





TEST REPORT
IEC 62722-2-1
Luminaire performance –Part 2-1: Particular requirements for LED luminaires

Report reference No..... : LCS190724033BS

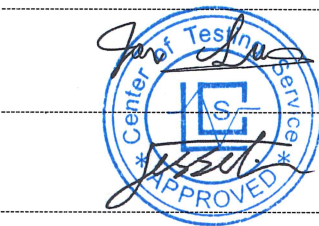
Tested by : Wade Liu (Project Engineer) **Wade Liu**

Check by..... : Ian Luo (Director) 

Approved : Jesse Liu (Manager) 

Date of issue : May 12, 2020

Contents..... : 17 pages



Testing laboratory

Name : Shenzhen Southern LCS Compliance Testing Laboratory Ltd.

Address : 101-201, No.39 Buliding, Xialang Industrial Zone, Heshuikou
Community, Matian Street, Guangming District, Shenzhen, China

Testing location : As above

Client

Name : DIMON Technology Limited

Address..... : Suite 14, 11/F Cheung Hing Industrial Building, 23 Tai Yip Street,
Kwun Tong, Kowloon, Hong Kong.

Manufacturer

Name : DIMON Technology Limited

Address..... : Suite 14, 11/F Cheung Hing Industrial Building, 23 Tai Yip Street,
Kwun Tong, Kowloon, Hong Kong.

Test specification

Standard..... : IEC 62722-2-1: 2014 Edition 1.0 and IEC 62722-1:2014

Test procedure : Compliance with IEC 62722-2-1: 2014 and IEC 62722-1:2014

Non-standard test method : N/A

Test item Description : LED OUTDOOR LIGHT

Trademark : **DIMON**
TECHNOLOGY

Model and/or type reference..... : DRIWOD-11W (3000K)

Rating(s)..... : AC100-240V, 11W

**Test item particulars:**

Lamp cap: N/A
Lamp identification.....: LED OUTDOOR LIGHT
Commission received form: Same as applicant
Electrical safety class: --
IP number: N/A

Test case verdicts

Test case does not apply to the test object : N (N/A)
Test item does meet the requirement: P(Pass)
Test item does not meet the requirement ...: F(Fail)

Testing

Date of receipt of test item: September 04, 2019
Date(s) of performance of test: September 04, 2019 – May11,2020

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item tested.

"(see remark #)" refers to a remark appended to the report.

"(see Annex #)" refers to an annex appended to the report.

Throughout this report a comma is used as the decimal separator.

Modified Information

Version	Report No.	Revision Data	Summary
V1.0	LCS190724033BS	/	Original Version

Remarks

1. The laboratory ambient for testing: 22.0-28.0°C, 60%-73%R.H.
2. The report includes: Attachment 1(S) of LUMINOUS INTENSITY DISTRIBUTION DIAGRAM.
3. The report includes: Attachment 2(S) of product photos.

Label of testing

Rubbing for 15 s with a piece of cloth soaked with water. And a further 15 s with a piece of cloth soaked with petroleum.



IEC 62722-2-1			
Cl.	Requirement - Test	Result	Verdict
4	PRODUCT INFORMATION		P
	Information on the parameters shown in Table 1 shall be provided by the manufacturer or responsible vendor on the product datasheets, leaflets or website.		P
	a) Rated input power (in W)	11W	P
	b) Photometric code		P
	c) Rated luminous flux (in lm)	1046LM	P
	d) Rated life (in h) of the LED module in the luminaire and the associated rated lumen maintenance(Lx)	30000h	P
	e) Failure fraction (Fy), corresponding to the rated life of the LED module in the luminaire		P
	f) Lumen maintenance code		P
	g) Rated chromaticity co-ordinate values both initial and maintained		P
	h) Correlated Colour Temperature (CCT in K)	3000K	P
	i) Rated Colour Rendering Index (CRI)	80	P
	j) Ambient temperature (t) for a luminaire		P
	k) LED luminaire efficacy (in lm/W)	95.13lm/W	P
	l) Aging time, if different to 0 h		P
5	NOT USED		N
6	TEST CONDITIONS		P
6.1	General test conditions		P
	Test conditions for testing electrical and photometric characteristics, lumen maintenance and life are given in Annex A.		P
	All tests are measured on “n” LED luminaires of the same type. The number “n” shall be a minimum of products as given in Table 3. LED luminaires used in the endurance tests shall not be used in other tests.		P



