



Shenzhen Huaxin Information Technology Service Co., Ltd

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中国认可
国际互认
检测
TESTING
CNAS L18255

TEST REPORT

Report No. : **HX260119R001**

Applicant : **SuZhou Solargy New Energy Technology Co., LTD**

Address : No. 003, 1st Floor, Building A, Shangkun Industrial Park, 2001 Yingbin West Road, Bacheng Town, Kunshan City, China

Manufacturer..... : SuZhou Solargy New Energy Technology Co., LTD

Address..... : No. 003, 1st Floor, Building A, Shangkun Industrial Park, 2001 Yingbin West Road, Bacheng Town, Kunshan City, China

Product Name : **Solar electronic parasol**

Trade Mark : /

Model/Type reference..... : ZL01

Listed Model(s) : ZL01-90

Standard..... : **ETSI EN 301 489-1 V2.2.3: 2019-11**
ETSI EN 301 489-17 V3.3.1: 2024-09
EN 55032: 2015
EN 55035: 2017 + A11: 2020
EN IEC 61000-3-2: 2019 + A1: 2021
EN 61000-3-3: 2013 + A1: 2019

Date of receipt of test sample...: Dec. 26, 2025

Date of testing..... : Dec. 27, 2025 ~ Mar. 10, 2026

Date of issue..... : Mar. 11, 2026

Result..... : **PASS**

Compiled by:

(Printed name + signature)

Sain Liao

Sain

Approved by:

(Printed name + signature)

Terry Su

Terry Su



Testing Laboratory Name..... : **Shenzhen Huaxin Information Technology Service Co., Ltd**

Address : 101, R & D Building, No.3 guansheng 4th Road, Luhuhu Community, Guanhu Street, Longhua District, Shenzhen, Guangdong, China

This test report shall not be copied in any form except with the written approval of our laboratory. The customer shall not claim that the product has been endorsed by Shenzhen Huaxin Information Technology Service Co., Ltd. based on this report, The test results in the report are only applicable to the samples tested. Without the signatures of the compiled engineer and the approver, the test report will be invalid. Any objection shall be submitted to Shenzhen Huaxin Information Technology Service Co., Ltd. within 15 days from the date of receiving the report. After this period, it will not be considered. The test report only corresponds to the test sample.



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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

[ETSI EN 301 489-1 V2.2.3: 2019-11](#)–ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

[ETSI EN 301 489-17 V3.3.1: 2024-09](#)–ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband

[EN 55032: 2015](#)–Electromagnetic compatibility of multimedia equipment–Emission Requirements

[EN 55035: 2017 + A11: 2020](#)–Electromagnetic compatibility of multimedia equipment–Immunity requirements

[EN IEC 61000-3-2: 2019 + A1: 2021](#)–Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

[EN 61000-3-3: 2013 + A1: 2019](#)–Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply system

1.2. Report version

Revised No.	Date of issue	Description
01	Mar. 11, 2026	Original



1.4. Test Facility

Address of the report laboratory

Shenzhen Huaxin Information Technology Service Co., Ltd

Address: 101, R & D Building, No.3 guansheng 4th Road, Luhua Community, Guanhu Street, Longhua District, Shenzhen, Guangdong, China

Laboratory accreditation

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

A2LA-Lab Cert. No.: 6855.01

Shenzhen Huaxin Information Technology Service Co., Ltd EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Company Number: 31786, CAB Identifier: CN0147)

Shenzhen Huaxin Information Technology Service Co., Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 31786.

FCC (Registration No.: 932271, Designation Number CN1344)

Shenzhen Huaxin Information Technology Service Co., Ltd 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 our files. Registration NO.: 932271.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huaxin Information Technology Service Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for Shenzhen Huaxin Information Technology Service Co., Ltd



Test	Measurement Frequency Range	U (dB)	Note
Conducted Emission	9kHz ~ 30MHz	±3.10	Main Power Port
Conducted Emission	150kHz ~ 30MHz	±3.26	Telecommunication
Radiated Emission	30MHz ~ 1000MHz	±5.75	/
Radiated Emission	Above 1GHz	±4.65	/

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

1.6. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity	55 %
Air Pressure	101kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	SuZhou Solargy New Energy Technology Co., LTD
Address:	No. 003, 1st Floor, Building A, Shangkun Industrial Park, 2001 Yingbin West Road, Bacheng Town, Kunshan City, China
Manufacturer:	SuZhou Solargy New Energy Technology Co., LTD
Address:	No. 003, 1st Floor, Building A, Shangkun Industrial Park, 2001 Yingbin West Road, Bacheng Town, Kunshan City, China

2.2. General Description of EUT

Product Name:	Solar electronic parasol
Trade Mark:	/
Model/Type reference:	ZL01
Listed Model(s):	ZL01-90
Model Different:	All these models are identical in the same PCB, layout and electrical circuit, The difference is Appearance color and aluminum thickness.
Power supply:	24Vdc/2.5A from AC/DC Adapter 14.4Vdc from 5000mAh Li-ion Battery
Hardware version:	ZL-LMS-H1.0
Software version:	ZL-LMS-V1.0
Technical index for Bluetooth	
Modulation:	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Operation frequency:	2402 ~ 2480MHz



2.3. Accessory Equipment Information

Equipment Information			
Name	Model	S/N	Manufacturer
Mobile phone	ALA-AN70	---	HUAWEI
Cement resistor	5R*2	---	---
Cable Information			
Name	Shielded Type	Ferrite Core	Length
Adapter AC Input Cable	without	without	0.32M
Adapter DC Output Cable	without	without	2.5M



2.4. Description of Test Modes

Test mode	Charging	BT + Fan ON (Maximum speed) + Discharging	AC/DC Adapter
T1	■		■
T2		■	

Note:

- 1) ■ is operation mode.

Pre-scan above all test mode, found below test mode which it was worse case mode, so only show the test data for worse case mode on the test report.

Test item	Test mode (Worse case mode)
Radiated Emission	T2
Conducted Emission (AC Mains)	T1
Conducted Emission (Signal Mains)	N/A
Harmonic Current Emissions	N/A
Voltage Fluctuations and Flicker	T1
Radio Frequency Electromagnetic Field	T1, T2
Electrostatic Discharge	T1, T2
Electrical Fast Transient / Burst	T1
Injected Current	T1
Voltage Dips and Interruptions	T1
Surges	T1

Note: "N/A" is no application.

2.5. Measurement Instruments List

Radiated emission					
Item	Test Equipment	Manufacturer	Model No.	Versions/ Serial No.	Calibrated until
1	EMI spectrum receiver	R&S	ESR7	102543	Apr. 08, 2026
2	9*6*6 anechoic chamber	Mao Rui	9*6*6	/	Apr. 08, 2026
3	Spectrum analyzer	R&S	FSV40-N	101795	Apr. 09, 2026
4	Preamplifier	Agilent	8449B	3008A00551	Apr. 09, 2026
5	Preamplifier	HP	8447D	1616A02061	Apr. 08, 2026
6	Horn Antenna	A. H. System, Inc	SAS-571	915	Apr. 18, 2026
7	Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	01318	Apr. 18, 2026
8	6dB Fixed Attenuator	SKET	AP_DC01G-2W-N-6dB	SK2021012803	Apr. 08, 2026
9	Test Software	SKET	EMC-I	V1.4.0.1	/
10	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Conducted emission					
Item	Test Equipment	Manufacturer	Model No.	Versions/ Serial No.	Calibrated until
1	LISN	R&S	ENV216	101291	Apr. 09, 2026
2	LISN	R&S	ESH3-Z5	894981/024	Apr. 09, 2026
3	EMI Test Receiver	R&S	ESR7	102543	Apr. 08, 2026
4	Test Software	SKET	EMC-I	V1.4.0.1	/
5	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Harmonic current emissions & Voltage fluctuations and flicker					
Item	Test Equipment	Manufacturer	Model No.	Versions/ Serial No.	Calibrated until
1	Harmonic and Flicker Analyzer	Li	AC2000A	536605	Apr. 08, 2026
2	Test Software	HTEC	HF	/	/
3	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Radio frequency electromagnetic field					
Item	Test Equipment	Manufacturer	Model No.	Versions/ Serial No.	Calibrated until
1	Analog Signal Generator	Agilent	N5181A	MY50141821	Apr. 08, 2026
2	Power Sensor	Keysight	E9300A	MY55060025	Apr. 08, 2026
3	Power Sensor	Keysight	E9300A	MY55050014	Apr. 08, 2026
4	Power Meter	Keysight	E4419B	MY45105087	Apr. 08, 2026
5	Power Amplifier	Micotop	MPA-80-1000-250	MPA2206215	Apr. 08, 2026
6	Power Amplifier	Micotop	MPA-1000-6000-100	MPA2206216	Apr. 08, 2026
7	High Gain Antenna	SCHWARZBECK	STLP9129	00203	Apr. 08, 2026
8	Test Software	SKET	EMC-S	V2.1.2.28	/
9	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Electrostatic discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	ESD Simulator	3ctest	EDS 20H	ES031000221048	Apr. 11, 2026
2	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Electrical fast transient / burst					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EFT Simulator	3ctest	EFT 500S	ES027000221031	Apr. 08, 2026
2	Capacitive Coupling	3ctest	CCC 100	CCC21093295	Apr. 08, 2026
3	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Radio frequency continuous conducted					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Conducted Immunity test System	3ctest	CST 1075	ES096000121022	Apr. 29, 2026
2	CDN	3ctest	CDN M2M3	ES06400262133	Apr. 08, 2026
3	6dB Attenuator	3ctest	AT80-6dB-4G-NM-N M-A	AT8021124555	Apr. 08, 2026
4	EMC-Clamp	3ctest	EMCL100	EMC21093329	Apr. 08, 2026
5	Test Software	SKET	EMC-S-CS	V2.0.0.11	/
6	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Voltage Dips and Interruptions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	DIPS Simulator	3ctest	PFS2216SD	ES049001222001	Apr. 08, 2026
2	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Surges					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Combined Wave Surge Simulator	3ctest	CWS 600	ES058001021027	Apr. 08, 2026
2	Surge CDN	3ctest	CDN405M40-5	ES064000421021	Apr. 08, 2026
3	Network Surge CDN	3ctest	CDN405T8	ES064000121008	Apr. 08, 2026
4	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Note: 1. The Cal. Interval was one year.



3. EMC EMISSION TEST

3.1. Radiated Emission

LIMIT

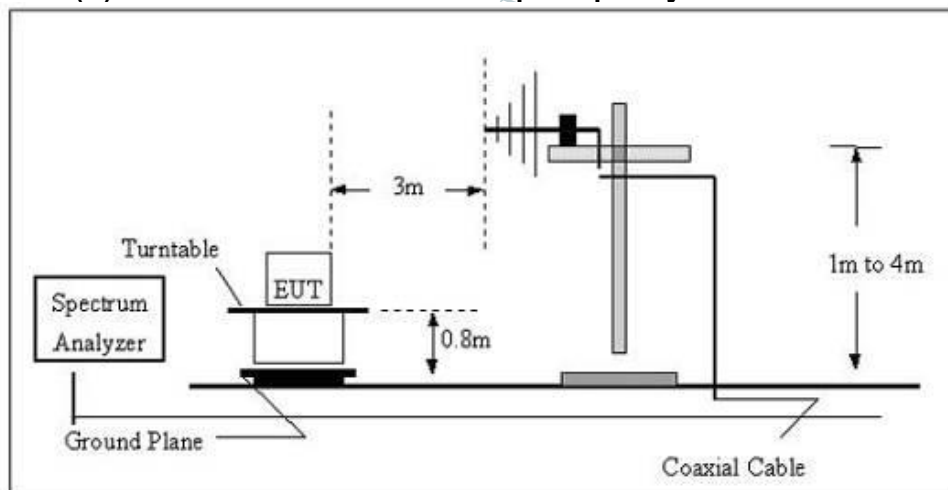
Please refer to ETSI EN301489-1 Clause 8.2.3, Table 4 and CENELEC EN 55032 Annex A Table A.4 & A.5

Frequency range (MHz)	Quasi-peak limits dB μ V/m@3m	Quasi-peak limits dB μ V/m@10m
30~230	40	30
230~1000	47	37

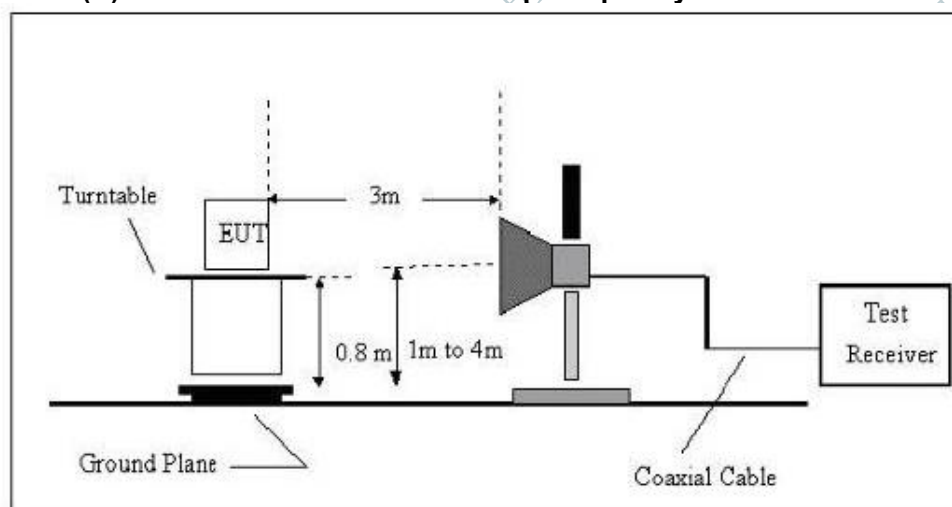
Frequency range (GHz)	Average limits dB μ V/m@3m	Peak limits dB μ V/m@3m
1 ~ 6	54	74

