



Shenzhen Belling Efficiency Testing Lab



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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-L120-0240-DN-30-MLV2-XXNX / IK-SBSL-L120-0240-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-L120-0240-DN-30-MLV2-XXNX / IK-SBSL-L120-0240-DN-57-MLV2-XXNX
Rated Inputs	AC 277-480V 50/60Hz
Rated Power	240 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-L120-0240-DN-30-MLV2-XXNX	276.99	60	0.861	237.44	0.996
IK-SBSL-L120-0240-DN-57-MLV2-XXNX	277.02	60	0.859	236.89	0.996

3.1.2 Additional Test

Test Item	Model	Test Voltage (V)	Frequency (Hz)	Test Result
Power factor	IK-SBSL-L120-0240-DN-30-MLV2-XXNX	277	60	0.996
		480	60	0.921
	IK-SBSL-L120-0240-DN-57-MLV2-XXNX	277	60	0.996
		480	60	0.928
Total harmonic distortion	IK-SBSL-L120-0240-DN-30-MLV2-XXNX	277	60	11.5%
		480	60	15.6%
	IK-SBSL-L120-0240-DN-57-MLV2-XXNX	277	60	12.4%
		480	60	16.6%
Off state power (W)	IK-SBSL-L120-0240-DN-30-MLV2-XXNX	277	60	0
	IK-SBSL-L120-0240-DN-30-MLV2-XXNX	480	60	0

3.1.3 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
IK-SBSL-L120-0240-DN-30-MLV2-XXNX	26825.971	112.98	2979	83.2	11
IK-SBSL-L120-0240-DN-57-MLV2-XXNX	28666.059	121.01	5612	84.6	17

3.1.4 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-SBSL-L120-0240-DN-30-MLV2-XXNX	-0.0006	0.4376	0.4028	0.2516	0.5210
IK-SBSL-L120-0240-DN-57-MLV2-XXNX	0.0019	0.3299	0.3425	0.2046	0.4779



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-L120-0240-DN-30-MLV2-XXNX	277.06	60	0.8652	238.83	0.9963

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-90°(%lm)	Zonal Lumen in 80-90°(%lm)
26852.54	112.43	99.825	0.721



4 Test Data

IK-SBSL-L120-0240-DN-30-MLV2-XXNX

Test Condition

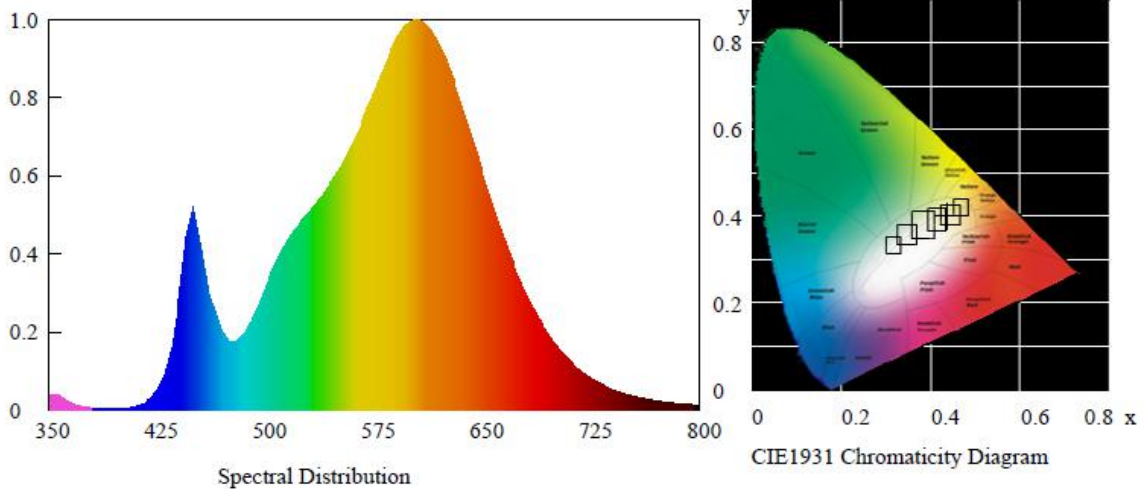
Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric Parameters



