NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

DONGGUAN THAILIGHT SEMICONDCTOR LIGHTING CO.,LTD

(Brand Name: THAILIGHT)

Sanhui Ind. Area, Cunwei, Hengli, Dongguan, China.

High-bay Luminaires for Commercial and Industrial Buildings

Model name(s): TLHBE150XYYZZ

Remark: The letter ”X” in the model name stands for CCT as bellow : 4=4000K, 5=5000K; “YY” stands for mounting option as bellow : YK= Yoke, PD=Knuckle ; “ZZ” stands for housing color as bellow : BK=Black, WH=White.

Representative (Tested) Model: TLHBE1504YKBK
TLHBE1505YKBK

Model Different: All construction and rating are the same, except CCT

Test & Report By:

Johnson Sun

Engineer: Johnson Sun

Update: Sep.14, 2016

Review By:

Tommy Liang

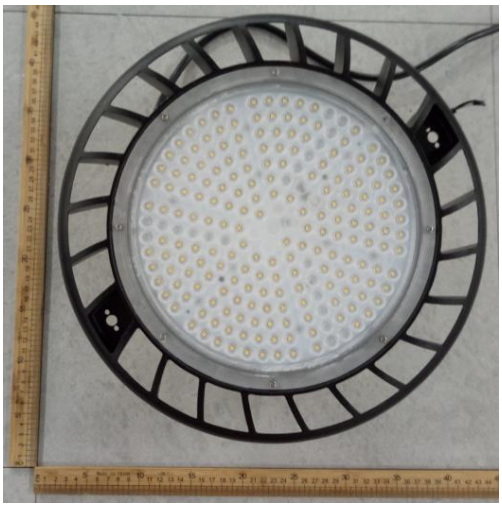
Manager: Tommy Liang

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

1.1 Product Information:

Organization Name	DONGGUAN THAILIGHT SEMICONDCTOR LIGHTING CO.,LTD	
Brand Name	THAILIGHT	
Model Number	TLHBE150XYYZZ	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	High-bay Luminaires for Commercial and Industrial Buildings	
Rated Voltage / Frequency	120 -277Vac, 50/60 Hz	
Nominal Power	150W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,5000K	
LED Manufacturer	Philips Lumileds	
LED Model	LUXEON 3030 2D	
Sample Number	GZE160886-I1(4000K);I2(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	: Sep.08,2016
Date of Test	: Sep.10,2016
Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25 °C ±1 °C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1 °vertical intervals and 22.5 °horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 ºC ±1 ºC. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25 ºC ±1 ºC. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-09-10	Test Ambient:	25.2 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	TLHBE1504YKBK		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160886-I1	120.0	60	1.252	148.3	0.9874	8.68
	277.0	60	0.5798	146.0	0.9090	19.16
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method :

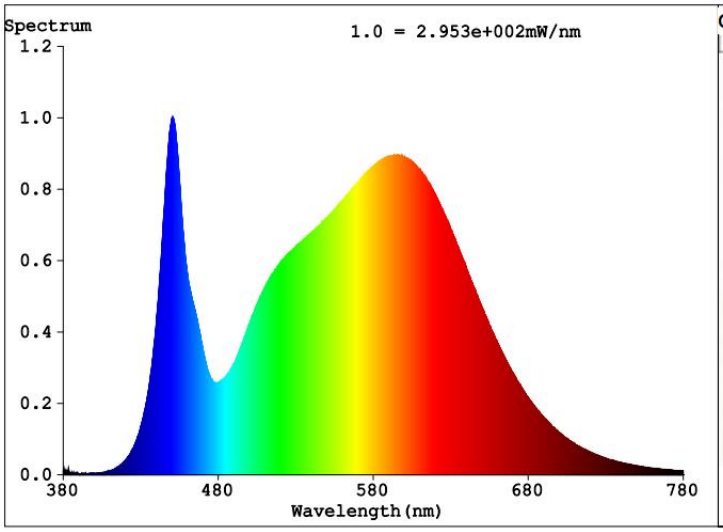
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3960
Duv	0.0005
Chromaticity (x, y)	x=0.3826 y=0.3793
Chromaticity (u', v')	u'=0.2255 v'=0.5030
Color Rendering Index (CRI)	83.3
R9	11

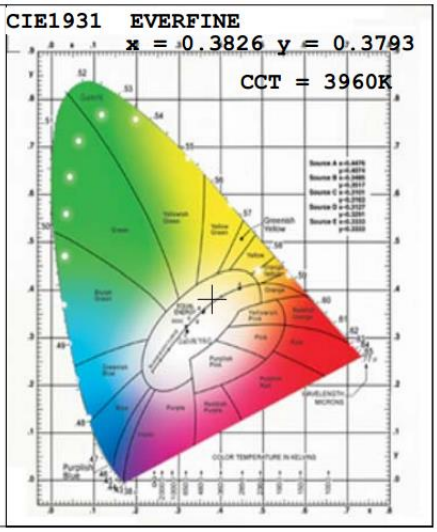
Special Color Rendering Indices			
R1	82	R9	11
R2	89	R10	74
R3	95	R11	81
R4	82	R12	62
R5	82	R13	84
R6	85	R14	97
R7	86	R15	76
R8	65	--	--

