



# TEST REPORT

IEC 62471

Photobiological Safety of Lamps and Lamp Systems

**Applicant Name:**

Würth Elektronik eiSos GmbH & Co.KG

**Address:**

EMC & Inductive Solutions

Max-Eyth-Str. 1, 74638 Waldenburg

[www.we-online.de](http://www.we-online.de)

**Product:** LED

**Match Code:** WL-SFRW

**Part No.:** 155124RG73200

**Reference Standard:** EN 62471:2008 IEC 62471:2006

Photobiological Safety of Lamps and Lamp Systems

**Test Results:** **Exempt Group**

**Find test summary on page 13**



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## Identification of Test Laboratory

**Third Testing Party:** TÜV Rheinland (Shenzhen) Co., Ltd

**Laboratory Address:** East of F/1, F/2~F/4, Building 1, Cybio Technology Building No.6, Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA

**Testing Engineer:** Simon Zou

**Contact Information:** Tel: 86 755 82681265  
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Homepage: [www.tuv.com](http://www.tuv.com)



## 1. Description of the Device under Test (DUT)

**Date of Receipt of Test Sample:** 2016-08-15

**Testing Start Date** 2016-08-15

**Testing End Date:** 2016-10-18

**Tested Lamp:**  Continuous Lamps  Pulse Lamps

**Product Status:**  Development Sample  
 Preproduction Sample  
 Production Sample

### General Product Information:

Model	Match-code	Color	Peak Forward Current (mA)	Continuous Forward Current (mA)	Forward Voltage (V)	Forward Voltage (V)	Forward Voltage (V)
156125M173000	WL-SFRW	Red	60	30	1.6	2	2.4
		Blue	80	30	2.7	3.3	3.9



## 2. Test Data

IEC 62471										
Clause	Requirement + Test			Result – Remark						Verdict
<b>Table 6.1</b>	Emission limits for risk groups of continuous wave lamps For model 156125M173000, blue light, $\alpha=0,0092$ rad.								P	
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	$E_s$	$W \cdot m^{-2}$	0,001	0,00E+00	0,003	--	0,03	--	
Near UV		$E_{UVA}$	$W \cdot m^{-2}$	10	0,00E+00	33	--	100	--	
Blue light	$B(\lambda)$	$L_B$	$W \cdot m^{-2} \cdot sr^{-1}$	100	--	10000	--	4000000	--	
Blue light, small source	$B(\lambda)$	$E_B$	$W \cdot m^{-2}$	0,01	3,99E-04	1,0	--	400	--	
Retinal thermal	$R(\lambda)$	$L_R$	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	2,40E+03	$28000/\alpha$	--	$71000/\alpha$	--	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	$L_{IR}$	$W \cdot m^{-2} \cdot sr^{-1}$	$6000/\alpha$	0,00E+00	$6000/\alpha$	--	$6000/\alpha$	--	
IR radiation, eye		$E_{IR}$	$W \cdot m^{-2}$	100	0,00E+00	570	--	3200	--	
* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.										
** Involves evaluation of non-GLS source										





IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

<b>Table 6.1</b>	Emission limits for risk groups of continuous wave lamps For model 156125M173000, red light, $\alpha=0,0072$ rad.	P
------------------	--	---

Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	$E_s$	$W \cdot m^{-2}$	0,001	0,00E+00	0,003	--	0,03	--
Near UV		$E_{UVA}$	$W \cdot m^{-2}$	10	0,00E+00	33	--	100	--
Blue light	$B(\lambda)$	$L_B$	$W \cdot m^{-2} \cdot sr^{-1}$	100	--	10000	--	4000000	--
Blue light, small source	$B(\lambda)$	$E_B$	$W \cdot m^{-2}$	0,01	2,23E-07	1,0	--	400	--
Retinal thermal	$R(\lambda)$	$L_R$	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	1,20E+02	$28000/\alpha$	--	$71000/\alpha$	--
Retinal thermal, weak visual stimulus**	$R(\lambda)$	$L_{IR}$	$W \cdot m^{-2} \cdot sr^{-1}$	$6000/\alpha$	0,00E+00	$6000/\alpha$	--	$6000/\alpha$	--
IR radiation, eye		$E_{IR}$	$W \cdot m^{-2}$	100	0,00E+00	570	--	3200	--

\* Small source defined as one with  $\alpha < 0,011$  radian. Averaging field of view at 10000 s is 0,1 radian.