Chromaticity Coordinates: $x=0.4376$ $y=0.4028$ $u'=0.2516$ $v'=0.5210$

Correlated Color Temperature: 2979 K

Dominant Wavelength: 582.0 nm(E)

Luminous Flux: 26825.971 lm

Purity: 0.5231

Chromaticity Difference: -0.0006Duv

Peak Wavelength: 477.2 nm

Color Ratio: $K_r=45.0\%$ $K_g=47.8\%$ $K_b=7.2\%$

Bandwidth: 281.2nm

Radiant Flux: 80.234 W

Rendering Index: $R_a=83.2$

$R_1=82$ $R_2=91$ $R_3=97$ $R_4=82$ $R_5=82$ $R_6=89$ $R_7=84$ $R_8=61$

$R_9=11$ $R_{10}=79$ $R_{11}=81$ $R_{12}=73$ $R_{13}=84$ $R_{14}=99$ $R_{15}=75$

Electric Parameters

Voltage: 276.99 V

Current: 0.861 A

Power Factor: 0.996

Power: 237.44 W

Luminous Efficacy: 112.98 lm/W

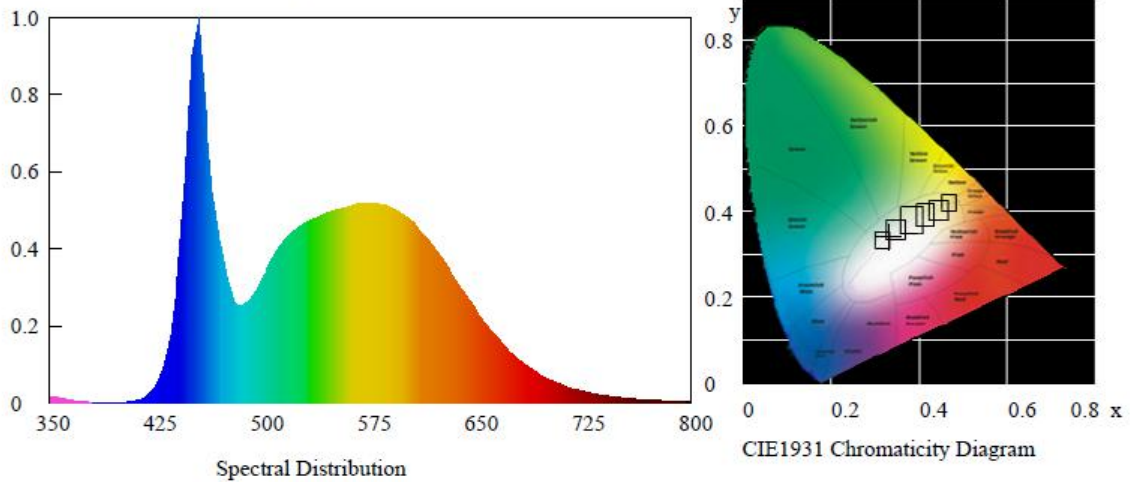
**IK-SBSL-L120-0240-DN-57-MLV2-XXNX****Test Condition**

Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric ParametersChromaticity Coordinates: $x=0.3299$ $y=0.3425$ $u'=0.2046$ $v'=0.4779$

Correlated Color Temperature: 5612 K

Dominant Wavelength: 530.0 nm(E)

Luminous Flux: 28666.059 lm

Purity: 0.0194

Chromaticity Difference: 0.0019Duv

Peak Wavelength: 447.8 nm

Color Ratio: $K_r=32.4\%$ $K_g=55.4\%$ $K_b=12.2\%$

Bandwidth: -444.3nm

Radiant Flux: 93.439 W

Rendering Index: $R_a=84.6$ $R_1=83$ $R_2=91$ $R_3=93$ $R_4=83$ $R_5=83$ $R_6=85$ $R_7=88$ $R_8=71$ $R_9=17$ $R_{10}=76$ $R_{11}=82$ $R_{12}=59$ $R_{13}=86$ $R_{14}=96$ $R_{15}=80$ **Electric Parameters**

