



# FCC TEST REPORT

Test report  
On Behalf of  
Yuyao Lishuai Film & Television Equipment Co.,Ltd.  
For  
LED STUDIO LIGHT

Model No.: HS-P12, RGB-P12, RGB-P10, HS-P10, A8, RGB-T25,  
HS-T25, HS-T60, HS-T120, RGB-T60, RGB-T120, RGB512,  
HS-512, RGB516, HS-516, RGB616, HS-616

FCC ID: 2A3MX-HS-P12

Prepared For : Yuyao Lishuai Film & Television Equipment Co.,Ltd.  
No.55 East Zhenxing road, Yuyao city, Zhejiang province, China

Prepared By : Shenzhen HUAKE Testing Technology Co., Ltd.  
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Date of Test: Jan. 12, 2022 ~Jan. 18, 2022

Date of Report: Jan. 18, 2022

Report Number: HK2201110138-2E

**TEST RESULT CERTIFICATION**

**Applicant's name** ..... : Yuyao Lishuai Film & Television Equipment Co.,Ltd.  
**Address** ..... : No.55 East Zhenxing road, Yuyao city, Zhejiang province, China  
**Manufacture's Name** ..... : Yuyao Lishuai Film & Television Equipment Co.,Ltd.  
**Address** ..... : No.55 East Zhenxing road, Yuyao city, Zhejiang province, China

**Product description**

**Trade Mark:** N/A  
**Product name** ..... : LED STUDIO LIGHT  
**Model and/or type reference** : HS-P12, RGB-P12, RGB-P10, HS-P10, A8, RGB-T25, HS-T25,  
HS-T60, HS-T120, RGB-T60, RGB-T120, RGB512, HS-512,  
RGB516, HS-516, RGB616, HS-616  
**Standards** ..... : FCC Rules and Regulations Part 15 Subpart C Section 15.249  
ANSI C63.10: 2013

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**Date of Test**..... :

**Date (s) of performance of tests** ..... : Jan. 12, 2022 ~Jan. 18, 2022

**Date of Issue**..... : Jan. 18, 2022

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

**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	Jan. 18, 2022	Jason Zhou



## 1. TEST SUMMARY

### 1.1 TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST	Test Requirement	RESULT
CONDUCTED EMISSIONS TEST	§15.207	COMPLIANT
RADIATED EMISSION TEST	§15.249 (a) / §15.209	COMPLIANT
BAND EDGE	§15.249 (d) / §15.209	COMPLIANT
OCCUPIED BANDWIDTH MEASUREMENT	§15.215 (c)	COMPLIANT
ANTENNA REQUIREMENT	§15.203	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

EUT Name:	LED STUDIO LIGHT
Model Name:	HS-P12
Series Model:	RGB-P12, RGB-P10, HS-P10, A8, RGB-T25, HS-T25, HS-T60, HS-T120, RGB-T60, RGB-T120, RGB512, HS-512, RGB516, HS-516, RGB616, HS-616
Model Difference:	All model's the function, software and electric circuit are the same, only with a product color, appearance and model named different. Test sample mode: HS-P12.
FCC ID:	2A3MX-HS-P12
Antenna Type:	Internal Antenna
Antenna Gain:	0dBi
Operation frequency:	2440MHz
Number of Channels:	1CH
Modulation Type:	GFSK
Power Source:	DC 7.4V from battery or DC 5V from Type-C
Power Rating:	DC 7.4V from battery or DC 5V from Type-C



## 2.2 CARRIER FREQUENCY OF CHANNELS

Description of Channel:	
Channel	Frequency (MHz)
1	2440

## 2.3 OPERATION OF EUT DURING TESTING

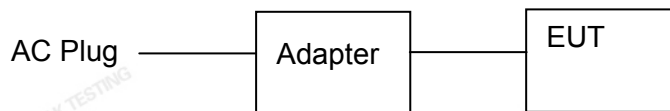
Operating Mode

The mode is used: **Transmitting mode**

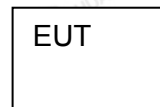
Channel: 2440MHz

## 2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during conducted and radiation below 1GHz testing:



Operation of EUT during radiation above 1GHz testing:



Adapter information

Model: HW-100225C00

Input: 100-240V, 50-60Hz, 0.75A

Output: 5V, 2A/9V, 2A/10V, 2.25A MAX

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.

