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Test report No:  
6137200.50

## TEST REPORT

### Electromagnetic Compatibility (EMC)

Identification of item tested	Hole Cutting Drill
Trademark	AGP
Model and /or type reference	HC127;CRW 12700;LSBM127;KW1500992;RB127;LB120CV; HC600;HC24;HCD24;HCD600;HCD127;HD127;HD24;HD600
Ratings	110-120 Vac,50-60 Hz,1100 W 220-240 Vac,50-60 Hz,1100 W
Test Laboratory / address	DEKRA Testing and Certification (Shanghai) Ltd. No.250, Jiangchangsang Road, Jing'an District, Shanghai, China
Applicant / address	LEE YEONG INDUSTRIAL CO., LTD NO.2,KEJIA RD.,DOULIU CITY,YUNLIN COUNGY,TAIWAN
Test method requested, standard	EN IEC 55014-1:2021 EN IEC 55014-2:2021 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A1:2019
Verdict Summary	IN COMPLIANCE
Tested by	Henry Cheng Project Engineer 
Approved by	Wency Yang Technical Manager 
Date of issue	2022-08-15
Report template No	TRF_EN55014-1_EN55014-2_EMC01 V1.0

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## COMPETENCES AND GUARANTEES

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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.

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## GENERAL CONDITIONS

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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.

## UNCERTAINTY

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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

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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

<input checked="" type="checkbox"/> Indicates that the listed condition, standard or equipment is applicable for this report/test/EUT.			
<input type="checkbox"/> Indicates that the listed condition, standard or equipment is not applicable for this report/test/EUT.			
Decimal separator used in this report	<input checked="" type="checkbox"/>	Comma (,)	<input type="checkbox"/> 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

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Report nr.	Date	Description
6137200.50	2022-08-15	First release

## REMARKS AND COMMENTS

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

The test results relate only to the samples tested.

The all models have the same material and structure except for the different models.

After review, all test were carried out on the following models HC127. The test results stated in this report are also representative for all models.

# 1 GENERAL INFORMATION

## 1.1 General Description of the Item(s)

Description of the item .....	Hole Cutting Drill
Model / Type number.....	HC127;CRW 12700;LSBM127;KW1500992;RB127;LB120CV; HC600;HC24;HCD24;HCD600;HCD127;HD127;HD24;HD600
Trademark.....	AGP
Manufacturer.....	LEE YEONG INDUSTRIAL CO., LTD NO.2,KEJIA RD.,DOULIU CITY,YUNLIN COUNGY,TAIWAN
Factory .....	LEE YEONG INDUSTRIAL CO., LTD NO.2,KEJIA RD.,DOULIU CITY,YUNLIN COUNGY,TAIWAN

Ratings.....	110-120 Vac,50-60 Hz,1100 W 220-240 Vac,50-60 Hz,1100 W
Clock frequencies .....	< 15 MHz
Other parameters.....	N/A
Mounting position.....	<input checked="" type="checkbox"/> Table top equipment
	<input type="checkbox"/> Wall/Ceiling mounted equipment
	<input type="checkbox"/> Floor standing equipment
	<input type="checkbox"/> Hand-held equipment
	<input type="checkbox"/> Other:

Intended use of the Equipment Under Test (EUT)
The submitted appliance is Hole Cutting Drill intended for household use only.

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



## 1.2 Environment

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

<input checked="" type="checkbox"/>	Residential (domestic) environment.
<input checked="" type="checkbox"/>	Commercial and light-industrial environment.
<input type="checkbox"/>	Industrial environment.

## 1.3 Test Location

Test Location	DEKRA Testing and Certification Co.,Ltd. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C
Date(receive sample)	2022-07-20
Date (start test)	2022-07-20
Date (finish test)	2022-08-12



## 1.4 Classification according to EN IEC 55014-2

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

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

## 2 DESCRIPTION OF TEST SETUP

### 2.1 Operating mode(s) used for tests

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

Operating mode	Operating mode description	Used for testing	
		Emission	Immunity
1	The EUT is operating continuously without load at its maximum speed.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2		<input checked="" type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>
4		<input type="checkbox"/>	<input type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>
6		<input type="checkbox"/>	<input type="checkbox"/>
<u>Supplemental information:</u>			

### 2.2 Port(s) of the EUT

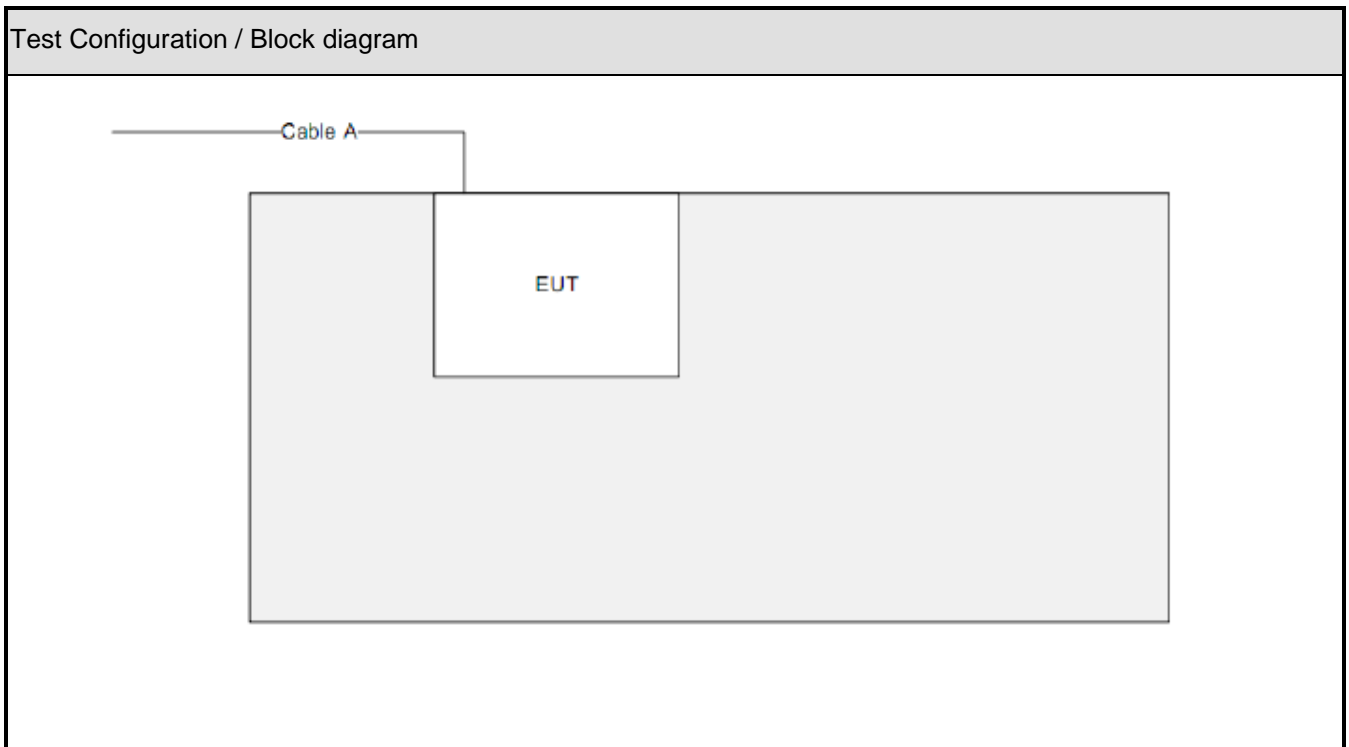
Port name and description	Connected to / Termination	Cable		
		Length used during test [m]	Attached during test	Shielded
N/A			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
<u>Supplemental information:</u>				

