DEKRA Testing and Certification (Shanghai) Ltd.
3F #250 Jiangchangsan Road Building 16 Headquarter Economy Park Shibei Hi-Tech Park,
Zhabei District Shanghai 200436 China
TEL: +86-21-6056 7666 / FAX: +86-21-6056 7555

This report will not be used for social proof function in China market.

Test report No:
6047407.50

TEST REPORT
Electromagnetic Compatibility (EMC)

Identification of item tested	Air Assisted Airless Paint Sprayer/ Electric Airless Sprayer
Trademark	AGP
Model and /or type reference	PM021; SLP-1100A; P21; S1021; EP21T; STPA21T; PM021LF; QP021LF; SLP-1101; P21LF; S1021LF; QP021; EP21H; STPA21S; PM025; PM025LF; QP025LF; SLP-1100B; FARBMAX Airless 2700; STPA25T; FE-AIRLESS 4001; P25; S1025; QP025; EP25; AC023; QPA023; SLP-A1113; AA23; S1323; EP23-AC; AIRLESS VERFPOMP FE-7001; 2560-261000; 2560-241000; QT290; 2560-281300
Ratings	PM021; SLP-1100A; P21; S1021; EP21T; STPA21T; PM021LF; QP021LF;SLP-1101; P21LF; S1021LF; QP021; EP21H; STPA21S; 2560-261000; 2560-241000: 110-120 V or 220-240 V; 50-60 Hz; 1000 W; Class I PM025; PM025LF; QP025LF; SLP-1100B; FARBMAX Airless 2700; STPA25T; FE-AIRLESS 4001; P25; S1025; QP025; EP25; QT290; 2560-281300: 110-120 V or 220-240 V; 50-60 Hz; 1300 W; Class I AC023; QPA023; SLP-A1113; AA23; S1323; EP23-AC; AIRLESS VERFPOMP FE-7001: 110-120 V or 220-240 V; 50-60 Hz; 1300 W; Class I
Test Laboratory / address	DEKRA Testing and Certification (Shanghai) Ltd. 3F #250 Jiangchangsan Road Building 16 Headquarter Economy Park Shibei Hi-Tech Park, Zhabei District Shanghai 200436 China
Applicant / address	LEE YEONG INDUSTRIAL CO., LTD. No.2, Kejia Rd., Douliu City, Yunlin County 64057, Taiwan
Test method requested, standard	EN 55014-1:2006+A1:2009+A2:2011 EN 55014-1:2017; EN 55014-2:2015; EN 61000-3-2:2014; EN 61000-3-3:2013
Verdict Summary	IN COMPLIANCE

Tested by	Kaiyuan Dai (Project Engineer) 
Approved by	Zuyao Fan (Project Manager) 
Date of issue	2019-02-20
Report template No	TRF_EN55014-1_EN55014-2_EMC02 V1.0

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%.

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

DOCUMENT HISTORY

Report nr.	Date	Description
6047407.50	2019-02-20	First release

Modification 1 report:
The original Test Report Ref. 6041659.50 dated 2018-11-02 include the following changes and/or addition, which were considered technical modifications.
- Add the new models 2560-261000; 2560-241000 which are the same as PM021except model's name.
- Add the new models QT290; 2560-281300 which are the same as PM025 except model's name.
- 2560-261000; 2560-241000; QT290; 2560-281300 share the same construction and components, only the models' names and rated input of them are different.
After review, no test is considered necessary.

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.

According to the declaration from manufacturer, all models are identical except the AC023 have an air assistant motor. Model AC023 is an air assisted airless paint sprayer, others are electric airless sprayer.

Due to the similarity between them, model AC023 was selected for the full tests and the corresponding data is representative for other models as well.

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Description of the item .....:	Air Assisted Airless Paint Sprayer /Electric Airless Sprayer
Model / Type number .....:	PM021; SLP-1100A; P21; S1021; EP21T; STPA21T; PM021LF; QP021LF; SLP-1101; P21LF; S1021LF; QP021; EP21H; STPA21S; PM025; PM025LF; QP025LF; SLP-1100B; FARBMAX Airless 2700; STPA25T; FE-AIRLESS 4001; P25; S1025; QP025; EP25; AC023; QPA023; SLP-A1113; AA23; S1323; EP23-AC; AIRLESS VERFPOMP FE-7001; 2560-261000; 2560-241000; QT290; 2560-281300
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: 220-240 V, 50-60 Hz	☒	☐	☐	☒	☐
	☒	AC: 110-120 V, 50-60 Hz	☒	☐	☐	☒	☐
	☐	DC: 18 V					
	☐	Battery powered					
Rated Power .....:	PM021; SLP-1100A; P21; S1021; EP21T; STPA21T; PM021LF; QP021LF;SLP-1101; P21LF; S1021LF; QP021; EP21H; STPA21S; 2560-261000; 2560-241000: 110-120 V or 220-240 V; 50-60 Hz; 1000 W; Class I PM025; PM025LF; QP025LF; SLP-1100B; FARBMAX Airless 2700; STPA25T; FE-AIRLESS 4001; P25; S1025; QP025; EP25; QT290; 2560-281300: 110-120 V or 220-240 V; 50-60 Hz; 1300 W; Class I AC023; QPA023; SLP-A1113; AA23; S1323; EP23-AC; AIRLESS VERFPOMP FE-7001: 110-120 V or 220-240 V; 50-60 Hz; 1300 W; Class I					
Clock frequencies .....:	Not provided						
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 air coat paint sprayer/electric airless sprayer can only use guns for spraying non-flammable materials. The models in this report are identical except that AC023 have an air assistant motor. AC023 is an air assisted airless paint sprayer, others are electric airless sprayer.

