DEKRA Testing and Certification (Shanghai) Ltd. Ningbo Branch
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This report will not be used for social proof function in China market.

Test report No: 6253239.50

TEST REPORT
Electromagnetic Compatibility (EMC)

Identification of item tested	Hot-air fryer
Trademark	N/A
Model and /or type reference	HC-5501E
Ratings	220-240 V~, 50/60 Hz, 1500 W, Class I
Test Laboratory / address	DEKRA Testing and Certification (Shanghai) Ltd. Ningbo Branch Room 5-1, No. 800 Chuangyuan Road, Yinzhou District, Ningbo City, Zhejiang Province, China
Applicant´s name / address	Ningbo Hengchuang Electric Appliance Co., Ltd No.258 Zhouxi Road,Zhouxiang Town, Cixi City,Zhejiang Province, China
Test method requested, standard	EN IEC 55014-1:2021 EN IEC 55014-2:2021 EN IEC 61000-3-2:2019+A1:2021+A2:2024 EN 61000-3-3:2013+A1:2019+A2:2021
Verdict Summary	IN COMPLIANCE
Tested by (name / position & signature)	Li Wang Test Engineer Li Wang
Approved by (name / position & signature)	Lucas Xu Project Engineer Lucas Xu
Date of issue	2026-02-09
Report template No.	TRF_EN IEC 55014-1_EN IEC 55014-2_EMC04 V1.0 for General

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

GENERAL CONDITIONS

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.
5. The information provided by the customer in this report may affect the validity of the results, the test lab is not responsible for it.
6. The test results presented in this report relate only to the object tested.
7. Samples undergoing test have been provided by: The applicant.

UNCERTAINTY

For all measurements where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in EN 55016-4-2 (CISPR 16-4-2), EN/IEC 61000-4 series or a product standard, the measurement instrumentation uncertainty has been calculated and applied in accordance with these standards. For all other measurements where no guidance is available, the measurement instrumentation uncertainty has been calculated and applied in accordance with ISO/IEC Guide 98-3 document.

Uncertainties have been calculated according to the DEKRA internal document MU-EMC. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. Refer to the Annex 1 for furter information.

The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to calculate the uncertainty associated with the measurement result, unless the specification, standard or customer have special requirements

CONFORMITY ASSESSMENT

For all EMI (emission) tests (when included in this report), as measurement uncertainties (U_{LAB}) are less than the values U_{CISPR} given in CISPR 16-4-2 (EN 55016-4-2) (Table-1), compliance with the limits is determined by comparing measurement results directly with corresponding limits without taking into consideration of measurement uncertainties.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%
Atmospheric pressure	86 kPa – 106 kPa

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

DEFINITION OF SYMBOLS USED IN THIS TEST REPORT

☒ Indicates that the listed condition, standard or equipment is applicable for this report/test/EUT.				
☐ Indicates that the listed condition, standard or equipment is not applicable for this report/test/EUT.				
Decimal separator used in this report	☒	Comma (,)	☐	Point (.)

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	:	Equipment Under Test
QP	:	Quasi-Peak
CAV	:	CISPR Average
AV	:	Average
CDN	:	Coupling Decoupling Network
SAC	:	Semi-Anechoic Chamber
OATS	:	Open Area Test Site
BW	:	Bandwidth
AM	:	Amplitude Modulation
PM	:	Pulse Modulation
HCP	:	Horizontal Coupling Plane
VCP	:	Vertical Coupling Plane
U_N	:	Nominal voltage

DATA PROVIDED BY THE APPLICANT

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested", "Applicant´s name / address", “Ratings” and "Derived model(s)").
2. Derived model not tested. These models have been declared by the applicant as being the same as the model under test.

DEKRA declines any responsibility with respect to the information provided by the applicant and that may affect the validity of results.

USAGE OF SAMPLES

Samples undergoing test have been selected by: Ningbo Liqi Electrical Appliance Co., Ltd.

Samples are composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
6253239-1	Air fryer	HC-5501E	N/A	2025-12-24
Supplemental information:				

DOCUMENT HISTORY

Report nr.	Date	Description
6243239.50	2026-02-09	First release.

REMARKS AND COMMENTS

The equipment under test (EUT) does meet the requirements of the stated standard(s)/test(s).
This report shall not be reproduced, except in full, without the written approval.
The test results relate only to the samples tested.
The tests described in this report do not result in the right to use any approval mark as conferred by DEKRA. As far as the tests were based on certain specifications, these are mentioned in the report.

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Description of the item .....:	Hot-air fryer
Model / Type number.....:	HC-5501E
Serial number .....:	N/A
Trademark.....:	N/A
Manufacturer.....:	Ningbo Hengchuang Electric Appliance Co., Ltd No.258 Zhouxi Road,Zhouxiang Town, Cixi City,Zhejiang Province, China
Factory .....:	Ningbo Hengchuang Electric Appliance Co., Ltd No.258 Zhouxi Road,Zhouxiang Town, Cixi City,Zhejiang Province, China

Rated power supply .....:	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☒	AC: 220 – 240 V, 50/60 Hz	☒	☐	☐	☒	☒
	☐	AC: 100 – 240 V, 50/60 Hz	☐	☐	☐	☐	☐
	☐	DC: 12 V, 24 V, 12 / 24 V					
	☐	Battery:					
Rated Power .....:	500 W						
Clock frequencies .....:	24 MHz						
Other parameters.....:	Class I						
Software version .....:	Not provided						
Hardware version.....:	Not provided						
Dimensions in cm (W x H x D)....:							
Mounting position.....:	☒	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☐	Other:					

Intended use of the Equipment Under Test (EUT)
The equipment provided for the test was a air fryer suitable for residential and indoor use. These products have e lectronic control units.

No	Module/parts of test item	Type	Manufacturer
	N/A		

No	Documents as provided by the applicant - Description	File name	Issue date
	N/A		

Modifications to the test item during testing .....:	☒	N/A	☐	Refer to the chapter 6.

Copy of marking plate:
N/A

1.2 Environment

The requirements and standards apply to equipment intended for use in:

☒	Residential (domestic) environment.
☐	Commercial and light-industrial environment.
☐	Industrial environment.

1.3 Test data

For other tests:

Test Location	DEKRA Testing and Certification (Shanghai) Ltd. Ningbo Branch
	Room 5-1, No. 800 Chuangyuan Road, Yinzhou District, Ningbo City, Zhejiang Province, China
Date (receive sample)	2025-12-24 (sample(s) provided by applicant)
Date (start test)	2025-12-24
Date (finish test)	2026-01-10

For Radio-frequency electromagnetic fields test:

Test Location	EMTEK (NINGBO) CO., LTD. No. 8, Building 8, Lane 216, Qingyi Road, Hi-Tech Zone, Ningbo, Zhejiang, China
Date (receive sample)	2026-01-11 (sample(s) provided by applicant)
Date (start test)	2026-01-11
Date (finish test)	2026-01-29

1.4 Classification according to EN IEC 55014-2

The standard EN IEC 55014-2 is subdivided in five categories. For each category, specific immunity requirements are formulated.

☐	**Category I:** equipment containing no electronic control circuitry. Examples: Appliances, tools and toys that contain no electronic control circuits and only electromechanical components such as switches, thermostats, brush motors, induction motors, heating elements, lighting toys containing only batteries and LED. Electric circuits consisting of passive components (such as radio interference suppression capacitors or inductors, mains transformers and mains frequency rectifiers) are not considered to be electronic control circuitry.
☐	**Category II:** mains operated equipment containing electronic control circuitry with no clock frequency higher than 15 MHz.
☐	**Category III:** battery operated equipment not included in Category I. Examples: Appliances, tools and toys powered by batteries and that include a microprocessor to provide a selection of functions. NOTE The assignment to Category III is independent of the clock frequency. This category also includes equipment provided with rechargeable batteries, which can be charged, directly or indirectly, from the mains. Accordingly, this equipment shall also be subjected to the test requirements for mains operated equipment but only when testing the charging function. If the equipment can operate its intended functions when connected, directly or indirectly to the mains, then it is not battery operated. Accordingly, it shall be classified as Category II, Category IV or Category V, as applicable, and subjected to the corresponding test requirements when in mains operation.
☒	**Category IV:** mains operated equipment containing electronic control circuitry with a highest clock frequency greater than 15 MHz but lower than or equal to 200 MHz.
☐	**Category V:** mains operated equipment containing electronic control circuitry with a highest clock frequency greater than 200 MHz.
Clock frequency: Fundamental frequency of any signal used in the device, excluding those which are solely used inside integrated circuits (IC).	

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Operating mode	Operating mode description	Used for testing	
		Emission	Immunity
1	The EUT is operating continuously.	☒	☒
		☐	☐
Supplemental information:			

2.2 Port(s) of the EUT

Port name and description	Connected to / Termination	Cable		
		Length used during test [m]	Attached during test	Shielded
AC input port	AC mains	1.0	☒	☐
			☐	☐
			☐	☐
			☐	☐
			☐	☐
Supplemental information:				

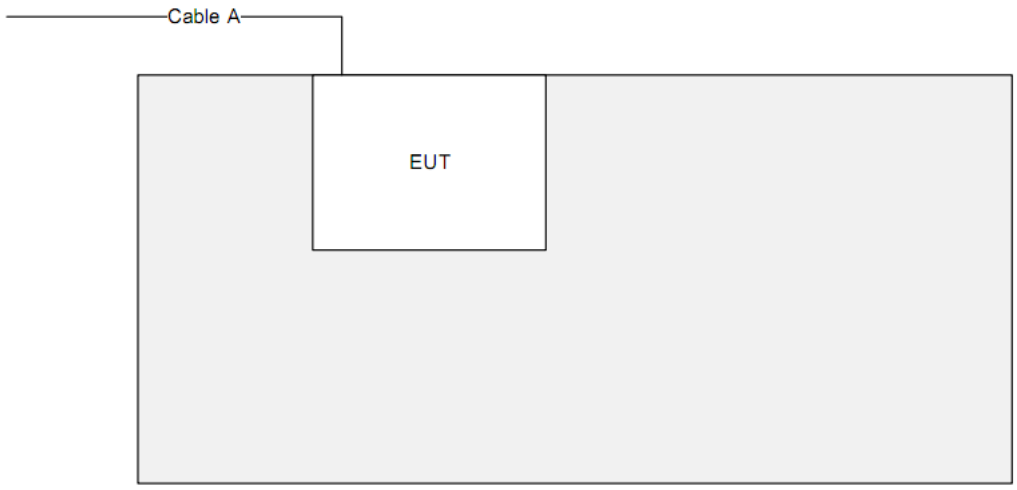
2.3 Support / Auxiliary equipment / unit / software for the EUT

The EUT has been tested with the following auxiliary equipment / unit / software:

Auxiliary equipment / unit / software	Type / Version	Manufacturer	Supplied by
N/A			
Supplemental information:			

2.4 Test Configuration / Block diagram used for tests

The following test setup / configuration / block diagram has been used during the tests:

Test Configuration / Block diagram		
		
Cable Type		Cable Description
A	*AC Mains Cable*	*Non-Shielded, 1.0 m*
B		
C		
D		
E		
Supplemental information:		

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
EN IEC 55014-1 EN 55014-1 +A11	2021 [1)] 2017 2020	Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission.
EN 55014-1 +A1 +A2	2006 2009 2011	
EN 55016-2-1 +A1	2014 2017	Methods of measurement of disturbances and immunity - Conducted disturbance measurements.
EN 55016-2-2	2011	Methods of measurement of disturbances and immunity – Measurement of disturbance power.
EN 55016-2-3 +A1	2017 2019	Methods of measurement of disturbances and immunity - Radiated disturbance measurements.
EN 55032 +A1 +A11	2015 2020 2020	Electromagnetic compatibility of multimedia equipment – Emission Requirements
EN IEC 61000-3-2 +A1 +A2	2019 [1)] 2021 [1)] 2024	Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
EN 61000-3-3 +A1 +A2	2013 2019 [1)] 2021 [1)]	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 IEC 55014-2 EN 55014-2	2021 [1)] 2015 [1)]	Requirements for household appliances, electric tools and similar apparatus – Part 2: Immunity – Product family standard.
EN 55014-2 +A1 +A2	1997 2001 2008	Requirements for household appliances, electric tools and similar apparatus – Part 2: Immunity – Product family standard.
EN 61000-4-2	2009	Electrostatic discharge immunity test.
EN 61000-4-3 +A1 +A2 EN IEC 61000-4-3	2006 2008 2010 2020	Radiated, radio-frequency, electromagnetic field immunity test.
EN 61000-4-4	2012	Electrical fast transient/burst immunity test.
EN 61000-4-5 +A1	2014 2017	Surge immunity test.
EN 61000-4-6 EN IEC 61000-4-6	2014 2023	Immunity to conducted disturbances, induced by radio-frequency fields.
EN 61000-4-11 +A1 EN IEC 61000-4-11	2004 2017 2020	Voltage dips, short interruptions and voltage variations immunity tests.

