



AB 003



TEST REPORT IEC CISPR15

Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

Report Number..... : B10-4/076/EMC/22

Date of issue : 2022-08-03

Total number of pages : 63

Name of Testing Laboratory
preparing the Report : Łukasiewicz - IMiF PREDOM Division
02-255 Warszawa, ul. Krakowiaków 53, Poland

Applicant's name : LUG Light Factory Sp. z o.o.
Address : 65-127 Zielona Góra, ul. Gorzowska 11, Poland

Test specification:

Standard : PN-EN IEC 55015:2019-11+A11:2020-07, PN-EN 61547:2009,
PN-EN IEC 61000-3-2:2019-04+A1:2021-08
PN-EN 61000-3-3:2013-10+A1:2019-10
EN IEC 55015:2019+A11:2020, EN 61547:2009,
EN IEC 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A1:2019,
CISPR 15:2018, IEC 61547:2009,
IEC 61000-3-2:2018+AMD1:2020, IEC 61000-3-3:2013+AMD1:2017

Test procedure..... : EMC

Non-standard test method..... : N/A

Test Report Form No. : PREDOM IEC CISPR15_ IEC 61547/21

Test Report Form(s) Originator.... : Łukasiewicz - IMiF PREDOM Division
02-255 Warszawa, ul. Krakowiaków 53, Poland

Master TRF : Dated 2022-01



Copyright © 2019 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description	Street luminaire	
Trade Mark(s)		
Original Product/Equipment Manufacturer	LUG Light Factory Sp. z o.o. 65-127 Zielona Góra, ul. Gorzowska 11, Poland	
Branding Manufacturer(s)	LUG	
Model/Type reference	URBINO IK10 LED ED D4i 18850lm/730 IP66 O5 szary I kl.	
Ratings	220-240 V 50/60 Hz 1 x max 117 W IP66 cl. I	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	Testing Laboratory:	Łukasiewicz - IMiF PREDOM Division
Testing location/ address		02-255 Warszawa, ul. Krakowiaków 53, Poland
Tested by (name, function, signature)		Marek Gabryszewski 
Approved by (name, function, signature) ..		Tomasz Małyska 
Supervised by (name, function, signature):		Filip Walczak 
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature) ..		
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) ..		
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	

Testing location/ address :	
Tested by (name, function, signature) :	
Witnessed by (name, function, signature) . :	
Approved by (name, function, signature) .. :	
Supervised by (name, function, signature) :	

List of Attachments (including a total number of pages in each attachment): N/A	
Summary of testing: Tests results - Positive	
<i>According to ISO / IEC Guide 98-4 for the assessment of compliance of the measurement result with the requirements, criterion B was chosen. 50% risk of incorrect assessment decision belongs to the customer and 50% risk of incorrect assessment belongs to the laboratory.</i>	
Tests performed (name of test and test clause): Conducted EMISSIONS (4.3) Radiated electromagnetic disturbances (4.5.2) Radiated EMISSIONS (4.5.3) Harmonic Currents (7) Voltage Fluctuations and Flicker (5) Electrostatic Discharges (5.2) RF Electromagnetic Fields (5.3) Power frequency magnetic fields (5.4) Electrical Fast Transients (5.5) Conducted Disturbances Induced by RF Fields (5.6) Surge (5.7) Voltage Dips and short Interruptions (5.8)	Testing location: Łukasiewicz - IMiF PREDOM Division 02-255 Warszawa, ul. Krakowiaków 53, Poland
Summary of compliance with National Differences (List of countries addressed): N/A	
Statement concerning the uncertainty of the measurement systems used for the tests no required (N/A)	
<input checked="" type="checkbox"/> Internal procedure used for type testing through which traceability of the measuring uncertainty has been established: Procedure number, issue date and title: General concept of methodologies for determining uncertainty of measurement, dated: October 2013 Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.	
<input type="checkbox"/> Statement not required by the standard used for type testing	

Copy of marking plate:

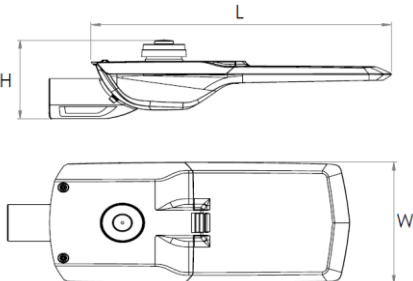


Test item particulars : For test item particulars refer to item 1	
Classification of installation and use : Street luminaire	
Supply Connection : Power connector	
Possible test case verdicts: - test case does not apply to the test object..... : N/A - test object does meet the requirement..... : P (Pass) - test object does not meet the requirement..... : F (Fail)	
Testing: Date of receipt of test item : 2022-07-11 Date (s) of performance of tests : 2022-07-11 ÷ 2022-07-15	
General remarks: "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 61010-2:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) : LUG Light Factory Sp. z o.o. 65-127 Zielona Góra, ul. Gorzowska 11, Poland	
General product information (GPI) and other remarks: The results in this report reflect the results for that specific model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the requirements detailed in this report. According to the information from our Applicant, the tests were done on 230 V / 50 Hz supply.	

Table of Contents:

1	General description of test item(s).....	7
1.1	Description of test item(s) according to CISPR 15.....	9
1.2	Photos of the test item.....	11
2	Verdict summary section.....	14
3	Test conditions.....	15
3.1	General.....	15
3.2	Specific test conditions for CISPR 15.....	15
4	Emission.....	16
4.1	Conducted disturbances.....	16
4.2	Radiated electromagnetic disturbances (9 kHz to 30 MHz).....	21
4.3	Radiated electromagnetic disturbances(30 MHz to 1000 MHz).....	26
5	Harmonic current emissions according to IEC 61000-3-2.....	33
6	Voltage changes, voltage fluctuations and flicker according to IEC 61000-3-3.....	37
7	Immunity.....	39
7.1	General information.....	39
7.2	Electrostatic discharges.....	40
7.3	Radio-frequency electromagnetic fields.....	44
7.4	Power frequency magnetic fields.....	48
7.5	Fast transients.....	50
7.6	Injected currents (radio-frequency common mode).....	52
7.7	Surges.....	54
7.8	Voltage dips and short interruptions.....	56
8	List of test equipment.....	59
9	Measurement instrumentation uncertainties.....	60
10	Annex.....	61
10.1	Annex A:.....	61
10.2	Annex B:.....	61

1 General description of test item(s)

Description	Street luminaire				
Model number	130822.7L151.050.001 URBINO IK10 LED				
Serial number	N/A				
Brand name	LUG				
Ports	Port name and description	Cable			
		Specified length [m]	Attached during test	Shielded	
Local wired ports	Mains, Supply Connection: power cord 3 x 2.5 mm ²	0.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	
Wired network ports.....	N/A		<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	
Supplemental information to the ports.....	N/A				
Rated power supply.....		Voltage and frequency	1 ph/ PE	2 ph/N/PE	3 ph/N/PE
	<input checked="" type="checkbox"/>	AC: 230 V / 50 Hz	<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"/>
	<input type="checkbox"/>	DC:			
Rated power	1 x max 117 W				
Protection class	cl. I				
Clock frequencies	No available data for these selection criteria				
Other parameters	See page 4				
Software version.....	of 07_2022				
Hardware version	of 07_2022				
Dimensions in mm (L x W x H):	550 x 250 x 130 				
Mounting position.....	<input type="checkbox"/>	Table top equipment			
	<input type="checkbox"/>	Wall/Ceiling mounted equipment			
	<input type="checkbox"/>	Floor standing equipment			
	<input type="checkbox"/>	Hand-held equipment			
	<input checked="" type="checkbox"/>	Other: In accordance with the manufacturer's instructions			

Modules / parts	Module / parts of test item	Type	Manufacturer
	See section Annex A Supplementary information: See section Annex B		

Operating modes	No.	Operating mode of test item	Applied for testing	
			Emission	Immunity
	1	Powered by 230 VAC 50 Hz, in accordance with the manufacturer's instructions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	2	Powered by 120 VAC 60 Hz, in accordance with the manufacturer's instructions	<input type="checkbox"/>	<input type="checkbox"/>
	3	EUT with battery power Powered by ...VDC (built-in battery), in accordance with the manufacturer's instructions	<input type="checkbox"/>	<input type="checkbox"/>
Supplemental information to the operating modes	N/A			
Accessories (not part of the test item)	Accessory	Type	Manufacturer	
	N/A	N/A	N/A	
	AE			
Documents as provided by the applicant	Description	File name	Issue date	
	N/A	N/A	N/A	
Modifications to the test item during testing	N/A			

1.1 Description of test item(s) according to CISPR 15 and IEC 61000-3-2

Description of the test item	<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)
	<input type="checkbox"/>	Replaceable starters for fluorescent lamps (6.4.10)
	<input type="checkbox"/>	Others: LED converter
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: ---
Control Gear	<input checked="" type="checkbox"/>	Electronic control gear
	<input type="checkbox"/>	Magnetic control gear / transformer
	<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 has phase control dimming functions with the following characteristic(s):
	<input type="checkbox"/>	rated power less than or equal to 1 kW when operating incandescent lamps
	<input type="checkbox"/>	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"/>	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
	<input type="checkbox"/>	Other: ---

Type of equipment..... :	<input checked="" type="checkbox"/>	Not for professional use
	<input type="checkbox"/>	For professional use
	<input type="checkbox"/>	Others: Supply power

1.2 Photos of the test item

Photo of test item:



Photo of test item:

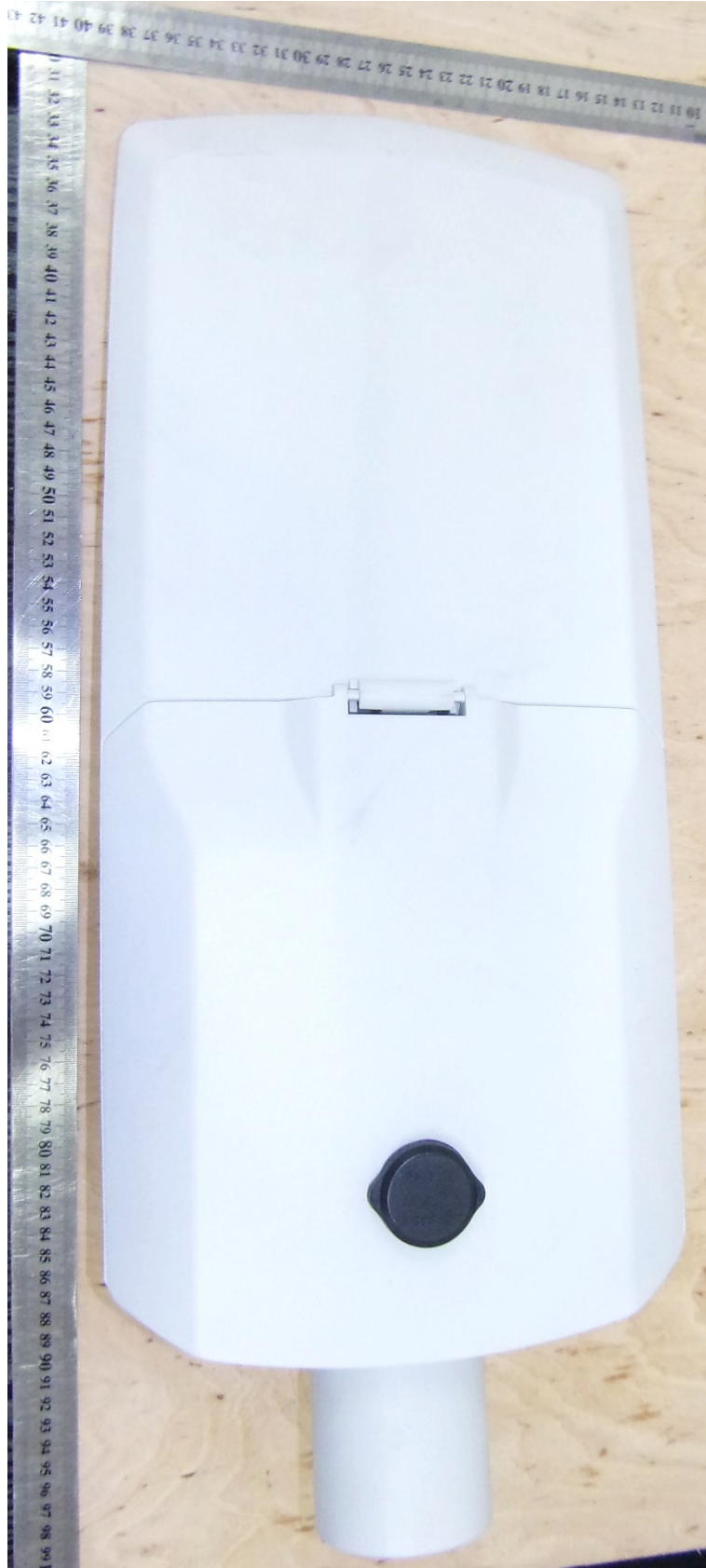


Photo of test item:



2 Verdict summary section

CISPR15			
Clause	Requirement – Test case	Basic standard	Verdict
4.3	Assessment of wired network ports Table 1, Table 2, Table 3	CISPR 16-1-1:2019 CISPR 16-1-2:2014+AMD1:2017	Pass
4.4	Assessment of local wired ports Table 4, Table 5, Table 6	CISPR 16-2-1:2014+AMD1:2017 CISPR 32:2015+AMD1:2019	N/A
4.5	Assessment of the enclosure port	---	---
4.5.2	Frequency range 9 kHz to 30 MHz Table 8, Table 9	CISPR 16-1-4:2019+AMD1:2020 CISPR 15:2018	Pass
4.5.3	Frequency range 30 MHz to 1 GHz Table 10	CISPR 16-2-3:2016+AMD1:2019	Pass
IEC 61000-3-2			
Clause	Requirement – Test case	Basic standard	Verdict
6.2 6.3	Harmonic current emissions	IEC 61000-3-2:2018+AMD1:2020 IEC 61000-4-7:2002+AMD1:2008	Pass
IEC 61000-3-3			
Clause	Requirement – Test case	Basic standard	Verdict
4	Voltage changes, voltage fluctuations and flicker	IEC 61000-3-3:2013+AMD1:2017 IEC 61000-4-15:2010	Pass
IEC 61547			
Clause	Requirement – Test case	Basic standard	Verdict
5.2	Electrostatic discharge	IEC 61000-4-2:2008	Pass
5.3	Radio-frequency electromagnetic fields	IEC 61000-4-3:2020	Pass
5.4	Power frequency magnetic fields	IEC 61000-4-8:2009	Pass
5.5	Fast transients	IEC 61000-4-4:2012	Pass
5.6	Injected currents (radio-frequency common mode)	IEC 61000-4-6:2013	Pass
5.7	Surges	IEC 61000-4-5:2014+AMD1:2017	Pass
5.8	Voltage dips and short interruptions	IEC 61000-4-11:2020	Pass
Supplementary information:			
According to ISO / IEC Guide 98-4 for the assessment of compliance of the measurement result with the requirements, criterion B was chosen. 50% risk of incorrect assessment decision belongs to the customer and 50% risk of incorrect assessment belongs to the laboratory.			

3 Test conditions

3.1 General

Environmental reference 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:		
	Temperature	Humidity	Atmospheric pressure
	15°C – 35°C	30% – 60%	860 hPa – 1060 hPa
	If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.		
Measurement uncertainties	For all measurements where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in CISPR 16-4-2 , IEC 61000-4 series or a product standard, the measurement instrumentation uncertainty has been calculated an applied in accordance with these standards. In all cases if the test laboratory uncertainty is larger than the value for UCISPR given in CISPR 16-4-2 the uncertainty are included in the test report annex. In case the standards in the IEC 61000-4 series or the product standard requires the indication of the uncertainty in the report these uncertainty values are included in the annex.		

