

FCC PART 15 SUBPART C

TEST REPORT

Issued By: Dongguan New Testing Centre Co., Ltd

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IC Test Site Number:CN0087

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3. The test report is invalid without the signatures of approver, reviewer and testing engineer.
4. The test report is invalid if altered.
5. Objections to the test report must be submitted to NTC within 15 days.
6. The test report is valid for the tested samples only.
7. As for test verdict, "—"means is "no need for judgment" "N/A" means is "not applicable", "P" means "pass", "F" means "fail".

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TEST REPORT DECLARE

FCC ID	:	XZH-50242161
IC ID	:	20122-50242161
Applicant	:	ETI Solid State Lighting (Zhuhai) Ltd
Address	:	No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City, Guangdong Prov., China
Equipment under Test	:	LED HIGH-BAY
Model No	:	502421XX where "XX=00-99" denotes color temperature (All the same except model name and color temperature)
Trade Mark	:	ETI, Commercial Electric, Hampton Bay
Manufacturer	:	ETI Solid State Lighting (Zhuhai) Ltd
Address	:	No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City, Guangdong Prov., China

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C: 2017, ANSI C63.10:2013.

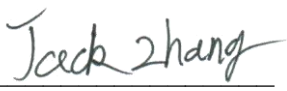
We Declare:

The equipment described above is tested by Dongguan New Testing Centre Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan New Testing Centre Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No.:	NTCER1908014		
Date of Test:	2019.07.16 to 2019.09.29	Date of Report:	2019.09.29

Prepared By:


Jack Zhang/Engineer



Neil Zhong/LAB Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan New Testing Centre Co., Ltd

1. Summary of test results

Description of Test Item	Standard	Results
20dB Bandwidth and 99% Bandwidth	F CC Part 15 Subpart C:2017 ANSI C63.10:2013 RSS-210:2017 RSS-Gen:2019	PASS
Conducted Emission Test	F CC Part 15 Subpart C:2017 ANSI C63.10:2013 RSS-210:2017 RSS-Gen:2019	PASS
Radiated Emission Test	F CC Part 15 Subpart C:2017 ANSI C63.10:2013 RSS-210:2017 RSS-Gen:2019	PASS

2. General test information

2.1. Description of EUT

EUT* Name	:	LED HIGH-BAY
Test model	:	50242161
EUT function description	:	Please reference user manual of this device
Power supply	:	AC 120-277V 50/60Hz 138W
Trade mark	:	ETI, Commercial Electric, Hampton Bay
Operation frequency	:	5801MHz
Antenna Type	:	PCB antenna
Antenna Gain	:	2.58 dBi
Sample Type	:	Series production

Note: 1,EUT is the ab. of equipment under test.

2.2. Detail models

Model	Rating	Note
502421XX	AC 120-277V 50/60Hz 138W	where "XX=00-99" denotes LED color temperature

Note: All the same except model name and LED color temperature.

2.3. Block diagram EUT configuration for test

For EUT Tx mode:



2.4. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-24°C
Humidity range:	40-75%
Pressure range:	86-106kPa

2.5. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (30MHz – 1GHz)	3.14 dB (Polarize: V)
	3.16 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz – 18GHz)	4.27 dB (Polarize: V)
	4.51 dB (Polarize: H)
Bandwidth	±1.2%
Stop Transmitting Time Test	±0.5%
Uncertainty for frequency error	5.8×10^{-8}

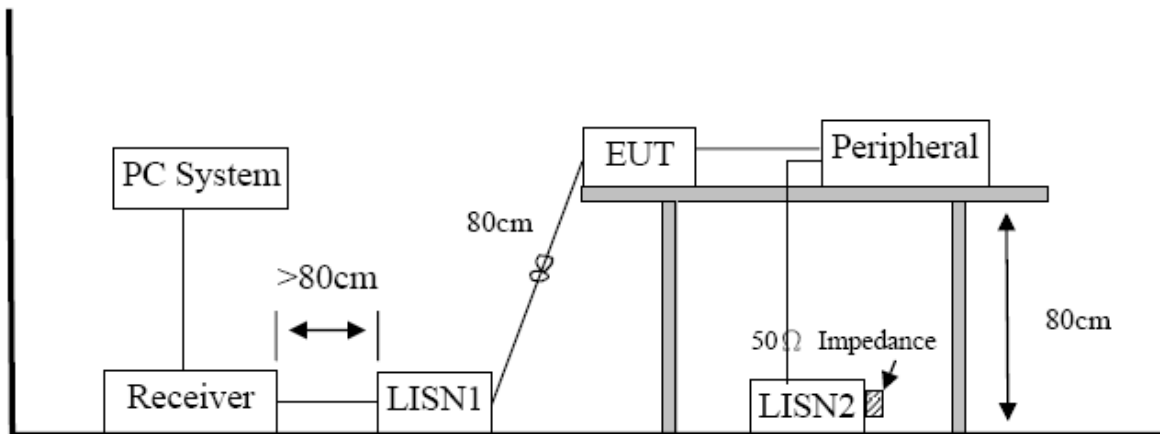
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Power Line Conducted Emission Test

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	R&S	ESCS30	8341151006	2019-05-23	1 Year
2	LISN	R&S	ENV216	3650.6550.06	2019-05-13	1 Year
3	Pulse Limiter	R&S	ESH3-Z2	0357-8810.54	2019-05-13	1 Year
4	RF Cable	HUBER	SUCOFLEX100	30722/4E	2019-05-13	1 Year
5	MEASUREMENT SOFTWARE	FARAD	EZ-EMC(VER:1.1.4.2)	N/A	N/A	N/A

3.2. BLOCK DIAGRAM OF TEST SETUP



3.3. Power Line Conducted Emission Limits (Class B)

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

3.4. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.3 and test equipment as described in clause 3.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.3 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

3.5. Test Result

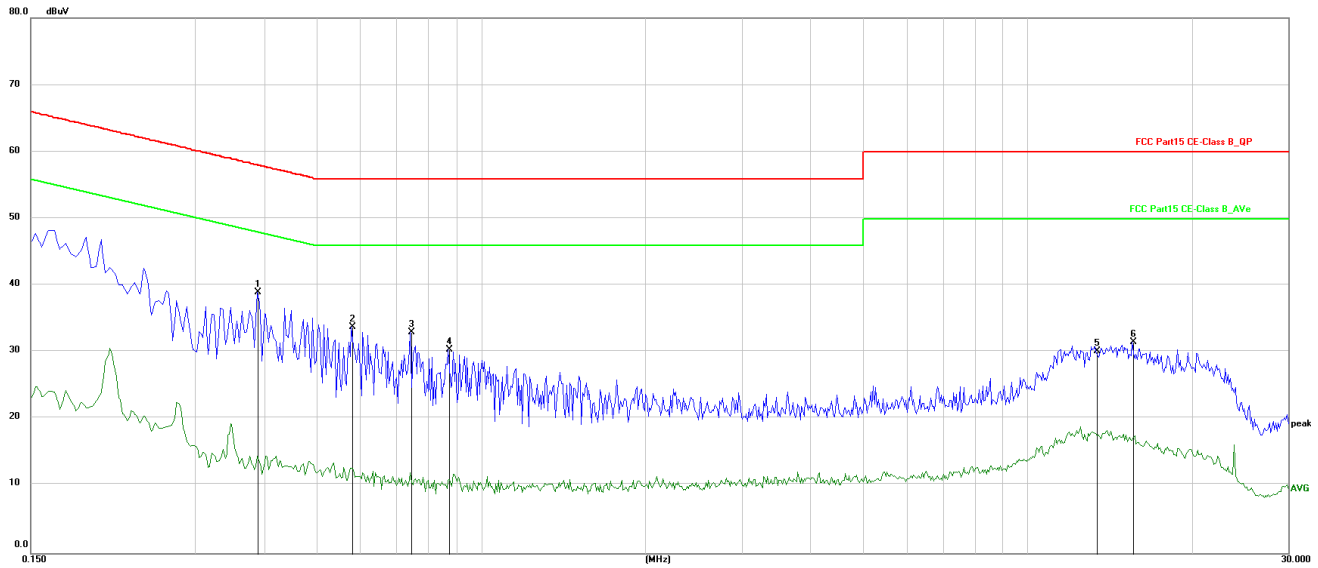
PASS. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: "-----" means Peak detection; "-----" mans Average detection

