

TEST REPORT

Applicant:	FOSHAN ECCO LIGHTING CO., LTD
Address of Applicant:	Danzao Town, Nanhai Foshan, Guangdong, China
Manufacturer:	FOSHAN ECCO LIGHTING CO.,LTD
Address of Manufacturer:	Danzao Town, Nanhai Foshan, Guangdong, China
Product name:	Under Cabinet Light
Model:	EC-310371-XXX, EC-310415-XXX, UCL-XXX (XXX may be followed by up to eight characters, the eight characters followed item denote body finish, commercial code or color temperature, such as 30K denote 3000K)
Rating(s):	Input: AC 100-240V, 50/60Hz (For CLASS 2 POWER UNIT) Output: 24Vdc, 1A (For CLASS 2 POWER UNIT) Input: 24Vdc (For main)
Trademark:	/
Standards:	FCC Part15 subpart B: 2020
FCC ID:	2AWW6-UCL1
Date of Receipt:	2020-11-17
Date of Test:	2020-11-17~2020-11-23
Date of Issue:	2020-11-24
Test Result	Pass*

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

Authorized for issue by:**Test by:**

Nov.24, 2020 Eleven Liang

Project Engineer

Date

Name/Position

Signature

Reviewed by:

Nov.24, 2020

Pauler Li
Project Manager

Date

Name/Position

Signature

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Testing Laboratory information:

Testing Laboratory Name : ITL Co., LTD
Address : No.8, Jinqianling Street 5, Huangjiang, Dongguan, Guangdong, China.
Testing location : Same as above
Tel..... : 0086-769-39001678
Fax : 0086-20-62824387
E-mail : itl@i-testlab.com

Possible test case verdicts:

- test case does not apply to the test object... : N/A
- test object does meet the requirement..... : P (Pass)
- test object does not meet the requirement . : F (Fail)

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report would be invalid test report without all the signatures of testing technician and approver.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

General product information:

EC-310371-XXX, EC-310415-XXX, UCL-XXX (XXX may be followed by up to eight characters, the eight characters followed item denote body finish, commercial code or color temperature, such as 30K denote 3000K)

All models are identical with each other except for model designation, color temperature.

All tests were performed on the model UCL as representative.

Test Summary:

The following standards have been applied to ensure the product conforms with the protection requirements of the council directive FCC part 15B

Electromagnetic Emissions				
Test Item	Test Standard	Test Method	Class/Severity	Result
Conducted Emission(0.15-30MHz)	FCC part 15.107	ANSI C63.4: 2014	Class B	PASS
Radiated Emission(30-1000MHz)	FCC part 15.109	ANSI C63.4: 2014	Class B	PASS

Test Location

All the tests were performed in ITL Co., LTD. Where is located at at No.8, Jinqianling Street 5, Huangjiang, Dongguan, Guangdong, China.

Tel: 0086-769-39001678, Fax: 0086-20-62824387

No test is subcontracted

Test Facility

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

- **CNAS Lab code:L9342**
- **FCC Designation No.:CN5035**
- **IC Registration NO.: 12593A**
- **NVLAP LAB CODE: 600199-0**

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Section 1 General Information and Equipment Used

1.1 Client Information

Applicant: FOSHAN ECCO LIGHTING CO.,LTD
Address of Applicant: Danzao Town, Nanhai Foshan, Guangdong, China

1.2 EUT General and Technical Descriptions

EUT Name: Under Cabinet Light
EUT Model: UCL
EUT Trademark: /
Input Voltage: AC 100-240V (For CLASS 2 POWER UNIT)
24Vdc (For main)
Frequency: 50/60Hz
Input Power/Current: /
Output rated: 24Vdc, 1A (For CLASS 2 POWER UNIT)
Power Cable Description: /
Other Cables Description: /
I/O Ports: /
Function(s) Description: /
Accessories information: /

1.3 Support Equipment(s) and Test Configuration

1.3.1 Details of Support Equipment(s)

Description	Manufacturer	Model No.	Connection	Working state
/	/	/	/	/

1.3.2 Working State of EUT

Power Supply of EUT: AC 120V, 60Hz
EUT Status: LED Lighting

1.3.3 Block Diagram of Test Configuration

/

1.4 Equipment Used during Test

Conducted Emission						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
DGITL-303a	EMI Test receiver	R&S	ESCI	100910	2020.05.22	2021.05.22
DGITL-304	L.I.S.N.#1	R&S	ESH3-Z5	100272	2020.05.22	2021.05.22
DGITL-302	Shielded Room	ETS•Lindgren	8*4*3	CT09010	2020.08.03	2022.08.03
DGITL-316	Pulse Limiter	R&S	ESH3-Z2	100327	2020.05.22	2021.05.22

Radiated Emission						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
DGITL- 301	Semi-Anechoic chamber	ETS•Lindgren	9*6*6	CT000874-1181	2020.08.03	2022.08.03
DGITL- 307	EMI test receiver	R&S	ESVS10	833616/003	2020.05.22	2021.05.22
DGITL- 306	Spectrum Analyzer	Agilent Technologies	N9010A	MY54200334	2020.05.22	2021.05.22
DGITL- 308	Bilog Antenna	ETS•Lindgren	3142E	156975	2020.06.20	2022.06.20
DGITL- 352	Pre Amplifier	MInI-CIrcuits	ZFC-1000 HX	SN292801110	2020.05.22	2021.05.22

Section 2 Emission Test Results

2.1 Conducted Emission at Mains Terminals, 150 kHz to 30MHz

Test Requirement:	FCC part 15.107
Test Method:	ANSI C63.4: 2014
Test Voltage:	120V AC, 60Hz
Test Date:	2020-11-17
Frequency Range:	150 kHz to 30MHz
Detector:	Peak for pre-scan Quasi-Peak and Average at frequency with maximum peak (9 kHz resolution bandwidth)
Uncertainty:	2Uc (V) = 2.3dB
Class / Limit:	Class B

Frequency range MHz	Class B Limits dB (μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
NOTE 1 :The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		
NOTE 2: The lower limit is applicable at the transition frequency.		