3.2 Specific test conditions for CISPR 15

Test set up	<input checked="" type="checkbox"/>	CISPR 15
	<input type="checkbox"/>	CISPR 30 technical report applied for built-in appliances
Type of test item (Clause 6.2 of CISPR 15).....	<input checked="" type="checkbox"/>	Active EUT
	<input type="checkbox"/>	Passive EUT (Deemed to comply without further testing)
	<input type="checkbox"/>	Others: ---
Maximum clock frequency (Clause 3.2.2)..... *No available data for these selection criteria	<input type="checkbox"/>	≤ 30 MHz → Measurement of radiated emissions up to 300 MHz is sufficient.
	<input checked="" type="checkbox"/>	> 30 MHz → Measurement of radiated emissions up to 1000 MHz is required.

4 Emission

4.1 Conducted disturbances

Tested by	Marek Gabryszewski
Test date	2022-07-12
Test Location (stand)	Disturbance voltage stand Faraday Cage U-11
Test set-up description	<input type="checkbox"/> Set-up Type A (40 cm distance to vertical ground plane, 80 cm o ground plane)
	<input checked="" 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)
Supplementary Test set-up description	Operating mode: 1
Test method applied	<input checked="" type="checkbox"/> Voltage disturbance measurement (Table 1, Table 2, Table 4, Table 5)
	<input type="checkbox"/> Current disturbance measurement (Table 3, Table 6)
	<input type="checkbox"/> Other: ---
Supplementary information.....	---

Test set-up photo:



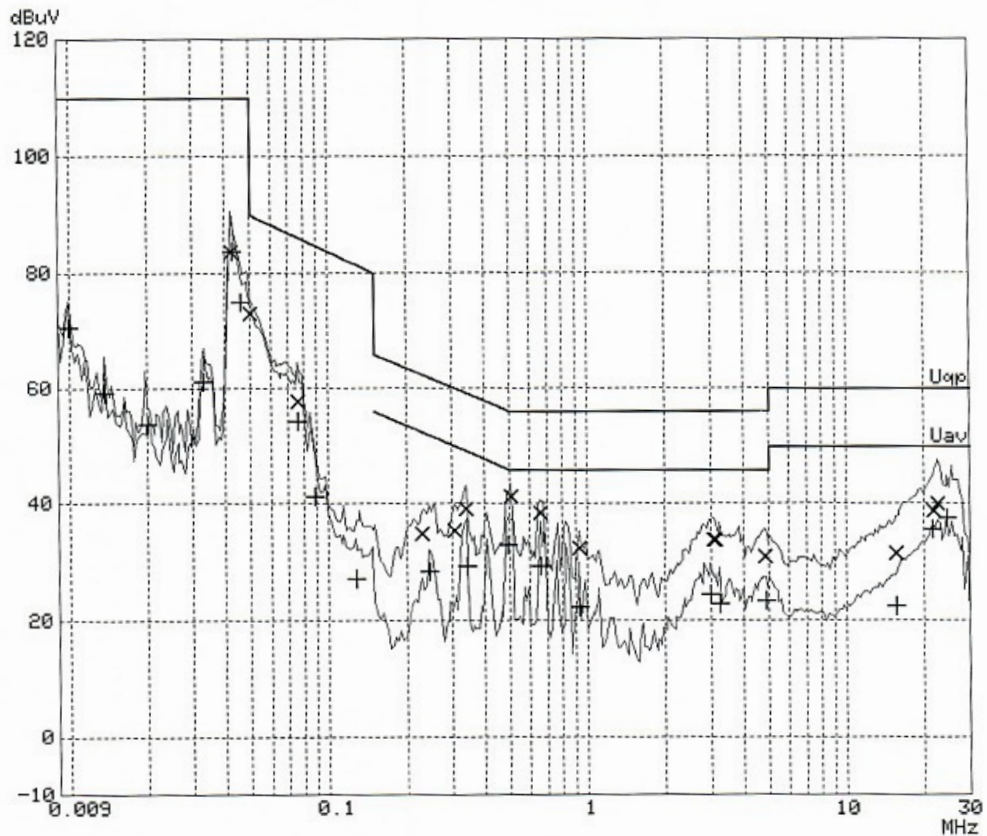
IMiF PREDOM Division Disturbance Voltage Measurement

EUT: URBINO IK10 LED
 Manuf: LUG Light Factory sp. z o.o.
 Test Spec: EN 55015
 Comment: Phase L1
 File name: _55015_.RES
 Date: 12. Jul 22 09:03

Overview Scan Settings (2 Ranges)

----- Frequencies -----			----- Receiver Settings -----					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	
9k	150k	61.0Hz	200Hz	PK+AV	10ms	60dB LN	OFF	
150k	30M	3.9k	9k	PK+AV	10ms	15dB LN	OFF	

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB



IMiF PREDOM Division Disturbance Voltage Measurement

EUT: URBINO IK10 LED
 Manuf: LUG Light Factory sp. z o.o.
 Test Spec: EN 55015
 Comment: Phase L1
 File name: _55015_.RES
 Date: 12. Jul 22 09:03

Final Measurement Results:

Indicated Phase/PE shows Configuration of max. Emission

Frequency MHz	QP Level dBuV	Delta Limit dB	Phase -	PE -
0.0422031	83.7	-26.2	L1	gnd
0.05014	72.9	-17.0	N	gnd
0.07571	57.8	-28.3	N	gnd
0.22813	34.8	-27.7	L1	gnd
0.30625	35.3	-24.8	L1	gnd
0.33750	39.2	-20.1	L1	gnd
0.50547	41.2	-14.7	L1	gnd
0.65391	38.4	-17.5	L1	gnd
0.92734	32.2	-23.7	L1	gnd
3.07578	33.8	-22.1	N	gnd
3.11094	33.7	-22.2	N	gnd
4.82578	30.9	-25.0	N	gnd
15.54063	31.5	-28.4	N	gnd
21.68516	38.8	-21.1	L1	gnd
22.59141	40.1	-19.9	L1	gnd

Frequency MHz	AV Level dBuV	Delta Limit dB	Phase -	PE -
0.0099155	70.6		N	gnd
0.0135776	59.2		L1	gnd
0.0199253	53.9		N	gnd
0.0329258	61.3		L1	gnd
0.0425083	83.8		N	gnd
0.0457432	74.9		N	gnd
0.07571	54.4		L1	gnd
0.08786	41.4		L1	gnd
0.12637	27.1		L1	gnd
0.24375	28.3	-23.7	L1	gnd
0.34141	29.3	-19.9	N	gnd
0.48984	32.8	-13.3	N	gnd
0.65391	29.3	-16.6	N	gnd
0.92344	22.2	-23.7	N	gnd
2.98203	24.4	-21.5	L1	gnd
3.24766	22.8	-23.1	N	gnd
4.89609	23.2	-22.7	N	gnd
15.48203	22.5	-27.4	L1	gnd
21.50547	35.6	-14.4	L1	gnd
24.57578	37.5	-12.5	L1	gnd

* limit exceeded

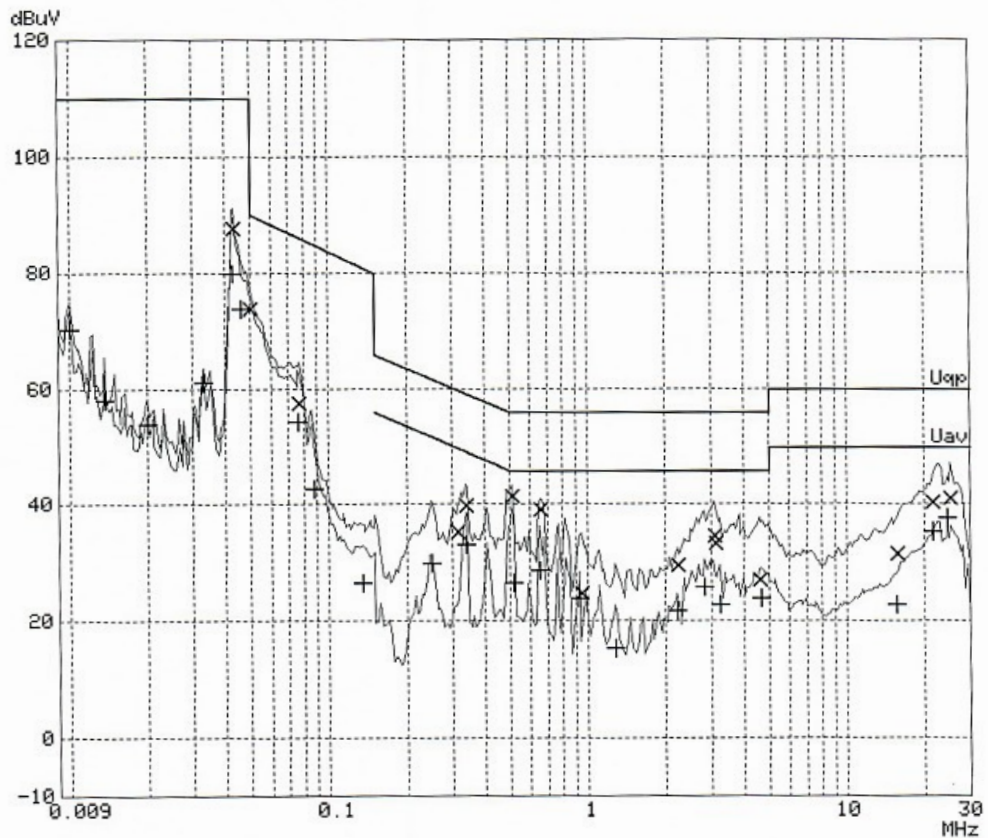
IMiF PREDOM Division Disturbance Voltage Measurement

EUT: URBINO IK10 LED
 Manuf: LUG Light Factory sp. z o.o.
 Test Spec: EN 55015
 Comment: Phase N
 File name: _55015_.RES
 Date: 12. Jul 22 09:23

Overview Scan Settings (2 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
9k	150k	61.0Hz	200Hz	PK+AV	10ms	60dBLN	OFF
150k	30M	3.9k	9k	PK+AV	10ms	15dBLN	OFF

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB



IMiF PREDOM Division Disturbance Voltage Measurement

EUT: URBINO IK10 LED
 Manuf: LUG Light Factory sp. z o.o.
 Test Spec: EN 55015
 Comment: Phase N
 File name: _55015_.RES
 Date: 12. Jul 22 09:23

Final Measurement Results:

Indicated Phase/PE shows Configuration of max. Emission

Frequency MHz	QP Level dBuV	Delta Limit dB	Phase -	PE -
0.0429966	87.7	-22.2	L1	gnd
0.05002	73.9	-16.0	N	gnd
0.07644	57.7	-28.4	N	gnd
0.31406	35.4	-24.4	L1	gnd
0.33750	39.8	-19.5	L1	gnd
0.50938	41.4	-14.5	L1	gnd
0.65391	39.1	-16.8	N	gnd
0.94297	24.7	-31.2	N	gnd
2.22422	29.6	-26.3	N	gnd
3.08750	34.7	-21.2	L1	gnd
3.11875	33.4	-22.5	N	gnd
4.61094	27.1	-28.8	N	gnd
15.66172	31.5	-28.4	N	gnd
21.50156	40.4	-19.6	L1	gnd
25.22813	41.1	-18.8	L1	gnd

Frequency MHz	AV Level dBuV	Delta Limit dB	Phase -	PE -
0.0099766	70.5		N	gnd
0.0135776	58.2		L1	gnd
0.0199863	54.1		N	gnd
0.0329258	61.3		L1	gnd
0.0425693	79.9		N	gnd
0.0458652	73.8		L1	gnd
0.07614	54.4		L1	gnd
0.08737	42.7		L1	gnd
0.13424	26.6		N	gnd
0.24766	29.9	-21.9	L1	gnd
0.33750	33.2	-16.1	L1	gnd
0.51328	26.6	-19.3	N	gnd
0.65000	28.8	-17.1	L1	gnd
0.92734	23.8	-22.1	L1	gnd
1.27500	15.3	-30.6	N	gnd
2.20078	21.7	-24.2	N	gnd
2.80234	25.8	-20.1	N	gnd
3.23984	22.8	-23.1	N	gnd
4.64609	23.8	-22.1	L1	gnd
15.60703	22.8	-27.1	N	gnd
21.50547	35.3	-14.6	L1	gnd
24.57578	37.6	-12.3	L1	gnd

* limit exceeded

4.2 Radiated electromagnetic disturbances (9 kHz to 30 MHz)

Tested by	Marek Gabryszewski	
Test date	2022-07-13	
Test Location (stand)	Radiated electromagnetic disturbances (9 kHz to 30 MHz) stand	
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 1.6 m
	<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 set-up description	<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: ---
Supplementary test set-up description	Position: Vertical and Horizontal Operating mode: 1	
Supplementary information.....	---	

Test set-up photo:



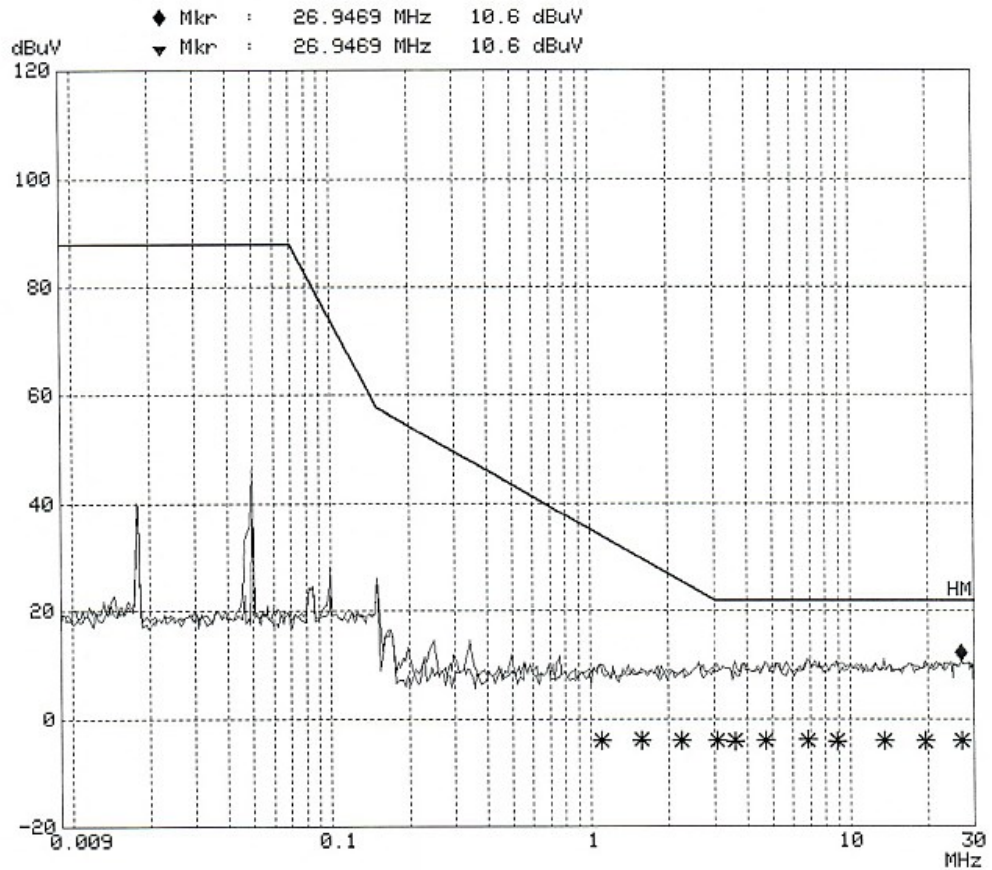
IMiF PREDOM Division Measurement of Radiation Disturbances

