Test Report

EMC TEST REPORT

For

Product:Fan

Model:MO2779

Report No.: RKEYS251224289

Issued for

Mid Ocean Brands B.V.

Unit 711-716, 7/F., Tower A, 83 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong

Issued by

Guangdong KEYS Testing Technology Co.,Ltd.

Address: Building 1, No.18, Shihuan Road, Dongcheng Subdistrict, Dongguan, Guangdong, China

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1. TEST CERTIFICATION

Product:	Fan
Trade mark:	/
Model:	MO2779
Applicant :	Mid Ocean Brands B.V.
Address:	Unit 711-716, 7/F., Tower A, 83 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Manufacturer:	Mid Ocean Brands B.V.
Address:	Unit 711-716, 7/F., Tower A, 83 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Sample Received Date:	Dec. 24, 2025
Test Date:	Dec. 24, 2025 to Dec. 29, 2025
Rating:	DC 5 by Adapter or DC 3.7V by battery
Applicable Standards:	EN IEC 55014-1:2021 EN IEC 55014-2:2021
Remark:	/

The above equipment has been tested by Guangdong KEYS Testing Technology Co., Ltd. and found compliance with the requirements in the technical standards mentioned above. The test results presented in this report only relate to the product/system tested. The Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Prepared by: Joy Jiang / Engineer

Approved by: Bruce Zhang/ Manager

2. TEST SUMMARY

EMISSION			
Standard	**Item**	**Result**	**Remarks**
EN IEC 55014-1:2021	Conducted (Main Port)	N/A	Note 3
	Disturbance Power	N/A	Note 1
	Radiated Emission	PASS	Complied with limit
	Click	N/A	Note 3
EN IEC 61000-3-2:2019 +A2:2024	Harmonic current emissions	N/A	Note 3
EN 61000-3-3:2013+A2:2021+ AC:2022-01	Voltage fluctuations & flicker	N/A	Note 3

IMMUNITY(EN IEC 55014-2:2021)			
Standard	**Item**	**Result**	**Remarks**
IEC 61000-4-2:2008	ESD	PASS	Complied with the requirements
IEC 61000-4-3:2006/AMD1:2007/ AMD2:2010	RS	PASS	Complied with the requirements
IEC 61000-4-4:2012	EFT	N/A	Note 3
IEC 61000-4-5:2014/AMD1:2017	Surge	N/A	Note 3
IEC 61000-4-6:2013	CS	N/A	Note 3
IEC 61000-4-11:2020	Voltage dips & voltage variations	N/A	Note 2

Note: 1) The Product shall be evaluated for emissions in the 30 MHz to 1 000 MHz range by testing in accordance with method b as described in clause 4.3.4.2 of EN IEC 55014-1.

2) The Product is belong to category III.

3)N/A means not applicable.The EUT is powered by DC.

3. TEST SITE

3.1. TEST FACILITY

Guangdong KEYS Testing Technology Co., Ltd.

Building 1, No.18, Shihuan Road, Dongcheng Subdistrict, Dongguan, Guangdong, China

3.2. MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Conducted Emission(150KHz-30MHz)	±3.2dB
Radiated Emission(30MHz-1GHz)	±4.7dB
Radiated Emission (1GHz-6GHz)	±5.1dB
Radiated Emission (6GHz-18GHz)	±5.1dB

Note 1: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.3. LIST OF TEST AND MEASUREMENT INSTRUMENTS

3.3.1. ☐ For conducted emission at the mains terminals test

Equipment	Manufacturer	Model	Equipment No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCI	KEYS-EL-203	Mar. 03, 2025	1 Year
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	KEYS-EL-201	Mar. 03, 2025	1 Year
LISN	Rohde&Schwarz	ENV216	KEYS-EL-202	Mar. 03, 2025	1 Year
Test software	Tonscend	JS32-RE Version 5.0.0			

3.3.2. ☒ For Radiated Emission Measurement(below 1GHz)

Equipment	Manufacturer	Model	Equipment No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCI7	KEYS-EL-205	Mar. 03, 2025	1 Year

Logarithmic periodic antenna	Schwarzbeck	VULB9168	KEYS-EL-209	Mar. 06, 2025	3 Year
Preamplifier	HP	8447F	KEYS-EL-210	Mar. 03, 2025	1 Year
3m Anechoic Chamber	Taihe MaoRui	9*6*6	KEYS-EL-234	Oct. 12, 2024	5 Year
Test software	Tonscend	JS32-RE Version 5.0.0			

3.3.3.☐ For Discontinuous disturbance (Clicks) test

Equipment	Manufacturer	Model	Equipment No.	Last Cal.	Cal. Interval
Click analyzer	SCHAFFNER	DIA1512D	KEYS-EL-281	Mar.18, 2025	1 Year

3.3.4.☐ For harmonic current emissions and voltage fluctuations/flicker test

Equipment	Manufacturer	Model	Equipment No.	Last Cal.	Cal. Interval
AC Power Source	California instruments	5001i-400	KEYS-EL-248	May 17, 2025	1 Year
Harmonic and Flicker Analyzer	California instruments	PACS-1	KEYS-EL-249	May 17, 2025	1 Year
Test software	California Instruments	CTS 4 Version 4.32.0			

3.3.5.☒ For electrostatic discharge immunity test

Equipment	Manufacturer	Model	Equipment No	Last Cal.	Cal. Interval
ESD Tester	PRIMA	ESD61002TB	KEYS-EL-215	Mar. 05, 2025	1 Year

3.3.6.☒ For RF Electromagnetic Field immunity Test

Equipment	Manufacturer	Model	Equipment No.	Last Cal.	Cal. Interval
Amplifier	Micotop	MPA-80-1000-250	KEYS-EL-258	May 17, 2025	1 Year
Amplifier	Micotop	MPA-1000-6000-100	KEYS-EL-259	May 19, 2025	1 Year
Power Meter	Agilent	E4417A	KEYS-EL-260	May 17, 2025	1 Year

Power Sensor	Agilent	E9304A	KEYS-EL-261	May 17, 2025	1 Year
Power Sensor	Agilent	E9304A	KEYS-EL-262	May 17, 2025	1 Year
Signal Generator	ROHDE&SCHWARZ	SMB100A	KEYS-EL-263	May 17, 2025	1 Year
Log-Per-Broadband Antenna	SKET	STLP 9129 PLUS	KEYS-EL-264	May 19, 2025	3 Year

3.3.7. ☐ For electrical fast transient/burst immunity test

Equipment	Manufacturer	Model	Equipment No.	Last Cal.	Cal. Interval
Fast Transient Burst Simulator	PRIMA	EFT61004TA	KEYS-EL-218	Mar. 03, 2025	1 Year
Clamp	PRIMA	PEFT-C105	KEYS-EL-219	Mar. 03, 2025	1 Year

3.3.8. ☐ For surge immunity test

Equipment	Manufacturer	Model	Equipment No.	Last Cal.	Cal. Interval
Fast Transient Burst Simulator	PRIMA	EFT61004TA	KEYS-EL-218	Mar. 03, 2025	1 Year
Clamp	PRIMA	PEFT-C105	KEYS-EL-219	Mar. 03, 2025	1 Year

3.3.9. ☐ For injected currents susceptibility test

Equipment	Manufacturer	Model	Equipment No.	Last Cal.	Cal. Interval
CS Test system	TESEQ	NSG4070	KEYS-EL-255	May 17, 2025	1 Year
6dB Attenuator	TESEQ	ATN6075	KEYS-EL-256	May 17, 2025	1 Year
CDN	TESEQ	CDN M016	KEYS-EL-254	May 17, 2025	1 Year
EM-Clamp	TESEQ	KEMZ 801A	KEYS-EL-257	May 17, 2025	1 Year

3.3.10. ☐ For voltage dips and short interruptions immunity test

Equipment	Manufacturer	Model	Equipment No.	Last Cal.	Cal. Interval
Cycle Sag Simulator	PRIMA	DRP61011TB	KEYS-EL-220	Mar. 03, 2025	1 Year

4. EUT DESCRIPTION

Product	Fan
Main Model	MO2779
Supplied Voltage	DC 5V by Adapter or DC 3.7V by battery
Highest Internal Frequency:	☒ ≤108MHz ☐ >108MHz
Product Category	☐ Category I ☐ Category II ☒ Category III ☐ Category IV ☐ Category V

I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
AC Port	1	☐
DC Port	1	☒

Models Difference

N/A

5. TEST METHODOLOGY

5.1. TEST MODE

The EUT was tested together with the thereinafter additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

Test Mode	
Mode 1	EUT+Charging+Working

The following test mode(s) were assessed.

