LIETUVOS RESPUBLIKOS RYŠIŲ REGULIAVIMO TARNYBOS APARATŪROS IR ĮRENGINIŲ ELEKTROMAGNETINIO SUDERINAMUMO KONTROLĖS SKYRIUS
EQUIPMENT AND DEVICES ELECTROMAGNETIC COMPATIBILITY CONTROL DIVISION OF COMMUNICATIONS REGULATORY AUTHORITY OF THE REPUBLIC OF LITHUANIA
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APPROVED
Head of Division
A.V.

Arvydas Giedraitis

BANDYMŲ ATASKAITA
TEST REPORT

2018-06-15 No (29.1) PB-66

BANDOMASIS OBJEKTAS TEST ITEM	LED street luminaire MAXFlux
GAMINTOJAS MANUFACTURER	YELLOW ENERGY, Lithuania
TIPAS TYPE	MF-SL-040
SERIJOS NUMERIS SERIAL NUMBER	EMC05813 (assigned number)
UŽSAKOVAS APPLICANT	UAB "Autokausta" Marvelės g. 199B LT-46204 Kaunas Lithuania Tel.: +370 37 397555 Fax: +370 37 397444 E-mail: statyba@autokausta.lt
BANDYMŲ PRADŽIA START OF TESTS	2018-05-22
BANDYMŲ PABAIGA END OF TESTS	2018-06-14
LAPŲ SKAIČIUS NUMBER OF PAGES	15
ATASKAITOS PRIEDAI ANNEXES OF REPORT	1 (2 pages), 2 (2 pages), 3 (2 pages), 4 (1 page), 5 (4 pages), 6 (3 pages), 7 (2 pages), 8 (2 pages)

1. BANDYMŲ SUVESTINĖ
SUMMARY OF TESTS

Test name	*Normative documents*	*Test result*
Electromagnetic disturbances:		
Disturbance voltage at the mains terminals	EN 55015:2013 EN 55015:2013/A1:2015	Pass
Radiated disturbance	EN 55015:2013 EN 55015:2013/A1:2015	Pass
Harmonic current emission	EN 61000-3-2:2014	Pass
Voltage changes, fluctuations and flicker	EN 61000-3-3:2013	Pass
Electromagnetic immunity:		
Electrostatic discharge immunity test	EN 61547:2009 EN 61000-4-2:2009	Pass
Radiated RF electromagnetic field immunity test	EN 61547:2009 EN 61000-4-3:2006 EN 61000-4-3:2006/A1:2008 EN 61000-4-3:2006/A2:2010	Pass
Electrical fast transients/burst immunity test	EN 61547:2009 EN 61000-4-4:2012	Pass
Surges immunity test	EN 61547:2009 EN 61000-4-5:2014	Pass
Voltage dips and short interruptions immunity test	EN 61547:2009 EN 61000-4-11:2004	Pass

Notes:
1. The applicant determined the extent of applied tests.
2. No applicant's representatives witnessed the tests.
3. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

2. STANDARTŲ NUORODINIAI ŽYMENYS IR ANTRAŠTĖS
REFERENCES AND TITLES OF THE STANDARDS

EN 55015:2013
Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment (CISPR 15:2013 + IS1:2013 + IS2:2013).
Amendment: EN 55015:2013/A1:2015.

EN 55032:2015
Electromagnetic compatibility of multimedia equipment - Emission requirements (CISPR 32:2012).
Corrigendum EN 55032:2012/AC:2013.

EN 61547:2009
Equipment for general lighting purposes - EMC immunity requirements (IEC 61547:2009).

EN 61000-4-2:2009
Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test (IEC 61000-4-2:2008).

EN 61000-4-3:2006
Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2006).
Amendment EN 61000-4-3:2006/A1:2008.
Amendment EN 61000-4-3:2006/A2:2010.

EN 61000-4-4:2012
Electromagnetic compatibility (EMC) -- Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test (IEC 61000-4-4:2012).

EN 61000-4-5:2014
Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test (IEC 61000-4-5:2014).

EN 61000-4-11:2004
Electromagnetic compatibility (EMC). Part 4-11: Testing and measurement techniques. Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:2004).

3. BANDOMOSIOS ĮRANGOS (BĮ) APRAŠYMAS
DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

3.1. APRAŠYMAS
DESCRIPTION

LED street luminaire MAXFlux MF-SL-040 is powered from 180-253 V, 50/60 Hz mains network. Max power consumption: 40 W.

3.2. BANDOMOSIOS ĮRANGOS FOTOGRAFIJOS
PHOTOS OF THE EQUIPMENT UNDER TEST

Fig. 1. Bottom view

Fig. 2. Top view

Fig. 3. Side view

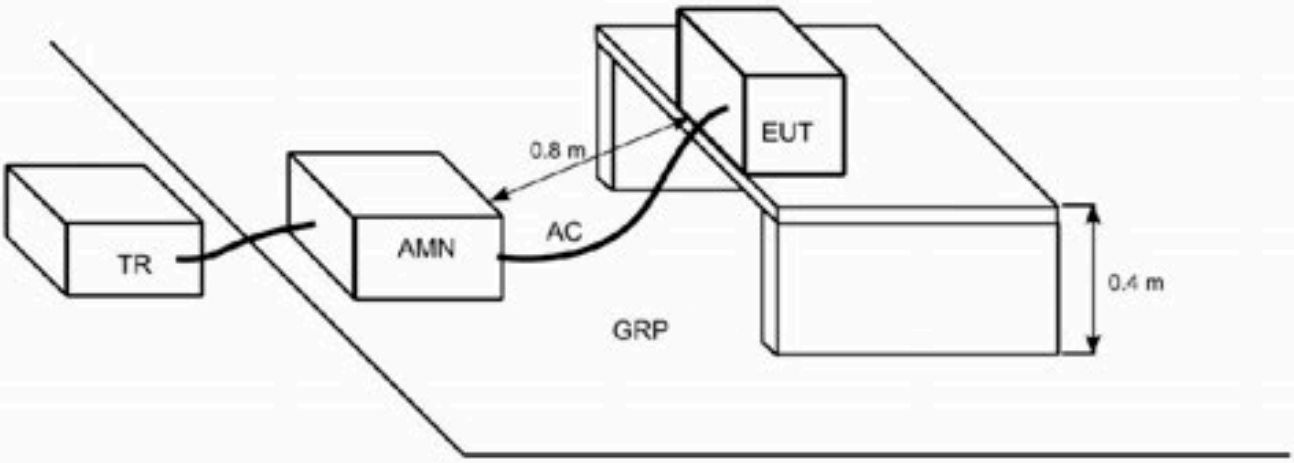
4. BANDYMAMS NAUDOTA ĮRANGA
EQUIPMENT USED FOR TESTS

Name	*Type*	*Serial No*	*Calibration document*
Conducted disturbances tests			
Rohde&Schwarz 20 Hz – 40 GHz test receiver	ESU 40	100062	Certificate of calibration No 45355 D-K-15195-01-01 2018-02
Rohde&Schwarz artificial mains network	ESH2-Z5	890485/009	Certificate of calibration No 372373 D-K-15012-01-00 2015-12
Rohde&Schwarz testing software EMC32	Version 9.12.00	-	-
Radiated emissions test			
Rohde&Schwarz 20 Hz – 40 GHz test receiver	ESU 40	100062	Certificate of calibration No 45355 D-K-15195-01-01 2018-02
TDK RF Solutions 30 MHz – 3 GHz log periodic antenna	HLP-3003	130603	Certificate of calibration No 2010110459
Rohde&Schwarz testing software EMC32	Version 9.12.00	-	-
Harmonic current emission, voltage changes, fluctuations and flicker tests			
Spitzenberger + Spies test system	EMV D 15000/PAS	A306907/ 01102	Certificate of calibration No A5801d
Spitzenberger + Spies EMC test software	Version 2.34f	-	-
Electrostatic discharge immunity test			
EM Test electrostatic discharge generator	ESD30N P30N	V1039107411 V1039107412	Certificate of calibration No SCS-1039107411-010-U17-ESD30N
Radiated radio frequency electromagnetic field immunity test			
Agilent Technologies 250 kHz – 20 GHz signal generator	E8257D	US44270408	Certificate of calibration No 1-7257953524-1
EMCO 80 MHz – 2 GHz broadband log periodic antenna	3144	00035589	Certificate of calibration No 48662
Amplifier Research 80 MHz – 1000 MHz power amplifier	250W1000A	307533	Certificate of calibration No C9907A
Amplifier Research 10 kHz – 100 GHz power meter	PM2002	321670	Certificate of calibration No D19192A
Amplifier Research 10 kHz – 8 GHz power head	PH2000	321958	
Amplifier Research 80 MHz – 1 GHz directional coupler	DC6180A	322196	Certificate of calibration No 027371/01/010
Amplifier Research 100 kHz – 6 GHz electric field probe	FL7006	0339425	Certificate of calibration No 2017090420-1
Amplifier Research field monitor	FM7004	0339366	-
Amplifier Research probe interface	FI7000	0339669	-
Amplifier Research software emcware	V3.1.0	0340646	-
Electrical fast transients/burst immunity test			
Teseq multifunction generator	NSG 3060	1478	Certificate of calibration No SCS-1478/1407-064-U17-NSG3060/ CDN3061
Teseq coupling/decoupling network	CDN 3061	1407	
Teseq software WIN 3000	v1.4.1	-	-
Surges immunity test			
Teseq multifunction generator	NSG 3040	6098	Certificates of calibration No SCT-3336-SLO-CH100517-CWM3451
Teseq software WIN 3000	v1.4.1	-	-
Voltage dips and short interruptions and voltage variations immunity tests			
Teseq multifunction generator	NSG 3060	1478	Certificate of calibration No SCS-1478/1407-064-U17-NSG3060/CDN3061
Teseq coupling/decoupling network	CDN 3061	1407	
Teseq automated variable transformer	VAR 3005-S16	0848	Certificate of calibration No H00508482213
Teseq software WIN 3000	v1.4.1	-	-

5. 5. LAIDININKAIS SKLINDANČIŲ TRIKDŽIŲ MAITINIMO PRIEIGOJE BANDYMAS 9 kHz – 30 MHz DAŽNIŲ DIAPAZONE
DISTURBANCE VOLTAGE AT THE MAINS TERMINALS TEST IN THE FREQUENCY RANGE 9 kHz TO 30 MHz

5.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
TR – test receiver
AMN – artificial mains network
GRP – ground reference plane
AC – power cable

Test setup: table-top equipment.
EUT arrangement: 0.4 m from metal floor of semianechoic chamber, 0.8 m from AMN and ≥0.8 m from other metal surfaces.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
Disturbances limits at mains terminals:

- 110 dB(µV) quasi-peak in the frequency range 9 kHz – 50 kHz;
- 90 dB(µV) – 80 dB(µV) quasi-peak in the frequency range 50 kHz – 150 kHz;
- 66 dB(µV) – 56 dB(µV) quasi-peak and 56 dB(µV) – 46 dB(µV) average in the frequency range 0,15 MHz – 0,5 MHz;
- 56 dB(µV) quasi-peak and 46 dB(µV) average in the frequency range 0,5 MHz – 5 MHz;
- 60 dB(µV) quasi-peak and 50 dB(µV) average in the frequency range 5 MHz – 30 MHz.

5.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 55015:2013, EN 55015:2013/A1:2015.

5.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 1.
Detailed information of equipment used for tests is presented in clause 4.
Measurement uncertainty: ±3,17 dB.

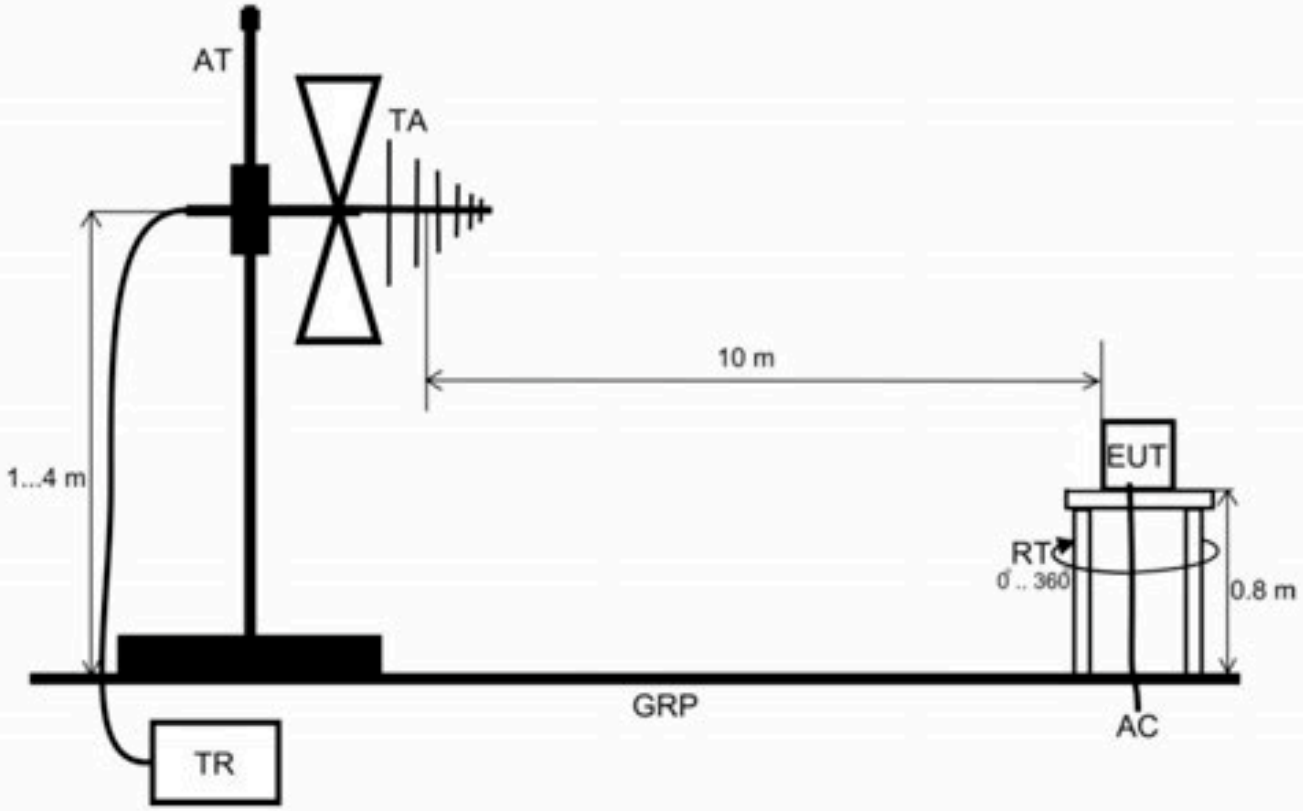
5.4 IŠVADA
CONCLUSION

Equipment under test complies with the requirements of conducted disturbances at mains terminals.

6. TRIKDŽIŲ SPINDULIUOTĖS BANDYMAS 30 MHz – 300 MHz DAŽNIŲ DIAPAZONE
RADIATED DISTURBANCE TEST IN THE FREQUENCY RANGE FROM 30 MHz TO 300 MHz

6.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
TA – measuring antenna
AT – antenna mast
TR – test receiver
RT – rotating table
AC – power cable
GRP – reference ground plane

Test setup: table-top equipment.
Test procedure: specified in clause A1.1 of Table A.1 of CISPR 32:2012.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
Emission limits:

- 30 dB(µV/m) Quasi-peak at 10 m in the frequency range 30 MHz – 230 MHz;
- 37 dB(µV/m) Quasi-peak at 10 m in the frequency range 230 MHz – 300 MHz.

6.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 55015:2013, EN 55015:2013/A1:2015.

6.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 2.
Detailed information of equipment used for tests is presented in clause 4.
Measurement uncertainty: ±4.7 dB.

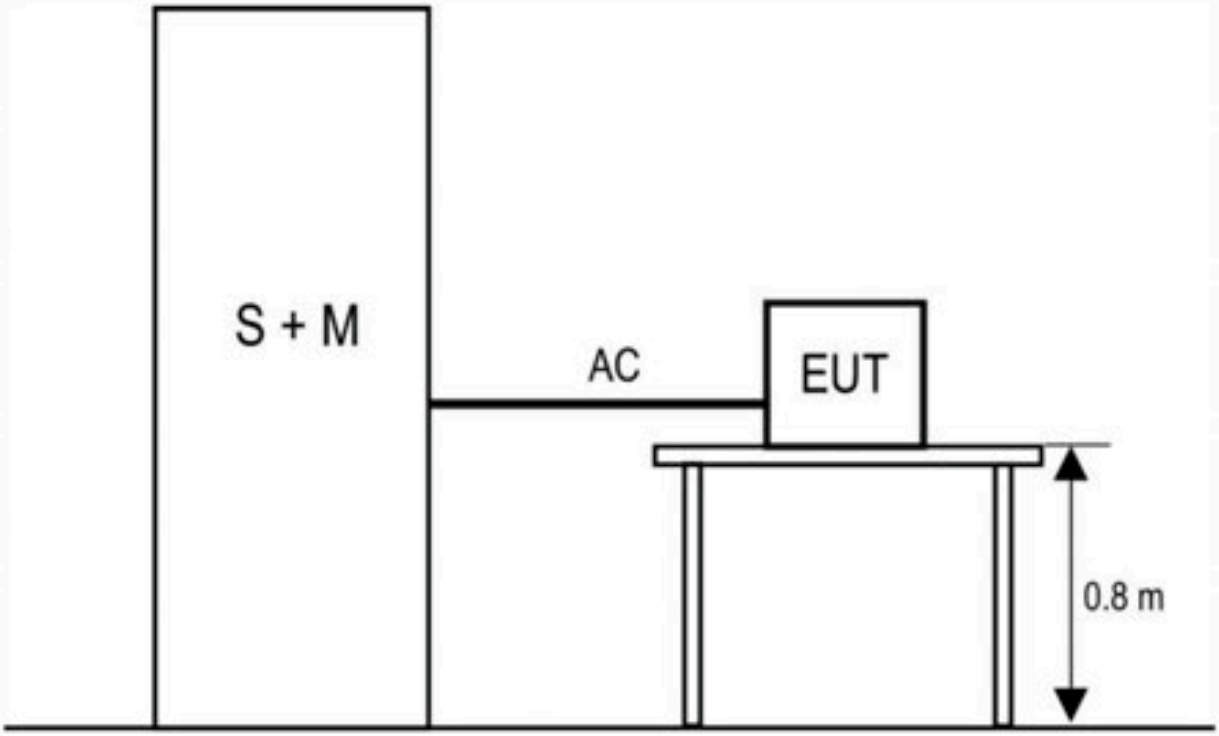
6.4. IŠVADA
CONCLUSION

Equipment under test complies with the requirements of radiated disturbance.

7. HARMONINIŲ SROVIŲ SPINDULIAVIMO BANDYMAS
HARMONIC CURRENT EMISSION TEST

7.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
S – power supply
M – measuring equipment
AC – mains cable

Test setup: table-top equipment.
Test voltage: 230 V.
EUT classification: class C b) 1.

7.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61000-3-2:2014.

7.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 3.
Detailed information of equipment used for tests is presented in clause 4.

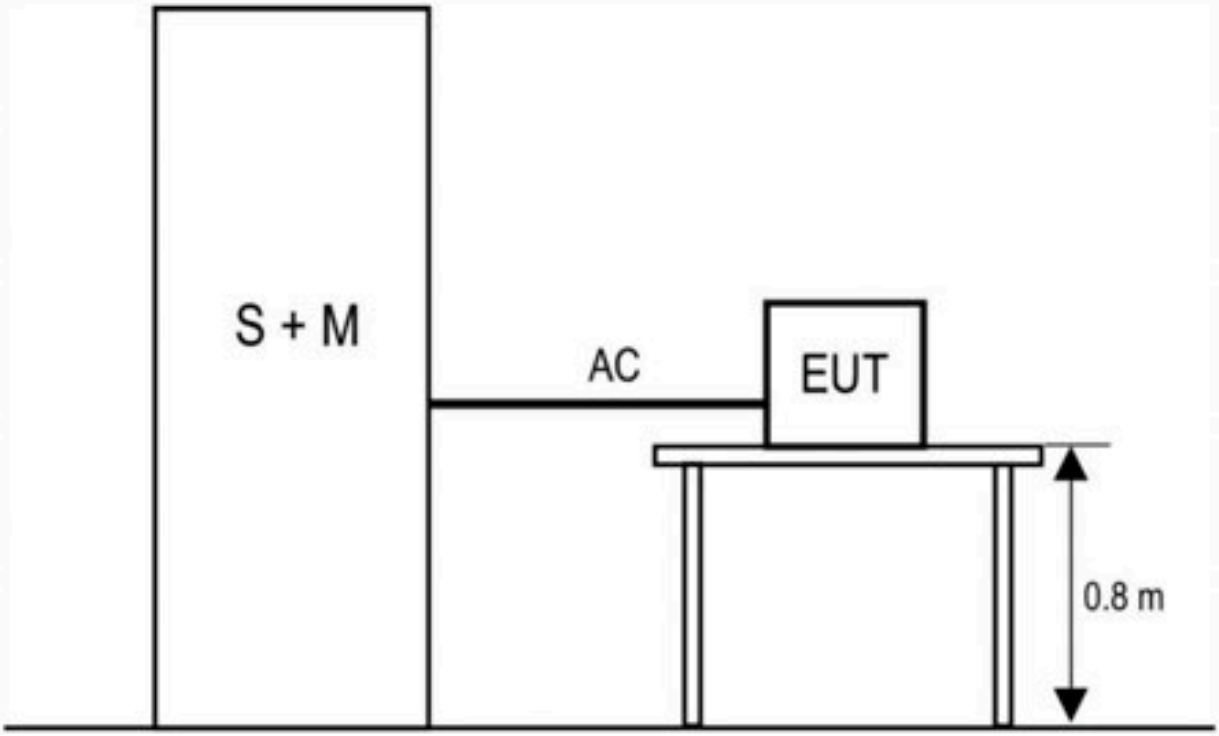
7.4. IŠVADA
CONCLUSION

The equipment under test complies with the requirements for harmonic current emission.

8. ĮTAMPOS POKYČIŲ, SVYRAVIMŲ IR MIRGĖJIMO BANDYMAS
VOLTAGE CHANGES, FLUCTUATIONS AND FLICKER TEST

8.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
S – power supply
M – measuring equipment
AC – mains cable

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz.

8.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61000-3-3:2013.

8.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 4.
Detailed information of equipment used for tests is presented in clause 4.

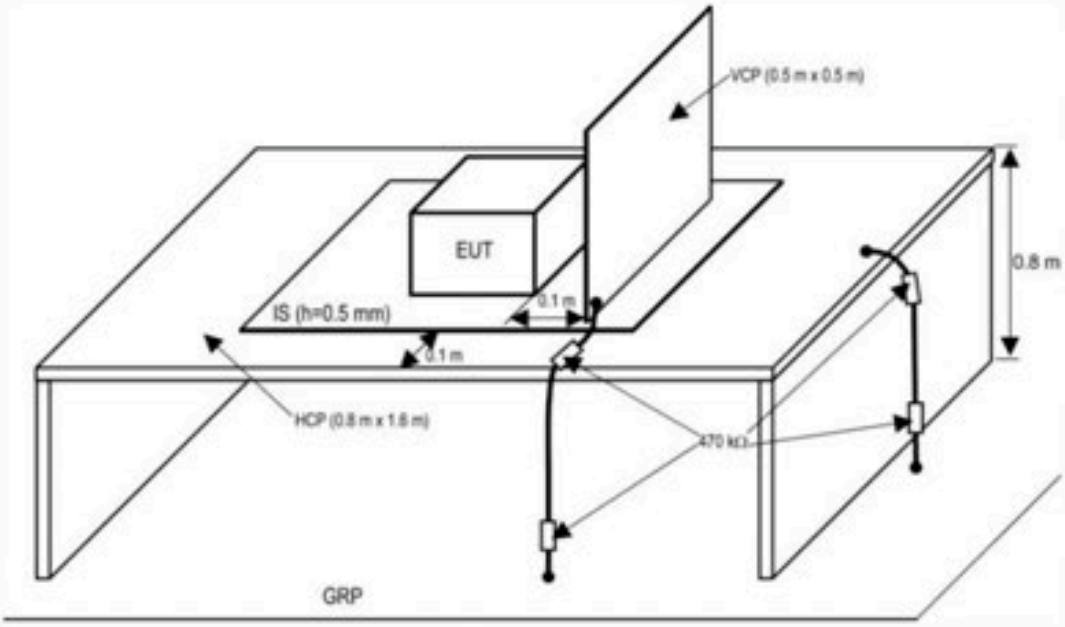
8.4. IŠVADA
CONCLUSION

The equipment under test complies with the requirements for voltage changes, fluctuations and flicker.

9. ATSPARUMO ELEKTROSTATINIAM IŠLYDŽIUI BANDYMAS
ELECTROSTATIC DISCHARGE IMMUNITY TEST

9.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – isolation seal
GRP – ground reference plane
HCP – horizontal coupling plane
VCP – vertical coupling plane

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network. .
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
Enclosure	Electrostatic discharge	4 kV contact discharge [1]	B
[1] 10 positive and 10 negative discharges at the front edge of HCP opposite the center of 4 sides of EUT; at the center of vertical edge of VCP placed on the 4 sides of EUT; at three selected points of EUT.			

9.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-2:2009.

9.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 5.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

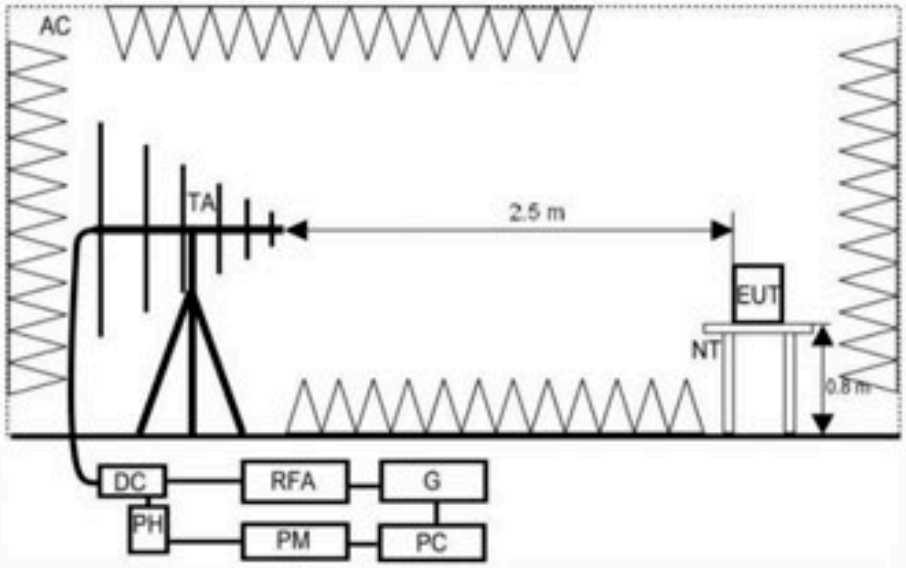
9.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to electrostatic discharge.

10. ATSPARUMO SPINDULIUOJAMAM ELEKTROMAGNETINIAM RADIJO DAŽNIŲ LAUKUI 80 MHz – 1 GHz DAŽNIŲ DIAPAZONE BANDYMAS
RADIATED RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST IN THE FREQUENCY RANGE FROM 80 MHz TO 1 GHz

10.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
DC – directional coupler
PH – power head
RFA – radio frequency amplifier
PM – power meter
G – generator
PC – computer
AC – anechoic chamber
TA – test antenna
NT – non conducting table

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
Enclosure	Electromagnetic field	3 V/m [1, 2]	A
[1] Modulation: 1 kHz, 80 % AM, sine wave. [2] Field generated with vertical and horizontal antenna polarization from four sides of EUT.			

10.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-3:2006, EN 61000-4-3:2006/A1:2008, EN 61000-4-3:2006/A2:2010.

10.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 6.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

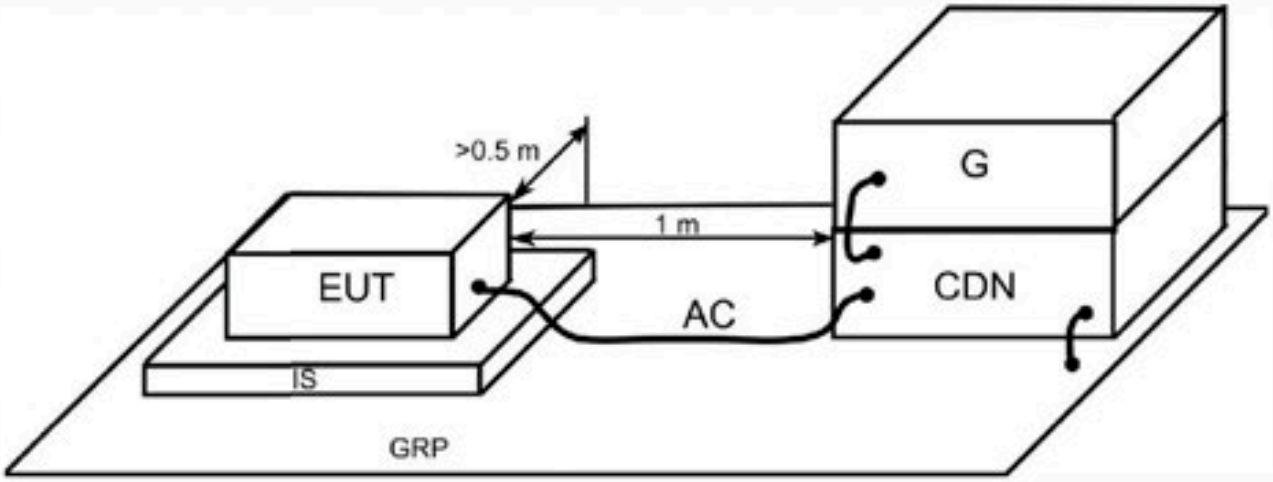
10.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to radiated RF electromagnetic field.

11. ATSPARUMO SPARČIAJAM ELEKTRINIAM PEREINAMAJAM VYKSMUI-VORAI BANDYMAS
ELECTRICAL FAST TRANSIENTS/BURST IMMUNITY TEST

11.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – insulating support
AC – power cable
G – generator
CDN – coupling-decoupling network
GRP – ground reference plane

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
a.c. power	Burst	± 1 kV (peak, 5/50 ns, 5 kHz) [1]	B
[1] Duration: 2 min with a positive polarity and a 2 min with a negative polarity pulses.			

11.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-4:2012.

11.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 7.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

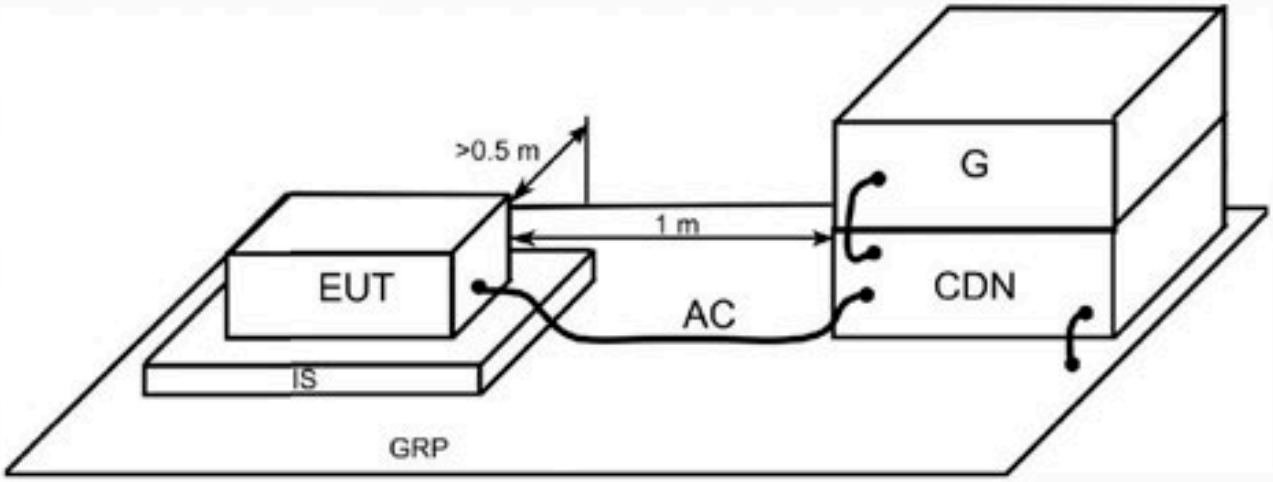
11.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to electrical fast transients/burst at input a.c power port.

