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

Test report No:
6018745.50

TEST REPORT
Electromagnetic Compatibility (EMC)

Identification of item tested	Diamond Core Drill
Trademark	AGP
Model and /or type reference	DM8P; DM8D; DM200P; DM200D; DM200; DM8; DM8R; DM200R; DM8RM; DM200RM; MT-2500
Ratings	220-240 V; 50-60 Hz; 2500 W; n_0=480/1050/2200 min^{-1}; Class I 110-120 V; 50-60 Hz; 2200 W; n_0=480/1050/2200 min^{-1}; 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 55014-1:2017; 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	2019-04-30
Report template No	TRF_EN55014-1_EN55014-2_EMC02 V1.0

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COMPETENCES AND GUARANTEES

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

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

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

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

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

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
6018745.50	2019-04-30	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.

According to the declaration from manufacturer, the model DM8P is the same as other models expect model name.

All test is carried on DM8P.

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Description of the item .....:	Diamond Core Drill
Model / Type number .....:	DM8P; DM8D; DM200P; DM200D; DM200; DM8; DM8R; DM200R; DM8RM; DM200RM; MT-2500
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

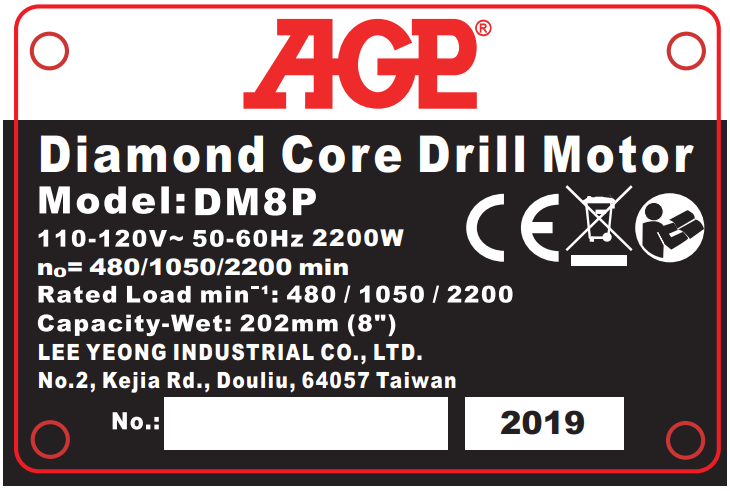
Rated power supply .....:	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☒	AC: 220-240 V, 50-60 Hz	☒	☐	☐	☒	☐
	☒	AC: 110-120 V, 50-60 Hz	☒	☐	☐	☒	☐
	☐	DC: 18 V					
	☐	Battery powered					
Rated Power .....:	220-240 V; 50-60 Hz; 2500 W; 110-120 V; 50-60 Hz; 2200 W;						
Clock frequencies .....:	Not provided						
Other parameters.....:	N/A						
Mounting position.....:	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☒	Hand-held equipment					
	☐	Other:					

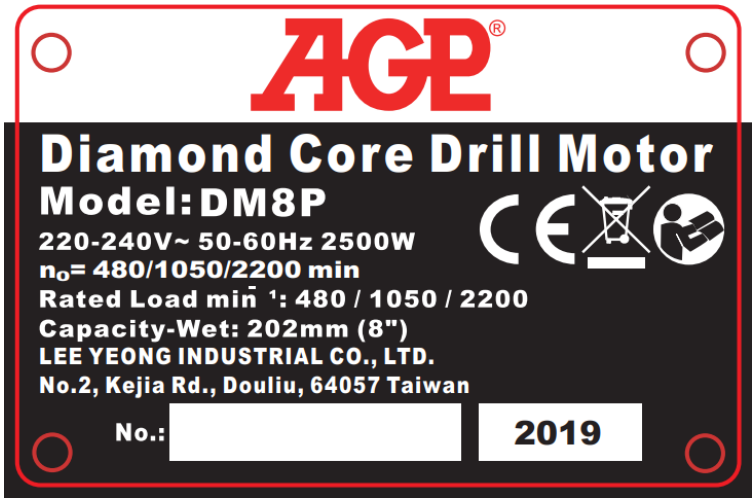
Intended use of the Equipment Under Test (EUT)
This machine is for the intended purpose of diamond core drilling of concrete, masonry, stone and similar materials.

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:





The labels of DM8D; DM200P; DM200D; DM200; DM8; DM8R; DM200R; DM8RM; DM200RM; MT-2500 are same as DM8P, only the models' name 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	February 2019
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:				

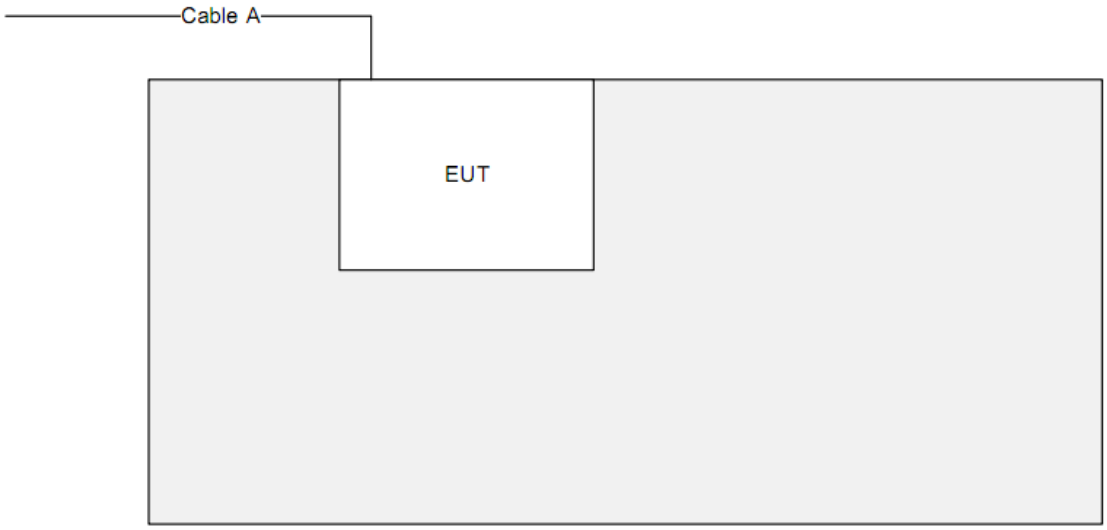
2.3 Support / Auxiliary equipment / unit / software for the EUT

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	2017 [1)]	Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission.
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	N/A	See 1)
Radio-frequency electromagnetic fields	EN 61000-4-3	N/A	See 1)
Fast transients	EN 61000-4-4	N/A	See 1)
Surge transient	EN 61000-4-5	N/A	See 1)
Injected currents (radio-frequency common mode)	EN 61000-4-6	N/A	See 1)
Voltage dips and short interruptions	EN 61000-4-11	N/A	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