### 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			
<u>Supplemental information:</u>			

## 2.4 Test Configuration / Block diagram used for tests



### 3 VERDICT SUMMARY SECTION

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

#### 3.1 Standards

Standard	Year	Description
EN IEC 55014-1	2021 <sup>1)</sup>	Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission.
EN 55016-2-1 +A1	2014 2017	Methods of measurement of disturbances and immunity - Conducted disturbance measurements.
EN 55016-2-2	2011	Methods of measurement of disturbances and immunity – Measurement of disturbance power.
EN 55016-2-3 +A1	2017 2019	Methods of measurement of disturbances and immunity - Radiated disturbance measurements.
EN IEC 61000-3-2 A1	2019 <sup>1)</sup> 2021 <sup>1)</sup>	Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
EN 61000-3-3 A1	2013 2019 <sup>1)</sup>	Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.
EN IEC 55014-2	2021 <sup>1)</sup>	Requirements for household appliances, electric tools and similar apparatus – Part 2: Immunity – Product family standard.
EN 61000-4-2	2009	Electrostatic discharge immunity test.
EN 61000-4-3 +A1 +A2	2006 2008 2010	Radiated, radio-frequency, electromagnetic field immunity test.
EN 61000-4-4	2012	Electrical fast transient/burst immunity test.
EN 61000-4-5 +A1	2014 2017	Surge immunity test.
EN 61000-4-6	2014	Immunity to conducted disturbances, induced by radio-frequency fields.
EN IEC 61000-4-11	2020	Voltage dips, short interruptions and voltage variations immunity tests.

<sup>1)</sup> Not harmonized yet.

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

No deviation.

### 3.3 Overview of results

EMISSION TESTS – EN IEC 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	See 4)
Conducted disturbance voltage at additional terminals (150 KHz – 30 MHz)	EN 55016-2-1	N/A	See 4)
Disturbance power (30 MHz to 300 MHz)	EN 55016-2-2	PASS	---
Radiated electromagnetic disturbances (30 - 1000 MHz)	EN 55016-2-3	N/M	See 3)
Discontinuous disturbance (clicks) on AC power leads	EN 55014-1	N/A	See 1)
<u>Supplementary information:</u>			
1) Exemptions from click measurements applicable (clause 4.2.3).			
2) Not applicable because no test requirements have been specified for DC/battery powered apparatus.			
3) According to clause 4.3.4.2 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.			
4) This limit does not apply to ports which connect to non-extendable wiring shorter than 2m			

EMISSION TESTS – EN IEC 61000-3-2, EN 61000-3-3			
Requirement – Test case	Basic standard(s)	Verdict	Remark
Harmonic current emissions	EN IEC 61000-3-2	PASS	See 1)
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3	PASS	See 2)
<u>Supplementary information:</u>			
1) The EUT is regarded as an “Equipment with rated power of $\leq 75$ W”. According to “Clause 7, Figure 1 - Flowchart for determining conformity” the EUT is deemed to comply with the requirements of the EN 61000-3-2 standard.			
2) The EUT is regarded as a professional equipment with a total rated power greater than 1 KW. The test is not applicable.			

IMMUNITY TESTS – EN IEC 55014-2			
Requirement – Test case	Basic standard(s)	Verdict	Remark
Electrostatic discharge	EN 61000-4-2	PASS	---
Radio-frequency electromagnetic fields	EN 61000-4-3	N/A	---
Fast transients	EN 61000-4-4	PASS	---
Surge transient	EN 61000-4-5	PASS	---
Injected currents (radio-frequency common mode)	EN 61000-4-6	PASS	---
Voltage dips and short interruptions	EN IEC 61000-4-11	PASS	---
<u>Supplementary information:</u>			
1) Not applicable because no test requirements have been specified for DC/battery powered apparatus.			
2) The equipment is classified as category 1 equipment according to EN 55014-2; no immunity tests are applicable.			

## 4 EMISSION TEST RESULTS

<b>4.1 Conducted disturbance voltage - Mains</b>	<b>VERDICT: PASS</b>
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Standard	EN IEC 55014-1
Basic standard	EN 55016-2-1

### Limits

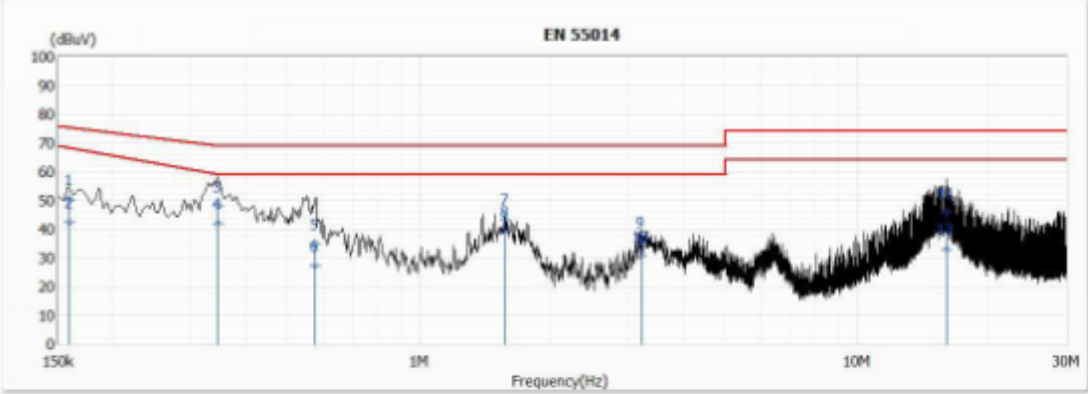
Frequency range [MHz]	Limit: QP [dB( $\mu$ V) <sup>1)</sup>	Limit: AV [dB( $\mu$ V) <sup>1)</sup>	IF BW	Detector(s)
0,15 - 0,50	66 - 56 <sup>2)</sup>	59 - 46 <sup>2)</sup>	9 KHz	QP, CAV
0,50 - 5,0	56	46	9 KHz	QP, CAV
5,0 - 30	60	50	9 KHz	QP, CAV