TEST CONFIGURATION

(A) Radiated Emission Test Set-Up Frequency below 1 GHz



(B) Radiated Emission Test Set-Up Frequency above 1GHz

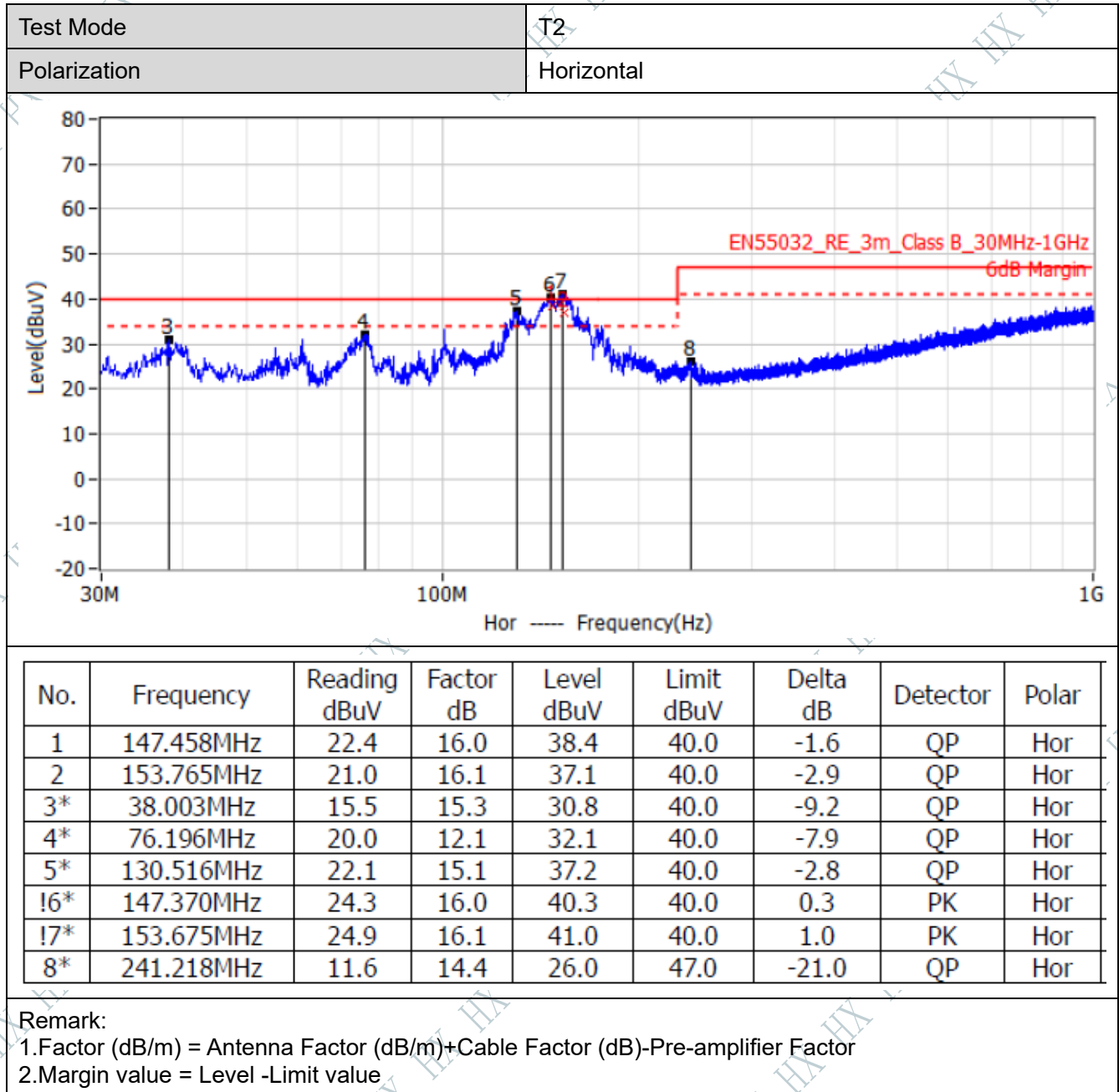


TEST PROCEDURE

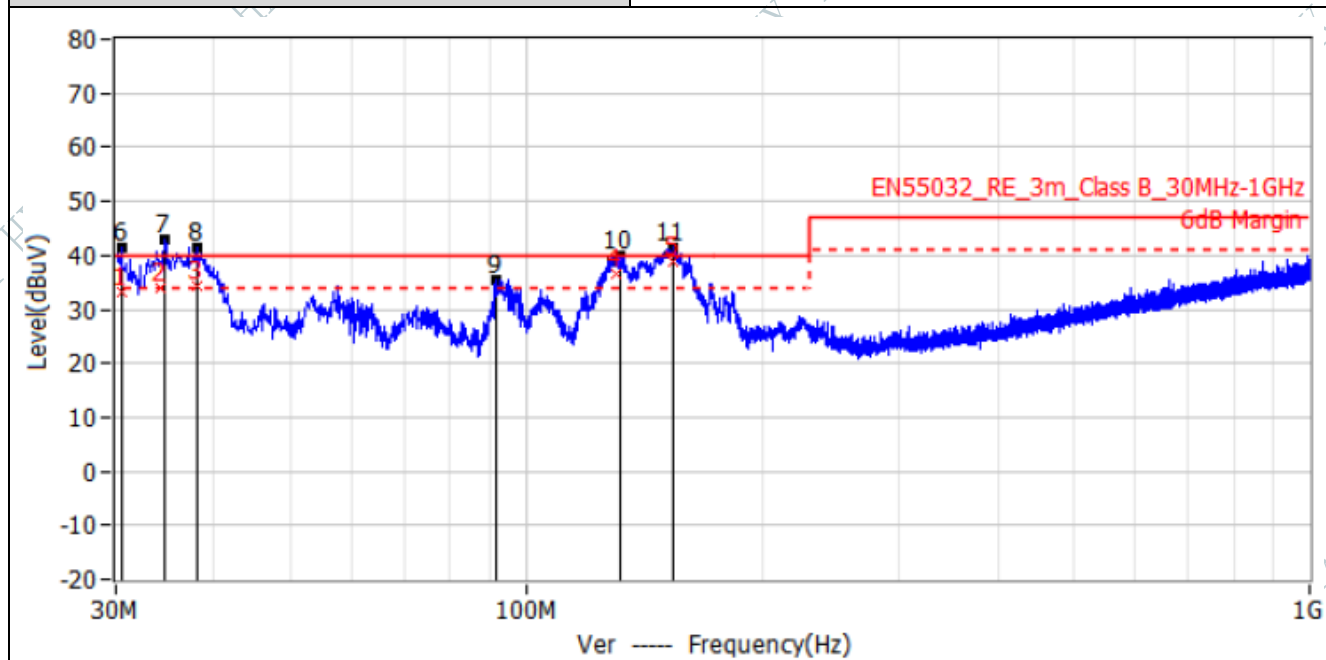
Please refer to ETSI EN 301 489-1 Clause 8.2.3 and CENELEC EN 55032 Clause 6.3 for the measurement methods

**TEST MODE**

Please refer to the Clause 2.4

TEST RESULTS**(1) 30MHz-1000MHz**

Test Mode	T2
Polarization	Vertical



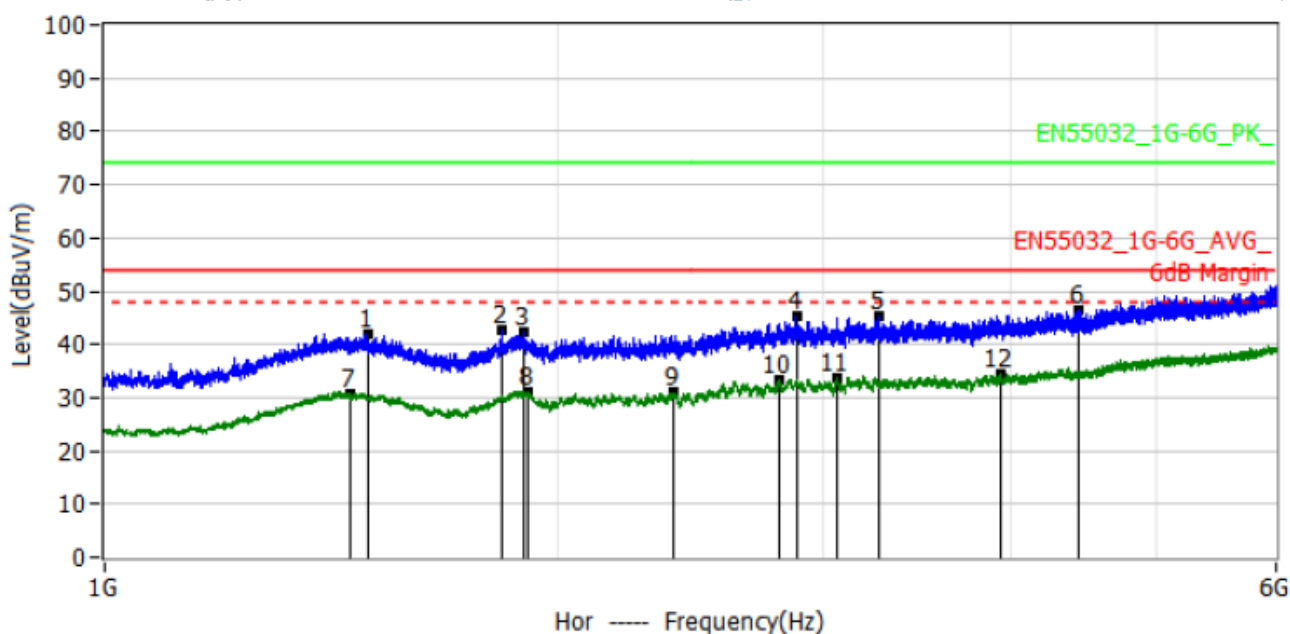
No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector	Polar
1	30.453MHz	18.0	15.0	33.0	40.0	-7.0	QP	Ver
2	34.304MHz	18.7	15.2	33.9	40.0	-6.1	QP	Ver
3	38.115MHz	19.0	15.3	34.3	40.0	-5.7	QP	Ver
4	130.693MHz	21.5	15.1	36.6	40.0	-3.4	QP	Ver
5	154.490MHz	22.7	16.1	38.8	40.0	-1.2	QP	Ver
!6*	30.485MHz	26.5	15.0	41.5	40.0	1.5	PK	Ver
!7*	34.608MHz	27.6	15.2	42.8	40.0	2.8	PK	Ver
!8*	38.003MHz	26.0	15.3	41.3	40.0	1.3	PK	Ver
9*	91.838MHz	23.8	11.7	35.5	40.0	-4.5	QP	Ver
10*	131.971MHz	24.6	15.3	39.9	40.0	-0.1	PK	Ver
!11*	154.403MHz	25.5	16.1	41.6	40.0	1.6	PK	Ver

Remark:

1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2. Margin value = Level -Limit value

(2) Above 1000MHz

Test Mode	T2
Polarization	Horizontal



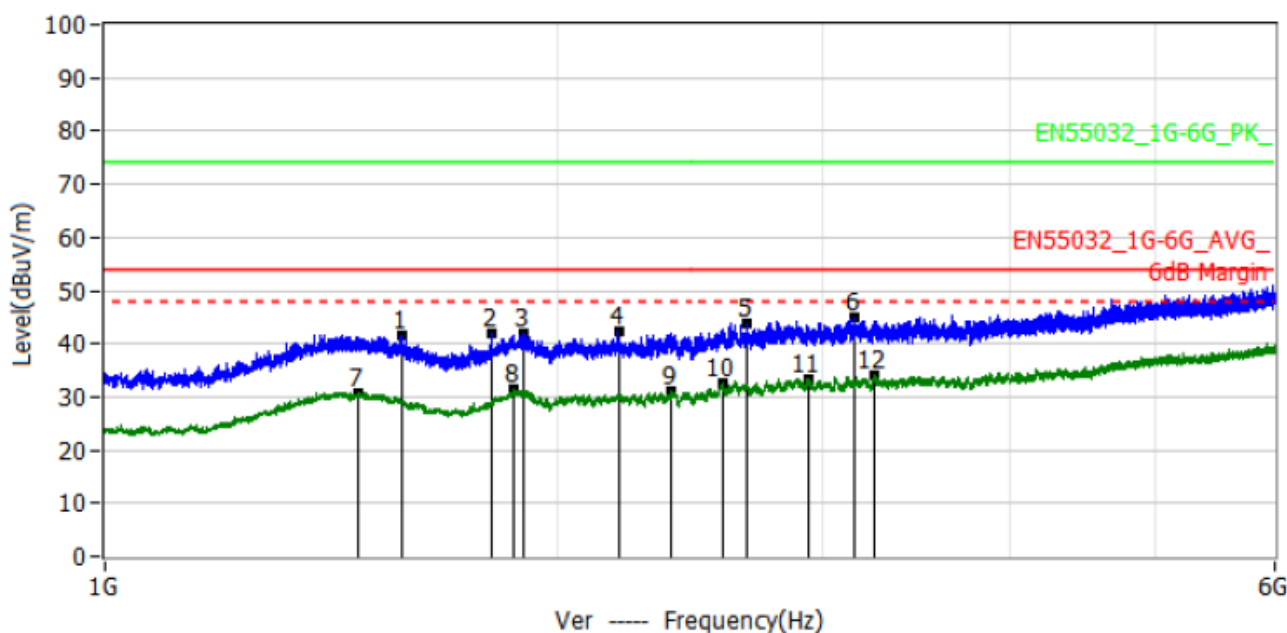
No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Delta dB	Detector	Polar
1*	1.494GHz	49.8	-7.8	42.0	54.0	-12.0	PK	Hor
2*	1.833GHz	47.1	-4.5	42.6	54.0	-11.4	PK	Hor
3*	1.901GHz	46.0	-3.8	42.2	54.0	-11.8	PK	Hor
4*	2.880GHz	44.2	1.3	45.5	54.0	-8.5	PK	Hor
5*	3.270GHz	43.5	1.9	45.4	54.0	-8.6	PK	Hor
6*	4.433GHz	41.9	4.5	46.4	54.0	-7.6	PK	Hor
7*	1.457GHz	38.6	-8.0	30.6	74.0	-43.4	AV	Hor
8*	1.909GHz	35.0	-3.8	31.2	74.0	-42.8	AV	Hor
9*	2.388GHz	31.8	-0.9	30.9	74.0	-43.1	AV	Hor
10*	2.802GHz	32.4	0.9	33.3	74.0	-40.7	AV	Hor
11*	3.064GHz	32.0	1.8	33.8	74.0	-40.2	AV	Hor
12*	3.934GHz	31.4	3.2	34.6	74.0	-39.4	AV	Hor

Remark:

1. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor

2. Margin value = Level - Limit value

Test Mode	T2
Polarization	Vertical



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Delta dB	Detector	Polar
1*	1.576GHz	48.5	-7.0	41.5	54.0	-12.5	PK	Ver
2*	1.806GHz	46.9	-4.8	42.1	54.0	-11.9	PK	Ver
3*	1.896GHz	45.9	-3.9	42.0	54.0	-12.0	PK	Ver
4*	2.195GHz	44.3	-1.9	42.4	54.0	-11.6	PK	Ver
5*	2.670GHz	43.5	0.4	43.9	54.0	-10.1	PK	Ver
6*	3.147GHz	43.3	1.8	45.1	54.0	-8.9	PK	Ver
7*	1.472GHz	38.6	-7.9	30.7	74.0	-43.3	AV	Ver
8*	1.868GHz	35.5	-4.1	31.4	74.0	-42.6	AV	Ver
9*	2.381GHz	31.9	-1.0	30.9	74.0	-43.1	AV	Ver
10*	2.574GHz	32.8	-0.1	32.7	74.0	-41.3	AV	Ver
11*	2.934GHz	32.0	1.5	33.5	74.0	-40.5	AV	Ver
12*	3.250GHz	32.1	1.9	34.0	74.0	-40.0	AV	Ver

Remark:

$$1. \text{Factor (dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Pre-amplifier Factor}$$

2. Margin value = Level - Limit value



3.2. Conducted Emission (AC Mains)

LIMIT

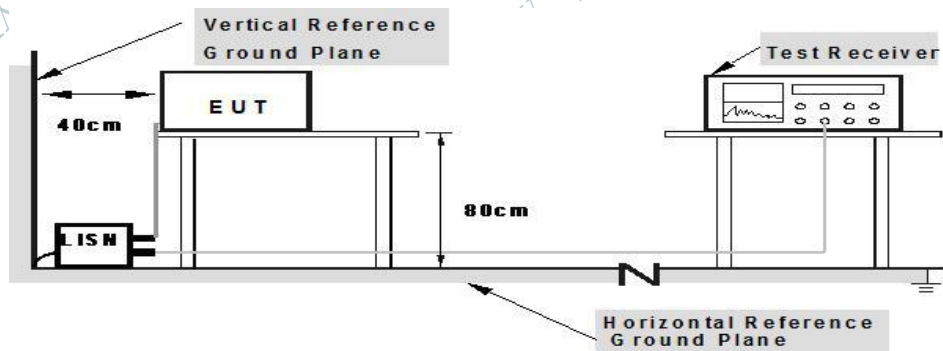
Please refer to ETSI EN301489-1 Clause 8.4.3.2 and CENELEC EN 55032 Annex A3 Table A.10

Frequency range MHz	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 lower limit shall apply at the transition frequencies.

NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

TEST CONFIGURATION



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

TEST PROCEDURE

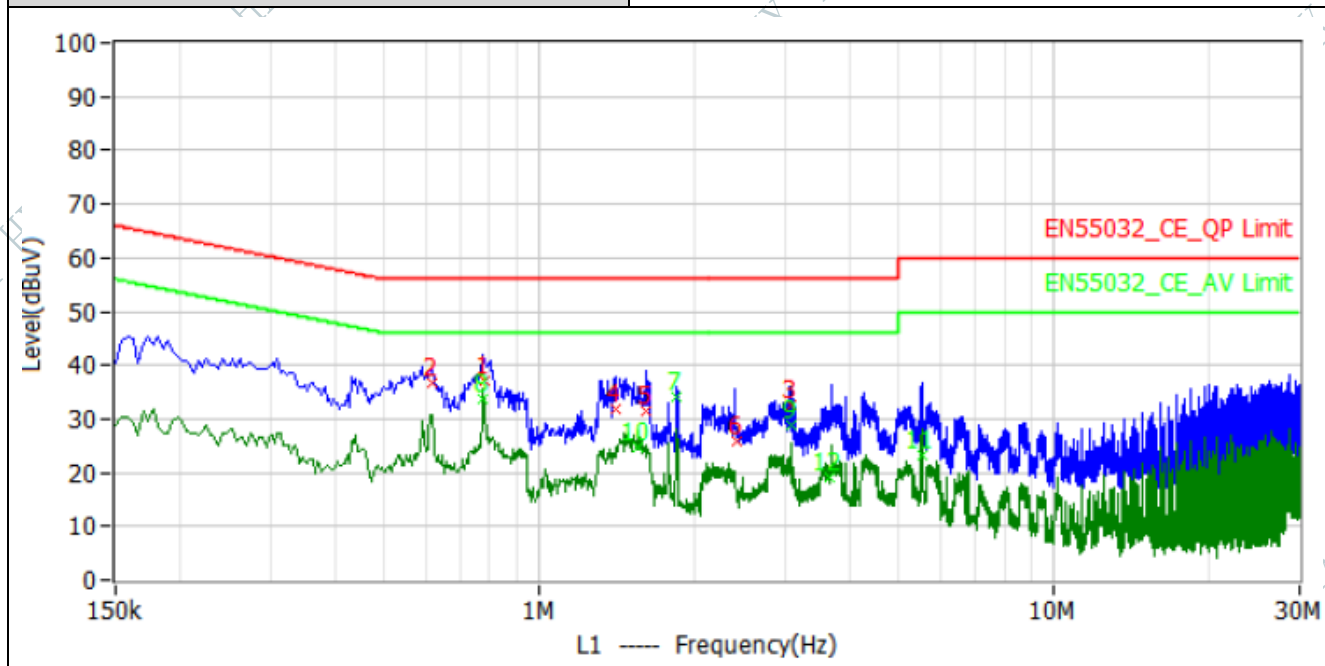
Please refer to ETSI EN 301 489-1 Clause 8.4.3 and CENELEC EN 55032 Annex A3 Table A.8

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

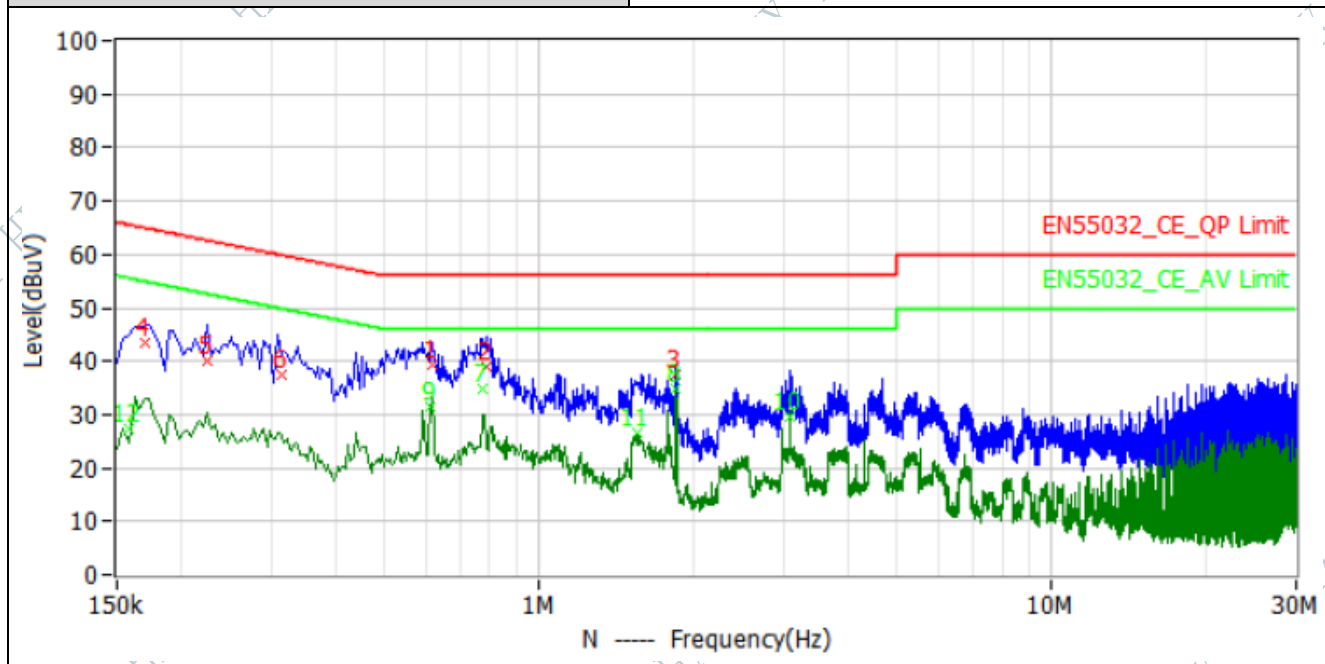
Test Mode	T1
Polarization	L



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector	Polar
1	782.000kHz	25.68	11.40	37.08	56.00	-18.92	QP	L1
2	618.000kHz	25.69	11.00	36.69	56.00	-19.31	QP	L1
3	3.082MHz	19.58	12.90	32.48	56.00	-23.52	QP	L1
4	1.410MHz	19.69	12.20	31.89	56.00	-24.11	QP	L1
5	1.606MHz	19.02	12.50	31.52	56.00	-24.48	QP	L1
6	2.418MHz	12.98	13.00	25.98	56.00	-30.02	QP	L1
7	1.850MHz	21.44	12.80	34.24	46.00	-11.76	AV	L1
8	778.000kHz	22.14	11.40	33.54	46.00	-12.46	AV	L1
9	3.086MHz	16.06	12.90	28.96	46.00	-17.04	AV	L1
10	1.554MHz	12.44	12.40	24.84	46.00	-21.16	AV	L1
11	5.550MHz	10.56	12.60	23.16	50.00	-26.84	AV	L1
12	3.666MHz	6.20	12.80	19.00	46.00	-27.00	AV	L1

$$\text{Emission Level} = \text{Read Level} + \text{Correct Factor}$$

Test Mode	T1
Polarization	N



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector	Polar
1	618.000kHz	28.08	11.10	39.18	56.00	-16.82	QP	N
2	786.000kHz	27.73	11.40	39.13	56.00	-16.87	QP	N
3	1.850MHz	24.69	12.80	37.49	56.00	-18.51	QP	N
4	170.000kHz	32.86	10.50	43.36	64.96	-21.60	QP	N
5	226.000kHz	29.49	10.60	40.09	62.60	-22.50	QP	N
6	314.000kHz	26.67	10.60	37.27	59.86	-22.59	QP	N
7	778.000kHz	23.54	11.40	34.94	46.00	-11.06	AV	N
8	1.850MHz	21.99	12.80	34.79	46.00	-11.21	AV	N
9	614.000kHz	20.21	11.10	31.31	46.00	-14.69	AV	N
10	3.082MHz	16.67	13.00	29.67	46.00	-16.33	AV	N
11	1.558MHz	14.21	12.50	26.71	46.00	-19.29	AV	N
12	158.000kHz	16.73	10.60	27.33	55.57	-28.24	AV	N

$$\text{Emission Level} = \text{Read Level} + \text{Correct Factor}$$



Please refer to ETSI EN301489-1 Clause 8.4.3.2 and CENELEC EN 55032 Annex A Table A.12

TEST CONFIGURATION



TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: This test item is not applicable.



3.4. Harmonic Current Emission

LIMIT

EN61000-3-2 Clause 7

➤ **Class A equipment**

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

➤ **Class B equipment**

not exceed the values given in Class A limit multiplied by a factor of 1,5

➤ **Class C equipment**

Active input power >25 W

Harmonic order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
$11 \leq n \leq 39$ (odd harmonics only)	3

* λ is the circuit power factor

Active input power ≤ 25 W

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3,4	2,30
5	1,9	1,14
7	1,0	0,77
9	0,5	0,40
11	0,35	0,33
$13 \leq n \leq 39$ (odd harmonics only)	$\frac{3,85}{n}$	See Table 1

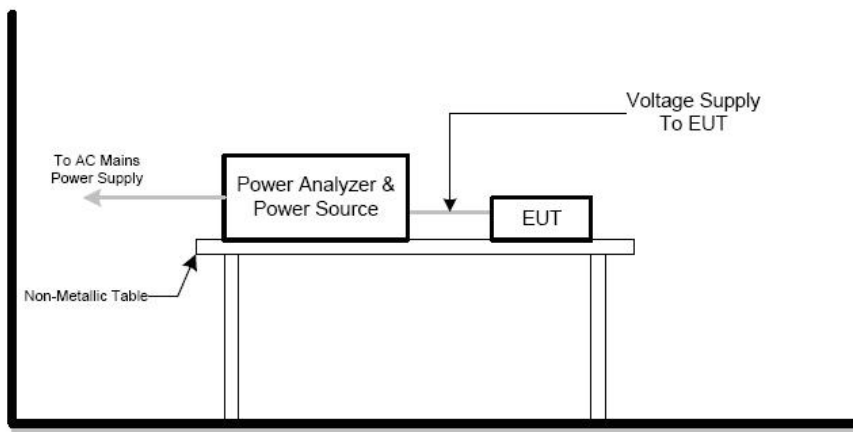
or the third harmonic current, expressed as a percentage of the fundamental current, shall not exceed 86 % and the fifth harmonic current shall not exceed 61 %. Also, the waveform of the input current shall be such that it reaches the 5 % current threshold before or at 60°, has its peak value before or at 65° and does not fall below the 5 % current threshold before 90°, referenced to any zero crossing of the fundamental supply voltage. The current threshold is 5 % of the highest absolute peak value that occurs in the measurement window, and the phase angle measurements are made on the cycle that includes this absolute peak value

➤ **Class D equipment**



Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3,4	2,30
5	1,9	1,14
7	1,0	0,77
9	0,5	0,40
11	0,35	0,33
$13 \leq n \leq 39$ (odd harmonics only)	$\frac{3,85}{n}$	See Table 1

TEST CONFIGURATION



TEST PROCEDURE

Please refer to EN61000-3-2 for the measurement methods.

TEST MODE

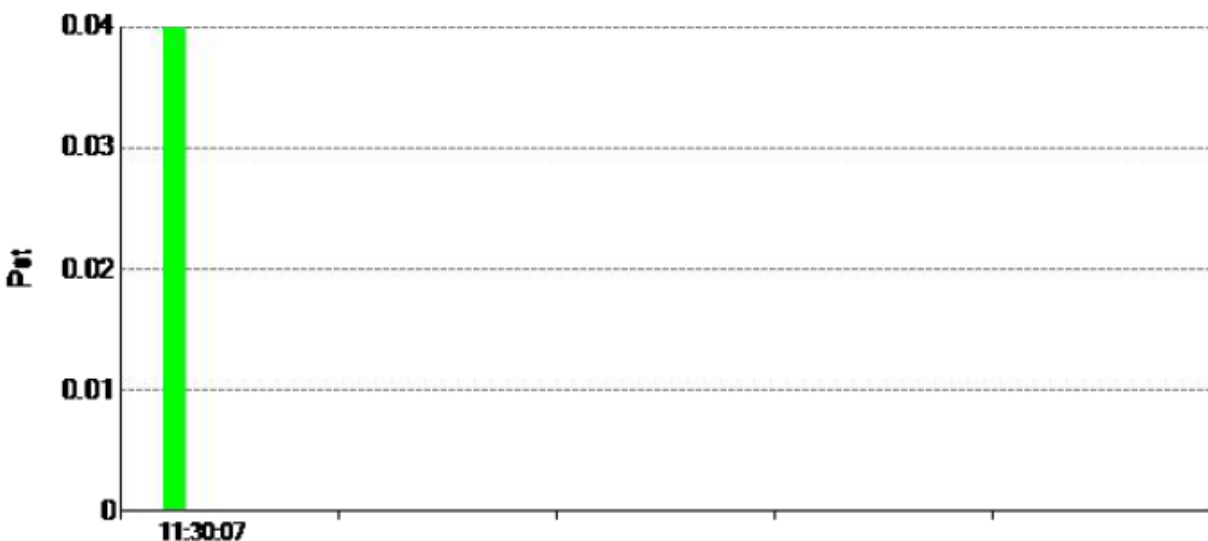
Please refer to the Clause 2.4

TEST RESULTS

Note: The power of the EUT is less than 75W, So this test item is not applicable.



**TEST RESULTS**

Test Mode		T1	
Load Power	: 0.054 kW	Power Factor:	0.882
Load Current	: 0.656 Arms	Crest Factor:	1.596
Nominal Voltage	: 230.58 Vrms		
Test Result: Pass		Status: Test Completed	
<u>Psti and limit line</u>		<u>European Limits</u>	
			
Result:			
T-max (ms):	0.00	Test limit (ms):	500.00 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.04	Test limit:	1.00 Pass



4. EMC IMMUNITY TEST

4.1. Performance criteria

- **EN 55035:**

General performance criteria

- Performance criteria A for immunity tests with phenomena of a continuous nature;
- Performance criteria B for immunity tests with phenomena of a transient nature;
- Performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following.

Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).

NOTE 1:

Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2:

No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

- **EN301489-17:**

**General performance criteria**

- Performance criteria A for immunity tests with phenomena of a continuous nature;
- Performance criteria B for immunity tests with phenomena of a transient nature;
- Performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following.

Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).
Note 1: Degradation of performance during the test is understood as degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended. Note 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.		

Performance criteria for Continuous phenomena applied to Transmitters (CT)

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or NotACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Transmitters (TT)



The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Receivers (CR)

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.