EUT: URBINO IK10 LED
 Manuf: LUG Light Factory sp. z o.o.
 Test Spec: EN 55015
 Comment: Vertical
 File name: 55015_V.RES
 Date: 13. Jul 22 10:31

Overview Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	
9k	150k	61.0Hz	200Hz	PK	10ms	35dB	BLN OFF	
150k	30M	3.9k	9k	PK	10ms	5dB	BLN OFF	

Final Measurement: x Hor-Max / + Vert-Max
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB



IMiF PREDOM Division Measurement of Radiation Disturbances

EUT: URBINO IK10 LED
 Manuf: LUG Light Factory sp. z o.o.
 Test Spec: EN 55015
 Comment: Vertical
 File name: 55015_V.RES
 Date: 13. Jul 22 10:31

Final Measurement Results:

Frequency MHz	QP Level hor. dBuV	QP Level vert. dBuV	Delta Limit dB
1.09141	-3.7	-3.7	-38.0
1.56406	-3.7	-3.8	-33.6
2.22031	-3.8	-3.8	-29.5
3.05234	-3.7	-3.7	-25.7
3.59922	-3.8	-4.0	-25.8
4.69297	-3.7	-3.8	-25.7
6.81406	-3.8	-3.6	-25.6
8.85313	-3.8	-3.9	-25.8
13.47813	-3.8	-3.8	-25.8
19.40000	-3.9	-3.7	-25.7
26.94688	-3.8	-3.8	-25.8

* limit exceeded

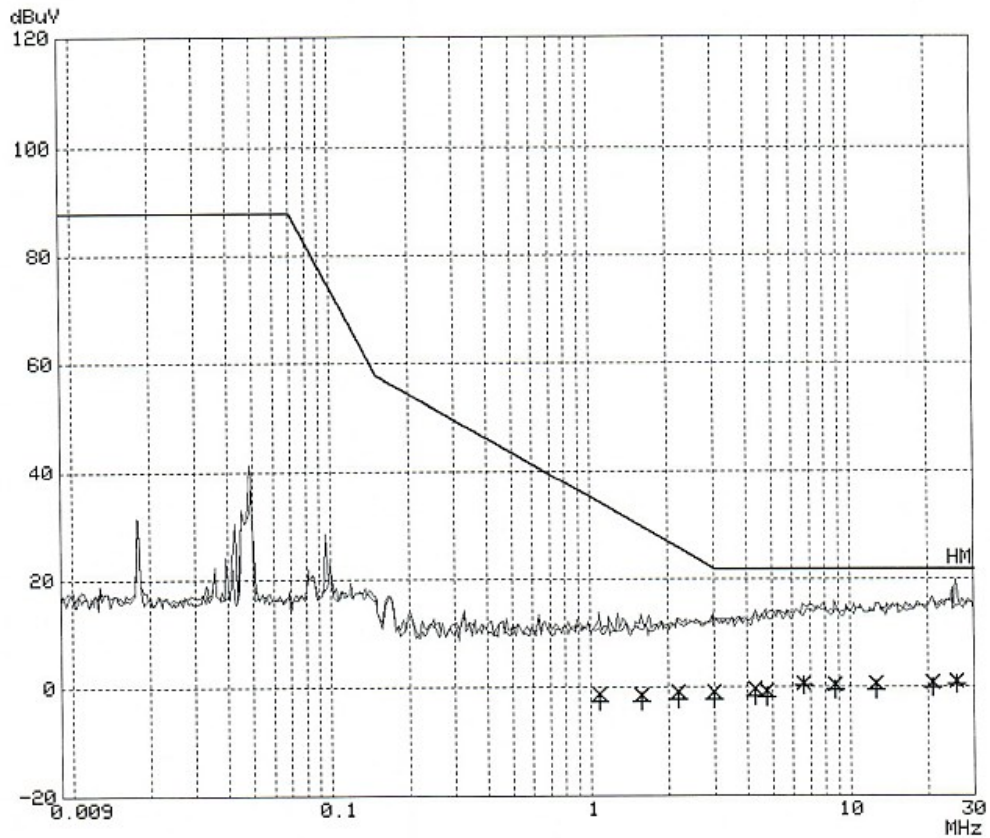
IMiF PREDOM Division Measurement of Radiation Disturbances

EUT: URBINO IK10 LED
 Manuf: LUG Light Factory sp. z o.o.
 Test Spec: EN 55015
 Comment: Horizontal
 File name: 55015_H.RES
 Date: 13. Jul 22 11:52

Overview Scan Settings (2 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
9k	150k	61.0Hz	200Hz	PK	10ms	35dBLN	OFF
150k	30M	3.9k	9k	PK	10ms	10dBLN	OFF

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB



IMiF PREDOM Division Measurement of Radiation Disturbances

EUT: URBINO IK10 LED
 Manuf: LUG Light Factory sp. z o.o.
 Test Spec: EN 55015
 Comment: Horizontal
 File name: 55015_H.RES
 Date: 13. Jul 22 11:52

Final Measurement Results:

Frequency MHz	QP Level dBuV	Delta Limit dB
1.07969	-1.1	-35.4
1.56797	-1.4	-31.3
2.16172	-0.7	-26.7
2.97031	-0.8	-23.1
4.27891	-0.2	-22.2
4.72813	-0.4	-22.4
6.55625	0.7	-21.2
8.73203	0.6	-21.3
12.57969	0.8	-21.1
20.71641	1.0	-20.9
25.74375	1.2	-20.7

Frequency MHz	AV Level dBuV	Delta Limit dB
1.07969	-2.4	
1.56797	-2.4	
2.16172	-2.0	
2.97031	-2.0	
4.27891	-1.5	
4.72813	-1.6	
6.55625	0.4	
8.73203	-0.3	
12.57969	-0.3	
20.71641	0.0	
25.74375	0.5	

* limit exceeded

4.3 Radiated electromagnetic disturbances (30 MHz to 1000 MHz)

Tested by	Marek Gabryszewski	
Test date	2022-07-11	
Test Location (stand)	Radiated electromagnetic disturbances stand Semi- anechoic chamber U-86	
Applied limit class	<input checked="" type="checkbox"/>	Table 10 Radiated disturbance limits
	<input type="checkbox"/>	Other: ---
Test set-up description	<input checked="" type="checkbox"/>	Equipment on a table of 80 cm height
	<input type="checkbox"/>	Equipment on the floor (insulated from ground plane)
	<input type="checkbox"/>	Equipment located approximately in the middle of the validated test volume (FAR)
	<input type="checkbox"/>	Equipment on a 10 cm support over the ground plane according CDNE-Method
	<input type="checkbox"/>	Other: ---
Supplementary test set-up description	Operating mode: 1	
Test method applied	<input type="checkbox"/>	CDN(E)
	<input checked="" type="checkbox"/>	OATS or SAC with measurement distance [m]: 10
	<input type="checkbox"/>	FAR with measurement distance [m]: ---
	<input type="checkbox"/>	TEM Waveguide (test item without cables and max. 300 mm dimension)
	<input type="checkbox"/>	Other: ---
Supplementary information	---	

Test set-up photo:



EMC32 Report

EMI Auto Test Template: 55015 EMI Test Auto 30MHz-1000MHz - 10m

Hardware Setup: HL562 EMI
Measurement Type: Open-Area-Test-Site
Frequency Range: 30 MHz - 1 GHz
Graphics Level Range: 0 dB μ V/m - 60 dB μ V/m

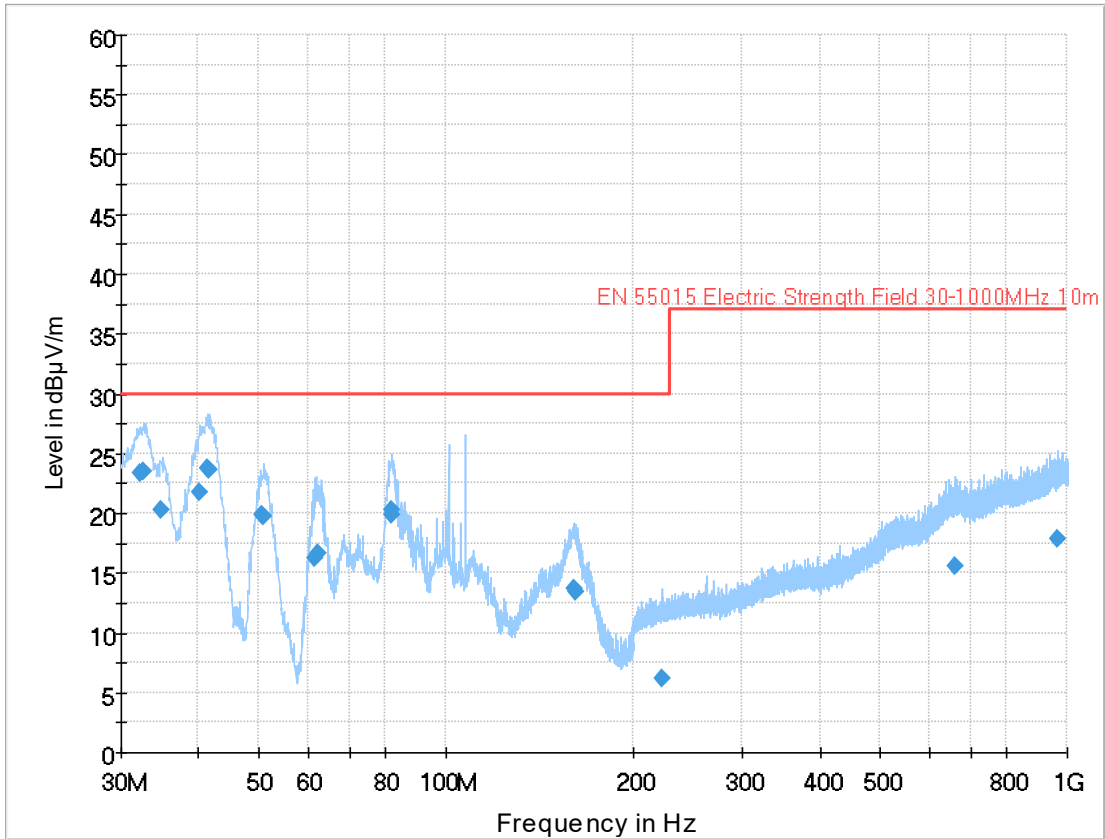
Preview Measurements:
Scan Test Template: EMI Prescan auto

Frequency Zoom:
Zoom Scan Template: EMI Zoom auto

Maximization Measurements:
Template for Single Meas.: EMI Prescan auto

Final Measurements:
Template for Single Meas.: EMI Final auto

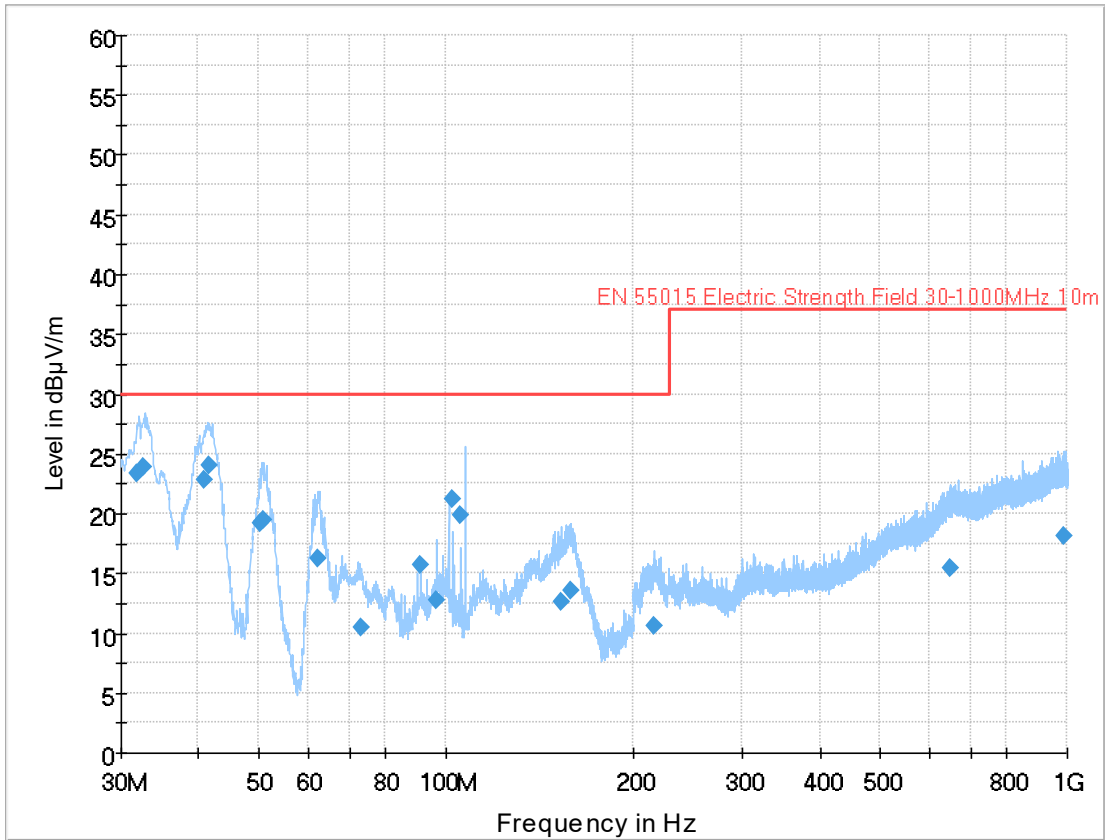
EMC32 Report 0deg



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.160000	23.35	30.00	6.65	1000.0	120.000	300.0	H	0.0	21
32.606500	23.51	30.00	6.49	1000.0	120.000	300.0	H	0.0	21
34.860000	20.28	30.00	9.72	1000.0	120.000	100.0	V	0.0	20
40.140000	21.68	30.00	8.32	1000.0	120.000	100.0	V	0.0	17
41.402100	23.71	30.00	6.29	1000.0	120.000	100.0	V	0.0	16
41.580000	23.63	30.00	6.37	1000.0	120.000	100.0	V	0.0	16
50.605900	19.87	30.00	10.13	1000.0	120.000	100.0	V	0.0	11
50.940000	19.76	30.00	10.24	1000.0	120.000	100.0	V	0.0	11
61.561300	16.19	30.00	13.81	1000.0	120.000	200.0	V	0.0	8
62.220000	16.60	30.00	13.40	1000.0	120.000	200.0	V	0.0	9
81.720000	20.33	30.00	9.67	1000.0	120.000	300.0	V	0.0	12
81.961400	19.90	30.00	10.10	1000.0	120.000	200.0	V	0.0	12
160.620000	13.68	30.00	16.32	1000.0	120.000	200.0	V	0.0	11
161.595500	13.41	30.00	16.59	1000.0	120.000	100.0	V	0.0	11
222.225500	6.13	30.00	23.87	1000.0	120.000	100.0	H	0.0	12
658.500000	15.53	37.00	21.47	1000.0	120.000	400.0	H	0.0	22
963.444500	17.87	37.00	19.13	1000.0	120.000	100.0	H	0.0	26

