TEST REPORT
IEC TR 62778
Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires

Report Number.....:	**381735-1TRFPHO**
Date of issue.....:	2019-10-03
Total number of pages	12
Name of Testing Laboratory preparing the Report .....:	**Nemko Spa** Via del Carroccio, 4 - 20853 Biassono (MB) – ITALY
Applicant's name .....:	**CLuce Srl**
Address.....:	Via Marmolada, 5/11 – 20060 – Trucazzano (MI) - Italy
Test specification:	
Standard.....:	IEC TR 62778:2014 (Second Edition)
Test procedure .....:	Testing
Non-standard test method .....:	N/A
Test Report Form No. .....:	IEC62778A
Test Report Form(s) Originator ....:	Nemko Spa
Master TRF .....:	Dated 2016-02

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

General disclaimer:

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Test item description..... :	**LED light**
Trade Mark..... :	CLuce ( )
Manufacturer ..... :	Cluce Srl Via Marmolada, 5/11 – 20060 – Trucazzano (MI) - Italy
Model/Type reference..... :	ANTARES 244643.936 (see speaking code on pag. 5)
Ratings..... :	315 W 220-240 V 50-60 Hz 4000 K Cl. II
s/n of model tested ..... :	381735 "1/1 identified by Nemko"

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**		
Testing location/ address ..... :		**Nemko Spa** Via del Carroccio, 4 – 20853 Biassono (MB) – Italy	
☐	**Associated Testing Laboratory:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :		Oscar Segantin (Project handler)	Segantin Oscar
Approved by (name, function, signature) .. :		Roberto Giampaglia (Verifier)	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):

- Attachment 1: Best Measurement Capability (1 page)
- Attachment 2: Characteristics of lamps (1 page)
- Attachment 3: Photo documentation (2 pages)
- Attachment 4: Equipment used for testing (1 page)

Summary of testing:

The equipment under test is a LED light.
The tests were performed with the following settings:

1- Distance of 200mm (IEC_62778)

Tests performed (name of test and test clause):

Cl. 8 – Risk Group classification

Note: The following Nemko technical procedures were also applied during testing:
- WML0177 General routines for using instruments at Nemko**.**
- WML1002: Measurement Uncertainty – Policy and Statement.
- WML0066: Procedure for measurement of Photobiological safety of lamps and lamp systems

Statement of the measurement uncertainty:

See Attachment 1 for best measurement capability

Unless different values are declared in the test case, following ambient conditions apply for the tests:

- Ambient temperature 18÷33 °C
- Relative Humidity 30÷70 %
- Atmospheric Pressure 980÷1020 hPa

Equipment used for testing is recorded and saved into Attachment 4 to this test report.

Testing location:

Nemko Spa
Via del Carroccio, 4 – 20853 Biassono (MB) –Italy (for all tests)

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

- European countries (no deviation listed on IECEE website)

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Calibration	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
Measurement uncertainty	Measurement uncertainties are calculated for all instruments and instrument set-ups given in this report. Calculations are based on the principles given in the standard EA-4/02 (Dec. 1999), IEC Guide 115:2007 and Nemko technical procedure WML1002. Further information about measurement uncertainties will be given on request.
Evaluation of results	If not explicitly stated otherwise in the standard, the test is passed if the measured value is equal to or below (above) the limit line, regardless of the measurement uncertainty. If the measured value is above (below) the limit line, the test is not passed - ref IEC Guide 115:2007, and Nemko technical procedure WML0177. The instrumentation accuracy is within limits agreed by IECEE-CTL (ref. Nemko technical procedure WML1002).

Test item particulars..... :	**LED light**
Product evaluated..... :	☐ **LED package** ☐ **LED module** ☐ **Lamp** ☒ **Luminaire**
Rated voltage (V)..... :	220-240 V
Rated current (mA) ..... :	700 mA
Rated CCT (K)..... :	4000 K
Rated Luminance (Mcd/m^2) ..... :	-
Component report data used ..... :	☒ **Not applicable** ☐ **LED package** ☐ **LED module** ☐ **Lamp** Report number: -
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A (Not applicated)
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2019-10-01
Date (s) of performance of tests.....:	2019-10-02
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. The phase of sampling/collection is carried out by manufacturer. **Throughout this report a ☒ comma / ☐ point is used as the decimal separator.** **-**	
Name and address of factory (ies) .....:	Cluce Srl Via Marmolada, 5/11 – 20060 – Trucazzano (MI) - Italy
General product information: The equipment under test is a LED light for general purpose composed by 36 LEDs module (144 leds in total) manufactured by SAMSUNG model LH181B, with asymmetric lens with beam angle 50° (characteristics of LED are described to attachment 4). Equipment has been supplied by controlgear model Xi FP 330W 2:0.2-0.75A SNDAE 230V C240 sXt manufactured by PHILIPS with ratings: Input: 356 W 202-254 V 47-63 Hz 1,77 Amax Output: 165 W per channel 350 Vdc_{max} S/n: 381735 “1/1 identified by Nemko”	

