



Test report No:
6100635.50

TEST REPORT

Electromagnetic Compatibility (EMC)

Identification of item tested	LED Recessed luminaire
Trademark	PROFOLUX
Model and /or type reference	DR-MB, DR-MW, DT, DRT, DZ-M
Ratings	220-240 Vac, 50/60 Hz, Class II; 6 , 9 , 12 W
Test Laboratory	DEKRA Testing and Certification (Shanghai) Ltd. No.250, Jiangchangsang Road, Jing'an District, Shanghai, China
Applicant's name / address	Profolux bv led supplier Van Leeuwenhoekweg 8, 5482 TK Schijndel, The Netherlands
Test method requested, standard	EN IEC 55015:2019+A11:2020 EN 61547:2009 EN IEC 61000-3-2:2019 EN 61000-3-3:2013+A1:2019
Verdict Summary	IN COMPLIANCE
Tested by (name / position & signature)	Kaiyuan Dai Test Engineer 
Approved by (name / position & signature)	Zuyao Fan Project Manager 
Date of issue	2021-06-22
Report template No	TRF_EN55015_EN61547_EMV V1.2

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COMPETENCES AND GUARANTEES

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

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

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

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

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

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GENERAL CONDITIONS

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.
5. The information provided by the customer in this report may affect the validity of the results, the test lab is not responsible for it.
6. The test results presented in this report relate only to the object tested.

UNCERTAINTY

For all measurements where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in EN 55016-4-2 (CISPR 16-4-2), EN/IEC 61000-4 series or a product standard, the measurement instrumentation uncertainty has been calculated and applied in accordance with these standards. For all other measurements where no guidance is available, the measurement instrumentation uncertainty has been calculated and applied in accordance with ISO/IEC Guide 98-3 document.

Uncertainties have been calculated according to the DEKRA internal document MU-EMC. 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.

The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to calculate the uncertainty associated with the measurement result, unless the specification, standard or customer have special requirements

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

DOCUMENT HISTORY

Report nr.	Date	Description
6100635.50	2021-06-22	First release.

CONCLUSION, REMARKS AND COMMENTS

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

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According to the declaration from manufacturer, all models have the similar construction except for the different driver and rated power.

Due to the similarity of them, model DR-MB090 was selected for the full test and the results are also representative for other models as well.

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Description of the item	LED Recessed luminaire
Test model / type number	DR-MB090
Trademark.....	PROFOLUX
Manufacturer.....	Profolux bv led supplier Van Leeuwenhoekweg 8, 5482 TK Schijndel, The Netherlands
Factory	Profolux bv led supplier Van Leeuwenhoekweg 8, 5482 TK Schijndel, The Netherlands

Type of the EUT	<input checked="" type="checkbox"/>	Luminaire
	<input type="checkbox"/>	Rope light (6.3)
	<input type="checkbox"/>	Internal Module (6.4.3)
	<input type="checkbox"/>	External module (6.4.4)
	<input type="checkbox"/>	Module having multiple applications (6.4.2)
	<input type="checkbox"/>	Single capped self-ballasted lamp (6.4.5)
	<input type="checkbox"/>	Double-capped self-ballasted lamps, double-capped lamp adapters, double-capped semi-luminaires and double-capped retrofit lamps used in fluorescent lamp luminaires (6.4.6)
	<input type="checkbox"/>	ELV lamps (6.4.7)
	<input type="checkbox"/>	Single-capped semi-luminaires (6.4.8)
	<input type="checkbox"/>	Independent igniter (6.4.9)
Control Gear used	<input type="checkbox"/>	Magnetic control gear / transformer
	<input checked="" type="checkbox"/>	Electronic control gear
	<input type="checkbox"/>	Others:
Lamp technology used.....	<input checked="" type="checkbox"/>	Light emitting diode (LED/OLED)
	<input type="checkbox"/>	High pressure discharge lamp (HID)
	<input type="checkbox"/>	Fluorescent lamp
	<input type="checkbox"/>	Tungsten halogen lamp
	<input type="checkbox"/>	Incandescent lamp
	<input type="checkbox"/>	Others:
Dimming.....	<input checked="" type="checkbox"/>	Test item has NO dimming functions
	<input type="checkbox"/>	Test item includes dimming functions other than phase control
	<input type="checkbox"/>	Test item includes phase control dimming functions

Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<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"/>	DC					
	<input type="checkbox"/>	Battery:					
Rated Power	12 W						
Clock frequencies	<30 MHz						
Other parameters.....	N/A						
Software version	Not provided						
Hardware version.....	Not provided						
Dimensions in cm (W x H x D)....	Not provided						
Mounting position.....	<input type="checkbox"/>	Table top equipment					
	<input checked="" 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 products are recessed luminaire which can be used indoor only.

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

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

No.	Test model	Type
1	DR-MB090	9 W
2		
3		
4		
5		
6		

1.2 The environment(s) in which the EUT is intended to be used

The equipment under test (EUT) is intended to be used in the following environment(s):

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

1.3 Test data

For radiated EM field immunity tests:

Location	DEKRA Testing and Certification (Suzhou) Co., Ltd.
Address	No. 99, Hongye Road, Suzhou Industrial Park, Suzhou, Jiangsu, China.
Date(s) of performance of tests	2021-06
Supervised by	Zuyao Fan

For other tests:

Location	DEKRA Testing and Certification (Shanghai) Ltd.
Address	No.250, Jiangchangsang Road, Jing'an District, Shanghai, China
Date of receipt of test item	2021-04
Date(s) of performance of tests	2021-06
Supervised by	Zuyao Fan

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

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

Operating mode	Operating mode description	Used for testing	
		Emission	Immunity
1	Normal operating	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
<u>Supplemental information:</u>			

2.2 Port(s) of the EUT

Port name and description	Port name / description	Cable		
		Length used during test [m]	Attached during test	Shielded
Wired network ports	AC mains	0,8 m	<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

Refer to Annex 3.

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 55015 +A11	2019 2020	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 55016-2-1 +A1	2014 2017	Methods of measurement of disturbances and immunity - Conducted disturbance measurements.
EN 55016-2-3	2017	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	2019	Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
EN 61000-3-3 +A1	2013 2019	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 61547	2009	Equipment for general lighting purposes – EMC immunity requirements.
EN 61000-4-2	2009	Electrostatic discharge immunity test.
EN 61000-4-3 +A1 +A2	2006 2008 2009	Radiated, radio-frequency, electromagnetic field immunity test.
EN 61000-4-4	2004	Electrical fast transient/burst immunity test.
EN 61000-4-5	2006	Surge immunity test.
EN 61000-4-6	2009	Immunity to conducted disturbances, induced by radio-frequency fields.
EN 61000-4-8	2008	Power frequency magnetic field immunity test.
EN 61000-4-11	2004	Voltage dips, short interruptions and voltage variations immunity tests.

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:

Summary of compliance with National Differences (List of countries addressed):

The product also fulfils the requirements of CISPR 15:2018, IEC 61547:2009, IEC 61000-3-2:2018, IEC 61000-3-3:2013+A1:2017.