**2.5 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	Dec. 09, 2021	1 Year
2.	Receiver	R&S	ESR-7	HKE-010	Dec. 09, 2021	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 09, 2021	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 09, 2021	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 09, 2021	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 09, 2021	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 09, 2021	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 09, 2021	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 09, 2021	1 Year
10.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Dec. 09, 2021	1 Year
11.	Pre-amplifier	EMCI	EMC051845S E	HKE-015	Dec. 09, 2021	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 09, 2021	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JY3120-B Version	HKE-083	Dec. 09, 2021	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 09, 2021	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 09, 2021	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 09, 2021	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 09, 2021	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 09, 2021	1 Year
19.	High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	Dec. 09, 2021	1 Year



### 3. CONDUCTED EMISSIONS TEST

#### 3.1 CONDUCTED POWER LINE EMISSION LIMIT

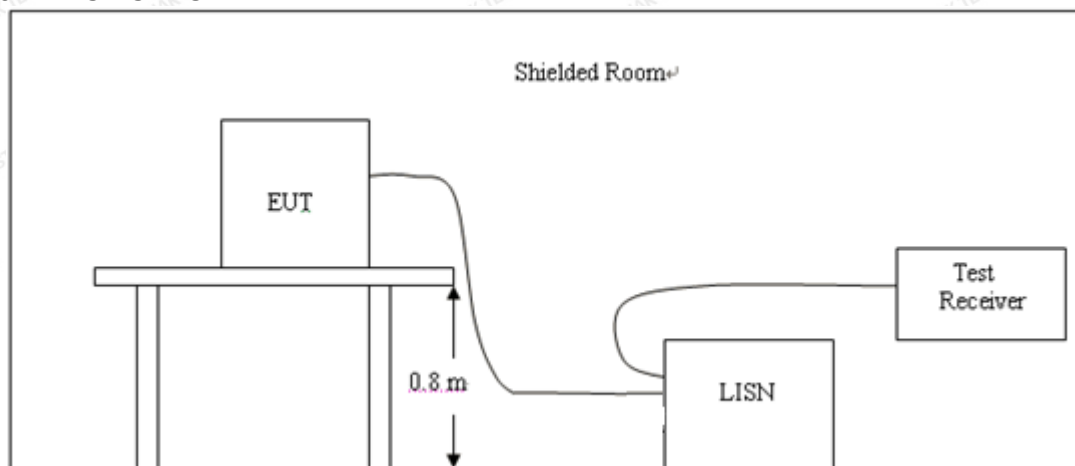
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following.

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

\* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

#### 3.2 TEST SETUP



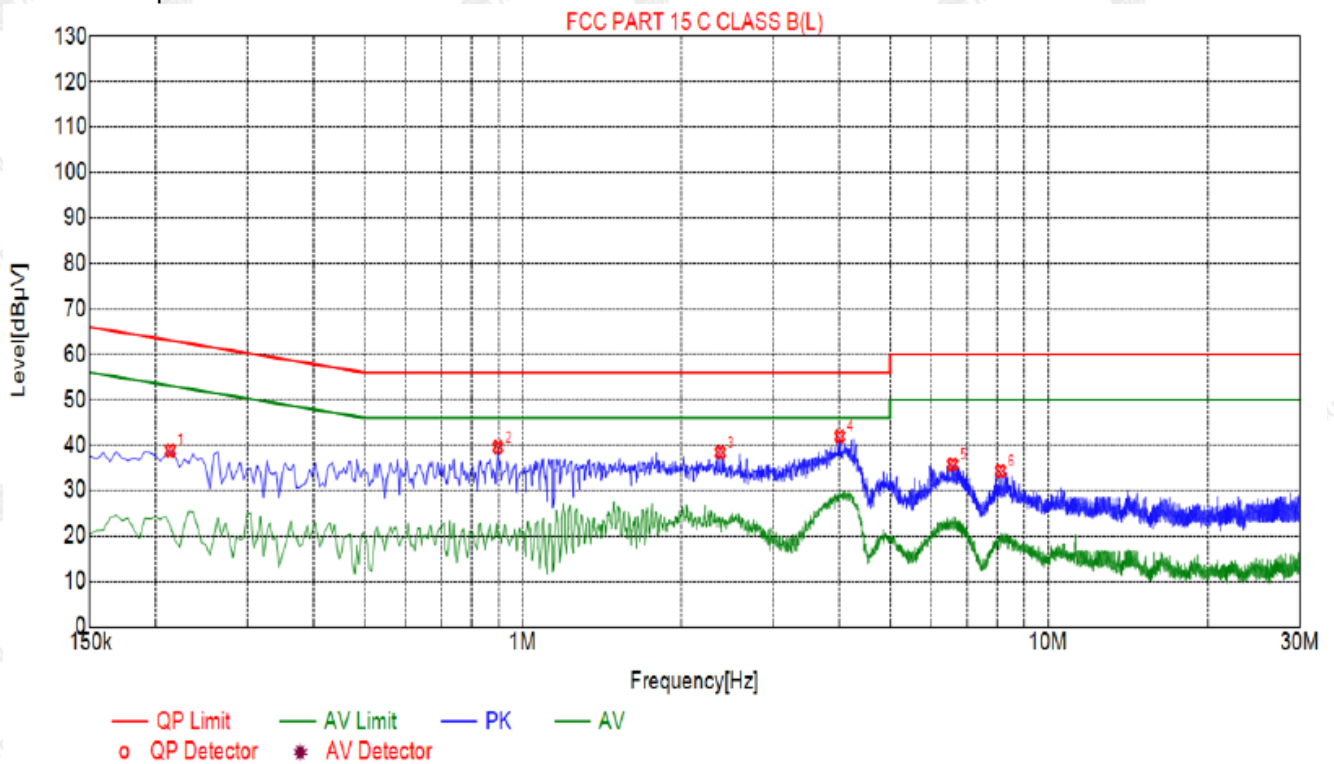
#### 3.3 TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.