This test report extend the following family:

- **ANTARES 24A643.ZZZ**

  Where "A": characteristics of lens mounted on LED:
  -3: SM symmetric (without lens)
  -4: AS asymmetric lens

  Where "ZZZ": power of the fitting:
  -416: 140 W
  -520: 175 W
  -624: 210 W
  -728: 245 W
  -832: 280 W
  -936: 315 W

- **SKYLINE 50A643.ZZZ ***

  Where "A": characteristics of pole adapter:
  -6: diameter 60 mm pole adapter
  -7: diameter 42 mm pole adapter

  Where "ZZZ": power of the fitting:
  -104: 35 W
  -208: 70 W
  -312: 105 W
  -416: 140 W

*SKYLINE version mounted the same LED module of the ANTARES version tested in this report.

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

7	**MEASUREMENT INFORMATION FLOW**		**P**
7.1	**Basic flow**		**P**
	'Law of conservation of luminance' applied		P
	Use of only true luminance/radiance values		P
	In case of luminaire: The light source is operated in the luminaire under similar conditions as when tested as a component		P
	In case E_{thr} value for RG2 was established the peak value was derived from angular light distribution		N/A
7.2	**Conditions for the radiance measurement**		**P**
	Standard condition applied (200mm distance, 0,011rad field of view)		P
	Non-standard condition applied		N/A
7.3	**Special cases (I): Replacement by a lamp or LED module of another type**		**N/A**
	Light source is a white light source		N/A
	Evaluation done based on highest luminance		N/A
	Evaluation done based on CCT value		N/A
7.4	**Special cases (II): Arrays and clusters of primary light sources**		N/A
	LED package is evaluated as ..... :	☐ RG0 unlimited ☐ RG1 unlimited	N/A
	E_{thr} of LED package applies to array		N/A
8	**RISK GROUP CLASSIFICATION**		**P**
	Risk group achieved:		P
	- .. Risk Group 0 unlimited		N/A
	- .. Risk Group 1 unlimited		P
	- E_{thr} ..... (lx) : Distance to reach RG1 ..... (m) :		N/A

	TABLE: Spectroradiometric measurement		**P**
	Measurement performed on:	☐ **LED package** ☐ **LED module** ☐ **Lamp** ☒ **Luminaire**	
	Model number.....:	381735 “1-1 (Identified by Nemko Spa)	
	Test voltage (V) .....:	240 V	—
	Test current (mA) .....:	-	—
	Test frequency (Hz).....:	50 Hz	—
	Ambient, t (°C).....:	26	—
	Measurement distance .....:	☒ 20 cm ☐ ... cm	—
	Source size .....:	☒ Non-small ☐ Small : .... mm	—
	Field of view .....:	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	N/A	See component datasheet
x/y colour coordinates			N/A	See component datasheet
Blue light hazard radiance	LB	W/(m2•sr1)	**4050**	**RG1**
Blue light hazard irradiance	EB	W/m2	N/A	
Luminance	L	cd/m2	**6,6E06 cd/ m2**	
Illuminance	E	lx	N/A	
Supplementary information:				

