



Test report No:  
6141987.50

## TEST REPORT

### Electromagnetic Compatibility (EMC)

Identification of item tested	Electric Drywall Sander
Trademark	AGP
Model and /or type reference	GS9FE, GS9FSE, GS9UE, GS9USE, GS9GE, GS9GSE, FM225U, FM225US, GS225U, GS225US, GS225G, GS225GS, GS9U, GS9US, GS9G, GS9GS, DWS225, DWS225S, PI2001, DRS2250, MAP-GS9FE, POG225, PB225, PI2001, DW20, MIRO 955, MIRO 955-S, FDW-550-110, FDW-550-240, DW10, 62 50 00, 62 55 00, DWS225, DWS225L, LHS 255 PRO, LPC97S, P1500, AG700, AG799, DYN0 550, MAXPRO 500, PS-1000, TESLER, MAXPRO 250, WS230F, WS230E, WS230U, S9E, S9F, S9U, DWS9F, DWS9E, DWS9U, DWS9
Ratings	220-240 Vac; 50-60 Hz; 550 W; 110-120 Vac; 50-60 Hz; 550 W; Class II
Test Laboratory / address	DEKRA Testing and Certification (Shanghai) Ltd. No.250, Jiangchangsan Road, Jing'an District, Shanghai, China
Applicant / address	LEE YEONG INDUSTRIAL CO., LTD. No.2, Kejia Rd., Douliu City, Yunlin County 64057, Taiwan
Test method requested, standard	EN IEC 55014-1:2021 EN IEC 55014-2:2021 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A1:2019+A2:2021
Verdict Summary	IN COMPLIANCE
Tested by (name / position & signature)	Stefan Zhao Senior Project Manager 
Approved by (name / position & signature)	Wency Yang Technical Manager 
Date of issue	2022-12-14
Report template No	TRF_EN55014-1_EN55014-2_EMCC02 V1.1

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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.
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

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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 %. Refer to the Annex 1 for further information.

## ENVIRONMENTAL CONDITIONS

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

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

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

## POSSIBLE TEST CASE VERDICTS

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

## DEFINITION OF SYMBOLS USED IN THIS TEST REPORT

<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 type="checkbox"/>	Comma (.)	<input checked="" 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
N/A	:	Not Applicable
N/M	:	Not Measured

## DOCUMENT HISTORY

Report nr.	Date	Description
6141987.50	2022-12-14	First release

## REMARKS AND COMMENTS

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

The test results relate only to the samples tested.

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

After review, all tests were carried out on the following models GS9USE (110-120 V) and GS9USE (220-240 V).  
 The test results stated in this report are also representative for all models

## USAGE OF SAMPLES

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

Samples are composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
6141987-1	Electric Drywall Sander	GS9USE (110-120 V)	N/A	2022-10-14
6141987-2	Electric Drywall Sander	GS9USE (220-240 V)	N/A	2022-10-14

Supplemental information:



# 1 GENERAL INFORMATION

## 1.1 General Description of the Item(s)

Description of the item .....	Electric Drywall Sander
Model / Type number .....	GS9FE, GS9FSE, GS9UE, GS9USE, GS9GE, GS9GSE, FM225U, FM225US, GS225U, GS225US, GS225G, GS225GS, GS9U, GS9US, GS9G, GS9GS, DWS225, DWS225S, PI2001, DRS2250, MAP-GS9FE, POG225, PB225, PI2001, DW20, MIRO 955, MIRO 955-S, FDW-550-110, FDW-550-240, DW10, 62 50 00, 62 55 00, DWS225, DWS225L, LHS 255 PRO, LPC97S, P1500, AG700, AG799, DYN0 550, MAXPRO 500, PS-1000, TESLER, MAXPRO 250, WS230F, WS230E, WS230U, S9E, S9F, S9U, DWS9F, DWS9E, DWS9U, DWS9
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
	<input checked="" type="checkbox"/>	AC: 100-120 V; 50-60 Hz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	AC: 220-240 V; 50-60 Hz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:					
	<input type="checkbox"/>	DC:					
Rated Power .....	550 W						
Clock frequencies .....	< 15 MHz						
Other parameters.....	N/A						
Mounting position.....	<input type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input checked="" type="checkbox"/>	Hand-held equipment					
	<input type="checkbox"/>	Other:					

<b>Intended use of the Equipment Under Test (EUT)</b>
The apparatus as supplied for the test is a electric drywall sander, intended for residential, commercial and light-industrial use.

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

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

Copy of marking plate:
N/A



## 1.2 Environment

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

<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 1	DEKRA Testing and Certification (Shanghai) Ltd. No. 250, Jiangchangsan Road, Jing'an District, Shanghai, China
Date (receive sample)	2022-10-14
Date (start test)	2022-10-14
Date (finish test)	2022-12-12

## 1.4 Classification according to EN IEC 55014-2

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

<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 type="checkbox"/>
2	The EUT is operating continuously without load at its mid-range speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3		<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
AC Mains port	AC Main	4.0	<input checked="" 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>				

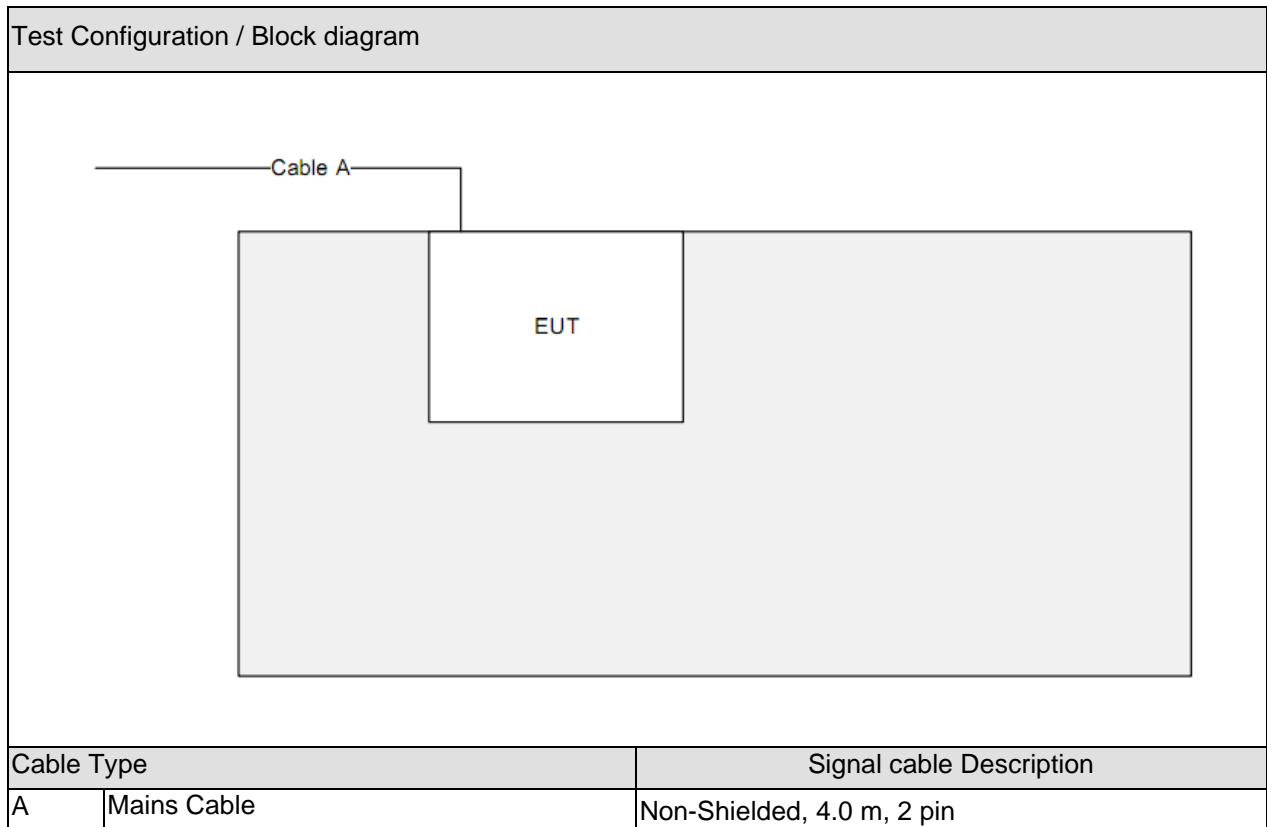
### 2.3 Support / Auxiliary equipment / unit / software for the EUT

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

The following test setup / configuration / block diagram has been used during the 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 55032	2015	Electromagnetic compatibility of multimedia equipment - Emission requirements
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 +A2	2013 2019 <sup>1)</sup> 2021 <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)

