中国认可
国际互认
检测
TESTING
CNAS L9069

TEST REPORT

Product Name:	Filament Dryer
Trade Mark:	N/A
Model No.:	SP2
Add. Model No.:	N/A
Report Number:	25052318108EMC-1
Test Standards:	EN IEC 55014-1:2021 EN IEC 55014-2:2021 EN IEC 61000-3-2:2019/A1:2021 EN 61000-3-3:2013/A2:2021
Directive:	2014/30/EU
Test Result:	PASS
Date of Issue:	August 6, 2025

Prepared for:

Sunlu（Guangdong）Technology Co., Ltd.

No. 162 Tanlong North Road, Tanzhou Town, Zhongshan City Zhongshan, Guangdong,528467,China

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
16/F, Block A, Building 6th, Baoneng Science and Technology Park, Longhua Street, Longhua District, Shenzhen, China
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Assistant Manager

Date: August 6, 2025

Version

Version No.	Date	Description
V1.0	August 6, 2025	Original

CONTENTS

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Sunlu（Guangdong）Technology Co., Ltd.
Address of Applicant:	No. 162 Tanlong North Road, Tanzhou Town, Zhongshan City Zhongshan, Guangdong,528467,China
Manufacturer:	Sunlu（Guangdong）Technology Co., Ltd.
Address of Manufacturer:	No. 162 Tanlong North Road, Tanzhou Town, Zhongshan City Zhongshan, Guangdong,528467,China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Filament Dryer
Model No.:	SP2
Add. Model No.:	N/A
Trade Mark:	N/A
DUT Stage:	Production Unit
Power Supply:	220-240V~ 50-60Hz
Highest Internal Frequency:	≤108 MHz
Software Version:	N/A
Hardware Version:	N/A
Sample Received Date:	May 22, 2025
Sample Tested Date:	May 28, 2025 to June 9, 2025

1.2.2 Description of Accessories

None.

1.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested independently

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6th, Baoneng Science and Technology Park, Longhua Street, Longhua District, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
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Tests were sub-contracted. [Disturbance voltage and Radiated disturbance]

Huizhou UnionTrust Quality and Technology Co., Ltd.

Address: 1-2/F., Building 16/17, Liandong U Valley Park, No.27, Hexi Road, Zhongkai District, Huizhou, Guangdong, China
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Fax:E-mail:info@uttlab.com

1.5 TEST FACILITY

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

Shenzhen UnionTrust Quality and Technology Co., Ltd.

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

Huizhou UnionTrust Quality and Technology Co., Ltd.

CNAS-Lab Code: L23214
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.9 MEASUREMENT UNCERTAINTY

No.	Item	Measurement Uncertainty
1	Disturbance voltage 9KHz-150KHz	±3.2 dB
2	Disturbance voltage 150KHz-30MHz	±2.8 dB
3	Disturbance Power 30MHz-300MHz	±3.6 dB
4	Radiated disturbance 30MHz-1GHz	±4.6 dB
5	Harmonic current emissions	±1.4 %
6	Voltage fluctuations and flicker	±1.4 %
Remark: 95% Confidence Levels, k=2.		

2. TEST SUMMARY

Part 1: Emission requirements				
Test Item		EN IEC 55014-1:2021		Results
		Test Requirement	Limits	
Continuous disturbances	Disturbance voltage (9 kHz to 30 MHz)	Clause 4.3.2	Table 2	NA(See Note 1, 2)
	Magnetic field strength (9 kHz to 30 MHz)	Clause 4.3.2	Table 3	NA(See Note 1, 2)
	Magnetic field induced current (9 kHz to 30 MHz)	Clause 4.3.2	Table 4	NA(See Note 1, 2)
	Disturbance voltage (150 kHz to 30 MHz)	Clause 4.3.3	Table 5, 6	PASS
	Continuous Disturbance Power (30 MHz to 300 MHz)	Clause 4.3.4	Table 7, 8	NA(See Note 1, 5)
	Radiated disturbance (30 MHz to 1 000 MHz)	Clause 4.3.4	Table 9	PASS
	Radiated disturbance (1 GHz-6 GHz)	Clause 4.3.5	Table 11	NA(See Note 1, 3)
Discontinuous disturbances	Clicks (150 kHz to 30 MHz)	Clause 4.4	Clause 4.2	NA(See Note 1, 4)
Harmonic Current Emissions		EN IEC 61000-3-2:2019/ A1:2021 Clause 6	EN IEC 61000-3-2:2019/ A1:2021 Clause 7	PASS
Voltage Fluctuations and Flicker		EN 61000-3-3:2013/ A2:2021 Clause 4	EN 61000-3-3:2013/ A2:2021 Clause 5	PASS

Note:

1) N/A: In the whole report not applicable.
2) It only apply to induction cooking appliances.
3) The highest frequency of EUT is less than 108MHz.
4) This product does not have a switch operated controller and thermostat.
5) The manufacturers choose to test radiated disturbance.

Part 2: Immunity requirements			
Test Item	Test Requirement (EN IEC 55014-2:2021)	Test Method	Results
Electrostatic discharge	Clause 5.1	IEC 61000-4-2:2008	PASS
Fast transients	Clause 5.2	IEC 61000-4-4:2012	PASS
Injected currents	Clause 5.3, 5.4	IEC 61000-4-6:2013	PASS
Radio frequency electromagnetic fields, 80 MHz to 1 000 MHz	Clause 5.5	IEC 61000-4-3:2006+A1:2007+A2:2010 IEC 61000-4-22:2010	PASS
Surges	Clause 5.6	IEC 61000-4-5:2014	PASS
Voltage dips	Clause 5.7	IEC 61000-4-11:2004	PASS

3. EQUIPMENT LIST

Huizohou UnionTrust Quality and Technology Co., Ltd.

Radiated Emission (3m) Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	3m SAC	ETS-LINDGREN	3M	--	27-Sep-2024	26-Sep-2027
☒	Receiver	R&S	ESR7	101181	26-Sep-2024	25-Sep-2025
☒	Log Periodic Antenna	SCHWARZBECK	VULB9162	599	28-Sep-2024	27-Sep-2025
☒	6dB Attenuator	Huaxiang	TS5-6dB-4G-A	15121802	28-Sep-2024	27-Sep-2025
☒	Preamplifier	Sonoma	310N	292968	26-Sep-2024	25-Sep-2025
☐	Double-Ridged Waveguide Horn Antenna	ETS-LINDGREN	3115	118405	27-Sep-2024	26-Sep-2025
☐	Pre-amplifier	Agilent	8449B	3008A04538	26-Sep-2024	25-Sep-2025
☒	Multi device Controller	ETS-LINDGREN	7006-001	2.8.0	N/A	N/A
☒	Test Software	FARAD	EZ-EMC RE	Software Version: FARAD-3A1.1+		

Conducted Emission Test						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	LISN	R&S	ESH2-Z5	860014/024	25-Oct-2024	24-Oct-2025
☒	Receiver	R&S	ESR7	101181	26-Sep-2024	25-Sep-2025
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	25-Oct-2024	24-Oct-2025
☒	Test Software	FARAD	EZ-CON	Software Version: EMC-CON 3A1.1		

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Voltage Fluctuations and Flicker Test						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	5KVA AC POWER SOURCE	California instruments	5001iX+CTS-411	56178	28-Mar-2025	27-Mar-2026
☒	Flicker & Harmonic Tester	California instruments	PACS-1	72333	28-Mar-2025	27-Mar-2026
☒	Test Software	California instruments	CTS 4	Software Version: 4.29.0		

Electrostatic Discharge Test						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	ESD Simulator	TESEQ	NSG438	634	26-Oct-2024	25-Oct-2025

RF electromagnetic field Test						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	3m SAC	ETS-Lindgren	3m SAC	Euroshiedpn-CT001270-1317	11-Nov-2023	10-Nov-2026
☒	Log Periodic Antenna	Schwarzbeck	VUSLP 9111E	00041	N/A	N/A
☒	Stacked Logarithmic-Periodic Broadband Antenna	Schwarzbeck	STLP 9149	00706	N/A	N/A
☒	Electric field probe	Frankonia	EFS-100	711ZX00424	28-Mar-2025	27-Mar-2026
☒	RF Amplifier	HTEC	HPA 0810-250	MPA2003056	28-Mar-2025	27-Mar-2026
☒	RF Amplifier	HTEC	HPA 1060-75	MPA2003057	28-Mar-2025	27-Mar-2026
☒	MXG Analog Signal Generator	Agilent	N5181A	MY47070613	28-Mar-2025	27-Mar-2026
☒	EPM-P Series Power Meter	Agilent	E4417A	MY45100705	28-Mar-2025	27-Mar-2026
☒	Peak and Avg Power Sensor	Agilent	E9323A	MY44420776	28-Mar-2025	27-Mar-2026
☒	Shielding box	SKET	ABSB_ABT/C35	N/A		
☒	Test Software	Suzhou Keleto Electronics Technology Co.,Ltd	EMC-S	Software Version: V1.4.0.57		

Fast transients common mode & Surges Test						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	NSG 3040 EMC test system	TESESQ	NSG 3040	2101	25-Oct-2024	24-Oct-2025

RF common mode Test						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	Conducted Immunity System	Schloder	CDG 6000-75	126B1367	25-Oct-2024	24-Oct-2025
☒	Coupling/Decoupling network	Schloder	CDN M2+M3-16	A2210363	25-Oct-2024	24-Oct-2025
☒	6dB Attenuator	Schloder	CDG60100	201411010018	25-Oct-2024	24-Oct-2025
☒	Test Software	HTEC	CS5045	Software Version: 2.01		

Voltage dips and interruptions Test						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	Voltage dips and variation test system	NTEC	HPFS 161P	161503	25-Oct-2024	24-Oct-2025
☒	Voltage Interruption Simulator with Step Simulator	NTEC	HV1P16	161504	25-Oct-2024	24-Oct-2025

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage	Relative Humidity (%)
NT/NV	+15 to +35	230V~50Hz	20 to 75 (Except Electrostatic Discharge is 30 to 60)
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment and Test Sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
Radiated Emission	23.5	53.6	100.8	S202505226077-ZJA07/10	Bowie Zhang
Conducted Emission	23.4	56.3	100.8		
Harmonic Current Emissions &Voltage Fluctuations and Flicker	24.1	56.3	100.0		Jackson Wu
Electrostatic Discharge	24.0	47.4	100.0		
Radio frequency electromagnetic fields	25.2	53.4	99.4		Fire Huo
Electrical fast transients/burst	24.1	56.3	100.0		Jackson Wu
Surges	24.1	56.3	100.0		
Continuous induced RF disturbances	24.1	56.3	100.0		
Voltage dips and Voltage interruptions	24.1	56.3	100.0		

4.2 TEST MODES

Test Modes	
AC mains power ports	Test Mode 1: AC 230V/50Hz+ Maximum power operation
Radiated disturbance	Test Mode 1: AC 230V/50Hz+ Maximum power operation
Harmonic Current Emissions	Test Mode 1: AC 230V/50Hz+ Maximum power operation
Voltage Fluctuations and Flicker	Test Mode 1: AC 230V/50Hz+ Maximum power operation
Electrostatic discharge	Test Mode 1: AC 230V/50Hz+ Maximum power operation
Radio frequency electromagnetic fields	Test Mode 1: AC 230V/50Hz+ Maximum power operation
Electrical fast transients/burst	Test Mode 1: AC 230V/50Hz+ Maximum power operation
Surges	Test Mode 1: AC 230V/50Hz+ Maximum power operation
Continuous induced RF disturbances	Test Mode 1: AC 230V/50Hz+ Maximum power operation
Voltage dips and Voltage interruptions	Test Mode 1: AC 230V/50Hz+ Maximum power operation

5. PERFORMANCE CRITERIA

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report, based on the following criteria.

- **Performance criterion 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

- **<Performance criterion 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 to persist after the test. 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.

- **<Performance criterion 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.

The selection, the specification of functions, and the permissible degradation is left to the responsibility of the manufacturer.

Annex A serves as a guide to formulate the permissible degradation of the equipment under test (EUT) caused by electromagnetic phenomena.

6. EMC REQUIREMENTS SPECIFICATION

6.1 REFERENCE DOCUMENTS FOR TESTING

EN IEC 55014-1:2021
Electromagnetic compatibility — Requirements for household appliances, electric tools and similar apparatus Part 1: Emission

EN IEC 55014-2:2021
Electromagnetic compatibility — Requirements for household appliances, electric tools and similar apparatus Part 2: Immunity — Product family standard

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/A2:2021
Electromagnetic compatibility (EMC) Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

EN 61000-4-2:2009
Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test

EN 61000-4-3:2006/A2:2010
Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test

EN 61000-4-4:2012
Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test

EN 61000-4-5:2014/A1:2017
Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test

EN 61000-4-6:2014
Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields

EN 61000-4-11:2004
Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests

6.2 EMISSION

Table 1 – Application of limits

		Disturbance voltage/ current			Disturbance voltage	Disturbance Power [c]		Radiated dist.	Magnetic field	
		Continuous [a, f]			Clicks [b]					
Used	Sub clause	(4.3.2)	(4.3.3)		(4.4.2)	(4.3.4)		(4.3.4)	(4.3.2)	
	Limits	Table 2	Table 5	Table 2	Text	Table 7	Table 8	Table 9	Table 3	Table 4
☒	All equipment not listed below		●			●	●	●		
☐	Tools			●	●	●	●	●		
☐	Induction cooking appliances	●			●	●	●	●	●	●
☐	Electric fence energisers [d]		●		●	●	●	●		
☐	Toys Cat. A [e]									
☐	Toys Cat. B							●		
☐	Toys Cat. C							●		
☐	Toys Cat. D		●		●	●	●	●		
☐	Toys Cat. E		●		●	●	●	●		

a. Limits of Table 5 and Table 6 can also be applicable to discontinuous disturbances (see 4.4.2.2).
b. For exemption and exceptions see 5.4.3.
c. For mains operated equipment, if certain conditions are met, the disturbance power test may be applied in alternative to the radiated disturbance test (see 4.3.4.2 and Figure 4).
d. For electric fence energisers the disturbance voltage test is applied according to 4.3.3.5.
e. Toys of category A shall be deemed to comply with the requirements of this standard without testing.
f. For wired network ports, see 4.3.3.7.

6.2.1 Radiated disturbance

Test Requirement: EN IEC 55014-1:2021 Clause 4.3.4

Receiver Setup:

Frequency: (f) (MHz)	Detector type	Measurement receiver bandwidth	
		RBW	VBW
30 ≤ f ≤ 1 000	Quasi Peak	120 kHz	300 kHz

Measured frequency range

Limit:

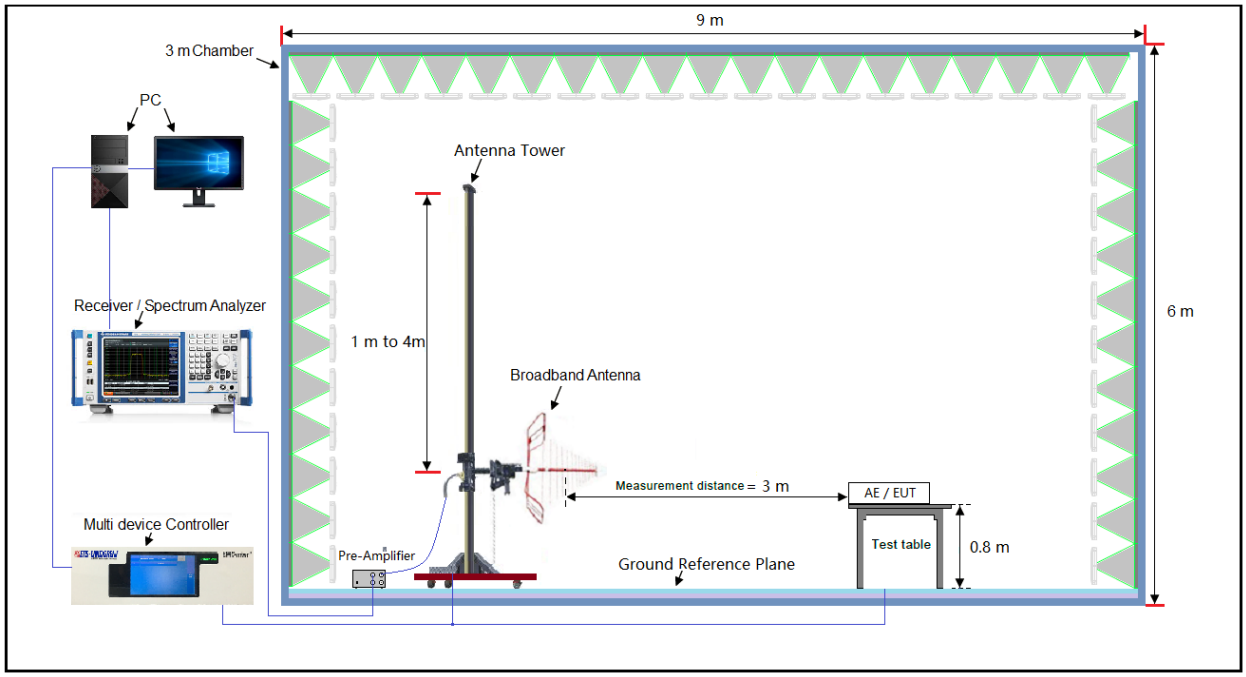
Radiated emission limit from frequency range 30MHz – 1000MHz

Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 10m
30 ~ 230	40	30
230 ~ 300	47	37

Notes:
1. For the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.
2. The gray rows are selected items.