## 3.4 Test Result

Test Specification: Line



### Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.2130	38.81	20.05	63.09	24.28	18.76	PK	L
2	0.8970	39.52	20.06	56.00	16.48	19.46	PK	L
3	2.3775	38.38	20.18	56.00	17.62	18.20	PK	L
4	4.0110	41.94	20.25	56.00	14.06	21.69	PK	L
5	6.5850	35.75	20.21	60.00	24.25	15.54	PK	L
6	8.1240	34.29	20.14	60.00	25.71	14.15	PK	L

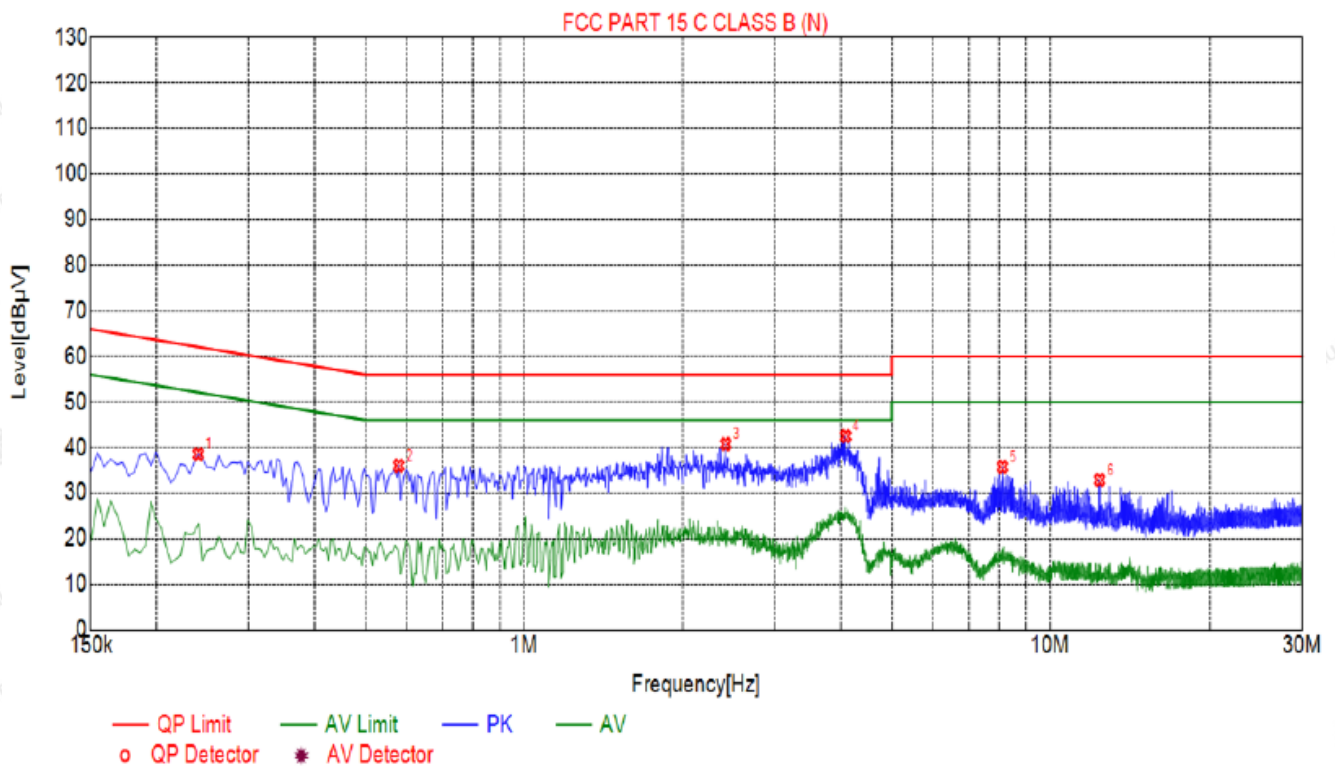
Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



Test Specification: Neutral



## Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.2400	38.54	20.03	62.10	23.56	18.51	PK	N
2	0.5775	36.01	20.05	56.00	19.99	15.96	PK	N
3	2.4180	40.74	20.18	56.00	15.26	20.56	PK	N
4	4.0875	42.50	20.25	56.00	13.50	22.25	PK	N
5	8.1285	35.76	20.14	60.00	24.24	15.62	PK	N
6	12.4305	32.88	19.98	60.00	27.12	12.90	PK	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