12. ATSPARUMO VIRŠĮTAMPIAMS BANDYMAS
SURGES IMMUNITY TEST

12.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – insulating support
AC – power cable

EUT – equipment under test
IS – insulating support
AC – power cable

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
AC power	Surge (line to line)	± 1,0 kV (1,2/50 µs) [1]	B
	Surge (line to ground)	± 2,0 kV (1,2/50 µs) [1]	B
[1] 5 positive polarity pulses at the 90° phase angle and 5 negative polarity pulses 270° phase angle.			

12.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-5:2006.

12.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 8.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

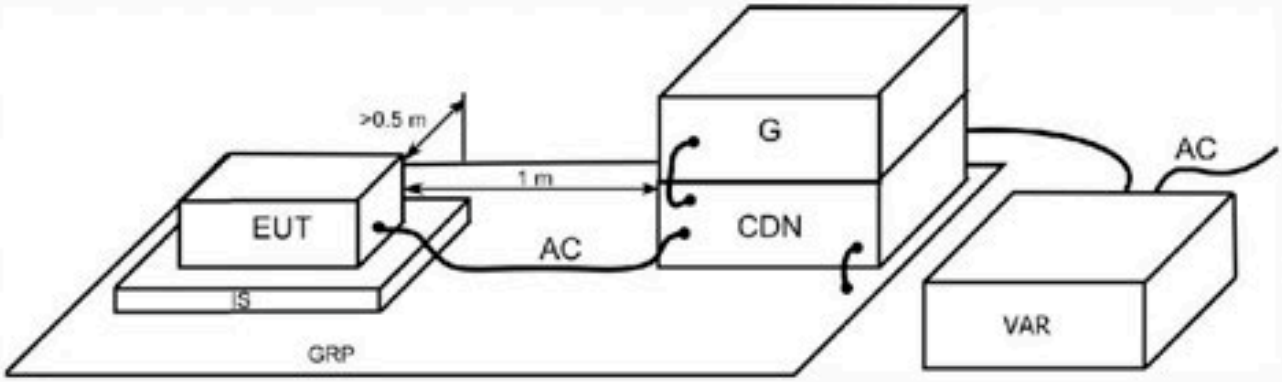
12.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to surges at input a.c power port.

13. ATSPARUMO ĮTAMPOS KRYČIAMS IR TRUMPIESIEMS PERTRŪKIAMS BANDYMAS
VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TEST

13.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – insulating support
G – generator
CDN – coupling/decoupling network
GRP – ground reference plane
AC – power cable
VAR - variac

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
AC power	Voltage dip	70 % for 10 periods	C
	Short interruptions	0 % for 0,5 periods	B

13.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-11:2004.

13.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 7.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

13.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to voltage dips, short interruptions.

Deputy Head of Division — Raimondas Štulas

Bandymų ataskaitos
1 priedas
Annex 1

LAIDININKAIS SKLINDANČIŲ TRIKDŽIŲ MAITINIMO PRIEIGOJE BANDYMO REZULTATAI
DISTURBANCE VOLTAGE AT THE MAINS TERMINALS TEST RESULTS

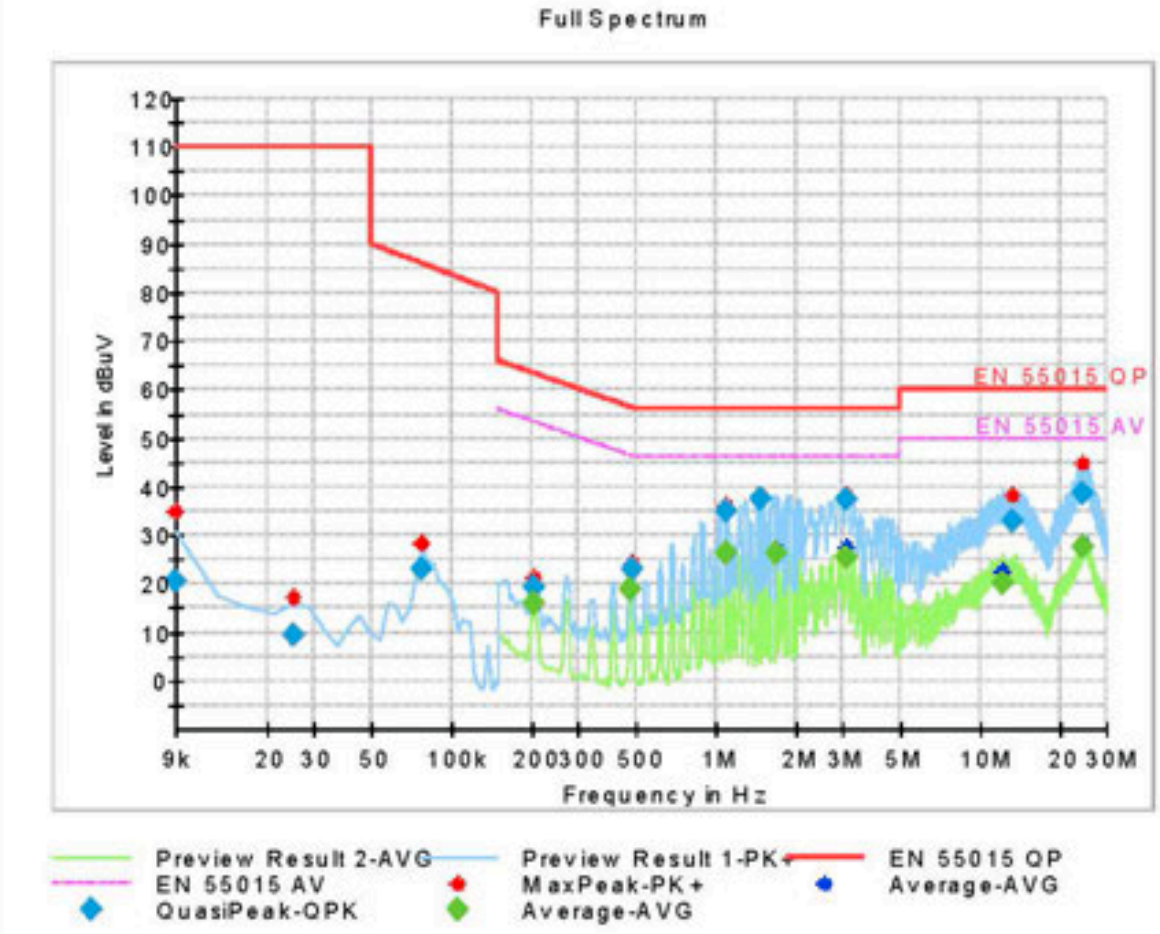
TEST REPORT
Order No. 2108

Common Information

Test Description:	Disturbance voltage on mains
Operating Conditions:	Operated
Ambient conditions:	t= 24oC; h= 37%; p= 101.4kPa
Test place:	Semianechoic chamber, Kaunas
Operator Name:	V.Gudkovas
Test date:	2018 05 22

EUT Information

EUT Name:	LED streetlight
Manufacturer:	Yellow Energy LT
Typr/model:	MF-SL-040
Serial Number:	EMC05813
Comment:	



Bandymų ataskaitos
1 priedas
Annex 1

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.009000	20.58	110.00	89.42	1000.0	0.200	N	GND	0.8
0.025000	9.36	110.00	100.64	1000.0	0.200	L1	GND	0.2
0.077000	23.01	86.07	63.06	1000.0	0.200	N	GND	0.2
0.206000	19.12	63.37	44.25	5000.0	9.000	N	GND	0.2
0.478000	23.00	56.37	33.37	5000.0	9.000	N	GND	0.2
1.082000	34.93	56.00	21.07	5000.0	9.000	N	GND	0.2
1.478000	37.36	56.00	18.64	5000.0	9.000	N	GND	0.3
3.094000	37.50	56.00	18.50	5000.0	9.000	L1	GND	0.4
13.246000	32.98	60.00	27.02	5000.0	9.000	L1	GND	0.9
24.386000	38.57	60.00	21.43	5000.0	9.000	N	GND	1.4

Final_Result_AVG

Frequency (MHz)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.206000	16.06	53.37	37.31	5000.0	9.000	N	GND	0.2
0.474000	19.09	46.44	27.35	5000.0	9.000	N	GND	0.2
1.082000	26.18	46.00	19.82	5000.0	9.000	N	GND	0.2
1.686000	26.27	46.00	19.73	5000.0	9.000	N	GND	0.3
3.094000	25.35	46.00	20.65	5000.0	9.000	L1	GND	0.4
12.030000	20.00	50.00	30.00	5000.0	9.000	N	GND	0.7
24.470000	27.42	50.00	22.58	5000.0	9.000	N	GND	1.4

Hardware Setup: EMI conducted\Voltage with 2-line LISN ESH2-Z5 - [EMI conducted]

Subrange 1

Frequency Range:	9 kHz - 30 MHz
Receiver:	ESU 40 [ESU 40] @ GPIB0 (ADR 20), SN 100062/040, FW 4.43, CAL 2014.04.13
Signal Path:	ESIB 26-2-line LISN ESH2-Z5 FW 1.0 Correction Table: Cable Tinkl Correction Table: Cable TMS-H2 10m Nr.100084
LISN:	2-line LISN ESH2-Z5 Correction Table (Line 0): ESH2-Z5 Nr 890485-009 shucoN Correction Table (Line 1): ESH2-Z5 Nr 890485-009 shucoL1

Bandymų ataskaitos
2 priedas
Annex 2

TRIKDŽIŲ SPINDULIUOTĖS BANDYMO REZULTATAI
RADIATED DISTURBANCE TEST RESULTS

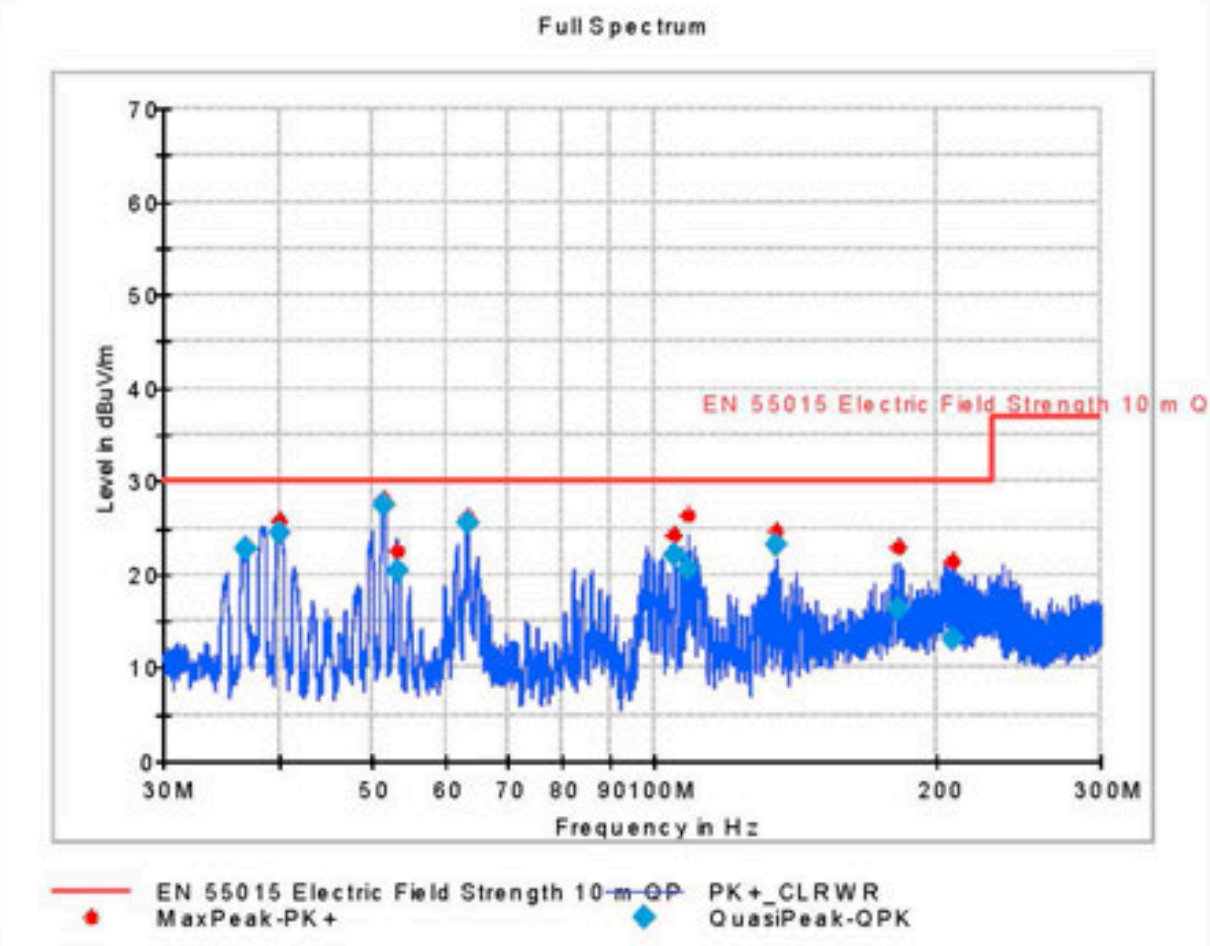
TEST REPORT
Order No. 2108

Common Information

Test Description:	Radiated disturbances in frequency range 30-300 MHz
Operating Conditions:	Operated
Ambient conditions:	t= 22oC; h= 41%; p= 100.7kPa
Test place:	Open area test site (OATS), Dovainonys
Operator Name:	V.Gudkovas
Test date:	2018 05 23

EUT Information

EUT Name:	LED streetlight
Manufacturer:	Yellow Energy LT
Typr/model:	MF-SL-040
Serial Number:	EMC05813
Comment:	



Bandymų ataskaitos
2 priedas
Annex 2

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.720000	22.70	30.00	7.30	15000.0	120.000	350.0	V	225.0	9.9
39.920000	24.44	30.00	5.56	15000.0	120.000	250.0	V	180.0	9.7
51.560000	27.38	30.00	2.62	15000.0	120.000	400.0	V	315.0	10.0
53.360000	20.34	30.00	9.66	15000.0	120.000	150.0	V	315.0	10.1
63.240000	25.47	30.00	4.53	15000.0	120.000	350.0	V	315.0	10.3
105.280000	22.22	30.00	7.78	15000.0	120.000	400.0	V	90.0	11.1
108.960000	20.62	30.00	9.38	15000.0	120.000	250.0	V	45.0	11.8
134.880000	23.28	30.00	6.72	15000.0	120.000	100.0	V	135.0	11.5
182.640000	16.22	30.00	13.78	15000.0	120.000	150.0	H	0.0	13.9
208.520000	13.17	30.00	16.83	15000.0	120.000	200.0	H	315.0	13.8

Hardware Setup: EMI radiated\Electric Field Strength OATS - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 1 GHz
Receiver:	ESU 40 [ESU 40] @ GPIB0 (ADR 20), SN 100062/040, FW 4.43, CAL 2014.04.13
Signal Path:	ESIB 26-HLP 3003 Nr130603 FW 1.0 Correction Table: Cable TMS-H2 10m Nr100083
Antenna:	HLP 3003 Nr130603 Correction Table (vertical): HLP-3003 Nr130603 vert 10m Correction Table (horizontal): HLP-3003 Nr130603 hor 10m
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.01
Turntable:	Turn Table [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.01

Bandymų ataskaitos
3 priedas
Annex 3

HARMONINIŲ SROVIŲ SPINDULIAVIMO BANDYMO RESULTATAI
HARMONIC CURRENT EMISSION TEST RESULTS

Name:	V. Gudkovas	Serial no:	EMC05813
Department:	EMC control division	Operating mode:	Operated
Company:	RRT	Comment1:	Ambient temp. +25 °C
Order no:	2108	Comment2:	Rel. humidity 37 %
Device:	LED streetlight	Comment3:	Atm. pressure 101.4kPa
Specimen:	Lighting equipment	Comment4:	
Manufacturer:	YellowEnergy LT	Date:	22.05.2018
Type:	MF-SL-040	Test date:	22.05.2018

Maximum RMS current and corresponding values in timewindow 3:

Voltage:	231.08 Vrms		THD=0.01 %	THV=0.013 V	POHV=0.005 V	PWHD=0.01 %
Current:	0.186 Arms		THD=5.36 %	THC=0.010 A	POHC=0.003 A	PWHD=10.51 %
Power:	41.5 W	P1=41.5 W	43.1 VA			
Power factor:	0.964	CosPhi1: 0.966				

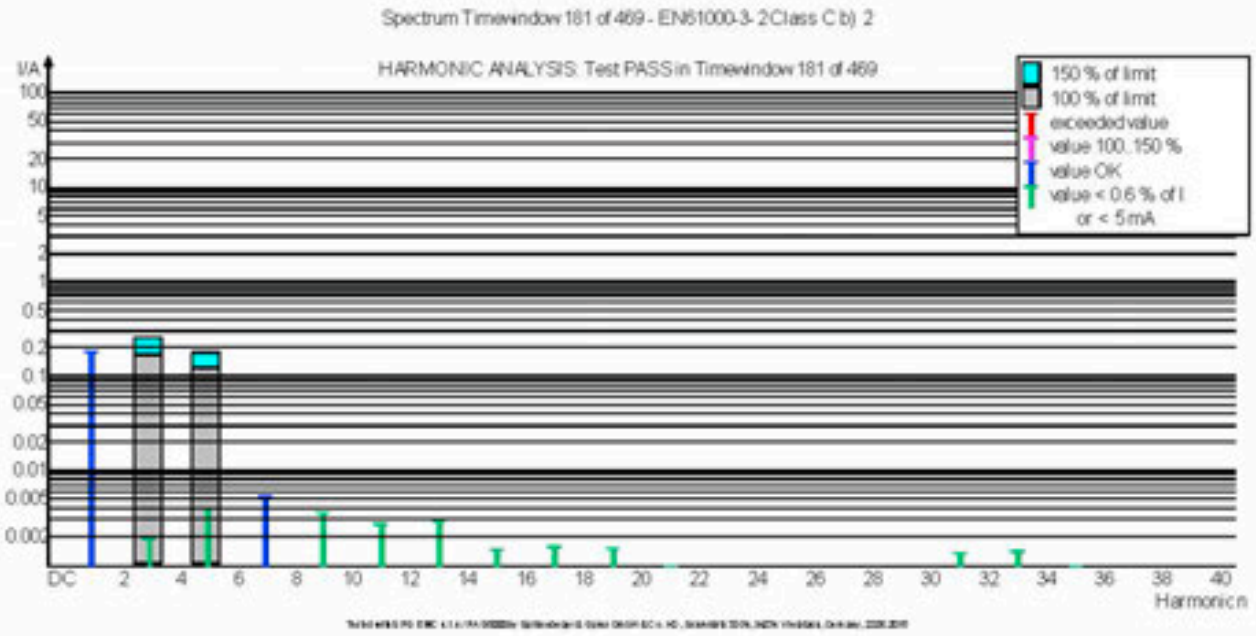
Test conditions: EN 61000-3-2:2014, f=50 Hz, Phase=L1, Range=0.80 A
Time window: 16, Grouping (>2nd harm.)=off, Rated power =43 W
No Ztest selected
harmonic currents < 0.6 % of I or < 5 mA are disregard for calc. of THD, THC, POHC, PWHD

HARMONIC ANALYSIS: Test PASS
Tobs = entire measurement; POHC: avg=0.00 A, limits=0.02 A
Iavg=0.186 Arms

Ha	Entire measurement (2.5 min = 469 time windows)						Worst 2.5 min		Average		PASS	FAIL
	Maximum	Window	EN61000-3-2 Class C b) 1	Margin in MaxWin	100 to 150%	Exceeded	100 to 150%	Exceeded	Value	Exceeded		
DC	-0.0004 A	387	------	----.-	0	0	n.e.	n.e.	-0.0002 A	0	X	
1	0.1861 A	3	------	----.-	0	0	n.e.	n.e.	0.1856 A	0	X	
2	0.0008 A	4	------	----.-	0	0	n.e.	n.e.	0.0006 A	0	X	
3	0.0024 A	465	0.1462 A	-98.3 %	0	0	n.e.	n.e.	0.0021 A	0	X	
4	0.0003 A	21	------	----.-	0	0	n.e.	n.e.	0.0002 A	0	X	
5	0.0042 A	181	0.0817 A	-94.9 %	0	0	n.e.	n.e.	0.0041 A	0	X	
6	0.0003 A	4	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
7	0.0056 A	200	0.0430 A	-87.1 %	0	0	n.e.	n.e.	0.0055 A	0	X	
8	0.0002 A	35	------	----.-	0	0	n.e.	n.e.	0.0002 A	0	X	
9	0.0039 A	21	0.0215 A	-81.7 %	0	0	n.e.	n.e.	0.0038 A	0	X	
10	0.0003 A	4	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
11	0.0029 A	311	0.0150 A	-80.8 %	0	0	n.e.	n.e.	0.0028 A	0	X	
12	0.0003 A	468	------	----.-	0	0	n.e.	n.e.	0.0002 A	0	X	
13	0.0032 A	427	0.0127 A	-75.2 %	0	0	n.e.	n.e.	0.0031 A	0	X	
14	0.0003 A	4	------	----.-	0	0	n.e.	n.e.	0.0002 A	0	X	
15	0.0016 A	438	0.0110 A	-85.7 %	0	0	n.e.	n.e.	0.0015 A	0	X	
16	0.0002 A	422	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
17	0.0017 A	399	0.0097 A	-82.6 %	0	0	n.e.	n.e.	0.0017 A	0	X	
18	0.0002 A	21	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
19	0.0017 A	1	0.0087 A	-80.7 %	0	0	n.e.	n.e.	0.0016 A	0	X	
20	0.0002 A	21	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
21	0.0011 A	1	0.0079 A	-85.9 %	0	0	n.e.	n.e.	0.0010 A	0	X	
22	0.0002 A	466	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
23	0.0006 A	102	0.0072 A	-92.2 %	0	0	n.e.	n.e.	0.0004 A	0	X	
24	0.0002 A	4	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
25	0.0005 A	48	0.0066 A	-92.7 %	0	0	n.e.	n.e.	0.0004 A	0	X	
26	0.0002 A	287	------	----.-	0	0	n.e.	n.e.	0.0002 A	0	X	
27	0.0005 A	23	0.0061 A	-91.2 %	0	0	n.e.	n.e.	0.0004 A	0	X	
28	0.0002 A	21	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
29	0.0007 A	22	0.0057 A	-86.9 %	0	0	n.e.	n.e.	0.0007 A	0	X	
30	0.0002 A	466	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
31	0.0014 A	1	0.0053 A	-73.5 %	0	0	n.e.	n.e.	0.0014 A	0	X	
32	0.0002 A	4	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
33	0.0015 A	153	0.0050 A	-70.5 %	0	0	n.e.	n.e.	0.0014 A	0	X	
34	0.0001 A	4	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
35	0.0011 A	132	0.0047 A	-77.8 %	0	0	n.e.	n.e.	0.0010 A	0	X	
36	0.0001 A	21	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
37	0.0007 A	108	0.0045 A	-84.8 %	0	0	n.e.	n.e.	0.0006 A	0	X	
38	0.0002 A	461	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	
39	0.0006 A	172	0.0042 A	-85.3 %	0	0	n.e.	n.e.	0.0006 A	0	X	
40	0.0001 A	450	------	----.-	0	0	n.e.	n.e.	0.0001 A	0	X	

average value < 0.6 % of Iavg or < 5 mA   n.e. = not evaluated

Bandymų ataskaitos
3 priedas
Annex 3



Bandymų ataskaitos
4 priedas
Annex 4

ĮTAMPOS POKYČIŲ, SVYRAVIMŲ IR MIRGĖJIMO BANDYMO RESULTATAI
VOLTAGE CHANGES, FLUCTUATIONS AND FLICKER TEST RESULTS

Name:	V. Gudkovas	Serial no:	EMC05813
Department:	EMC control division	Operating modes:	Operated
Company:	RRT	Comment1:	Ambient temp. +25 °C
Order no:	2108	Comment2:	Rel. humidity 37 %
Device:	LED streetlight	Comment3:	Atm. pressure 101.4 kPa
Specimen:	Lighting equipment	Comment4:	
Manufacturer:	Yellow Energy LT	Date:	22.05.2018
Type:	MF-SL-040	Test date:	22.05.2018

Test conditions: EN 61000-3-3:2013 / 230 V / 50 Hz / Phase L1
EN 61000-4-15:2011 / 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
10:07:36	0.000	0.0060	- . - - - -	0.000	+0.000	- . - - -	X	
Limits:		1.000	0.650	0.500	4.000	3.300		
Plt: 0.002621 (calculated over 12 periods)							X	
Evaluated: PST, PLT, Sliding PLT, dc, dmax, Tmax								

FLICKER: Source test PASS!

Time	Pmax	Pst	Sliding Plt	Tmax[s]	dmax[%]	dc [%]	PASS	FAIL
10:07:36	0.000	0.0060	- . - - - -	0.000	+0.000	- . - - -	X	
Plt: 0.002621 (calculated over 12 periods)								
Evaluated: PST <= 0.4 dmax < 2.0 % dmax1								

Bandymų ataskaitos
5 priedas
Annex 5

ATSPARUMO ELEKTROSTATINIAM IŠLYDŽIUI BANDYMO REZULTATAI
ELECTROSTATIC DISCHARGE IMMUNITY TEST RESULTS

ESD TEST REPORT

Report Number :	2108
Test Lab :	EMC control division/ RRT
Test Person :	V.Gudkovas
Test Date :	6/12/2018 , 1:15:44 PM
Test Standard :	EN 61000-4-2:2009
Customer :	Yellow Energy LT

E . U . T

Name :	LED streetlight MF-SL-040
Description :	Ser.No. EMC05813

Test Level max.

Contact :	4000 V		
Horizontal Coupling Plane :	4000 V	Vertical Coupling Plane :	4000 V

Test Result

Test passed :	☑	Failure Criteria :	B
Test not passed :	☐		
Test not rated :	☐		

Climatic Conditions

Temperature :	26 °C	Humidity :	43 %
Pressure :	100 kPa		

Test Simulator

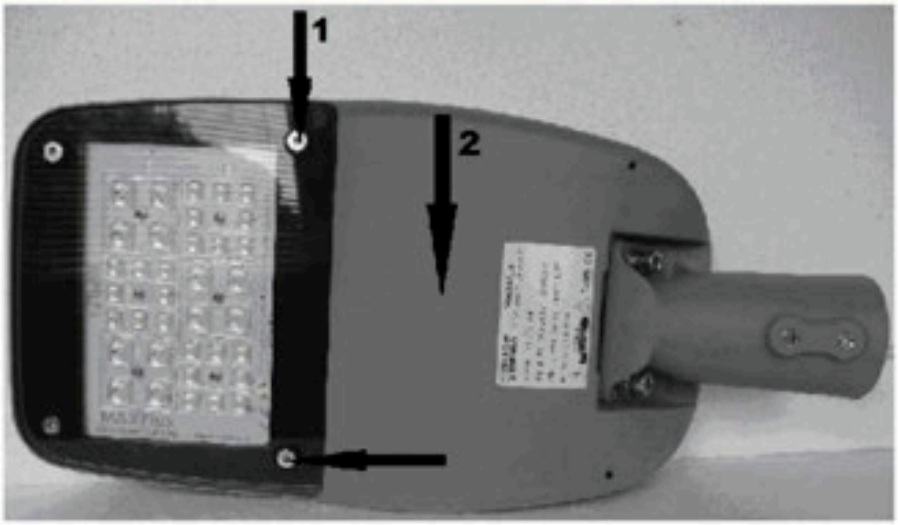
Name / Version : esd30n, 1.23

Contact Discharge

Test Setup

Test Routine :	Contact 4kV				
Discharge Module :	150 pf / 330 ohm				
Test Voltages :	Level 1	Level 2	Level 3	Level 4	
	4000 V				
Polarity :	Positive & Negative			Repetition :	1.0 s
Iteration :	Polarity -> Point -> Voltage			Discharges :	10
Trigger :	Automatic			Test Points :	3

Figure EUT



Test Points

Test Point	Break	Description
1		1 side- CD
2		2 side - CD
3		3 side - CD

Horizontal Coupling Plane

Test Setup

Test Routine : Contact 4kV

Discharge Module : 150 pf / 330 ohm

Test Voltages : Level 1 Level 2 Level 3 Level 4

4000 V

Polarity : Positive & Negative Repetition : 1.0 s

Iteration : Polarity -> Point -> Voltage Discharges : 10

Trigger : Automatic Test Points : 4

Test Points

Test Point	Break	Description
1		Front-CD
2		1 side- CD
3		Back - CD
4		3 side - CD

Bandymų ataskaitos
5 priedas
Annex 5

Vertical Coupling Plane

Test Setup

Test Routine :	Contact 4kV				
Discharge Module :	150 pf / 330 ohm				
Test Voltages :	Level 1	Level 2	Level 3	Level 4	
	4000 V				
Polarity :	Positive & Negative			Repetition :	1.0 s
Iteration :	Polarity -> Point -> Voltage			Discharges :	10
Trigger :	Automatic			Test Points :	4

Test Points

Test Point	Break	Description
1		Front-CD
2		1 side- CD
3		Back - CD
4		2 side - CD

Bandymų ataskaitos
6 priedas
Annex 6

ATSPARUMO SPINDULIUOJAMAM ELEKTROMAGNETINIAM RADIJO DAŽNIŲ LAUKUI BANDYMO REZULTATAI
RADIATED RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST RESULTS

emcware v3.1.0

IEC 61000-4-3 Test Report

Test File Information			
Test Data File:	C:\emcware v3.1.0\Radiated\IEC61000\Test Data\MF-SL-040_3V_80-1000MHz.rstd		
IEC Calibration File:	C:\emcware v3.1.0\Radiated\IEC61000\Calibration Data\IEC_80-1000 MHz_10 Vm_CP_9 Pos.rscd		
Test Setup File:	C:\emcware v3.1.0\Radiated\IEC61000\Test Setup\IEC 61000-4-3 (Level 2) - 112712.rsts		
Equipment Setup File:	C:\emcware v3.1.0\Radiated\Equipment Setup\RRT_Equipment_Setup.rses		
Test Date:	13/06/2018 13:51		
Test Standard:	IEC 61000-4-3 (Level 2) - Custom		
Start Frequency:	80.000 MHz		
Stop Frequency:	1000.000 MHz		
EUT Sides Tested:	Front, Right, Rear, Left		
Polarizations Tested:	Vertical, Horizontal		
Modulations Tested:	Modulation 1; Consult Test Setup File Listed Above For Definitions		
Test Status:	----------Complete ----------		
EUT Status:	**Passed**	**EUT Monitoring:**	Manual
Non-Conformities:	None		

Order No.2108					
Test Engineer:	Vygintas Gudkovas				
Temperature:	25 °C	Humidity:	39 %	Pressure:	100.0 kPa
Customer:	Yellow Energy LT				
EUT Model Number:	LED streetlight MF-SL-040				
EUT Serial Number:	EMC05813				
EUT Description	EUT operated				
Notes:	Normal performance, no change of operation (criterion A).				

