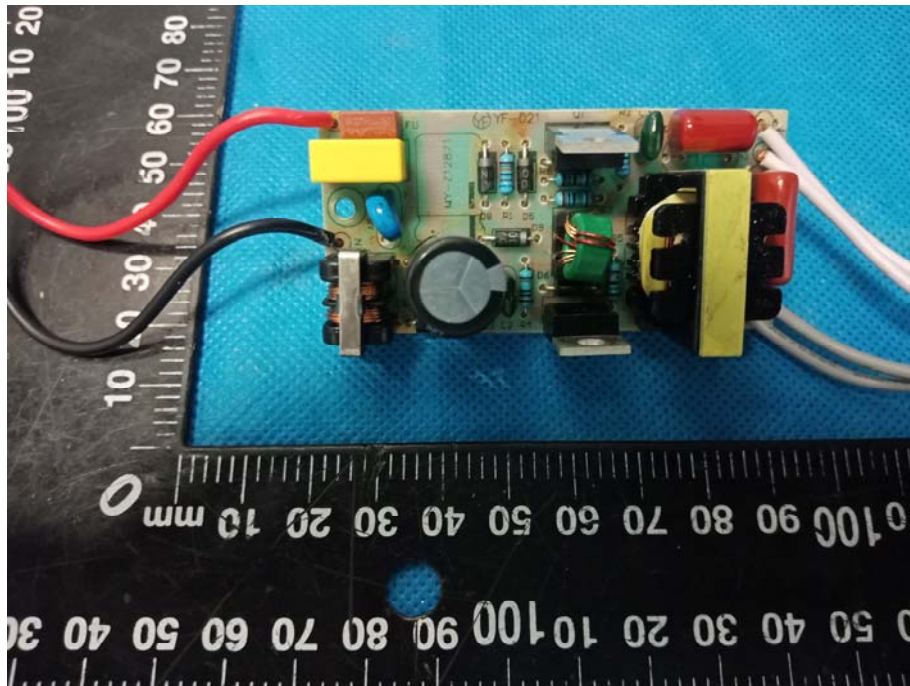
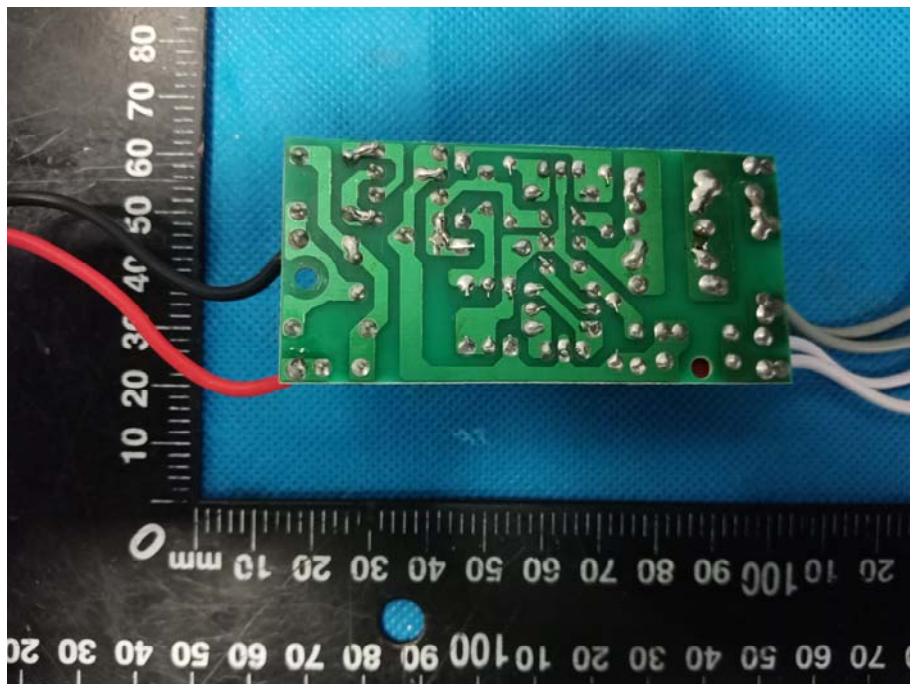


Photo 18



.....End of Report.....