\*\* Involves evaluation of non-GLS source



IEC62471A - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

<b>ATTACHMENT TO TEST REPORT IEC 62471</b> <b>EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES</b> Photobiological safety of lamps and lamps systems			
<b>Differences according to.....:</b> EN 62471:2008			
<b>Attachment Form No.....:</b> EU_GD_IEC62471A			
<b>Attachment Originator.....:</b> IMQ S.p.A.			
<b>Master Attachment.....:</b> 2009-07			
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CENELEC COMMON MODIFICATIONS (EN)			P
<b>4</b>	<b>EXPOSURE LIMITS</b>		P
	Contents of the whole Clause 4 of IEC 62471:2006 moved into a new informative Annex ZB		-
	Clause 4 replaced by the following:		P
	Limits of the Artificial Optical Radiation Directive (2006/25/EC) have been applied instead of those fixed in IEC 62471:2006	See appended Table 6.1	P
4.1	General		P
	First paragraph deleted		-

Table 6.1 Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) For model 156125M173000, blue light, $\alpha=0,0092$ rad.									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	$E_s$	$W \cdot m^{-2}$	0,001	0,00E+00	--	--	--	--
Near UV		$E_{UVA}$	$W \cdot m^{-2}$	0,33	0,00E+00	--	--	--	--
Blue light	$B(\lambda)$	$L_B$	$W \cdot m^{-2} \cdot sr^{-1}$	100	--	10000	--	4000000	--
Blue light, small source	$B(\lambda)$	$E_B$	$W \cdot m^{-2}$	0,01*	3,99E-04	1,0	--	400	--
Retinal thermal	$R(\lambda)$	$L_R$	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	$2,40E+03$	$28000/\alpha$	--	$71000/\alpha$	--
Retinal thermal, weak visual stimulus**	$R(\lambda)$	$L_{IR}$	$W \cdot m^{-2} \cdot sr^{-1}$	$545000$ $0,0017 \leq \alpha \leq$ $0,011$	$0,00E+00$				
				$6000/\alpha$ $0,011 \leq \alpha \leq$ $0,1$	--				
IR radiation, eye		$E_{IR}$	$W \cdot m^{-2}$	100	$0,00E+00$	570	--	3200	--