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:

Note:

Marking labels of SLP-A1113; AA23; S1323; EP23-AC; AIRLESS VERFPOMP FE-7001; QPA023 are same as AC023, only the models' names are different.

Marking labels of SLP-1100B; FARBMAX Airless 2700; STPA25T; FE-AIRLESS 4001; P25; S1025; QP025; EP25; PM025LF; QP025LF; QT290; 2560-281300 are same as PM025, only the models' names are different.

Marking labels of SLP-1100A; P21; S1021; EP21T; STPA21T; PM021LF; QP021LF;SLP-1101; P21LF; S1021LF; QP021; EP21H; STPA21S; 2560-261000; 2560-241000 are same as PM021, only the models' names are different.

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

Location	Global Certification Corp.
Address	No.146, Sec. 2, Xiangzhang Rd., Xizhi Dist., New Taipei City 221, Taiwan
Date	Sep. 2011
Supervised by	Kaiyuan Dai

1.4 Classification according to EN 55014-2

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

☐	**Category I:** Apparatus containing no electronic control circuitry. Examples: Motor operated appliances, lighting toys, track sets without electronic control units, tools, heating appliances, UV and IR radiators and apparatus containing components such as electromechanical switches and thermostats. 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:** Transformer toys, dual supply toys, mains powered motor operated appliances, tools, heating appliances and similar electric apparatus (for example – UV radiators, IR radiators and microwave ovens) containing electronic control circuitry with no internal clock frequency or oscillator frequency higher than 15 MHz.
☐	**Category III:** Battery powered apparatus (with built-in batteries or external batteries), which in normal use is not connected to the mains, containing an electronic control circuitry with no internal clock frequency or oscillator frequency higher than 15 MHz.
☐	**Category IV:** All other apparatus covered by the scope of the EN 55014-2 standard.
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	Normal operation	☒	☐
2		☐	☐
3		☐	☐
4		☐	☐
5		☐	☐
6		☐	☐
Supplemental information:			

2.2 Port(s) of the EUT

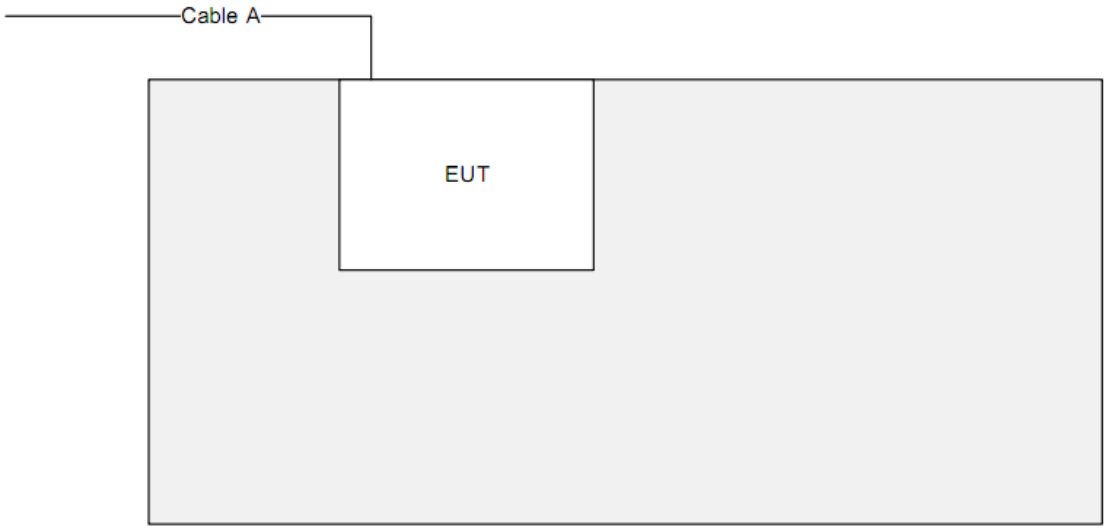
Port name and description	Connected to / Termination	Cable		
		Length used during test [m]	Attached during test	Shielded
N/A			☐	☐
			☐	☐
			☐	☐
			☐	☐
			☐	☐
Supplemental information:				

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

Test Configuration / Block diagram


Cable Type		Signal cable Description
A	Mains Cable	Non-Shielded, 1 m, 3pin

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 55014-1 +A1 +A2	2006 2009 2011	Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission.
EN 55014-1	2017 [1)]	
EN 55016-2-1	2014	Methods of measurement of disturbances and immunity - Conducted disturbance measurements.
EN 55016-2-2	2010	Methods of measurement of disturbances and immunity – Measurement of disturbance power.
EN 55016-2-3 +A1 +A2	2010 2010 2014	Methods of measurement of disturbances and immunity - Radiated disturbance measurements.
EN 61000-3-2	2014	Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
EN 61000-3-3	2013	Limitation of voltage fluctuations and flicker
EN 55014-2	2015 [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	2014	Surge immunity test.
EN 61000-4-6	2014	Immunity to conducted disturbances, induced by radio-frequency fields.
EN 61000-4-11	2004	Voltage dips, short interruptions and voltage variations immunity tests.