Test Setup:

Test setup for radiated emissions of tabletop equipment



Test setup for radiated emissions of floor standing equipment

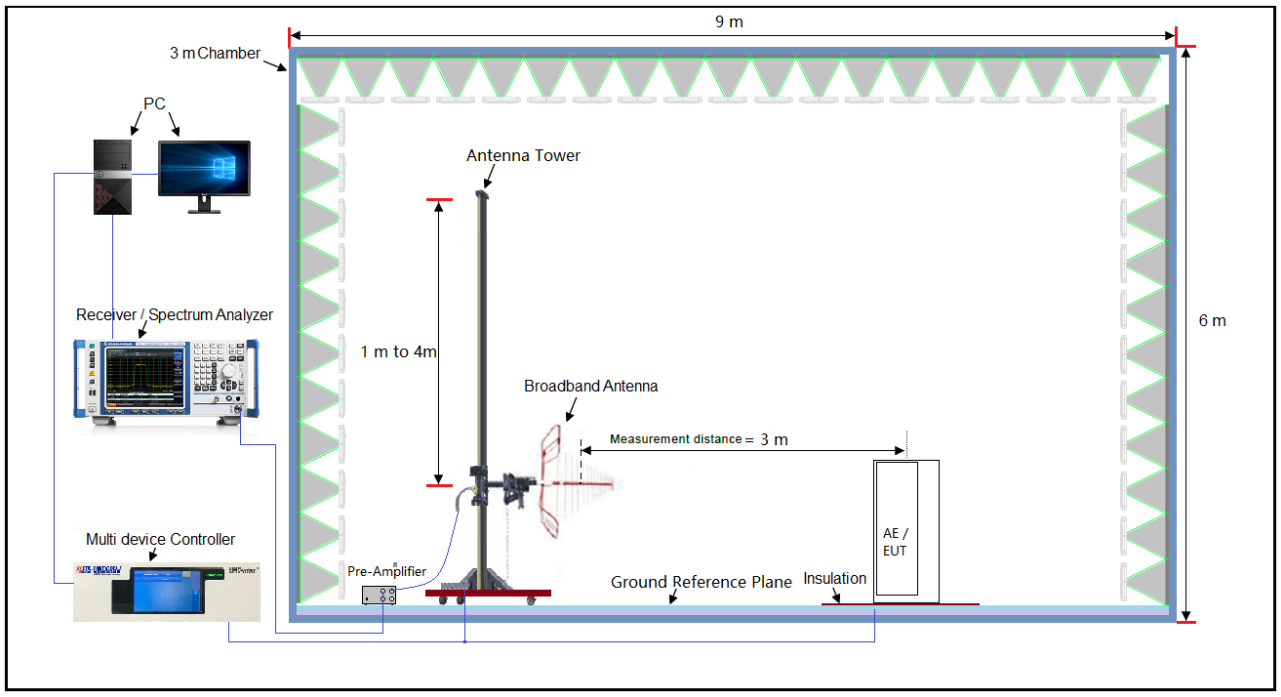


Figure 1. 30 MHz to 1 GHz

Test Procedures:

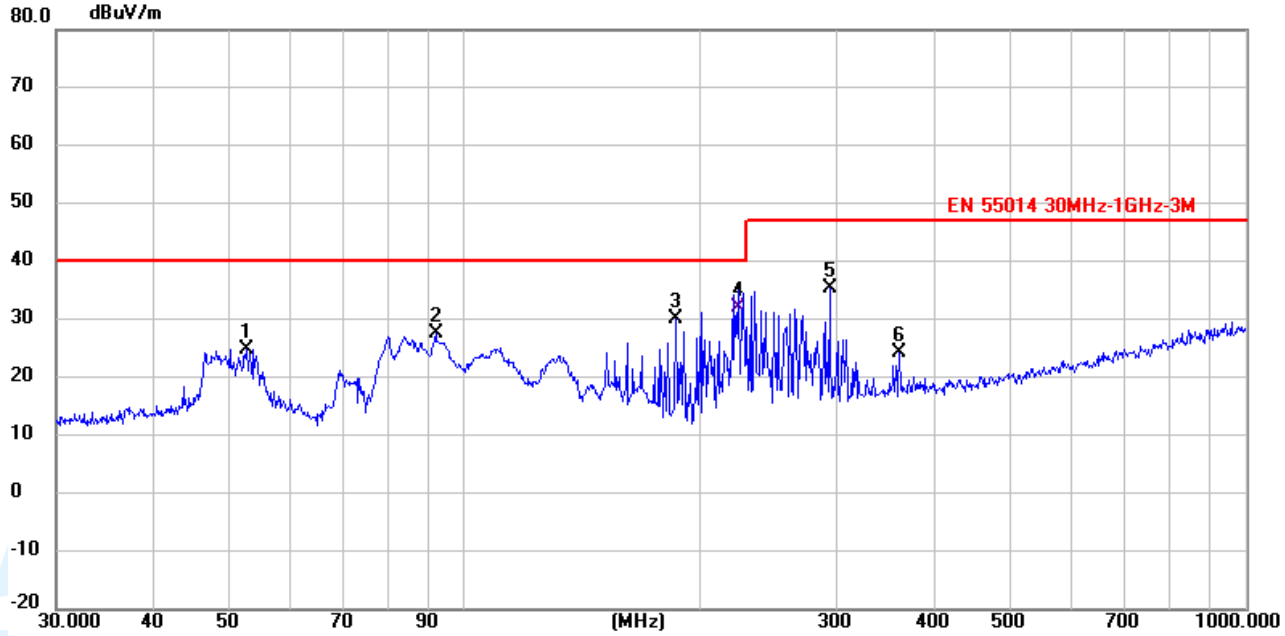
1) The radiated emissions were tested in a semi-anechoic chamber.
2) The Product was placed on the non-conductive turntable 0.8 m or 0.1 m above the ground at a chamber.
3) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
4) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

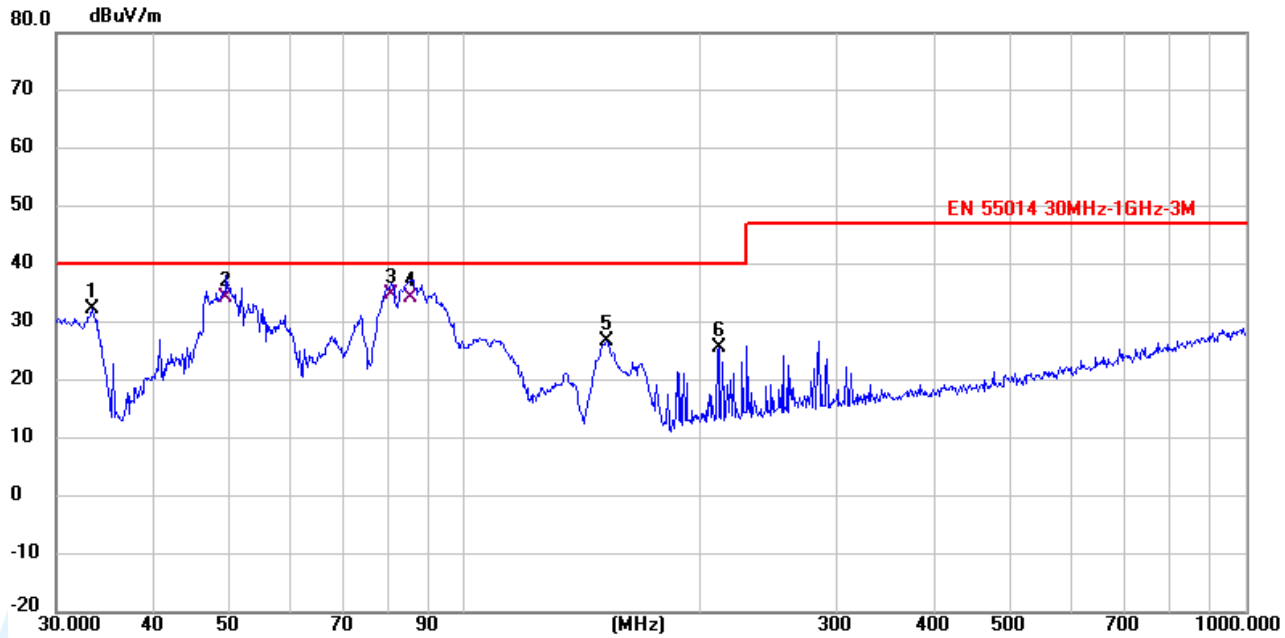
The worst measurement data as follows:

Quasi Peak:
Test Mode 1:
Horizontal



No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
1	52.575	36.56	-11.57	24.99	40.00	-15.01	QP
2	91.816	42.54	-14.99	27.55	40.00	-12.45	QP
3	186.441	44.79	-14.75	30.04	40.00	-9.96	QP
4	223.733	45.72	-13.60	32.12	40.00	-7.88	QP
5	293.084	46.84	-11.50	35.34	47.00	-11.66	QP
6	360.448	34.01	-9.59	24.42	47.00	-22.58	QP

Vertical



No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
1	33.328	46.61	-14.30	32.31	40.00	-7.69	QP
2	49.533	45.58	-11.36	34.22	40.00	-5.78	QP
3	80.644	52.38	-17.61	34.77	40.00	-5.23	QP
4	85.298	50.87	-16.44	34.43	40.00	-5.57	QP
5	152.130	43.69	-16.91	26.78	40.00	-13.22	QP
6	211.526	39.57	-13.91	25.66	40.00	-14.34	QP

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

6.2.2 Mains Terminal Continuous Disturbance voltage (150 kHz to 30 MHz)

Test Requirement: EN IEC 55014-1:2021 Clause 4.3.3

Limit:

General limits

Frequency range (MHz)	Mains ports		Associated ports			
	Disturbance voltage		Disturbance voltage		Disturbance current	
	Limits dB(μV)		Limits dB(μV)		Limits dB(μV)	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	66 ~ 56 *	80	70	40 ~ 30 *	30 ~ 20 *
0.5 ~ 5.0	56	56	74	64	30	20
5.0 ~ 30	60	60	74	64		

Notes:
1. * means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.
2. If the quasi-peak measurements meet the average limit, the EUT shall be deemed to meet both limits and the measurements using the average detector need not be carried out.

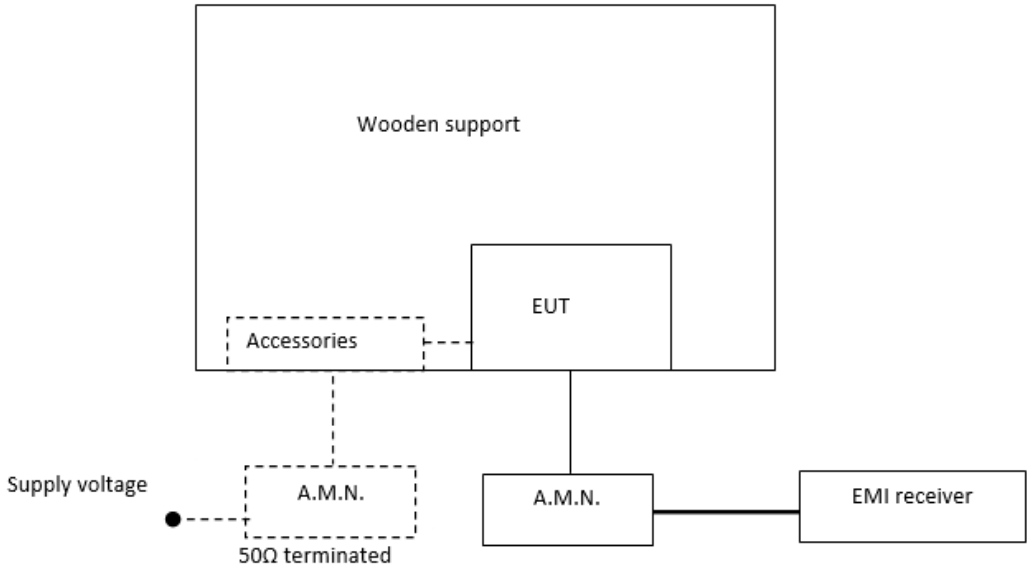
Limits for mains port of tools

	P ≤ 700 W		700 W < P ≤ 1 000 W		P > 1 000 W	
Frequency range (MHz)	Limits dB(μV)		Limits dB(μV)		Limits dB(μV)	
	Quasi-peak	A erage	Quasi-peak	Average	Quasi-peak	Average
0.15-0.35	66-59*	59-49*	70-63*	63-53*	76-69*	69 ~ 59 *
0.35-5	59	49	63	53	69	59
5-30	64	54	68	58	74	64

Notes:
1. * means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.35MHz.
2. If the quasi-peak measurements meet the average limit, the EUT shall be deemed to meet both limits and the measurements using the average detector need not be carried out.

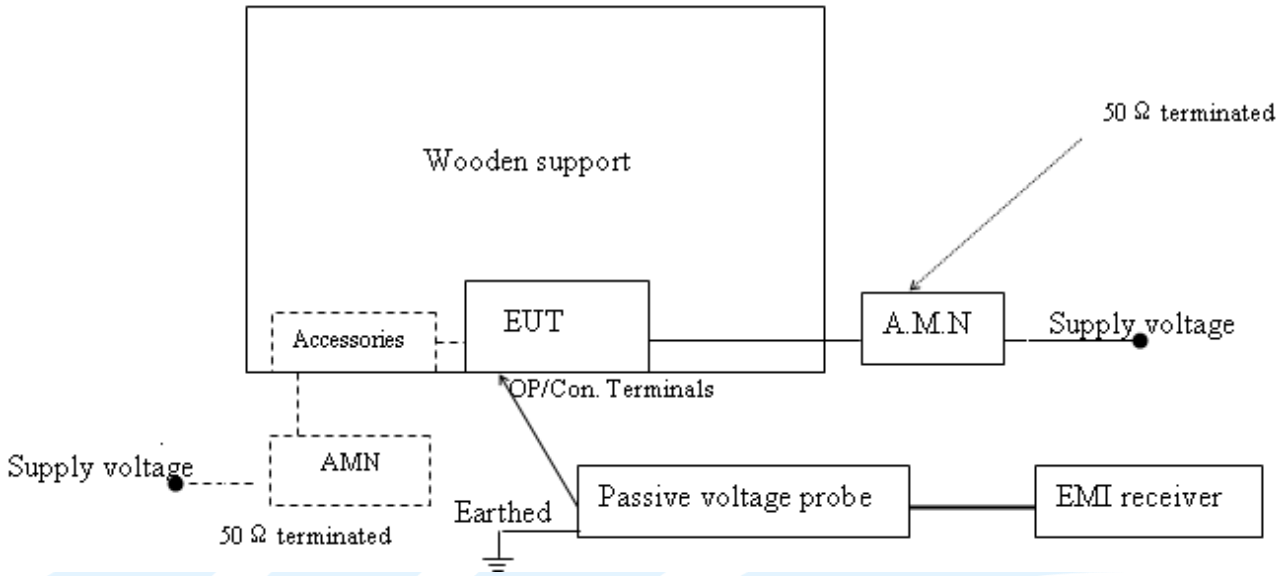
Test Setup:

At mains terminal



For table top equipment, wooden support is 0.8m height table

At Associated ports



Note: : power line
: signal line
- - - - - - - - : means the test setup while available

Test Procedures: Detailed test procedure and arrangement was according to clause 5.2 of EN 55014-1.