## 4 RADIATED EMISSION TEST

### 4.1 RADIATION LIMIT

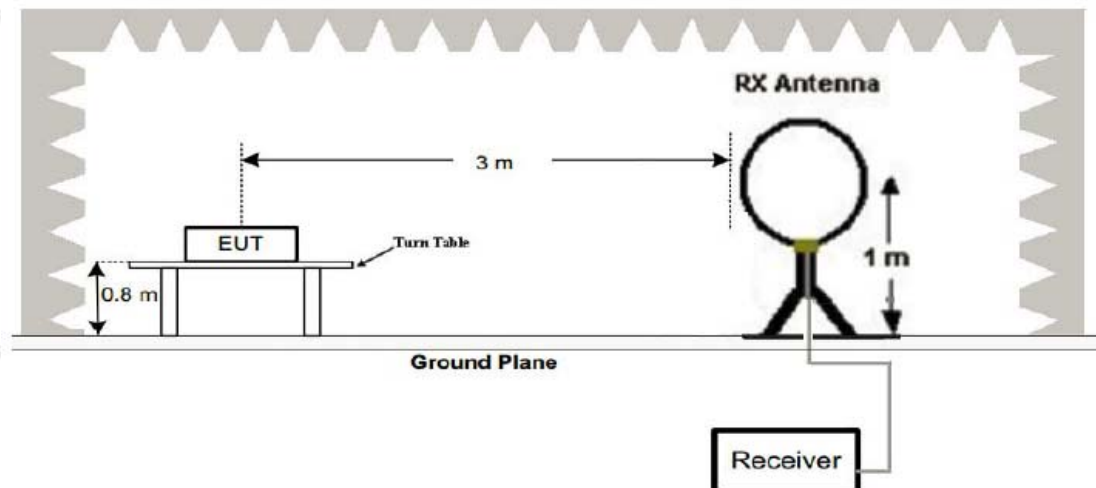
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dB $\mu$ V/m)	Radiated ( $\mu$ V/m)
30-88	3	40	100
88-216	3	43.5	150
216-960	3	46	200
Above 960	3	54	500

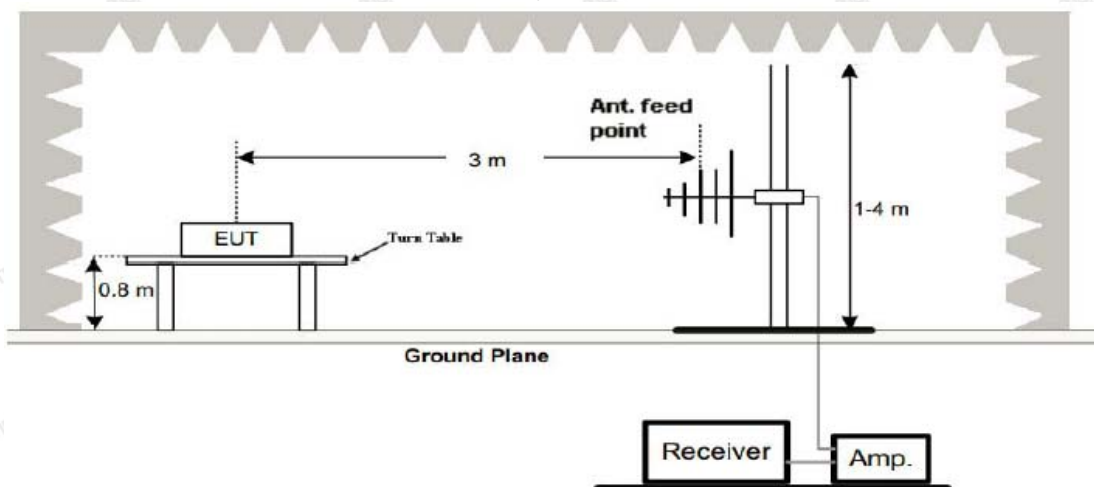
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