Bandymų ataskaitos
6 priedas
Annex 6

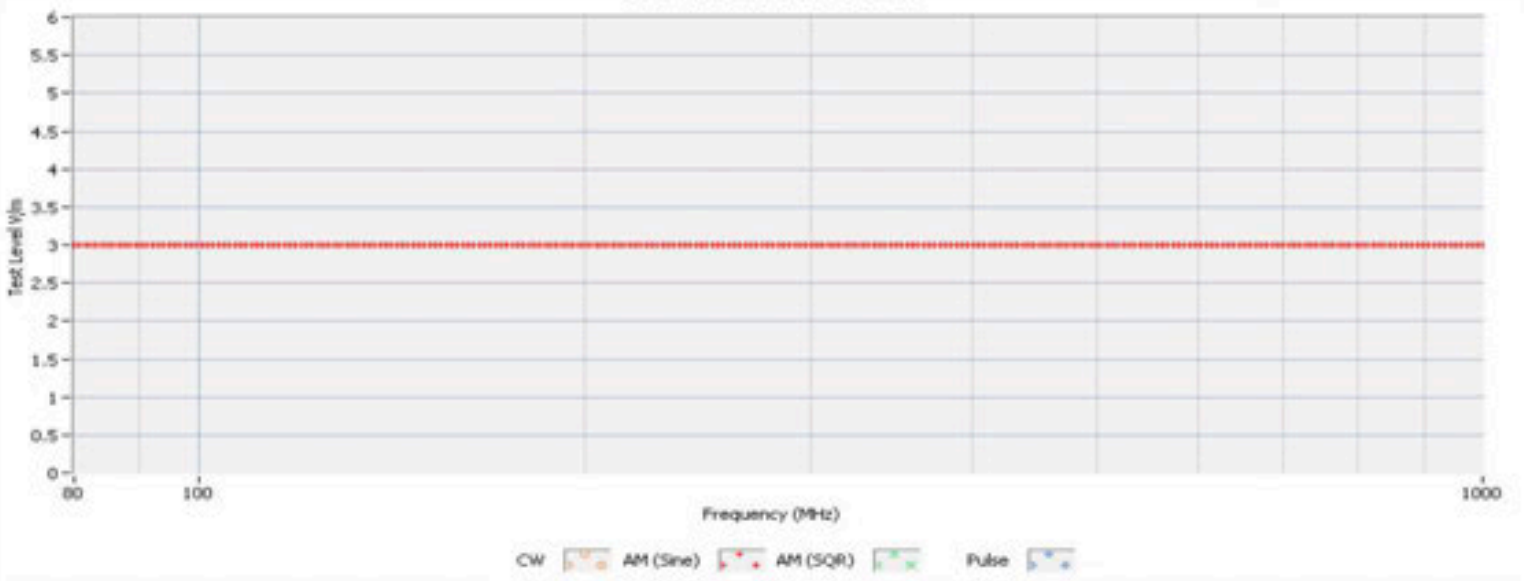
Test Parameters

General Information

Test Standard:	IEC 61000-4-3
Test Setup Name:	IEC 61000-4-3 (Level 2) - Custom
Date:	09/09/2016 11:04
File Path:	C:\emcware v3.1.0\Radiated\IEC61000\Test Setup\IEC 61000-4-3 (Level 2) - 112712.rsts
Power Leveling Method:	Forward Power
Power Leveling Tolerance:	+ 0.50 (dBm) / -0.00 (dBm)
Power Leveling Between Frequencies:	Unchanged
Start Drive Level:	-40.00 (dBm)
Field Leveling Tolerance:	+ 0.75 (V/m) / -0.00 (V/m)
EUT Monitor Type:	None

Test Parameters

Test Level Plot



Bandymų ataskaitos
6 priedas
Annex 6

Test Parameters
Frequency Dependent Parameters

Frequency	Frequency Step	Field Strength	Dwell	Field Interp.	Test CW	Modulation 1	Modulation 2
80.000 MHz	1.000 %	3.000 V/m	1.00 Sec	None	No	AM Sine, 80.000%, 1000.000(Hz)	None
1000.000 MHz	1.000 %	3.000 V/m	1.00 Sec	None	No	AM Sine, 80.000%, 1000.000(Hz)	None

Test Parameters
Frequency Dependent RF Signal Routing

Frequency	Equipment Control	SC Switch Positions	SC1000(1) Aux	SC1000(2) Aux	User Defined Msg
80MHz	-------- (General) ---------- E8257D - US44270408_(Sig Gen 1) 250W1000A - 307533_(Amp 1) DC6180A - 322196 _(DC 1) PM2002 - 321670_(Power Meter 1) EMCO3144 - 00035589 _(Antenna 1) Manual - _(Antenna Controller 1) -------- (Calibration/Test) ---------- FM7004 - 0339366_(Field Monitor 1) -------- (Harmonic Test) ----------	No SC Connection No SC Connection No SC Connection No SC Connection No SC Connection	None	None	

Bandymų ataskaitos
7 priedas
Annex 7

ATSPARUMO SPARČIAJAM ELEKTRINIAM PEREINAMAJAM VYKSMUI-VORAI, ĮTAMPOS KRYČIAMS IR TRUMPIESIEMS PERTRŪKIAMS BANDYMŲ REZULTATAI
ELECTRICAL FAST TRANSIENTS/BURST, VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TESTS RESULTS

6/12/2018 3:04 PM

- TEST REPORT-

Immunity to EMC Pulses

Equipment under test	
Order number	2108
Manufacturer/customer	Yellow Energy LT
EUT description/name	LED streetlight
Type	MF-SL-040
Serial number	EMC05813
SW version	
Notes	EUT operated

Normative documents:	
Requirements according to :	EN 61547:2009

Test specification and results:

Phenomena	Standard	Criteria	Notes	Result
Bursts to mains	EN 61000-4-4:2012	B		Pass
Bursts to signal lines	EN 61000-4-4:2012	B		N/A
Surges to mains	EN 61000-4-5:2014	B		N/A
Voltage dips	EN 61000-4-11:2004	B,C		Pass
Short interruptions	EN 61000-4-11:2004	C		Pass
Power fr. magnetic field	EN 61000-4-8:2010	B		N/A
Pulse magnetic field	EN 61000-4-9:1993+A1:2001			N/A

Main test equipment:

Manufacturer	Type	Serial Nr	In use
Teseq	NSG 3060	1478	☑
Teseq	CDN 3061	1407	☑
Teseq	NSG 3040	6098	☐
Teseq	CDN 3043	5012	☐

Manual or additional Equipment :

Manufacturer	Type	Serial Nr	Calibration date	Certificate Nr:	In use
Teseq	Coil INA702	255	2013-04-02	H70202551413	☐
Teseq	INA 752	164	2013-02-14	H75201640613	☐
Schaffner	Clamp CDN 8014	17308	2013-01-10	A090/13	☐

Modules:

Manufacturer	Type	Serial No.	Version / FW	Calibration date	Certificate No.
Teseq	WIN 3000	0550-0-0102-0000-7E8A-7AE3-3CC3-32D7	1.4.1	---	---
Teseq	MCR 3000	550	0002.30	---	---
Teseq	SUI 3000	---	V02.20	---	---
Teseq	CWM 3650	421	0002.31	10/18/2017	CR05782B/CR0
Teseq	HVM 3060	372	0002.31	---	---
Teseq	FTM 3425	455	0002.31	10/18/2017	CR05782B/CR0
Teseq	RWM 3652	221	0002.31	10/18/2017	CR05782B/CR0
Teseq	CDM 3061-C	1407	0002.31	10/18/2017	CR05782B/CR0
Teseq	PQM 3403	375	0002.31	10/18/2017	CR05782B/CR0
Teseq	VAR 3005-516	848	0002.14	5/29/2013	H00508482213
Teseq	MFO 6502	162	0002.31	10/19/2017	CR06003B

Settings:
EUT supply voltage Uin used for 100% reference value: 230 V
Measured EUT Supply Voltage: 235 V
Measured EUT Supply Frequency: 50 Hz

Environmental Conditions:		
Temperature, °C	Humidity, %	Pressure, kPa
26	37	99.6

Bandymų ataskaitos
7 priedas
Annex 7

Test Results

Sequence:

Burst / Electrical Fast Transient:
C:\Program Files (x86)\Teseq AG\WIN 3000\UserTests\EN 61000-4-4\EN 61547 lamp virs 25W.eft
EFT Test for 1-phase power line up to 1000V, alternate polarity, burst frequency 5 kHz & 100 kHz, coupling to all lines.

Time	Volt	Polarity	Frequency	Phase	Burst Time	Repetition Time	Step Duration	Coupling	Status
6/12/2018 3:07:08 PM	1000 V	Pos	5 KHz	---	15 ms	300 ms	120 s	IEC L1	Passed
6/12/2018 3:09:12 PM	1000 V	Neg	5 KHz	---	15 ms	300 ms	120 s	IEC L1	Passed
6/12/2018 3:11:18 PM	1000 V	Pos	5 KHz	---	15 ms	300 ms	120 s	IEC N	Passed
6/12/2018 3:13:23 PM	1000 V	Neg	5 KHz	---	15 ms	300 ms	120 s	IEC N	Passed
6/12/2018 3:15:28 PM	1000 V	Pos	5 KHz	---	15 ms	300 ms	120 s	IEC PE	Passed
6/12/2018 3:17:33 PM	1000 V	Neg	5 KHz	---	15 ms	300 ms	120 s	IEC PE	Passed

Dips and Drops:
C:\Program Files (x86)\Teseq AG\WIN 3000\UserTests\EN 61000-4-11_2004\EN 61547dips&interrup.dnd

Time	Volt	Phase	Repetition Time	Event Time	Step Duration	Status
6/12/2018 3:18:09 PM	70 %	0 °	10 s	200 ms	3 Pulses	Passed
6/12/2018 3:18:43 PM	0 %	0 °	10 s	10 ms	3 Pulses	Passed

Tested by: Vygintas Gudkovas
Date: 6/12/2018

Bandymų ataskaitos
8 priedas
Annex 8

ATSPARUMO VIRŠĮTAMPAIMS BANDYMŲ REZULTATAI
SURGES IMMUNITY TESTS RESULTS

6/12/2018 3:33 PM

- TEST REPORT-

Immunity to EMC Pulses

Equipment under test	
Order number	2108
Manufacturer/customer	Yellow Energy LT
EUT description/name	LED streetlight
Type	MF-SL-040
Serial number	EMC05813
SW version	
Notes	EUT operated

Normative documents:	
Requirements according to :	EN 61547:2009

Test specification and results:

Phenomena	Standard	Criteria	Notes	Result
Bursts to mains	EN 61000-4-4:2012	B		N/A
Bursts to signal lines	EN 61000-4-4:2012	B		N/A
Surges to mains	EN 61000-4-5:2014	B		Pass
Voltage dips	EN 61000-4-11:2004	B,C		N/A
Short interruptions	EN 61000-4-11:2004	C		N/A
Power fr. magnetic field	EN 61000-4-8:2010	B		N/A
Pulse magnetic field	EN 61000-4-9:1993+A1:2001			N/A

Main test equipment:

Manufacturer	Type	Serial Nr	In use
Teseq	NSG 3060	1478	☐
Teseq	CDN 3061	1407	☐
Teseq	NSG 3040	6098	☑
Teseq	CDN 3043	5012	☐

Manual or additional Equipment :

Manufacturer	Type	Serial Nr	Calibration date	Certificate Nr:	In use
Teseq	Coil INA702	255	2013-04-02	H702025S1413	☐
Teseq	INA 752	164	2013-02-14	H752016A0613	☐
Schaffner	Clamp CDN 8014	17308	2013-01-10	A090/13	☐

Modules:

Manufacturer	Type	Serial No.	Version / FW	Calibration date	Certificate No.
Teseq	WIN 3000	1906-0-0104-0000-23D1-E37F-DCEE-D368	1.4.1	---	---
Teseq	MCR 3000	1906	0002.42	---	---
Teseq	CDM 3041-C	1723	0002.39	11/23/2017	CR00205B
Teseq	PQM 3403	2479	0002.39	11/23/2017	CR00209B
Teseq	HVM 3040	1518	0002.39	---	---
Teseq	CWM 3451	3336	0002.39	11/20/2017	CR00207B
Teseq	FTM 3425	3687	0002.39	11/20/2017	CR00206B
Teseq	CDN 3043-C	5012	0002.39	11/20/2017	CR00208B
Teseq	INA 6502	221	0002.31	3/21/2013	H50202211213

Settings:
EUT supply voltage Uin used for 100% reference value: 230 V
Measured EUT Supply Voltage: 238 V
Measured EUT Supply Frequency: 49.9 Hz

Environmental Conditions:		
Temperature, °C	Humidity, %	Pressure, kPa
27	37	99.6

Bandymų ataskaitos
8 priedas
Annex 8

Test Results

Combination Wave:
C:\Program Files (x86)\Teseq AG\WIN 3000\UserTests\EN 61000-4-5\EN 61547 lamp daugiau 25W.cw
Combination wave test for 1-phase power line up to 2000V, alternate polarity, synchronous coupling from 0° to 270° in 90° step, line to line coupling.

Time	Volt	Polarity	Impedance	Phase	Repetition Time	Step Duration	Coupling	Status
6/12/2018 3:39:01 PM	1000 V	Pos	2 Ω	90 °	60 s	5 Pulses	IEC L1 -> N	Passed
6/12/2018 3:44:09 PM	1000 V	Neg	2 Ω	270 °	60 s	5 Pulses	IEC L1 -> N	Passed
6/12/2018 3:49:19 PM	2000 V	Pos	12 Ω	90 °	60 s	5 Pulses	IEC L1 -> PE	Passed
6/12/2018 3:54:28 PM	2000 V	Neg	12 Ω	270 °	60 s	5 Pulses	IEC N -> PE	Passed
6/12/2018 3:59:37 PM	2000 V	Pos	12 Ω	90 °	60 s	5 Pulses	IEC L1 -> PE	Passed
6/12/2018 4:03:46 PM	2000 V	Neg	12 Ω	270 °	60 s	5 Pulses	IEC N -> PE	Passed

Tested by: Vygintas Gudkovas

Date: 6/12/2018

LIETUVOS RESPUBLIKOS RYŠIŲ REGULIAVIMO TARNYBOS APARATŪROS IR ĮRENGINIŲ ELEKTROMAGNETINIO SUDERINAMUMO KONTROLĖS SKYRIUS
EQUIPMENT AND DEVICES ELECTROMAGNETIC COMPATIBILITY CONTROL DIVISION OF COMMUNICATIONS REGULATORY AUTHORITY OF THE REPUBLIC OF LITHUANIA

Valstybės biudžetinė įstaiga. Juridinių asmenų registras. Kodas 121442211. Zarasų g. 38, LT - 44140 Kaunas. Tel. (8 37) 334040. Faks. (8 37) 211907. El.p. emc@rrt.lt.

APPROVED
Head of Division
A.V.

Arvydas Giedraitis

BANDYMŲ ATASKAITA
TEST REPORT

2018-06-22 No (29.1) PB-74

BANDOMASIS OBJEKTAS TEST ITEM	LED street luminaire MAXFlux
GAMINTOJAS MANUFACTURER	YELLOW ENERGY, Lithuania
TIPAS TYPE	MF-SL-040
SERIJOS NUMERIS SERIAL NUMBER	EMC05813 (assigned number)
UŽSAKOVAS APPLICANT	UAB "Autokausta" Marvelės g. 199B LT-46204 Kaunas Lithuania Tel.: +370 37 397555 Fax: +370 37 397444 E-mail: statyba@autokausta.lt
BANDYMŲ PRADŽIA START OF TESTS	2018-06-22
BANDYMŲ PABAIGA END OF TESTS	2018-06-22
LAPŲ SKAIČIUS NUMBER OF PAGES	7
ATASKAITOS PRIEDAI ANNEXES OF REPORT	1 (1 page)

1. BANDYMŲ SUVESTINĖ
SUMMARY OF TESTS

Test name	*Normative documents*	*Test result*
Electromagnetic immunity:		
Immunity to conducted radio frequency electromagnetic disturbances	EN 61547:2009 EN 61000-4-6:2014	Pass

Notes:
1. The applicant determined the extent of applied tests.
2. No applicant's representatives witnessed the tests.
3. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

2. STANDARTŲ NUORODINIAI ŽYMENYS IR ANTRAŠTĖS
REFERENCES AND TITLES OF THE STANDARDS

EN 61547:2009
Equipment for general lighting purposes - EMC immunity requirements (IEC 61547:2009).

EN 61000-4-6:2014
Electromagnetic compatibility (EMC) -- Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2013).

3. BANDOMOSIOS ĮRANGOS (BĮ) APRAŠYMAS
DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

3.1. APRAŠYMAS
DESCRIPTION

LED street luminaire MAXFlux MF-SL-040 is powered from 180-253 V, 50/60 Hz mains network. Max power consumption: 40 W.

3.2. BANDOMOSIOS ĮRANGOS FOTOGRAFIJOS
PHOTOS OF THE EQUIPMENT UNDER TEST

Fig. 1. Bottom view

Fig. 2. Top view

Fig. 3. Side view

4. BANDYMAMS NAUDOTA ĮRANGA
EQUIPMENT USED FOR TESTS

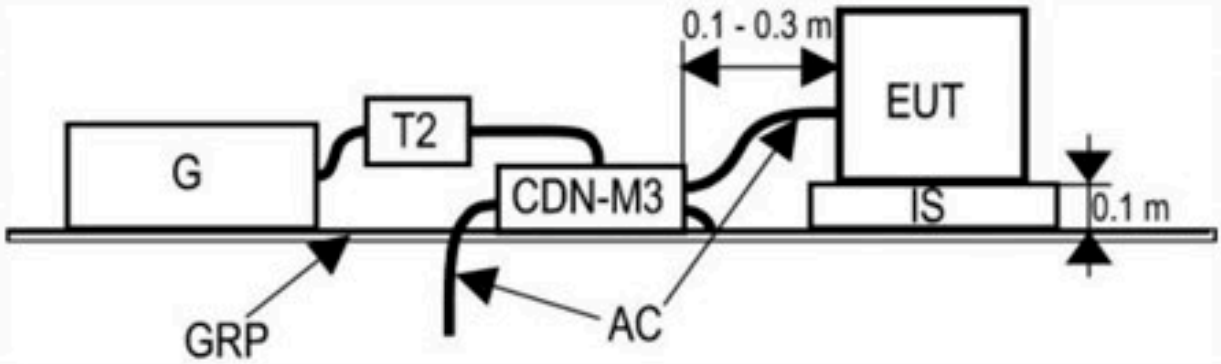
Name	*Type*	*Serial No*	*Calibration document*
Immunity to conducted disturbances, induced by RF fields test			
Frankonia, immunity testing system	CIT-10/75 FLL-75	102C3214 1029	Certificate of calibration No E61604 D-K-15070-01-01 2018-13
Bird Electronic corp. attenuator	75-A-FFN-06	0332	Certificate No 70A/13
Frankonia software CIT-10	Version 2.27	102C3214	-

5. ATSPARUMO RADIJO DAŽNIŲ LAUKŲ INDUKUOTIEMS LAIDININKAIS SKLINDANTIEMS TRIKDŽIAMS BANDYMAS DAŽNIŲ DIAPAZONE NUO 150 kHz IKI 80 MHz

IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS TEST IN THE FREQUENCY RANGE FROM 150 kHz TO 80 MHz

5.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Conducted disturbances to a.c. power input



EUT – equipment under test
IS – insulating support
T2 – attenuator (6 dB)
AC – power cable
G – generator
CDN-M3 – coupling/decoupling device
GRP – ground reference plane

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
a.c. power input	Injected currents (radio-frequency common mode)	± 3 V r.m.s (unmodulated) [1]	A
[1] Modulation: 1 kHz, 80 % AM, sine wave; source impedance 150 Ω.			

5.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-6:2014.

5.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 1.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

5.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to conducted disturbances, induced by radio-frequency fields at input a.c power port.

Deputy Head of Division — Raimondas Štulas

Vaidotas Stankus, tel. (+370) 37 334040, fax (+370) 37 211907, e-mail vaidotas.stankus@rrt.lt

Bandymų ataskaitos
1 priedas
Annex 1

ATSPARUMO RADIJO DAŽNIŲ LAUKŲ INDUKUOTIEMS LAIDININKAIS SKLINDANTIEMS TRIKDŽIAMS BANDYMO REZULTATAI
IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS TEST RESULTS

IEC1000-4-6/EN61000-4-6 Conducted disturbances test

Date: 22.06.18
Time: 16:09
Order No.: 2108
Id.no.: EMC05813
Device: LED luminaire MF-SL-040
Company: Yellow Energy LT
Test engineer: V.Gudkovas
Operating mode: EUT operated.
EUT dimensions:300x70x600 mm.
CDN coupling factor:- 0.6 dB
Test location: EMC test room
Temp.=25.4 C
Hum.=34.5 %
p.=99.6 kPa

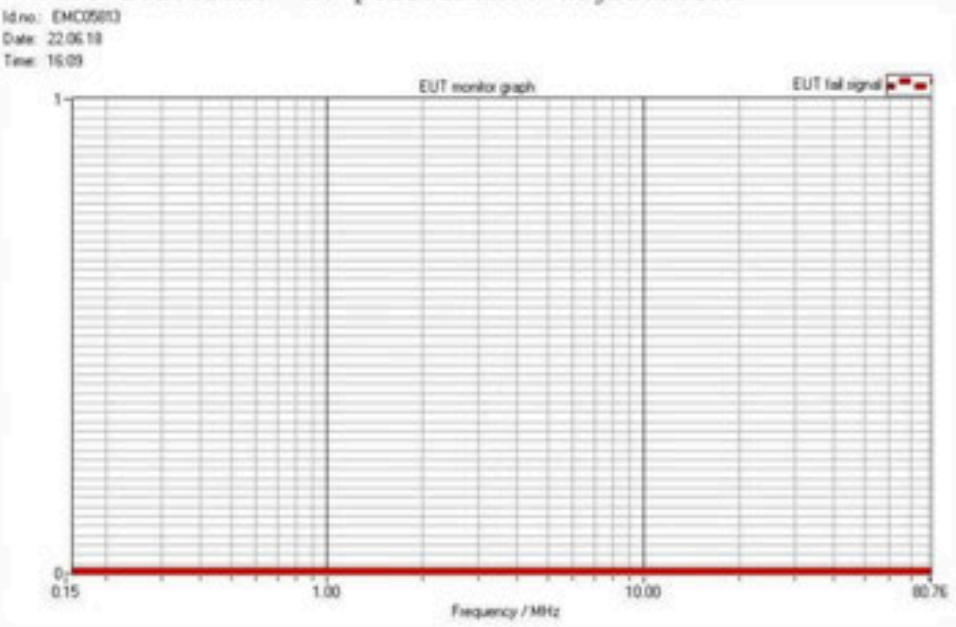
CDN: CDN_M2_3V
Start frequency: 0.150000 MHz
Stop frequency: 80.000000 MHz
Test level: 3.0 V

Sweep type: logarithmic
Steps: 1.00 %
Dwell time: 2.9 s

Modulation: internal AM
Modulation frequency: 1000.0 Hz
Modulation level: 80.0 %

Test system: Frankonia CIT-10/75 No.102C3214; FLL-75 No. 1029
Software: EN 61000-4-6 v.2.27

Test reactions: no performance degradation



LIETUVOS RESPUBLIKOS RYŠIŲ REGULIAVIMO TARNYBOS APARATŪROS IR ĮRENGINIŲ ELEKTROMAGNETINIO SUDERINAMUMO KONTROLĖS SKYRIUS
EQUIPMENT AND DEVICES ELECTROMAGNETIC COMPATIBILITY CONTROL DIVISION OF COMMUNICATIONS REGULATORY AUTHORITY OF THE REPUBLIC OF LITHUANIA

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APPROVED
Head of Division
A.V.

Arvydas Giedraitis

BANDYMŲ ATASKAITA
TEST REPORT

2018-06-15 No (29.1) PB-67

BANDOMASIS OBJEKTAS TEST ITEM	LED street luminaire MAXFlux
GAMINTOJAS MANUFACTURER	YELLOW ENERGY, Lithuania
TIPAS TYPE	MF-SL-075
SERIJOS NUMERIS SERIAL NUMBER	EMC05817 (assigned number)
UŽSAKOVAS APPLICANT	UAB "Autokausta" Marvelės g. 199B LT-46204 Kaunas Lithuania Tel.: +370 37 397555 Fax: +370 37 397444 E-mail: statyba@autokausta.lt
BANDYMŲ PRADŽIA START OF TESTS	2018-05-22
BANDYMŲ PABAIGA END OF TESTS	2018-06-12
LAPŲ SKAIČIUS NUMBER OF PAGES	15
ATASKAITOS PRIEDAI ANNEXES OF REPORT	1 (2 pages), 2 (2 pages), 3 (2 pages), 4 (1 page), 5 (4 pages), 6 (3 pages), 7 (2 pages), 8 (2 pages)

1. BANDYMŲ SUVESTINĖ
SUMMARY OF TESTS

Test name	*Normative documents*	*Test result*
Electromagnetic disturbances:		
Disturbance voltage at the mains terminals	EN 55015:2013 EN 55015:2013/A1:2015	Pass
Radiated disturbance	EN 55015:2013 EN 55015:2013/A1:2015	Pass
Harmonic current emission	EN 61000-3-2:2014	Pass
Voltage changes, fluctuations and flicker	EN 61000-3-3:2013	Pass
Electromagnetic immunity:		
Electrostatic discharge immunity test	EN 61547:2009 EN 61000-4-2:2009	Pass
Radiated RF electromagnetic field immunity test	EN 61547:2009 EN 61000-4-3:2006 EN 61000-4-3:2006/A1:2008 EN 61000-4-3:2006/A2:2010	Pass
Electrical fast transients/burst immunity test	EN 61547:2009 EN 61000-4-4:2012	Pass
Surges immunity test	EN 61547:2009 EN 61000-4-5:2014	Pass
Voltage dips and short interruptions immunity test	EN 61547:2009 EN 61000-4-11:2004	Pass

Notes:
1. The applicant determined the extent of applied tests.
2. No applicant's representatives witnessed the tests.
3. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

2. STANDARTŲ NUORODINIAI ŽYMENYS IR ANTRAŠTĖS
REFERENCES AND TITLES OF THE STANDARDS

EN 55015:2013
Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment (CISPR 15:2013 + IS1:2013 + IS2:2013).
Amendment: EN 55015:2013/A1:2015.

EN 55032:2015
Electromagnetic compatibility of multimedia equipment - Emission requirements (CISPR 32:2012).
Corrigendum EN 55032:2012/AC:2013.

EN 61547:2009
Equipment for general lighting purposes - EMC immunity requirements (IEC 61547:2009).

EN 61000-4-2:2009
Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test (IEC 61000-4-2:2008).

EN 61000-4-3:2006
Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2006).
Amendment EN 61000-4-3:2006/A1:2008.
Amendment EN 61000-4-3:2006/A2:2010.

EN 61000-4-4:2012
Electromagnetic compatibility (EMC) -- Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test (IEC 61000-4-4:2012).

EN 61000-4-5:2014
Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test (IEC 61000-4-5:2014).

EN 61000-4-11:2004
Electromagnetic compatibility (EMC). Part 4-11: Testing and measurement techniques. Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:2004).

3. BANDOMOSIOS ĮRANGOS (BĮ) APRAŠYMAS
DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

3.1. APRAŠYMAS
DESCRIPTION

LED street luminaire MAXFlux MF-SL-075 is powered from 180-253 V, 50/60 Hz mains network. Max power consumption: 75 W.

3.2. BANDOMOSIOS ĮRANGOS FOTOGRAFIJOS
PHOTOS OF THE EQUIPMENT UNDER TEST

Fig. 1. Bottom view

Fig. 2. Top view

Fig. 3. Side view

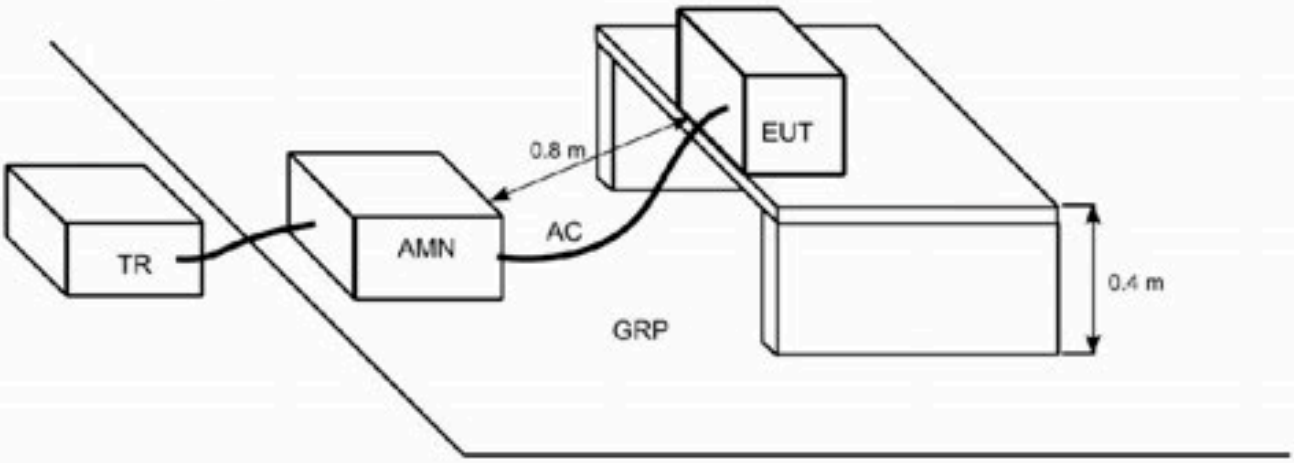
4. BANDYMAMS NAUDOTA ĮRANGA
EQUIPMENT USED FOR TESTS

Name	*Type*	*Serial No*	*Calibration document*
Conducted disturbances tests			
Rohde&Schwarz 20 Hz – 40 GHz test receiver	ESU 40	100062	Certificate of calibration No 45355 D-K-15195-01-01 2018-02
Rohde&Schwarz artificial mains network	ESH2-Z5	890485/009	Certificate of calibration No 372373 D-K-15012-01-00 2015-12
Rohde&Schwarz testing software EMC32	Version 9.12.00	-	-
Radiated emissions test			
Rohde&Schwarz 20 Hz – 40 GHz test receiver	ESU 40	100062	Certificate of calibration No 45355 D-K-15195-01-01 2018-02
TDK RF Solutions 30 MHz – 3 GHz log periodic antenna	HLP-3003	130603	Certificate of calibration No 2010110459
Rohde&Schwarz testing software EMC32	Version 9.12.00	-	-
Harmonic current emission, voltage changes, fluctuations and flicker tests			
Spitzenberger + Spies test system	EMV D 15000/PAS	A306907/ 01102	Certificate of calibration No A5801d
Spitzenberger + Spies EMC test software	Version 2.34f	-	-
Electrostatic discharge immunity test			
EM Test electrostatic discharge generator	ESD30N P30N	V1039107411 V1039107412	Certificate of calibration No SCS-1039107411-010-U17-ESD30N
Radiated radio frequency electromagnetic field immunity test			
Agilent Technologies 250 kHz – 20 GHz signal generator	E8257D	US44270408	Certificate of calibration No 1-7257953524-1
EMCO 80 MHz – 2 GHz broadband log periodic antenna	3144	00035589	Certificate of calibration No 48662
Amplifier Research 80 MHz – 1000 MHz power amplifier	250W1000A	307533	Certificate of calibration No C9907A
Amplifier Research 10 kHz – 100 GHz power meter	PM2002	321670	Certificate of calibration No D19192A
Amplifier Research 10 kHz – 8 GHz power head	PH2000	321958	
Amplifier Research 80 MHz – 1 GHz directional coupler	DC6180A	322196	Certificate of calibration No 027371/01/010
Amplifier Research 100 kHz – 6 GHz electric field probe	FL7006	0339425	Certificate of calibration No 2017090420-1
Amplifier Research field monitor	FM7004	0339366	-
Amplifier Research probe interface	FI7000	0339669	-
Amplifier Research software emcware	V3.1.0	0340646	-
Electrical fast transients/burst immunity test			
Teseq multifunction generator	NSG 3060	1478	Certificate of calibration No SCS-1478/1407-064-U17-NSG3060/ CDN3061
Teseq coupling/decoupling network	CDN 3061	1407	
Teseq software WIN 3000	v1.4.1	-	-
Surges immunity test			
Teseq multifunction generator	NSG 3040	6098	Certificates of calibration No SCT-3336-SLO-CH100517-CWM3451
Teseq software WIN 3000	v1.4.1	-	-
Voltage dips and short interruptions and voltage variations immunity tests			
Teseq multifunction generator	NSG 3060	1478	Certificate of calibration No SCS-1478/1407-064-U17-NSG3060/CDN3061
Teseq coupling/decoupling network	CDN 3061	1407	
Teseq automated variable transformer	VAR 3005-S16	0848	Certificate of calibration No H00508482213
Teseq software WIN 3000	v1.4.1	-	-

5. 5. LAIDININKAIS SKLINDANČIŲ TRIKDŽIŲ MAITINIMO PRIEIGOJE BANDYMAS 9 kHz – 30 MHz DAŽNIŲ DIAPAZONE
DISTURBANCE VOLTAGE AT THE MAINS TERMINALS TEST IN THE FREQUENCY RANGE 9 kHz TO 30 MHz

5.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
TR – test receiver
AMN – artificial mains network
GRP – ground reference plane
AC – power cable

Test setup: table-top equipment.
EUT arrangement: 0.4 m from metal floor of semianechoic chamber, 0.8 m from AMN and ≥0.8 m from other metal surfaces.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
Disturbances limits at mains terminals:

- 110 dB(µV) quasi-peak in the frequency range 9 kHz – 50 kHz;
- 90 dB(µV) – 80 dB(µV) quasi-peak in the frequency range 50 kHz – 150 kHz;
- 66 dB(µV) – 56 dB(µV) quasi-peak and 56 dB(µV) – 46 dB(µV) average in the frequency range 0,15 MHz – 0,5 MHz;
- 56 dB(µV) quasi-peak and 46 dB(µV) average in the frequency range 0,5 MHz – 5 MHz;
- 60 dB(µV) quasi-peak and 50 dB(µV) average in the frequency range 5 MHz – 30 MHz.