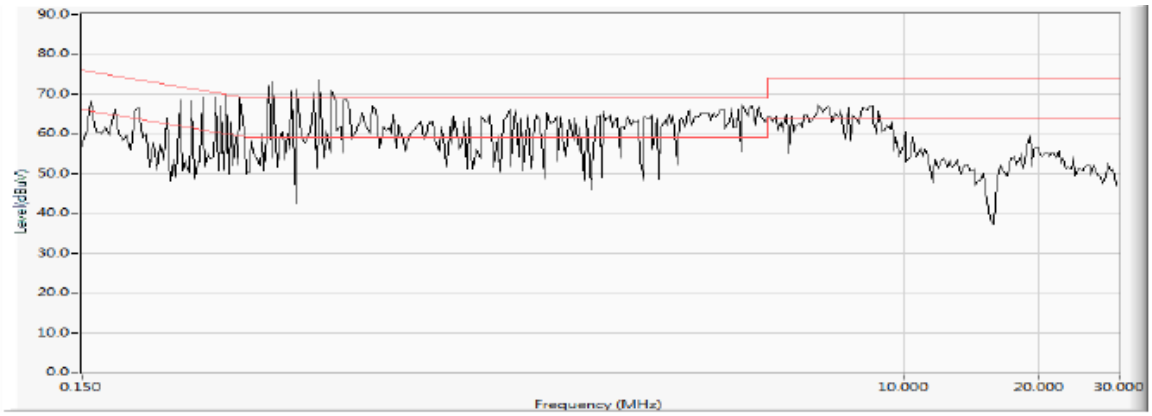
Scan range (0,9 - 1,1 U_N)	☐	198 – 264 V_{AC}	☐	207 – 253 V_{AC}			☒	230 V_{AC}			
Tested terminal(s) / port	☒	AC mains input power	☒	N	☒	L1	☐	L2	☐	L3
	☐	DC mains input power	☐	Positive (+)			☐	Negative (-)		

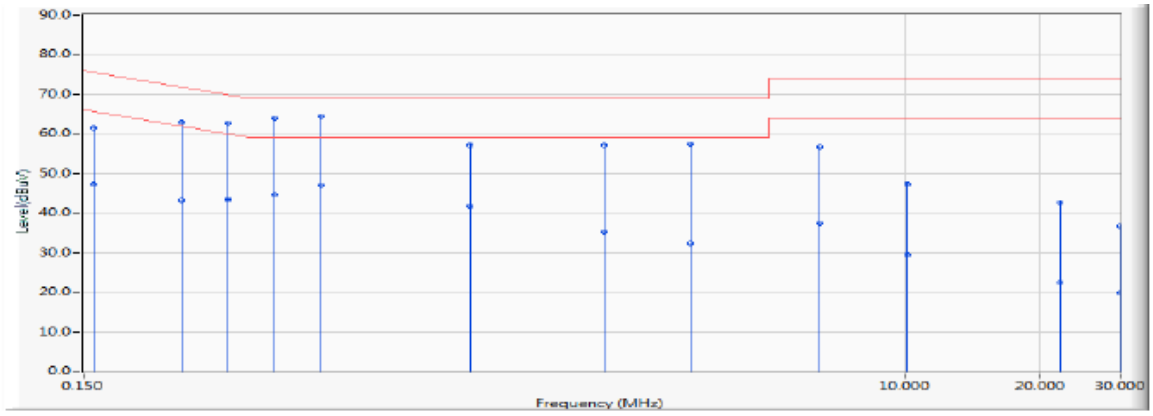
Voltage – Mains [V]	230/ 120 Vac			
Frequency – Mains [Hz]	50/ 60 Hz			
Test method applied	☒	Artificial mains network		
	☐	Voltage probe		
Test setup	☐	Table top	☒	Artificial hand applied
	☐	Floor standing	☐	Other:
	Refer to the Annex 3 for test setup photo(s).			
Operating mode(s) used	Mode 1			
Remark	---			

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

Results for 220-240 v model

Line





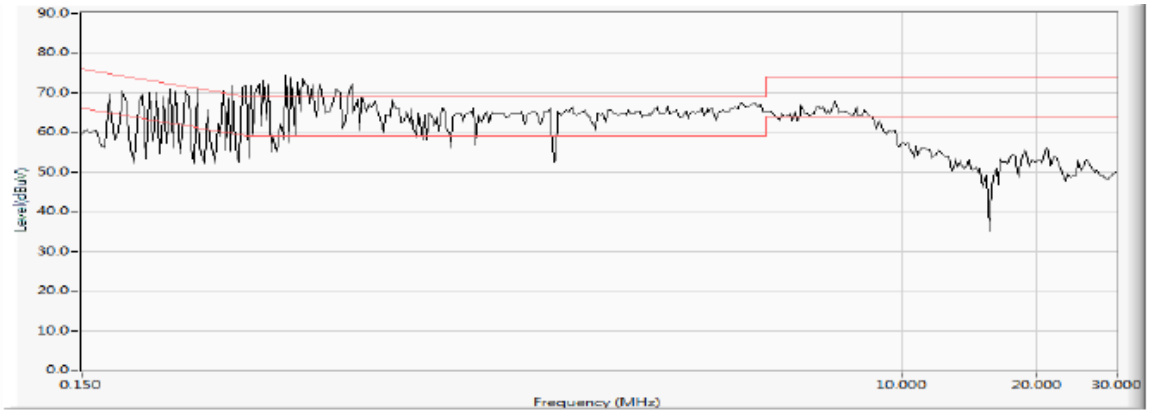
Measurement data	Port under test	AC mains power input

