FCC REPORT

Applicant:	SKY RICH STAR LIMITED
Address of Applicant:	Unit E, 10/F, Worldwide Centre, 123 Tung Chau Street, Tai Kok Tsui Kowloon, Hong Kong
Manufacturer/Factory:	ZhongshanQuanxin Lighting Electrical Co., Ltd.
Address of Manufacturer/Factory:	Hong Ji Street, Shalang, Long Ping Cun, West District, ZHONGSHAN Guangdong 528411 China

Equipment Under Test (EUT)

Product Name:	LED WALL LAMP
Model No.:	A04HB013C-HG, A04HB013*-**（Where "*" is used to denote letters or blank for commercial purpose.)
FCC ID:	2AP2LA04HB013C
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of sample receipt:	February 19, 2019
Date of Test:	February 20, 2019-March 06, 2019
Date of report issued:	March 07, 2019
Test Result :	PASS *

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

Authorized Signature:

Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*March 07, 2019*	*Original*

Prepared By:	***Project Engineer***	***Date:***	*March 07, 2019*
Check By:	***Reviewer***	***Date:***	*March 07, 2019*

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	N/A
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.209 15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

Remark: Test according to ANSI C63.10: 2013.

Pass: The EUT complies with the essential requirements in the standard.

N/A: Not applicable

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	LED WALL LAMP
Model No.:	A04HB013C-HG, A04HB013*-**（Where “*” is used to denote letters or blank for commercial purpose.)
Test Model No:	A04HB013C-HG
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is model name for commercial purpose.	
Serial No.:	QXA04HB
Hardware version:	V1.5
Software version:	V1.0
Test sample(s) ID:	GTS201902000031-1
Sample(s) Status	Engineered sample
Operation Frequency:	2440MHz
Channel numbers:	1
Modulation type:	GFSK
Antenna Type:	PCB Antenna
Antenna gain:	1.0dBi(declare by applicant)
Power supply:	DC 4.5V (3 x 1.5V“AA” Size battery)

Operation Frequency each of channel	
Channel	Frequency
1	2440MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: New battery is used during all test	

Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	95.68	104.84	100.25

5.3 Description of Support Units

None.

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 20 2018	Oct. 19 2019
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 20 2018	Oct. 19 2019
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 20 2018	Oct. 19 2019
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 27 2018	June. 26 2019

RF Conducted Test:

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 27 2018	June. 26 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 27 2018	June. 26 2019
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 27 2018	June. 26 2019
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 27 2018	June. 26 2019
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 27 2018	June. 26 2019
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 27 2018	June. 26 2019
8	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
9	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 27 2018	June. 26 2019

General used equipment:

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

Conducted:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 27 2018	June. 26 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 27 2018	June. 26 2019
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 27 2018	June. 26 2019
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 27 2018	June. 26 2019
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 27 2018	June. 26 2019
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 27 2018	June. 26 2019
8	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
9	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 27 2018	June. 26 2019

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	ChangChun	DYM3	GTS257	June 27 2018	June 26 2019

7 Test results and Measurement Data

7.1 Antenna requirement

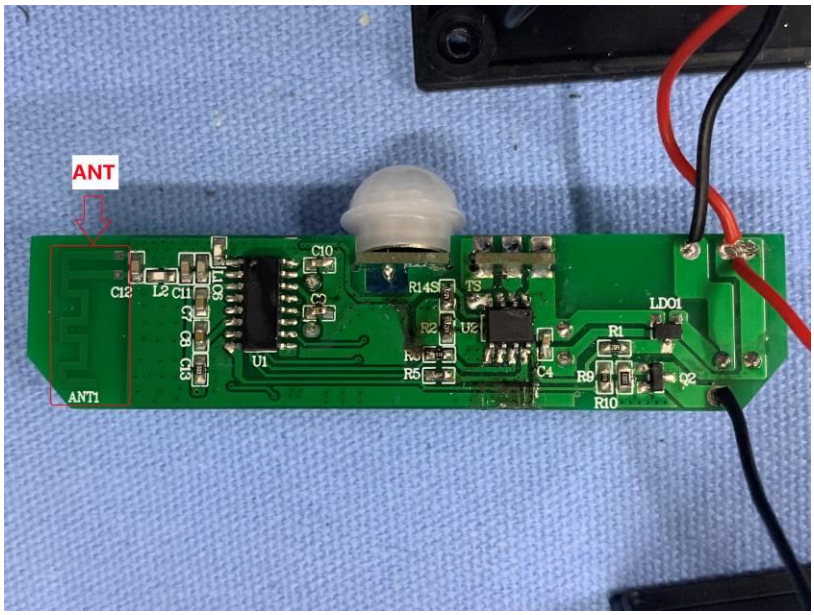
Standard requirement:	FCC Part15 C Section 15.203

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is PCB antenna, the best case gain of the antenna is 1.0 dBi



7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Remark
9kHz-150kHz	PK,AV,QP	200Hz	300Hz	PK,AV,QP
150kHz-30MHz	PK,AV,QP	9kHz	10kHz	PK,AV,QP
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

Limit: (Field strength of the fundamental signal)

Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.00	Average Value
	114.00	Peak Value

Limit: (Spurious Emissions)