3.3 Overview of results

EMISSION TESTS – EN IEC 55015			
Requirement – Test case	Basic Standard(s)	Verdict	Remark
Conducted disturbance voltage at mains terminals (9 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 3)
Conducted disturbance voltage at control terminals (150 KHz – 30 MHz)	EN 55016-2-1	N/A	See 3)
Radiated electromagnetic disturbances (9 kHz to 30 MHz)	EN 55016-2-3	PASS	---
Radiated electromagnetic disturbances (30 – 1000 MHz)	EN 55032	N/M	---
Independent method of measurement of radiated emission (CDN) / Annex B	EN 55016-2-1	Pass	See 2)
Insertion loss	EN IEC 55015	N/A	See 1)
<u>Supplementary information:</u> 1) The test is not applicable because the luminaire is not a starter switch operated type. 2) The CDNE method and the associated limits up to 300 MHz can be only applied for EUTs with clock frequencies below or equal to 30 MHz and the largest dimensions of the EUT are 3 m x 1 m x 1 m (l x w x h). 3) There are no load and control terminals.			

EMISSION TESTS –EN IEC 61000-3-2, EN 61000-3-3			
Requirement – Test case	Basic Standard(s)	Verdict	Remark
Control principle shall be allowed for the application according to the clause	EN IEC 61000-3-2	PASS	---
Harmonic current emissions	EN IEC 61000-3-2	PASS	---
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3	N/M	See 1)
<u>Supplementary information:</u> 1) LED lamp luminaires with ratings less than or equal to 600 W, are deemed to comply with the dc, dmax and Tmax limits in this standard and are not required to be tested.			

IMMUNITY TESTS – EN 61547			
Requirement – Test case	Basic Standard(s)	Verdict	Remark
Electrostatic discharge	EN 61000-4-2	PASS	---
Radio-frequency electromagnetic fields	EN 61000-4-3	PASS	---
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	---
Power frequency magnetic fields	EN 61000-4-8	N/A	See 1)
Voltage dips and short interruptions	EN 61000-4-11	PASS	---
<u>Supplementary information:</u>			
1) The apparatus does not contain any components susceptible to this low-frequency magnetic fields.			

4 EMISSION TEST RESULTS

4.1	Conducted disturbance at electric power supply interface	VERDICT: PASS
------------	-----------------------------------------------------------------	----------------------

Standard	EN IEC 55015
Basic standard	EN 55016-2-1

Limits

Frequency range [MHz]	Limit: QP [dB(μV) ¹⁾	Limit: AV [dB(μV) ¹⁾	IF BW	Detector(s)
0,009 - 0,05	110	N/A	200 Hz	QP
0,05 - 0,15	90 – 80 ²⁾	N/A	200 Hz	QP
0,15 - 0,50	66 – 56 ²⁾	56 - 46 ²⁾	9 KHz	QP, CAV
0,50 - 5,0	56 ³⁾	46 ³⁾	9 KHz	QP, CAV
5,0 - 30	60	50	9 KHz	QP, CAV

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

²⁾ The limit decreases linearly with the logarithm of the frequency in the ranges 50 kHz to 150 kHz and 150 kHz to 0,5 MHz.

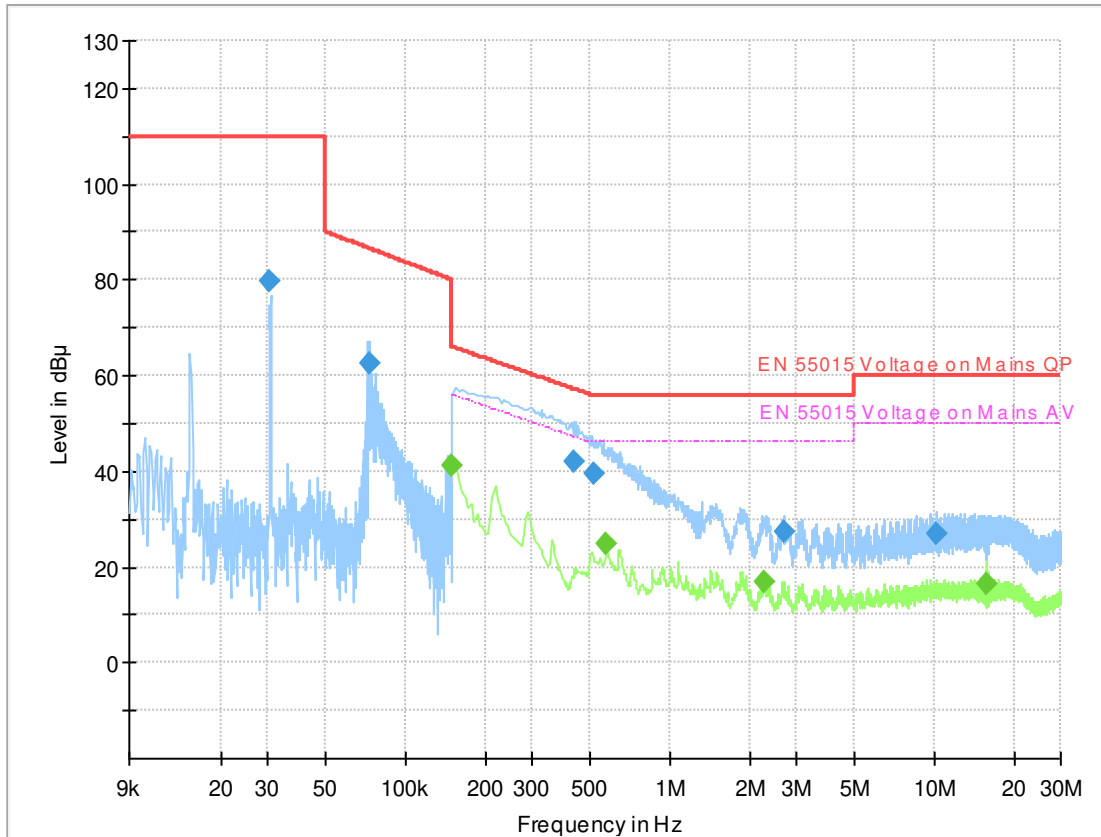
³⁾ For electrodeless lamps and luminaires, the limit in the frequency range of 2,51 MHz to 3,0 MHz is 73 dB(μV) quasi-peak and 63 dB(μV) average.

Performed measurements

Port under test		Terminal							
<input checked="" type="checkbox"/>	AC mains input power	<input checked="" type="checkbox"/>	N	<input checked="" type="checkbox"/>	L1	<input type="checkbox"/>	L2	<input type="checkbox"/>	L3
<input type="checkbox"/>	AC output power	<input type="checkbox"/>	N	<input type="checkbox"/>	L1	<input type="checkbox"/>	L2	<input type="checkbox"/>	L3
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"/>	Set-up Type A (40 cm distance to vertical ground plane, 80 cm o ground plane)							
	<input type="checkbox"/>	Set-up Type B (40 cm distance to horizontal ground plane)							
	<input type="checkbox"/>	Floor standing equipment set-up (10 cm over ground plane)							
	<input type="checkbox"/>	Other:							
	<input type="checkbox"/>	Artificial hand applied (See photo)							
		Refer to the Annex 3 for test setup photo(s).							
Operating mode(s) used		Mode 1							
Remark		The RF disturbance level was investigated at all operating modes listed at chapter 2.1 respectively. The worst case results were reported.							

See next page.