ATTACHMENT 1: BEST MEASUREMENT CAPABILITY

Test	Range	Measurement Uncertainty	Note
Radiance Blue light, Retinal thermal, Retinal thermal weak visual stimulus	0 ÷ 0.1 MW/(sr·m^2) 300 ÷ 1400 nm	7.0 %	(1) (4)
	0.1 ÷ 100 MW/(sr·m^2) 300 ÷ 1400 nm	8.0 %	
Luminance	0 ÷ 0.1 Mcd/m^2	7.0 %	(1)
	0.1 ÷ 100 Mcd/m^2	8.0 %	
Irradiance Actinic UV, Near UV, Blue light small source, IR radiation, eye	0 ÷ 0.1 MW/(m^2) 200 ÷ 300 nm	9.2 %	(1) (5)
	0.1 ÷ 100 MW/(m^2) 200 ÷ 300 nm	10.0 %	
	0 ÷ 0.1 MW/(m^2) 300 ÷ 3000 nm	6.4 %	
	0.1 ÷ 100 MW/(m^2) 300 ÷ 3000 nm	7.2 %	
Illuminance	0 ÷ 20 klx	4.0 %	(1)
Spectral Radiance	0 ÷ 0.1 MW/(sr·m^2·nm) 300 ÷ 1400 nm	6.2 %	(1)
	0.1 ÷ 1 MW/(sr·m^2·nm) 300 ÷ 1400 nm	7.0 %	
Spectral Irradiance	0 ÷ 0.1 MW/(m^2·nm) 200 ÷ 300 nm	8.6 %	(1)
	0.1 ÷ 1 MW/(m^2·nm) 200 ÷ 300 nm	9.2 %	
	0-0.1 MW/(m^2·nm) 300 ÷ 3000nm	5.4 %	
	0.1 ÷ 1 MW/(m^2·nm) 300 ÷ 3000 nm	6.4 %	
Radiant power Laser radiation Output power	350 ÷ 400 nm 950 ÷ 3000 nm 30 uW ÷ 30 W	9.0 %	(1), (2), (3)
	400 ÷ 950 nm 50 nW ÷ 3 W	4.6 %	(1), (2), (3)
Radiant energy Laser radiation	350 ÷ 400 nm 950 ÷ 3000 nm 20 uJ ÷ 2 J	9.0 %	(1), (2)
	400 ÷ 950 nm 20 uJ ÷ 2 J	4.6 %	(1), (2)
Wavelength	200 ÷ 3000 nm	4.5 %	(1)
Length in optical measurement	0 ÷ 20 mm	0.5 mm	(1)
	20 ÷ 200 mm	2 mm	
	0.2 ÷ 200 m	0.5 %	

NOTES:

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %

(2) In the standard 60825-1 laser radiation can indicate radiant power or radiant energy

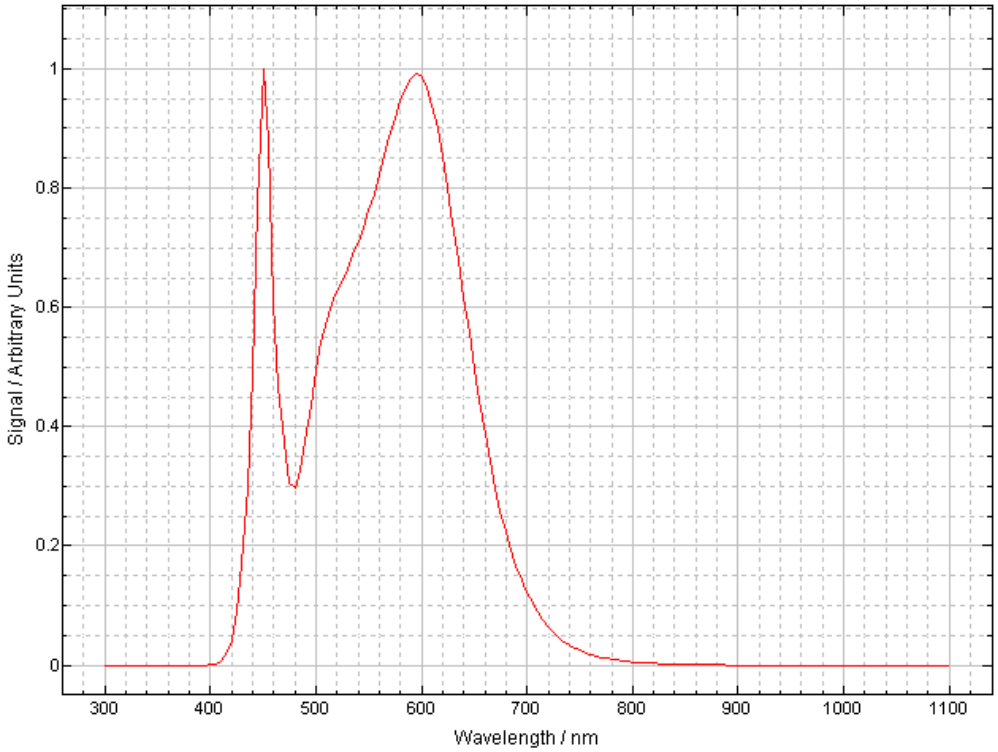
(3) In the standard 60825-1 the radiant power can be called also output power