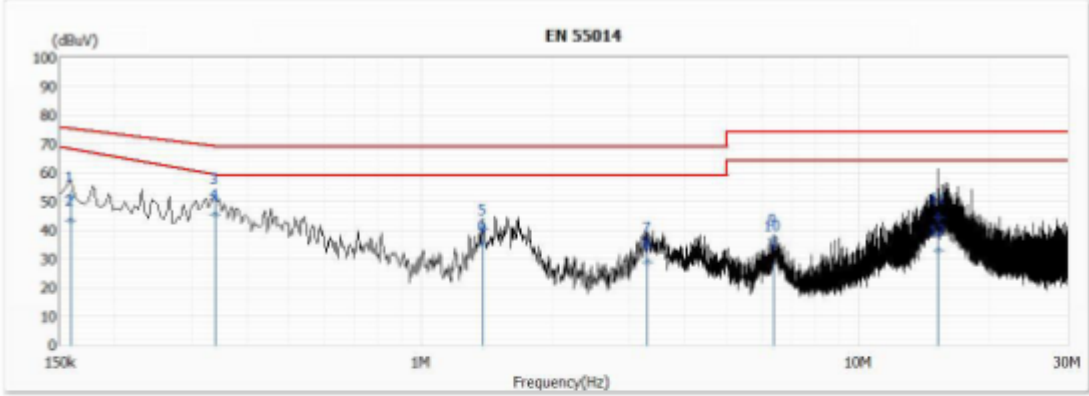
<sup>1)</sup> At the transition frequency, the lower limit applies.

<sup>2)</sup> The limit decreases linearly with the logarithm of the frequency.

### Performed measurements

Scan range (0,9 - 1,1 $U_N$ )	<input checked="" type="checkbox"/> 220 – 240 V <sub>AC</sub>	<input type="checkbox"/> 207 – 253 V <sub>AC</sub>	<input type="checkbox"/> 230 V <sub>AC</sub>
Tested terminal(s) / port	<input checked="" type="checkbox"/> AC mains input power	<input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> L1
	<input type="checkbox"/> DC mains input power	<input type="checkbox"/> Positive (+)	<input type="checkbox"/> Negative (-)
Voltage – Mains [V]	230 Vac		
Frequency – Mains [Hz]	50 Hz		
Test method applied	<input checked="" type="checkbox"/> Artificial mains network		
	<input type="checkbox"/> Voltage probe		
Test setup	<input checked="" type="checkbox"/> Table top	<input type="checkbox"/> Artificial hand applied	
	<input type="checkbox"/> Floor standing	<input type="checkbox"/> Other:	
Refer to the Annex 3 for test setup photo(s).			
Operating mode(s) used	Mode 1		
Remark	---		

Measurement data		<input checked="" type="checkbox"/>	Line	<input type="checkbox"/>	Neutral		
Operating mode / voltage / frequency used during the test			Mode 1 / 230 Vac / 50 Hz				
Port under test			AC mains input port				
							
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.159	50.39	75.53	-25.14	40.77	9.62	QP
2	0.159	42.49	68.33	-25.84	32.87	9.62	AV
3	0.347	47.95	69.08	-21.13	38.31	9.64	QP
*4	0.347	41.96	59.12	-17.16	32.32	9.64	AV
5	0.579	34.69	69.00	-34.31	25.03	9.66	QP
6	0.579	27.35	59.00	-31.65	17.69	9.66	AV
7	1.571	43.48	69.00	-25.52	33.75	9.73	QP
8	1.571	39.14	59.00	-19.86	29.41	9.73	AV
9	3.205	35.63	69.00	-33.37	25.83	9.80	QP
10	3.205	30.76	59.00	-28.24	20.96	9.80	AV
11	15.949	45.84	74.00	-28.16	35.58	10.26	QP
12	15.949	32.99	64.00	-31.01	22.73	10.26	AV
Remark	The given graph is the combination of max-hold function						

Measurement data		<input type="checkbox"/>	Line		<input checked="" type="checkbox"/>	Neutral	
Operating mode / voltage / frequency used during the test					Mode 1 / 230 Vac / 50 Hz		
Port under test					AC mains input port		
							
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.158	51.80	75.57	-23.77	42.18	9.62	QP
2	0.158	43.57	68.39	-24.82	33.95	9.62	AV
3	0.337	50.97	69.31	-18.34	41.34	9.63	QP
*4	0.337	45.56	59.44	-13.88	35.93	9.63	AV
5	1.388	40.34	69.00	-28.66	30.62	9.72	QP
6	1.388	35.02	59.00	-23.98	25.30	9.72	AV
7	3.293	34.25	69.00	-34.75	24.43	9.82	QP
8	3.293	28.85	59.00	-30.15	19.03	9.82	AV
9	6.381	37.03	74.00	-36.97	27.06	9.97	QP
10	6.381	34.74	64.00	-29.26	24.77	9.97	AV
11	15.220	44.34	74.00	-29.66	34.00	10.34	QP
12	15.220	33.09	64.00	-30.91	22.75	10.34	AV
Remark	The given graph is the combination of max-hold function						



<b>4.2 Disturbance power (30 MHz – 300 MHz)</b>	<b>VERDICT: PASS</b>
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Standard	EN IEC 55014-1
Basic standard	EN 55016-2-2

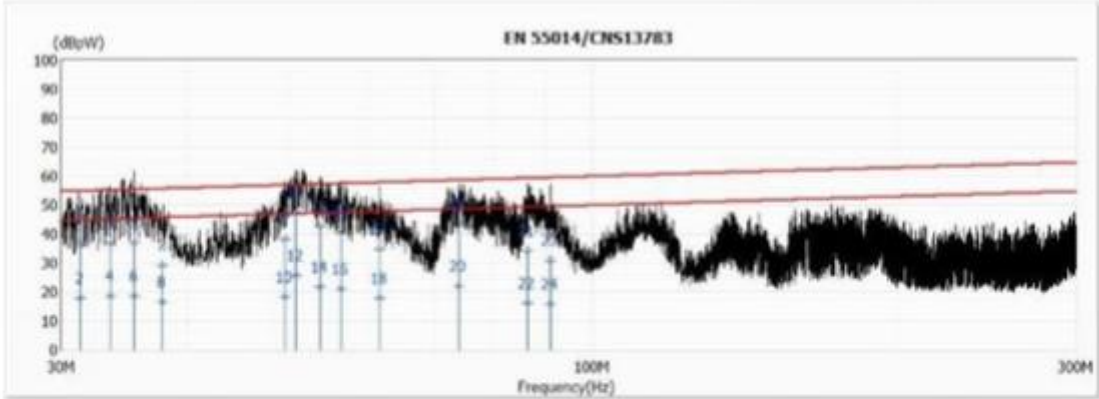
**Limits**

Frequency range [MHz]	Limit: QP [dB(pW)]	Limit: AV [dB(pW)]	IF BW	Detector(s)
30 - 300	45 – 55 <sup>1)</sup>	35 – 45 <sup>1)</sup>	120 KHz	QP, CAV
Margin				
200 - 300	0 – 10 <sup>1)</sup>	---	120 KHz	QP, CAV

<sup>1)</sup> The limit increases linearly with the frequency.

