



FCC TEST REPORT

FCC PART 15 SUBPART C 15.231

Test report

On Behalf of

Yancheng Meiyi Arts & crafts Factory

For

Open Sign by Element Lux 01, Open Sign by Element Lux 02

**Model No.: Open Sign by Element Lux 01, Open Sign by Element
Lux 02**

FCC ID: 2A7GW-ELEMENTLUX01

Prepared For : Yancheng Meiyi Arts & crafts Factory
No.8 Building, Area B, Science and Technology Incubation Park, 118#
Xinyang West Road, Xinyang Street, Tinghu District, Yancheng City, China

Prepared By : Shenzhen HUAKE Testing Technology Co., Ltd.
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Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Date of Test: Jun. 01, 2022 ~ Jun. 09, 2022

Date of Report: Jun. 09, 2022

Report Number: HK2206012398-E



TEST RESULT CERTIFICATION

Applicant's name : Yancheng Meiyi Arts & crafts Factory
Address : No.8 Building, Area B, Science and Technology Incubation Park, 118#
Xinyang West Road, Xinyang Street, Tinghu District, Yancheng City,
China
Manufacture's Name : Yancheng Meiyi Arts & crafts Factory
Address : No.8 Building, Area B, Science and Technology Incubation Park, 118#
Xinyang West Road, Xinyang Street, Tinghu District, Yancheng City,
China

Product description

Trade Mark: N/A
Product name : Open Sign by Element Lux 01, Open Sign by Element Lux 02
Model and/or type reference .. : Open Sign by Element Lux 01, Open Sign by Element Lux 02
Standards : FCC Rules and Regulations Part 15 Subpart C Section 15.231
ANSI C63.10: 2013

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Date of Test :
Date (s) of performance of tests : Jun. 01, 2022 ~ Jun. 09, 2022
Date of Issue : Jun. 09, 2022
Test Result : **Pass**

Testing Engineer :

Gary Qian

(Gary Qian)

Technical Manager :

Eden Hu

(Eden Hu)

Authorized Signatory :

Jason Zhou

(Jason Zhou)



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**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Jun. 09, 2022	Jason Zhou



1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.231(a)(1)	Manually operated transmitter	Compliant
§15.231(b)	Average Factor	N/A
§15.231(b) & §15.209	Field Strength of Fundamental and Spurious Emission	Compliant
§15.231(c)	Bandwidth	Compliant

1.2 INFORMATION OF THE TEST LABORATORY

Shenzhen HUAKE Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping,
Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization:

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty

= 2.71dB, k=2

Radiated emission expanded uncertainty(9kHz-30MHz)

= 3.90dB, k=2

Radiated emission expanded uncertainty(30MHz-1000MHz)

= 3.90dB, k=2

Radiated emission expanded uncertainty(Above 1GHz)

= 4.28dB, k=2



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name	:	Open Sign by Element Lux 01, Open Sign by Element Lux 02	
Model No.	:	Open Sign by Element Lux 01	
Series Models	:	Open Sign by Element Lux 02	
Model Difference	:	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: Open Sign by Element Lux 01.	
Trade Mark	:	N/A	
Test Power Supply	:	DC 12V from battery	
Product Description	:	Operation Frequency:	315MHz
	:	Number of Channel:	1 Channels
	:	Modulation Type:	FSK
	:	Antenna Type:	External Antenna
	:	Antenna Gain(Peak):	1dBi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			



2.2 OPERATION OF EUT DURING TESTING

NO.	TEST MODE DESCRIPTION
1	Transmitting mode
Note: 1. All the test modes can be supply by new battery, and only the data of the worst case recorded in the test report. 2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.	

2.3 DESCRIPTION OF TEST SETUP

Operation of EUT during Radiation and Above1GHz Radiation testing:

EUT

The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position

**2.4 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	Feb. 18, 2022	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Feb. 18, 2022	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 18, 2022	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Feb. 18, 2022	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 18, 2022	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Feb. 18, 2022	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Feb. 18, 2022	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Feb. 18, 2022	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Feb. 18, 2022	1 Year
10.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Feb. 18, 2022	1 Year
11.	Pre-amplifier	EMCI	EMC051845 SE	HKE-015	Feb. 18, 2022	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Feb. 18, 2022	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	N/A	N/A
14.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 09, 2021	3 Year

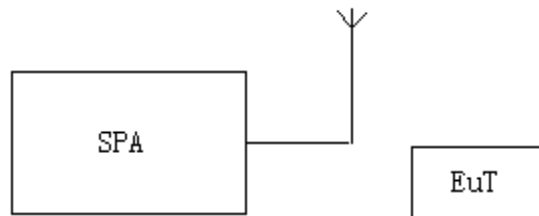


3. PROVISION FOR MOMENTARY OPERATION

3.1 MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
Centre frequency = Operation Frequency
RBW=1MHz, VBW=50MHz
Span: 0Hz
Sweep time: 10.00s
2. Set the EUT to transmit by manually operated. Use the "View" function of SPA to find the transmission time of being released.
3. Record the data and Reported.