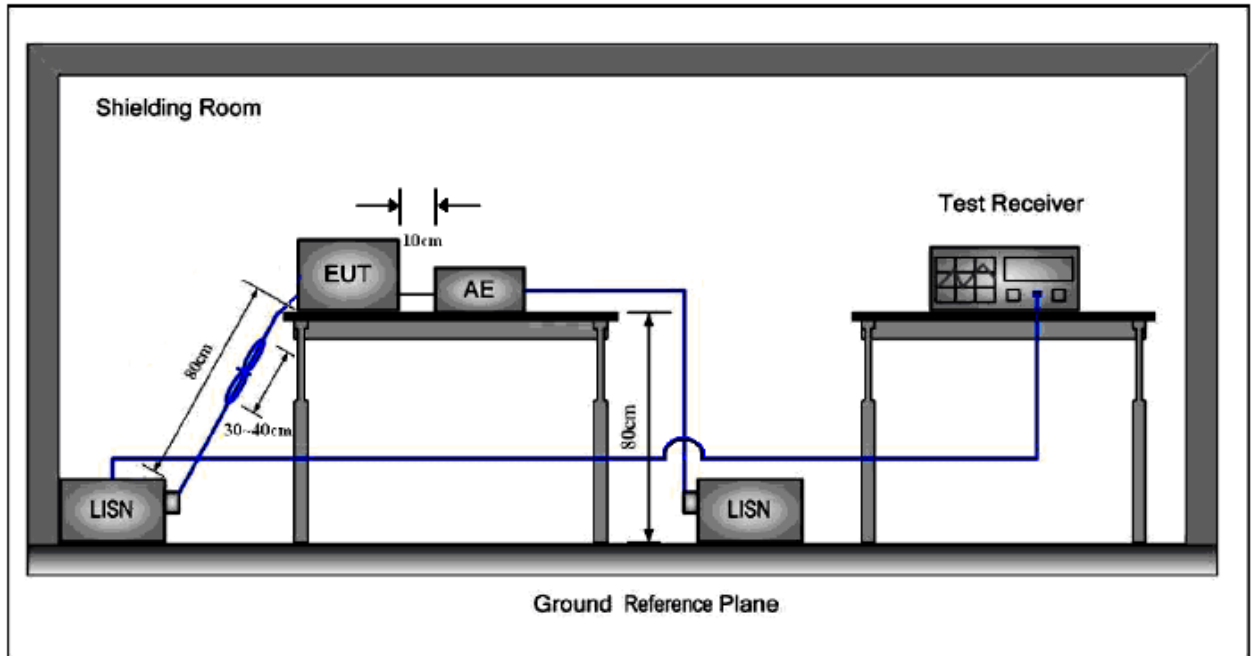
2.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 48 % RH Atmospheric Pressure: 101 kPa

EUT Operation: Pre-test the EUT in On Mode with dimming to find the worst case, Compliance
test the EUT in On Mode with maximum brightness as the worst case was found.

2.1.2 Test Setup and Procedure



1. The mains terminal disturbance voltage test was conducted in a shielded room.
2. The EUT was connected to nominal power supply through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H}+5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

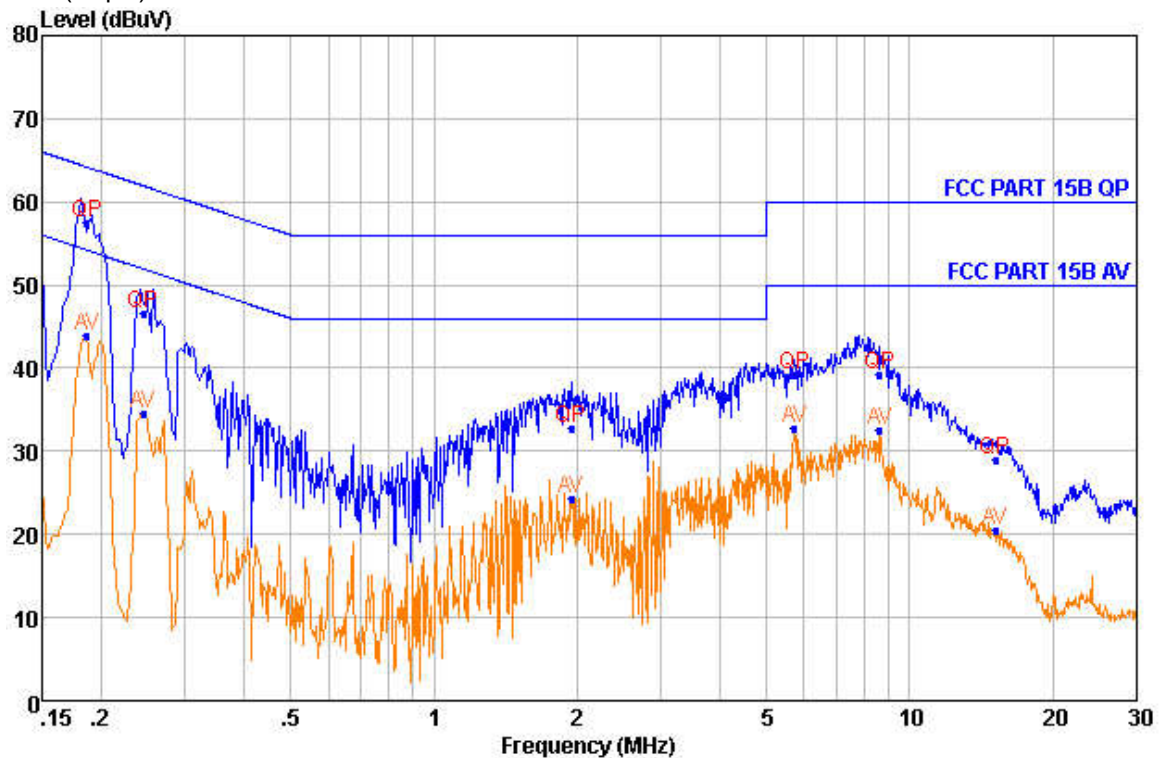
2.1.3 Measurement Data

Pre-scan was performed with peak detected on both live and neutral cable. Quasi-peak & average measurements were performed at the frequencies which maximum peak emission level was detected. Please see the attached Quasi-peak and Average test results.