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω 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 table top EUT was placed upon a non-metallic table 0.8 m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
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 or 0.1 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 LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

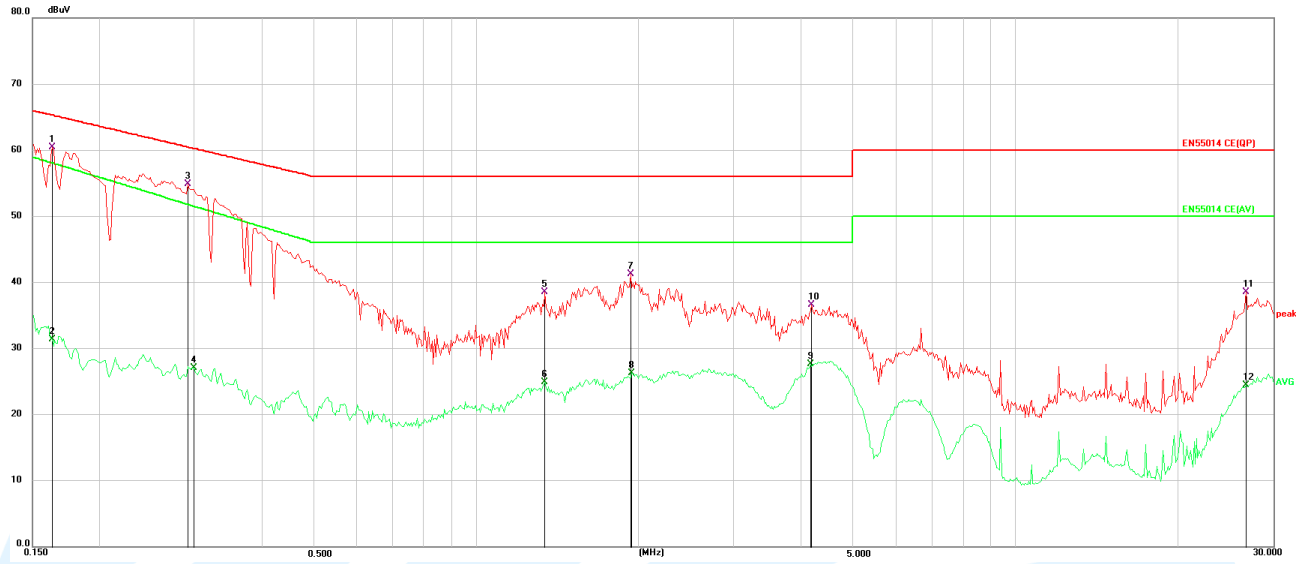
Equipment Used: Refer to section 3 for details.

Test Result: Pass

The worst measurement data as follows:

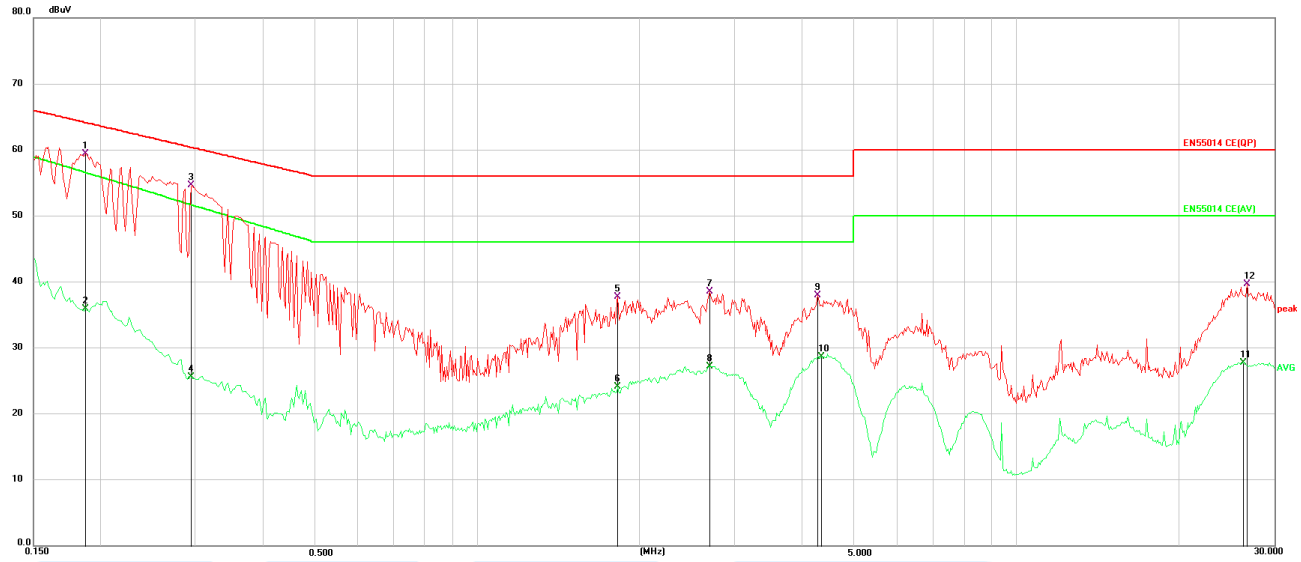
Test Mode 1: Quasi Peak and Average:

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark
1	0.1632	50.44	10.03	60.47	65.30	-4.83	QP
2	0.1632	21.34	10.03	31.37	58.09	-26.72	AVG
3	0.2894	44.75	10.13	54.88	60.54	-5.66	QP
4	0.2983	16.96	10.14	27.10	51.58	-24.48	AVG
5	1.3380	28.36	10.20	38.56	56.00	-17.44	QP
6	1.3380	14.75	10.20	24.95	46.00	-21.05	AVG
7	1.9320	30.95	10.26	41.21	56.00	-14.79	QP
8	1.9410	16.04	10.26	26.30	46.00	-19.70	AVG
9	4.1684	17.40	10.24	27.64	46.00	-18.36	AVG
10	4.1864	26.32	10.24	36.56	56.00	-19.44	QP
11	26.7720	27.36	11.12	38.48	60.00	-21.52	QP
12	26.7720	13.31	11.12	24.43	50.00	-25.57	AVG

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark
1	0.1873	49.21	10.16	59.37	64.16	-4.79	QP
2	0.1873	25.76	10.16	35.92	56.60	-20.68	AVG
3	0.2940	44.42	10.17	54.59	60.41	-5.82	QP
4	0.2940	15.46	10.17	25.63	51.73	-26.10	AVG
5	1.8194	27.58	10.19	37.77	56.00	-18.23	QP
6	1.8194	13.90	10.19	24.09	46.00	-21.91	AVG
7	2.7014	28.33	10.19	38.52	56.00	-17.48	QP
8	2.7014	17.02	10.19	27.21	46.00	-18.79	AVG
9	4.2900	27.74	10.21	37.95	56.00	-18.05	QP
10	4.3395	18.48	10.21	28.69	46.00	-17.31	AVG
11	26.3535	16.73	11.07	27.80	50.00	-22.20	AVG
12	26.8125	28.57	11.07	39.64	60.00	-20.36	QP

Remark:

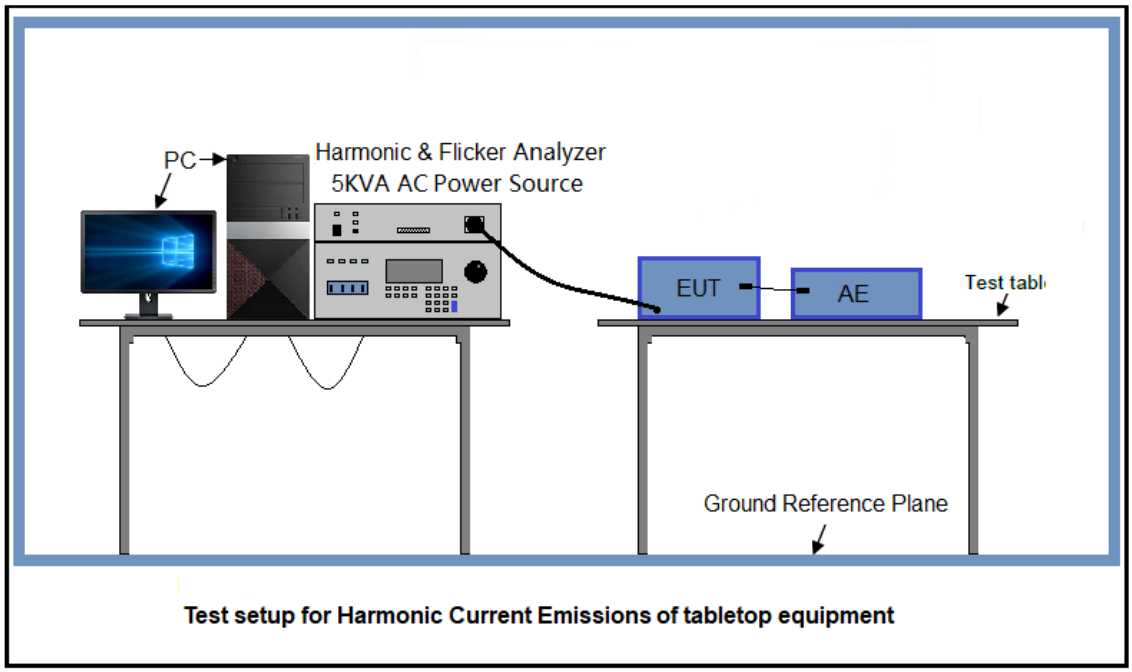
1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

6.2.3 Harmonic Current Emissions

Test Requirement: EN IEC 61000-3-2:2019/A1:2021 Clause 6.2.3

Test Method: The appropriate requirements of EN 61000-3-2/A1 for harmonic current emission apply for equipment covered by the scope of the present document with an input current up to and including 16A per phase. For equipment with an input current of greater than 16A per phase EN 61000-3-12 applies.

Test Setup:



Test setup for Harmonic Current Emissions of tabletop equipment

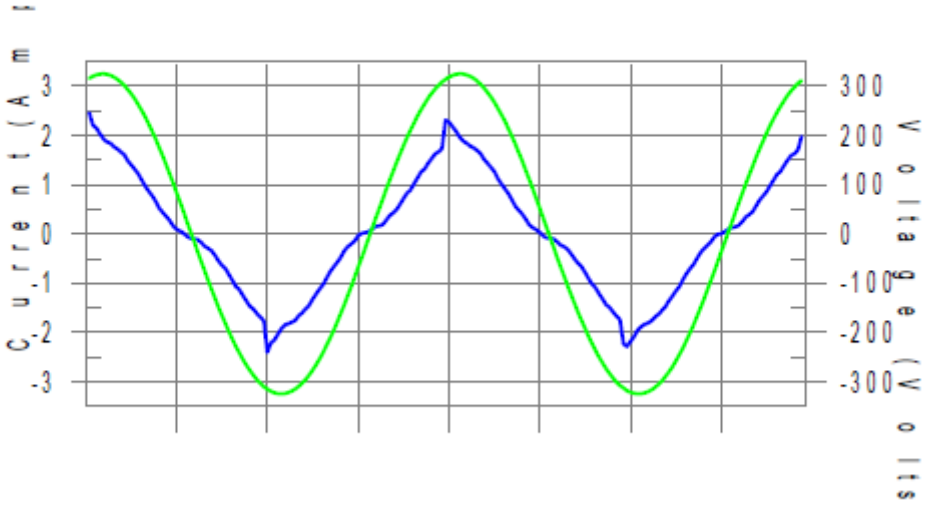
Equipment Used: Refer to section 3 for details.

Test Procedure: Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyser which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions.

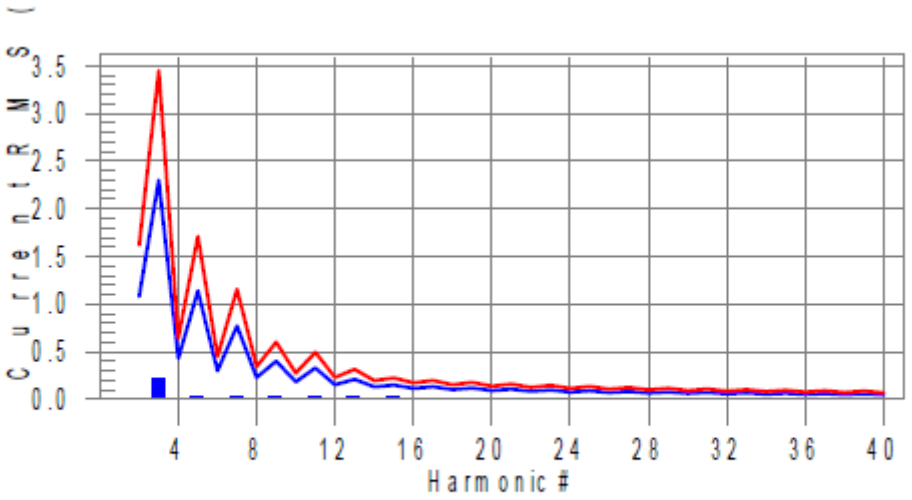
Test Result: PASS

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass **Worst harmonics H39-10.2% of 150% limit, H39-14.7% of 100% limit**

Test Result: Pass Source qualification: Normal
THC(A): 0.234 I-THD(%): 19.5 POHC(A): 0.032 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts):	229.63	Frequency(Hz):	50.00
I_Peak (Amps):	2.451	I_RMS (Amps):	1.224
I_Fund (Amps):	1.199	Crest Factor:	2.103
Power (Watts):	274.7	Power Factor:	0.978

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	1.080	N/A	0.003	1.620	N/A	Pass
3	0.218	2.300	9.5	0.229	3.450	6.6	Pass
4	0.001	0.430	N/A	0.002	0.645	N/A	Pass
5	0.029	1.140	2.6	0.031	1.710	1.8	Pass
6	0.001	0.300	N/A	0.002	0.450	N/A	Pass
7	0.039	0.770	5.1	0.041	1.155	3.5	Pass
8	0.001	0.230	N/A	0.002	0.345	N/A	Pass
9	0.034	0.400	8.4	0.035	0.600	5.8	Pass
10	0.001	0.184	N/A	0.002	0.276	N/A	Pass
11	0.029	0.330	8.8	0.030	0.495	6.0	Pass
12	0.001	0.153	N/A	0.002	0.230	N/A	Pass
13	0.026	0.210	12.5	0.027	0.315	8.5	Pass
14	0.001	0.131	N/A	0.002	0.197	N/A	Pass
15	0.022	0.150	14.4	0.022	0.225	9.6	Pass
16	0.001	0.115	N/A	0.002	0.173	N/A	Pass
17	0.019	0.132	14.1	0.019	0.198	9.5	Pass
18	0.001	0.102	N/A	0.002	0.153	N/A	Pass
19	0.015	0.118	12.8	0.015	0.178	8.6	Pass
20	0.001	0.092	N/A	0.001	0.138	N/A	Pass
21	0.013	0.107	12.2	0.013	0.161	8.2	Pass
22	0.001	0.084	N/A	0.001	0.125	N/A	Pass
23	0.011	0.098	11.5	0.011	0.147	7.7	Pass
24	0.001	0.077	N/A	0.001	0.115	N/A	Pass
25	0.011	0.090	11.7	0.011	0.135	7.9	Pass
26	0.001	0.071	N/A	0.001	0.107	N/A	Pass
27	0.010	0.083	12.1	0.010	0.125	8.2	Pass
28	0.001	0.066	N/A	0.002	0.099	N/A	Pass
29	0.010	0.078	12.8	0.010	0.116	8.6	Pass
30	0.001	0.061	N/A	0.001	0.092	N/A	Pass
31	0.010	0.073	13.6	0.010	0.109	9.2	Pass
32	0.001	0.058	N/A	0.001	0.086	N/A	Pass
33	0.009	0.068	13.9	0.010	0.102	9.5	Pass
34	0.001	0.054	N/A	0.002	0.081	N/A	Pass
35	0.009	0.064	14.6	0.010	0.096	9.9	Pass
36	0.001	0.051	N/A	0.002	0.077	N/A	Pass
37	0.009	0.061	14.3	0.009	0.091	9.8	Pass
38	0.001	0.048	N/A	0.002	0.073	N/A	Pass
39	0.008	0.058	14.7	0.009	0.087	10.2	Pass
40	0.001	0.046	N/A	0.002	0.069	N/A	Pass

Test Result: Pass **Source qualification: Normal**

Highest parameter values during test:

Voltage (Vrms):	229.63	Frequency(Hz):	50.00
I_Peak (Amps):	2.451	I_RMS (Amps):	1.224
I_Fund (Amps):	1.199	Crest Factor:	2.103
Power (Watts):	274.7	Power Factor:	0.978