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

### 3.3 Overview of results

EMISSION TESTS – EN IEC 55014-1			
Requirement – Test case	Basic standard(s)	Verdict	Remark
Conducted disturbance at mains terminals (150 kHz – 30 MHz)	EN 55016-2-1	PASS	---
Conducted disturbance at wired network ports (150 kHz – 30 MHz)	EN 55016-2-1 EN 55032	N/A	See 2)
Disturbance power (30 MHz – 300 MHz)	EN 55016-2-2	PASS	---
Radiated disturbance (30 MHz – 1000 MHz)	EN 55016-2-3	N/A	See 4)
Radiated disturbance (1 GHz – 6 GHz)	EN 55016-2-3	N/A	See 3)
Discontinuous disturbance (clicks) on AC power leads	EN IEC 55014-1	N/A	See 1)
<u>Supplementary information:</u> 1) Exemptions from click measurements applicable (clause 5.4.3). 2) The test is not applicable as the EUT does not have associated ports / wired network ports. 3) The highest internal frequency of the EUT is less than 108 MHz. 4) According to clause 4.3.4.2 procedure (a) of the CISRP 14-1 standard the EUT is deemed to comply in the frequency range from 300 MHz to 1000 MHz without further measurements.			

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

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

## 4 EMISSION TEST RESULTS

<b>4.1</b>	<b>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 – Tools

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

<input checked="" type="checkbox"/>	Rated power below 700 W	Limits as above
<input type="checkbox"/>	Rated power between 700 and 1000 W	Limits +4 dB
<input type="checkbox"/>	Rated power above 1000 W	Limits +10 dB

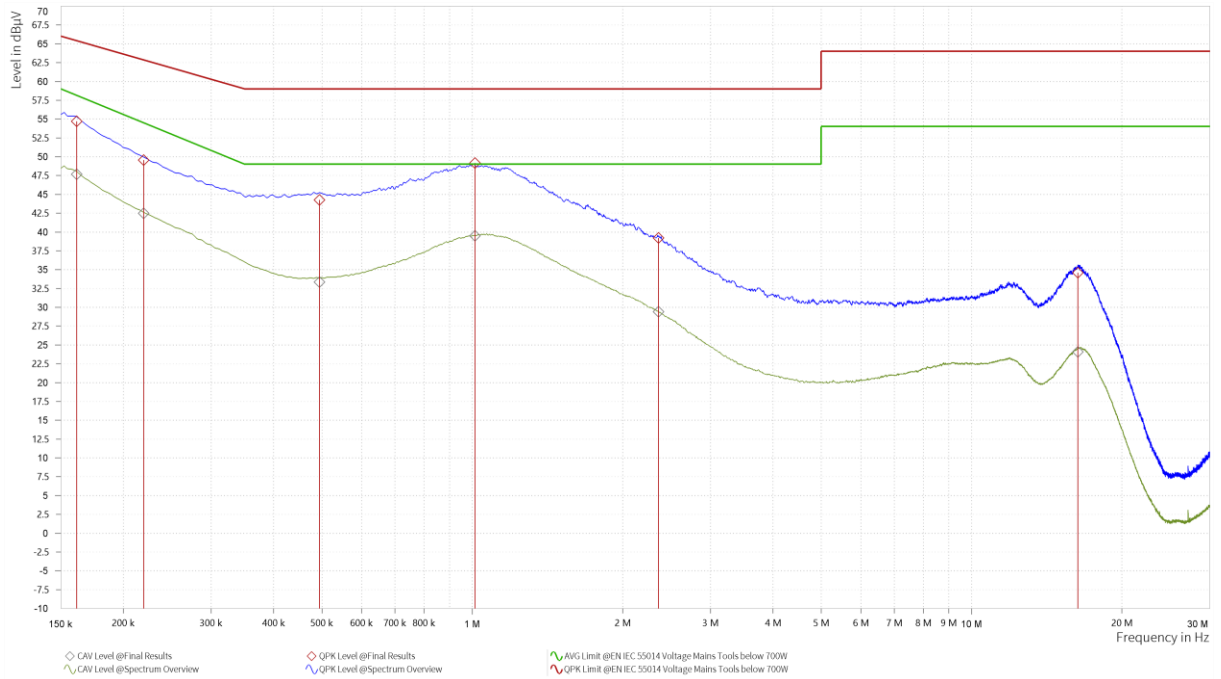
### Performed measurements

Scan range (0,9 – 1,1 U <sub>N</sub> )	<input type="checkbox"/> 198 – 264 V <sub>AC</sub>	<input type="checkbox"/> 207 – 253 V <sub>AC</sub>	<input checked="" type="checkbox"/> 120/230 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]	120 Vac / 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 type="checkbox"/> Table top	<input checked="" type="checkbox"/> Artificial hand applied	
	<input checked="" type="checkbox"/> Floor standing	<input type="checkbox"/> Other:	
	Refer to the Annex 3 for test setup photo(s).		
Operating mode(s) used	Mode 1, mode 2		
Remark	For the level of continuous disturbance is not steady, the reading on the measuring receiver is observed for at least 15 s for each measurement.		

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 120 Vac/ 50 Hz

Result for sample no.: 6141987-1

Line



## EMI Final Results

Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.161	54.70	65.40	10.70	47.64	58.15	10.50	9.84	L1
0.220	49.54	62.85	13.31	42.46	54.49	12.03	9.79	L1
0.494	44.23	59.00	14.77	33.33	49.00	15.67	9.77	L1
1.012	49.16	59.00	9.84	39.47	49.00	9.53	9.69	L1
2.360	39.20	59.00	19.80	29.41	49.00	19.59	9.82	L1
16.323	34.58	64.00	29.42	24.05	54.00	29.95	10.21	L1