[1)] Not harmonized yet.

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

No deviation.

3.3 Overview of results

EMISSION TESTS – EN 55014-1			
Requirement – Test case	**Basic standard(s)**	**Verdict**	**Remark**
Conducted disturbance voltage at mains terminals (150 KHz – 30 MHz)	EN 55016-2-1	PASS	---
Conducted disturbance voltage at load terminals (150 KHz – 30 MHz)	EN 55016-2-1	N/A	---
Conducted disturbance voltage at additional terminals (150 KHz – 30 MHz)	EN 55016-2-1	N/A	---
Disturbance power (30 MHz to 300 MHz)	EN 55016-2-2	PASS	See 2)
Radiated electromagnetic disturbances (30 - 1000 MHz)	EN 55016-2-3	N/A	---
Discontinuous disturbance (clicks) on AC power leads	EN 55014-1	N/A	See 1)
Supplementary information: 1) Exemptions from click measurements applicable (clause 4.2.3). 2) According to clause 4.1.2.3.2 procedure (a) of the EN 55014-1 standard the EUT is deemed to comply in the frequency range from 300 MHz to 1000 MHz without further measurements.			

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

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

4 EMISSION TEST RESULTS

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

Standard	EN 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

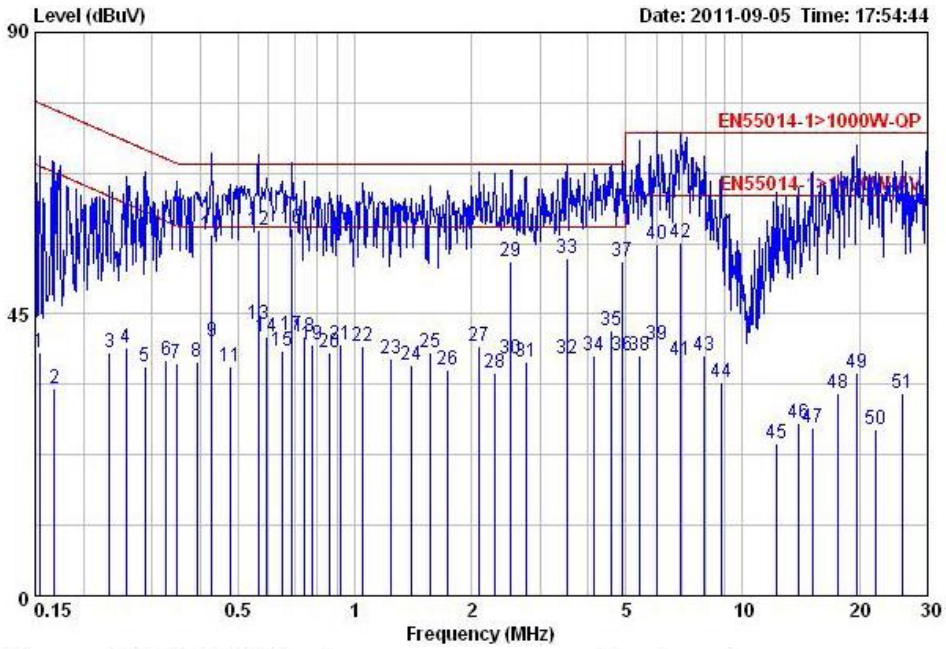
Performed measurements

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

Voltage – Mains [V]	264 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	---			

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 264 Vac/ 50 Hz

Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.15	28.48	10.25	38.73	68.69	-29.96	Average
2	0.17	22.81	10.25	33.06	67.62	-34.56	Average
3	0.23	28.54	10.24	38.78	63.81	-25.03	Average
4	0.26	29.29	10.24	39.53	62.62	-23.09	Average
5	0.29	26.27	10.25	36.52	61.31	-24.79	Average
6	0.33	27.37	10.25	37.62	59.81	-22.19	Average
7	0.35	26.75	10.25	37.00	59.12	-22.12	Average
8	0.39	27.23	10.25	37.48	59.00	-21.52	Average
9	0.43	30.40	10.25	40.65	59.00	-18.35	Average
10	0.43	47.31	10.25	57.56	69.00	-11.44	QP
11	0.48	26.40	10.25	36.65	59.00	-22.35	Average
12	0.56	48.09	10.25	58.34	69.00	-10.66	QP
13	0.56	33.15	10.25	43.40	59.00	-15.60	Average
14	0.59	31.00	10.25	41.25	59.00	-17.75	Average
15	0.65	28.73	10.26	38.99	59.00	-20.01	Average
16	0.69	48.31	10.26	58.57	69.00	-10.43	QP
17	0.69	31.41	10.26	41.67	59.00	-17.33	Average