Photometric Measurement – Goniophotometer Method :

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	19283	19083	>=10000 (-10%)	
Luminous Efficacy (lm/W)	130.03	130.71	Standard: >= 105(-3%)	Premium: >= 130(-3%)
Zonal lumens in the 20-50 °zone (%)	55.6	--	>=30(-10)	
Beam Angle ( )	90.1	--	--	
Center Beam Candle Power (cd)	9429	--	--	

Spectral Power Distribution & Chromaticity Diagram

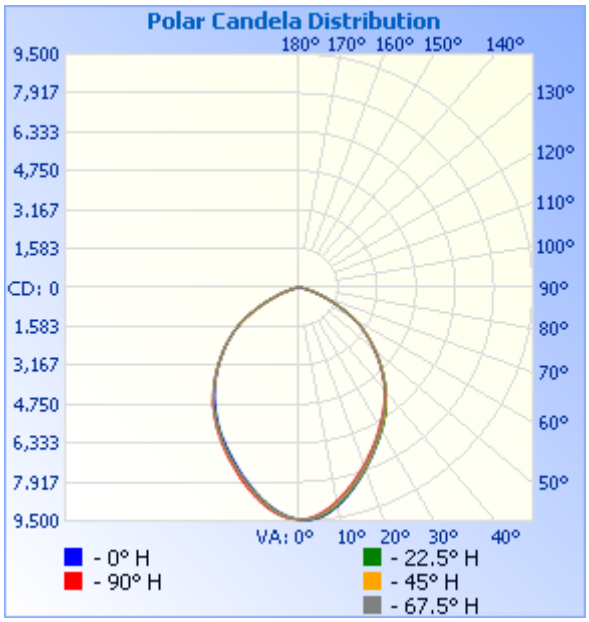


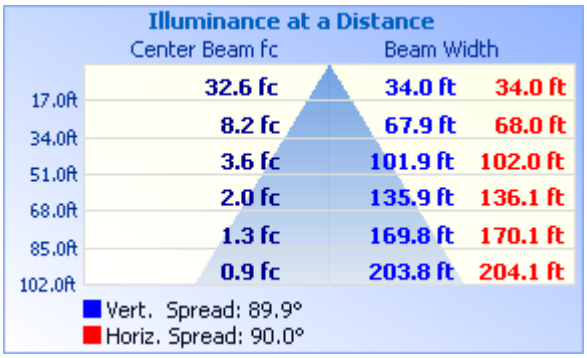


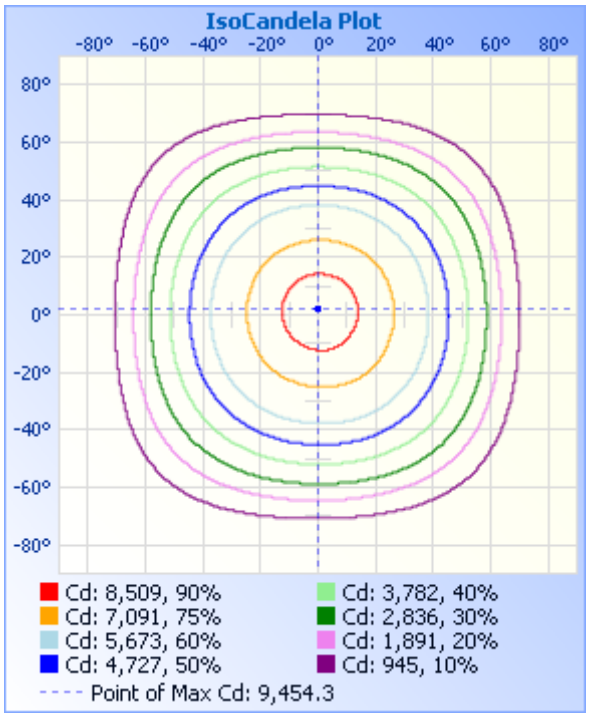
Zonal Lumen Tabulation

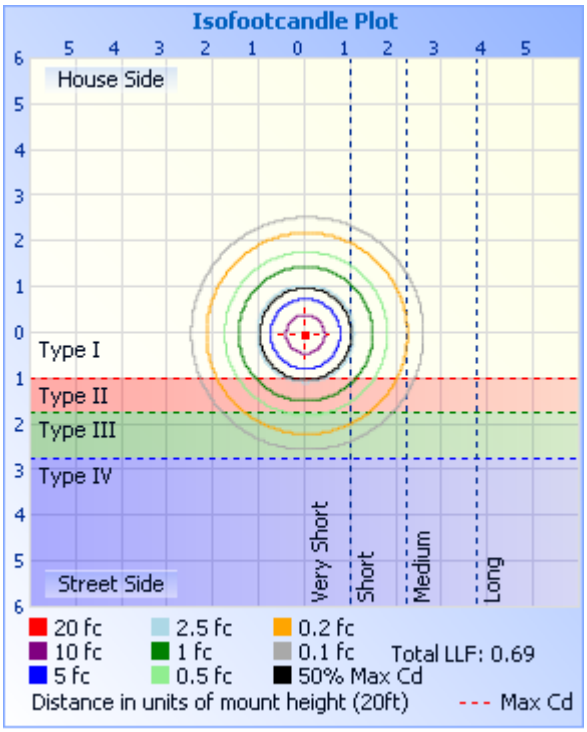
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	6,509.2	33.8%
0-40	10,279.2	53.3%
0-60	16,900.5	87.7%
60-90	2,379.7	12.3%
70-100	658.0	3.4%
90-120	0	0%
0-90	19,280.3	100%
90-180	0	0%
0-180	19,280.3	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	871.7	4.5%	90-100	0	0%
10-20	2,336.3	12.1%	100-110	0	0%
20-30	3,301.2	17.1%	110-120	0	0%
30-40	3,770.0	19.6%	120-130	0	0%
40-50	3,644.7	18.9%	130-140	0	0%
50-60	2,976.6	15.4%	140-150	0	0%
60-70	1,721.8	8.9%	150-160	0	0%