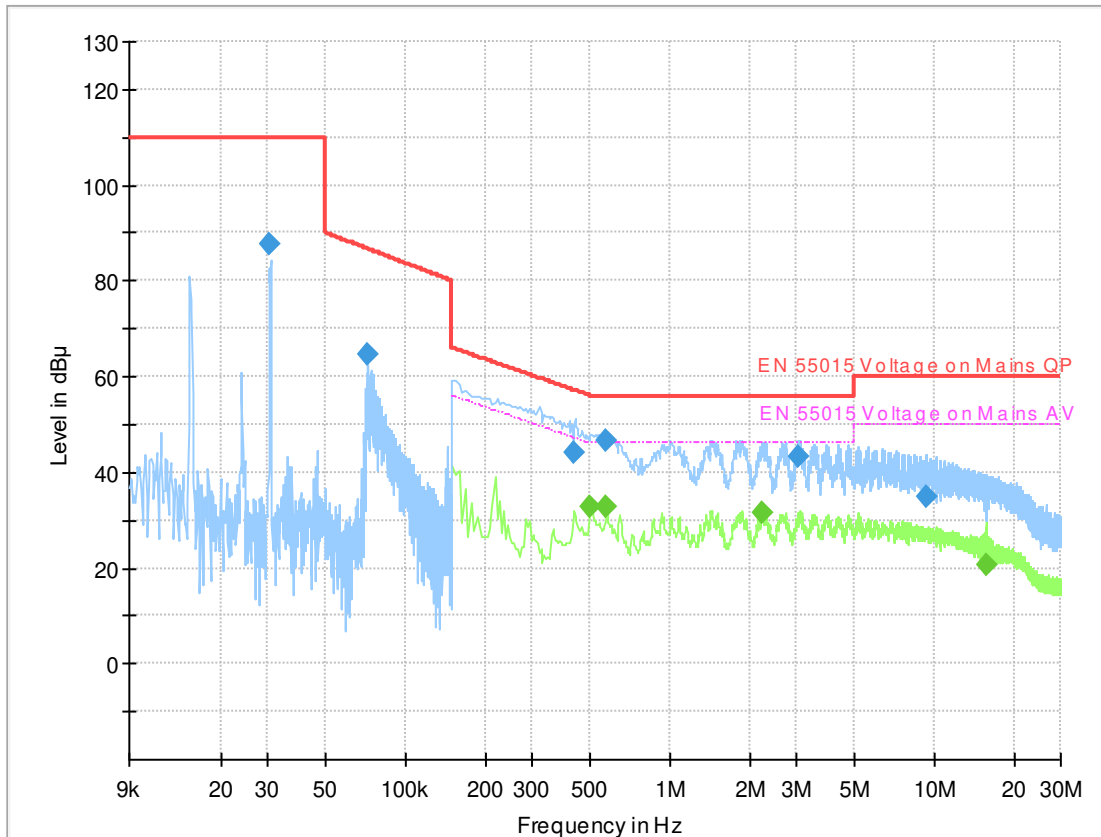
Measurement data	<input checked="" type="checkbox"/>	Line	<input type="checkbox"/>	Neutral
Operating mode / voltage / frequency used during the test		Mode 1 / 230 Vac / 50 Hz		
Port under test		AC mains input port		
Model 1				



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Corr. (dB)
0.030700	79.59	---	110.00	30.41	9.7
0.072900	62.63	---	86.57	23.94	9.6
0.150001	---	41.33	56.00	14.67	9.6
0.433500	42.04	---	57.19	15.14	9.7
0.519000	39.29	---	56.00	16.71	9.7
0.573000	---	24.85	46.00	21.15	9.7
2.287500	---	16.82	46.00	29.18	9.7
2.719500	27.54	---	56.00	28.46	9.8
10.153500	26.75	---	60.00	33.25	10.0
15.801000	---	16.35	50.00	33.65	10.3

Remark	---
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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		
Model 1				



Frequency (MHz)	QuasiPeak (dB µV)	Average (dB µV)	Limit (dB µV)	Margin (dB)	Corr. (dB)
0.030700	87.73	---	110.00	22.27	9.7
0.072100	64.71	---	86.67	21.96	9.6
0.433500	44.16	---	57.19	13.02	9.7
0.501000	---	32.90	46.00	13.10	9.7
0.573000	---	32.94	46.00	13.06	9.7
0.573000	46.76	---	56.00	9.24	9.7
2.224500	---	31.33	46.00	14.67	9.7
3.066000	43.48	---	56.00	12.52	9.8
9.303000	34.89	---	60.00	25.11	10.0
15.742500	---	20.49	50.00	29.51	10.2

Remark ---

4.2 Radiated disturbances (9 KHz – 30 MHz)	VERDICT: PASS
---------------------------------------------------	----------------------

Standard	EN IEC 55015
Basic standard	EN 55016-2-3
Test method	Large Loop Antenna (LLA) or Loop antenna

Limits LLA- D ≤ 1.6m

Frequency range [MHz]	Limit: QP [dB(μV/m) ¹⁾	IF BW	Detector(s)
0,009 - 0,07	88	200 Hz	Quasi-Peak (QP)
0,07 - 0,15	88 – 58 ²⁾	200 Hz	Quasi-Peak (QP)
0,15 - 2,2	58 – 22 ²⁾	9 KHz	Quasi-Peak (QP)
2,2 - 3,0	58 ³⁾	9 KHz	Quasi-Peak (QP)
3,0 - 30	22	9 KHz	Quasi-Peak (QP)

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

²⁾ The limit decreases linearly with the logarithm of the frequency.

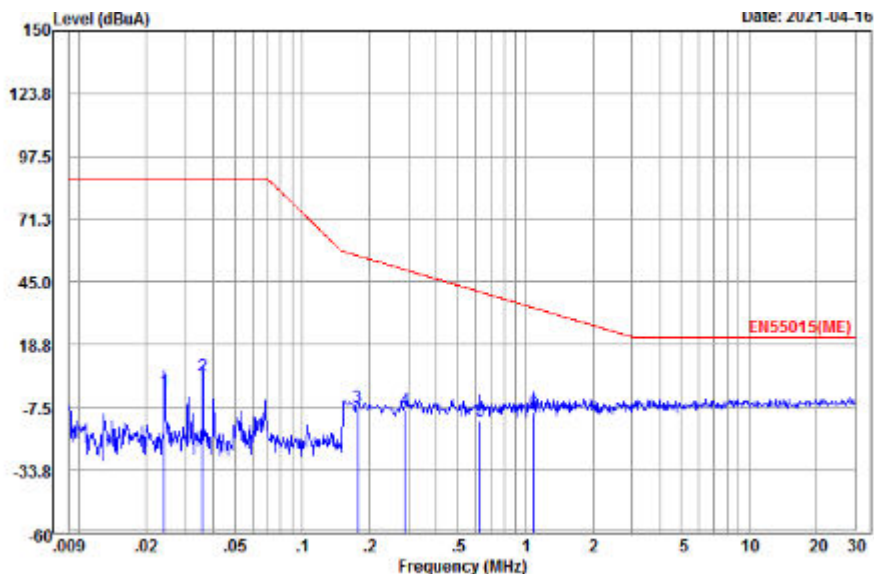
³⁾ For lighting equipment incorporating exclusively electrodeless lamps, the limit applies.

