



Shenzhen Belling Efficiency Testing Lab



Report No.:BL170713115-9

Date of issue 2017-07-17

Version 1.0

Total pages 14

Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Applicant:

IKIO LED LIGHTING

Address:

8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250

For Product:

Outdoor Pole/Arm-Mounted Area and Roadway Luminaires

Model No.:

IK-SBSL-L120-0200-DN-30-MLV2-XXNX / IK-SBSL-L120-0200-DN-57-MLV2-XXNX

Test laboratory: Shenzhen Belling Efficiency Testing Lab., 1/F., Building 1, 1F, No.1 building, Meibaohe industrial park, Dalang street, Shenzhen, Guangdong Prov.518101, China.

Complied by: Zac Kuang

Review by: Jason Zhou

Project Engineer

Technical Manager

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Shenzhen Belling Efficiency Testing Lab. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



1 General

1.1 Product Information

Manufacturer	IKIO LED LIGHTING
Manufacturer Address	8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250
Brand Name	IKIO
Luminaire Type	Outdoor Pole/Arm-Mounted Area and Roadway Luminaires
Model Number	IK-SBSL-L120-0200-DN-30-MLV2-XXNX / IK-SBSL-L120-0200-DN-57-MLV2-XXNX
Rated Inputs	AC 100-277V 50/60Hz
Rated Power	200 W
Nominal CCT	3000K / 5700K
Date of Receipt Samples	2017-06-19

1.2 Standards or methods

- ANSI C78.377-2015: Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits-Related Power Quality Requirements for Lighting Equipment
- CIE Publication No.13.3-1995: Method of Measuring and Specifying Color Rendering of Light Sources
- IESNA LM-79-08 Approved Method: Electric & Photometric Measurement of Solid-state Lighting Products



1.3 Equipment list

Device	Manufacture	Model No.	Serial No.	Calibration due date
Goniophotometric System	SENSING	GMS-3000	N.A	2017-09-21
AC Power Source	ALL POWER	APW-110N	992257	2017-08-27
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S13100234	2017-09-15
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2017-08-29
Integral Sphere	SENSING	SPR-600M	N.A	2017-08-27
Digital Power Meter	YOKOGAWA	WT210	91L929742	2017-08-29
Optical Color and Electrical Measurement System	SENSING	SPR-3000	N.A	2017-08-27
Temperature/humidity/clock	VICTOR	VC230	57636	2017-09-13
Digital Anemometer	TECMAN	TD8901	026141	2017-09-13

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab attests that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).



2 Test conducted and method

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within ± 0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards. 4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

2.5 Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report. The method according to IESNA LM-79-08 following chapter.



3 Test Result Summary

3.1 Integrating Sphere System

3.1.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
IK-SBSL-L120-0200-DN-30-MLV2-XXNX	120.02	60	1.723	206.31	0.997
IK-SBSL-L120-0200-DN-57-MLV2-XXNX	119.99	60	1.747	209.10	0.997

3.1.2 Additional Test

Test Item	Model	Test Voltage (V)	Frequency (Hz)	Test Result
Power factor	IK-SBSL-L120-0200-DN-30-MLV2-XXNX	120	60	0.997
		277	60	0.933
	IK-SBSL-L120-0200-DN-57-MLV2-XXNX	120	60	0.997
		277	60	0.939
Total harmonic distortion	IK-SBSL-L120-0200-DN-30-MLV2-XXNX	120	60	10.5%
		277	60	15.1%
	IK-SBSL-L120-0200-DN-57-MLV2-XXNX	120	60	11.3%
		277	60	15.8%
Off state power (W)	IK-SBSL-L120-0200-DN-30-MLV2-XXNX	120	60	0
	IK-SBSL-L120-0200-DN-30-MLV2-XXNX	277	60	0

3.1.3 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
IK-SBSL-L120-0200-DN-30-MLV2-XXNX	23430.627	113.570	2968	83.2	13
IK-SBSL-L120-0200-DN-57-MLV2-XXNX	24571.132	117.509	5586	84.7	17