IEC 62722-2-1			
Cl.	Requirement - Test	Result	Verdict
	Each sample luminaire shall comply with all the relevant tests except for the tests of 10.3 where one sample is required for each of the three separate tests mentioned in Table 2 and Table 3. In order to reduce the time of testing, the manufacturer or responsible vendor may submit additional luminaires or parts of luminaires provided that these are of the same materials and design as the original luminaire and that the results of the test are the same as if carried out on an identical luminaire.		P
	LED luminaires with dimming control shall be adjusted to maximum output for all tests.		N
	LED luminaires with adjustable CCT shall be adjusted/set to one fixed value as indicated by the manufacturer or responsible vendor.		N
	LED luminaires of linear geometry and variable length shall be tested at a length at which the parameters are given (e.g. performance per x cm).		N
6.2	Luminaires using LED modules where compliance with IEC 62717 has been proven (Type A)		N
	Only the tests for measurement of initial performance are to be conducted, when the LED module is operated within its temperature limit t_p .		N
	The information for luminaire design given in IEC 62717, Clause B.1, requires LED modules to be operated within their t_p temperature limit. The t_p temperature shall be measured according to the thermal test procedure defined in 12.4 of IEC 60598-1, (normal operation).		N
	For luminaires for road and street lighting and floodlights intended for outdoor use only, the reduction of the measured temperature according to 3.12.1 of IEC 60598-2-3, and 5.12.1 of IEC 60598-2-5, respectively shall not be applied for the t_p temperature of the LED module.		N



IEC 62722-2-1			
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	The ambient performance temperature t_q is measured in a draught-proof enclosure, as the air temperature, at a position near one of the perforated walls on a level with the centre of the luminaire, see item e), Clause K.1 of IEC 60598-1.		N
6.3	Luminaires using LED modules where compliance with IEC 62717 has not been proven (Type B)		P
6.3.1	General		P
	The manufacturer shall conduct testing for 25 % of rated life up to a maximum of 6 000 h.		P
6.3.2	Creation of module families to reduce test effort		N
6.3.2.1	General		N
	The provisions of 6.2.1 of IEC 62717 apply to the LED luminaire.		N
6.3.2.2	Variations within family		N
	The provisions of 6.2.2 of IEC 62717 apply to the LED luminaire.		N
6.3.2.3	Compliance testing of family members		N
	The provisions of 6.2.3 of IEC 62717 apply to the LED luminaire.		N
6.4	Performance requirements		P
	The performance criteria given in Table 2 applies for LED luminaires of Types A and B. All of the tested n LED luminaires shall have passed the performance requirements.		P
7	INPUT POWER		P
	Power shall be measured at the supply to the luminaire, see Figure 1. The provisions of Clause 7 of IEC 62717 apply to the LED luminaire. In case the power is not constant, the average of the power is measured over an appropriate time.		P
8	PHOTOMETRIC PERFORMANCE		P
8.1	Luminous flux		P