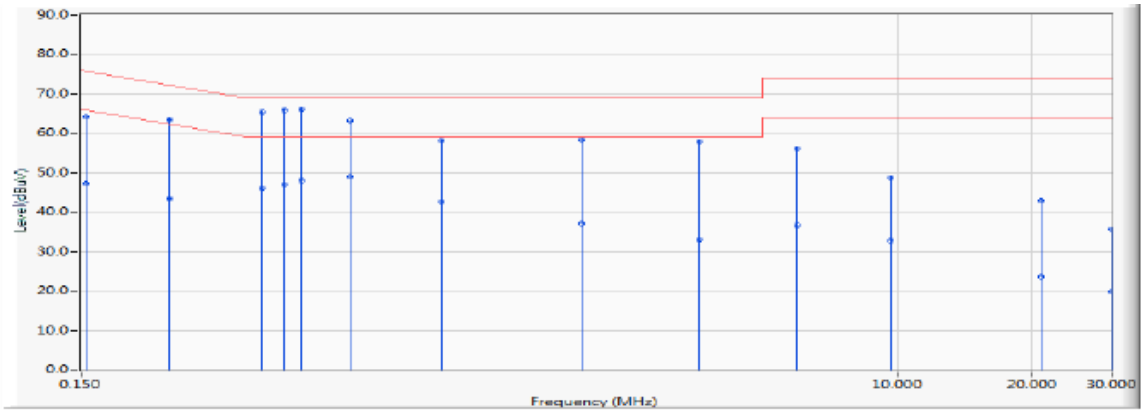
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.158	9.680	51.840	61.520	-14.051	75.571	QUASIPEAK
2		0.158	9.680	37.610	47.290	-21.097	68.387	AVERAGE
3		0.248	9.680	53.410	63.090	-8.756	71.846	QUASIPEAK
4		0.248	9.680	33.430	43.110	-19.956	63.066	AVERAGE
5		0.314	9.680	53.140	62.820	-7.077	69.897	QUASIPEAK
6		0.314	9.680	33.780	43.460	-16.821	60.281	AVERAGE
7		0.400	9.680	54.360	64.040	-4.960	69.000	QUASIPEAK
8		0.400	9.680	35.050	44.730	-14.270	59.000	AVERAGE
9	*	0.505	9.684	54.780	64.464	-4.536	69.000	QUASIPEAK
10		0.505	9.684	37.400	47.084	-11.916	59.000	AVERAGE
11		1.080	9.791	47.430	57.221	-11.779	69.000	QUASIPEAK
12		1.080	9.791	32.020	41.811	-17.189	59.000	AVERAGE
13		2.150	9.801	47.310	57.111	-11.889	69.000	QUASIPEAK
14		2.150	9.801	25.510	35.311	-23.689	59.000	AVERAGE
15		3.349	9.807	47.500	57.307	-11.693	69.000	QUASIPEAK
16		3.349	9.807	22.540	32.347	-26.653	59.000	AVERAGE
17		6.474	9.902	46.920	56.822	-17.178	74.000	QUASIPEAK
18		6.474	9.902	27.610	37.512	-26.488	64.000	AVERAGE
19		10.099	10.095	37.150	47.245	-26.755	74.000	QUASIPEAK
20		10.099	10.095	19.420	29.515	-34.485	64.000	AVERAGE
21		22.029	10.424	32.380	42.804	-31.196	74.000	QUASIPEAK
22		22.029	10.424	12.020	22.444	-41.556	64.000	AVERAGE
23		30.000	10.580	26.190	36.770	-37.230	74.000	QUASIPEAK
24		30.000	10.580	9.110	19.690	-44.310	64.000	AVERAGE

Remark	

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

Neutral





Measurement data	Port under test	AC mains power input

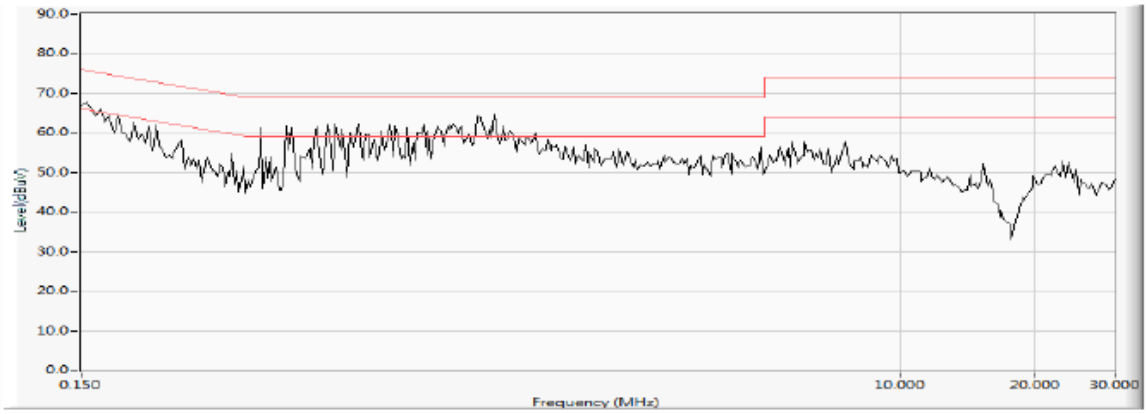
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.154	9.681	54.540	64.221	-11.562	75.783	QUASIPEAK
2		0.154	9.681	37.620	47.301	-21.389	68.689	AVERAGE
3		0.236	9.680	53.790	63.470	-8.786	72.256	QUASIPEAK
4		0.236	9.680	33.850	43.530	-20.121	63.651	AVERAGE
5		0.380	9.680	55.770	65.450	-3.550	69.000	QUASIPEAK
6		0.380	9.680	36.460	46.140	-12.860	59.000	AVERAGE
7		0.427	9.680	56.270	65.950	-3.050	69.000	QUASIPEAK
8		0.427	9.680	37.450	47.130	-11.870	59.000	AVERAGE
9	*	0.466	9.681	56.360	66.041	-2.959	69.000	QUASIPEAK
10		0.466	9.681	38.410	48.091	-10.909	59.000	AVERAGE
11		0.599	9.703	53.480	63.183	-5.817	69.000	QUASIPEAK
12		0.599	9.703	39.210	48.913	-10.087	59.000	AVERAGE
13		0.955	9.780	48.380	58.160	-10.840	69.000	QUASIPEAK
14		0.955	9.780	32.960	42.740	-16.260	59.000	AVERAGE
15		1.966	9.800	48.520	58.320	-10.680	69.000	QUASIPEAK
16		1.966	9.800	27.470	37.270	-21.730	59.000	AVERAGE
17		3.599	9.816	48.140	57.956	-11.044	69.000	QUASIPEAK
18		3.599	9.816	23.170	32.986	-26.014	59.000	AVERAGE
19		5.974	9.879	46.290	56.169	-17.831	74.000	QUASIPEAK
20		5.974	9.879	26.760	36.639	-27.361	64.000	AVERAGE
21		9.681	10.064	38.700	48.764	-25.236	74.000	QUASIPEAK
22		9.681	10.064	22.730	32.794	-31.206	64.000	AVERAGE
23		20.877	10.359	32.490	42.849	-31.151	74.000	QUASIPEAK
24		20.877	10.359	13.300	23.659	-40.341	64.000	AVERAGE
25		30.000	10.450	25.230	35.680	-38.320	74.000	QUASIPEAK
26		30.000	10.450	9.300	19.750	-44.250	64.000	AVERAGE

