

| EMS TEST REPORT                                                                                                             |                                                                                                                                      | № 2018-263<br>EMC<br>Page 1 of 30 |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| BelGISS Testing Center                                                                                                      |                                                                                                                                      |                                   |
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|                                      |                                                                                              |
|--------------------------------------|----------------------------------------------------------------------------------------------|
| Product                              | LED luminaire                                                                                |
| Name and address of the applicant    | Ecocity S.R.L.,<br>11, Mircha cel Batrin str., 2012, Chisinau, Moldova                       |
| Name and address of the Manufacturer | Ecocity S.R.L.,<br>11, Mircha cel Batrin str., 2012, Chisinau, Moldova                       |
| Model / type                         | Pro - Street Quasar S SiO 80 C                                                               |
| Rating power                         | 110 – 250 V~; 50-60 Hz;<br>Rated power 80 W.                                                 |
| Brand names                          | <br>EcoCity |
| Serial №                             | ---                                                                                          |
| EuT received                         | 2018-06-22 No. 15348                                                                         |
| Additional information               | ---                                                                                          |

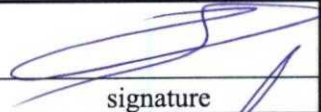
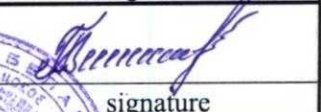
|                                                                              |                                                                                                                                                                    |
|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applied Standards:                                                           |                                                                                                                                                                    |
| Product- or Generic Standards                                                | Basic Standards                                                                                                                                                    |
| EN 55015:2013;<br>EN 61547:2009;<br>EN 61000-3-2:2014;<br>EN 61000-3-3:2013. | EN 61000-4-2:2009;<br>EN 61000-4-3:2006+A1:2008+A2:2010+IS1:2009+A1:2008;<br>EN 61000-4-4:2012;<br>EN 61000-4-5:2014;<br>EN 61000-4-6:2014;<br>EN 61000-4-11:2004. |

**Test result: PASSED**

Tested in period 2018-07-04 – 2018-07-13  
Issue date 2018-07-13

Revision Copy № 3

|                                         |                                                                                                                                |                                         |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Name of the testing laboratory          |                                             | Accredited Test Laboratory<br>BELGISS   |
| Accreditation of the testing laboratory | <br>№ BY/112 02.1.0.0085<br>from 1995-09-01 | Accreditation is valid until 2019-12-01 |

|               |                                                   |                 |            |                                                                                                    |
|---------------|---------------------------------------------------|-----------------|------------|----------------------------------------------------------------------------------------------------|
| Tested by     | First rank engineer                               | Murauyou A.A.   | 2018-07-13 | <br>signature |
| Verified by   | Chief of the laboratory of Testing Centre BelGISS | Grinko V.V.     | 2018-07-13 | <br>signature |
| Authorized by | Deputy head of Testing Centre BelGISS             | Vasileuski D.V. | 2018-07-13 | <br>signature |

Possible test case verdicts:

- test case does not apply to the test object .....: N.A. (Not applicable)
- test case meet the requirement .....: P(ass)
- test case does not meet the requirement .....: F(ail)

The test results presented in this report relate only to the object tested.  
This report shall not reproduce except in full without approval of the head test centre BelGISS.

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## 1 Description of Equipment under Test (EuT)

### Description of the EUT:

|                              |                                |
|------------------------------|--------------------------------|
| Type of EUTs:                | LED luminaire                  |
| Model and/or type reference: | Pro - Street Quasar S SiO 80 C |

### Technical Data:

|                   |               |                            |          |
|-------------------|---------------|----------------------------|----------|
| Rated voltage:    | 110 – 250 V ~ | Protection class:          | I        |
| Rated current:    | ---           | Maximum current:           | ---      |
| Rated power:      | 80 W          | Maximum power consumption: | ---      |
| Number of phases: | one           | Rated frequency:           | 50-60 Hz |

### The classification of the EUT:

|                            |                              |
|----------------------------|------------------------------|
| Production classification: | Electric domestic appliances |
|----------------------------|------------------------------|

### Ports:

#### a) Power Input AC:

| Designation/description | Voltage       | Current | Type of shielding | Power |
|-------------------------|---------------|---------|-------------------|-------|
| Mains                   | 180 – 265 V ~ | ---     | Unshielded        | ---   |

#### b) Load Terminals AC:

| Designation/description | Voltage | Current | Type of shielding | Power |
|-------------------------|---------|---------|-------------------|-------|
| ---                     | ---     | ---     | ---               | ---   |

#### c) Power Input DC:

| Designation/description | Voltage | Current | Type of shielding | Power |
|-------------------------|---------|---------|-------------------|-------|
| ---                     | ---     | ---     | ---               | ---   |

#### d) Load Terminals DC:

| Designation/description | Voltage | Current | Type of shielding | Power |
|-------------------------|---------|---------|-------------------|-------|
| ---                     | ---     | ---     | ---               | ---   |

#### e) Additional Terminals:

| Designation/description | Specified length | Type of shielding |
|-------------------------|------------------|-------------------|
| ---                     | ---              | ---               |

### Disturbance Sources/EMC-Measure:

|                      |                        |
|----------------------|------------------------|
| Disturbance sources: | Electronic components. |
|----------------------|------------------------|

### Operational modes investigated:

| Working mode | Description                           |
|--------------|---------------------------------------|
| № 1          | Continuous operation in lighting mode |

### Support Equipment:

| Device | Identification/Short description |
|--------|----------------------------------|
| ---    | ---                              |

Photos: see Appendix 1 on page 30.

## 2 Failure criteria for Immunity testing:

### Performance criteria for Immunity testing to the EN 61547:2009.

| Performance criteria | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A</b>             | During the test, no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>B</b>             | During the test, the luminous intensity may change to any value. After the test, the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test, the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.                                                                                                                                                                    |
| <b>C</b>             | During and after the test, any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal, if necessary by temporary interruption of the mains supply and/or operating the regulating control.<br>Additional requirement for lighting equipment incorporating a starting device: After the test, the lighting equipment is switched off. After half an hour, it is switched on again. The lighting equipment shall start and operate as intended. |

## 3 Summary of Immunity Test Result according to EN 61547:2009.

### Results of the individual Tests:

| Section of the Generic Standard        | Test Parameters and severity Levels                                  | Applied Basic Standard | Protocol Pages | Failure Criteria |       | Results          |
|----------------------------------------|----------------------------------------------------------------------|------------------------|----------------|------------------|-------|------------------|
|                                        |                                                                      |                        |                | Standard         | EUT   |                  |
| Electrostatic discharge                | Contact discharge:<br>4 kV Test voltage                              | EN 61000-4-2           | 5              | B                | A     | Pass             |
|                                        | Air discharge:<br>8 kV Test voltage                                  |                        |                | B                | A     | Pass             |
| Radio-frequency electromagnetic fields | 80 MHz to 1 000 MHz 3 V/m (unmodulated)<br>1 kHz, 80 % AM, sine wave | EN 61000-4-3           | 7              | A                | A     | Pass             |
| Power frequency magnetic fields        | Field frequency 50/60 Hz<br>Test level 3 A/m                         | EN 61000-4-8           | 9              | A                | ----- | N.A.<br>(note 1) |
| Fast transients (Burst)                | 5/50 ns $T_r/T_d$ 5 kHz rep. freq.                                   | EN 61000-4-4           | 10             | B                | A     | Pass             |
| AC input                               | ± 1 kV peak                                                          |                        | -----          | B                | ----- | N.A.             |
| AC output                              | ± 1 kV peak                                                          |                        | -----          | B                | ----- | N.A.             |
| DC input                               | ± 0,5 kV peak                                                        |                        | -----          | B                | ----- | N.A.             |
| DC output                              | ± 0,5 kV peak                                                        |                        | -----          | B                | ----- | N.A.             |
| Signal and control lines               | ± 0,5 kV peak                                                        |                        | -----          | B                | ----- | N.A.             |
| Surge Pulse                            | 1,2/50 (8/20) $T_r/T_d$ $\mu$ s                                      | EN 61000-4-5           | 13             | C                | A     | Pass             |
| AC input                               | line-to-line: ± 1 kV<br>line-to-earth: ± 2 kV                        |                        | 13             | C                | A     | Pass             |
| Injected RF currents                   | 0,15 – 230 MHz<br>80% AM @ 1 kHz<br>150 $\Omega$ source impedance    | EN 61000-4-6           | 11             | A                | A     | Pass             |
| AC input                               | 3 V (unmod.) e.m.f.                                                  |                        | -----          | A                | ----- | N.A.             |
| AC output                              | 3 V (unmod.) e.m.f.                                                  |                        | -----          | A                | ----- | N.A.             |
| DC input                               | 1 V (unmod.) e.m.f.                                                  |                        | -----          | A                | ----- | N.A.             |
| DC output                              | 1 V (unmod.) e.m.f.                                                  |                        | -----          | A                | ----- | N.A.             |
| Signal and control lines               | 1 V (unmod.) e.m.f.                                                  |                        | -----          | A                | ----- | N.A.             |
| Voltage dips and interruptions         | Residual %<br>Unom.                                                  | EN 61000-4-11          |                |                  |       |                  |
| AC input                               | 0 %:                                                                 |                        | 12             | B                | B     | Pass             |
|                                        | 70 %:                                                                |                        | 12             | C                | B     | Pass             |

1) Equipment doesn't contain components susceptible to magnetic fields, such as Hall elements or magnetic field sensors.