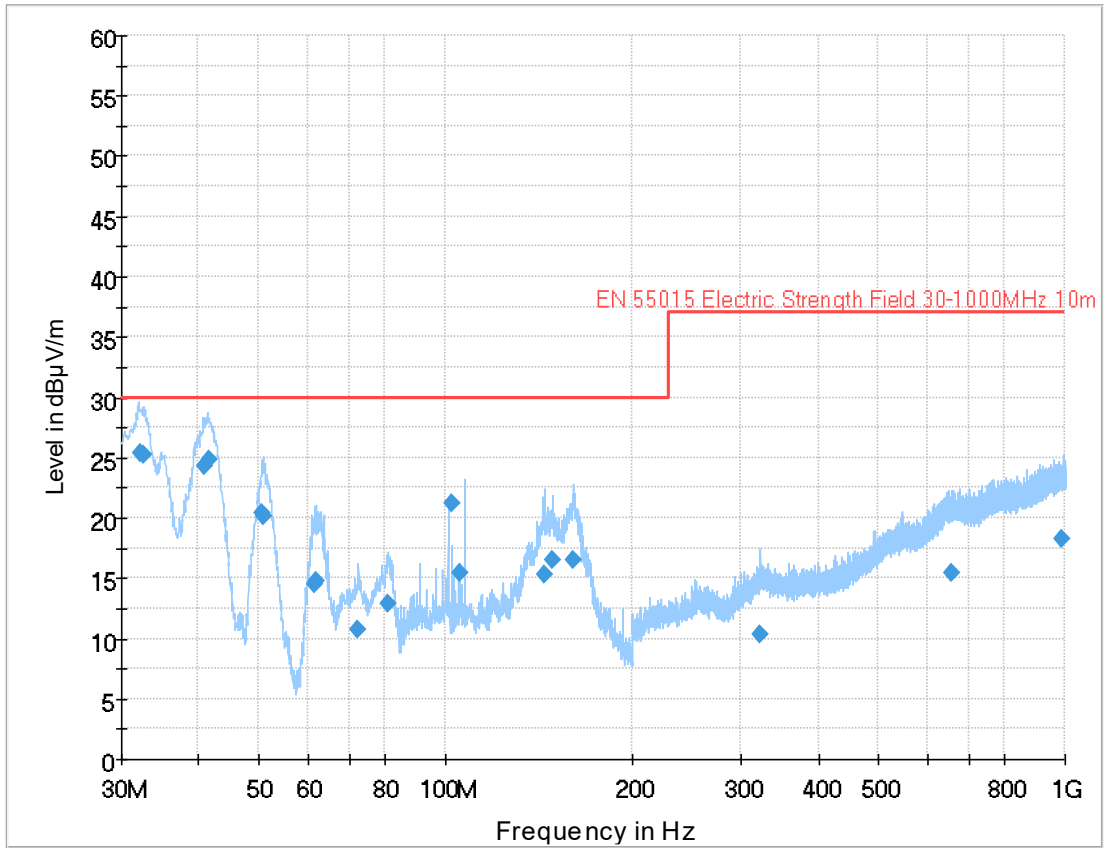
EMC32 Report 90deg



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.920000	23.29	30.00	6.71	1000.0	120.000	300.0	H	90.0	21
32.636500	23.93	30.00	6.07	1000.0	120.000	300.0	H	90.0	21
40.740000	22.86	30.00	7.14	1000.0	120.000	100.0	V	90.0	16
41.523000	24.00	30.00	6.00	1000.0	120.000	100.0	V	90.0	16
50.280000	19.22	30.00	10.78	1000.0	120.000	100.0	V	90.0	11
50.805000	19.43	30.00	10.57	1000.0	120.000	100.0	V	90.0	11
62.358300	16.26	30.00	13.74	1000.0	120.000	100.0	V	90.0	9
72.900000	10.51	30.00	19.49	1000.0	120.000	400.0	V	90.0	11
91.020000	15.68	30.00	14.32	1000.0	120.000	100.0	V	90.0	11
96.480000	12.82	30.00	17.18	1000.0	120.000	400.0	V	90.0	11
102.448000	21.25	30.00	8.75	1000.0	120.000	200.0	V	90.0	11
105.621500	19.81	30.00	10.19	1000.0	120.000	200.0	V	90.0	11
153.120000	12.62	30.00	17.38	1000.0	120.000	200.0	V	90.0	11
159.175500	13.60	30.00	16.40	1000.0	120.000	200.0	V	90.0	11
216.796000	10.58	30.00	19.42	1000.0	120.000	400.0	H	90.0	12
647.280000	15.44	37.00	21.56	1000.0	120.000	100.0	V	90.0	21
990.813500	18.17	37.00	18.83	1000.0	120.000	400.0	H	90.0	26

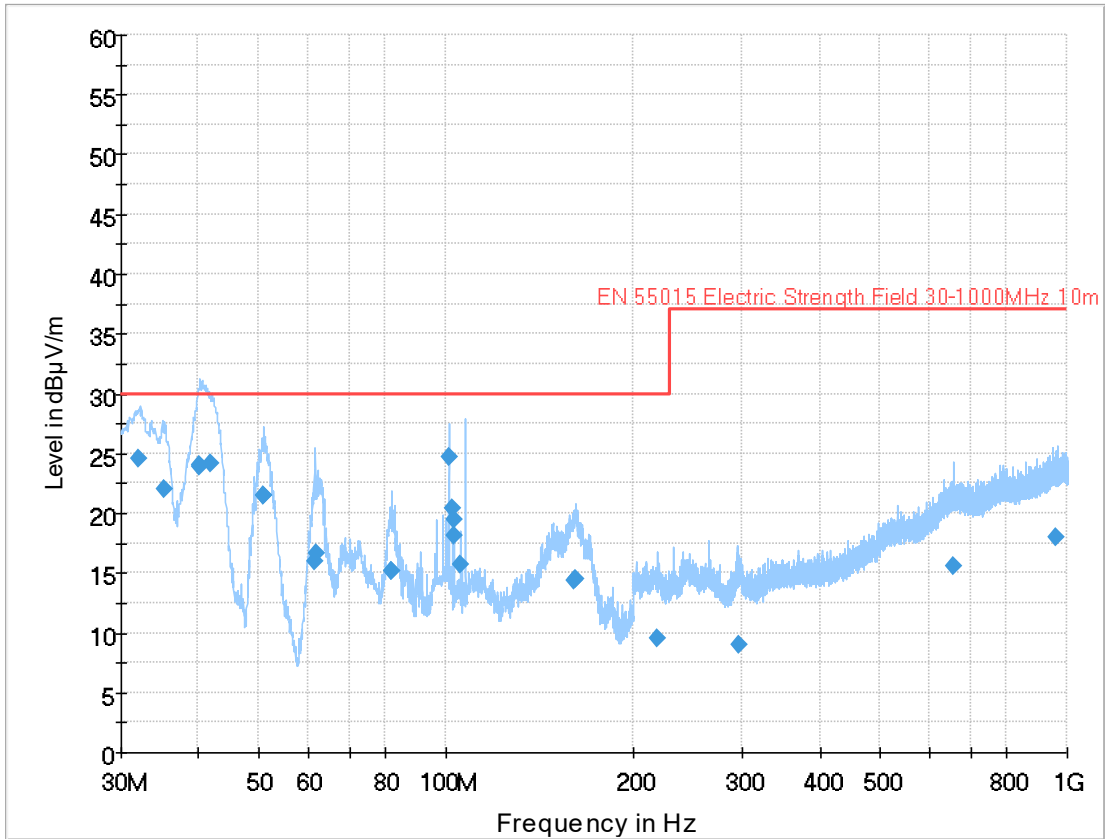
EMC32 Report 180deg



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.130100	25.33	30.00	4.67	1000.0	120.000	300.0	H	180.0	21
32.520000	25.22	30.00	4.78	1000.0	120.000	300.0	H	180.0	21
40.860000	24.29	30.00	5.71	1000.0	120.000	100.0	V	180.0	16
41.513300	24.86	30.00	5.14	1000.0	120.000	100.0	V	180.0	16
50.716200	20.36	30.00	9.64	1000.0	120.000	100.0	V	180.0	11
50.760000	20.08	30.00	9.92	1000.0	120.000	100.0	V	180.0	11
61.620000	14.44	30.00	15.56	1000.0	120.000	200.0	V	180.0	8
61.751300	14.71	30.00	15.29	1000.0	120.000	100.0	V	180.0	9
72.360000	10.77	30.00	19.23	1000.0	120.000	300.0	V	180.0	11
80.935300	12.91	30.00	17.09	1000.0	120.000	300.0	V	180.0	12
102.428000	21.25	30.00	8.75	1000.0	120.000	200.0	V	180.0	11
105.600000	15.43	30.00	14.57	1000.0	120.000	300.0	V	180.0	11
144.600000	15.36	30.00	14.64	1000.0	120.000	200.0	V	180.0	11
148.800000	16.52	30.00	13.48	1000.0	120.000	200.0	V	180.0	11
161.234000	16.53	30.00	13.47	1000.0	120.000	100.0	V	180.0	11
321.240000	10.35	37.00	26.66	1000.0	120.000	100.0	V	180.0	14
657.180000	15.50	37.00	21.50	1000.0	120.000	100.0	H	180.0	22
987.976000	18.24	37.00	18.76	1000.0	120.000	200.0	H	180.0	26

EMC32 Report 270deg



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.009200	24.58	30.00	5.42	1000.0	120.000	300.0	H	270.0	21
35.220000	22.01	30.00	7.99	1000.0	120.000	100.0	V	270.0	19
40.109000	23.89	30.00	6.11	1000.0	120.000	100.0	V	270.0	17
40.200000	24.08	30.00	5.92	1000.0	120.000	100.0	V	270.0	17
41.820000	24.12	30.00	5.88	1000.0	120.000	100.0	V	270.0	16
50.820000	21.43	30.00	8.57	1000.0	120.000	100.0	V	270.0	11
50.895900	21.52	30.00	8.48	1000.0	120.000	100.0	V	270.0	11
61.380000	15.98	30.00	14.02	1000.0	120.000	200.0	V	270.0	8
61.761600	16.62	30.00	13.38	1000.0	120.000	200.0	V	270.0	9
81.711400	15.15	30.00	14.85	1000.0	120.000	200.0	V	270.0	12
81.720000	15.15	30.00	14.85	1000.0	120.000	200.0	V	270.0	12
101.035000	24.68	30.00	5.32	1000.0	120.000	200.0	V	270.0	11
102.438000	20.44	30.00	9.56	1000.0	120.000	200.0	V	270.0	11
103.025000	19.48	30.00	10.52	1000.0	120.000	200.0	V	270.0	11
103.080000	18.07	30.00	11.93	1000.0	120.000	100.0	V	270.0	11
105.612000	15.66	30.00	14.34	1000.0	120.000	300.0	V	270.0	11
161.182500	14.30	30.00	15.70	1000.0	120.000	100.0	V	270.0	11
161.520000	14.48	30.00	15.52	1000.0	120.000	100.0	V	270.0	11
219.547500	9.55	30.00	20.45	1000.0	120.000	400.0	H	270.0	12
296.160000	9.02	37.00	27.98	1000.0	120.000	100.0	V	270.0	14
656.160000	15.61	37.00	21.39	1000.0	120.000	200.0	V	270.0	22
961.037000	17.94	37.00	19.06	1000.0	120.000	400.0	H	270.0	26

5 Harmonic current emissions according to IEC 61000-3-2

Tested by	Marek Gabryszewski		
Test date	2022-07-13		
Test Location (stand)	U-84		
Version of measurement instrument standard used IEC 61000-4-7 (Clause 7)	<input type="checkbox"/>	IEC 61000-4-7:1991	
	<input checked="" type="checkbox"/>	IEC 61000-4-7:2002 + AMD1:2008	
Test set-up description	---		
Operating modes of EUT	1		
Limit classification in accordance with the standard	<input type="checkbox"/>	Class A	
	<input type="checkbox"/>	Class B	
	<input checked="" type="checkbox"/>	Class C with rated power > 25 W (Table 2)	
	<input type="checkbox"/>	Class C with rated power ≥ 5 and ≤ 25 W (First requirement, Table 3 column 2)	
		<input type="checkbox"/>	Table 3, column 2 (Power related limits)
	<input type="checkbox"/>	3 rd harmonic ≤ 86 %, 5 th harmonic ≤ 61 % and waveform conditions	
	<input type="checkbox"/>	THD ≤ 70 %, Harmonics: 3 rd ≤ 35 %, 5 th ≤ 25 %, 7 th ≤ 30 %, 9 th and 11 th ≤ 20 %, 2 nd ≤ 5 %	
	<input type="checkbox"/>	Other: Lighting equipment having a rated power-less to 5 W - test not required.	
<input type="checkbox"/>	Class D		
Observation period	Description		
	<input checked="" type="checkbox"/>	Quasi stationary	
	<input type="checkbox"/>	Short cyclic	
	<input type="checkbox"/>	Random	
	<input type="checkbox"/>	Long cyclic	
		Period selected T_{obs}	
		2.5 min	
		$T_{obs} \geq 10$ cycles =	
		$T_{obs} =$	
		Full program cycle or 2.5 min. with highest THC $T_{obs} =$	
Control method used in the sample according clause 6.2 of the standard	<input checked="" type="checkbox"/>	The EUT does not utilize half-wave rectification or any other method to control the active input power. Such equipment is in conformity with the standard if the measured values comply with the applicable limit.	
	<input type="checkbox"/>	The EUT uses half-wave rectification directly on the mains supply, or it uses symmetrical or asymmetrical methods to control the active input power. Such equipment is permitted under conditions only. An evaluation on the control method is required. However, the equipment shall still comply with the harmonic requirements of the standard.	
Supplementary information	---		

Test set-up photo:



Tabulated/Graphical Results for Harmonic Current Emissions:

Name:		Serial no:	
Department:		Operating modes:	
Company:	IMiF PREDOM Division	Comment1:	
Test report no:	B10-4/076/EMC/22	Comment2:	
Device:	Street luminaire	Comment3:	
Specimen:		Comment4:	
Manufacturer:	LUG Light Factory	Date:	13.07.2022
Type:	URBINO IK10 LED	Test date:	13.07.2022

Maximum RMS current and corresponding values in timewindow 1:

Voltage:	230.31 Vrms	THD=0.01 %	THV=0.012 V	POHV=0.005 V	PWHD=0.02 %
Current:	0.514 Arms	-0.741 Apk	THD=5.52 %	THC=0.028 A	POHC=0.006 A
Power:	117.1 W	P1=117.1 W	118.4 VA		
Power factor:	0.989	CosPhi1: 0.991			

Test conditions EN IEC 61000-3-2:2019/FprA1:2020, f=50 Hz, Phase=L1, Range=0.80 A
 Time window=16, Grouping (>2nd harm.)=off, Rated I1=3.0 A
 No Ztest selected
 Time window=16, Grouping (>2nd harm.)=off, Rated I1=3.0 A