Test Items		Test Mode
Emission	Radiated Emission	Mode 1
Immunity	ESD	Mode 1
	RS	Mode 1

5.2. EUT SYSTEM OPERATION

1. Set up EUT with the support equipment.
2. Make sure the EUT work normally during the test.

6. SETUP OF EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF SUPPORT UNITS

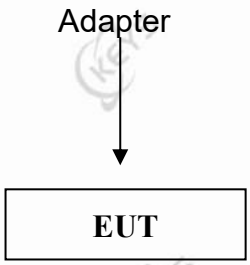
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model	Serial No.	Manufacturer
1	Adapter	MDY-12-EH	/	XIAOMI
2	/	/	/	/

Note: 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

6.2. CONFIGURATION OF SYSTEM UNDER TEST



(EUT:Fan)

7. EMISSION TEST

7.1. CONDUCTED EMISSION MEASUREMENT

7.1.1.LIMITS

Household appliances and equipment causing similar disturbances and regulation controls incorporation semiconductor devices

FREQUENCY	At mains terminals		At load terminals and additional terminals	
(MHz)	Quasi-peak dBμV	Average dBμV	Quasi-peak dBμV	Average dBμV
0.15 - 0.5	66-56	59-46	80	70
0.5 - 5.0	56	46	74	64
5.0 - 30.0	60	50	74	64

Mains terminals of tools

FREQUENCY	Rated motor power not exceeding 700W		Rated motor power above 700W and not exceeding 1000W		Rated motor power above 1000W	
(MHz)	Quasi-peak dBμV	Average dBμV	Quasi-peak dBμV	Average dBμV	Quasi-peak dBμV	Average dBμV
0.15 - 0.35	66-59	59-49	70-63	63-53	79-69	69-59
0.35 - 5.0	59	49	63	53	69	59
5.0 - 30.0	64	54	68	58	74	64

Note: 1) The lower limit shall apply at the transition frequencies.

2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 MHz to 0.5 MHz

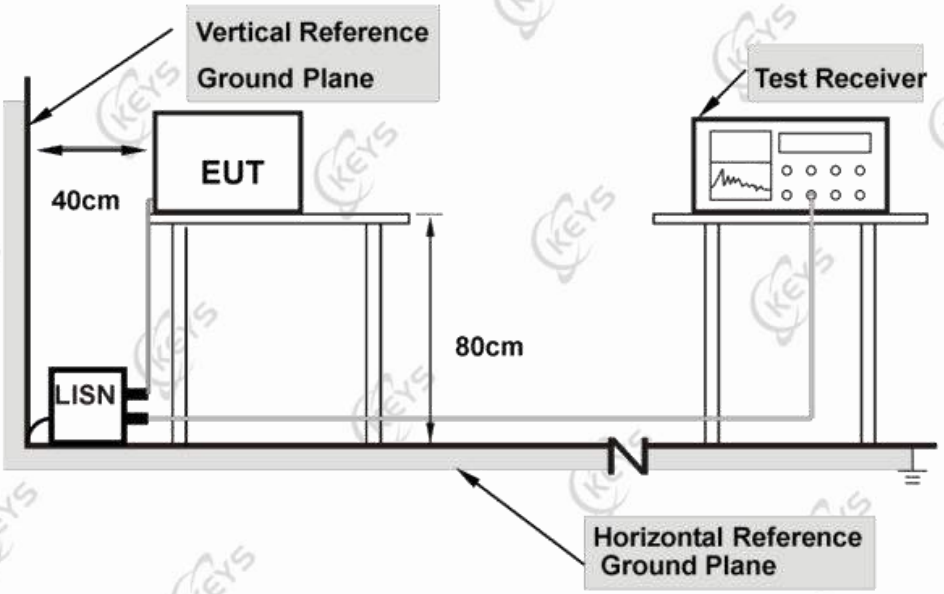
7.1.2.TEST PROCEDURES

The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When 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. When the EUT is floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane. The EUT should be 0.8 m apart from the AMN, where the mains cable supplied by the manufacturer is longer than 0.8 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, Details please refer to test setup photography.

The Receiver scanned from 9 kHz to 30 MHz for emissions in each of the test modes.
During the above scans, the emissions were maximized by cable manipulation.

A scanning was taken on the power lines, Line and neutral, recording at least 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.

7.1.3.TEST SETUP



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

7.1.4.TEST RESULT

Not applicable

7.2. CLICK MEASUREMENT

7.2.1.LIMITS

Frequency	150kHz	500	1.4MHz	30MHz
Limit Value(L)(dBμV)	66	56	56	60

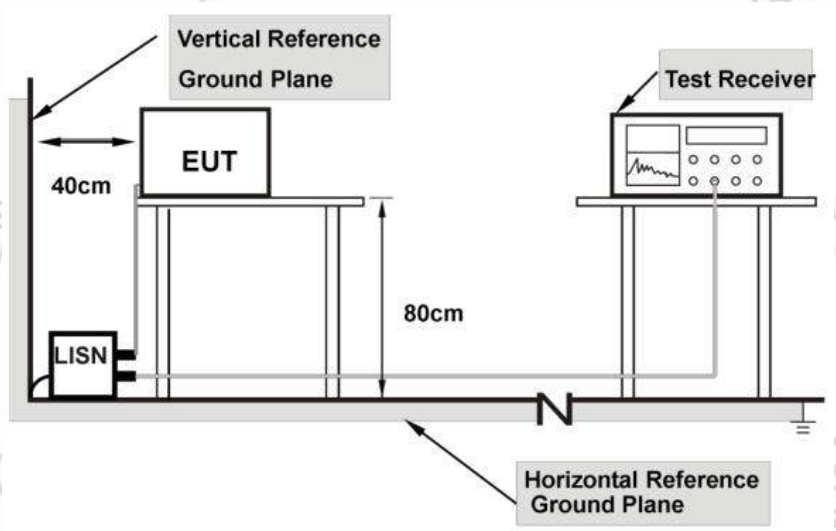
7.2.2.TEST PROCEDURE

The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When 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. When the EUT is floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane. The EUT should be 0.8 m apart from the AMN, where the mains cable supplied by the manufacturer is longer than 1m, the excess should be folded at the centre into a bundle no longer than 0.4 m, Details please refer to test setup photography.

At first, determining N by measuring the Clicks, calculating the limit.
Then, use the Upper quartile method to confirm EUT is fulfilled the requirement of standard or not.

The amplitude of the clicks shall be evaluated only at the following restricted number of frequencies: 150 kHz; 500 kHz; 1.4 MHz and 30 MHz

7.2.3.TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

7.2.4.TEST RESULT

Not applicable.

7.3. DISTURBANCE POWER MEASUREMENT

7.3.1.LIMITS

FREQUENCY (MHz)	Household appliances and similar appliances		Rated motor power not exceeding 700W		Rated motor power above 700W and not exceeding 1000W		Rated motor power above 1000W	
	QP dBpW	Average dBpW	QP dBpW	Average dBpW	QP dBpW	Average dBpW	QP dBpW	Average dBpW
30 ~ 300	45-55	35-45	45-55	35-45	49-59	39-49	55-65	45-55

Note: 1) The lower limit shall apply at the transition frequencies.
2) Increasing linearly with the frequency.
3) QP means Quasi-peak, AV means Average.
4) The limit of column 2 and 3 apply to this product.