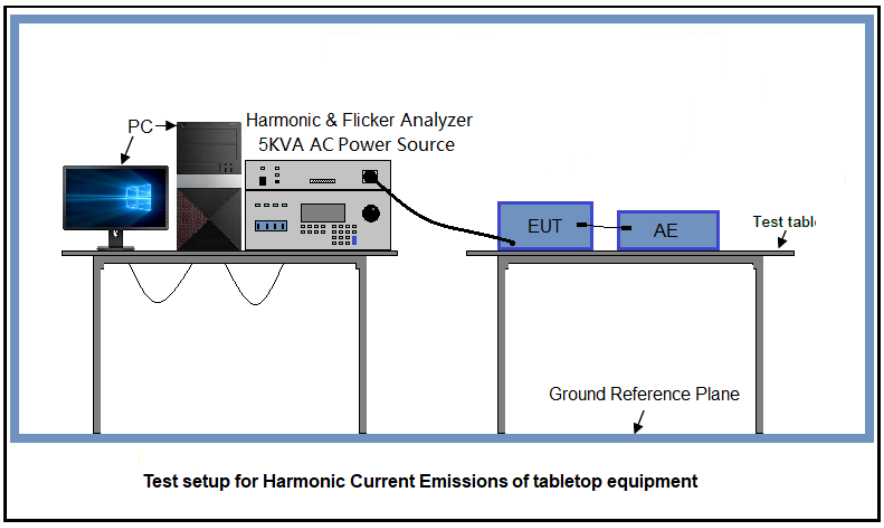
Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.172	0.459	37.35	OK
3	0.573	2.066	27.75	OK
4	0.117	0.459	25.50	OK
5	0.032	0.918	3.50	OK
6	0.129	0.459	28.07	OK
7	0.041	0.689	5.97	OK
8	0.062	0.459	13.54	OK
9	0.023	0.459	5.07	OK
10	0.036	0.459	7.93	OK
11	0.030	0.230	12.99	OK
12	0.020	0.230	8.78	OK
13	0.012	0.230	5.05	OK
14	0.014	0.230	6.10	OK
15	0.022	0.230	9.76	OK
16	0.017	0.230	7.29	OK
17	0.016	0.230	7.08	OK
18	0.016	0.230	6.88	OK
19	0.014	0.230	6.21	OK
20	0.022	0.230	9.67	OK
21	0.019	0.230	8.10	OK
22	0.009	0.230	4.07	OK
23	0.008	0.230	3.44	OK
24	0.006	0.230	2.70	OK
25	0.019	0.230	8.18	OK
26	0.009	0.230	3.75	OK
27	0.010	0.230	4.45	OK
28	0.007	0.230	3.12	OK
29	0.011	0.230	4.77	OK
30	0.006	0.230	2.82	OK
31	0.014	0.230	6.11	OK
32	0.005	0.230	2.26	OK
33	0.014	0.230	5.89	OK
34	0.004	0.230	1.78	OK
35	0.016	0.230	6.96	OK
36	0.003	0.230	1.41	OK
37	0.013	0.230	5.57	OK
38	0.004	0.230	1.72	OK
39	0.016	0.230	7.17	OK
40	0.012	0.230	5.43	OK

6.2.4 Voltage Fluctuations and Flicker

Test Requirement: EN 61000-3-3:2013/A2:2021 Clause 4

Test Method: The appropriate requirements of EN 61000-3-3 for voltage fluctuations and flicker apply for equipment covered by the scope of the present document with an input current up to and including 16A per phase, if no conditional connection is needed. Where a conditional connection is required then the requirements of EN 61000-3-11 [12] shall apply.
For equipment with an input current of greater than 16A up to and including 75A per phase EN 61000-3-11 applies.

Test Setup:



Test setup for Harmonic Current Emissions of tabletop equipment

Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

	Result	Test Limit
T-max (ms)	0	500.0
dc (%)	0.35	3.30
dmax (%)	0.38	4.00
Pst (10 min. period)	0.282	1.000

6.3 IMMUNITY

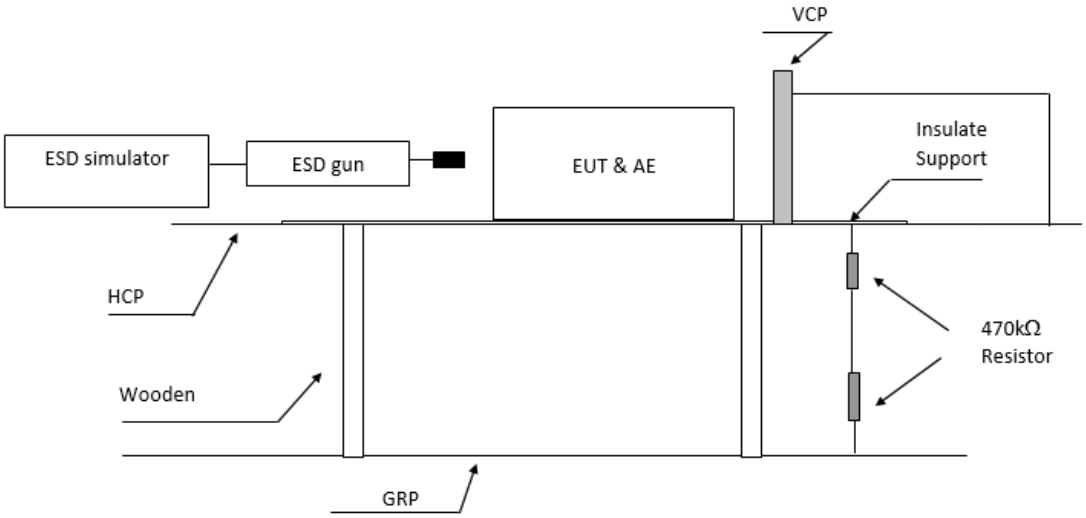
Categories of apparatus	
☐	Category I (fulfill the relevant immunity requirements without testing)
☐	Category II (Shall fulfill the tests: ESD, EFT, Inject current, Surge, Dips)
☐	Category III (Shall fulfill the tests: ESD, Radio frequency electromagnetic fields *)
☒	Category IV (Shall fulfill the tests: ESD, EFT, Inject current, Surge, Dips, Radio frequency electromagnetic fields)
☐	Category V (Shall fulfill the tests: ESD, EFT, Inject current, Surge, Dips, Radio frequency electromagnetic fields)
Note: *only applicable to the ride on toys operating with electronic devices.	

6.3.1 Electrostatic Discharge

Test Requirement:	EN IEC 55014-2:2021 Clause 5.1
Test Method:	The test method shall be in accordance with IEC 61000-4-2
Criterion Required:	performance criteria B
Discharge Impedance:	330 Ω / 150 pF
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Test Level:	Contact discharge: Level 2, ±4 Kv, Air discharge: Level 3, ±8 kV

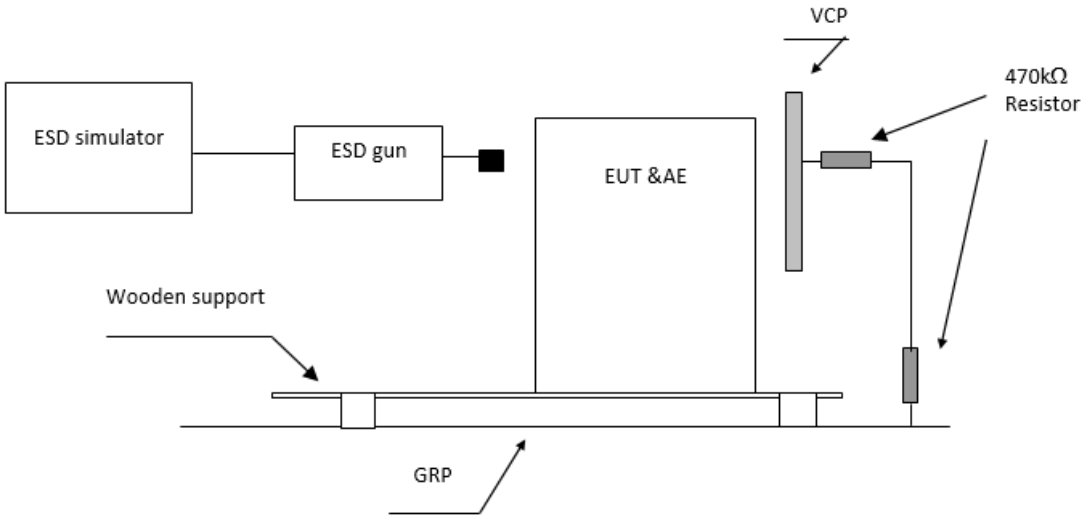
Test Setup:

Test set-up for table-top equipment



Note:
HCP means Horizontal Coupling Plane;
VCP means Vertical Coupling Plane;
GRP means Ground Reference Plane;
Wooden support is a 0.8m height table

Test setup for floor-standing equipment



Note:
VCP means Vertical Coupling Plane;
GRP means Ground Reference Plane;
Wooden support is a 0.1m height rack

Test Procedures:

1) Electrostatic discharges shall be applied only to points and surfaces of the EUT which are expected to be touched during normal operation, including user access operations specified in the user manual, for example cleaning or adding consumables when the EUT is powered. The application of discharges to the contacts of open connectors is not required.
   When applying direct discharges to a portable or handheld battery- powered EUT with a display screen, it may not be possible to observe the screen for a given EUT orientation. If observation of the screen is necessary during this test, the EUT may be mounted vertically using non - metallic supports.
2) The EUT was put on a 0.8m high wooden table for table-top equipment or 0.1m high for floor standing equipment standing on the ground reference plane (GRP).
3) A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size & HCP were constructed from the same material type & think mess as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end. The distance between EUT and any of the other metallic surface excepted the GRP, HCP and VCP was greater than 1m.
4) During the contact discharges, the tip of the discharge electrode was touch the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.
5) After each discharge, the ESD generator was removed from the EUT, the generator was then retriggered for a new single discharge. For ungrounded product, a discharge cable with two resistances was used after each discharge to remove remnant electrostatic voltage. 10 times of each polarity single discharge were applied to HCP and VCP.

Equipment Used: Refer to section 3 for details.

Test Result: See below table.

Discharge Type	Applied Voltage	Pulse No.	Result (Pursuant to EN IEC 55014-2:2021 Criterion B)		
Contact Discharge	± 2 kV, ± 4 kV	10 for every level	☒ A	☐ B (see phenomena)	☐ N/A
Air Discharge	± 2 kV, ± 4 kV, ± 8 kV	10 for every level	☒ A	☐ B (see phenomena)	☐ N/A
Indirect HCP Discharge	± 4 kV,	10 for every level	☒ A	☐ B (see phenomena)	☐ N/A
Indirect VCP Discharge	± 4 kV,	10 for every level	☒ A	☐ B (see phenomena)	☐ N/A

Remark:
N/A: Not applicable

Observation:
☒ No observable change.
☐ During the experiment, the following phenomena occurred:

Conclusion: The EUT met the requirements of the standard.

6.3.2 Radio frequency electromagnetic fields, 80 MHz to 1 000 MHz

Test Requirement: EN IEC 55014-2:2021 Clause 5.5

Test Method: The test method shall be in accordance with IEC 61000-4-3

Criterion Required: performance criteria A

Frequency range: 80 MHz to 1 000 MHz

Test Level: Level : 3 V/m(measured unmodulated)

Modulation: 1 kHz Sine wave, 80 % Amp. Modulation, audio signal of 400 Hz

Frequency Step: 1 % increment

Dwell time: 1 seconds

Polarity Antenna: Horizontal and vertical

Test Setup:

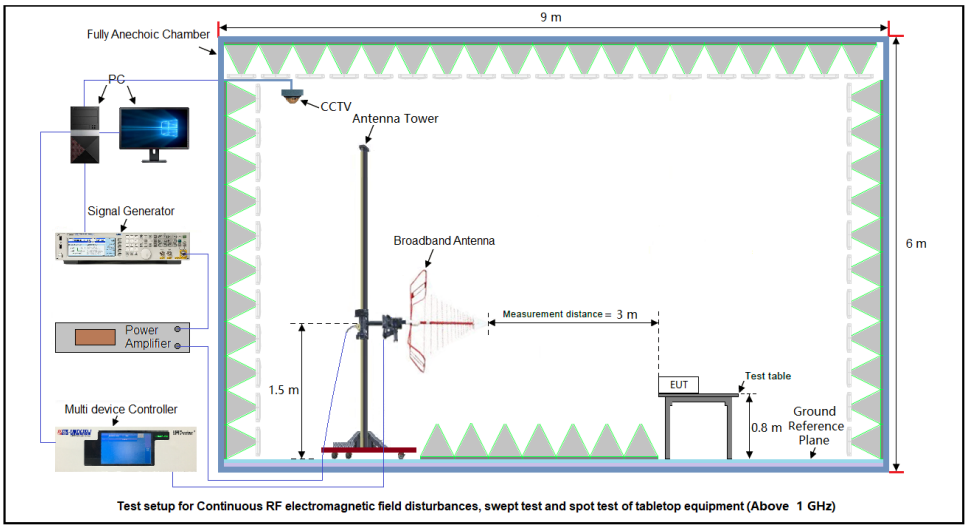


Figure 1. 80 MHz to 1 GHz

Test Procedures:

1) For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items.
2) If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length.
3) The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area).
4) The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceed 10 % of the preceding frequency value.
5) The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5 s.
6) The test normally was performed with the generating antenna facing each side of the EUT.
7) The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.
8) The EUT was performed in a configuration to actual installation conditions, a video camera and/or an audio monitor were used to monitor the performance of the EUT.

Equipment Used: Refer to section 3 for details.

Test Result: See below table.

EUT Face	Frequency	Level	Result (Pursuant to EN 55014 Criterion A)
Front	80 MHz to 1 000 MHz	3 V/m	A
Back			A
Left			A
Right			A
Top			A
Under			A

Observation:

☒ No observable change.

☐ During the experiment, the following phenomena occurred:

Conclusion: The EUT met the requirements of the standard.

6.3.3 Fast transients

Test Requirement: EN IEC 55014-2:2021 Clause 5.2

Test Method: The test method shall be in accordance with EN 61000-4-4

Criterion Required: performance criteria B

Polarity: Positive & Negative

Test Level and Repetition Frequency:

Open circuit output test voltage (±10%) and repetition rate of the impulses (±20%)				
Level	Input and output a.c. power ports		Input and output d.c. power ports Signal lines and control lines ports	
	Voltage peak kV	Repetition rate kHz	Voltage peak kV	Repetition rate kHz
1	0.5	5	0.25	5
2	1	5	0.5	5
3	2	5	1	5
4	4	5	2	5
X	Special	Special	Special	Special
Notes : 1. “X” is an open level. The level has to be specified in the dedicated equipment specification. 2. The gray rows were the selected test level.				