5.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 55015:2013, EN 55015:2013/A1:2015.

5.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 1.
Detailed information of equipment used for tests is presented in clause 4.
Measurement uncertainty: ±3,17 dB.

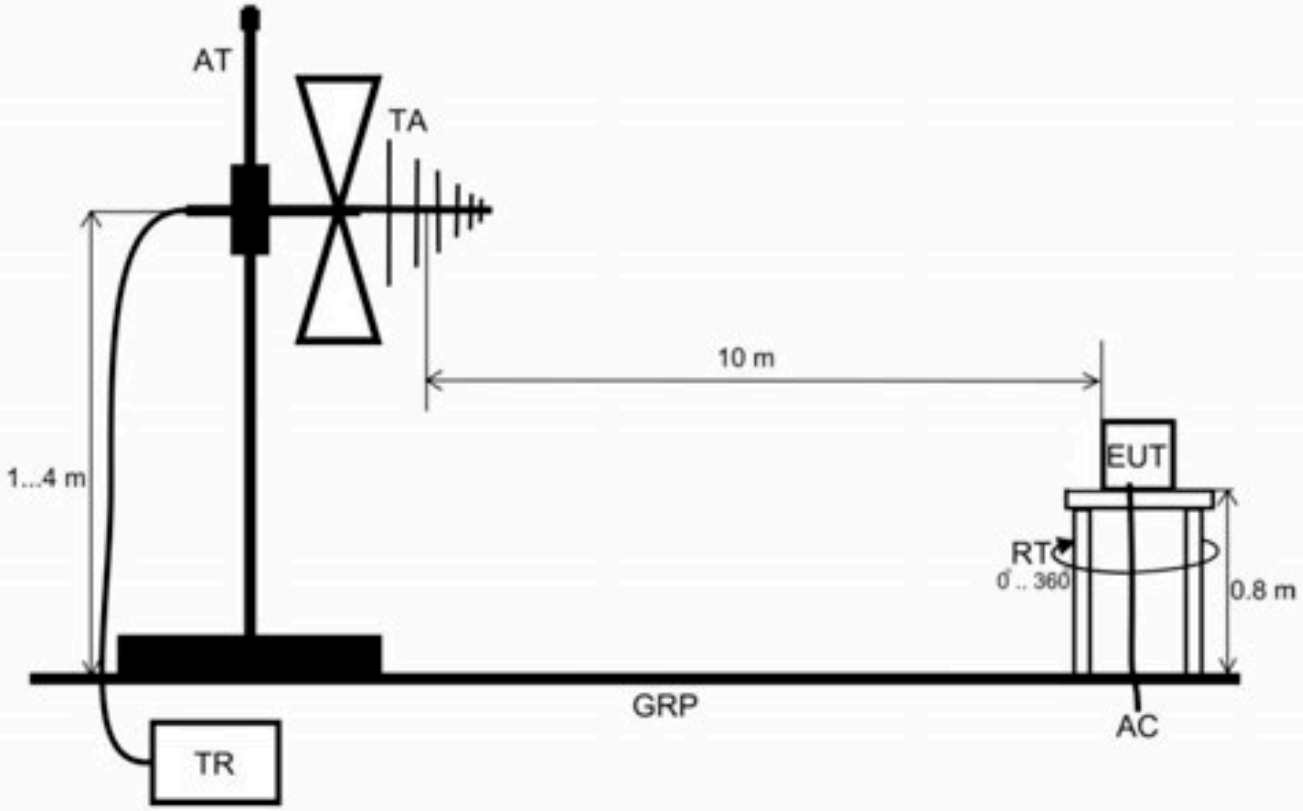
5.4 IŠVADA
CONCLUSION

Equipment under test complies with the requirements of conducted disturbances at mains terminals.

6. TRIKDŽIŲ SPINDULIUOTĖS BANDYMAS 30 MHz – 300 MHz DAŽNIŲ DIAPAZONE
RADIATED DISTURBANCE TEST IN THE FREQUENCY RANGE FROM 30 MHz TO 300 MHz

6.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
TA – measuring antenna
AT – antenna mast
TR – test receiver
RT – rotating table
AC – power cable
GRP – reference ground plane

Test setup: table-top equipment.
Test procedure: specified in clause A1.1 of Table A.1 of CISPR 32:2012.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
Emission limits:

- 30 dB(µV/m) Quasi-peak at 10 m in the frequency range 30 MHz – 230 MHz;
- 37 dB(µV/m) Quasi-peak at 10 m in the frequency range 230 MHz – 300 MHz.

6.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 55015:2013, EN 55015:2013/A1:2015.

6.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 2.
Detailed information of equipment used for tests is presented in clause 4.
Measurement uncertainty: ±4.7 dB.

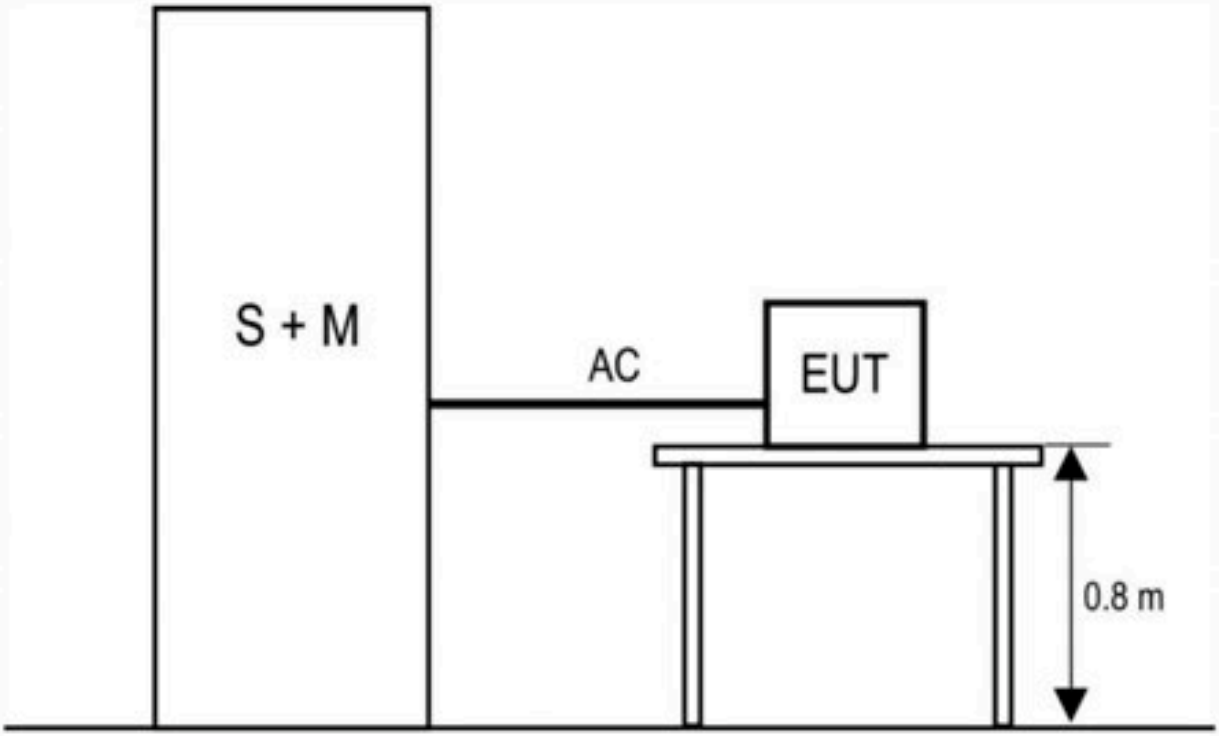
6.4. IŠVADA
CONCLUSION

Equipment under test complies with the requirements of radiated disturbance.

7. HARMONINIŲ SROVIŲ SPINDULIAVIMO BANDYMAS
HARMONIC CURRENT EMISSION TEST

7.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
S – power supply
M – measuring equipment
AC – mains cable

Test setup: table-top equipment.
Test voltage: 230 V.
EUT classification: class C b) 1.

7.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61000-3-2:2014.

7.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 3.
Detailed information of equipment used for tests is presented in clause 4.

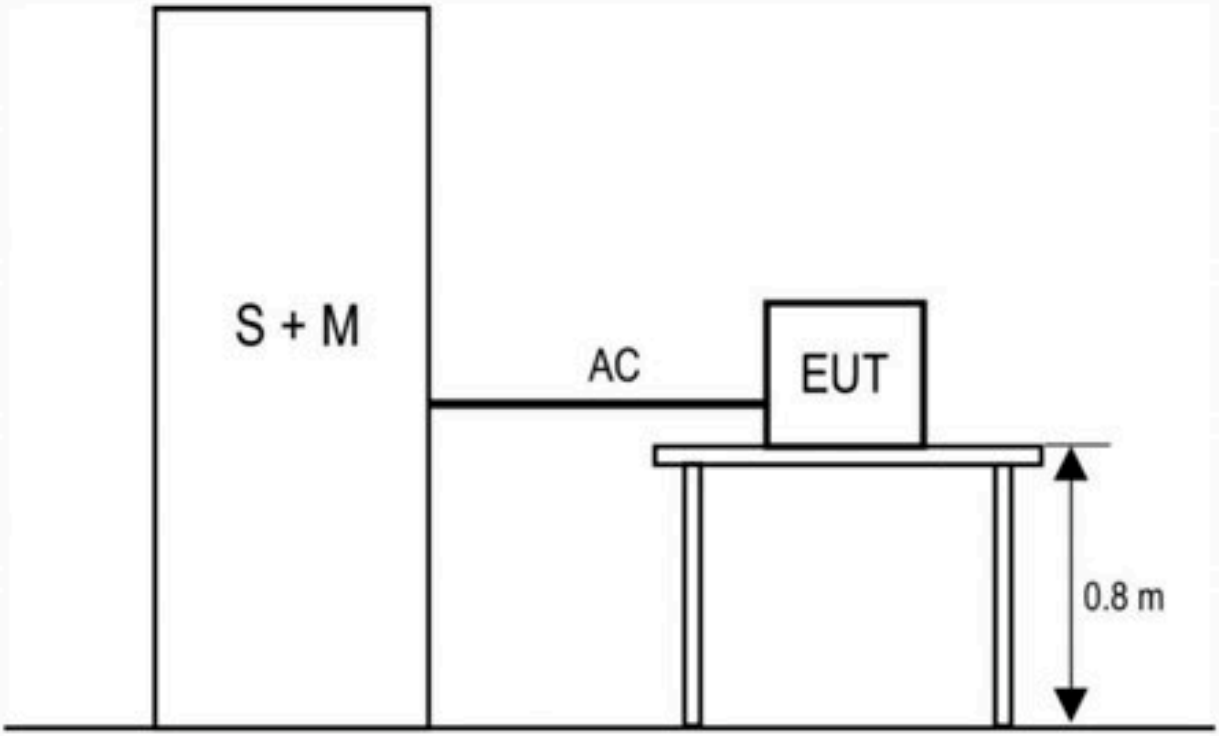
7.4. IŠVADA
CONCLUSION

The equipment under test complies with the requirements for harmonic current emission.

8. ĮTAMPOS POKYČIŲ, SVYRAVIMŲ IR MIRGĖJIMO BANDYMAS
VOLTAGE CHANGES, FLUCTUATIONS AND FLICKER TEST

8.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
S – power supply
M – measuring equipment
AC – mains cable

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz.

8.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61000-3-3:2013.

8.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 4.
Detailed information of equipment used for tests is presented in clause 4.

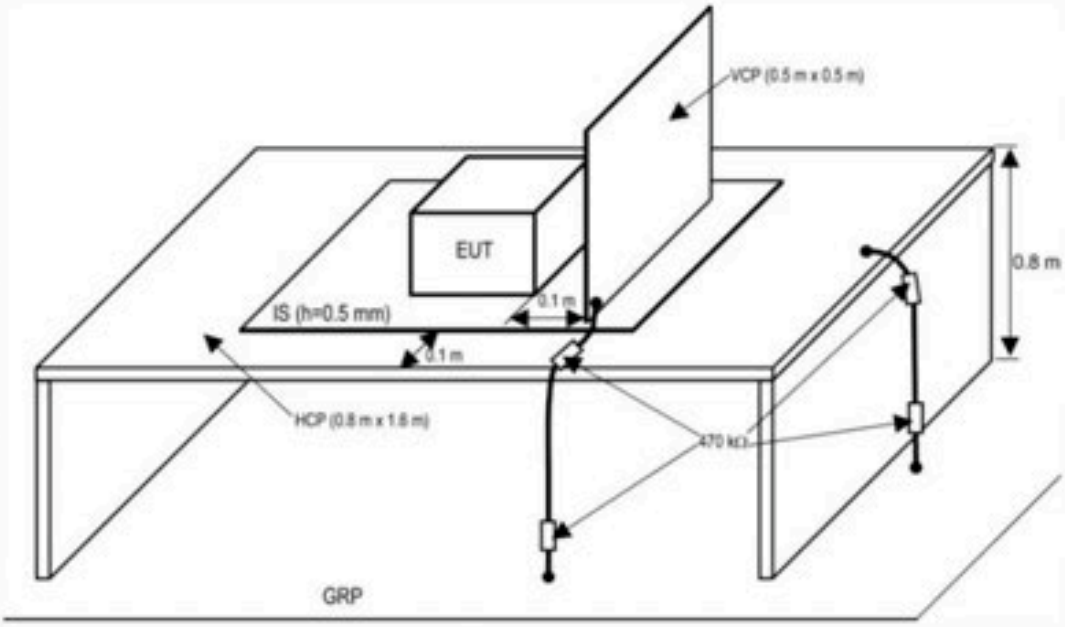
8.4. IŠVADA
CONCLUSION

The equipment under test complies with the requirements for voltage changes, fluctuations and flicker.

9. ATSPARUMO ELEKTROSTATINIAM IŠLYDŽIUI BANDYMAS
ELECTROSTATIC DISCHARGE IMMUNITY TEST

9.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – isolation seal
GRP – ground reference plane
HCP – horizontal coupling plane
VCP – vertical coupling plane

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network. .
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
Enclosure	Electrostatic discharge	4 kV contact discharge [1]	B
[1] 10 positive and 10 negative discharges at the front edge of HCP opposite the center of 4 sides of EUT; at the center of vertical edge of VCP placed on the 4 sides of EUT; at three selected points of EUT.			

9.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-2:2009.

9.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 5.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

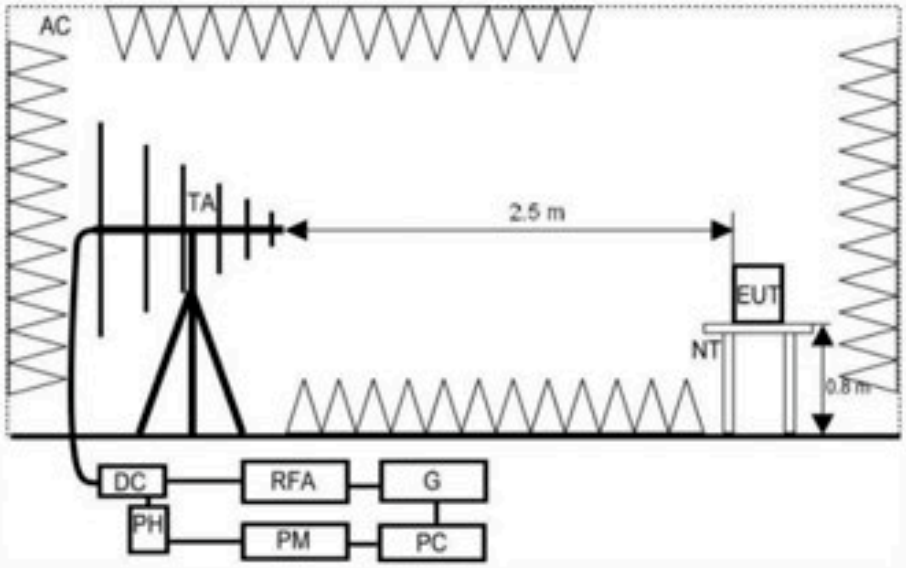
9.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to electrostatic discharge.

10. ATSPARUMO SPINDULIUOJAMAM ELEKTROMAGNETINIAM RADIJO DAŽNIŲ LAUKUI 80 MHz – 1 GHz DAŽNIŲ DIAPAZONE BANDYMAS
RADIATED RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST IN THE FREQUENCY RANGE FROM 80 MHz TO 1 GHz

10.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
DC – directional coupler
PH – power head
RFA – radio frequency amplifier
PM – power meter
G – generator
PC – computer
AC – anechoic chamber
TA – test antenna
NT – non conducting table

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
Enclosure	Electromagnetic field	3 V/m [1, 2]	A
[1] Modulation: 1 kHz, 80 % AM, sine wave. [2] Field generated with vertical and horizontal antenna polarization from four sides of EUT.			

10.2. NORMINIAIDOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-3:2006, EN 61000-4-3:2006/A1:2008, EN 61000-4-3:2006/A2:2010.

10.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 6.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

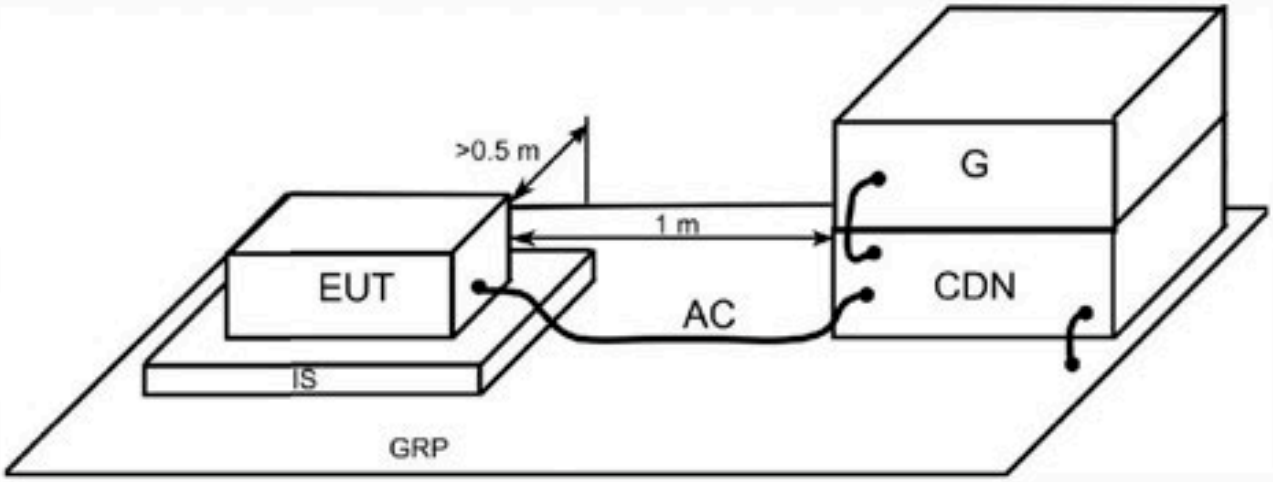
10.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to radiated RF electromagnetic field.

11. ATSPARUMO SPARČIAJAM ELEKTRINIAM PEREINAMAJAM VYKSMUI-VORAI BANDYMAS
ELECTRICAL FAST TRANSIENTS/BURST IMMUNITY TEST

11.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – insulating support
AC – power cable
G – generator
CDN – coupling-decoupling network
GRP – ground reference plane

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
a.c. power	Burst	± 1 kV (peak, 5/50 ns, 5 kHz) [1]	B
[1] Duration: 2 min with a positive polarity and a 2 min with a negative polarity pulses.			

11.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-4:2012.

11.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 7.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

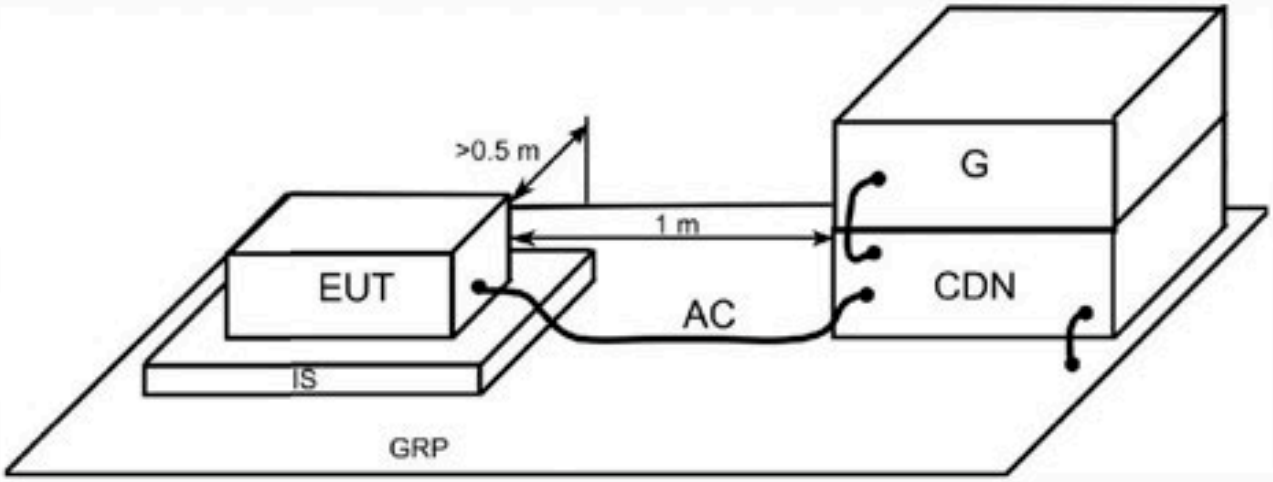
11.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to electrical fast transients/burst at input a.c power port.

12. ATSPARUMO VIRŠĮTAMPIAMS BANDYMAS
SURGES IMMUNITY TEST

12.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – insulating support
AC – power cable

EUT – equipment under test
IS – insulating support
AC – power cable

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
AC power	Surge (line to line)	± 1,0 kV (1,2/50 µs) [1]	B
	Surge (line to ground)	± 2,0 kV (1,2/50 µs) [1]	B
[1] 5 positive polarity pulses at the 90° phase angle and 5 negative polarity pulses 270° phase angle.			

12.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-5:2006.

12.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 8.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

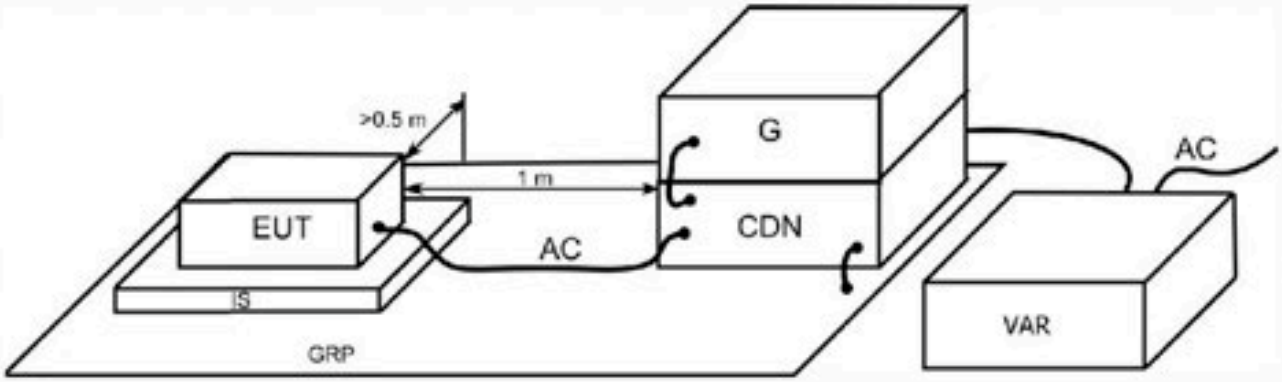
12.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to surges at input a.c power port.

13. ATSPARUMO ĮTAMPOS KRYČIAMS IR TRUMPIESIEMS PERTRŪKIAMS BANDYMAS
VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TEST

13.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – insulating support
G – generator
CDN – coupling/decoupling network
GRP – ground reference plane
AC – power cable
VAR - variac

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
AC power	Voltage dip	70 % for 10 periods	C
	Short interruptions	0 % for 0,5 periods	B

13.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-11:2004.

13.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 7.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

13.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to voltage dips, short interruptions.

Deputy Head of Division — Raimondas Štulas

Bandymų ataskaitos
1 priedas
Annex 1

LAIDININKAIS SKLINDANČIŲ TRIKDŽIŲ MAITINIMO PRIEIGOJE BANDYMO REZULTATAI
DISTURBANCE VOLTAGE AT THE MAINS TERMINALS TEST RESULTS

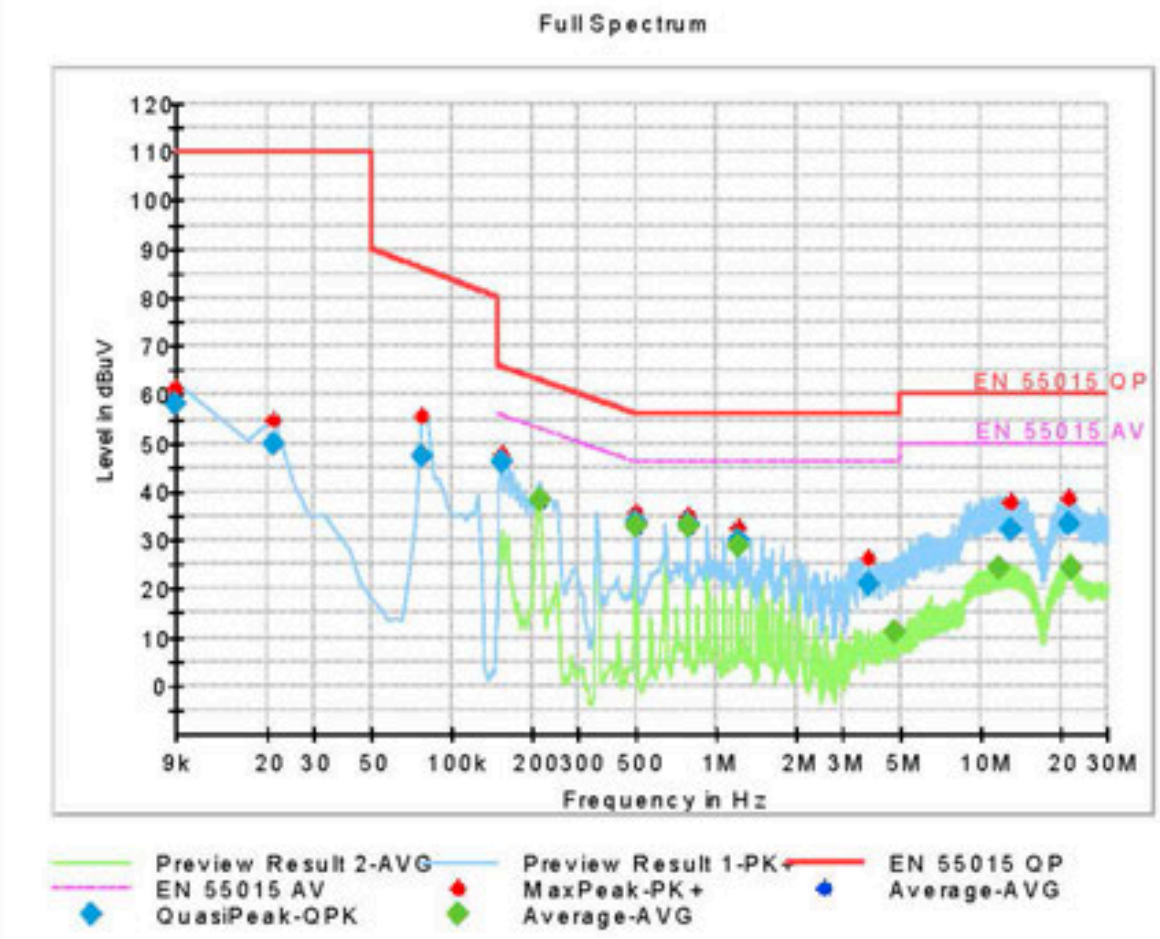
TEST REPORT
Order No. 2109

Common Information

Test Description:	Disturbance voltage on mains
Operating Conditions:	Operated
Ambient conditions:	t= 24oC; h= 37%; p= 101.4kPa
Test place:	Semianechoic chamber, Kaunas
Operator Name:	V.Gudkovas
Test date:	2018 05 22

EUT Information

EUT Name:	LED streetlight
Manufacturer:	Yellow Energy LT
Typr/model:	MF-SL-075
Serial Number:	EMC05817
Comment:	



Bandymų ataskaitos
1 priedas
Annex 1

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.009000	57.99	110.00	52.01	1000.0	0.200	N	GND	0.8
0.021000	49.99	110.00	60.01	1000.0	0.200	L1	GND	0.3
0.077000	47.50	86.07	38.57	1000.0	0.200	N	GND	0.2
0.154000	46.12	65.78	19.66	5000.0	9.000	L1	GND	0.2
0.494000	33.90	56.10	22.20	5000.0	9.000	N	GND	0.2
0.778000	33.27	56.00	22.73	5000.0	9.000	L1	GND	0.2
1.202000	30.16	56.00	25.84	5000.0	9.000	L1	GND	0.2
3.754000	20.89	56.00	35.11	5000.0	9.000	L1	GND	0.3
13.038000	32.05	60.00	27.95	5000.0	9.000	L1	GND	0.9
21.614000	33.50	60.00	26.50	5000.0	9.000	N	GND	1.4

Final_Result_AVG

Frequency (MHz)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.214000	38.10	53.05	14.95	5000.0	9.000	L1	GND	0.2
0.494000	32.79	46.10	13.31	5000.0	9.000	N	GND	0.2
0.778000	32.97	46.00	13.03	5000.0	9.000	L1	GND	0.2
1.202000	28.91	46.00	17.09	5000.0	9.000	L1	GND	0.2
4.738000	11.12	46.00	34.88	5000.0	9.000	N	GND	0.5
11.730000	24.30	50.00	25.70	5000.0	9.000	L1	GND	0.7
21.858000	24.44	50.00	25.56	5000.0	9.000	N	GND	1.4

Hardware Setup: EMI conducted\Voltage with 2-line LISN ESH2-Z5 - [EMI conducted]

Subrange 1

Frequency Range:	9 kHz - 30 MHz
Receiver:	ESU 40 [ESU 40] @ GPIB0 (ADR 20), SN 100062/040, FW 4.43, CAL 2014.04.13
Signal Path:	ESIB 26-2-line LISN ESH2-Z5 FW 1.0 Correction Table: Cable Tinkl Correction Table: Cable TMS-H2 10m Nr.100084
LISN:	2-line LISN ESH2-Z5 Correction Table (Line 0): ESH2-Z5 Nr 890485-009 shucoN Correction Table (Line 1): ESH2-Z5 Nr 890485-009 shucoL1