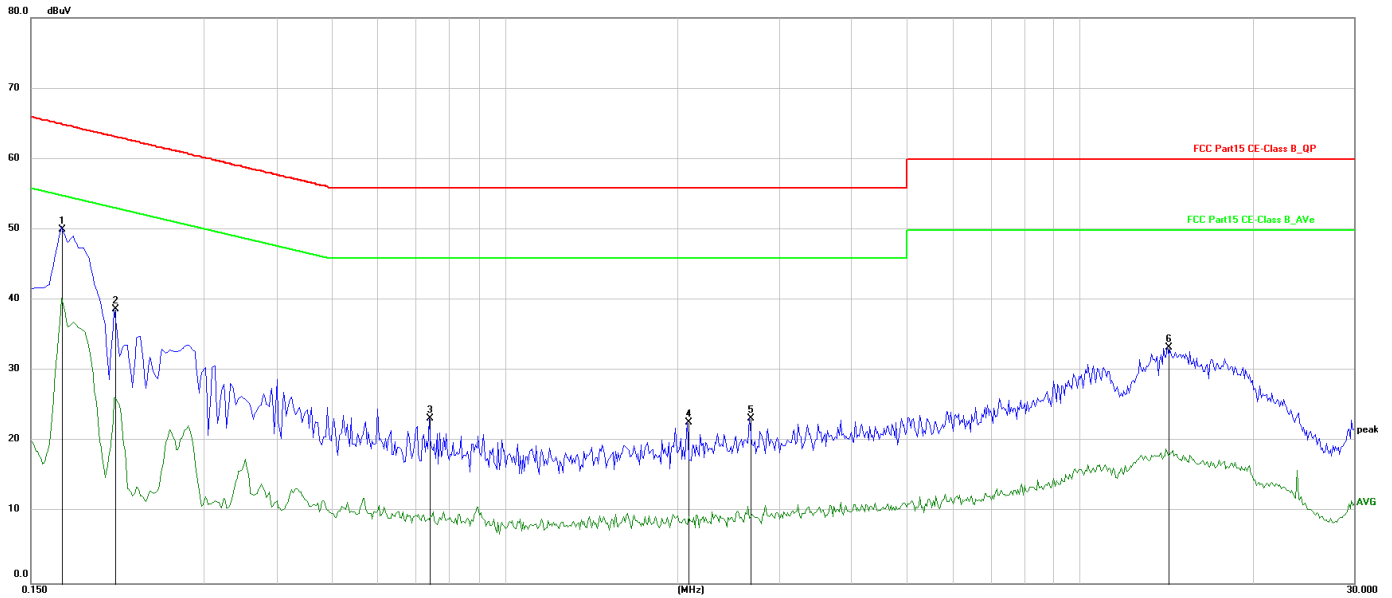
Note3: Measurement = Reading Level + Factor, Margin= Measurement-Limit

Conducted Emission Test Result



Site:	844LAB	Phase:	L1	Temperature(C):	24(C)
Limit:	FCC Part15 CE-Class B_QP	Test Time:		Humidity(%):	63%
EUT:	LED HIGH-BAY	Power Rating:		AC120/60Hz	
M/N.:	50242161	Test Engineer:			
Mode:	Tx mode with light on				
Note:					

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1 *	0.3899	29.34	9.73	39.07	58.07	-19.00	peak	
2	0.5804	24.14	9.77	33.91	56.00	-22.09	peak	
3	0.7442	23.29	9.79	33.08	56.00	-22.92	peak	
4	0.8716	20.64	9.82	30.46	56.00	-25.54	peak	
5	13.3419	20.17	10.10	30.27	60.00	-29.73	peak	
6	15.5619	21.44	10.11	31.55	60.00	-28.45	peak	



Site:	844LAB	Phase:	N	Temperature(C):	24(C)
Limit:	FCC Part15 CE-Class B_QP	Test Time:	2019/7/18 15:02:55	Humidity(%):	63%
EUT:	LED HIGH-BAY	Power Rating:	AC120/60Hz		
M/N.:	50242161	Test Engineer:			
Mode:	Tx mode with light on				
Note:					

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1 *	0.1703	40.42	9.62	50.04	64.95	-14.91	peak	
2	0.2100	29.22	9.64	38.86	63.21	-24.35	peak	
3	0.7420	13.73	9.68	23.41	56.00	-32.59	peak	
4	2.0780	12.75	10.05	22.80	56.00	-33.20	peak	
5	2.6740	13.30	10.05	23.35	56.00	-32.65	peak	
6	14.2620	23.28	10.10	33.38	60.00	-26.62	peak	