**Result: PASS**

**3.1 Electrostatic Discharge according to EN 61000-4-2:2009.**

**Information concerning the test:**

|            |                |                       |          |
|------------|----------------|-----------------------|----------|
| Tested by: | Murauiyou A.A. | Ambient temperature:  | 21,2 °C  |
| Test date: | 2018-07-04     | Rel. humidity:        | 45,6 %   |
|            |                | Atmospheric pressure: | 99,4 kPa |

| Working mode | Description                           |
|--------------|---------------------------------------|
| № 1          | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

EN 61000-4-2

Electromagnetic compatibility (EMC) -- Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test.

**Test set-up**

A ground reference plane is located on the floor, and connected to earth via a low impedance connection. The return cable of the EFT generator is connected to the reference plane.

EuT is placed on a wooden table 10 cm above the reference plane, and all cables attached to the EuT is isolated the same way.

A vertical coupling plane (VCP) of 50x50 cm is placed 10 cm from the EuT's exterior. This VCP is connected to the reference plane via a cable with two 470 kΩ resistors located one in each end of the cable.

**Procedure**

The test was done by applying contact and air discharge to the EuT itself, and contact discharge to the HCP and VCP. When applying the discharges to VCP the tip of the generator was located at middle edge of the VCP. VCP was located 10 cm from each side of the EuT.

Contact discharges of  $\pm 4$  kV were applied to the various points of the EuT at conductive surfaces, and to the HCP and VCP. Air discharges of  $\pm 8$  kV were applied to the various points of the EuT at non-conductive surfaces.

Test results can be found in the following pages.

**Record:**

**See page: 6**

**Used test equipment:**

| Factory Number | Type                           | Manufacturer    | Model    | Calibration Due |
|----------------|--------------------------------|-----------------|----------|-----------------|
| 308            | ESD-Generator                  | EMC Partner     | ESD 3000 | 2018-12-15      |
| ---            | VCP (0,5m x 0,5m)              | Made in Belarus | ---      | ---             |
| 13450          | Aneroid barometer              | Made in Belarus | BAMM-1   | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus | Cоча 004 | 2018-10-02      |

Test modes: 1.

**Contact discharges**

| Points of Discharging | Polarity | Number | Discharge Voltage [kV] | Performance Criteria | Result               | Remark |
|-----------------------|----------|--------|------------------------|----------------------|----------------------|--------|
| VCP (0,5m x 0,5m)     | positive | 40     | 4.0                    | B                    | Criteria A fulfilled |        |
|                       | negative | 40     | 4.0                    | B                    | Criteria A fulfilled |        |
| HCP (2,0m x 1,0m)     | positive | 40     | 4.0                    | B                    | Criteria A fulfilled |        |
|                       | negative | 40     | 4.0                    | B                    | Criteria A fulfilled |        |
| Enclosure front side  | positive | 20     | 4.0                    | B                    | Criteria A fulfilled |        |
|                       | negative | 20     | 4.0                    | B                    | Criteria A fulfilled |        |
| Enclosure top side    | positive | 20     | 4.0                    | B                    | Criteria A fulfilled |        |
|                       | negative | 20     | 4.0                    | B                    | Criteria A fulfilled |        |
| Enclosure left side   | positive | 20     | 4.0                    | B                    | Criteria A fulfilled |        |
|                       | negative | 20     | 4.0                    | B                    | Criteria A fulfilled |        |
| Enclosure right side  | positive | 20     | 4.0                    | B                    | Criteria A fulfilled |        |
|                       | negative | 20     | 4.0                    | B                    | Criteria A fulfilled |        |
| Enclosure rear side   | positive | 20     | 4.0                    | B                    | Criteria A fulfilled |        |
|                       | negative | 20     | 4.0                    | B                    | Criteria A fulfilled |        |

**Air discharges**

| Points of Discharging   | Polarity | Number | Discharge Voltage [kV] | Criteria | Result               | Remark |
|-------------------------|----------|--------|------------------------|----------|----------------------|--------|
| Non-conductive surfaces | positive | 50     | 8.0                    | B        | Criteria A fulfilled |        |
|                         | negative | 50     | 8.0                    | B        | Criteria A fulfilled |        |

**Result: PASSED**

**3.2 Radio-frequency electromagnetic fields to EN 61000-4-3:2006+A1:2008+A2:2010+IS: 2009.**

**Information concerning the test:**

|            |                |                       |          |
|------------|----------------|-----------------------|----------|
| Tested by: | Murauiyou A.A. | Ambient temperature:  | 23,4 °C  |
| Test date: | 2018-07-04     | Rel. humidity:        | 45,6 %   |
|            |                | Atmospheric pressure: | 99,4 kPa |

| Working mode | Description                           |
|--------------|---------------------------------------|
| № 1          | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

EN 61000-4-3 Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test.

**Test set-up**

Tests were carried out in a semi anechoic chamber.

EUT is not bulky, and according to p.7.2 EN 61000-4-3 was taken on a wooden table height of 0.8 meters.

Wiring between the EUT and auxiliary equipment as follows :

- the manufacturer's specified wiring types and connectors was used;
- length of cables to auxiliary equipment 3 meters;
- wires was arranged parallel to the uniform area of the field to minimize immunity.

**Procedure**

The EuT is exposed to a RF electromagnetic field generated by one log-periodic antenna. The field is applied with the antennas facing each of the four faces of the EuT (0°, 90°, 180°, 270°). The polarization of the field requires testing each side of the EuT twice, once with the antenna horizontally and again with the antenna vertically. The antenna height during test is 150 cm. A field level and type as specified below is applied in the defined frequency range. The frequency is swept through the range with a step width and a dwell time per frequency as specified below. Performance is evaluated them according to the defined performance criteria.

Test results can be found in the following pages.

**Used test equipment:**

| Factory Number | Type                           | Manufacturer       | Model     | Calibration Due |
|----------------|--------------------------------|--------------------|-----------|-----------------|
| MY47420048     | Signal Generator               | Agilent            | N5181A    | 2019-04-05      |
| 325513         | RF Amplifier                   | Amplifier Research | 250W1000A | ---             |
| 1007           | RF Amplifier                   | OPHIR              | 5263FE    | ---             |
| 13450          | Aneroid barometer              | Made in Belarus    | БАММ-1    | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus    | Сосна 004 | 2018-10-02      |
| 00060032       | Log-periodic antenna           | ETS Lindgren       | 3142C     | 2019-04-02      |
| 117161         | Tape-measure                   | ---                | P-10      | 2018-11-30      |
| r. 208         | Semi anechoic chamber          | Made in Belarus    | ---       | 2019-02-20      |
| ---            | Rotation platform              | Made in Belarus    | ---       | ---             |
| ---            | Antenna control device         | Made in Belarus    | ---       | ---             |

**Record:**

See page: 8

**TEST PARAMETERS**

**Port:** Enclosure

**Basic Standard:** EN 61000-4-3

**Frequency range:** 80 – 1000 MHz

**Frequency Step:** 1,0 %

**Test Level:** 3 V/m

**Performance Criteria:** A

**Dwell time:** 3 sec

**Modulation:** 80 % AM @ 1 kHz

**TEST RESULTS**

| Frequency range | Frequency step | Dwell time | EUT position | Test level | Antenna polarization | Criteria | Result               |
|-----------------|----------------|------------|--------------|------------|----------------------|----------|----------------------|
| 80 – 1000 MHz   | 1,0 %          | 3 sec      | 0°           | 3 V/m      | Vertical             | A        | Criteria A fulfilled |
|                 |                | 3 sec      | 90°          | 3 V/m      | Vertical             | A        | Criteria A fulfilled |
|                 |                | 3 sec      | 180°         | 3 V/m      | Vertical             | A        | Criteria A fulfilled |
|                 |                | 3 sec      | 270°         | 3 V/m      | Vertical             | A        | Criteria A fulfilled |
|                 |                | 3 sec      | 0°           | 3 V/m      | Horizontal           | A        | Criteria A fulfilled |
|                 |                | 3 sec      | 90°          | 3 V/m      | Horizontal           | A        | Criteria A fulfilled |
|                 |                | 3 sec      | 180°         | 3 V/m      | Horizontal           | A        | Criteria A fulfilled |
|                 |                | 3 sec      | 270°         | 3 V/m      | Horizontal           | A        | Criteria A fulfilled |

**Result: PASSED**

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**3.3 Power frequency magnetic fields to EN 61000-4-8:2010.**

**Information concerning the test:**

|            |               |                       |          |
|------------|---------------|-----------------------|----------|
| Tested by: | Murauyou A.A. | Ambient temperature:  | 21,2 °C  |
| Test date: | 2018-07-04    | Rel. humidity:        | 45,6 %   |
|            |               | Atmospheric pressure: | 99,4 kPa |

| Working mode | Description                           |
|--------------|---------------------------------------|
| № 1          | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

EN 61000-4-8:2010

Electromagnetic compatibility (EMC) -Part 4-8: Testing and measurement techniques -Power frequency magnetic field immunity test

**Result: N.A. (Equipment doesn't contain components susceptible to magnetic fields, such as Hall elements or magnetic field sensors).**

**3.4 Fast Transient/Burst according to EN 61000-4-4:2012.**

**Information concerning the test:**

|            |              |                       |          |
|------------|--------------|-----------------------|----------|
| Tested by: | MuraYOU A.A. | Ambient temperature:  | 23,2 °C  |
| Test date: | 2018-07-05   | Rel. humidity:        | 46,7 %   |
|            |              | Atmospheric pressure: | 99,9 kPa |

| Working mode | Description                           |
|--------------|---------------------------------------|
| № 1          | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

EN 61000-4-4

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

**Test set-up**

A ground reference plane is located on the floor, and connected to earth via a low impedance connection. The burst generator reference ground is connected to the reference plane. EuT is placed on a wooden table 10 cm above the reference plane, and all cables attached to the EuT is isolated the same way.