Bandymų ataskaitos
2 priedas
Annex 2

TRIKDŽIŲ SPINDULIUOTĖS BANDYMO REZULTATAI
RADIATED DISTURBANCE TEST RESULTS

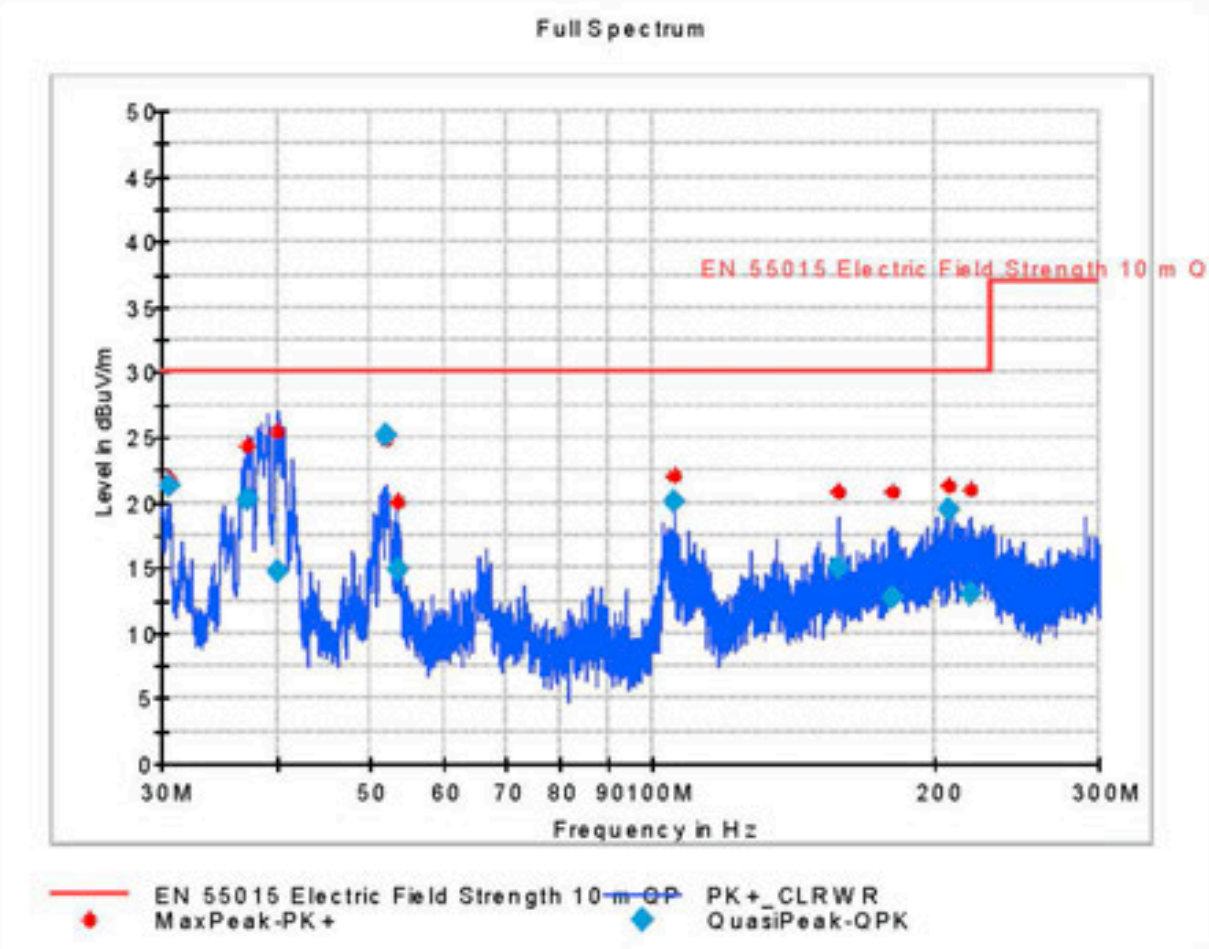
TEST REPORT
Order No. 2109

Common Information

Test Description:	Radiated disturbances in frequency range 30-300 MHz
Operating Conditions:	Operated
Ambient conditions:	t= 22oC; h= 41%; p= 100.7kPa
Test place:	Open area test site (OATS), Dovainonys
Operator Name:	V.Gudkovas
Test date:	2018 05 23

EUT Information

EUT Name:	LED streetlight
Manufacturer:	Yellow Energy LT
Typr/model:	MF-SL-075
Serial Number:	EMC05817
Comment:	



Bandymų ataskaitos
2 priedas
Annex 2

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.600000	21.32	30.00	8.68	15000.0	120.000	250.0	H	270.0	11.1
37.000000	20.27	30.00	9.73	15000.0	120.000	300.0	H	225.0	10.6
40.000000	14.80	30.00	15.20	15000.0	120.000	350.0	H	0.0	10.3
52.080000	25.15	30.00	4.85	15000.0	120.000	200.0	H	225.0	10.2
53.680000	14.92	30.00	15.08	15000.0	120.000	250.0	H	225.0	10.3
105.640000	20.10	30.00	9.90	15000.0	120.000	400.0	V	0.0	11.1
158.400000	15.01	30.00	14.99	15000.0	120.000	250.0	V	270.0	13.2
181.080000	12.74	30.00	17.26	15000.0	120.000	200.0	H	270.0	13.9
206.920000	19.45	30.00	10.55	15000.0	120.000	350.0	H	270.0	14.0
218.560000	13.02	30.00	16.98	15000.0	120.000	200.0	H	315.0	12.7

Hardware Setup: EMI radiated\Electric Field Strength OATS - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 1 GHz
Receiver:	ESU 40 [ESU 40] @ GPIB0 (ADR 20), SN 100062/040, FW 4.43, CAL 2014.04.13
Signal Path:	ESIB 26-HLP 3003 Nr130603 FW 1.0 Correction Table: Cable TMS-H2 10m Nr100083
Antenna:	HLP 3003 Nr130603 Correction Table (vertical): HLP-3003 Nr130603 vert 10m Correction Table (horizontal): HLP-3003 Nr130603 hor 10m
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.01
Turntable:	Turn Table [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.01

Bandymų ataskaitos
3 priedas
Annex 3

HARMONINIŲ SROVIŲ SPINDULIAVIMO BANDYMO RESULTATAI
HARMONIC CURRENT EMISSION TEST RESULTS

Name:	V. Gudkovas	Serial no:	EMC05817
Department:	EMC control division	Operating mode:	Operated
Company:	RRT	Comment1:	Ambient temp. +24 °C
Order no:	2109	Comment2:	Rel. humidity 37 %
Device:	LED streetlight	Comment3:	Atm. pressure 101.4kPa
Specimen:	Lighting equipment	Comment4:	
Manufacturer:	YellowEnergyLT	Date:	22.05.2018
Type:	MF-SL-075	Test date:	22.05.2018

Maximum RMS current and corresponding values in timewindow 194:

Voltage:	231.12 Vrms		THD=0.01 %	THV=0.013 V	POHV=0.004 V	PWHD=0.01 %
Current:	0.318 Arms		THD=15.08 %	THC=0.047 A	POHC=0.002 A	PWHD=3.77 %
Power:	70.5 W	P1=70.5 W	73.5 VA			
Power factor:	0.958	CosPhi1: 0.970				

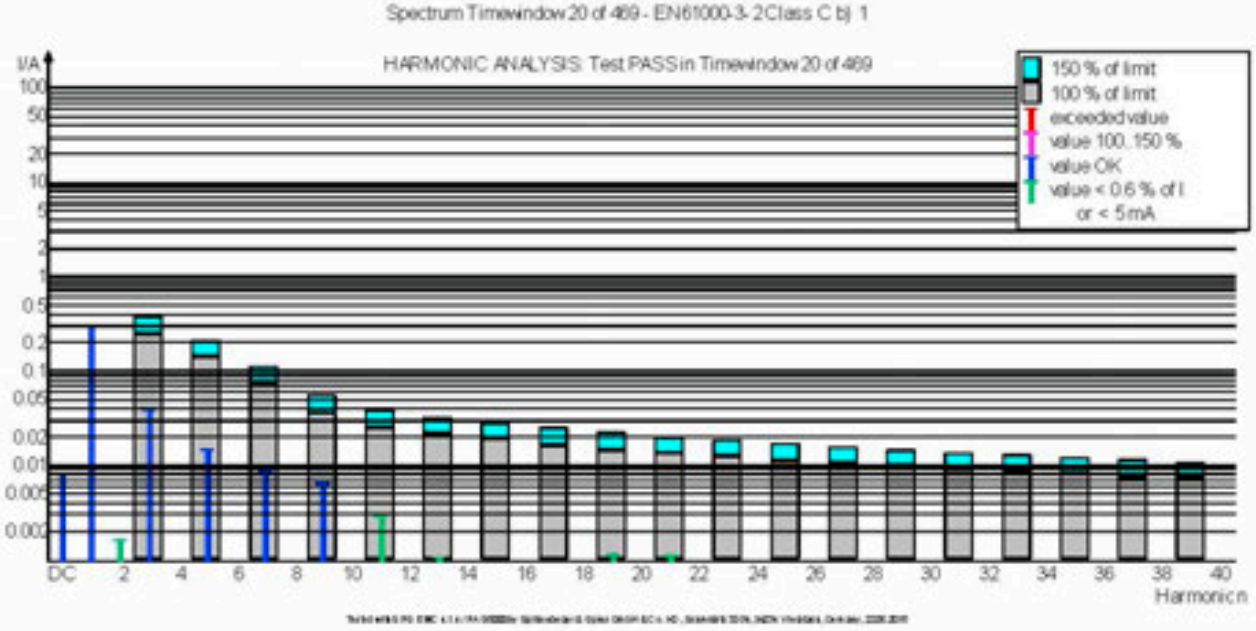
Test conditions: EN 61000-3-2 2014, f=50 Hz, Phase=L1, Range=4.00 A
Time window: 16, Grouping (>2nd harm.)=off, Rated power=71 W
No Ztest selected
harmonic currents < 0.6 % of I or < 5 mA are disregard for calc. of THD, THC, POHC, PWHD

HARMONIC ANALYSIS: Test PASS
Tobs = entire measurement; POHC: avg=0.00 A, limits=0.03 A
Iavg=0.316 Arms

Ha	Entire measurement (2.5 min = 469 time windows)						Worst 2.5 min		Average		PASS	FAIL
	Maximum	Window	EN61000-3-2 Class C b) 1	Margin in MaxWin	100 to 150%	Exceeded	100 to 150%	Exceeded	Value	Exceeded		
DC	-0.0110 A	467	-.----	---.-	0	0	n.e.	n.e.	-0.0095 A	0	--	
1	0.3144 A	194	-.----	---.-	0	0	n.e.	n.e.	0.3122 A	0	X	
2	0.0021 A	1	-.----	---.-	0	0	n.e.	n.e.	0.0015 A	0	X	
3	0.0434 A	111	0.2414 A	-82.0 %	0	0	n.e.	n.e.	0.0419 A	0	X	
4	0.0006 A	360	-.----	---.-	0	0	n.e.	n.e.	0.0003 A	0	X	
5	0.0155 A	177	0.1349 A	-88.5 %	0	0	n.e.	n.e.	0.0152 A	0	X	
6	0.0002 A	7	-.----	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
7	0.0101 A	108	0.0710 A	-85.8 %	0	0	n.e.	n.e.	0.0097 A	0	X	
8	0.0004 A	2	-.----	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
9	0.0066 A	20	0.0355 A	-81.4 %	0	0	n.e.	n.e.	0.0065 A	0	X	
10	0.0003 A	386	-.----	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
11	0.0033 A	145	0.0248 A	-86.7 %	0	0	n.e.	n.e.	0.0031 A	0	X	
12	0.0002 A	199	-.----	---.-	0	0	n.e.	n.e.	0.0001 A	0	X	
13	0.0011 A	30	0.0210 A	-94.5 %	0	0	n.e.	n.e.	0.0010 A	0	X	
14	0.0003 A	39	-.----	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
15	0.0005 A	382	0.0182 A	-97.1 %	0	0	n.e.	n.e.	0.0004 A	0	X	
16	0.0002 A	455	-.----	---.-	0	0	n.e.	n.e.	0.0001 A	0	X	
17	0.0006 A	114	0.0161 A	-96.0 %	0	0	n.e.	n.e.	0.0005 A	0	X	
18	0.0003 A	93	-.----	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
19	0.0013 A	40	0.0144 A	-91.1 %	0	0	n.e.	n.e.	0.0012 A	0	X	
20	0.0003 A	1	-.----	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
21	0.0013 A	253	0.0130 A	-90.3 %	0	0	n.e.	n.e.	0.0012 A	0	X	
22	0.0004 A	1	-.----	---.-	0	0	n.e.	n.e.	0.0001 A	0	X	
23	0.0009 A	369	0.0119 A	-92.6 %	0	0	n.e.	n.e.	0.0008 A	0	X	
24	0.0002 A	55	-.----	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
25	0.0008 A	300	0.0109 A	-92.5 %	0	0	n.e.	n.e.	0.0007 A	0	X	
26	0.0002 A	1	-.----	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
27	0.0006 A	445	0.0101 A	-93.6 %	0	0	n.e.	n.e.	0.0005 A	0	X	
28	0.0002 A	1	-.----	---.-	0	0	n.e.	n.e.	0.0001 A	0	X	
29	0.0003 A	468	0.0094 A	-96.8 %	0	0	n.e.	n.e.	0.0002 A	0	X	
30	0.0002 A	288	-.----	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
31	0.0002 A	146	0.0088 A	-97.3 %	0	0	n.e.	n.e.	0.0002 A	0	X	
32	0.0002 A	135	-.----	---.-	0	0	n.e.	n.e.	0.0001 A	0	X	
33	0.0004 A	391	0.0083 A	-95.5 %	0	0	n.e.	n.e.	0.0003 A	0	X	
34	0.0002 A	1	-.----	---.-	0	0	n.e.	n.e.	0.0001 A	0	X	
35	0.0006 A	199	0.0078 A	-92.5 %	0	0	n.e.	n.e.	0.0005 A	0	X	
36	0.0002 A	166	-.----	---.-	0	0	n.e.	n.e.	0.0001 A	0	X	
37	0.0006 A	317	0.0074 A	-91.4 %	0	0	n.e.	n.e.	0.0006 A	0	X	
38	0.0002 A	251	-.----	---.-	0	0	n.e.	n.e.	0.0001 A	0	X	
39	0.0007 A	1	0.0070 A	-89.9 %	0	0	n.e.	n.e.	0.0005 A	0	X	
40	0.0002 A	76	-.----	---.-	0	0	n.e.	n.e.	0.0001 A	0	X	

average value < 0.6 % of Iavg or < 5 mA   n.e. = not evaluated

Bandymų ataskaitos
3 priedas
Annex 3



Bandymų ataskaitos
4 priedas
Annex 4

ĮTAMPOS POKYČIŲ, SVYRAVIMŲ IR MIRGĖJIMO BANDYMO RESULTATAI
VOLTAGE CHANGES, FLUCTUATIONS AND FLICKER TEST RESULTS

Name:	V. Gudkovas	Serial no:	EMC05817
Department:	EMC control division	Operating modes:	Operated
Company:	RRT	Comment1:	Ambient temp. +24 °C
Order no:	2109	Comment2:	Rel. humidity 37 %
Device:	LED streetlight	Comment3:	Atm. pressure 101.4 kPa
Specimen:	Lighting equipment	Comment4:	
Manufacturer:	Yellow Energy LT	Date:	22.05.2018
Type:	MF-SL-075	Test date:	22.05.2018

Test conditions: EN 61000-3-3:2013 / 230 V / 50 Hz / Phase L1
EN 61000-4-15:2011 / 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
11:02:11	0.000	0.0040	- . - - - -	0.000	+0.000	- . - - -	X	
Limits:		1.000	0.650	0.500	4.000	3.300		
Plt: 0.001747 (calculated over 12 periods)							X	
Evaluated: PST, PLT, Sliding PLT, dc, dmax, Tmax								

FLICKER: Source test PASS!

Time	Pmax	Pst	Sliding Plt	Tmax[s]	dmax[%]	dc [%]	PASS	FAIL
11:02:11	0.000	0.0030	- . - - - -	0.000	+0.000	- . - - -	X	
Plt: 0.001310 (calculated over 12 periods)								
Evaluated: PST <= 0.4 dmax < 20 % dmax1								

Bandymų ataskaitos
5 priedas
Annex 5

ATSPARUMO ELEKTROSTATINIAM IŠLYDŽIUI BANDYMO REZULTATAI
ELECTROSTATIC DISCHARGE IMMUNITY TEST RESULTS

ESD TEST REPORT

Report Number :	2109
Test Lab :	EMC control division/ RRT
Test Person :	V.Gudkovas
Test Date :	6/12/2018 , 1:15:44 PM
Test Standard :	EN 61000-4-2:2009
Customer :	Yellow Energy LT

E . U . T

Name : LED streetlight MF-SL-075

Description : Ser.No. EMC05817

Test Level max.

Contact : 4000 V

Horizontal Coupling Plane : 4000 V Vertical Coupling Plane : 4000 V

Test Result

Test passed : ☑ Failure Criteria : B

Test not passed : ☐

Test not rated : ☐

Bandymų ataskaitos
5 priedas
Annex 5

Climatic Conditions

Temperature :	26 °C	Humidity :	43 %
Pressure :	100 kPa		

Test Simulator

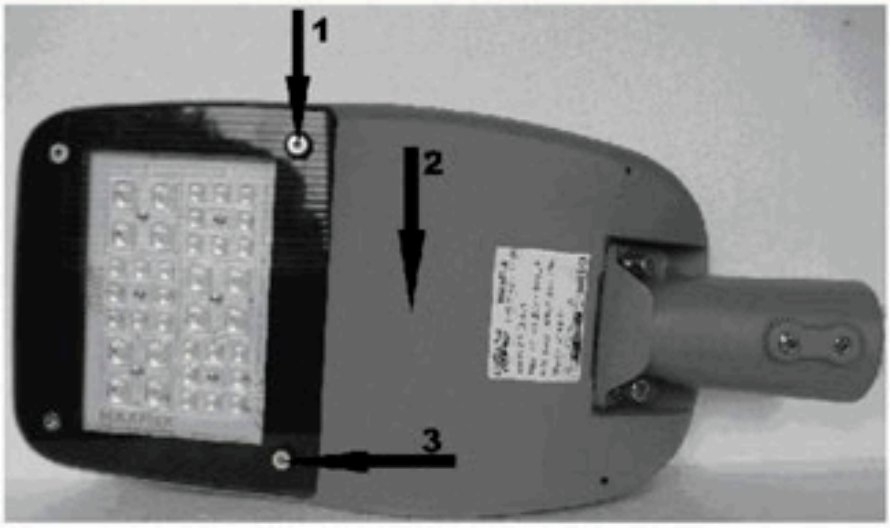
Name / Version : esd30n, 1.23

Contact Discharge

Test Setup

Test Routine :	Contact 4kV				
Discharge Module :	150 pf / 330 ohm				
Test Voltages :	Level 1	Level 2	Level 3	Level 4	
	4000 V				
Polarity :	Positive & Negative			Repetition :	1.0 s
Iteration :	Polarity -> Point -> Voltage			Discharges :	10
Trigger :	Automatic			Test Points :	3

Figure EUT



Test Points

Test Point	Break	Description
1		1 side- CD
2		2 side - CD
3		3 side - CD

Horizontal Coupling Plane

Test Setup

Test Routine :	Contact 4kV			
Discharge Module :	150 pf / 330 ohm			
Test Voltages :	Level 1	Level 2	Level 3	Level 4
	4000 V			
Polarity :	Positive & Negative		Repetition :	1.0 s
Iteration :	Polarity -> Point -> Voltage		Discharges :	10
Trigger :	Automatic		Test Points :	4

Test Points

Test Point	Break	Description
1		Front-CD
2		1 side- CD
3		Back - CD
4		2 side - CD

Bandymų ataskaitos
5 priedas
Annex 5

Vertical Coupling Plane

Test Setup

Test Routine :	Contact 4kV				
Discharge Module :	150 pf / 330 ohm				
Test Voltages :	Level 1	Level 2	Level 3	Level 4	
	4000 V				
Polarity :	Positive & Negative			Repetition :	1.0 s
Iteration :	Polarity -> Point -> Voltage			Discharges :	10
Trigger :	Automatic			Test Points :	4

Test Points

Test Point	Break	Description
1		Front-CD
2		1 side- CD
3		Back - CD
4		2 side - CD

Bandymų ataskaitos
6 priedas
Annex 6

ATSPARUMO SPINDULIUOJAMAM ELEKTROMAGNETINIAM RADIJO DAŽNIŲ LAUKUI BANDYMO REZULTATAI
RADIATED RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST RESULTS

emcware v3.1.0

IEC 61000-4-3 Test Report

Test File Information			
Test Data File:	C:\emcware v3.1.0\Radiated\IEC61000\Test Data\MF-SL-075_3V_80-1000MHz.rstd		
IEC Calibration File:	C:\emcware v3.1.0\Radiated\IEC61000\Calibration Data\IEC_80-1000 MHz_10 Vm_CP_9 Pos.rscd		
Test Setup File:	C:\emcware v3.1.0\Radiated\IEC61000\Test Setup\IEC 61000-4-3 (Level 2) - 112712.rsts		
Equipment Setup File:	C:\emcware v3.1.0\Radiated\Equipment Setup\RRT_Equipment_Setup.rses		
Test Date:	13/06/2018 12:11		
Test Standard:	IEC 61000-4-3 (Level 2) - Custom		
Start Frequency:	80.000 MHz		
Stop Frequency:	1000.000 MHz		
EUT Sides Tested:	Front, Right, Rear, Left		
Polarizations Tested:	Vertical, Horizontal		
Modulations Tested:	Modulation 1; Consult Test Setup File Listed Above For Definitions		
Test Status:	----------Complete ----------		
EUT Status:	**Passed**	**EUT Monitoring:**	Manual
Non-Conformities:	None		

Order No.2109					
Test Engineer:	Vygintas Gudkovas				
Temperature:	25 °C	Humidity:	39 %	Pressure:	100.0 kPa
Customer:	Yellow Energy LT				
EUT Model Number:	LED streetlight MF-SL-075				
EUT Serial Number:	EMC05817				
EUT Description	EUT operated				
Notes:	Normal performance, no change of operation (criterion A).				

Bandymų ataskaitos
6 priedas
Annex 6

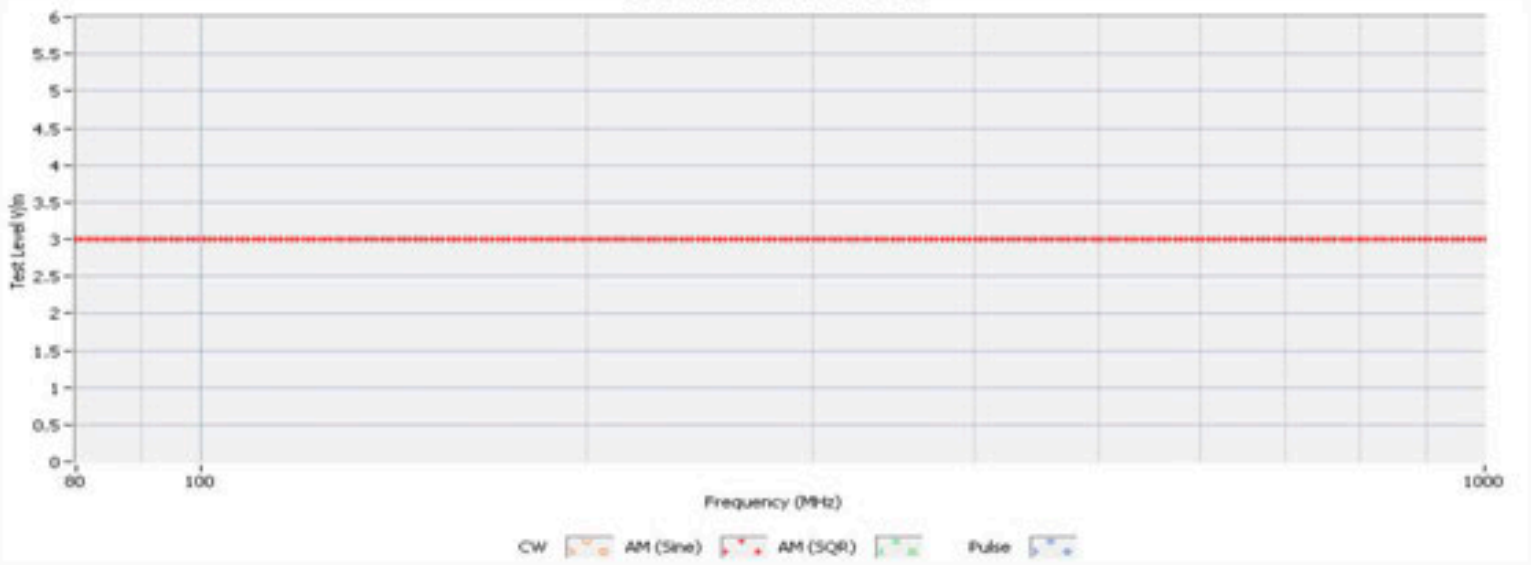
Test Parameters

General Information

Test Standard:	IEC 61000-4-3
Test Setup Name:	IEC 61000-4-3 (Level 2) - Custom
Date:	09/09/2016 11:04
File Path:	C:\emcware v3.1.0\Radiated\IEC61000\Test Setup\IEC 61000-4-3 (Level 2) - 112712.rsts
Power Leveling Method:	Forward Power
Power Leveling Tolerance:	+ 0.50 (dBm) / -0.00 (dBm)
Power Leveling Between Frequencies:	Unchanged
Start Drive Level:	-40.00 (dBm)
Field Leveling Tolerance:	+ 0.75 (V/m) / -0.00 (V/m)
EUT Monitor Type:	None

Test Parameters

Test Level Plot



Bandymų ataskaitos
6 priedas
Annex 6

Test Parameters

Frequency Dependent Parameters

Frequency	Frequency Step	Field Strength	Dwell	Field Interp.	Test CW	Modulation 1	Modulation 2
80.000 MHz	1.000 %	3.000 V/m	1.00 Sec	None	No	AM Sine, 80.000%, 1000.000(Hz)	None
1000.000 MHz	1.000 %	3.000 V/m	1.00 Sec	None	No	AM Sine, 80.000%, 1000.000(Hz)	None

Test Parameters

Frequency Dependent RF Signal Routing

Frequency	Equipment Control	SC Switch Positions	SC1000(1) Aux	SC1000(2) Aux	User Defined Msg
80MHz	-------- (General) ---------- -- E8257D - US44270408_(Sig Gen 1) 250W1000A - 307533_(Amp 1) DC6180A - 322196 _(DC 1) PM2002 - 321670_(Power Meter 1) EMCO3144 - 00035589 _(Antenna 1) Manual - _(Antenna Controller 1) -------- (Calibration/Test) ---------- - FM7004 - 0339366_(Field Monitor 1) -------- (Harmonic Test) ---------- --	No SC Connection No SC Connection No SC Connection No SC Connection No SC Connection	None	None	

Bandymų ataskaitos
7 priedas
Annex 7

ATSPARUMO SPARČIAJAM ELEKTRINIAM PEREINAMAJAM VYKSMUI-VORAI, ĮTAMPOS KRYČIAMS IR TRUMPIESIEMS PERTRŪKIAMS BANDYMŲ REZULTATAI
ELECTRICAL FAST TRANSIENTS/BURST, VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TESTS RESULTS

6/12/2018 2:47 PM

- TEST REPORT-

Immunity to EMC Pulses

Equipment under test	
Order number	2109
Manufacturer/customer	Yellow Energy LT
EUT description/name	LED streetlight
Type	MF-SL-075
Serial number	EMC05817
SW version	
Notes	EUT operated

Normative documents:	
Requirements according to :	EN 61547:2009

Test specification and results:

Phenomena	Standard	Criteria	Notes	Result
Bursts to mains	EN 61000-4-4:2012	B		Pass
Bursts to signal lines	EN 61000-4-4:2012	B		N/A
Surges to mains	EN 61000-4-5:2014	B		N/A
Voltage dips	EN 61000-4-11:2004	B,C		Pass
Short interruptions	EN 61000-4-11:2004	C		Pass
Power fr. magnetic field	EN 61000-4-8:2010	B		N/A
Pulse magnetic field	EN 61000-4-9:1993+A1:2001			N/A

Main test equipment:

Manufacturer	Type	Serial Nr	In use
Teseq	NSG 3060	1478	☑
Teseq	CDN 3061	1407	☑
Teseq	NSG 3040	6098	☐
Teseq	CDN 3043	5012	☐

Manual or additional Equipment :

Manufacturer	Type	Serial Nr	Calibration date	Certificate Nr:	In use
Teseq	Coil INA702	255	2013-04-02	H70202551413	☐
Teseq	INA 752	164	2013-02-14	H75201640613	☐
Schaffner	Clamp CDN 8014	17308	2013-01-10	A090/13	☐

Modules:

Manufacturer	Type	Serial No.	Version / FW	Calibration date	Certificate No.
Teseq	WIN 3000	0550-0-0102-0000-7E8A-7AE3-3CC3-32D7	1.4.1	---	---
Teseq	MCR 3000	550	0002.30	---	---
Teseq	SUI 3000	---	V02.20	---	---
Teseq	CWM 3650	421	0002.31	10/18/2017	CR05782B/CR0
Teseq	HVM 3060	372	0002.31	---	---
Teseq	FTM 3425	455	0002.31	10/18/2017	CR05782B/CR0
Teseq	RWM 3652	221	0002.31	10/18/2017	CR05782B/CR0
Teseq	CDM 3061-C	1407	0002.31	10/18/2017	CR05782B/CR0
Teseq	PQM 3403	375	0002.31	10/18/2017	CR05782B/CR0
Teseq	VAR 3005-516	848	0002.14	5/29/2013	H00508482213
Teseq	MFO 6502	162	0002.31	10/19/2017	CR06003B

Settings:
EUT supply voltage Uin used for 100% reference value: 230 V
Measured EUT Supply Voltage: 232 V
Measured EUT Supply Frequency: 49.9 Hz

Environmental Conditions:		
Temperature, °C	Humidity, %	Pressure, kPa
26	37	99.6

Bandymų ataskaitos
7 priedas
Annex 7

Test Results

Sequence:

Burst / Electrical Fast Transient:
C:\Program Files (x86)\Teseq AG\WIN 3000\UserTests\EN 61000-4-4\EN 61547 lamp virs 25W.eft
EFT Test for 1-phase power line up to 1000V, alternate polarity, burst frequency 5 kHz & 100 kHz, coupling to all lines.

Time	Volt	Polarity	Frequency	Phase	Burst Time	Repetition Time	Step Duration	Coupling	Status
6/12/2018 2:50:00 PM	1000 V	Pos	5 KHz	---	15 ms	300 ms	120 s	IEC L1	Passed
6/12/2018 2:52:05 PM	1000 V	Neg	5 KHz	---	15 ms	300 ms	120 s	IEC L1	Passed
6/12/2018 2:54:11 PM	1000 V	Pos	5 KHz	---	15 ms	300 ms	120 s	IEC N	Passed
6/12/2018 2:56:16 PM	1000 V	Neg	5 KHz	---	15 ms	300 ms	120 s	IEC N	Passed
6/12/2018 2:58:21 PM	1000 V	Pos	5 KHz	---	15 ms	300 ms	120 s	IEC PE	Passed
6/12/2018 3:00:26 PM	1000 V	Neg	5 KHz	---	15 ms	300 ms	120 s	IEC PE	Passed

Dips and Drops:
C:\Program Files (x86)\Teseq AG\WIN 3000\UserTests\EN 61000-4-11_2004\EN 61547dips&interrup.dnd

Time	Volt	Phase	Repetition Time	Event Time	Step Duration	Status
6/12/2018 3:01:01 PM	70 %	0 °	10 s	200 ms	3 Pulses	Passed
6/12/2018 3:01:34 PM	0 %	0 °	10 s	10 ms	3 Pulses	Passed

Tested by: Vygintas Gudkovas
Date: 6/12/2018

Bandymų ataskaitos
8 priedas
Annex 8

ATSPARUMO VIRŠĮTAMPAIMS BANDYMŲ REZULTATAI
SURGES IMMUNITY TESTS RESULTS

6/12/2018 4:10 PM

- TEST REPORT-

Immunity to EMC Pulses

Equipment under test	
Order number	2109
Manufacturer/customer	Yellow Energy LT
EUT description/name	LED streetlight
Type	MF-SL-075
Serial number	EMC05817
SW version	
Notes	EUT operated

Normative documents:	
Requirements according to :	EN 61547:2009

Test specification and results:

Phenomena	Standard	Criteria	Notes	Result
Bursts to mains	EN 61000-4-4:2012	B		N/A
Bursts to signal lines	EN 61000-4-4:2012	B		N/A
Surges to mains	EN 61000-4-5:2014	B		Pass
Voltage dips	EN 61000-4-11:2004	B,C		N/A
Short interruptions	EN 61000-4-11:2004	C		N/A
Power fr. magnetic field	EN 61000-4-8:2010	B		N/A
Pulse magnetic field	EN 61000-4-9:1993+A1:2001			N/A

Main test equipment:

Manufacturer	Type	Serial Nr	In use
Teseq	NSG 3060	1478	✔
Teseq	CDN 3061	1407	
Teseq	NSG 3040	6098	
Teseq	CDN 3043	5012	

Manual or additional Equipment :

Manufacturer	Type	Serial Nr	Calibration date	Certificate Nr:	In use
Teseq	Coil INA702	255	2013-04-02	H702025S1413	
Teseq	INA 752	164	2013-02-14	H752016406I3	
Schaffner	Clamp CDN 8014	17308	2013-01-10	A090/13	

Modules:

Manufacturer	Type	Serial No.	Version / FW	Calibration date	Certificate No.
Teseq	WIN 3000	1906-0-0104-0000-23D1-E37F-DCEE-D368	1.4.1	---	---
Teseq	MCR 3000	1906	0002.42	---	---
Teseq	CDM 3041-C	1723	0002.39	11/23/2017	CR00205B
Teseq	PQM 3403	2479	0002.39	11/23/2017	CR00209B
Teseq	HVM 3040	1518	0002.39	---	---
Teseq	CWM 3451	3336	0002.39	11/20/2017	CR00207B
Teseq	FTM 3425	3687	0002.39	11/20/2017	CR00206B
Teseq	CDN 3043-C	5012	0002.39	11/20/2017	CR00208B
Teseq	INA 6502	221	0002.31	3/21/2013	H50202211213

Settings:

EUT supply voltage Uin used for 100% reference value:	230 V
Measured EUT Supply Voltage:	239 V
Measured EUT Supply Frequency:	49.9 Hz

Environmental Conditions:		
Temperature, °C	Humidity, %	Pressure, kPa
26	37	99.6

Bandymų ataskaitos
8 priedas
Annex 8

Test Results

Combination Wave:
C:\Program Files (x86)\Teseq AG\WIN 3000\UserTests\EN 61000-4-5\EN 61547 lamp daugiau 25W.cw
Combination wave test for 1-phase power line up to 2000V, alternate polarity, synchronous coupling from 0° to 270° in 90° step, line to line coupling.