(4) The uncertainty value expressed in W/(m^2) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

(5) The uncertainty value expressed in W/(sr·m^2) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

ATTACHMENT 2: CHARACTERISTICS OF LAMP

Application / Function	Manufacturer trademark	Type / Model	Technical data	Standard	Mark(s) of conformity evidence of acceptance
LEDs	SAMSUNG	LH181B	V_F 3,2 V at I_F 1400 mA 4000 K	IEC 62778	Tested in appliance



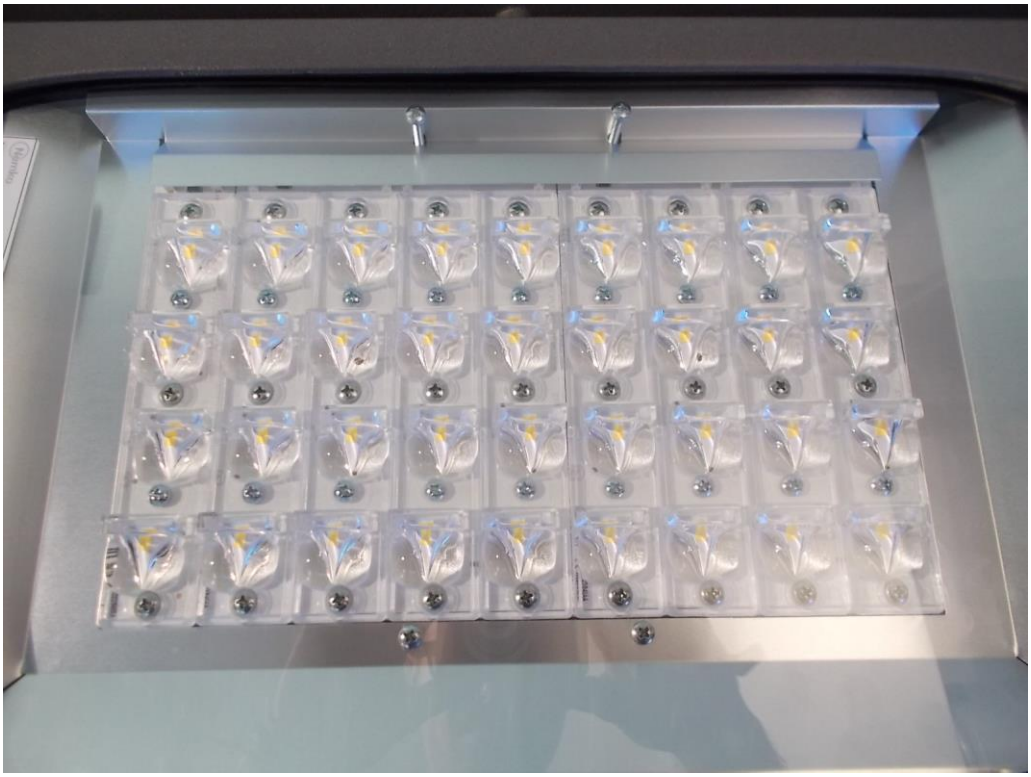
Spectral measurement normalized

ATTACHMENT 3: PHOTO DOCUMENTATION

a)

b)

d)



e)

ATTACHMENT 4: EQUIPMENT USED FOR TESTING

MEASUREMENT EQUIPMENT			
Manufacturer	**Type of equipment**	**Type designation**	**Serial number**
Bentham instruments	Double monochromator	IDR300	12290
	Calibration lamp for irradiance measurement	CL6-H	12094/5
	Calibration lamp for irradiance measurements (UV)	CL7	12281/3
	Calibration lamp for radiance measurements	SRS12	12283/3
	Telescope for radiance measurements	TEL309	12280/3
	Illuminance detector	DH400_vl	12284/3
	Power supply	PSU605	12236/4
	Power supply	PSU705	12295
	Diffuser	DIFF_D7	12279/3
	Source Profiler	PSL_Profiler	12698/4
Other instruments	Tape	Stanley 8 m	30-457
	Distance meter	Bosch DLE70	005558860
	Multimeter	Fluke 8846	9673012
	Power supply	Philips	003926
	Data logger	Severis 2	0054634793

END OF TEST REPORT