70-80	571.7	3.0%	160-170	0	0%
80-90	86.2	0.4%	170-180	0	0%


Polar Candela Distribution
180° 170° 160° 150° 140°
9,500
7,917
6,333
4,750
3,167
1,583
CD: 0
1,583
3,167
4,750
6,333
7,917
9,500
130°
120°
110°
100°
90°
80°
70°
60°
50°
VA: 0° 10° 20° 30° 40°
- 0° H
- 90° H
- 22.5° H
- 45° H
- 67.5° H


Illuminance at a Distance
Center Beam fc
Beam Width
17.0ft 32.6 fc 34.0 ft 34.0 ft
34.0ft 8.2 fc 67.9 ft 68.0 ft
51.0ft 3.6 fc 101.9 ft 102.0 ft
68.0ft 2.0 fc 135.9 ft 136.1 ft
85.0ft 1.3 fc 169.8 ft 170.1 ft
102.0ft 0.9 fc 203.8 ft 204.1 ft
Vert. Spread: 89.9°
Horiz. Spread: 90.0°


IsoCandela Plot
-80° -60° -40° -20° 0° 20° 40° 60° 80°
80°
60°
40°
20°
0°
-20°
-40°
-60°
-80°
Cd: 8,509, 90%
Cd: 7,091, 75%
Cd: 5,673, 60%
Cd: 4,727, 50%
Cd: 3,782, 40%
Cd: 2,836, 30%
Cd: 1,891, 20%
Cd: 945, 10%
Point of Max Cd: 9,454.3


Isofootcandle Plot
5 4 3 2 1 0 1 2 3 4 5
House Side
Type I
Type II
Type III
Type IV
Very Short
Short
Medium
Long
Street Side
20 fc
10 fc
5 fc
2.5 fc
1 fc
0.5 fc
0.2 fc
0.1 fc
50% Max Cd
Total LLF: 0.69
Distance in units of mount height (20ft)
Max Cd