3.1.4 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-SBSL-L120-0200-DN-30-MLV2-XXNX	0.0005	0.4399	0.4063	0.2515	0.5227
IK-SBSL-L120-0200-DN-57-MLV2-XXNX	0.0020	0.3305	0.3432	0.2047	0.4783



3.2 Goniophotometer System

3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
IK-SBSL-L120-0200-DN-30-MLV2-XXNX	120.09	60	1.6982	203.37	0.9973

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-90°(%lm)	Zonal Lumen in 80-90°(%lm)
23136.28	113.76	99.832	0.693



4 Test Data

IK-SBSL-L120-0200-DN-30-MLV2-XXNX

Test Condition

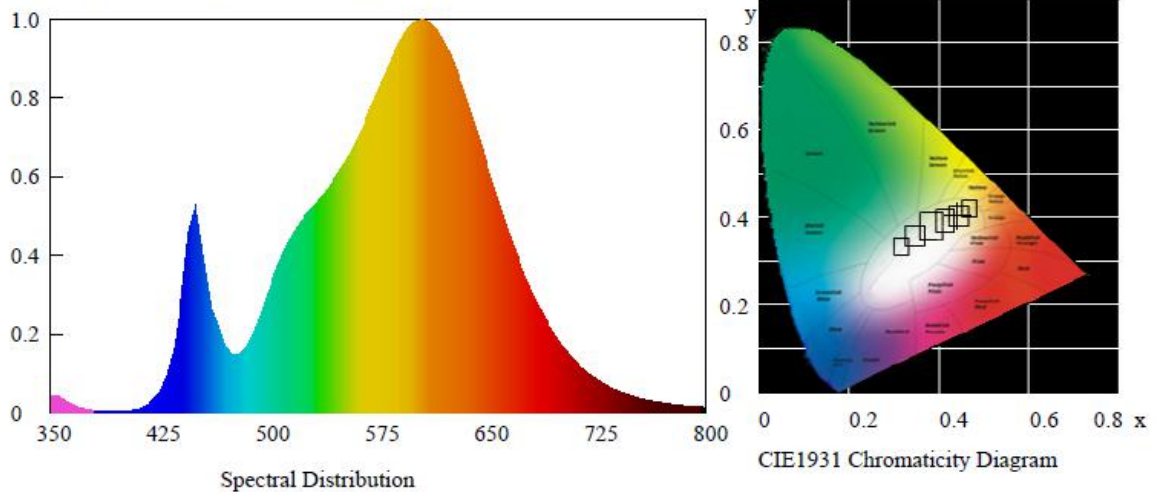
Temperature: 25°C

Spectrum Range: 350-800 nm

RH: 58%

Scan Step: 5 nm

Spectroradiometric Parameters



Chromaticity Coordinates: $x=0.4399$ $y=0.4063$ $u'=0.2515$ $v'=0.5227$

Correlated Color Temperature: 2968 K

Dominant Wavelength: 581.0 nm(E)