Time	Volt	Polarity	Impedance	Phase	Repetition Time	Step Duration	Coupling	Status
6/12/2018 4:15:20 PM	1000 V	Pos	2 Ω	90 °	60 s	5 Pulses	IEC L1 -> N	Passed
6/12/2018 4:20:29 PM	1000 V	Neg	2 Ω	270 °	60 s	5 Pulses	IEC L1 -> N	Passed
6/12/2018 4:25:38 PM	2000 V	Pos	12 Ω	90 °	60 s	5 Pulses	IEC L1 -> PE	Passed
6/12/2018 4:30:47 PM	2000 V	Neg	12 Ω	270 °	60 s	5 Pulses	IEC N -> PE	Passed
6/12/2018 4:35:56 PM	2000 V	Pos	12 Ω	90 °	60 s	5 Pulses	IEC L1 -> PE	Passed
6/12/2018 4:40:06 PM	2000 V	Neg	12 Ω	270 °	60 s	5 Pulses	IEC N -> PE	Passed

Tested by: Vygintas Gudkovas

Date: 6/12/2018

LIETUVOS RESPUBLIKOS RYŠIŲ REGULIAVIMO TARNYBOS APARATŪROS IR ĮRENGINIŲ ELEKTROMAGNETINIO SUDERINAMUMO KONTROLĖS SKYRIUS
EQUIPMENT AND DEVICES ELECTROMAGNETIC COMPATIBILITY CONTROL DIVISION OF COMMUNICATIONS REGULATORY AUTHORITY OF THE REPUBLIC OF LITHUANIA
Valstybės biudžetinė įstaiga. Juridinių asmenų registras. Kodas 121442211. Zarasų g. 38, LT - 44140 Kaunas. Tel. (8 37) 334040. Faks. (8 37) 211907. El.p. emc@rrt.lt.

LIETUVOS NACIONALINIS AKREDITACIJOS BIURAS
BANDYMAI ISO/IEC 17025 Nr. LA.01.026

APPROVED
Head of Division
A.V.

Arvydas Giedraitis

BANDYMŲ ATASKAITA
TEST REPORT

2018-06-22 No (29.1) PB-75

BANDOMASIS OBJEKTAS TEST ITEM	LED street luminaire MAXFlux
GAMINTOJAS MANUFACTURER	YELLOW ENERGY, Lithuania
TIPAS TYPE	MF-SL-075
SERIJOS NUMERIS SERIAL NUMBER	EMC05817 (assigned number)
UŽSAKOVAS APPLICANT	UAB "Autokausta" Marvelės g. 199B LT-46204 Kaunas Lithuania Tel.: +370 37 397555 Fax: +370 37 397444 E-mail: statyba@autokausta.lt
BANDYMŲ PRADŽIA START OF TESTS	2018-06-22
BANDYMŲ PABAIGA END OF TESTS	2018-06-22
LAPŲ SKAIČIUS NUMBER OF PAGES	7
ATASKAITOS PRIEDAI ANNEXES OF REPORT	1 (1 page)

1. BANDYMŲ SUVESTINĖ
SUMMARY OF TESTS

Test name	*Normative documents*	*Test result*
Electromagnetic immunity:		
Immunity to conducted radio frequency electromagnetic disturbances	EN 61547:2009 EN 61000-4-6:2014	Pass

Notes:
1. The applicant determined the extent of applied tests.
2. No applicant's representatives witnessed the tests.
3. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

2. STANDARTŲ NUORODINIAI ŽYMENYS IR ANTRAŠTĖS
REFERENCES AND TITLES OF THE STANDARDS

EN 61547:2009
Equipment for general lighting purposes - EMC immunity requirements (IEC 61547:2009).

EN 61000-4-6:2014
Electromagnetic compatibility (EMC) -- Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2013).

3. BANDOMOSIOS ĮRANGOS (BĮ) APRAŠYMAS
DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

3.1. APRAŠYMAS
DESCRIPTION

LED street luminaire MAXFlux MF-SL-075 is powered from 180-253 V, 50/60 Hz mains network. Max power consumption: 75 W.

3.2. BANDOMOSIOS ĮRANGOS FOTOGRAFIJOS
PHOTOS OF THE EQUIPMENT UNDER TEST

Fig. 1. Bottom view

Fig. 2. Top view

Fig. 3. Side view

4. BANDYMAMS NAUDOTA ĮRANGA
EQUIPMENT USED FOR TESTS

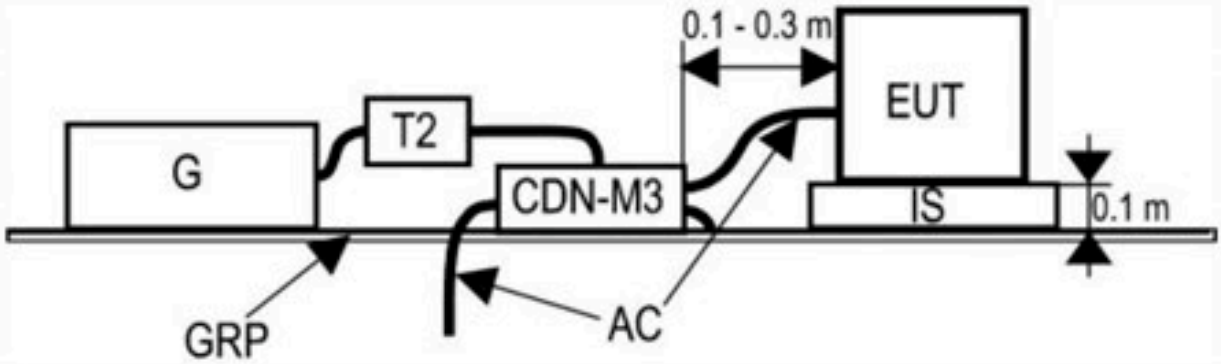
Name	*Type*	*Serial No*	*Calibration document*
Immunity to conducted disturbances, induced by RF fields test			
Frankonia, immunity testing system	CIT-10/75 FLL-75	102C3214 1029	Certificate of calibration No E61604 D-K-15070-01-01 2018-13
Bird Electronic corp. attenuator	75-A-FFN-06	0332	Certificate No 70A/13
Frankonia software CIT-10	Version 2.27	102C3214	-

5. ATSPARUMO RADIJO DAŽNIŲ LAUKŲ INDUKUOTIEMS LAIDININKAIS SKLINDANTIEMS TRIKDŽIAMS BANDYMAS DAŽNIŲ DIAPAZONE NUO 150 kHz IKI 80 MHz

IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS TEST IN THE FREQUENCY RANGE FROM 150 kHz TO 80 MHz

5.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Conducted disturbances to a.c. power input



EUT – equipment under test
IS – insulating support
T2 – attenuator (6 dB)
AC – power cable
G – generator
CDN-M3 – coupling/decoupling device
GRP – ground reference plane

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
a.c. power input	Injected currents (radio-frequency common mode)	± 3 V r.m.s (unmodulated) [1]	A
[1] Modulation: 1 kHz, 80 % AM, sine wave; source impedance 150 Ω.			

5.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-6:2014.

5.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 1.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

5.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to conducted disturbances, induced by radio-frequency fields at input a.c power port.

Deputy Head of Division — Raimondas Štulas

Vaidotas Stankus, tel. (+370) 37 334040, fax (+370) 37 211907, e-mail vaidotas.stankus@rrt.lt

Bandymų ataskaitos
1 priedas
Annex 1

ATSPARUMO RADIJO DAŽNIŲ LAUKŲ INDUKUOTIEMS LAIDININKAIS SKLINDANTIEMS TRIKDŽIAMS BANDYMO REZULTATAI
IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS TEST RESULTS

IEC1000-4-6/EN61000-4-6 Conducted disturbances test

Date: 22.06.18
Time: 16:58
Order No.: 2109
Id.no.: EMC05817
Device: LED luminaire MF-SL-075
Company: Yellow Energy LT
Test engineer: V.Gudkovas
Operating mode: EUT operated.
EUT dimensions:300x70x600 mm.
CDN coupling factor:- 0.6 dB
Test location: EMC test room
Temp.=25.4 C
Hum.=34.5 %
p.=99.6 kPa

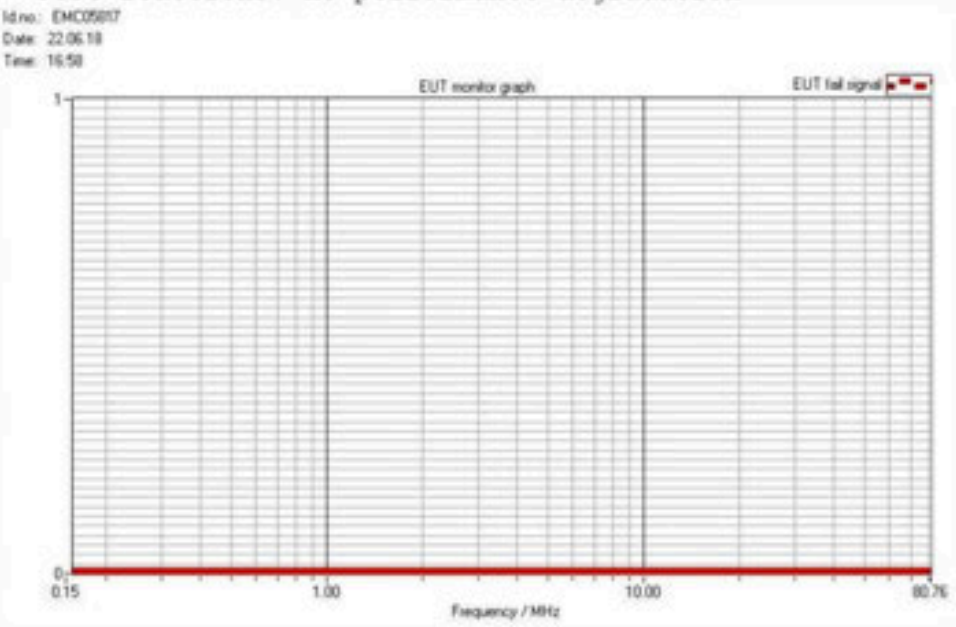
CDN: CDN_M2_3V
Start frequency: 0.150000 MHz
Stop frequency: 80.000000 MHz
Test level: 3.0 V

Sweep type: logarithmic
Steps: 1.00 %
Dwell time: 2.9 s

Modulation: internal AM
Modulation frequency: 1000.0 Hz
Modulation level: 80.0 %

Test system: Frankonia CIT-10/75 No.102C3214; FLL-75 No. 1029
Software: EN 61000-4-6 v.2.27

Test reactions: no performance degradation



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APPROVED
Head of Division
A.V.

Arvydas Giedraitis

BANDYMŲ ATASKAITA
TEST REPORT

2018-06-15 No (29.1) PB-68

BANDOMASIS OBJEKTAS TEST ITEM	LED street luminaire MAXFlux
GAMINTOJAS MANUFACTURER	YELLOW ENERGY, Lithuania
TIPAS TYPE	MF-SL-120
SERIJOS NUMERIS SERIAL NUMBER	EMC05814 (assigned number)
UŽSAKOVAS APPLICANT	UAB "Autokausta" Marvelės g. 199B LT-46204 Kaunas Lithuania Tel.: +370 37 397555 Fax: +370 37 397444 E-mail: statyba@autokausta.lt
BANDYMŲ PRADŽIA START OF TESTS	2018-05-22
BANDYMŲ PABAIGA END OF TESTS	2018-06-12
LAPŲ SKAIČIUS NUMBER OF PAGES	15
ATASKAITOS PRIEDAI ANNEXES OF REPORT	1 (2 pages), 2 (2 pages), 3 (2 pages), 4 (1 page), 5 (4 pages), 6 (3 pages), 7 (2 pages), 8 (2 pages)

1. BANDYMŲ SUVESTINĖ
SUMMARY OF TESTS

Test name	*Normative documents*	*Test result*
Electromagnetic disturbances:		
Disturbance voltage at the mains terminals	EN 55015:2013 EN 55015:2013/A1:2015	Pass
Radiated disturbance	EN 55015:2013 EN 55015:2013/A1:2015	Pass
Harmonic current emission	EN 61000-3-2:2014	Pass
Voltage changes, fluctuations and flicker	EN 61000-3-3:2013	Pass
Electromagnetic immunity:		
Electrostatic discharge immunity test	EN 61547:2009 EN 61000-4-2:2009	Pass
Radiated RF electromagnetic field immunity test	EN 61547:2009 EN 61000-4-3:2006 EN 61000-4-3:2006/A1:2008 EN 61000-4-3:2006/A2:2010	Pass
Electrical fast transients/burst immunity test	EN 61547:2009 EN 61000-4-4:2012	Pass
Surges immunity test	EN 61547:2009 EN 61000-4-5:2014	Pass
Voltage dips and short interruptions immunity test	EN 61547:2009 EN 61000-4-11:2004	Pass

Notes:
1. The applicant determined the extent of applied tests.
2. No applicant's representatives witnessed the tests.
3. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

2. STANDARTŲ NUORODINIAI ŽYMENYS IR ANTRAŠTĖS
REFERENCES AND TITLES OF THE STANDARDS

EN 55015:2013
Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment (CISPR 15:2013 + IS1:2013 + IS2:2013).
Amendment: EN 55015:2013/A1:2015.

EN 55032:2015
Electromagnetic compatibility of multimedia equipment - Emission requirements (CISPR 32:2012).
Corrigendum EN 55032:2012/AC:2013.

EN 61547:2009
Equipment for general lighting purposes - EMC immunity requirements (IEC 61547:2009).

EN 61000-4-2:2009
Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test (IEC 61000-4-2:2008).

EN 61000-4-3:2006
Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2006).
Amendment EN 61000-4-3:2006/A1:2008.
Amendment EN 61000-4-3:2006/A2:2010.

EN 61000-4-4:2012
Electromagnetic compatibility (EMC) -- Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test (IEC 61000-4-4:2012).

EN 61000-4-5:2014
Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test (IEC 61000-4-5:2014).

EN 61000-4-11:2004
Electromagnetic compatibility (EMC). Part 4-11: Testing and measurement techniques. Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:2004).

3. BANDOMOSIOS ĮRANGOS (BĮ) APRAŠYMAS
DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

3.1. APRAŠYMAS
DESCRIPTION

LED street luminaire MAXFlux MF-SL-120 is powered from 180-253 V, 50/60 Hz mains network. Max power consumption: 116 W.

3.2. BANDOMOSIOS ĮRANGOS FOTOGRAFIJOS
PHOTOS OF THE EQUIPMENT UNDER TEST

Fig. 1. Bottom view

Fig. 2. Top view

Fig. 3. Side view

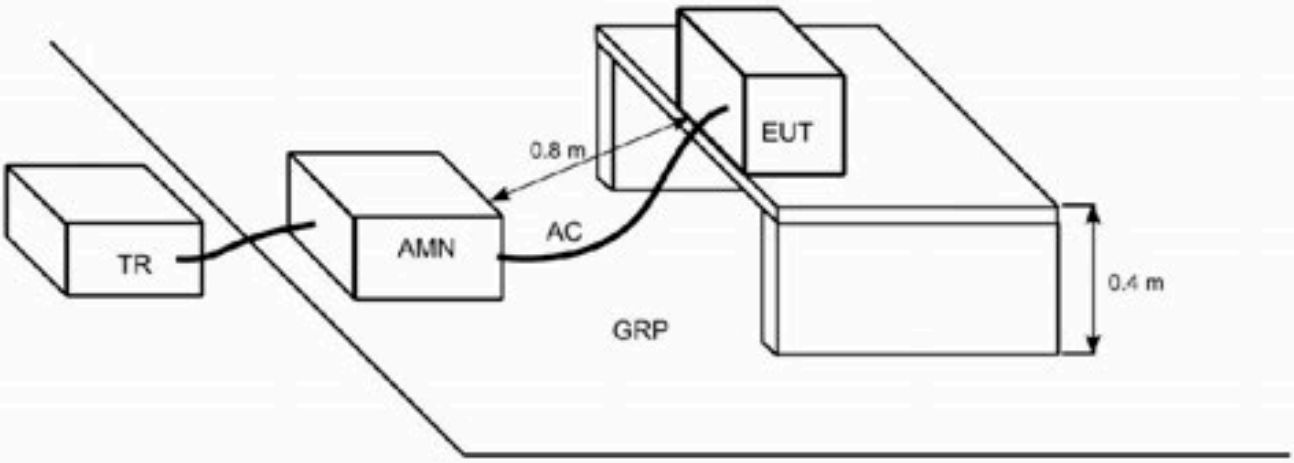
4. BANDYMAMS NAUDOTA ĮRANGA
EQUIPMENT USED FOR TESTS

Name	*Type*	*Serial No*	*Calibration document*
Conducted disturbances tests			
Rohde&Schwarz 20 Hz – 40 GHz test receiver	ESU 40	100062	Certificate of calibration No 45355 D-K-15195-01-01 2018-02
Rohde&Schwarz artificial mains network	ESH2-Z5	890485/009	Certificate of calibration No 372373 D-K-15012-01-00 2015-12
Rohde&Schwarz testing software EMC32	Version 9.12.00	-	-
Radiated emissions test			
Rohde&Schwarz 20 Hz – 40 GHz test receiver	ESU 40	100062	Certificate of calibration No 45355 D-K-15195-01-01 2018-02
TDK RF Solutions 30 MHz – 3 GHz log periodic antenna	HLP-3003	130603	Certificate of calibration No 2010110459
Rohde&Schwarz testing software EMC32	Version 9.12.00	-	-
Harmonic current emission, voltage changes, fluctuations and flicker tests			
Spitzenberger + Spies test system	EMV D 15000/PAS	A306907/ 01102	Certificate of calibration No A5801d
Spitzenberger + Spies EMC test software	Version 2.34f	-	-
Electrostatic discharge immunity test			
EM Test electrostatic discharge generator	ESD30N P30N	V1039107411 V1039107412	Certificate of calibration No SCS-1039107411-010-U17-ESD30N
Radiated radio frequency electromagnetic field immunity test			
Agilent Technologies 250 kHz – 20 GHz signal generator	E8257D	US44270408	Certificate of calibration No 1-7257953524-1
EMCO 80 MHz – 2 GHz broadband log periodic antenna	3144	00035589	Certificate of calibration No 48662
Amplifier Research 80 MHz – 1000 MHz power amplifier	250W1000A	307533	Certificate of calibration No C9907A
Amplifier Research 10 kHz – 100 GHz power meter	PM2002	321670	Certificate of calibration No D19192A
Amplifier Research 10 kHz – 8 GHz power head	PH2000	321958	
Amplifier Research 80 MHz – 1 GHz directional coupler	DC6180A	322196	Certificate of calibration No 027371/01/010
Amplifier Research 100 kHz – 6 GHz electric field probe	FL7006	0339425	Certificate of calibration No 2017090420-1
Amplifier Research field monitor	FM7004	0339366	-
Amplifier Research probe interface	FI7000	0339669	-
Amplifier Research software emcware	V3.1.0	0340646	-
Electrical fast transients/burst immunity test			
Teseq multifunction generator	NSG 3060	1478	Certificate of calibration No SCS-1478/1407-064-U17-NSG3060/ CDN3061
Teseq coupling/decoupling network	CDN 3061	1407	
Teseq software WIN 3000	v1.4.1	-	-
Surges immunity test			
Teseq multifunction generator	NSG 3040	6098	Certificates of calibration No SCT-3336-SLO-CH100517-CWM3451
Teseq software WIN 3000	v1.4.1	-	-
Voltage dips and short interruptions and voltage variations immunity tests			
Teseq multifunction generator	NSG 3060	1478	Certificate of calibration No SCS-1478/1407-064-U17-NSG3060/CDN3061
Teseq coupling/decoupling network	CDN 3061	1407	
Teseq automated variable transformer	VAR 3005-S16	0848	Certificate of calibration No H00508482213
Teseq software WIN 3000	v1.4.1	-	-

5. 5. LAIDININKAIS SKLINDANČIŲ TRIKDŽIŲ MAITINIMO PRIEIGOJE BANDYMAS 9 kHz – 30 MHz DAŽNIŲ DIAPAZONE
DISTURBANCE VOLTAGE AT THE MAINS TERMINALS TEST IN THE FREQUENCY RANGE 9 kHz TO 30 MHz

5.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
TR – test receiver
AMN – artificial mains network
GRP – ground reference plane
AC – power cable

Test setup: table-top equipment.
EUT arrangement: 0.4 m from metal floor of semianechoic chamber, 0.8 m from AMN and ≥0.8 m from other metal surfaces.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
Disturbances limits at mains terminals:

- 110 dB(µV) quasi-peak in the frequency range 9 kHz – 50 kHz;
- 90 dB(µV) – 80 dB(µV) quasi-peak in the frequency range 50 kHz – 150 kHz;
- 66 dB(µV) – 56 dB(µV) quasi-peak and 56 dB(µV) – 46 dB(µV) average in the frequency range 0,15 MHz – 0,5 MHz;
- 56 dB(µV) quasi-peak and 46 dB(µV) average in the frequency range 0,5 MHz – 5 MHz;
- 60 dB(µV) quasi-peak and 50 dB(µV) average in the frequency range 5 MHz – 30 MHz.

5.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 55015:2013, EN 55015:2013/A1:2015.

5.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 1.
Detailed information of equipment used for tests is presented in clause 4.
Measurement uncertainty: ±3,17 dB.

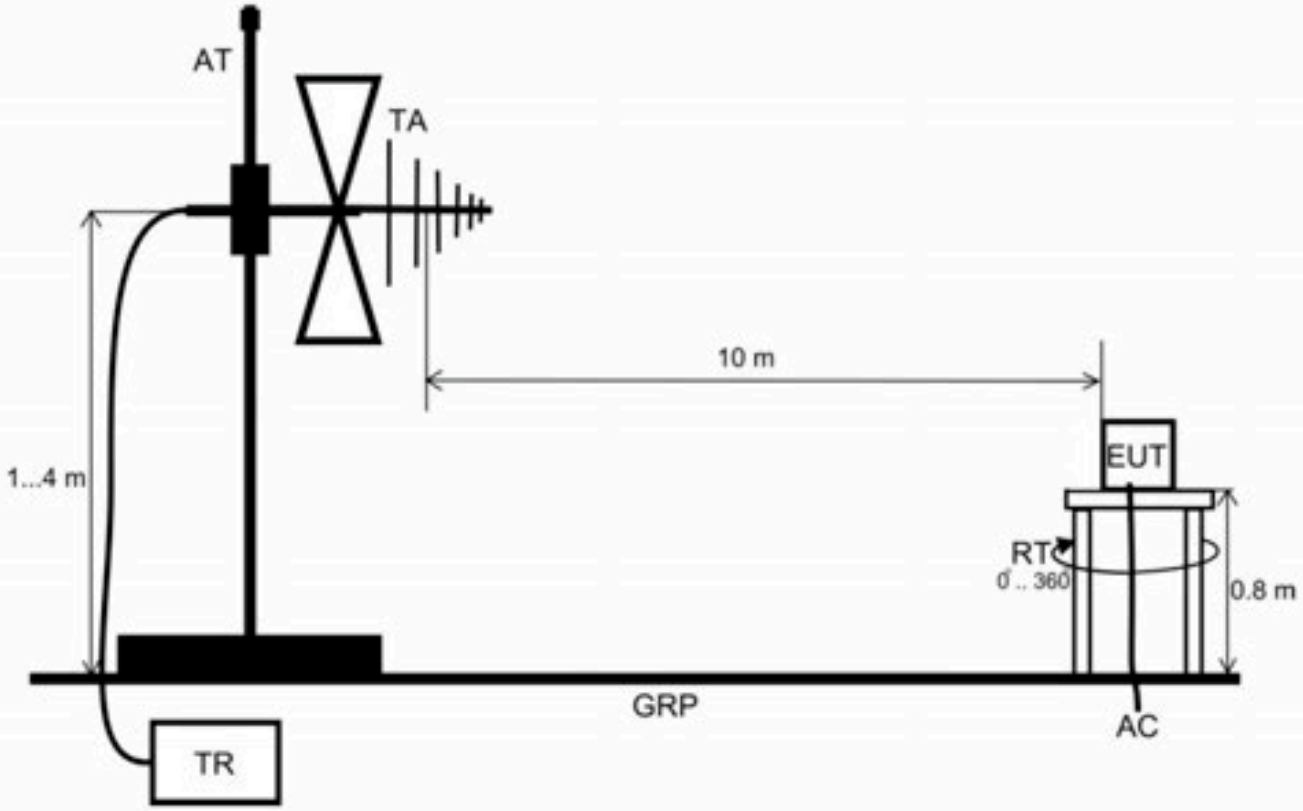
5.4 IŠVADA
CONCLUSION

Equipment under test complies with the requirements of conducted disturbances at mains terminals.

6. TRIKDŽIŲ SPINDULIUOTĖS BANDYMAS 30 MHz – 300 MHz DAŽNIŲ DIAPAZONE
RADIATED DISTURBANCE TEST IN THE FREQUENCY RANGE FROM 30 MHz TO 300 MHz

6.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
TA – measuring antenna
AT – antenna mast
TR – test receiver
RT – rotating table
AC – power cable
GRP – reference ground plane

Test setup: table-top equipment.
Test procedure: specified in clause A1.1 of Table A.1 of CISPR 32:2012.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
Emission limits:

- 30 dB(µV/m) Quasi-peak at 10 m in the frequency range 30 MHz – 230 MHz;
- 37 dB(µV/m) Quasi-peak at 10 m in the frequency range 230 MHz – 300 MHz.

6.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 55015:2013, EN 55015:2013/A1:2015.

6.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 2.
Detailed information of equipment used for tests is presented in clause 4.
Measurement uncertainty: ±4.7 dB.

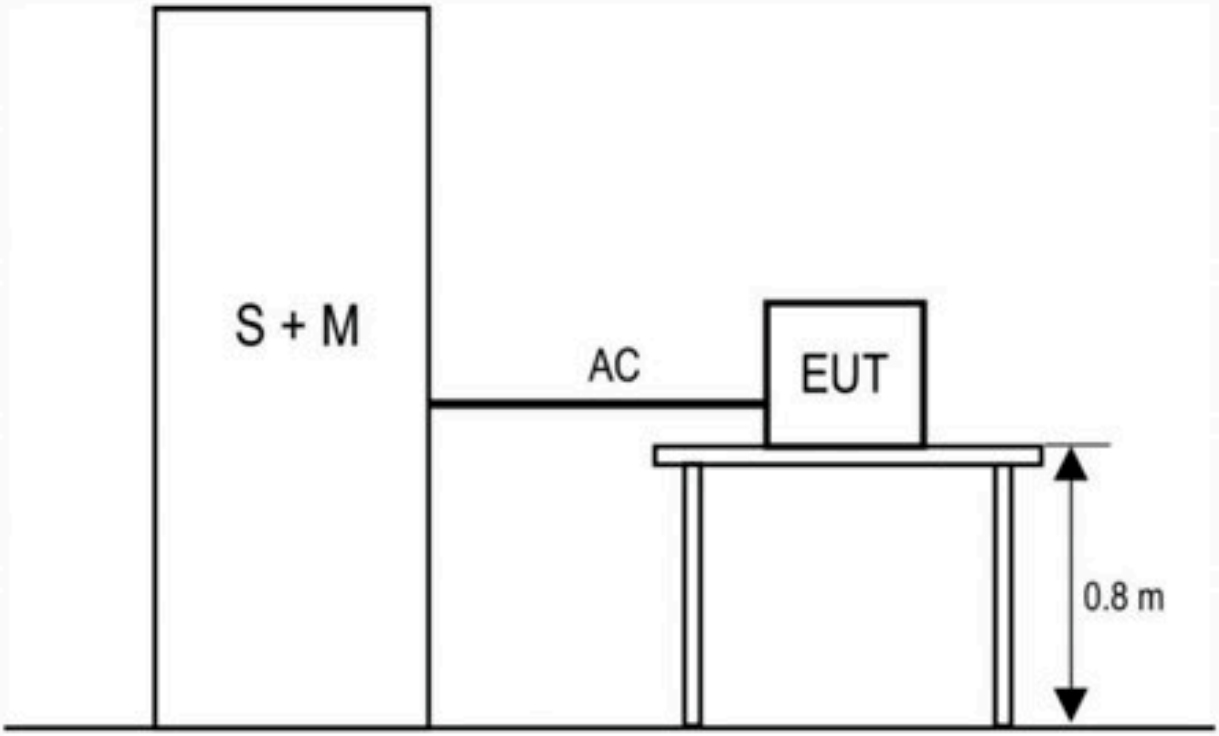
6.4. IŠVADA
CONCLUSION

Equipment under test complies with the requirements of radiated disturbance.

7. HARMONINIŲ SROVIŲ SPINDULIAVIMO BANDYMAS
HARMONIC CURRENT EMISSION TEST

7.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
S – power supply
M – measuring equipment
AC – mains cable

Test setup: table-top equipment.
Test voltage: 230 V.
EUT classification: class C b) 1.

7.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61000-3-2:2014.

7.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 3.
Detailed information of equipment used for tests is presented in clause 4.

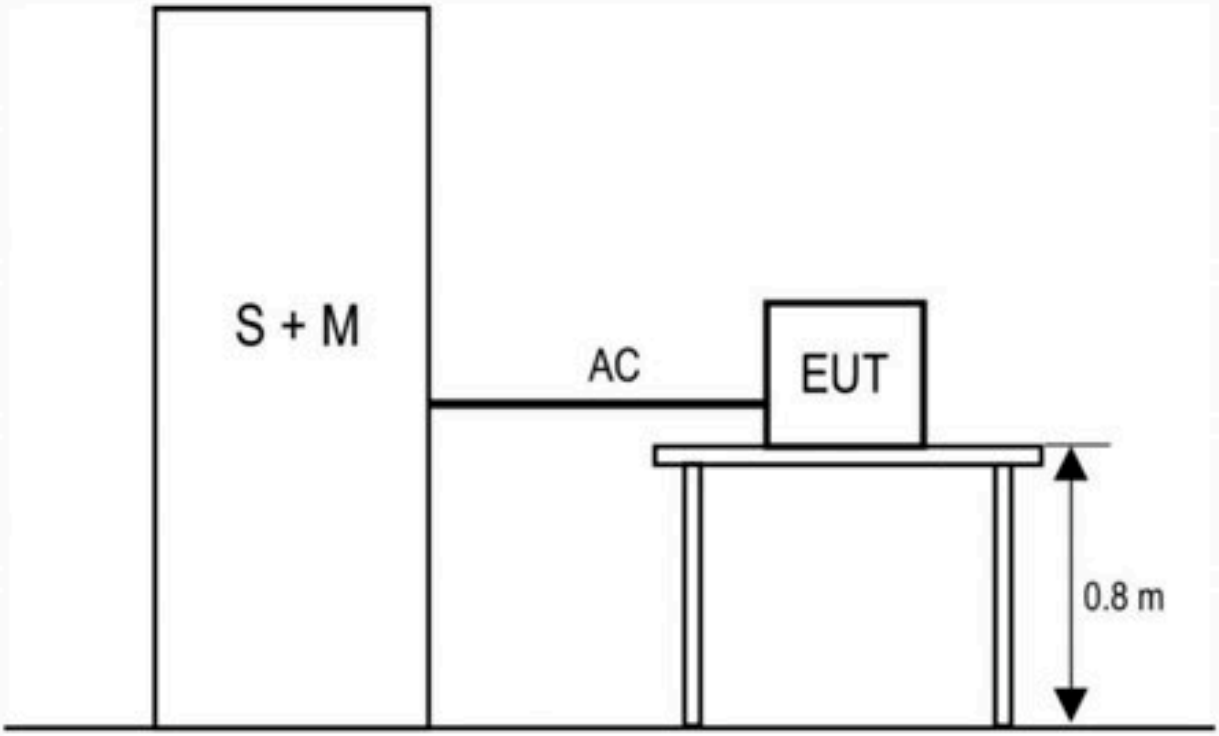
7.4. IŠVADA
CONCLUSION

The equipment under test complies with the requirements for harmonic current emission.