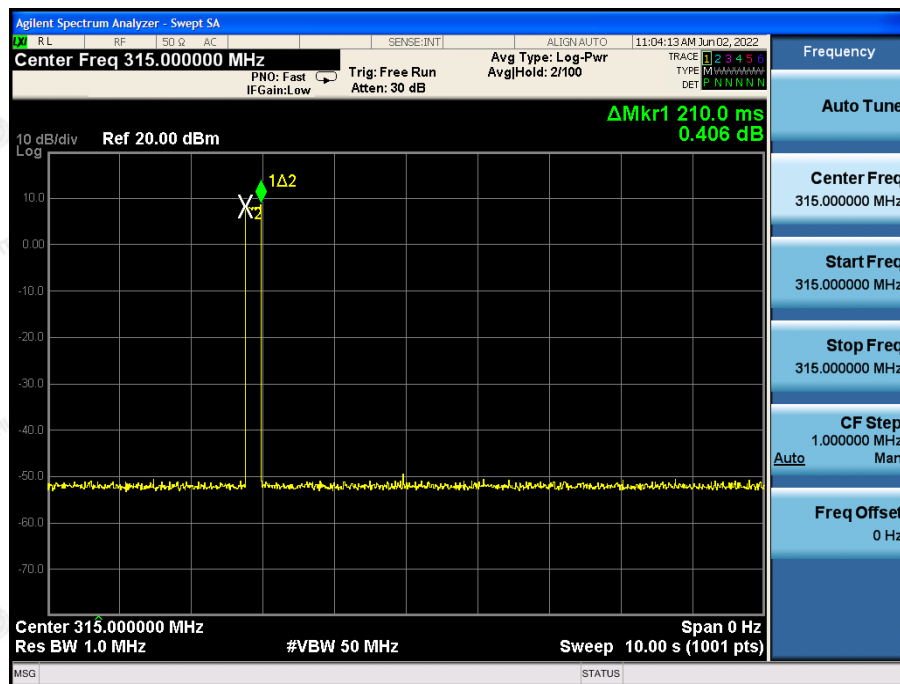
3.2 TEST SETUP



3.3 TEST RESULT

Test Mode: EUT @ 315MHz for RF Transmitter

The time of stopping transmission(s)	Limit (s)
0.21	5.00



RESULT: PASS

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

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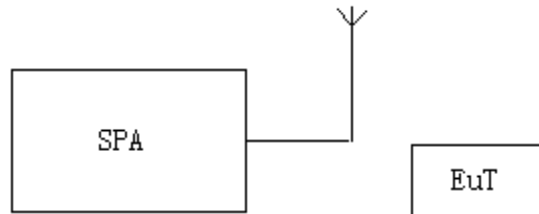


4. DUTY CYCLE CORRECTION FACTOR

4.1 MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
Centre frequency = Operation Frequency
RBW=1MHz; VBW=3MHz
Span: 0Hz
Sweep time: more than two pulse trains or more than each type of pulse occupancy time
2. Set the EUT to transmit by manually operated. Use the "Delta mark" function of SPA to find the period time between two pulse trains and each type of pulse occupancy time.
3. Record the plots and Reported.

4.2 TEST SETUP



4.3 TEST RESULT

Note: The level of the peak emission are less than the average limit, so the average factor need not to be tested.



5. RADIATED EMISSION

5.1. STANDARD APPLICABLE

According to §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750 **	125 to 375 **
174 - 260	3,750	375
260 - 470	3,750 to 12,500 **	375 to 1,250 **
Above 470	12,500	1,250

** linear interpolations

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

Compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section



5.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.



The following table is the setting of spectrum analyzer and receiver.