7.3.2.TEST PROCEDURE

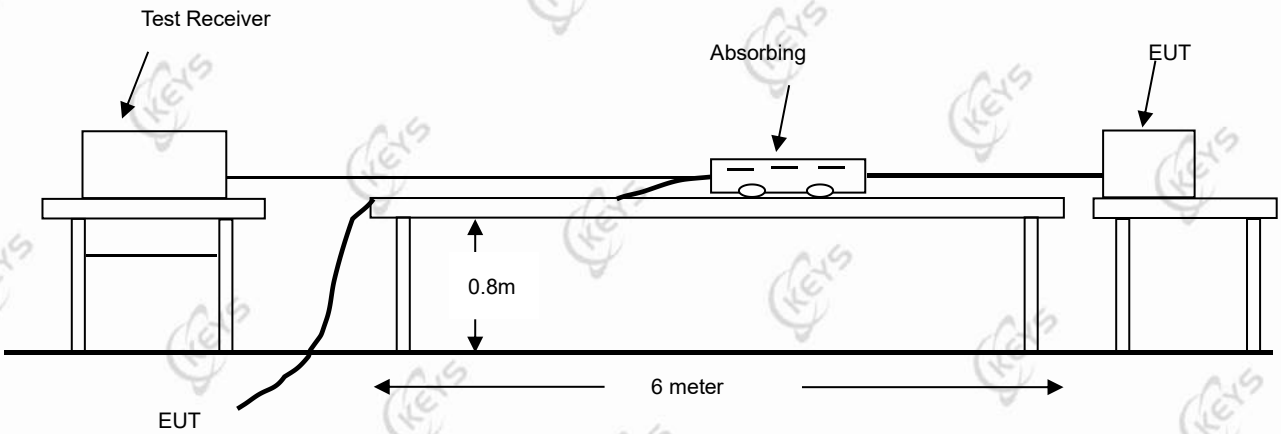
The EUT is place on a 0.8 meters height wooden table above the ground plane, and kept at least 0.8 m from other metallic object. The straight portion of lead would put on 6 m long testing bench of (if lead is shorter than 6 m it should be extended)

Any lead connecting the main appliance to an auxiliary apparatus is disconnected if this does not affect the operation of the appliance, or is isolated by means of ferrite rings (or an absorbing clamp) close to the appliance.

The receiver scanned from 30 MHz to 300 MHz. Emissions were scanned and measured to moving the absorbing clamp along the main lead until the maximum emission value is found. Recorded at least the six highest emissions.

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

7.3.3.TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

7.3.4.TEST RESULT

Not applicable.

7.4. RADIATED EMISSION MEASUREMENT

7.4.1.LIMITS

FREQUENCY (MHz)	Limit (dBμV/m) (At 3m)
30 ~ 230	40
230 ~ 1000	47

Note: 1) The lower limit shall apply at the transition frequencies.

2) Emission level (dBμV/m) = 20 log Emission level (μV/m).

7.4.2.TEST PROCEDURE

The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is floor standing equipment, it is placed on the ground plane which has a 0.1 m non-conductive covering to insulate the EUT from the ground plane.

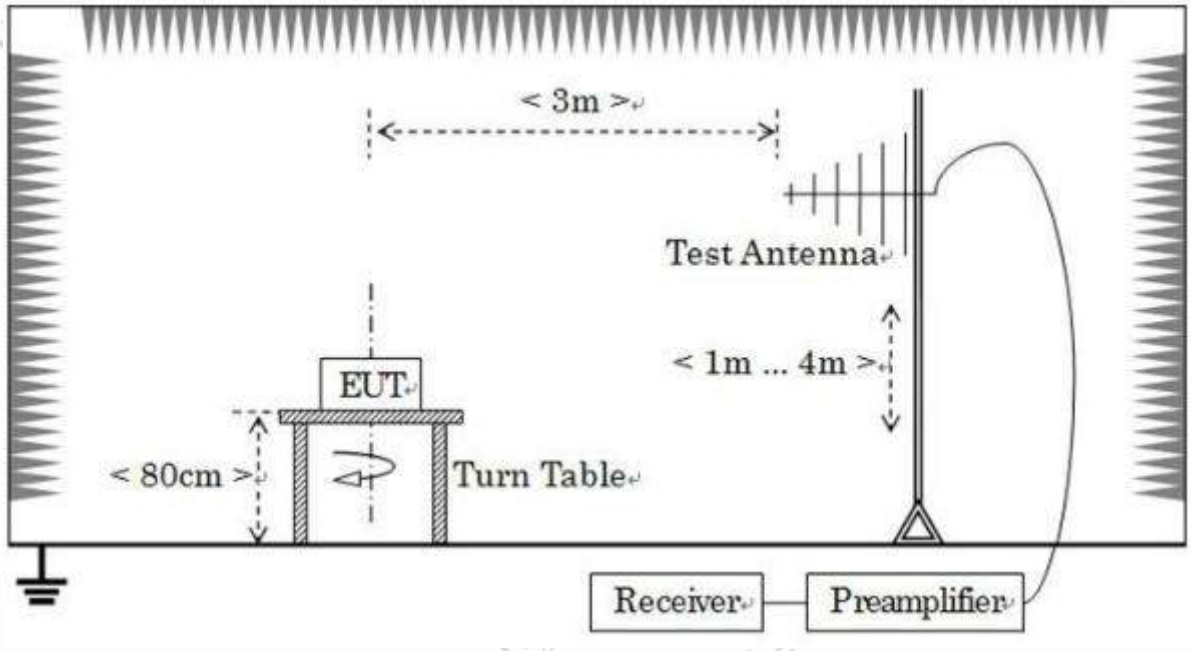
The antenna was placed at 3 meter away from the EUT. The antenna connected to the spectrum analyzer via a cable and at times a pre-amplifier would be used.

The analyzer / receiver quickly scanned from 30 MHz to 1000 MHz. 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.

During the above scans, the emissions were maximized by cable manipulation. Each modes is measured, recorded at least the six highest emissions. The emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.

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

7.4.3.TEST SETUP



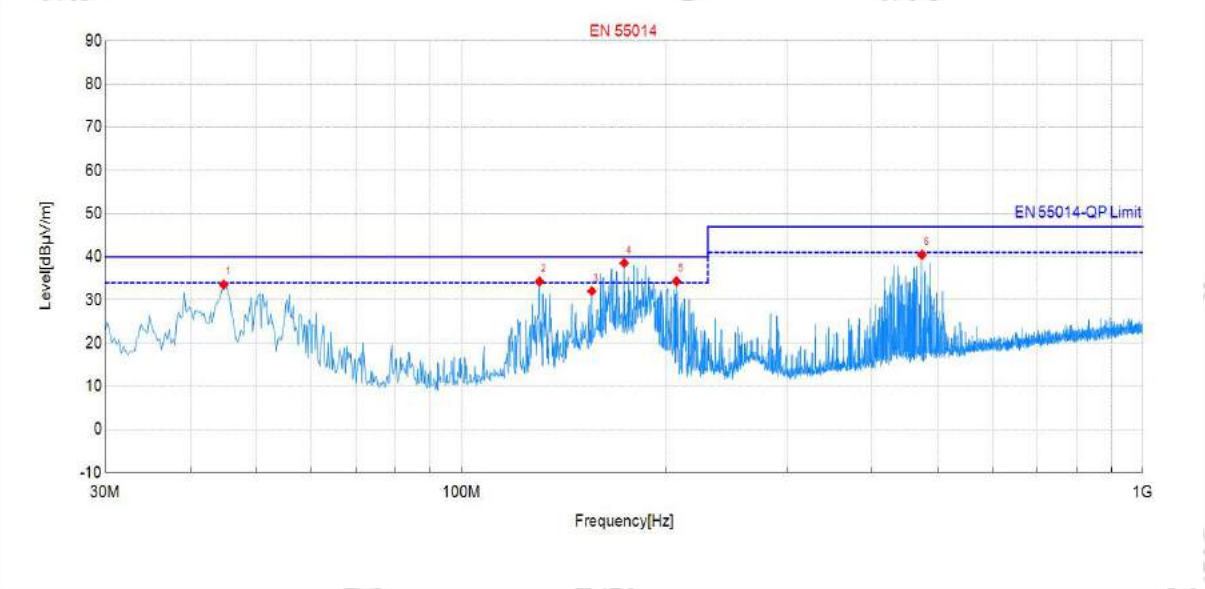
Note: For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

7.4.4.TEST RESULT

Product name	Fan	**Test voltage:**	DC 5V by Adapter(AC230V/50Hz)
Model	MO2779	**Temperature:**	23.5℃
Test Mode	Mode 1	**Relative Humidity :**	56 % RH

Please refer to the following diagram:

Vertical:

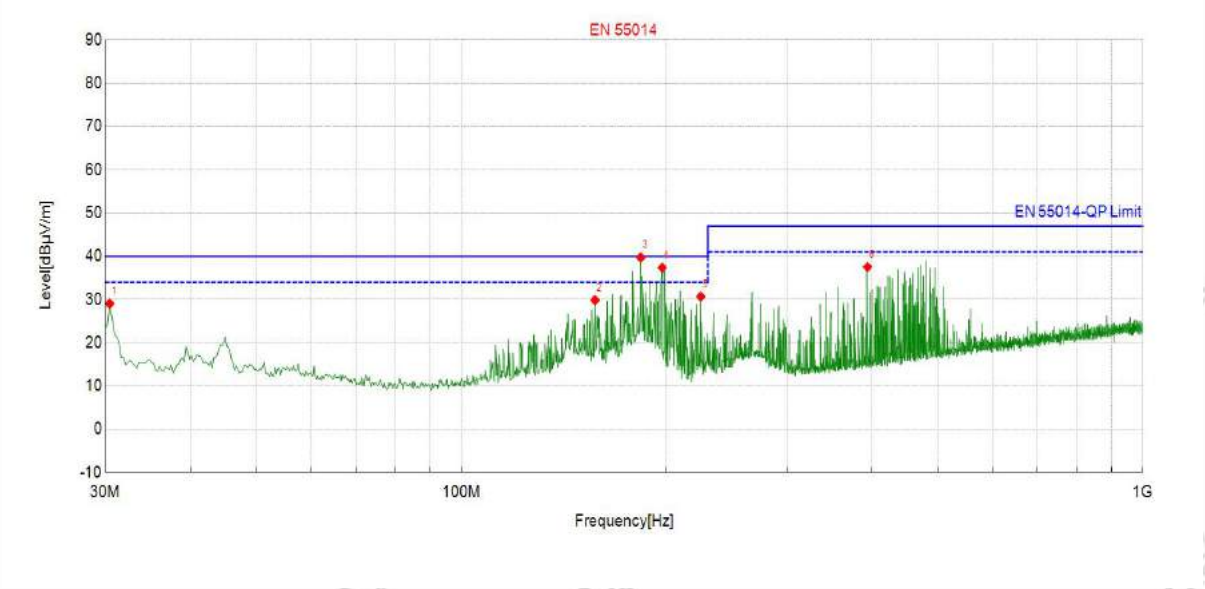


Suspected Data List											
NO.	Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	44.79	50.66	33.55	-17.11	40.00	6.45	100	252	QP	Vert	PASS
2	130.15	51.37	34.30	-17.07	40.00	5.70	100	351	QP	Vert	PASS
3	155.37	48.14	32.05	-16.09	40.00	7.95	100	1	QP	Vert	PASS
4	173.32	56.21	38.56	-17.65	40.00	1.44	100	1	QP	Vert	PASS
5	206.78	54.07	34.36	-19.71	40.00	5.64	100	1	QP	Vert	PASS
6	473.78	53.30	40.48	-12.82	47.00	6.52	100	157	QP	Vert	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

Horizontal:



Suspected Data List											
NO.	Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	30.49	46.78	29.02	-17.76	40.00	10.98	100	296	QP	Hori	PASS
2	157.07	45.88	29.82	-16.06	40.00	10.18	100	1	QP	Hori	PASS
3	183.26	58.44	39.74	-18.70	40.00	0.26	100	240	QP	Hori	PASS
4	197.08	57.10	37.34	-19.76	40.00	2.66	100	259	QP	Hori	PASS
5	224.49	49.63	30.65	-18.98	40.00	9.35	100	183	QP	Hori	PASS
6	394.24	52.14	37.50	-14.64	47.00	9.50	100	240	QP	Hori	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

7.5. HARMONICS CURRENT MEASUREMENT

7.5.1.LIMITS OF HARMONICS CURRENT MEASUREMENT

Limit for Class A equipment	
Harmonics Order N	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15≦n≦39	0.15x(15/n)
Even harmonics	
2	1.08
4	0.43
6	0.30
8≦n≦40	0.23x8/n

Limit for Class D equipment		
Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd Harmonics only		
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	0.30	0.21
15≦n≦39 (odd harmonics only)	3.85/n	0.15x(15/n)

Limit for Class C equipment	
Harmonics Order n	Max. permissible harmonics current expressed as a percentage of the input current at the fundamental frequency A
2	2
3	30xF
5	10
7	7
9	5
11≦n<≦39 (odd harmonics only)	3
F is the circuit power factor	

7.5.2.TEST PROCEDURES

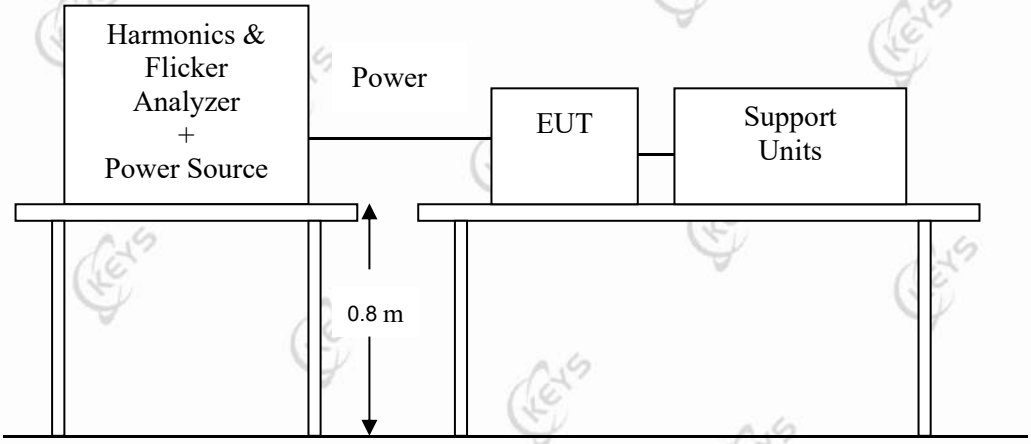
The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the

maximum harmonic. The classification of EUT is according to section 5 of EN 61000-3-2.

The EUT is classified as follows:
Class A:
Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.
Class B:
Portable tools; Arc welding equipment which is not professional equipment.
Class C:
Lighting equipment
Class D:
Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.

The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

7.5.3.TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.5.4.TEST RESULT

Not applicable.

7.6. VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

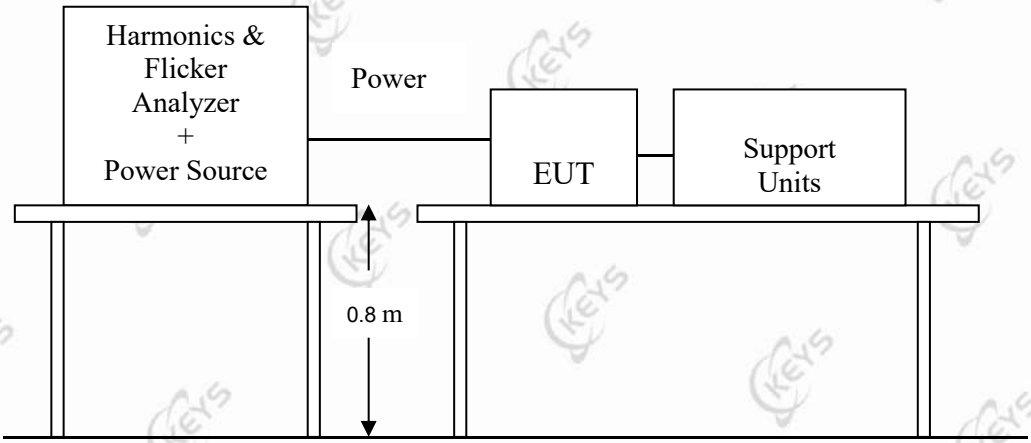
7.6.1.LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

TEST ITEM	LIMIT	REMARK
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that dt exceeds 3 %.
d_{max} (%)	4/6/7 %	d_{max} means maximum relative voltage change.
dc (%)	3.3 %	dc means relative steady-state voltage change

7.6.2.TEST PROCEDURE

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under lighting operating conditions.
During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

7.6.3.TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.6.4.TEST RESULT

Not applicable.