8. ĮTAMPOS POKYČIŲ, SVYRAVIMŲ IR MIRGĖJIMO BANDYMAS
VOLTAGE CHANGES, FLUCTUATIONS AND FLICKER TEST

8.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
S – power supply
M – measuring equipment
AC – mains cable

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz.

8.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61000-3-3:2013.

8.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 4.
Detailed information of equipment used for tests is presented in clause 4.

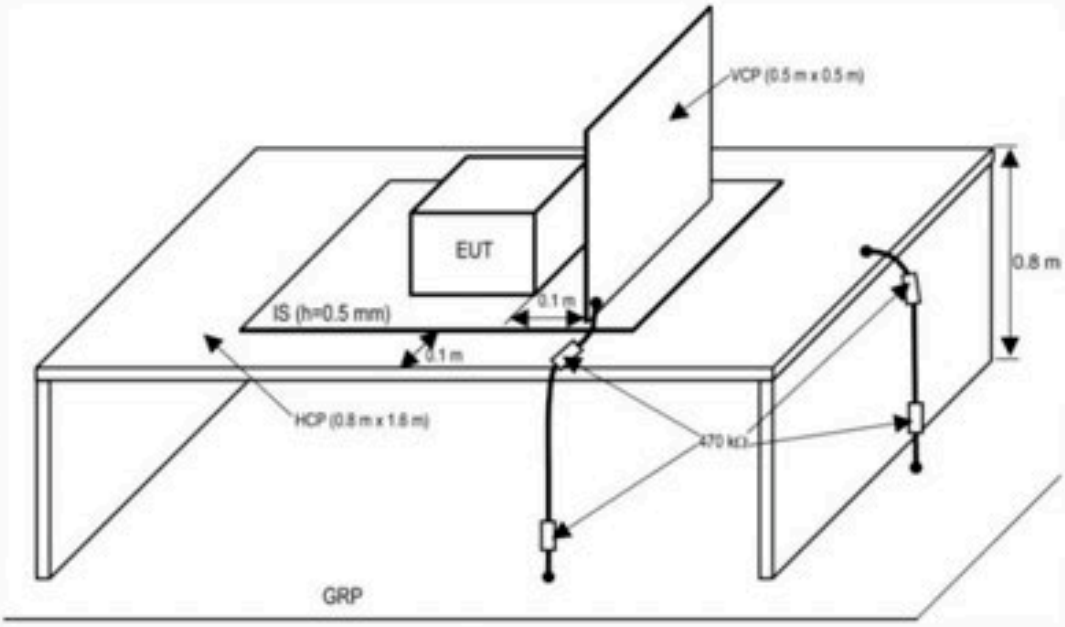
8.4. IŠVADA
CONCLUSION

The equipment under test complies with the requirements for voltage changes, fluctuations and flicker.

9. ATSPARUMO ELEKTROSTATINIAM IŠLYDŽIUI BANDYMAS
ELECTROSTATIC DISCHARGE IMMUNITY TEST

9.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – isolation seal
GRP – ground reference plane
HCP – horizontal coupling plane
VCP – vertical coupling plane

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network. .
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
Enclosure	Electrostatic discharge	4 kV contact discharge [1]	B
[1] 10 positive and 10 negative discharges at the front edge of HCP opposite the center of 4 sides of EUT; at the center of vertical edge of VCP placed on the 4 sides of EUT; at three selected points of EUT.			

9.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-2:2009.

9.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 5.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

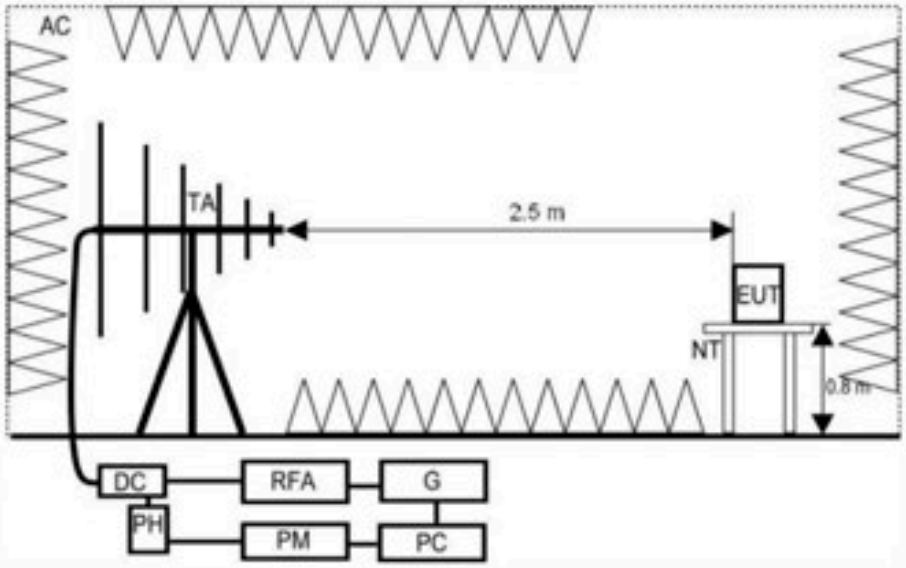
9.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to electrostatic discharge.

10. ATSPARUMO SPINDULIUOJAMAM ELEKTROMAGNETINIAM RADIJO DAŽNIŲ LAUKUI 80 MHz – 1 GHz DAŽNIŲ DIAPAZONE BANDYMAS
RADIATED RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST IN THE FREQUENCY RANGE FROM 80 MHz TO 1 GHz

10.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
DC – directional coupler
PH – power head
RFA – radio frequency amplifier
PM – power meter
G – generator
PC – computer
AC – anechoic chamber
TA – test antenna
NT – non conducting table

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
Enclosure	Electromagnetic field	3 V/m [1, 2]	A
[1] Modulation: 1 kHz, 80 % AM, sine wave. [2] Field generated with vertical and horizontal antenna polarization from four sides of EUT.			

10.2. NORMINIAIDOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-3:2006, EN 61000-4-3:2006/A1:2008, EN 61000-4-3:2006/A2:2010.

10.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 6.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

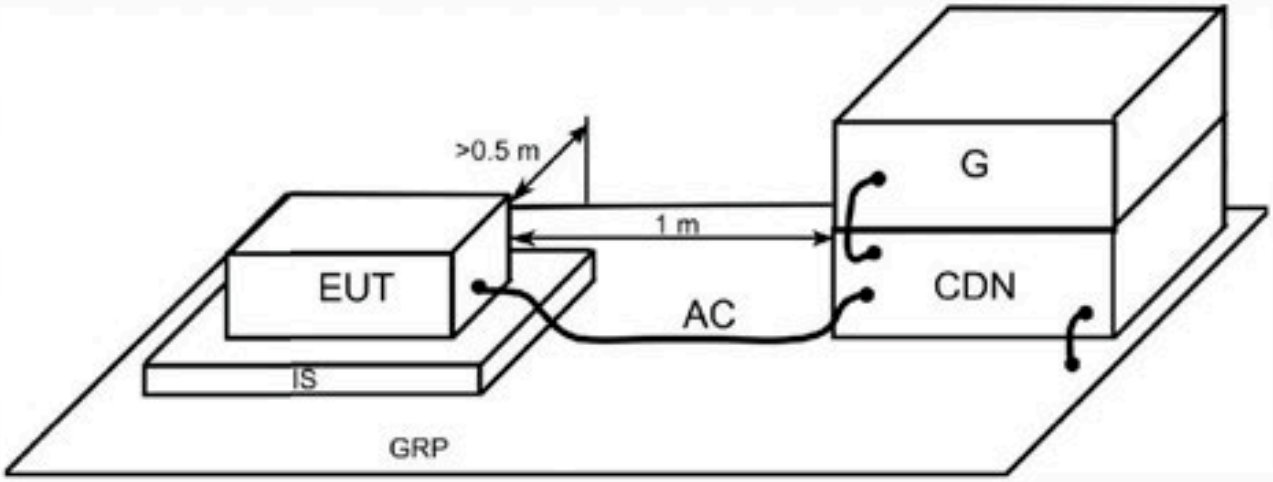
10.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to radiated RF electromagnetic field.

11. ATSPARUMO SPARČIAJAM ELEKTRINIAM PEREINAMAJAM VYKSMUI-VORAI BANDYMAS
ELECTRICAL FAST TRANSIENTS/BURST IMMUNITY TEST

11.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – insulating support
AC – power cable
G – generator
CDN – coupling-decoupling network
GRP – ground reference plane

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
a.c. power	Burst	± 1 kV (peak, 5/50 ns, 5 kHz) [1]	B
[1] Duration: 2 min with a positive polarity and a 2 min with a negative polarity pulses.			

11.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-4:2012.

11.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 7.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

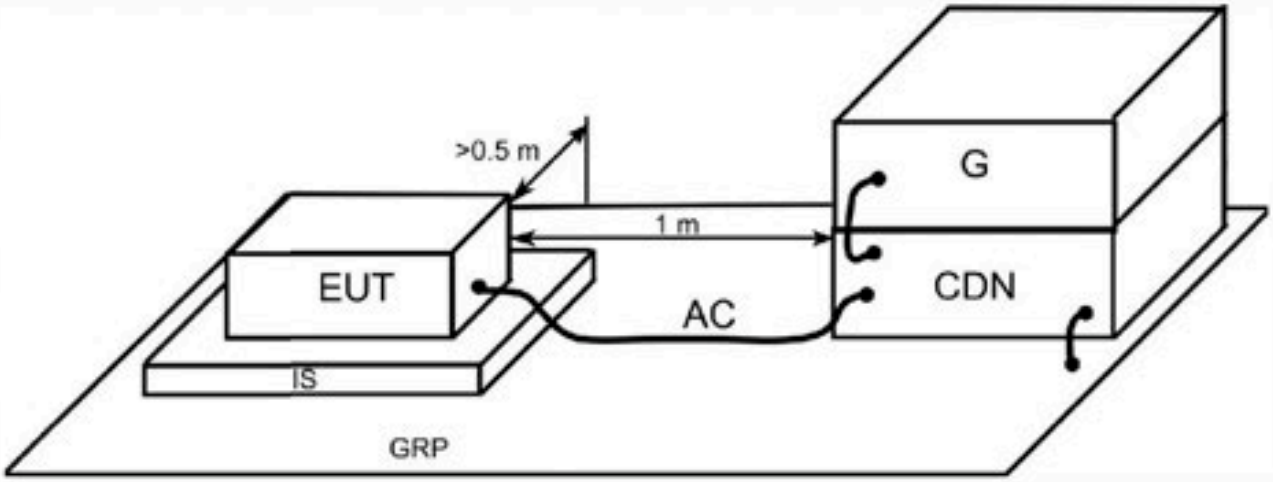
11.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to electrical fast transients/burst at input a.c power port.

12. ATSPARUMO VIRŠĮTAMPIAMS BANDYMAS
SURGES IMMUNITY TEST

12.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – insulating support
AC – power cable

EUT – equipment under test
IS – insulating support
AC – power cable

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
AC power	Surge (line to line)	± 1,0 kV (1,2/50 µs) [1]	B
	Surge (line to ground)	± 2,0 kV (1,2/50 µs) [1]	B
[1] 5 positive polarity pulses at the 90° phase angle and 5 negative polarity pulses 270° phase angle.			

12.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-5:2006.

12.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 8.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

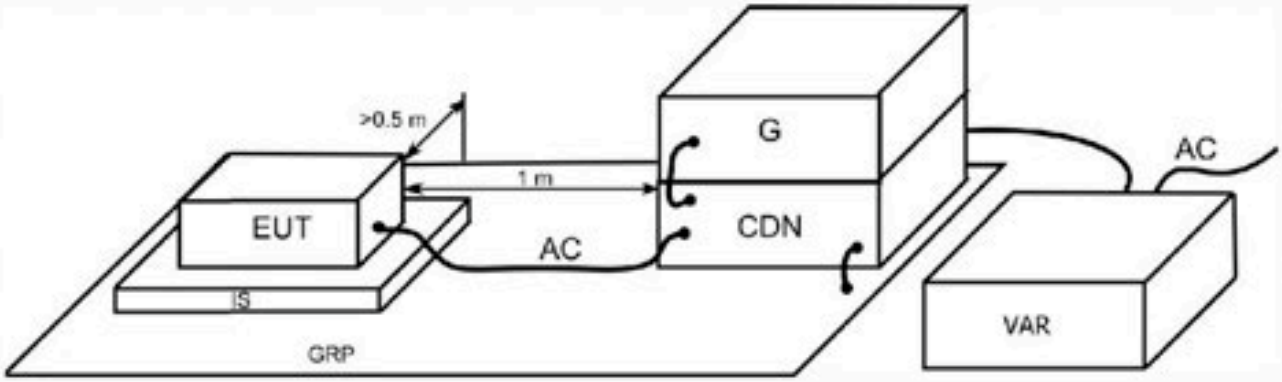
12.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to surges at input a.c power port.

13. ATSPARUMO ĮTAMPOS KRYČIAMS IR TRUMPIESIEMS PERTRŪKIAMS BANDYMAS
VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TEST

13.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Block diagram of test setup



EUT – equipment under test
IS – insulating support
G – generator
CDN – coupling/decoupling network
GRP – ground reference plane
AC – power cable
VAR - variac

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
AC power	Voltage dip	70 % for 10 periods	C
	Short interruptions	0 % for 0,5 periods	B

13.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-11:2004.

13.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 7.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

13.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to voltage dips, short interruptions.

Deputy Head of Division — Raimondas Štulas

Bandymų ataskaitos
1 priedas
Annex 1

LAIDININKAIS SKLINDANČIŲ TRIKDŽIŲ MAITINIMO PRIEIGOJE BANDYMO REZULTATAI
DISTURBANCE VOLTAGE AT THE MAINS TERMINALS TEST RESULTS

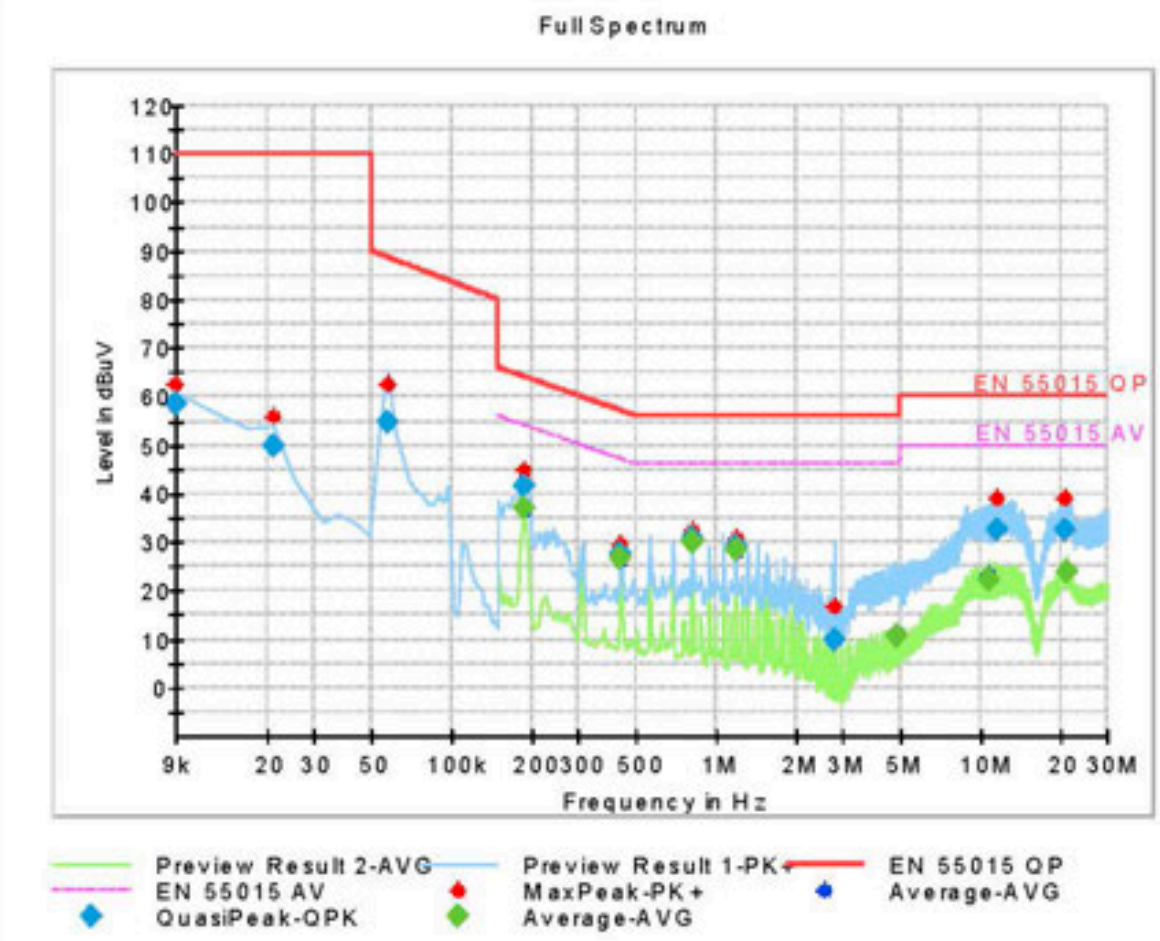
TEST REPORT
Order No. 2110

Common Information

Test Description:	Disturbance voltage on mains
Operating Conditions:	Operated
Ambient conditions:	t= 24oC; h= 37%; p= 101.4kPa
Test place:	Semianechoic chamber, Kaunas
Operator Name:	V.Gudkovas
Test date:	2018 05 22

EUT Information

EUT Name:	LED streetlight
Manufacturer:	Yellow Energy LT
Typr/model:	MF-SL-120
Serial Number:	EMC05814
Comment:	



Bandymų ataskaitos
1 priedas
Annex 1

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.009000	58.63	110.00	51.37	1000.0	0.200	N	GND	0.8
0.021000	50.00	110.00	60.00	1000.0	0.200	L1	GND	0.3
0.057000	54.78	88.81	34.03	1000.0	0.200	L1	GND	0.2
0.186000	41.51	64.21	22.70	5000.0	9.000	N	GND	0.2
0.434000	27.67	57.18	29.51	5000.0	9.000	L1	GND	0.2
0.810000	30.72	56.00	25.28	5000.0	9.000	L1	GND	0.2
1.182000	29.14	56.00	26.86	5000.0	9.000	L1	GND	0.2
2.774000	9.96	56.00	46.04	5000.0	9.000	N	GND	0.3
11.582000	32.47	60.00	27.53	5000.0	9.000	N	GND	0.7
20.742000	32.57	60.00	27.43	5000.0	9.000	L1	GND	1.2

Final_Result_AVG

Frequency (MHz)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.186000	37.18	54.21	17.03	5000.0	9.000	N	GND	0.2
0.434000	26.66	47.18	20.52	5000.0	9.000	L1	GND	0.2
0.810000	29.91	46.00	16.09	5000.0	9.000	L1	GND	0.2
1.182000	28.39	46.00	17.61	5000.0	9.000	L1	GND	0.2
4.794000	10.53	46.00	35.47	5000.0	9.000	L1	GND	0.5
10.654000	22.20	50.00	27.80	5000.0	9.000	N	GND	0.6
21.090000	24.00	50.00	26.00	5000.0	9.000	L1	GND	1.2

Hardware Setup: EMI conducted\Voltage with 2-line LISN ESH2-Z5 - [EMI conducted]

Subrange 1

Frequency Range:	9 kHz - 30 MHz
Receiver:	ESU 40 [ESU 40] @ GPIB0 (ADR 20), SN 100062/040, FW 4.43, CAL 2014.04.13
Signal Path:	ESIB 26-2-line LISN ESH2-Z5 FW 1.0 Correction Table: Cable Tinkl Correction Table: Cable TMS-H2 10m Nr.100084
LISN:	2-line LISN ESH2-Z5 Correction Table (Line 0): ESH2-Z5 Nr 890485-009 shucoN Correction Table (Line 1): ESH2-Z5 Nr 890485-009 shucoL1

Bandymų ataskaitos
2 priedas
Annex 2

TRIKDŽIŲ SPINDULIUOTĖS BANDYMO REZULTATAI
RADIATED DISTURBANCE TEST RESULTS

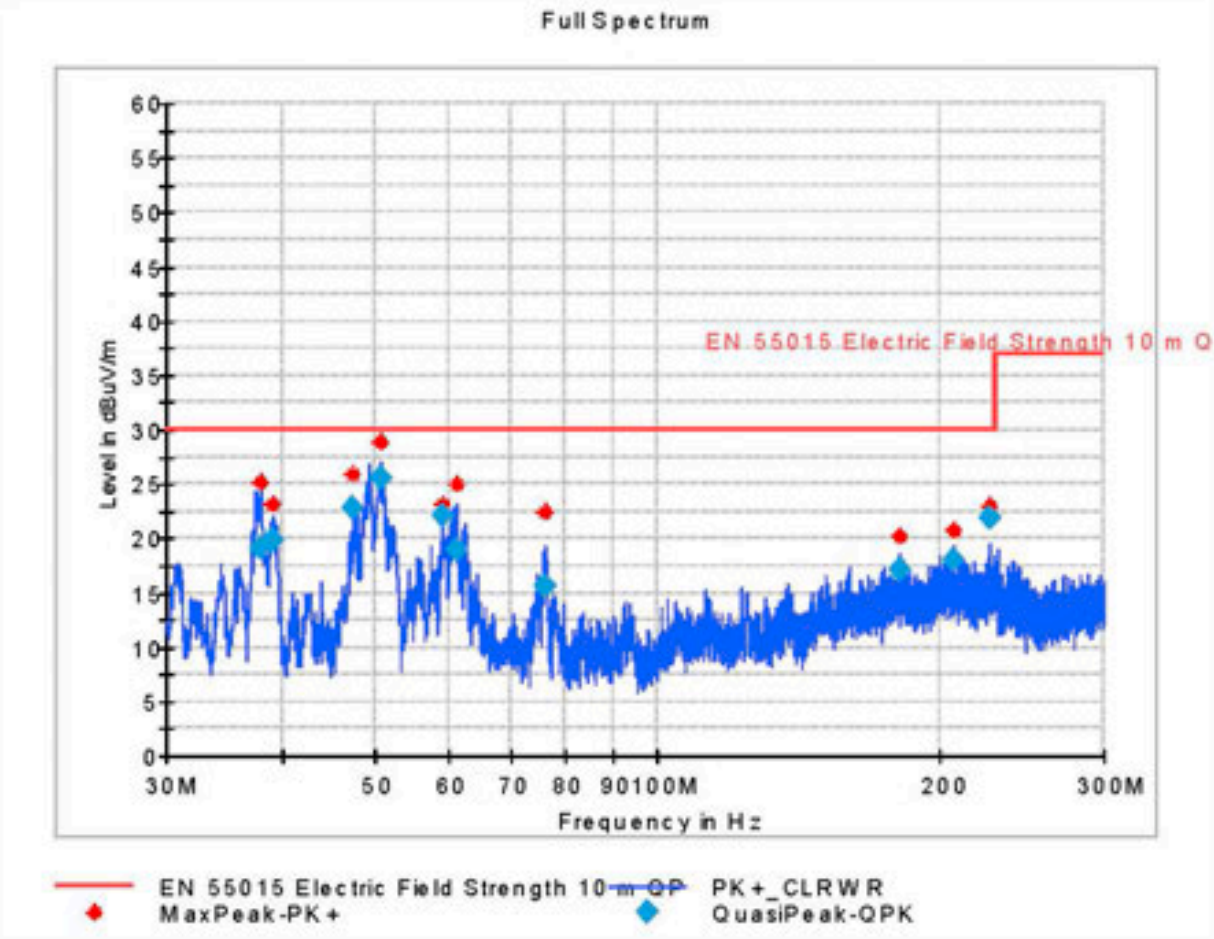
TEST REPORT
Order No. 2110

Common Information

Test Description:	Radiated disturbances in frequency range 30-300 MHz
Operating Conditions:	Operated
Ambient conditions:	t= 22oC; h= 41%; p= 100.7kPa
Test place:	Open area test site (OATS), Dovainonys
Operator Name:	V.Gudkovas
Test date:	2018 05 23

EUT Information

EUT Name:	LED streetlight
Manufacturer:	Yellow Energy LT
Typr/model:	MF-SL-120
Serial Number:	EMC05814
Comment:	



Bandymų ataskaitos
2 priedas
Annex 2

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
37.720000	19.07	30.00	10.93	15000.0	120.000	100.0	H	0.0	10.5
39.000000	19.83	30.00	10.17	15000.0	120.000	400.0	V	315.0	9.9
47.360000	22.86	30.00	7.14	15000.0	120.000	250.0	V	0.0	10.1
50.680000	25.63	30.00	4.37	15000.0	120.000	400.0	V	0.0	10.0
59.240000	22.08	30.00	7.92	15000.0	120.000	350.0	V	315.0	10.5
61.120000	18.90	30.00	11.10	15000.0	120.000	200.0	V	180.0	10.4
76.000000	15.59	30.00	14.41	15000.0	120.000	350.0	V	315.0	9.4
181.880000	17.17	30.00	12.83	15000.0	120.000	350.0	V	315.0	15.1
207.880000	18.10	30.00	11.90	15000.0	120.000	100.0	V	270.0	15.5
226.880000	21.84	30.00	8.16	15000.0	120.000	350.0	V	270.0	14.0

Hardware Setup: EMI radiated\Electric Field Strength OATS - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 1 GHz
Receiver:	ESU 40 [ESU 40] @ GPIB0 (ADR 20), SN 100062/040, FW 4.43, CAL 2014.04.13
Signal Path:	ESIB 26-HLP 3003 Nr130603 FW 1.0 Correction Table: Cable TMS-H2 10m Nr100083
Antenna:	HLP 3003 Nr130603 Correction Table (vertical): HLP-3003 Nr130603 vert 10m Correction Table (horizontal): HLP-3003 Nr130603 hor 10m
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.01
Turntable:	Turn Table [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.01

Bandymų ataskaitos
3 priedas
Annex 3

HARMONINIŲ SROVIŲ SPINDULIAVIMO BANDYMO RESULTATAI
HARMONIC CURRENT EMISSION TEST RESULTS

Name:	V. Gudiovas	Serial no:	EMC05814
Department:	EMC control division	Operating modus:	Operated
Company:	RRT	Comment1:	Ambient temp. +24 °C
Order no:	2110	Comment2:	Rel. humidity 37 %
Device:	LED streetlight	Comment3:	Atm. pressure 101.4 kPa
Specimen:	Lighting equipment	Comment4:	
Manufacturer:	YellowEnergyLT	Date:	22.05.2018
Type:	MF-SL-120	Test date:	22.05.2018

Maximum RMS current and corresponding values in timewindow 297:

Voltage:	231.12 Vrms		THD=0.01 %	THV=0.013 V	POHV=0.004 V	PWHD=0.01 %
Current:	0.496 Arms		THD=11.55 %	THC=0.057 A	POHC=0.002 A	PWHD=2.94 %
Power:	112.4 W	P1=112.4 W	114.6 VA			
Power factor:	0.981	CosPhi1: 0.987				

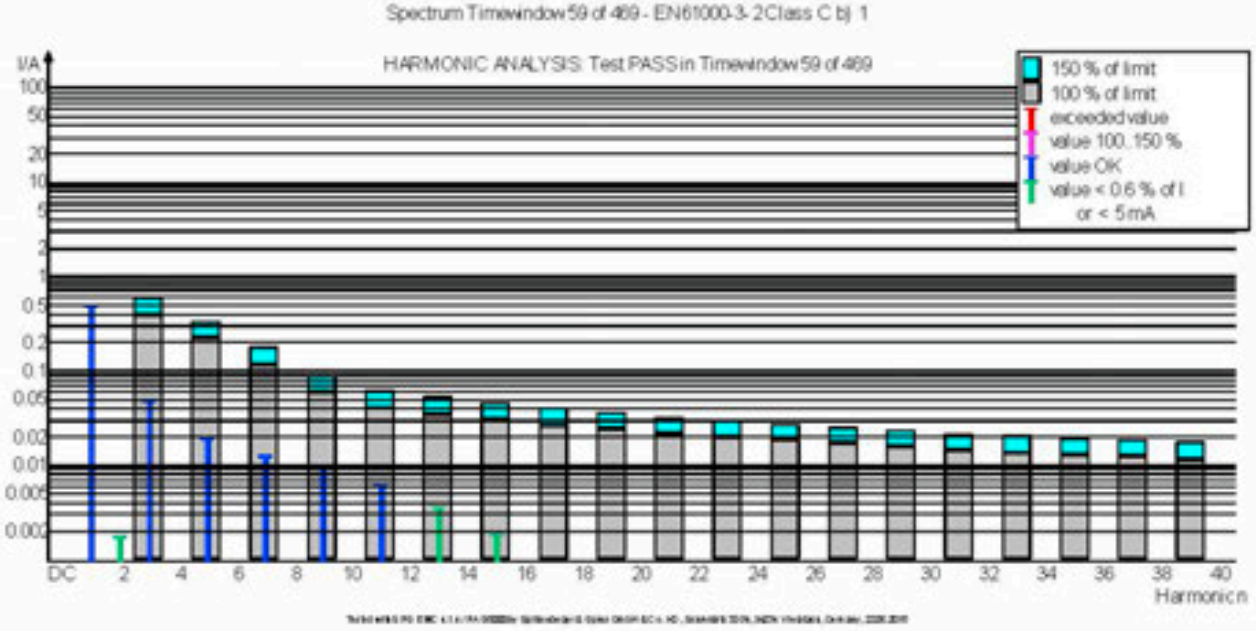
Test conditions: EN 61000-3-2:2014, f=50 Hz, Phase=L1, Range=0.80 A
Time window: 16, Grouping (>2nd harm.)=off, Rated power=114 W
No Ztest selected
harmonic currents < 0.6 % of I or < 5 mA are disregarded for calc. of THD, THC, POHC, PWHD

HARMONIC ANALYSIS: Test PASS
Tobs = entire measurement; POHC: avg=0.00 A, limits=0.05 A
Iavg=0.496 Arms

Ha	Entire measurement (2.5 min = 469 time windows)						Worst 2.5 min		Average		PASS	FAIL
	Maximum	Window	EN61000-3-2 Class C b) 1	Margin in MaxWin	100 to 150%	Ex-ceeded	100 to 150%	Ex-ceeded	Value	Ex-ceeded		
DC	-0.0007 A	132	-.-.---	---.-	0	0	n.e.	n.e.	-0.0005 A	0	X	
1	0.4925 A	270	-.-.---	---.-	0	0	n.e.	n.e.	0.4924 A	0	X	
2	0.0020 A	237	-.-.---	---.-	0	0	n.e.	n.e.	0.0019 A	0	X	
3	0.0502 A	152	0.3876 A	-87.1 %	0	0	n.e.	n.e.	0.0499 A	0	X	
4	0.0010 A	197	-.-.---	---.-	0	0	n.e.	n.e.	0.0009 A	0	X	
5	0.0199 A	125	0.2166 A	-90.8 %	0	0	n.e.	n.e.	0.0197 A	0	X	
6	0.0005 A	107	-.-.---	---.-	0	0	n.e.	n.e.	0.0004 A	0	X	
7	0.0133 A	395	0.1140 A	-88.3 %	0	0	n.e.	n.e.	0.0132 A	0	X	
8	0.0006 A	418	-.-.---	---.-	0	0	n.e.	n.e.	0.0004 A	0	X	
9	0.0098 A	59	0.0570 A	-82.8 %	0	0	n.e.	n.e.	0.0097 A	0	X	
10	0.0005 A	106	-.-.---	---.-	0	0	n.e.	n.e.	0.0004 A	0	X	
11	0.0067 A	415	0.0399 A	-83.1 %	0	0	n.e.	n.e.	0.0066 A	0	X	
12	0.0004 A	152	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
13	0.0037 A	33	0.0338 A	-88.9 %	0	0	n.e.	n.e.	0.0036 A	0	X	
14	0.0003 A	466	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
15	0.0020 A	355	0.0298 A	-93.1 %	0	0	n.e.	n.e.	0.0019 A	0	X	
16	0.0003 A	1	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
17	0.0010 A	80	0.0258 A	-96.2 %	0	0	n.e.	n.e.	0.0009 A	0	X	
18	0.0003 A	423	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
19	0.0003 A	172	0.0231 A	-98.6 %	0	0	n.e.	n.e.	0.0002 A	0	X	
20	0.0003 A	28	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
21	0.0009 A	1	0.0209 A	-95.9 %	0	0	n.e.	n.e.	0.0006 A	0	X	
22	0.0003 A	85	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
23	0.0009 A	432	0.0191 A	-95.4 %	0	0	n.e.	n.e.	0.0007 A	0	X	
24	0.0003 A	1	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
25	0.0012 A	446	0.0176 A	-93.3 %	0	0	n.e.	n.e.	0.0010 A	0	X	
26	0.0003 A	394	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
27	0.0010 A	191	0.0163 A	-93.9 %	0	0	n.e.	n.e.	0.0008 A	0	X	
28	0.0003 A	13	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
29	0.0011 A	80	0.0151 A	-92.9 %	0	0	n.e.	n.e.	0.0009 A	0	X	
30	0.0003 A	24	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
31	0.0009 A	252	0.0142 A	-93.3 %	0	0	n.e.	n.e.	0.0008 A	0	X	
32	0.0003 A	20	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
33	0.0006 A	421	0.0133 A	-95.4 %	0	0	n.e.	n.e.	0.0004 A	0	X	
34	0.0003 A	341	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
35	0.0006 A	90	0.0125 A	-95.1 %	0	0	n.e.	n.e.	0.0005 A	0	X	
36	0.0003 A	283	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
37	0.0007 A	1	0.0119 A	-94.5 %	0	0	n.e.	n.e.	0.0004 A	0	X	
38	0.0003 A	283	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	
39	0.0003 A	49	0.0113 A	-97.2 %	0	0	n.e.	n.e.	0.0002 A	0	X	
40	0.0003 A	240	-.-.---	---.-	0	0	n.e.	n.e.	0.0002 A	0	X	

average value < 0.6 % of Iavg or < 5 mA   n.e. = not evaluated

Bandymų ataskaitos
3 priedas
Annex 3



Bandymų ataskaitos
4 priedas
Annex 4

ĮTAMPOS POKYČIŲ, SVYRAVIMŲ IR MIRGĖJIMO BANDYMO RESULTATAI
VOLTAGE CHANGES, FLUCTUATIONS AND FLICKER TEST RESULTS

Name:	V. Gudkovas	Serial no:	EMC05814
Department:	EMC control division	Operating modes:	Operated
Company:	RRT	Comment1:	Ambient temp. +24 °C
Order no:	2110	Comment2:	Rel. humidity 37 %
Device:	LED streetlight	Comment3:	Atm. pressure 101.4 kPa
Specimen:	Lighting equipment	Comment4:	
Manufacturer:	Yellow Energy LT	Date:	22.05.2018
Type:	MF-SL-120	Test date:	22.05.2018

Test conditions: EN 61000-3-3:2013 / 230 V / 50 Hz / Phase L1
EN 61000-4-15:2011 / Obs 1 x 10 min / Zbest (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
11:31:12	0.000	0.0060	- . - - - -	0.000	+0.000	- . - - -	X	
Limits:		1.000	0.650	0.500	4.000	3.300		
Plt: 0.002621 (calculated over 12 periods)							X	
Evaluated: PST, PLT, Sliding PLT, dc, dmax, Tmax								

FLICKER: Source test PASS!