4.2. Electrostatic Discharge

PERFORMANCE CRITERION

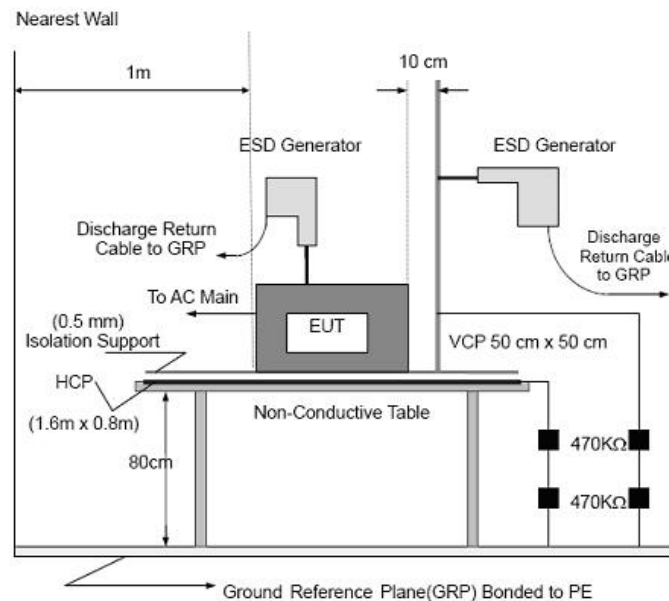
Standard	Criterion
EN 55035/ ETSI EN301489-17	Criteria B

TEST LEVEL

Contact Discharge at $\pm 2\text{kV}$, $\pm 4\text{kV}$

Air Discharge at $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 for the measurement methods.

Contact Discharge:

The ESD generator is held perpendicular to the surface to which the discharge is applied and the tip of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Air Discharge:

Air discharge is used where contact discharge can't be applied. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Indirect discharge for horizontal coupling plane:

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT.

Indirect discharge for vertical coupling plane:

At least 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

**TEST MODE**

Please refer to the Clause 2.4

TEST RESULTS

Test mode		T1, T2				
Temperature	23°C	Humidity	40%	Atmospheric pressure		101KPa
Test Points	Test Voltage	Kind	Total Times	Perform Criteria	Results	Test Result
HCP	☒ ±2 kV ; ☒ ±4 kV ☐ ±6 kV ; ☐ ±8 kV ☐ ±10 kV ; ☐ ±15 kV	☐ Air ☒ Contact	☒ 20 ☐ 50	B	A	☒ Pass ☐ Fail
VCP	☒ ±2 kV ; ☒ ±4 kV ☐ ±6 kV ; ☐ ±8 kV ☐ ±10 kV ; ☐ ±15 kV	☐ Air ☒ Contact	☒ 20 ☐ 50	B	A	☒ Pass ☐ Fail
Contact Discharge	☒ ±2 kV ; ☒ ±4 kV ☐ ±6 kV ; ☐ ±8 kV ☐ ±10 kV ; ☐ ±15 kV	☐ Air ☒ Contact	☒ 20 ☐ 50	B	A	☒ Pass ☐ Fail
Air Discharge	☒ ±2 kV ; ☒ ±4 kV ☒ ±6 kV ; ☒ ±8 kV ☐ ±10 kV ; ☐ ±15 kV	☒ Air ☐ Contact	☒ 20 ☐ 50	B	A	☒ Pass ☐ Fail
* Comment:						
☒ No degradation was found						
☐ Phenomenon Description						

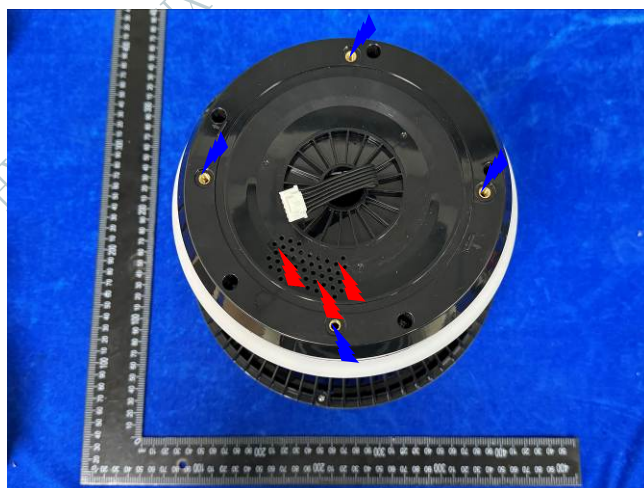
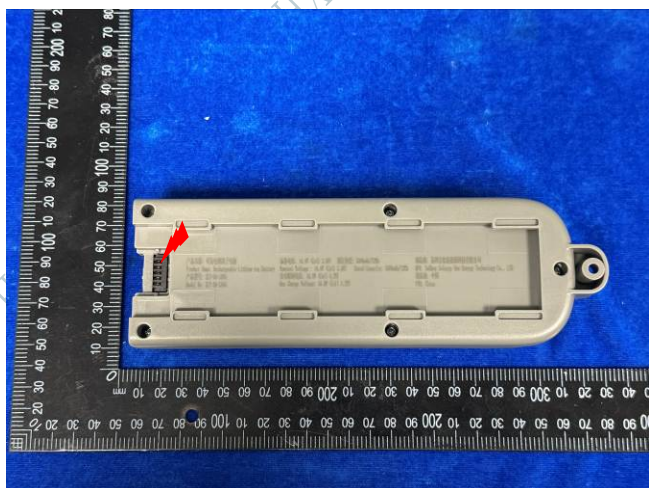
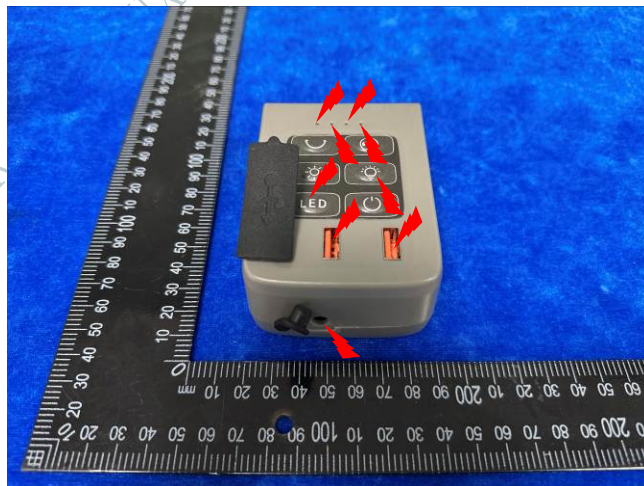
Note:

The ancillary equipment's specification for an acceptable level of performance or degradation of performance during and/or after the ESD tests.



Description of Discharge Point

Contact discharge-Blue, Air discharge-Red





4.3. Radio Frequency Electromagnetic Field

PERFORMANCE CRITERION

Standard	Criterion
EN 55035/ ETSI EN301489-17	Criteria A

TEST LEVEL

Test frequency range: 80MHz~6000MHz

Level: 3V/m (Un-modulation)

Modulation type: Amplitude Modulation, 80% depth

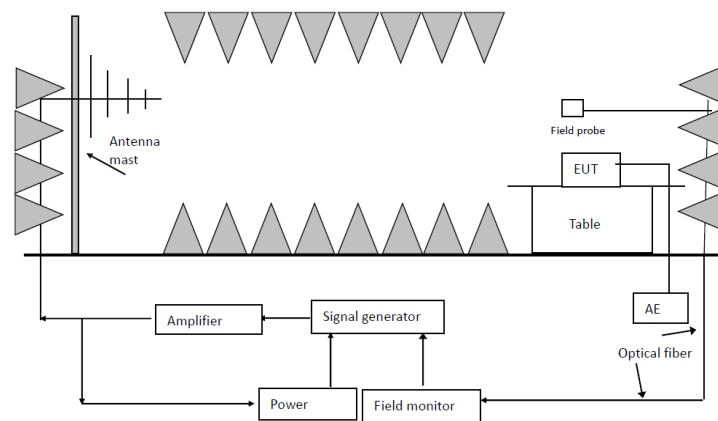
Modulated signal: 1KHz sinusoidal audio signal, 400Hz sinusoidal audio signal for audio breakthrough

Frequency increment step: 1%

Dwell time: 3 seconds

A spot frequency test shall be performed at 920 MHz $\pm$ 1 MHz using a test level of 3 V/m (measured Un-modulated) 100 % modulated by 200 Hz pulses of equal mark to space ratio.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2 and EN 61000-4-3 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS



Test mode		T1, T2			
Temperature	23°C	Humidity	40%	Atmospheric pressure	101kPa
EUT Position	Frequency range: 80-6000 MHz 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz Level: ☒ 3V/m ☐ 10V/m		Perform Criteria	Test Result	
	Horizontal (Results)				Vertical (Results)
Front	A		A	☒ Pass ☐ Fail	
Right	A		A	☒ Pass ☐ Fail	
Back	A		A	☒ Pass ☐ Fail	
Left	A		A	☒ Pass ☐ Fail	
Top	A		A	☒ Pass ☐ Fail	
*Comment: ☒ No degradation was found ☐ Phenomenon Description					



4.4. Fast Transients Common Mode

PERFORMANCE CRITERION

Standard	Criterion
EN 55035/ ETSI EN3014893-17	Criteria B

TEST LEVEL

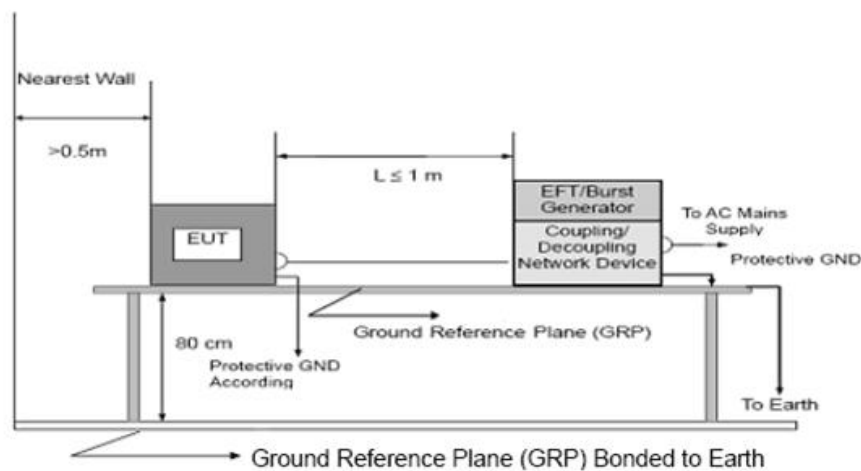
Level: 1KV for AC port, 0.5KV for signal port

Impulse Frequency: 5 kHz;

Tr/Td: 5/50ns;

Burst Duration: 15ms; Burst Period: 300ms

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-4 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Test mode		T1				
Temperature	23℃	Humidity	40%	Atmospheric pressure		101KPa
Test Ports		Test Voltage	Duration time	Perform Criteria	Result	Test Result
AC power port		☐ ±0.5KV ☒ ±1KV ☐ ±2KV	☒ 120s ☐	B	A	☒ Pass ☐ Fail
* Comment: ☒ No degradation was found ☐ Phenomenon Description						



4.5. Surge

PERFORMANCE CRITERION

Standard	Criterion
EN 55035/ ETSI EN301489-17	Criteria B

TEST LEVEL

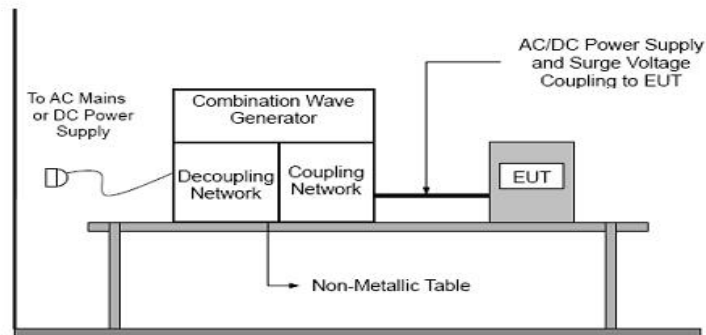
Level: 1kV for line to line, 2kV for line to ground, 1kV for signal line

Voltage Waveform: 1.2/50 us; Current Waveform: 8/20 us

Pulse quantity: 5, interval time: 60 seconds

Phase: 0°, 90°, 180°, 270°

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.8.2 and EN 61000-4-5 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Test mode			T1							
Temperature		23℃	Humidity		40%		Atmospheric pressure		101KPa	
Test Ports		Test Voltage	Resistor	Surge Wave	Total Times	Phase	Interval time	Perform Criteria	Results	Test Result
AC Power port	L-N	☒ ±1 KV	☒ 2Ω ☐ 12Ω	☒ 1.2/50us ☐ 10/700us ☐	☒ 10 ☐	☒ 0°	☒ 60s ☐ ____	B	A	☒ Pass ☐ Fail
		☐ ±2 KV								
		☐ ±4 KV								
		☐ ± KV								
* Comment:										
☒ No degradation was found										
☐ Phenomenon Description										

Note: The generator and coupling/decoupling network are verified before the test.



4.6. Radio frequency common mode

PERFORMANCE CRITERION

Standard	Criterion
EN 55035/ ETSI EN301489-17	Criteria A

TEST LEVEL

Test frequency range: 150kHz~80MHz

Level: 3Vrms

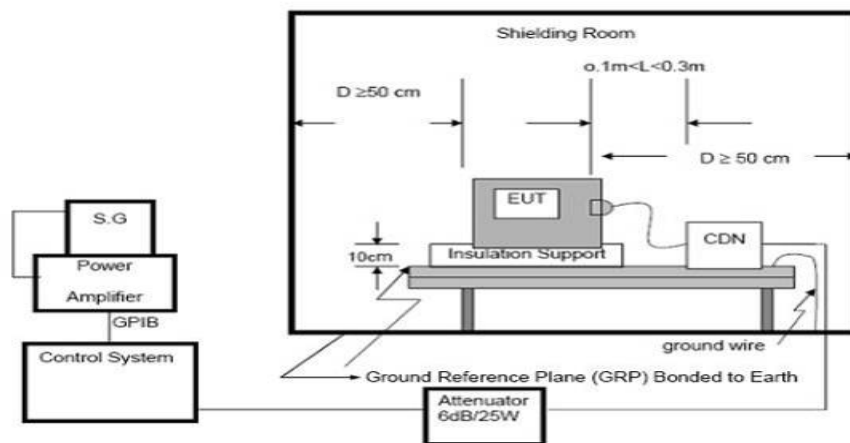
Modulation type: Amplitude Modulation, 80% depth

Modulated signal: 1KHz sinusoidal audio signal, 400Hz sinusoidal audio signal for audio breakthrough

Frequency increment step: 1%

Dwell time: 3 seconds

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.5.2 and EN 61000-4-6 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Test mode		T1				
Temperature	23℃	Humidity	40%	Atmospheric pressure		101KPa
Test Ports		Frequency range	Test level (Vrms)	Phenomenon	Results	Test Result
AC power port		☒ 0.15MHz~80MHz ☐ 0.15MHz~230MHz	☐ 1V ☒ 3V ☐	A	A	☒ Pass ☐ Fail
		☒ 0.15MHz~10MHz ☐ 10MHz~30MHz ☐ 30MHz~80MHz	☐ 1V ☒ 3V ☐	A	A	☒ Pass ☐ Fail
		☐ 0.15MHz~10MHz ☒ 10MHz~30MHz ☐ 30MHz~80MHz	☐ 1V ☐ 3V ☒ 3V-1V	A	A	☒ Pass ☐ Fail
		☐ 0.15MHz~10MHz ☒ 10MHz~30MHz ☒ 30MHz~80MHz	☒ 1V ☐ 3V ☐	A	A	☒ Pass ☐ Fail
*Comment: ☒ No degradation was found ☐ Phenomenon Description						



