Test Report issued under the responsibility of:

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

Report Number..... :	4789889617.2
Date of issue ..... :	2021-08-11
Total number of pages ..... :	12 including attachments
Name of Testing Laboratory preparing the Report ..... :	UL International Italia S.r.l
Applicant's name ..... :	**NERI SPA**
Address..... :	**SS EMILIA 1622 LONGIANO, FC, 47020 Italy**
Test specification:	
Standard ..... :	IEC TR 62778:2014 (Second Edition)
Test procedure..... :	Informative Report
Non-standard test method..... :	N/A
Test Report Form No. ..... :	IEC62778A
Test Report Form(s) Originator.... :	TÜV SÜD Product Service GmbH
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:

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

Test item description ..... :	LED module
Trade Mark ..... :	NERI
Manufacturer ..... :	Same as Applicant
Model/Type reference ..... :	LED module B5673
Ratings ..... :	1400 mA (70,6 Vdc) 4000 K

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**Testing Laboratory:**	UL International Italia S.r.l.	
Testing location/ address.....:		Via Delle Industrie 5&6, 20061 Carugate (MI) - Italy	
☐	**Associated Testing Laboratory:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:		Marco Caroli Project handler	
Approved by (name, function, signature)...:		Luca Nobile Reviewer	
☐	**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 enclosure):	
Components List	(Enclosure 1): 1 page
Measured wavelength curves	(Enclosure 2): 1 page
Photographs	(Enclosure 3): 1 page

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
7.2 Radiance measurements	UL International Italia S.r.l. Via Delle Industrie 5 & 6, 20061 Carugate (MI) - Italy

The measurement uncertainties stated in this Test Report are estimated according to the Quality Procedure 23-CL-G0025.

If requested, UL International Italia S.r.l. will be able to estimate the uncertainty contribution for all the quantities stated in this Test Report.

Equipment list for instrument used was saved under UL Italy Lab project number 1001290196.

Considering that the applied test standards take measurement uncertainty into account, acceptance limit equals the tolerance limit (Accuracy Method). This leads to a maximum 50% of false accept or false reject when the measured value equals the tolerance limit. See ILAC-G8:09/2019 for further details.

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.

N/A

Test item particulars .....:	-
Product evaluated.....:	☐ **LED package** ☒ **LED module** ☐ **Lamp** ☐ **Luminaire**
Rated voltage (V) .....:	-
Rated current (mA) .....:	1400 mA d.c.(I_{LED} 700 mA d.c.)
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
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2021-08-09
Date (s) of performance of tests.....:	2021-08-10

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

General product information:

The product under test is a LED module composed by 24 LED chip (2 rows parallel connected of 12 chips series connected) supplied at max 1400 mA d.c. (I_{LED} 700 mA d.c.).

The Radiance measures were carried out at the distance of 200 from detector in the direction of maximum light output, directly on one LED chip, without any optics/reflectors in position in order to determinate (according to IEC/TR 62778) LB value of the product.

The product has been classified **RISK GROUP 1 unlimited**.

The classification may be extended on products with same LED Chip, with Same or less $I_{LED\ Chip}$, Same or Less CCT.

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		N/A
	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**		**P**
	LED package is evaluated as ..... :	☐ RG0 unlimited ☒ RG1 unlimited	P
	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..... :		LED module 24 LEDs (2 x 12)		—
	Test voltage (V) ..... :		70,6 V		—
	Test current (mA) ..... :		1400 mA		—
	Test frequency (Hz)..... :		--		—
	Ambient, t (°C) ..... :		25,0		—
	Measurement distance..... :		☒ 20 cm ☐ ... cm		—
	Source size ..... :		☒ Non-small ☐ Small		—
	Field of view ..... :		☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)		—
Item	Symbol	Units	Result	Remark	
Correlated colour temperature	CCT	K	4000	Rated CCT	
x/y colour coordinates			/	-	
Blue light hazard radiance	L_B	W/(m²•sr¹)	**8835**	Measured value	
Blue light hazard irradiance	E_B	W/m²	-	-	
Luminance	L	cd/m²	**14398143**	Measured value	
Illuminance	E	lx	-	Calculated value	
Supplementary information: Measurements performed directly on LED chip supplied at 700 mA d.c.. **RISK GROUP CLASSIFICATION: RISK GROUP 1 unlimited**					

