DEKRA Testing and Certification (Shanghai) Ltd.
No.250, Jiangchangsan Road, Jing`an District, Shanghai, China
TEL: +86-21-6056 7666 / FAX: +86-21-6056 7555

Test report No:
6180795.50

TEST REPORT
Electromagnetic Compatibility (EMC)

Identification of item tested	Stone Cutting Circular Saw
Trademark	AGP
Model and /or type reference	SCS8
Ratings	110-120 Vac; 50-60 Hz; 1700 W; 230-240 Vac; 50-60 Hz; 2200 W; Class I
Test Laboratory / address	DEKRA Testing and Certification (Shanghai) Ltd. No.250, Jiangchangsan Road, Jing'an District, Shanghai, China
Applicant / address	LEE YEONG INDUSTRIAL CO., LTD. No.2, Kejia Rd., Douliu City, Yunlin County 64057, Taiwan
Test method requested, standard	EN IEC 55014-1:2021 EN IEC 55014-2:2021 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A1:2019+A2:2021
Verdict Summary	IN COMPLIANCE
Tested by (name / position & signature)	Stefan Zhao Senior Project Manager 
Approved by (name / position & signature)	Wency Yang Technical Manager 
Date of issue	2024-03-26
Report template No	TRF_EN55014-1_EN55014-2_EMC02 V1.1

INDEX

page

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.

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.

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.

Uncertainties have been calculated according to the DEKRA internal document. 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.

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
N/A : Not Applicable
N/M : Not Measured

DOCUMENT HISTORY

Report nr.	Date	Description
6180795.50	2024-03-26	First release

REMARKS AND COMMENTS

The equipment under test (EUT) does meet the requirements of the stated standard(s)/test(s).

The test results relate only to the samples tested.

The Stone Cutting Circular Saw is intended to pull medium to large wire through conduit.

After review, all tests were carried out on the following models SCS8 (110-120 V) and SCS8 (230-240 V). The test results stated in this report are also representative for all models

USAGE OF SAMPLES

Samples undergoing test have been selected by: LEE YEONG INDUSTRIAL CO., LTD.

Samples are composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
6180795-1	Stone Cutting Circular Saw	SCS8 (110-120 V)	N/A	2024-01-18
6180795-2	Stone Cutting Circular Saw	SCS8 (230-240 V)	N/A	2024-01-18

Supplemental information:

6180795-1

6180795-2

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Description of the item .....:	Stone Cutting Circular Saw
Model / Type number .....:	SCS8
Trademark .....:	AGP
Manufacturer .....:	LEE YEONG INDUSTRIAL CO., LTD. No.2, Kejia Rd., Douliu City, Yunlin County 64057, Taiwan
Factory .....:	LEE YEONG INDUSTRIAL CO., LTD. No.2, Kejia Rd., Douliu City, Yunlin County 64057, Taiwan

Rated power supply .....:	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☒	AC: 100-120 V; 50-60 Hz	☒	☐	☐	☒	☐
	☒	AC: 230-240 V; 50-60 Hz	☒	☐	☐	☒	☐
	☐	AC:					
	☐	DC:					
Rated Power .....:	Refer to page 1						
Clock frequencies .....:	< 15 MHz						
Other parameters.....:	N/A						
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 apparatus as supplied for the test is a Stone Cutting Circular Saw, intended for residential, commercial and light-industrial use.

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

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

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 Location

Test Location	SERTC Testing Center Co., Ltd No. 230, Section 2, Fengshi Road, Fengyuan District, Taichung City, Taiwan
Date (receive sample)	2024-01-18
Date (start test)	2024-01-18
Date (finish test)	2024-03-19

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	Continuous operation without load	☒	☒
2		☐	☐
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 Mains port	AC Main	2.0	☒	☐
			☐	☐
			☐	☐
			☐	☐
			☐	☐
Supplemental information:				

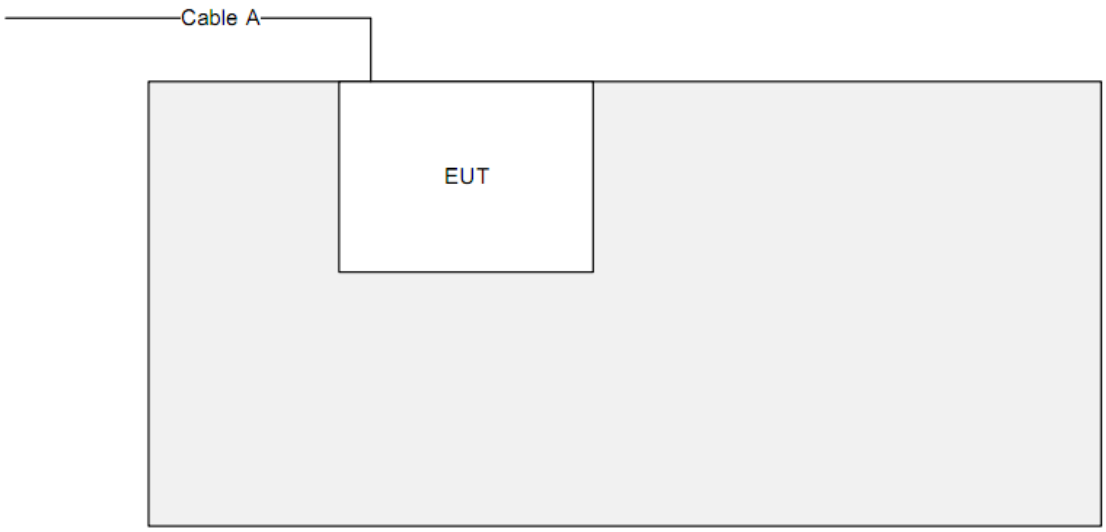
2.3 Support / Auxiliary equipment / unit / software for the EUT

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		Signal cable Description
A	Mains Cable	Non-Shielded, 2.0 m, 3 pin

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	2021 [1)]	Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission.
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	2015	Electromagnetic compatibility of multimedia equipment - Emission requirements
EN IEC 61000-3-2 +A1	2019 [1)] 2021 [1)]	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	2021 [1)]	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	2006 2008 2010	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	2014	Immunity to conducted disturbances, induced by radio-frequency fields.
EN IEC 61000-4-11	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 IEC 55014-1			
Requirement – Test case	**Basic standard(s)**	**Verdict**	**Remark**
Conducted disturbance at mains terminals (150 kHz – 30 MHz)	EN 55016-2-1	PASS	---
Conducted disturbance at wired network ports (150 kHz – 30 MHz)	EN 55016-2-1 EN 55032	N/A	See 2)
Disturbance power (30 MHz – 300 MHz)	EN 55016-2-2	PASS	---
Radiated disturbance (30 MHz – 1000 MHz)	EN 55016-2-3	N/A	See 4)
Radiated disturbance (1 GHz – 6 GHz)	EN 55016-2-3	N/A	See 3)
Discontinuous disturbance (clicks) on AC power leads	EN IEC 55014-1	N/A	See 1)
Supplementary information: 1) Exemptions from click measurements applicable (clause 5.4.3). 2) The test is not applicable as the EUT does not have associated ports / wired network ports. 3) The highest internal frequency of the EUT is less than 108 MHz. 4) According to clause 4.3.4.2 procedure (a) of the CISRP 14-1 standard the EUT is deemed to comply in the frequency range from 300 MHz to 1000 MHz without further measurements.			

EMISSION TESTS – EN IEC 61000-3-2, EN 61000-3-3			
Requirement – Test case	**Basic standard(s)**	**Verdict**	**Remark**
Harmonic current emissions	EN IEC 61000-3-2	PASS	---
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3	PASS	---
Supplementary information:			

IMMUNITY TESTS – EN IEC 55014-2			
Requirement – Test case	**Basic standard(s)**	**Verdict**	**Remark**
Electrostatic discharge	EN 61000-4-2	PASS	---
Radio-frequency electromagnetic fields	EN 61000-4-3	N/A	See 1)
Fast transients	EN 61000-4-4	PASS	---
Surge transient	EN 61000-4-5	PASS	---
Injected currents (radio-frequency common mode)	EN 61000-4-6	PASS	---
Voltage dips and short interruptions	EN IEC 61000-4-11	PASS	---
Supplementary information: 1) The equipment is classified as category II equipment according to EN 55014-2, no radio-frequency electromagnetic fields immunity test is applicable.			

4 EMISSION TEST RESULTS

4.1	**Conducted disturbance voltage – Mains**	**VERDICT: PASS**

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

Limits – Tools

Frequency range [MHz]	Limit: QP [dB(µV)[1]]	Limit: AV [dB(µV) [1]]	IF BW	Detector(s)
0.15 - 0,35	66 – 56 [2)]	59 - 46 [2)]	9 KHz	QP, CAV
0,35 - 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.