8. IMMUNITY TEST

8.1. GENERAL DESCRIPTION

Product Standard	EN IEC 55014-2	
	Test Type	Minimum Requirement
Basic Standard, Specification, and Performance Criterion required	IEC 61000-4-2	Electrostatic Discharge – ESD: ±8 kV air discharge, ±4 kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 MHz to 1 GHz, 3 V/m, 80 % AM(1 kHz), Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: ±1kV, Signal line: ±0.5kV, Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 µs Open Circuit Voltage, 8 /20 µs Short Circuit Current, Power Port ~ Line to line: ±1 kV, Line to ground: ±2 kV Signal and Control Port : ±0.5 kV Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test –CS: 0.15 ~ 230MHz, 3 Vrms, 80 % AM, 1 kHz, Performance Criterion A
	IEC 61000-4-11	Voltage Dips and Interruptions: i) 30 % reduction for 10 period, Performance Criterion C ii) 100 % reduction for 0.5 period Performance Criterion B

8.2. GENERAL PERFORMANCE CRITERIA DESCRIPTION

Criteria A:	The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.
Criteria B:	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.
Criteria C:	Temporary loss of function is allowed, provided the function is self- recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

8.3. ELECTROSTATIC DISCHARGE (ESD)

8.3.1.TEST SPECIFICATION

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 Ω
Charging Capacity:	150 pF
Discharge Voltage:	Air Discharge: ±8 kV (Direct) Contact Discharge: ±4 kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	10 times at each test point
Discharge Mode:	1 time/s
Performance Criterion:	B

8.3.2.TEST PROCEDURE

The discharges shall be applied in two ways:

a) Contact discharges to the conductive surfaces and coupling planes:
Twenty dischargers (10 with positive and 10 with negative polarity) shall be applied on each accessible metallic part of the enclosure, terminals are excluded. In case of a non-conductive enclosure, dischargers shall be applied on the horizontal or vertical coupling planes. Test shall be performed at a maximum repetition rate of one discharge per second.

b) Air discharges at slots and apertures and insulating surfaces:
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

The basic test procedure was in accordance with IEC 61000-4-2:

a) The EUT was located 0.1 m minimum from all side of the HCP (dimensions 1.6 m x 0.8 m).

b) The support units were located another table 30 cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10cm with EUT.

c) The time interval between two successive single discharges was at least 1 second.

d) Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

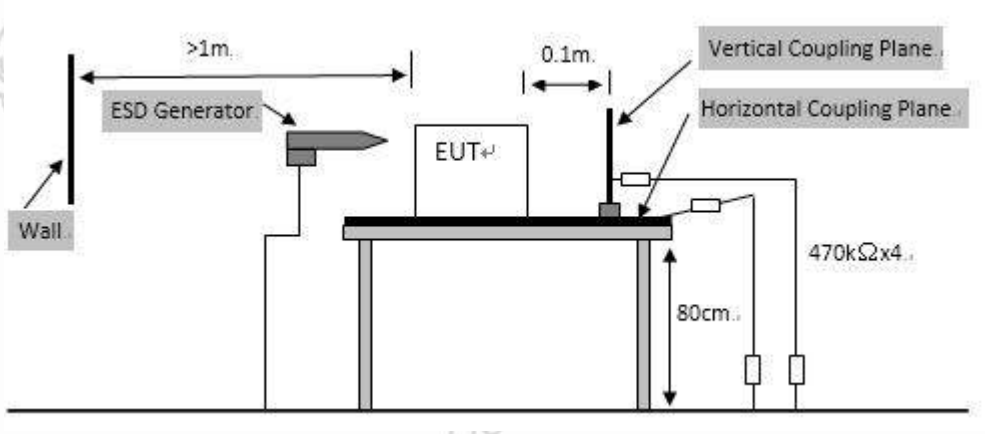
e) Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each

discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

f) At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the HCP and perpendicular to its front edge during the discharge.

g) At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane (VCP) in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5 m x 0.5 m) was placed vertically to and 0.1 meters from the EUT.

8.3.3.TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

Note:

1) TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the ground reference plane (GRP) . The GRP consisted of a sheet of aluminum at least 0.25 mm thick, and 2.5 meters square connected to the protective grounding system. A horizontal coupling plane (HCP) (1.6 m x 0.8 m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5 mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

2) FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the ground reference plane by an insulating support of 0.1 meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25 mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

8.3.4.TEST RESULT

Product name	Fan	Test voltage:	DC 5V by Adapter(AC230V/50Hz)
Model	MO2779	Temperature:	25.2℃
Test Mode	Mode 1	Relative Humidity :	54 % RH

Discharge Type	Level (kV)	Test Point	Observation	Performance Criterion
Contact Discharge	± 4	2	Note ☒1☐2☐3	A
Direct Air Discharge	± 8	1	Note ☒1☐2☐3	A
Indirect Discharge (HCP)	± 4	3	Note ☒1☐2☐3	A
Indirect Discharge (VCP)	± 4	3	Note ☒1☐2☐3	A
Test point: 1.All insulated enclosure and seams. 2.All accessible metal parts of the enclosure 3.All side				

Note:
1) The EUT shall continue to operate as intended during and after the test.
2) The EUT shall continue to operate as intended after the test.
3) Temporary loss of function is allowed during the test, provided the function is self-recoverable or can be restored by the operation of the controls

8.4. RADIATED RADIO-FREQUENCY, ELECTROMAGNETIC FIELD (RS)

8.4.1.TEST SPECIFICATION

Basic Standard:	IEC 61000-4-3
Frequency Range:	80 MHz ~ 1000 MHz
Field Strength:	3 V/m
Modulation:	1 kHz Sine Wave, 80 %, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Performance Criterion:	A

8.4.2.TEST PROCEDURE

The test procedure was in accordance with IEC 61000-4-3

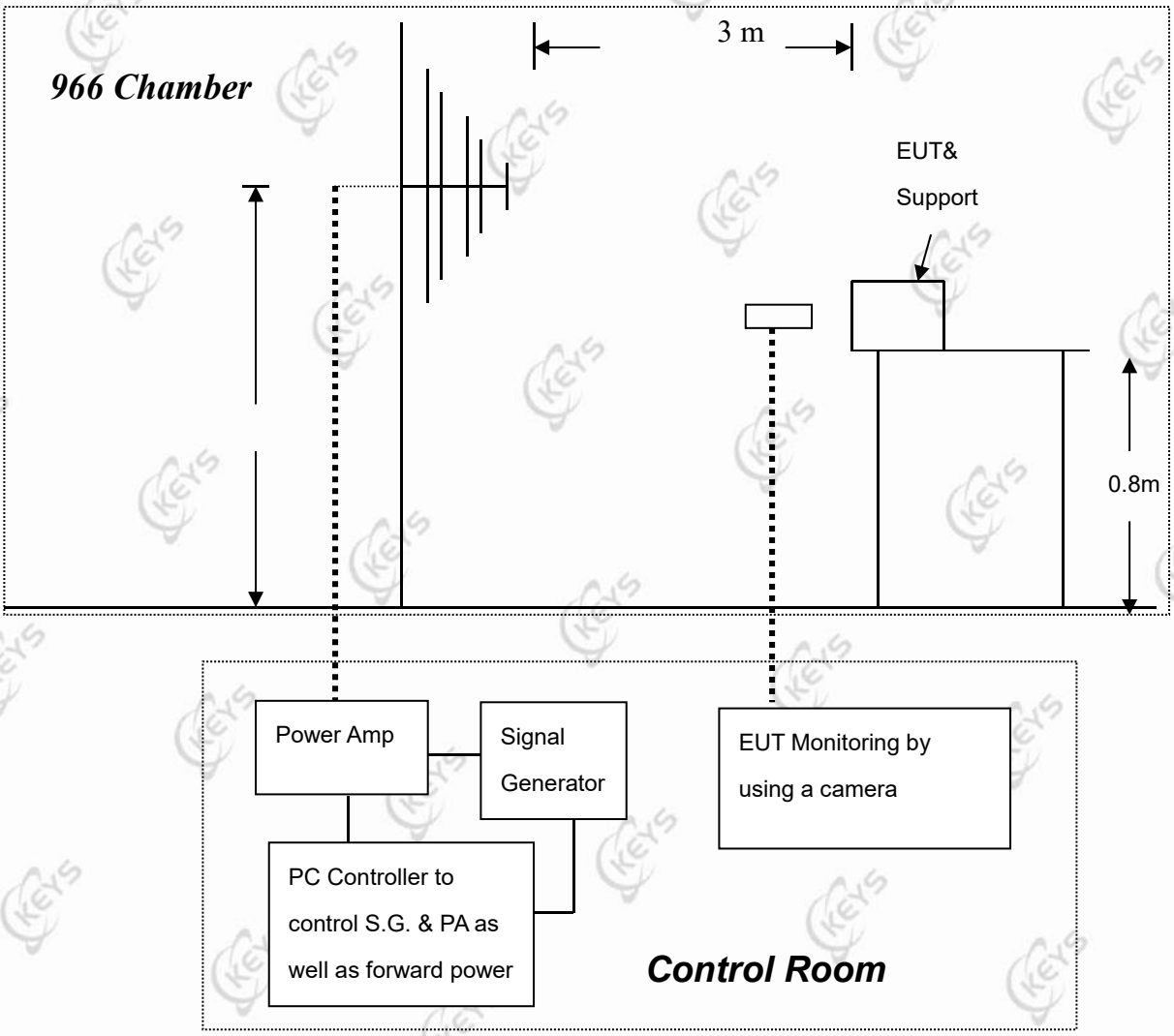
a) The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.