HARMONIC ANALYSIS: Test PASS

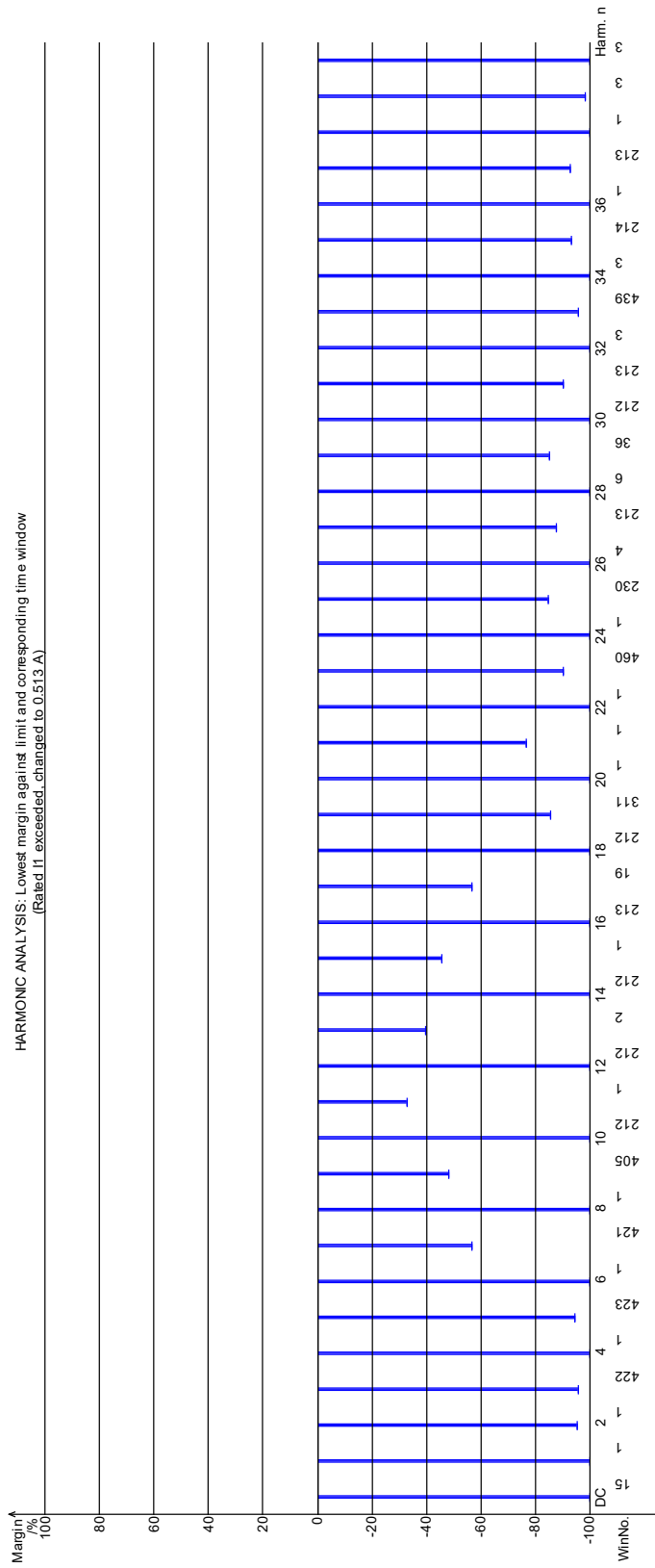
Tobs = worst 2.5 min: tw 1.469; POHC (C.2): avg=0.01 A, limit=0.05 A
 Iavg=0.514 Arms; Rated I1 exceeded, changed to 0.513 A

Ha	Entire measurement (2.5 min = 469 time windows)						Worst 2.5 min		Worst 2.5 min avg		P A S S	F A I L
	Maximum	Window	EN61000-3-2 Class C>25W	Margin in MaxWin	100 to 150%	Ex- ceeded	100 to 150%	Ex- ceeded	Value	Ex- ceeded		
DC	-0.0014 A	15	-----	-----	0	0	0	0	-0.0007 A	0	X	
1	0.5133 A	1	-----	-----	0	0	0	0	0.5127 A	0	X	
2	0.0005 A	1	0.0103 A	-95.4 %	0	0	0	0	0.0003 A	0	X	
3	0.0057 A	422	0.1386 A	-95.9 %	0	0	0	0	0.0056 A	0	X	
4	0.0002 A	1	-----	-----	0	0	0	0	0.0001 A	0	X	
5	0.0029 A	423	0.0513 A	-94.4 %	0	0	0	0	0.0028 A	0	X	
6	0.0001 A	32	-----	-----	0	0	0	0	0.0001 A	0	X	
7	0.0156 A	421	0.0359 A	-56.7 %	0	0	0	0	0.0155 A	0	X	
8	0.0001 A	311	-----	-----	0	0	0	0	0.0001 A	0	X	
9	0.0133 A	405	0.0257 A	-48.1 %	0	0	0	0	0.0133 A	0	X	
10	0.0001 A	213	-----	-----	0	0	0	0	0.0001 A	0	X	
11	0.0103 A	1	0.0154 A	-33.0 %	0	0	0	0	0.0103 A	0	X	
12	0.0001 A	311	-----	-----	0	0	0	0	0.0001 A	0	X	
13	0.0093 A	2	0.0154 A	-39.8 %	0	0	0	0	0.0092 A	0	X	
14	0.0001 A	213	-----	-----	0	0	0	0	0.0001 A	0	X	
15	0.0084 A	1	0.0154 A	-45.7 %	0	0	0	0	0.0083 A	0	X	
16	0.0001 A	213	-----	-----	0	0	0	0	0.0000 A	0	X	
17	0.0066 A	19	0.0154 A	-56.8 %	0	0	0	0	0.0066 A	0	X	
18	0.0001 A	213	-----	-----	0	0	0	0	0.0001 A	0	X	
19	0.0022 A	311	0.0154 A	-85.6 %	0	0	0	0	0.0022 A	0	X	
20	0.0002 A	213	-----	-----	0	0	0	0	0.0001 A	0	X	
21	0.0036 A	1	0.0154 A	-76.5 %	0	0	0	0	0.0036 A	0	X	
22	0.0001 A	214	-----	-----	0	0	0	0	0.0000 A	0	X	
23	0.0015 A	460	0.0154 A	-90.2 %	0	0	0	0	0.0015 A	0	X	
24	0.0001 A	214	-----	-----	0	0	0	0	0.0000 A	0	X	
25	0.0023 A	230	0.0154 A	-84.9 %	0	0	0	0	0.0023 A	0	X	
26	0.0001 A	213	-----	-----	0	0	0	0	0.0000 A	0	X	
27	0.0019 A	213	0.0154 A	-87.8 %	0	0	0	0	0.0018 A	0	X	
28	0.0001 A	160	-----	-----	0	0	0	0	0.0000 A	0	X	
29	0.0023 A	36	0.0154 A	-85.3 %	0	0	0	0	0.0022 A	0	X	
30	0.0001 A	311	-----	-----	0	0	0	0	0.0001 A	0	X	
31	0.0015 A	213	0.0154 A	-90.3 %	0	0	0	0	0.0014 A	0	X	
32	0.0001 A	213	-----	-----	0	0	0	0	0.0000 A	0	X	
33	0.0007 A	439	0.0154 A	-95.7 %	0	0	0	0	0.0006 A	0	X	
34	0.0001 A	213	-----	-----	0	0	0	0	0.0000 A	0	X	
35	0.0011 A	214	0.0154 A	-93.1 %	0	0	0	0	0.0010 A	0	X	
36	0.0001 A	213	-----	-----	0	0	0	0	0.0000 A	0	X	
37	0.0011 A	213	0.0154 A	-92.6 %	0	0	0	0	0.0011 A	0	X	
38	0.0001 A	213	-----	-----	0	0	0	0	0.0000 A	0	X	
39	0.0003 A	3	0.0154 A	-98.2 %	0	0	0	0	0.0002 A	0	X	
40	0.0001 A	311	-----	-----	0	0	0	0	0.0000 A	0	X	

average value < 0.6 % of Iavg or < 5 mA

Tested with SPSEMC4.5.1 /PAS000 by Spitzberger & Spies GmbH & Co. KG, Schmidstr. 32-34, 94234 Viechtach, Germany, 13.07.2022

Graphical Harmonic Overview - ENE1000-3-2 Class C<25W



Tested with SPSSIMC v.5.1 (PRESD00) by: S&E electronic & Service GmbH & Co. KG, Sommer 28-34, 94251 Weiching, Germany, 10.07.2022

6 Voltage changes, voltage fluctuations and flicker according to IEC 61000-3-3

Tested by	Marek Gabryszewski	
Test date	2022-07-13	
Test Location (stand)	U-84	
Test set-up description	---	
Test method	<input checked="" type="checkbox"/>	4.2.2 Flicker meter according IEC 61000-4-15
	<input type="checkbox"/>	4.2.3 Simulation
	<input type="checkbox"/>	4.2.4 Analytical method
	<input type="checkbox"/>	4.2.5 Use of $P_{st} = 1$ curve
Observation time selected	<input checked="" type="checkbox"/>	10 Minutes
	<input type="checkbox"/>	120 Minutes
	<input type="checkbox"/>	24 times switching according to Annex B
Limit for d_{max} applied	<input type="checkbox"/>	4 %
	<input checked="" type="checkbox"/>	6 %
	<input type="checkbox"/>	7 %
Supplementary information	---	

Test set-up photo:



Tabulated Results for Voltage Fluctuations and Flicker:

Name:		Serial no:	
Department:		Operating modes:	
Company:	IMiF PREDOM Division	Comment1:	
Test report no:	B10-4/076/EMC/22	Comment2:	
Device:	Street luminaire	Comment3:	
Specimen:		Comment4:	
Manufacturer:	LUG Light Factory	Date:	13.07.2022
Type:	URBINO IK10 LED	Test date:	13.07.2022

Test conditions EN 61000-3-3:2013 + A1:2019 / 230 V / 50 Hz / Phase L1
 EN 61000-4-15:2011 / d(t) = 3.3 % / Obs 1 x 10 min / Ztest (0.400+j0.250) Ohm
 Ra+jXa (0.2400+j0.1500) Ohm / Rn+jXn (0.1600+j0.1000) Ohm

FLICKER: Test PASS!

Time	Pmax	Pst	Sliding Plt	Tmax [s]	dmax [%]	dc [%]	PASS	FAIL
08:39:25	0.000	0.0090	0.0090	0.000	0.000	- . - - -	X	
Limits:		1.000	0.650	0.500	6.000	3.300		
Plt: 0.009000								
Evaluated: PST, dc, dmax, Tmax								

FLICKER: Source test PASS!

Time	Pmax	Pst	Sliding Plt	Tmax [s]	dmax [%]	dc [%]	PASS	FAIL
08:39:25	0.000	0.0080	- . - - - -	0.000	0.000	- . - - -	X	
Plt: 0.008000								
Evaluated: PST <= 0.4 dmax < 20 % dmax1								

Tested with SPSEMC4.5.1 / PAS5000 by Spitzenberger & Spies GmbH & Co. KG, Schmidstr. 32-34, 94234 Viechtach, Germany, 13.07.2022




7 Immunity

7.1 General information

Performance criteria as defined by the standard	
Criterion	Description from standard
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.
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.
C	During and after the test, any change of the 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. Additional requirement for lighting equipment incorporating a starting device: After the test, the lighting equipment is switched off. After half an hour, it is switched on again. The lighting equipment shall start and operate as intended.
Other:	---

Manufacturer defined performance criteria	Criterion	Description
	A	Manufacturer defined performance criteria- not specified.
	B	Apply performance criteria as defined by the standard.
	C	See above: Performance criteria as defined by the standard
D		
Monitoring during the tests	Radio-frequency electromagnetic fields: visual EUT observation using a camera.	
Mains voltage applied during the testing if not otherwise specified....	AC: 230 V / 50 Hz	

7.2 Electrostatic discharges

Tested by	Marek Gabryszewski	
Test date	2022-07-15	
Test Location(Stand)	ESD stand	
Test set-up	<input checked="" type="checkbox"/>	Table top equipment
	<input type="checkbox"/>	Floor standing equipment
	<input type="checkbox"/>	Wall or ceiling mounted equipment (Treated as table top)
Supplementary test set-up description	Operating mode: 1	
Size of horizontal coupling plate..	1.6 x 0.8 m	
Size of vertical coupling plate:	0.5 x 0.5 m	
Number of discharges for each test point	10 positive / 10 negative	
Discharge interval	1/s	
Performance criterion	B	
Supplementary information	---	
Symbols identifying discharge applied		Contact discharge
		Air discharge
		Air discharge, discharge did not occur

Test set-up photo:



Photo of selected test points Air



Photo of selected test points: Contact

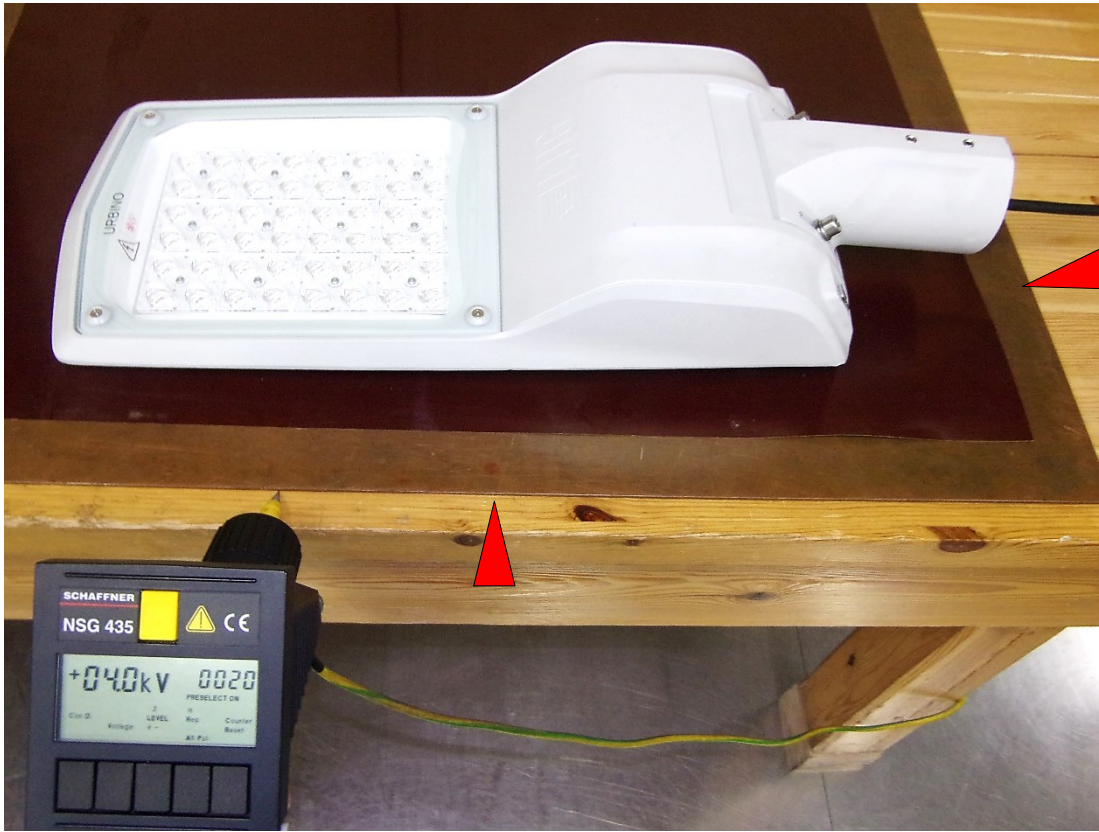


Photo of selected test points: Contact

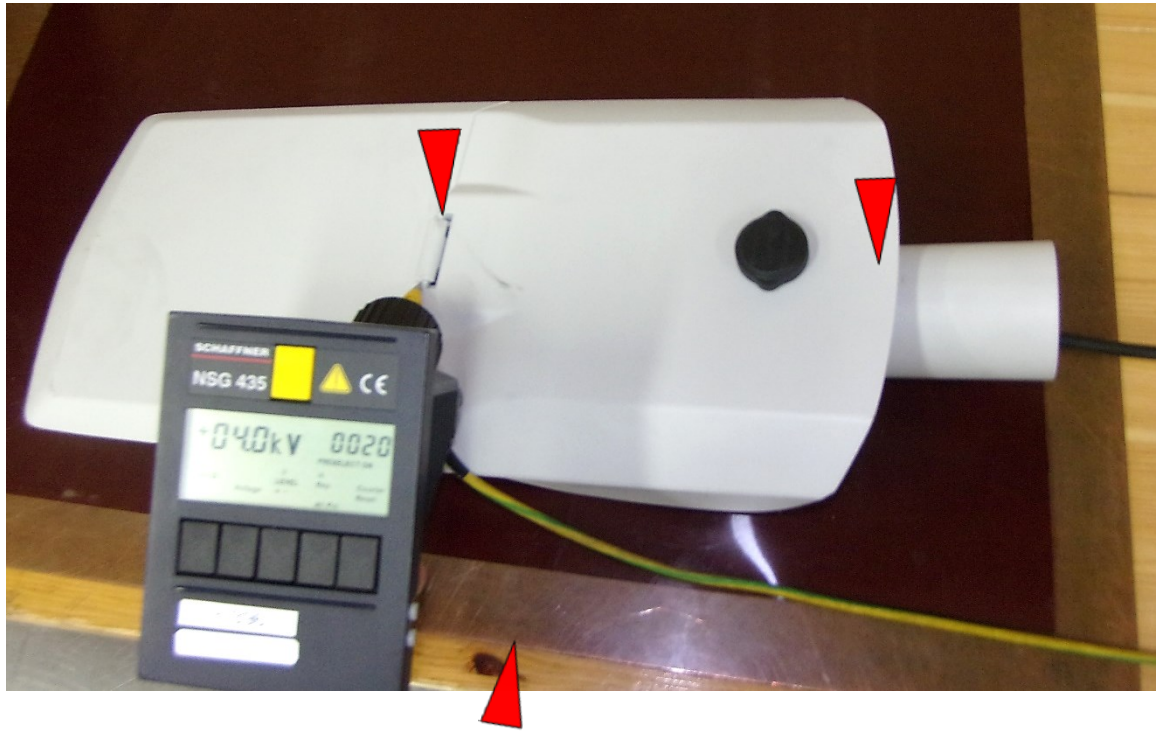


Table: Test results for electrostatic discharges

No.	Location of discharge	Polarity	Discharge	Number of discharges	Test level [kV]	Operating mode	Observations
1	HCP	P	C	10	4	1	Pass
2	VCP	P	C	10	4	1	Pass
3	Points on conductive surface as indicated in the picture above	P	C	10	4	1	Pass
4	Points on conductive surface as indicated in the picture above	N	C	10	4	1	Pass
5	Points on non-conductive surface as indicated in the picture above	P	A	10	8	1	Pass
6	Points on non-conductive surface as indicated in the picture above	N	A	10	8	1	Pass

HCP = Horizontal coupling plate
VCP = Vertical coupling plate

N = Negative
P = Positive

A = Air discharge
C = Contact discharge
X = Not performed nor required

Supplementary information: No observed response from EUT.

7.3 Radio-frequency electromagnetic fields

Tested by	Marek Gabryszewski		
Test date	2022-07-15		
Test location (stand)	Radio-frequency electromagnetic fields stand Semi-anechoic chamber U-86		
Test set-up	<input checked="" type="checkbox"/>	Equipment on the table (see photos below)	
	<input type="checkbox"/>	Equipment standing on floor (0.05 – 0.15 m height)	
Supplementary test set up description	Operating mode: 1		
Exposed side of EUT	<input checked="" type="checkbox"/>	0° (Front)	
	<input checked="" type="checkbox"/>	90 °	
	<input checked="" type="checkbox"/>	180 ° (Rear)	
	<input checked="" type="checkbox"/>	270 °	
	<input checked="" type="checkbox"/>	Top side	
	<input checked="" type="checkbox"/>	Bottom side	
Reason for not exposing a side ... :	As a result of the analysis, it was found that the EUT (front) side is the most susceptible to radiation, see below photos, next page.		
Distance Antenna to EUT	3 m		
Step size [%]	1		
Performance criterion	A		
Supplementary information	---		



Test results for radiated electromagnetic field						
Frequency range	Test Level [V/m]	Polarization	Modulation	Operating mode	Dwell time [s]	Observations
80 MHz ÷ 1 GHz	3.0	V	AM: 80.0 %; 1.0 kHz	1	1.0	Pass
80 MHz ÷ 1 GHz	3.0	H	AM: 80.0 %; 1.0 kHz	1	1.0	Pass
H = Horizontal V = Vertical X = Not performed nor required						
Supplementary information: No observed response from EUT.						

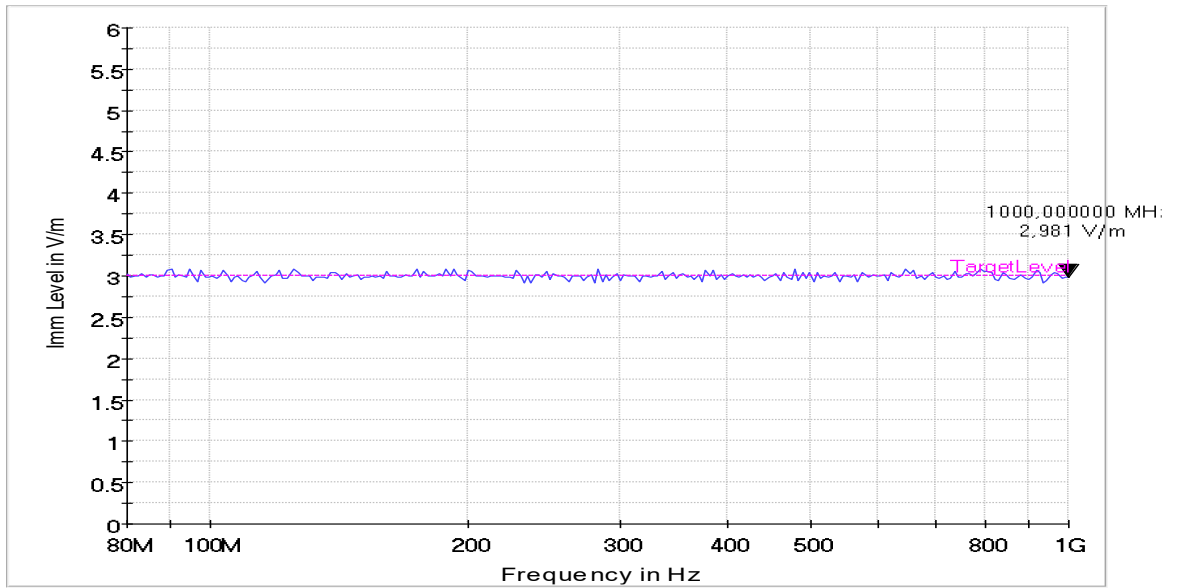
EMC32 Report position antenna: V

EMS Scan Template: EMS Scan 3Vm 80-1000MHz [EMS Radiated]

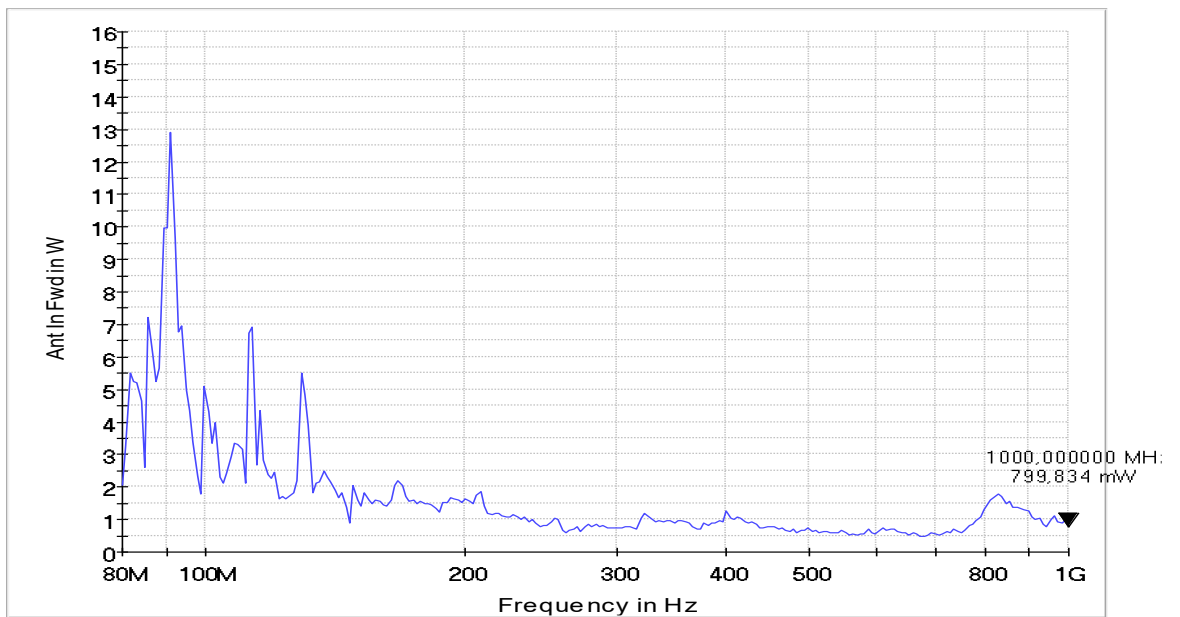
Hardware Setup: EMS radiated\Copy of Hardware Setup 80-1000MHz
24.05.2017_SMBV100A
Level On: Substitution Method: EMS radiated\.Kalibracija pola
EMS\C28Vm_80-1000

Subrange	Step Width	Level	Modulation	Dwell Time
80MHz - 1GHz	1% LOG	3V/m	AM: 80.0%; 1.0kHz	1s

Imm Level



Ant In Fwd



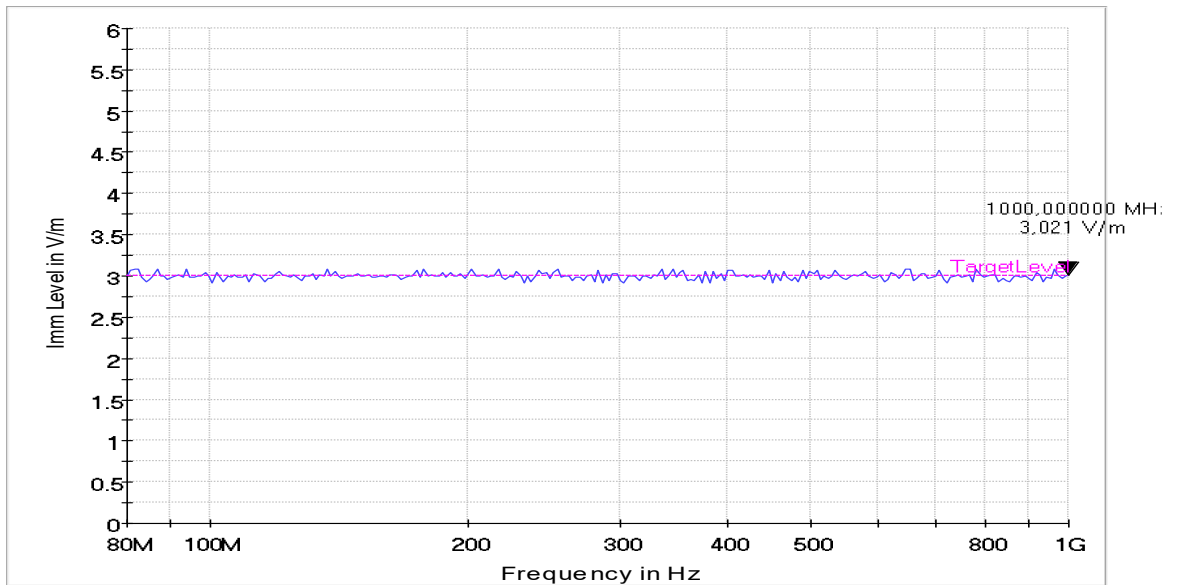
EMC32 Report position antenna: H

EMS Scan Template: EMS Scan 3Vm 80-1000MHz [EMS Radiated]

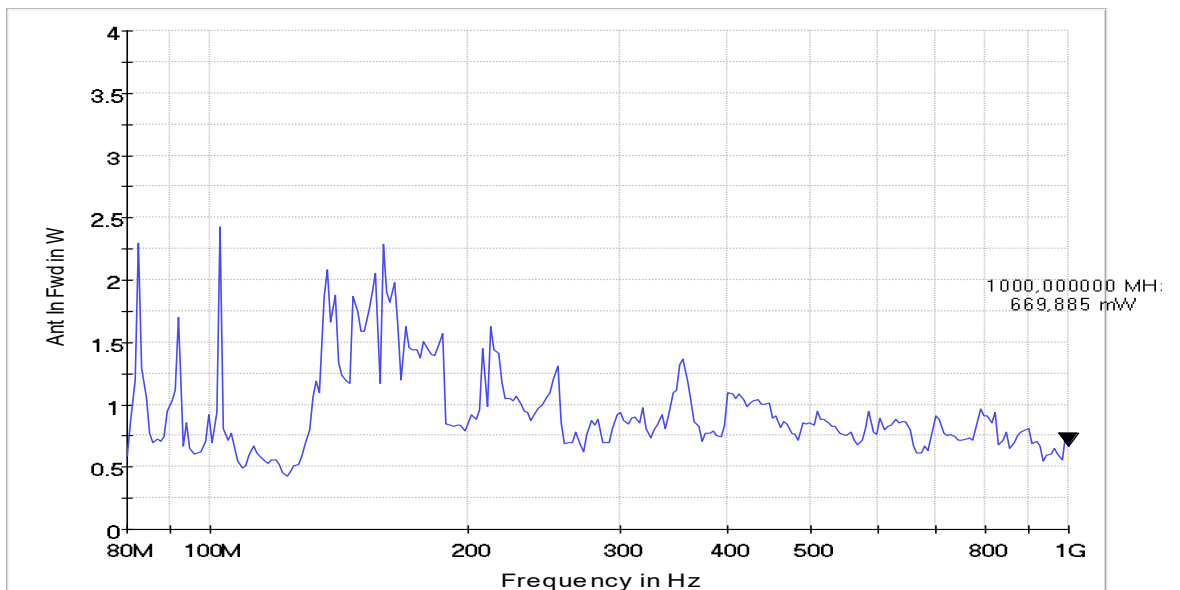
Hardware Setup: EMS radiated\Copy of Hardware Setup 80-1000MHz
 24.05.2017_SMBV100A
 Level On: Substitution Method: EMS radiated\.Kalibracija pola
 EMS\C28Vm_80-1000

Subrange	Step Width	Level	Modulation	Dwell Time
80MHz - 1GHz	1% LOG	3V/m	AM: 80.0%; 1.0kHz	1s