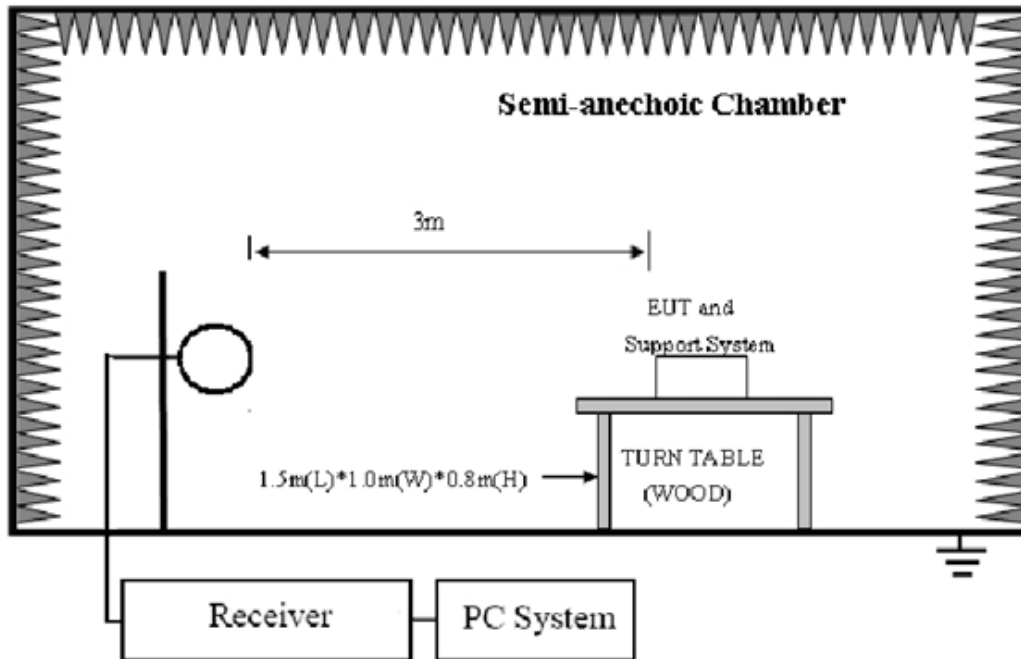
4. Radiated emission test

4.1. Test equipment

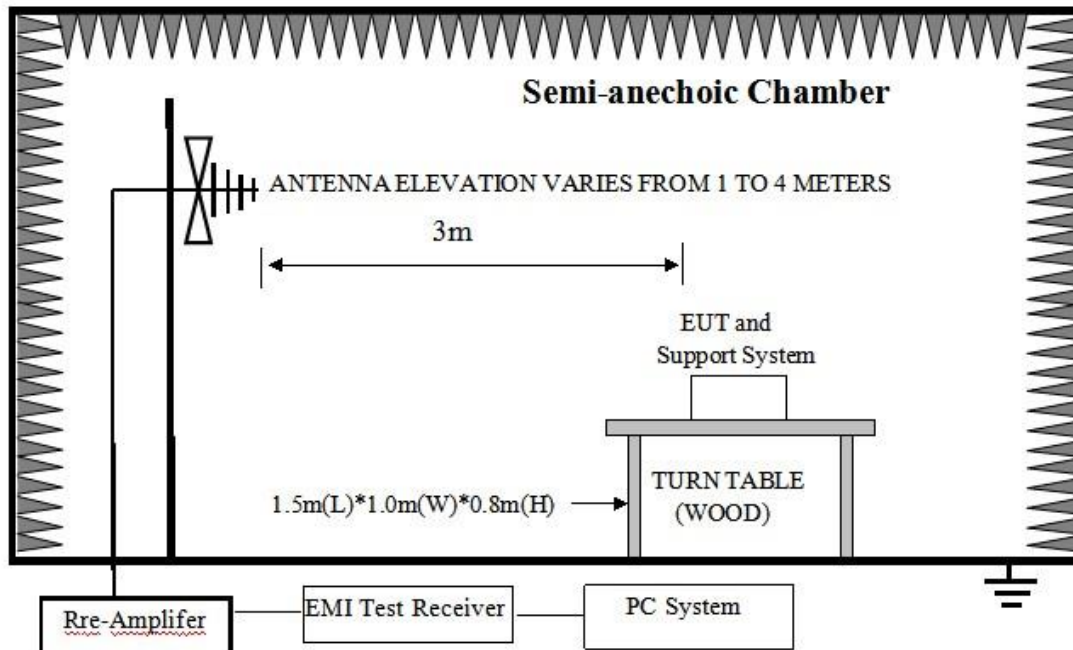
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESR	7250-30406 7528	2019-04-30	1Year
2	Trilog Broadband Antenna	Schwarzbeck	VULB9168	00969	2019-06-14	2 Year
3	Pre-amplifier	R&S	8447F	3113A04553	2019-05-13	1Year
4	Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	2019-05-23	1Year
5	Horn antenna	Schwarzbeck	BBHA9120D	453	2019-05-23	2Year
6	Double Ridged Horn Antenna	A.H. System	SAS-574	584	2019-05-23	1Year
7	Pre-amplifier	R&S	SCU18	105326	2019-05-23	1Year
8	RF Cable	GORE	OSQ01Q010 78.7	SN1545847 3	2019-05-23	2Year
9	RF Cable	GORE	OSQ01Q010 78.7	SN1545847 4	2019/5/14	1Year
10	RF Cable	ESCO	ETS-LINGR EN	RFC-SMS-1 00-SMS-340 -IN	2019-05-23	1Year
11	Measurement software	Farad	EZ-EMC(VE R:1.1.4.2)	N/A	N/A	N/A

4.2. Block diagram of test setup

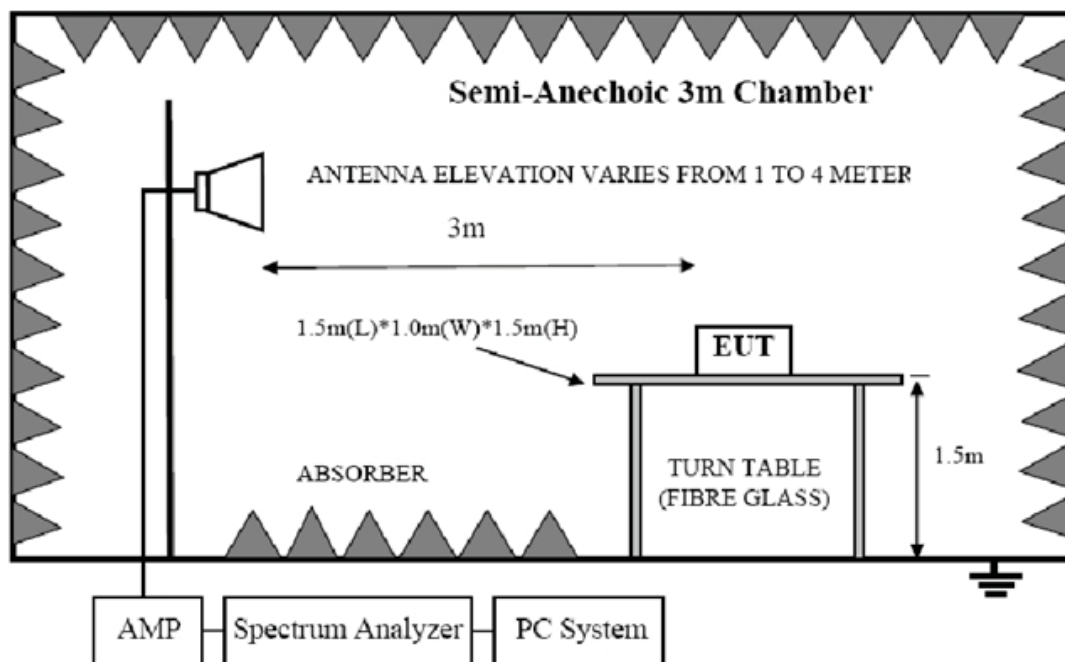
In 3m Anechoic Chamber Test Setup Diagram for 9KHz to 30MHz:



In 3m Anechoic Chamber Test Setup Diagram for 30MHz to 1GHz:



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz:



4.3. Limit

FCC 15.205 Restricted frequency band:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

FCC 15.209 Limit

Frequency (MHz)	Distance (Meters)	Field Strengths Limits dB(μV)/m
30--88	3	40.0
88--216	3	43.5
216--960	3	46.0
960--1000	3	54.0
Above 1GHz	3	Peak: 74.0
	3	Average: 54.0

Note: (1) The smaller limit shall apply at the cross point between two frequency bands.

(2) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

(3) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(4) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3\text{m}}(\text{dB}\mu\text{V}/\text{m}) = \text{Limit}_{30\text{m}}(\text{dB}\mu\text{V}/\text{m}) + 40\text{Log}(30\text{m}/3\text{m})$$

(5) All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.109, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.109 limits.

4.4. Test Procedure

Procedure of Preliminary Test

Configuration EUT to simulate typical usage as described in clause 2.3 and test equipment as described in clause 4.2 of this report.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No extension cords shall be used to mains receptacle.

EUT height should be 0.8m for below 1GHz and 1.5m for above 1GHz at ground with absorbers.

The antenna was placed at 3 meter away from the EUT as stated in ANSI C63.10. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Analyzer / Receiver quickly scanned from 30MHz to 18GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

The X, Y, Z three axial are tested and the report only the worst case.