IEC 62722-2-1			
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	The provisions of 8.1 of IEC 62717 apply to the LED luminaire. In addition the provisions in Clause A.1, paragraph 2 of this document apply where a rated ambient temperature related to performance other than 25 °C is advised by the manufacturer.		P
8.2	Luminous intensity distribution, peak intensity and beam angle		P
8.2.1	General		P
	The provisions of 8.2.1 of IEC 62717 apply to the LED luminaire.		P
8.2.2	Measurement		P
	The provisions of 8.2.2 of IEC 62717 apply to the LED luminaire.		P
8.2.3	Luminous intensity distribution		P
	The provisions of 8.2.3 of IEC 62717 apply to the LED luminaire.		P
8.2.4	Peak intensity		P
	The provisions of 8.2.4 of IEC 62717 apply to the LED luminaire.		P
8.2.5	Beam angle		P
	The provisions of 8.2.5 of IEC 62717 apply to the LED luminaire.		P
8.3	Luminaire luminous efficacy		P
	LED luminaire luminous efficacy shall be calculated from the measured initial luminous flux of LED luminaire divided by the measured initial input power of the luminaire. For measurement of luminous flux see 8.1. For input power measurement, see Figure 1.		P
9	CHROMATICITY CO-ORDINATES, CORRELATED COLOUR TEMPERATURE AND COLOUR RENDERING		P
9.1	Chromaticity co-ordinates		P
	The provisions of 9.1 of IEC 62717 apply to the LED luminaire.		P
9.2	Correlated colour temperature (CCT)		P
	The provisions of 9.2 of IEC 62717 apply to the LED luminaire.		P
9.3	Colour rendering index (CRI)		P
	The provisions of 9.3 of IEC 62717 apply to the LED luminaire.		P



IEC 62722-2-1			
Cl.	Requirement - Test	Result	Verdict

	For all tested items in the sample, the measured CRI value shall not have decreased by more than: – 3 points from the rated CRI value (see Table 1) for initial CRI values; – 4 points from the rated CRI value, when tested for 6 000 h for maintained CRI values.		P
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10	LED LUMINAIRE LIFE		P
10.1	General		P
	The provisions of 10.1 of IEC 62717 apply to the LED luminaire.		P
10.2	Lumen maintenance		P
	LED luminaires using modules shown to be in conformity with IEC 62717 (see 6.2) do not have to be submitted for the test. Maintenance values declared for the module at the considered rating t_p may be declared as the maintenance values of the luminaire for the related rated t_q .		N
	Other luminaires are submitted for the test. The provisions of 10.2 of IEC 62717 apply to the LED luminaire except that the maintenance test shall be conducted at the ambient temperature in the temperature interval (rated t_q , rated $t_q - 2$). The provisions of 10.2 of IEC 62717 apply to the LED luminaire, except that the maximum rated temperature t_p of the LED module is not exceeded in the luminaire during testing as long as the interval (rated $t_p - 5$, rated t_p) is maintained.		P
	Compliance criteria		P
	The measured luminous flux value shall not be less than the luminous flux value given by the rated lumen maintenance factor related to rated median useful life.		P
	For all the tested items in a sample, the measured values shall be of the same maintenance code as the provided values. All the LED modules in a sample shall pass the test.		P
10.3	Endurance tests		P
	The provisions of 10.3 of IEC 62717 apply to the LED luminaire.		P
	Endurance test shall be performed only on a LED luminaire using a LED module not tested for compliance with IEC 62717.		N

TRF No. IEC 62722-2-1: 2014

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Add: 101-201, No.39 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China

Tel: +(86) 0755-29871520 | Fax: +(86) 0755-2987 1521 | E-mail: webmaster@lcs-cert.com | [http:// www.lcs-cert.com](http://www.lcs-cert.com)



IEC 62722-2-1			
Cl.	Requirement - Test	Result	Verdict

	For accelerated operation life test, a LED luminaire using a LED module where compliance with IEC 62717 has not been proven, shall be operated at a temperature corresponding to 10 K above maximum t_q advised by the manufacturer or responsible vendor. Separate samples shall be used for the endurance tests in 10.3.2, 10.3.3 and 10.3.4 of IEC 62717.		P
	Where in 10.3 of IEC 62717 the word module is mentioned, it shall be considered as luminaire, where appropriate.		P