[1)] Not harmonized yet.

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards:
N/A.

3.3 Overview of results

EMISSION TESTS – EN 55014-1:2017+A11:2020/ EN IEC 55014-1:2021					
Requirement – Test case	**Basic standard(s)**	**Worst Case Margin of Limit**		**Verdict**	**Remark**
		(dB)	**Detector**		
Conducted disturbance at mains terminals (150 kHz – 30 MHz)	EN 55016-2-1:2014+A1:2017	17.43	QP	PASS	See 2,7)
		26.81	AV		
Conducted disturbance at wired network ports (150 kHz – 30 MHz)	EN 55032:2017+A1:2020+A11:2020 EN 55016-2-1:2014+A1:2017	---	QP	N/A	See 1)
		---	AV		
Conducted disturbance at auxiliary terminals (150 kHz – 30 MHz)	EN 55016-2-1:2014+A1:2017	---	QP	N/A	See 2,7)
		---	AV		
Disturbance power (30 MHz – 300 MHz)	EN 55016-2-2:2011	15.62	QP	PASS	---
		23.00	AV		
Radiated disturbance (30 MHz – 1000 MHz)	EN 55016-2-3:2017+A1:2019	---	QP	N/A	See 3)
Radiated disturbance (1 GHz – 6 GHz)	EN 55016-2-3:2017+A1:2019	---	PEAK	N/A	See 6)
		---	AV		
Discontinuous disturbance (clicks) on AC power leads	EN 55014-1:2017+A11:2020 EN IEC 55014-1:2021	N/A	N/A	PASS	---

Supplementary information:

1) The test is not applicable as the EUT does not have wired network ports.
2) The test is not applicable as the EUT is DC/battery powered apparatus.
3) According to clause 4.3.4.2 procedure (a) of the CISRP 14-1:2020 and EN IEC 55014-1:2021 standard the EUT is deemed to comply in the frequency range from 300 MHz to 1000 MHz without further measurements.
4) The Disturbance power test is not applicable, According to clause 4.3.4.2 procedure (b) of the CISRP 14-1:2020 and EN IEC 55014-1:2021 standard ,The limits for radiated disturbances in Table 9 for the selected test method is met..
5) Exemptions from click measurements applicable (clause 5.4.3).
6) The highest internal frequency of the EUT is less than 108 MHz.
7) The worst-case of the quick scanned results of 198 - 264 Vac is 230 Vac. Therefore, voltage 230 Vac was selected for the conducted disturbance, disturbance power and radiated disturbance tests.

EMISSION TESTS – EN IEC 61000-3-2:2019/ EN IEC 61000-3-2:2019+A1:2021/ EN IEC 61000-3-2:2019+A1:2021+A2:2024/ EN 61000-3-3:2013+A1:2019+A2:2021			
Requirement – Test case	**Basic standard(s)**	**Verdict**	**Remark**
Harmonic current emissions	EN IEC 61000-3-2:2019 EN IEC 61000-3-2:2019+A1:2021 EN IEC 61000-3-2:2019+A1:2021+A2:2024	PASS	---
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3:2013+A1:2019+A2:2021	PASS	---
Supplementary information: 1) The EUT is regarded as an "Equipment with rated power of ≤ 75 W". According to "Clause 7, Figure 1 - Flowchart for determining conformity" the EUT is deemed to comply with the requirements of the EN 61000-3-2 standard. 2) The EUT is regarded as a professional equipment with a total rated power greater than 1 KW. The test is not applicable.			

IMMUNITY TESTS – EN 55014-2:2015/ EN IEC 55014-2:2021			
Requirement – Test case	**Basic standard(s)**	**Verdict**	**Remark**
Electrostatic discharge	EN 61000-4-2:2009	PASS	---
Radio-frequency electromagnetic fields	EN 61000-4-3:2006+A1:2008 +A2:2010 EN IEC 61000-4-3:2020[2]	PASS	---
Fast transients	EN 61000-4-4:2012	PASS	---
Surges	EN 61000-4-5:2014+A1:2017	PASS	---
Injected currents (radio-frequency common mode)	EN 61000-4-6:2014+AC:2015	PASS	---
Voltage dips and short interruptions	EN 61000-4-11:2004+A1:2017 EN IEC 61000-4-11:2020[2)]	PASS	---
Supplementary information: 1) The equipment is classified as category II equipment according to EN IEC 55014-2, no radio-frequency electromagnetic fields immunity test is applicable. 2) The new version of the standard is used for testing, and the old version of the standard is also included in the scope of the new standard after evaluation, so the two versions of the standard are listed here.			

4 EMISSION TEST RESULTS

4.1	Conducted disturbance voltage – Mains Ports	VERDICT:	PASS

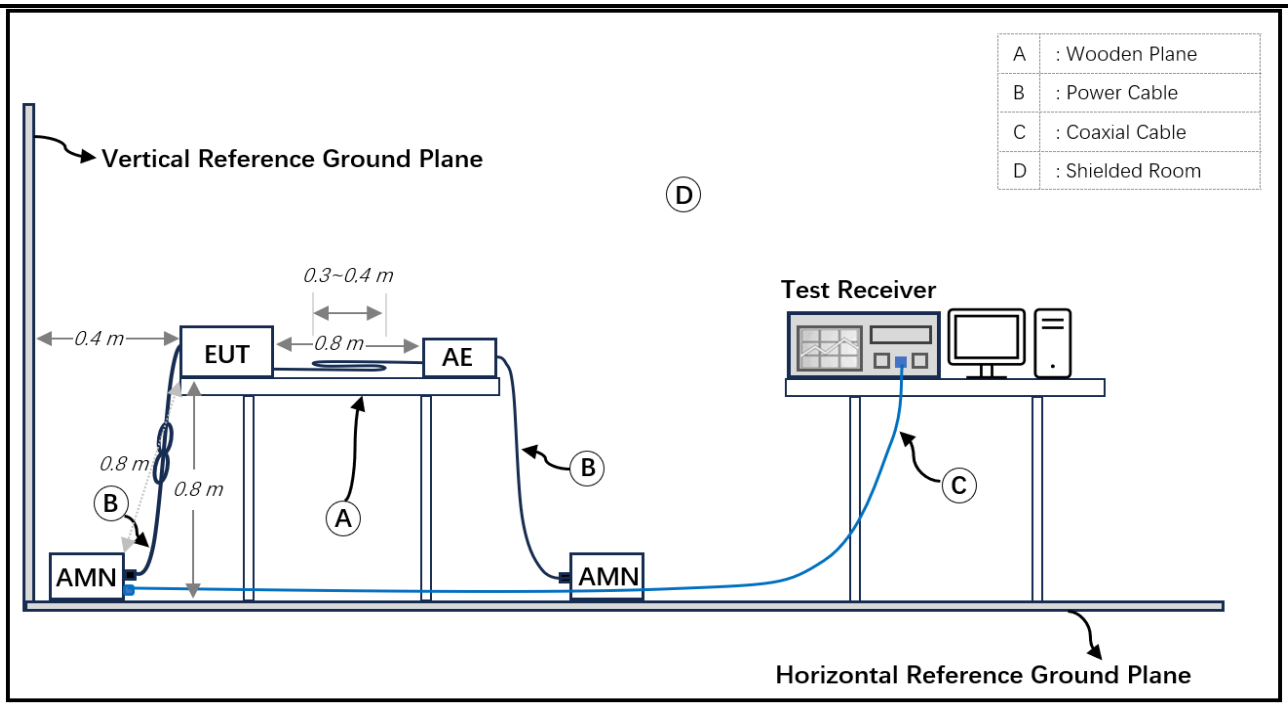
Standard	EN 55014-1, EN IEC 55014-1
Basic standard	EN 55016-2-1

Limits

Frequency range [MHz]	Limit: QP [dB(µV)[1)]]	Limit: AV [dB(µV) [1)]]	IF BW	Detector(s)
0,15 - 0,50	66 – 56 [2)]	59 - 46 [2)]	9 KHz	QP, CAV
0,50 - 5,0	56	46	9 KHz	QP, CAV
5,0 - 30	60	50	9 KHz	QP, CAV

[1)] At the transition frequency, the lower limit applies.
[2)] The limit decreases linearly with the logarithm of the frequency.

Test Configuration



Supplementary information:

Performed measurements

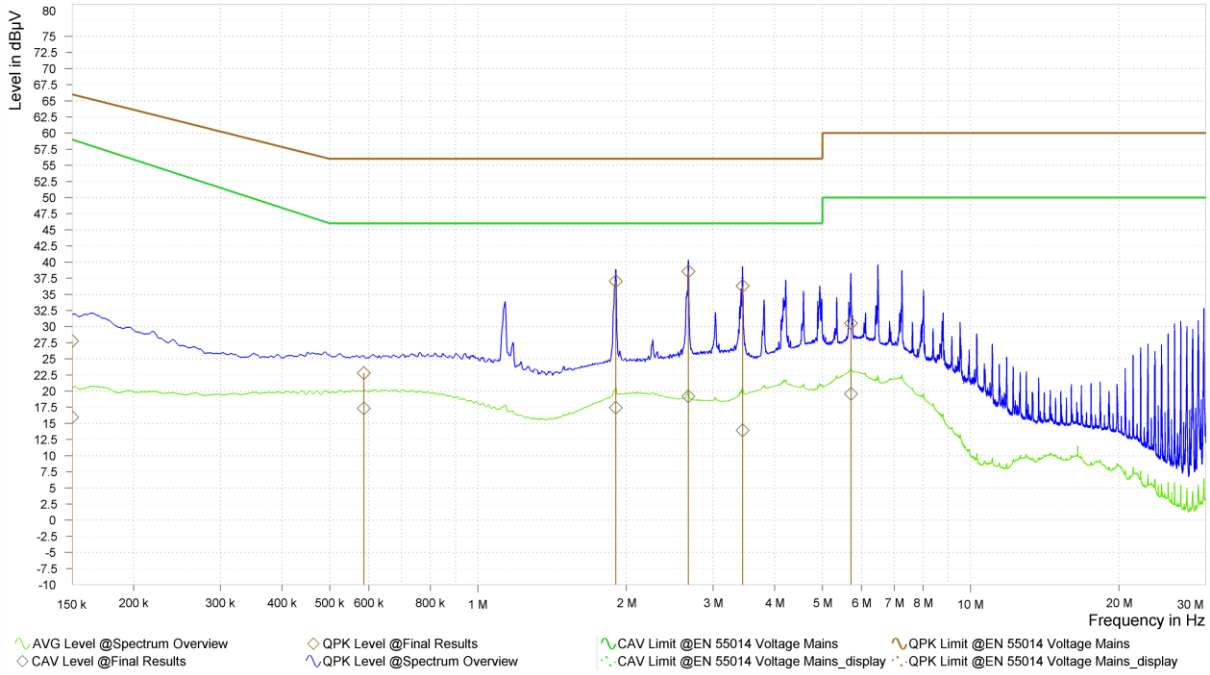
Scan range (0,9 - 1,1 U_N)	☐	198 – 264 V_{AC}	☐	207 – 253 V_{AC}			☒	230 V_{AC}	
Tested terminal(s) / port	☒	AC mains input power	☒	N	☒	L1	☐	L2	☐ L3
	☐	DC mains input power	☐	Positive (+)			☐	Negative (-)	
Voltage – Mains [V]	230 Vac								
Frequency – Mains [Hz]	50 Hz								
Test method applied	☒	Artificial mains network							
	☐	Voltage probe							
Test setup	☒	Table top	☐	Artificial hand applied					
	☐	Floor standing	☐	Other:					
	Refer to the Annex 3 for test setup photo(s).								
Operating mode(s) used	Mode 1								
Remark	---								