Impulse Wave shape: 5/50 ns

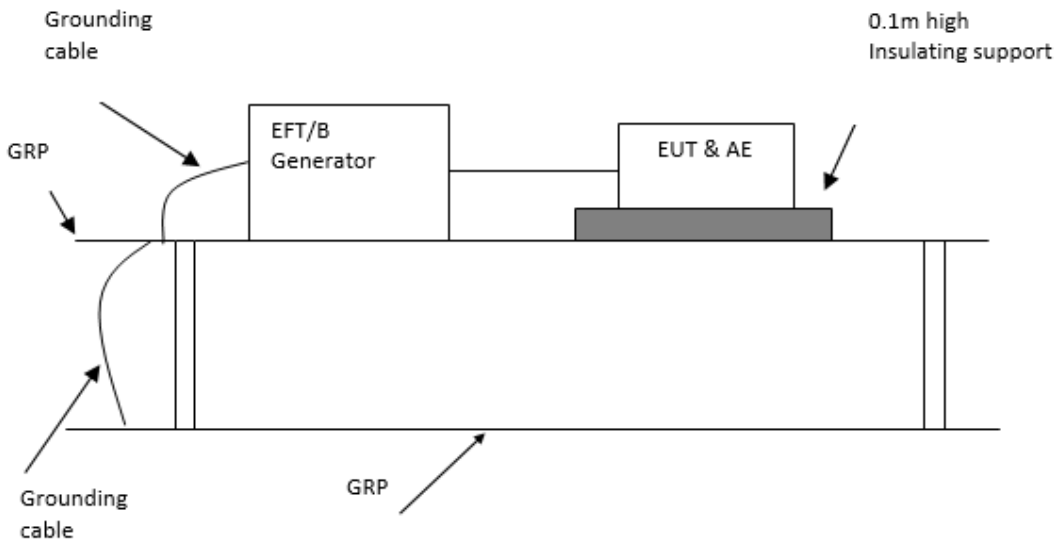
Burst Duration: 15ms

Burst Period: 300ms

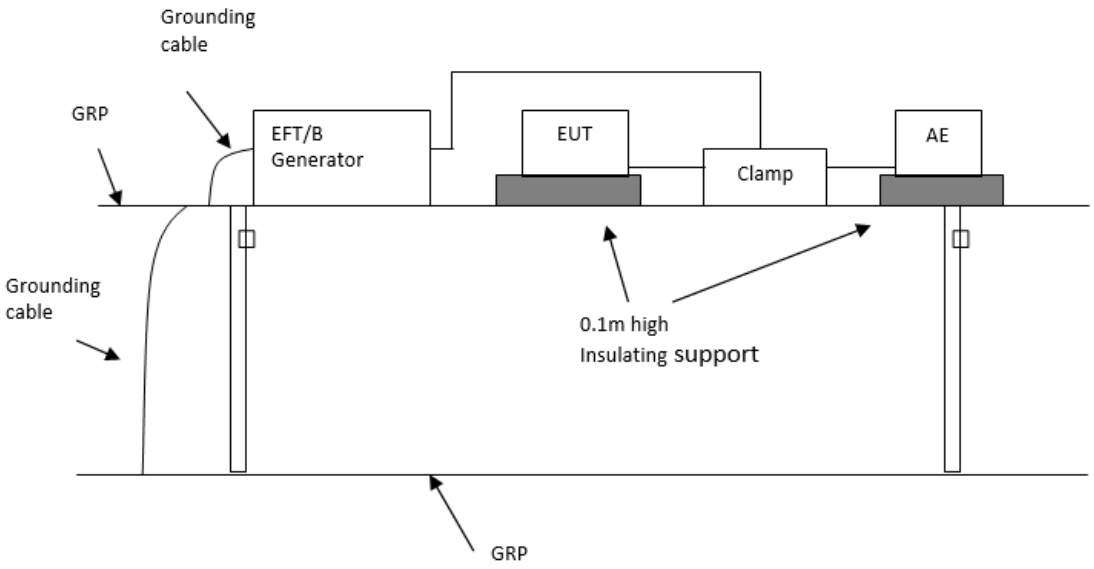
Test Duration: 2 minute per level & polarity

Test Setup:

Test set-up for table-top equipment

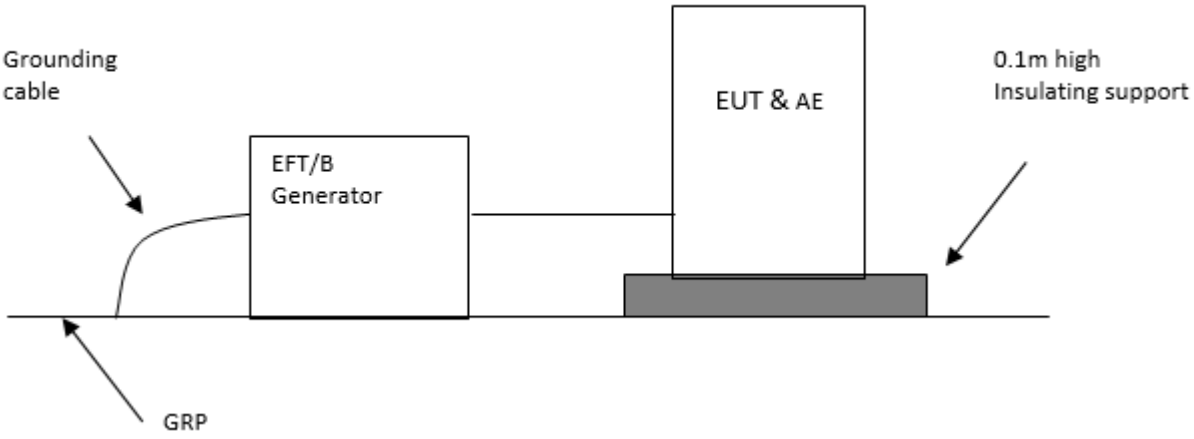


(for input a.c./d.c. power line)

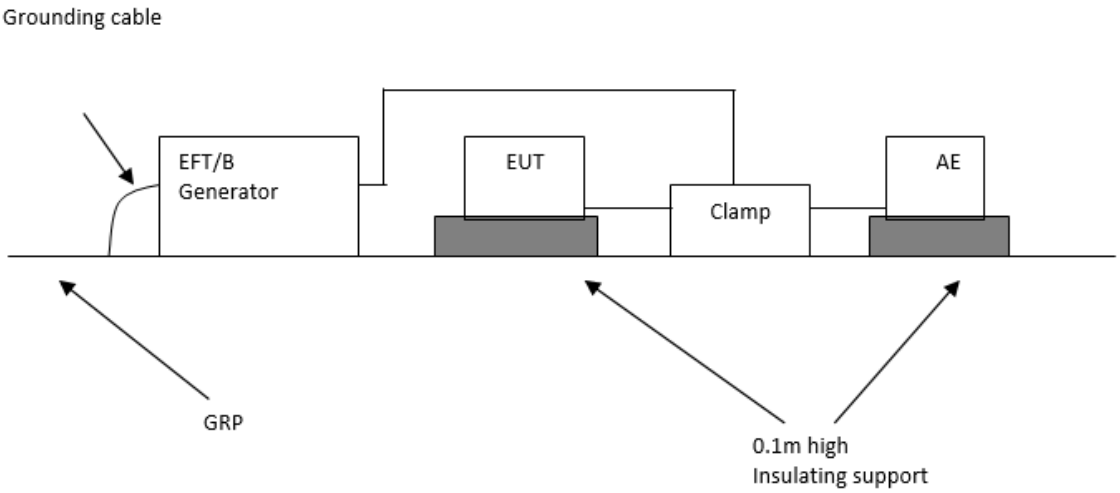


(for output a.c./d.c. power line or signal/control lines)

Test setup for floor-standing equipment



(for input a.c./d.c. power line)



(for output a.c./d.c. power line or signal/control lines)

Test Procedures:

1) The EUT was placed on a ground reference plane(GRP) insulated by an insulating support 0.1m thick

and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.

2) The GRP shall project beyond the EUT and the clamp by at least 0.1m on all sides. The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m. All cables to the EUT was placed on the insulation support 0.1m above GRP. A cable not subject to EFT was routed as far as possible from cable under test to minimize the coupling between the cables.
3) The length of signal and power cable between the EUT and EFT generator was 0.5m. If the cable is a non-detachable supply cable more than 0.5m, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1m above the GRP.
4) The EUT was conducted the below specified test voltages for line and neutral or line, neutral and earth simultaneously (for Wired network, single, control and DC port line with capacitive coupling clamp), 120 seconds duration. If the equipment contains identical ports, only one was tested; multicomputer cables, such as a 50-pair Wired network cable, were tested as a single cable. Cables did not be split or divided into groups of conductors for this test; interface ports, which were intended by the manufacturer to be connected to data cables not longer than 3 m, did not be tested.

Equipment Used: Refer to section 3 for details.

Test Result: See below table.

Test Ports	Test Level	Result (Pursuant to EN IEC 55014-2:2021 Criterion B)		
AC mains power ports	± 0.5 kV, ± 1.0 kV	☒ A	☐ B (see phenomena)	☐ N/A
DC mains power ports	± 0.5 kV	☐ A	☐ B (see phenomena)	☒ N/A
Signal lines and control lines	± 0.5 kV	☐ A	☐ B (see phenomena)	☒ N/A

Observation:

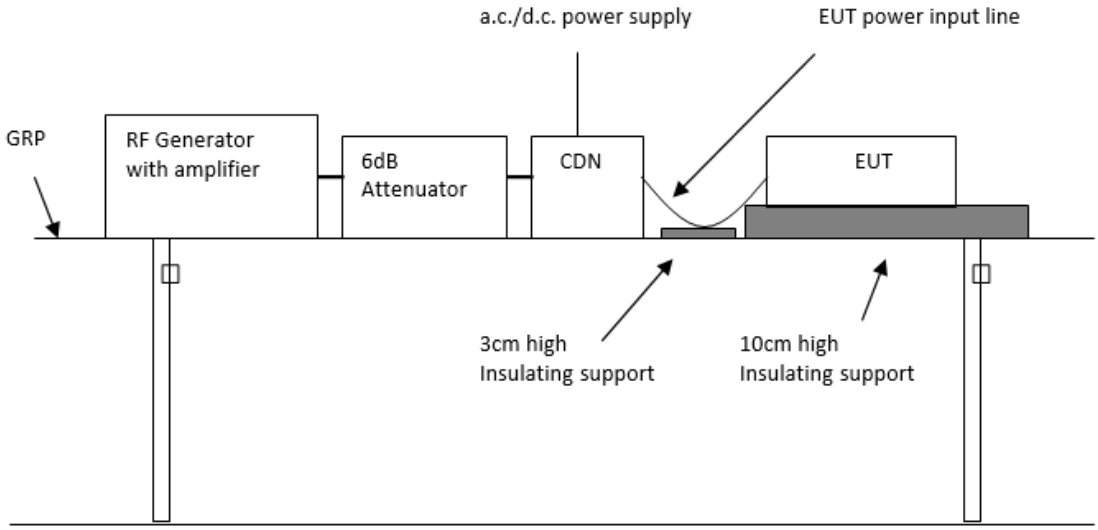
☒ No observable change.

☐ During the experiment, the following phenomena occurred:

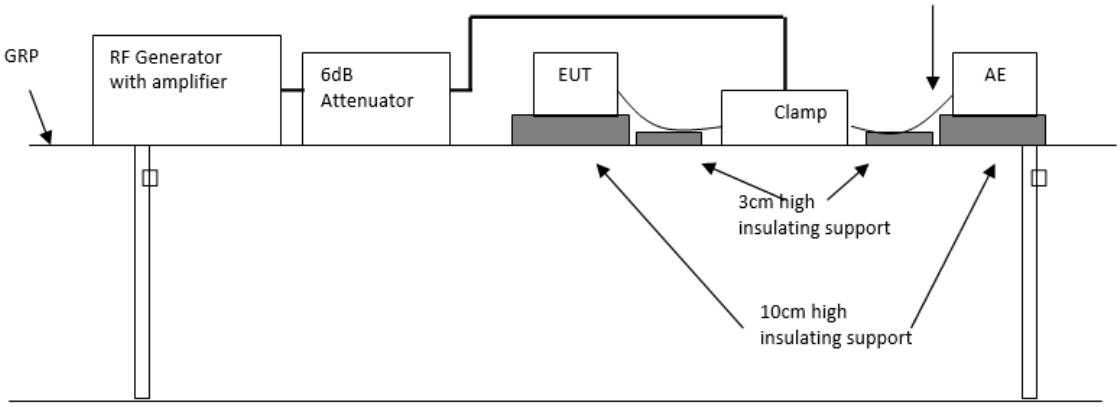
Conclusion: The EUT met the requirements of the standard.

6.3.4 Injected currents

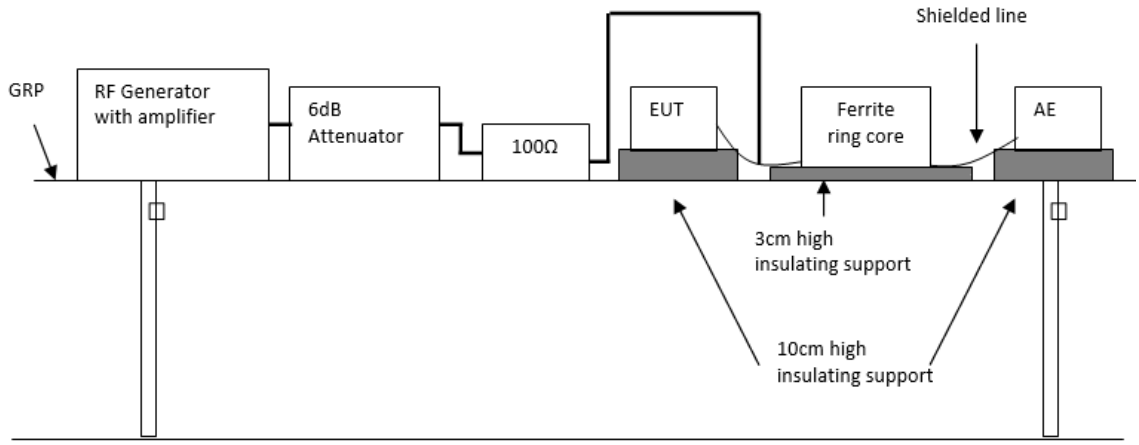
Test Requirement:	EN IEC 55014-2:2021 Clause 5.3, 5.4
Test Method:	The test method shall be in accordance with EN 61000-4-6
Criterion Required:	performance criteria A for signal lines and control lines: 1 V (r.m.s)
Test Level:	Input and output d.c. power ports: 1 V (r.m.s) Input and output a.c. power ports: 3 V (r.m.s)
Test Frequency:	0.15 MHz to 80 MHz or 0.15 MHz to 230 MHz
Modulation:	80%, 1kHz Amplitude Modulation
Step Size:	1% increment
Dwell Time:	1s
Test Setup:	



(for a.c./d.c input power line)



(for output a.c./d.c. power line or signal/control lines_ Unshielded line)



(for output a.c./d.c. power line or signal/control lines_ Shielded line)

Test Procedures:

1) The Product and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.
2) The frequency range is swept from 150 kHz to 80MHz, 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 fundamental.
1) The dwell time at each frequency shall be not less than the time necessary for the Product to be able to respond.

Equipment Used: Refer to section 3 for details.

Test Result: See below table.

☒**For EUT test Electromagnetic field susceptibility**

Test Ports	Frequency	Test Level	Result (Pursuant to EN IEC 55014-2:2021 Criterion A)
AC mains power ports	0.15 MHz to 80 MHz	3 V	A

Observation:

☒ No observable change.

☐ During the experiment, the following phenomena occurred:

Conclusion: The EUT met the requirements of the standard.

6.3.5 Surges

Test Requirement: EN IEC 55014-2:2021 Clause 5.6

Test Method: The test method shall be in accordance with EN 61000-4-5

Criterion Required: performance criteria B

Wave Shape: 1.2/50 (8/20) μs

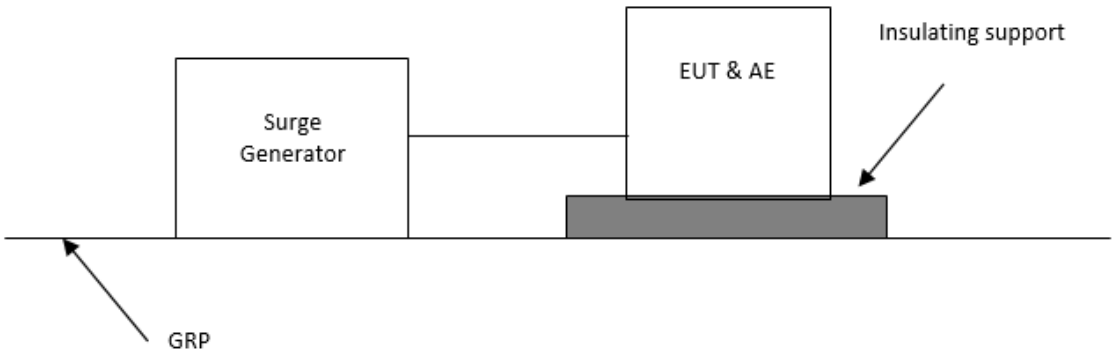
Test Level: for AC mains power ports:
2kV line-to-earth with 12 Ω Impedance and 1 kV line-to-line with 2 Ω Impedance.

Polarity: Positive & Negative

Interval: 60s between each surge

No. of Surges: 5 positive at 90°, 5 negative at 270°

Test Setup:



Test Procedures:

Test Procedure:

1) The EUT was placed on a ground reference plane(GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2) The 1.2/50 μs surge was to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks were required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines and to provide sufficient decoupling impedance to the surge wave so that the specified wave may be applied on the lines under test.
3) The power cord between the EUT and the coupling/decoupling network was not exceed 2 m in length. The interconnection line between the EUT and the coupling/ decoupling network shall not exceed 2 m in length.
4) The EUT was conducted 0.5 kV and 1 kV test voltage for line to line and line to neutral and conducted 0.5 kV, 1 kV and 2 kV test voltage for line to earth and neutral to earth, five positive pulses and five negative pulses each at 90°, 270° for a.c. power ports and five positive pulses and five negative surge pulses for d.c. power ports, The test levels were applied on the EUT with a 2 Ω generator source impedance for power supply terminals and 12Ω output impedance for interconnection lines. The tests were done at repetition rate one per minute.