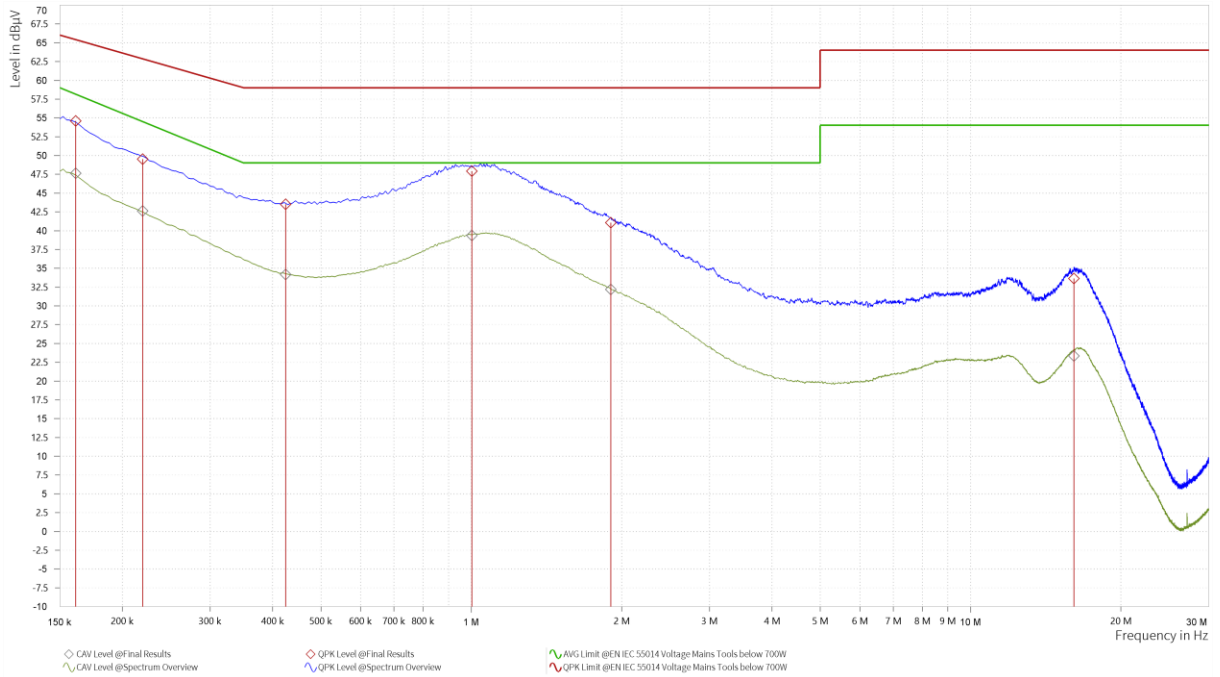
Remark



Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 120 Vac/ 50 Hz

Result for sample no.: 6141987-1

**Neutral**



**EMI Final Results**

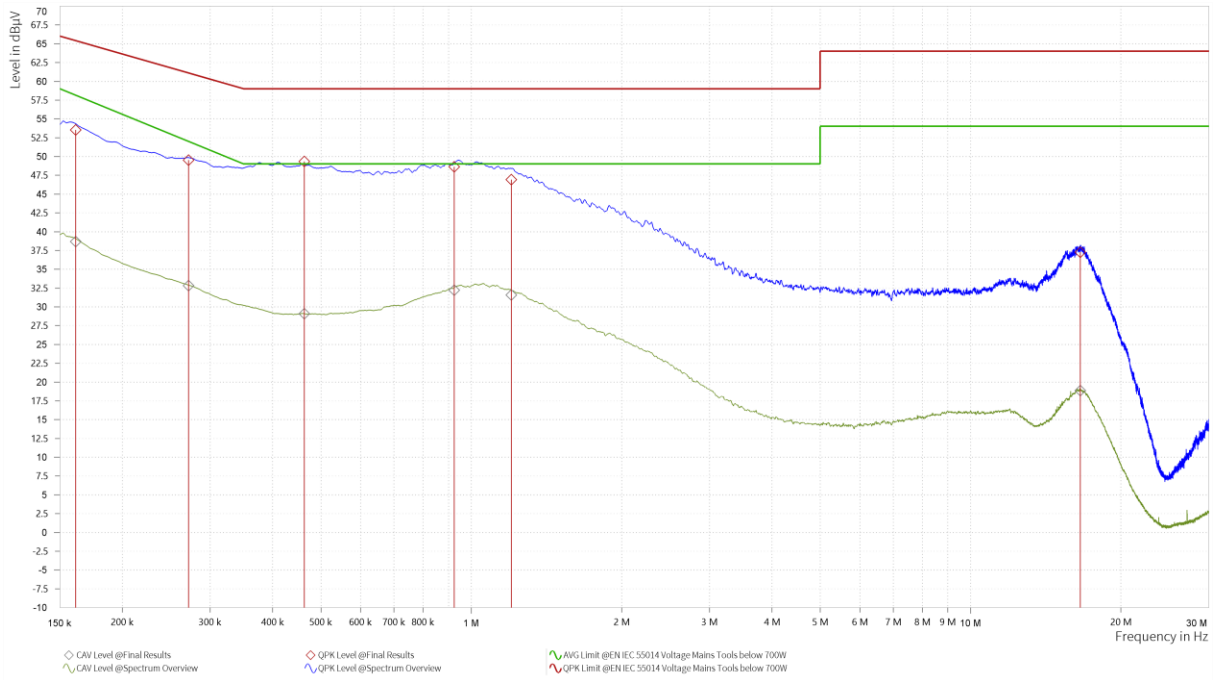
Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.161	54.60	65.40	10.81	47.62	58.15	10.52	9.92	N
0.220	49.49	62.85	13.36	42.60	54.49	11.89	9.87	N
0.425	43.51	59.00	15.49	34.15	49.00	14.85	9.87	N
1.003	47.90	59.00	11.10	39.36	49.00	9.64	9.81	N
1.903	41.04	59.00	17.96	32.18	49.00	16.82	9.87	N
16.100	33.64	64.00	30.36	23.31	54.00	30.69	10.15	N

Remark

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 2/ 120 Vac/ 50 Hz

Result for sample no.: 6141987-1

Line



### EMI Final Results

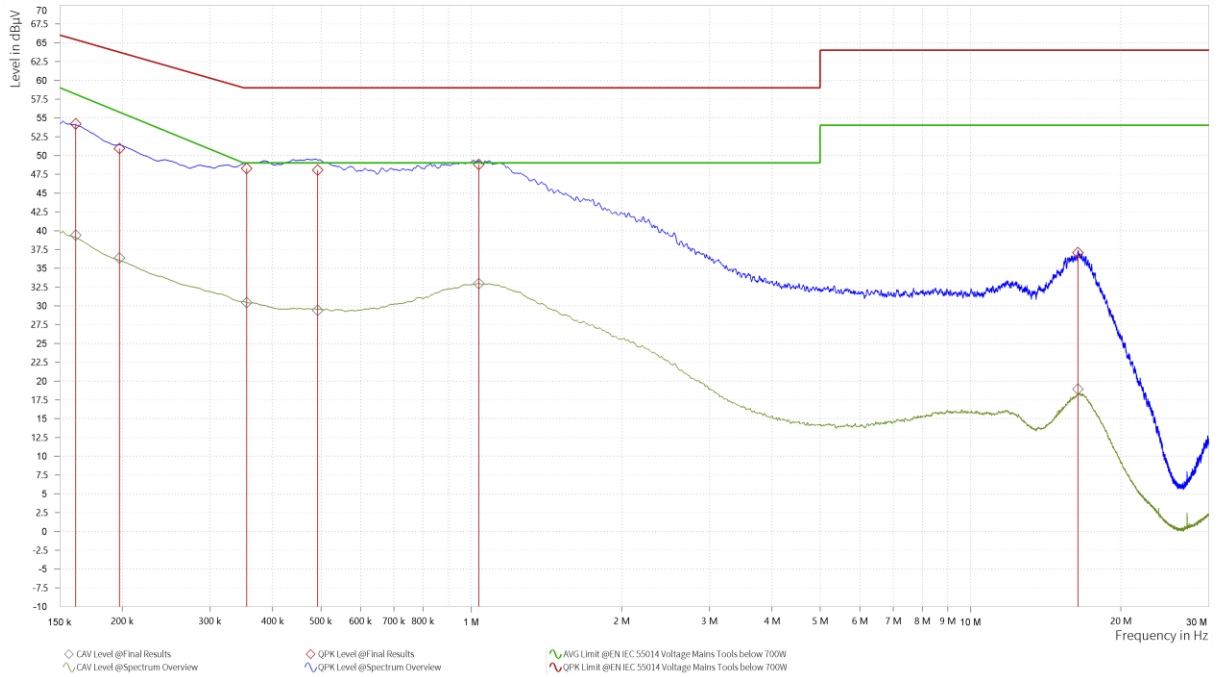
Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.161	53.53	65.40	11.87	38.68	58.15	19.46	9.84	L1
0.272	49.50	61.10	11.60	32.81	52.00	19.18	9.79	L1
0.463	49.31	59.00	9.69	29.07	49.00	19.93	9.77	L1
0.924	48.63	59.00	10.37	32.19	49.00	16.81	9.72	L1
1.203	46.90	59.00	12.10	31.55	49.00	17.45	9.71	L1
16.584	37.26	64.00	26.74	18.84	54.00	35.16	10.22	L1

Remark

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 2/ 120 Vac/ 50 Hz

Result for sample no.: 6141987-1

**Neutral**



**EMI Final Results**

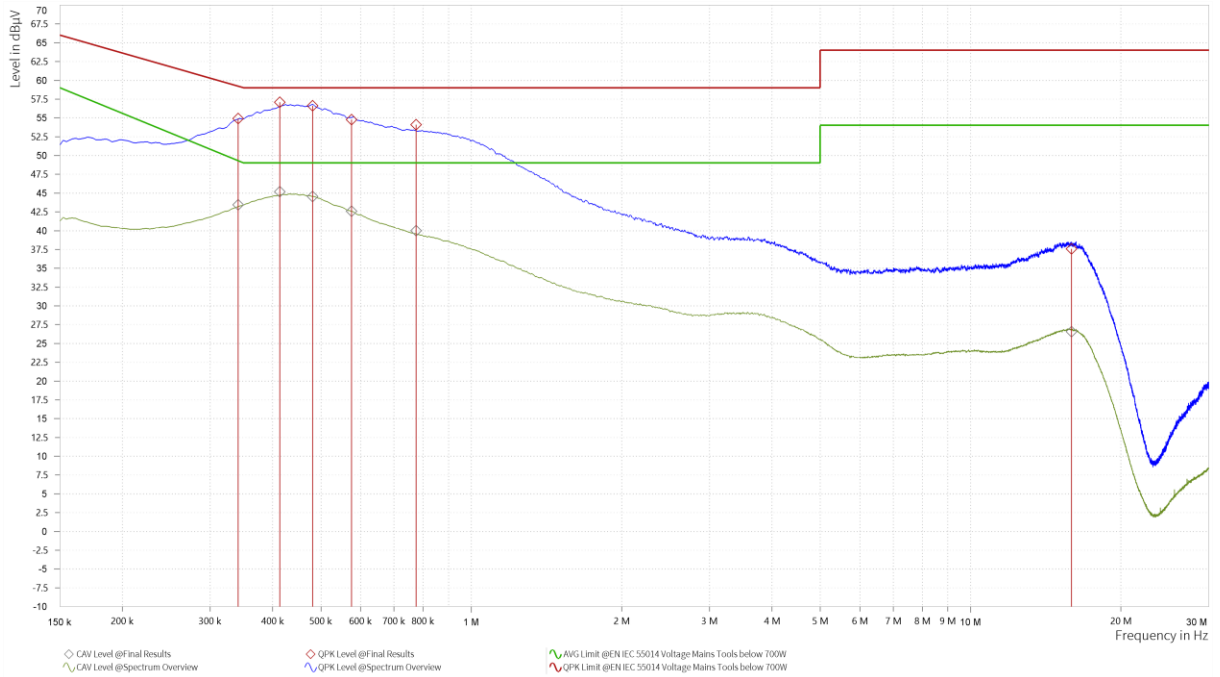
Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.161	54.19	65.40	11.21	39.39	58.15	18.76	9.92	N
0.197	50.94	63.74	12.80	36.38	55.77	19.39	9.87	N
0.355	48.27	59.00	10.73	30.42	49.00	18.58	9.87	N
0.492	48.06	59.00	10.94	29.41	49.00	19.59	9.87	N
1.034	48.80	59.00	10.20	32.93	49.00	16.07	9.81	N
16.409	37.07	64.00	26.93	18.92	54.00	35.08	10.15	N