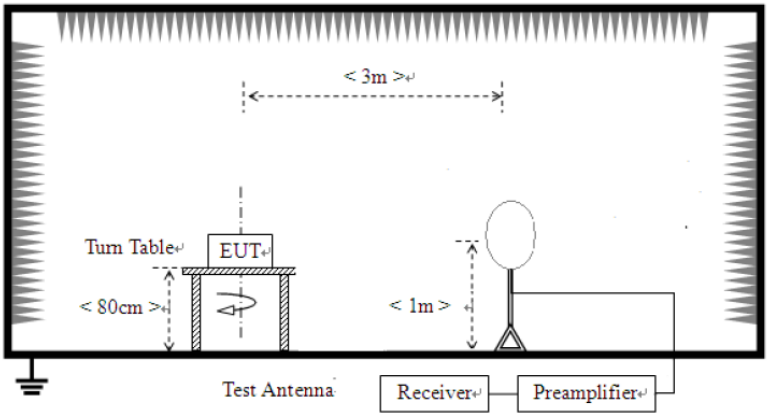
Frequency	Limit (uV/m)	Remark
0.009MHz-0.490MHz	2400/F(kHz) @300m	PK,AV,QP
0.490MHz-1.705MHz	24000/F(kHz) @30m	Quasi-peak Value
1.705MHz-30.0MHz	30 @30m	Quasi-peak Value
30MHz-88MHz	100 @3m	Quasi-peak Value
88MHz-216MHz	150 @3m	Quasi-peak Value
216MHz-960MHz	200 @3m	Quasi-peak Value
960MHz-1GHz	500 @3m	Quasi-peak Value
Above 1GHz	500 @3m	Average Value
	5000 @3m	Peak Value

Limit: (band edge)

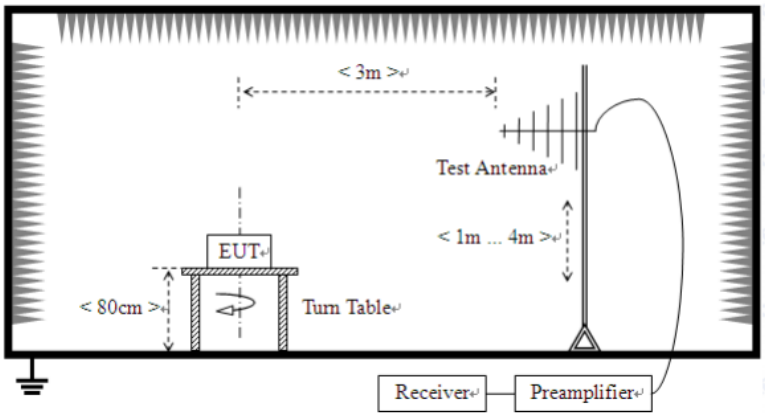
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Test setup:

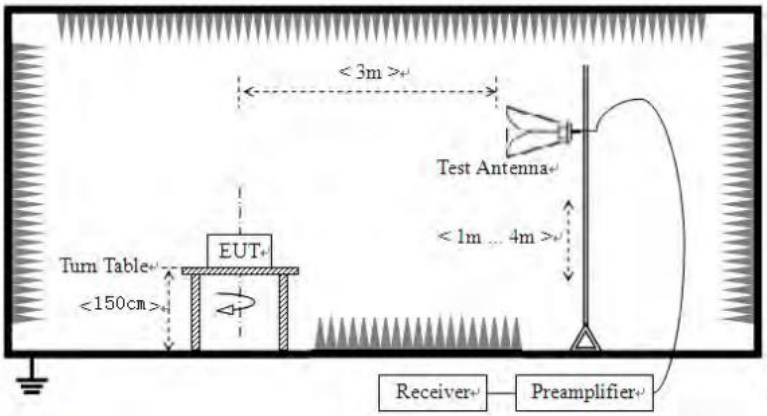
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

7.2.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2440.00	103.92	27.53	6.39	36.89	100.95	114.00	-13.05	Vertical
2440.00	104.84	27.53	6.39	36.89	101.87	114.00	-12.13	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2440.00	82.49	27.53	6.39	36.89	79.52	94.00	-14.48	Vertical
2440.00	84.59	27.53	6.39	36.89	81.62	94.00	-12.38	Horizontal

Note: RBW 3MHz VBW 3MHz PK detector is for PK value， RMS detector is for AV value

