



NVLAP LAB CODE:201045-0



Shenzhen Anbotek Compliance Laboratory Limited

IES LM-79-08 TEST REPORT

For
P.Q.L., Inc.

Report Number: R011508088L

Product Type: 2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces

Date of Receipt: 2015-08-04

Date of Test: 2015-08-04 to 2015-08-19

Date of Report: 2015-08-20

Product Model: 55181 / 55182 / 55184

Product Description: AC100-277V 50/60Hz 75W 3000K/5000K

Product Criteria: IES LM-79-08: Electrical and Photometric Measurements of Solid-State Lighting Products

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1 – GENERAL

1.1 Product description

General Information

Applicant	P.Q.L., Inc.
Applicant Address	2285 Ward Avenue / Simi Valley, CA 93065
Manufacturer	P.Q.L., Inc.
Manufacturer Address	2285 Ward Avenue / Simi Valley, CA 93065
Brand name	Superior Life®
Test Model Number	55181/ 55184
Burning time before test	0 Hours (For new products)

Rated Values

Rated Inputs	AC100-277V 50/60Hz
Rated Power	75W
Nominal CCT	3000K/5000K

1.2 Standard of method

- ANSI C78.377-2011: 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 Test Facility

The test facility used by Shenzhen Anbotek Compliance Laboratory Limited is located at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China.

2 – Test Equipment List and Details

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Goniophotometric System	SENSING	GMS-3000	-	-	2015-03-16	2016-03-15
AC Power Source	Ainuo	AN97001W	-	0-300V, 1000VA	2015-03-16	2016-03-15
Digital Power Meter	YOKOGAWA	WT310		0-600V/0-10A/0-100Hz	2015-03-16	2016-03-15
Temperature & Humidity meter	XINIXI	CTH-608	-	0°C~50°C, 10% to 90%RH	2015-03-16	2016-03-15
Total Luminous Flux Standard Lamp	SENSING	220V/500W	S135009	220V/500W	2015-03-16	2016-03-15
Total Luminous Flux Standard Lamp	SENSING	220V/500W	S1350014	220V/500W	2015-03-16	2016-03-15
1.5m Integral Sphere	SENSING	SPR-600M	-	380nm-780nm,0.011m~6.00×10 ⁵ lm	2015-03-16	2016-03-15
Spectrum analyzer	SENSING	SPR-3000	-	380nm-780nm,0.011m~6.00×10 ⁵ lm	2015-03-16	2016-03-15
AC Power Source	ALL POWER	APW-110N	997079	0-300V, 0-1000VA	2015-07-15	2016-07-14
Digital Power Meter	YOKOGAWA	WT210	-	0-600V/0-10A/0-100Hz	2015-03-16	2016-03-15
DC Power Supply	Linkcolor	Linkcolor	-	DC 30V, 5A	2015-03-16	2016-03-15
Total Luminous Flux Standard Lamp	SENSING	110 V / 100 W	S13100190	Refer specification	2015-03-16	2016-03-15
Total Luminous Flux Standard Lamp	SENSING	110 V / 100 W	S1310034	Refer specification	2015-03-16	2016-03-15
Temperature & Humidity meter	XINIXI	CTH-608	-	0°C~50°C, 10% to 90%RH	2015-03-16	2016-03-15

Statement of Traceability:Shenzhen Anbotek Compliance Laboratory Limited attests that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).

3 - Test Method

3.1 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.

3.2 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.

3.3 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).

3.4 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.

3.5 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.