Voltage: 277.02 V

Current: 0.859 A

Power Factor: 0.996

Power: 236.89 W

Luminous Efficacy: 121.01 lm/W

**Zonal Flux Diagram**

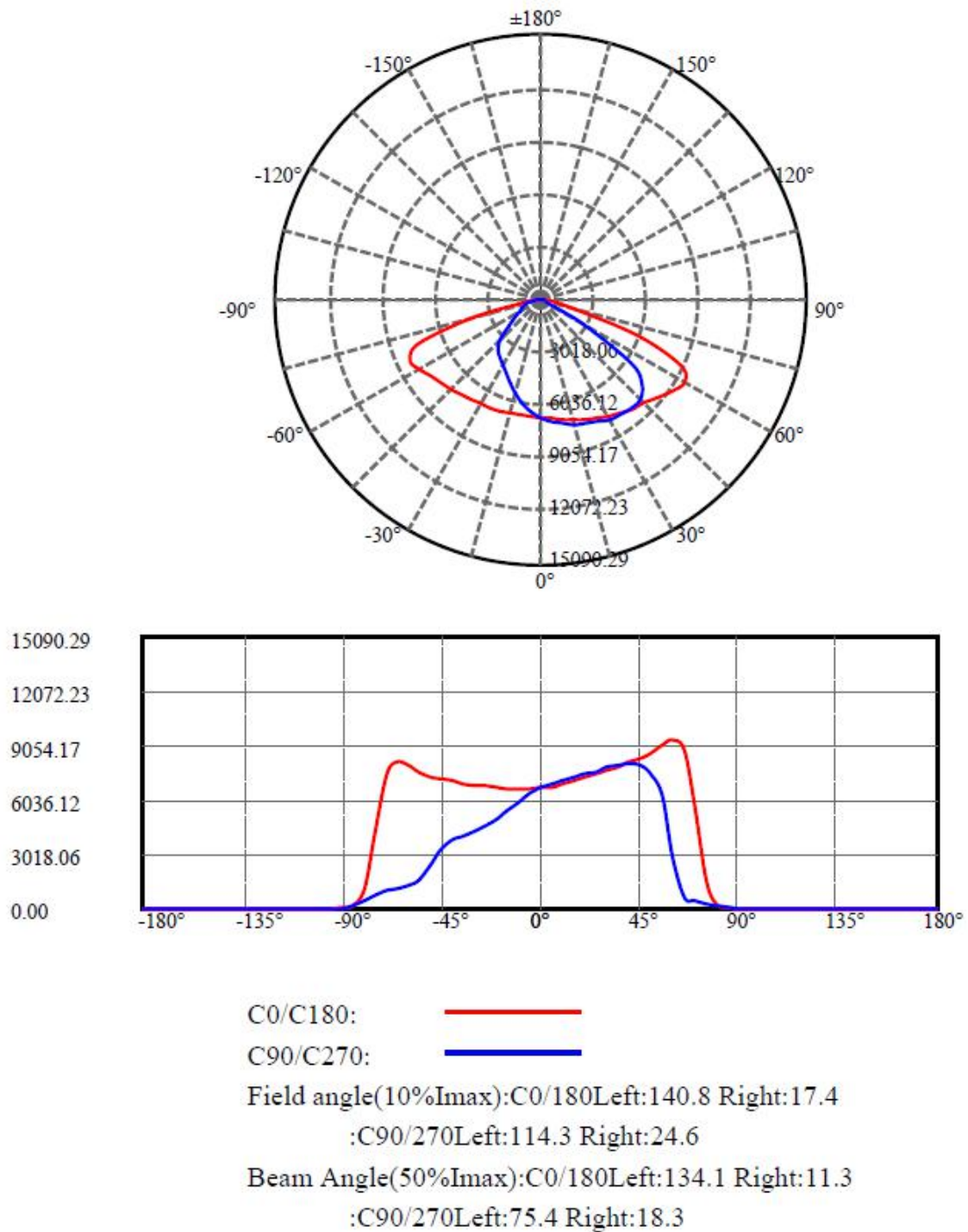
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	6689.429	.000	.000	.000%	.000%
5.0	6679.000	159.816	159.816	.595%	.595%
10.0	6664.633	477.344	637.160	1.778%	2.373%
15.0	6644.836	789.509	1426.668	2.940%	5.313%
20.0	6629.575	1093.998	2520.666	4.074%	9.387%
25.0	6619.907	1389.626	3910.292	5.175%	14.562%
30.0	6645.791	1678.785	5589.077	6.252%	20.814%
35.0	6724.234	1968.830	7557.907	7.332%	28.146%
40.0	6837.932	2262.745	9820.651	8.427%	36.573%
45.0	6870.097	2538.152	12358.800	9.452%	46.025%
50.0	6819.581	2766.200	15125.000	10.301%	56.326%
55.0	6580.088	2913.534	18038.540	10.850%	67.176%
60.0	5818.015	2865.786	20904.320	10.672%	77.849%
65.0	4524.875	2514.376	23418.700	9.364%	87.212%
70.0	2745.944	1841.018	25259.720	6.856%	94.068%
75.0	1000.835	979.348	26239.070	3.647%	97.715%
80.0	392.308	372.766	26611.830	1.388%	99.104%
85.0	148.801	147.032	26758.860	.548%	99.651%
90.0	21.722	46.691	26805.550	.174%	99.825%
95.0	3.715	6.965	26812.520	.026%	99.851%
100.0	3.924	2.076	26814.600	.008%	99.859%
105.0	4.506	2.255	26816.850	.008%	99.867%
110.0	5.416	2.593	26819.450	.010%	99.877%
115.0	6.341	2.977	26822.420	.011%	99.888%
120.0	7.221	3.297	26825.720	.012%	99.900%
125.0	8.071	3.535	26829.250	.013%	99.913%
130.0	8.578	3.620	26832.880	.013%	99.927%
135.0	8.817	3.515	26836.390	.013%	99.940%
140.0	8.892	3.279	26839.670	.012%	99.952%
145.0	8.937	2.975	26842.640	.011%	99.963%
150.0	8.921	2.630	26845.270	.010%	99.973%
155.0	8.862	2.250	26847.520	.008%	99.981%
160.0	8.608	1.832	26849.360	.007%	99.988%
165.0	8.355	1.398	26850.750	.005%	99.993%
170.0	8.176	.981	26851.730	.004%	99.997%
175.0	8.235	.587	26852.320	.002%	99.999%
180.0	8.235	.197	26852.520	.001%	100.000%