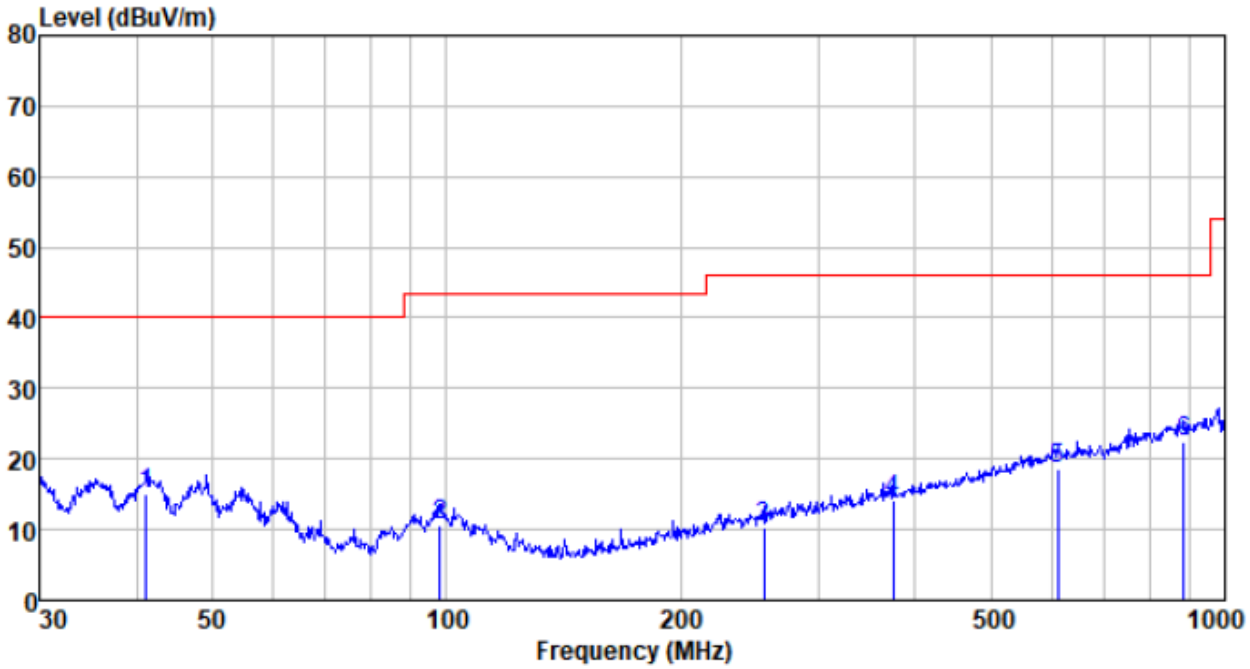
7.2.2 Spurious emissions

- Below 30MHz

  The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

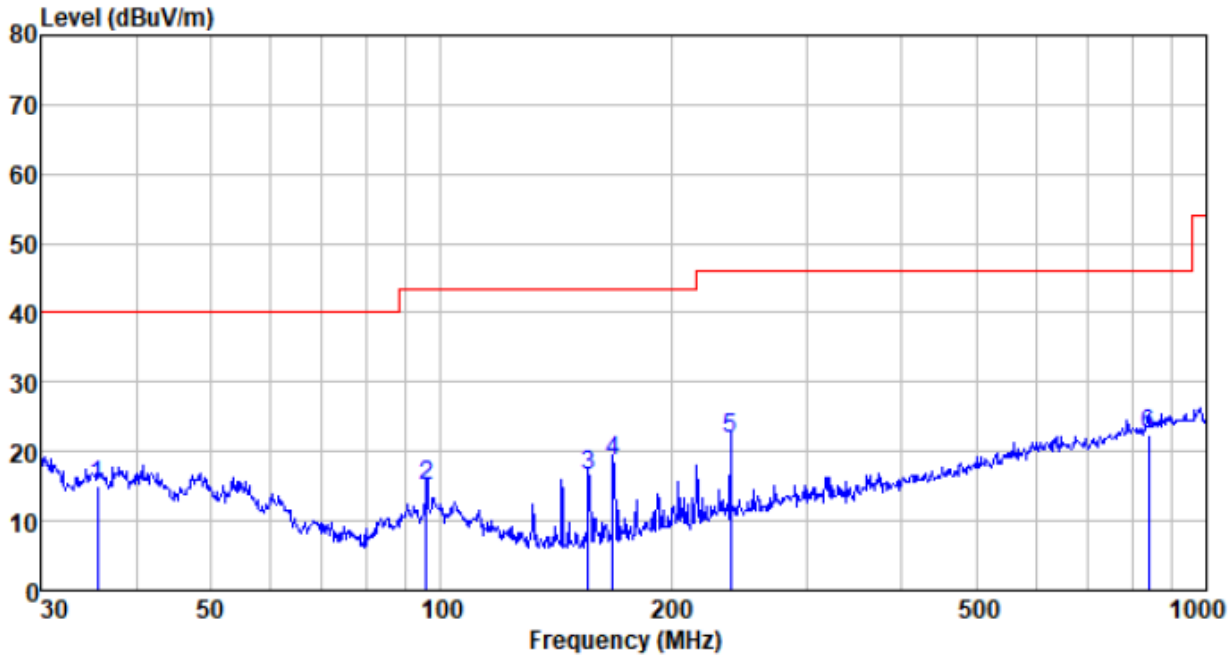
- **Below 1GHz**

Mode:	**Transmitting mode**	**Test by:**	**Jason**
Temp./Hum.(%H):	**26℃/56%RH**	**Polarziation:**	**Horizontal**



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
41.132	37.81	12.21	0.67	35.73	14.96	40.00	-25.04	QP
98.142	34.11	11.93	1.18	36.71	10.51	43.50	-32.99	QP
255.623	33.21	12.33	2.15	37.38	10.31	46.00	-35.69	QP
374.623	33.93	14.92	2.74	37.50	14.09	46.00	-31.91	QP
609.922	33.00	19.51	3.76	37.55	18.72	46.00	-27.28	QP
884.503	33.17	22.16	4.79	37.60	22.52	46.00	-23.48	QP

Mode:	**Transmitting mode**	**Test by:**	**Jason**
Temp./Hum.(%H):	**26℃/56%RH**	**Polarziation:**	**Vertical**



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
35.624	38.33	11.42	0.62	35.40	14.97	40.00	-25.03	QP
95.762	38.99	11.59	1.16	36.69	15.05	43.50	-28.45	QP
155.910	44.09	8.05	1.60	37.11	16.63	43.50	-26.87	QP
167.824	45.67	8.46	1.67	37.18	18.62	43.50	-24.88	QP
239.147	45.47	11.82	2.06	37.37	21.98	46.00	-24.02	QP
839.182	33.77	21.75	4.62	37.61	22.53	46.00	-23.47	QP