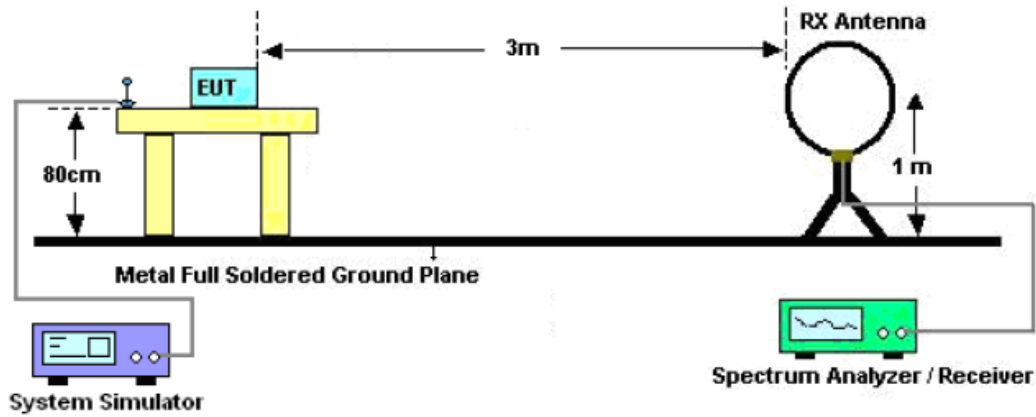
Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/1MHz for Peak, 1MHz/10Hz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

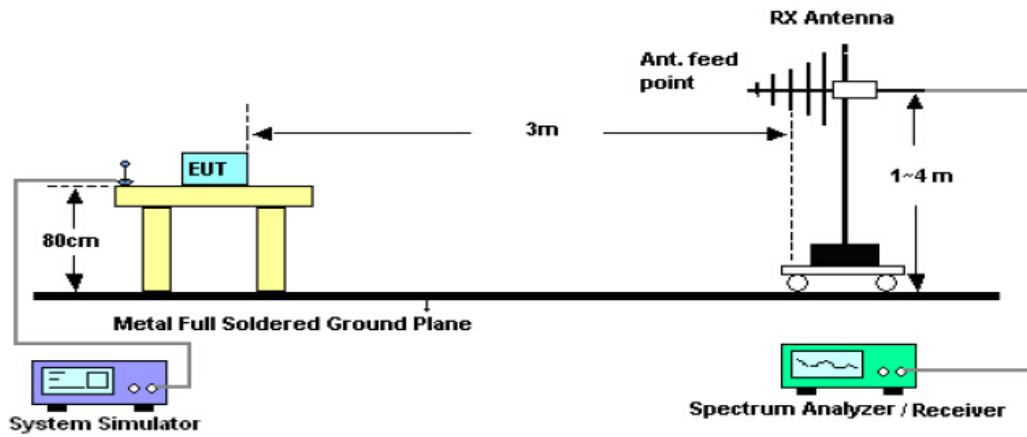


5.3. TEST SETUP

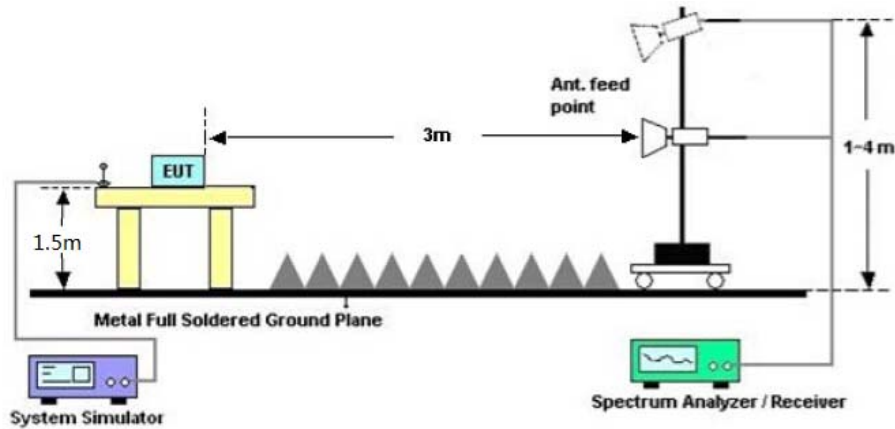
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz





5.4. TEST RESULT

According to the data below, the FCC Part 15.205, 15.209 and 15.231 standards, and had the worst margin of:

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

The level of the peak emission are less than the average limit, so the average value is not reflected in the report.