**Performed measurements**

Port(s) under test						
<input checked="" type="checkbox"/>	AC mains input power	<input type="checkbox"/>	Load	<input type="checkbox"/>	Control	
<input type="checkbox"/>	Other:	<input type="checkbox"/>	Other:	<input type="checkbox"/>	Other:	
Scan range (0,9 - 1,1 U <sub>N</sub> )	<input checked="" type="checkbox"/>	220 – 240 Vac	<input type="checkbox"/>	207 – 253 V <sub>AC</sub>	<input type="checkbox"/>	230 V <sub>AC</sub>
Voltage – Mains [V]	230 Vac					
Frequency – Mains [Hz]	50 Hz					
Test setup	<input checked="" type="checkbox"/>	Table top	<input type="checkbox"/>	Floor standing		
	<input type="checkbox"/>	Other:				
Refer to the Annex 3 for test setup photo(s).						
Conditions for exemption from measurements above 300 MHz	<input checked="" type="checkbox"/>	"Limits" reduced by "Margin" applied and passed				
	<input type="checkbox"/>	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					
							
No	Frequency (MHz)	Emission Level (dBpW)	Limit (dBpW)	Margin (dB)	Reading Level (dBpW)	Correct Factor (dB)	Detector Type
1	31.289	36.10	55.18	-19.08	10.92	25.18	QP
2	31.289	18.09	45.18	-27.09	-7.09	25.18	AV
3	33.489	36.95	55.48	-18.53	11.94	25.01	QP
4	33.489	18.61	45.48	-26.87	-6.40	25.01	AV
5	35.413	37.07	55.72	-18.65	12.23	24.84	QP
6	35.413	18.64	45.72	-27.08	-6.20	24.84	AV
7	37.717	29.36	55.99	-26.63	4.70	24.66	QP
8	37.717	16.47	45.99	-29.52	-8.19	24.66	AV
9	49.773	38.11	57.20	-19.09	14.47	23.64	QP
10	49.773	18.25	47.20	-28.95	-5.39	23.64	AV
*11	51.108	47.66	57.31	-9.65	24.00	23.66	QP
12	51.108	25.91	47.31	-21.40	2.25	23.66	AV
13	53.969	42.69	57.55	-14.86	18.89	23.80	QP
14	53.969	21.85	47.55	-25.70	-1.95	23.80	AV
15	56.523	40.60	57.75	-17.15	16.69	23.91	QP
16	56.523	21.20	47.75	-26.55	-2.71	23.91	AV
17	61.830	34.82	58.14	-23.32	11.15	23.67	QP
18	61.830	17.99	48.14	-30.15	-5.68	23.67	AV
19	73.924	43.31	58.92	-15.61	21.26	22.05	QP
20	73.924	21.91	48.92	-27.01	-0.14	22.05	AV
21	86.449	34.29	59.60	-25.31	12.06	22.23	QP
22	86.449	16.26	49.60	-33.34	-5.97	22.23	AV
23	90.994	31.16	59.82	-28.66	8.94	22.22	QP
24	90.994	15.93	49.82	-33.89	-6.29	22.22	AV
Remark							

<b>4.3 Harmonic current emissions</b>	<b>VERDICT: PASS</b>
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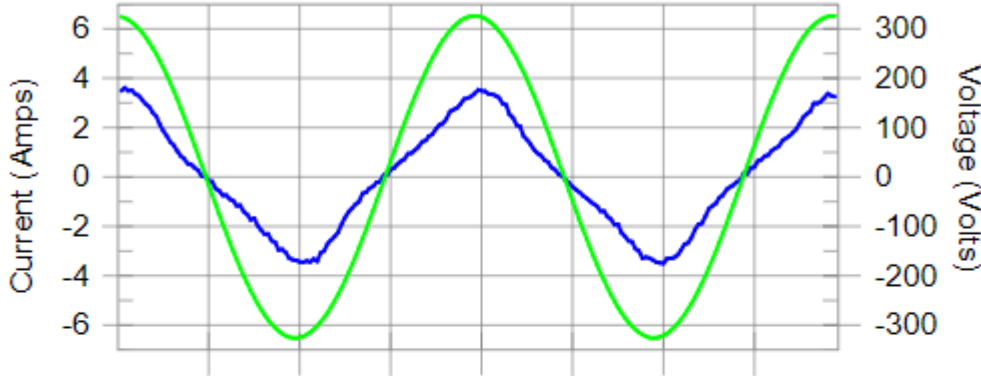
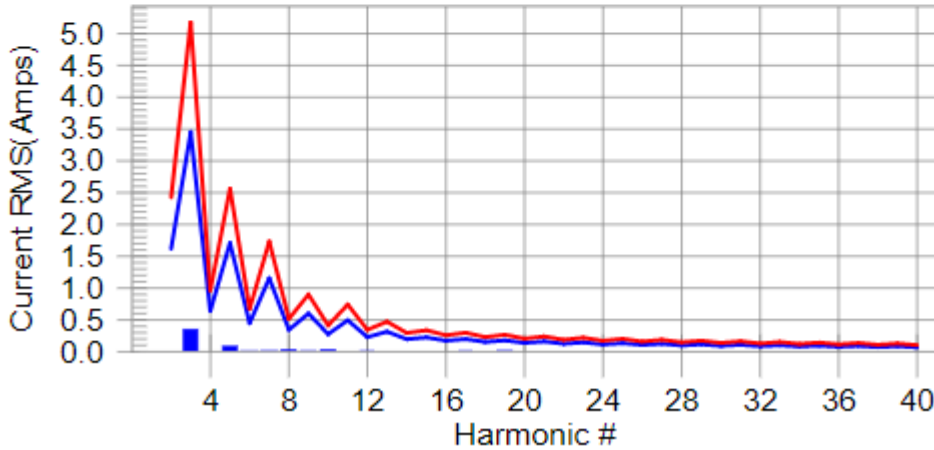
Standard	EN IEC 61000-3-2	
Exclusions (For these categories of equipment, limits are not specified in the EN 61000-3-2 standard)	<input type="checkbox"/>	Arc welding equipment intended for professional use.
	<input type="checkbox"/>	System(s) with nominal voltage(s) less than 220 V <sub>AC</sub> (line-to-neutral).
	<input checked="" type="checkbox"/>	Equipment with rated power of ≤ 75 W (other than lighting equipment).
	<input type="checkbox"/>	Professional equipment with total rated power > 1 kW.
	<input type="checkbox"/>	Symmetrically controlled heating elements with a rated power ≥ 200 W.
	<input type="checkbox"/>	Independent dimmers for incandescent lamps with rated power ≤ 1 kW.