11	VERIFICATION		P
	The minimum sampling size for type testing shall be as given in Table 3. The sample shall be representative of a manufacturer's production. If the LED luminaire does not change the properties of single LEDs, LED packages or LED modules, it should be allowed to reference to test data of the LED manufactures.		P
	The results of the test shall comply with the requirements given in Table 2.		P

Annex A	Method of measuring LED luminaire characteristics		P
A.1	General		P
	The provisions of Clause A.1 of IEC 62717 apply to the LED luminaire, except that the wording in the third paragraph, first sentence "in the temperature interval (t_p rated - 5, t_p rated)" does not apply to the LED luminaire.		P
	Where a rated ambient performance temperature t_q other than 25 °C is advised by the manufacturer, a correction factor will need to be established to correct the measured luminous flux value at 25 °C to the luminous flux value at the declared ambient temperature. This shall be done using relative photometry in a temperature controlled cabinet.		P
	In addition for LED luminaires the international and regional requirements shall be followed for measurement methods and provision of data but format may be optional.		P
A.2	Electrical characteristics		P

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IEC 62722-2-1			
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	The provisions of Clause A.2 of IEC 62717 apply to the LED luminaire.		P
A.3	Photometric characteristics		P
	The provisions of Clause A.3 of IEC 62717 apply to the LED luminaire.		P

ANNEX B	Explanation of recommended life time metrics		P
B.1	General		P
	Life time of LED luminaire can be far more than what practically can be verified with testing. Furthermore the decrease in light output differs per manufacturer making general prediction methods difficult. This standard has opted for lumen maintenance categories that cover the initial decrease in luminous flux until an operational time as stated in 6.1. Due to this limited test time, the claimed life of a LED luminaire cannot be confirmed nor rejected in most cases.		P
B.2	Life time specification		P
	It is recommended for LED luminaires to specify the lumen maintenance apart from the abrupt failures in a standardised way giving more insight in light output behaviour. One can distinguish 2 types of failures.		P
	Lifetime specification for gradual light output degradation		P
	Lifetime specification for abrupt light output degradation		P



IEC 62722-2-1			
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Table 1 – Product information

Ref	Parameter
a	Rated input power (in W)
b	Photometric code ¹⁾
c	Rated luminous flux (in lm)
d	Rated median useful life (h) and the associated rated lumen maintenance factor (x)
e	Rated abrupt failure value (%)
f	Lumen maintenance code ²⁾
g	Rated chromaticity co-ordinate values both initial and maintained ³⁾
h	Rated correlated colour temperature (CCT in K)
i	Rated colour rendering index (CRI)
j	Rated ambient temperature (t_q) related to performance for a luminaire ⁴⁾ (°C)
k	Rated LED luminaire luminous efficacy (in lm/W)
l	Ageing time, if different from 0 h
NOTE Regional legal requirements may apply and overrule.	
¹⁾ See Annex D of IEC 62717.	
²⁾ See Table 6 of IEC 62717.	
³⁾ See Table 5 of IEC 62717.	
⁴⁾ See 6.2.	



IEC 62722-2-1			
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Table 2 – Performance criteria for which testing is required

Clause or subclause of this standard (in brackets clause or subclause of IEC 62717)	Testing	Luminaires of type A ^{a b}	Luminaires of type B
6.2	LED module performance temperature	x	x
7	Power	x	x
8.1	Luminous flux	x	x
8.2.3	Luminous intensity distribution ^c	x	x
8.2.4	Peak intensity value(s) ^{c d}	x	x
8.2.5	Beam angle value ^{c d}	x	x
8.3	Luminous efficacy	x	x
9.1	Initial chromaticity tolerance of the light source ^e	–	x
9.1	Maintained chromaticity tolerance of the light source ^e	–	x
9.2	Initial correlated colour temperature of the light source ^e	–	x
9.3	CRI initial ^e	–	x
9.3	CRI maintained ^e	–	x
10.2	Lumen maintenance	–	x
10.3 (10.3.2)	Temperature cycling, energised	–	x
10.3 (10.3.3)	Supply voltage switching	–	x
10.3 (10.3.4)	Accelerated operation life test	–	x
(x = required, – = not required)			
The required testing for each type of luminaire is indicated by an "x".			
^a Where the LED manufacturers provide data according to IEC 62717, the tests on the luminaire may be carried out according to the column for Type A luminaires. ^b Testing requirements for Type A LED luminaires will depend on the requirements of IEC 62717. It is not the intention to re-measure the values of a product complying with its own standard. However where luminaires combine different LED modules in one luminaire, or where secondary optics are added in the luminaire, certain parameters may be required to be measured, e.g. if there is a mixing of colours, the final CRI and CCT need to be measured in the luminaire.			