4-Test Result

4.1 Photometric test with Integrating Sphere

System 4.1.1 Model: 55181

Electrical data

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.02	60	0.6289	75.03	0.994

Photometric data

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
7115.773	15.715	94.84	2991	-0.00185

Chromaticity Coordinate

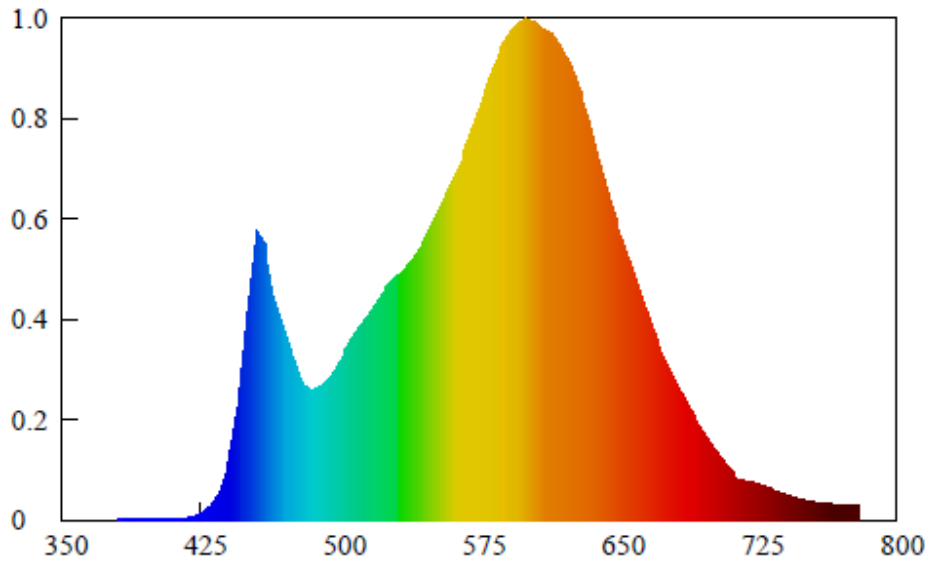
x	y	u	v	u'	v'
0.4349	0.3988	0.2515	0.346	0.2515	0.519

Color Rendering Details

Ra
83.0

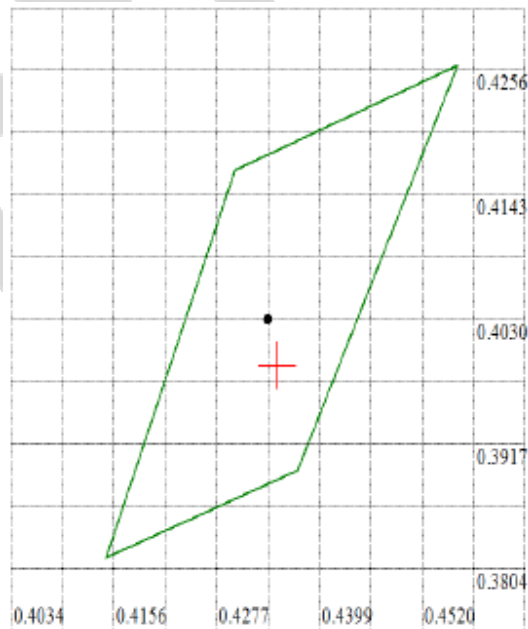
R1	R2	R3	R4	R5
83	95	92	79	83
R6	R7	R8	R9	R10
93	80	59	12	87
R11	R12	R13	R14	R15
78	73	87	97	76