Horizontal

No.	Frequency	Reading	Corr.	Duty cycle	Result	Limit	Margin	Deg.	Height	Remark
	MHz	dBuV/m	Factor (dB)	Factor (dB)	dBuV/m	dBuV/m	dB	(°)	(cm)	
1	315.00	49.54	12.33	N/A	61.87	95.63	-33.76	169	100	peak
2	630.00	20.28	15.82	N/A	36.1	55.63	-19.53	168	100	QP

Above 1GHz

No.	Frequency	Reading	Corr.	Duty cycle	Result	Limit	Margin	Deg.	Height	Remark
	MHz	dBuV/m	Factor (dB)	Factor (dB)	dBuV/m	dBuV/m	dB	(°)	(cm)	
1	1260.00	23.16	25.83	N/A	48.99	74	-25.01	41	100	Peak
2	1575.00	20.33	27.25	N/A	47.58	74	-26.42	204	100	Peak

**Vertical**

No.	Frequency	Reading	Corr.	Duty cycle	Result	Limit	Margin	Deg.	Height	Remark
	MHz	dBuV/m	Factor (dB)	Factor (dB)	dBuV/m	dBuV/m	dB	(°)	(cm)	
1	315.00	45.14	12.23	N/A	57.37	95.63	-38.26	103	300	peak
2	630.00	18.97	16.26	N/A	35.23	55.63	-20.4	125	200	QP

Above 1GHz

No.	Frequency	Reading	Corr.	Duty cycle	Result	Limit	Margin	Deg.	Height	Remark
	MHz	dBuV/m	Factor (dB)	Factor (dB)	dBuV/m	dBuV/m	dB	(°)	(cm)	
1	1260.00	21.64	25.83	N/A	47.47	74	-26.53	166	100	Peak
2	1575.00	19.31	27.25	N/A	46.56	74	-27.44	245	100	Peak

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The fundamental frequency is 315MHz, so the fundamental and spurious emissions radiated limit base on the the operating frequency 315MHz.

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBμV/m)		Limit@3m (dBμV/m)	
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--

Note: 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.

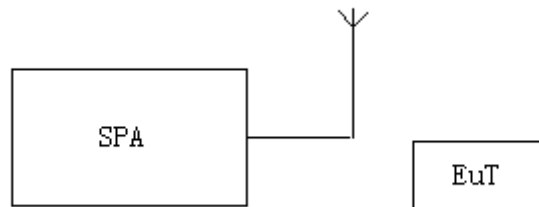


6. BANDWIDTH

6.1. MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
Centre frequency = Operation Frequency
RBW=1 KHz
VBW=3 KHz
Span: 100 KHz
Sweep time: Auto
2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
3. Record the plots and Reported.

6.2. TEST SETUP





6.3. TEST RESULT

Test Mode: EUT @ 315MHz for RF Transmitter

-20dB bandwidth	LIMIT	RESULT
14.07kHz	787.5KHz	Pass
Note: Limit= Operation Frequency ×0.25%		

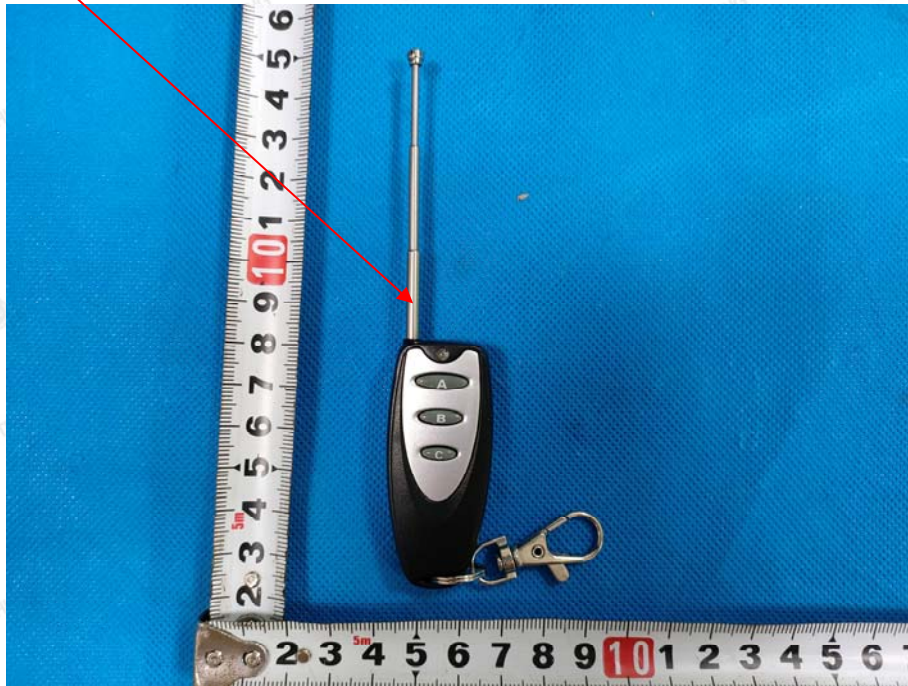




7. ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is External Antenna, need professional installation, It conforms to the standard requirements. The directional gains of antenna used for transmitting is 1dBi