Classification			
<input checked="" type="checkbox"/>	Class A	All apparatus not classified as Class B, C or D	
<input type="checkbox"/>	Class B	Portable tools	
<input type="checkbox"/>	Class C	<input type="checkbox"/>	Lighting equipment with active input power > 25 W
		<input type="checkbox"/>	Lighting equipment with active input power ≤ 25 W (First requirement, Table 3 column 2)
		<input type="checkbox"/>	Lighting equipment with active input power ≤ 25 W (Second requirement)
<input type="checkbox"/>	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 period	<input type="checkbox"/>	6.5 min.	<input checked="" type="checkbox"/>	2.5 min.	<input type="checkbox"/>	Other:
Version of measurement instrument standard used EN / IEC61000-4-7 (Cl. 7)	<input checked="" type="checkbox"/>	EN 61000-4-7:2002 + AM1:2009 (IEC 61000-4-7:2002+AM1:2008)				
	<input type="checkbox"/>	EN 61000-4-7:1991				
Control principle used in the EUT	<input checked="" type="checkbox"/>	Comply with the requirements of the Clause 6.1 (EN / IEC 61000-3-2).				
	<input type="checkbox"/>	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 input power
Operating mode / voltage / frequency used during the test		Mode 1 / 230 Vac / 50 Hz
<p><b>Test Result: Pass</b>      <b>Source qualification: Normal</b></p> <p><u>Current &amp; voltage waveforms</u></p>  <p><u>Harmonics and Class B limit line</u>      <u>European Limits</u></p>  <p><b>Test result: Pass</b>      <b>Worst harmonics H10-8.4% of 150% limit, H3-10% of 100% limit.</b></p>		

Measurement data		Port under test		AC input power			
Operating mode / voltage / frequency used during the test				Mode 1 / 230 Vac / 50 Hz			
Test Result: Pass		Source qualification: Normal					
THC(A): 0.358		I-THD(%): 16.7		POHC(A): 0.005			
				POHC Limit(A): 0.377			
Highest parameter values during test:							
V_RMS (Volts): 230.307		Frequency(Hz): 50.00					
I_Peak (Amps): 4.019		I_RMS (Amps): 2.185					
I_Fund (Amps): 2.150		Crest Factor: 1.894					
Power (Watts): 494.9		Power Factor: 0.985					
Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	1.620	N/A	0.003	2.430	N/A	Pass
3	0.346	3.450	10.0	0.366	5.175	7.1	Pass
4	0.002	0.645	N/A	0.003	0.968	N/A	Pass
5	0.082	1.710	4.8	0.089	2.565	3.5	Pass
6	0.005	0.450	N/A	0.007	0.675	N/A	Pass
7	0.008	1.155	N/A	0.009	1.733	N/A	Pass
8	0.024	0.345	7.1	0.035	0.518	6.7	Pass
9	0.007	0.600	N/A	0.008	0.900	N/A	Pass
10	0.024	0.276	8.7	0.035	0.414	8.4	Pass
11	0.003	0.495	N/A	0.005	0.743	N/A	Pass
12	0.004	0.230	N/A	0.007	0.345	N/A	Pass
13	0.003	0.315	N/A	0.005	0.473	N/A	Pass
14	0.002	0.197	N/A	0.006	0.295	N/A	Pass
15	0.002	0.225	N/A	0.005	0.338	N/A	Pass
16	0.002	0.173	N/A	0.008	0.260	N/A	Pass
17	0.004	0.199	N/A	0.008	0.299	N/A	Pass
18	0.002	0.153	N/A	0.004	0.230	N/A	Pass
19	0.010	0.178	N/A	0.018	0.267	N/A	Pass
20	0.001	0.138	N/A	0.002	0.207	N/A	Pass
21	0.001	0.161	N/A	0.002	0.241	N/A	Pass
22	0.001	0.125	N/A	0.003	0.188	N/A	Pass
23	0.002	0.147	N/A	0.004	0.221	N/A	Pass
24	0.002	0.115	N/A	0.004	0.173	N/A	Pass
25	0.002	0.135	N/A	0.003	0.203	N/A	Pass
26	0.002	0.106	N/A	0.004	0.159	N/A	Pass
27	0.001	0.125	N/A	0.002	0.188	N/A	Pass
28	0.003	0.099	N/A	0.007	0.149	N/A	Pass
29	0.001	0.116	N/A	0.002	0.174	N/A	Pass
30	0.001	0.092	N/A	0.002	0.138	N/A	Pass
31	0.001	0.110	N/A	0.002	0.164	N/A	Pass
32	0.001	0.086	N/A	0.001	0.129	N/A	Pass
33	0.001	0.102	N/A	0.001	0.153	N/A	Pass
34	0.001	0.081	N/A	0.002	0.122	N/A	Pass
35	0.001	0.096	N/A	0.002	0.144	N/A	Pass
36	0.001	0.077	N/A	0.002	0.116	N/A	Pass
37	0.002	0.092	N/A	0.003	0.137	N/A	Pass
38	0.001	0.073	N/A	0.001	0.110	N/A	Pass
39	0.001	0.087	N/A	0.001	0.131	N/A	Pass
40	0.001	0.069	N/A	0.001	0.104	N/A	Pass

<b>4.4 Voltage changes, voltage fluctuations and flicker</b>	<b>VERDICT: PASS</b>
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Standard	EN 61000-3-3
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**Limits**

P <sub>ST</sub> (Short term flicker)	<input checked="" type="checkbox"/>	≤ 1	<input type="checkbox"/>	Not Applicable
P <sub>LT</sub> (Long term flicker)	<input checked="" type="checkbox"/>	≤ 0,65	<input type="checkbox"/>	Not Applicable
d <sub>C</sub> (Relative Voltage change)	<input checked="" type="checkbox"/>	≤ 3,3%	<input type="checkbox"/>	Not Applicable
d <sub>MAX</sub> (Max. voltage change)	<input checked="" type="checkbox"/>	≤ 4%	<input type="checkbox"/>	6%
	<input type="checkbox"/>	7%	<input type="checkbox"/>	Not Applicable
<u>Supplemental information:</u>				

**Performed measurements**

Reason for not performing the measurement(s)	<input type="checkbox"/>	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	<input checked="" type="checkbox"/>	Flickermeter according EN / IEC 61000-4-15:2011				
	<input type="checkbox"/>	Simulation (Clause 4.2.3 of EN / IEC 61000-3-3)				
	<input type="checkbox"/>	Analytical method (Clause 4.2.4 of EN / IEC 61000-3-3)				
	<input type="checkbox"/>	Use of P <sub>st</sub> = 1 curve (Clause 4.2.5 of EN / IEC 61000-3-3)				
Observation period	<input checked="" type="checkbox"/>	10 min.	<input type="checkbox"/>	120 min.	<input type="checkbox"/>	Other:
	<input type="checkbox"/>	24 times switching according to Annex B				
Operating mode(s) used	Mode 1					
Remark	---					

See next page.