Imm Level

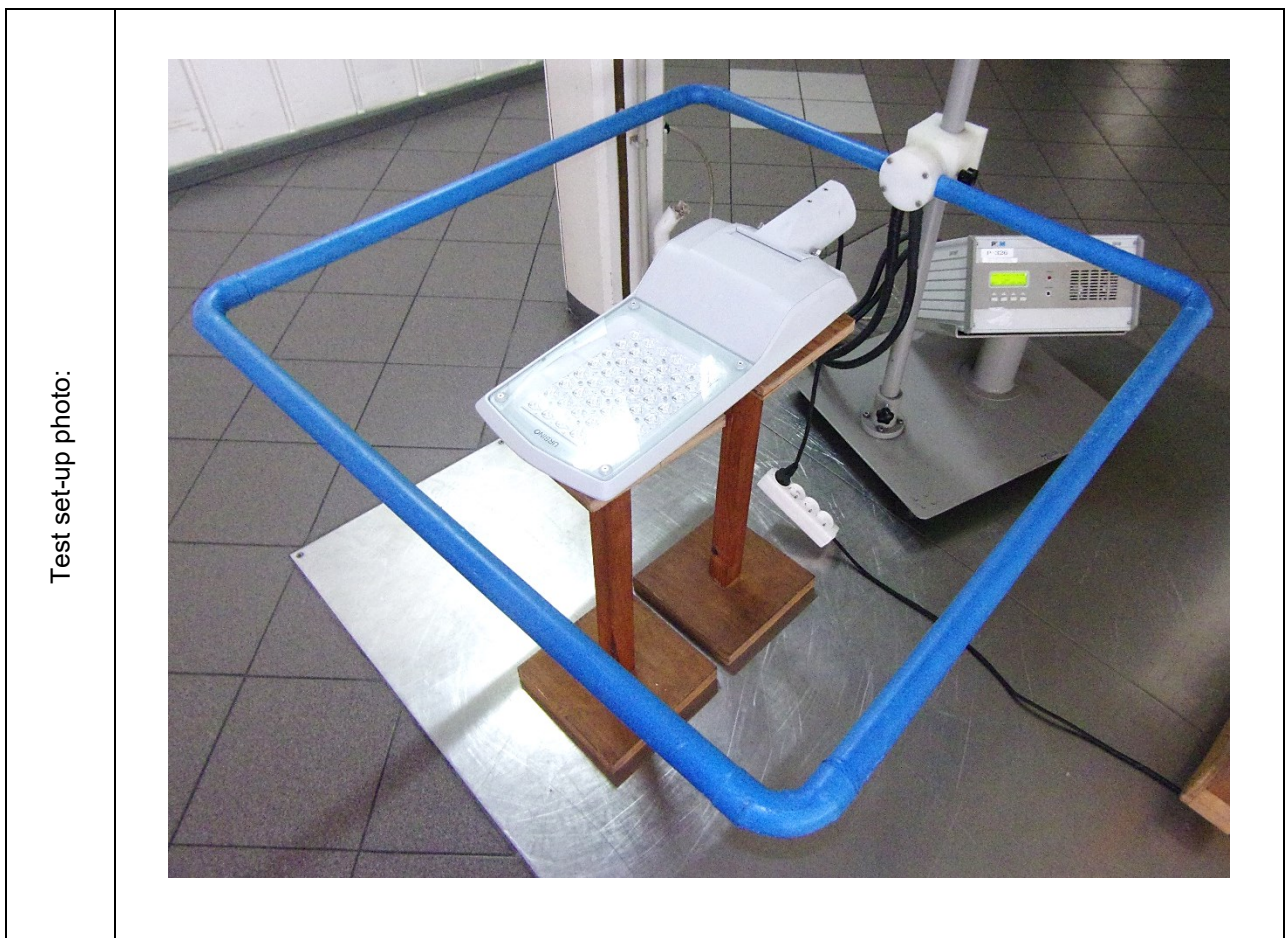


Ant In Fwd



7.4 Power frequency magnetic fields

Tested by	Marek Gabryszewski	
Test date	2022-07-15	
Test location (Stand)	PMM 1008	
Applicability	<input checked="" type="checkbox"/>	The test was performed
	<input type="checkbox"/>	The test was not performed
	Reason: According to the manufacturers information there are no magnetic sensitive components in the product.	
Test set-up	<input type="checkbox"/>	0.1 m above metal surface
	<input type="checkbox"/>	Homogeneous field (Helmholtz coil). Dimensions: ---
	<input checked="" type="checkbox"/>	Single Coil. Dimensions: 1 x 1 m
	<input type="checkbox"/>	Single Coil. Dimensions: 1 x 2.6 m
Performance criterion	A	
Supplementary information	---	

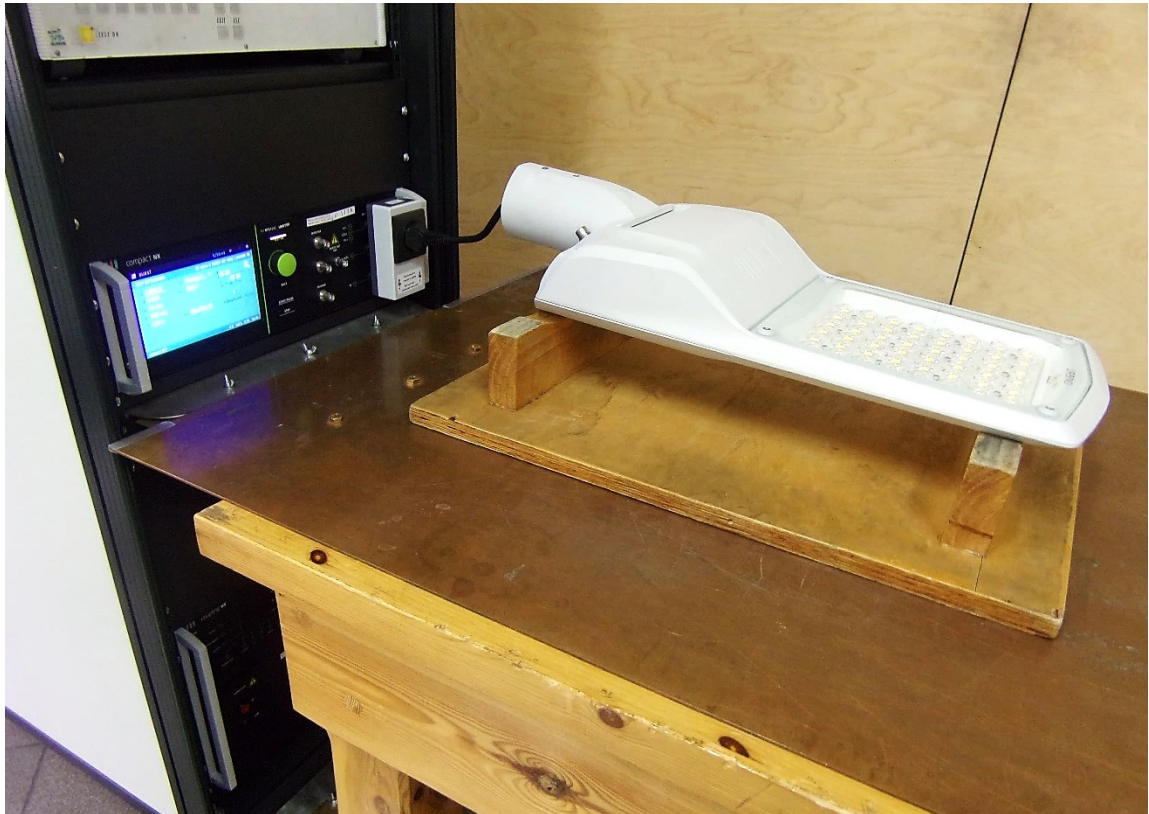


Test results for power frequency magnetic field immunity test							
Test frequency	Test Level [A/m]	Test time [s]	Coil size/type	Axis	Operating mode	Mains voltage/frequency (PMM)	Observations
50 Hz	3.0	180	1 m x 1 m	X	1	230 V / 50 Hz	Pass
50 Hz	3.0	180	1 m x 1 m	Y	1	230 V / 50 Hz	Pass
50 Hz	3.0	180	1 m x 1 m	Z	1	230 V / 50 Hz	Pass
X = Not performed nor required							
Supplementary information: No observed response from EUT.							

7.5 Fast transients

Tested by	Marek Gabryszewski
Test date	2022-07-14
Test location (stand)	Fast transient stand
Test set-up	<input checked="" type="checkbox"/> Equipment on the table (0.1 ± 0.01) m above ground plane
	<input type="checkbox"/> Equipment standing on floor at (0.1 ± 0.01) m above ground plane
	<input type="checkbox"/> Artificial hand applied. Location see photo.
Supplementary test set-up description	Operating mode: 1
Repetition frequency	5 kHz
Test time	4 min
Performance criterion	B
Supplementary information	---

Test set-up photo:

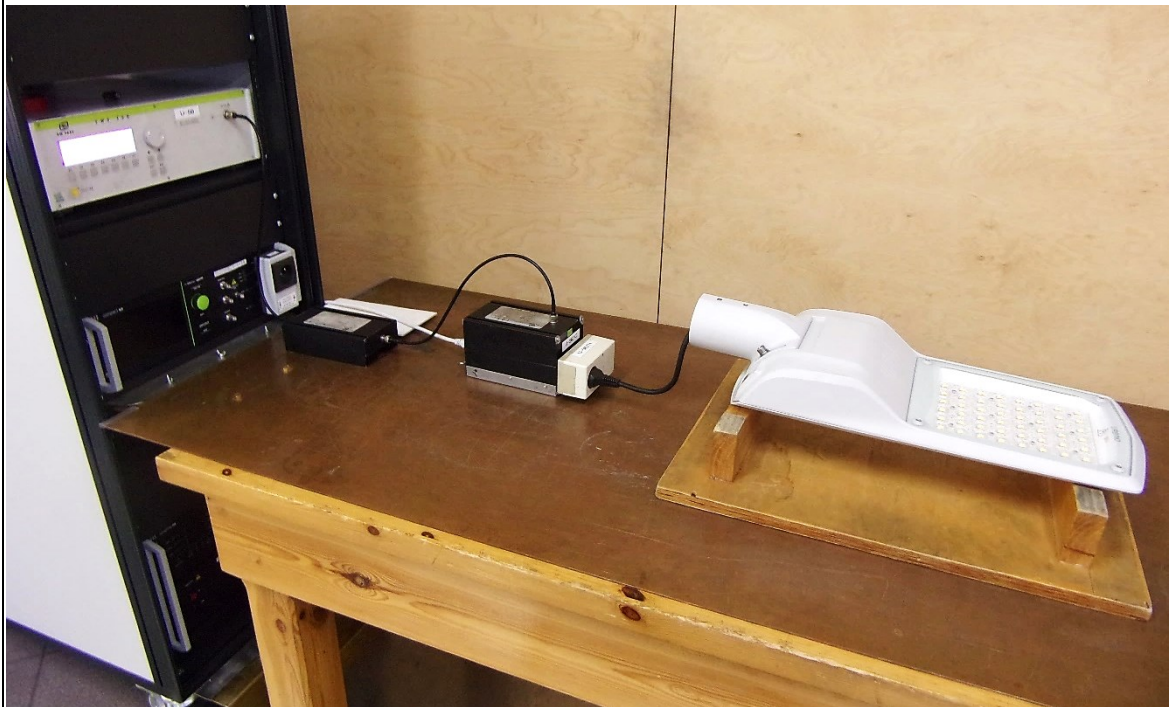


Test results fast transients						
Port	Coupling	Level [kV]	Polarity	Operating mode	Mains voltage/ frequency	Observation
AC power port	L1 N	1	Positive	---	---	X
AC power port	L1 N	1	Negative	---	---	X
AC power port	L1 N PE	1	Positive	1	230 V / 50 Hz	Pass
AC power port	L1 N PE	1	Negative	1	230 V / 50 Hz	Pass
SIP/SOP	Clamp	0.5	Positive	---	---	X
SIP/SOP	Clamp	0.5	Negative	---	---	X
X = Not performed nor required						
Supplementary information: No observed response from EUT.						

7.6 Injected currents (radio-frequency common mode)

Tested by	Marek Gabryszewski	
Test date	2022-07-14	
Test location (Stand)	Injected currents stand	
Test set-up	<input checked="" type="checkbox"/>	Equipment located (0.1 ± 0.05) m above ground plane
	<input type="checkbox"/>	Elevated ground plane according to Annex F
	<input type="checkbox"/>	Artificial hand applied. Location see photo
Supplementary test set-up description	Operating mode: 1	
Modulation	<input checked="" type="checkbox"/>	80 % AM with 1 kHz
	<input type="checkbox"/>	Other: ---
Step size	1 %	
Performance criterion	A	
Supplementary information.....	---	

Test set-up photo:



Test results for conducted disturbances, induced by radio-frequency fields							
Frequency range	Test Level [V]	Port under test	CDN type	Port with terminated CDN	Operating mode	Dwell time [s]	Observations
0.15 ÷ 80 MHz	3.0	AC power port	CDN-M2	---	---	---	X
0.15 ÷ 80 MHz	3.0	AC power port	CDN-M3	ATT 6	1	1.0	Pass
0.15 ÷ 80 MHz	3.0	AC power port	CDN-M5	---	---	---	X
X = Not performed nor required							
Supplementary information: No observed response from EUT.							

7.7 Surges

Tested by	Marek Gabryszewski
Test date	2022-07-14
Test location(Stand)	Surge stand
Test set-up description	Operating mode: 1
Repetition rate	1 / min
Number of pulses for each coupling	5
Performance criterion	B
Supplementary information.....	---

Test set-up photo:



Test results for surges								
Port	Coupling	CDN	Level [kV]	Polarity	Phase angles [°]	Operating mode	Mains voltage/frequency	Observation *
AC power port	L1-N	MCN	1	Positive	90	1	230 V / 50 Hz	Pass
AC power port	L1-N	MCN	1	Negative	270	1	230 V / 50 Hz	Pass
AC power port	N-PE	MCN	2	Positive	90	1	230 V / 50 Hz	Pass
AC power port	N-PE	MCN	2	Negative	270	1	230 V / 50 Hz	Pass
AC power port	L1-PE	MCN	2	Positive	90	1	230 V / 50 Hz	Pass
AC power port	L1-PE	MCN	2	Negative	270	1	230 V / 50 Hz	Pass
Lower test levels:			<input type="checkbox"/>	Tested				
			<input checked="" type="checkbox"/>	Not tested				
P = Positive N = Negative X = Not performed nor required				MCN = Mains Coupling Network ICN = Coupling Network for interconnection lines D = Direct Coupling (shielded lines)				
Supplementary information: *Observed response from EUT. During the test, the luminous intensity change, dimming, flashing light. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention. Consistent with the evaluation criterion.								

7.8 Voltage dips and short interruptions

Tested by	Marek Gabryszewski
Test date	2022-07-13
Test Location (Stand)	U-84
Test set-up description	Operating mode: 1
Repetition rate	10 s
Number of dips or interruptions ... :	3
Performance criterion	B (Voltage dips) C (Short interruptions $U_N=0\%$)
Supplementary information.....	---

Test results voltage dips						
U_N [V]	Frequency in Hz	Test Level [% of U_N]	Phase angle	Duration [Cycles]	Operating mode	Observations*
230	50	70	0°	12	1	Pass
Supplementary information: *Observed response from EUT. During the test, the luminous intensity change, dimming, flashing light. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention. Consistent with the evaluation criterion.						

Test results voltage interruptions						
U_N [V]	Frequency [Hz]	Test Level [% of U_N]	Phase angle	Duration [Cycles]	Operating mode	Observations*
230	50	0	0°	0.5	1	Pass
Supplementary information: *Observed response from EUT. During the test, the luminous intensity change, dimming, flashing light. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention. Consistent with the evaluation criterion.						