Luminous Flux: 23430.627 lm

Purity: 0.5429

Chromaticity Difference: 0.0005Duv

Peak Wavelength: 321.4 nm

Color Ratio: $K_r=44.8\%$ $K_g=48.2\%$ $K_b=7.0\%$

Bandwidth: 0nm

Radiant Flux: 78.313 W

Rendering Index: $R_a=83.2$

$R_1=82$ $R_2=90$ $R_3=97$ $R_4=82$ $R_5=81$ $R_6=87$ $R_7=85$ $R_8=62$

$R_9=13$ $R_{10}=77$ $R_{11}=82$ $R_{12}=70$ $R_{13}=84$ $R_{14}=98$ $R_{15}=75$

Electric Parameters

Voltage: 120.02 V

Current: 1.723 A

Power Factor: 0.997

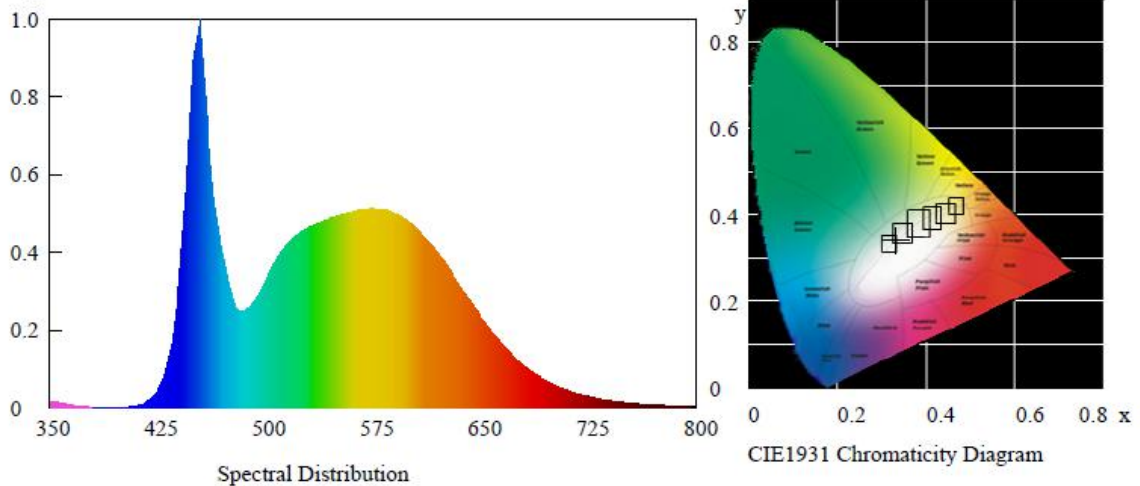
Power: 206.31 W

Luminous Efficacy: 113.57 lm/W

**IK-SBSL-L120-0200-DN-57-MLV2-XXNX****Test Condition**

Temperature: 25°C
Spectrum Range: 350-800 nm

RH: 58%
Scan Step: 5 nm

Spectroradiometric Parameters

Chromaticity Coordinates: $x=0.3305$ $y=0.3432$ $u'=0.2047$ $v'=0.4783$

Correlated Color Temperature: 5586 K

Dominant Wavelength: 537.0 nm(E)