☐	Rated power below 700 W	Limits as above
☐	Rated power between 700 and 1000 W	Limits +4 dB
☒	Rated power above 1000 W	Limits +10 dB

Performed measurements

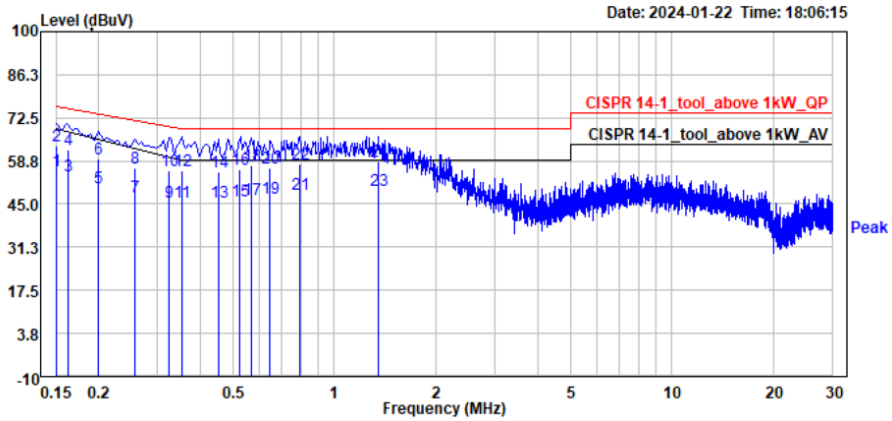
Scan range (0,9 – 1,1 U_N)	☐	198 – 264 V_{AC}	☐	207 – 253 V_{AC}		☒	120/230 V_{AC}			
Tested terminal(s) / port	☒	AC mains input power	☒	N	☒ L1	☐	L2	☐	L3	
	☐	DC mains input power	☐	Positive (+)		☐	Negative (-)			

Voltage – Mains [V]	110 Vac / 230 Vac			
Frequency – Mains [Hz]	60 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	For the level of continuous disturbance is not steady, the reading on the measuring receiver is observed for at least 15 s for each measurement.			

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 110 Vac/ 60 Hz

Result for sample no.: 6180795-1

Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.150	45.53	10.15	55.68	69.00	-13.32	line1	Average
2	0.150	53.49	10.15	63.64	76.00	-12.36	line1	QP
3	0.162	43.84	10.15	53.99	68.07	-14.08	line1	Average
4	0.162	52.27	10.15	62.42	75.35	-12.93	line1	QP
5	0.200	40.09	10.14	50.23	65.62	-15.39	line1	Average
6	0.200	49.08	10.14	59.22	73.64	-14.42	line1	QP
7	0.257	36.97	10.14	47.11	62.65	-15.54	line1	Average
8	0.257	46.25	10.14	56.39	71.55	-15.16	line1	QP
9	0.325	35.52	10.14	45.66	59.89	-14.23	line1	Average
10	0.325	45.70	10.14	55.84	69.62	-13.78	line1	QP
11	0.354	35.28	10.15	45.43	59.00	-13.57	line1	Average
12	0.354	45.72	10.15	55.87	69.00	-13.13	line1	QP
13	0.454	35.53	10.15	45.68	59.00	-13.32	line1	Average
14	0.454	45.29	10.15	55.44	69.00	-13.56	line1	QP
15	0.526	36.00	10.15	46.15	59.00	-12.85	line1	Average
16	0.526	45.92	10.15	56.07	69.00	-12.93	line1	QP
17	0.567	36.30	10.16	46.46	59.00	-12.54	line1	Average
18	0.567	47.28	10.16	57.44	69.00	-11.56	line1	QP
19	0.646	36.60	10.16	46.76	59.00	-12.24	line1	Average
20	0.646	46.51	10.16	56.67	69.00	-12.33	line1	QP
21	0.793	37.80	10.17	47.97	59.00	-11.03	line1	Average
22	0.793	47.63	10.17	57.80	69.00	-11.20	line1	QP
23 PP	1.356	39.29	10.19	49.48	59.00	-9.52	line1	Average
24 QP	1.356	48.35	10.19	58.54	69.00	-10.46	line1	QP

Remark:

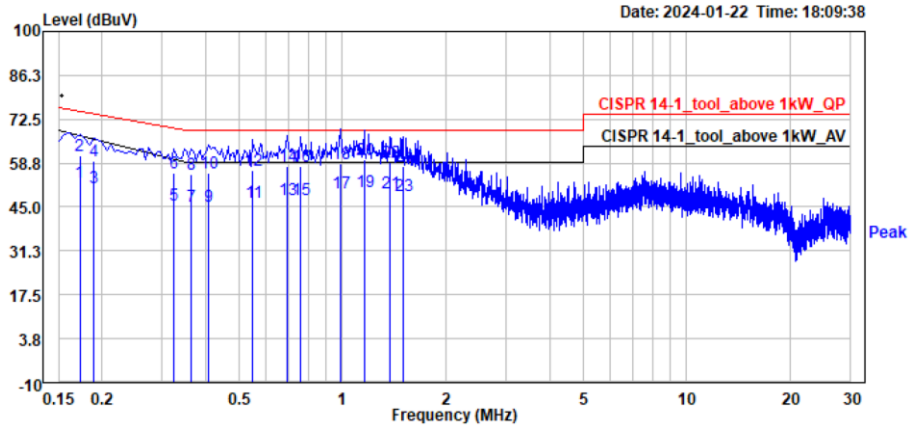
1. "orange color" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level – Limit.

Remark	

DEKRA Testing and Certification (Shanghai) Ltd.
No.250, Jiangchangsan Road, Jing`an District, Shanghai, China
TEL: +86-21-6056 7666 / FAX: +86-21-6056 7555

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 110 Vac/ 60 Hz

Result for sample no.: 6180795-1
Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.173	42.39	10.14	52.53	67.35	-14.82	neutral	Average
2	0.173	50.76	10.14	60.90	74.84	-13.94	neutral	QP
3	0.189	40.73	10.14	50.87	66.25	-15.38	neutral	Average
4	0.189	49.30	10.14	59.44	74.07	-14.63	neutral	QP
5	0.325	35.44	10.14	45.58	59.89	-14.31	neutral	Average
6	0.325	45.34	10.14	55.48	69.62	-14.14	neutral	QP
7	0.364	35.03	10.15	45.18	59.00	-13.82	neutral	Average
8	0.364	45.30	10.15	55.45	69.00	-13.55	neutral	QP
9	0.408	35.12	10.15	45.27	59.00	-13.73	neutral	Average
10	0.408	45.35	10.15	55.50	69.00	-13.50	neutral	QP
11	0.550	36.16	10.15	46.31	59.00	-12.69	neutral	Average
12	0.550	46.36	10.15	56.51	69.00	-12.49	neutral	QP
13	0.692	37.09	10.15	47.24	59.00	-11.76	neutral	Average
14	0.692	47.40	10.15	57.55	69.00	-11.45	neutral	QP
15	0.758	37.29	10.17	47.46	59.00	-11.54	neutral	Average
16	0.758	47.40	10.17	57.57	69.00	-11.43	neutral	QP
17	0.989	39.28	10.17	49.45	59.00	-9.55	neutral	Average
18	0.989	48.54	10.17	58.71	69.00	-10.29	neutral	QP
19 PP	1.159	39.79	10.17	49.96	59.00	-9.04	neutral	Average
20 QP	1.159	49.49	10.17	59.66	69.00	-9.34	neutral	QP
21	1.378	39.29	10.18	49.47	59.00	-9.53	neutral	Average
22	1.378	48.77	10.18	58.95	69.00	-10.05	neutral	QP
23	1.502	38.24	10.19	48.43	59.00	-10.57	neutral	Average
24	1.502	47.68	10.19	57.87	69.00	-11.13	neutral	QP

Remark:

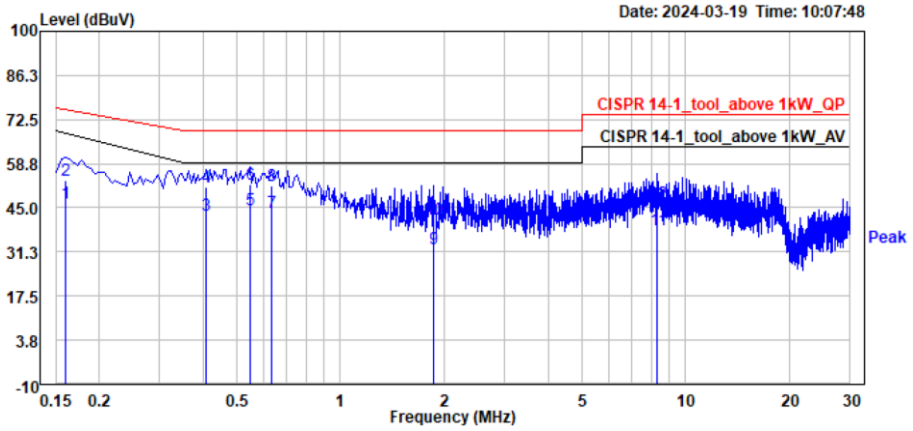
1. " orange color " means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level – Limit.