**Procedure**

The Burst were applied simultaneously between a ground reference plane and all of the power supply terminals.

Test results can be found in the following pages.

**Used test equipment:**

| Factory Number | Type                           | Manufacturer    | Model     | Calibration Due |
|----------------|--------------------------------|-----------------|-----------|-----------------|
| 1125           | Noise generator                | EMC Partner     | TRA2000   | 2019-06-30      |
| 13450          | Aneroid barometer              | Made in Belarus | BAMM-1    | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus | Сочна 004 | 2018-10-02      |

**Burst parameters:**

Tr/Th, Repetition rate: 5/50 ns, 5 kHz  
Burst-duration and -period:  $T_D = 15$  ms,  $T_r = 300$  ms

**Record:**

| Terminal | Operation Mode | Test Voltage [V] | Polarity | Coupling | Duration [min] | Required Criteria | Result                |
|----------|----------------|------------------|----------|----------|----------------|-------------------|-----------------------|
| Mains    | Test Mode: 1   | 1000             | +        | L1+N+PE  | 2              | B                 | Criterion A fulfilled |
| Mains    | Test Mode: 1   | 1000             | -        | L1+N+PE  | 2              | B                 | Criterion A fulfilled |

**Result: PASSED**

**3.5 Conductive disturbances, induced by radio-frequency fields according to EN 61000-4-6:2014**

**Information concerning the test:**

|            |               |                       |          |
|------------|---------------|-----------------------|----------|
| Tested by: | Murauyou A.A. | Ambient temperature:  | 22,6 °C  |
| Test date: | 2018-07-05    | Rel. humidity:        | 46,4 %   |
|            |               | Atmospheric pressure: | 99,9 kPa |

| Working mode | Description                           |
|--------------|---------------------------------------|
| № 1          | Continuous operation in lighting mode |

**Test Procedure:**

**Method**

EN 61000-4-6

Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields”.

**Test set-up**

EUT is positioned on a 0,1 m wooden support on 2\*1 m metallic ground reference plane. The unwanted signal is then inducted successively into mains supply terminals. The performance is evaluated them according to the defined performance criteria.

**Procedure**

The unwanted signal is then inducted successively into electromagnetic clamp. Cable for mains is isolated from the reference ground plane by a 5 cm isolating support. A signal level/type as specified below is applied in the defined frequency range. The frequency is swept through the range with a step width and a dwell time per frequency as specified below.

Test results can be found in the following pages.

**Used test equipment:**

| Factory Number | Type                           | Manufacturer                         | Model     | Calibration Due |
|----------------|--------------------------------|--------------------------------------|-----------|-----------------|
| MY47420048     | Signal Generator               | Agilent                              | N5181A    | 2019-04-05      |
| 325513         | RF Amplifier                   | Amplifier Research                   | 100A400   | N.A.            |
| 101133         | Electromagnetic clamp          | “Fischer Custom Communications Inc.” | F-2031-23 | 2019-01-11      |
| 13450          | Aneroid barometer              | Made in Belarus                      | БАММ-1    | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus                      | Сосна 004 | 2018-10-02      |

**Record:**

See page: 12

**Test Parameters**

**Port:** AC Input  
**Basic Standard:** EN 61000-4-6  
**Frequency range:** 0,15 – 230 MHz  
**Frequency Step:** 0,2 %

**Test Level:** 3 V (e.m.f.)  
**Performance Criteria:** A  
**Dwell time:** 10 sec  
**Modulation:** 80% AM@1kHz

**TEST RESULTS**

| Port  | Operation Mode | Frequency Step: | Frequency range: | Test Level   | Dwell time: | Test results         |
|-------|----------------|-----------------|------------------|--------------|-------------|----------------------|
| Mains | Test mode: 1   | 0,2 %           | 0,15 – 230 MHz   | 3 V (e.m.f.) | 10 sec      | Criteria A fulfilled |

**Result: PASSED**

### 3.6 Surge Pulse according to EN 61000-4-5:2014

#### **Information concerning the test:**

|            |               |                       |          |
|------------|---------------|-----------------------|----------|
| Tested by: | Murauyou A.A. | Ambient temperature:  | 22,7 °C  |
| Test date: | 2018-07-05    | Rel. humidity:        | 45,9 %   |
|            |               | Atmospheric pressure: | 99,9 kPa |

| Working mode | Description                           |
|--------------|---------------------------------------|
| № 1          | Continuous operation in lighting mode |

#### **TEST DESCRIPTION:**

##### **Method**

EN 61000-4-5

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

##### **Test set-up**

A ground reference plane is located on the floor, and connected to earth via a low impedance connection. The surge-generator and coupling/decoupling network reference ground is connected to the ground reference plane. EuT is placed on a wooden table 10 cm above the reference plane, and all cables attached to the EuT is isolated the same way.

##### **Procedure**

The surge test was applicable to AC mains (between each phase and ground and between the phases). Test results can be found in the following pages.

#### **Used test equipment:**

| Factory Number | Type                           | Manufacturer    | Model     | Calibration Due |
|----------------|--------------------------------|-----------------|-----------|-----------------|
| 1125           | Noise generator                | EMC Partner     | TRA2000   | 2019-06-30      |
| 13450          | Aneroid barometer              | Made in Belarus | БАММ-1    | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus | Сосна 004 | 2018-10-02      |

#### **Surge parameters:**

Tr/Th: 1,2/50 (8/20)  $\mu$ s  
Repetition rate: 1 pulse per minute

#### **Record:**

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| Terminal             | Operation Mode | Test Voltage [V] | Polarity | Coupling | Phase | Number of Impulses | Required Criteria | Comments/Remarks       |
|----------------------|----------------|------------------|----------|----------|-------|--------------------|-------------------|------------------------|
| <b>Line-to-line</b>  |                |                  |          |          |       |                    |                   |                        |
| Mains                | Test mode: 1   | 1000             | -        | L1-N     | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | +        | L1-N     | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | -        | L1-N     | 270 ° | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | +        | L1-N     | 270 ° | 5                  | C                 | Criterion A fulfilled. |
| <b>Line-to-earth</b> |                |                  |          |          |       |                    |                   |                        |
| Mains                | Test mode: 1   | 1000             | -        | L1-PE    | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | +        | L1-PE    | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | -        | L1-PE    | 270 ° | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | +        | L1-PE    | 270 ° | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | -        | N-PE     | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | +        | N-PE     | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | -        | N-PE     | 270 ° | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 1000             | +        | N-PE     | 270 ° | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 2000             | -        | L1-PE    | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 2000             | +        | L1-PE    | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 2000             | -        | L1-PE    | 270 ° | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 2000             | +        | L1-PE    | 270 ° | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 2000             | -        | N-PE     | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 2000             | +        | N-PE     | 90 °  | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 2000             | -        | N-PE     | 270 ° | 5                  | C                 | Criterion A fulfilled. |
| Mains                | Test mode: 1   | 2000             | +        | N-PE     | 270 ° | 5                  | C                 | Criterion A fulfilled. |

**Result: PASSED**

**3.7 Voltage dip/short interruption according to EN 61000-4-11:2004.**

**Information concerning the test:**

|            |                |                       |          |
|------------|----------------|-----------------------|----------|
| Tested by: | Murauiyou A.A. | Ambient temperature:  | 22,7 °C  |
| Test date: | 2018-07-05     | Rel. humidity:        | 45,9 %   |
|            |                | Atmospheric pressure: | 99,9 kPa |

| Working mode | Description                           |
|--------------|---------------------------------------|
| № 1          | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

EN 61000-4-11

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

**Test set-up**

EuT was placed on the reference plane on 10 cm of insulating support.

**Procedure**

EUT was connected to the power mains through a coupling device that directly couples to the Voltage Dips and Interruption Generator.

Test results can be found in the following pages.

**Used test equipment:**

| Factory Number | Type                           | Manufacturer    | Model     | Calibration Due |
|----------------|--------------------------------|-----------------|-----------|-----------------|
| 1125           | Noise generator                | EMC Partner     | TRA2000   | 2019-06-30      |
| 13450          | Aneroid barometer              | Made in Belarus | БАММ-1    | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus | Сочна 004 | 2018-10-02      |

**Record:**

**Test Parameters:**

| Operation Mode | Residual % Unom | Periods | Start Phase | Repeat | Gap (s) | Delay (s) | Failure Criteria | Result                |
|----------------|-----------------|---------|-------------|--------|---------|-----------|------------------|-----------------------|
| Test mode: 1   | 0               | 0,5     | 0           | 10     | 10      | 10        | B                | Criterion B fulfilled |
|                | 70              | 10      | 0           | 10     | 10      | 10        | C                | Criterion B fulfilled |

**Result: PASSED**

**4 Summary of Emission Test Result according to EN 55015:2013.**

**Results of the individual Tests:**

| Section of the Generic Standard |                                              | Frequency Range     | Applied Basic Standard | Reference to Protocol Pages | Results  |
|---------------------------------|----------------------------------------------|---------------------|------------------------|-----------------------------|----------|
| 4.2                             | <b>Insertion loss</b>                        | 150 kHz – 1 605 kHz | CISPR 15:2013          | ---                         | N.A.     |
| 4.3                             | <b>Disturbance voltages</b>                  |                     |                        |                             |          |
| 4.3.1                           | Mains terminals                              | 9 kHz – 30 MHz      | CISPR 15:2013          | 17                          | Complied |
| 4.3.2                           | Load terminals                               |                     |                        | ---                         | N.A.     |
| 4.3.3                           | Control terminals                            |                     |                        | ---                         | N.A.     |
| 4.4                             | <b>Radiated electromagnetic disturbances</b> |                     |                        |                             |          |
| 4.4.1                           | Enclosure                                    | 9 kHz – 30 MHz      | CISPR 15:2013          | 19                          | Complied |
| 4.4.2                           |                                              | 30 MHz – 300 MHz    | CISPR 32:2012          | 21                          | Complied |

**Result: PASSED**

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**4.1 Terminal Disturbance Voltage Measurement according to EN 55015:2013.**

**Information concerning the test:**

|            |              |                       |          |
|------------|--------------|-----------------------|----------|
| Tested by: | MuraYOU A.A. | Ambient temperature:  | 23,6 °C  |
| Test date: | 2018-07-09   | Rel. humidity:        | 48,2 %   |
|            |              | Atmospheric pressure: | 99,8 kPa |

**Operating modes of the sample used for testing**

| No. | Description                           |
|-----|---------------------------------------|
| № 1 | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

EN 55015:2013

**Test Procedure:**

The disturbance voltage measured at the mains terminals of the lighting equipment by means of the arrangement described in Figure 6 EN 55015:2013.