### 4.2 TEST SETUP

#### (1) Radiated Emission Test-Up Frequency Below 30MHz

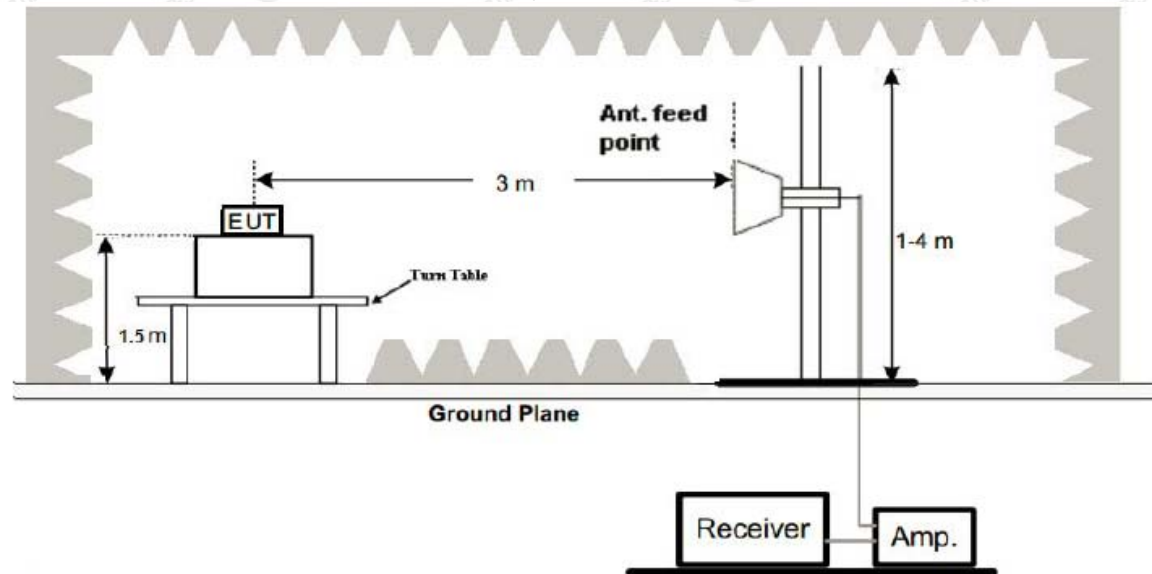


#### (2) Radiated Emission Test-Up Frequency 30MHz~1GHz





### (3) Radiated Emission Test-Up Frequency Above 1GHz



#### 4.3 TEST PROCEDURE

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

#### Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

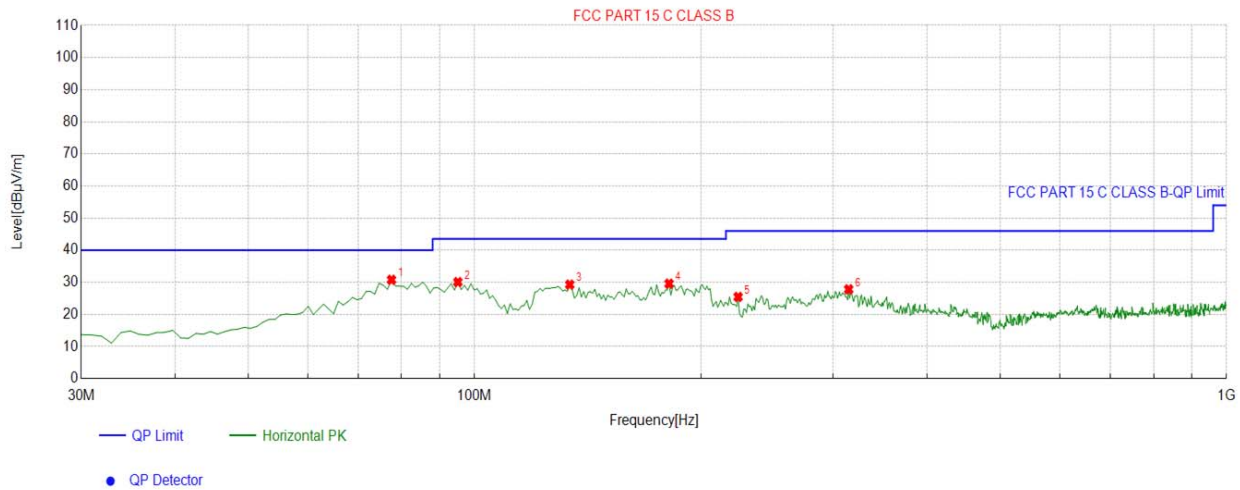
#### 4.4 TEST RESULT

PASS



## Below 1GHz Test Results:

Antenna polarity: H



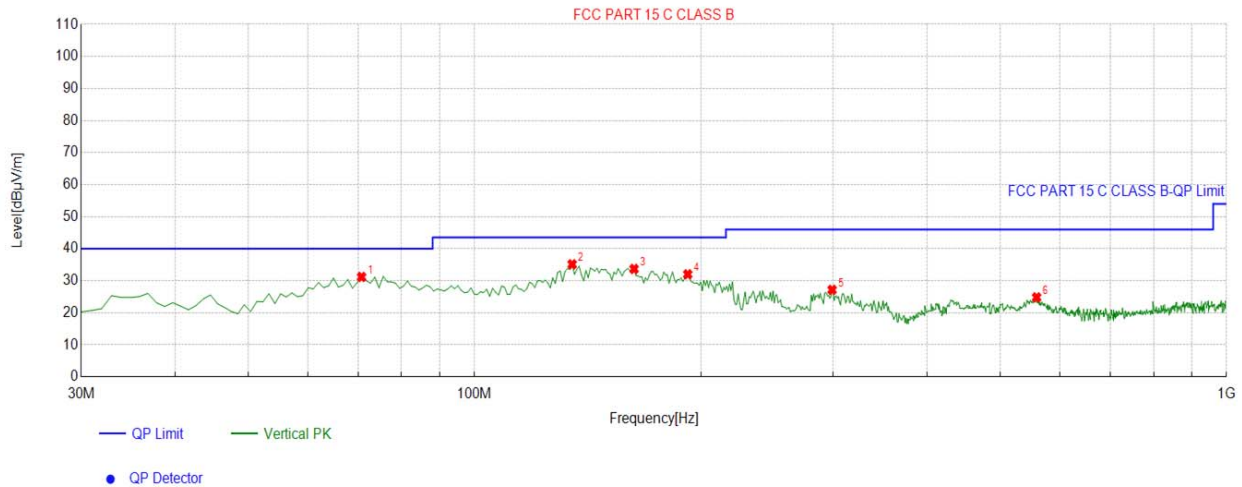
## Suspected List

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	77.5776	-19.03	49.80	30.77	40.00	9.23	100	2	Horizontal
2	95.0551	-16.23	46.29	30.06	43.50	13.44	100	359	Horizontal
3	133.8939	-18.81	48.08	29.27	43.50	14.23	100	331	Horizontal
4	181.4715	-16.73	46.30	29.57	43.50	13.93	100	286	Horizontal
5	224.1942	-14.46	39.91	25.45	46.00	20.55	100	359	Horizontal
6	314.4945	-12.38	40.18	27.80	46.00	18.20	100	280	Horizontal