Performed measurements

Port under test	Enclosure	
Voltage – Mains [V]	230 Vac	
Frequency – Mains [Hz]	50 Hz	
Applied Limit for antenna measurement (Table 9)	<input type="checkbox"/>	Loop antenna radiated disturbance limit 9 kHz – 30 MHz for equipment with a dimension > 1,6 m
Applied limit according to LLAS diameter (Table 8)	<input checked="" type="checkbox"/>	2 m for equipment length not exceeding 1,6m
	<input type="checkbox"/>	3 m for equipment length between 1,6 m and 2,6 m
	<input type="checkbox"/>	4 m for equipment length between 2,6 m and 3,6 m
Test setup	<input checked="" type="checkbox"/>	Equipment placed in the centre of the LLAS
	<input type="checkbox"/>	Equipment on a table 80 cm height
	<input type="checkbox"/>	Equipment on the floor (isolated from ground plane)
	<input type="checkbox"/>	Other: --
Refer to the Annex 3 for test setup photo(s).		
Operating mode(s) used	Mode 1	
Remark	The RF disturbance level was investigated at all operating modes listed at chapter 2.1 respectively. The worst case results were reported.	

See next page.

Measurement data	<input checked="" type="checkbox"/> X-axis	<input type="checkbox"/> Y-axis	<input type="checkbox"/> Z-axis
Operating mode / voltage / frequency used during the test		Mode 1 / 230 Vac / 50 Hz	
Model 1			



	Freq	Limit Line	Level	Read Level	LISN Factor	Cable Loss	Over Limit	Remark
	MHz	dBuA	dBuA	dBuA	dB	dB	dB	
1	0.02	88.00	-0.39	-34.38	0.00	0.01	-88.39	QP
2	0.04	88.00	5.61	-28.38	0.00	0.01	-82.39	QP
3	0.18	56.03	-7.48	-41.48	0.00	0.02	-63.51	QP
4	0.29	50.11	-8.68	-42.68	0.00	0.02	-58.79	QP
5	0.63	40.81	-13.27	-47.28	0.00	0.03	-54.08	QP
6 pp	1.09	34.19	-9.46	-43.48	0.00	0.04	-43.65	QP

Remark	The given graph is the combination of max-hold function
--------	---------------------------------------------------------

Measurement data		<input type="checkbox"/> X-axis	<input checked="" type="checkbox"/> Y-axis	<input type="checkbox"/> Z-axis																																																																					
Operating mode / voltage / frequency used during the test			Mode 1 / 230 Vac / 50 Hz																																																																						
Model 1																																																																									
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Remark	The given graph is the combination of max-hold function																																																																											

4.3 Radiated disturbance (30 – 300 MHz) - CDNE method	VERDICT: PASS
--------------------------------------------------------------	----------------------

Standard	EN IEC 55015
Basic standard	EN 55016-2-1
Test method	CDNE method

Limits

Frequency [MHz]	Limit: QP [dB(μV) ¹⁾	IF BW	Detector(s)
30 – 100	64 – 54 ²⁾	120 KHz	Quasi-Peak (QP)
100 – 230	54	120 KHz	Quasi-Peak (QP)
230 – 300	54 – 51 ²⁾	120 KHz	Quasi-Peak (QP)

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

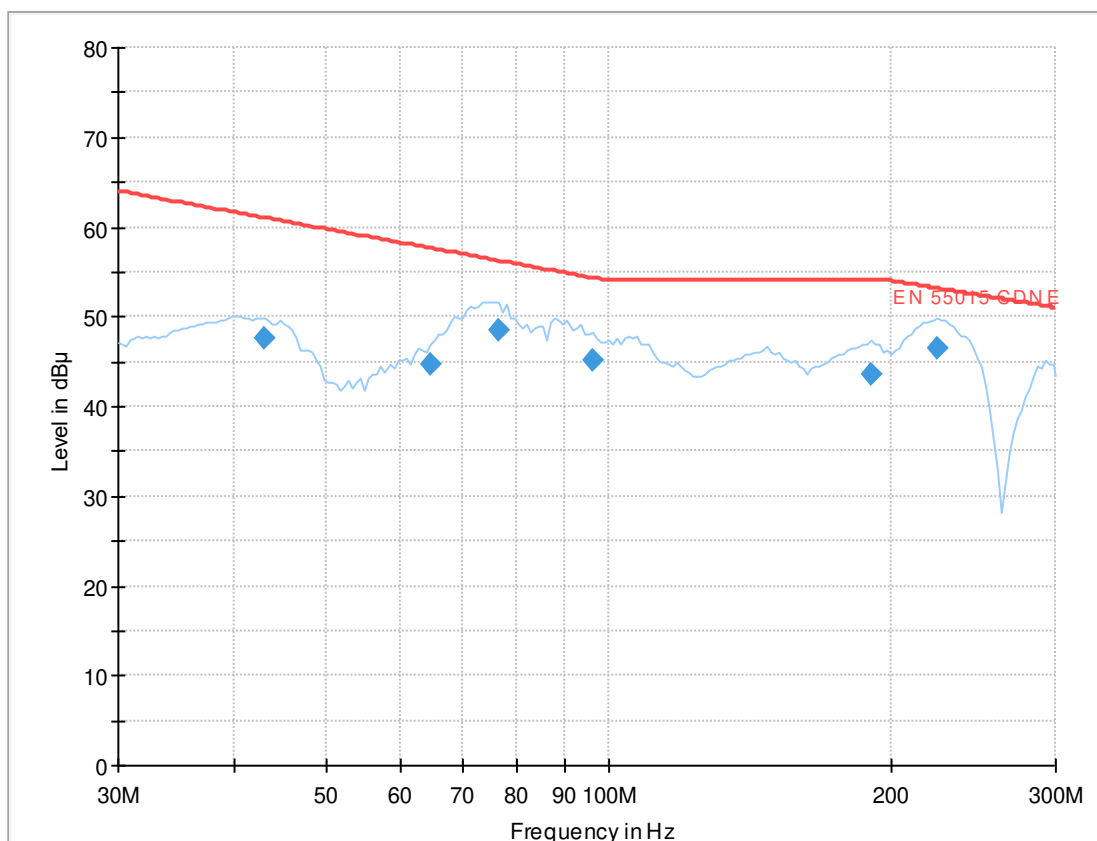
²⁾ The limit decreases linearly with the logarithm of the frequency.

Performed measurements

Tested terminal(s) / port	<input checked="" type="checkbox"/>	AC mains input terminal	<input type="checkbox"/>	Control terminal
	<input type="checkbox"/>	DC mains input terminal	<input type="checkbox"/>	Load terminal
	<input type="checkbox"/>	Other:		
Voltage – Mains [V]	230 Vac			
Frequency – Mains [Hz]	50 Hz			
Test setup	Equipment on a 10 cm support over the ground plane according CDNE-Method			
Operating mode(s) used	Mdoe 1			
Remark	The RF disturbance level was investigated at all operating modes listed at chapter 2.1 respectively. The worst case results were reported.			

See next page.