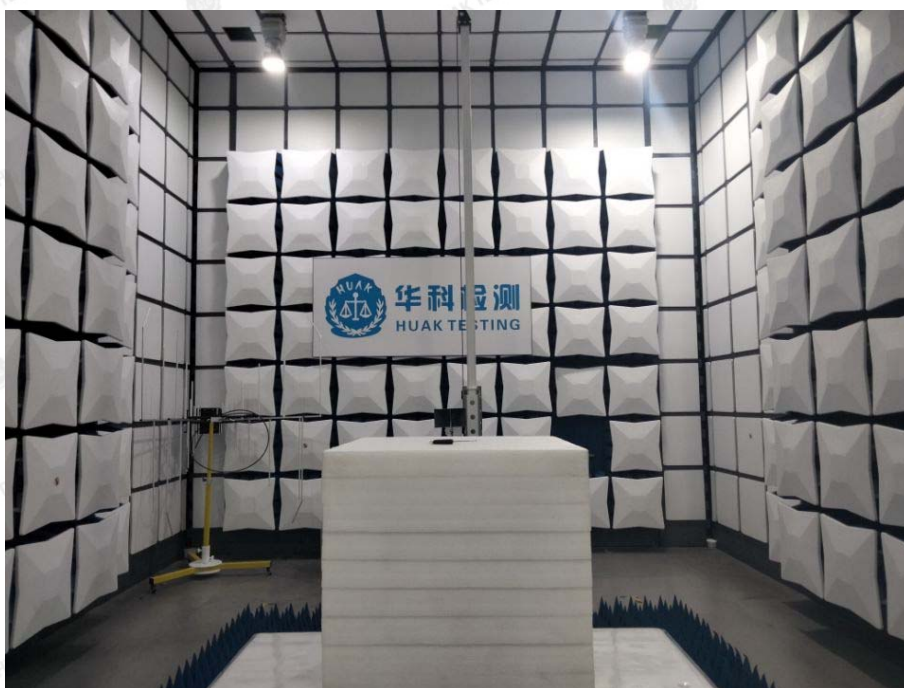
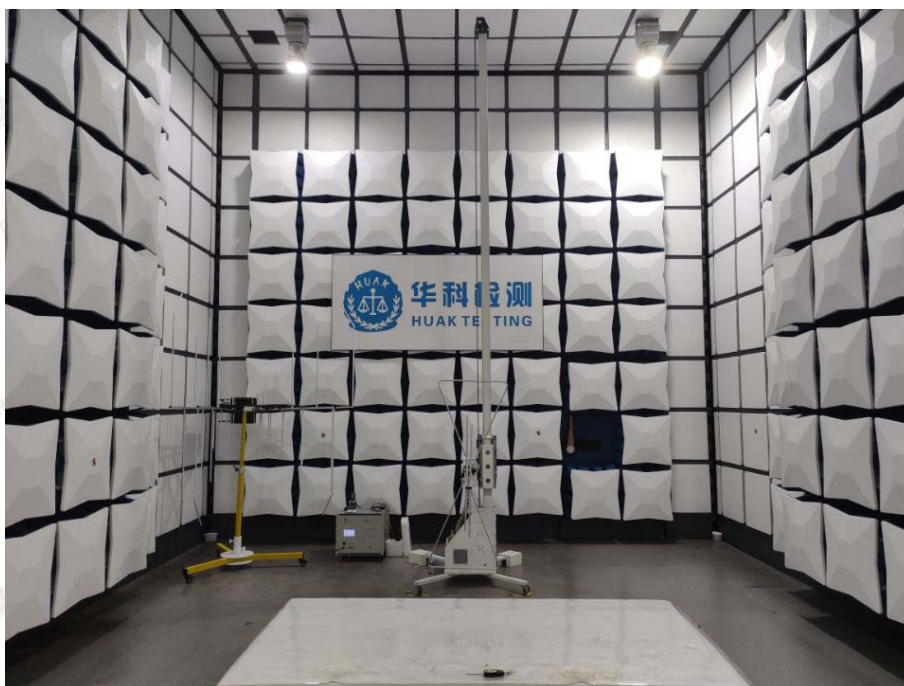
ANTENNA :





8. PHOTOGRAPH OF TEST

Radiated Emission





9. PHOTOS OF THE EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos

*****End of Report*****