Remark	

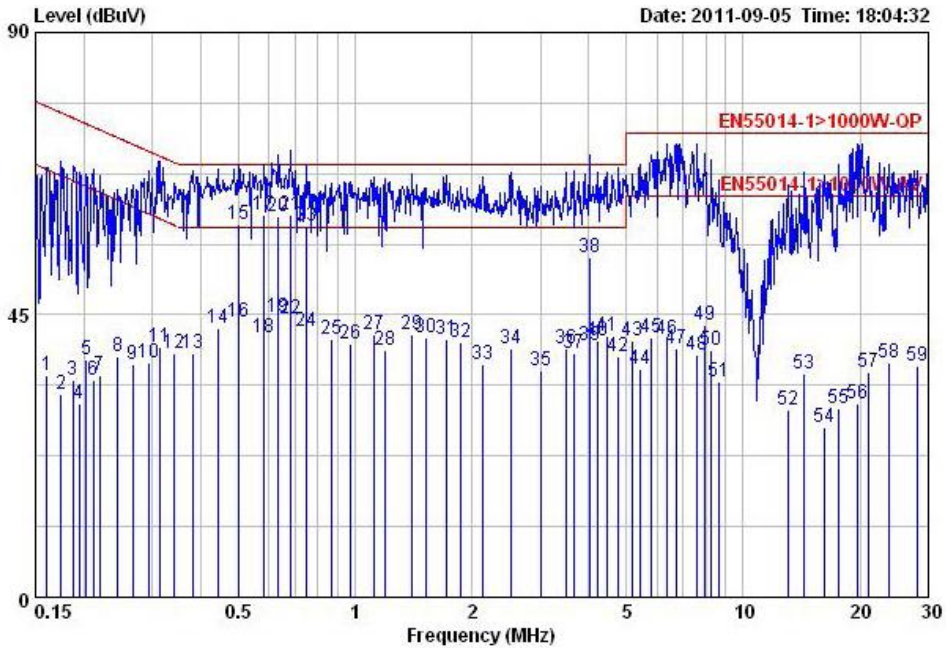
Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 264 Vac/ 50 Hz

18	0.74	31.01	10.25	41.26	59.00	-17.74	Average
19	0.78	29.81	10.25	40.06	59.00	-18.94	Average
20	0.86	28.58	10.25	38.83	59.00	-20.17	Average
21	0.92	29.76	10.25	40.01	59.00	-18.99	Average
22	1.05	29.65	10.25	39.90	59.00	-19.10	Average
23	1.24	27.68	10.25	37.93	59.00	-21.07	Average
24	1.40	26.55	10.25	36.80	59.00	-22.20	Average
25	1.56	28.55	10.26	38.81	59.00	-20.19	Average
26	1.73	25.73	10.25	35.98	59.00	-23.02	Average
27	2.10	29.66	10.26	39.92	59.00	-19.08	Average
28	2.30	25.40	10.25	35.65	59.00	-23.35	Average
29	2.53	43.15	10.25	53.40	69.00	-15.60	QP
30	2.53	27.66	10.25	37.91	59.00	-21.09	Average
31	2.76	27.04	10.25	37.29	59.00	-21.71	Average
32	3.55	27.71	10.24	37.95	59.00	-21.05	Average
33	3.55	43.62	10.24	53.86	69.00	-15.14	QP
34	4.14	28.11	10.24	38.35	59.00	-20.65	Average
35	4.60	32.08	10.24	42.32	59.00	-16.68	Average
36	4.90	28.07	10.24	38.31	59.00	-20.69	Average
37	4.90	43.16	10.24	53.40	69.00	-15.60	QP
38	5.45	28.17	10.25	38.42	64.00	-25.58	Average
39	6.02	29.94	10.24	40.18	64.00	-23.82	Average
40	6.02	45.93	10.24	56.17	74.00	-17.83	QP
41	6.91	27.29	10.25	37.54	64.00	-26.46	Average
42	6.91	46.27	10.25	56.52	74.00	-17.48	QP
43	7.98	28.11	10.25	38.36	64.00	-25.64	Average
44	8.82	23.93	10.25	34.18	64.00	-29.82	Average
45	12.25	14.17	10.24	24.41	64.00	-39.59	Average
46	13.91	17.22	10.25	27.47	64.00	-36.53	Average
47	15.15	16.47	10.24	26.71	64.00	-37.29	Average
48	17.57	22.18	10.20	32.38	64.00	-31.62	Average
49	19.64	25.44	10.17	35.61	64.00	-28.39	Average
50	22.06	16.40	10.19	26.59	64.00	-37.41	Average
51	25.73	22.03	10.18	32.21	64.00	-31.79	Average

Remark	

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 264 Vac/ 50 Hz

Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.16	24.18	11.15	35.33	68.19	-32.86	Average
2	0.17	21.20	11.14	32.34	67.19	-34.85	Average
3	0.19	23.54	11.14	34.68	66.37	-31.69	Average
4	0.19	19.59	11.14	30.73	65.94	-35.21	Average
5	0.20	26.64	11.14	37.78	65.44	-27.66	Average
6	0.21	23.44	11.14	34.58	64.94	-30.36	Average
7	0.22	24.19	11.14	35.33	64.50	-29.17	Average
8	0.24	27.22	11.14	38.36	63.25	-24.89	Average
9	0.27	26.02	11.14	37.16	62.18	-25.02	Average
10	0.29	26.19	11.13	37.32	61.06	-23.74	Average
11	0.31	28.72	11.13	39.85	60.25	-20.40	Average
12	0.34	27.72	11.13	38.85	59.25	-20.40	Average
13	0.38	27.76	11.13	38.89	59.00	-20.11	Average
14	0.44	31.64	11.13	42.77	59.00	-16.23	Average
15	0.50	48.32	11.13	59.45	69.00	-9.55	QP
16	0.50	32.80	11.13	43.93	59.00	-15.07	Average
17	0.58	49.85	11.13	60.98	69.00	-8.02	QP