Remark

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

Result for sample no.: 6141987-2

Line



### EMI Final Results

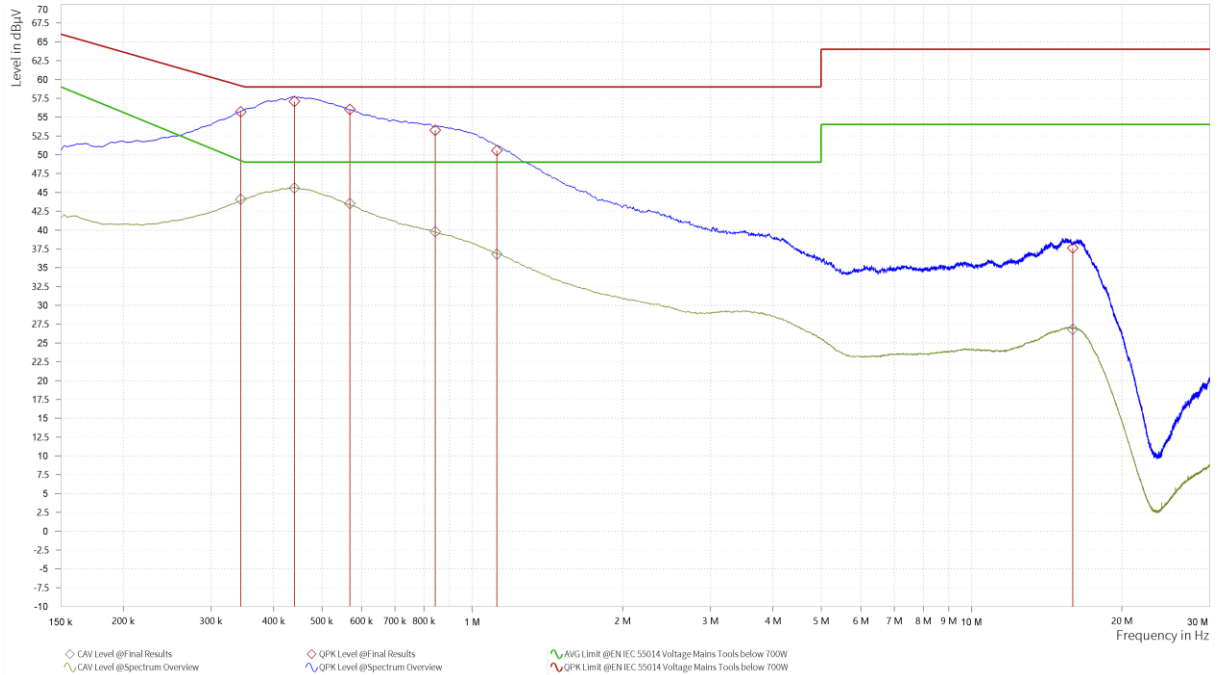
Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.341	54.90	59.21	4.31	43.44	49.30	5.86	9.78	L1
0.413	57.08	59.00	1.92	45.16	49.00	3.84	9.78	L1
0.481	56.61	59.00	2.39	44.53	49.00	4.47	9.77	L1
0.575	54.78	59.00	4.22	42.59	49.00	6.41	9.78	L1
0.776	54.07	59.00	4.93	40.00	49.00	9.00	9.76	L1
15.923	37.55	64.00	26.45	26.57	54.00	27.43	10.21	L1

Remark

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

Result for sample no.: 6141987-2

**Neutral**



**EMI Final Results**

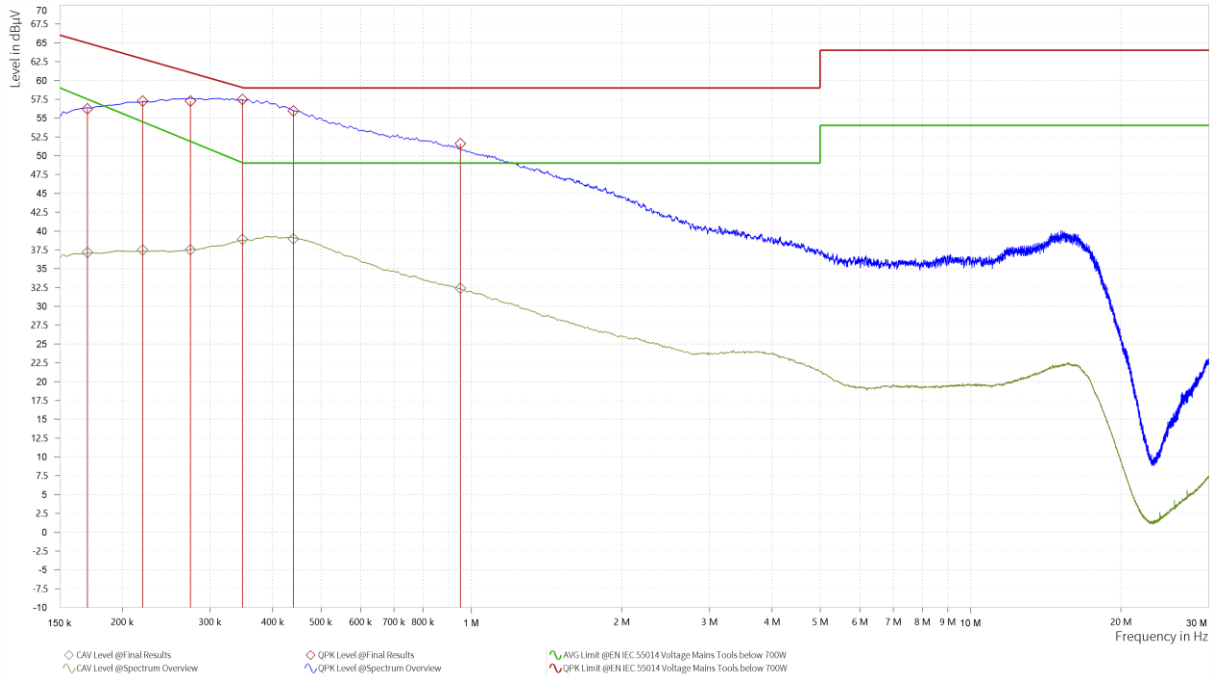
Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.344	55.69	59.15	3.46	44.08	49.22	5.15	9.87	N
0.440	57.05	59.00	1.95	45.54	49.00	3.46	9.87	N
0.569	55.99	59.00	3.01	43.51	49.00	5.49	9.86	N
0.843	53.23	59.00	5.77	39.79	49.00	9.21	9.83	N
1.120	50.53	59.00	8.47	36.79	49.00	12.21	9.82	N
15.932	37.59	64.00	26.41	26.81	54.00	27.19	10.16	N