See next page

Measurement data	Port under test	AC mains power input	☒	**Line**	☐	**Neutral**
Operating mode / voltage / frequency used during the test			Mode 1 / 230 Vac / 50 Hz			

Frequency	Detector	Scan mode	IF BW	VBW	Test time	Pre-Amplifier
0.15 MHz-30 MHz	QP & CAV	Time domain	9 kHz	30 kHz	1000 ms	OFF

Result for sample no.: 6253239-1



EMI Final Results

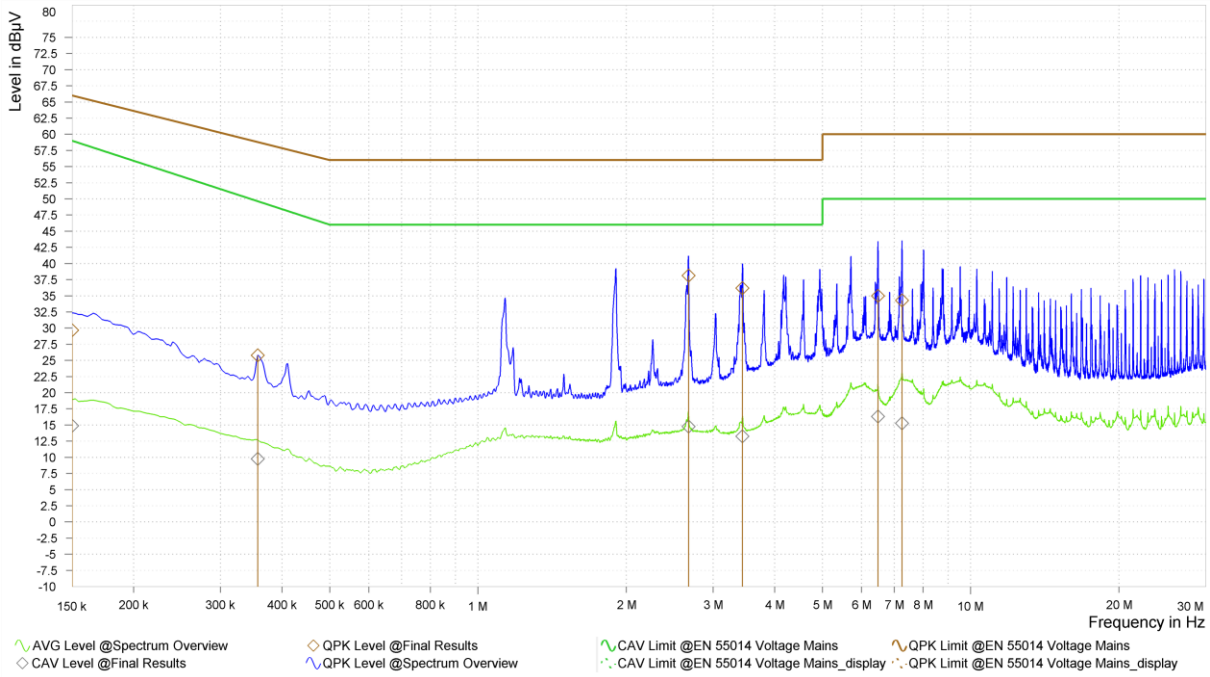
Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.150	27.76	66.00	38.24	15.96	59.00	43.04	9.72	L1
0.587	22.81	56.00	33.19	17.32	46.00	28.68	9.65	L1
1.903	37.03	56.00	18.97	17.42	46.00	28.58	9.65	L1
2.672	38.57	56.00	17.43	19.19	46.00	26.81	9.68	L1
3.444	36.28	56.00	19.72	13.92	46.00	32.08	9.70	L1
5.712	30.54	60.00	29.46	19.59	50.00	30.41	9.75	L1

Remark	QP limit — QP — AV limit — AV
	1. QPK Level [dBµV]=Reading QPK Level [dBµV] + Correction [dB] 2. CAV Level [dBµV]=Reading CAV Level [dBµV] + Correction [dB] 3. Correction [dB]= AMN VDF [dB] + Cable Loss [dB]

Measurement data	Port under test	AC mains power input	☐	**Line**	☒	**Neutral**
Operating mode / voltage / frequency used during the test			Mode 1 / 230 Vac / 50 Hz			

Frequency	Detector	Scan mode	IF BW	VBW	Test time	Pre-Amplifier
0.15 MHz-30 MHz	QP & CAV	Time domain	9 kHz	30 kHz	1000 ms	OFF

Result for sample no.: 6253239-1



EMI Final Results

Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.150	29.65	66.00	36.35	14.86	59.00	44.14	9.77	N
0.357	25.79	58.80	33.00	9.75	49.64	39.89	9.72	N
2.675	38.11	56.00	17.89	14.77	46.00	31.23	9.72	N
3.442	36.17	56.00	19.83	13.26	46.00	32.74	9.74	N
6.484	34.96	60.00	25.04	16.32	50.00	33.68	9.83	N
7.253	34.27	60.00	25.73	15.26	50.00	34.74	9.85	N

Remark	QP limit — QP — AV limit — AV
	1. QPK Level [dBµV]=Reading QPK Level [dBµV] + Correction [dB] 2. CAV Level [dBµV]=Reading CAV Level [dBµV] + Correction [dB] 3. Correction [dB]= AMN VDF [dB] + Cable Loss [dB]

4.2	**Disturbance power (30 MHz – 300 MHz)**	**VERDICT: PASS**

Standard	EN IEC 55014-1
Basic standard	EN 55016-2-2

Limits

Frequency range [MHz]	Limit: QP [dB(pW)]	Limit: AV [dB(pW)]	IF BW	Detector(s)
30 - 300	45 – 55 [1)]	35 – 45 [1)]	120 KHz	QP, CAV
Margin				
200 - 300	0 – 10 [1)]	---	120 KHz	QP, CAV
[1)] The limit increases linearly with the frequency.				

Performed measurements

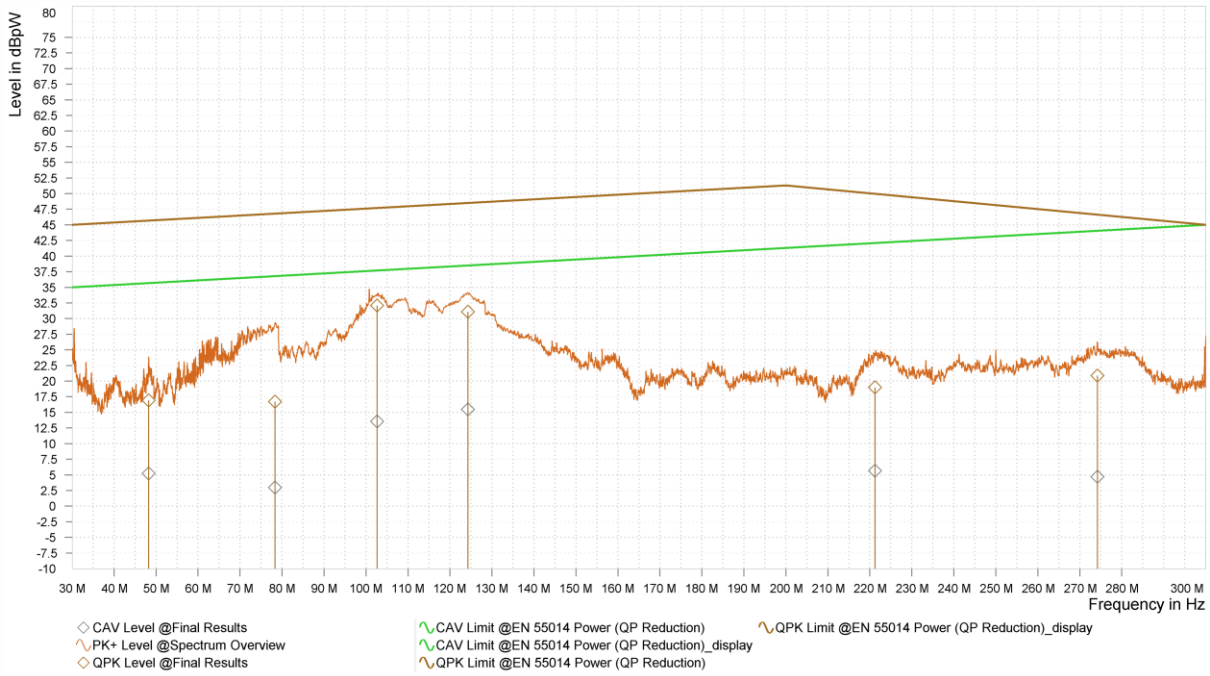
Port(s) under test					
☒	AC input power	☐	Load	☐	Control
☐	Other: DC output power	☐	Other:	☐	Other:

Voltage – Mains [V]	230 Vac			
Frequency – Mains [Hz]	50 Hz			
Test setup	☒	Table top	☐	Floor standing
	☐	Other:		
	Refer to the Annex 3 for test setup photo(s).			
Conditions for exemption from measurements above 300 MHz	☒	“Limits” reduced by “Over Limit” applied and passed		
	☒	Maximum clock frequency < 30 MHz		
Operating mode(s) used	Mode 1			
Remark	---			

See next page.