Remark	

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 264 Vac/ 50 Hz

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
18	0.58	30.20	11.13	41.33	59.00	-17.67	Average
19	0.63	33.37	11.13	44.50	59.00	-14.50	Average
20	0.63	49.55	11.13	60.68	69.00	-8.32	QP
21	0.68	49.75	11.13	60.88	69.00	-8.12	QP
22	0.68	33.37	11.13	44.50	59.00	-14.50	Average
23	0.75	48.12	11.12	59.24	69.00	-9.76	QP
24	0.75	31.22	11.12	42.34	59.00	-16.66	Average
25	0.87	29.97	11.12	41.09	59.00	-17.91	Average
26	0.97	29.20	11.12	40.32	59.00	-18.68	Average
27	1.12	30.82	11.13	41.95	59.00	-17.05	Average
28	1.20	28.31	11.12	39.43	59.00	-19.57	Average
29	1.40	30.79	11.12	41.91	59.00	-17.09	Average
30	1.52	30.11	11.13	41.24	59.00	-17.76	Average
31	1.73	29.99	11.12	41.11	59.00	-17.89	Average
32	1.88	29.39	11.13	40.52	59.00	-18.48	Average
33	2.13	26.00	11.13	37.13	59.00	-21.87	Average
34	2.51	28.44	11.12	39.56	59.00	-19.44	Average
35	3.01	24.91	11.12	36.03	59.00	-22.97	Average
36	3.49	28.50	11.12	39.62	59.00	-19.38	Average
37	3.66	27.78	11.11	38.89	59.00	-20.11	Average
38	4.01	43.13	11.11	54.24	69.00	-14.76	QP
39	4.01	28.92	11.11	40.03	59.00	-18.97	Average
40	4.22	29.84	11.11	40.95	59.00	-18.05	Average
41	4.45	30.39	11.11	41.50	59.00	-17.50	Average
42	4.77	27.36	11.11	38.47	59.00	-20.53	Average
43	5.17	29.71	11.11	40.82	64.00	-23.18	Average
44	5.45	25.32	11.11	36.43	64.00	-27.57	Average
45	5.80	30.27	11.10	41.37	64.00	-22.63	Average
46	6.35	29.94	11.11	41.05	64.00	-22.95	Average
47	6.73	28.52	11.11	39.63	64.00	-24.37	Average
48	7.61	27.51	11.10	38.61	64.00	-25.39	Average
49	7.94	32.35	11.10	43.45	64.00	-20.55	Average
50	8.28	28.35	11.10	39.45	64.00	-24.55	Average
51	8.64	23.22	11.11	34.33	64.00	-29.67	Average
52	13.06	18.74	11.05	29.79	64.00	-34.21	Average
53	14.36	24.53	11.03	35.56	64.00	-28.44	Average
54	16.23	15.94	11.05	26.99	64.00	-37.01	Average
55	17.57	19.09	11.06	30.15	64.00	-33.85	Average
56	19.64	19.86	11.09	30.95	64.00	-33.05	Average
57	21.04	24.78	11.04	35.82	64.00	-28.18	Average
58	23.76	26.44	10.95	37.39	64.00	-26.61	Average
59	28.00	26.15	10.73	36.88	64.00	-27.12	Average

Remark	

4.2 **Conducted disturbance voltage– Load terminals**	**VERDICT: N/A**

Standard	EN 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	80	70	9 KHz	QP, CAV
5,0 - 30	74	64	9 KHz	QP, CAV

[1)] At the transition frequency, the lower limit applies.

Performed measurements

Port(s) / Terminal(s) under test			
☐	(please write the name of the port under test)	☐	Other:
☐	Other:	☐	Other:

Voltage – Mains [V]	(Please write the voltage/voltages used for testing)			
Frequency – Mains [Hz]	(Please write the frequency/frequencies used for testing)			
Test method applied	☐	Voltage probe		
	☐	ISN – Impedance Stabilisation Network		
	☐	CDN according to EN / IEC 61000-4-6		
	☐	Current probe		
	☐	Artificial mains network		
Test setup	☐	Table top	☐	Artificial hand applied
	☐	Floor standing	☐	Other:
	Refer to the Annex 3 for test setup photo(s).			
Operating mode(s) used	Please write the operating mode(s) used during testing			
Remark	---			

4.3 **Conducted disturbance voltage– Additional terminals**	**VERDICT: N/A**

Standard	EN 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	80	70	9 KHz	QP, CAV
5,0 - 30	74	64	9 KHz	QP, CAV

[1)] At the transition frequency, the lower limit applies.

Performed measurements

Port(s) / Terminal(s) under test			
☐	(please write the name of the port under test)	☐	Other:
☐	Other:	☐	Other:

Voltage – Mains [V]	(Please write the voltage/voltages used for testing)			
Frequency – Mains [Hz]	(Please write the frequency/frequencies used for testing)			
Test method applied	☐	CDN according to EN / IEC 61000-4-6		
	☐	ISN – Impedance Stabilisation Network		
	☐	Voltage probe		
	☐	Current probe		
	☐	Artificial mains network		
	☐	Other:		
Test setup	☐	Table top	☐	Artificial hand applied
	☐	Floor standing	☐	Other:
	Refer to the Annex 3 for test setup photo(s).			
Operating mode(s) used	Please write the operating mode(s) used during testing			
Remark	---			

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

Standard	EN 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.