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



Frequency (MHz)	QuasiPeak (dB µV)	Limit (dB µV)	Margin (dB)	Corr. (dB)
42.923064	47.64	61.03	13.38	19.7
64.665659	44.66	57.62	12.96	19.7
76.561709	48.45	56.22	7.77	19.8
96.099690	45.08	54.33	9.25	19.8
190.819938	43.66	54.00	10.34	20.5
223.892094	46.38	53.17	6.78	20.8

Remark	The given graph is the combination of max-hold function
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4.4 Harmonic current emissions	VERDICT: PASS
---------------------------------------	----------------------

Standard	EN IEC 61000-3-2	
Exclusions (For these categories of equipment, limits are not specified in the EN IEC 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 _{AC} (line-to-neutral).
	<input type="checkbox"/>	Lighting equipment with a rated power ≤ 5W.
	<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 phase control dimmers with a rated power less than or equal to 1 kW when operating incandescent lamps
	<input type="checkbox"/>	Independent phase control dimmers with a rated power less than or equal to 200 W for trailing edge dimmers and universal phase control dimmers with the default mode set to trailing edge, when operating lighting equipment other than incandescent lamps
<input type="checkbox"/>	Independent phase control dimmers with a rated power less than or equal to 100 W for leading edge dimmers, and universal phase control dimmers without default mode set to trailing edge, when operating lighting equipment other than incandescent lamps.	

Classification		
<input type="checkbox"/>	Class A	All apparatus not classified as Class B, C or D
<input type="checkbox"/>	Class B	Portable tools
<input checked="" type="checkbox"/>	Class C	<input type="checkbox"/> Lighting equipment with rated power > 25 W <input checked="" type="checkbox"/> Lighting equipment with rated power ≥ 5W and ≤ 25 W (First requirement, Table 3 column 2) <input type="checkbox"/> Lighting equipment with rated power ≥ 5W and ≤ 25 W (Second requirement) <input type="checkbox"/> Lighting equipment with rated power ≥ 5W and ≤ 25 W (Third requirement)
<input type="checkbox"/>	Class D	Personal computers, television receivers

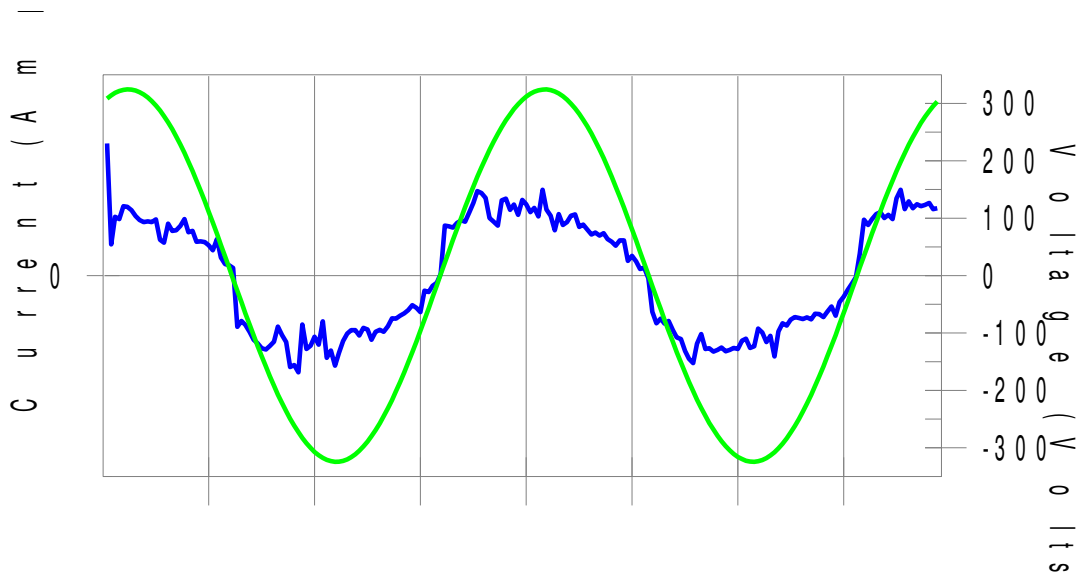
Performed measurements

Port under test	AC mains input port				
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	with the means for control set to the position which produce the maximum total harmonic current (THC) within the active input power range [Pmin, Pmax]				

See next page.

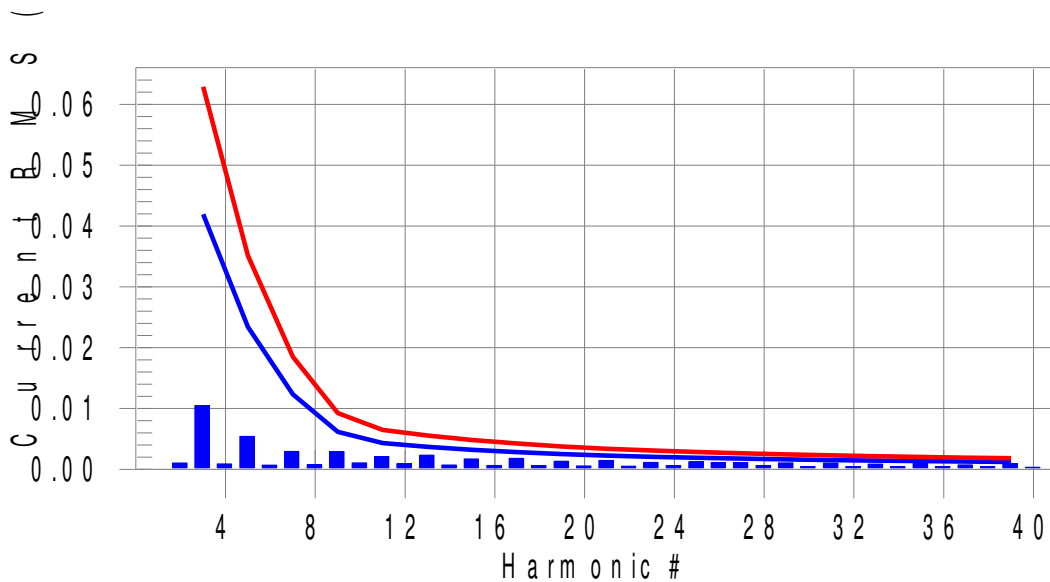
Measurement data	Port under test	AC mains input port
Operating mode / voltage / frequency used during the test		Mode 1 / 230 Vac / 50 Hz
Model 1		

Current & voltage waveforms



Harmonics and Class C limit line (Table-2 Class-C)