Measurement data				Port under test	AC input port/Load	
Operating mode / voltage / frequency used during the test				Mode 1 / 230 Vac / 50 Hz		
Frequency	Detector	Scan mode	IF BW	VBW	Test time	Pre-Amplifier
30 MHz-300 MHz	QP & CAV	Time domain	120 kHz	1000 kHz	1000 ms	OFF

Result for sample no.: 6253239-1



EMI Final Results

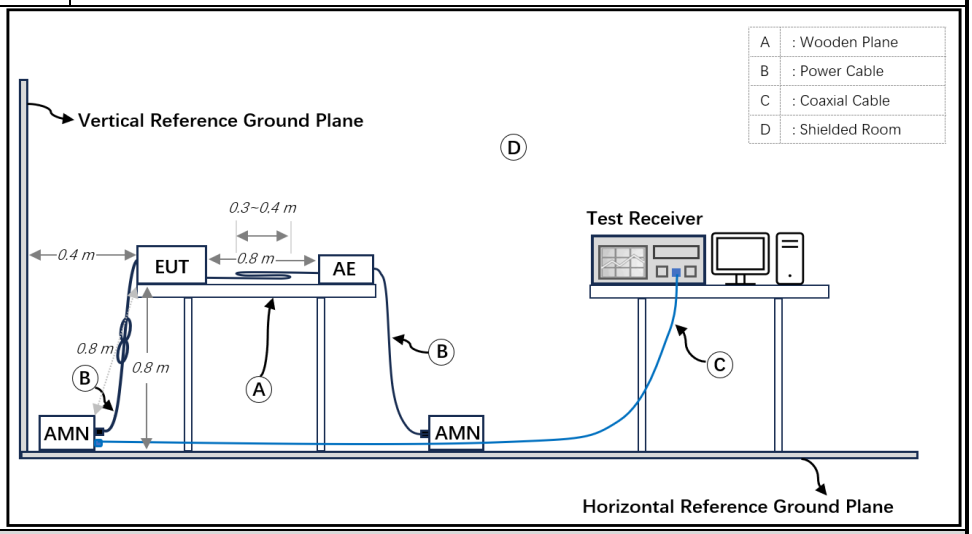
Frequency [MHz]	QPK Level [dBpW]	QPK Limit [dBpW]	QPK Margin [dB]	CAV Level [dBpW]	CAV Limit [dBpW]	CAV Margin [dB]	Correction [dB]
48.240	16.92	45.68	28.76	5.20	35.68	30.47	4.53
78.330	16.72	46.79	30.07	2.98	36.79	33.81	4.95
102.660	32.08	47.69	15.62	13.55	37.69	24.14	3.56
124.260	31.10	48.49	17.39	15.49	38.49	23.00	3.92
221.240	19.01	49.96	30.95	5.66	42.09	36.43	3.95
274.200	20.87	46.63	25.76	4.71	44.05	39.34	3.82

Remark	QP limit QP AV limit AV
	1. QPK Level [dBµV]=Reading QPK Level [dBµV] + Correction [dB] 2. CAV Level [dBµV]=Reading CAV Level [dBµV] + Correction [dB] 3. Correction [dB]= AMN VDF [dB] + Cable Loss [dB]

4.3	**Discontinuous disturbance (clicks) on AC power leads**	**VERDICT: PASS**

Standard	EN 55014-1, EN IEC 55014-1		
Frequency [MHz]	Limit: QP [dB(μV)]	IF BW	Detector
0,15	66	9 KHz	Quasi-Peak (QP)
0,50	56	9 KHz	Quasi-Peak (QP)
1,40	56	9 KHz	Quasi-Peak (QP)
30,0	60	9 KHz	Quasi-Peak (QP)

Performed measurements

Scan range (0,9 - 1,1 U_N)	☐	198 – 264 V_{AC}	☐	207 – 253 V_{AC}	☒	230 V_{AC}
Voltage – Mains [V]	230 Vac					
Frequency – Mains [Hz]	50 Hz					
Test method applied	☒	Artificial mains network				
	☐	Voltage probe				
Test setup	☒	Table top	☐	Floor standing		
	☐	Other:				
						
Operating mode(s) used	Mode 1					
Remark	---					

See next page.

Reason for not performing the test	☒	The amplitudes of the observed disturbances were all below the limit for continuous disturbance, these are not considered to be clicks.

Measurement results	☒	Neutral	☒	Line 1	☐	Line 2	☐	Line 3

Frequency (MHz)	First Measurement: Determination of the limit L_q – Quasi-peak							
	Limit L (dBµV)	Number of short clicks	Number of long clicks	Number of clicks – N_1	Time of meas. (min.)	Click rate N	Increased limit (dB)	Increased Limit L_q
0,15	66	0	0	0	120	0	44	110
0,5	56	0	0	0	120	0	44	100
1,4	56	0	0	0	120	0	44	100
30	60	0	0	0	120	0	44	104
☒	The calculated click rate N is not more than 5 times per minute and all the clicks are classified as short (t ≤ 10 ms). Thus, the EUT is deemed to comply with the limits without any further measurement at an increased limit.							

Frequency (MHz)	Second measurement with Limit = L_q (Upper quartile method):			
	Limit Lq (dBµV)	Number of clicks – N_2	Number of authorized clicks N2 ≤N1/4	Verdict
0,15				
0,5				
1,4				
30				

Supplementary information: ---

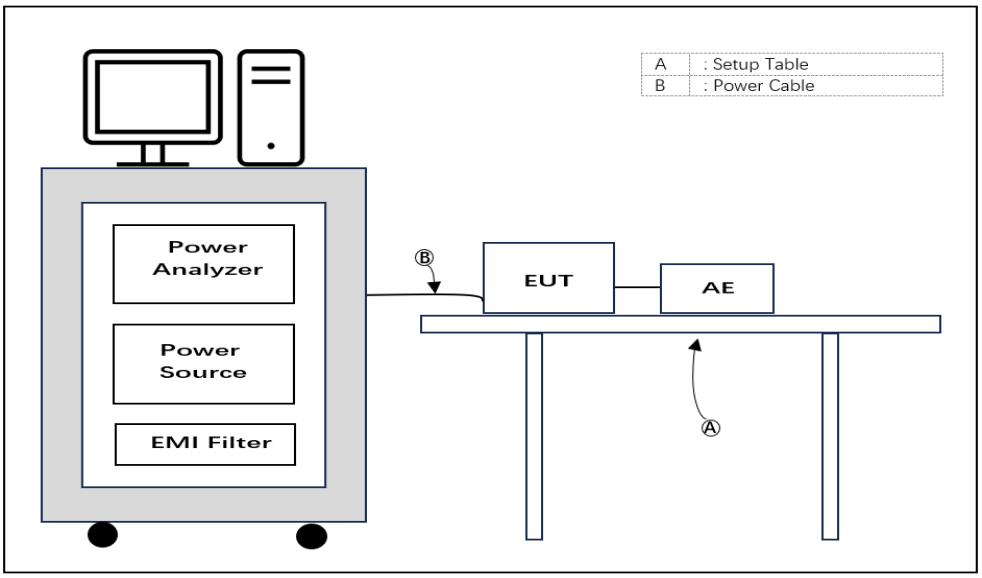
4.4	**Harmonic current emissions**	**VERDICT: PASS**

Standard	EN 61000-3-2 EN IEC 61000-3-2	
Exlusions (For these categories of equipment, limits are not specified in the EN IEC 61000-3-2 standard)	☐	Arc welding equipment intended for professional use.
	☐	Lighting equipment with a rated power < 5W.
	☐	Equipment with rated power of ≤ 75 W (other than lighting equipment).
	☐	Professional equipment with total rated power > 1 kW.
	☐	Symmetrically controlled heating elements with a rated power ≥ 200 W.
	☐	Independent phase control dimmers with a rated power less than or equal to 1 kW when operating incandescent lamps
	☐	Independent phase control dimmers with a rated power less than or equal to 200 W for trailing edge dimmers and universal phase control dimmers with the default mode set to trailing edge, when operating lighting equipment other than incandescent lamps
	☐	Independent phase control dimmers with a rated power less than or equal to 100 W for leading edge dimmers, and universal phase control dimmers without default mode set to trailing edge, when operating lighting equipment other than incandescent lamps.

Classification			
☒	Class A	- All apparatus not classified as Class B, C or D	
☐	Class B	- Portable tools - Arc welding equipment which is not professional equipment.	
☐	Class C	☐	Lighting equipment with rated power > 25 W
		☐	Lighting equipment with rated power ≥ 5W and ≤ 25 W (First requirement, Table 3 column 2)
		☐	Lighting equipment with rated power ≥ 5W and ≤ 25 W (Second requirement)
		☐	Lighting equipment with rated power ≥ 5W and ≤ 25 W (Third requirement)
☐	Class D	- Personal computers, - Television receivers, - Refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).	

See next page.

Performed measurements

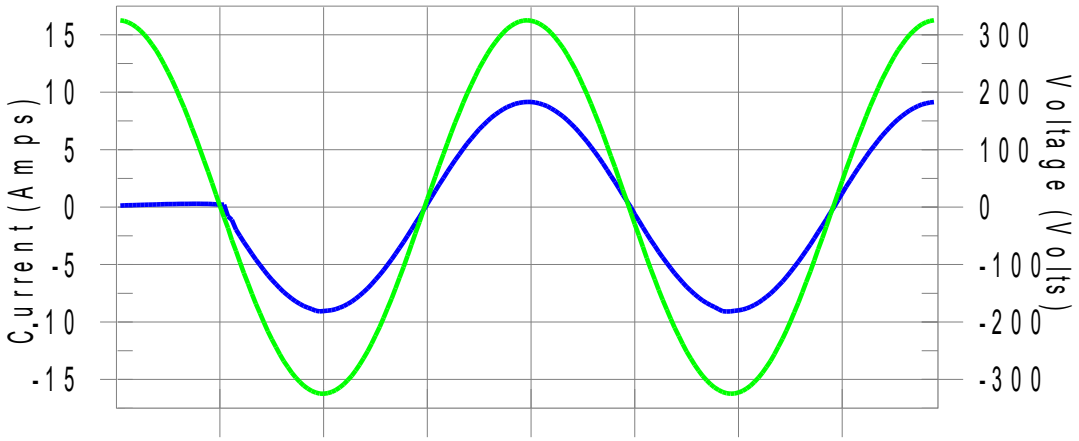
Port under test	AC mains power input					
Voltage – Mains [V]	230 Vac					
Frequency – Mains [Hz]	50 Hz					
Observation peroid	☐	6.5 min.	☒	2.5 min.	☐	Other:
Version of measurement instrument standard used EN / IEC61000-4-7 (Cl. 7)	☒	EN 61000-4-7:2002 + AM1:2009 (IEC 61000-4-7:2002+AM1:2008)				
	☐	EN 61000-4-7:1991				
Control principle used in the EUT	☒	Comply with the requirements of the Clause 6.1 (EN / IEC 61000-3-2).				
	☐	Not comply with the requirements of the Clause 6.1 (EN / IEC 61000-3-2).				
Test setup						
Operating mode(s) used	Mode 1					
Remark	---					

See next page.