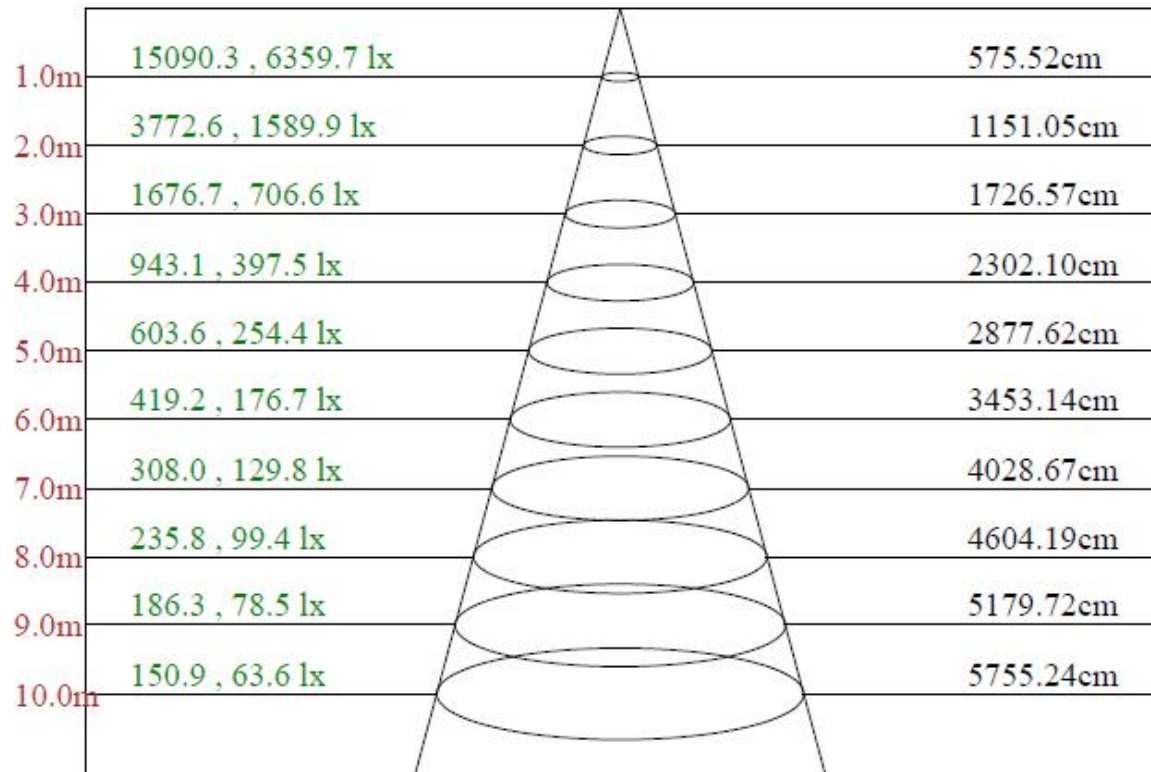
Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