Spectral Distribution



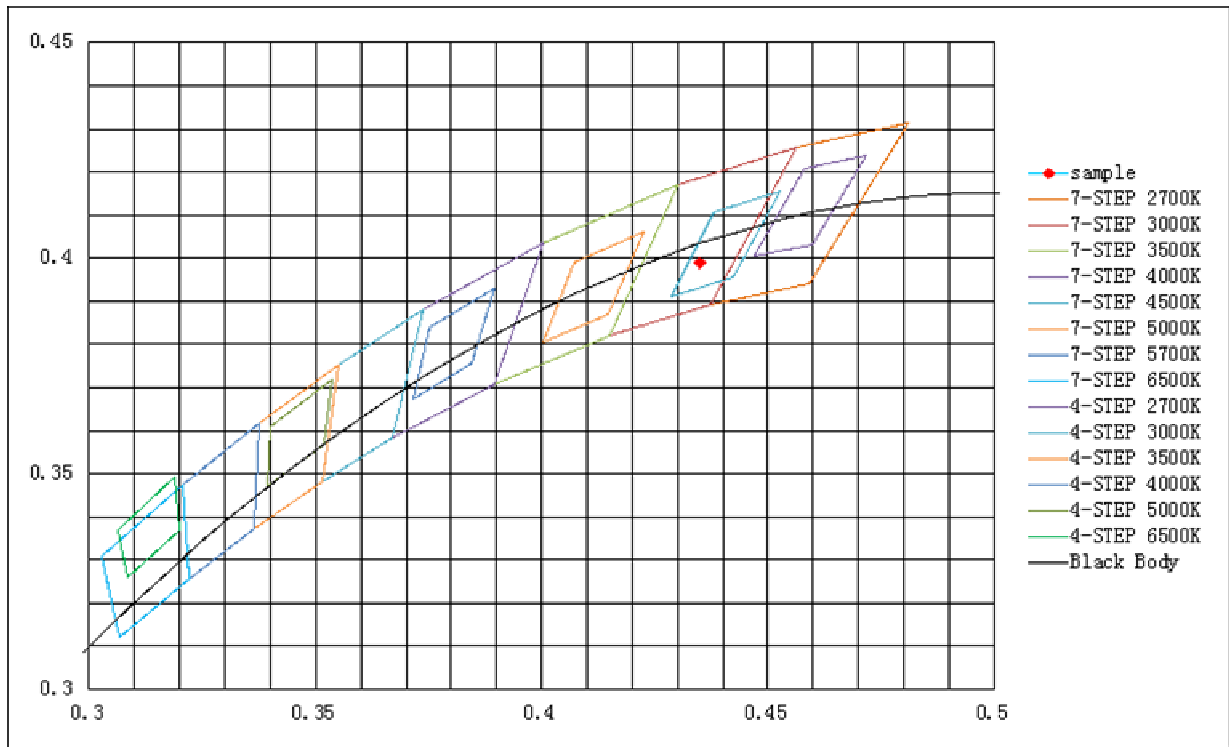
光谱分布 Spectral Distribution

Chromaticity Diagram (CIE 1931)



Nominal CCT:LED_3000K

ANSI Chromaticity Quadrangles Diagram



4.1.2 Model: 55184

Electrical data

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.01	60	0.6288	74.76	0.991

Photometric data

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
7502.317	17.219	100.35	5020	0.00501

Chromaticity Coordinate

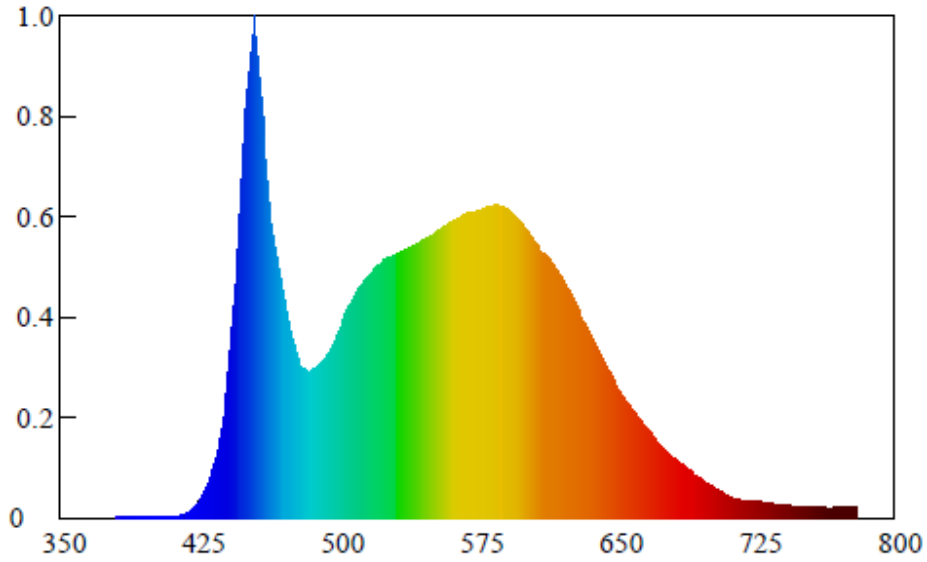
x	y	u	v	u'	v'
0.3455	0.3621	0.2077	0.3265	0.2077	0.4897