European Limits



Test result: Pass

Measurement data		Port under test		AC mains input port			
Test Result: Pass Source qualification: Normal THC(A): 0.014 I-THD(%): 25.3 POHC(A): 0.003 POHC Limit(A): 0.005							
Highest parameter values during test:							
V_RMS (Volts): 229.58		Frequency(Hz): 50.00					
I_Peak (Amps): 0.145		I_RMS (Amps): 0.058					
I_Fund (Amps): 0.055		Crest Factor: 2.569					
Power (Watts): 12.3		Power Factor: 0.945					
Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.000	N/A	0.001	0.000	N/A	Pass
3	0.010	0.042	24.9	0.011	0.063	17.9	Pass
4	0.001	0.000	N/A	0.001	0.000	N/A	Pass
5	0.005	0.023	23.2	0.006	0.035	16.8	Pass
6	0.001	0.000	N/A	0.001	0.000	N/A	Pass
7	0.003	0.012	N/A	0.003	0.019	N/A	Pass
8	0.001	0.000	N/A	0.001	0.000	N/A	Pass
9	0.003	0.006	N/A	0.003	0.009	N/A	Pass
10	0.001	0.000	N/A	0.001	0.000	N/A	Pass
11	0.002	0.004	N/A	0.003	0.006	N/A	Pass
12	0.001	0.000	N/A	0.001	0.000	N/A	Pass
13	0.002	0.004	N/A	0.003	0.006	N/A	Pass
14	0.001	0.000	N/A	0.001	0.000	N/A	Pass
15	0.002	0.003	N/A	0.002	0.005	N/A	Pass
16	0.001	0.000	N/A	0.001	0.000	N/A	Pass
17	0.002	0.003	N/A	0.002	0.004	N/A	Pass
18	0.001	0.000	N/A	0.001	0.000	N/A	Pass
19	0.001	0.003	N/A	0.002	0.004	N/A	Pass
20	0.001	0.000	N/A	0.001	0.000	N/A	Pass
21	0.001	0.002	N/A	0.002	0.003	N/A	Pass
22	0.001	0.000	N/A	0.001	0.000	N/A	Pass
23	0.001	0.002	N/A	0.001	0.003	N/A	Pass
24	0.001	0.000	N/A	0.001	0.000	N/A	Pass
25	0.001	0.002	N/A	0.001	0.003	N/A	Pass
26	0.001	0.000	N/A	0.001	0.000	N/A	Pass
27	0.001	0.002	N/A	0.001	0.003	N/A	Pass
28	0.001	0.000	N/A	0.001	0.000	N/A	Pass
29	0.001	0.002	N/A	0.001	0.002	N/A	Pass
30	0.000	0.000	N/A	0.001	0.000	N/A	Pass
31	0.001	0.002	N/A	0.001	0.002	N/A	Pass
32	0.000	0.000	N/A	0.001	0.000	N/A	Pass
33	0.001	0.001	N/A	0.001	0.002	N/A	Pass
34	0.000	0.000	N/A	0.001	0.000	N/A	Pass
35	0.001	0.001	N/A	0.001	0.002	N/A	Pass
36	0.000	0.000	N/A	0.001	0.000	N/A	Pass
37	0.001	0.001	N/A	0.001	0.002	N/A	Pass
38	0.000	0.000	N/A	0.001	0.000	N/A	Pass
39	0.001	0.001	N/A	0.001	0.002	N/A	Pass
40	0.000	0.000	N/A	0.000	0.000	N/A	Pass
Remark	---						

5 IMMUNITY TEST RESULTS

5.1 Classification according to EN 61547

The immunity test requirements apply to the following lighting equipment:

<input checked="" type="checkbox"/>	Self-ballasted lamps and semi-luminaires.
<input type="checkbox"/>	Independent auxiliaries.
<input type="checkbox"/>	Luminaires or equivalent appliances (including emergency lighting).

5.2 Performance (Compliance) criteria

[According to EN 61547]

Performance criteria A : During the test no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended. The luminous intensity shall be deemed to be unchanged if the measured intensities do not deviate by more than 15 %.

Performance criteria B : During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Performance criteria C : During and after the test any change of luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control.

Product		Test (subclause – of this document) and performance criteria							
		6.1 (ESD)	6.2 (RI)	6.3 (EFT)	6.4 (Surge)	6.5 (RF-CI)	6.6 (MI)	6.7 (Dips&Interruptions)	
								Dips	Interruption
<input type="checkbox"/>	Self-ballasted lamps	B	A	B	C	A	A	C	B
<input type="checkbox"/>	Independent electronic auxiliary ⁴⁾	B	A	B	C	A	A	C	B ¹⁾
<input checked="" type="checkbox"/>	Luminaire including active electronic component	B	A	B	C	A	A	C	B ¹⁾
<input type="checkbox"/>	Luminaire for emergency lighting ⁵⁾	B ²⁾	A	B ²⁾	B ²⁾	A	A	See ³⁾	See ³⁾

Supplementary information:

- ¹⁾ For ballasts where the lamp is not able to restart within 1 min, due to the physical constraints of the lamp, performance criterion C applies.
- ²⁾ For emergency luminaires designed to operate in high-risk task areas, after the test, the luminous intensity shall be restored to its initial value within 0,5 s.
- ³⁾ These tests do not apply as they are covered by the test in IEC 60598-2-22.
- ⁴⁾ These tests apply for built-in auxiliaries which set for independent auxiliaries
- ⁵⁾ Luminaires for emergency lighting shall be tested in both the normal and emergency mode of operation.

5.2.1 **Manufacturer defined performance criteria**

Not provided.

5.3 Monitored – Checked Functions / Parameters

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

<input 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 checked="" 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	Illumination	Visual observation
Radio-frequency electromagnetic fields	Illumination	Visual observation / Camera
Fast transients	Illumination	Visual observation
Surge transient	Illumination	Visual observation
Injected currents (radio-frequency common mode)	Illumination	Visual observation
Voltage dips and short interruptions	Illumination	Visual observation
<u>Supplementary information :</u> In case of doubt, the luminous intensity shall be deemed to be unchanged if the measured intensities do not deviate by more than 15 %.		

5.4 Electrostatic discharge immunity	VERDICT: PASS
---------------------------------------------	----------------------

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

Requirements

Standard	EN 61547							
Basic standard	EN 61000-4-2							
Port under test	Enclosure							
Air discharges	<input checked="" type="checkbox"/>	±2 kV	<input checked="" type="checkbox"/>	±4 kV	<input checked="" type="checkbox"/>	±8 kV	<input type="checkbox"/>	kV
Contact discharges	<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.							

Performed tests

Set-up	<input checked="" type="checkbox"/>	Table-top	<input type="checkbox"/>	Floor standing
Ambient temperature [°C]	23°C		Relative Humidity air [%]	49%
Voltage – Mains [V]	230 Vac			
Frequency – Mains [Hz]	50 Hz			
Operating mode(s) used	Mode 1			

	Test Point	Test Voltage [kV] & Polarity	Coupling type	# of applied discharges / polarity	Discharge interval [s]
<input checked="" type="checkbox"/>	Points on conductive surface touchable by hand	±4	Contact	10	1
<input checked="" type="checkbox"/>	Points on non-conductive surface touchable by hand	±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.
<u>Supplementary information:</u>	

5.5	Radio-frequency electromagnetic fields immunity	VERDICT: PASS
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During the test it is verified if the equipment under test (EUT) has sufficient immunity against radiated electromagnetic fields. Industrial electromagnetic sources, walkie-talkies, radio transmitters, television transmitters and telecommunication equipment including cellular telephones and other emitting devices can generate these fields.