IEC 62722-2-1			
Cl.	Requirement - Test	Result	Verdict

Table 3 – Sample sizes

Clause or subclause of this standard (in brackets clause or subclause of IEC 62717)	Test	No reliability data of components available Minimum sample size (units) for testing at 25 % of life time (6 000 h max.)	LED modules where compliance with IEC 62717 has been proven Minimum sample size (units) for testing (0 h)
6.3	LED module performance temperature	Same 5 samples for all tests	1
7	Power		1
8.1	Luminous flux		1
8.2.3	Luminous intensity distribution		1
8.2.4	Intensity value		1
8.2.5	Beam angle value		1
8.3	Luminaire luminous efficacy		1
9.1	Initial chromaticity tolerance		-
9.1	Maintained chromaticity tolerance		-
9.2	Initial correlated colour temperature		-
9.3	CRI initial		-
9.3	CRI maintained		-
10.2	Lumen maintenance		-
10.3 (10.3.2)	Temperature cycling, energised	5	-
10.3 (10.3.3)	Supply voltage switching	5	-
10.3 (10.3.4)	Accelerated operation life test	5	-



IEC 62722-2-1			
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Lamp Wattage (W)					
Model:	DRIWOD-11W (3000K)	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
--	11.1	11.09	11.21	11.3	11.15
Average	11.17 W				
Note	1、 The initial power consumed by each individual LED module in the measured sample shall not exceed the rated power by more than 10 %.				

Luminous Flux (lm)					
Model:	DRIWOD-11W (3000K)	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
--	1066.33	1061.89	1067.13	1071.37	1064.74
Average	1066.29 lm				
Note	1、 The initial luminous flux of each individual LED module in the measured sample shall not be less than 90 % of the rated lumen output.				

Peak intensity (cd)					
Model:	DRIWOD-11W (3000K)	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
--	535.4	532.4	528.4	533.4	537.4
Average	533.4				
Note	Where a peak intensity value is provided by the manufacturer or responsible vendor, the initial peak intensity of each individual LED module in the measured sample shall not be less than 75 % of the rated intensity.				

Beam angle (°)					
Model:	DRIWOD-11W (3000K)	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
--	85.4	85.1	84.8	85	85.2
Average	85.1°				
Note	Where a beam angle value is provided by the manufacturer or responsible vendor, the beam angle value of each individual LED module in the measured sample shall not deviate by more than 25 % of the rated value.				

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IEC 62722-2-1			
Cl.	Requirement - Test	Result	Verdict

Efficacy (lm/W)					
Model:	DRIWOD-11W (3000K)	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
--	96.07	95.75	95.19	94.81	95.49
Average	95.46 lm/W				
Note	For all tested items in a sample, the LED module efficacy shall not be less than 90 % of the rated LED module efficacy as declared by the manufacturer of responsible vendor.				

Correlated Color Temperature (K)、chromaticity					
Model:	DRIWOD-11W (3000K)	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
CCT	3097	3096	3092	3097	3101
X	0.4294	0.4298	0.4292	0.4294	0.4302
Y	0.3998	0.3997	0.3996	0.3998	0.3997

Colour rendering(Ra) for lamp					
Model:	DRIWOD-11W (3000K)	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
The initial CRI	85.8	85.6	85.7	85.6	85.8
6000 hours of CRI	84.9	84.7	84.8	84.7	84.9
Average	85.7				
6000 hours of Average CRI	84.8				
	For all tested units in a sample the measured CRI values shall not decrease by more than: - 3 points from the rated CRI value (see Table 1) for initial CRI values, and - 5 points from the rated CRI value (see Table 1) for maintained CRI values.				