Remark

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 2/ 230 Vac/ 50 Hz

Result for sample no.: 6141987-2

**Line**



**EMI Final Results**

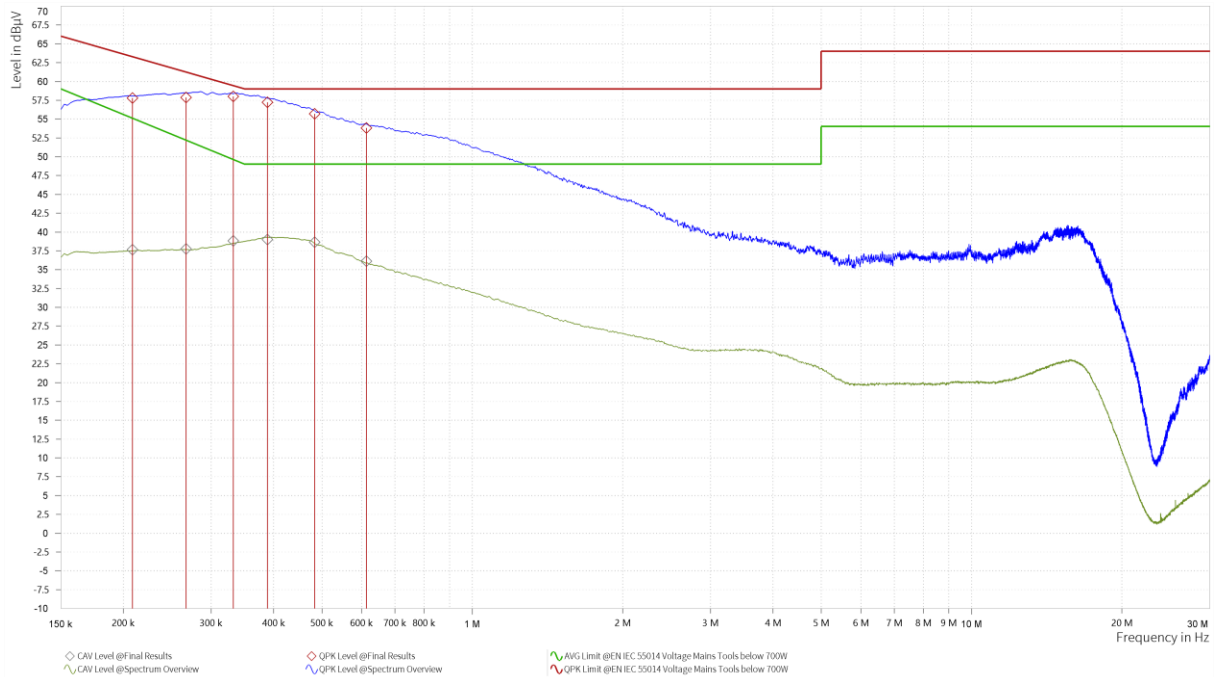
Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.170	56.23	64.95	8.72	37.13	57.51	20.37	9.83	L1
0.220	57.26	62.85	5.58	37.45	54.49	17.04	9.79	L1
0.274	57.24	61.03	3.79	37.48	51.90	14.42	9.79	L1
0.348	57.46	59.05	1.59	38.87	49.07	10.20	9.78	L1
0.440	55.93	59.00	3.07	38.96	49.00	10.04	9.78	L1
0.951	51.60	59.00	7.40	32.37	49.00	16.63	9.71	L1

Remark

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 2/ 230 Vac/ 50 Hz

Result for sample no.: 6141987-2

**Neutral**



**EMI Final Results**

Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line
0.209	57.79	63.28	5.49	37.63	55.11	17.49	9.87	N
0.267	57.86	61.24	3.38	37.74	52.19	14.45	9.87	N
0.332	57.98	59.43	1.45	38.81	49.61	10.80	9.87	N
0.389	57.20	59.00	1.80	39.00	49.00	10.00	9.87	N
0.483	55.67	59.00	3.33	38.63	49.00	10.37	9.87	N
0.614	53.81	59.00	5.19	36.10	49.00	12.90	9.86	N

Remark

<b>4.2 Disturbance power (30 MHz – 300 MHz)</b>	<b>VERDICT: PASS</b>
---	----------------------

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

**Limits – Tools**

Frequency range [MHz]	Limit: QP [dB(pW)]	Limit: AV [dB(pW)]	IF BW	Detector(s)
30 - 300	45 – 55 <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.				
<input checked="" type="checkbox"/>	Rated power below 700 W		Limits as above	
<input type="checkbox"/>	Rated power between 700 and 1000 W		Limits +4 dB	
<input type="checkbox"/>	Rated power above 1000 W		Limits +10 dB	

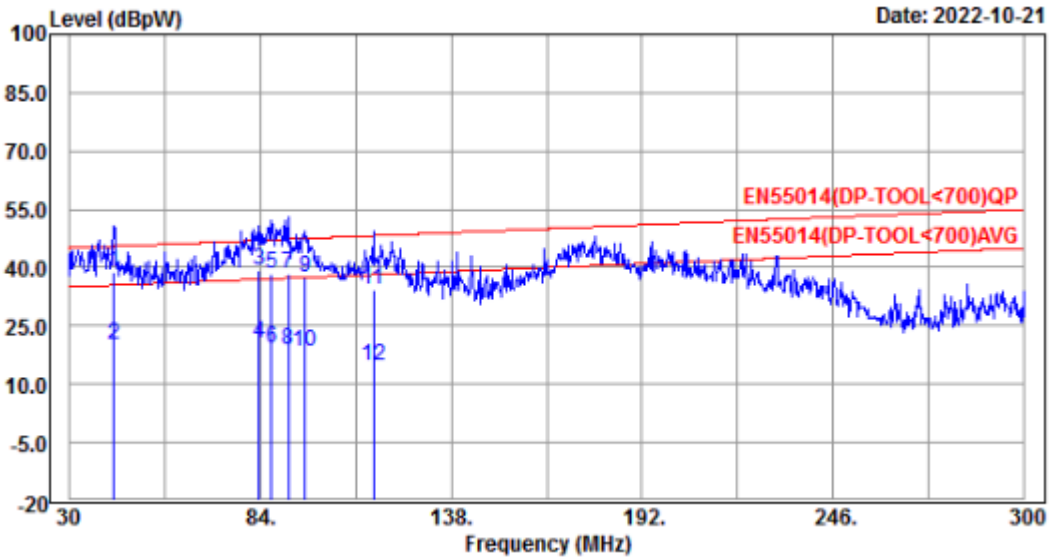
**Performed measurements**

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 type="checkbox"/>	198 – 264 V <sub>AC</sub>	<input type="checkbox"/>	207 – 253 V <sub>AC</sub>	<input checked="" type="checkbox"/>	120/230 V <sub>AC</sub>
Voltage – Mains [V]	120 Vac / 230 Vac					
Frequency – Mains [Hz]	50 Hz					
Test setup	<input type="checkbox"/>	Table top	<input checked="" 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, mode 2					
Remark	For the level of continuous disturbance is not steady, the reading on the measuring receiver is observed for at least 15 s for each measurement.					



<b>Measurement data</b>	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 1/ 120 Vac/ 50 Hz

Result for sample no.: 6141987-1



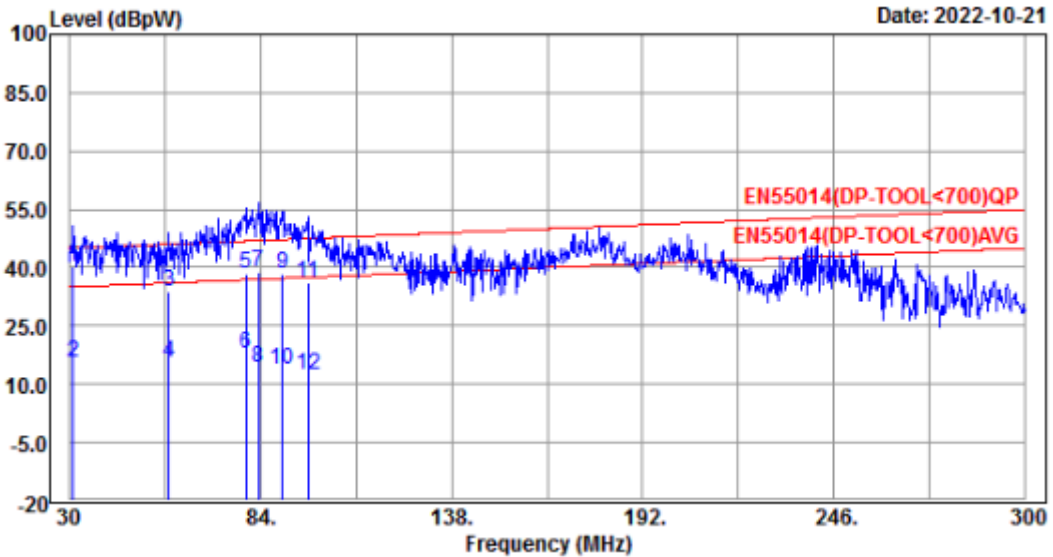
Item	Freq. MHz	Reading Level dBpW	C.F dB	Emission Level dBpW	Limit dBpW	Over Limit dB	Detector
1	42.69	11.81	27.14	38.95	45.48	-6.53	QP
2	42.69	-6.89	27.14	20.25	35.48	-15.23	Average
3	83.73	14.31	25.06	39.37	47.00	-7.63	QP
4	83.73	-4.49	25.06	20.57	37.00	-16.43	Average
5	87.24	13.61	24.73	38.34	47.13	-8.79	QP
6	87.24	-5.29	24.73	19.44	37.13	-17.69	Average
7	92.10	14.21	24.00	38.21	47.31	-9.10	QP
8	92.10	-5.09	24.00	18.91	37.31	-18.40	Average
9	96.69	13.82	23.47	37.29	47.48	-10.19	QP
10	96.69	-5.08	23.47	18.39	37.48	-19.09	Average
11	116.13	11.11	23.28	34.39	48.20	-13.81	QP
12	116.13	-8.39	23.28	14.89	38.20	-23.31	Average