Remark	

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

Result for sample no.: 6180795-2

Line



		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.159	36.35	10.15	46.50	68.29	-21.79	line1	Average
2		0.159	43.56	10.15	53.71	75.51	-21.80	line1	QP
3		0.409	32.48	10.15	42.63	59.00	-16.37	line1	Average
4		0.409	41.38	10.15	51.53	69.00	-17.47	line1	QP
5	PP	0.549	34.18	10.15	44.33	59.00	-14.67	line1	Average
6	QP	0.549	42.06	10.15	52.21	69.00	-16.79	line1	QP
7		0.635	33.30	10.16	43.46	59.00	-15.54	line1	Average
8		0.635	41.88	10.16	52.04	69.00	-16.96	line1	QP
9		1.866	22.02	10.21	32.23	59.00	-26.77	line1	Average
10		1.866	31.12	10.21	41.33	69.00	-27.67	line1	QP
11		8.298	27.95	10.36	38.31	64.00	-25.69	line1	Average
12		8.298	36.01	10.36	46.37	74.00	-27.63	line1	QP

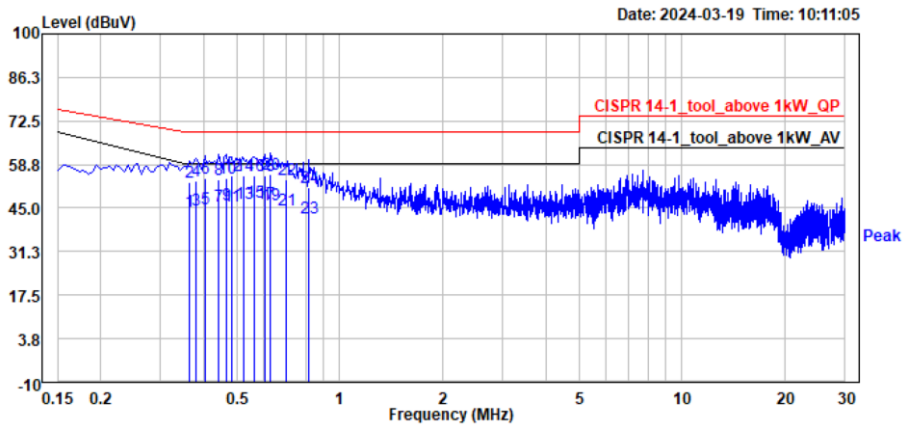
Remark:

1. " orange color " means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level – Limit.

Remark	

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

Result for sample no.: 6180795-2
Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.363	33.78	10.15	43.93	59.00	-15.07	neutral	Average
2	0.363	43.13	10.15	53.28	69.00	-15.72	neutral	QP
3	0.381	34.43	10.15	44.58	59.00	-14.42	neutral	Average
4	0.381	43.37	10.15	53.52	69.00	-15.48	neutral	QP
5	0.403	34.53	10.15	44.68	59.00	-14.32	neutral	Average
6	0.403	44.06	10.15	54.21	69.00	-14.79	neutral	QP
7	0.444	35.68	10.15	45.83	59.00	-13.17	neutral	Average
8	0.444	44.04	10.15	54.19	69.00	-14.81	neutral	QP
9	0.466	35.76	10.15	45.91	59.00	-13.09	neutral	Average
10	0.466	44.22	10.15	54.37	69.00	-14.63	neutral	QP
11	0.482	35.68	10.15	45.83	59.00	-13.17	neutral	Average
12	0.482	45.15	10.15	55.30	69.00	-13.70	neutral	QP
13	0.523	36.30	10.15	46.45	59.00	-12.55	neutral	Average
14	0.523	44.94	10.15	55.09	69.00	-13.91	neutral	QP
15 PP	0.562	36.73	10.15	46.88	59.00	-12.12	neutral	Average
16	0.562	45.24	10.15	55.39	69.00	-13.61	neutral	QP
17	0.606	36.18	10.15	46.33	59.00	-12.67	neutral	Average
18	0.606	45.08	10.15	55.23	69.00	-13.77	neutral	QP
19	0.629	36.02	10.15	46.17	59.00	-12.83	neutral	Average
20 QP	0.629	45.64	10.15	55.79	69.00	-13.21	neutral	QP
21	0.701	34.14	10.16	44.30	59.00	-14.70	neutral	Average
22	0.701	43.90	10.16	54.06	69.00	-14.94	neutral	QP
23	0.814	31.88	10.17	42.05	59.00	-16.95	neutral	Average
24	0.814	41.26	10.17	51.43	69.00	-17.57	neutral	QP

Remark:

1. " orange color " means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level – Limit.

Remark	

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

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

Limits – Tools

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.				

☐	Rated power below 700 W	Limits as above
☐	Rated power between 700 and 1000 W	Limits +4 dB
☒	Rated power above 1000 W	Limits +10 dB

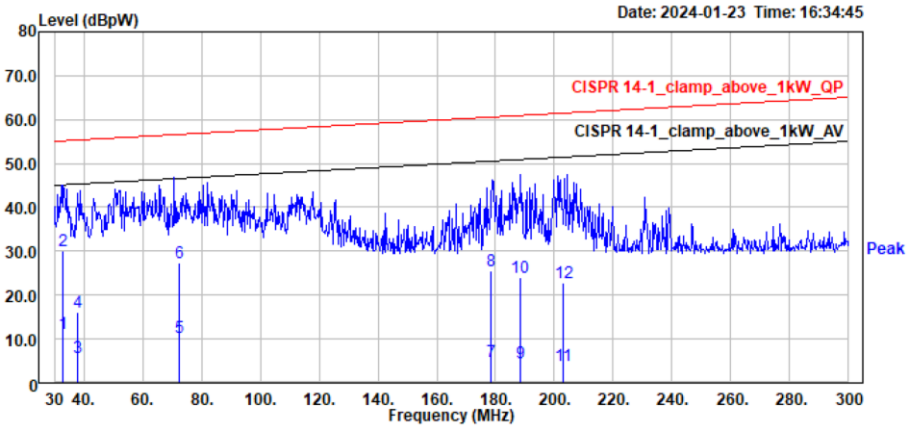
Performed measurements

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

Scan range (0,9 – 1,1 U_N)	☐	198 – 264 V_{AC}	☐	207 – 253 V_{AC}	☒	120/230 V_{AC}	
Voltage – Mains [V]	110 Vac / 230 Vac						
Frequency – Mains [Hz]	60 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 “Margin” applied and passed					
	☒	Maximum clock frequency < 30 MHz					
Operating mode(s) used	Mode 1						
Remark	For the level of continuous disturbance is not steady, the reading on the measuring receiver is observed for at least 15 s for each measurement.						

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 110 Vac/ 60 Hz

Result for sample no.: 6180795-1 Before than protector



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark	APos
	MHz	dBpW	dB	dBpW	dBpW	dB			cm
1 AV	32.935	-13.70	25.00	11.30	45.09	-33.79		Average	240
2 PP	32.935	5.11	25.00	30.11	55.09	-24.98		QP	240
3	38.025	-18.85	24.56	5.71	45.28	-39.57		Average	240
4	38.025	-8.47	24.56	16.09	55.28	-39.19		QP	240
5	72.215	-11.84	22.23	10.39	46.54	-36.15		Average	240
6	72.215	5.00	22.23	27.23	56.54	-29.31		QP	240
7	178.540	-16.70	21.57	4.87	50.48	-45.61		Average	275
8	178.540	3.98	21.57	25.55	60.48	-34.93		QP	275
9	188.245	-16.83	21.47	4.64	50.84	-46.20		Average	260
10	188.245	2.64	21.47	24.11	60.84	-36.73		QP	260
11	202.885	-17.48	21.40	3.92	51.38	-47.46		Average	310
12	202.885	1.44	21.40	22.84	61.38	-38.54		QP	310

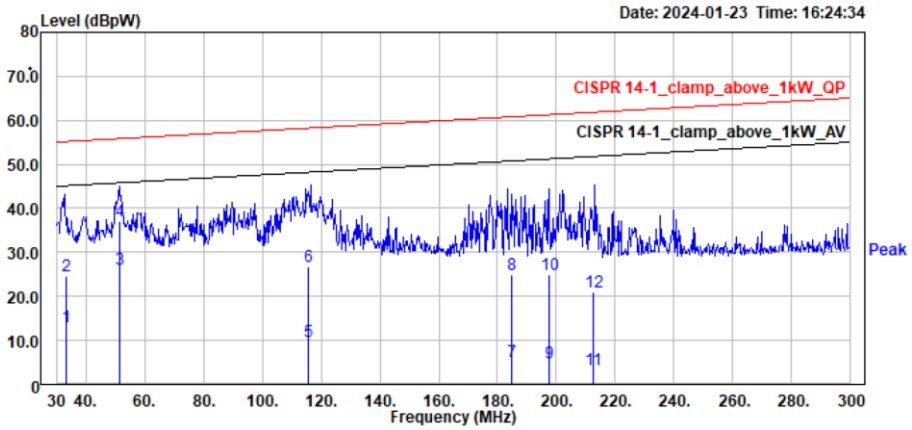
Remark:

1. "orange color" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level – Limit.