b) The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1 kHz sine-wave. The rate of sweep did not exceed 1.5 x 10^{-3} decade/s, where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value.

c) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

d) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

8.4.3.TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

Note:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

8.4.4.TEST RESULT

Product name	Fan	Test voltage:	DC 5V by Adapter(AC230V/50Hz)
Model	MO2779	Temperature:	24.5℃
Test Mode	Mode 1	Relative Humidity :	53 % RH

Frequency (MHz)	Polarity	Position	Field Strength (V/m)	Observation	Performance Criterion
80 ~ 1000	V&H	Front	3	Note ☒1 ☐2 ☐3	A
80 ~ 1000	V&H	Rear	3	Note ☒1 ☐2 ☐3	A
80 ~ 1000	V&H	Left	3	Note ☒1 ☐2 ☐3	A
80 ~ 1000	V&H	Right	3	Note ☒1 ☐2 ☐3	A

Note:
1) No degradation in performance of the EUT was observed.
2) During the test, Loss of functionality, after the experiment, the function can automatically return to normal.
3) Loss of functionality, but self-recoverable by user, without loss of information or settings.

8.5. ELECTRICAL FAST TRANSIENT (EFT)

8.5.1.TEST SPECIFICATION

Basic Standard:	IEC 61000-4-4
Test Voltage:	Power Line: ±1 kV Signal/Control Line: ±0.5 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave-shape:	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	2 mins
Performance Criterion:	B

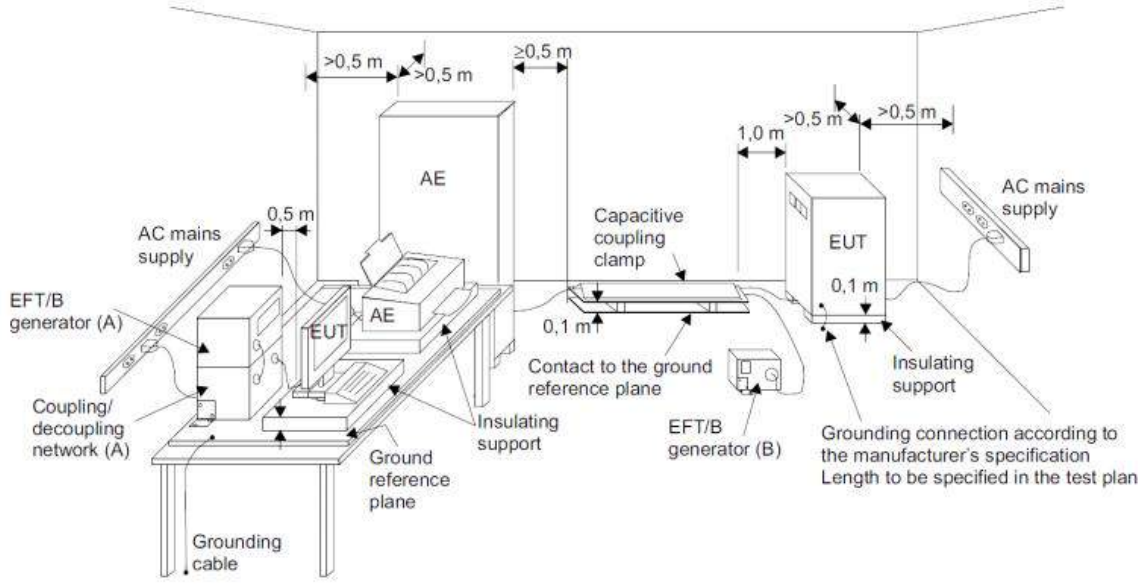
8.5.2.TEST PROCEDURE

EUT is placed on a 0.1 m (table type equipment) / 0.8 m (floor type equipment) tall wooden table.

EUT operate at normal mode, the transient/burst was 5/50 ns in accordance with IEC 61000-4-4, both positive and negative polarity burst waveform were applied.

The duration time of each test line was 2 minutes.

8.5.3.TEST SETUP



For the actual test configuration, please refer to the related item – photographs of the test configuration.

8.5.4.TEST RESULT

Not applicable.

8.6. SURGE IMMUNITY TEST

8.6.1.TEST SPECIFICATION

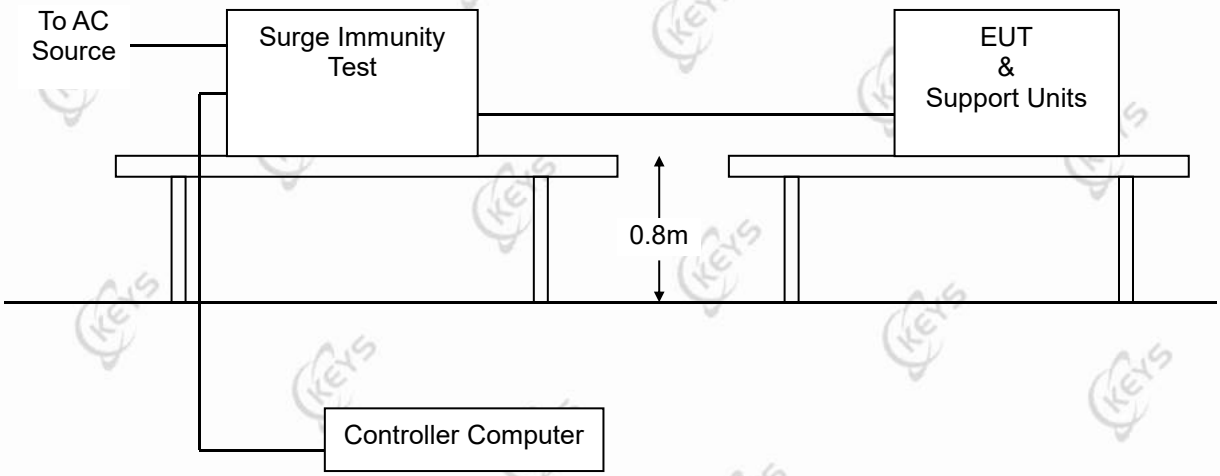
Basic Standard:	IEC 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 μs Open Circuit Voltage 8/20 μs Short Circuit Current
Test Voltage:	Power Port ~ Line to line: ±1 kV, Line to ground: ± 2 kV
Surge Input/Output:	Power Line: L-N / L-PE / N-PE
Generator Source Impedance:	2 Ω between networks 12 Ω between network and ground
Polarity:	Positive/Negative
Phase Angle:	90°(positive polarity pulses) / 270°(negative polarity pulses)
Pulase Repetition Rate:	1 time / min
Number of Tests:	5 positive polarity pulses at the 90° phase angle, and 5 negative polarity pulses at 270° phase 3angle
Performance Criterion:	B

8.6.2.TEST PROCEDURE

EUT is placed on a 0.1 m (table type equipment) / 0.8 m (floor type equipment) tall wooden table. EUT operate at normal mode, two types of combination wave generator (1.2/50 us open-circuit voltage and 8/20 us short-circuit current) are applied to the EUT power supply terminals via the capacitive coupling network.

The power cord between the EUT and the coupling/decoupling network shall not exceed 2 m in length.

8.6.3.TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

8.6.4.TEST RESULT

Not applicable.

8.7. CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

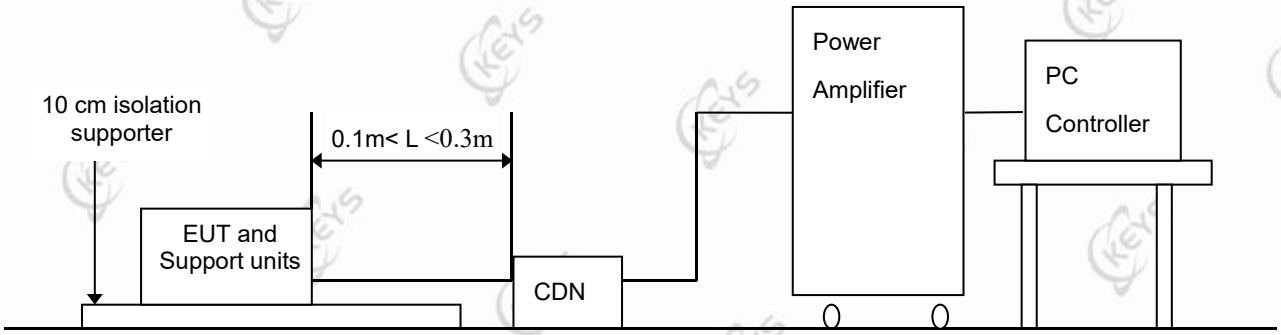
8.7.1.TEST SPECIFICATION

Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz ~230 MHz
Field Strength:	3 V
Modulation:	1 kHz Sine Wave, 80 %, AM Modulation
Frequency Step:	1 % of preceding frequency value
Coupled cable:	Power Mains, Shielded
Coupling device:	CDN-M3/2 (3 wires/2 wires)
Performance Criterion:	A

8.7.2.TEST PROCEDURE

The EUT shall be tested within its intended operating and climatic conditions.
The test shall performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50 Ω load resistor.
The frequency range was swept from 150 kHz to 230 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was 1.5 x 10^{-3} decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value the dwell time of the amplitude modulated carrier at each frequency was 0.5 s.