Equipment Used: Refer to section 3 for details.

Test Result: See below table.

For AC mains power port				
Test Ports	**Level**	**Result (Pursuant to EN IEC 55014-2:2021 Criterion B)**		
Between Phase And Neutral	± 1.0 kV	☒ A	☐ B (see phenomena)	
Between Phase And Earth	± 2.0 kV	☐ A	☐ B (see phenomena)	☒ N/A
Neutral Phase And Earth	± 2.0 kV	☐ A	☐ B (see phenomena)	☒ N/A

Remark:
N/A: Not applicable

Observation:
☒ No observable change.
☐ During the experiment, the following phenomena occurred:

Conclusion: The EUT met the requirements of the standard.

6.3.6 Voltage dips

Test Requirement: EN IEC 55014-2:2021 Clause 5.7

Test Method: The test method shall be in accordance with EN 61000-4-11

Criterion Required: performance criteria C

Test Port : AC mains power port

Test Level:

Test level % UT	Voltage dip and short interruptions % UT	Duration (in period)	
		50Hz	60Hz
0	100	0.5 cycle	0.5 cycle
40	60	10 cycles	12 cycles
70	30	25 cycles	30 cycles

Notes:

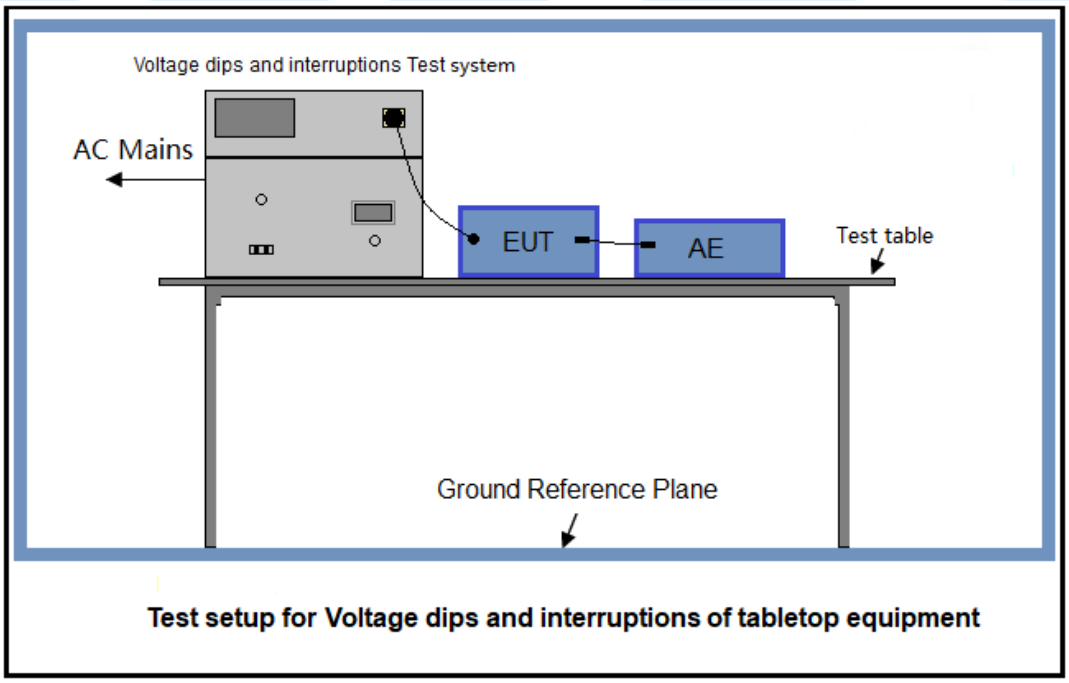
1."*" for 0.5 period, the test shall be made in positive and negative polarity, i.e. starting at 0° and 80°, respectively.

2. "**" means "x" is an open duration. This duration can be given in the product specification. Utilities in Europe have measured dips and short interruptions of duration between ½ a period and 3000 periods, but duration less than 50 periods are most common.

3. If the EUT is tested for voltage dips of 100%, it is generally unnecessary to test for other levels for the same durations. However, for some cases (safeguard systems or electro-mechanical devices) it is not true. The product specification or product committee shall give an indication of the applicability of this note.

4. The gray rows are selected test level.

Test Setup:



Test setup for Voltage dips and interruptions of tabletop equipment

Test Procedures:

1) The EUT was placed on a ground reference plane(GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2) The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.
3) The EUT was tested for each selected combination of test level and duration with a sequence of three dips /interruptions with intervals of 10 s minimum. Each representative mode of operation was tested.
4) For EUT with more than one power cord, each power cord was tested individually.

Equipment Used: Refer to section 3 for details.

Test Result: See below table.

Test Condition		Result (Pursuant to EN IEC 55014-2:2021 Criterion C)		
Test Level in %UT	Period			
0	0.5	☒ A	☐ B (see phenomena)	☐ C(see phenomena)
40	10 for 50 Hz 12 for 60 Hz	☒ A	☐ B (see phenomena)	☐ C(see phenomena)
70	25 for 50 Hz 30 for 60 Hz	☒ A	☐ B (see phenomena)	☐ C(see phenomena)

Remark:
N/A: Not applicable

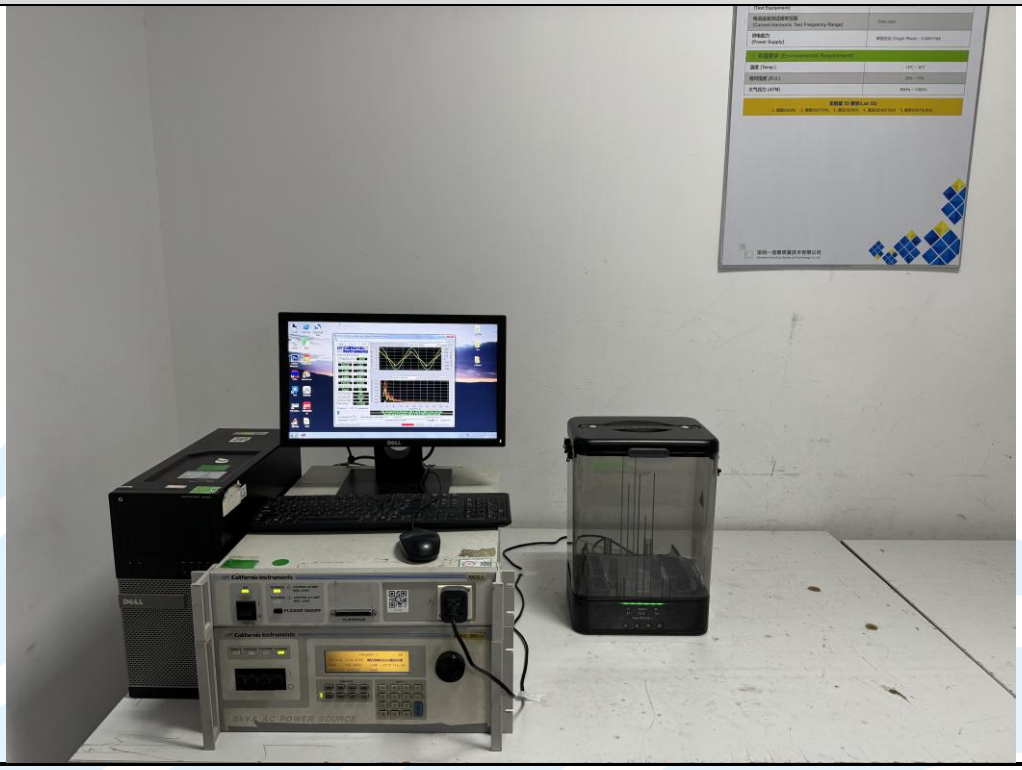
Observation:
☒ No observable change.
☐ During the experiment, the following phenomena occurred:

Conclusion: The EUT met the requirements of the standard.

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Radiated emission Test Setup (30MHz~1GHz)

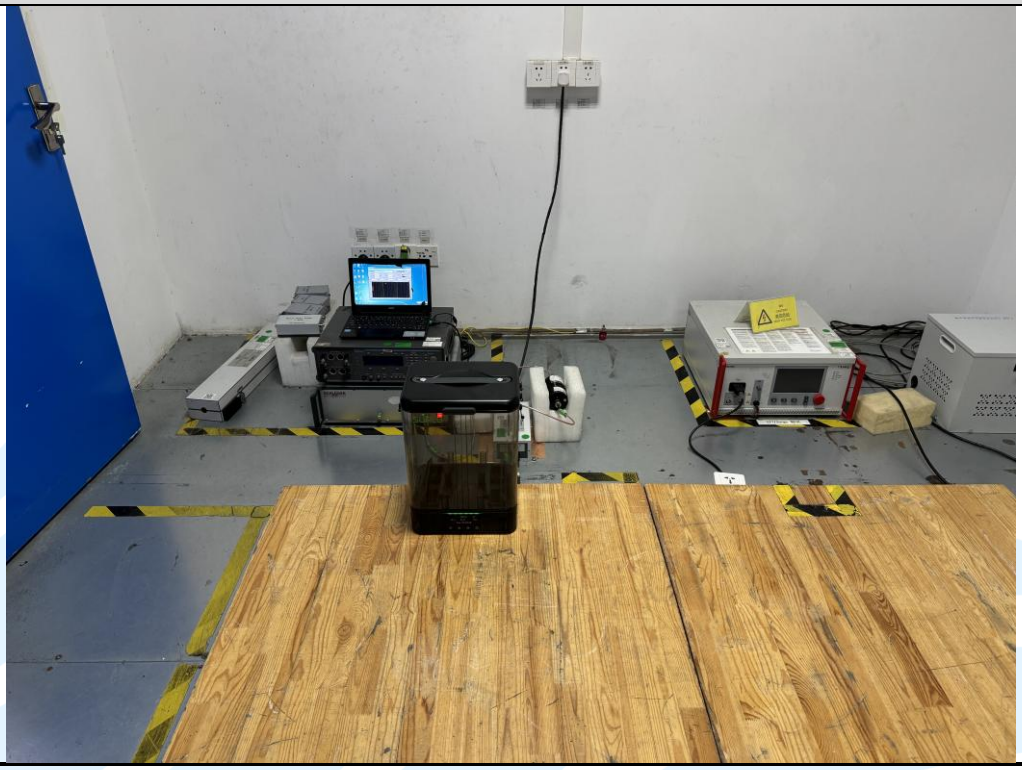
Conducted Emission (AC port) Test Setup

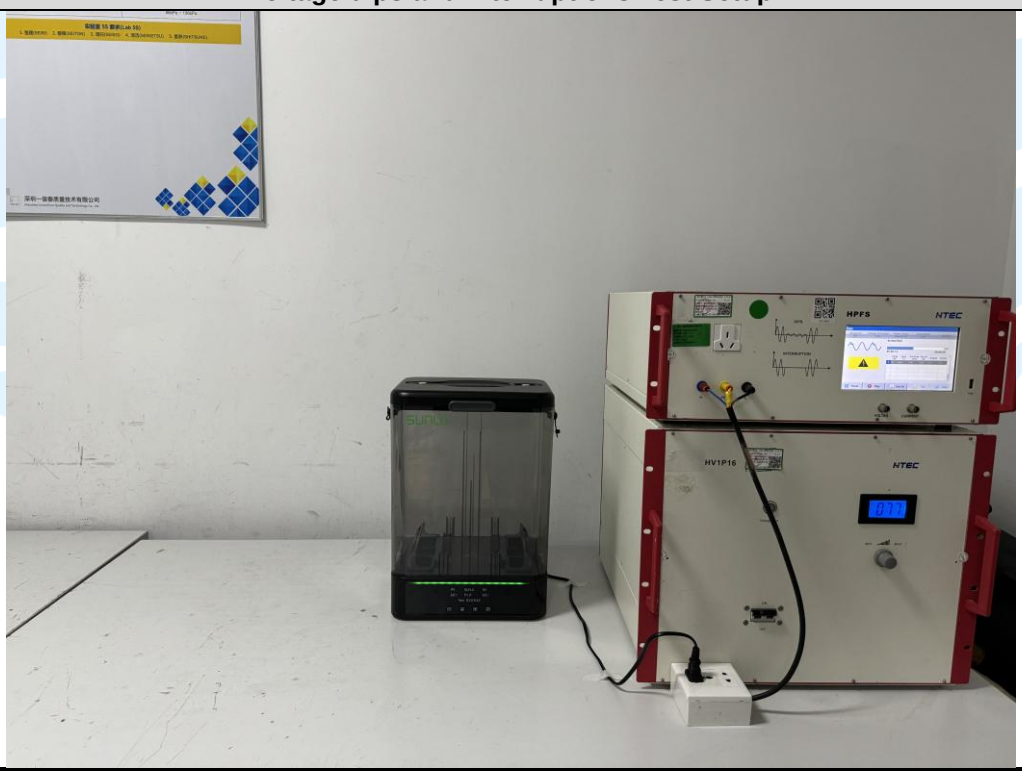
Harmonic Current Emissions &Flicker Test Setup