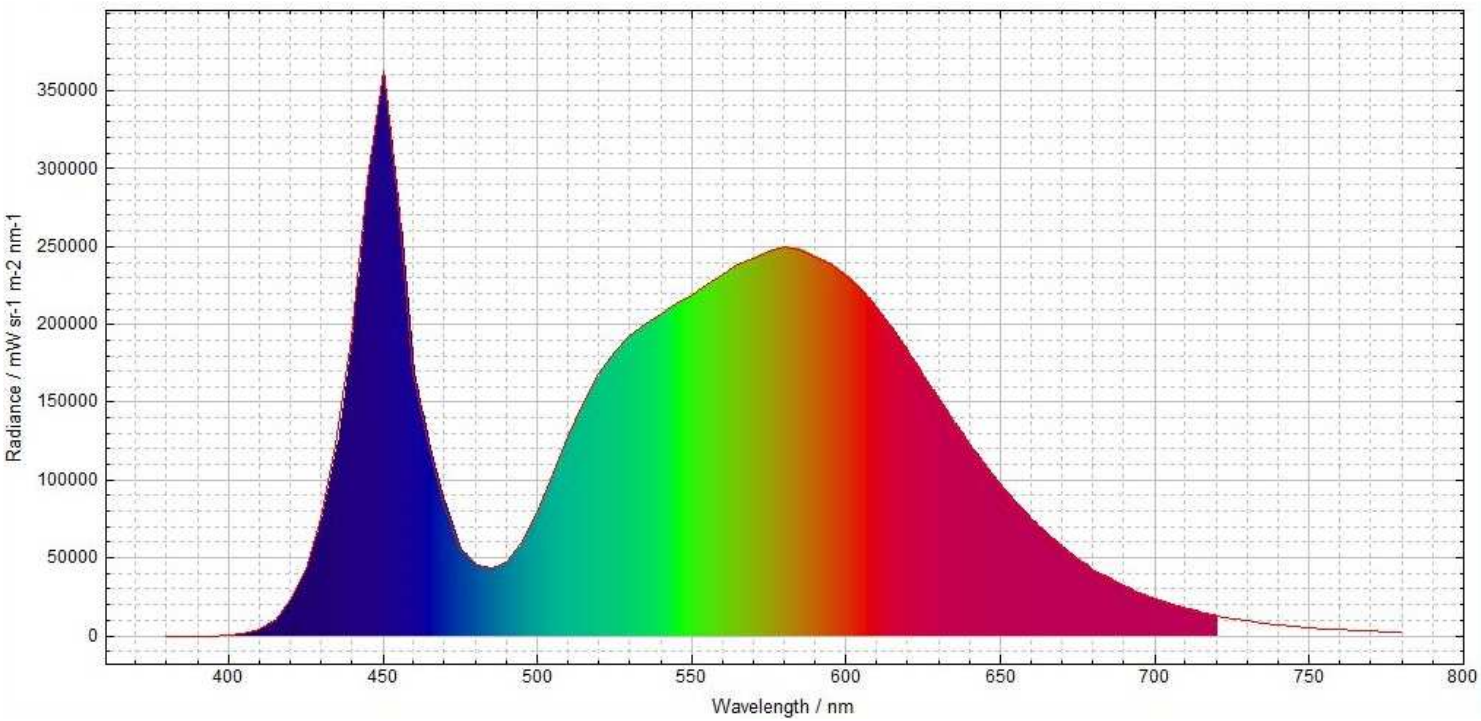
	TABLE: Angular light distribution	N/A

Enclosure 1	**Components List**

Component	Manufacturer	Type model	Ratings / Technical data
LED chip	LUMILEDS	LUXEON 5050 Square LES 6V	CCT: 4000 K I LED (test): 700 mA d.c. Imax 800 mA

Enclosure 2	Measured wavelength curves

Spectral measurement performed with 11 mrad FOV at distance 200 mm, CCT 4000 K:



Enclosure 3	Photos

Photograph No. 1 – General view of the LED module.

Photograph No. 2 – Detail view of the LED chip.