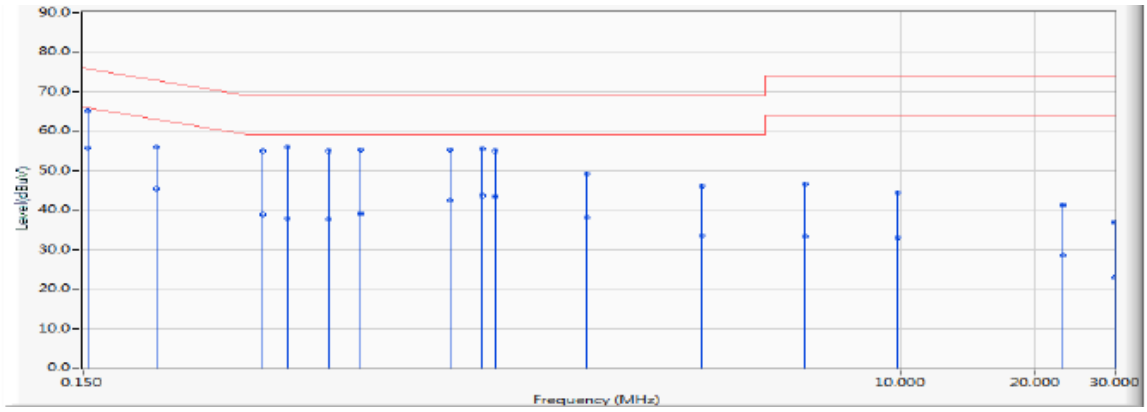
Remark	

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

Results for 110-120 v model

Line





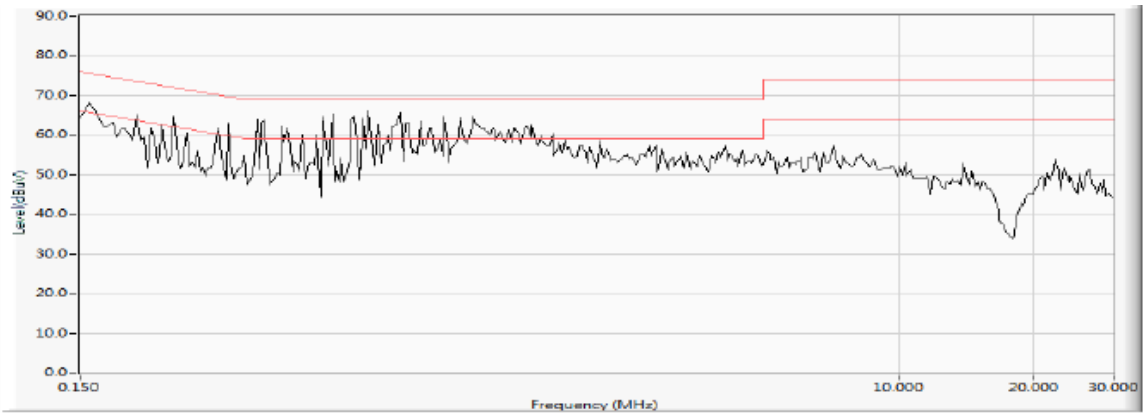
Measurement data	Port under test	AC mains power input

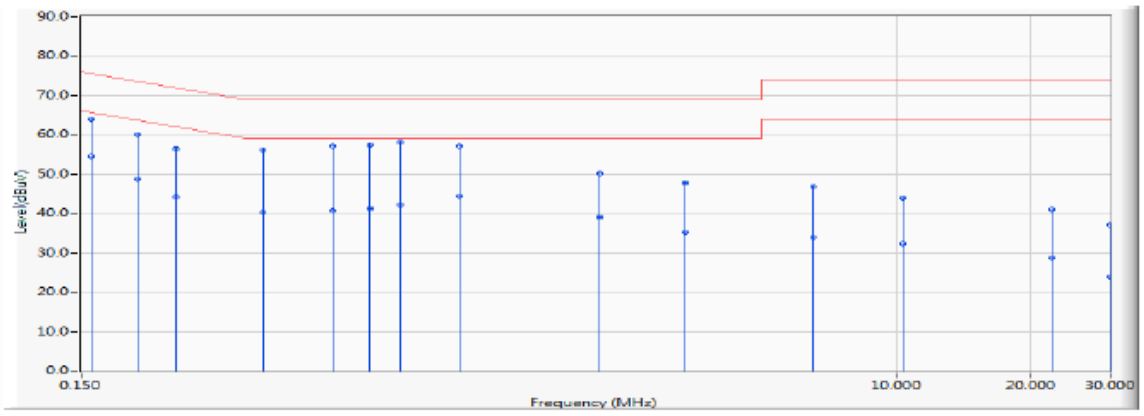
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.154	9.680	55.380	65.060	-10.723	75.783	QUASIPEAK
2		0.154	9.680	46.170	55.850	-12.839	68.689	AVERAGE
3		0.220	9.680	46.380	56.060	-16.776	72.836	QUASIPEAK
4		0.220	9.680	35.730	45.410	-19.070	64.480	AVERAGE
5		0.377	9.680	45.220	54.900	-14.100	69.000	QUASIPEAK
6		0.377	9.680	29.110	38.790	-20.210	59.000	AVERAGE
7		0.431	9.681	46.340	56.021	-12.979	69.000	QUASIPEAK
8		0.431	9.681	28.250	37.931	-21.069	59.000	AVERAGE
9		0.529	9.688	45.380	55.068	-13.932	69.000	QUASIPEAK
10		0.529	9.688	28.050	37.738	-21.262	59.000	AVERAGE
11		0.623	9.708	45.520	55.228	-13.772	69.000	QUASIPEAK
12		0.623	9.708	29.470	39.178	-19.822	59.000	AVERAGE
13		0.994	9.789	45.420	55.208	-13.792	69.000	QUASIPEAK
14		0.994	9.789	32.720	42.508	-16.492	59.000	AVERAGE
15		1.166	9.792	45.760	55.552	-13.448	69.000	QUASIPEAK
16		1.166	9.792	33.780	43.572	-15.428	59.000	AVERAGE
17		1.252	9.793	45.130	54.923	-14.077	69.000	QUASIPEAK
18		1.252	9.793	33.700	43.493	-15.507	59.000	AVERAGE
19		1.994	9.800	39.330	49.130	-19.870	69.000	QUASIPEAK
20		1.994	9.800	28.410	38.210	-20.790	59.000	AVERAGE
21		3.595	9.808	36.350	46.158	-22.842	69.000	QUASIPEAK
22		3.595	9.808	23.780	33.588	-25.412	59.000	AVERAGE
23		6.123	9.883	36.630	46.513	-27.487	74.000	QUASIPEAK
24		6.123	9.883	23.480	33.363	-30.637	64.000	AVERAGE
25		9.857	10.082	34.230	44.312	-29.688	74.000	QUASIPEAK
26		9.857	10.082	22.870	32.952	-31.048	64.000	AVERAGE
27		22.947	10.431	30.800	41.231	-32.769	74.000	QUASIPEAK
28		22.947	10.431	17.960	28.391	-35.609	64.000	AVERAGE
29		30.000	10.580	26.290	36.870	-37.130	74.000	QUASIPEAK
30		30.000	10.580	12.340	22.920	-41.080	64.000	AVERAGE