Electrostatic Discharge Test Setup


RF electromagnetic field Test Setup


Fast Transients, Common mode / Surge Test Setup

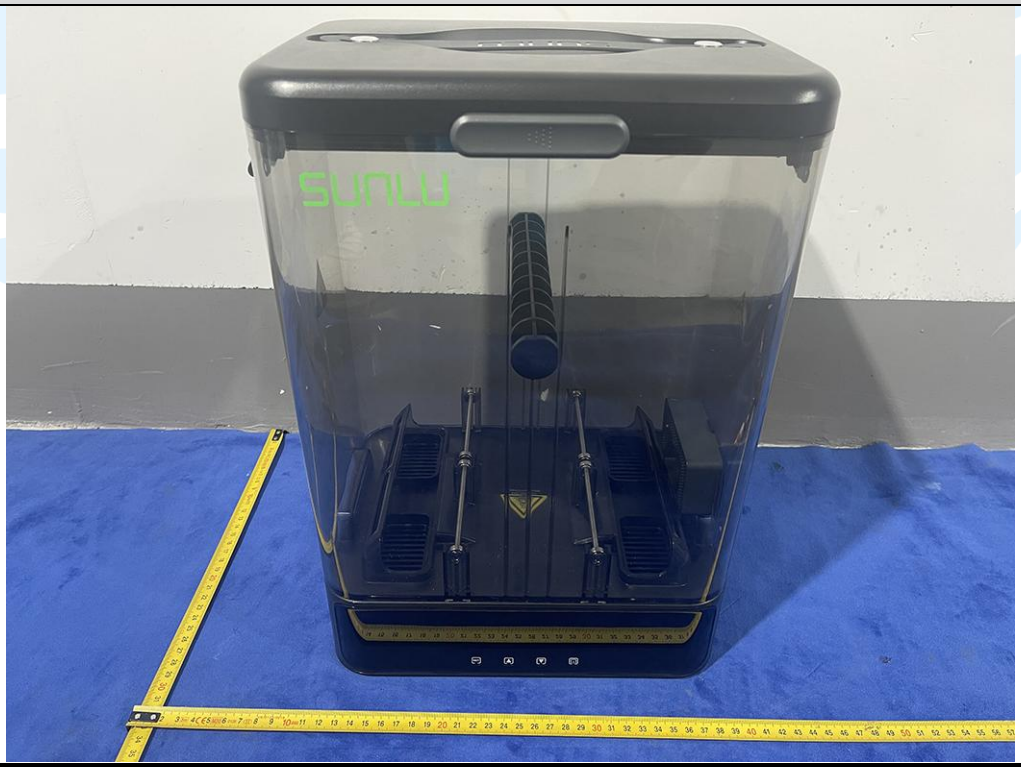

Radio frequency, common mode Test Setup


Voltage dips and interruptions Test Setup


APPENDIX 2 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

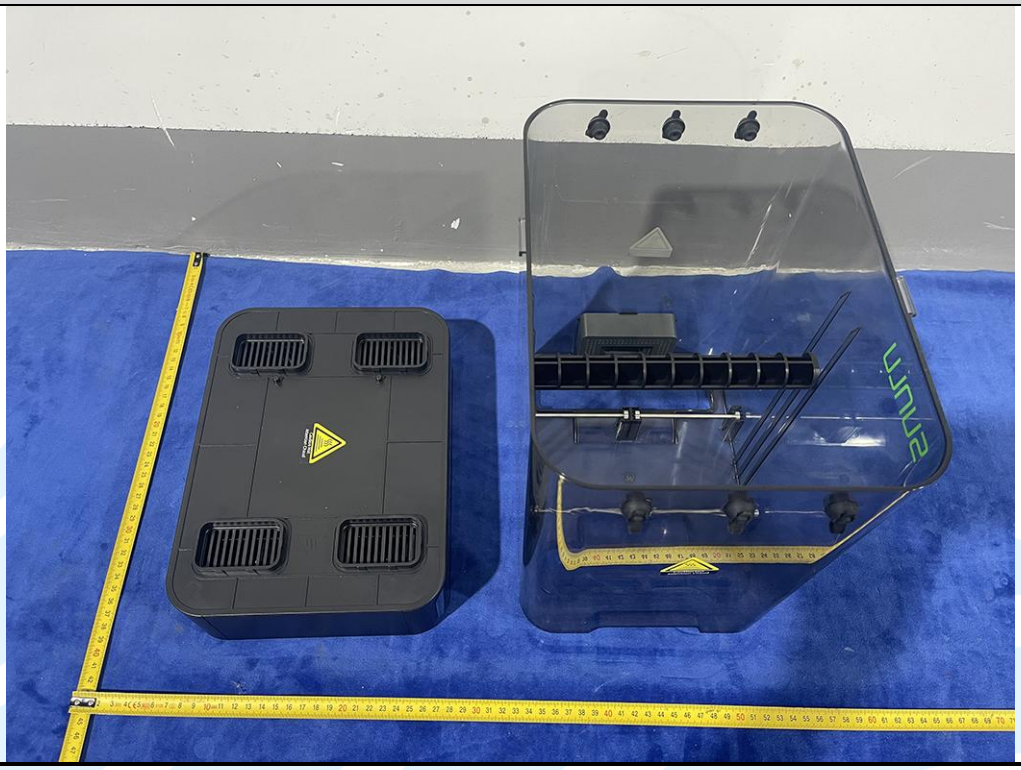
EUT EXTERNAL PHOTOS

EUT Photo


EUT Photo


EUT Photo


EUT Photo


EUT Photo


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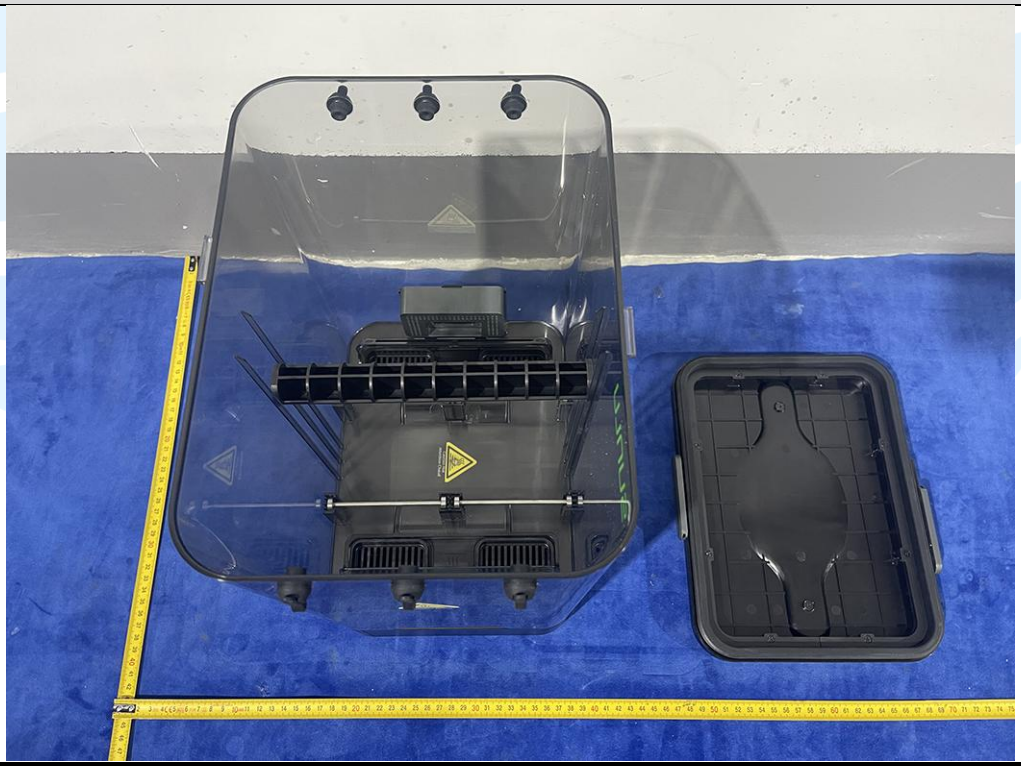
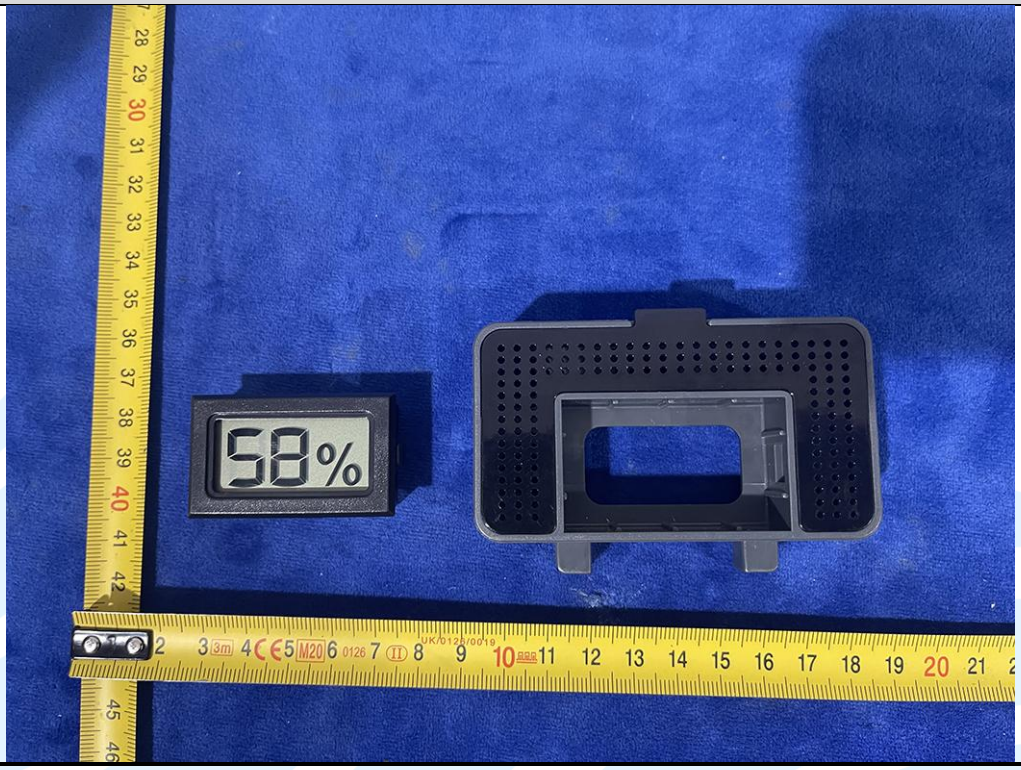
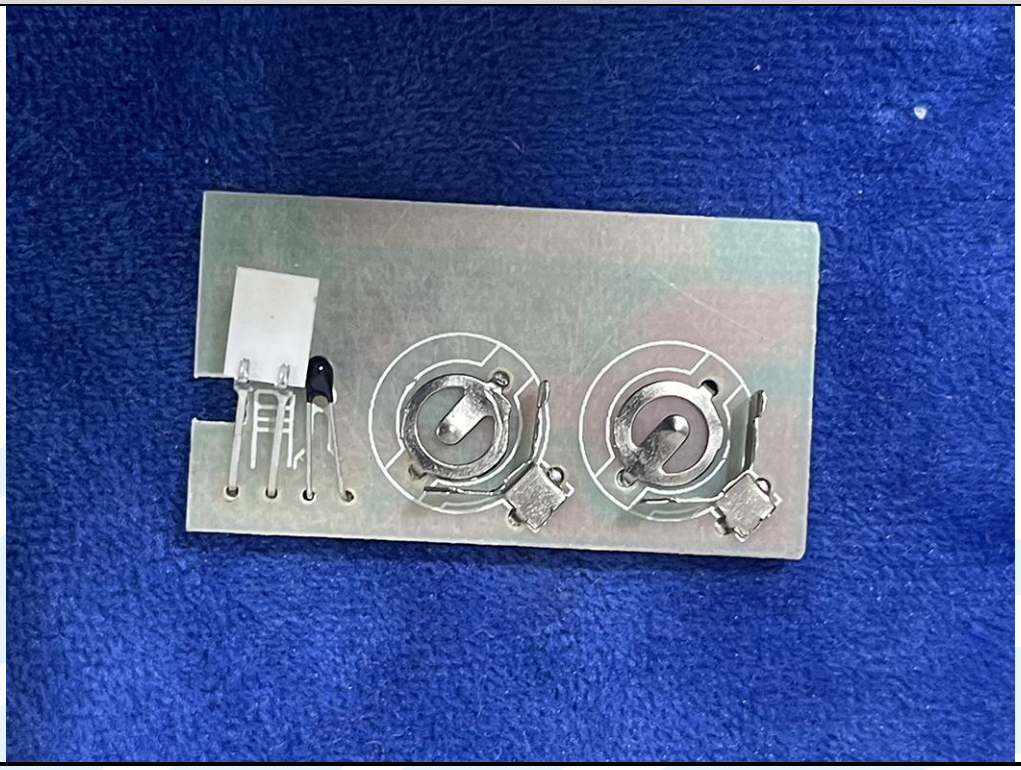


EUT INTERNAL PHOTOS

EUT Photo


EUT Photo


EUT Photo


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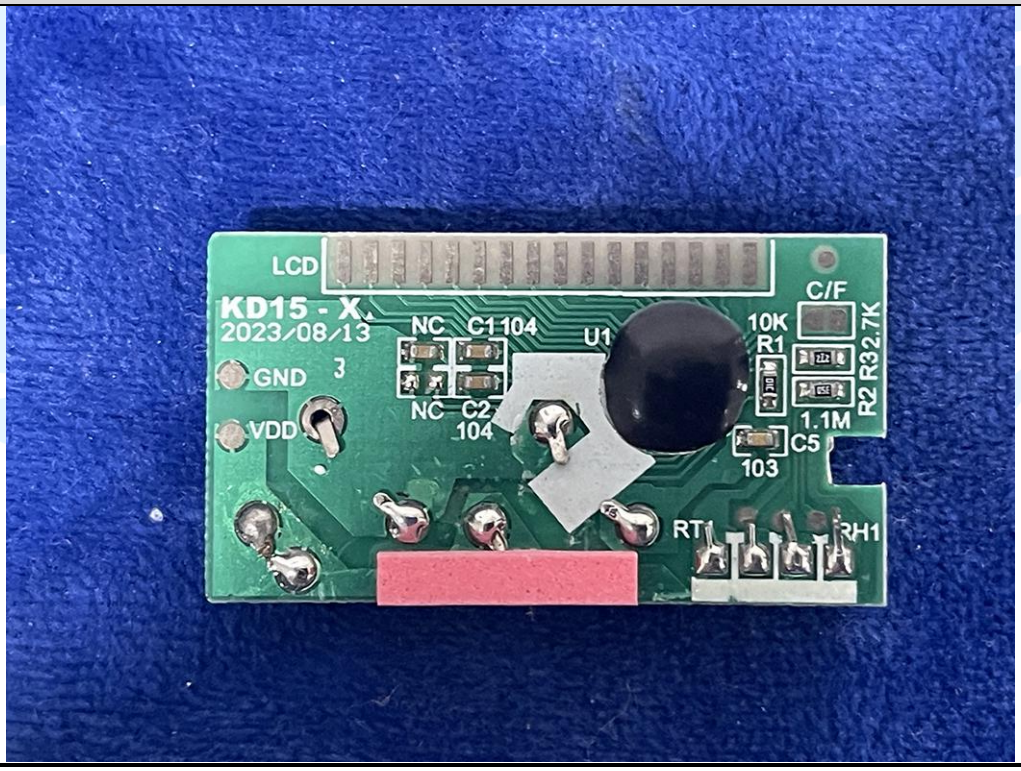

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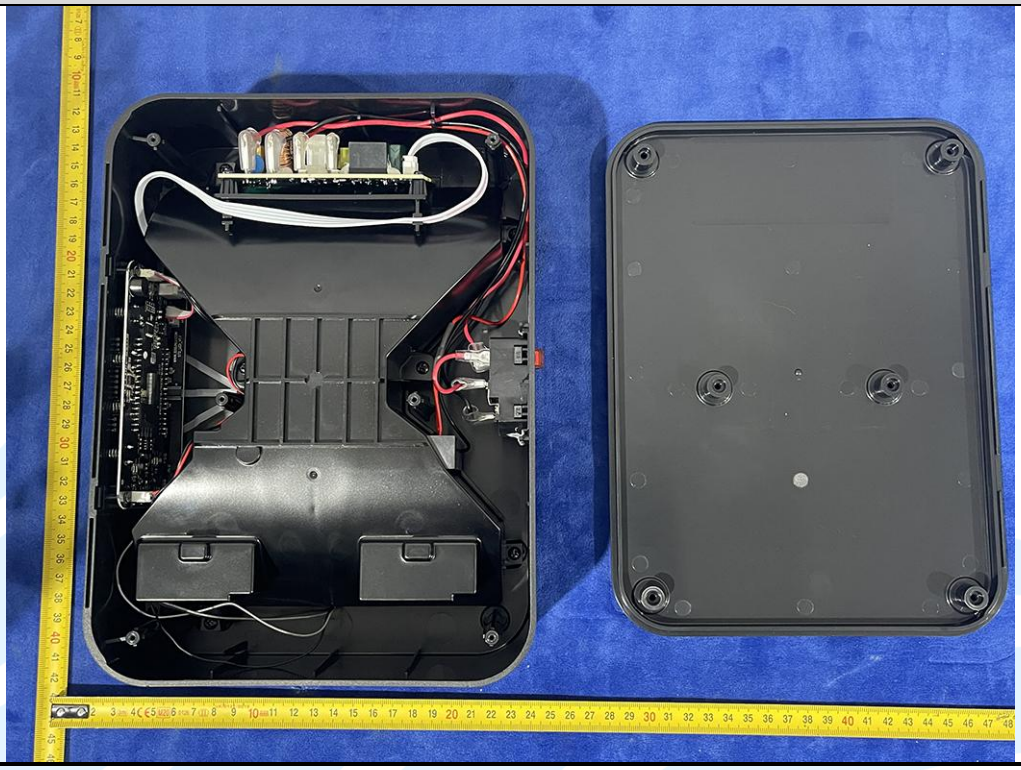

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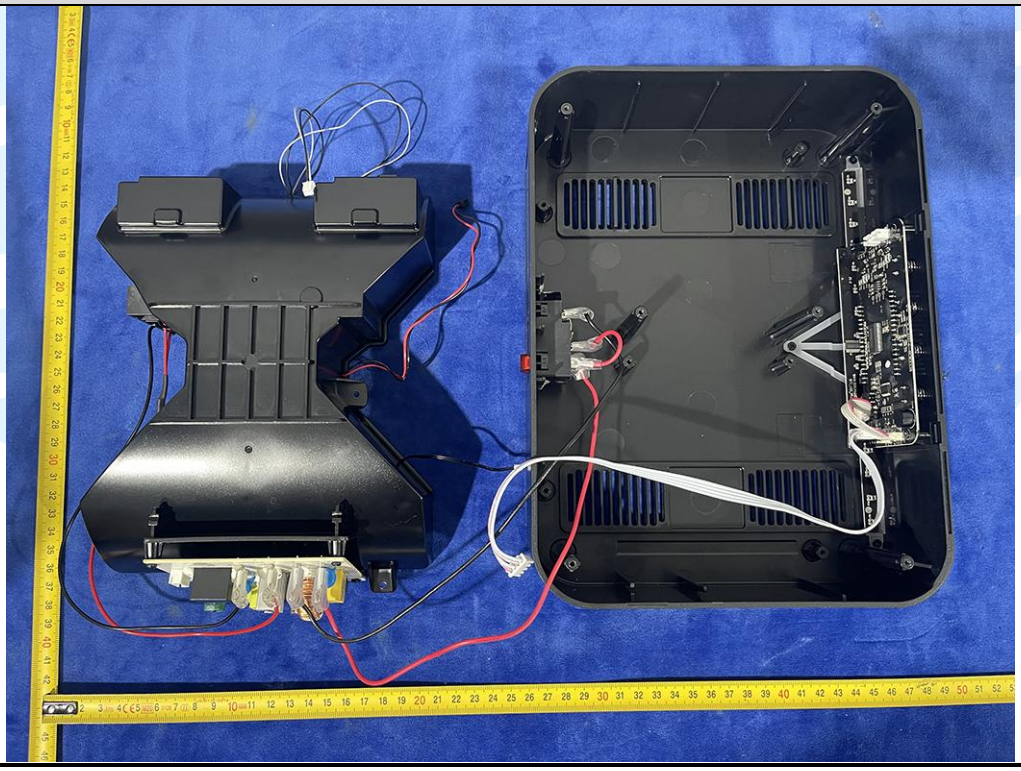