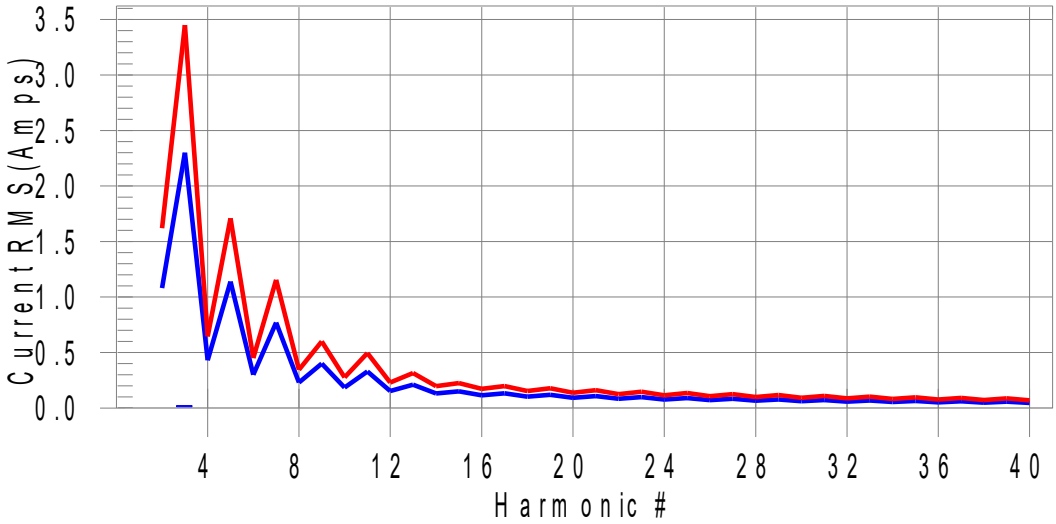
Measurement data	Port under test	AC mains input port
Operating mode / voltage / frequency used during the test		Mode 1 / 230 Vac / 50 Hz
Result for sample no.: 6253239-1		

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

Current & voltage waveforms



Harmonics and Class A limit line **European Limits**



Test result: Pass **Worst harmonics H3-0.8% of 150% limit, H3-1% of 100% limit**

Measurement data	Port under test	AC mains input port

Test Result: Pass **Source qualification: Normal**
THC(A): 0.027 **I-THD(%): 0.4** **POHC(A): 0.003** **POHC Limit(A): 0.251**

Highest parameter values during test:

V_RMS (Volts):	**229.97**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**9.157**	**I_RMS (Amps):**	**6.429**
I_Fund (Amps):	**6.357**	**Crest Factor:**	**2.411**
Power (Watts):	**1460.8**	**Power Factor:**	**1.000**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.004	1.080	N/A	0.026	1.620	N/A	Pass
3	0.022	2.300	1.0	0.029	3.450	0.8	Pass
4	0.004	0.430	N/A	0.010	0.645	N/A	Pass
5	0.008	1.140	0.7	0.012	1.710	0.7	Pass
6	0.004	0.300	N/A	0.008	0.450	N/A	Pass
7	0.002	0.770	N/A	0.005	1.155	N/A	Pass
8	0.003	0.230	N/A	0.006	0.345	N/A	Pass
9	0.004	0.400	N/A	0.006	0.600	N/A	Pass
10	0.003	0.184	N/A	0.006	0.276	N/A	Pass
11	0.003	0.330	N/A	0.005	0.495	N/A	Pass
12	0.003	0.153	N/A	0.006	0.230	N/A	Pass
13	0.003	0.210	N/A	0.005	0.315	N/A	Pass
14	0.003	0.131	N/A	0.004	0.197	N/A	Pass
15	0.003	0.150	N/A	0.004	0.225	N/A	Pass
16	0.002	0.115	N/A	0.003	0.173	N/A	Pass
17	0.002	0.132	N/A	0.003	0.198	N/A	Pass
18	0.002	0.102	N/A	0.004	0.153	N/A	Pass
19	0.002	0.118	N/A	0.003	0.178	N/A	Pass
20	0.002	0.092	N/A	0.003	0.138	N/A	Pass
21	0.002	0.107	N/A	0.003	0.161	N/A	Pass
22	0.002	0.084	N/A	0.003	0.125	N/A	Pass
23	0.002	0.098	N/A	0.002	0.147	N/A	Pass
24	0.001	0.077	N/A	0.002	0.115	N/A	Pass
25	0.001	0.090	N/A	0.002	0.135	N/A	Pass
26	0.001	0.071	N/A	0.002	0.107	N/A	Pass
27	0.001	0.083	N/A	0.002	0.125	N/A	Pass
28	0.001	0.066	N/A	0.001	0.099	N/A	Pass
29	0.001	0.078	N/A	0.001	0.116	N/A	Pass
30	0.001	0.061	N/A	0.001	0.092	N/A	Pass
31	0.001	0.073	N/A	0.001	0.109	N/A	Pass
32	0.001	0.058	N/A	0.001	0.086	N/A	Pass
33	0.001	0.068	N/A	0.001	0.102	N/A	Pass
34	0.001	0.054	N/A	0.001	0.081	N/A	Pass
35	0.001	0.064	N/A	0.001	0.096	N/A	Pass
36	0.000	0.051	N/A	0.001	0.077	N/A	Pass
37	0.000	0.061	N/A	0.001	0.091	N/A	Pass
38	0.000	0.048	N/A	0.001	0.073	N/A	Pass
39	0.000	0.058	N/A	0.001	0.087	N/A	Pass
40	0.000	0.046	N/A	0.001	0.069	N/A	Pass

Remark	

4.5	**Voltage changes, voltage fluctuations and flicker**	**VERDICT: PASS**

Standard	EN 61000-3-3

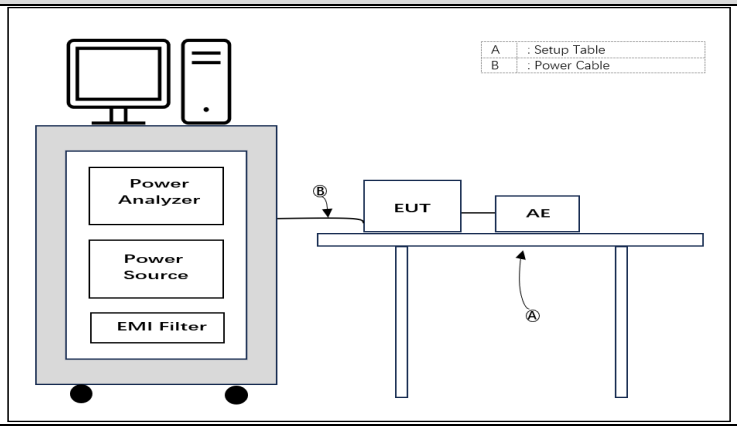
Limits

P_{ST} (Short term flicker) 1)	☒	≤ 1	☐	Not Applicable
P_{LT} (Long term flicker) 1)	☐	≤ 0.65	☒	Not Applicable
T_{max} (d_t > 3.3%)	☒	≤ 500 ms	☐	Not Applicable
d_C (Relative Voltage change)	☒	≤ 3.3%	☐	Not Applicable
d_{MAX} (Max. voltage change)	☒	≤ 4%	☐	6%
	☐	7%	☐	Not Applicable

Supplemental information:

1) P_{ST} and P_{LT} evaluations are required only for lighting equipment which is likely to produce multiple voltage fluctuations which in turn can cause flicker of other lighting equipment, for example due to fast varying or switching of significant loads inside the lighting equipment.

Performed measurements

Reason for not performing the measurement(s)	☒	Tests are not necessary because the EUT is unlikely to produce significant voltage fluctuations or flicker (clause 6.1).				
Port under test	AC Mains power input					
Voltage – Mains [V]	230 Vac					
Frequency – Mains [Hz]	50 Hz					
Test method	☒	Flickermeter according EN / IEC 61000-4-15:2011				
	☐	Simulation (Clause 4.2.3 of EN / IEC 61000-3-3)				
	☐	Analytical method (Clause 4.2.4 of EN / IEC 61000-3-3)				
	☐	Use of P_{st} = 1 curve (Clause 4.2.5 of EN / IEC 61000-3-3)				
Observation peroid	☒	10 min.	☐	120 min.	☐	Other:
	☐	24 times switching according to Annex B				
Test setup						
Operating mode(s) used	Mode 1					
Remark	---					

See next page.

Measurement data	Port under test	AC Mains power input
Operating mode used during the test	Mode 1 / 230 Vac / 50 Hz	

Results:

Tmax (dt > 3.3%)	0.0 ms
Maximum relative voltage change d_{MAX}	1.18 %
Relative Voltage change d_C	1.16 %
Short term flicker P_{ST}	0.574
Long term flicker P_{LT}	---

Remark	

5 IMMUNITY TEST RESULTS

5.1 Performance (Compliance) criteria

[According to EN 55014-2, EN IEC 55014-2 (CISPR 14-2)]

Performance 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.

Performance 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 reasonable expect from the apparatus if used as intended.

Performance 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 instruction for use.

5.1.1 Performance criteria related to immunity tests

Immunity test	Performance criteria
Electrostatic discharge	B
Radio-frequency electromagnetic fields	A
Fast transients	B
Surge transient	B
Injected currents (radio-frequency common mode)	A
Voltage dips and short interruptions	C

5.1.2 Manufacturer defined performance criteria

Not provided.

5.2 Monitored – Checked Functions / Parameters

During the immunity tests the following functions of the EUT has/have been monitored/checked.

☐	Motor speed	☐	Display data
☐	Switching	☐	Data storage
☐	Standby mode	☐	Sensor functions
☐	Temperature	☐	Audible signals
☐	Power consumption	☒	Others : LED's
☐	AC mains input current	☒	Others : Functional status
☐	Timing	☐	Others :
☐	Illumination	☐	Others :
Supplementary information :			

Immunity test	Monitored - Checked function(s)/parameter(s) during / after the test	Method
Electrostatic discharge	LED's & Functional status	Visual
Radio-frequency electromagnetic fields	---	Visual / Camera
Fast transients	LED's & Functional status	Visual
Surge transient	LED's & Functional status	Visual
Injected currents (radio-frequency common mode)	LED's & Functional status	Visual
Voltage dips and short interruptions	LED's & Functional status	Visual
Supplementary information :		

5.3	**Electrostatic discharge immunity**	**VERDICT:**	**PASS**

Electrostatic discharges (ESD) are the result of persons or objects that accumulate static electricity due to for instance walking on synthetic carpets. The ESD can influence the operation of equipment or damage its electronics, either by a direct discharge or indirectly by coupling or radiation. Both effects are simulated during the tests.

Requirements

Standard	EN 55014-2, EN IEC 55014-2							
Basic standard	EN 61000-4-2							
Port under test	Enclosure							
Air discharges [1)]	☐	±2 kV	☐	±4 kV	☒	±8 kV	☐	kV
Contact discharges [1)]	☐	±2 kV	☒	±4 kV	☐	±8 kV	☐	kV
Number of discharges	≥ 10 per polarity with ≥ 1 sec interval.							
[1)] Tests with lower voltages are not required.								

Performed tests

Test set-up	☒	Table-top	☐	Floor standing
Ambient temperature [°C]	24		Relative Humidity air [%]	45
Voltage – Mains [V]	230 Vac			
Frequency – Mains [Hz]	50 Hz			
Operating mode(s) used	Mode 1			

	Test Point (Location of discharge, see also photo)	Test Voltage [kV] & Polarity	Coupling type	# of applied discharges / polarity	Discharge interval [s]
☒	Points on conductive surface as indicated in the picture below.	±4	Contact	10	1
☒	Points on non-conductive surface as indicated in the picture below.	±8	Air	10	1
☒	HCP top side.	±4	Contact	10	1
☒	HCP bottom side.	±4	Contact	10	1
☒	VCP right side.	±4	Contact	10	1
☒	VCP left side.	±4	Contact	10	1
☒	VCP front side.	±4	Contact	10	1
☒	VCP rear side.	±4	Contact	10	1
Observation(s)	During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or data was observed.				
Supplementary information:					

5.4	**Radio-frequency electromagnetic fields immunity**	**VERDICT: PASS**

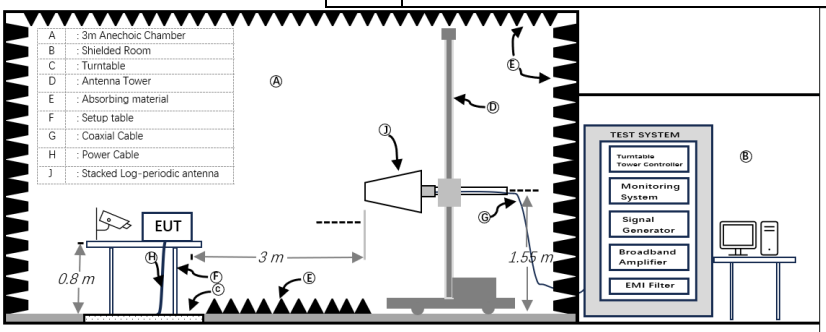
During the test it is verified if the equipment under test (EUT) has sufficient immunity against radiated electromagnetic fields. Industrial electromagnetic sources, walkie-talkies, radio transmitters, television transmitters and telecommunication equipment including cellular telephones and other emitting devices can generate these fields.