Remark	

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

Neutral





Measurement data	Port under test	AC mains power input

		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.158	9.680	54.360	64.040	-11.531	75.571	QUASIPEAK
2		0.158	9.680	44.930	54.610	-13.777	68.387	AVERAGE
3		0.201	9.680	50.340	60.020	-13.562	73.582	QUASIPEAK
4		0.201	9.680	39.100	48.780	-16.766	65.546	AVERAGE
5		0.244	9.680	46.840	56.520	-15.460	71.980	QUASIPEAK
6		0.244	9.680	34.520	44.200	-19.058	63.258	AVERAGE
7		0.384	9.680	46.610	56.290	-12.710	69.000	QUASIPEAK
8		0.384	9.680	30.660	40.340	-18.660	59.000	AVERAGE
9		0.548	9.691	47.600	57.292	-11.708	69.000	QUASIPEAK
10		0.548	9.691	31.150	40.842	-18.158	59.000	AVERAGE
11		0.662	9.716	47.700	57.417	-11.583	69.000	QUASIPEAK
12		0.662	9.716	31.620	41.337	-17.663	59.000	AVERAGE
13	*	0.775	9.741	48.320	58.061	-10.939	69.000	QUASIPEAK
14		0.775	9.741	32.560	42.301	-16.699	59.000	AVERAGE
15		1.052	9.791	47.450	57.241	-11.759	69.000	QUASIPEAK
16		1.052	9.791	34.640	44.431	-14.569	59.000	AVERAGE
17		2.162	9.801	40.480	50.281	-18.719	69.000	QUASIPEAK
18		2.162	9.801	29.190	38.991	-20.009	59.000	AVERAGE
19		3.373	9.807	38.060	47.867	-21.133	69.000	QUASIPEAK
20		3.373	9.807	25.510	35.317	-23.683	59.000	AVERAGE
21		6.486	9.902	36.930	46.833	-27.167	74.000	QUASIPEAK
22		6.486	9.902	24.120	34.023	-29.977	64.000	AVERAGE
23		10.322	10.107	33.870	43.977	-30.023	74.000	QUASIPEAK
24		10.322	10.107	22.270	32.377	-31.623	64.000	AVERAGE
25		22.209	10.425	30.630	41.055	-32.945	74.000	QUASIPEAK
26		22.209	10.425	18.190	28.615	-35.385	64.000	AVERAGE
27		30.000	10.580	26.600	37.180	-36.820	74.000	QUASIPEAK
28		30.000	10.580	13.380	23.960	-40.040	64.000	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

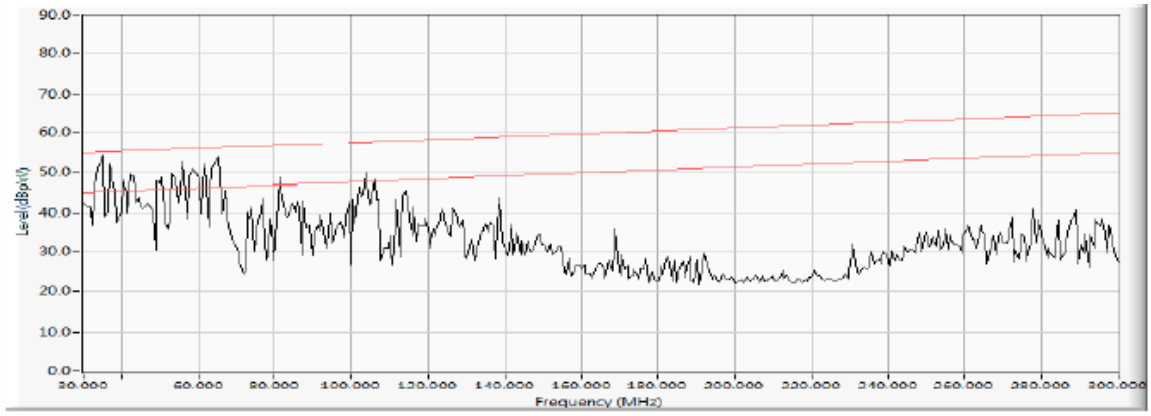
Performed measurements

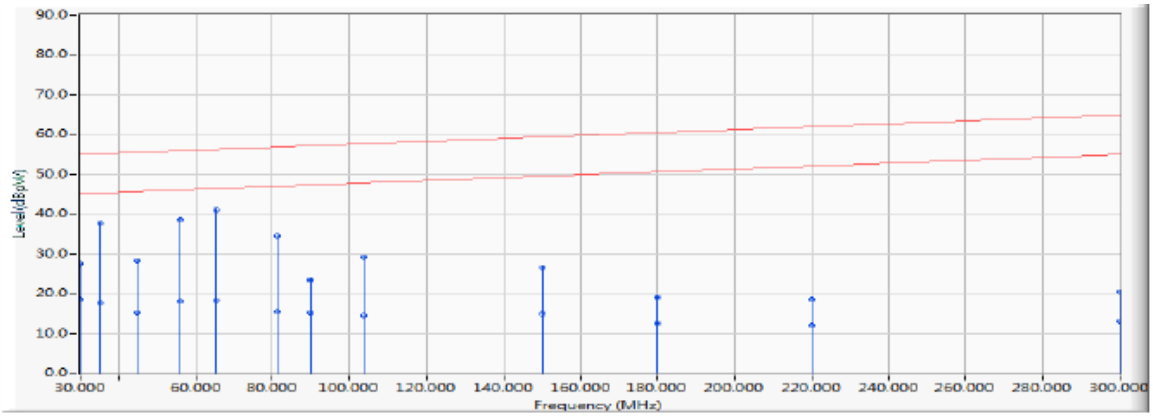
Port(s) under test					
☒	AC mains input power	☐	Load	☐	Control
☐	Other:	☐	Other:	☐	Other:

Scan range (0,9 - 1,1 U_N)	☐	198 – 264 V_{AC}	☐	207 – 253 V_{AC}	☒	230 V_{AC}	
Voltage – Mains [V]	230/ 120Vac						
Frequency – Mains [Hz]	50/ 60 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/ 230 Vac/ 50 Hz