Luminous Flux: 24571.132 lm

Purity: 0.0226

Chromaticity Difference: 0.0020Duv

Peak Wavelength: 447.9 nm

Color Ratio: $K_r=32.5\%$ $K_g=55.4\%$ $K_b=12.2\%$

Bandwidth: -444.5nm

Radiant Flux: 84.027 W

Rendering Index: $R_a=84.7$

$R_1=84$ $R_2=91$ $R_3=93$ $R_4=83$ $R_5=83$ $R_6=85$ $R_7=88$ $R_8=71$

$R_9=17$ $R_{10}=76$ $R_{11}=82$ $R_{12}=59$ $R_{13}=86$ $R_{14}=96$ $R_{15}=80$

Electric Parameters

Voltage: 119.99 V

Current: 1.747 A

Power Factor: 0.997

Power: 209.1 W

Luminous Efficacy: 117.509 lm/W

**Zonal Flux Diagram**

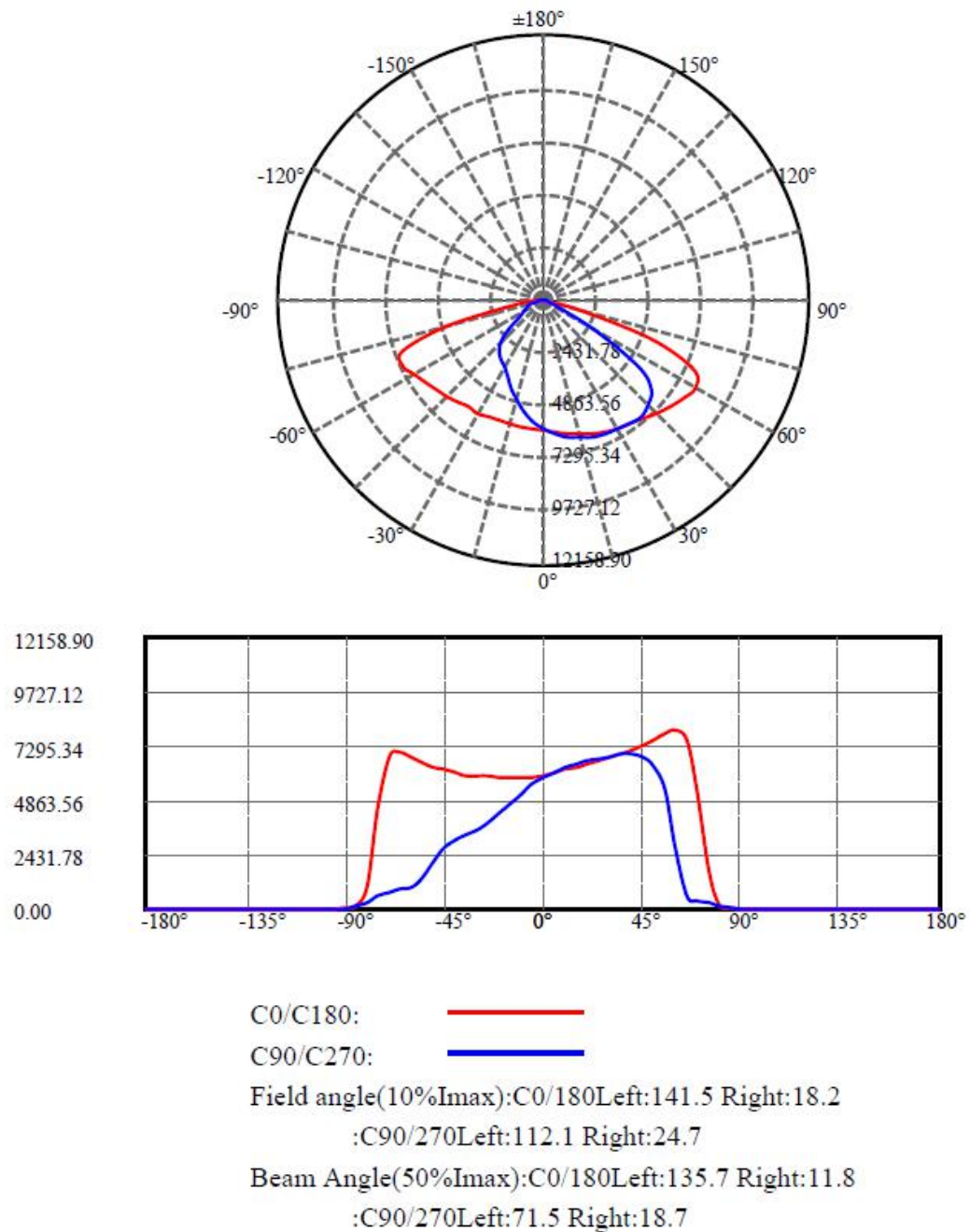
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	5885.935	.000	.000	.000%	.000%
5.0	5877.646	140.630	140.630	.608%	.608%
10.0	5857.015	419.786	560.416	1.814%	2.422%
15.0	5826.449	693.055	1253.471	2.996%	5.418%
20.0	5794.608	957.738	2211.209	4.140%	9.557%
25.0	5760.103	1211.876	3423.085	5.238%	14.795%
30.0	5744.055	1455.861	4878.946	6.293%	21.088%
35.0	5776.795	1696.526	6575.472	7.333%	28.421%
40.0	5831.082	1936.687	8512.159	8.371%	36.791%
45.0	5843.489	2161.641	10673.800	9.343%	46.134%
50.0	5783.103	2349.323	13023.120	10.154%	56.289%
55.0	5549.830	2464.157	15487.280	10.651%	66.939%
60.0	4898.280	2415.051	17902.330	10.438%	77.378%
65.0	3926.852	2145.406	20047.740	9.273%	86.651%
70.0	2509.089	1629.622	21677.360	7.044%	93.694%
75.0	973.666	910.336	22587.700	3.935%	97.629%
80.0	331.870	349.325	22937.020	1.510%	99.139%
85.0	120.761	122.991	23060.010	.532%	99.670%
90.0	15.715	37.368	23097.380	.162%	99.832%
95.0	3.153	5.166	23102.540	.022%	99.854%
100.0	3.243	1.738	23104.280	.008%	99.862%
105.0	3.797	1.884	23106.160	.008%	99.870%
110.0	4.530	2.177	23108.340	.009%	99.879%
115.0	5.341	2.499	23110.840	.011%	99.890%
120.0	6.088	2.778	23113.620	.012%	99.902%
125.0	6.770	2.972	23116.590	.013%	99.915%
130.0	7.207	3.039	23119.630	.013%	99.928%
135.0	7.413	2.954	23122.590	.013%	99.941%
140.0	7.490	2.760	23125.350	.012%	99.953%
145.0	7.555	2.510	23127.860	.011%	99.964%
150.0	7.581	2.229	23130.080	.010%	99.973%
155.0	7.568	1.917	23132.000	.008%	99.982%
160.0	7.349	1.564	23133.570	.007%	99.988%
165.0	7.143	1.194	23134.760	.005%	99.993%
170.0	7.014	.840	23135.600	.004%	99.997%
175.0	6.950	.500	23136.100	.002%	99.999%
180.0	7.078	.168	23136.270	.001%	100.000%