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



Antenna polarity: V



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	70.7808	-17.81	48.98	31.17	40.00	8.83	100	17	Vertical
2	134.8649	-18.87	53.99	35.12	43.50	8.38	100	210	Vertical
3	163.0230	-17.94	51.61	33.67	43.50	9.83	100	178	Vertical
4	192.1522	-15.81	47.81	32.00	43.50	11.50	100	184	Vertical
5	298.9590	-12.75	39.90	27.15	46.00	18.85	100	152	Vertical
6	559.1792	-6.70	31.50	24.80	46.00	21.20	100	232	Vertical

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

### Harmonics and Spurious Emissions

#### 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.



## Above 1 GHz Test Results:

CH (2440MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2440	100.06	-5.65	94.41	114	-19.59	peak
2440	81.34	-5.65	75.69	94	-18.31	AVG
4880	55.21	-3.43	51.78	74	-22.22	peak
4880	40.17	-3.43	36.74	54	-17.26	AVG
7320	53.81	-0.75	53.06	74	-20.94	peak
7320	35.22	-0.75	34.47	54	-19.53	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2440	98.13	-5.65	92.48	114	-21.52	peak
2440	81.79	-5.65	76.14	94	-17.86	AVG
4880	56.32	-3.43	52.89	74	-21.11	peak
4880	43.78	-3.43	40.35	54	-13.65	AVG
7320	53.29	-0.75	52.54	74	-21.46	peak
7320	40.75	-0.75	40	54	-14	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

## Remark :

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency; "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
- (6) 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.
- (7) All modes of operation were investigated and the worst-case emissions are reported.



## 5 BAND EDGE

### 5.1 LIMITS

FCC PART 15.249(d) 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 §15.209, whichever is the lesser attenuation.

### 5.2 TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 1MHz and VBM to 3MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 1MHz and VBW to 3MHz, to measure the conducted peak band edge.



## 5.3 TEST RESULT

**PASS**

Radiated Band Edge Test:

Operation Mode: TX CH Low (2440MHz)

Horizontal (Worst case)

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	56.41	-5.81	50.6	74	-23.4	peak
2310	/	-5.81	/	54	/	AVG
2390	55.87	-5.84	50.03	74	-23.97	peak
2390	/	-5.84	/	54	/	AVG
2400	53.64	-5.84	47.8	74	-26.2	peak
2400	/	-5.84	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	57.88	-5.81	52.07	74	-21.93	peak
2310	/	-5.81	/	54	/	AVG
2390	54.61	-5.84	48.77	74	-25.23	peak
2390	/	-5.84	/	54	/	AVG
2400	53.79	-5.84	47.95	74	-26.05	peak
2400	/	-5.84	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						



Operation Mode: TX CH High (2440MHz)

Horizontal (Worst case)

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	57.14	-5.65	51.49	74	-22.51	peak
2483.50	/	-5.65	/	54	/	AVG
2500.00	56.28	-5.65	50.63	74	-23.37	peak
2500.00	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	56.14	-5.65	50.49	74	-23.51	peak
2483.50	/	-5.65	/	54	/	AVG
2500.00	54.34	-5.65	48.69	74	-25.31	peak
2500.00	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						
Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.						



## 6 OCCUPIED BANDWIDTH MEASUREMENT

### 6.1 TEST SETUP

Same as Radiated Emission Measurement

### 6.2 TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on ANSI C63.10 section 6.9.2: RBW= 10KHz. VBW= 30KHz, Span=2MHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