The output terminals of the artificial mains network (V-network) and the terminals a-b shall be positioned  $0,8 \text{ m} \pm 20 \%$  apart and shall be connected by the two power conductors of a flexible three-core cable of 0,8 m length.

**Used test equipment:**

| Factory Number | Type                           | Manufacturer       | Model     | Calibration Due |
|----------------|--------------------------------|--------------------|-----------|-----------------|
| 02404          | Test receiver                  | VEB MESSELEKTRONIK | SMV-11    | 2018-10-30      |
| 09472          | Artificial Mains Network       | VEB MESSELEKTRONIK | NNB-111   | 2018-09-14      |
| C011230        | Oscilloscope                   | Tektronix          | TDS3052C  | 2018-10-04      |
| 13450          | Aneroid barometer              | Made in Belarus    | БАММ-1    | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus    | Сосна 004 | 2018-10-02      |

**Record:**

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Test mode 1:

Test mode 1.

| Frequency, kHz | Test results, dB(μV) |     | Limit, dB(μV) |      | Remarks |
|----------------|----------------------|-----|---------------|------|---------|
|                | QP                   | AV  | QP            | AV   |         |
|                | N                    | N   |               |      |         |
| 10             | 85                   | --- | 110,0         |      | Pass    |
| 58             | 75                   | --- | 88,7          |      | Pass    |
| 117            | 45                   | --- | 82,3          |      | Pass    |
| 150            | 43                   | --- | 66,0          | 56,0 | Pass    |
| 178            | 48                   | --- | 64,6          | 54,6 | Pass    |
| 289            | 46                   | --- | 60,6          | 50,6 | Pass    |
| 297            | 48                   | --- | 60,3          | 50,3 | Pass    |
| 355            | 47                   | --- | 58,9          | 48,9 | Pass    |
| 504            | 38                   | --- | 56,0          | 46,0 | Pass    |
| 1000           | 35                   | --- | 56,0          | 46,0 | Pass    |
| 1528           | 32                   | --- | 56,0          | 46,0 | Pass    |
| 2000           | 30                   | --- | 56,0          | 46,0 | Pass    |
| 3500           | 21                   | --- | 56,0          | 46,0 | Pass    |
| 6000           | 24                   | --- | 60,0          | 50,0 | Pass    |
| 10000          | 28                   | --- | 60,0          | 50,0 | Pass    |
| 13500          | 25                   | --- | 60,0          | 50,0 | Pass    |
| 16000          | 21                   | --- | 60,0          | 50,0 | Pass    |
| 20000          | 21                   | --- | 60,0          | 50,0 | Pass    |
| 22000          | 18                   | --- | 60,0          | 50,0 | Pass    |
| 24000          | 15                   | --- | 60,0          | 50,0 | Pass    |
| 30000          | 23                   | --- | 60,0          | 50,0 | Pass    |

| Frequency, kHz | Test results, dB(μV) |     | Limit, dB(μV) |      | Remarks |
|----------------|----------------------|-----|---------------|------|---------|
|                | QP                   | AV  | QP            | AV   |         |
|                | L1                   | L1  |               |      |         |
| 10             | 85                   | --- | 110,0         |      | Pass    |
| 58             | 75                   | --- | 88,7          |      | Pass    |
| 117            | 46                   | --- | 82,3          |      | Pass    |
| 150            | 42                   | --- | 66,0          | 56,0 | Pass    |
| 178            | 47                   | --- | 64,6          | 54,6 | Pass    |
| 289            | 47                   | --- | 60,6          | 50,6 | Pass    |
| 297            | 49                   | --- | 60,3          | 50,3 | Pass    |
| 355            | 48                   | --- | 58,9          | 48,9 | Pass    |
| 504            | 36                   | --- | 56,0          | 46,0 | Pass    |
| 1000           | 35                   | --- | 56,0          | 46,0 | Pass    |
| 1528           | 32                   | --- | 56,0          | 46,0 | Pass    |
| 2000           | 30                   | --- | 56,0          | 46,0 | Pass    |
| 3500           | 27                   | --- | 56,0          | 46,0 | Pass    |
| 6000           | 29                   | --- | 60,0          | 50,0 | Pass    |
| 10000          | 32                   | --- | 60,0          | 50,0 | Pass    |
| 13500          | 31                   | --- | 60,0          | 50,0 | Pass    |
| 16000          | 25                   | --- | 60,0          | 50,0 | Pass    |
| 20000          | 23                   | --- | 60,0          | 50,0 | Pass    |
| 22000          | 24                   | --- | 60,0          | 50,0 | Pass    |
| 24000          | 20                   | --- | 60,0          | 50,0 | Pass    |
| 30000          | 23                   | --- | 60,0          | 50,0 | Pass    |

**Result: PASSED**

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**4.2 Radiated electromagnetic disturbances in frequency range from 9 kHz to 30 MHz according to EN 55015:2013.**

**Information concerning the test:**

|            |                |                       |          |
|------------|----------------|-----------------------|----------|
| Tested by: | Muraouyou A.A. | Ambient temperature:  | 23,7 °C  |
| Test date: | 2018-07-09     | Rel. humidity:        | 48,5 %   |
|            |                | Atmospheric pressure: | 99,8 kPa |

**Operating modes of the sample used for testing**

| No. | Description                           |
|-----|---------------------------------------|
| № 1 | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

According to EN 55015:2013.

**Test Procedure:**

The magnetic component measured by means of a loop antenna as described in 4.7 of CISPR 16-1-4. The lighting equipment was placed in the center of the antenna shown in Annex C of CISPR 16-1-4:2010. The induced current in the loop antenna is measured by means of a current probe (1 V/A) and the CISPR measuring receiver (or equivalent). By means of a coaxial switch, the three field directions measured in sequence. Each value shall fulfill the requirements given.

Used test equipment:

| Factory Number | Type                           | Manufacturer       | Model     | Calibration Due |
|----------------|--------------------------------|--------------------|-----------|-----------------|
| 02404          | Test receiver                  | VEB MESSELEKTRONIK | SMV-11    | 2018-10-30      |
| TPA00407       | Three-axis frame antenna       | ROHDE & SCHWARZ    | TRA-002   | 2019-02-24      |
| 13450          | Aneroid barometer              | Made in Belarus    | BAMM-1    | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus    | Сочна 004 | 2018-10-02      |

**Record:**

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| IF Bandwidth | Frequency,<br>kHz | Measured value, dB(μA) |        |        | Limit dB(μA) | Results |
|--------------|-------------------|------------------------|--------|--------|--------------|---------|
|              |                   | Loop 1                 | Loop 2 | Loop 3 |              |         |
| 0,2 kHz      | 9                 | < 10                   | < 10   | < 10   | 88,0         | Pass    |
|              | 25                | < 10                   | < 10   | < 10   | 88,0         | Pass    |
|              | 50                | < 10                   | < 10   | < 10   | 88,0         | Pass    |
|              | 100               | < 10                   | < 10   | < 10   | 74,0         | Pass    |
| 9 kHz        | 150               | < 10                   | < 10   | < 10   | 58,0         | Pass    |
|              | 240               | < 10                   | < 10   | < 10   | 52,4         | Pass    |
|              | 500               | < 10                   | < 10   | < 10   | 43,7         | Pass    |
|              | 1000              | < 10                   | < 10   | < 10   | 35,4         | Pass    |
|              | 1400              | < 10                   | < 10   | < 10   | 31,4         | Pass    |
|              | 2000              | < 10                   | < 10   | < 10   | 27,2         | Pass    |
|              | 6000              | < 10                   | < 10   | < 10   | 22,0         | Pass    |
|              | 10000             | < 10                   | < 10   | < 10   | 22,0         | Pass    |
|              | 22000             | < 10                   | < 10   | < 10   | 22,0         | Pass    |
|              | 30000             | < 10                   | < 10   | < 10   | 22,0         | Pass    |

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**4.3 Radiated electromagnetic disturbances in frequency range from 30 MHz to 300 MHz according to EN 55015:2013.**

**Information concerning the test:**

|            |               |                       |          |
|------------|---------------|-----------------------|----------|
| Tested by: | Murauyou A.A. | Ambient temperature:  | 21,1 °C  |
| Test date: | 2018-07-10    | Rel. humidity:        | 49,3 %   |
|            |               | Atmospheric pressure: | 99,7 kPa |

**Operating modes of the sample used for testing**

| No. | Description                           |
|-----|---------------------------------------|
| № 1 | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

According to EN 55015:2013.