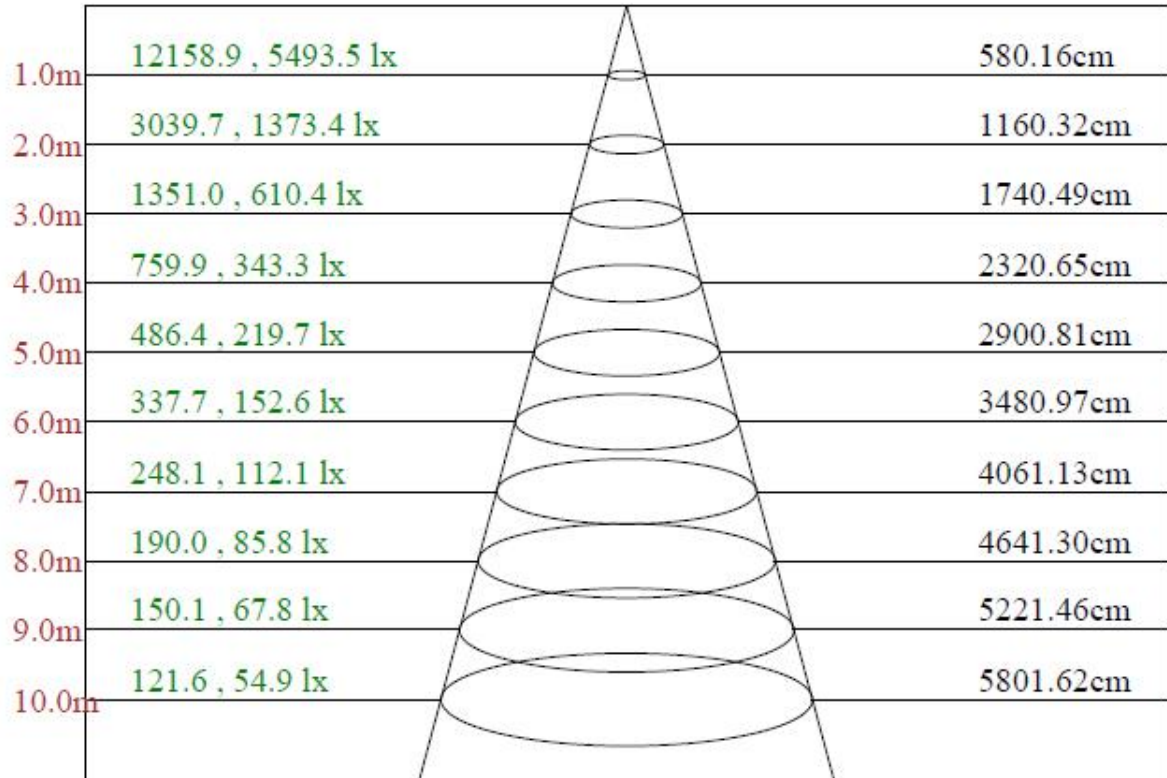
Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