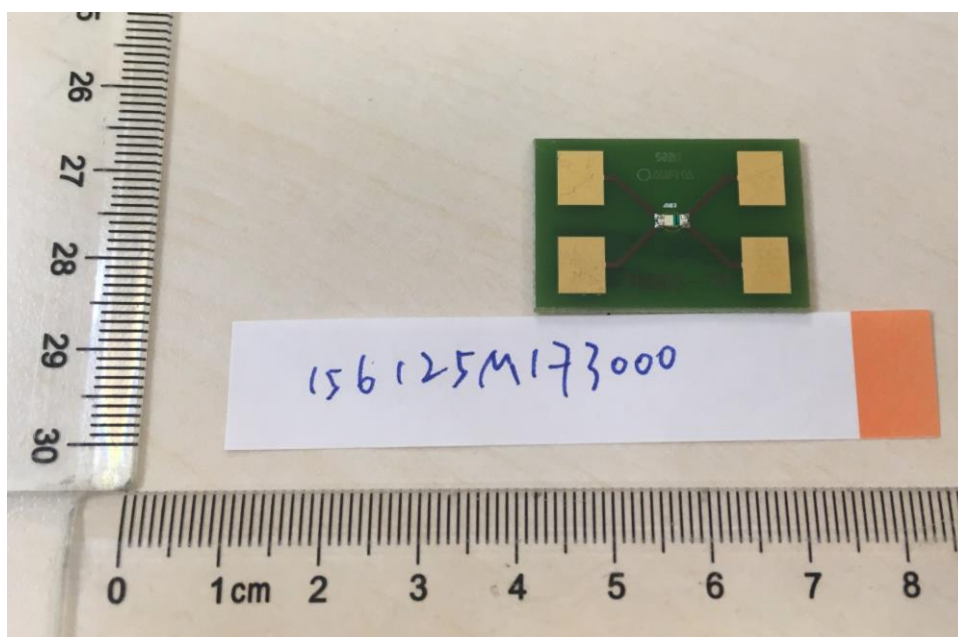




Table 6.1 Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) For model 156125M173000, red light, $\alpha=0,0072$ rad.									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	$E_s$	$W \cdot m^{-2}$	0,001	0,00E+00	--	--	--	--
Near UV		$E_{UVA}$	$W \cdot m^{-2}$	0,33	0,00E+00	--	--	--	--
Blue light	$B(\lambda)$	$L_B$	$W \cdot m^{-2} \cdot sr^{-1}$	100	--	10000	--	4000000	--
Blue light, small source	$B(\lambda)$	$E_B$	$W \cdot m^{-2}$	0,01*	2,23E-07	1,0	--	400	--
Retinal thermal	$R(\lambda)$	$L_R$	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	1,20E+02	$28000/\alpha$	--	$71000/\alpha$	--
Retinal thermal, weak visual stimulus**	$R(\lambda)$	$L_{IR}$	$W \cdot m^{-2} \cdot sr^{-1}$	$545000$ $0,0017 \leq \alpha \leq$ $0,011$	0,00E+00				
				$6000/\alpha$ $0,011 \leq \alpha \leq$ $0,1$	--				
IR radiation, eye		$E_{IR}$	$W \cdot m^{-2}$	100	0,00E+00	570	--	3200	--



### 3. Picture of Test Sample



## 4. Testing Conditions and Performance Criteria

### Testing Conditions

1. Ambient temperature: 25,0°C; Humidity: 65%
2. Input: see model list
3. Aperture stop: 7mm
4. Angular subtense and Measurement distance, see table as below:

Model	Match-code	Color	Measurement distance (mm)	Angular subtense	Classification
156125M173000	WL-SFRW	Red	200	0,0072 rad	Exempt Group
		Blue	200	0,0092 rad	Exempt Group

### Performance Criteria

Photobiological safety of lamps and lamp systems  
(EN 62471: 2008/IEC 62471: 2006) (Excerpt)

#### 6. LAMP CLASSIFICATION

This standard was developed by CIE TC 6-47 with representation of IEC SC34A. This joint effort was deemed important so that issues concerning risk group classification and distance at which the photobiological hazard values due to lamp radiation are reported could be agreed upon. Since lamps may be hazardous from several aspects, a classification scheme is helpful. For the purposes of this standard it was decided that the values shall be reported as follows:

- for lamps intended for general lighting service (GLS), see definition 3.11, the hazard values shall be reported as either irradiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm;
- for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm.

This clause is concerned with lamp classification. However a similar classification system could be applicable to luminaires or other systems containing operating lamps. For lamps intended for general lighting, the distance at which the irradiance measurements are made is left to the discretion of the measurement facility.

The classification scheme indicates only the potential risk. Depending upon use factors, time of exposure, and luminaire effects, these potential hazards may or may not actually become real hazards. Table 6.1 summarizes the various irradiance and radiance emission limits for each of the hazards discussed in clause 4.3 for each risk group classification.

Note: In some cases the same lamp may be used in both GLS and special applications and in such cases should be evaluated and rated for the intended applications.

## 6.1 Continuous wave lamps

### 6.1.1 Exempt group

The philosophical basis for the exempt group classification is that the lamp does not pose any photobiological hazard for the end points in this standard. This requirement is met by any lamp that does not pose

- an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor
- a near-UV hazard (EUVA) within 1000 s, (about 16 min) nor
- a retinal blue-light hazard (LB) within 10000 s (about 2,8 h), nor
- a retinal thermal hazard (LR) within 10 s, nor
- an infrared radiation hazard for the eye (EIR) within 1000 s.

These lamps are in the Exempt Group.

Also, lamps that emit infrared radiation without a strong visual stimulus (i.e., less than 10 cd · m<sup>-2</sup>) and do not pose a near-infrared retinal hazard (LIR) within 1000 s are in the Exempt Group.