**Test Procedure:**

EuT was placed on a wooden support 0.8 m parallel to the floor. The distance during measurements between antenna and the boundary of the EUT was 3 m using proportionality factor of 20 dB per decade to normalize the measured data to the specified distance for determining compliance. The antenna adjusted between 1 m and 4 m in height above ground plane for maximum meter reading at each test frequency. The measurements was applied with the antennas facing around the EuT with horizontal and vertical polarization.

Used test equipment:

| Factory Number | Type                           | Manufacturer      | Model     | Calibration Due |
|----------------|--------------------------------|-------------------|-----------|-----------------|
| 00060032       | Log-periodic antenna           | ETS Lindgren      | 3142C     | 2019-04-02      |
| 1311002        | Test receiver                  | GAUSS INSTRUMENTS | TDEMI 26G | 2019-06-07      |
| 117161         | Tape-measure                   | ---               | P-10      | 2018-11-30      |
| ---            | Open area test site            | ---               | ---       | 2019-10-16      |
| ---            | Rotation platform              | Made in Belarus   | ---       | ---             |
| ---            | Antenna control device         | Made in Belarus   | ---       | ---             |
| 13450          | Aneroid barometer              | Made in Belarus   | БАММ-1    | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus   | Сосна 004 | 2018-10-02      |

**Record:**

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Scan1: 30.0 MHz, 50.0 kHz, 300.0 MHz; IF:120 kHz, 1.0 s QP, Att AutodB, Horizontal Polarization

| f           | Magnitude dB $\mu$ V/m | Limit | Difference | Name       | Result |
|-------------|------------------------|-------|------------|------------|--------|
| 30.079 MHz  | 30.74                  | 40.00 | 9.26       | EN55015,QP | Pass   |
| 46.183 MHz  | 22.29                  | 40.00 | 17.71      | EN55015,QP | Pass   |
| 72.919 MHz  | 33.89                  | 40.00 | 6.11       | EN55015,QP | Pass   |
| 93.669 MHz  | 23.76                  | 40.00 | 16.24      | EN55015,QP | Pass   |
| 104.616 MHz | 31.78                  | 40.00 | 8.22       | EN55015,QP | Pass   |
| 111.231 MHz | 20.24                  | 40.00 | 19.76      | EN55015,QP | Pass   |
| 143.006 MHz | 20.21                  | 40.00 | 19.79      | EN55015,QP | Pass   |
| 159.189 MHz | 21.36                  | 40.00 | 18.64      | EN55015,QP | Pass   |
| 174.546 MHz | 24.35                  | 40.00 | 15.65      | EN55015,QP | Pass   |
| 175.609 MHz | 24.29                  | 40.00 | 15.71      | EN55015,QP | Pass   |
| 201.242 MHz | 23.45                  | 40.00 | 16.55      | EN55015,QP | Pass   |
| 223.961 MHz | 23.58                  | 40.00 | 16.42      | EN55015,QP | Pass   |
| 238.727 MHz | 24.45                  | 47.00 | 22.55      | EN55015,QP | Pass   |
| 247.901 MHz | 25.16                  | 47.00 | 21.84      | EN55015,QP | Pass   |
| 264.714 MHz | 25.23                  | 47.00 | 21.77      | EN55015,QP | Pass   |
| 288.379 MHz | 26.08                  | 47.00 | 20.92      | EN55015,QP | Pass   |

Scan1: 30.0 MHz, 50.0 kHz, 300.0 MHz; IF:120 kHz, 1.0 s QP, Att AutodB, Vertical Polarization

| f           | Magnitude dB $\mu$ V/m | Limit | Difference | Name       | Result |
|-------------|------------------------|-------|------------|------------|--------|
| 36.969 MHz  | 35.41                  | 40.00 | 4.59       | EN55015,QP | Pass   |
| 46.656 MHz  | 26.77                  | 40.00 | 13.23      | EN55015,QP | Pass   |
| 93.709 MHz  | 27.83                  | 40.00 | 12.17      | EN55015,QP | Pass   |
| 104.616 MHz | 32.01                  | 40.00 | 7.99       | EN55015,QP | Pass   |
| 114.026 MHz | 20.26                  | 40.00 | 19.74      | EN55015,QP | Pass   |
| 142.770 MHz | 20.15                  | 40.00 | 19.85      | EN55015,QP | Pass   |
| 154.898 MHz | 21.96                  | 40.00 | 18.04      | EN55015,QP | Pass   |
| 172.223 MHz | 25.09                  | 40.00 | 14.91      | EN55015,QP | Pass   |
| 190.847 MHz | 22.41                  | 40.00 | 17.59      | EN55015,QP | Pass   |
| 192.028 MHz | 22.46                  | 40.00 | 17.54      | EN55015,QP | Pass   |
| 223.371 MHz | 23.23                  | 40.00 | 16.77      | EN55015,QP | Pass   |
| 240.026 MHz | 24.25                  | 47.00 | 22.75      | EN55015,QP | Pass   |
| 256.209 MHz | 24.42                  | 47.00 | 22.58      | EN55015,QP | Pass   |
| 271.566 MHz | 24.67                  | 47.00 | 22.33      | EN55015,QP | Pass   |
| 288.024 MHz | 25.55                  | 47.00 | 21.45      | EN55015,QP | Pass   |

**5 Summary of Exposure Test Result according to EN 62493:2015.**

**Results of the individual Tests:**

| Section of the Generic Standard |                                                                                                            | Frequency Range | Applied Basic Standard | Reference to Protocol Pages | Results  |
|---------------------------------|------------------------------------------------------------------------------------------------------------|-----------------|------------------------|-----------------------------|----------|
| 4.2                             | The weighted and total induced current density due to the electric field created by the lighting equipment | 20 kHz – 10 MHz | EN 62493:2015          | 24                          | Complied |

**Result: PASSED**

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**5.1 The weighted and total induced current density due to the electric field created by the lighting equipment in frequency range from 20 kHz – 10 MHz according to EN 62493:2015.**

**Information concerning the test:**

|            |              |                       |          |
|------------|--------------|-----------------------|----------|
| Tested by: | MuraYOU A.A. | Ambient temperature:  | 22,6 °C  |
| Test date: | 2018-07-10   | Rel. humidity:        | 47,3 %   |
|            |              | Atmospheric pressure: | 99,7 kPa |

**Operating modes of the sample used for testing**

| No. | Description                           |
|-----|---------------------------------------|
| № 1 | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

According to Annex E EN 62493:2015.

**Test Procedure:**

According to Annex E EN 62493:2015.

Used test equipment:

| Factory Number | Type                           | Manufacturer      | Model     | Calibration Due |
|----------------|--------------------------------|-------------------|-----------|-----------------|
| 134            | "Van der Houfden" test head    | SCHWARZBECK       | VDHH 9502 | 2018-07-04      |
| 1311002        | Test receiver                  | GAUSS INSTRUMENTS | TDEMI 26G | 2019-06-07      |
| 117161         | Tape-measure                   | ---               | P-10      | 2018-11-30      |
| 13450          | Aneroid barometer              | Made in Belarus   | БАММ-1    | 2019-01-31      |
| 3000           | Temperature and Humidity Meter | Made in Belarus   | Сочна 004 | 2018-10-02      |

**Record:**

| Type of equipment                                | Measuring distance, cm | The measured value of the weighted and total induced current density (F) due to the electric field created by the lighting equipment in the frequency range from 20 kHz to 10 MHz | Coefficient F limit | Result |
|--------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------|
| Lighting equipment for roads and street lighting | 200                    | 0,051                                                                                                                                                                             | 0,85                | Pass   |

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**6 Harmonic Currents emissions according to EN 61000-3-2:2014.**

**Information concerning the test:**

|            |               |                       |          |
|------------|---------------|-----------------------|----------|
| Tested by: | Murauyou A.A. | Ambient temperature:  | 23,1 °C  |
| Test date: | 2018-07-11    | Rel. humidity:        | 48,3 %   |
|            |               | Atmospheric pressure: | 99,1 kPa |

| Test mode | Description                           |
|-----------|---------------------------------------|
| № 1       | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

EN 61000-3-2

**Test Procedure:**

According to clause 6.2 EN 61000-3-2

Measurement results can be found in the following pages.

**Used test equipment:**

| Factory Number                           | Type                                                                                                                                                                         | Manufacturer       | Model                                       | Calibration Due |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------|-----------------|
| 1347A00836/<br>1343A00428/<br>1347A02705 | The AMETEK MX15-CTSHL measuring complex consists of AMETEK PACS-1 power analyzer, AMETEK MX15-1Pi programmable power supply, programmable AMETEK OMNI 1-37 network impedance | «Ametek»           | AMETEK<br>PACS-1/<br>MX15-1Pi/<br>OMNI 1-37 | 2018-12-21      |
| 13450                                    | Aneroid barometer                                                                                                                                                            | Made in<br>Belarus | БАММ-1                                      | 2019-01-31      |
| 3000                                     | Temperature and Humidity Meter                                                                                                                                               | Made in<br>Belarus | Сосна 004                                   | 2018-10-02      |

**Record:**

**Result: PASSED**

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Harmonics – Class-C per Ed. 4.0 (2014)(Run time)

Test category: Class-C per Ed. 4.0 (2014) (European limits)