Measurement data	Port under test	AC input power										
Operating mode used during the test	Mode 1 / 230 Vac / 50 Hz											
<table border="1"> <tbody> <tr> <td data-bbox="196 416 874 461">Tmax (dt &gt; 3,3%)</td> <td data-bbox="874 416 1323 461">0,0 ms</td> </tr> <tr> <td data-bbox="196 461 874 506">Maximum relative voltage change d<sub>MAX</sub></td> <td data-bbox="874 461 1323 506">-0.02%</td> </tr> <tr> <td data-bbox="196 506 874 551">Relative Voltage change d<sub>c</sub></td> <td data-bbox="874 506 1323 551">0%</td> </tr> <tr> <td data-bbox="196 551 874 595">Short term flicker P<sub>ST</sub></td> <td data-bbox="874 551 1323 595">0.00</td> </tr> <tr> <td data-bbox="196 595 874 636">Long term flicker P<sub>LT</sub></td> <td data-bbox="874 595 1323 636">0.00</td> </tr> </tbody> </table>			Tmax (dt > 3,3%)	0,0 ms	Maximum relative voltage change d <sub>MAX</sub>	-0.02%	Relative Voltage change d <sub>c</sub>	0%	Short term flicker P <sub>ST</sub>	0.00	Long term flicker P <sub>LT</sub>	0.00
Tmax (dt > 3,3%)	0,0 ms											
Maximum relative voltage change d <sub>MAX</sub>	-0.02%											
Relative Voltage change d <sub>c</sub>	0%											
Short term flicker P <sub>ST</sub>	0.00											
Long term flicker P <sub>LT</sub>	0.00											
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.

<input checked="" type="checkbox"/>	Motor speed	<input type="checkbox"/>	Display data
<input type="checkbox"/>	Switching	<input type="checkbox"/>	Data storage
<input type="checkbox"/>	Standby mode	<input type="checkbox"/>	Sensor functions
<input type="checkbox"/>	Temperature	<input type="checkbox"/>	Audible signals
<input type="checkbox"/>	Power consumption	<input type="checkbox"/>	Others :
<input type="checkbox"/>	AC mains input current	<input type="checkbox"/>	Others :
<input type="checkbox"/>	Timing	<input type="checkbox"/>	Others :
<input type="checkbox"/>	Illumination	<input type="checkbox"/>	Others :
<u>Supplementary information :</u>			

Immunity test	Monitored - Checked function(s)/parameter(s) during / after the test	Method
Electrostatic discharge	Motor speed	Visual
Radio-frequency electromagnetic fields	N/A	---
Fast transients	Motor speed	Visual
Surge transient	Motor speed	Visual
Injected currents (radio-frequency common mode)	Motor speed	Visual
Voltage dips and short interruptions	Motor speed	Visual
<u>Supplementary information :</u>		

<b>5.3 Electrostatic discharge immunity</b>	<b>VERDICT: PASS</b>
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Electrostatic discharges (ESD) are the result of persons or objects that accumulate static electricity due to for instance walking on synthetic carpets. The ESD can influence the operation of equipment or damage its electronics, either by a direct discharge or indirectly by coupling or radiation. Both effects are simulated during the tests.

**Requirements**

Standard	EN IEC 55014-2						
Basic standard	EN 61000-4-2						
Port under test	Enclosure						
Air discharges <sup>1)</sup>	<input checked="" type="checkbox"/>	±2 kV	<input checked="" type="checkbox"/>	±4 kV	<input checked="" type="checkbox"/>	±8 kV	<input type="checkbox"/> kV
Contact discharges <sup>1)</sup>	<input checked="" type="checkbox"/>	±2 kV	<input checked="" type="checkbox"/>	±4 kV	<input type="checkbox"/>	±8 kV	<input type="checkbox"/> kV
Number of discharges	≥ 10 per polarity with ≥ 1 sec interval.						
<sup>1)</sup> Tests with lower voltages are not required.							

**Performed tests**

Set-up	<input checked="" type="checkbox"/>	Table-top	<input type="checkbox"/>	Floor standing
Ambient temperature [°C]	23 °C		Relative Humidity air [%]	58 %
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]
<input checked="" type="checkbox"/>	Points on conductive surface as indicated in the picture below.	±2, ±4	Contact	10	1
<input checked="" type="checkbox"/>	Points on non-conductive surface as indicated in the picture below.	±2, ±4, ±8	Air	10	1
<input checked="" type="checkbox"/>	HCP top side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	HCP bottom side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	VCP right side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	VCP left side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	VCP front side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	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:					

<b>5.4 Electrical Fast Transients immunity</b>	<b>VERDICT: PASS</b>
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The EFT immunity test simulates disturbances by bursts of very short transients caused for example by switching off loads such as an AC motor or bouncing relay contacts. The transients are likely to disturb electronics but less likely to cause damage.

**Requirements**

Standard	EN IEC 55014-2			
Basic standard	EN 61000-4-4			
Pulse characteristics	5/50 ns			
Port	Test level	Repetition frequency	Duration	
<input checked="" type="checkbox"/> AC input-output power <sup>1)</sup>	± 1000 V	5 KHz	2 min. / polarity	
<input type="checkbox"/> DC input-output power <sup>2)</sup>	± 500 V	5 KHz	2 min. / polarity	
<input type="checkbox"/> Signal and Control lines <sup>3)</sup>	± 500 V	5 KHz	2 min. / polarity	
<sup>1)</sup> 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. <sup>2)</sup> Not applicable to battery operated appliances that cannot be connected to the mains while in use. <sup>3)</sup> 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	<input type="checkbox"/>	Equipment standing on floor at (0,1 ± 0,01) m above ground plane	
	<input checked="" type="checkbox"/>	Equipment on the table (0,1 ± 0,01) m above ground plane	
	<input type="checkbox"/>	Artificial hand applied.	
Coupling	<input checked="" type="checkbox"/>	Common mode	<input type="checkbox"/> Other:

Port(s) under test	Test Voltage & Polarity	Repetition Frequency	Test duration / polarity	Injection method		
				<input checked="" type="checkbox"/> CDN	<input type="checkbox"/> Clamp	<input type="checkbox"/> Clamp
AC / DC mains power input	1 kV	5 KHz	2 min	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC / DC power output		5 KHz		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ethernet / LAN		5 KHz		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.					

<b>5.5 Surge transient immunity</b>	<b>VERDICT: PASS</b>
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The surge transient immunity test simulates the surges that are caused by over-voltages due to indirect (induced) lightning transients. The pulse is a slow transient with high-energy contents and due to its long duration may cause damage to an unprotected EUT.

**Requirements**

Standard	EN IEC 55014-2		
Basic standard	EN 61000-4-5		
Pulse characteristics	1,2/50µs 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 <sup>1)</sup>	+ 1 kV	N/A	90
AC input power <sup>1)</sup>	- 1 kV	N/A	270
<sup>1)</sup> 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
<input checked="" type="checkbox"/> AC mains input power	Line to Neutral	+1 kV	90	
<input checked="" type="checkbox"/> AC mains input power	Line to Neutral	-1 kV	270	
<input checked="" type="checkbox"/> AC mains input power	Line to Earth	+2 kV	90	1
<input checked="" type="checkbox"/> AC mains input power	Line to Earth	-2 kV	270	1
<input checked="" type="checkbox"/> AC mains input power	Neutral to Earth	+2 kV	90	1
<input checked="" type="checkbox"/> AC mains input power	Neutral to Earth	-2 kV	270	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.
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Supplementary information:  
 1. The EUT does not include an earth port.