## 5. Summary of Testing

### Testing Conditions

1. Tests were performed on all models.
2. Ambient temperature: 25,0°C; Humidity: 65%
3. Aperture stop: 7mm

**Test Location:** TÜV Rheinland (Shenzhen) Co., Ltd.

**Test Engineer:** Simon Zou

**Test Standard:** Photobiological safety of lamps and lamp systems (EN 62471: 2008 IEC 62471:2006)

### Tests Performed (name of test and test clause):

All applicable tests as described in Test Case and Measurement Sections of the test specification (EN 62471: 2008/IEC 62471:2006) were performed.

### Copy of marking plate and Warning Labels:

Note: No warning label is needed for this product.

### Summary of testing:

This test report was issued for considering the potential radiation hazards resulting from the LED under the normal operating conditions only. The rating of LED has been considered for the testing as shown in the test result section. No further single fault and abnormal tests performed.



### Test Results:

This test report is for photobiological safety evaluation of optical output per request from the client. According to EN 62471: 2008 / IEC 62471: 2006, LEDs mentioned above have satisfied the requirements for Exempt Group, see table below:

Model	Match-code	Color	Measurement distance (mm)	Angular subtense	Classification
156125M173000	WL-SFRW	Red	200	0,0072 rad	Exempt Group
		Blue	200	0,0092 rad	Exempt Group



## 6. TUV Original Testing Report Excerpt

Produkte Products		TÜVRheinland®	
Prüfbericht-Nr.: Test Report No.:	50051673 001	Auftrags-Nr.: Order No.:	164070385
Kunden-Referenz-Nr.: Client Reference No.:	N/A	Auftragsdatum: Order date:	2016-08-15
Auftraggeber: Client:	Wuerth Elektronik eiSos GmbH&Co.KG Max-Eyth Strasse1, Waldenburg,74638 Germany		
Prüfgegenstand: Test item:	LED components		
Bezeichnung / Typ-Nr.: Identification / Type No.:	See page 5 to 6		
Auftrags-Inhalt: Order content:	Type test		
Prüfgrundlage: Test specification:	EN 62471:2008 IEC 62471:2006		
Wareneingangsdatum: Date of receipt:	2016-08-15		
Prüfmuster-Nr.: Test sample No.:	A000401754 001-040		
Prüfzeitraum: Testing period:	2016-08-15 to 2016-10-18		
Ort der Prüfung: Place of testing:	See page 3	Photos see test report.	
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.		
Prüfergebnis*: Test result*:	Pass		
geprüft von / tested by:		kontrolliert von / reviewed by:	
2016-10-24 Datum Date	Simon Zou / Engineer Name / Stellung Name / Position	2016-10-28 Datum Date	Allan Huang / Supervisor Name / Stellung Name / Position
	 Unterschrift Signature		 Unterschrift Signature
<b>Sonstiges / Other:</b> -Optical output testing based on Photobiological safety: Exempt Group, Low Risk or Mod Risk for model mentioned above, see page 3 to 4 in report. -Other than optical hazards have not been considered during investigation. -Attachment 1: Measuring Instruments and Test Equipments.			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged	
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested			
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>			

v04

TÜV Rheinland (Shenzhen) Co., Ltd., East of F/1, F/2 - F/4, Building 1, Cybio Technology Building, No. 6 Langshan No. 2 Road,  
North Hi-tech Industry Park, Nanshan District, Shenzhen, P.R. China  
<http://www.tuv.com>

<b>TEST REPORT</b> <b>IEC 62471</b> <b>Photobiological safety of lamps and lamp systems</b>	
Report Reference No. ....	See cover page
Date of issue .....	See cover page
Total number of pages .....	See cover page
Testing Laboratory .....	TÜV Rheinland (Shenzhen) Co., Ltd.
Address .....	East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA
Applicant's name .....	See cover page
Address .....	See cover page
<b>Test specification:</b>	
Standard .....	EN 62471:2008 IEC 62471:2006
Test procedure .....	Test report only
Non-standard test method .....	N/A
Test Report Form No. ....	IEC62471A
TRF Originator .....	VDE Testing and Certification Institute
Master TRF .....	Dated 2009-05
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Test item description .....	LED components
Trade Mark .....	N/A
Factory .....	Same as the applicant
Model/Type reference .....	See general product information
Ratings .....	See general product information





**Summary of testing:****Test conditions:**

1. Ambient temperature: 25,0°C; Humidity: 50,0%;
2. Measurement distance: see below table;
3. Aperture stop: 7mm;

Angular subtense: see below table.