Lux distance Curve



Max , Ave

Beam angle of C157.5plane140.17

diagram

**Luminous Intensity Distribution Data**

C/γ(°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	5980.61	6099.01	6249.95	6373.71	6508.59	6632.35	6779.79	6941.65	7118.33
22.5	5965.99	6197.24	6419.22	6666.95	6894.49	7138.30	7382.32	7708.09	8165.03
45.0	5944.16	6204.45	6475.65	6677.86	6943.50	7163.84	7413.21	7700.88	8035.71
67.5	5915.13	6204.45	6433.84	6632.35	6790.71	6952.56	7112.77	7283.89	7400.44
90.0	5889.59	6120.84	6337.47	6526.71	6652.33	6723.37	6774.23	6916.32	6941.65
112.5	5865.91	6099.01	6269.93	6426.64	6541.34	6665.09	6794.21	6952.56	7078.18
135.0	5771.18	5965.99	6118.99	6301.02	6451.96	6615.88	6812.54	7107.42	7347.73
157.5	5754.92	5820.40	5936.95	6089.75	6235.54	6386.48	6568.52	6801.62	7198.43
180.0	5980.61	5893.30	5896.80	5884.03	5891.44	5935.10	5976.90	6000.58	6111.58
202.5	5965.99	5753.06	5591.00	5447.27	5321.66	5179.57	5037.69	4904.66	4777.40
225.0	5944.16	5631.16	5339.78	5046.75	4757.22	4493.44	4253.12	4020.02	3839.84
247.5	5915.13	5563.82	5176.07	4788.32	4402.42	4030.93	3707.02	3472.06	3275.61
270.0	5889.59	5591.00	5146.83	4686.38	4276.81	3881.64	3530.34	3326.47	3073.39
292.5	5865.91	5580.09	5237.85	4862.86	4493.44	4127.51	3803.39	3570.49	3390.31
315.0	5771.18	5614.68	5414.53	5188.84	4955.73	4710.07	4487.88	4303.99	4154.69
337.5	5754.92	5703.85	5667.40	5623.74	5596.56	5525.52	5470.95	5418.03	5388.99
360.0	5980.61	6099.01	6249.95	6373.71	6508.59	6632.35	6779.79	6941.65	7118.33

C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	7311.28	7535.12	7828.35	8022.95	7584.33	5297.98	1737.37	256.17	99.46
22.5	8623.83	9348.27	10323.92	11530.84	12044.20	9087.98	1969.86	322.68	112.02
45.0	8387.02	8809.37	9016.94	8397.93	5654.84	1055.35	317.94	198.30	72.28
67.5	7395.09	7112.77	6299.17	3593.35	1039.91	387.13	282.73	176.89	95.55
90.0	6819.74	6437.55	5359.75	2784.90	566.70	374.37	272.02	157.12	67.75
112.5	7123.68	6872.66	6051.65	3598.08	877.64	377.25	272.85	168.45	79.69
135.0	7684.41	8088.64	8354.28	7728.07	5217.87	841.81	301.06	177.30	60.34
157.5	7507.94	8190.57	9277.22	10868.18	12158.90	9266.31	1958.53	328.86	89.16
180.0	6248.10	6333.77	6559.46	6779.79	7058.20	6825.30	4486.02	1071.00	163.91
202.5	4640.88	4528.03	4344.14	3943.62	2955.19	1498.91	552.08	292.00	141.26
225.0	3657.80	3379.39	2780.37	1793.79	969.07	663.28	512.75	330.30	109.96
247.5	2973.32	2396.32	1606.20	994.61	815.66	727.94	553.31	361.39	153.21
270.0	2702.12	2108.65	1345.91	1005.52	890.82	774.06	585.23	330.09	156.50
292.5	3080.81	2469.22	1646.35	1032.91	858.90	764.38	594.29	394.75	182.24
315.0	4041.85	3712.37	2984.23	1868.34	1031.05	733.70	580.29	389.81	160.00
337.5	5297.98	5206.96	5019.36	4429.60	3106.34	1469.67	602.32	354.81	188.83
360.0	7311.28	7535.12	7828.35	8022.95	7584.33	5297.98	1737.37	256.17	99.46