Lumen maintenance (%)					
Model:	DRIWOD-11W (3000K)	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
Luminous Flux at 6 000 h	1018.77	1006.14	1016.23	1014.16	1014.06
Lumen Maintenance	95.54%	94.75%	95.23%	94.66%	95.24%

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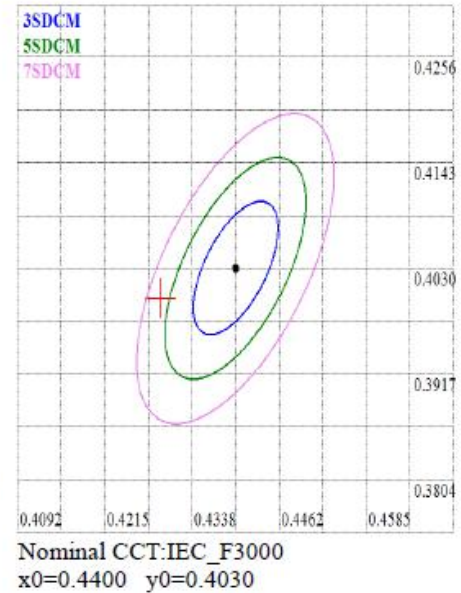
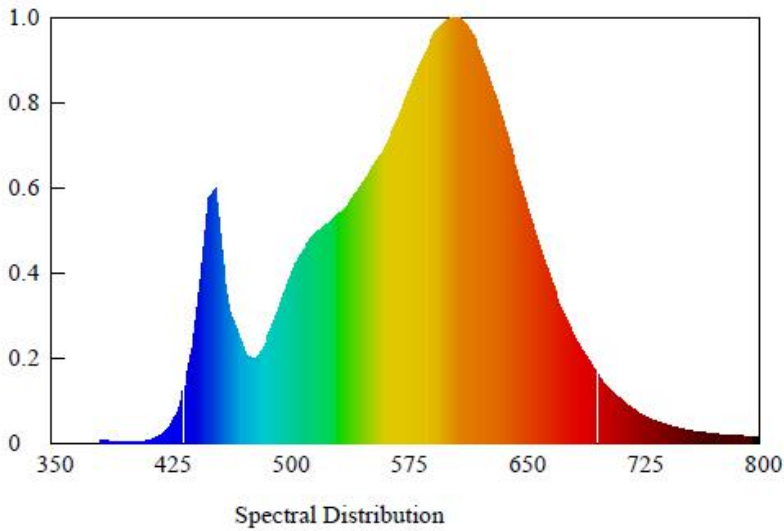
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Spectroradiometric Parameter