Model	Match-code	Color	Measurement distance (mm)	Angular subtense	Classification
150224BS73100	WL-SMTW	Blue	200	0,0104 rad	Exempt Group
150066M153000	WL-SFCD	Red	200	0,0086 rad	Exempt Group
		Blue	200	0,0101 rad	Exempt Group
150080M153000	WL-SFCD	Red	200	0,0097 rad	Exempt Group
		Blue	200	0,0087 rad	Exempt Group
150120M153000	WL-SFCD	Red	200	0,0122 rad	Exempt Group
		Blue	200	0,0151 rad	Exempt Group
150066M173000	WL-SFCW	Red	200	0,0107 rad	Exempt Group
		Blue	200	0,0101 rad	Exempt Group
150080M173000	WL-SFCW	Red	200	0,0083 rad	Exempt Group
		Blue	200	0,0091 rad	Exempt Group
150121M173000	WL-SFCW	Red	200	0,0120 rad	Exempt Group
		Blue	200	0,0149 rad	Exempt Group
155124M173200	WL-SFSW	Red	200	0,0245 rad	Exempt Group
		Blue	200	0,0167 rad	Exempt Group
155124RG73200	WL-SBSW	Red	200	0,0090 rad	Exempt Group
156125M173000	WL-SFRW	Red	200	0,0072 rad	Exempt Group
		Blue	200	0,0092 rad	Exempt Group
156125RB73000	WL-SBRW	Red	200	0,0080 rad	Exempt Group
		Blue	200	0,0118 rad	Exempt Group
155124BS73200	WL-SMSW	Blue	200	0,0102 rad	Exempt Group
155124WS73200	WL-SMSW	White	200	0,0103 rad	Exempt Group
156120BS82500	WL-SMRW	Blue	200	0,0105 rad	Exempt Group
156120WS82500	WL-SMRW	White	200	0,0101 rad	Exempt Group
156125BS55000	WL-SMRW	Blue	200	0,0123 rad	Exempt Group
156125WS55000	WL-SMRW	White	200	0,0064 rad	Exempt Group
158301260	WL-SWTP	white	200	0,0110 rad	Exempt Group
158302260	WL-SWTP	white	200	0,0124 rad	Exempt Group
158563460	WL-SWTP	white	200	0,0189 rad	Exempt Group
150506MW73500	WL-SLMW	Blue	200	0,0346 rad	Mod Risk
		White	200	0,0199 rad	Low Risk
15406085BA300	WL-SICW	IR	200	0,00176 rad	Exempt Group
15406094BA500	WL-SICW	IR	200	0,00190 rad	Exempt Group



15412485AA370	WL-SISW	IR	200	0,00224 rad	Exempt Group
15412494AA670	WL-SISW	IR	200	0,00231 rad	Exempt Group
15412085A3060	WL-SIRW	IR	200	0,00323 rad	Exempt Group
15412094A3060	WL-SIRW	IR	200	0,00370 rad	Exempt Group
15400585A3590	WL-TIRW	IR	200	0,01391 rad	Exempt Group
15400594A3590	WL-TIRW	IR	200	0,00801 rad	Exempt Group

**Conclusion:** Sample tested is considered as **Exempt Group, Low Risk or Mod Risk.**

**Tests performed (name of test and test clause):**

All applicable tests as described in Test Case and Measurement Sections were performed.