Results for 220-240 v model





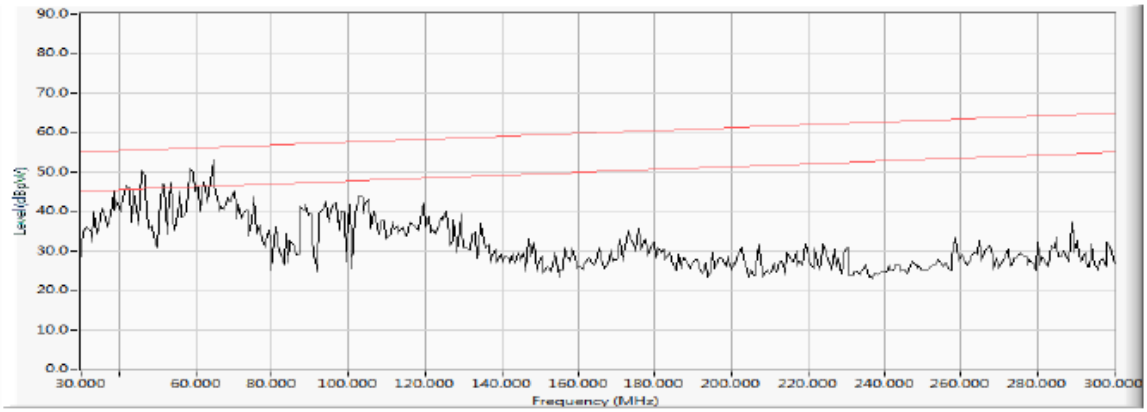
Measurement data	Port under test	AC mains power input

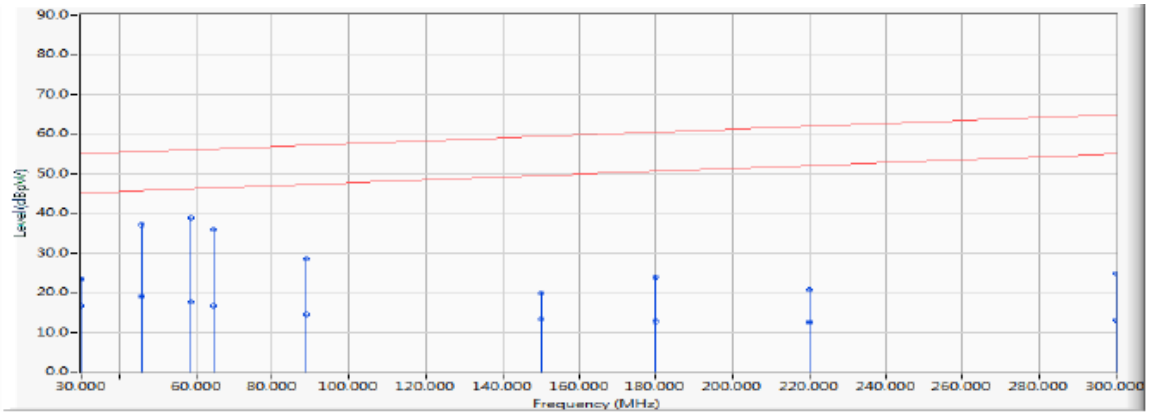
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBpW)	Measure Level (dBpW)	Margin (dB)	Limit (dBpW)	Detector Type
1		30.000	8.700	18.810	27.510	-27.490	55.000	QUASIPEAK
2		30.000	8.700	9.910	18.610	-26.390	45.000	AVERAGE
3		35.250	8.121	29.540	37.661	-18.039	55.700	QUASIPEAK
4		35.250	8.121	9.480	17.601	-28.099	45.700	AVERAGE
5		45.000	7.460	20.720	28.180	-28.581	56.761	QUASIPEAK
6		45.000	7.460	7.770	15.230	-31.531	46.761	AVERAGE
7		56.125	7.504	31.190	38.693	-19.027	57.720	QUASIPEAK
8		56.125	7.504	10.490	17.993	-29.727	47.720	AVERAGE
9	*	65.187	6.635	34.360	40.995	-17.375	58.370	QUASIPEAK
10		65.187	6.635	11.640	18.275	-30.095	48.370	AVERAGE
11		81.062	6.425	28.090	34.515	-24.802	59.317	QUASIPEAK
12		81.062	6.425	8.920	15.345	-33.972	49.317	AVERAGE
13		90.000	6.715	16.630	23.345	-36.426	59.771	QUASIPEAK
14		90.000	6.715	8.430	15.145	-34.626	49.771	AVERAGE
15		103.687	6.693	22.390	29.083	-31.303	60.386	QUASIPEAK
16		103.687	6.693	7.880	14.573	-35.813	50.386	AVERAGE
17		150.000	5.755	20.730	26.485	-35.505	61.990	QUASIPEAK
18		150.000	5.755	9.180	14.935	-37.055	51.990	AVERAGE
19		180.000	5.171	13.900	19.071	-43.711	62.782	QUASIPEAK
20		180.000	5.171	7.320	12.491	-40.291	52.782	AVERAGE
21		220.000	5.174	13.460	18.634	-45.019	63.653	QUASIPEAK
22		220.000	5.174	7.010	12.184	-41.469	53.653	AVERAGE
23		300.000	5.585	14.890	20.475	-44.525	65.000	QUASIPEAK
24		300.000	5.585	7.450	13.035	-41.965	55.000	AVERAGE

Remark	

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

Results for 110-120 v model





Measurement data	Port under test	AC mains power input

		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBpW)	Measure Level (dBpW)	Margin (dB)	Limit (dBpW)	Detector Type
1		30.000	8.700	14.810	23.510	-31.490	55.000	QUASIPEAK
2		30.000	8.700	7.930	16.630	-28.370	45.000	AVERAGE
3		45.875	7.441	29.750	37.191	-19.654	56.845	QUASIPEAK
4		45.875	7.441	11.640	19.081	-27.764	46.845	AVERAGE
5	*	58.625	7.565	31.310	38.876	-19.034	57.910	QUASIPEAK
6		58.625	7.565	9.970	17.536	-30.374	47.910	AVERAGE
7		64.687	6.728	29.260	35.988	-22.349	58.337	QUASIPEAK
8		64.687	6.728	9.910	16.638	-31.699	48.337	AVERAGE
9		88.937	6.685	21.720	28.405	-31.315	59.720	QUASIPEAK
10		88.937	6.685	7.850	14.535	-35.185	49.720	AVERAGE
11		150.000	5.755	14.150	19.905	-42.085	61.990	QUASIPEAK
12		150.000	5.755	7.460	13.215	-38.775	51.990	AVERAGE
13		180.000	5.171	18.740	23.911	-38.871	62.782	QUASIPEAK
14		180.000	5.171	7.510	12.681	-40.101	52.782	AVERAGE
15		220.000	5.174	15.550	20.724	-42.929	63.653	QUASIPEAK
16		220.000	5.174	7.300	12.474	-41.179	53.653	AVERAGE
17		300.000	5.585	19.230	24.815	-40.185	65.000	QUASIPEAK
18		300.000	5.585	7.500	13.085	-41.915	55.000	AVERAGE