Requirements

Standard	EN 61547			
Basic standard	EN 61000-4-3			
Port under test	Enclosure			
Frequency range	Test level	Modulation	Dwell time	Step size
80 – 1000 MHz	3 V/m	80% AM (1kHz)	≥ 0.5 s	≤ 1%
<u>Supplementary information:</u>				
--				

Performed tests

Test method	<input checked="" type="checkbox"/>	EN 61000-4-3	<input type="checkbox"/>	EN 61000-4-20		
Test set-up (see annex 3 for photo)	<input checked="" type="checkbox"/>	Equipment on the table (0,8 m height)				
	<input type="checkbox"/>	Equipment standing on floor (0,05 – 0,15 m height)				
Voltage – Mains [V]	230 Vac					
Frequency – Mains [Hz]	50 Hz					
Operating mode(s) used	Mode 1					
Frequency range (applied)	Antenna Polarization	Test level (applied)	Modulation (applied)	Dwell time (applied)	Remark	
80 – 1000 MHz (step size 1%)	H	3 V/m	80% AM (1kHz)	3 s	1%	
	V	3 V/m	80% AM (1kHz)	3 s	1%	
Exposed side of the EUT	<input checked="" type="checkbox"/>	Front (0°)	<input checked="" type="checkbox"/>	Right (90°)	<input checked="" type="checkbox"/>	Top
	<input checked="" type="checkbox"/>	Rear (180°)	<input checked="" type="checkbox"/>	Left (270°)	<input checked="" type="checkbox"/>	Bottom
Observation(s)	During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance was observed.					
<u>Supplementary information:</u>						

5.6	Electrical Fast Transients immunity	VERDICT: PASS
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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 61547			
Basic standard	EN 61000-4-4			
Pulse characteristics	5/50 ns			
Port under test	Test level	Repetition frequency	Duration	
<input checked="" type="checkbox"/> AC input-output power	± 1000 V	5 KHz	2 min. / polarity	
<input type="checkbox"/> DC input-output power ²⁾	± 500 V	5 KHz	2 min. / polarity	
<input type="checkbox"/> Signal and Control lines ^{1) 3)}	± 500 V	5 KHz	2 min. / polarity	
¹⁾ Only applicable to ports interfacing with cables whose total length may exceed 3 m. ²⁾ Only applicable to equipment that is connected to the mains while in use. ³⁾ Change of state commands are not applied during the test.				

Performed tests

Voltage – Mains [V]	230 Vac			
Frequency – Mains [Hz]	50 Hz			
Operating mode(s) used	Mode 1			
Test Set-up (see annex 3 for photo)	<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. Location refer to annex 3.		
Coupling	<input checked="" type="checkbox"/>	Common mode	<input type="checkbox"/>	Other:

Port under test	Test Voltage & Polarity	Repetition Frequency	Test duration / polarity	Injection method			
				<input checked="" type="checkbox"/>	CDN	<input type="checkbox"/>	Clamp
AC mains power input	± 1000 V	5 KHz	2 min	<input checked="" 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.						

5.7 Surge transient immunity	VERDICT: PASS
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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 61547
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)

Device type	Port	Test level & Polarity	Coupling	Phase angle	Perf. Criteria	
<input type="checkbox"/>	Luminaires and independent auxiliaries with rated input power > 25 W.	AC input power ¹⁾	+ 1 kV	Line to Line	90°	C; See chapter 5.2 for details.
			- 1 kV	Line to Line	270°	
	AC input power ¹⁾	+ 2 kV	Line to Earth	90°		
		- 2 kV	Line to Earth	270°		
<input checked="" type="checkbox"/>	Luminaires and independent auxiliaries with rated input power ≤ 25 W.	AC input power	+ 0,5 kV	Line to Line	90°	C; See chapter 5.2 for details.
			- 0,5 kV	Line to Line	270°	
	AC input power ¹⁾	+ 1 kV	Line to Earth	90°		
		- 1 kV	Line to Earth	270°		
<input type="checkbox"/>	Self-ballasted lamps and semi-luminaires	AC input power	+ 0,5 kV	Line to Line	90°	C; See chapter 5.2 for details.
			- 0,5 kV	Line to Line	270°	
	AC input power ¹⁾	+ 1 kV	Line to Earth	90°		
		- 1 kV	Line to Earth	270°		

¹⁾ In addition to the specified test level, all lower test levels as detailed in EN 61000-4-5 should also be satisfied.

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)

See next page.

Port under test		Coupling	Test level & Polarity	Phase angle [°]	Remark
<input checked="" type="checkbox"/>	AC input power	Line to Neutral	+0,5 kV	90	--
			-0,5 kV	270	--
			+1 kV	90	N/A
			-1 kV	270	N/A
<input type="checkbox"/>	AC input power	Line to Earth	+0,5 kV	90	N/A
			-0,5 kV	270	N/A
			+1 kV	90	N/A
			-1 kV	270	N/A
			+2 kV	90	N/A
			-2 kV	270	N/A
<input type="checkbox"/>	AC input power	Neutral to Earth	+0,5 kV	90	N/A
			-0,5 kV	270	N/A
			+1 kV	90	N/A
			-1 kV	270	N/A
			+2 kV	90	N/A
			-2 kV	270	N/A
<u>Supplementary information:</u>					
1. The EUT does not include an earth port.					
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.			

5.8	Injected currents (RF common mode) immunity	VERDICT: PASS
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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 61547				
Basic standard	EN 61000-4-6				
Frequency range	0,15 – 80 MHz				
Port under test	Test level, U_0	Modulation	Step size	Dwell time	
<input checked="" type="checkbox"/> AC input-output power	3 V	80% AM (1kHz)	≤ 1%	≥ 0,5 s	
<input type="checkbox"/> DC input-output power ²⁾	3 V	80% AM (1kHz)	≤ 1%	≥ 0,5 s	
<input type="checkbox"/> Signal and Control lines ¹⁾	3 V	80% AM (1kHz)	≤ 1%	≥ 0,5 s	
¹⁾ Only applicable to ports interfacing with cables whose total length may exceed 3 m. ²⁾ Only applicable to equipment that is connected to the mains while in use.					

Performed tests

Frequency range (applied)	Modulation (applied)		Step size (applied)	
<input checked="" type="checkbox"/> 0,15 – 80 MHz	<input type="checkbox"/> 0,15 – 230 MHz	80% AM (1kHz)		1%
Voltage – Mains [V]	230 Vac	Frequency – Mains [Hz]	50 Hz	
Operating mode(s) used	Mode 1			
Test set-up (see annex 3 for photo)	<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. Location refer to annex 3.		

Port under test	Test Level (applied)	Injection method	Dwell time (applied)	Remark
AC input power	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 was observed.			
Supplementary information:	---			

5.9	Power supply interruptions and dips immunity	VERDICT: PASS
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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 61547			
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 under test	Test level ¹⁾	Period (Cycles)		Performance Criteria
		50 Hz	60 Hz	
AC input power port	$U_{NOM} - 30\%$	10	12	C; Refer to the chapter 5.2 for details.
AC input power port	$U_{NOM} - \geq 95\%$	0,5	0,5	C; Refer to the chapter 5.2 for details.
¹⁾ Changes to the voltage level shall occur at a zero crossing point in the a.c. voltage waveform. NOTE: Where the equipment has a rated voltage range the following shall apply: <ul style="list-style-type: none"> - If the voltage range does not exceed 20% of the lower voltage specified for the rated voltage range. A single voltage within that range may be selected for testing. - In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range. 				