Live Line:

Peak Scan:

Level (dBμV)

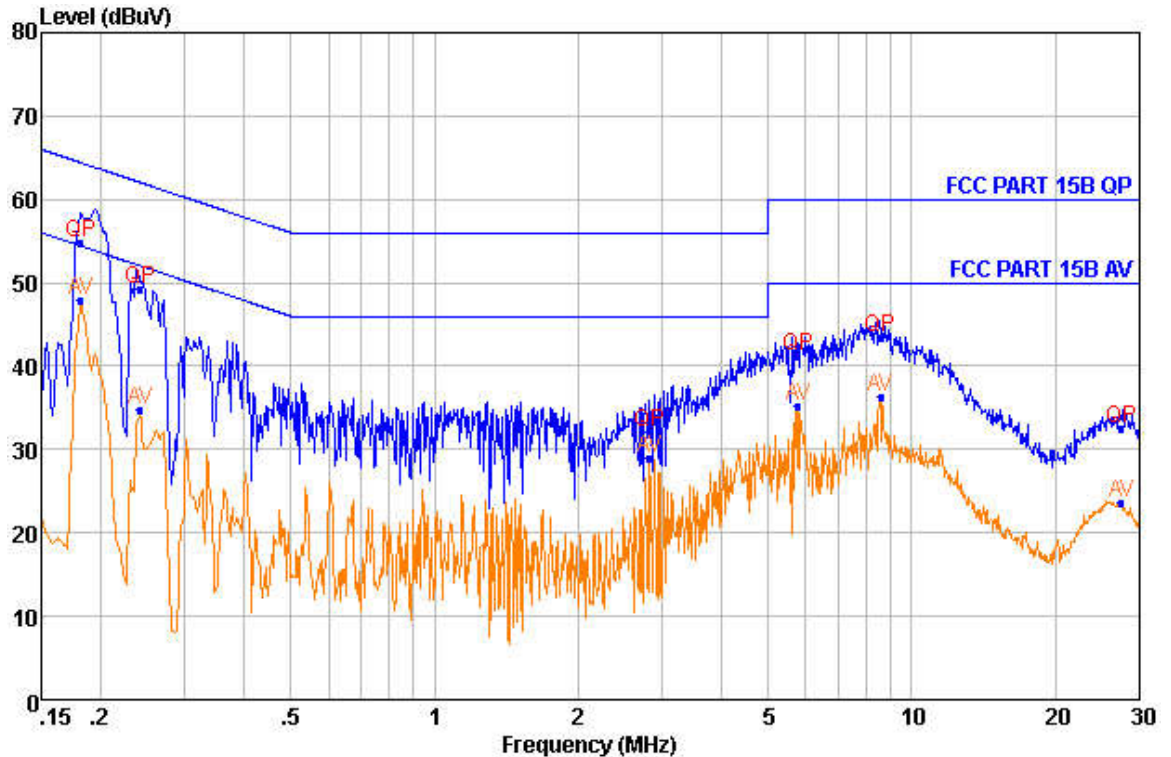


Quasi-peak and Average measurement

NO.	Freq MHz	Level dBμV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBμV	Over Limit dB
1	0.186	57.56	QP	9.68	0.21	64.20	-6.64
2	0.186	43.82	Average	9.68	0.21	54.20	-10.38
3	0.246	46.47	QP	9.67	0.23	61.91	-15.44
4	0.246	34.51	Average	9.67	0.23	51.91	-17.40
5	1.944	32.73	QP	9.65	0.35	56.00	-23.27
6	1.944	24.37	Average	9.65	0.35	46.00	-21.63
7	5.713	39.20	QP	9.64	0.41	60.00	-20.80
8	5.713	32.77	Average	9.64	0.41	50.00	-17.23
9	8.637	39.20	QP	9.67	0.43	60.00	-20.80
10	8.637	32.62	Average	9.67	0.43	50.00	-17.38
11	15.115	28.97	QP	9.71	0.46	60.00	-31.03
12	15.115	20.45	Average	9.71	0.46	50.00	-29.55

Neutral Line:

Peak Scan:

Level (dB μ V)

Quasi-peak and Average measurement

NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Over Limit dB
1	0.182	54.89	QP	9.66	0.21	64.42	-9.53
2	0.182	48.01	Average	9.66	0.21	54.42	-6.41
3	0.242	49.27	QP	9.64	0.23	62.04	-12.77
4	0.242	34.65	Average	9.64	0.23	52.04	-17.39
5	2.824	32.10	QP	9.62	0.37	56.00	-23.90
6	2.824	28.89	Average	9.62	0.37	46.00	-17.11
7	5.774	41.33	QP	9.62	0.41	60.00	-18.67
8	5.774	35.21	Average	9.62	0.41	50.00	-14.79
9	8.592	43.45	QP	9.62	0.43	60.00	-16.55
10	8.592	36.29	Average	9.62	0.43	50.00	-13.71
11	27.491	32.59	QP	9.62	0.50	60.00	-27.41
12	27.491	23.67	Average	9.62	0.50	50.00	-26.33

2.2 Radiated Emissions, 30MHz to 1GHz

Test Requirement:	FCC part 15.109
Test Method:	ANSI C63.4: 2014
Test Voltage:	AC 120V, 60Hz
Test Date:	2020-11-17
Frequency Range:	30MHz to 1GHz
Measurement Distance	3m
Detector:	Peak for pre-scan Quasi-Peak if maximised peak within 6dB of limit (120 kHz resolution bandwidth)
Uncertainty:	2Uc (V) = 3.35dB
Class / Limit:	Class B