The emissions from 9KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW:

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RMS detector RBW 1MHz VBW 3MHz for Average measure.

4.5. Test result

PASS. (See below detailed test result)

All the emissions except fundamental emission from 9 KHz to 40GHz were comply with FCC PART 15.209 limits limit.

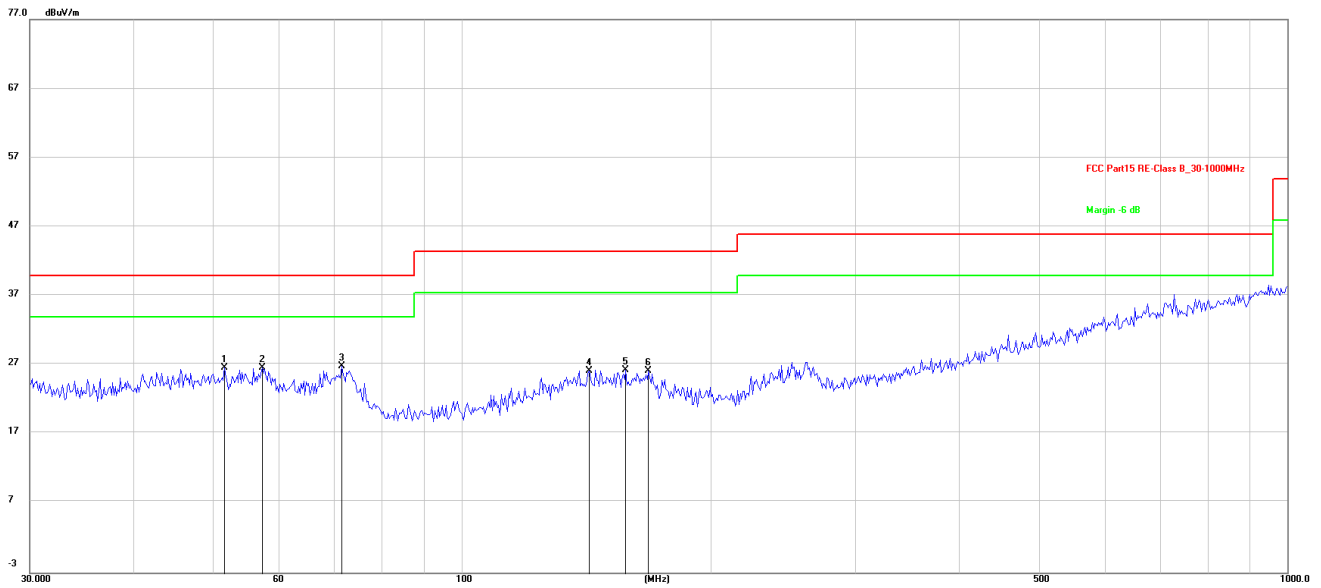
Note1: According exploratory test no any obvious emission were detected from 9KHz to 30MHz and

18GHz to 40GHz, so the final test was performed with frequency range from 30MHz to 18GHz and recorded in below.

Note2: For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

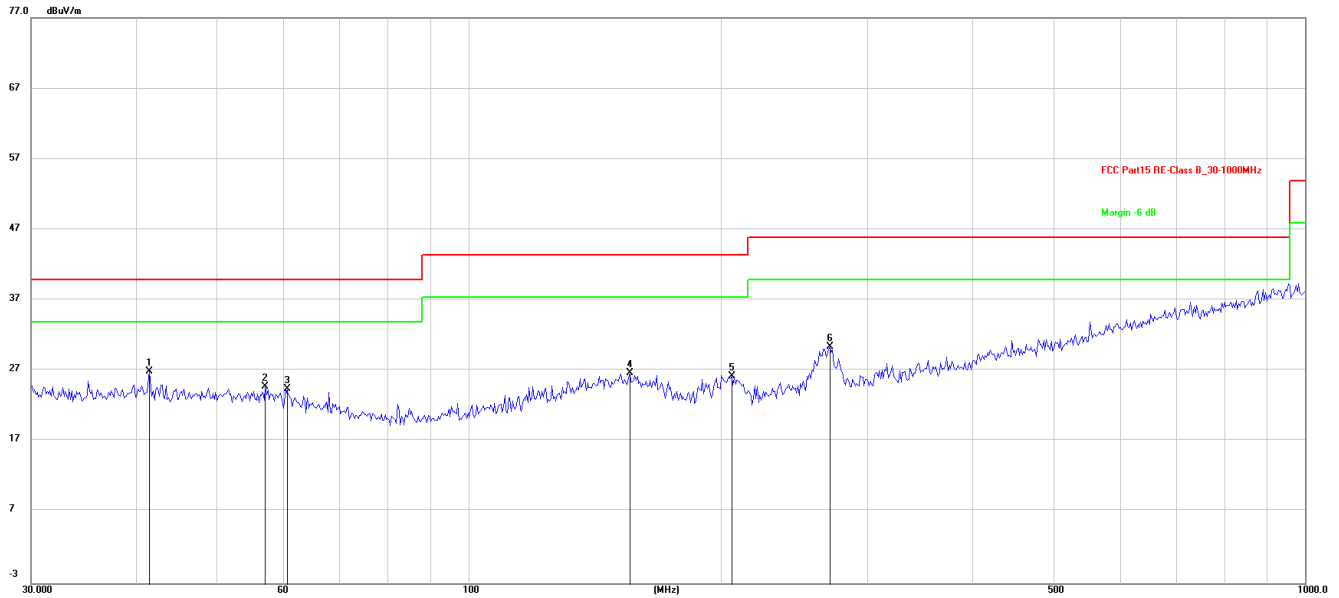
Note3: Level = Reading Level + Factor, Margin= Level-Limit

Radiated Emission Test Result



Site:	966LAB	Antenna::Vertical	Temperature(C):24(C)
Limit:	FCC Part15 RE-Class B_30-1000MHz		Humidity(%):60%
EUT:	LED HIGH-BAY	Test Time:	2019/7/17 22:10:21
M/N.:	50242161	Power Rating:	AC 120V/60Hz
Mode:	Tx mode with light on	Test Engineer:	
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	51.6613	12.51	14.22	26.73	40.00	-13.27	peak			
2	57.3922	12.85	13.81	26.66	40.00	-13.34	peak			
3 *	71.5805	15.43	11.53	26.96	40.00	-13.04	peak			
4	142.8242	11.32	14.95	26.27	43.50	-17.23	peak			
5	158.1123	10.90	15.45	26.35	43.50	-17.15	peak			
6	168.4137	11.53	14.68	26.21	43.50	-17.29	peak			



Site:	966LAB	Antenna::Horizontal	Temperature(C):24(C)
Limit:	FCC Part15 RE-Class B_30-1000MHz		Humidity(%):60%
EUT:	LED HIGH-BAY	Test Time:	2019/7/17 21:59:21
M/N.:	50242161	Power Rating:	AC 120V/60Hz
Mode:	Tx mode with light on	Test Engineer:	
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1 *	41.5670	12.28	14.71	26.99	40.00	-13.01	peak			
2	57.1914	11.06	13.82	24.88	40.00	-15.12	peak			
3	60.4919	11.00	13.53	24.53	40.00	-15.47	peak			
4	155.9101	11.34	15.46	26.80	43.50	-16.70	peak			
5	206.3975	14.88	11.47	26.35	43.50	-17.15	peak			
6	270.3748	16.73	13.77	30.50	46.00	-15.50	peak			