Performed tests

U_{NOM} [V _{AC}]	Terminal	Test level [% U_{NOM}]	Duration [cycles]		Repetition rate [s]	Number of dips per test	Phase angle [°]
			50 Hz	60 Hz			
230	L-N	70	10	---	10	3	0, 180
230	L-N	0	0,5	---	10	3	0, 180
Operating mode		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 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 – 30 MHz	AMN: R&S ENV216	3.24 dB	3.83 dB
RF Conducted disturbance (control terminals) using AAN (asymmetrical artificial network) method, 150 KHz – 30 MHz		4.04 dB 4.44 dB	4.20 dB 4.59 dB
Conducted disturbance using a VP, 150kHz – 30MHz		1.82 dB	2.91 dB
Conducted disturbance using a CVP, 150kHz – 30MHz		3.44 dB	3.85 dB
Conducted disturbance using a CP, 150kHz – 30MHz		2.66 dB	2.89 dB
Radiated disturbance using CDNE, 30MHz – 300MHz		3.12 dB	3.79 dB
Radiated disturbance, 9 kHz – 30 MHz (triple loop)		2.62 dB	3.30 dB
Radiated disturbance, 30 MHz – 300 MHz (Horz.) ----- DEKRA SZ		3.60 dB	5.34 dB
Radiated disturbance, 300 MHz – 1000 MHz (Horz.) ----- DEKRA SZ		3.10 dB	
Radiated disturbance, 30 MHz – 300 MHz (Vert.) ----- DEKRA SZ		3.20 dB	6.32 dB
Radiated disturbance, 300 MHz – 1000 MHz (Vert.) ----- DEKRA SZ		3.20 dB	
LF harmonic current emissions		0.20 %	na
LF voltage fluctuations		2.50 %	na

Immunity tests	Uncertainty
Electrostatic discharge	$U_{peak}=6\%$, $U_{30ns}=6\%$ $U_{60ns}=6\%$, $U_{rt}=13\%$
Radio-frequency electromagnetic fields----- DEKRA SZ	1.48 dB
Fast transients	$U_{tr}=6.2\%$, $U_{pw}=3\%$ $U_{bp}=3\%$, $U_{bd}=3\%$
Surges	$U_{peak}=3.3\%$, $U_{ft}=3\%$, $U_{dt}=3\%$
Injected currents (radio-frequency common mode)	1.71 dB
Voltage dips and short interruptions	$U_{out}=0.4\%$, $U_i=3\%$, $U_{r-d}=3\%$

8 ANNEX 2 – USED EQUIPMENT

DEKRA SH:

Conducted disturbance				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESCI	101351	2022/07/20
EMI test receiver	R&S	ESR3	102305	2022/07/20
Artificial Mains Network	R&S	ENV216	101620	2022/07/06
Artificial Mains Network	SCHWARZBECK	NSLK 8128	8128-287	2022/07/21
Asymmetric artificial network	SCHWARZBECK	NTFM8131	8131-151	2022/07/06
Asymmetric artificial network	TESEQ	ISN T800	30306	2022/07/28
High power voltage probe	SCHWARZBECK	TK9421	#308	2022/04/19
Capacitive voltage probe	TESEQ	CVP 2200A	43476	2022/07/27
Current probe	ETS.LINDGREN	91550-1L	218473	2022/07/06
Radiated disturbance-CDN/CDNE				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESCI	101351	2022/07/20
EMI test receiver	R&S	ESR3	102305	2022/07/20
Coupling/Decoupling Network	SCHWARZBECK	CDNE M3	00088	2022/10/17
Coupling/Decoupling Network	SCHWARZBECK	CDNE M2	00110	2022/03/30
Coupling/Decoupling Network	TESEQ	CDN M016S	34640	2022/05/17
Radiated disturbance (9 kHz to 30 MHz)				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESCI	101351	2022/07/20
EMI test receiver	R&S	ESR3	102305	2022/07/20
3-dimensional large loop antenna	SCHWARZBECK	HXYZ 9170	HXYZ9170-245	2022/07/06
Harmonic & Flicker				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Harmonic currents and flicker tester	California Instruments	CTS	1306A00135	2022/05/13
AC power source	California Instruments	5001iX-CTS-400	1306A00135	2022/05/13
Harmonic currents and flicker tester	TESEQ	Proflin 2145	1736A02510	2022/08/09
ESD immunity				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
ESD generator	TESEQ	NSG 435	6716	2022/04/27
ESD generator	TESEQ	NSG 437	1447	2022/07/02
EFT, Surge and V-Dips immunity				

Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EFT, Surge, DIPS all-in-one	TESEQ	NSG-3040-MF	2006/EFT:0535 /SURGE:1234 /DIPS:2062	2022/05/12
Injected currents immunity				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system (RF)	TESEQ	NSG 4070-30	35895	2022/05/12
Coupling decoupling network (CDN)	TESEQ	CDN M016S	34640	2022/05/17
Attenuator	TESEQ	ANT 6050	34847	2022/05/16

DEKRA SZ:

Radiated disturbance				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI Test Receiver	R&S	ESCI	100573	2022/03/04
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2022/06/09
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2022/02/28
Radio-frequency electromagnetic fields immunity				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Signal Generator	R&S	SMB100A	114728	2022/10/20
Power Meter	R&S	NRP2	106362	2022/10/20
Power Sensor	R&S	NRP6A	101411	2022/10/20
Power Sensor	R&S	NRP6B	101412	2022/10/20
RF Switch	R&S	OPS120	101944	2022/11/15
Power Amplifier	R&S	BBA150 BC500	102912	2022/01/24
Power Amplifier	R&S	BBA150 D200	102889	N/A
Power Amplifier	R&S	BBA150 E200	102890	N/A
LOG Antenna	R&S	HL046E	100257	N/A
LOG Antenna	R&S	STLP9149	9149-505	N/A
Filed Probe	AR	FL7006/KIT	350261	2022/09/19
Power frequency magnetic field immunity				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Immunity test system	Teseq GmbH	NSG 3060	4019	2022/03/21
CDN	Teseq GmbH	CDN 3061	5010	2022/03/21
Automatic step transformer	Teseq GmbH	VAR 3005-S16	3010	2022/04/20
Magnetic field Coil	Teseq GmbH	INA 702	306	2022/07/20
Magnetic field Generator	Teseq GmbH	MFO 6502	201	2022/07/20

9 ANNEX 3 – TEST PHOTOS

Conducted disturbance at electric power supply interface



Radiated disturbances (9 kHz to 30 MHz)



Radiated disturbances-CDNE (30 MHz to 300 MHz)



Harmonic current emissions



Radiated EM Field Immunity



Electrostatic discharge immunity



Electrical fast transient (EFT) / Burst transients / Surge transients / Power supply voltage interruptions & dips immunity



Conducted RF disturbances immunity



10 ANNEX 4 – MODEL LIST

Model name	Rating input	Rating power	LED driver
DR-M 068	220 – 240 V~; 50/60 Hz	6 W	NDF007HTEA085-C3VY
DR-M 090	220 – 240 V~; 50/60 Hz	9 W	NDF010HTEA115-C3VW
DT090	220 – 240 V~; 50/60 Hz	10 W	NDF010HTEA115-C3VW
DRT090	220 – 240 V~; 50/60 Hz	10 W	NDF010HTEA115-C3WE
DT120	220 – 240 V~; 50/60 Hz	14 W	NH012N0160T-MH069
DRT120	220 – 240 V~; 50/60 Hz	15 W	NH012N0160T-MH079
DT135	220 – 240 V~; 50/60 Hz	18 W	NDF006HTEA075-C3AB
DRT145	220 – 240 V~; 50/60 Hz	15 W	NDL006HCEA075-C3BA
DT170	220 – 240 V~; 50/60 Hz	20 W	NDF009HTEA115-C3AC
DT195	220 – 240 V~; 50/60 Hz	20 W	NDF009HCEA195-C3BC
DRT195	220 – 240 V~; 50/60 Hz	20 W	NDL006HCEA195-C3BA
DZ-M120	220 – 240 V~; 50/60 Hz	15 W	NDF007HCEA075-C3VW
DZ-M150	220 – 240 V~; 50/60 Hz	22 W	NDF006HCEA115-C3VY

-----END-----