Lux distance Curve



Max , Ave

Beam angle of C157.5plane140.14

draft

**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	6708.97	6776.53	6919.99	7088.75	7266.10	7458.02	7692.19	7886.49	8141.67
22.5	6708.97	6926.19	7202.61	7472.82	7751.39	8027.80	8354.83	8776.85	9485.80
45.0	6687.73	6993.75	7291.41	7567.82	7801.99	8074.11	8346.47	8795.95	9232.77
67.5	6721.62	7025.49	7278.76	7458.02	7639.44	7842.09	8072.20	8321.17	8485.64
90.0	6734.28	6970.59	7164.66	7344.16	7489.77	7614.13	7846.39	7953.81	8053.11
112.5	6698.47	6951.49	7147.95	7320.77	7481.18	7624.64	7816.79	8048.81	8249.32
135.0	6649.77	6818.78	7036.00	7219.56	7449.67	7650.18	7873.84	8295.87	8633.39
157.5	6605.61	6700.62	6867.23	7057.00	7244.86	7441.07	7666.89	8000.35	8506.88
180.0	6708.97	6664.57	6618.27	6645.72	6740.48	6801.83	6824.98	6913.54	7086.60
202.5	6708.97	6508.46	6354.50	6229.90	6096.94	5963.98	5824.82	5712.87	5628.61
225.0	6687.73	6402.96	6137.04	5824.82	5552.70	5274.13	5031.37	4814.15	4672.60
247.5	6721.62	6371.21	5976.63	5561.05	5168.63	4799.35	4503.84	4261.08	4022.85
270.0	6734.28	6405.10	5942.98	5461.75	5012.51	4630.35	4311.92	4043.86	3797.04
292.5	6698.47	6394.60	6035.83	5649.61	5257.18	4890.06	4581.90	4368.73	4145.07
315.0	6649.77	6422.05	6177.14	5957.78	5710.96	5493.50	5292.99	5128.52	5010.37
337.5	6605.61	6531.62	6483.16	6457.86	6409.40	6333.25	6291.24	6265.70	6255.20
360.0	6708.97	6776.53	6919.99	7088.75	7266.10	7458.02	7692.19	7886.49	8141.67