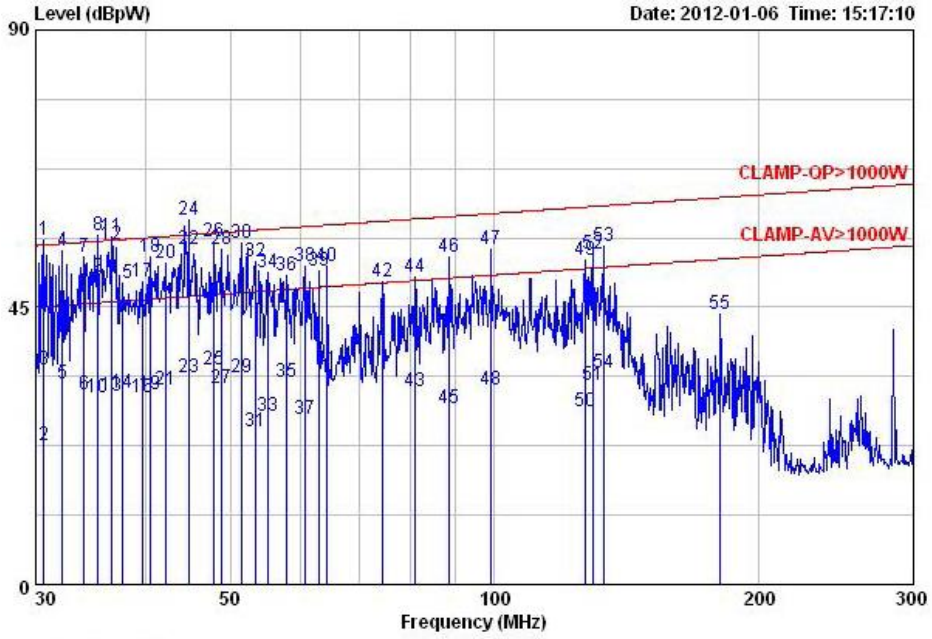
☐	Rated power below 700 W	Limits as above
☐	Rated power between 700 and 1000 W	Limits +4 dB
☒	Rated power above 1000 W	Limits +10 dB

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}	☐	230 V_{AC}
Voltage – Mains [V]	264 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 “Margin” applied and passed				
	☐	Maximum clock frequency < 30 MHz				
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/ 264 Vac/ 50 Hz



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBpW	dB	dBpW	dBpW	dB	
1 X	30.63	40.08	15.78	55.86	55.10	0.76	Peak
2	30.63	6.83	15.78	22.61	45.10	-22.49	Average
3	30.63	18.96	15.78	34.74	55.10	-20.36	QP
4	32.15	38.44	15.72	54.16	55.31	-1.15	Peak
5	32.15	16.80	15.72	32.52	45.31	-12.79	Average
6	34.05	15.11	15.66	30.77	45.56	-14.79	Average
7	34.05	37.45	15.66	53.11	55.56	-2.45	Peak
8 X	35.33	40.90	15.63	56.53	55.72	0.81	Peak
9	35.33	34.22	15.63	49.85	55.72	-5.87	QP
10	35.33	14.74	15.63	30.37	45.72	-15.35	Average
11 X	36.57	40.83	15.59	56.42	55.87	0.55	Peak
12	36.57	39.55	15.59	55.14	55.87	-0.73	QP
13	36.57	14.97	15.59	30.56	45.87	-15.31	Average
14	37.68	15.61	15.56	31.17	46.00	-14.83	Average
15	37.68	33.37	15.56	48.93	56.00	-7.07	Peak
16	39.64	14.93	15.51	30.44	46.22	-15.78	Average
17	39.64	33.68	15.51	49.19	56.22	-7.03	Peak

Remark	

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 264 Vac/ 50 Hz

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
		MHz	dBµV	dB	dBµV	dBµV	dB	
18		40.47	37.66	15.48	53.14	56.31	-3.17	Peak
19		40.47	15.28	15.48	30.76	46.31	-15.55	Average
20		42.18	36.86	15.40	52.26	56.49	-4.23	Peak
21		42.18	16.18	15.40	31.58	46.49	-14.91	Average
22		44.78	39.20	15.30	54.50	56.75	-2.25	QP
23		44.78	18.26	15.30	33.56	46.75	-13.19	Average
24	X	44.78	43.87	15.30	59.17	56.75	2.42	Peak
25		47.88	19.76	15.18	34.94	47.04	-12.10	Average
26		47.88	40.45	15.18	55.63	57.04	-1.41	Peak
27		48.77	16.76	15.15	31.91	47.12	-15.21	Average
28		48.77	39.31	15.15	54.46	57.12	-2.66	Peak
29		51.54	18.45	15.05	33.50	47.36	-13.86	Average
30		51.54	40.41	15.05	55.46	57.36	-1.90	Peak
31		53.35	9.70	15.00	24.70	47.51	-22.81	Average
32		53.35	37.42	15.00	52.42	57.51	-5.09	Peak
33		55.22	12.41	14.93	27.34	47.66	-20.32	Average
34		55.22	35.61	14.93	50.54	57.66	-7.12	Peak
35		57.96	18.00	14.86	32.86	47.87	-15.01	Average
36		57.96	35.17	14.86	50.03	57.87	-7.84	Peak
37		60.69	11.93	14.79	26.72	48.07	-21.35	Average
38		60.69	36.78	14.79	51.57	58.07	-6.50	Peak
39		62.97	36.10	14.74	50.84	58.23	-7.39	Peak
40		64.43	36.97	14.71	51.68	58.33	-6.65	Peak
41		64.43	20.22	14.71	34.93	48.33	-13.40	Average
42		74.49	34.40	14.69	49.09	58.96	-9.87	Peak
43		81.12	16.61	14.74	31.35	49.33	-17.98	Average
44		81.12	35.05	14.74	49.79	59.33	-9.54	Peak

Remark	

4.5 **Radiated electromagnetic disturbances (30 – 1000 MHz)**	**VERDICT: N/A**

Standard	EN 55014-1
Basic standard	EN 55016-2-3
Test method	Antenna method according to EN 55016-2-3 standard.