Frequency range MHz	Quasi-peak limits dB (µV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
960 to 1000	54
At transitional frequencies the lower limit applies	

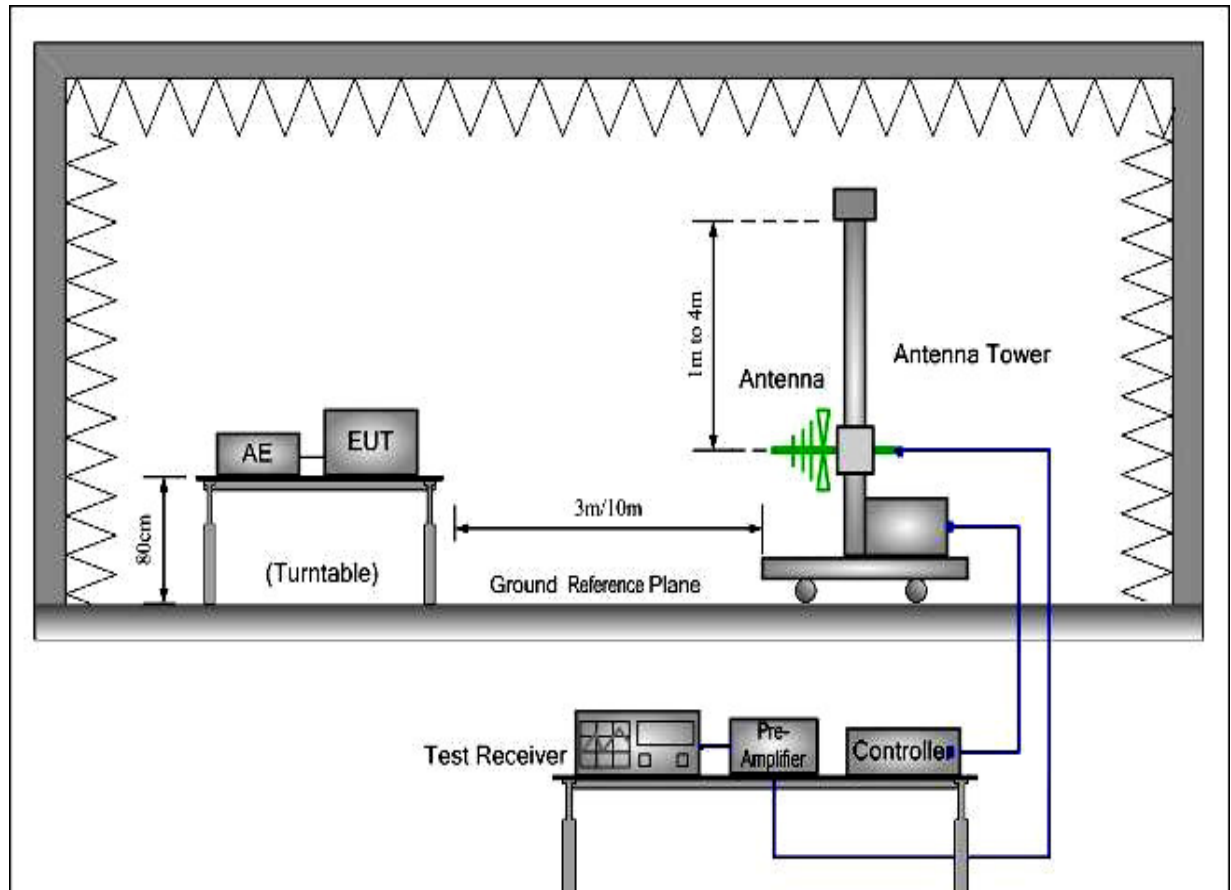
2.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C Humidity: 48 % RH Atmospheric Pressure: 101 kPa

EUT Operation: Pre-test the EUT in On Mode with dimming to find the worst case, Compliance
test the EUT in On Mode with maximum brightness as the worst case was found.

2.2.2 Test Setup and Procedure



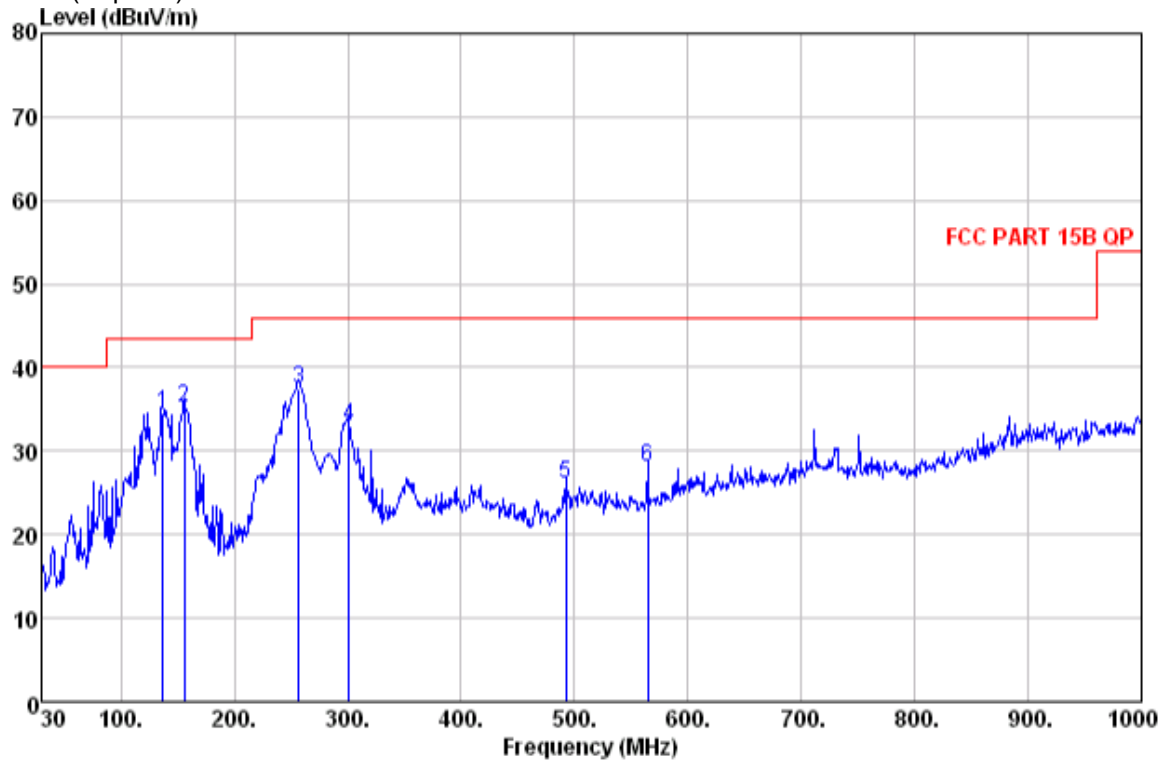
1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. Biconical and log periodic antenna was used for the frequency range from 30MHz to 1GHz
3. The EUT was connected to nominal power supply through a mains power outlet which was bonded to the ground reference plane; The mains cables were draped to the ground reference plane. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.
5. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