Remark	

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 110 Vac/ 60 Hz

Result for sample no.: 6180795-1 Between EUT and protector



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark	APos
	MHz	dBpW	dB	dBpW	dBpW	dB			cm
1	33.390	-11.75	24.95	13.20	45.11	-31.91		Average	0
2	33.390	-0.39	24.95	24.56	55.11	-30.55		QP	0
3 AV	51.455	2.68	23.43	26.11	45.77	-19.66		Average	120
4 PP	51.455	13.70	23.43	37.13	55.77	-18.64		QP	120
5	115.530	-13.08	22.91	9.83	48.15	-38.32		Average	0
6	115.530	3.90	22.91	26.81	58.15	-31.34		QP	0
7	184.815	-16.43	21.50	5.07	50.71	-45.64		Average	60
8	184.815	3.34	21.50	24.84	60.71	-35.87		QP	60
9	197.370	-16.57	21.39	4.82	51.18	-46.36		Average	55
10	197.370	3.57	21.39	24.96	61.18	-36.22		QP	55
11	212.445	-18.08	21.54	3.46	51.74	-48.28		Average	0
12	212.445	-0.55	21.54	20.99	61.74	-40.75		QP	0

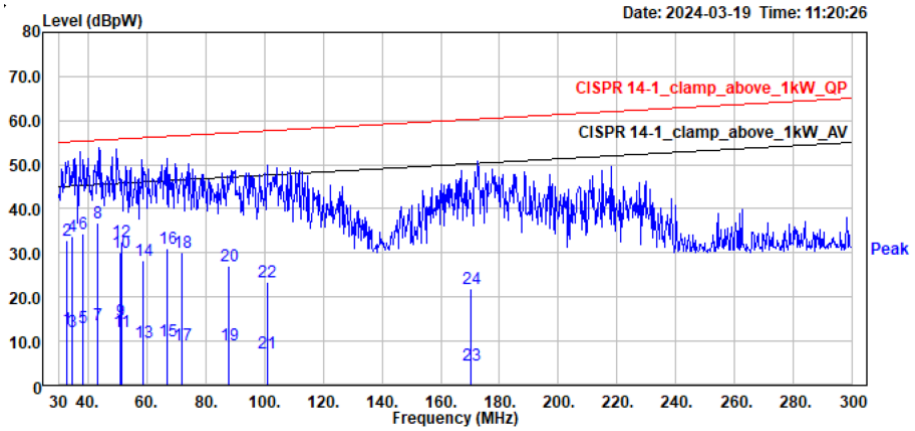
Remark:

1. " orange color " means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level – Limit.

Remark	

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

Result for sample no.: 6180795-2



		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
		MHz	dBpW	dB	dBpW	dBpW	dB		
1		32.754	-12.30	25.00	12.70	45.08	-32.38		Average
2		32.754	7.81	25.00	32.81	55.08	-22.27		QP
3		34.802	-12.65	24.83	12.18	45.16	-32.98		Average
4		34.802	9.00	24.83	33.83	55.16	-21.33		QP
5		38.138	-11.54	24.55	13.01	45.28	-32.27		Average
6		38.138	9.69	24.55	34.24	55.28	-21.04		QP
7		43.385	-10.21	24.01	13.80	45.48	-31.68		Average
8	PP	43.385	12.78	24.01	36.79	55.48	-18.69		QP
9	AV	50.870	-8.68	23.38	14.70	45.75	-31.05		Average
10		50.870	6.80	23.38	30.18	55.75	-25.57		QP
11		51.235	-11.16	23.41	12.25	45.77	-33.52		Average
12		51.235	9.12	23.41	32.53	55.77	-23.24		QP
13		58.915	-14.33	24.17	9.84	46.05	-36.21		Average
14		58.915	4.18	24.17	28.35	56.05	-27.70		QP
15		67.010	-12.82	22.74	9.92	46.35	-36.43		Average
16		67.010	8.34	22.74	31.08	56.35	-25.27		QP
17		72.015	-13.13	22.22	9.09	46.54	-37.45		Average
18		72.015	8.00	22.22	30.22	56.54	-26.32		QP
19		87.675	-14.08	23.14	9.06	47.12	-38.06		Average
20		87.675	4.08	23.14	27.22	57.12	-29.90		QP
21		100.840	-15.50	22.73	7.23	47.60	-40.37		Average
22		100.840	0.63	22.73	23.36	57.60	-34.24		QP
23		170.190	-17.10	21.77	4.67	50.17	-45.50		Average
24		170.190	0.23	21.77	22.00	60.17	-38.17		QP

Remark:

1. " orange color " means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level – Limit.

Remark	

4.3 **Harmonic current emissions**	**VERDICT: PASS**

Standard	EN IEC 61000-3-2	
Exlusions (For these categories of equipment, limits are not specified in the EN 61000-3-2 standard)	☐	Arc welding equipment intended for professional use.
	☐	System(s) with nominal voltage(s) less than 220 V_{AC} (line-to-neutral).
	☐	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 dimmers for incandescent lamps with rated power ≤ 1 kW.

Classification			
☒	Class A	All apparatus not classified as Class B, C or D	
☐	Class B	Portable tools	
☐	Class C	☐	Lighting equipment with active input power > 25 W
		☐	Lighting equipment with active input power ≤ 25 W (First requirement, Table 3 column 2)
		☐	Lighting equipment with active input power ≤ 25 W (Second requirement)
☐	Class D	Personal computers, television receivers	

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).				
Operating mode(s) used	Mode 1					
Remark	---					

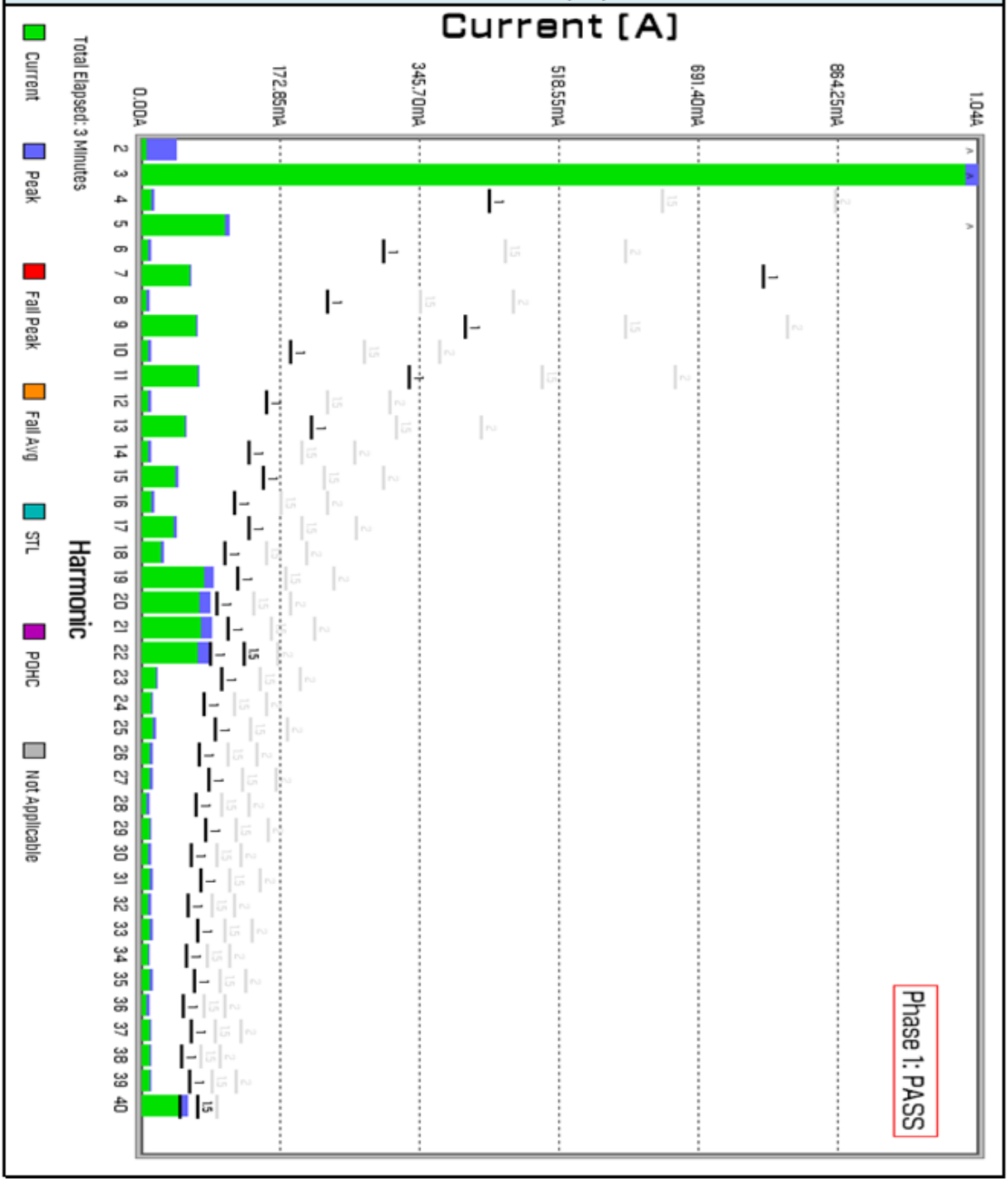
Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 220 Vac/ 50 Hz