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

Urms = 230.1V Freq = 50.000 Range: 25 A
Irms = 3.491A Ipk = 8.826A cf = 2.528
P = 434.4W S = 803.4VA pf = 0.541
THDi = 85.1 % THDu = 0.20 % Class B

Test - Time :5min (100 %)

Test completed, Result: PASSED

Order	Freq.	Iavg	Irms	Irms%	Irms%L	Imax	Imax%	Imax%L	Limit	Status
	[Hz]	[A]	[A]	[%]	[%]	[A]	[%]	[%]	[A]	
1	50	2.7457	2.6657	76.355		2.8671	82.124		0.00	
2	100	0.0000	0.0092	0.2622	0.5651	0.0122	0.3497	0.7535	1.6200	0.00
3	150	2.0241	1.9623	56.206	56.878	2.0920	59.921	60.637	3.4500	0.00
4	200	0.0000	0.0076	0.2185	1.1829	0.0107	0.3059	1.6560	0.6450	0.00
5	250	1.0389	1.0117	28.977	59.161	1.0635	30.463	62.195	1.7100	0.00
6	300	0.0000	0.0061	0.1748	1.3563	0.0076	0.2185	1.6954	0.4500	0.00
7	350	0.4374	0.4257	12.194	36.859	0.4440	12.719	38.444	1.1550	0.00
8	400	0.0000	0.0031	0.0874	0.8846	0.0046	0.1311	1.3269	0.3450	0.00
9	450	0.2024	0.1999	5.7255	33.315	0.2060	5.9003	34.332	0.6000	0.00
10	500	0.0000	0.0031	0.0874	1.1057	0.0031	0.0874	1.1057	0.2760	0.00
11	550	0.0777	0.0748	2.1416	15.105	0.0793	2.2727	16.029	0.4950	0.00
12	600	0.0000	0.0031	0.0874	1.3269	0.0031	0.0874	1.3269	0.2300	0.00
13	650	0.1072	0.1053	3.0157	33.424	0.1083	3.1031	34.393	0.3150	0.00
14	700	0.0000	0.0031	0.0874	1.5480	0.0031	0.0874	1.5480	0.1971	0.00
15	750	0.0792	0.0778	2.2290	34.587	0.0793	2.2727	35.265	0.2250	0.00
16	800	0.0000	0.0031	0.0874	1.7691	0.0046	0.1311	2.6537	0.1725	0.00
17	850	0.0879	0.0854	2.4476	43.041	0.0900	2.5787	45.347	0.1985	0.00
18	900	0.0000	0.0046	0.1311	2.9854	0.0046	0.1311	2.9854	0.1533	0.00
19	950	0.0687	0.0687	1.9668	38.656	0.0702	2.0105	39.515	0.1776	0.00
20	1000	0.0000	0.0076	0.2185	5.5285	0.0092	0.2622	6.6343	0.1380	0.00
21	1050	0.0583	0.0565	1.6171	35.129	0.0610	1.7483	37.977	0.1607	0.00
22	1100	0.0000	0.0107	0.3059	8.5140	0.0122	0.3497	9.7302	0.1255	0.00
23	1150	0.0502	0.0504	1.4423	34.315	0.0519	1.4860	35.355	0.1467	0.00
24	1200	0.0000	0.0107	0.3059	9.2880	0.0122	0.3497	10.615	0.1150	0.00
25	1250	0.0369	0.0366	1.0490	27.127	0.0381	1.0927	28.257	0.1350	0.00
26	1300	0.0000	0.0076	0.2185	7.1871	0.0092	0.2622	8.6245	0.1062	0.00
27	1350	0.0362	0.0366	1.0490	29.297	0.0366	1.0490	29.297	0.1250	0.00
28	1400	0.0000	0.0046	0.1311	4.6440	0.0061	0.1748	6.1920	0.0986	0.00
29	1450	0.0259	0.0259	0.7430	22.289	0.0259	0.7430	22.289	0.1164	0.00
30	1500	0.0000	0.0031	0.0874	3.3171	0.0031	0.0874	3.3171	0.0920	0.00
31	1550	0.0286	0.0275	0.7867	25.228	0.0290	0.8304	26.629	0.1089	0.00
32	1600	0.0000	0.0031	0.0874	3.5383	0.0031	0.0874	3.5383	0.0862	0.00
33	1650	0.0180	0.0229	0.6556	22.380	0.0229	0.6556	22.380	0.1023	0.00
34	1700	0.0000	0.0031	0.0874	3.7594	0.0031	0.0874	3.7594	0.0812	0.00
35	1750	0.0216	0.0214	0.6119	22.154	0.0229	0.6556	23.736	0.0964	0.00
36	1800	0.0000	0.0015	0.0437	1.9903	0.0031	0.0874	3.9806	0.0767	0.00
37	1850	0.0000	0.0198	0.5682	21.747	0.0198	0.5682	21.747	0.0912	0.00
38	1900	0.0000	0.0031	0.0874	4.2017	0.0031	0.0874	4.2017	0.0726	0.00
39	1950	0.0000	0.0168	0.4808	19.396	0.0183	0.5245	21.159	0.0865	0.00
40	2000	0.0000	0.0031	0.0874	4.4228	0.0031	0.0874	4.4228	0.0690	0.00

Measurement data	Port under test	AC mains power input

Fixed Limits for **Class B:** (1.5 times Limits of Class A)

Order	Limits in Ampere	
	100%	150%
2	1.6205	2.4307
3	3.4500	5.1750
4	0.6454	0.9682
5	1.7105	2.5658
6	0.4501	0.6752
7	1.1551	1.7326
8	0.3448	0.5173
9	0.5997	0.8995
10	0.2762	0.4143
11	0.4944	0.7416
12	0.2304	0.3456
13	0.3143	0.4715
14	0.1968	0.2953
15	0.2243	0.3365
16	0.1724	0.2586
17	0.1984	0.2975
18	0.1526	0.2289
19	0.1770	0.2655
20	0.1373	0.2060
21 *	0.1602	0.2403
22	0.1251	0.1877
23 *	0.1465	0.2197
24	0.1144	0.1717
25 *	0.1343	0.2014
26	0.1068	0.1602
27 *	0.1251	0.1877
28	0.0992	0.1488
29 *	0.1160	0.1740
30	0.0916	0.1373
31 *	0.1083	0.1625
32	0.0870	0.1305
33 *	0.1022	0.1534
34	0.0809	0.1213
35 *	0.0961	0.1442
36	0.0763	0.1144
37 *	0.0916	0.1373
38	0.0732	0.1099
39 *	0.0870	0.1305
40	0.0687	0.1030

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%)	320,0 ms
Maximum voltage change d_{MAX}	2,51%
Relative Voltage change d_C	1,22%
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	N/A	---
Radio-frequency electromagnetic fields	N/A	---
Fast transients	N/A	---
Surge transient	N/A	---
Injected currents (radio-frequency common mode)	N/A	---
Voltage dips and short interruptions	N/A	---
Supplementary information :		

5.3 **Electrostatic discharge immunity**	**VERDICT: N/A**

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.~~	~~±2, ±4, ±8~~	~~Contact~~	~~10~~	~~1~~
☒	~~Points on non-conductive surface as indicated in the picture below.~~	~~±4, ±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: N/A**

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: N/A**

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: N/A**

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, *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 (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:**	**N/A**

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 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%.