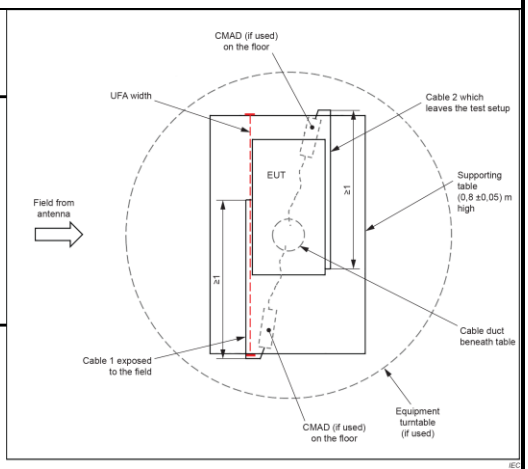
Requirements

Standard	EN 55014-2, EN IEC 55014-2			
Basic standard	EN 61000-4-3			
Port under test	Enclosure			
Frequency range	Test level	Modulation	Dwell time	Step size
80 – 1000 MHz	3 V/m	80% AM (1kHz)	≥ 0,5 s	≤ 1%
1000 – 6000 MHz	3 V/m	80% AM (1kHz)	≥ 0,5 s	≤ 1%
Supplementary information:				

Performed tests

Test method	☒	EN 61000-4-3	☐	EN 61000-4-20
Test set-up	☒	Equipment on the table (0,8 m height)		
	☐	Equipment standing on floor (0,05 – 0,15 m height)		





Voltage – Mains [V]	230 Vac				
Frequency – Mains [Hz]	50 Hz				
Operating mode(s) used	Mode 1				
Frequency range (applied)	Antenna Polarization	Test level (applied)	Modulation (applied)	Dwell time (applied)	Remark
80 – 1000 MHz	H	3 V/m	80% AM (1kHz)	3 s	
(step size 1%)	V	3 V/m	80% AM (1kHz)	3 s	

Exposed side of the EUT	☒	Front (0°)	☒	Right (90°)	☐	Top
	☒	Rear (180°)	☒	Left (270°)	☐	Bottom

Observation(s)	During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or data was observed.
Supplementary information:	

5.5	**Electrical Fast Transients immunity**	**VERDICT: PASS**

The EFT immunity test simulates disturbances by bursts of very short transients caused for example by switching off loads such as an AC motor or bouncing relay contacts. The transients are likely to disturb electronics but less likely to cause damage.

Requirements

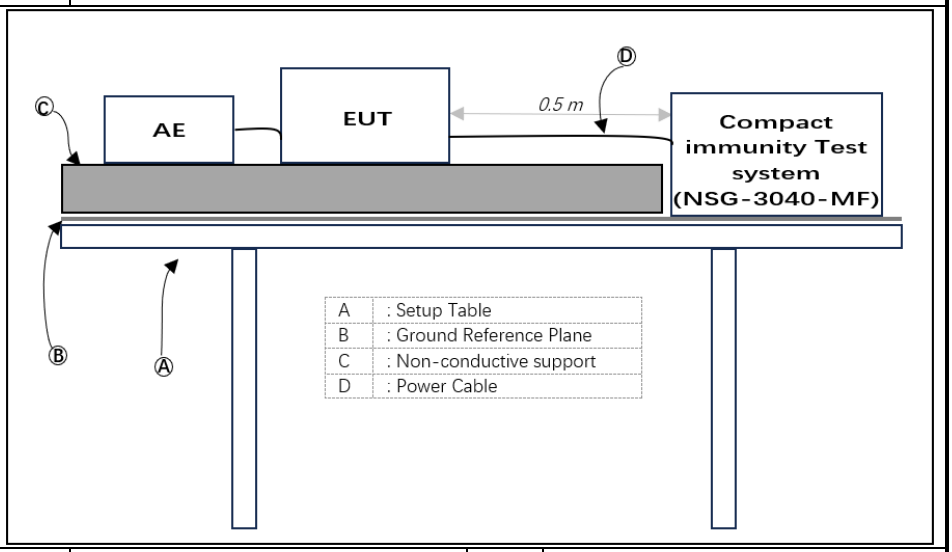
Standard		EN 55014-2, EN IEC 55014-2		
Basic standard		EN 61000-4-4		
Pulse characteristics		5/50 ns		
Port		Test level	Repetition frequency	Duration
☒	AC input-output power [1)]	± 1000 V	5 KHz	2 min. / polarity
☐	DC input-output power [2)]	± 500 V	5 KHz	2 min. / polarity
☐	Signal, control ports and wired network ports [3)]	± 500 V	5 KHz	2 min. / polarity

[1)] For extra low voltage a.c ports, this testing is only applicable to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.

[2)] Not applicable to battery operated appliances that cannot be connected to the mains while in use and only applicable to cables longer than 3 m..

[3)] Applicable only to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.

Performed tests

Voltage – Mains [V]	230 Vac			
Frequency – Mains [Hz]	50 Hz			
Operating mode(s) used	Mode 1			
Test Set-up	☐	Equipment standing on floor at (0,1 ± 0,01) m above ground plane		
	☒	Equipment on the table (0,1 ± 0,01) m above ground plane		
	☐	Artificial hand applied. Location refer to annex 3.		
				
Coupling	☒	Common mode	☐	Other:

See next page.

Port(s) under test	Test Voltage &Polarity	Repetition Frequency	Test duration / polarity	Injection method			
AC mains power input	± 1 kV	5 KHz	2 min.	☒	CDN	☐	Clamp
Observation(s)	During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or data was observed.						

5.6	**Surge transient immunity**	**VERDICT: PASS**

The surge transient immunity test simulates the surges that are caused by over-voltages due to indirect (induced) lightning transients. The pulse is a slow transient with high-energy contents and due to its long duration may cause damage to an unprotected EUT.

Requirements

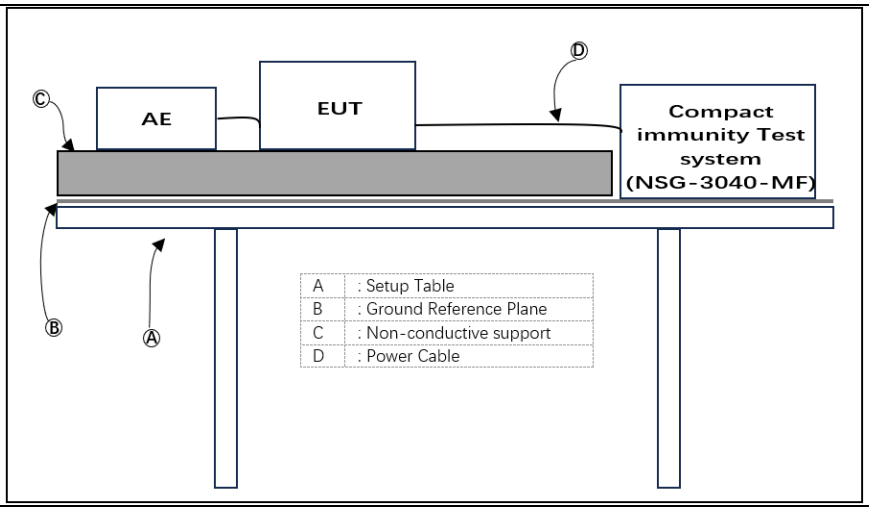
Standard	EN 55014-2, EN IEC 55014-2
Basic standard	EN 61000-4-5
Pulse characteristics	1,2/50µs Voltage; 8/20µs Current
Repetition rate	≤ 60 secs. (for each test level and phase angle)
Number of pulses	5 pulses (at each polarity and phase angle)

Port	Test level & Polarity & Coupling		Phase angle [°]
	Line to Line	Line to Earth	
AC input power [1)]	+ 1 kV	+ 2 kV	90
AC input power [1)]	- 1 kV	- 2 kV	270
Port	**Test level & Polarity & Coupling**		**Phase angle [°]**
	Shield-to-Earth (shielded)	Line to Earth (unshielded)	
Wired network ports [2)]	+ 0,5 kV	+ 1 kV	---
Wired network ports [2)]	- 0,5 kV	- 1 kV	---

[1)] Tests with lower voltages are not required.

[2)] Only applicable to wired network ports that can connect directly to cables leaving the building structure.

Performed tests

Voltage – Mains [V]	230 Vac
Frequency – Mains [Hz]	50 Hz
Test Set-up	
Operating mode(s) used	Mode 1
Repetition rate	60 secs. (for each test level and phase angle)
Number of pulses	5 pulses (at each polarity and phase angle)

Port(s) under test		Coupling	Test level & Polarity	Phase angle [°]	Remark
☒	AC mains input power	Line to Neutral	+1 kV	90	---
☒	AC mains input power	Line to Neutral	-1 kV	270	---
☒	AC mains input power	Line to Earth	+2 kV	90	---
☒	AC mains input power	Line to Earth	-2 kV	270	---
☒	AC mains input power	Neutral to Earth	+2 kV	90	---
☒	AC mains input power	Neutral to Earth	-2 kV	270	---
Observation(s)		During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or data was observed.			
Supplementary information:					

5.7	**Conducted RF disturbances immunity**	**VERDICT: PASS**

During this test the immunity of the equipment for induced or conducted electromagnetic fields is checked. Fields generated by radio and other transmitters cause RF voltages in long cables like the mains network. This test reproduces these induced disturbing voltages by injecting them to the EUT via the cabling.

Requirements

Standard		EN 55014-2, EN IEC 55014-2		
Basic standard		EN 61000-4-6		
Frequency range		Modulation	Step size	Dwell time
☒	0,15 – 80 MHz	80% AM (1kHz)	≤ 1%	≥ 0,5 s
☐	0,15 – 230 MHz	80% AM (1kHz)	≤ 1%	≥ 0,5 s
Port			Test level, *Uo*	
☒	AC input-output power [1)]		3 V	
☐	DC input-output power [2) 3)]		1 V	
☐	Signal, control ports and wired network ports [4)]		1 V	

[1)] For extra low voltage a.c ports, this testing is only applicable to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.

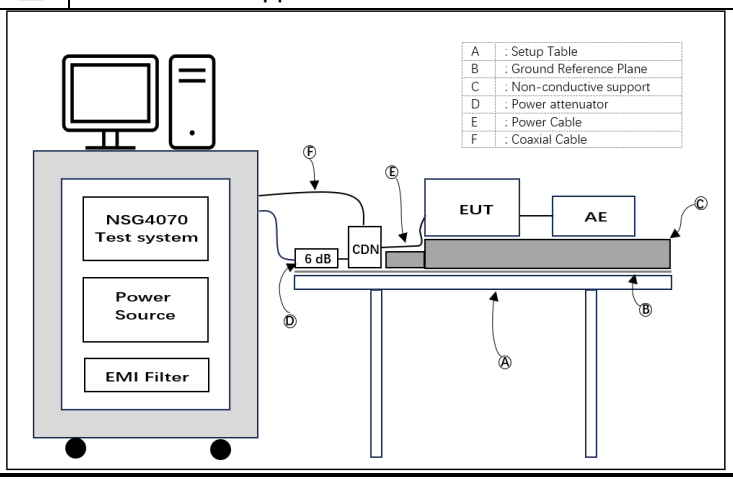
[2)] Not applicable to battery operated appliances that cannot be connected to the mains while in use.