Results and limits for 6180795-2

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

Equipment Under Test	
Brand	AGP
Model	SCS8
Serial	N/A

Harmonics Results Graph 1/1



Measurement data	Port under test	AC mains power input

Extra Test Information			
Current THDG	2945.20%		
	Average	Peak	Limit
THC	1.052A	1.061A	N/A
POHC	84.603mA	96.586mA	251.375mA
Voltage Crest Factor	1.711	2.378	N/A
Current Crest Factor	3.74	6.912	N/A

Harmonics Results 1/1

Harmonic	Status	Avg (A)	Avg L(A)	Avg %ofL	Peak (A)	Peak L(A)	Peak %ofL
1	PASS	5.2765	No Limit	N/A	5.3253	No Limit	N/A
2	PASS	0.007858	1.08	0.727602	0.045468	1.62	2.80667
3	PASS	1.0224	2.3	44.4522	1.0371	3.45	30.0609
4	PASS	0.012726	0.43	2.95953	0.017874	0.645	2.77116
5	PASS	0.1035	1.14	9.07895	0.11051	1.71	6.46257
6	PASS	0.009145	0.3	3.04837	0.013517	0.45	3.00378
7	PASS	0.059735	0.77	7.75779	0.062948	1.155	5.45004
8	PASS	0.007861	0.23	3.41787	0.011559	0.345	3.35043
9	PASS	0.067851	0.4	16.9627	0.071502	0.6	11.917
10	PASS	0.009102	0.184	4.9469	0.012563	0.276	4.55181
11	PASS	0.069651	0.33	21.1064	0.072734	0.495	14.6937
12	PASS	0.008452	0.15333	5.51255	0.012027	0.229995	5.22924
13	PASS	0.05421	0.21	25.8143	0.055747	0.315	17.6975
14	PASS	0.009052	0.13143	6.88724	0.012294	0.197145	6.23602
15	PASS	0.042954	0.15	28.636	0.045777	0.225	20.3453
16	PASS	0.013066	0.115	11.3617	0.017126	0.1725	9.92812
17	PASS	0.040858	0.13235	30.8712	0.044508	0.198525	22.4193
18	PASS	0.023951	0.10222	23.4308	0.029131	0.15333	18.9989
19	PASS	0.07749	0.11842	65.4366	0.090338	0.17763	50.8574
20	PASS	0.0728	0.092	79.1304	0.086221	0.138	62.479
21	PASS	0.075166	0.10714	70.1568	0.088314	0.16071	54.9524
22	PASS	0.07043	0.083636	84.2102	0.08511	0.125454	67.8416
23	PASS	0.019335	0.097826	19.7647	0.021613	0.146739	14.7289
24	PASS	0.012826	0.076667	16.7295	0.015717	0.115001	13.6669
25	PASS	0.015051	0.09	16.7233	0.017912	0.135	13.2681
26	PASS	0.010089	0.070769	14.2562	0.014247	0.106154	13.4211
27	PASS	0.011713	0.083333	14.0557	0.015209	0.125	12.1672
28	PASS	0.006758	0.065714	10.2832	0.01055	0.098571	10.7029
29	PASS	0.010952	0.077586	14.1159	0.013603	0.116379	11.6885
30	PASS	0.008262	0.061333	13.4707	0.011958	0.092	12.9979
31	PASS	0.010919	0.072581	15.0439	0.014083	0.108872	12.9354
32	PASS	0.009402	0.0575	16.3518	0.013617	0.08625	15.7878
33	PASS	0.011048	0.068182	16.2037	0.014296	0.102273	13.9783
34	PASS	0.008028	0.054118	14.835	0.011579	0.081177	14.2639
35	PASS	0.010972	0.064286	17.0675	0.013921	0.096429	14.4365
36	PASS	0.006938	0.051111	13.5738	0.0107	0.076667	13.9566
37	PASS	0.010591	0.060811	17.4163	0.01384	0.091217	15.1727
38	PASS	0.010363	0.048421	21.4019	0.013851	0.072632	19.0702
39	PASS	0.010241	0.057692	17.7512	0.013437	0.086538	15.5273
40	PASS	0.047515	0.046	103.293	0.057817	0.069	83.7928

Remark	

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

Standard	EN 61000-3-3

Limits

P_{ST} (Short term flicker)	☐	≤ 1	☒	Not Applicable
P_{LT} (Long term flicker)	☐	≤ 0,65	☒	Not Applicable
d_C (Relative Voltage change)	☒	≤ 3,3%	☐	Not Applicable
d_{MAX} (Max. voltage change)	☐	≤ 4%	☐	6%
	☒	7%	☐	Not Applicable
Supplemental information:				

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				
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	Mode1/ 230 Vac/ 50 Hz	

Results and limits for 6180795-2

T-max (dt > 3.3%)	0 ms
Maximum voltage change d_{MAX}	0.62 %
Relative Voltage change d_C	0.04 %
Short term flicker P_{ST}	Not applicable
Long term flicker P_{LT}	Not applicable

Remark	

5 IMMUNITY TEST RESULTS

5.1 Performance (Compliance) criteria

[According to 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 : function status
☐	Timing	☐	Others :
☐	Illumination	☐	Others :
Supplementary information :			

Immunity test	**Monitored - Checked function(s)/parameter(s) during / after the test**	**Method**
Electrostatic discharge	Tool speed / function status	Visual
Radio-frequency electromagnetic fields	---	Visual / Camera/ tachometer
Fast transients	Tool speed / function status	Visual
Surge transient	Tool speed / function status	Visual
Injected currents (radio-frequency common mode)	Tool speed / function status	Visual
Voltage dips and short interruptions	Tool speed / function 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 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

Set-up	☒	Table-top	☐	Floor standing	
Ambient temperature [°C]	18 °C			Relative Humidity air [%]	55 %
Voltage – Mains [V]	110 Vac / 230 Vac				
Frequency – Mains [Hz]	60 Hz / 50 Hz				
Operating mode(s) used	Mode 1				

Test Point		Test Voltage [kV] & Polarity	Coupling type	# of applied discharges / polarity	Discharge interval [s]
☒	Points on conductive surface.	±4	Contact	10	1
☒	Points on non-conductive surface.	±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 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 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 and Control lines [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.

[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]	110 Vac / 230 Vac			
Frequency – Mains [Hz]	60 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: unsymmetric mode

Port(s) under test	Test Voltage &Polarity	Repetition Frequency	Test duration / polarity	Injection method			
AC / DC mains power input	1 kV	5 KHz	2 min	☒	CDN	☐	Clamp
AC / DC power output		5 KHz		☐	CDN	☐	Clamp
Ethernet / LAN		5 KHz		☐	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 was observed.						

5.5 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 IEC 55014-2
Basic standard	EN 61000-4-5
Pulse characteristics	1.2/50 µs Voltage; 8/20 µs 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

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

Performed tests

Voltage – Mains [V]	110 Vac / 230 Vac
Frequency – Mains [Hz]	60 Hz / 50 Hz
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:					

5.6	**Injected currents (RF common mode) 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 IEC 55014-2		
Basic standard		EN 61000-4-6		
Frequency range		Modulation	Step size	Dwell time
☐	0.15 – 80 MHz	80 % AM (1 kHz)	≤ 1%	≥ 0,5 s
☒	0.15 – 230 MHz	80 % AM (1 kHz)	≤ 1%	≥ 0,5 s
Port			Test level, *U*o	
☒	AC input-output power [1)]		3 V	
☐	DC input-output power [2) 3)]		1 V	
☐	Signal and Control lines [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 (1 kHz)	1 %
Voltage – Mains [V]		110 Vac / 230 Vac		Frequency – Mains [Hz]	60Hz / 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.		