Site:	966LAB	Antenna::H / V	Temperature(C):24(C)
Limit:	FCC Part 15.249		Humidity(%):60%
EUT:	LED HIGH-BAY	Test Time:	2019/8/09 :17:54
M/N.:	50242161	Power Rating:	AC 120V/60Hz
Mode:	Tx mode	Test Engineer:	
Note:			

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Pre-amp (dB)	Cable lost (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detect	Antenna polarizat ion
5150.00	50.59	31.32	40.32	11.21	52.80	74.00	-21.20	Peak	H
5150.00	43.37	31.32	40.32	11.21	45.58	54.00	-8.42	Average	H
5725.00	49.62	31.96	40.28	11.64	52.94	74.00	-21.06	Peak	H
5725.00	42.86	31.96	40.28	11.64	46.18	54.00	-7.82	Average	H
5801.00	76.70	32.11	40.26	11.68	80.23	114.00	-33.77	Peak	H
5801.00	71.81	32.11	40.26	11.68	75.34	94.00	-18.66	Average	H
5875.00	47.33	32.26	40.15	12.14	51.58	74.00	-22.42	Peak	H
5875.00	41.12	32.26	40.15	12.14	45.37	54.00	-8.63	Average	H
11602.0	40.80	39.81	40.37	16.81	57.05	74.00	-16.95	Peak	H
11602.0	31.27	39.81	40.37	16.81	47.52	54.00	-6.48	Average	H
5725.00	47.33	31.32	40.32	11.21	49.54	74.00	-24.46	Peak	V
5725.00	40.56	31.32	40.32	11.21	42.77	54.00	-11.23	Average	V
5801.00	73.44	31.96	40.28	11.64	76.76	114.00	-37.24	Peak	V
5801.00	68.54	31.96	40.28	11.64	71.86	94.00	-22.14	Average	V
5875.00	49.62	32.11	40.26	11.68	53.15	74.00	-20.85	Peak	V
5875.00	40.58	32.11	40.26	11.68	44.11	54.00	-9.89	Average	V
11602.0	35.90	39.81	40.37	16.81	52.15	74.00	-21.85	Peak	V
11602.0	30.64	39.81	40.37	16.81	46.89	54.00	-7.11	Average	V

Note: 1. Result Level = Reading Level + Antenna Factor + Cable loss – Pre-amp Factor.

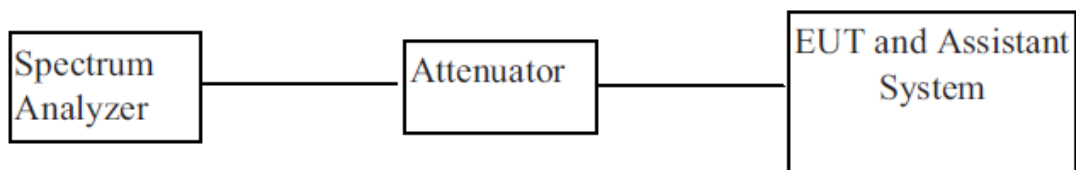
2. Antenna polarization: "H" means Horizontal , "V" means Vertical.

5. -20dB & 99% Bandwidth

5.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Analyzer	Agilent	N9020A	MY54510476	2019-06-21	1 Year

5.2. BLOCK DIAGRAM OF TEST SETUP



5.3. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained

in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

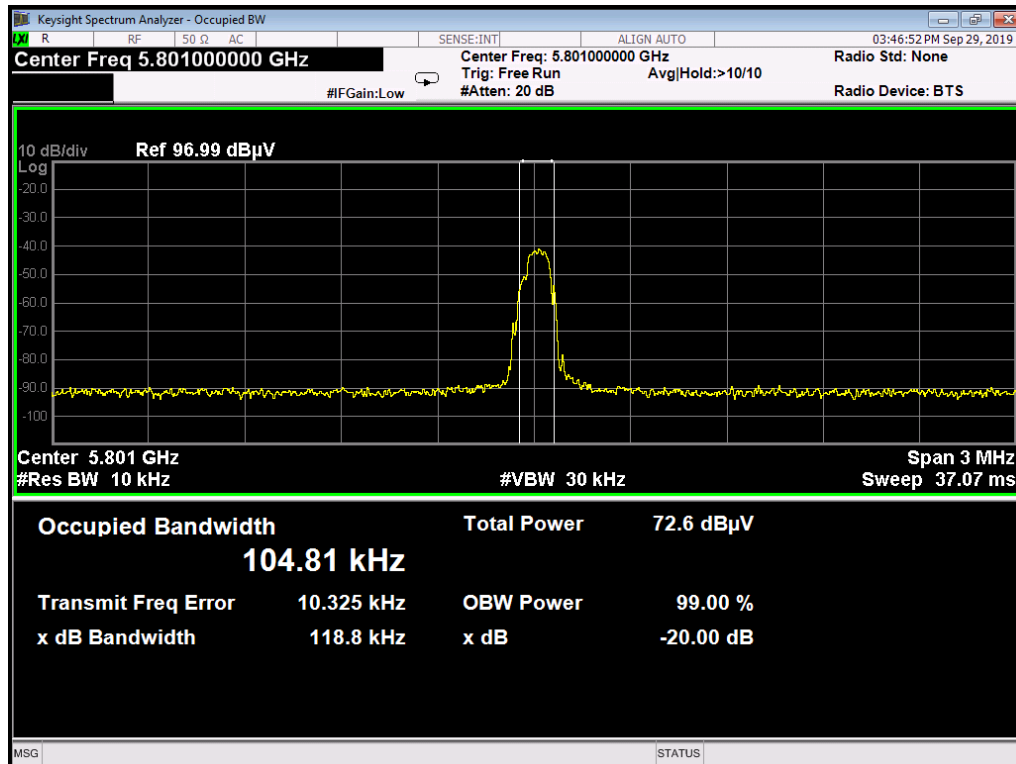
5.4. Test Procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) The bandwidth of the fundamental frequency was measured by spectrum analyzer with 10 kHz RBW and 30 kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

5.5. Test result

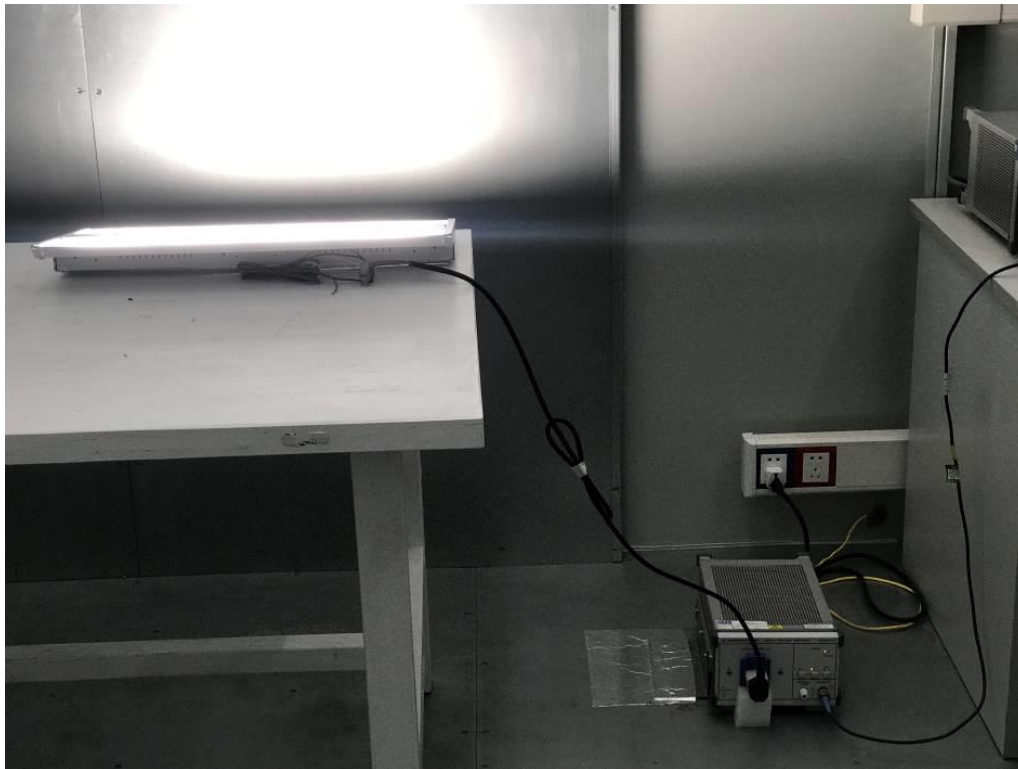
Cent. Freq.	20dB bandwidth	99% bandwidth
(MHz)	Result (KHz)	Result (KHz)
5801	118.80	104.81