2.2.3 Measurement Data

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

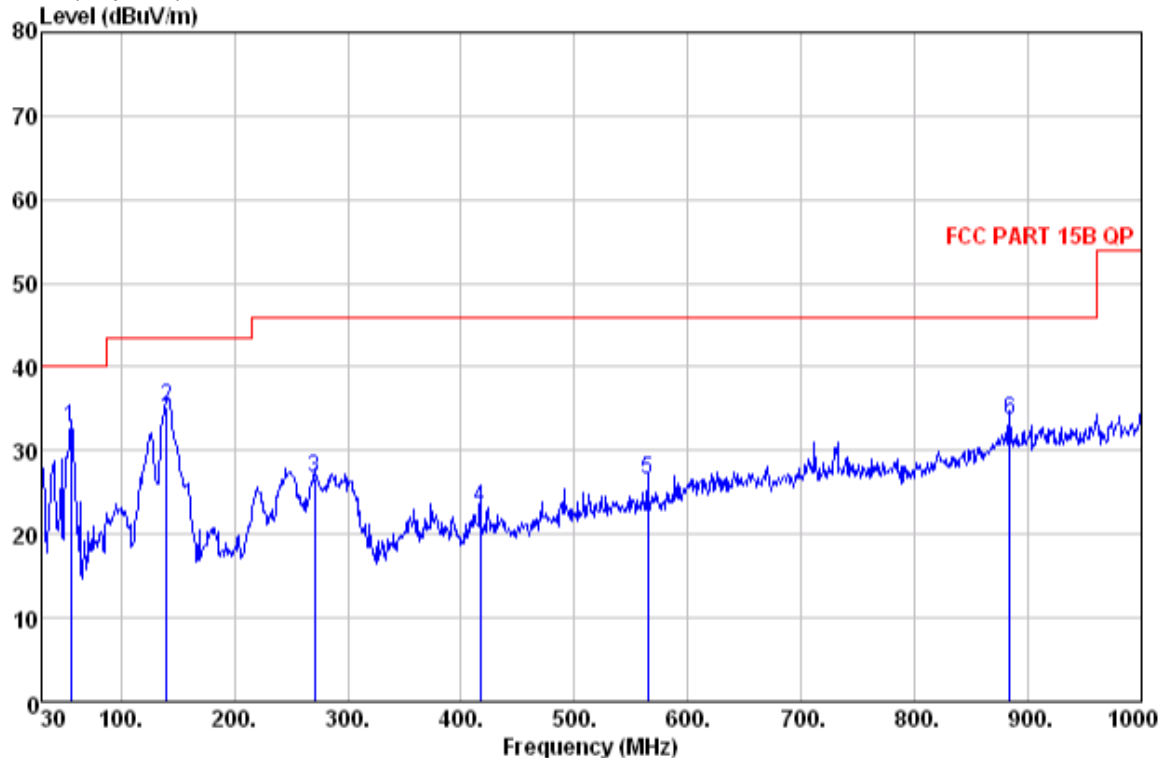
No.	Freq MHz	Read Level dBμV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBμV/m	Limit Line dBμV/m	Over Limit dB	Pol/ Phase	Remark
1	136.700	44.99	16.48	1.39	28.26	34.60	43.50	-8.90	HORIZONTAL	QP
2	156.100	44.97	17.11	1.49	28.29	35.28	43.50	-8.22	HORIZONTAL	QP
3	256.980	46.44	16.60	1.96	27.51	37.49	46.00	-8.51	HORIZONTAL	QP
4	301.600	40.48	18.07	2.13	27.59	33.09	46.00	-12.91	HORIZONTAL	QP
5	492.690	29.04	22.91	2.76	28.69	26.02	46.00	-19.98	HORIZONTAL	QP
6	564.470	29.13	24.74	2.96	28.78	28.05	46.00	-17.95	HORIZONTAL	QP

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq MHz	Read Level dBμV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBμV/m	Limit Line dBμV/m	Over Limit dB	Pol/ Phase	Remark
1	56.190	44.03	16.18	0.86	28.34	32.73	40.00	-7.27	VERTICAL	QP
2	140.580	45.39	16.72	1.41	28.22	35.30	43.50	-8.20	VERTICAL	QP
3	270.560	34.89	17.18	2.01	27.23	26.85	46.00	-19.15	VERTICAL	QP
4	417.030	27.61	21.15	2.51	28.13	23.14	46.00	-22.86	VERTICAL	QP
5	564.470	27.49	24.74	2.96	28.78	26.41	46.00	-19.59	VERTICAL	QP
6	883.600	27.42	29.71	3.76	27.20	33.69	46.00	-12.31	VERTICAL	QP