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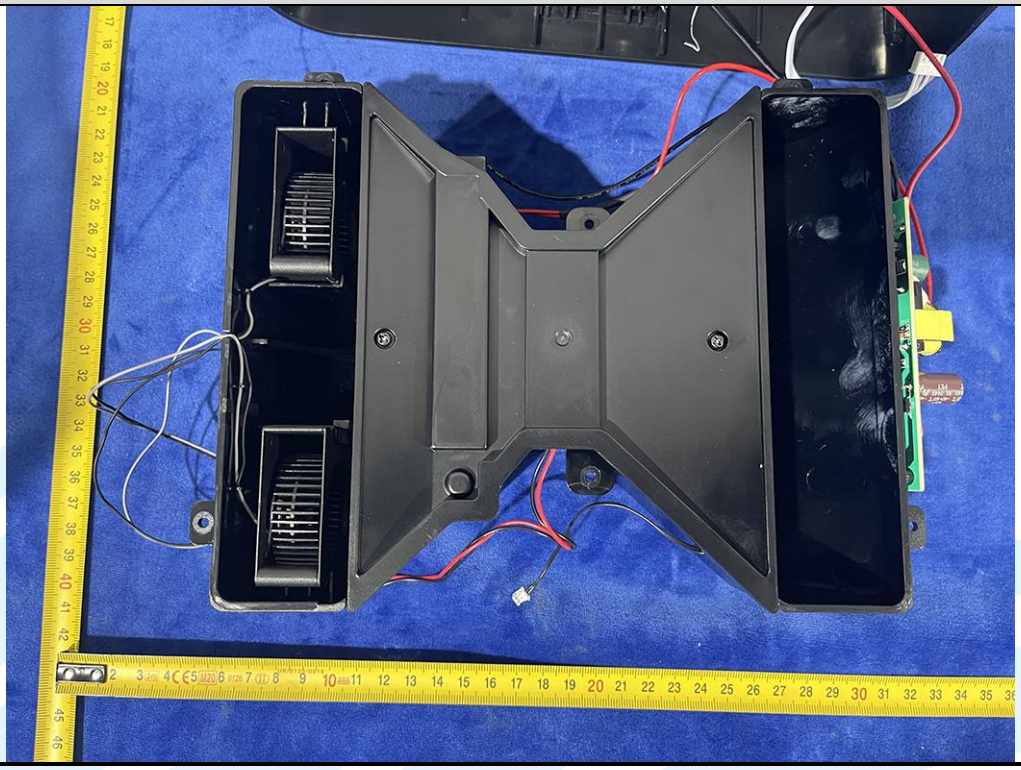
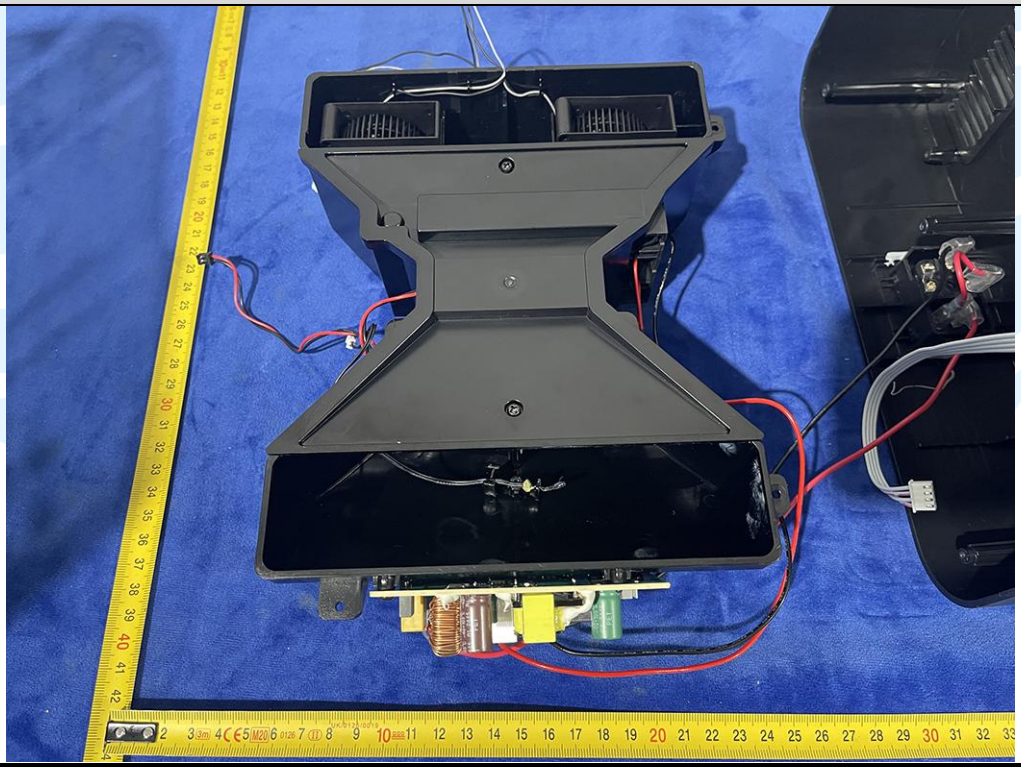


EUT Photo



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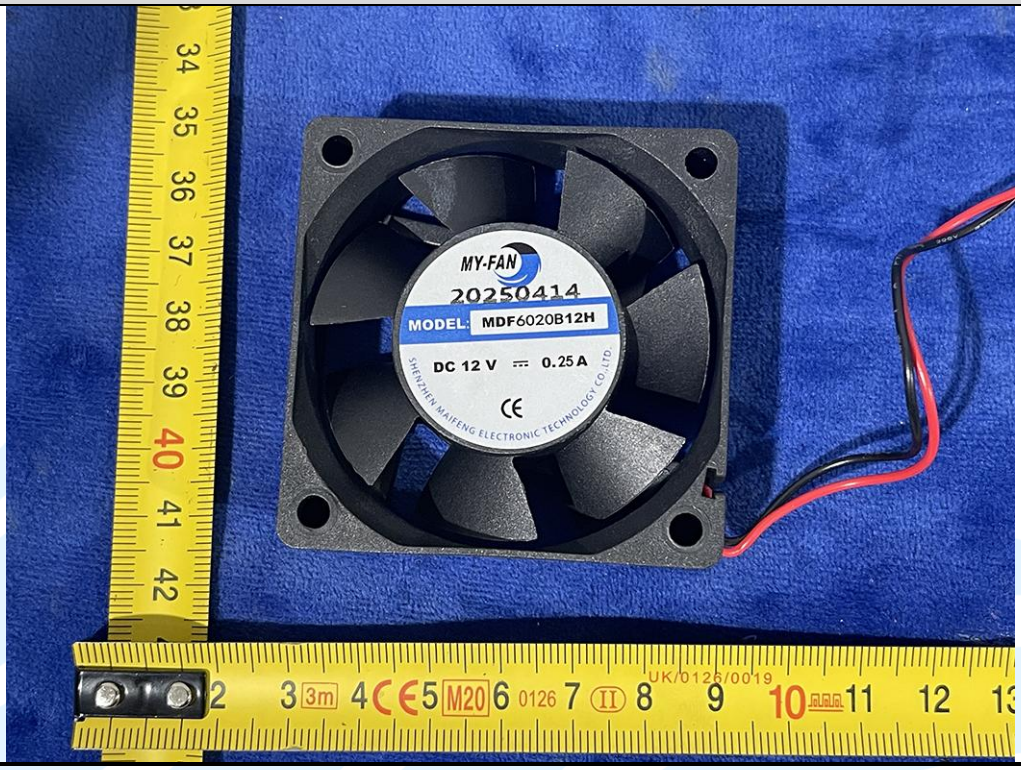

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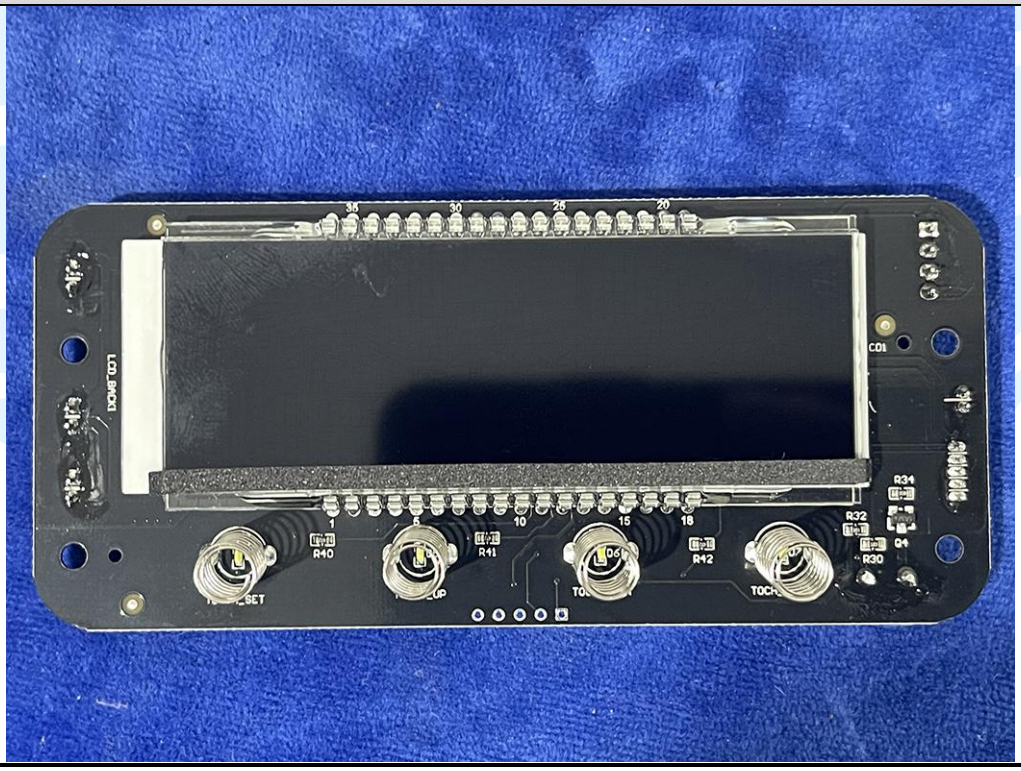

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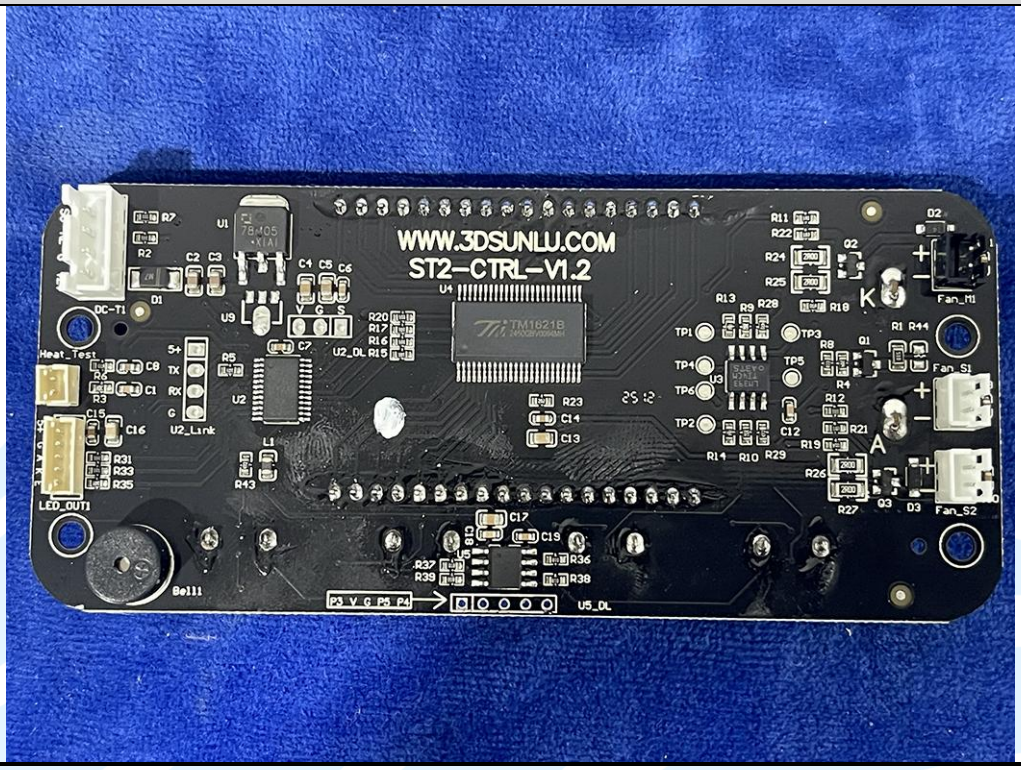

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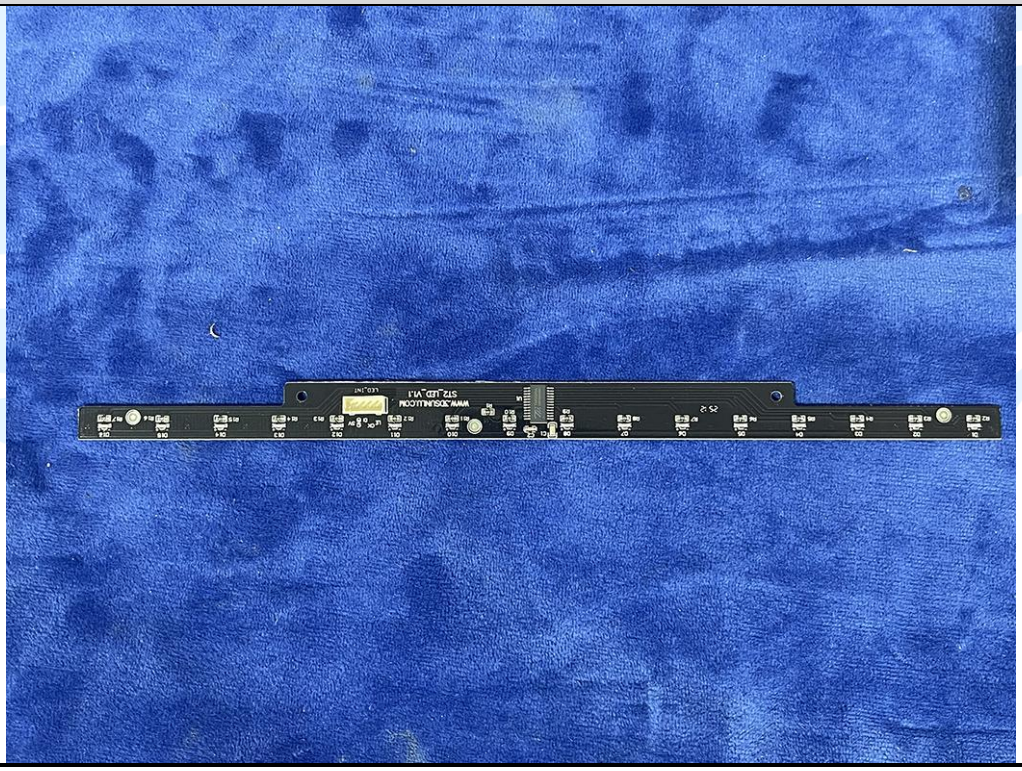

EUT Photo


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*** End of Report ***

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