4.7. Voltage dips and interruptions

PERFORMANCE CRITERION

Standard	Criterion
EN 55035/ ETSI EN301489-17	Criteria B for voltage dip Criteria C for voltage interruption

TEST LEVEL

0% of VT (Supply Voltage) for 0.5 period

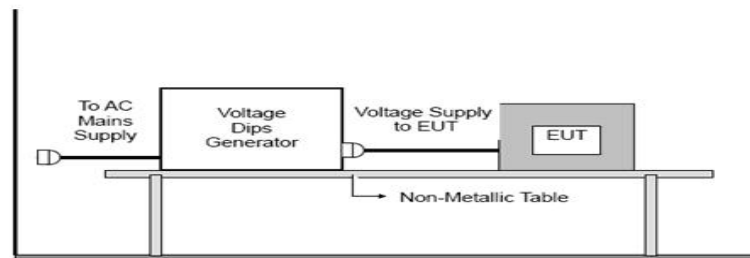
0% of V_T (Supply Voltage) for 1 period

70% of VT (Supply Voltage) for 25 period

0% of VT (Supply Voltage) for 250 period

Dip quantity: 3, interval time: 10 seconds

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.7.2 and EN 61000-4-11 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Test mode		T1				
Temperature	23℃	Humidity	40%	Atmospheric pressure		101KPa
Voltage Reduction		Cycle	Duration	Perform Criteria	Results	Test Result
Voltage dips	Reduction <u>100</u> %	0.5	0.01	B	A	☒ Pass ☐ Fail
	Reduction <u>100</u> %	1	0.02	B	A	☒ Pass ☐ Fail
	Reduction <u>30</u> %	25	0.5	C	A	☒ Pass ☐ Fail
Voltage interruption	Reduction <u>100</u> %	250	5	C	A	☒ Pass ☐ Fail
* Comment: ☒ No degradation was found ☐ Phenomenon Description						

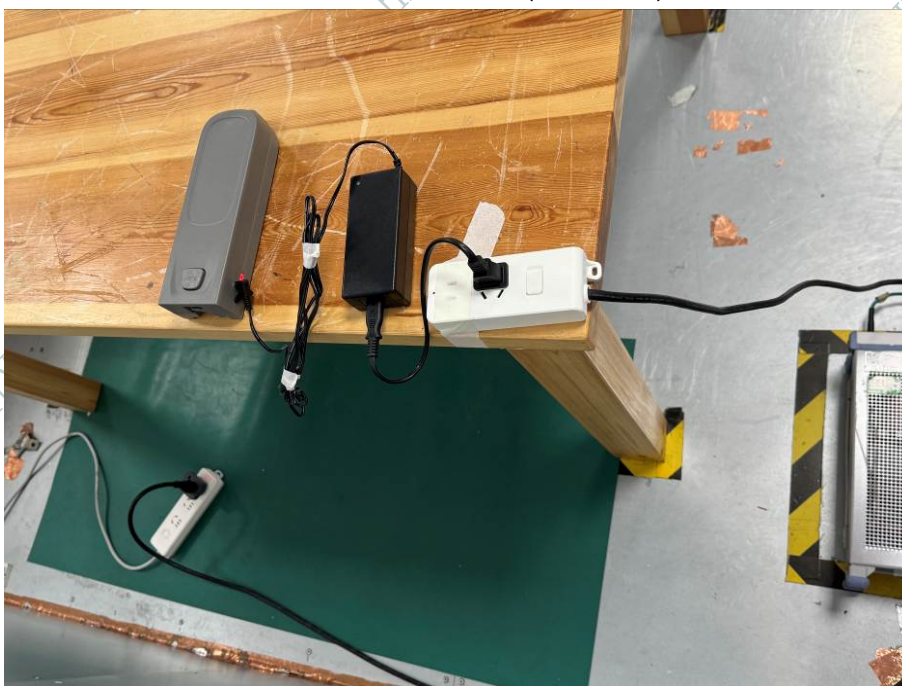


5. EUT TEST PHOTOS

Conducted Emission (AC Mains)

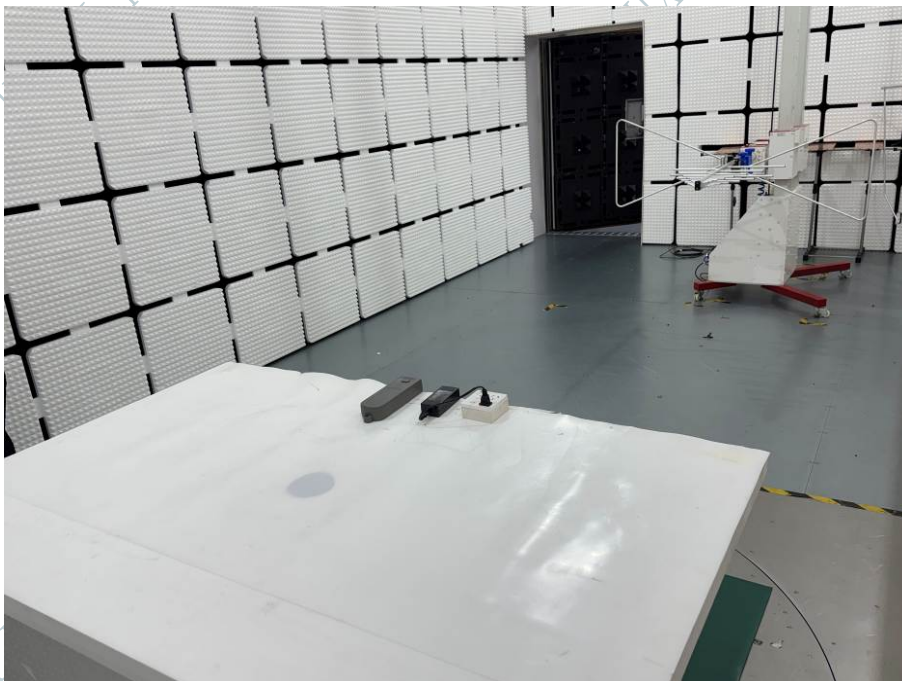


Conducted Emission (AC Mains)

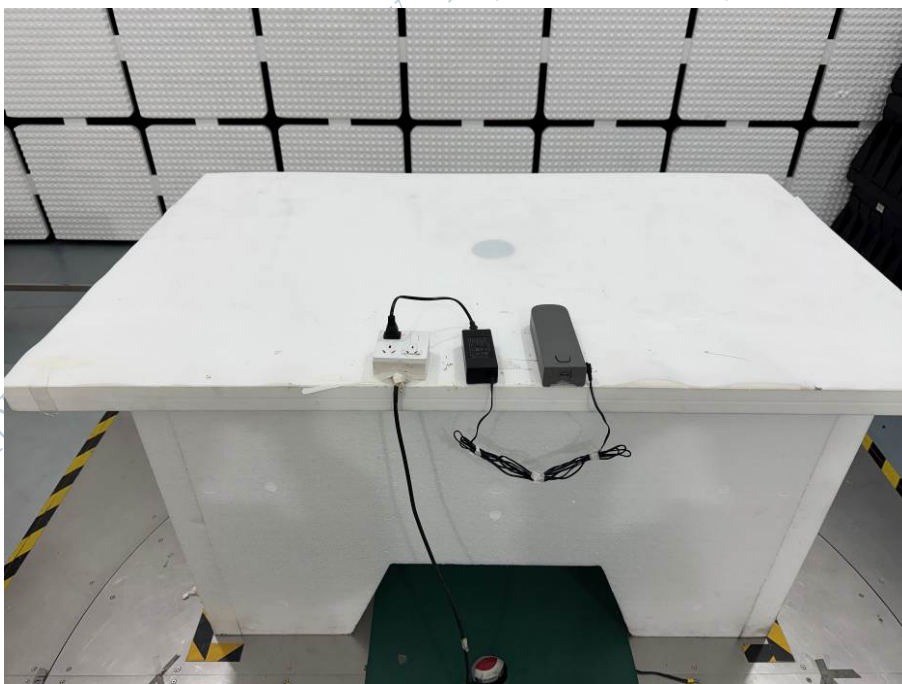




Radiated Measurement (30MHz~1000MHz)



Radiated Measurement (30MHz~1000MHz)

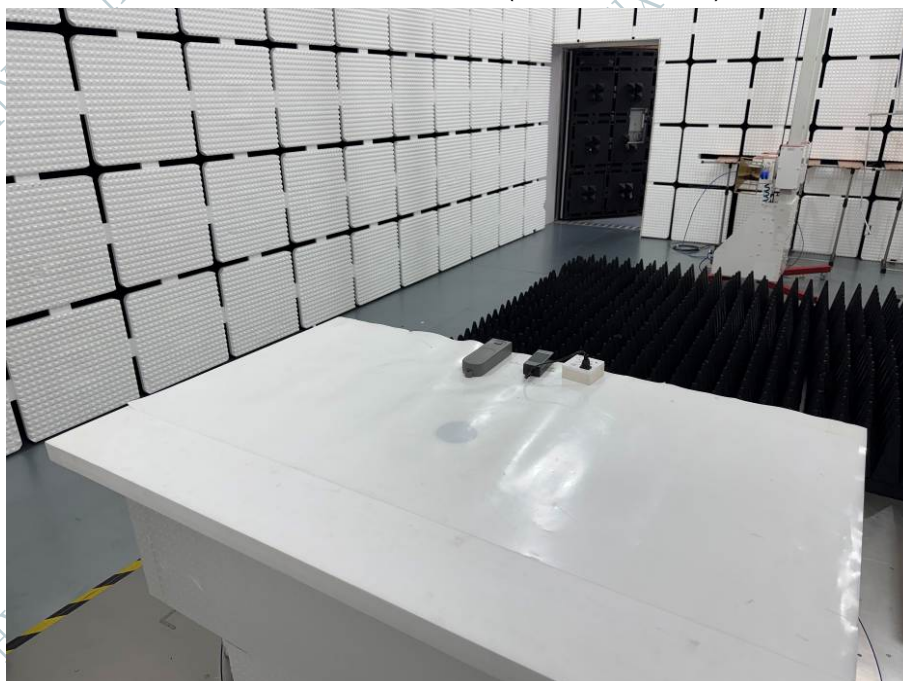




Radiated Measurement (30MHz~1000MHz)

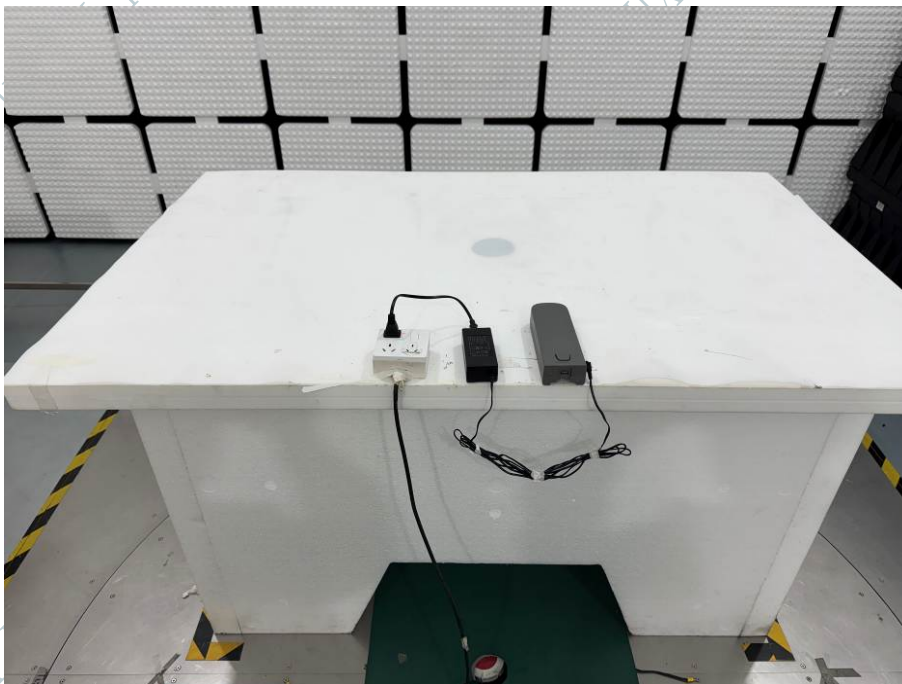


Radiated Measurement (1000~6000MHz)





Radiated Measurement (1000~6000MHz)

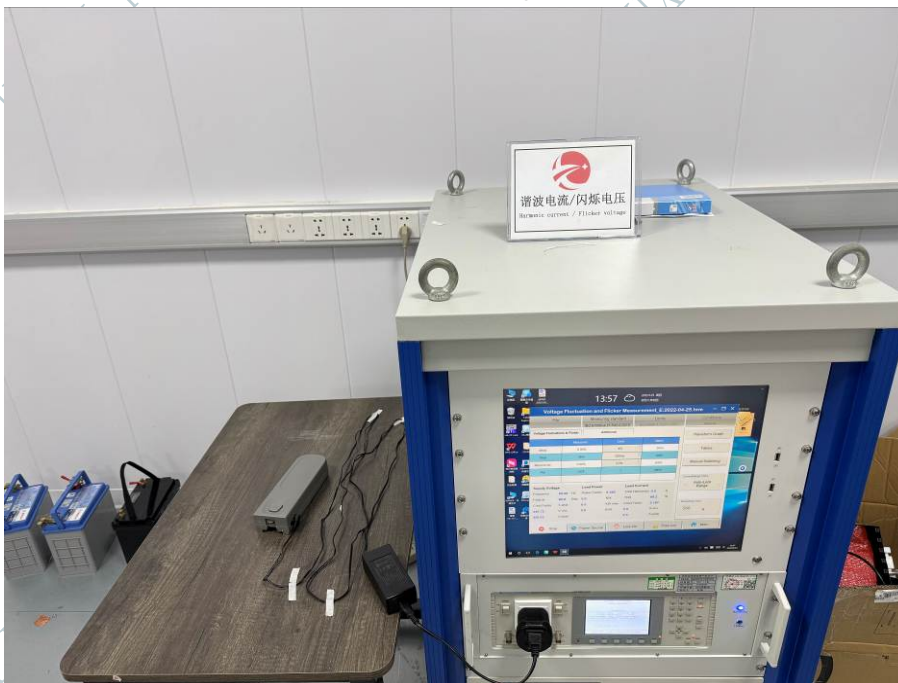


Radiated Measurement (1000~6000MHz)