Remarks:1. C.F (Correction Factor) = Clamp factor + Cable loss+ATT..  
 2. Emission Level = Reading Level + C.F (Correction Factor).

Remark

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 2/ 120 Vac/ 50 Hz

Result for sample no.: 6141987-1



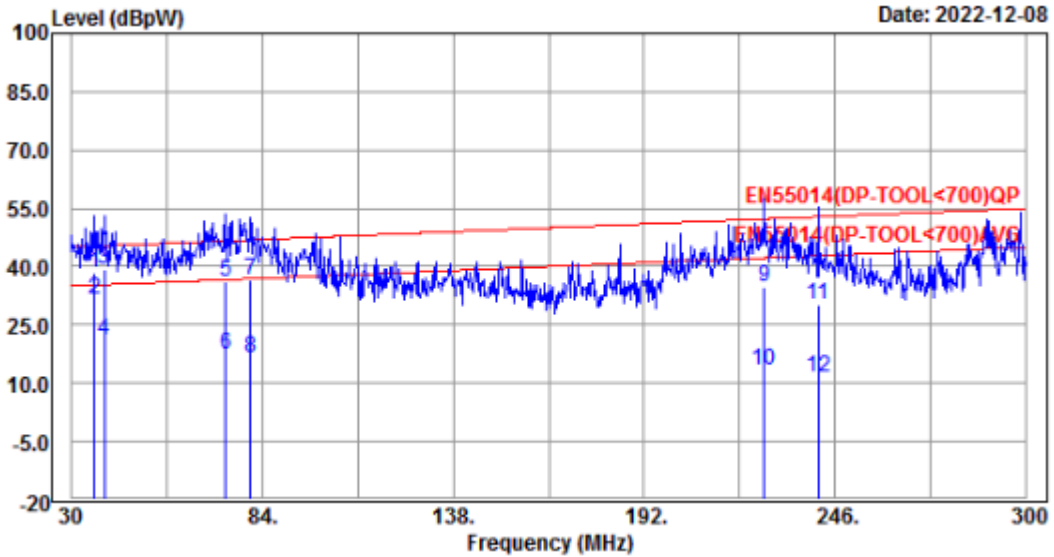
Item	Freq. MHz	Reading Level dBpW	C.F dB	Emission Level dBpW	Limit dBpW	Over Limit dB	Detector
1	31.35	12.81	27.53	40.34	45.06	-4.72	QP
2	31.35	-12.09	27.53	15.44	35.06	-19.62	Average
3	58.35	10.42	23.50	33.92	46.06	-12.14	QP
4	58.35	-7.68	23.50	15.82	36.06	-20.24	Average
5	79.95	13.31	25.25	38.56	46.86	-8.30	QP
6	79.95	-7.39	25.25	17.86	36.86	-19.00	Average
7	83.46	14.01	25.07	39.08	46.99	-7.91	QP
8	83.46	-10.69	25.07	14.38	36.99	-22.61	Average
9	90.21	14.01	24.37	38.38	47.24	-8.86	QP
10	90.21	-10.59	24.37	13.78	37.24	-23.46	Average
11	97.50	12.71	23.50	36.21	47.51	-11.30	QP
12	97.50	-10.89	23.50	12.61	37.51	-24.90	Average

Remarks: 1. C.F (Correction Factor) = Clamp factor + Cable loss+ATT..  
 2. Emission Level = Reading Level + C.F (Correction Factor).

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

Result for sample no.: 6141987-2



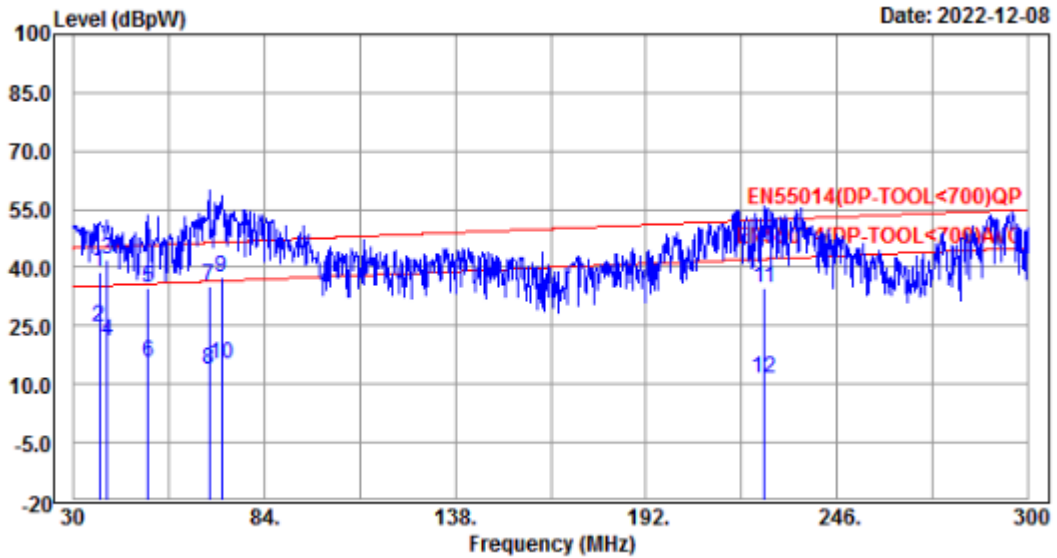
Item	Freq. MHz	Reading Level dBpW	C.F dB	Emission Level dBpW	Limit dBpW	Over Limit dB	Detector
1	36.75	10.91	27.38	38.29	45.26	-6.97	QP
2	36.75	4.01	27.38	31.39	35.26	-3.87	Average
3	39.45	12.11	27.35	39.46	45.36	-5.90	QP
4	39.45	-6.39	27.35	20.96	35.36	-14.40	Average
5	73.74	12.01	24.10	36.11	46.63	-10.52	QP
6	73.74	-6.79	24.10	17.31	36.63	-19.32	Average
7	80.76	11.42	25.21	36.63	46.89	-10.26	QP
8	80.76	-8.58	25.21	16.63	36.89	-20.26	Average
9	226.02	12.51	22.10	34.61	52.27	-17.66	QP
10	226.02	-8.69	22.10	13.41	42.27	-28.86	Average
11	241.14	7.91	22.41	30.32	52.83	-22.51	QP
12	241.14	-10.99	22.41	11.42	42.83	-31.41	Average

Remarks: 1. C.F (Correction Factor) = Clamp factor + Cable loss+ATT..  
 2. Emission Level = Reading Level + C.F (Correction Factor).

Remark

Measurement data	Port under test	AC mains power input
Operating mode / voltage / frequency used during the test		Mode 2/ 230 Vac/ 50 Hz

Result for sample no.: 6141987-2



Item	Freq. MHz	Reading Level dBpW	C.F dB	Emission Level dBpW	Limit dBpW	Over Limit dB	Detector
1	37.56	11.61	27.37	38.98	45.29	-6.31	QP
2	37.56	-2.79	27.37	24.58	35.29	-10.71	Average
3	39.72	14.70	27.35	42.05	45.37	-3.32	QP
4	39.72	-6.40	27.35	20.95	35.37	-14.42	Average
5	51.33	10.21	24.43	34.64	45.80	-11.16	QP
6	51.33	-8.69	24.43	15.74	35.80	-20.06	Average
7	68.61	11.91	23.46	35.37	46.44	-11.07	QP
8	68.61	-9.69	23.46	13.77	36.44	-22.67	Average
9	72.12	13.51	23.80	37.31	46.57	-9.26	QP
10	72.12	-8.89	23.80	14.91	36.57	-21.66	Average
11	225.48	12.60	22.04	34.64	52.25	-17.61	QP
12	225.48	-10.50	22.04	11.54	42.25	-30.71	Average

Remarks: 1. C.F (Correction Factor) = Clamp factor + Cable loss+ATT..  
 2. Emission Level = Reading Level + C.F (Correction Factor).