8.7.3.TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

Note: 1) The EUT is setup 0.1 m above Ground Reference Plane

2) All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

8.7.4.TEST RESULT

Not applicable.

8.8. VOLTAGE DIP & VOLTAGE INTERRUPTIONS

8.8.1.TEST SPECIFICATION

Basic Standard:	IEC 61000-4-11
Test Duration Time:	3 test events in sequence
Interval Between Event:	10 seconds
Phase Angle:	0°
Test Cycle:	3 times
Performance Criterion:	C

8.8.2.TEST PROCEDURE

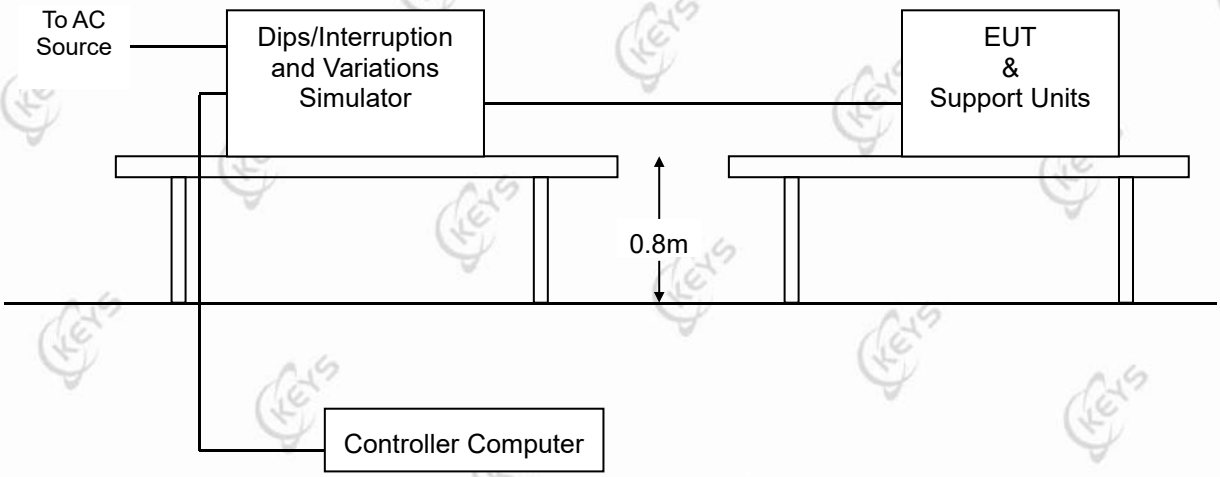
The EUT and support units were located on a wooden table, 0.8 m away from ground floor.

Setting the parameter of tests and then perform the test software of test simulator.

Changes to the voltage level shall occur at 0 degree crossing point in the a.c. voltage waveform.

Record the test result in test record form.