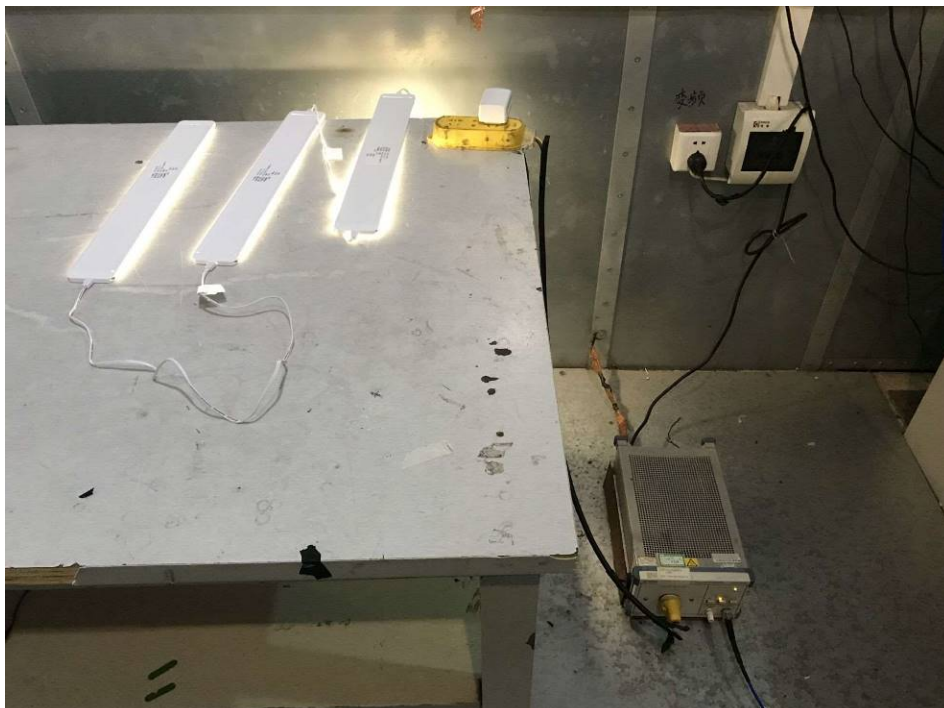
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Section 3 Photographs

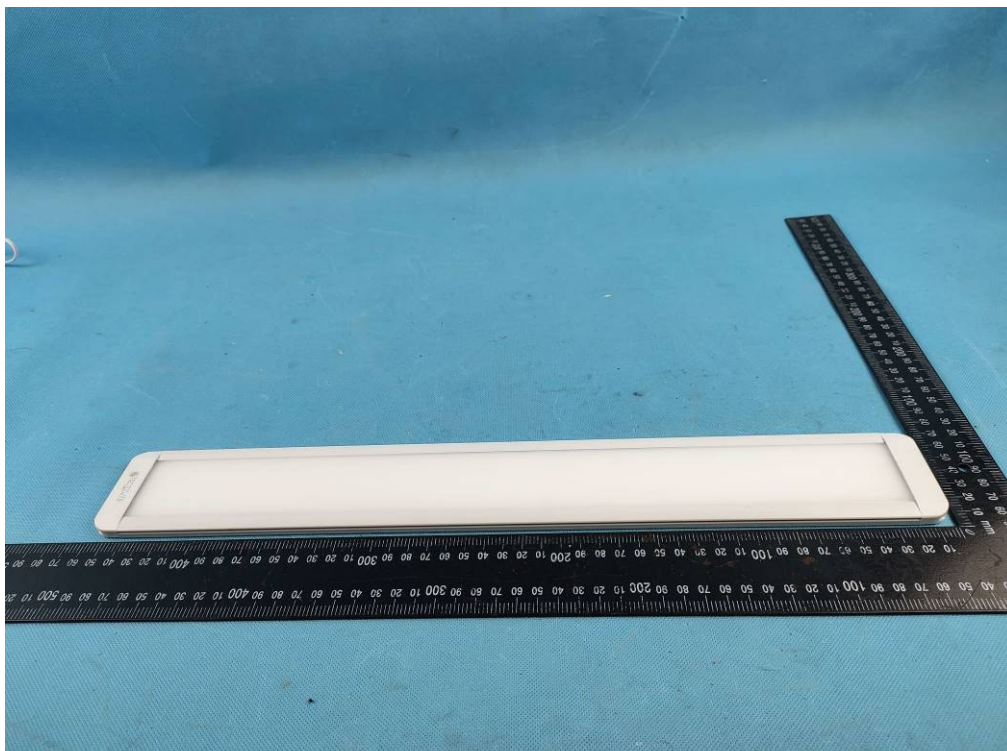
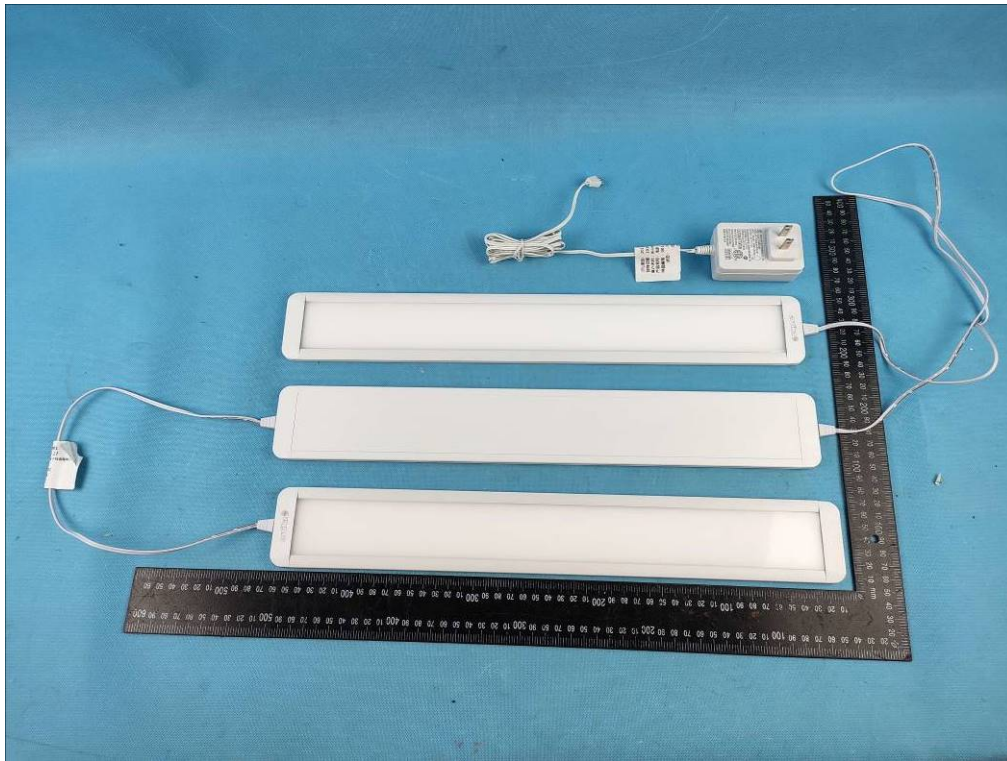
3.1 Radiated Emissions, 30MHz to 1GHz Test Setup