Remark

<b>4.3 Harmonic current emissions</b>	<b>VERDICT: PASS</b>
---------------------------------------	----------------------

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 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 type="checkbox"/>	Class A	All apparatus not classified as Class B, C or D
<input checked="" 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**

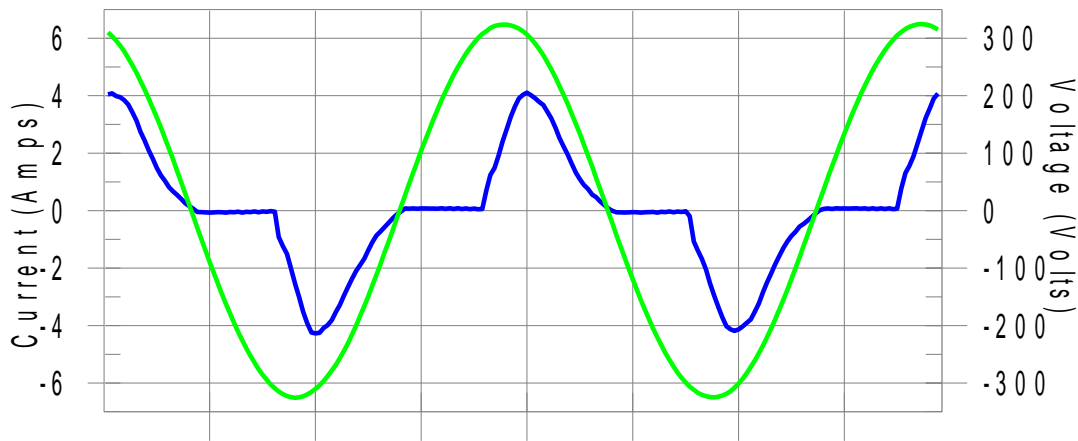
Port under test	AC mains power input					
Voltage – Mains [V]	230 Vac					
Frequency – Mains [Hz]	50 Hz					
Observation period	<input type="checkbox"/>	6.5 min.	<input checked="" type="checkbox"/>	2.5 min.	<input type="checkbox"/>	Other:
Version of measurement instrument standard used EN / IEC61000-4-7 (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	---					

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

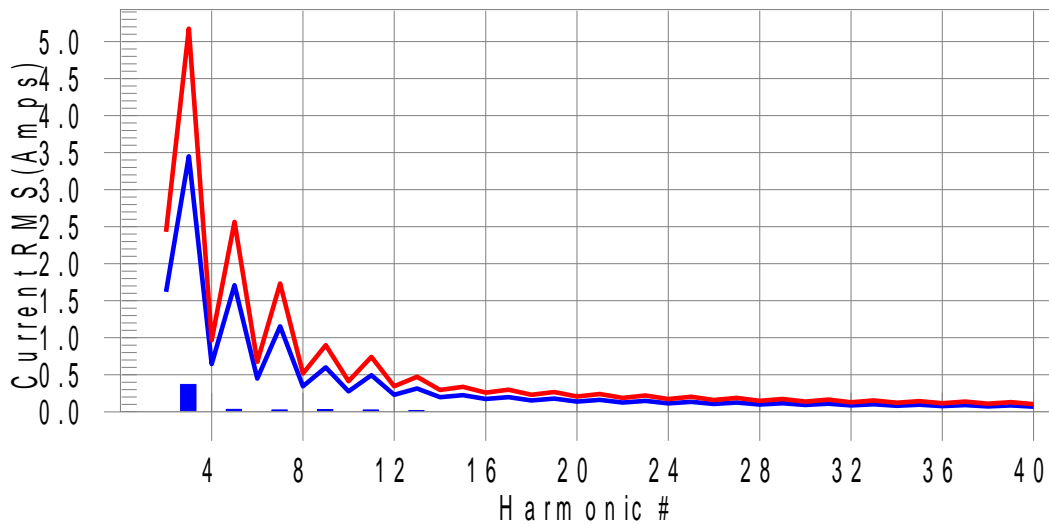
Results and limits for 6141987-2

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

**Current & voltage waveforms**



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



**Test result: Pass**      **Worst harmonics H3-9.8% of 150% limit, H3-10.7% of 100% limit**

Measurement data		Port under test		AC mains power input			
Test Result: Pass      Source qualification: Normal THC(A): 0.377      I-THD(%): 22.9      POHC(A): 0.021      POHC Limit(A): 0.377							
Highest parameter values during test:							
V_RMS (Volts): 229.98		Frequency(Hz): 50.00		I_RMS (Amps): 2.058		Crest Factor: 5.378	
I_Peak (Amps): 4.321		I_RMS (Amps): 2.058		Crest Factor: 5.378		Power Factor: 0.965	
I_Fund (Amps): 1.644		Power (Watts): 374.1		Power (Watts): 374.1			
Power (Watts): 374.1							
Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.007	1.620	N/A	0.025	2.430	N/A	Pass
3	0.370	3.450	10.7	0.507	5.175	9.8	Pass
4	0.004	0.645	N/A	0.020	0.968	N/A	Pass
5	0.033	1.710	1.9	0.121	2.565	4.7	Pass
6	0.004	0.450	N/A	0.012	0.675	N/A	Pass
7	0.026	1.155	2.2	0.052	1.733	3.0	Pass
8	0.004	0.345	N/A	0.007	0.518	N/A	Pass
9	0.030	0.600	5.1	0.033	0.900	3.7	Pass
10	0.004	0.276	N/A	0.005	0.414	N/A	Pass
11	0.025	0.495	5.1	0.027	0.743	3.7	Pass
12	0.003	0.230	N/A	0.005	0.345	N/A	Pass
13	0.017	0.315	5.3	0.019	0.473	4.0	Pass
14	0.003	0.197	N/A	0.005	0.295	N/A	Pass
15	0.011	0.225	4.9	0.016	0.338	4.8	Pass
16	0.003	0.173	N/A	0.005	0.260	N/A	Pass
17	0.008	0.199	N/A	0.015	0.299	N/A	Pass
18	0.003	0.153	N/A	0.007	0.230	N/A	Pass
19	0.012	0.178	6.6	0.016	0.267	6.1	Pass
20	0.004	0.138	N/A	0.007	0.207	N/A	Pass
21	0.014	0.161	9.0	0.016	0.241	6.7	Pass
22	0.004	0.125	N/A	0.006	0.188	N/A	Pass
23	0.007	0.147	N/A	0.011	0.221	N/A	Pass
24	0.004	0.115	N/A	0.005	0.173	N/A	Pass
25	0.007	0.135	N/A	0.010	0.203	N/A	Pass
26	0.003	0.106	N/A	0.005	0.159	N/A	Pass
27	0.006	0.125	N/A	0.009	0.188	N/A	Pass
28	0.003	0.099	N/A	0.004	0.149	N/A	Pass
29	0.006	0.116	N/A	0.008	0.174	N/A	Pass
30	0.003	0.092	N/A	0.004	0.138	N/A	Pass
31	0.005	0.110	N/A	0.007	0.164	N/A	Pass
32	0.003	0.086	N/A	0.004	0.129	N/A	Pass
33	0.004	0.102	N/A	0.006	0.153	N/A	Pass
34	0.003	0.081	N/A	0.004	0.122	N/A	Pass
35	0.003	0.096	N/A	0.005	0.144	N/A	Pass
36	0.003	0.077	N/A	0.005	0.116	N/A	Pass
37	0.004	0.092	N/A	0.006	0.137	N/A	Pass
38	0.004	0.073	N/A	0.005	0.110	N/A	Pass
39	0.005	0.087	N/A	0.006	0.131	N/A	Pass
40	0.003	0.069	N/A	0.006	0.104	N/A	Pass
Remark							

<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 type="checkbox"/>	≤ 1	<input checked="" type="checkbox"/>	Not Applicable
P <sub>LT</sub> (Long term flicker)	<input type="checkbox"/>	≤ 0,65	<input checked="" 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 type="checkbox"/>	≤ 4%	<input type="checkbox"/>	6%
	<input checked="" 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 type="checkbox"/>	10 min.	<input type="checkbox"/>	120 min.	<input type="checkbox"/>	Other:
	<input checked="" type="checkbox"/>	24 times switching according to Annex B				
Operating mode(s) used	Mode 1					
Remark	---					

See next page.