[3)] Applicable to battery operated appliances that can be connected to the mains while in use, or to appliances for which the length of d.c. cables may exceed 3 m according to the manufacturer's functional specification.

[4)] Applicable only to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.

Performed tests

Frequency range (applied)				Modulation (applied)	Step size (applied)
☒	0,15 – 80 MHz	☐	0,15 – 230 MHz	80% AM (1kHz)	1%
Voltage – Mains [V]		230 Vac		Frequency – Mains [Hz]	50 Hz
Operating mode(s) used		Mode 1			
Test set-up		☐	Equipment standing on floor at (0,1 ± 0,01) m above ground plane.		
		☒	Equipment on the table (0,1 ± 0,01) m above ground plane.		
		☐	Artificial hand applied. Location refer to annex 3.		



Port(s) under test	Test Level (applied)	Injection method	Dwell time (applied)	Remark
AC power output	3 V	CDN-M3	3 s	1

Observation(s)	During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or data was observed.

Supplementary information:

1. During the test the metal enclosure of the EUT was connected to the reference ground plane through CDN-M1, the RF port was terminated with 50 Ohm.

5.8	**Power supply interruptions and dips immunity**	**VERDICT: PASS**

The purpose of the test is to verify the immunity of the equipment against voltage dips and voltage interruptions. It helps to ensure that the equipment functions properly (as expected and safely) with power supply fluctuations. Voltage dips and interruptions are caused by faults in the LV, MV, HV networks (short-circuit or ground faults).

Requirements

Standard	EN 55014-2, EN IEC 55014-2			
Basic standard	EN 61000-4-11			
# of dips & interruptions	3 dips / interruptions for each test level and phase angle			
Interval between events	≥ 10 seconds			
Port	Test level [1)]	Period (Cycles)		Performance Criterion
		50 Hz	60 Hz	
AC input power port	U_{NOM} – 100%	0,5	0,5	C; Refer to the chapter 5.1 for details.
AC input power port	U_{NOM} – 60%	10	12	C; Refer to the chapter 5.1 for details.
AC input power port	U_{NOM} – 30%	25	30	C; Refer to the chapter 5.1 for details.

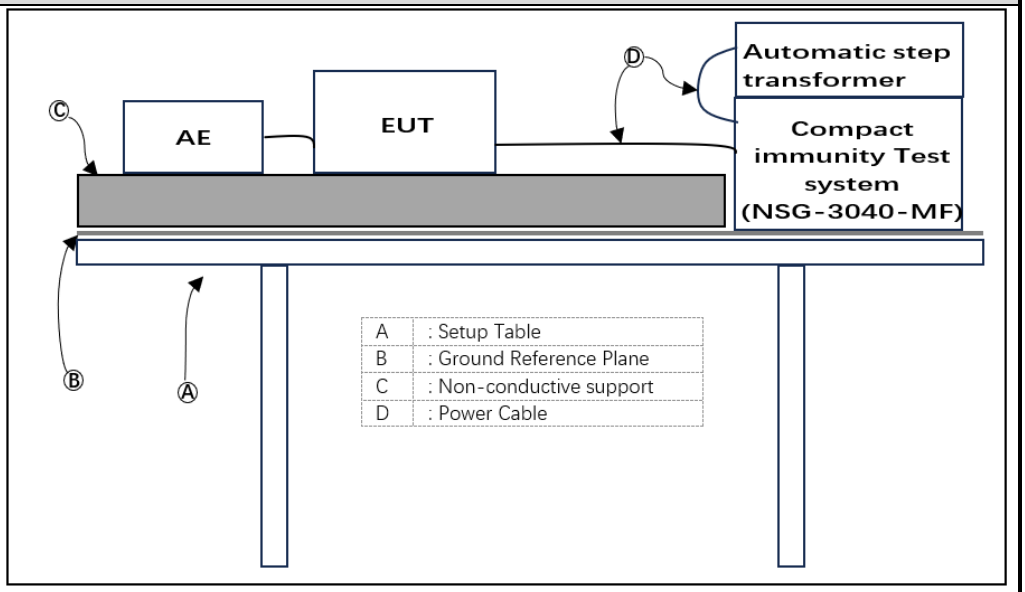
[1)] Changes to the voltage level shall occur at a zero crossing point in the a.c. voltage waveform.

NOTE: Where the equipment has a rated voltage range the following shall apply:
- If the voltage range does not exceed 20% of the lower voltage specified for the rated voltage range. A single voltage within that range may be selected for testing.
- In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.

Performed tests

U_{NOM} [V_{AC}]	Terminal	Voltage dip [% U_{NOM}]	Duration [cycles]		Repetion rate [s]	Number of dips per test	Phase angle [°]
			50 Hz	60 Hz			
230	L-N	0	0,5	---	10	3	0, 180
230	L-N	40	10	---	10	3	0, 180
230	L-N	70	25	---	10	3	0, 180

Test set-up



Operating mode(s) used	Mode 1
Observation(s)	During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or data was observed.
Supplementary information:	

6 IDENTIFICATION OF THE EQUIPMENT UNDER TEST

The photographs show the tested device.

EUT PHOTOS

7 ANNEX 1 - MEASUREMENT UNCERTAINTIES

The table(s) below show(s) measurment uncertainties of the EMC test set-ups. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Emission tests		U_{LAB}	U_{CISPR}
Conducted disturbance using AMN 9 kHz – 150 kHz	AMN: R&S ENV216	3.1 dB	3.8 dB
Conducted disturbance using AMN 150 kHz – 30 MHz		2.6 dB	3.4 dB
Disturbance power using Absorbing clamp 30 MHz – 300 MHz	Absorbing clamp: MDS 21C	4.0 dB	4.5 dB
Harmonic current emissions		0.6 %	N/A
Voltage changes, Voltage fluctuations and Flicker		2.8 %	N/A

Immunity tests		U_{LAB}	U_{IEC} *(Recommendation)*
Electrostatic discharge	Rise time (t_r)	12.4 %	≤ 15 %
	Peak current (I_p)	6.4 %	≤ 7 %
	Current at 30 ns (I_{30})	6.4 %	≤ 7 %
	Current at 60 ns (I_{60})	6.4 %	≤ 7 %
Electrical fast transients/burst	Rise time (t_r)	7.2 %	N/A
	Peak voltage (V_p)	6.8 %	
	Pulse width (t_w)	5.4 %	
Surge	Front time (t_f)	4.3 %	N/A
	Peak voltage (V_p)	6.7 %	
	Voltage duration (T_d)	1.3 %	
Conducted disturbances, induced by radio-frequency fields	CDN (v)	1.6 dB	N/A
	EM clamp (v)	3.6 dB	
Voltage dips, short interruptions and voltage variations	Time at reduced voltage (t_s)	3.0 %	N/A
	Voltage rising time (t_r)	3.0 %	
	Voltage fall time (t_f)	3.0 %	
	Voltage dips (v)	0.4 %	

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Uncertainty for R/S Test	2.10dB(80MHz-200MHz)
	2.36dB(200MHz-1000MHz)

8 ANNEX 2 – USED EQUIPMENT

Conducted disturbance

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR3	103149	2026/09/23
Artificial Mains Network	R&S	ENV216	103162	2026/09/23
Software	R&S	ELEKTRA	5.05	N/A

Discontinuous disturbance (clicks)

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR3	103149	2026/09/23
Artificial Mains Network	R&S	ENV216	103162	2026/09/23
Software	R&S	Click Rate Analyzer	2.52	N/A

Disturbance power

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR3	103149	2026/09/23
EMI absorbing clamp	SCHWARZBECK	MDS 21C	00167	2026/09/23
Software	R&S	ELEKTRA	5.05	N/A

Harmonic current emissions & Voltage changes, voltage fluctuations and flicker

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Harmonic currents and flicker tester	California Instruments	CTS	1306A00135	2026/05/29
AC power source	California Instruments	5001iX-CTS-400	1306A00135	2026/05/29
Software	California Instruments	CTS4	4.29.0	N/A

Electrostatic discharge immunity

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
ESD generator	TESEQ	NSG 437-GB	1447	2026/09/27

Fast transient immunity

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG 3040A-IEC	P2424288940	2026/09/23
EFT/Burst capacitive coupling clamp	TESEQ	CCI	P2416286626	2026/09/23

Surge immunity

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG 3040A-IEC	P2424288940	2026/09/23

Injected currents immunity

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG 4070C2-35	68081	2026/09/23
Coupling/Decoupling Network (CDN)	TESEQ	CDN M016S	68918	2026/09/23
Attenuator	TESEQ	ANT 6150	24051305	2026/09/23

Voltage dips and short interruptions immunity

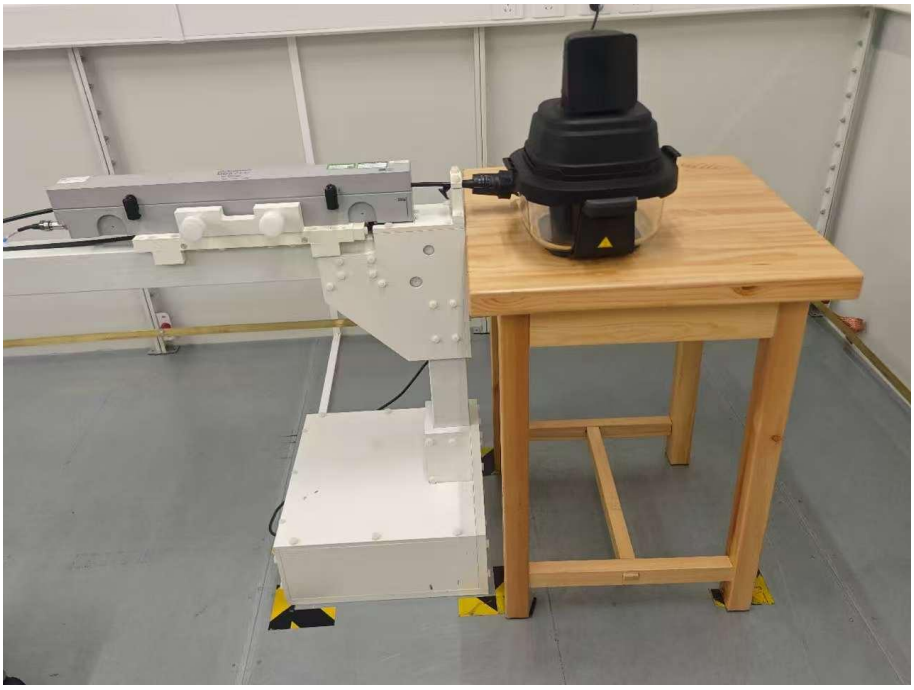
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG 3040A-IEC	P2424288940	2026/09/23
Single-phase toroidal transformer	TESEQ	TVT 1-250-16	P2425289057	2026/09/23

EMTEK (NINGBO) CO., LTD.
For RF Strength Susceptibility Test (80 MHz to 1000 MHz)