Color Rendering Details

Ra
82.4

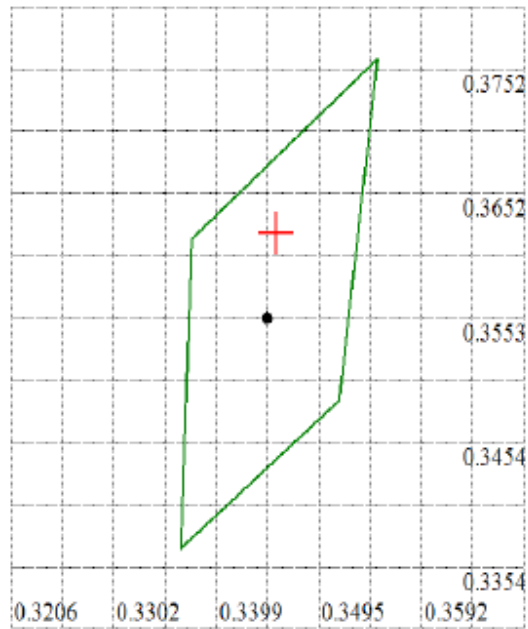
R1	R2	R3	R4	R5
80	90	95	79	80
R6	R7	R8	R9	R10
86	85	64	1	76
R11	R12	R13	R14	R15
78	59	84	97	74

Spectral Distribution



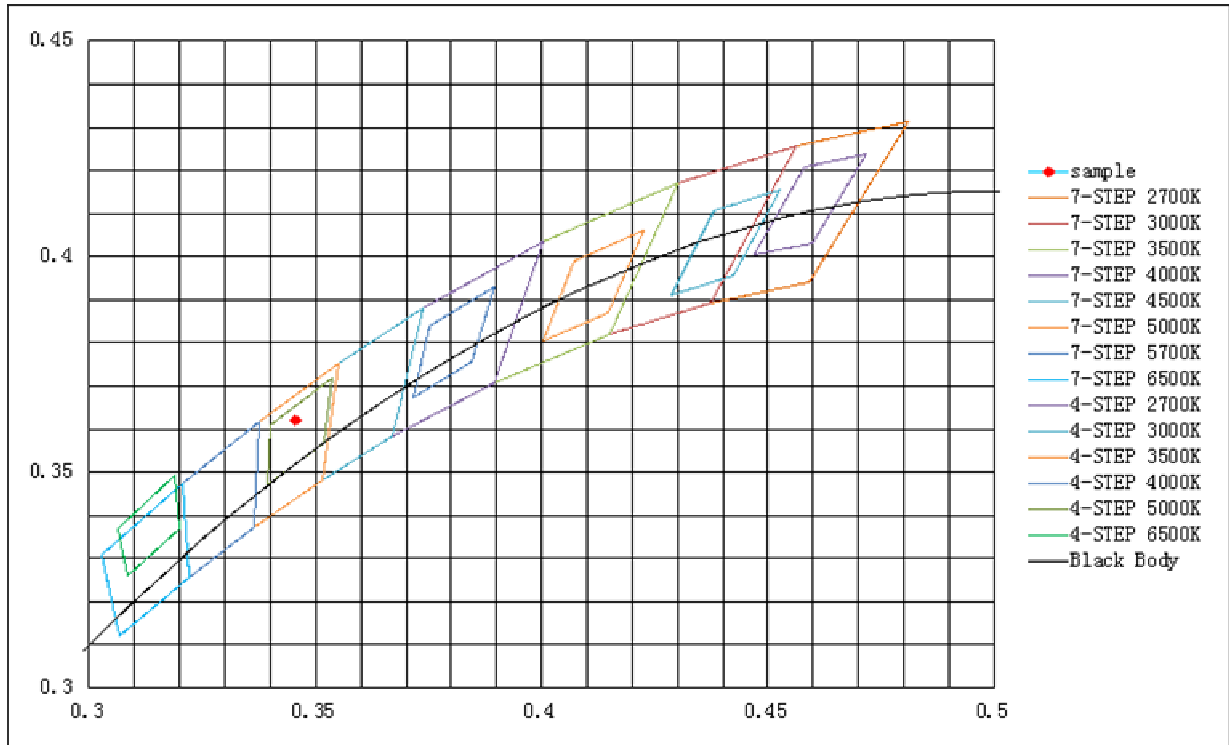
光谱分布 Spectral Distribution

Chromaticity Diagram (CIE 1931)