## 5 IMMUNITY TEST RESULTS

### 5.1 Performance (Compliance) criteria

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

Performance criteria A : The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and from what the user may reasonably expect from the apparatus if used as intended.

Performance criteria B : The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level ( or permissible loss of performance) specified by the manufacturer when the apparatus is used as intended. During the test, degradation of performance is allowed however no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and from what the user may reasonable expect from the apparatus if used as intended.

Performance criteria C : Temporary loss of function is allowed provided the function is self- recoverable or can be restored by the operation of the controls or by any operation specified in the instruction for use.

#### 5.1.1 Performance criteria related to immunity tests

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

#### 5.1.2 Manufacturer defined performance criteria

Not provided.

**5.2 Monitored – Checked Functions / Parameters**

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

<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 : LED's
<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	Tool speed	Visual
Radio-frequency electromagnetic fields	Tool speed	Visual / Camera/ tachometer
Fast transients	Tool speed	Visual
Surge transient	Tool speed	Visual
Injected currents (radio-frequency common mode)	Tool speed	Visual
Voltage dips and short interruptions	Tool 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 type="checkbox"/>	±2 kV	<input type="checkbox"/>	±4 kV	<input checked="" type="checkbox"/>	±8 kV	<input type="checkbox"/>	kV
Contact discharges <sup>1)</sup>	<input 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 type="checkbox"/>	Table-top	<input checked="" type="checkbox"/>	Floor standing
Ambient temperature [°C]	23 °C		Relative Humidity air [%]	49 %
Voltage – Mains [V]	120 Vac / 230 Vac			
Frequency – Mains [Hz]	50 Hz			
Operating mode(s) used	Mode 2			

Test Point	Test Voltage [kV] & Polarity	Coupling type	# of applied discharges / polarity	Discharge interval [s]
<input checked="" type="checkbox"/> Points on conductive surface.	±4	Contact	10	1
<input checked="" type="checkbox"/> Points on non-conductive surface.	±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.
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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]	120 Vac / 230 Vac			
Frequency – Mains [Hz]	50 Hz			
Operating mode(s) used	Mode 2			
Test Set-up	<input checked="" type="checkbox"/>	Equipment standing on floor at (0.1 ± 0.01) m above ground plane		
	<input type="checkbox"/>	Equipment on the table (0.1 ± 0.01) m above ground plane		
	<input type="checkbox"/>	Artificial hand applied. Location refer to annex 3.		
Coupling	<input checked="" type="checkbox"/>	Common mode	<input type="checkbox"/>	Other: unsymmetric mode

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

<b>5.5</b>	<b>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	1.2/50 $\mu$ s Voltage; 8/20 $\mu$ s Current		
Repetition rate	$\geq$ 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]	120 Vac / 230 Vac
Frequency – Mains [Hz]	50 Hz
Operating mode(s) used	Mode 2
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 type="checkbox"/> AC mains input power	Line to Earth		90	
<input type="checkbox"/> AC mains input power	Line to Earth		270	
<input type="checkbox"/> AC mains input power	Neutral to Earth		90	
<input type="checkbox"/> AC mains input power	Neutral to Earth		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:				

<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 (1 kHz)	≤ 1%	≥ 0,5 s
<input checked="" type="checkbox"/>	0.15 – 230 MHz	80 % AM (1 kHz)	≤ 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 (1 kHz) 1 %
Voltage – Mains [V]		120 Vac / 230 Vac		Frequency – Mains [Hz] 50 Hz
Operating mode(s) used		Mode 2		
Test set-up		<input type="checkbox"/>	Equipment standing on floor at (0.1 ± 0.01) m above ground plane.	
		<input type="checkbox"/>	Equipment on the table (0.1 ± 0.01) m above ground plane.	
		<input checked="" 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-M2	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</b>	<b>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	/	10	3	0, 180
230	L-N	40	10	/	10	3	0, 180
230	L-N	70	25	/	10	3	0, 180
120	L-N	0	0,5	/	10	3	0, 180
120	L-N	40	10	/	10	3	0, 180
120	L-N	70	25	/	10	3	0, 180
Operating mode(s) used		Mode 2					
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



GS9USE (110-120 V)

### EUT PHOTOS



GS9USE (220-240 V)

## 7 ANNEX 1- 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 %.

Emission tests		Uncertainty	UCISPR
RF Conducted disturbance (mains port) 9 kHz – 150 kHz	AMN: R&S ENV216	3.3 dB	3.8 dB
RF Conducted disturbance (mains port) 150 kHz – 30 MHz		2.9 dB	3.4 dB
RF Conducted disturbance (mains port) 9 kHz – 150 kHz	AMN: R&S ENV432	3.5 dB	3.8 dB
RF Conducted disturbance (mains port) 150 kHz – 30 MHz		3.1 dB	3.4 dB
Conducted disturbance using a CP 150 kHz – 30 MHz		2.6 dB	2.9 dB
Radiated disturbance using CDNE 30 MHz – 300 MHz	CDNE M2	3.3 dB	3.8 dB
Radiated disturbance using CDNE 30 MHz – 300 MHz	CDNE M3	3.4 dB	3.8 dB
Radiated disturbance 9 kHz – 30 MHz	LLAS	3.6 dB	3.3 dB
Disturbance power 30 MHz – 300 MHz		4.0 dB	2.0 dB
Radiated disturbance 30 MHz – 1000 MHz	Horizontal	4.9 dB	6.3 dB
Radiated disturbance 30 MHz – 1000 MHz	Vertical	6.1 dB	
Radiated disturbance 1000 MHz – 6000 MHz		4.8 dB	5.2 dB
LF harmonic current emissions		0.6 %	N/A
LF voltage fluctuations		2.6 %	N/A

Immunity tests		Uncertainty
Electrostatic discharge		$U_{peak}=5.6\%$ , $U_{30ns}=5.7\%$ $U_{60ns}=5.7\%$ , $U_{IT}=14.3\%$
Radio-frequency electromagnetic fields 80 MHz – 1000 MHz		2.0 dB
Radio-frequency electromagnetic fields, 1000 MHz – 6000 MHz		1.9 dB
Fast transients		$U_{tr}=7.2\%$ , $U_{vp}=6.8\%$ , $U_{tw}=5.4\%$
Surges		$U_{vp}=4.3\%$ , $U_{TFV}=6.7\%$ , $U_{td}=1.3\%$
Injected currents (radio-frequency common mode)	CDN	1.5 dB
Injected currents (radio-frequency common mode)	EM Clamp	2.6 dB
Voltage dips, Short interruptions and voltage variations		$U_{out}=0.4\%$ , $U_f=3\%$ , $U_{r-d}=3\%$

## 8 ANNEX 2 - USED EQUIPMENT

### Conducted disturbance -Shielded Room No.1

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESCI	101351	2023/06/20
Artificial Mains Network	R&S	ENV216	101620	2023/06/20

### Disturbance power

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESCI	101351	2023/06/20
EMI absorbing clamp	SCHWARZBECK	MDS 21B	4183	2023/06/28

### Harmonic current emissions & Voltage changes, voltage fluctuations and flicker

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Harmonic currents and flicker tester	California Instruments	CTS	1306A00135	2023/06/20
AC power source	California Instruments	5001iX-CTS-400	1306A00135	2023/06/20

### Electrostatic discharge immunity

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
ESD generator	TESEQ	NSG 437	1447	2023/10/10

### Fast transient immunity

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG-3040-MF	2006/EFT:0535	2023/06/20

### Surge immunity

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG-3040-MF	2006 /SURGE:1234	2023/06/20
Coupling/Decoupling Network (CDN)	TESEQ	CDN 117-M	35452	NCR

### Injected currents immunity

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG 4070-30	35895	2023/06/20
Coupling/Decoupling Network (CDN)	TESEQ	CDN M016S	34640	2023/06/20
Attenuator	TESEQ	ANT 6050	34847	2023/06/20

Voltage dips and short interruptions immunity

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG-3040-MF	2006/DIPS:2062	2023/06/20
Automatic step transformer with circuit breaker	TESEQ	INA 6502-CIB	217	NCR

## 9 ANNEX 3 - TEST PHOTOS

### Conducted disturbance at mains terminals



### Disturbance power



### Harmonic current emissions & Voltage changes, voltage fluctuations and flicker



### Electrostatic discharge immunity





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



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



End of the report