C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	8356.97	8669.20	9110.32	9388.89	8781.15	5845.82	1573.77	260.66	109.56
22.5	9988.03	11002.99	12446.43	14280.14	14974.29	9909.97	1708.63	331.08	121.02
45.0	9736.91	10382.60	10741.37	9798.26	6312.25	912.56	381.92	238.23	85.46
67.5	8565.84	8276.77	7365.17	4090.17	975.34	473.83	342.78	213.40	109.33
90.0	7996.06	7521.28	6289.10	2886.15	622.78	451.39	322.97	179.27	72.33
112.5	8382.28	8131.16	7101.40	4094.70	809.68	451.63	317.00	189.53	80.20
135.0	9108.17	9789.67	10281.39	9504.90	4192.81	810.40	349.22	196.45	61.59
157.5	8886.66	9823.56	11266.76	13450.89	15090.29	9578.65	1804.11	342.78	101.69
180.0	7244.86	7344.16	7605.78	7939.25	8164.82	7388.32	4109.26	1085.38	171.15
202.5	5518.80	5404.94	5185.33	4522.94	3102.66	1429.35	608.69	373.57	173.78
225.0	4444.88	4035.50	3142.76	1929.43	1112.83	849.54	664.07	426.56	140.60
247.5	3609.18	2822.18	1809.13	1218.34	1062.23	948.13	721.60	470.24	199.56
270.0	3305.31	2414.72	1591.91	1298.54	1142.43	1032.63	767.67	455.92	194.54
292.5	3742.14	2929.60	1944.23	1298.54	1112.83	1032.63	784.38	523.71	255.17
315.0	4843.51	4436.29	3518.48	2205.85	1292.34	954.09	767.43	524.19	247.77
337.5	6191.94	6128.69	5881.87	5181.28	3649.28	1866.18	789.87	465.95	257.08
360.0	8356.97	8669.20	9110.32	9388.89	8781.15	5845.82	1573.77	260.66	109.56

C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	3.34	3.58	3.82	4.30	4.77	5.49	5.97	6.92	7.16
22.5	5.01	4.30	3.34	3.34	3.58	4.54	4.54	5.49	5.97
45.0	5.01	3.58	2.63	2.63	3.34	3.34	4.30	4.54	4.77
67.5	3.82	2.39	2.39	2.39	2.63	3.10	3.58	4.06	4.54
90.0	2.39	2.15	2.39	2.39	2.86	2.86	3.58	4.06	4.54
112.5	2.15	2.15	2.39	2.86	3.34	3.58	4.54	5.25	5.97
135.0	2.63	2.39	2.86	3.58	4.54	5.73	6.68	7.40	7.88
157.5	5.25	4.30	4.77	5.97	7.88	9.55	10.26	10.26	10.50
180.0	72.80	5.01	5.49	5.73	6.21	6.92	7.88	8.59	9.31
202.5	28.64	5.49	5.97	7.88	8.83	10.03	10.98	11.94	11.94
225.0	19.34	4.06	5.25	7.16	9.55	11.46	12.65	13.13	12.89
247.5	20.53	2.63	3.58	4.30	6.45	8.59	10.26	11.22	11.46
270.0	29.60	2.39	3.10	3.58	4.30	5.73	6.92	8.36	9.55
292.5	35.09	3.10	3.34	3.82	4.54	5.49	6.21	7.88	8.83
315.0	46.31	5.49	5.01	5.25	5.97	6.68	7.40	8.59	9.79
337.5	65.64	6.45	6.45	6.92	7.88	8.36	9.79	11.46	12.17
360.0	3.34	3.58	3.82	4.30	4.77	5.49	5.97	6.92	7.16