■ **Above 1GHz**

Test Frequency:	2440MHz

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880.00	50.22	31.26	8.66	37.68	52.46	74.00	-21.54	Vertical
7320.00	40.36	36.32	11.72	35.64	52.76	74.00	-21.24	Vertical
9760.00	28.26	38.01	14.25	34.98	45.54	74.00	-28.46	Vertical
12200.00	*					74.00		Vertical
14640.00	*					74.00		Vertical
4880.00	49.33	31.26	8.66	37.68	51.57	74.00	-22.43	Horizontal
7320.00	39.65	36.32	11.72	35.64	52.05	74.00	-21.95	Horizontal
9760.00	29.58	38.01	14.25	34.98	46.86	74.00	-27.14	Horizontal
12200.00	*					74.00		Horizontal
14640.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880.00	40.33	31.26	8.66	37.68	42.57	54.00	-11.43	Vertical
7320.00	30.26	36.32	11.72	35.64	42.66	54.00	-11.34	Vertical
9760.00	21.69	38.01	14.25	34.98	38.97	54.00	-15.03	Vertical
12200.00	*					54.00		Vertical
14640.00	*					54.00		Vertical
4880.00	40.15	31.26	8.66	37.68	42.39	54.00	-11.61	Horizontal
7320.00	28.64	36.32	11.72	35.64	41.04	54.00	-12.96	Horizontal
9760.00	22.33	38.01	14.25	34.98	39.61	54.00	-14.39	Horizontal
12200.00	*					54.00		Horizontal
14640.00	*					54.00		Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

7.2.3 Bandedge emissions

Test Frequency:	2440MHz

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	34.22	27.91	5.30	36.79	30.64	74.00	-43.36	Horizontal
2390.00	33.15	27.59	5.38	36.85	29.27	74.00	-44.73	Horizontal
2400.00	34.62	27.56	5.40	36.86	30.72	74.00	-43.28	Horizontal
2310.00	34.77	27.91	5.30	36.79	31.19	74.00	-42.81	Vertical
2390.00	34.36	27.59	5.38	36.85	30.48	74.00	-43.52	Vertical
2400.00	34.82	27.56	5.40	36.86	30.92	74.00	-43.08	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	28.65	27.91	5.30	36.79	25.07	54.00	-28.93	Horizontal
2390.00	28.33	27.59	5.38	36.85	24.45	54.00	-29.55	Horizontal
2400.00	28.47	27.56	5.40	36.86	24.57	54.00	-29.43	Horizontal
2310.00	29.01	27.91	5.30	36.79	25.43	54.00	-28.57	Vertical
2390.00	28.06	27.59	5.38	36.85	24.18	54.00	-29.82	Vertical
2400.00	29.25	27.56	5.40	36.86	25.35	54.00	-28.65	Vertical

Test Frequency:	2440MHz

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	34.59	27.53	5.47	36.93	30.66	74.00	-43.34	Horizontal
2500.00	33.86	27.55	5.49	36.94	29.96	74.00	-44.04	Horizontal
2483.50	34.06	27.53	5.47	36.93	30.13	74.00	-43.87	Vertical
2500.00	33.35	27.55	5.49	36.94	29.45	74.00	-44.55	Vertical

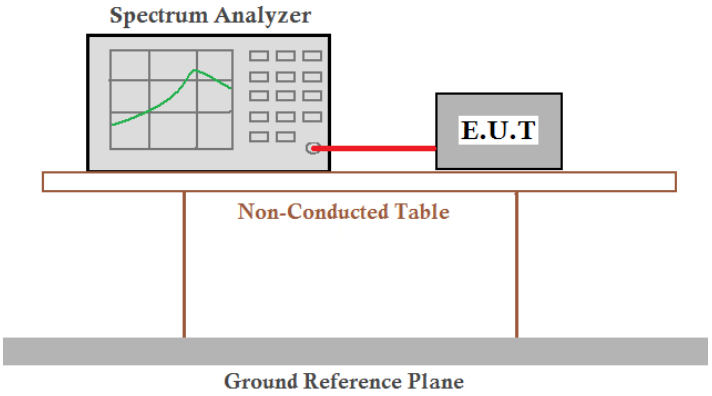
Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	28.52	27.53	5.47	36.93	24.59	54.00	-29.41	Horizontal
2500.00	28.40	27.55	5.49	36.94	24.50	54.00	-29.50	Horizontal
2483.50	27.36	27.53	5.47	36.93	23.43	54.00	-30.57	Vertical
2500.00	26.59	27.55	5.49	36.94	22.69	54.00	-31.31	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *All of the restriction bands were tested, and only the data of worst case was exhibited.*

7.3 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10:2013
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

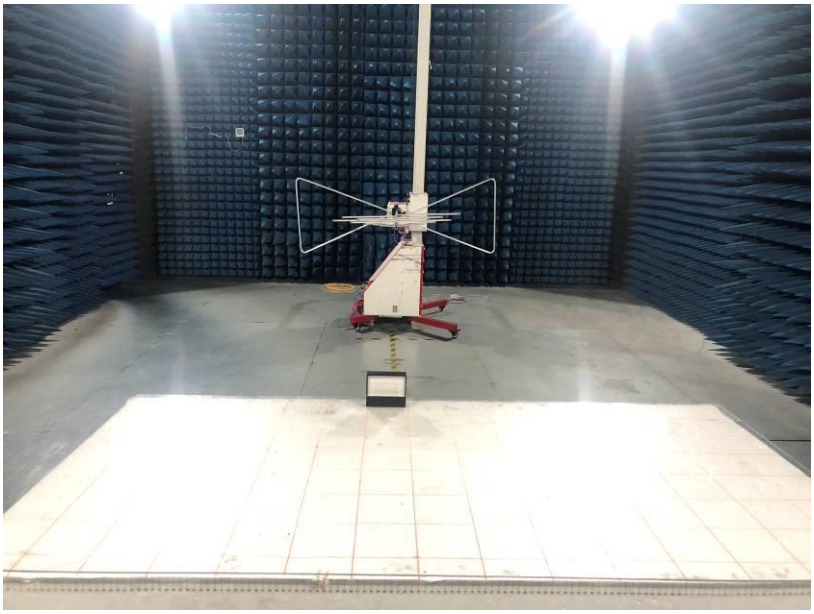
Test Frequency:	20dB bandwidth(MHz)	Result
2440MHz	1.481	Pass