**Testing location:**

For models 15406085BA300, 15406094BA500, 15412485AA370, 15412494AA670, 15412085A3060, 15412094A3060, 15400585A3590 and 15400594A3590:

**Centre Testing International Group Co., Ltd**

Build C, Hongwei Industrial Zone, Baoan 70 District, Shenzhen, China

For others:

**Anbotek Compliance Laboratory Limited**

1/F., Building 1, SEC Industrial Park, No. 0409 Qi-anhai Road, Nanshan District, Shenzhen, 518054, Guangdong, China

**Copy of marking plate: No provide.**



<b>Test item particulars</b> .....							
Tested lamp .....	<input checked="" type="checkbox"/> continuous wave lamps		<input type="checkbox"/> pulsed lamps				
Tested lamp system .....	N/A						
Lamp classification group .....	<input checked="" type="checkbox"/> exempt	<input checked="" type="checkbox"/> risk 1	<input checked="" type="checkbox"/> risk 2	<input type="checkbox"/> risk 3			
Lamp cap .....	N/A						
Bulb .....	LED						
Rated of the lamp .....	N/A						
Furthermore marking on the lamp .....	N/A						
Seasoning of lamps according IEC standard .....	N/A						
Used measurement instrument .....	See equipment list						
Temperature by measurement .....	25,0°C						
Information for safety use .....	N/A						
<b>Possible test case verdicts:</b>							
– test case does not apply to the test object .....							
– test object does meet the requirement .....							
– test object does not meet the requirement .....							
<b>Testing:</b>							
Date of receipt of test item .....							
Date (s) of performance of tests .....							
<b>General remarks:</b>							
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 testing laboratory.							
"(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.							
List of test equipment must be kept on file and available for review.							
<b>General product information:</b>							
Product: LED components							
Model list:							
Model	Match-code	Color	Peak Forward Current (mA)	Continuous Forward Current (mA)	Forward Voltage (V)	Forward Voltage (V)	Forward Voltage (V)
150224BS73100	WL-SMTW	Blue	100	30	2.8	3	3.4
150066M153000	WL-SFCD	Red	60	30	1.6	2	2.4
		Blue	80	30	2.7	3.4	3.8
150080M153000	WL-SFCD	Red	60	30	1.6	2	2.4
		Blue	80	30	2.7	3.3	3.9
150120M153000	WL-SFCD	Red	60	30	1.6	2	2.4
		Blue	80	30	2.7	3.3	3.9
150066M173000	WL-SFCW	Red	60	30	1.6	2	2.4
		Blue	80	30	2.7	3.4	3.8

150080M173000	WL-SFCW	Red	60	30	1.6	2	2.4
		Blue	80	30	2.7	3.3	3.9
150121M173000	WL-SFCW	Red	60	30	1.6	2	2.4
		Blue	80	30	2.7	3.3	3.9
155124M173200	WL-SFSW	Red	60	30	1.8	2	2.4
		Blue	80	30	2.6	3	3.4
155124RG73200	WL-SBSW	Red	60	30	1.6	2	2.4
156125M173000	WL-SFRW	Red	60	30	1.6	2	2.4
		Blue	80	30	2.7	3.3	3.9
156125RB73000	WL-SBRW	Red	60	30	1.6	2	2.4
		Blue	80	30	2.7	3.3	3.9
155124BS73200	WL-SMSW	Blue	80	30	2.7	3.3	3.9
155124WS73200	WL-SMSW	White	80	30	2.7	3.3	3.9
156120BS82500	WL-SMRW	Blue	80	30	2.7	3.3	3.9
156120WS82500	WL-SMRW	White	80	30	2.7	3.3	3.9
156125BS55000	WL-SMRW	Blue	80	30	2.7	3.3	3.9
156125WS55000	WL-SMRW	White	80	30	2.5	2.8	3.3
158301260	WL-SWTP	white	40	30	-	3	-
158302260	WL-SWTP	white	100	85	-	3.2	-
158563460	WL-SWTP	white	300	150	-	3.2	-
150506MW73500	WL-SLMW	Blue	1000	700	-	3.4	-
		White	1000	700	-	3.4	-
15406085BA300	WL-SICW	IR	700	70	1.3	1.4	1.7
15406094BA500	WL-SICW	IR	700	70	1	1.2	1.5
15412485AA370	WL-SISW	IR	700	70	1.3	1.4	1.7
15412494AA670	WL-SISW	IR	700	70	1	1.2	1.5
15412085A3060	WL-SIRW	IR	700	70	1.3	1.4	1.7
15412094A3060	WL-SIRW	IR	700	70	1.1	1.2	1.35
15400585A3590	WL-TIRW	IR	1000	100	-	1.5	2
15400594A3590	WL-TIRW	IR	1000	100	-	1.3	2