Bandwidth



TEST SETUP PHOTOGRAPH

6.1. Photos of power line conducted emission test



6.2. Photos of radiated emission test

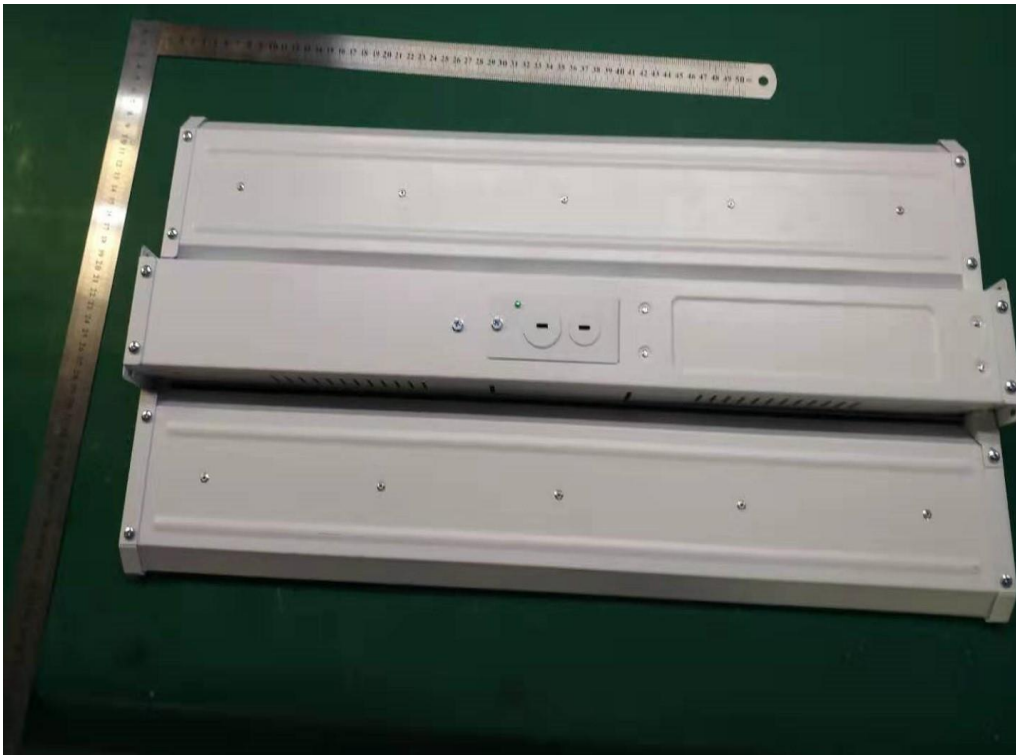
30MHz – 1GHz

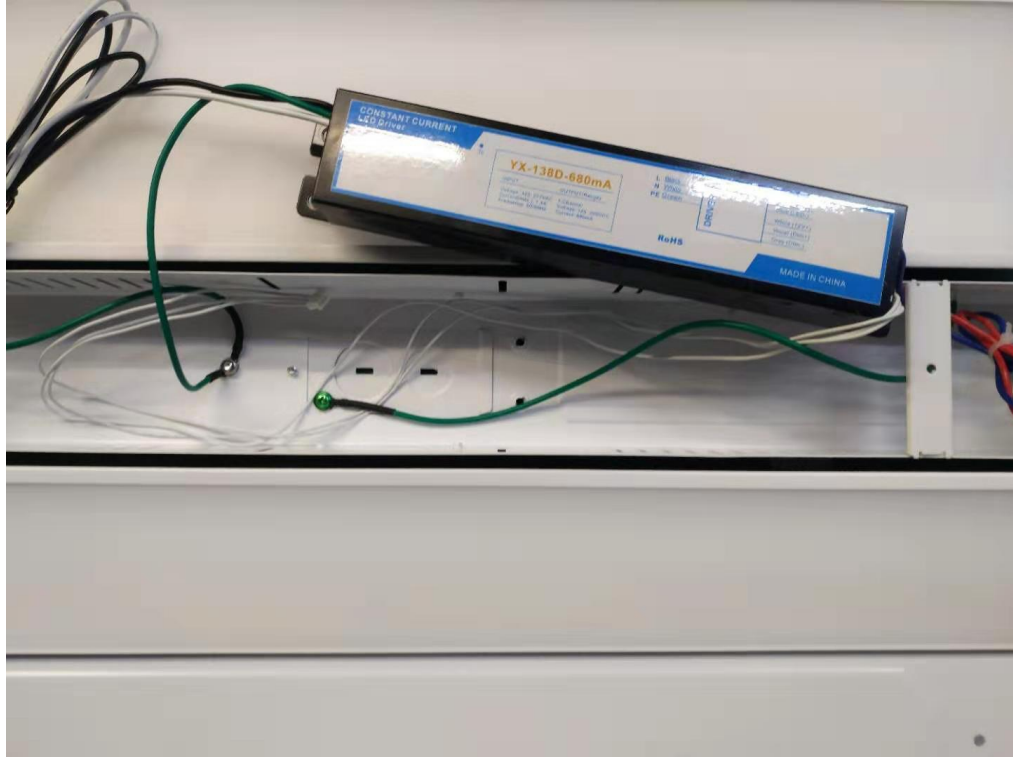