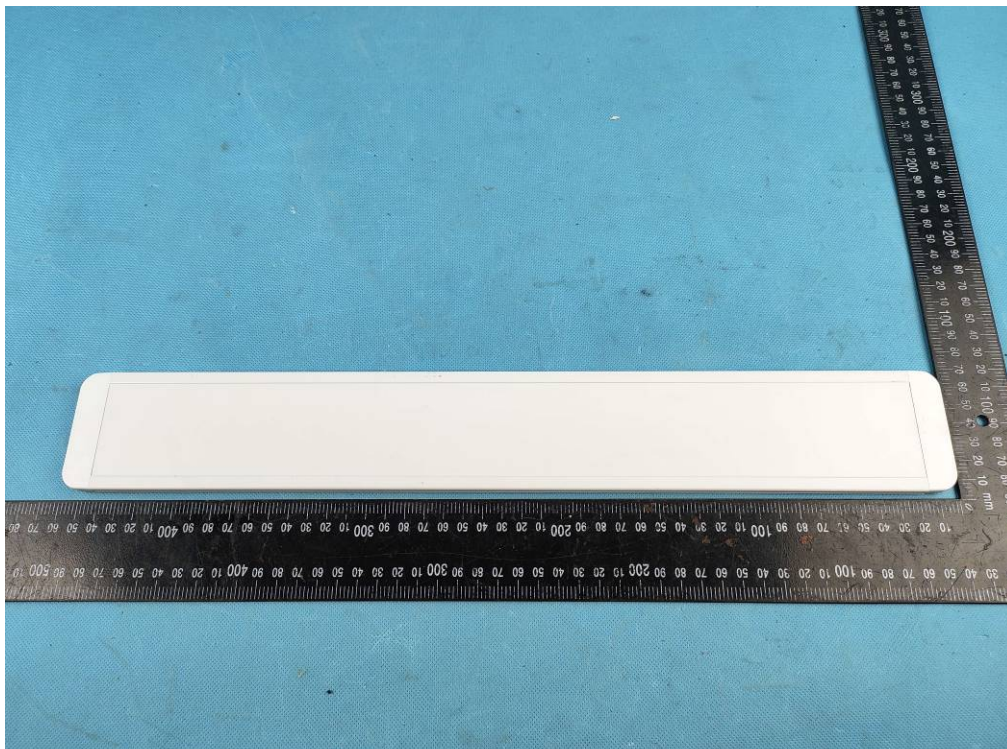
3.2 Conducted Emission Test Setup



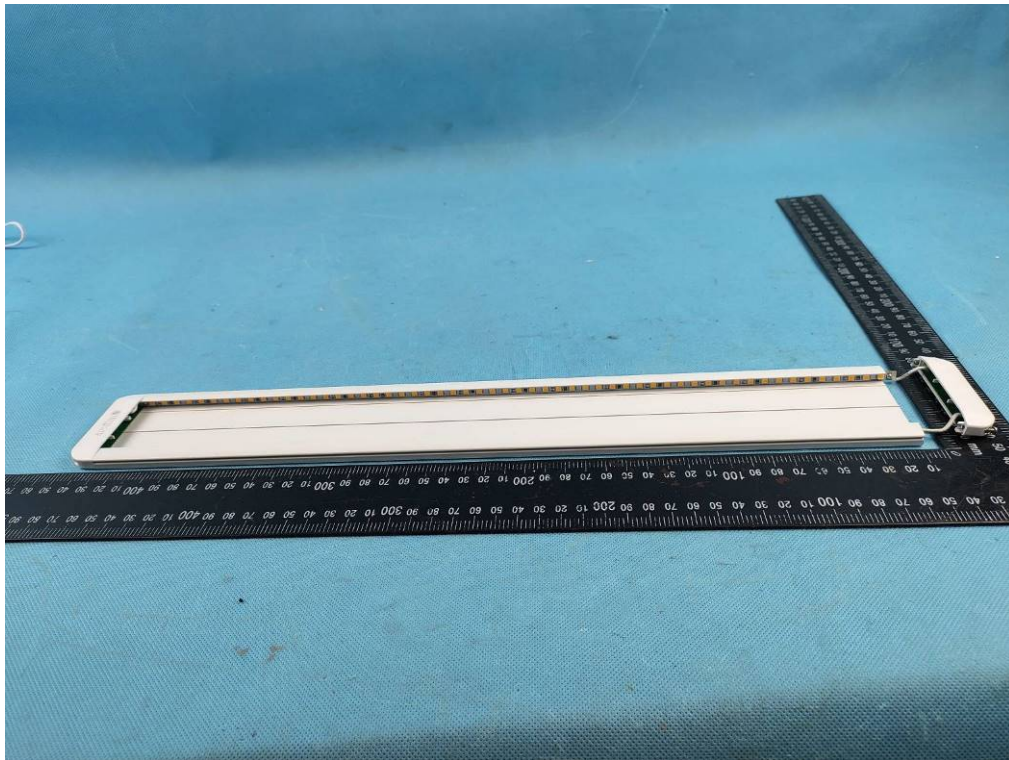
3.3 EUT Constructional Details