Conducted Emissions

The measurement uncertainty is evaluated as ± 2.26 dB.

Disturbance Power Emission

The measurement uncertainty is evaluated as ± 3.34 dB.

Harmonic Current Emission

The measurement uncertainty is evaluated as 0.1%.

Voltage Fluctuation and Flicker

The measurement uncertainty is evaluated as ±4%.

8 ANNEX 2 - USED EQUIPMENT

Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Test Receiver	R&S	ESCS 30	825442/014	2018/03/13	2019/03/12
Artificial Mains Network	R&S	ENV4200	848411/010	2018/01/22	2019/01/21
LISN	R&S	ENV216	100092	2018/07/23	2019/07/22
Coaxial Cable	Harbour	RG-400	SR2-H	2017/08/15	2018/08/14
Quietek EMI system	Quietek	Version 2.2	SR2-H	N/A	N/A

Disturbance Power Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Test Receiver	R&S	ESCS 30	825442/014	2018/03/13	2019/03/12
Absorbing Clamp	Luthi	MDS 21B	P1602169770	2018/02/05	2019/02/04
QuieTek EMI	Dekra	Version 2	SR2-H	N/A	N/A

Power Harmonics / SR3-H

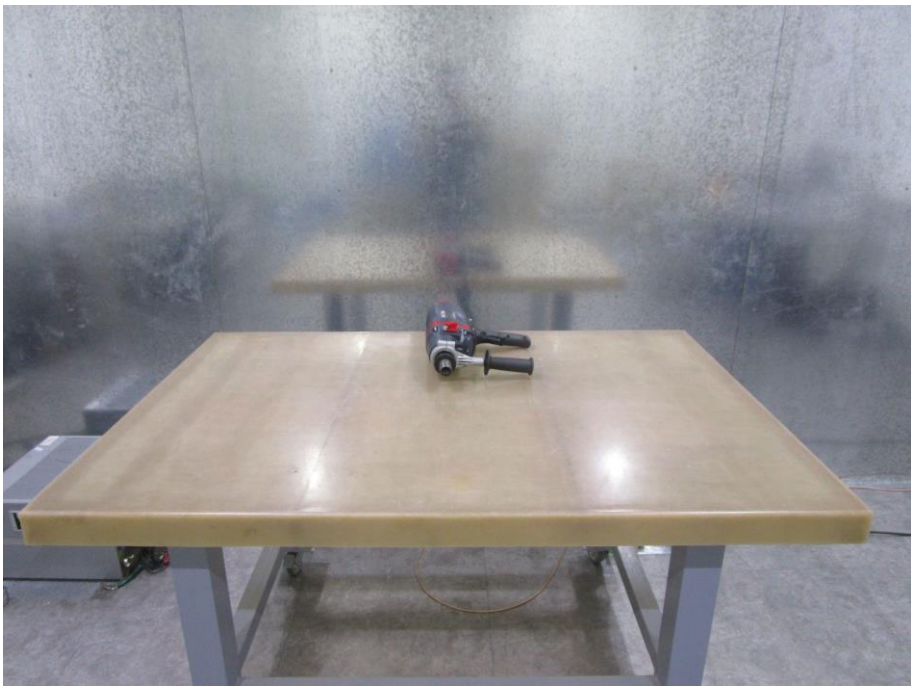
Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMC Emission Tester	EMC-Partner	HAR-1000-1P	109	2018/01/15	2019/01/14

Voltage Fluctuation and Flicker / SR3-H

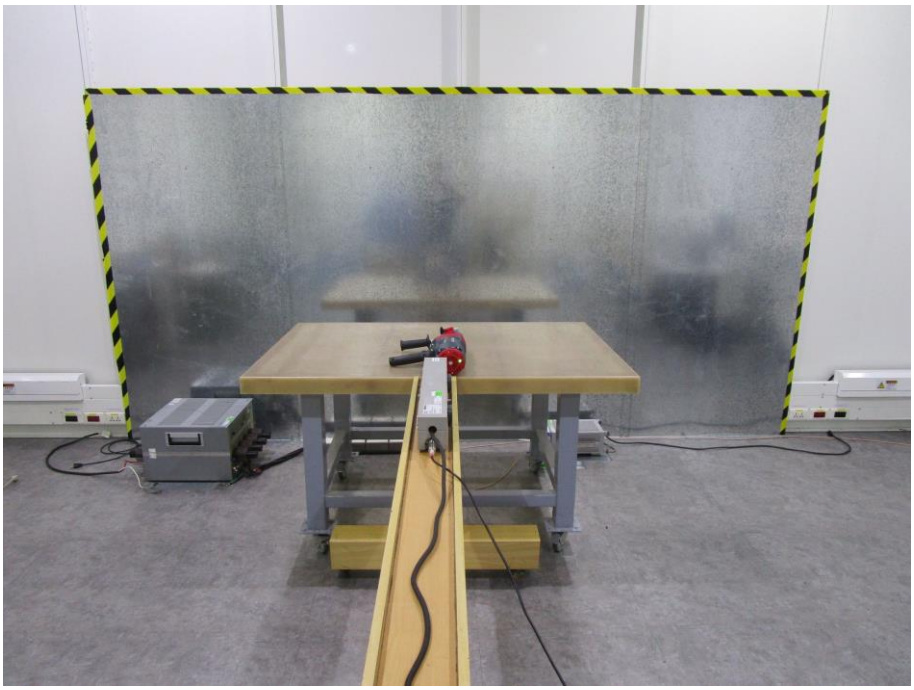
Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMC Emission Tester	EMC-Partner	HAR-1000-1P	109	2018/01/15	2019/01/14

9 ANNEX 3 - TEST PHOTOS

Conducted disturbance voltage at mains terminals



Disturbance power



Harmonic & Flicker

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