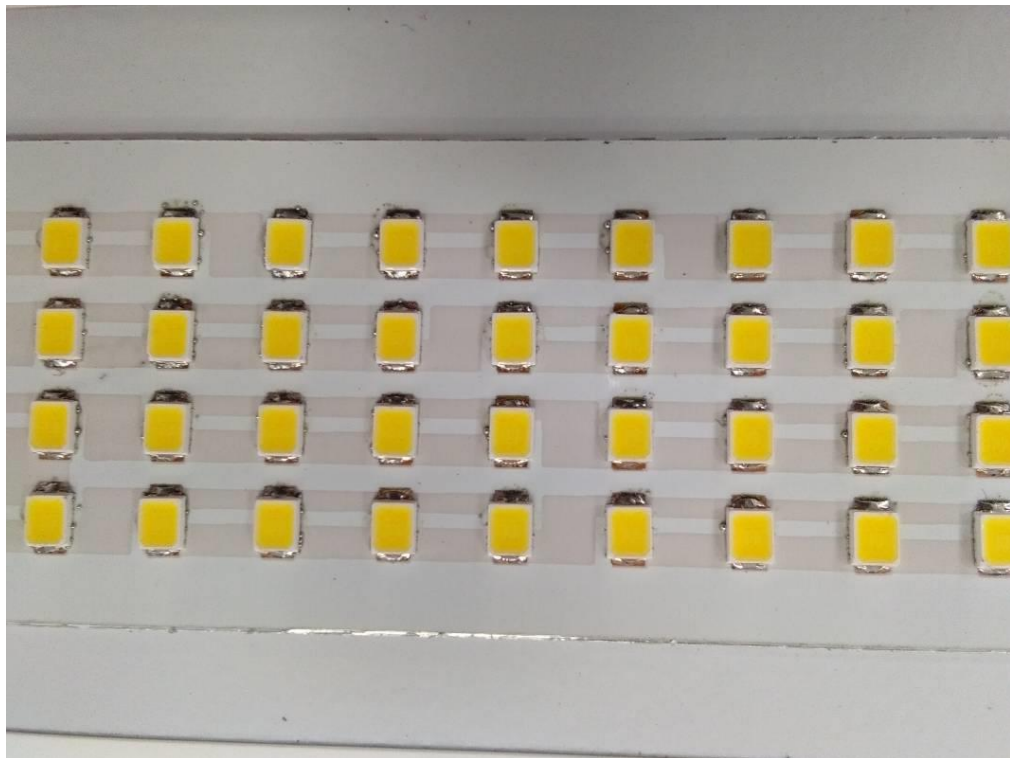
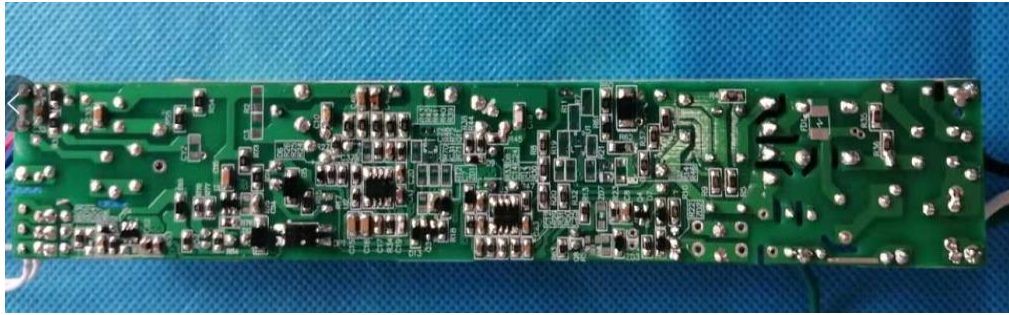
Above 1GHz



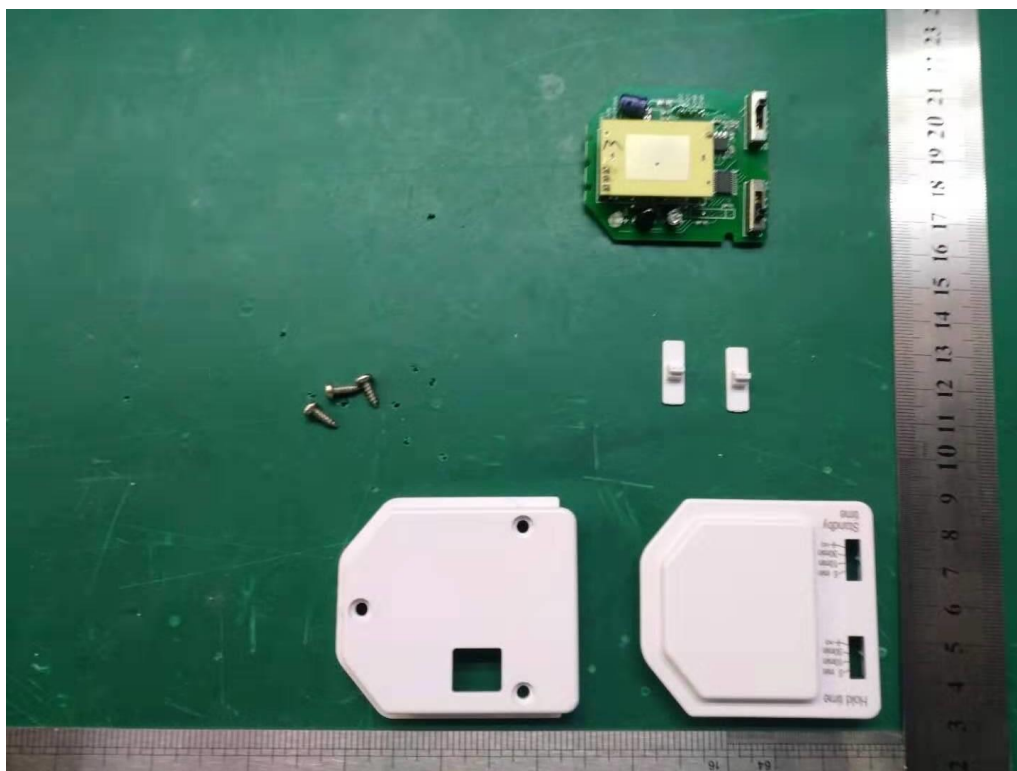
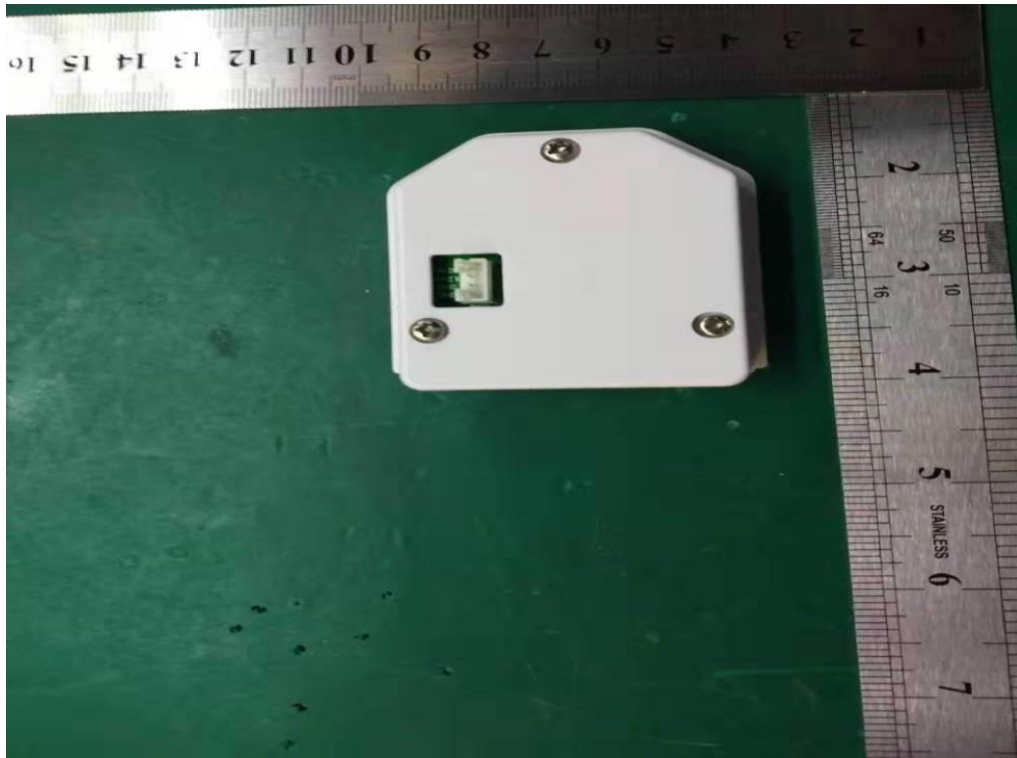
6. Photos of the EUT