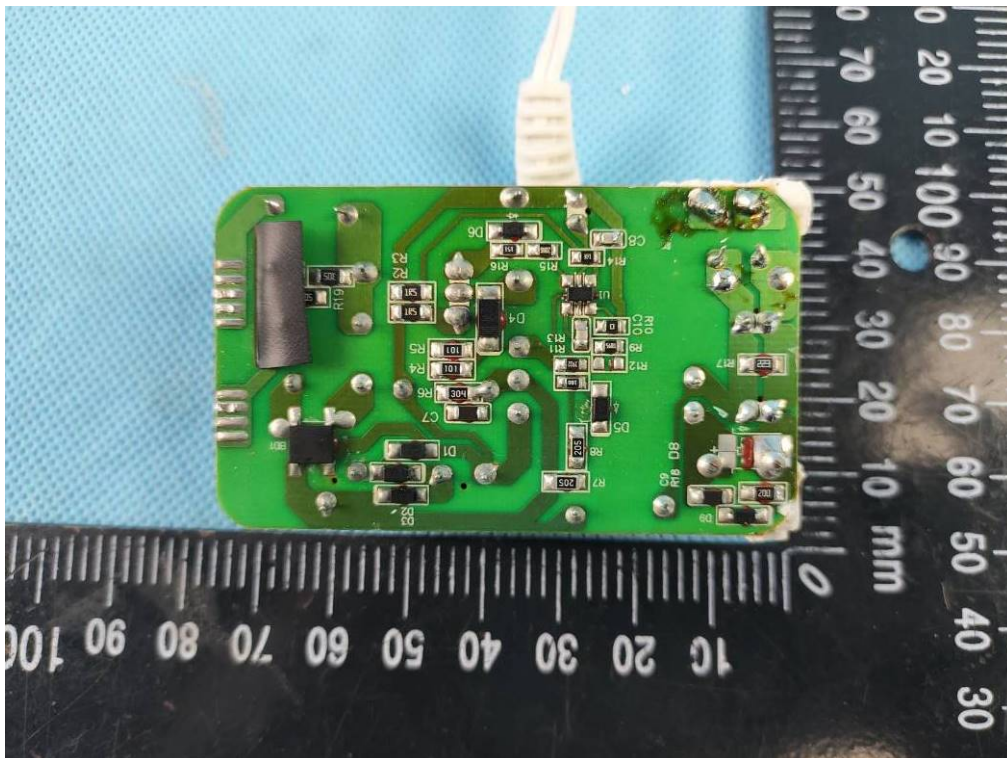
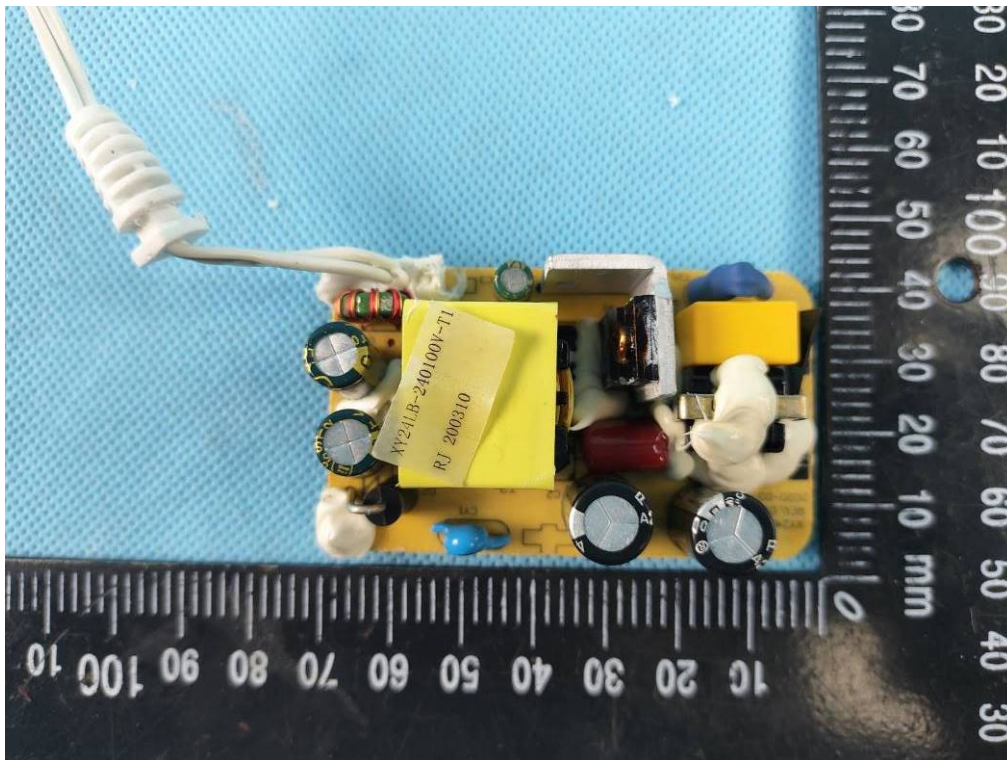
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