Test set-up photo:



Tabulated Results for Voltage Dips and Interruptions:

Name:		Serial no:	
Department:		Operating modes:	
Company:	IMiF PREDOM Division	Comment1:	
Test report no:	B10-4/076/EMC/22	Comment2:	
Device:	Street luminaire	Comment3:	
Specimen:		Comment4:	
Manufacturer:	LUG Light Factory	Date:	13.07.2022
Type:	URBINO IK10 LED	Test date:	13.07.2022

Test conditions: EN 61000-4-11 voltage dips, short interruptions and variations test

Voltage / frequency:	230.0 V / 50.0 Hz
Test phase:	Single phase / L1-N
Executed test:	61547 dips
Test description:	--
Disturbances per step:	3 (per phase angle) / 10.5 sec delay between

Step	Disturbance	Test level	Duration	Phase angle(s) (Ref. L1)
1	Voltage dip / short interruption	70 %	10 periods	0° L1

Test results:

- Normal performance within limits specified by manufacturer, requestor or purchaser
- Temporary loss of function or degradation of performance which ceases after the disturbance ceases and from which the equipment under test recovers its normal performance, without operator intervention
- Temporary loss of function or degradation of performance, the correction of which requires operator intervention
- Loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data

Comments:

Pass, in accordance with the criterion

Tested with SPSEMC 4.1.3 / PAS5000 by Spitzenberger & Spies GmbH & Co. KG, Schmidstr. 32-34, 94234 Weichtsch, Germany, 13.07.2022

Name:		Serial no:	
Department:		Operating modes:	
Company:	IMiF PREDOM Division	Comment1:	
Test report no:	B10-4/076/EMC/22	Comment2:	
Device:	Street luminaire	Comment3:	
Specimen:		Comment4:	
Manufacturer:	LUG Light Factory	Date:	13.07.2022
Type:	URBINO IK10 LED	Test date:	13.07.2022

Test conditions: EN 61000-4-11 voltage dips, short interruptions and variations test

Voltage / frequency:	230.0 V / 50.0 Hz
Test phase:	Single phase / L1-N
Executed test:	61547 short
Test description:	--
Disturbances per step:	3 (per phase angle) / 10.5 sec delay between

Step	Disturbance	Test level	Duration	Phase angle(s) (Ref. L1)
1	Voltage dip / short interruption	0 %	0.5 periods	0° L1

Test results:

- Normal performance within limits specified by manufacturer, requestor or purchaser
- Temporary loss of function or degradation of performance which ceases after the disturbance ceases and from which the equipment under test recovers its normal performance, without operator intervention
- Temporary loss of function or degradation of performance, the correction of which requires operator intervention
- Loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data

Comments:

Pass, in accordance with the criterion

Tested with SPSEMC 4.1.3 / PAS5000 by Spitzenberger & Spies GmbH & Co. KG, Schmidstr. 32-34, 94234 Weichtsch, Germany, 13.07.2022

8 List of test equipment

Equipment	Type	Inventory number	Manufacturer
Test Stand:	Disturbance voltages		
EMI Test Receiver	ESCS 30	U-57	Rohde & Schwarz
Artificial Mains Network	ESH 2-Z5	U-57/A	Rohde & Schwarz
Artificial hand	RC	Pp-416	PREDOM-OBR
Faraday Cage	EK-1	U-11	Unitra Unima Olsztyn
Test Stand:	Disturbance powerstand		
EMI Test Receiver	ESCS 30	U-57	Rohde & Schwarz
Absorbing clamp	MDS-21	P-395/A	Rohde & Schwarz
Faraday Cage	EK-1	U-11	UnitraUnima Olsztyn
Test Stand:	Harmonic current emissions, Voltage changes, voltage fluctuations and flicker		
Test System	EMV D 15000/PAS	U-84	Spitzenberger+Spies GmbH
Test Stand:	Electrostatic discharges		
Simulator ESD	NSG 435	P-396	Schaffner
Test Stand:	Fast Transients / Surges		
Multifunctional Test Generator	COMPACT NX5	U-117A	EM TEST
Combined 3-Phase Coupling/ Decoupling Networks	COUPLING NX5	U-117B	EM TEST
Test Stand:	Conducted Disturbances Immunity		
Continuous Wave Simulator	CWS 500	U-56	EM TEST
Coupling-Decoupling Network	CDN-M5,M3,M2	U-56/D,C,B	EM TEST
Attenuator	ATT 6	U-56/F	EM TEST
Test Stand:	Radiated electromagnetic disturbances stand Semi-anechoic chamber U-86		
EMI Test Receiver	ESIB 26	P-377	Rohde & Schwarz
Antenna	HL 562	P-382	Rohde & Schwarz
Test Stand:	Radiated, radio-frequency, electromagnetic field stand Semi-anechoic chamber U-86		
Vector Signal Generator	SMBV100A	P-601	Rohde & Schwarz
Power Amplifier	BLWA 0810-250/75D	P-370	BONN Elektronik
Power Amplifier	BLMA 0830-40	P-369	BONN Elektronik
Power Amplifier	BLMA 4060-10	P-467	BONN Elektronik
Power Meter	NRVD	P-375	Rohde & Schwarz
Power Sensor	NRP-Z211	P-468/469	Rohde & Schwarz
Power Sensor	URV5-Z2	P-373/374	Rohde & Schwarz
Ultra log antenna	HL 046	P-434	Rohde & Schwarz
Horn antenna	HF 907	P-447	Rohde & Schwarz
Test Stand:	Power frequency magnetic fields		
Magnetic field generator	1008	P-326	PMM

9 Measurement instrumentation uncertainties

Type of disturbance test method	Used test equipment (only main instruments, no details)	Calculated uncertainty	U_{CISPR}
Disturbance voltage Mains terminals 9 kHz ... 150 kHz 150 kHz ... 30 MHz	EMI Test Receiver Artificial Mains Network	3.6 dB	4.0 dB 3.6 dB
Electric field strength Horiz. 30 MHz ... 200 MHz Horiz. 200 MHz ... 1000 MHz Vert. 30 MHz ... 130 MHz Vert. 130 MHz ... 200 MHz Vert. 200 MHz ... 1000 MHz	EMI Test Receiver Antenna	Horiz. 30 MHz ... 200 MHz 4.9 dB Horiz. 200 MHz ... 300 MHz 5.2 dB Vert. 30 MHz ... 200 MHz 5.1 dB Vert. 30 MHz ... 200 MHz 5.2 dB Vert. 200 MHz ... 300 MHz 5.2 dB	5.2 dB

10 Annex

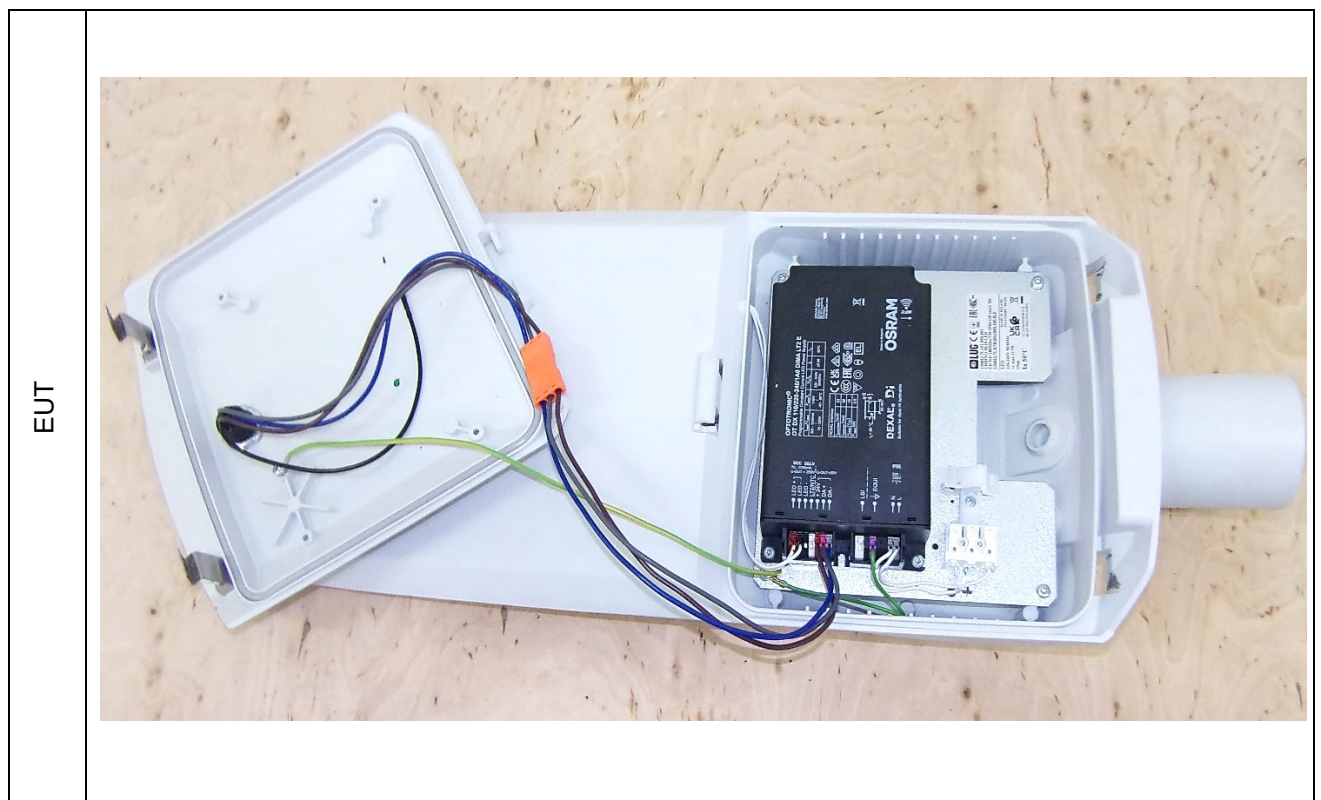
10.1 Annex A:

Critical components information			
Object	Manufacturer/ Trademark	Type/Model	Remark
Power supply	OSRAM	OPTOTRONIC OT DX 110/220-240/1A0 DIMA LT2 E	I _{rated} /U _{rated} 200-1050mA / 75-220V P _{rated} 110W, λ≥0.98 I _N /f _N 220-240V 50/60Hz

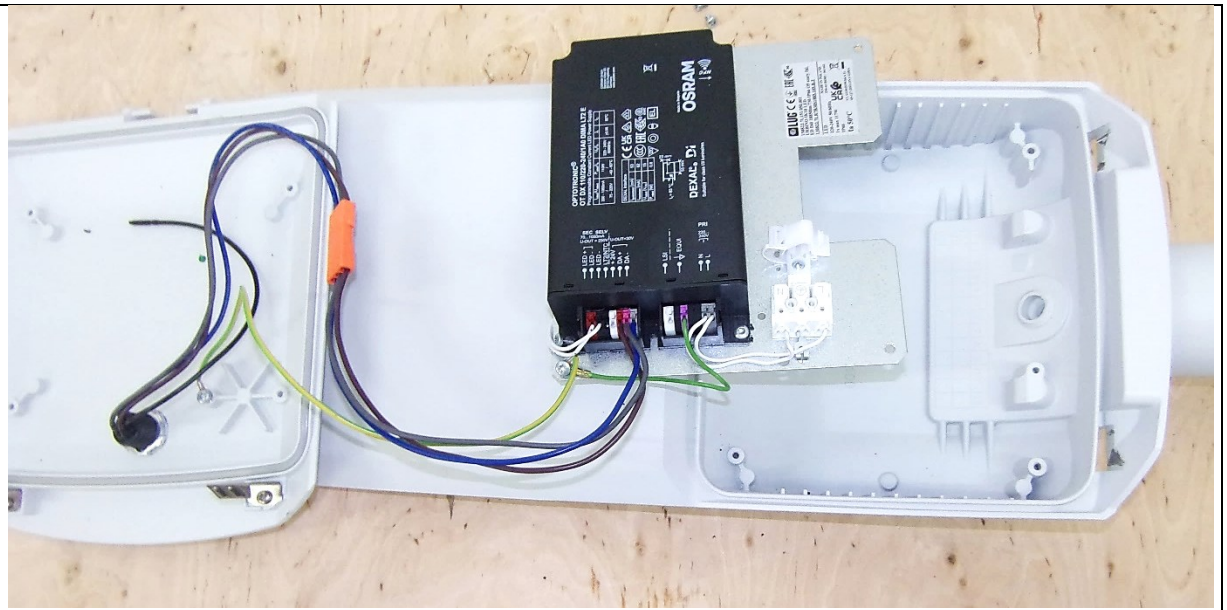
See Technical documentation and photos Annex B.

10.2 Annex B:

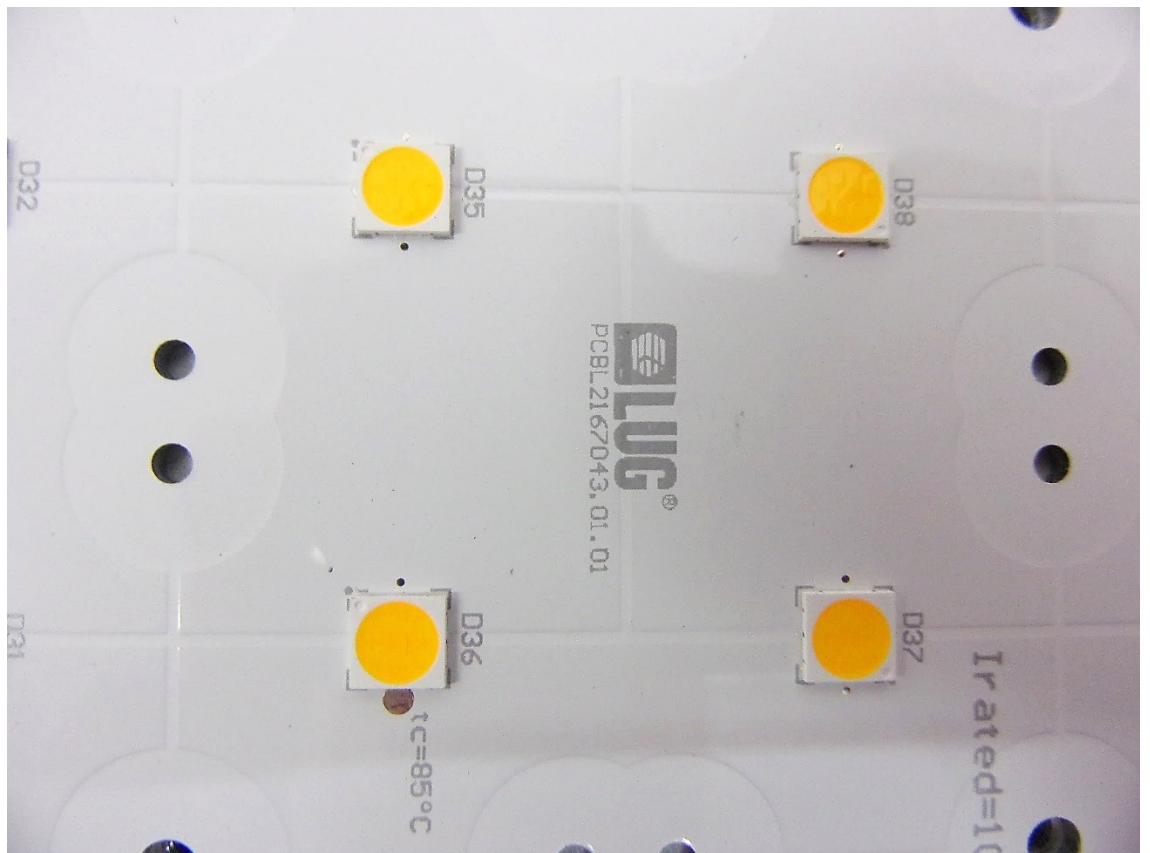
TABLE: Photography of the components	
Component/ Part No.	Photography



Power supply



LED module



End of the Report