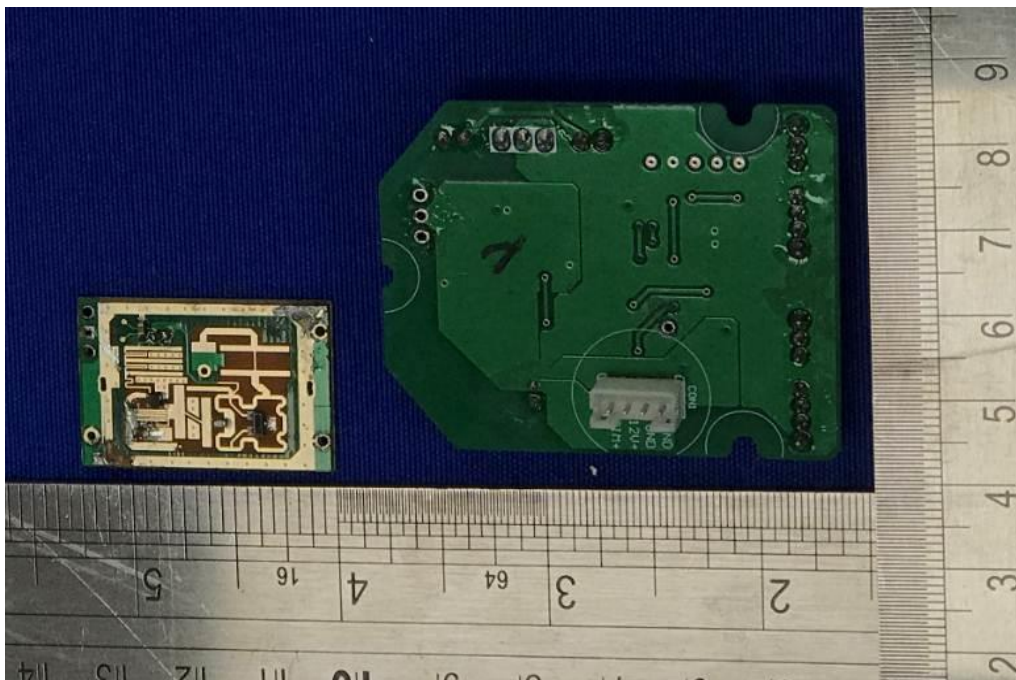
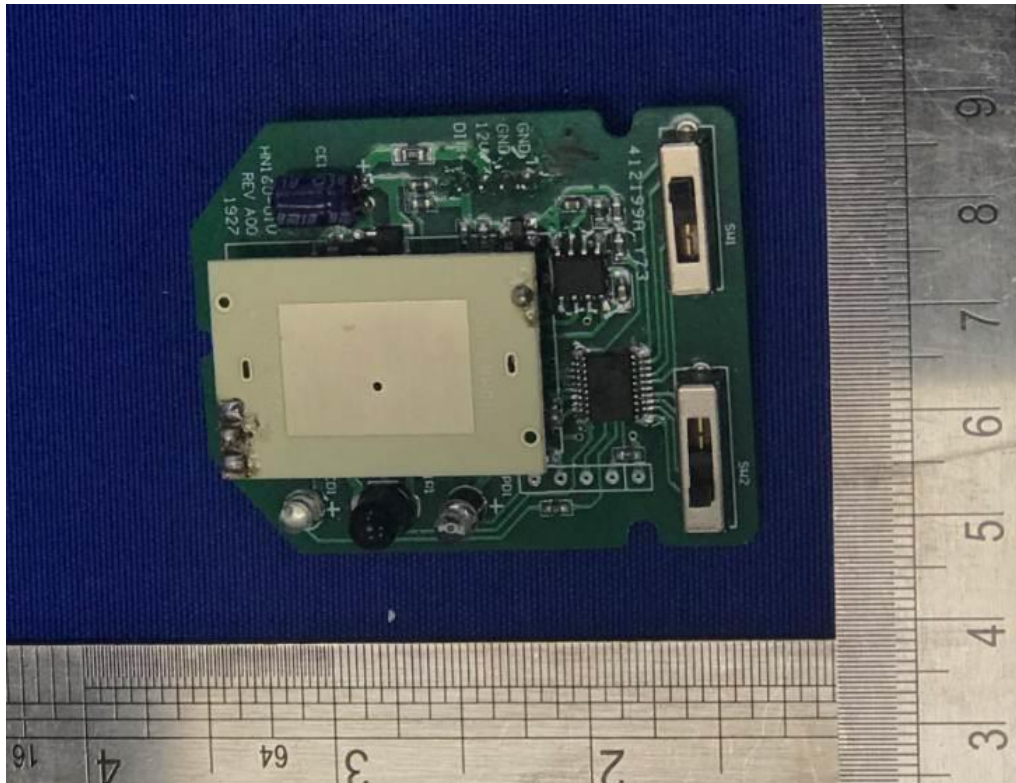


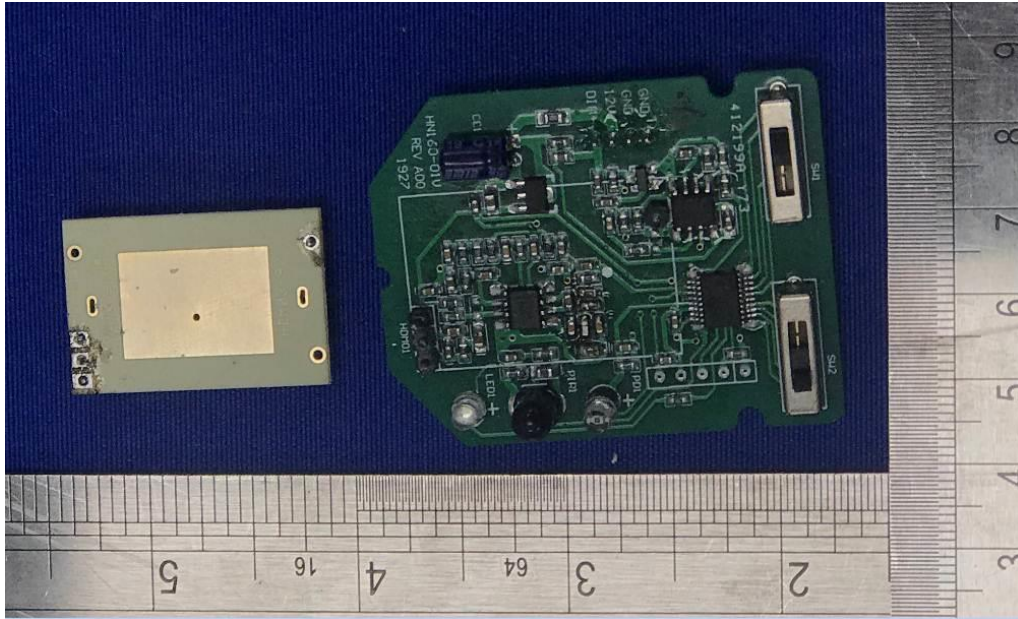












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