Harmonic Current Emission/ Voltage Fluctuations & Flicker



Electrostatic Discharge

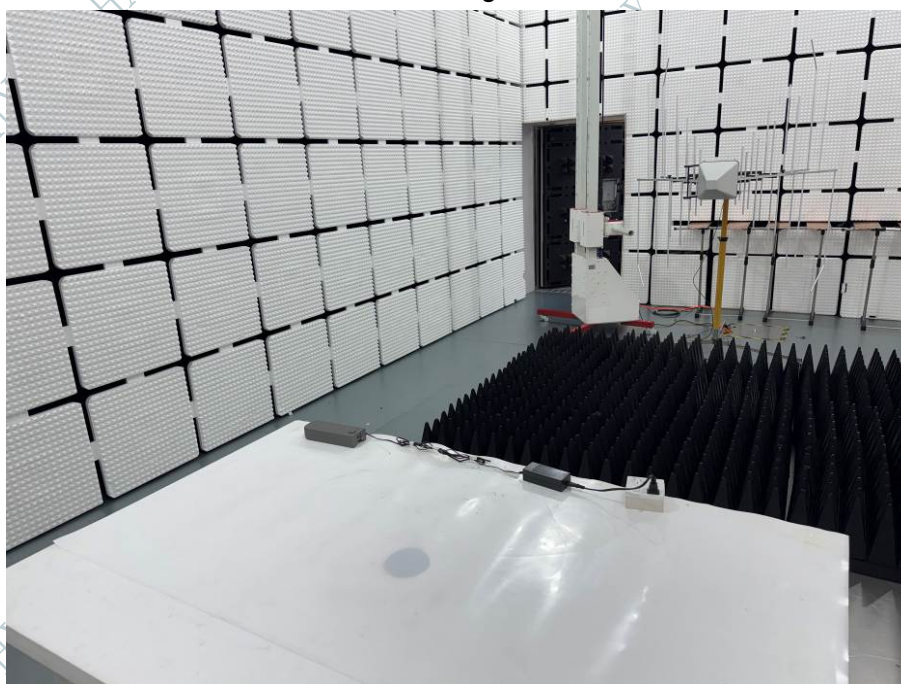




Electrostatic Discharge



RF electromagnetic field

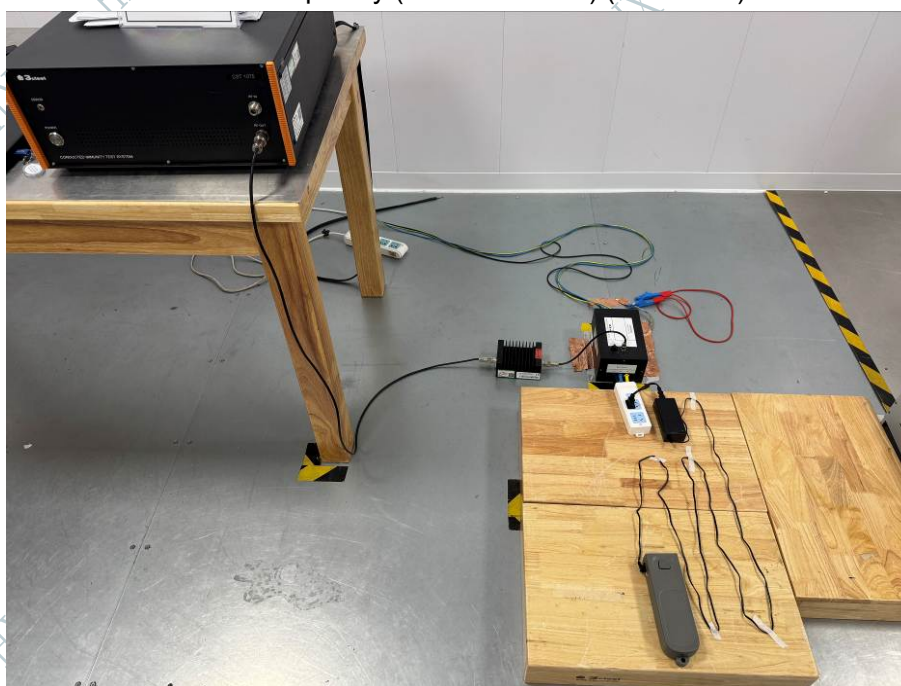




RF electromagnetic field



Radio frequency (common mode) (AC Mains)

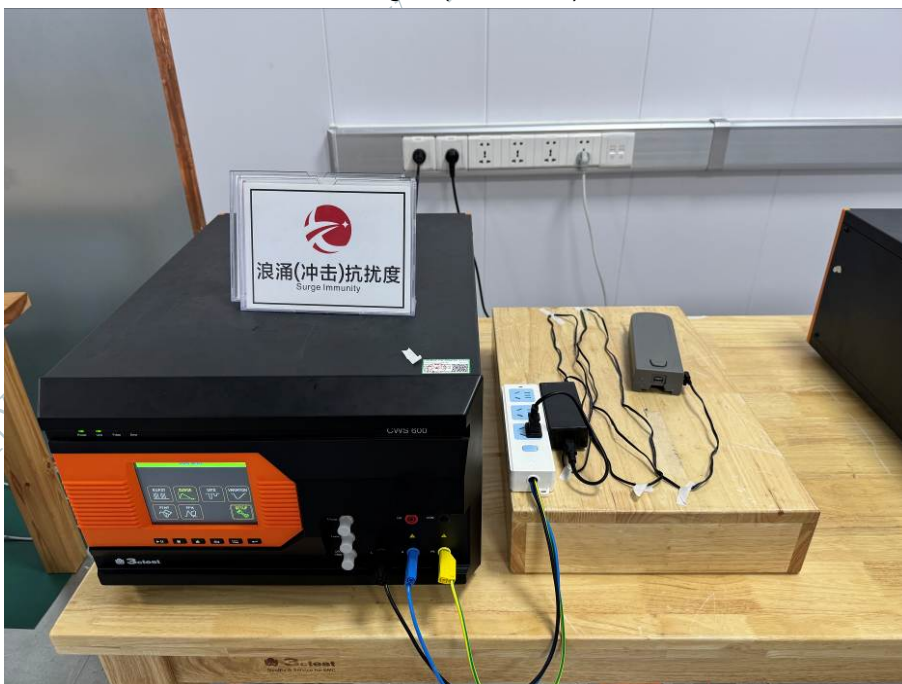




Electric Fast Transients (AC Mains)

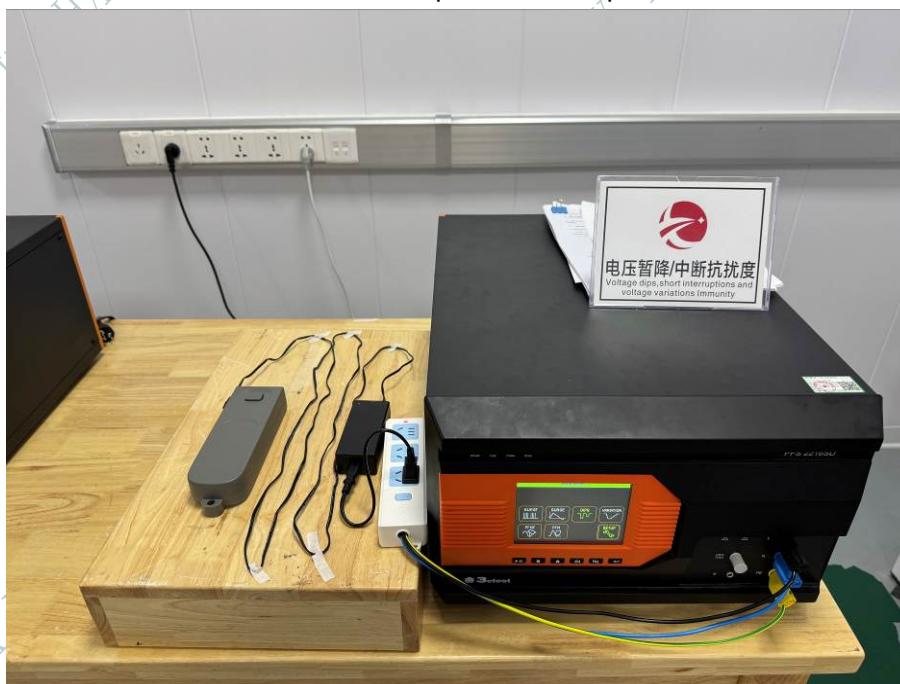


Surges (AC Mains)





Volt. Interruptions/Volt. Dips

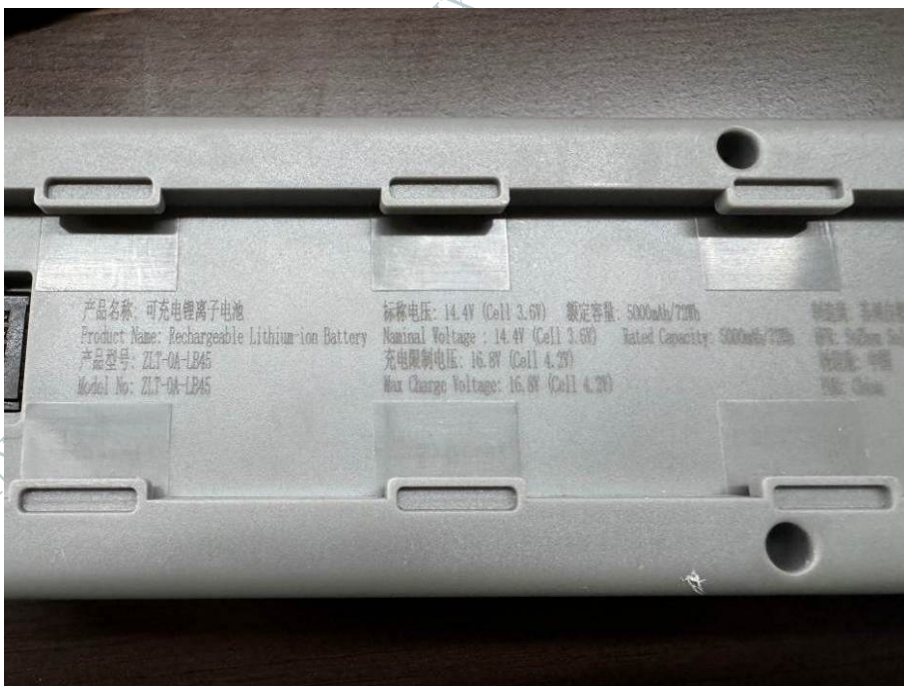
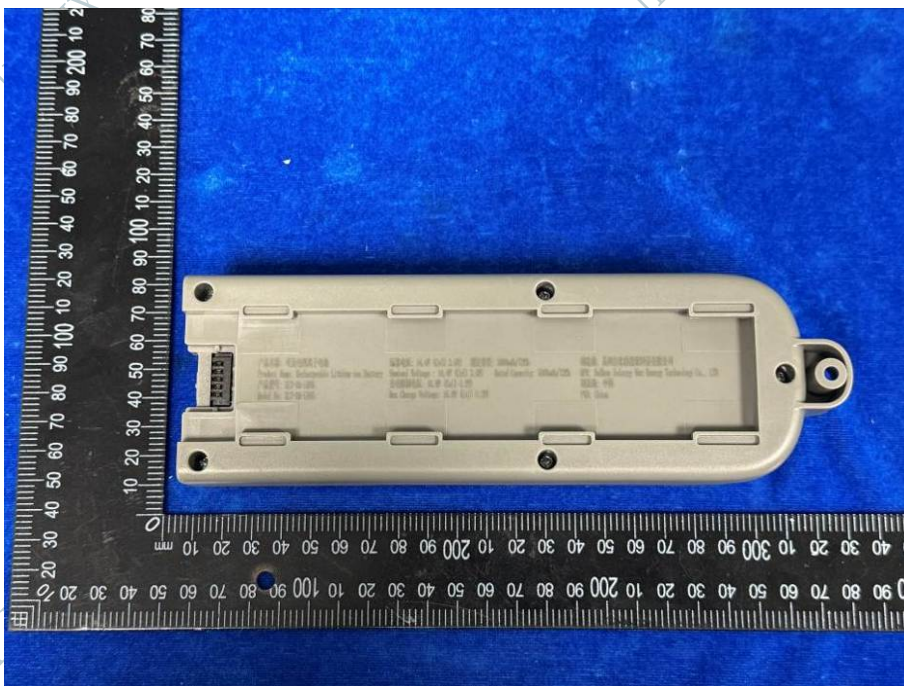




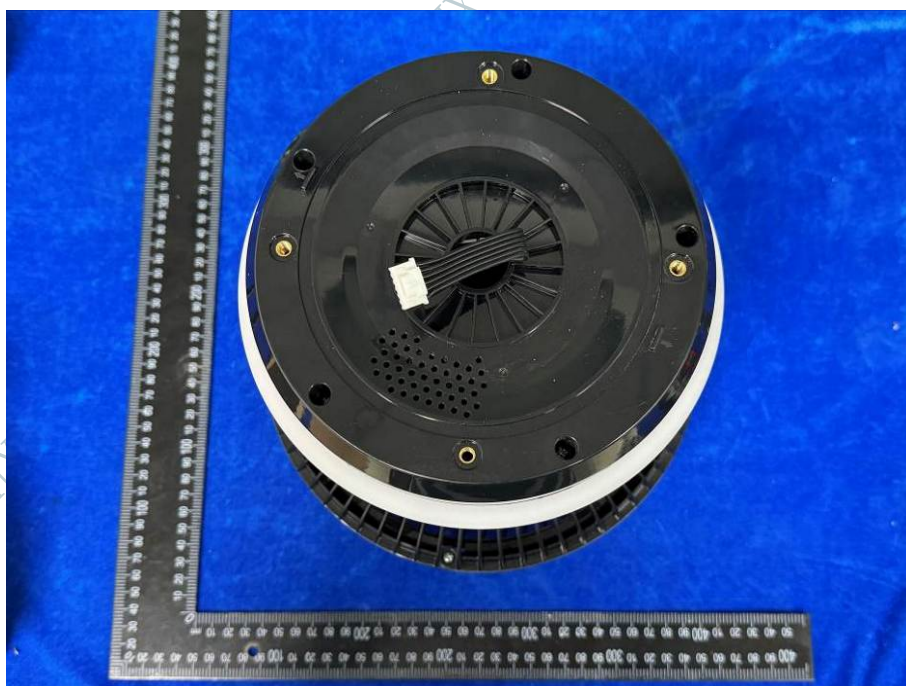
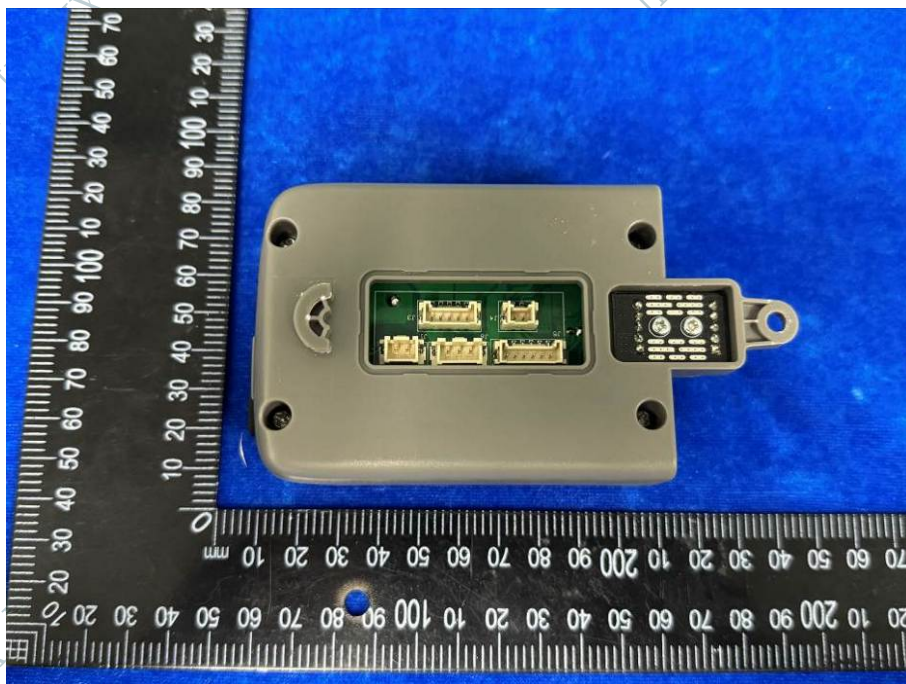
6. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