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

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 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 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 Criteria
		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
120	L-N	0	/	0.5	10	3	0, 180
120	L-N	40	/	12	10	3	0, 180
120	L-N	70	/	30	10	3	0, 180

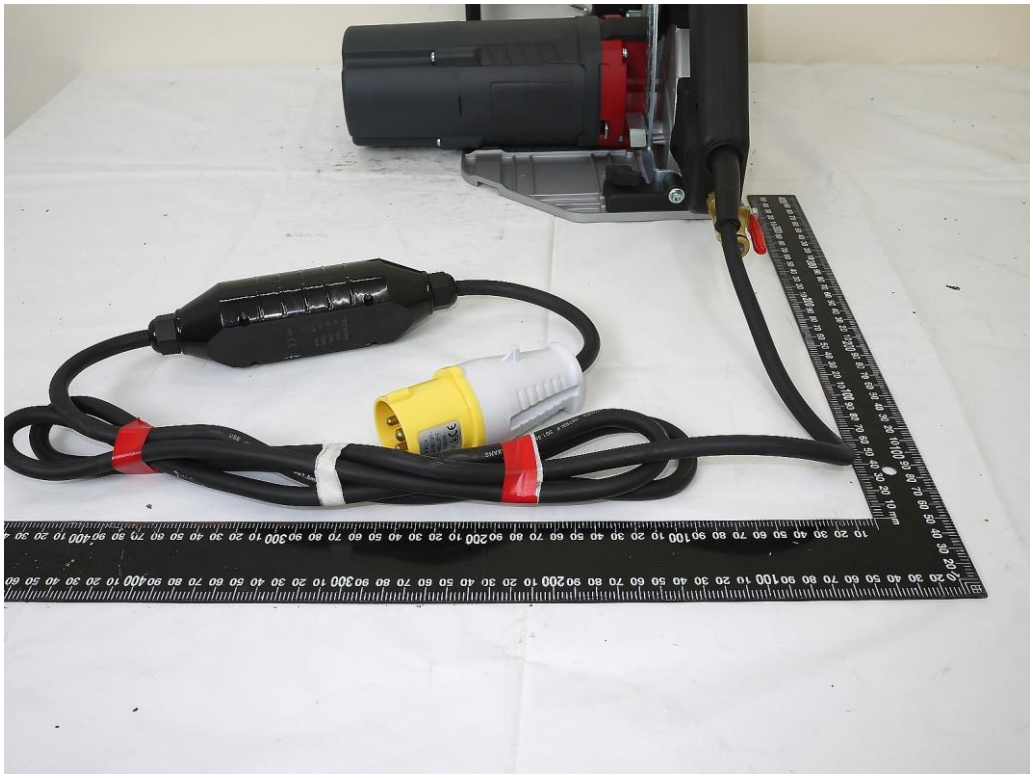
Operating mode(s) used	Mode 1
Observation(s)	During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance was observed.

Supplementary information:

6 IDENTIFICATION OF THE EQUIPMENT UNDER TEST

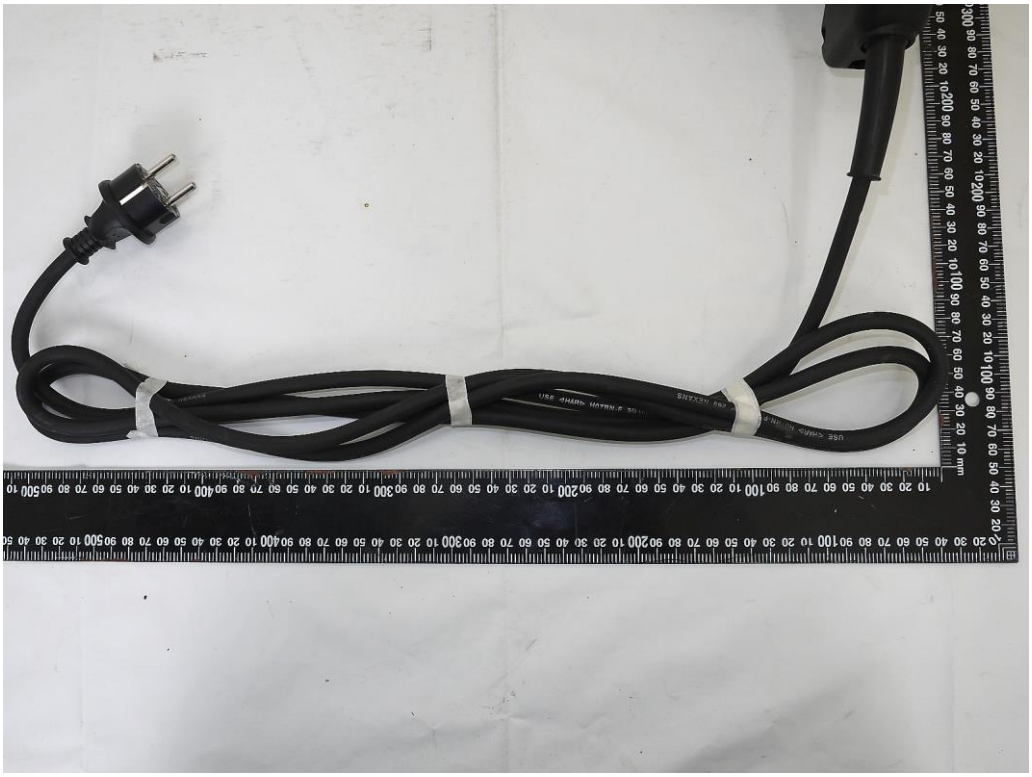
EUT PHOTOS

SCS8 (110-120 V)



SCS8 (110-120 V)

SCS8 (230-240 V)



SCS8 (230-240 V)

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 %.

Electromagnetic Interference			
Measurement Item	**Measurement Frequency**	**Polarization**	**Uncertainty**
Conducted Emission	150 kHz ~ 30 MHz	LINE / NEUTRAL	± 3.44dB
Absorbing clamp test	30MHz ~ 300MHz	Voltage	± 4.37dB
Harmonic current emission	-	-	± 0.53%
voltage fluctuations and flicker	-	-	± 0.44%
Electromagnetic Susceptibility			
Measurement		**Item**	**Uncertainty**
Electrostatic Discharges (ESD)		--	Rise time Tr ± 12.71% ns Voltage peak ± 1.74%V Peak current Ip ± 3.35% A Current at 30 ns ± 3.47% ns Current at 60 ns ± 3.47% ns
Electrical Fast Transients and bursts		--	CDN & Clamp V peak ± 12.82% V Rise time ± 9.25% ns Pulse width ±6.25% ns
Surges		--	V peak = ± 9.75% V Rise time = ± 14.54% us Duration = ± 2.04% us
Conducted Disturbances, induced by RF fields		--	M2/M3/M5 ± 1.40 dB Clamp ± 3.21 dB
Voltage Dips, Interruptions, and variations		--	± 1.61% V

8 ANNEX 2 - USED EQUIPMENT

Conducted disturbance					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Receiver	R&S	ESHS10	835499/012	10/30/2023	10/29/2024
LISN	INTRX	LIN63-4	1803001	03/12/2024	03/12/2025
LISN	Schwarzbeck	NSLK-8127	01071	7/6/2023	7/5/2024
Coaxial Cable	SUHNER	RG214	C001-1358175	6/21/2023	6/20/2024
Attenuator	JYEBAO	FAT-NM5NF5T6G2W10	ATT002	10/24/2023	10/23/2024
test software	Audix	E3	20180316b	NA	NA

Disturbance power					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI test receiver	R&S	ESR7	102004	4/28/2023	4/27/2024
Absorbing clamp	AMETEK CTS Europe GmbH	MDS21	60696	6/14/2023	6/13/2024
Coaxial cable	HUBER+SHUNER	RG223	C002	6/13/2023	6/12/2024
Attenuator	AMETEK CTS Europe GmbH	ATT6dB	LE263	6/13/2023	6/12/2024
test software	Audix	E3	20180316b	NA	NA

Harmonic current emissions & Voltage changes, voltage fluctuations and flicker					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Power source	N4L	N4A30	91J-12901	4/14/2023	4/13/2024
Flicker Impedance Network	N4L	IMP323	91G-12804	4/14/2023	4/13/2024
power Analyzer	N4L	PPA5531	166-05417	4/14/2023	4/13/2024
Test software	N4L	IEC_Soft	2.6	NA	NA

Electrostatic discharge immunity					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
ESD Simulator	NoiseKen	ESS-S3011A	ESS1848144	02/03/2024	02/02/2025
ESD Gun	NoiseKen	GT-30RA	ESS1848164	02/03/2024	02/02/2025
Thermometer	Elitech	GSP-6	EFG22A102880	3/12/2024	3/11/2025

Fast transient immunity					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EFT Burst Generator	EMCLioncel	EFT-406CB	180803	02/16/2024	02/15/2025
Coupling Decoupling	EMCLioncel	CDN-433CB	180801	02/16/2024	02/15/2025