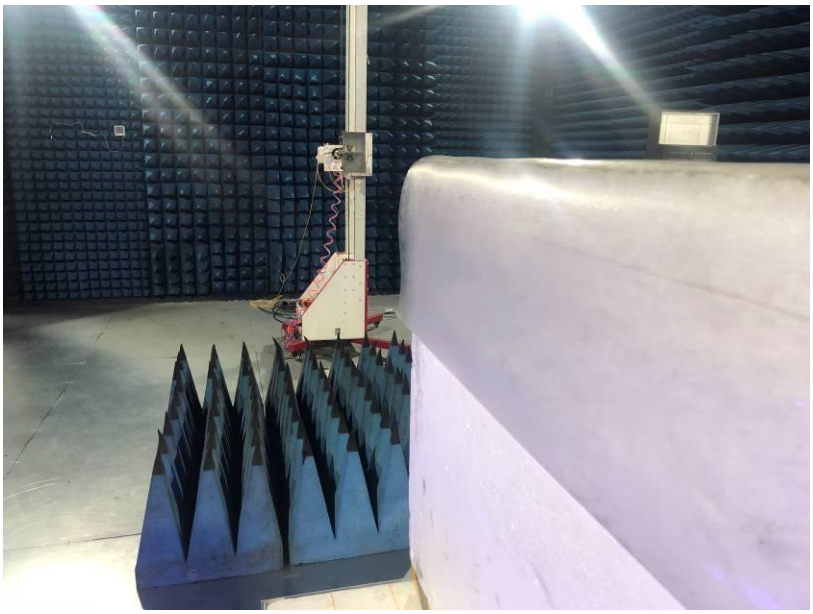
Test plot as follows:

2440MHz

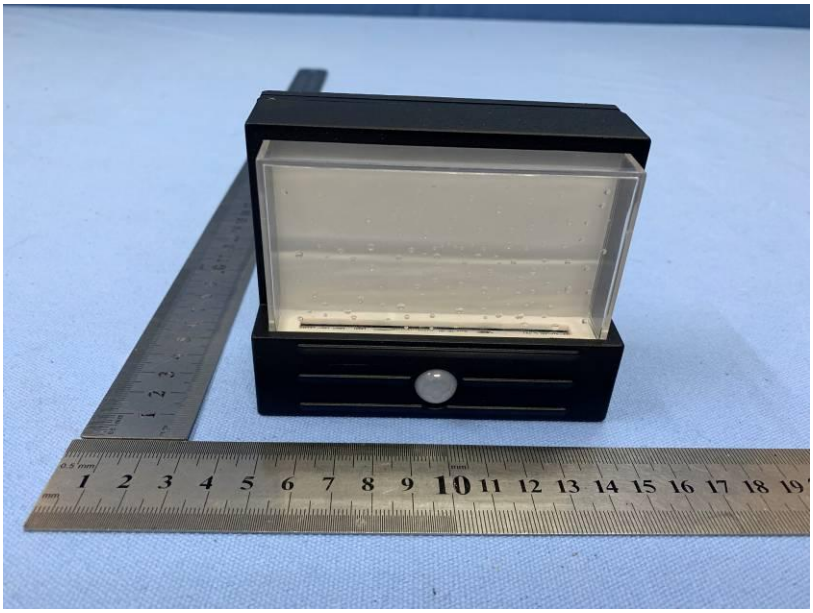
8 Test Setup Photo

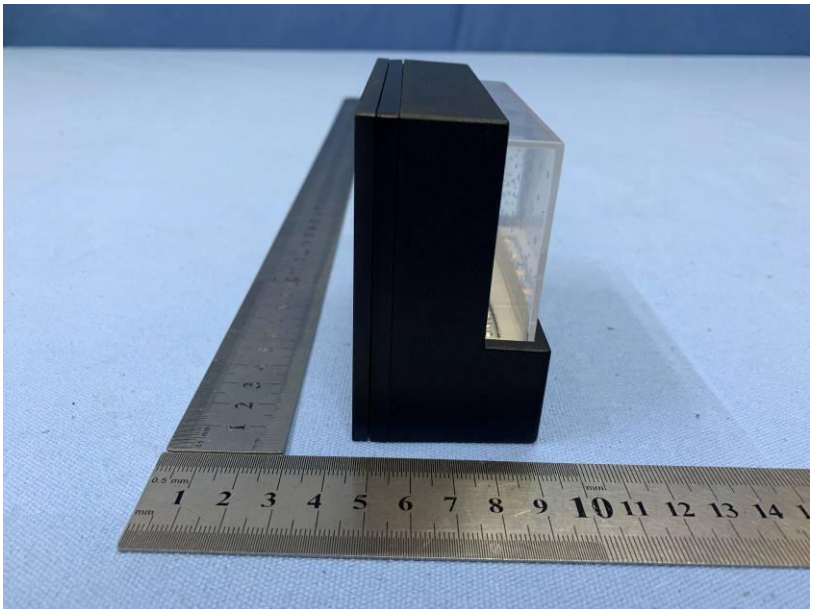
Radiated Emission

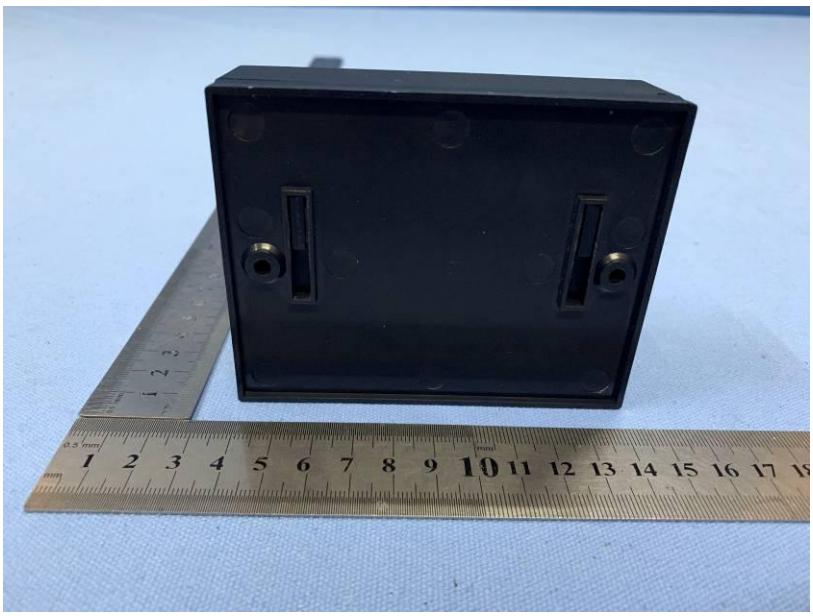


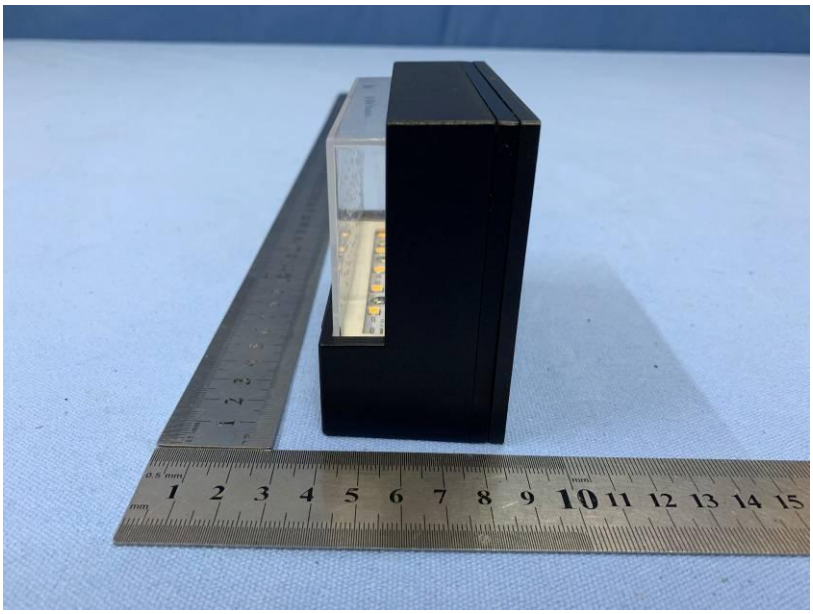


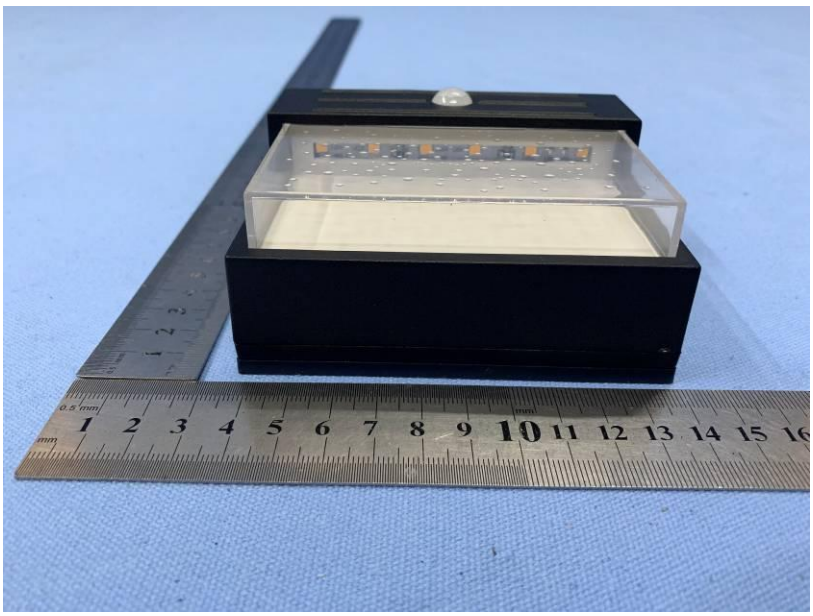