Limits

Frequency	Limit: QP [dB(µV/m)[1)]]			IF BW	Detector
[MHz]	@3 m.	@5 m.	@10 m.		
30 - 230	40	36	30	120 KHz	QP
230 - 1000	47	43	37	120 KHz	QP
[1)] At the transition frequency, the lower limit applies.					

Performed measurements

Port under test	Enclosure	
Voltage – Mains [V]	(Please write the voltage/voltages used for testing)	
Frequency – Mains [Hz]	(Please write the frequency/frequencies used for testing)	
Test method applied	☒	OATS or SAC with measurement distance [m]: 3 m.
	☐	OATS or SAC with measurement distance [m]: 5 m.
	☐	OATS or SAC with measurement distance [m]: 10 m.
Test setup	☒	Equipment on a table of 80 cm height
	☐	Equipment on the floor (insulated from ground plane)
	☐	Other:
	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Please write the operating mode(s) used during testing	
Remark	---	

4.6 Discontinuous disturbance (clicks) on AC power leads — VERDICT: N/A

Standard	EN 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}	☐	V_{AC}
Voltage – Mains [V]	264 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	---					

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	2			
0,5	56	0	0	0	2			
1,4	56	0	0	0	2			
30	60	0	0	0	2			

☐	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: ---

4.7 **Harmonic current emissions**	**VERDICT: PASS**

Standard	EN 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	

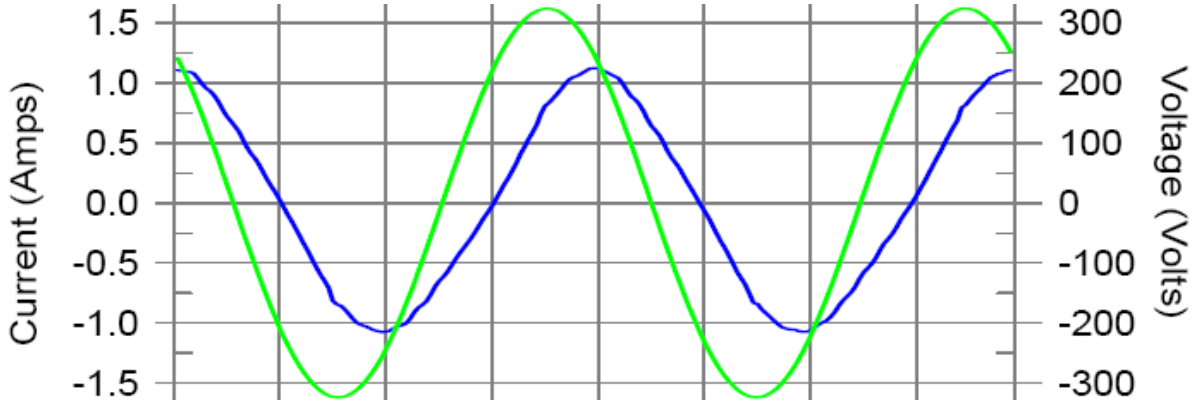
Performed measurements

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						

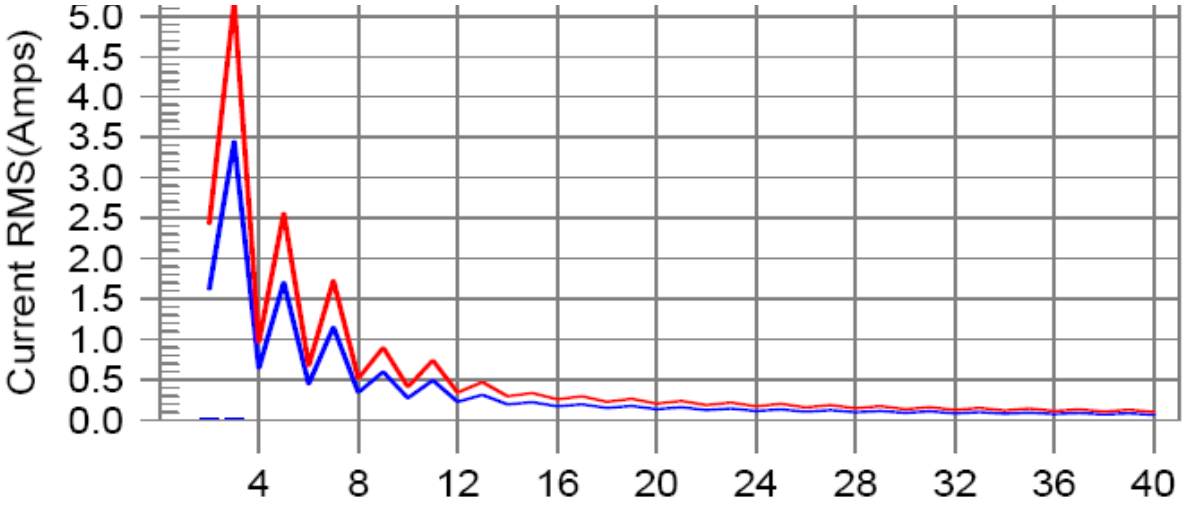
See next page.