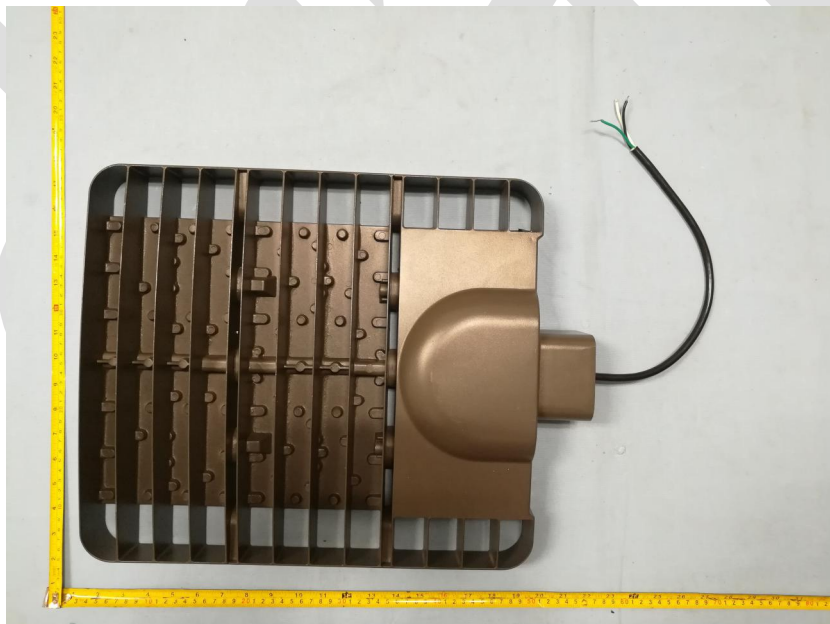
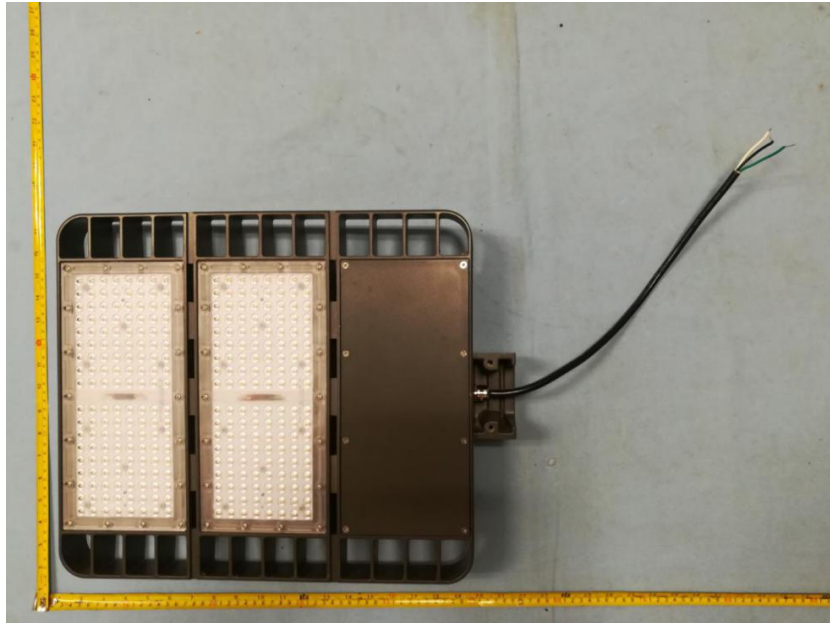
C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	7.16	7.16	7.16	6.92	6.92	6.45	5.97	5.97	6.45
22.5	6.21	6.68	7.16	7.16	7.16	7.40	7.40	7.40	7.88
45.0	5.49	5.97	6.21	6.92	6.68	7.40	7.40	7.64	7.88
67.5	5.01	5.25	5.97	6.45	6.68	7.40	7.40	7.64	8.12
90.0	5.25	5.73	6.45	6.92	7.40	7.40	7.88	7.88	8.59
112.5	6.45	7.16	7.40	7.88	7.88	8.12	8.12	8.36	8.83
135.0	7.88	8.12	8.59	8.83	8.83	8.83	8.59	8.36	8.83
157.5	10.26	10.03	9.79	9.79	9.55	9.31	8.59	8.59	8.83
180.0	9.31	9.07	8.83	8.83	8.59	8.12	7.88	7.64	7.40
202.5	11.46	11.22	10.50	10.03	9.55	9.07	8.59	8.12	7.88
225.0	12.41	11.70	11.46	10.50	10.50	9.55	8.83	8.36	8.12
247.5	11.46	11.46	10.98	10.74	10.50	9.79	9.31	8.59	8.12
270.0	10.50	10.74	10.74	10.50	10.50	9.79	9.55	9.31	8.59
292.5	9.55	10.26	10.50	10.26	10.50	10.03	9.55	9.07	8.83
315.0	10.74	10.74	10.50	10.26	10.26	9.55	9.31	9.07	8.59
337.5	11.94	10.98	10.74	10.74	10.26	9.55	9.31	8.83	8.83
360.0	7.16	7.16	7.16	6.92	6.92	6.45	5.97	5.97	6.45

C/γ(°)	180.0
0.0	6.45
22.5	7.88
45.0	8.12
67.5	8.12
90.0	8.36
112.5	8.83
135.0	9.07
157.5	9.07
180.0	6.45
202.5	7.88
225.0	8.12
247.5	8.12
270.0	8.36
292.5	8.83
315.0	9.07
337.5	9.07
360.0	6.45





Photo Document



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