Nominal CCT:LED_5000K

ANSI Chromaticity Quadrangles Diagram



4.2 Photometric test with Goniophotometer

System 4.2.1 Model: 55181

Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.08	60	0.6290	74.98	0.993

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	Zonal Lumen Density(0~60°)
7131.16	95.11	2418.675	76.56%

Spacing Criteria 0-180°	Spacing Criteria 90-270°
1.26	1.27

Zonal Lumen Summary

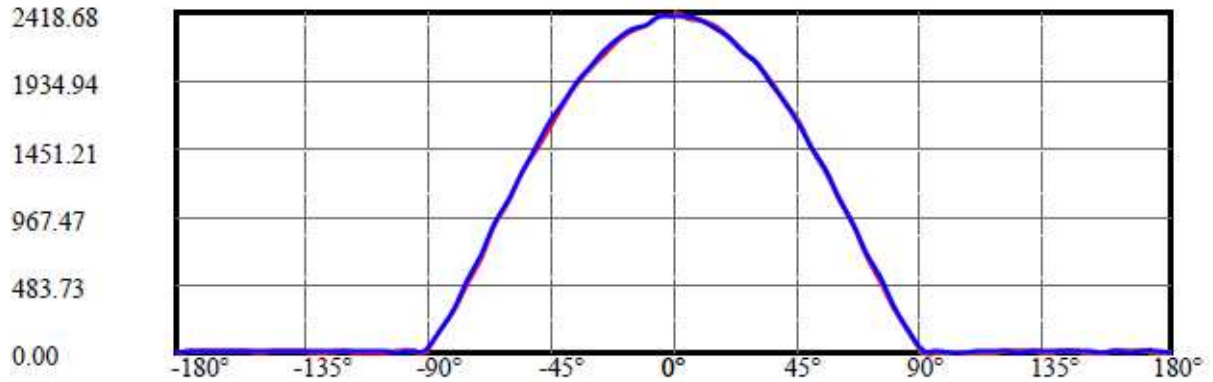
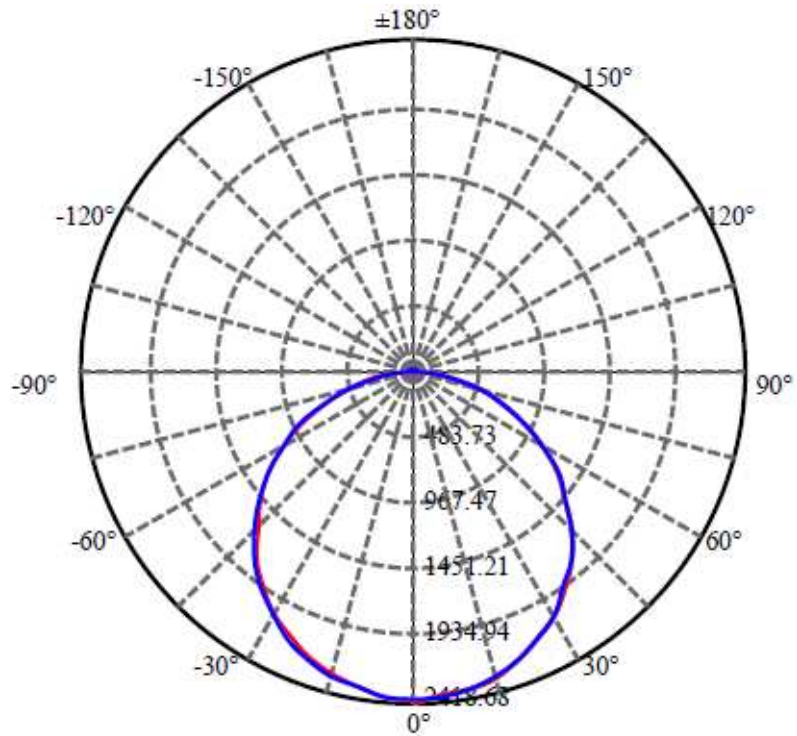
ZONAL LUMEN SUMMARY