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

Current & voltage waveforms



Harmonics and Class B limit line European Limits



Remark	

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

Test Result: Pass **Source qualification: Normal**
THC(A): 0.03 **I-THD(%): 4.35** **POHC(A): 0.000** **POHC Limit(A): 0.480**
Highest parameter values during test:

V_RMS (Volts):	229.36	Frequency(Hz):	50.00
I_Peak (Amps):	1.129	I_RMS (Amps):	0.752
I_Fund (Amps):	0.743	Crest Factor:	1.611
Power (Watts):	131.0	Power Factor:	0.776

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.016	1.620	1.0	0.017	2.430	0.70	Pass
3	0.027	3.450	0.8	0.028	5.175	0.55	Pass
4	0.001	0.645	0.0	0.001	0.968	0.00	Pass
5	0.007	1.710	0.4	0.007	2.565	0.28	Pass
6	0.000	0.450	0.0	0.000	0.675	0.00	Pass
7	0.004	1.155	0.0	0.004	1.733	0.00	Pass
8	0.000	0.345	0.0	0.000	0.518	0.00	Pass
9	0.002	0.600	0.0	0.002	0.900	0.00	Pass
10	0.000	0.276	0.0	0.000	0.414	0.00	Pass
11	0.002	0.495	0.0	0.002	0.743	0.00	Pass
12	0.000	0.230	0.0	0.000	0.344	0.00	Pass
13	0.002	0.315	0.0	0.002	0.473	0.00	Pass
14	0.000	0.197	0.0	0.000	0.296	0.00	Pass
15	0.002	0.225	0.0	0.002	0.338	0.00	Pass
16	0.000	0.173	0.0	0.000	0.259	0.00	Pass
17	0.002	0.199	0.0	0.002	0.297	0.00	Pass
18	0.000	0.153	0.0	0.000	0.230	0.00	Pass
19	0.002	0.178	0.0	0.002	0.266	0.00	Pass
20	0.000	0.138	0.0	0.000	0.207	0.00	Pass
21	0.002	0.161	0.0	0.002	0.241	0.00	Pass
22	0.000	0.125	0.0	0.000	0.188	0.00	Pass
23	0.002	0.147	0.0	0.002	0.220	0.00	Pass
24	0.000	0.115	0.0	0.000	0.173	0.00	Pass
25	0.002	0.135	0.0	0.002	0.203	0.00	Pass
26	0.000	0.106	0.0	0.000	0.159	0.00	Pass
27	0.001	0.125	0.0	0.001	0.188	0.00	Pass
28	0.000	0.099	0.0	0.000	0.148	0.00	Pass
29	0.001	0.116	0.0	0.001	0.175	0.00	Pass
30	0.000	0.092	0.0	0.000	0.138	0.00	Pass
31	0.001	0.110	0.0	0.001	0.163	0.00	Pass
32	0.000	0.086	0.0	0.000	0.129	0.00	Pass
33	0.001	0.102	0.0	0.001	0.153	0.00	Pass
34	0.000	0.081	0.0	0.000	0.122	0.00	Pass
35	0.001	0.096	0.0	0.001	0.145	0.00	Pass
36	0.000	0.077	0.0	0.000	0.115	0.00	Pass
37	0.001	0.092	0.0	0.001	0.137	0.00	Pass
38	0.000	0.073	0.0	0.000	0.109	0.00	Pass
39	0.001	0.087	0.0	0.001	0.130	0.00	Pass
40	0.000	0.069	0.0	0.000	0.104	0.00	Pass

Remark	

4.8 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	

Tmax (dt > 3,3%)	0,0 ms
Maximum voltage change d_{MAX}	0,947%
Relative Voltage change d_C	0,468%
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 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 :
☐	Timing	☐	Others :
☐	Illumination	☐	Others :
Supplementary information :			

Immunity test	**Monitored - Checked function(s)/parameter(s) during / after the test**	**Method**
Electrostatic discharge	PASS	---
Radio-frequency electromagnetic fields	N/A	---
Fast transients	PASS	---
Surge transient	PASS	---
Injected currents (radio-frequency common mode)	PASS	---
Voltage dips and short interruptions	PASS	---
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							
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]	23 °C			Relative Humidity air [%]	46.1%
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: N/A**

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			
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%
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 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		
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]	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.		
Coupling	☒	Common mode	☐	Other:

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.						

5.6 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
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	N/A	90
AC input power [1)]	- 1 kV	N/A	270

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

Performed tests

Voltage – Mains [V]	230 Vac
Frequency – Mains [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: 1. The EUT does not include an earth port.					

5.7	**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 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 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 (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.		

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:				

5.8 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			
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

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

7 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%.

Conducted Emission Expanded Uncertainty: U = 3.38 dB
Disturbance Power Expanded Uncertainty: U = 3.92 dB

8 TEST PHOTOS

Conducted disturbance voltage at mains terminals

Disturbance power

----------END----------