Time	Pmax	Pst	Sliding Plt	Tmax[s]	dmax[%]	dc [%]	PASS	FAIL
11:31:12	0.000	0.0060	- . - - - -	0.000	+0.000	- . - - -	X	
Plt: 0.002621 (calculated over 12 periods)								
Evaluated: PST <= 0.4 dmax < 20 % dmax1								

Bandymų ataskaitos
5 priedas
Annex 5

ATSPARUMO ELEKTROSTATINIAM IŠLYDŽIUI BANDYMO REZULTATAI
ELECTROSTATIC DISCHARGE IMMUNITY TEST RESULTS

ESD TEST REPORT

Report Number :	2110
Test Lab :	EMC control division/ RRT
Test Person :	V.Gudkovas
Test Date :	6/12/2018 , 1:15:44 PM
Test Standard :	EN 61000-4-2:2009
Customer :	Yellow Energy LT

E . U . T

Name :	LED streetlight MF-SL-120
Description :	Ser.No. EMC05814

Test Level max.

Contact :	4000 V		
Horizontal Coupling Plane :	4000 V	Vertical Coupling Plane :	4000 V

Test Result

Test passed :	☑	Failure Criteria :	B
Test not passed :	☐		
Test not rated :	☐		

Bandymų ataskaitos
5 priedas
Annex 5

Climatic Conditions

Temperature :	26 °C	Humidity :	43 %
Pressure :	100 kPa		

Test Simulator

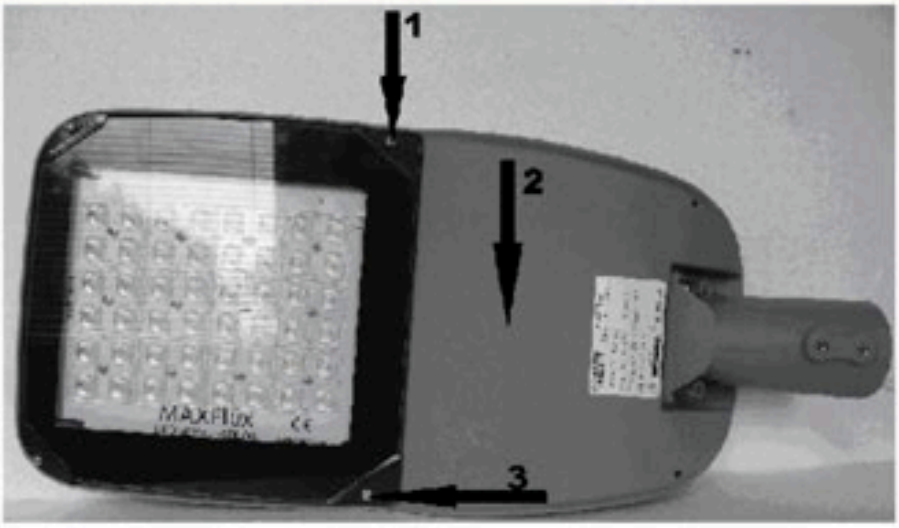
Name / Version : esd30n, 1.23

Contact Discharge

Test Setup

Test Routine :	Contact 4kV				
Discharge Module :	150 pf / 330 ohm				
Test Voltages :	Level 1	Level 2	Level 3	Level 4	
	4000 V				
Polarity :	Positive & Negative			Repetition :	1.0 s
Iteration :	Polarity -> Point -> Voltage			Discharges :	10
Trigger :	Automatic			Test Points :	3

Figure EUT



Test Points

Test Point	Break	Description
1		1 side- CD
2		2 side - CD
3		3 side - CD

Horizontal Coupling Plane

Test Setup

Test Routine : Contact 4kV

Discharge Module : 150 pf / 330 ohm

Test Voltages : Level 1 Level 2 Level 3 Level 4

4000 V

Polarity :	Positive & Negative	Repetition :	1.0 s
Iteration :	Polarity -> Point -> Voltage	Discharges :	10
Trigger :	Automatic	Test Points :	4

Test Points

Test Point	Break	Description
1		Front-CD
2		1 side- CD
3		Back - CD
4		2 side - CD

Bandymų ataskaitos
5 priedas
Annex 5

Vertical Coupling Plane

Test Setup

Test Routine :	Contact 4kV				
Discharge Module :	150 pf / 330 ohm				
Test Voltages :	Level 1	Level 2	Level 3	Level 4	
	4000 V				
Polarity :	Positive & Negative			Repetition :	1.0 s
Iteration :	Polarity -> Point -> Voltage			Discharges :	10
Trigger :	Automatic			Test Points :	4

Test Points

Test Point	Break	Description
1		Front-CD
2		1 side- CD
3		Back - CD
4		2 side - CD

Bandymų ataskaitos
6 priedas
Annex 6

ATSPARUMO SPINDULIUOJAMAM ELEKTROMAGNETINIAM RADIJO DAŽNIŲ LAUKUI BANDYMO REZULTATAI
RADIATED RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST RESULTS

emcware v3.1.0

IEC 61000-4-3 Test Report

Test File Information			
Test Data File:	C:\emcware v3.1.0\Radiated\IEC61000\Test Data\MF-SL-120_3V_80-1000MHz.rstd		
IEC Calibration File:	C:\emcware v3.1.0\Radiated\IEC61000\Calibration Data\IEC_80-1000 MHz_10 Vm_CP_9 Pos.rscd		
Test Setup File:	C:\emcware v3.1.0\Radiated\IEC61000\Test Setup\IEC 61000-4-3 (Level 2) - 112712.rsts		
Equipment Setup File:	C:\emcware v3.1.0\Radiated\Equipment Setup\RRT_Equipment_Setup.rses		
Test Date:	13/06/2018 10:21		
Test Standard:	IEC 61000-4-3 (Level 2) - Custom		
Start Frequency:	80.000 MHz		
Stop Frequency:	1000.000 MHz		
EUT Sides Tested:	Front, Right, Rear, Left		
Polarizations Tested:	Vertical, Horizontal		
Modulations Tested:	Modulation 1; Consult Test Setup File Listed Above For Definitions		
Test Status:	----------Complete ----------		
EUT Status:	**Passed**	**EUT Monitoring:**	Manual
Non-Conformities:	None		

Order No.2110					
Test Engineer:	Vygintas Gudkovas				
Temperature:	25 °C	Humidity:	39 %	Pressure:	100.0 kPa
Customer:	Yellow Energy LT				
EUT Model Number:	LED streetlight MF-SL-120				
EUT Serial Number:	EMC05814				
EUT Description	EUT operated				
Notes:	Normal performance, no change of operation (criterion A).				

Bandymų ataskaitos
6 priedas
Annex 6

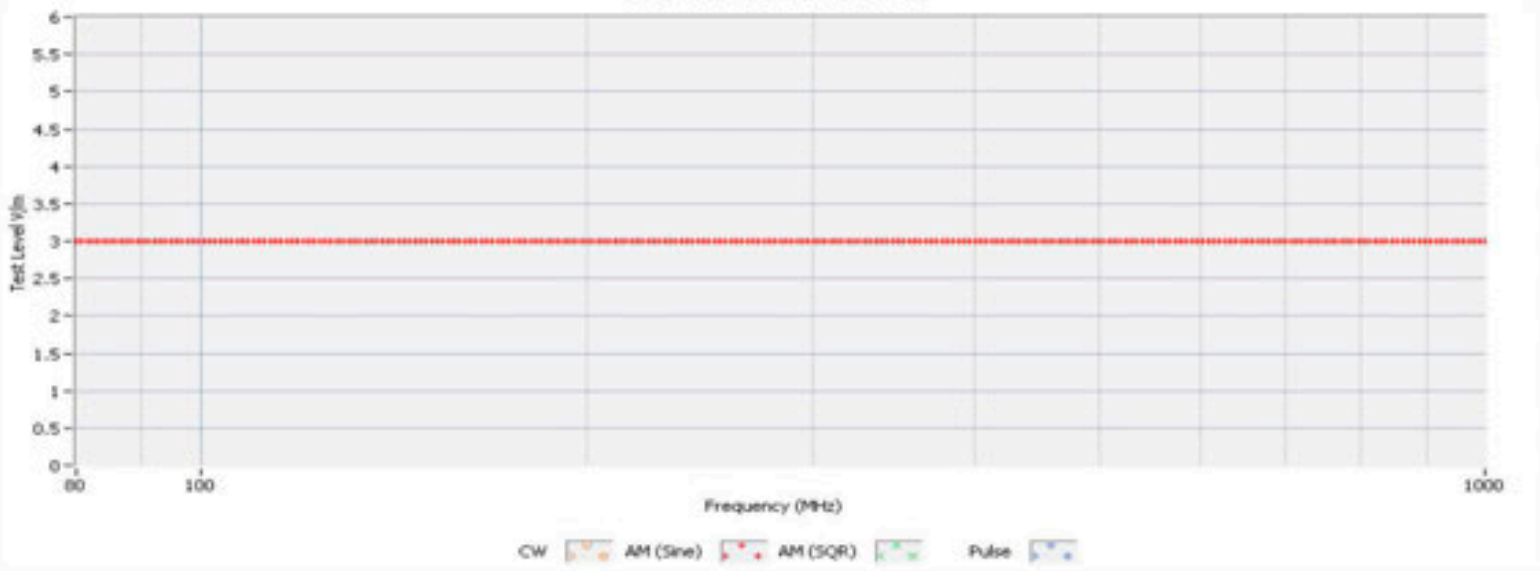
Test Parameters

General Information

Test Standard:	IEC 61000-4-3
Test Setup Name:	IEC 61000-4-3 (Level 2) - Custom
Date:	09/09/2016 11:04
File Path:	C:\emcware v3.1.0\Radiated\IEC61000\Test Setup\IEC 61000-4-3 (Level 2) - 112712.rsts
Power Leveling Method:	Forward Power
Power Leveling Tolerance:	+ 0.50 (dBm) / -0.00 (dBm)
Power Leveling Between Frequencies:	Unchanged
Start Drive Level:	-40.00 (dBm)
Field Leveling Tolerance:	+ 0.75 (V/m) / -0.00 (V/m)
EUT Monitor Type:	None

Test Parameters

Test Level Plot



Bandymų ataskaitos
6 priedas
Annex 6

Test Parameters

Frequency Dependent Parameters

Frequency	Frequency Step	Field Strength	Dwell	Field Interp.	Test CW	Modulation 1	Modulation 2
80.000 MHz	1.000 %	3.000 V/m	1.00 Sec	None	No	AM Sine, 80.000%, 1000.000(Hz)	None
1000.000 MHz	1.000 %	3.000 V/m	1.00 Sec	None	No	AM Sine, 80.000%, 1000.000(Hz)	None

Test Parameters

Frequency Dependent RF Signal Routing

Frequency	Equipment Control	SC Switch Positions	SC1000(1) Aux	SC1000(2) Aux	User Defined Msg
80MHz	-------- (General) ---------- -- E8257D - US44270408_(Sig Gen 1) 250W1000A - 307533_(Amp 1) DC6180A - 322196 _(DC 1) PM2002 - 321670_(Power Meter 1) EMCO3144 - 00035589 _(Antenna 1) Manual - _(Antenna Controller 1) -------- (Calibration/Test) ---------- - FM7004 - 0339366_(Field Monitor 1) -------- (Harmonic Test) ---------- --	No SC Connection No SC Connection No SC Connection No SC Connection No SC Connection	None	None	

Bandymų ataskaitos
7 priedas
Annex 7

ATSPARUMO SPARČIAJAM ELEKTRINIAM PEREINAMAJAM VYKSMUI-VORAI, ĮTAMPOS KRYČIAMS IR TRUMPIESIEMS PERTRŪKIAMS BANDYMŲ REZULTATAI
ELECTRICAL FAST TRANSIENTS/BURST, VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TESTS RESULTS

6/12/2018 2:25 PM

- TEST REPORT-

Immunity to EMC Pulses

Equipment under test	
Order number	2110
Manufacturer/customer	Yellow Energy LT
EUT description/name	LED streetlight
Type	MF-SL-120
Serial number	EMC05814
SW version	
Notes	EUT operated

Normative documents:	
Requirements according to :	EN 61547:2009

Test specification and results:

Phenomena	Standard	Criteria	Notes	Result
Bursts to mains	EN 61000-4-4:2012	B		Pass
Bursts to signal lines	EN 61000-4-4:2012	B		N/A
Surges to mains	EN 61000-4-5:2014	B		N/A
Voltage dips	EN 61000-4-11:2004	B,C		Pass
Short interruptions	EN 61000-4-11:2004	C		Pass
Power fr. magnetic field	EN 61000-4-8:2010	B		N/A
Pulse magnetic field	EN 61000-4-9:1993+A1:2001			N/A

Main test equipment:

Manufacturer	Type	Serial Nr	In use
Teseq	NSG 3060	1478	☑
Teseq	CDN 3061	1407	☑
Teseq	NSG 3040	6098	☐
Teseq	CDN 3043	5012	☐

Manual or additional Equipment :

Manufacturer	Type	Serial Nr	Calibration date	Certificate Nr:	In use
Teseq	Coil INA702	255	2013-04-02	H70202551413	☐
Teseq	INA 752	164	2013-02-14	H75201640613	☐
Schaffner	Clamp CDN 8014	17308	2013-01-10	A090/13	☐

Modules:

Manufacturer	Type	Serial No.	Version / FW	Calibration date	Certificate No.
Teseq	WIN 3000	0550-0-0102-0000-7E8A-7AE3-3CC3-32D7	1.4.1	---	---
Teseq	MCR 3000	550	0002.30	---	---
Teseq	SUI 3000	---	V02.20	---	---
Teseq	CWM 3650	421	0002.31	10/18/2017	CR05782B/CR0
Teseq	HVM 3060	372	0002.31	---	---
Teseq	FTM 3425	455	0002.31	10/18/2017	CR05782B/CR0
Teseq	RWM 3652	221	0002.31	10/18/2017	CR05782B/CR0
Teseq	CDM 3061-C	1407	0002.31	10/18/2017	CR05782B/CR0
Teseq	PQM 3403	375	0002.31	10/18/2017	CR05782B/CR0
Teseq	VAR 3005-516	848	0002.14	5/29/2013	H00508482213
Teseq	MFO 6502	162	0002.31	10/19/2017	CR06003B

Settings:
EUT supply voltage Uin used for 100% reference value: 230 V
Measured EUT Supply Voltage: 232 V
Measured EUT Supply Frequency: 50 Hz

Environmental Conditions:		
Temperature, °C	Humidity, %	Pressure, kPa
26	37	99.6

Bandymų ataskaitos
7 priedas
Annex 7

Test Results

Sequence:

Burst / Electrical Fast Transient:
C:\Program Files (x86)\Teseq AG\WIN 3000\UserTests\EN 61000-4-4\EN 61547 lamp virs 25W.eft
EFT Test for 1-phase power line up to 1000V, alternate polarity, burst frequency 5 kHz & 100 kHz, coupling to all lines.

Time	Volt	Polarity	Frequency	Phase	Burst Time	Repetition Time	Step Duration	Coupling	Status
6/12/2018 2:27:14 PM	1000 V	Pos	5 KHz	---	15 ms	300 ms	120 s	IEC L1	Passed
6/12/2018 2:29:20 PM	1000 V	Neg	5 KHz	---	15 ms	300 ms	120 s	IEC L1	Passed
6/12/2018 2:31:24 PM	1000 V	Pos	5 KHz	---	15 ms	300 ms	120 s	IEC N	Passed
6/12/2018 2:33:30 PM	1000 V	Neg	5 KHz	---	15 ms	300 ms	120 s	IEC N	Passed
6/12/2018 2:35:35 PM	1000 V	Pos	5 KHz	---	15 ms	300 ms	120 s	IEC PE	Passed
6/12/2018 2:37:41 PM	1000 V	Neg	5 KHz	---	15 ms	300 ms	120 s	IEC PE	Passed

Dips and Drops:
C:\Program Files (x86)\Teseq AG\WIN 3000\UserTests\EN 61000-4-11_2004\EN 61547dips&interrup.dnd

Time	Volt	Phase	Repetition Time	Event Time	Step Duration	Status
6/12/2018 2:38:16 PM	70 %	0 °	10 s	200 ms	3 Pulses	Passed
6/12/2018 2:38:49 PM	0 %	0 °	10 s	10 ms	3 Pulses	Passed

Tested by: Vygintas Gudkovas

Date: 6/12/2018

Bandymų ataskaitos
8 priedas
Annex 8

ATSPARUMO VIRŠĮTAMPAIMS BANDYMŲ REZULTATAI
SURGES IMMUNITY TESTS RESULTS

6/12/2018 4:42 PM

- TEST REPORT-

Immunity to EMC Pulses

Equipment under test	
Order number	2110
Manufacturer/customer	Yellow Energy LT
EUT description/name	LED streetlight
Type	MF-SL-120
Serial number	EMC058174
SW version	
Notes	EUT operated

Normative documents:	
Requirements according to :	EN 61547:2009

Test specification and results:

Phenomena	Standard	Criteria	Notes	Result
Bursts to mains	EN 61000-4-4:2012	B		N/A
Bursts to signal lines	EN 61000-4-4:2012	B		N/A
Surges to mains	EN 61000-4-5:2014	B		Pass
Voltage dips	EN 61000-4-11:2004	B,C		N/A
Short interruptions	EN 61000-4-11:2004	C		N/A
Power fr. magnetic field	EN 61000-4-8:2010	B		N/A
Pulse magnetic field	EN 61000-4-9:1993+A1:2001			N/A

Main test equipment:

Manufacturer	Type	Serial Nr	In use
Teseq	NSG 3060	1478	☐
Teseq	CDN 3061	1407	☑
Teseq	NSG 3040	6098	☐
Teseq	CDN 3043	5012	☐

Manual or additional Equipment :

Manufacturer	Type	Serial Nr	Calibration date	Certificate Nr:	In use
Teseq	Coil INA702	255	2013-04-02	H702025S1413	☐
Teseq	INA 752	164	2013-02-14	H752016A0613	☐
Schaffner	Clamp CDN 8014	17308	2013-01-10	A090/13	☐

Modules:

Manufacturer	Type	Serial No.	Version / FW	Calibration date	Certificate No.
Teseq	WIN 3000	1906-0-0104-0000-23D1-E37F-DCEE-D368	1.4.1	---	---
Teseq	MCR 3000	1906	0002.42	---	---
Teseq	CDM 3041-C	1723	0002.39	11/23/2017	CR00205B
Teseq	PQM 3403	2479	0002.39	11/23/2017	CR00209B
Teseq	HVM 3040	1518	0002.39	---	---
Teseq	CWM 3451	3336	0002.39	11/20/2017	CR00207B
Teseq	FTM 3425	3687	0002.39	11/20/2017	CR00206B
Teseq	CDN 3043-C	5012	0002.39	11/20/2017	CR00208B
Teseq	INA 6502	221	0002.31	3/21/2013	H50202211213

Settings:

EUT supply voltage Uin used for 100% reference value:	230 V
Measured EUT Supply Voltage:	239 V
Measured EUT Supply Frequency:	50 Hz

Environmental Conditions:		
Temperature, °C	Humidity, %	Pressure, kPa
26	37	99.6

Bandymų ataskaitos
8 priedas
Annex 8

Test Results

Combination Wave:
C:\Program Files (x86)\Teseq AG\WIN 3000\UserTests\EN 61000-4-5\EN 61547 lamp daugiau 25W.cw
Combination wave test for 1-phase power line up to 2000V, alternate polarity, synchronous coupling from 0° to 270° in 90° step, line to line coupling.

Time	Volt	Polarity	Impedance	Phase	Repetition Time	Step Duration	Coupling	Status
6/12/2018 4:47:44 PM	1000 V	Pos	2 Ω	90 °	60 s	5 Pulses	IEC L1 -> N	Passed
6/12/2018 4:52:53 PM	1000 V	Neg	2 Ω	270 °	60 s	5 Pulses	IEC L1 -> N	Passed
6/12/2018 4:58:02 PM	2000 V	Pos	12 Ω	90 °	60 s	5 Pulses	IEC L1 -> PE	Passed
6/12/2018 5:03:11 PM	2000 V	Neg	12 Ω	270 °	60 s	5 Pulses	IEC N -> PE	Passed
6/12/2018 5:08:20 PM	2000 V	Pos	12 Ω	90 °	60 s	5 Pulses	IEC L1 -> PE	Passed
6/12/2018 5:12:29 PM	2000 V	Neg	12 Ω	270 °	60 s	5 Pulses	IEC N -> PE	Passed

Tested by: Vygintas Gudkovas

Date: 6/12/2018

LIETUVOS NACIONALINIS AKREDITACIJOS BIURAS
BANDYMAI ISO/IEC 17025 Nr. LA.01.006

LIETUVOS RESPUBLIKOS RYŠIŲ REGULIAVIMO TARNYBOS APARATŪROS IR ĮRENGINIŲ ELEKTROMAGNETINIO SUDERINAMUMO KONTROLĖS SKYRIUS
EQUIPMENT AND DEVICES ELECTROMAGNETIC COMPATIBILITY CONTROL DIVISION OF COMMUNICATIONS REGULATORY AUTHORITY OF THE REPUBLIC OF LITHUANIA

Valstybės biudžetinė įstaiga. Juridinių asmenų registras. Kodas 121442211. Zarasų g. 38, LT - 44140 Kaunas. Tel. (8 37) 334040. Faks. (8 37) 211907. El.p. emc@rrt.lt.

APPROVED
Head of Division
A.V.

Arvydas Giedraitis

BANDYMŲ ATASKAITA
TEST REPORT

2018-06-22 No (29.1) PB-76

BANDOMASIS OBJEKTAS TEST ITEM	LED street luminaire MAXFlux
GAMINTOJAS MANUFACTURER	YELLOW ENERGY, Lithuania
TIPAS TYPE	MF-SL-120
SERIJOS NUMERIS SERIAL NUMBER	EMC05814 (assigned number)
UŽSAKOVAS APPLICANT	UAB "Autokausta" Marvelės g. 199B LT-46204 Kaunas Lithuania Tel.: +370 37 397555 Fax: +370 37 397444 E-mail: statyba@autokausta.lt
BANDYMŲ PRADŽIA START OF TESTS	2018-06-22
BANDYMŲ PABAIGA END OF TESTS	2018-06-22
LAPŲ SKAIČIUS NUMBER OF PAGES	7
ATASKAITOS PRIEDAI ANNEXES OF REPORT	1 (2 page)

1. BANDYMŲ SUVESTINĖ
SUMMARY OF TESTS

Test name	*Normative documents*	*Test result*
Electromagnetic immunity:		
Immunity to conducted radio frequency electromagnetic disturbances	EN 61547:2009 EN 61000-4-6:2014	Pass

Notes:
1. The applicant determined the extent of applied tests.
2. No applicant's representatives witnessed the tests.
3. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

2. STANDARTŲ NUORODINIAI ŽYMENYS IR ANTRAŠTĖS
REFERENCES AND TITLES OF THE STANDARDS

EN 61547:2009
Equipment for general lighting purposes - EMC immunity requirements (IEC 61547:2009).

EN 61000-4-6:2014
Electromagnetic compatibility (EMC) -- Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2013).

3. BANDOMOSIOS ĮRANGOS (BĮ) APRAŠYMAS
DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

3.1. APRAŠYMAS
DESCRIPTION

LED street luminaire MAXFlux MF-SL-120 is powered from 180-253 V, 50/60 Hz mains network. Max power consumption: 116 W.

3.2. BANDOMOSIOS ĮRANGOS FOTOGRAFIJOS
PHOTOS OF THE EQUIPMENT UNDER TEST

Fig. 1. Bottom view

Fig. 2. Top view

Fig. 3. Side view

4. BANDYMAMS NAUDOTA ĮRANGA
EQUIPMENT USED FOR TESTS

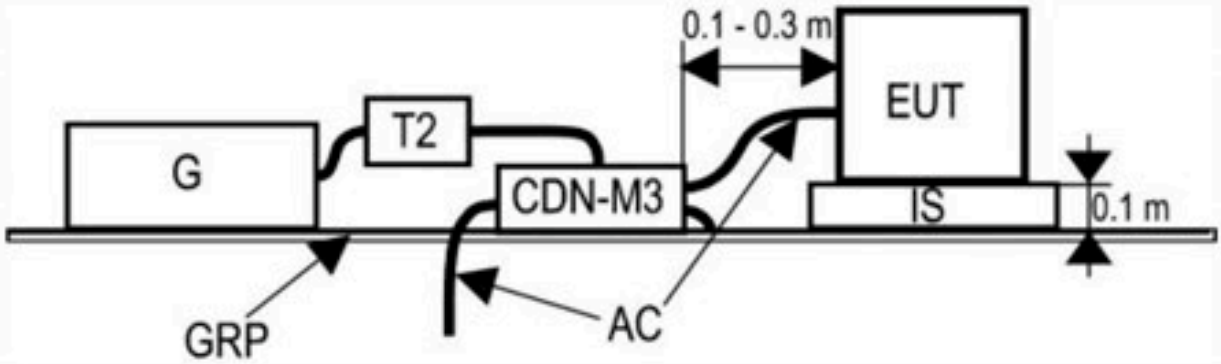
Name	*Type*	*Serial No*	*Calibration document*
Immunity to conducted disturbances, induced by RF fields test			
Frankonia, immunity testing system	CIT-10/75 FLL-75	102C3214 1029	Certificate of calibration No E61604 D-K-15070-01-01 2018-13
Bird Electronic corp. attenuator	75-A-FFN-06	0332	Certificate No 70A/13
Frankonia software CIT-10	Version 2.27	102C3214	-

5. ATSPARUMO RADIJO DAŽNIŲ LAUKŲ INDUKUOTIEMS LAIDININKAIS SKLINDANTIEMS TRIKDŽIAMS BANDYMAS DAŽNIŲ DIAPAZONE NUO 150 kHz IKI 80 MHz

IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS TEST IN THE FREQUENCY RANGE FROM 150 kHz TO 80 MHz

5.1. BANDYMO APRAŠYMAS
DESCRIPTION OF THE TEST

Conducted disturbances to a.c. power input



EUT – equipment under test
IS – insulating support
T2 – attenuator (6 dB)
AC – power cable
G – generator
CDN-M3 – coupling/decoupling device
GRP – ground reference plane

Test setup: table-top equipment.
EUT power supply: 230 V, 50 Hz mains network.
EUT operating mode: switched on.
EUT performance assessment method: visual observation of luminous intensity of the luminaire.
Immunity test requirement:

Port	*Phenomenon*	*Applicable test level*	*Applicable performance criterion*
a.c. power input	Injected currents (radio-frequency common mode)	± 3 V r.m.s (unmodulated) [1]	A
[1] Modulation: 1 kHz, 80 % AM, sine wave; source impedance 150 Ω.			

5.2. NORMINIAI DOKUMENTAI
NORMATIVE DOCUMENTS

EN 61547:2009.
EN 61000-4-6:2014.

5.3. BANDYMO REZULTATAI
TEST RESULTS

Climatic conditions, test conditions, test equipment and the test results are presented in the annex 1.
Detailed information of equipment used for tests is presented in clause 4.
No performance degradation.

5.4. IŠVADA
CONCLUSION

The equipment under test complies with the immunity requirements to conducted disturbances, induced by radio-frequency fields at input a.c power port.

Deputy Head of Division — Raimondas Štulas

Vaidotas Stankus, tel. (+370) 37 334040, fax (+370) 37 211907, e-mail vaidotas.stankus@rrt.lt

Bandymų ataskaitos
1 priedas
Annex 1

ATSPARUMO RADIJO DAŽNIŲ LAUKŲ INDUKUOTIEMS LAIDININKAIS SKLINDANTIEMS TRIKDŽIAMS BANDYMO REZULTATAI
IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS TEST RESULTS

IEC1000-4-6/EN61000-4-6 Conducted disturbances test

Date: 22.06.18
Time: 14:56
Order No.: 2110
Id.no.: EMC05814
Device: LED luminaire MF-SL-120
Company: Yellow Energy LT
Test engineer: V.Gudkovas
Operating mode: EUT operated.
EUT dimensions:300x70x600 mm.
CDN coupling factor:- 0.6 dB
Test location: EMC test room
Temp.=25.4 C
Hum.=34.5 %
p.=99.6 kPa

CDN: CDN_M2_3V
Start frequency: 0.150000 MHz
Stop frequency: 80.000000 MHz
Test level: 3.0 V

Sweep type: logarithmic
Steps: 1.00 %
Dwell time: 2.9 s

Modulation: internal AM
Modulation frequency: 1000.0 Hz
Modulation level: 80.0 %

Test system: Frankonia CIT-10/75 No.102C3214; FLL-75 No. 1029
Software: EN 61000-4-6 v.2.27

Test reactions: no performance degradation