C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	2.88	3.09	2.88	3.71	4.12	4.53	5.35	5.97	6.18
22.5	3.71	3.50	2.68	2.68	3.09	3.71	4.12	4.74	4.94
45.0	3.91	2.68	2.27	2.06	2.27	2.88	3.30	3.71	4.12
67.5	3.30	2.06	2.06	2.06	2.27	2.47	2.88	3.30	3.71
90.0	2.06	1.85	1.85	2.06	2.27	2.47	2.88	3.50	3.71
112.5	2.06	1.65	1.85	2.06	2.27	2.88	3.50	4.32	4.94
135.0	2.47	2.06	2.06	2.68	3.71	4.53	5.56	6.18	6.80
157.5	4.12	3.91	3.91	4.94	6.80	7.62	8.44	8.86	8.86
180.0	77.84	4.32	4.53	4.53	5.15	5.77	6.59	7.00	7.41
202.5	22.45	4.53	5.15	6.59	7.41	8.44	9.27	9.88	10.09
225.0	13.18	3.50	4.53	6.18	8.03	9.68	10.30	10.71	10.71
247.5	11.74	2.47	3.09	3.91	5.35	7.41	8.65	9.47	9.68
270.0	13.80	2.47	2.47	3.09	4.12	5.15	6.38	7.21	8.44
292.5	18.53	2.47	2.88	3.50	3.91	4.74	5.35	6.38	7.41
315.0	27.39	4.32	4.12	4.53	5.15	5.77	6.38	7.21	8.24
337.5	42.01	5.56	5.56	6.18	6.59	7.41	8.44	9.88	10.09
360.0	2.88	3.09	2.88	3.71	4.12	4.53	5.35	5.97	6.18