Networks					
EMC clamp	EMCLioncel	EFTC	18071802	02/15/2024	02/14/2025

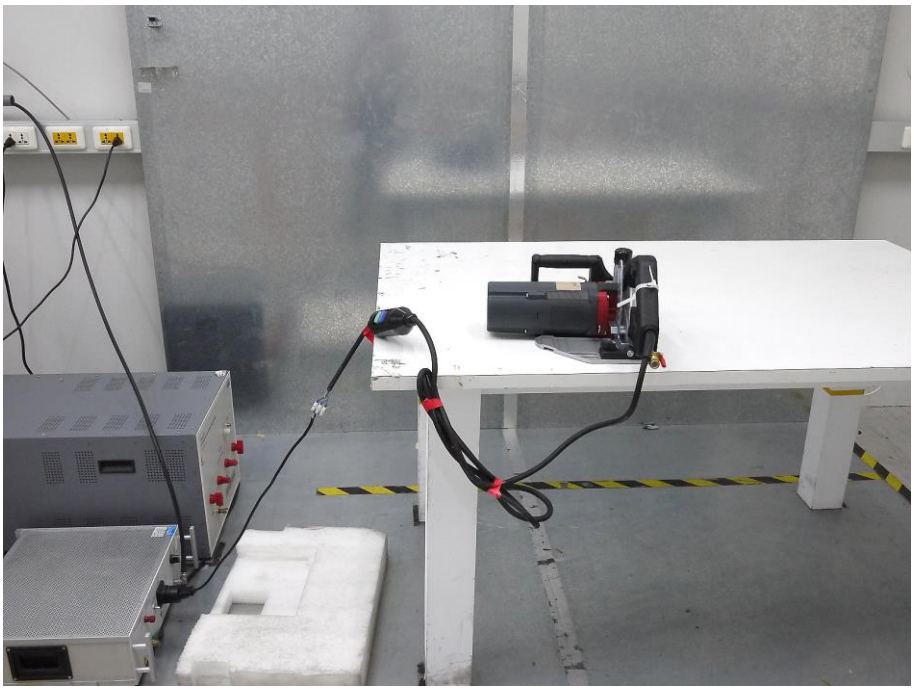
Surge immunity					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Surge controller	EMCLioncel	SCU-614A+	0180202	NA	NA
Surge generator	EMCLioncel	LSG-510CB+	0171101	02/16/2024	02/15/2025
coupling Device Network	EMCLioncel	CDN-5310P	0180302	02/16/2024	02/15/2025

Injected currents immunity					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Signal generator	Keysight	N5171B	MY57281132	3/12/2024	3/11/2025
Power Amplifier	fflight communication	NTWPA-4K0100	18103215	NA	NA
100W attunator	JPT	JPTATT-03-6	ATT17001	3/13/2024	3/12/2025
Couple device network	EMC Liconcel	CDN-M5-32	181001	5/10/2023	5/9/2024
Couple device network	EMC Liconcel	CDN-M3-16	181103	5/10/2023	5/9/2024
Couple device network	EMC Liconcel	CDN-M2-16	018074	5/10/2023	5/9/2024
EM Clamp	FRANKONIA	EMCL-20	18101672-0113	5/10/2023	5/9/2024
Power sensor	Keysight	U2004A	MY57420018	3/12/2024	3/11/2025
test software	Audix	I2	20181211	NA	NA

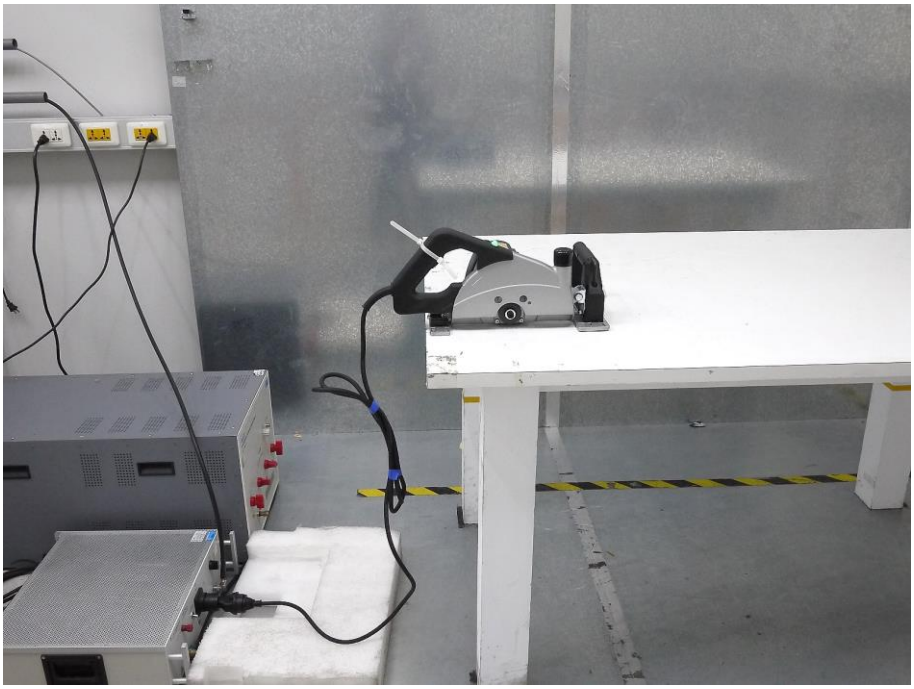
Voltage dips and short interruptions immunity					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Power source	N4L	N4A30	91J-12901	02/15/2024	02/14/2025
Voltage drop simulator	EMCLioncel	VDS-1103	21101	02/15/2024	02/14/2025
Adjust power module	EMCLioncel	RGL-232	21101	02/15/2024	02/14/2025

9 ANNEX 3 - TEST PHOTOS

Conducted disturbance at mains terminals



SCS8 (110-120 V)



SCS8 (230-240 V)

Disturbance power

SCS8 (110-120 V) between EUT and protector

SCS8 (110-120 V) before than protector

SCS8 (230-240 V)

Harmonic current emissions & Voltage changes, voltage fluctuations and flicker

SCS8 (230-240 V)

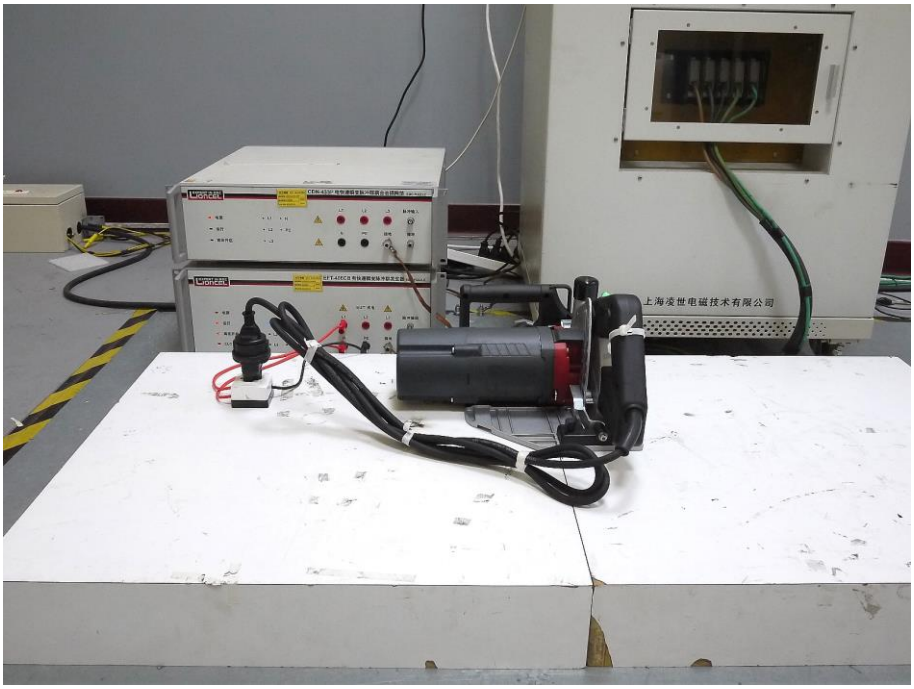
Electrostatic discharge immunity

SCS8 (110-120 V)

SCS8 (230-240 V)

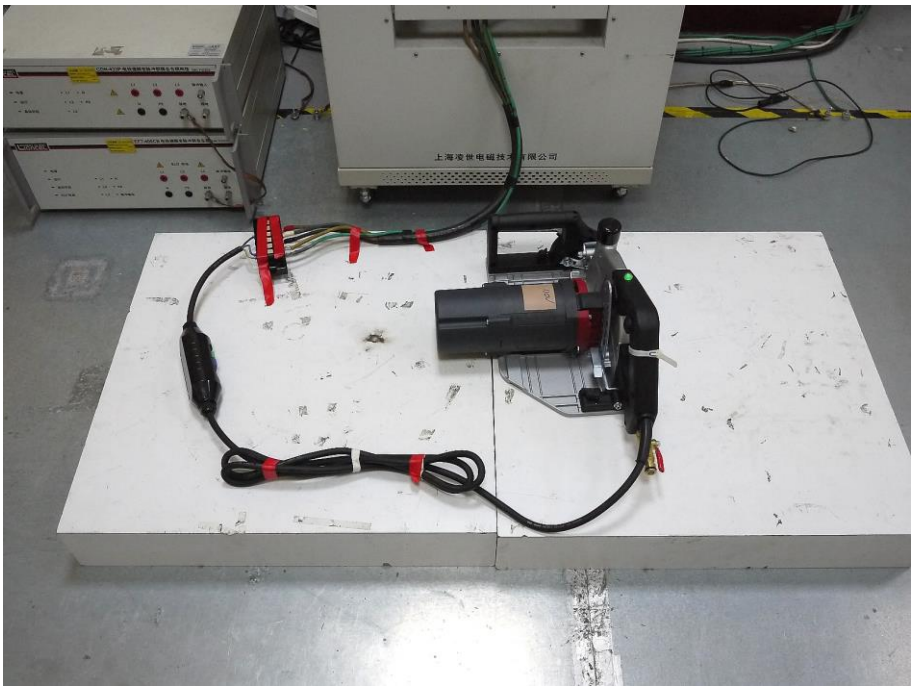
Fast transients

SCS8 (110-120 V)