Test Margin: 100

Test date: 09.07.2018

Start time: 13:50:00

End time: 13:52:41

Test duration (min): 2,5

Data file name: H-000371.cts\_data

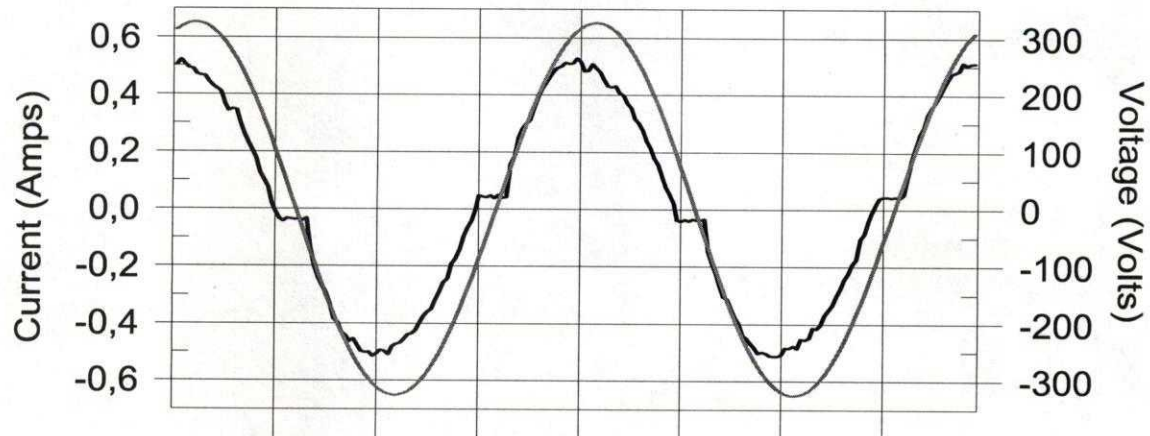
Comment: Comment

Customer: Customer information

Test Result: Pass

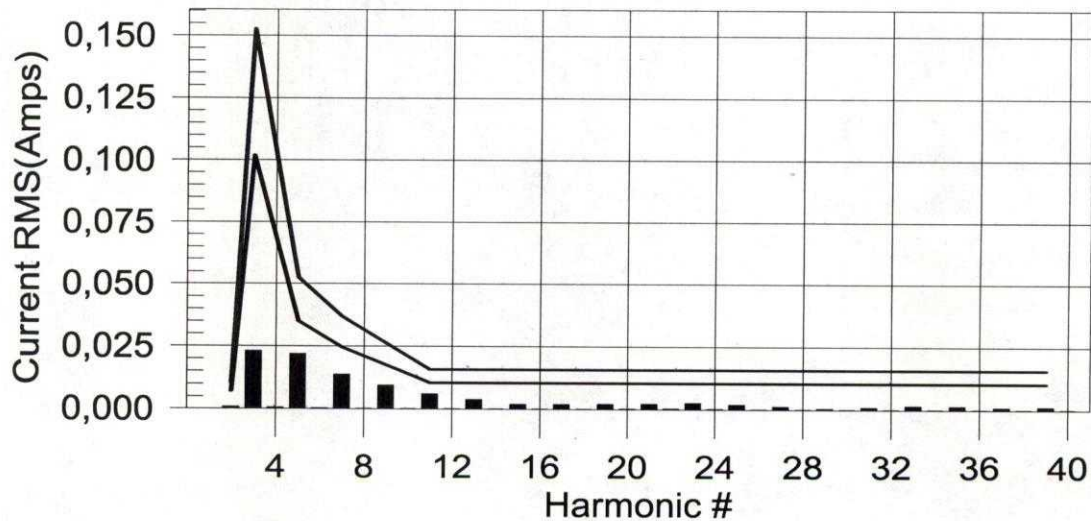
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line

European Limits



Test result: Pass Worst harmonics H5-42,8% of 150% limit, H5-62,8% of 100% limit

**EMC TEST REPORT**  
**№ 2018-263 EMC**

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**Current Test Result Summary (Run time)**

Test category: Class-C per Ed. 4.0 (2014) (European limits)      Test Margin: 100  
Test date: 09.07.2018      Start time: 13:50:00      End time: 13:52:41  
Test duration (min): 2,5      Data file name: H-000371.cts\_data  
Comment: Comment  
Customer: Customer information

Test Result: Pass      Source qualification: Normal  
THC(A): 0,037      I-THD(%): 10,7      POHC(A): 0,005      POHC Limit(A): 0,033

**Highest parameter values during test:**

|                |        |                |       |
|----------------|--------|----------------|-------|
| V_RMS (Volts): | 230,55 | Frequency(Hz): | 50,00 |
| I_Peak (Amps): | 0,551  | I_RMS (Amps):  | 0,352 |
| I_Fund (Amps): | 0,350  | Crest Factor:  | 1,573 |
| Power (Watts): | 78,7   | Power Factor:  | 0,972 |

| Harm# | Harms(avg) | 100%Limit | %of Limit | Harms(max) | 150%Limit | %of Limit | Status |
|-------|------------|-----------|-----------|------------|-----------|-----------|--------|
| 2     | 0,001      | 0,007     | 0,0       | 0,001      | 0,010     | 0,0       | Pass   |
| 3     | 0,023      | 0,102     | 22,6      | 0,025      | 0,153     | 16,3      | Pass   |
| 4     | 0,001      | 0,000     | 0,0       | 0,001      | 0,000     | 0,0       | Pass   |
| 5     | 0,022      | 0,035     | 62,8      | 0,022      | 0,052     | 42,8      | Pass   |
| 6     | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 7     | 0,014      | 0,024     | 56,1      | 0,014      | 0,037     | 38,6      | Pass   |
| 8     | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 9     | 0,010      | 0,017     | 54,5      | 0,010      | 0,026     | 36,9      | Pass   |
| 10    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 11    | 0,006      | 0,010     | 58,0      | 0,006      | 0,016     | 39,6      | Pass   |
| 12    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 13    | 0,004      | 0,010     | 0,0       | 0,004      | 0,016     | 0,0       | Pass   |
| 14    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 15    | 0,002      | 0,010     | 0,0       | 0,002      | 0,016     | 0,0       | Pass   |
| 16    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 17    | 0,002      | 0,010     | 0,0       | 0,002      | 0,016     | 0,0       | Pass   |
| 18    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 19    | 0,002      | 0,010     | 0,0       | 0,002      | 0,016     | 0,0       | Pass   |
| 20    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 21    | 0,002      | 0,010     | 0,0       | 0,003      | 0,016     | 0,0       | Pass   |
| 22    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 23    | 0,003      | 0,010     | 0,0       | 0,003      | 0,016     | 0,0       | Pass   |
| 24    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 25    | 0,002      | 0,010     | 0,0       | 0,002      | 0,016     | 0,0       | Pass   |
| 26    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 27    | 0,001      | 0,010     | 0,0       | 0,001      | 0,016     | 0,0       | Pass   |
| 28    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 29    | 0,001      | 0,010     | 0,0       | 0,001      | 0,016     | 0,0       | Pass   |
| 30    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 31    | 0,001      | 0,010     | 0,0       | 0,001      | 0,016     | 0,0       | Pass   |
| 32    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 33    | 0,002      | 0,010     | 0,0       | 0,002      | 0,016     | 0,0       | Pass   |
| 34    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 35    | 0,002      | 0,010     | 0,0       | 0,002      | 0,016     | 0,0       | Pass   |
| 36    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 37    | 0,001      | 0,010     | 0,0       | 0,001      | 0,016     | 0,0       | Pass   |
| 38    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |
| 39    | 0,001      | 0,010     | 0,0       | 0,001      | 0,016     | 0,0       | Pass   |
| 40    | 0,000      | 0,000     | 0,0       | 0,000      | 0,000     | 0,0       | Pass   |

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**Voltage Source Verification Data (Run time)**

Test category: Class-C per Ed. 4.0 (2014) (European limits)      Test Margin: 100  
Test date: 09.07.2018      Start time: 13:50:00      End time: 13:52:41  
Test duration (min): 2,5      Data file name: H-000371.cts\_data  
Comment: Comment  
Customer: Customer information

Test Result: Pass      Source qualification: Normal

**Highest parameter values during test:**

|                 |        |                |       |
|-----------------|--------|----------------|-------|
| Voltage (Vrms): | 230,55 | Frequency(Hz): | 50,00 |
| I_Peak (Amps):  | 0,551  | I_RMS (Amps):  | 0,352 |
| I_Fund (Amps):  | 0,350  | Crest Factor:  | 1,573 |
| Power (Watts):  | 78,7   | Power Factor:  | 0,972 |

| Harm# | Harmonics V-rms | Limit V-rms | % of Limit | Status |
|-------|-----------------|-------------|------------|--------|
| 2     | 0,075           | 0,461       | 16,21      | OK     |
| 3     | 0,140           | 2,075       | 6,73       | OK     |
| 4     | 0,036           | 0,461       | 7,78       | OK     |
| 5     | 0,066           | 0,922       | 7,11       | OK     |
| 6     | 0,018           | 0,461       | 3,98       | OK     |
| 7     | 0,047           | 0,691       | 6,84       | OK     |
| 8     | 0,006           | 0,461       | 1,32       | OK     |
| 9     | 0,021           | 0,461       | 4,51       | OK     |
| 10    | 0,009           | 0,461       | 2,04       | OK     |
| 11    | 0,010           | 0,231       | 4,25       | OK     |
| 12    | 0,010           | 0,231       | 4,36       | OK     |
| 13    | 0,013           | 0,231       | 5,78       | OK     |
| 14    | 0,005           | 0,231       | 2,01       | OK     |
| 15    | 0,012           | 0,231       | 5,30       | OK     |
| 16    | 0,005           | 0,231       | 2,12       | OK     |
| 17    | 0,008           | 0,231       | 3,65       | OK     |
| 18    | 0,005           | 0,231       | 2,29       | OK     |
| 19    | 0,006           | 0,231       | 2,72       | OK     |
| 20    | 0,010           | 0,231       | 4,20       | OK     |
| 21    | 0,011           | 0,230       | 4,65       | OK     |
| 22    | 0,004           | 0,231       | 1,81       | OK     |
| 23    | 0,008           | 0,230       | 3,44       | OK     |
| 24    | 0,004           | 0,231       | 1,61       | OK     |
| 25    | 0,008           | 0,231       | 3,60       | OK     |
| 26    | 0,004           | 0,231       | 1,54       | OK     |
| 27    | 0,009           | 0,231       | 3,92       | OK     |
| 28    | 0,003           | 0,231       | 1,46       | OK     |
| 29    | 0,008           | 0,231       | 3,37       | OK     |
| 30    | 0,003           | 0,231       | 1,37       | OK     |
| 31    | 0,005           | 0,231       | 2,22       | OK     |
| 32    | 0,003           | 0,231       | 1,34       | OK     |
| 33    | 0,005           | 0,231       | 2,16       | OK     |
| 34    | 0,004           | 0,230       | 1,58       | OK     |
| 35    | 0,009           | 0,231       | 4,09       | OK     |
| 36    | 0,003           | 0,231       | 1,51       | OK     |
| 37    | 0,004           | 0,231       | 1,77       | OK     |
| 38    | 0,003           | 0,231       | 1,30       | OK     |
| 39    | 0,009           | 0,231       | 4,08       | OK     |
| 40    | 0,005           | 0,231       | 2,37       | OK     |