<b>5.6</b>	<b>Injected currents (RF common mode) immunity</b>	<b>VERDICT: PASS</b>
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During this test the immunity of the equipment for induced or conducted electromagnetic fields is checked. Fields generated by radio and other transmitters cause RF voltages in long cables like the mains network. This test reproduces these induced disturbing voltages by injecting them to the EUT via the cabling.

**Requirements**

Standard		EN IEC 55014-2		
Basic standard		EN 61000-4-6		
Frequency range		Modulation	Step size	Dwell time
<input type="checkbox"/>	0,15 – 80 MHz	80% AM (1kHz)	≤ 1%	≥ 0,5 s
<input checked="" type="checkbox"/>	0,15 – 230 MHz	80% AM (1kHz)	≤ 1%	≥ 0,5 s
Port			Test level, U <sub>o</sub>	
<input checked="" type="checkbox"/>	AC input-output power <sup>1)</sup>		3 V	
<input type="checkbox"/>	DC input-output power <sup>2) 3)</sup>		1 V	
<input type="checkbox"/>	Signal and Control lines <sup>4)</sup>		1 V	
<sup>1)</sup> 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. <sup>2)</sup> Not applicable to battery operated appliances that cannot be connected to the mains while in use. <sup>3)</sup> 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. <sup>4)</sup> 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)
<input type="checkbox"/>	0,15 – 80 MHz	<input checked="" type="checkbox"/>	0,15 – 230 MHz	80% AM (1kHz)
Voltage – Mains [V]		230 Vac	Frequency – Mains [Hz]	50 Hz
Operating mode(s) used		Mode 1		
Test set-up		<input type="checkbox"/>	Equipment standing on floor at (0,1 ± 0,01) m above ground plane.	
		<input checked="" type="checkbox"/>	Equipment on the table (0,1 ± 0,01) m above ground plane.	
		<input type="checkbox"/>	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:	

<b>5.7 Power supply interruptions and dips immunity</b>	<b>VERDICT: PASS</b>
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The purpose of the test is to verify the immunity of the equipment against voltage dips and voltage interruptions. It helps to ensure that the equipment functions properly (as expected and safely) with power supply fluctuations. Voltage dips and interruptions are caused by faults in the LV, MV, HV networks (short-circuit or ground faults).

**Requirements**

Standard	EN IEC 55014-2			
Basic standard	EN 61000-4-11			
# of dips & interruptions	3 dips / interruptions for each test level and phase angle			
Interval between events	≥ 10 seconds			
Port	Test level <sup>1)</sup>	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.
<sup>1)</sup> Changes to the voltage level shall occur at a zero crossing point in the a.c. voltage waveform. <b>NOTE:</b> Where the equipment has a rated voltage range the following shall apply: <ul style="list-style-type: none"> <li>- 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.</li> <li>- In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.</li> </ul>				

**Performed tests**

$U_{NOM}$ [V <sub>AC</sub> ]	Terminal	Voltage dip [% $U_{NOM}$ ]	Duration [cycles]		Repetition rate [s]	Number of dips per test	Phase angle [°]
			50 Hz	60 Hz			
230	L-N	0	0,5	0,5	10	3	0, 180
230	L-N	40	10	12	10	3	0, 180
230	L-N	70	25	30	10	3	0, 180
Operating mode(s) used		Mode 1					
Observation(s)		During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance was observed.					
<u>Supplementary information:</u>							

## 6 IDENTIFICATION OF THE EQUIPMENT UNDER TEST

### EUT PHOTOS



## 7 MEASUREMENT UNCERTAINTIES

The table(s) below show(s) measurement 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%.

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2 or a product standard. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.

Emission tests	Uncertainty
Conducted emissions, 150 kHz to 30 MHz	$\pm 2.10$ dB
Radiated emissions, 30 MHz to 1000 MHz	$\pm 3.90$ dB
Radiated emissions, 1 GHz to 6 GHz	$\pm 5.22$ dB
Harmonic Current Emissions	0.1 %
Voltage Fluctuation and Flicker	$\pm 4\%$



## 8 USED EQUIPMENT

### Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Test Receiver	R&S	ESR3	102608	2022/05/30	2023/05/29
Artificial Mains Network	R&S	ENV4200	848411/010	2021/12/27	2022/12/26
LISN	R&S	ENV216	100092	2022/05/17	2023/05/16
Coaxial Cable(9m)	Belden	8129	SR2-H	2021/08/15	2022/08/14
DEKRA-EMI system	DEKRA	Version 1.0	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	ESC17	100879	2022/05/30	2023/05/29
Absorbing Clamp	Luthi	MDS 21B	P1602169770	2022/01/05	2023/01/04
Coaxial Cable(5m)	Schwarzbeck	RG-223U	SR2-H-PT	2021/08/15	2022/08/14
DEKRA-EMI system	DEKRA	Version 1.0	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	2021/10/28	2022/10/27

### 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	2021/10/28	2022/10/27

### Electrostatic Discharge / SR8-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Electrostatic Simulator Discharge	NoiseKen	ESS-2002	ESS04Z3759	2022/03/17	2023/03/16
Horizontal Coupling Plane (HCP)	QuieTek	HCP AL50	N/A	N/A	N/A
Vertical Coupling Plane (VCP)	QuieTek	HCP AL50	N/A	N/A	N/A

### Electrical fast transient/ Brust / SR3-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMC Immunity Tester	Teseq	NSG 3060	1424	2022/05/05	2023/05/04

### Surge / SR3-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMC Immunity Tester	Teseq	NSG 3060	1424	022/05/05	2023/05/04

Conducted susceptibility / SR7-H

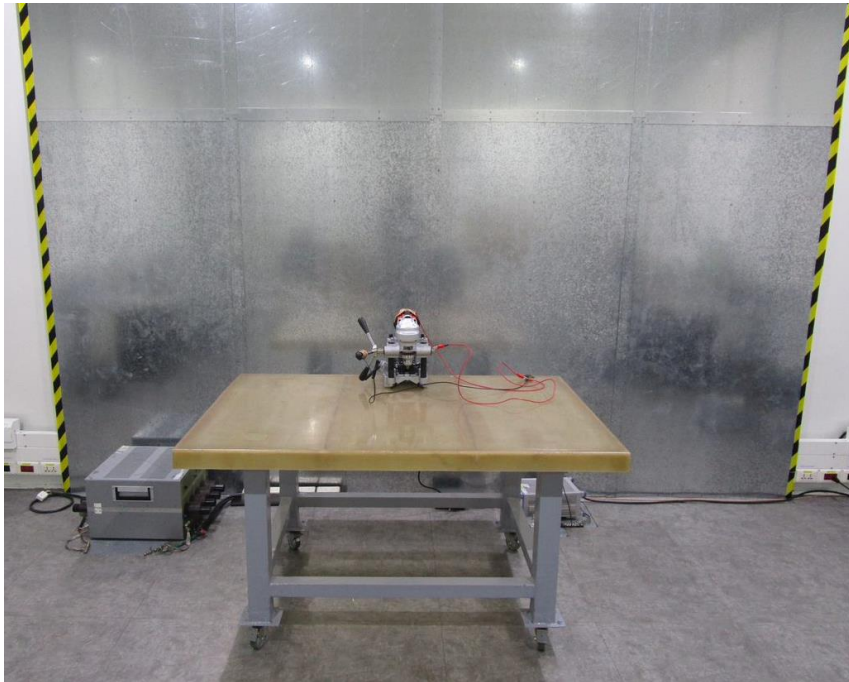
Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Compact Immunity Test System	Teseq	NSG 4070b-80	41145	2021/09/03	2022/09/02
CDN	Teseq	CDN M016	50519	2022/01/14	2023/01/13