C (DEG) / γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	9429	9429	9429	9429	9429	9429	9429	9429	9429	9429	9429	9429	9429	9429	9429	9429
5	9287	9332	9386	9382	9396	9372	9322	9298	9252	9209	9178	9158	9174	9200	9217	9250
10	8880	8951	9028	9015	9028	8992	8931	8879	8812	8759	8701	8689	8716	8747	8779	8812
15	8348	8399	8466	8463	8476	8442	8389	8331	8263	8197	8164	8140	8167	8208	8240	8256
20	7775	7812	7859	7857	7862	7847	7808	7729	7683	7606	7589	7588	7597	7653	7685	7697
25	7222	7251	7281	7276	7270	7248	7217	7158	7115	7051	7027	7031	7059	7115	7160	7159
30	6658	6686	6717	6709	6693	6703	6657	6597	6537	6507	6487	6499	6527	6568	6596	6616
35	6065	6086	6121	6132	6117	6127	6090	6020	5989	5936	5929	5926	5945	6004	6035	6046
40	5410	5432	5452	5472	5476	5495	5478	5437	5406	5362	5335	5339	5339	5386	5383	5398
45	4727	4746	4760	4764	4765	4782	4780	4749	4738	4692	4670	4671	4683	4712	4711	4706
50	4041	4045	4053	4056	4056	4071	4068	4049	4030	4006	3982	3996	3999	4024	4032	4035
55	3341	3350	3343	3350	3343	3355	3367	3350	3342	3320	3296	3309	3320	3334	3356	3350
60	2529	2542	2556	2586	2614	2638	2657	2644	2636	2632	2602	2602	2590	2590	2578	2542
65	1617	1619	1646	1661	1698	1747	1790	1806	1815	1806	1784	1762	1739	1715	1675	1624
70	904	907	928	957	977	1009	1047	1072	1071	1060	1045	1028	1011	981	946	909
75	462	467	474	499	505	521	544	554	551	547	537	530	514	495	483	461
80	213	217	216	231	229	234	249	245	242	240	232	231	219	214	218	206
85	67.5	70.7	66.4	66.0	62.7	65.5	74.0	70.8	68.0	65.1	58.7	51.5	46.5	49.3	59.6	61.4
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BUG Rating: B4-U0-G1

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	3290.8	17.1
FM - Front-Medium(30-60)	5232	27.1
FH - Front-High(60-80)	1135.6	5.9
FVH - Front-Very High(80-90)	44.961	0.2
Total Forward Light	9703.3	50.3

BL - Back-Low(0-30)	3218.9	16.7
BM - Back-Medium(30-60)	5161.5	26.8
BH - Back-High(60-80)	1158	6.0
BVH - Back-Very High(80-90)	41.256	0.2
Total Back Light	9579.7	49.7

UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B4-U0-G1

Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	9579.7	0	9579.7
Street Side	9703.3	0	9703.3

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-09-10	Test Ambient:	25.2 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	TLHBE1505YKBK		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160886-I2	120.0	60	1.239	146.7	0.9871	8.75
	277.0	60	0.5737	144.4	0.9086	19.23
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method :

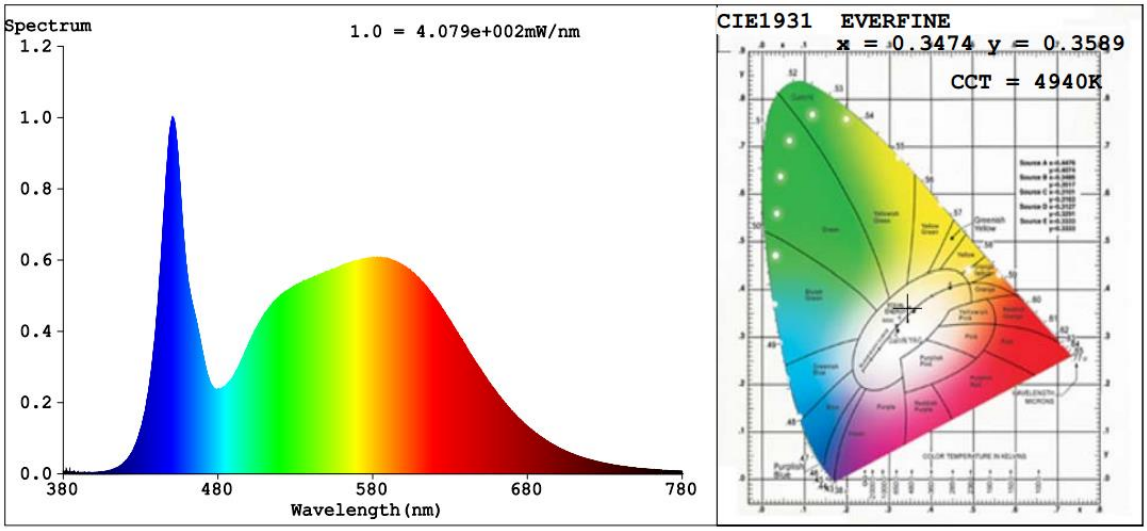
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	4940
Duv	0.0027
Chromaticity (x, y)	x=0.3474 y=0.3589
Chromaticity (u', v')	u'=0.2101 v'=0.4885
Color Rendering Index (CRI)	83.0
R9	10

Special Color Rendering Indices			
R1	81	R9	10
R2	88	R10	71
R3	93	R11	81
R4	82	R12	56
R5	81	R13	83
R6	83	R14	96
R7	88	R15	76
R8	68	--	--

Photometric Measurement – Sphere-Spectroradiometer Method :

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	20879	20662	>=10000 (-10%)	
Luminous Efficacy (lm/W)	142.32	143.09	Standard: >= 105(-3%)	Premium: >= 130(-3%)

Spectral Power Distribution & Chromaticity Diagram



3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

******** END OF REPORT ********