Spectroradiometric Parameters



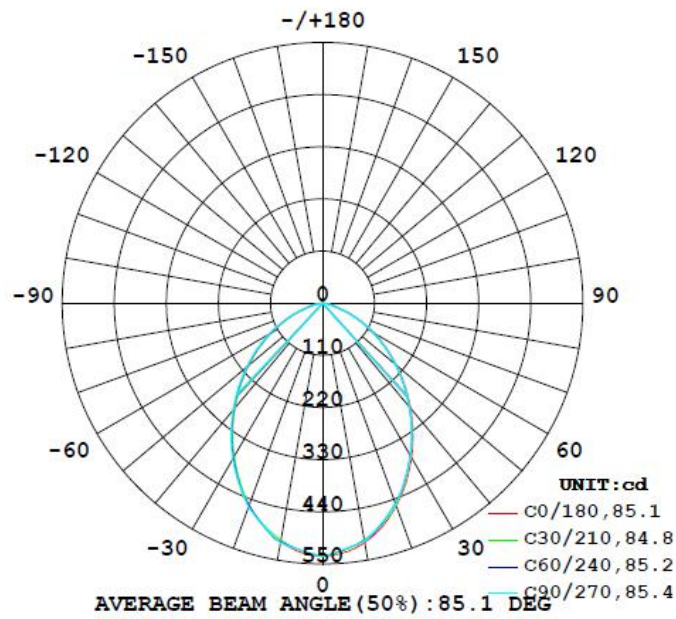
Chromaticity Coordinates: $x=0.4294$ $y=0.3998$ $u'=0.2475$ $v'=0.5186$
 Correlated Color Temperature: 3097 K Dominant Wavelength: 581.0 nm(E)
 Colour Fidelity Index: $R_f=85$ Gamut Index: $R_g=96$
 Luminous Flux: 1066.33 lm Purity: 0.4910
 Chromaticity Difference: -0.00061Duv Peak Wavelength: 610.0 nm
 Color Ratio: $K_r=44.2\%$ $K_g=47.7\%$ $K_b=8.1\%$ Color Tolerance(SDCM): 5.8
 Bandwidth: 136.1nm Radiant Flux: 4.632 W
 Rendering Index: $R_a=85.7$
 $R_1=85$ $R_2=93$ $R_3=97$ $R_4=85$ $R_5=85$ $R_6=92$ $R_7=85$ $R_8=64$
 $R_9=19$ $R_{10}=85$ $R_{11}=86$ $R_{12}=75$ $R_{13}=88$ $R_{14}=99$ $R_{15}=78$ $R_e=81$



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ATTACHMENT 1(S)

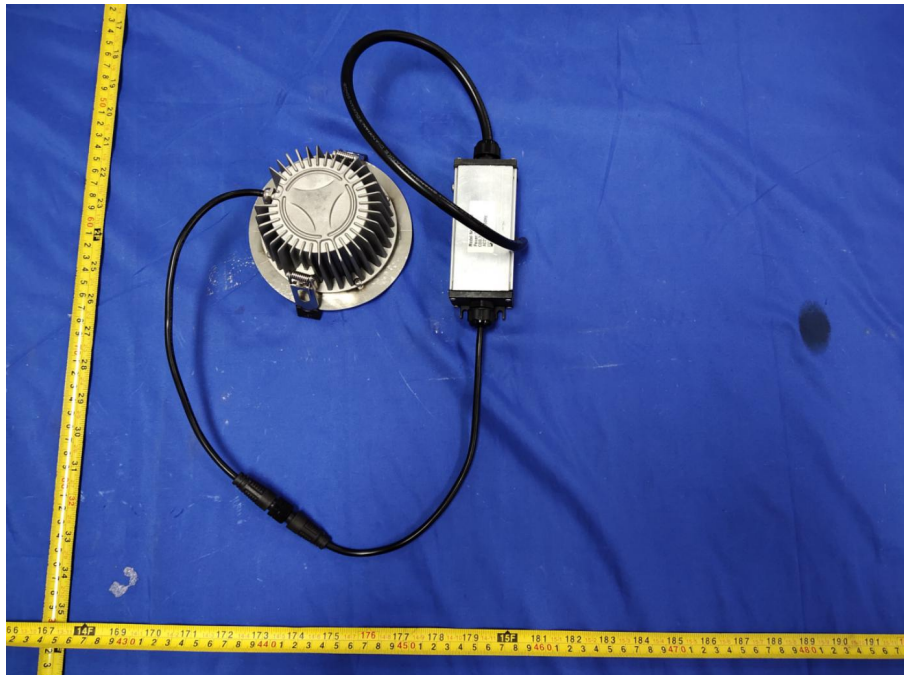
LUMINOUS INTENSITY DISTRIBUTION DIAGRAM for DRIWOD-11W (3000K)



IEC 62722-2-1			
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ATTACHMENT 2(S)

Photos of DRIWOD-11W (3000K)



----- End of test report-----