**7 Voltage fluctuations and flicker according to EN 61000-3-3:2013.**

**Information concerning the test:**

|            |                |                       |          |
|------------|----------------|-----------------------|----------|
| Tested by: | Muraouyou A.A. | Ambient temperature:  | 23,1 °C  |
| Test date: | 2018-07-11     | Rel. humidity:        | 48,3 %   |
|            |                | Atmospheric pressure: | 99,1 kPa |

| Test mode | Description                           |
|-----------|---------------------------------------|
| № 1       | Continuous operation in lighting mode |

**TEST DESCRIPTION:**

**Method**

EN 61000-3-3

**Test Procedure:**

According to clause 6 EN 61000-3-3.

Measurement results can be found in the following pages.

**Used test equipment:**

| Factory Number                           | Type                                                                                                                                                                         | Manufacturer    | Model                                    | Calibration Due |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------|-----------------|
| 1347A00836/<br>1343A00428/<br>1347A02705 | The AMETEK MX15-CTSHL measuring complex consists of AMETEK PACS-1 power analyzer, AMETEK MX15-1Pi programmable power supply, programmable AMETEK OMNI 1-37 network impedance | «Ametek»        | AMETEK PACS-1/<br>MX15-1Pi/<br>OMNI 1-37 | 2018-12-21      |
| 13450                                    | Aneroid barometer                                                                                                                                                            | Made in Belarus | БАММ-1                                   | 2019-01-31      |
| 3000                                     | Temperature and Humidity Meter                                                                                                                                               | Made in Belarus | Сосна 004                                | 2018-10-02      |

**Record:**

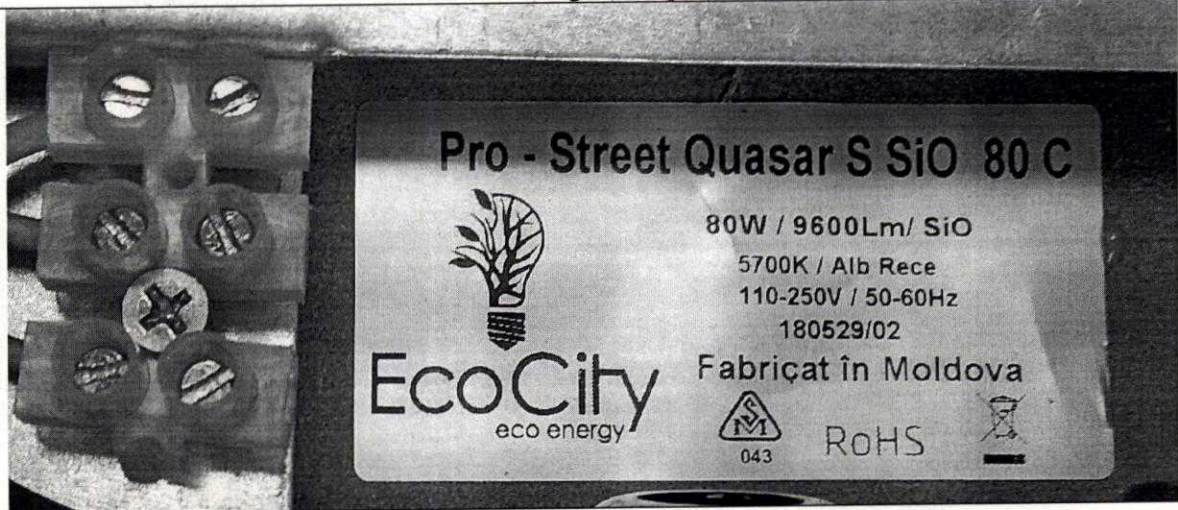
**Test mode 1:**

| Parameter                      | Measured value | Limit    | Result |
|--------------------------------|----------------|----------|--------|
| Vrms at the end of test (Volt) | 230,31         |          |        |
| Highest dt (%)                 | 0,00           | N/A      | N/A    |
| T-max (mS)                     | 0,00           | 500,0 mS | Pass   |
| Highest dc (%)                 | 0,00           | 3,30 %   | Pass   |
| Highest dmax (%)               | < 0,10         | 6,00 %   | Pass   |
| Highest Pst (10 min. period)   | < 0,10         | 1,000    | Pass   |
| Highest Plt (2 hr. period)     | < 0,10         | 0,650    | Pass   |

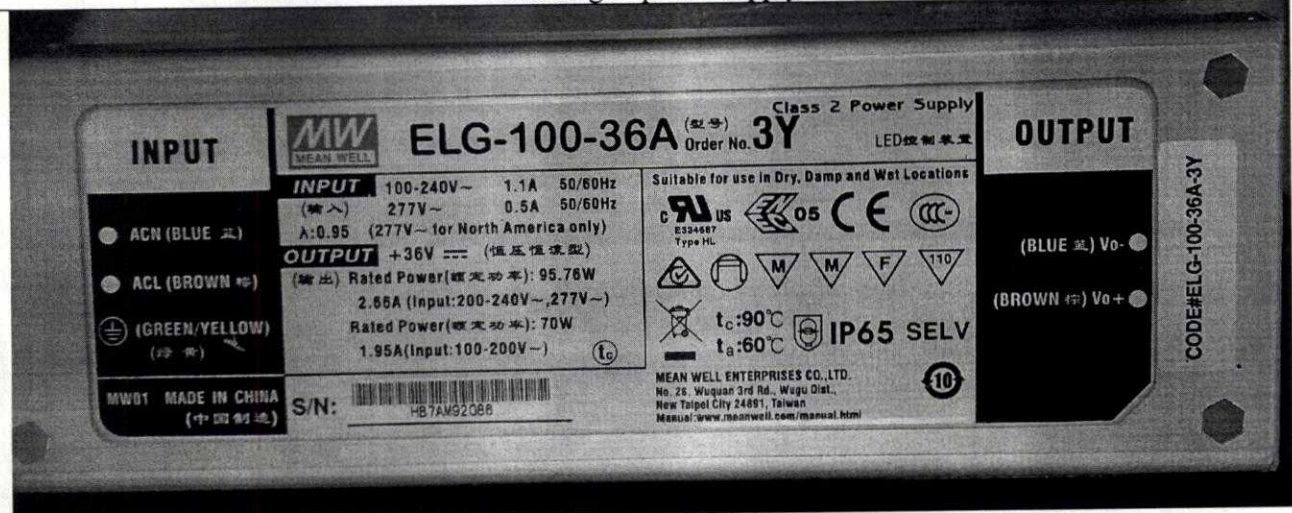
**Result: PASSED**

Appendix 1 (Photos of the EuT)

Marking of sample



Marking of power supply



Sample appearance





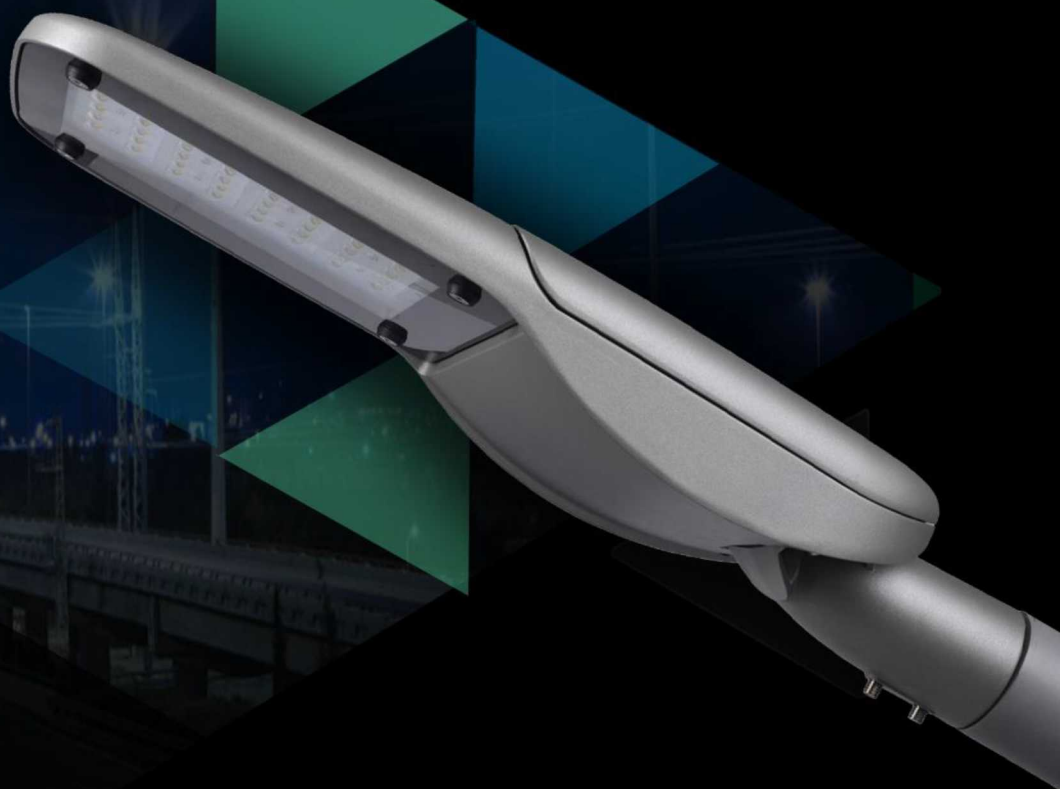
EcoCity  
eco energy

# Oferta comercială

## Producere iluminat cu LED

[www.ecocity.md](http://www.ecocity.md)