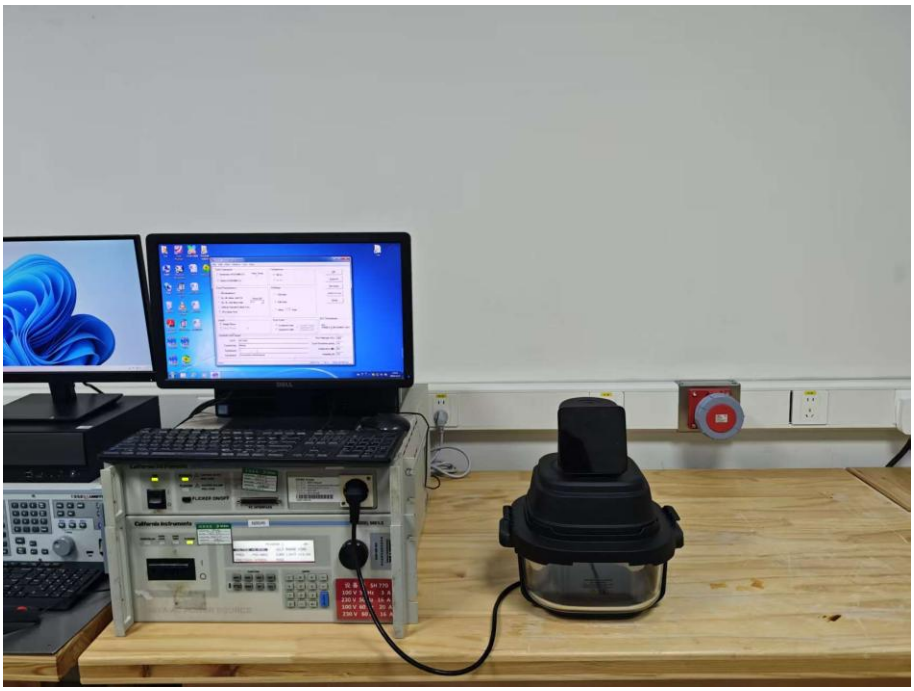
Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-173	RF Signal generator	Keysight	N5171B	MY61252820	Jan 04, 2025	1 Year
ENE-174	SW-RF	JS Denki	JSDSW-BS02	JSDSW2120D 01	Jan 04, 2025	1 Year
ENE-175	Power Amplifier	Vectawave	VBA 1000-600c	132035	Jan 04, 2025	1 Year
ENE-176	Power Amplifier	Vectawave	VBA 1060-200	132120	Jan 04, 2025	1 Year
ENE-177	Directional couplers	Bonn	BDC 0810-50/1500	2129259-01	Jan 04, 2025	1 Year
ENE-178	Directional couplers	Bonn	BDC 1060-40/500	2129304-03	Jan 04, 2025	1 Year
ENE-179	Multilayer periodic Antenna	Schwarzbeck	STLP9129-7/16	03043	Jan 04, 2025	1 Year
ENE-182	power meter	Lumiloop	LSPM	86	Jan 04, 2025	1 Year
ENE-153	RS anechoic chamber	SKET	7.6*5*4m	/	Mar 05, 2025	1 Year

9 ANNEX 3 - TEST PHOTOS

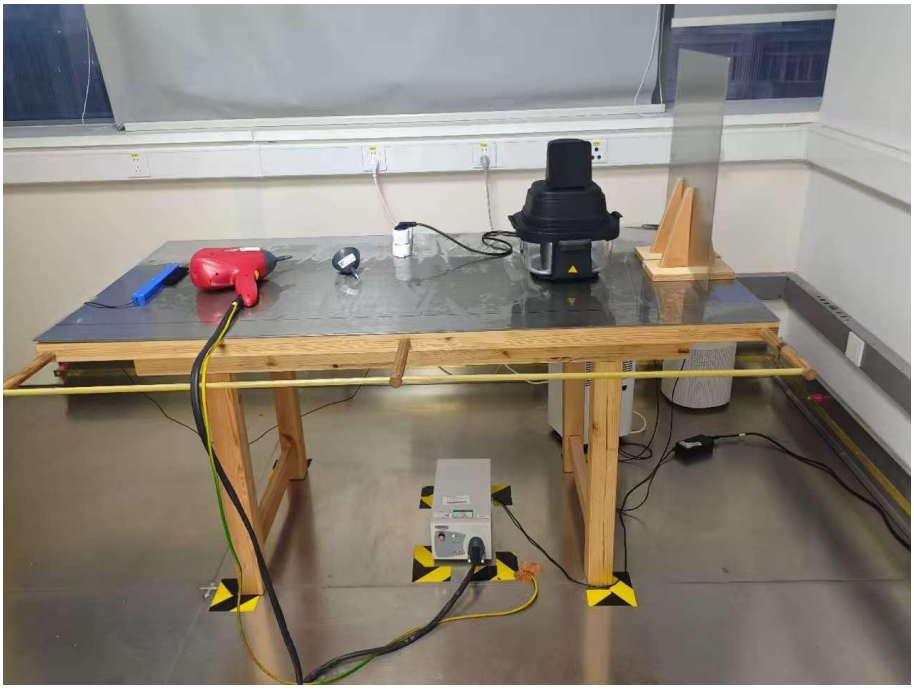
Conducted disturbance voltage at mains terminals & Click

Disturbance power


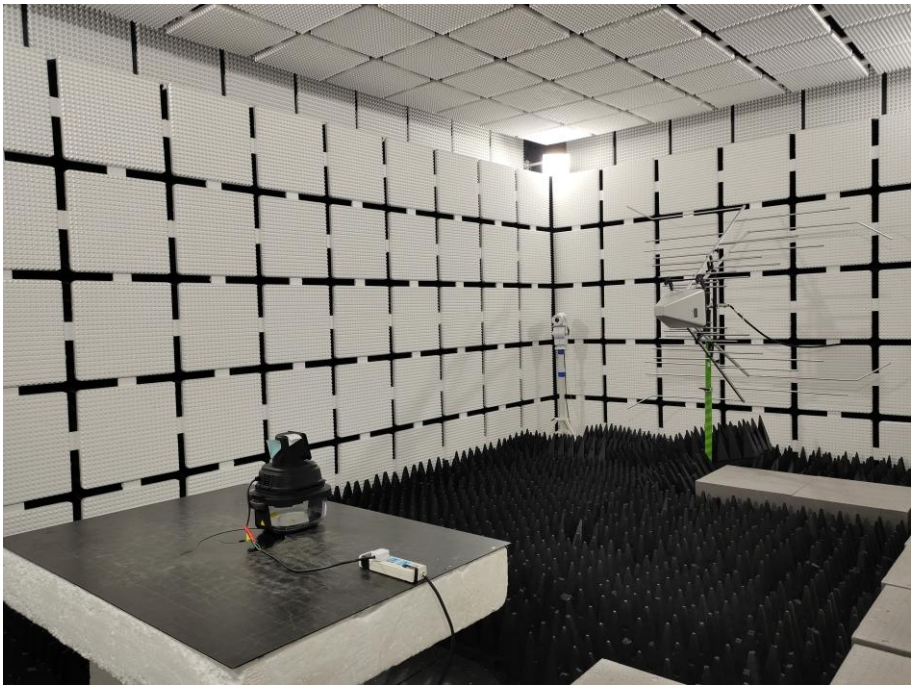
Harmonic current emissions & Voltage changes, voltage fluctuations and flicker



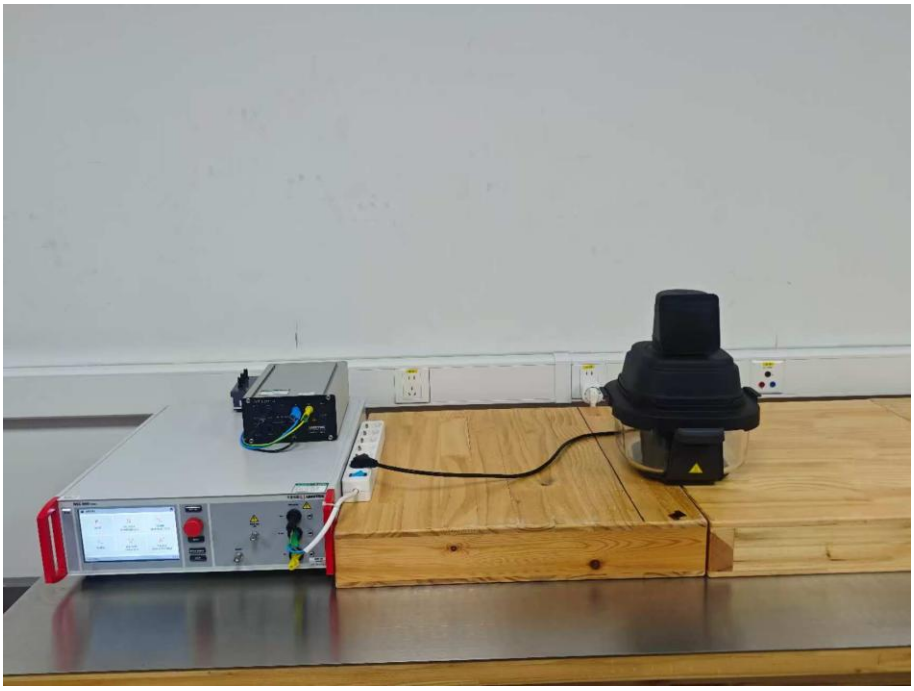
Electrostatic discharge immunity



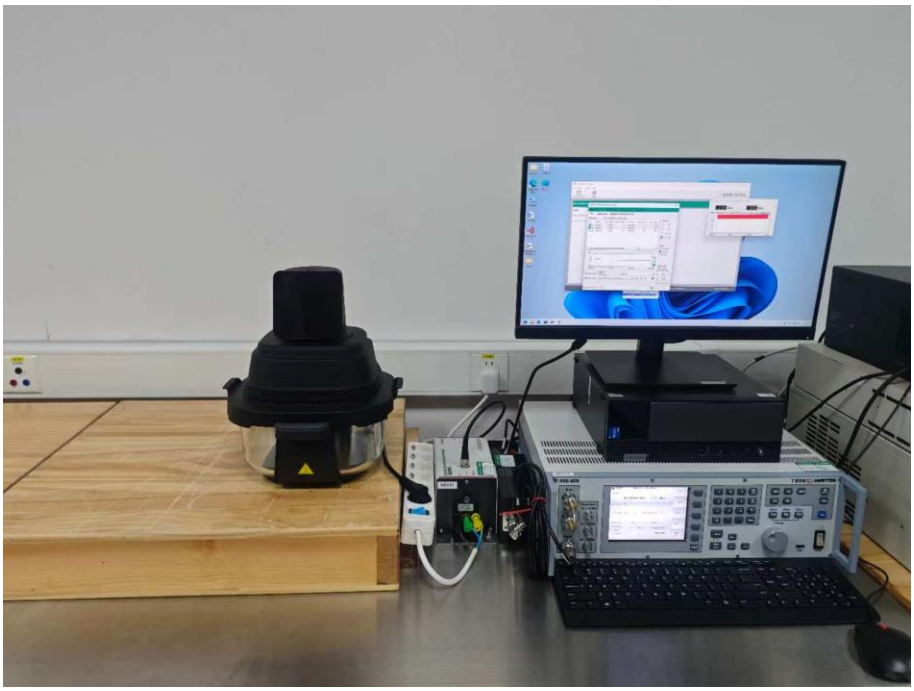
Radio-frequency electromagnetic fields immunity (80 MHz – 1 GHz)



Electrical fast transient (EFT) / Burst transients / Surge transients / Power supply voltage interruptions & dips immunity



Conducted RF disturbances immunity



----------End of the report----------