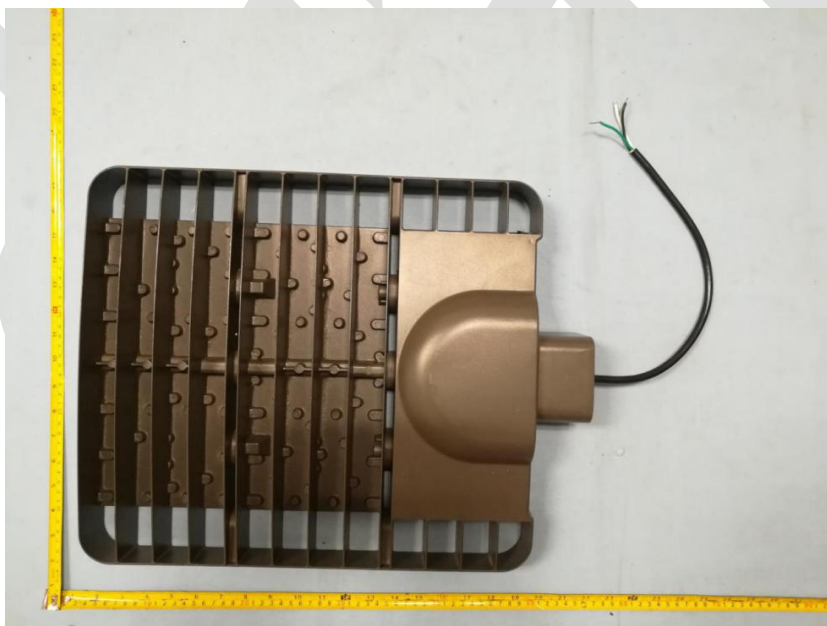
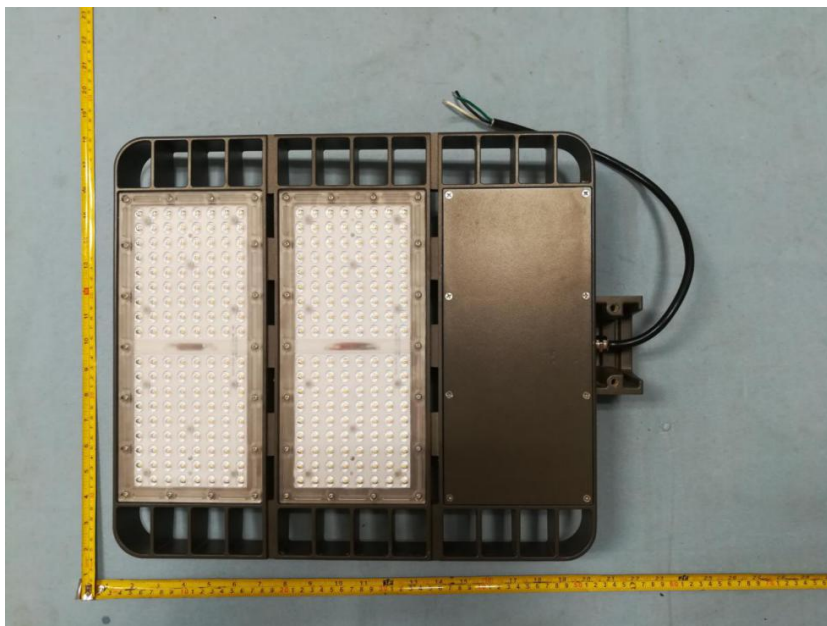
C/ γ (°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	5.77	5.77	5.56	5.56	5.35	5.15	5.15	4.94	5.15
22.5	5.35	5.56	5.97	5.97	6.18	5.97	6.38	6.38	6.59
45.0	4.53	4.94	5.15	5.56	5.97	5.97	6.18	6.38	6.59
67.5	3.91	4.53	5.15	5.35	5.56	5.97	5.97	6.59	6.80
90.0	4.53	4.74	5.35	5.77	6.18	6.38	6.59	7.00	7.21
112.5	5.15	5.56	6.18	6.59	6.80	7.00	7.00	7.21	7.41
135.0	6.80	7.00	7.41	7.62	7.83	7.41	7.41	7.21	7.62
157.5	8.86	8.44	8.44	8.44	8.24	8.03	7.62	7.41	7.41
180.0	7.83	7.83	7.41	7.41	7.41	7.00	6.80	6.38	6.38
202.5	9.88	9.47	8.86	8.65	8.24	7.83	7.21	6.80	6.80
225.0	10.30	9.88	9.88	9.27	9.06	8.24	7.62	7.21	6.80
247.5	9.88	9.68	9.47	9.27	9.06	8.44	8.03	7.41	7.00
270.0	8.86	9.06	9.27	9.27	9.06	8.44	8.24	7.83	7.21
292.5	8.24	8.86	8.65	8.86	8.86	8.65	8.03	7.83	7.41
315.0	8.86	9.06	8.86	8.86	8.44	8.65	8.24	7.83	7.41
337.5	9.88	9.47	9.27	8.86	8.86	8.44	7.83	7.83	7.41
360.0	5.77	5.77	5.56	5.56	5.35	5.15	5.15	4.94	5.15

C/ γ (°)	180.0
0.0	5.15
22.5	6.80
45.0	6.80
67.5	7.41
90.0	7.41
112.5	7.62
135.0	7.62
157.5	7.83
180.0	5.15
202.5	6.80
225.0	6.80
247.5	7.41
270.0	7.41
292.5	7.62
315.0	7.62
337.5	7.83
360.0	5.15





Photo Document



****End of test report****