9 EUT Constructional Details

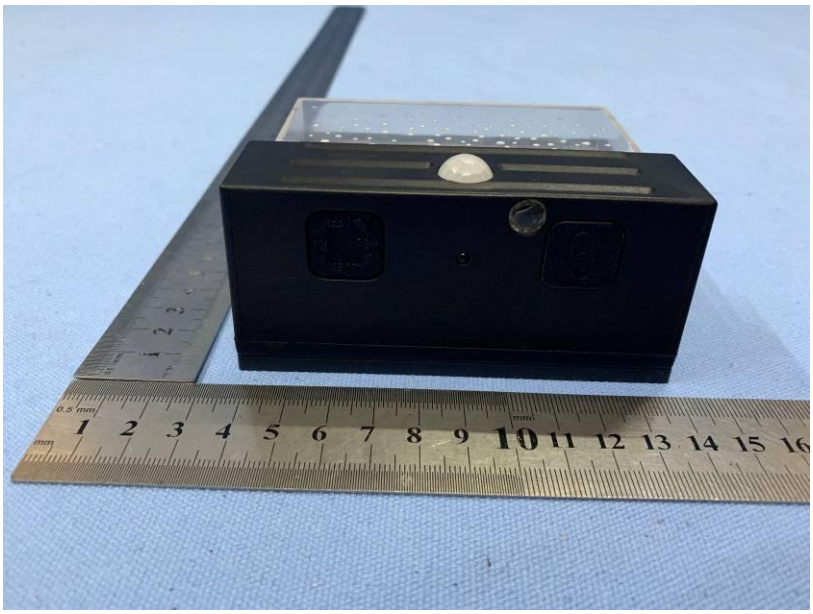


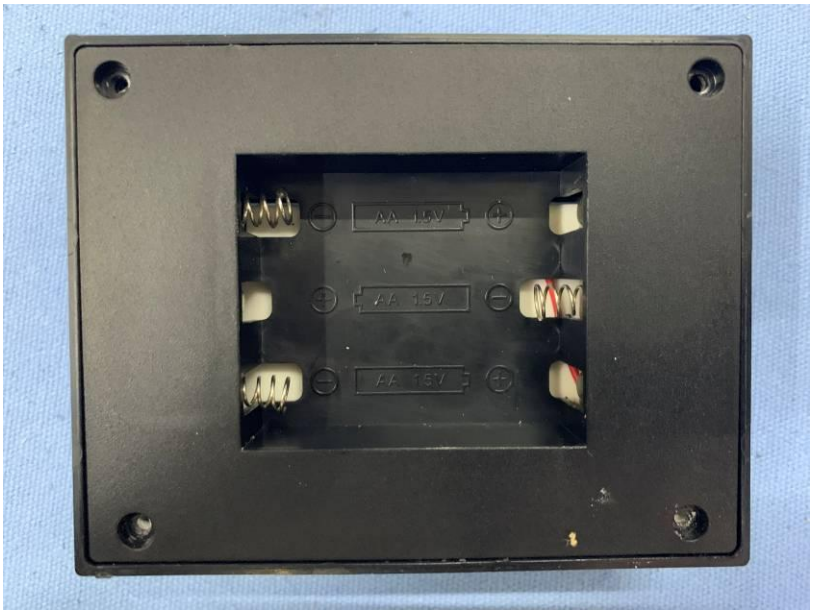


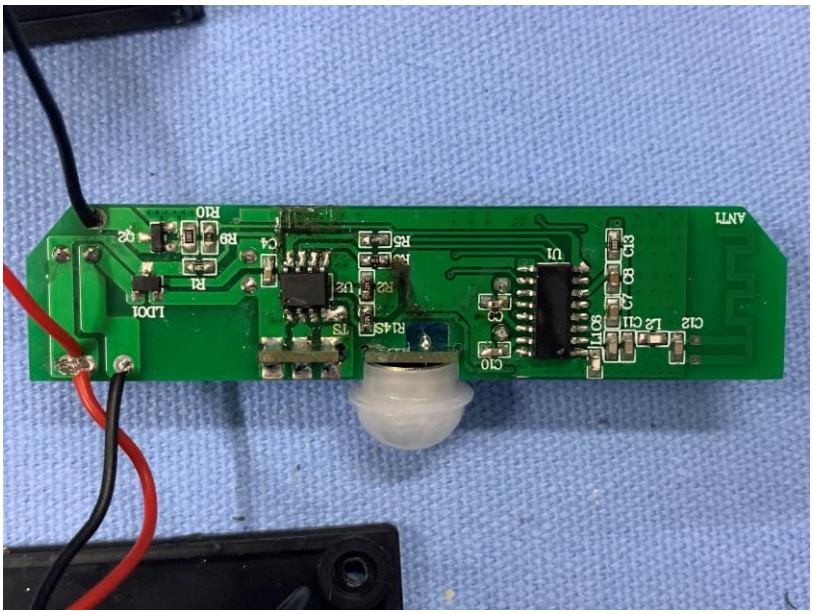


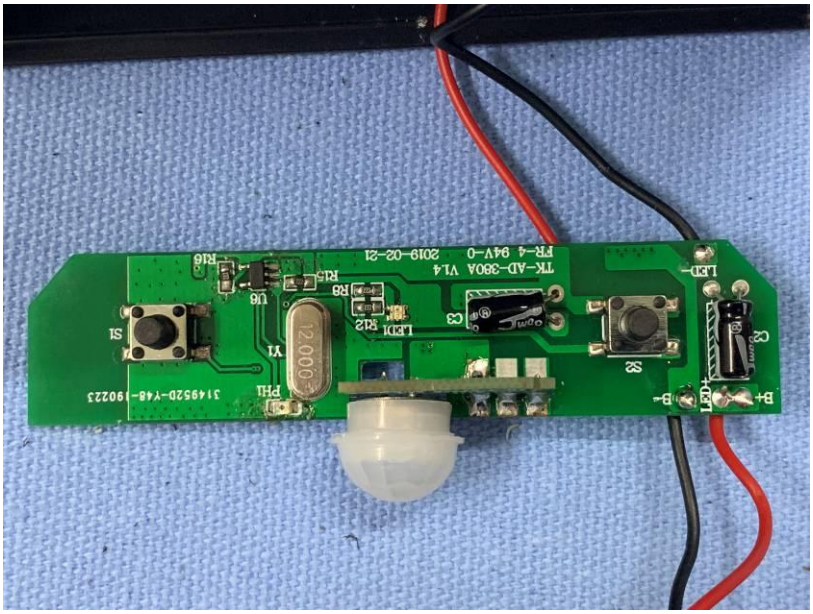


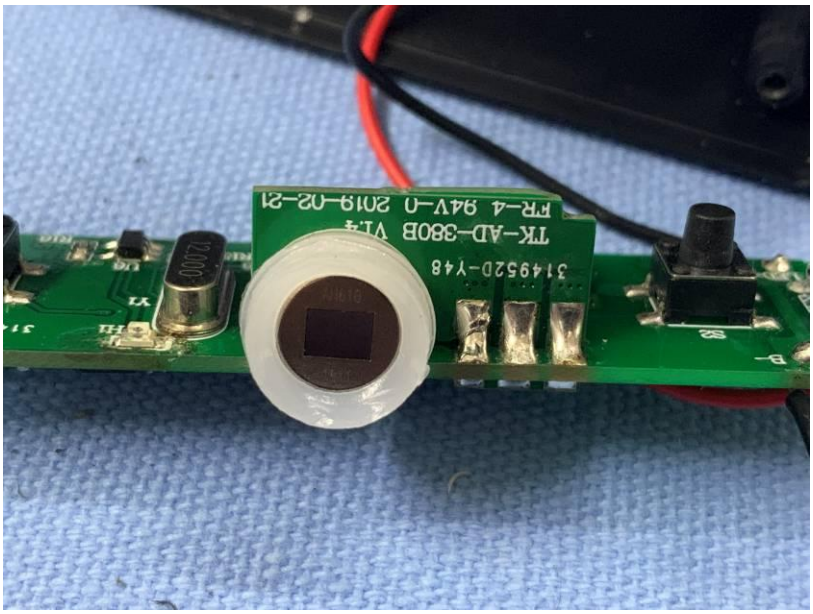