### 6.3 MEASUREMENT EQUIPMENT USED

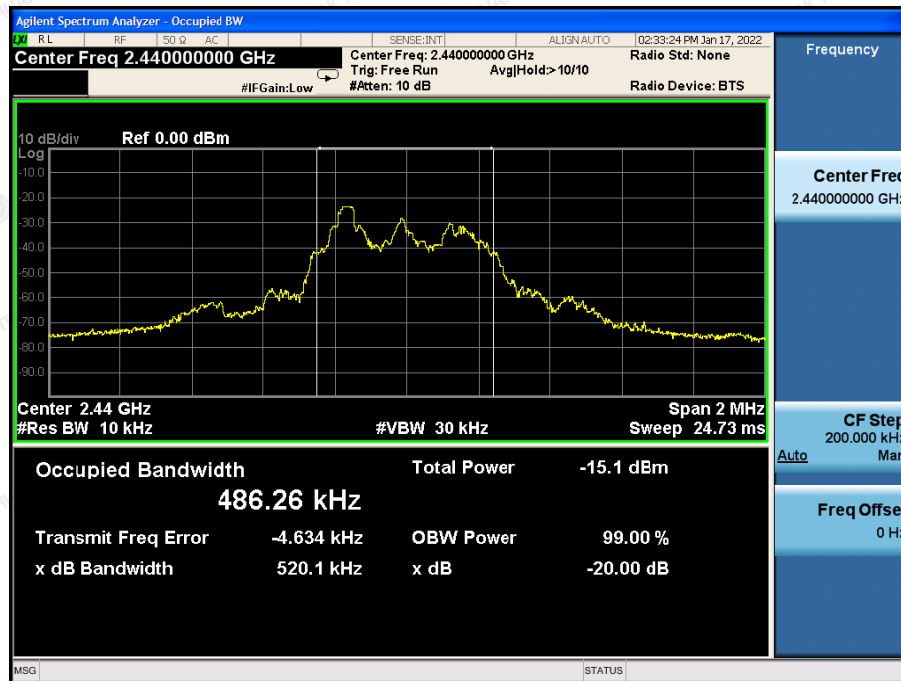
Same as Radiated Emission Measurement

### 6.4 TEST RESULT

**PASS**

Frequency	20dB Bandwidth (MHz)	Result
2440 MHz	0.5201	<b>PASS</b>

CH: 2440MHz





## 7 ANTENNA REQUIREMENT

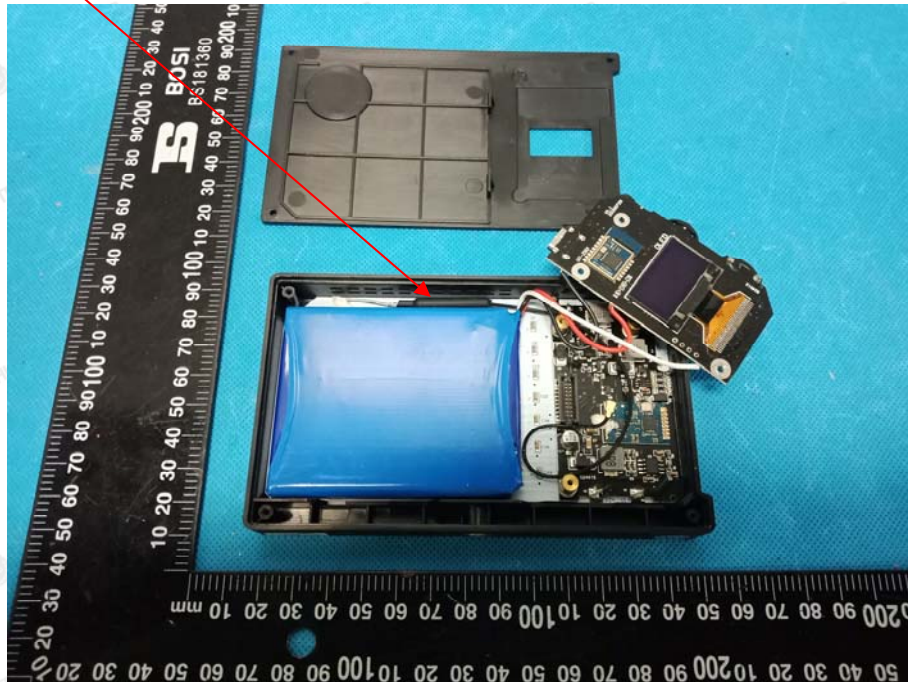
### Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

### Antenna Connected Construction

The antenna used in this product is a Internal Antenna, need professional installation, It conforms to the standard requirements. The directional gains of antenna used for transmitting is 0dBi.