8.8.3.TEST SETUP

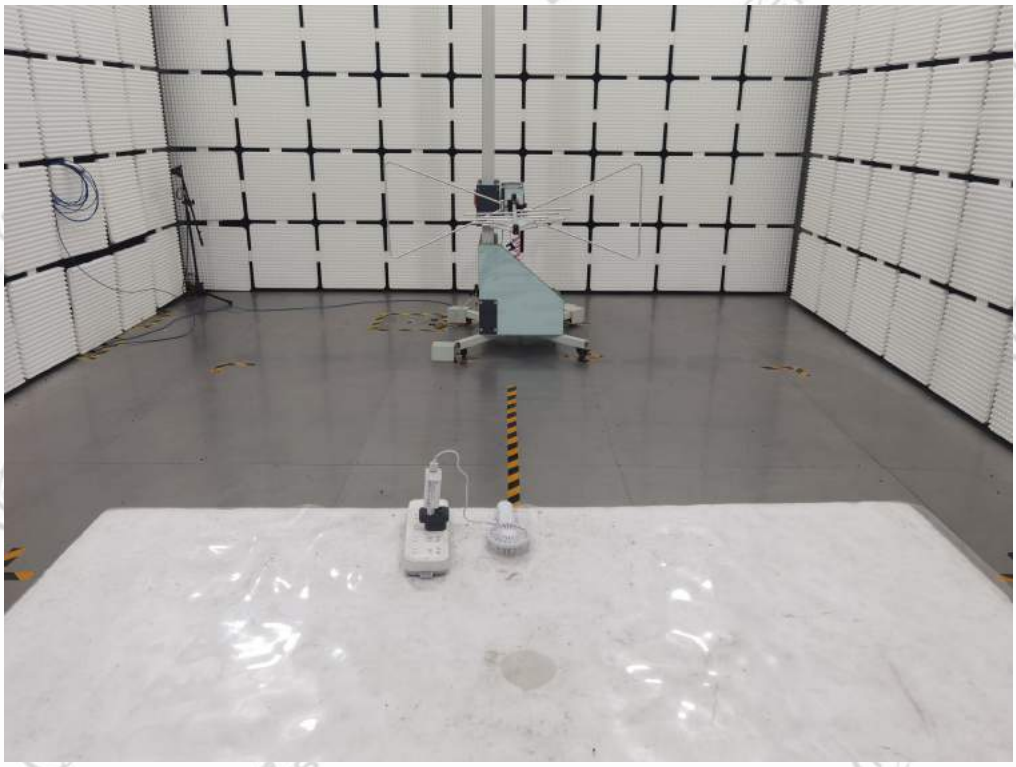


For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

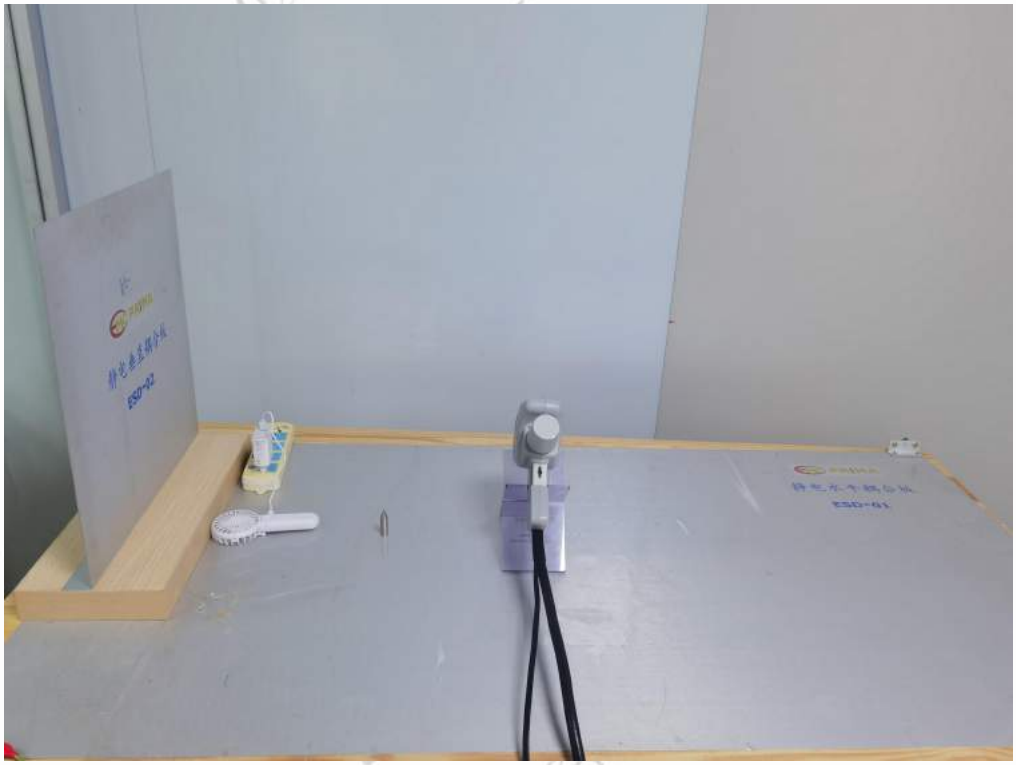
8.8.4.TEST RESULT

9. PHOTOGRAPHS OF THE TEST CONFIGURATION

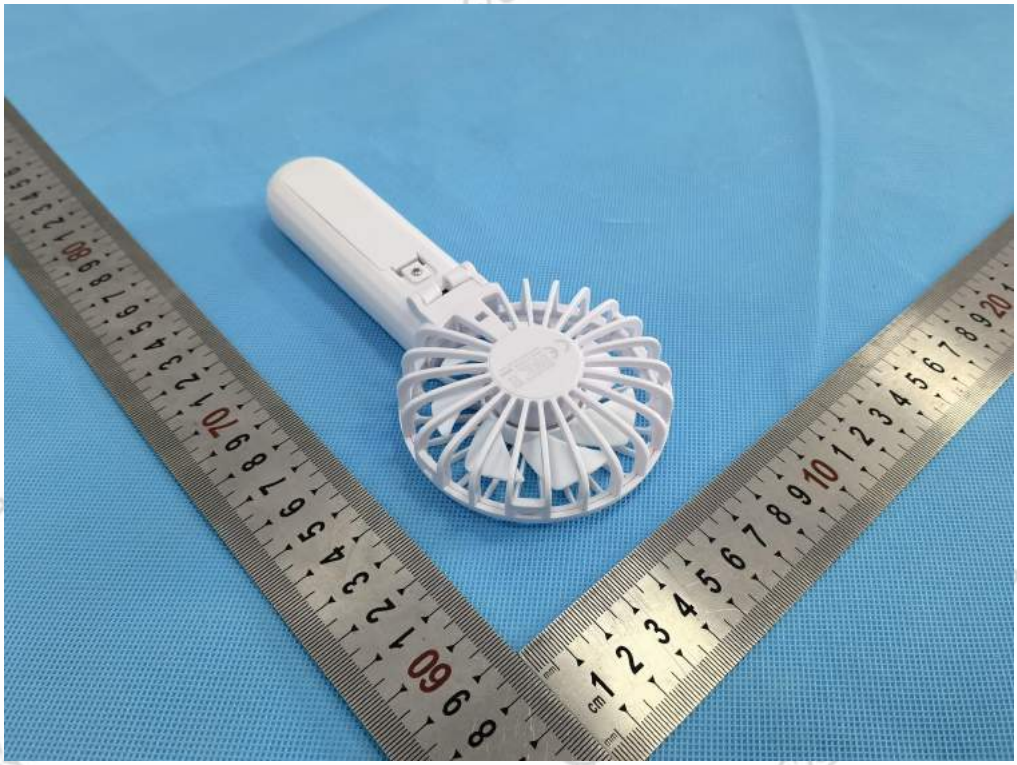
RADIATED EMISSION TEST

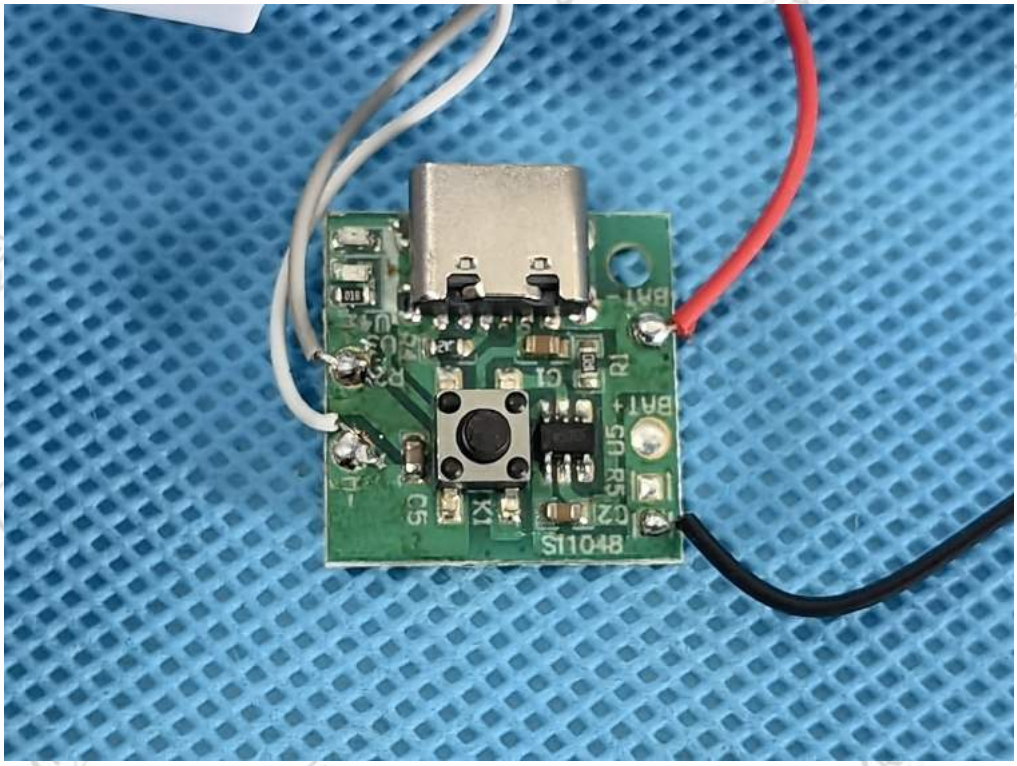


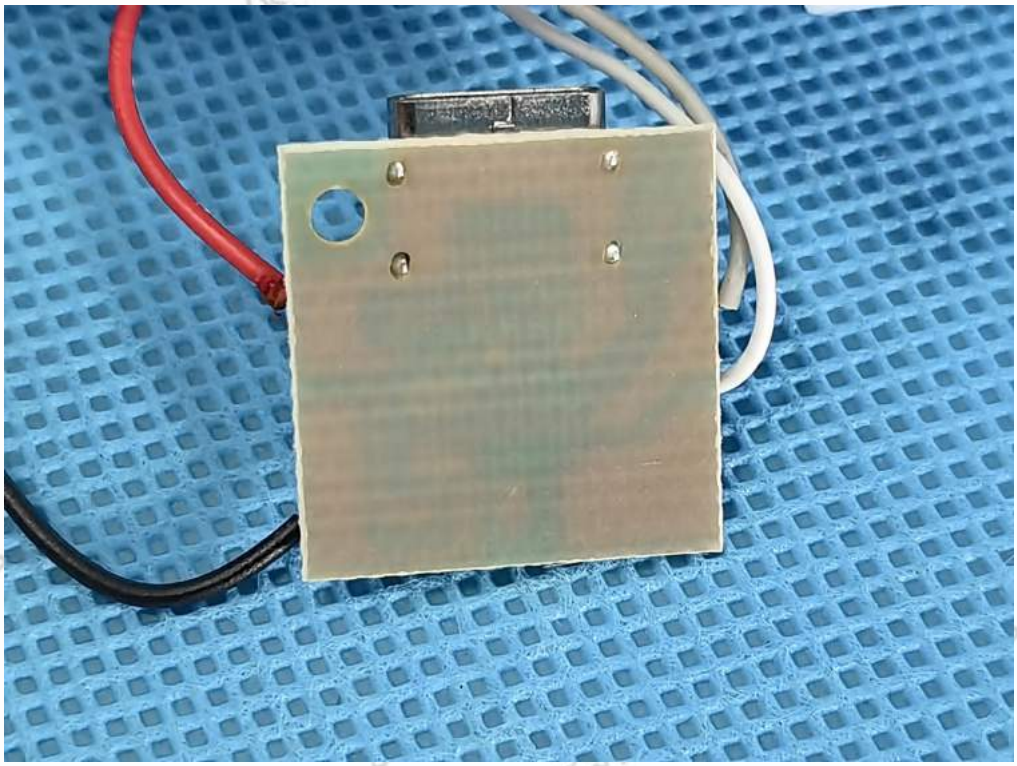
ESD TEST



10. PHOTOGRAPHS OF EUT







**** End of Report ****