## PRO-STREET QUASAR (S)



Diode ceramice  
160 Lm/W



38 curbe fotometrice



Suport pivotant  
reglabil



Smart City  
(opțional)

Pro-Street Quasar (S) - corp de iluminat stradal cu design modern și capacitate mărită de răcire, oferă o distribuție uniformă a luminii datorită LED-urilor de mare putere, fiind rezistent la șocuri mecanice, umiditate și vibrații. Acest model este cea mai potrivită sursă de iluminat cu LED pentru montarea pe piloni cu înălțimea de 4-6 metri.

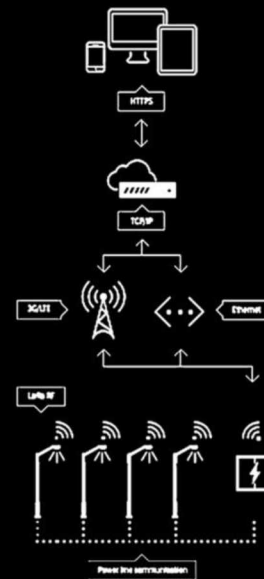
Este destinat pentru iluminatul stradal, a parcurilor, terenurilor de fotbal, parcurilor etc.



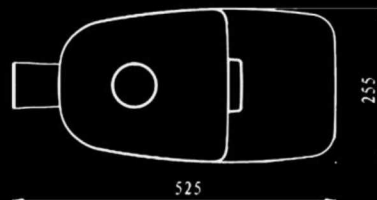
## PRO-STREET QUASAR (S)

| Model                      | Pro-Street Quasar (S) 30                                                                                                       | Pro-Street Quasar (S) 50 | Pro-Street Quasar (S) 80 |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| Putere                     | 30 W                                                                                                                           | 50 W                     | 80 W                     |
| Flux luminos               | 3300 Lm                                                                                                                        | 5500 Lm                  | 8800 Lm                  |
| Temperatura de culoare     | 4000 K – Lumina zilei                                                                                                          |                          |                          |
| Tensiune rețea             | 180 – 265 V / 50 – 60 Hz                                                                                                       |                          |                          |
| Temperatura de lucru       | De la -40 °C până la +50 °C                                                                                                    |                          |                          |
| Dimensiuni                 | L-525 mm<br>I- 250 mm<br>H -102 mm                                                                                             |                          |                          |
| Greutate                   | 6.100 kg                                                                                                                       |                          |                          |
| Unghi fascicul             | Reglabil în dependență de lentile                                                                                              |                          |                          |
| Gradul de protecție IP     | IP66                                                                                                                           |                          |                          |
| Indice de redare a culorii | >70Ra                                                                                                                          |                          |                          |
| Material                   | Carcasă: aluminiu, turnată sub presiune înaltă.<br>Compactor: cauciuc siliconic rezistent la căldură<br>Sticlă refractară IK08 |                          |                          |
| Sursa de alimentare        | Încorporat                                                                                                                     |                          |                          |
| Montare                    | Pe bracket cu un diametru de 48-60 mm, acces lateral                                                                           |                          |                          |

### Sistemul de telemetrie și gestionarea a iluminatului



Sistem de control la distanță.  
De la PC sau smartphone



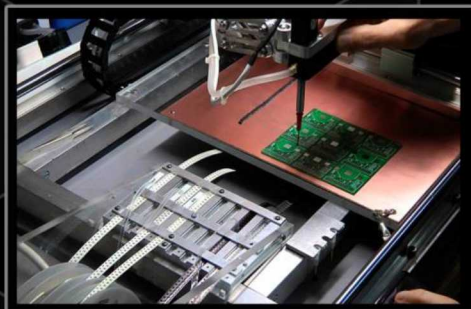
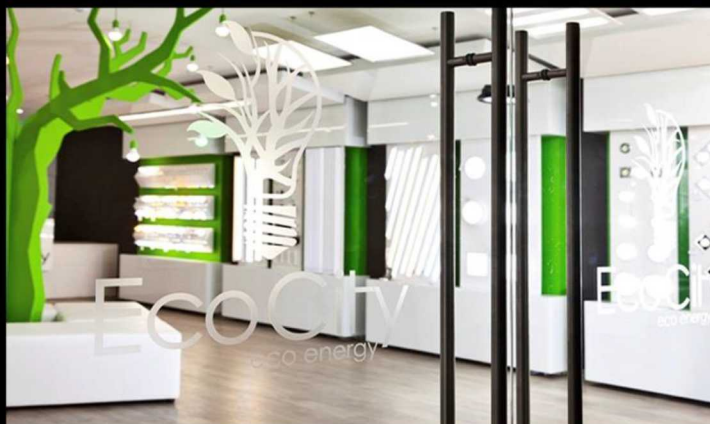
Drumuri suburbii



Alee Pietonale



Parcări



GARANȚIE **5 ani**

Compania EcoCity S.R.L.

+373 22 022 000

[www.ecocity.md](http://www.ecocity.md)

Data: 11.12.2018

Ediția OC: Nr. 1

## CERTIFICATE

RoHS

CE



SMC 0114



SMM 0037

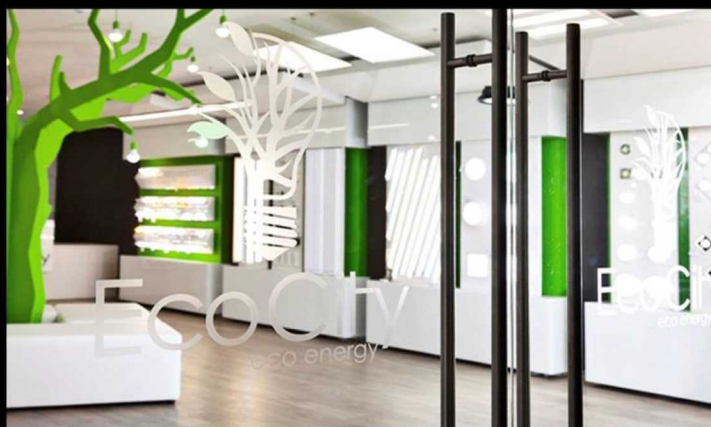


SMSO 0038

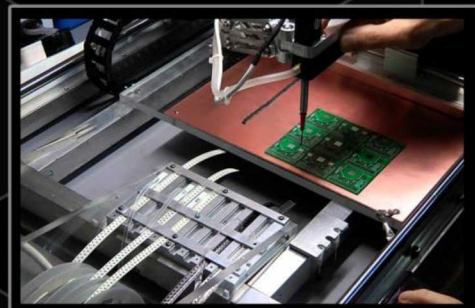


Sunt conforme cu cerințele obligatorii stabilite în:  
 SM SR EN 60598-2-2:2014, SM SR EN 61195:2010, SM SR EN 60598-2-3: 2014, SM SR EN  
 62560:2014, SM SR EN 60598-2-3:2010, SM SR EN 60598-1:2014, SR EN 55015:2016  
 compatibilitate electromagnetică, SM SR EN 13201-4:2011, SM SR EN 62262:2013

## SHOWROOM



## PRODUCERE



Producător ECO CITY S.R.L. / MADE IN EUROPE

# Harta proiectelor realizate pentru Iluminatul Stradal în Republica Moldova și România



## REPUBLICA MOLDOVA:

Mun. Chișinău (Treceri pietonale - 370 buc.)  
 Mun. Chișinău (Com. Bubuieci, Com. Vatra)  
 Mun. Bălți (Or. Bălți - Piața Vasile Alecsandri,  
 S. Răuțel, S. Sadovoe)  
 Raionul Dondușeni (Or. Dondușeni, S. Moșana)  
 Raionul Briceni (S. Lipcani)  
 Raionul Soroca (S. Rudi, S. Șaptelici)  
 Raionul Fălești (Or. Fălești)  
 Raionul Orhei (Or. Orhei, S. Ivancea,  
 S. Brănești, S. Furceni)  
 Raionul Telenești (S. Verejeni)  
 Raionul Șoldănești (S. Salcia)  
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 Raionul Cantemir (S. Tartaul, S. Lărguța, S. Cociulia)  
 Raionul Ștefan Vodă (S. Palanca)

## ROMÂNIA:

Judetul Vâlcea Comuna Perișani



Mercedes-Benz



HYUNDAI



MOLDINDCONBANK





EcoCity  
eco energy

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[www.ecocity.md](http://www.ecocity.md)