External Photographs





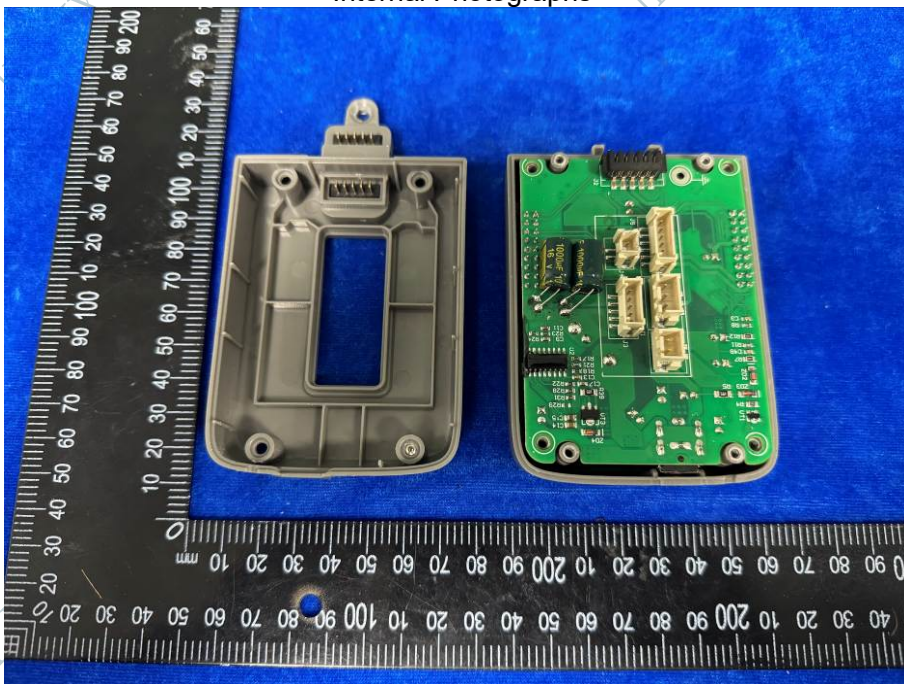


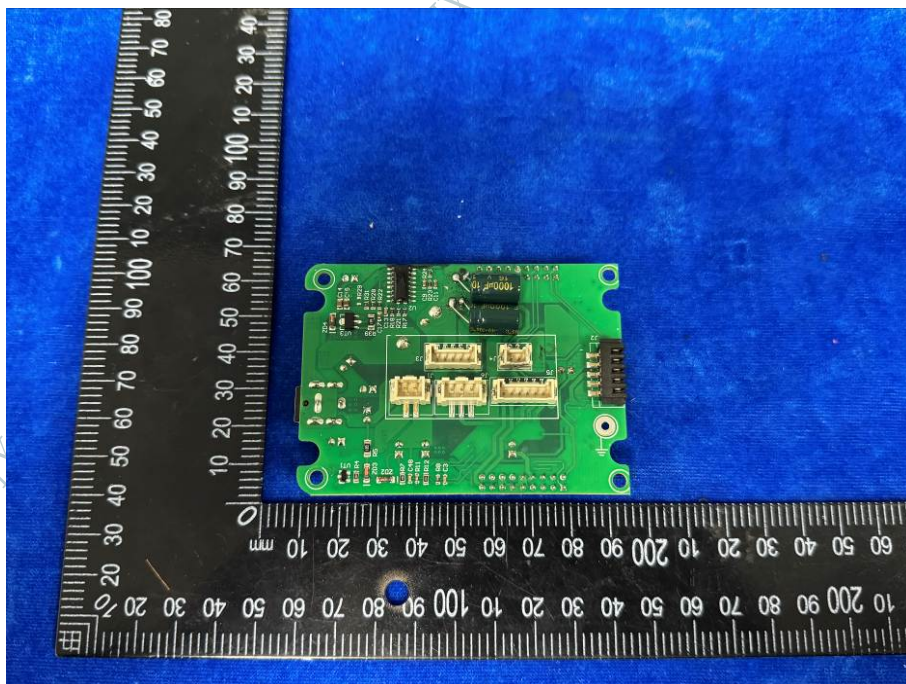
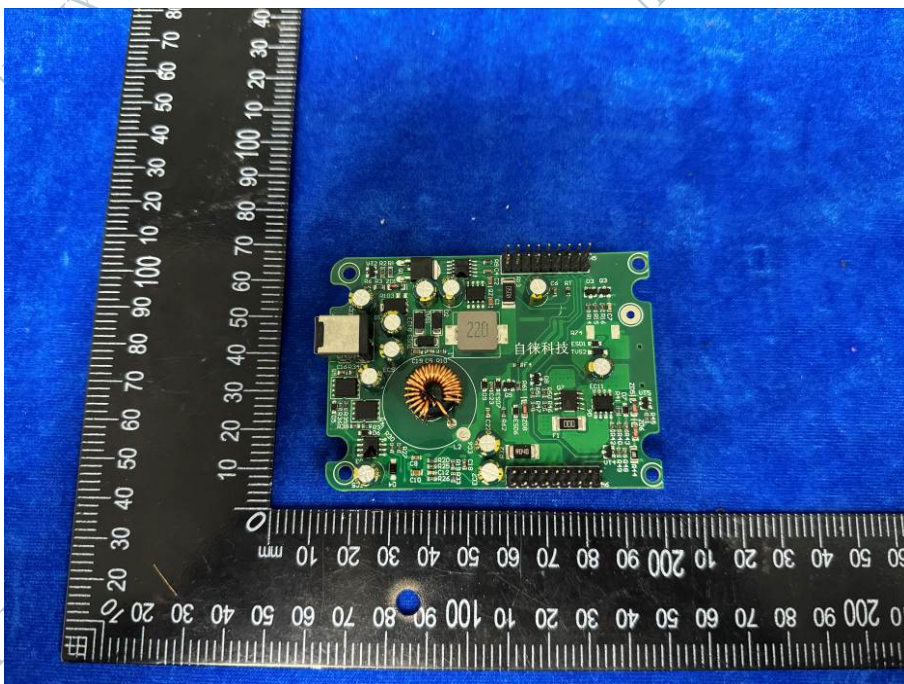


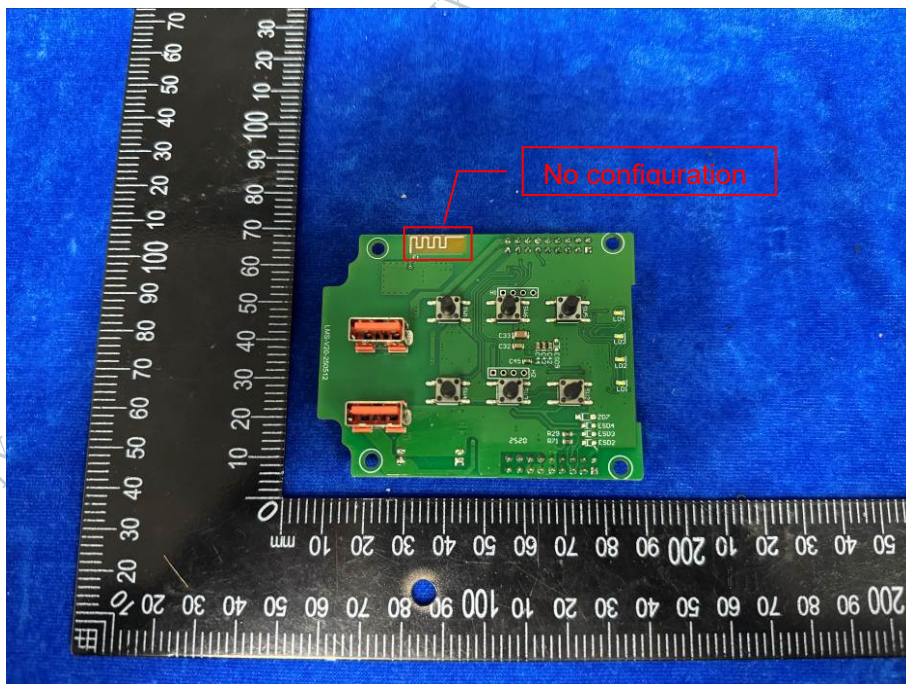
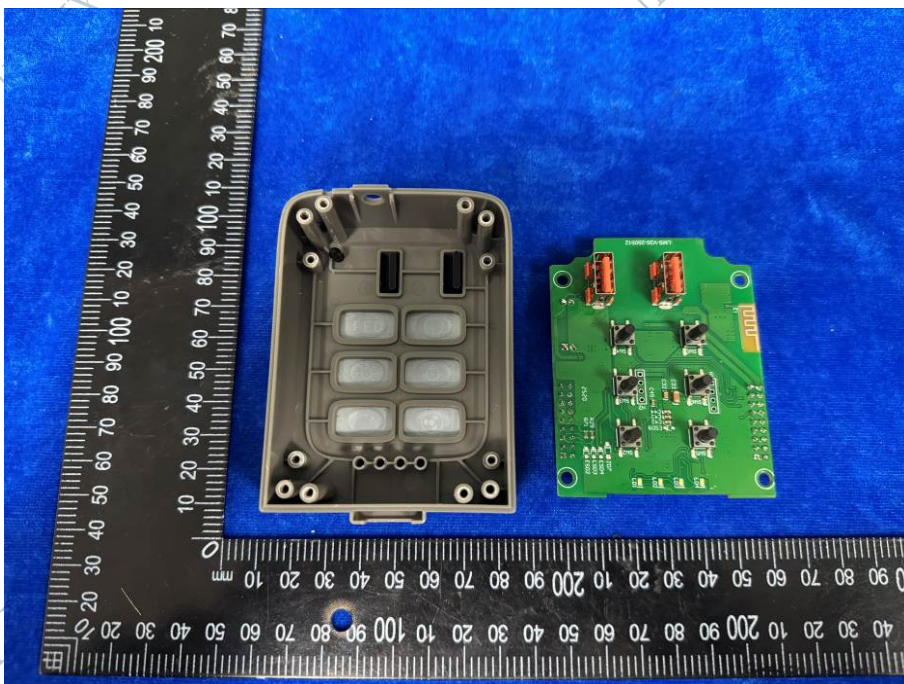


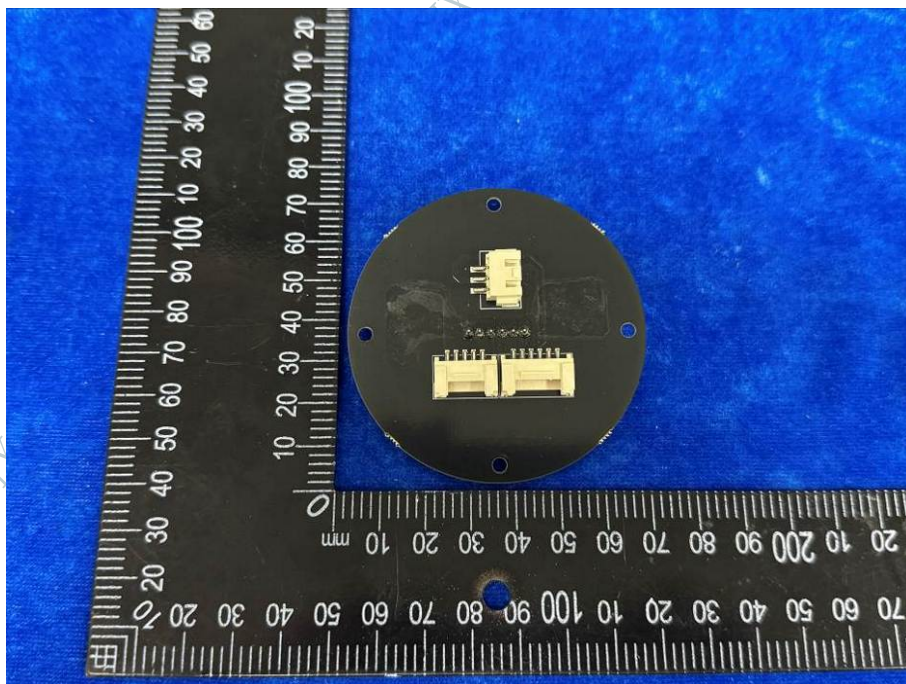
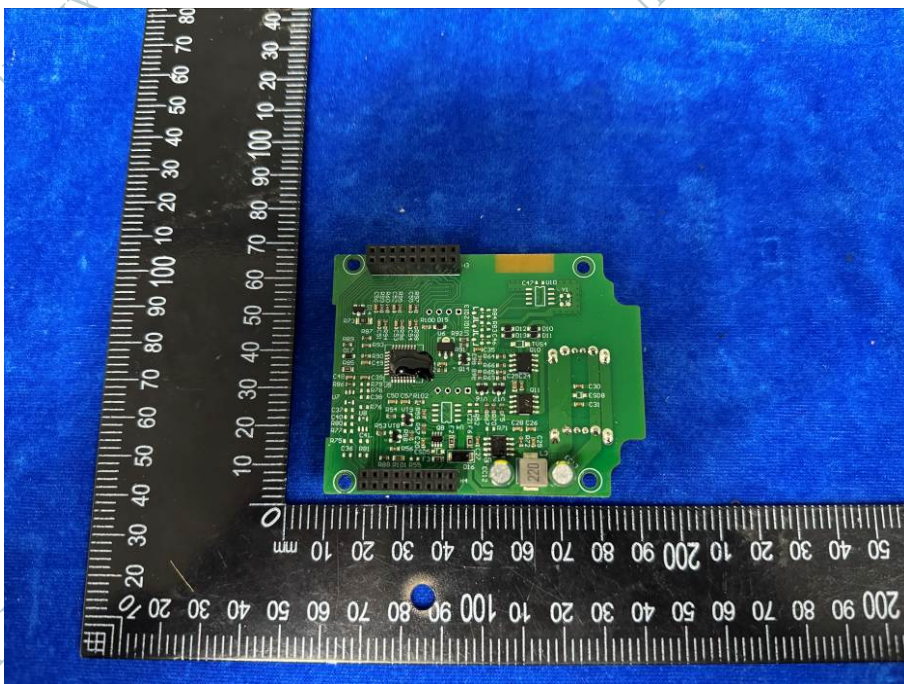