Voltage dips and interruptions / SR7-H

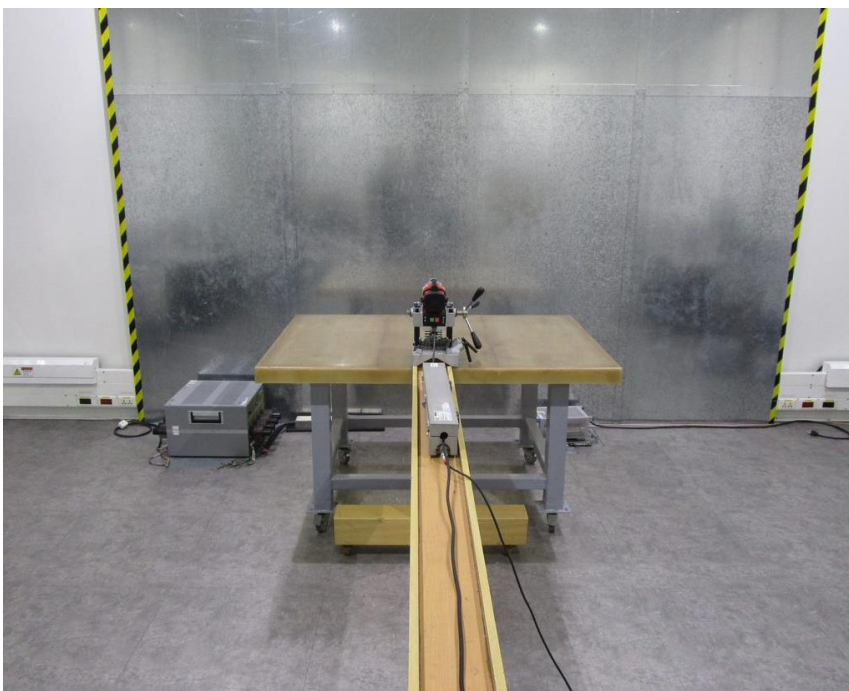
Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMC Immunity Tester	Teseq	NSG 3060	1424	2022/05/05	2023/05/04

## 9 TEST PHOTOS

### Conducted disturbance voltage at mains terminals



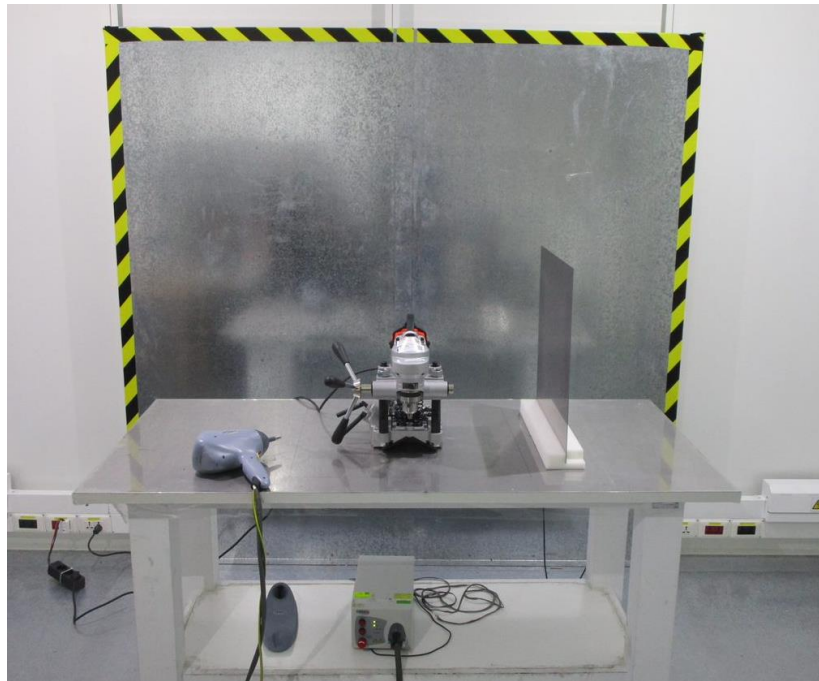
### Disturbance power



### Harmonic current emissions & Flicker



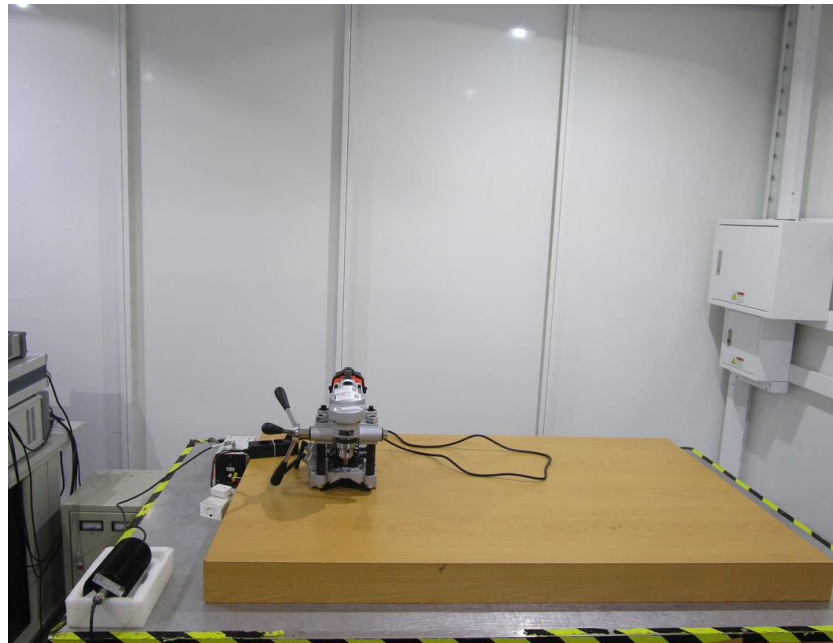
### Electrostatic discharge immunity



**Fast transients, Surges & Voltage dips and short interruptions immunity**



**Injected currents (radio-frequency common mode) immunity**



End of the report