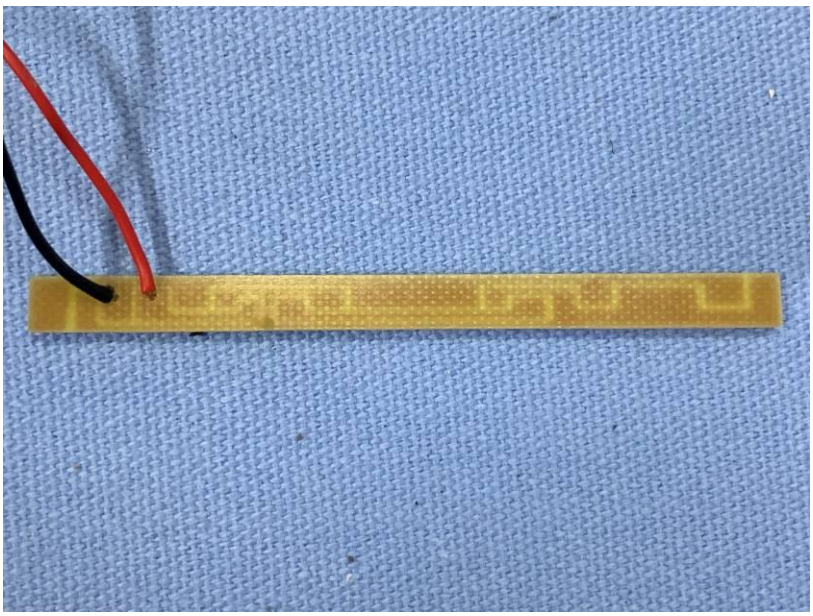



AA 1.5V
AA 1.5V
AA 1.5V

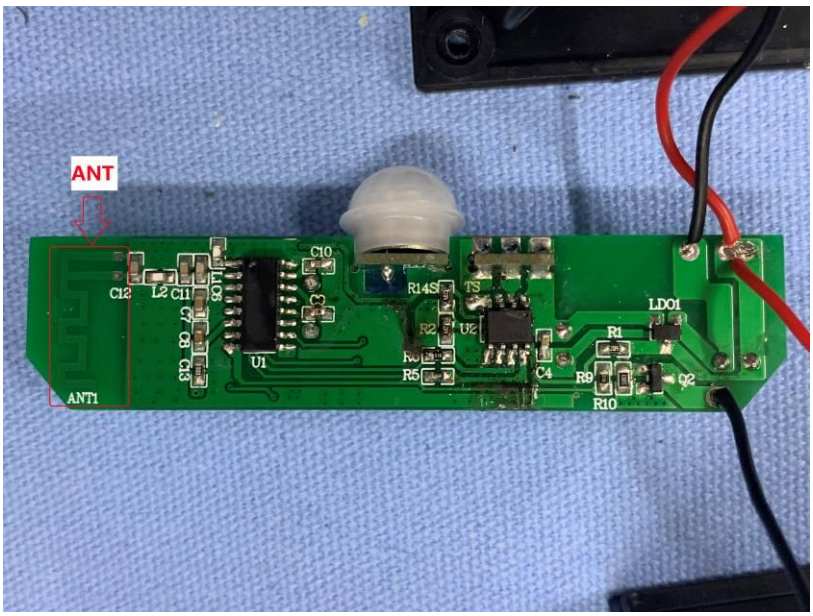

ANT1
R10
R9
R1
LDO1
C4
R5
U1
U2
R2
R14S
C10
C13
C8
C7
C11
L2
C12







LED1
LED2
RL1
LED3
LED4
RL2
LED5
LED+
LED-
LED6
TK-AD-380 C V1.1
2019-02-20



------End------