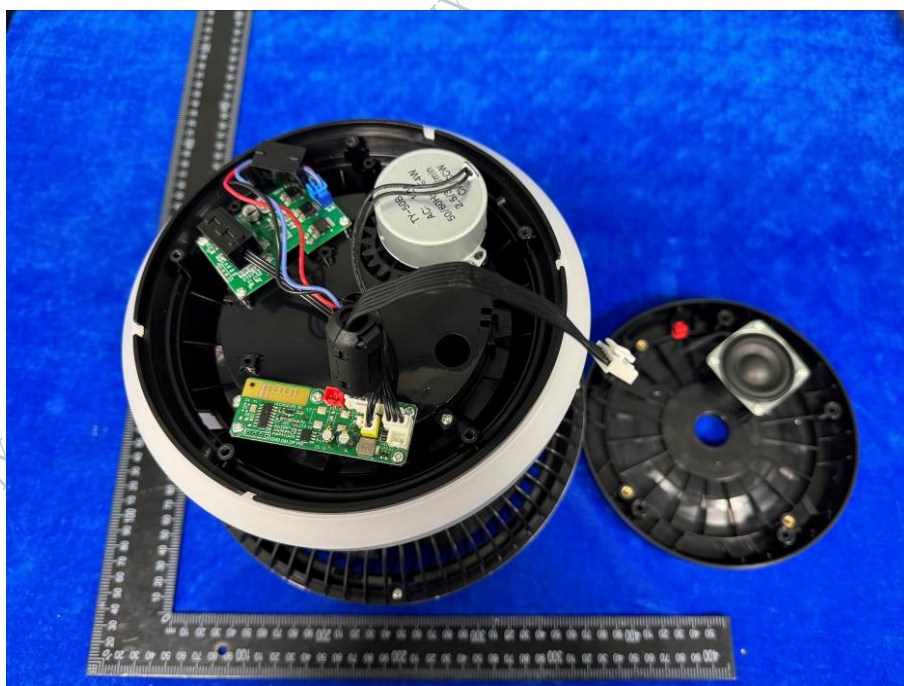
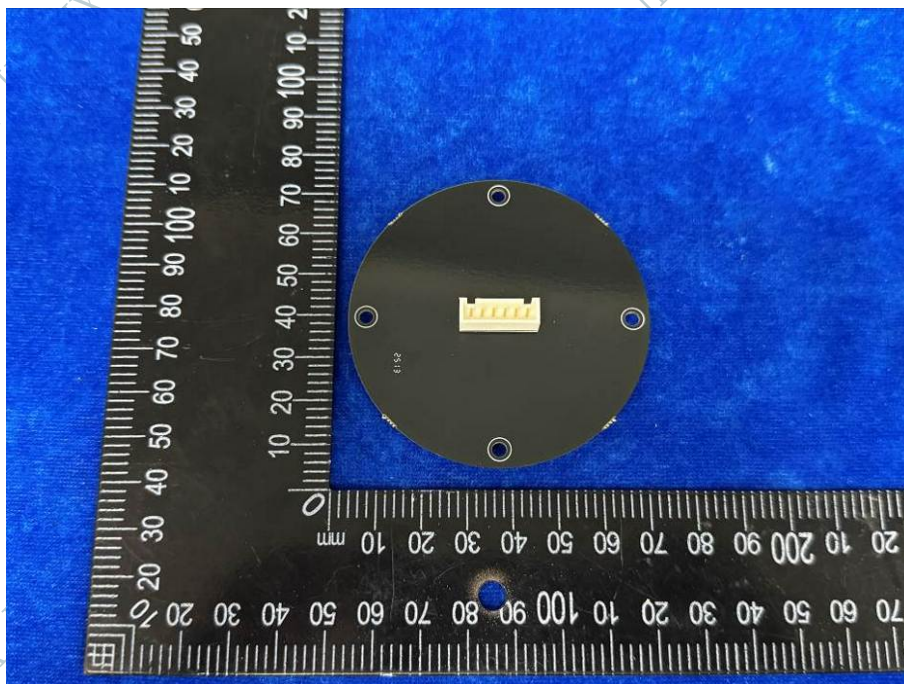
Internal Photographs

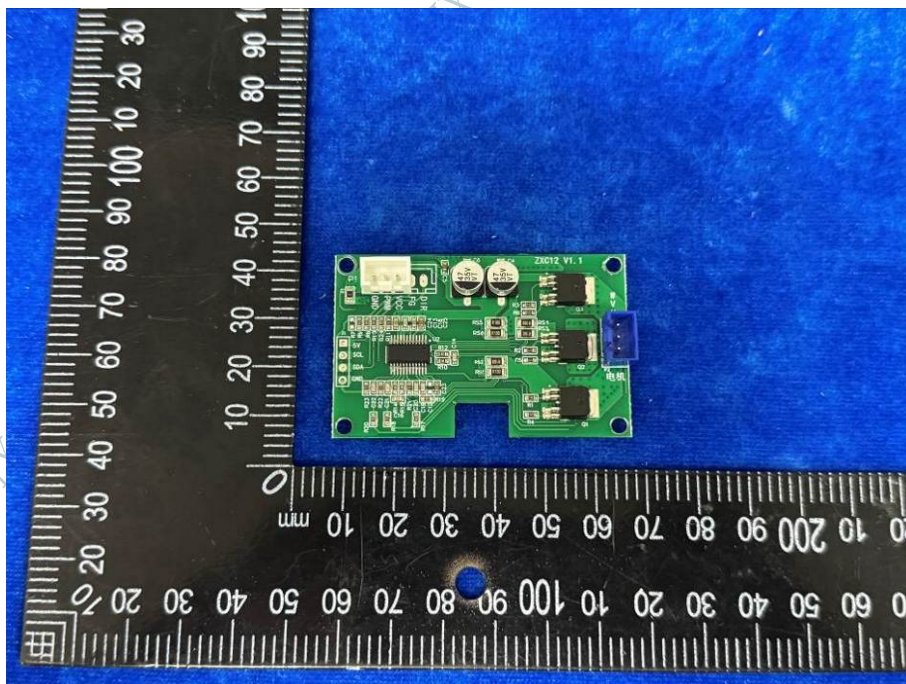
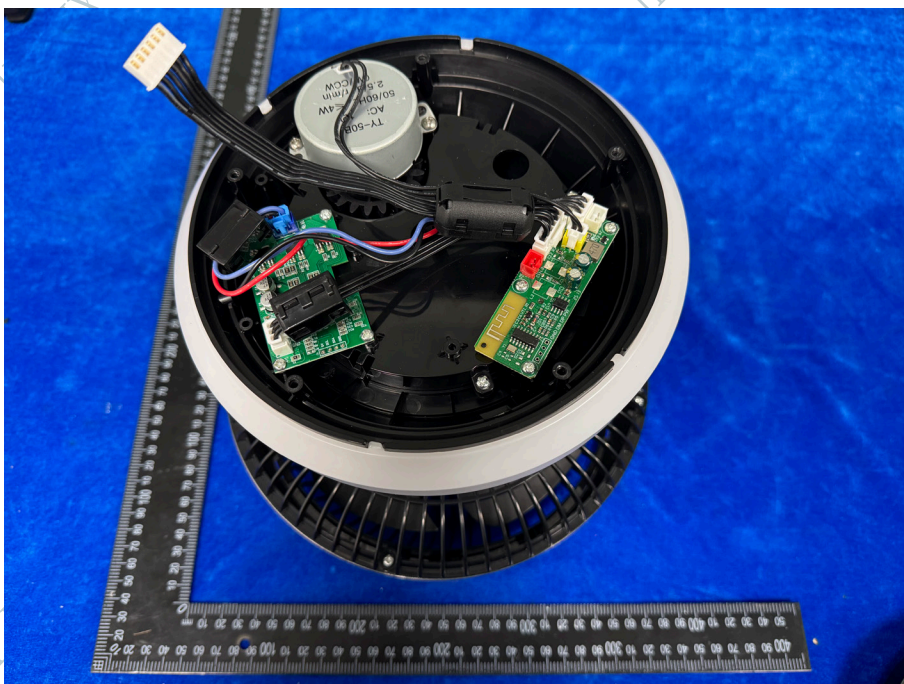


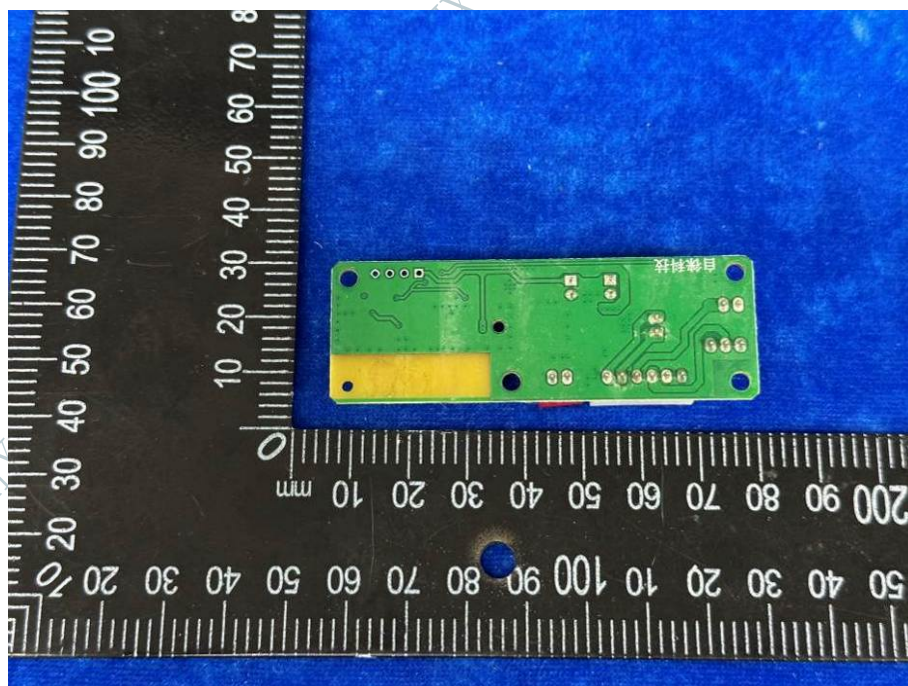
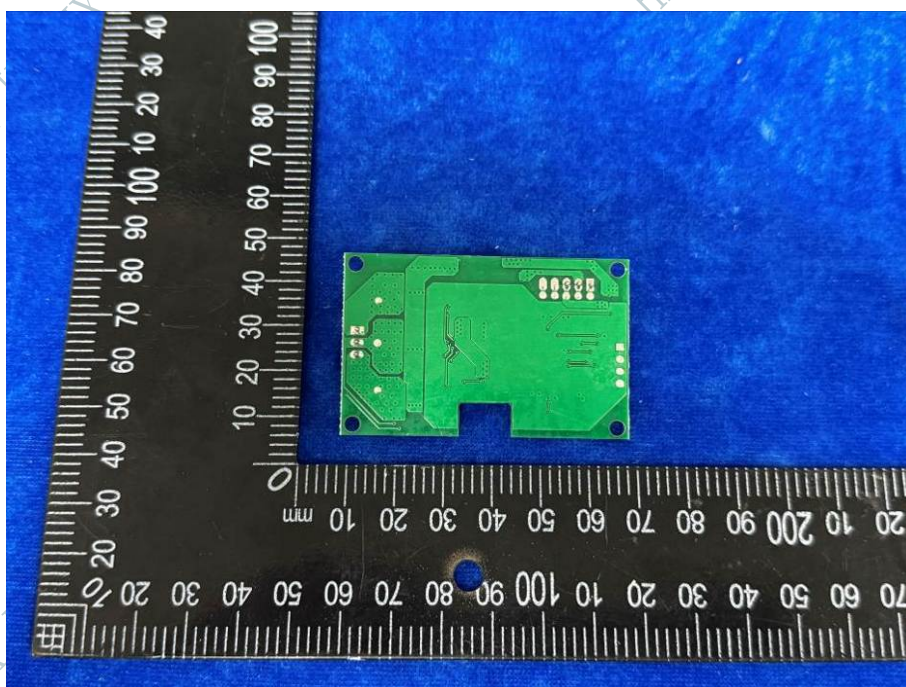


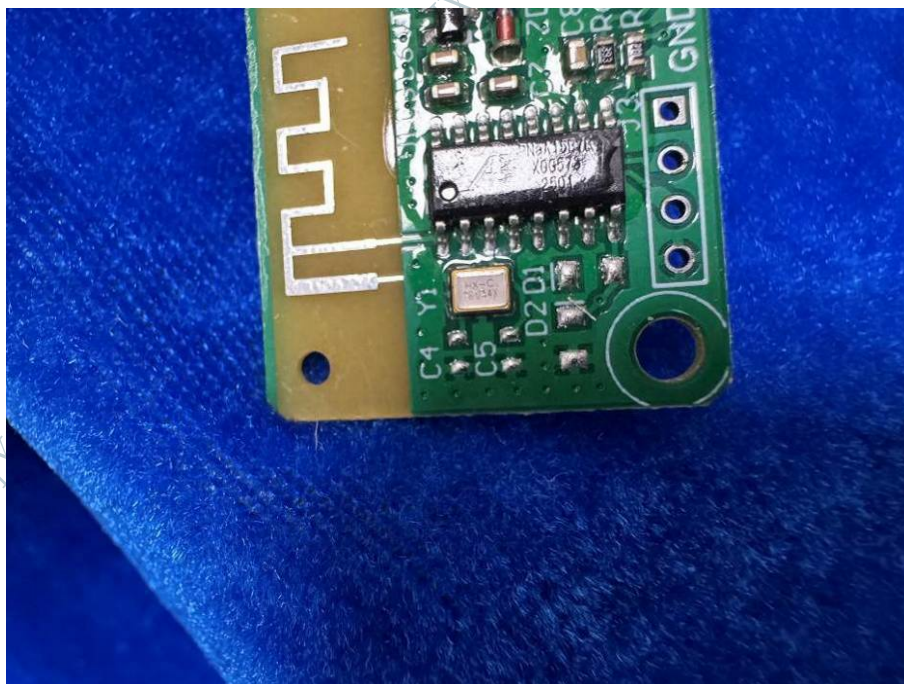
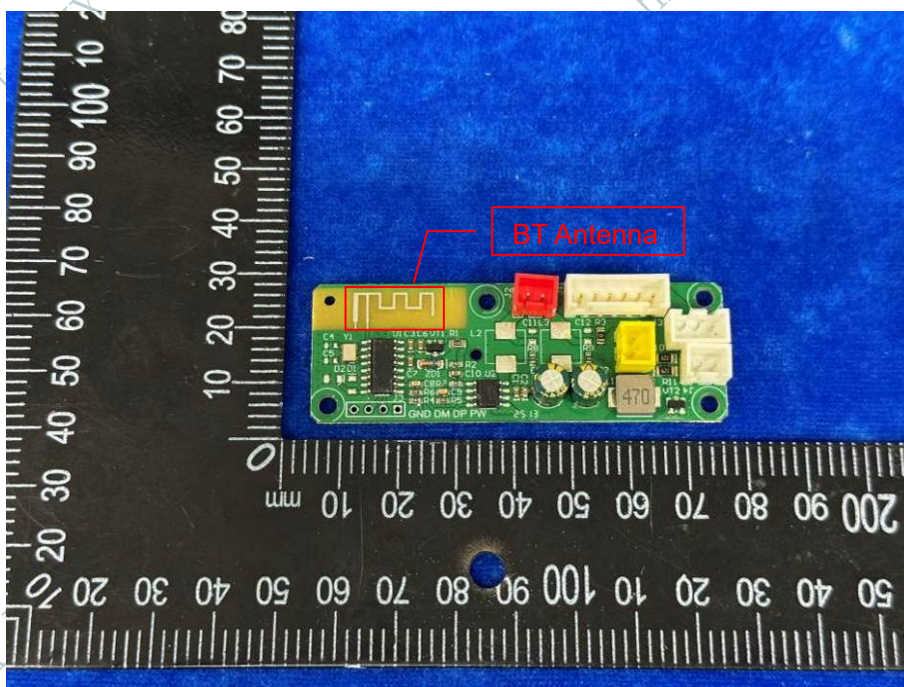












*****THE END*****