SCS8 (230-240 V)

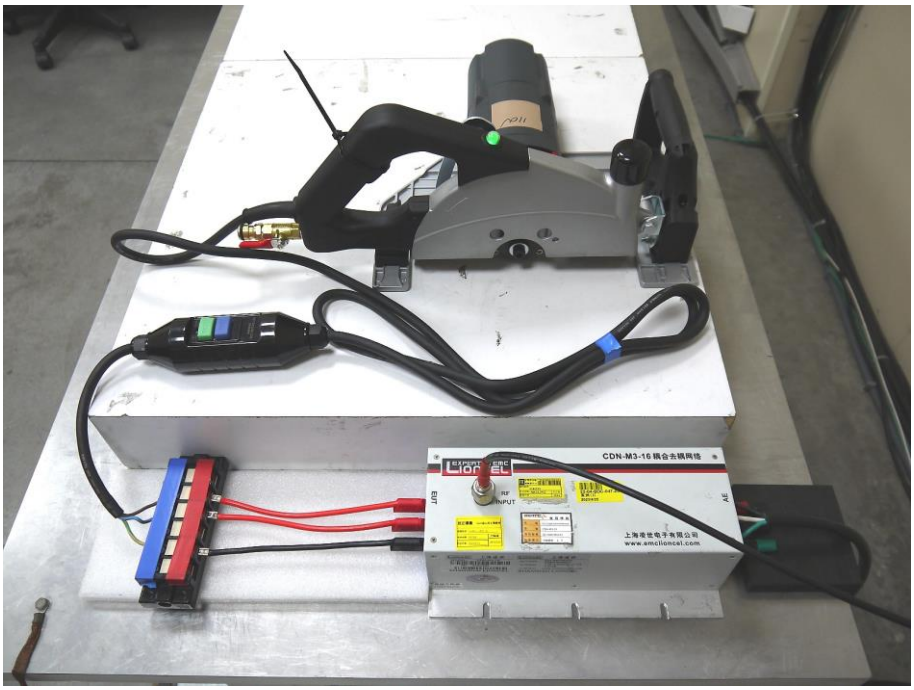
Surges



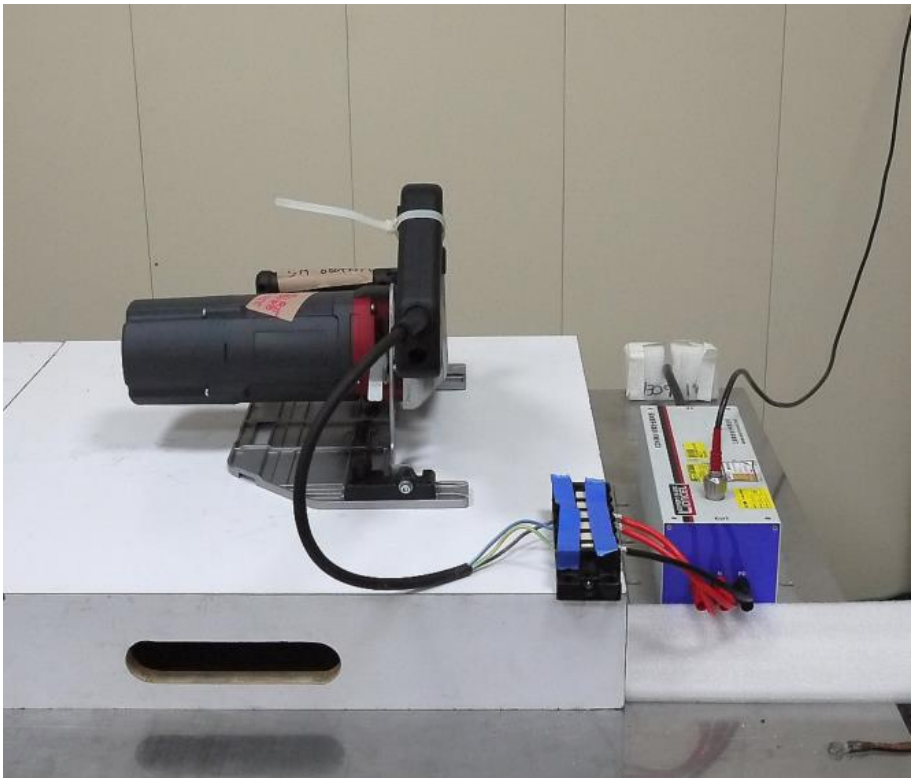
SCS8 (110-120 V)

SCS8 (230-240 V)

Injected currents (radio-frequency common mode) immunity

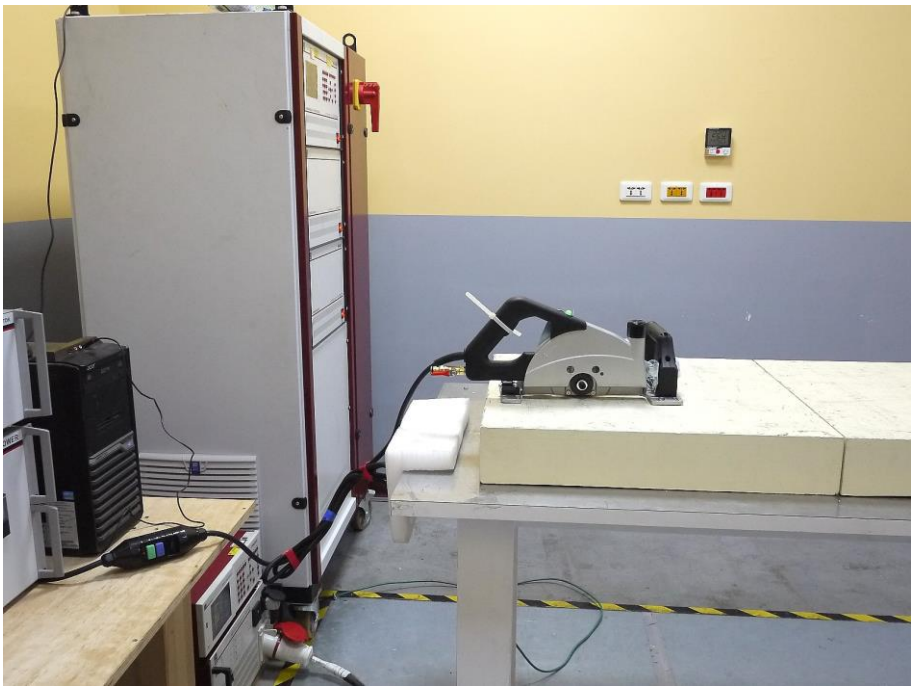


SCS8 (110-120 V)

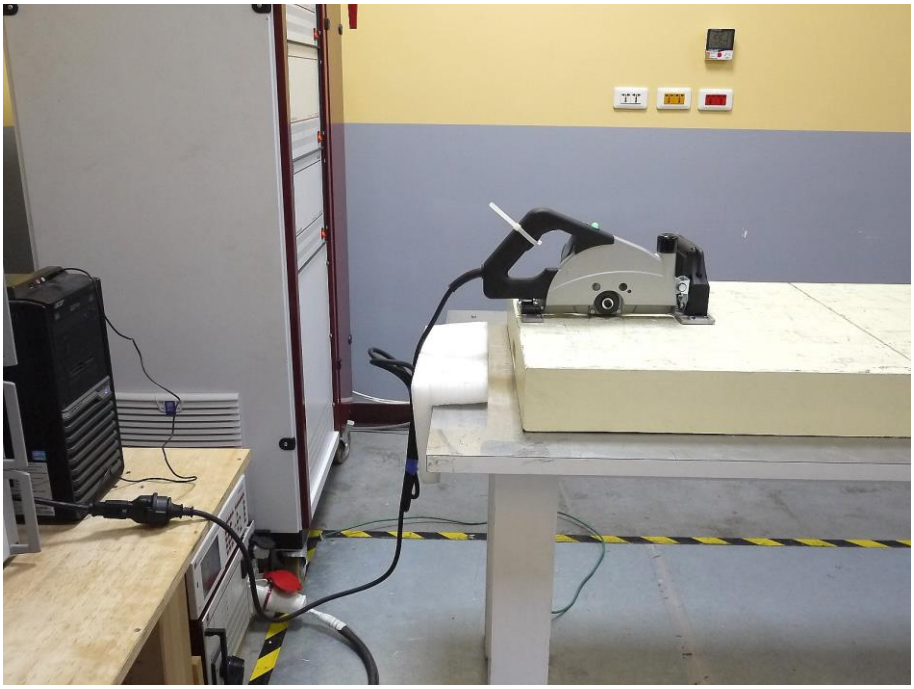


SCS8 (230-240 V)

Voltage dips and short interruptions immunity



SCS8 (110-120 V)



SCS8 (230-240 V)

End of the report