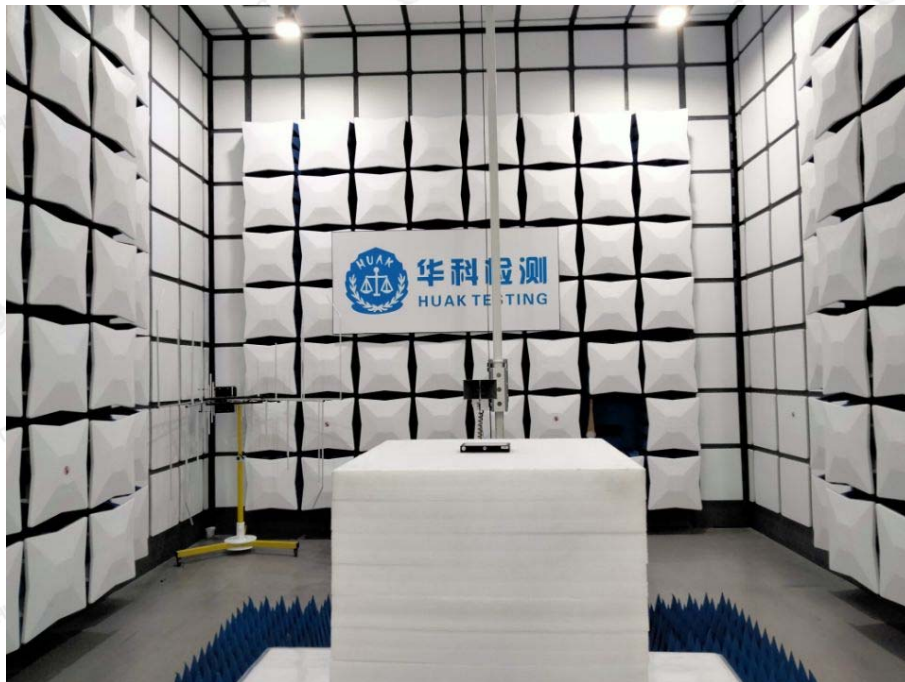
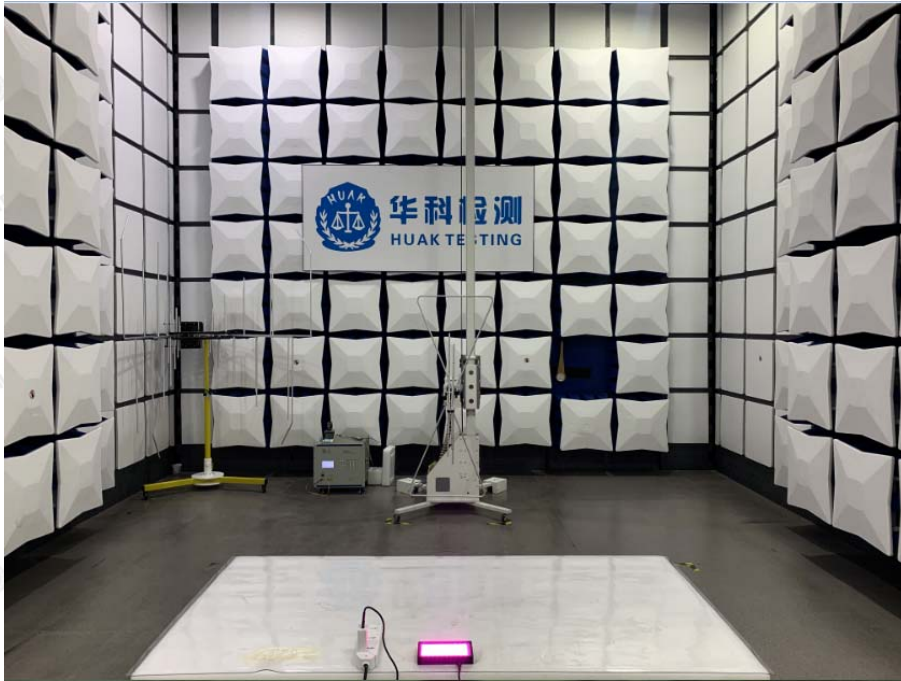
### ANTENNA





## 8 PHOTOGRAPH OF TEST

### Radiated Emission



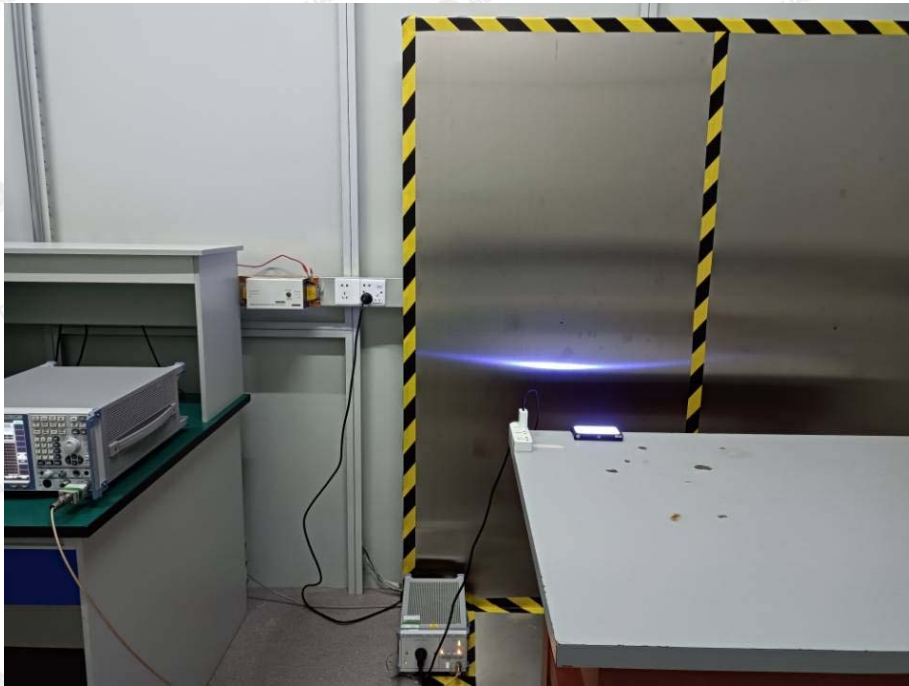
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## Conducted Emission



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## 9 PHOTOS OF THE EUT

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

-----End of test report-----