Zone	Lumens	%Fixt
0-30	1862.15	26.11%
0-40	3061.46	42.93%
0-60	5459.86	76.56%
0-90	7053.38	98.91%
0-120	7088.75	99.41%
0-180	7131.16	100.00%
60-90	2142.29	30.04%
90-120	78.75	1.10%
90-130	88.98	1.25%
90-150	109.63	1.54%
90-180	120.94	1.70%
0-62.53	5704.93	80.00%

ZONAL LUMEN SUMMARY

0-10	226.21
10-20	649.30
20-30	986.64
30-40	1199.31
40-50	1254.16
50-60	1144.24
60-70	889.09
70-80	534.44
80-90	169.98
90-100	11.72
100-110	10.82
110-120	12.84
120-130	10.23
130-140	12.00
140-150	8.65
150-160	6.70
160-170	3.67
170-180	0.94

Light Distribution Curve [Unit: cd]



C0(Max): ———
C0/C180: ———
C90/C270: ———
Field angle(10%Imax):C0/180Left:81.9 Right:82.2
:C90/270Left:82.3 Right:82.5
Beam Angle(50%Imax):C0/180Left:56.7 Right:56.8
:C90/270Left:57.3 Right:57.5

Luminous Intensity (cd) Distribution Data

C/γ(°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	2418.68	2368.98	2352.41	2319.28	2236.45	2137.05	2054.22	1921.69	1789.16
22.5	2402.11	2385.54	2368.98	2319.28	2236.45	2153.61	2054.22	1938.25	1789.16
45.0	2385.54	2385.54	2352.41	2302.71	2219.88	2137.05	2037.65	1905.12	1789.16
67.5	2402.11	2402.11	2352.41	2302.71	2236.45	2120.48	2037.65	1921.69	1789.16
90.0	2385.54	2385.54	2352.41	2302.71	2236.45	2137.05	2054.22	1905.12	1789.16
112.5	2385.54	2368.98	2335.84	2302.71	2219.88	2137.05	2037.65	1905.12	1772.59
135.0	2385.54	2385.54	2335.84	2286.15	2219.88	2120.48	2021.08	1921.69	1772.59
157.5	2385.54	2368.98	2352.41	2286.15	2203.31	2137.05	2037.65	1888.55	1756.02
180.0	2385.54	2385.54	2335.84	2286.15	2219.88	2120.48	2021.08	1905.12	1772.59
202.5	2402.11	2368.98	2352.41	2319.28	2219.88	2153.61	2037.65	1921.69	1772.59
225.0	2385.54	2368.98	2352.41	2302.71	2236.45	2137.05	2037.65	1921.69	1789.16
247.5	2402.11	2385.54	2352.41	2302.71	2236.45	2153.61	2037.65	1921.69	1789.16
270.0	2385.54	2385.54	2335.84	2302.71	2236.45	2153.61	2037.65	1921.69	1789.16
292.5	2385.54	2385.54	2352.41	2302.71	2236.45	2137.05	2037.65	1921.69	1772.59
315.0	2385.54	2368.98	2352.41	2302.71	2219.88	2137.05	2054.22	1921.69	1789.16
337.5	2385.54	2385.54	2335.84	2302.71	2236.45	2137.05	2037.65	1905.12	1789.16
360.0	2418.68	2368.98	2352.41	2319.28	2236.45	2137.05	2054.22	1921.69	1789.16

C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	1640.06	1457.83	1275.60	1093.37	894.58	695.78	496.99	314.76	149.10
22.5	1640.06	1457.83	1275.60	1093.37	911.14	728.92	496.99	331.33	149.10
45.0	1640.06	1457.83	1292.17	1109.94	911.14	695.78	513.55	331.33	132.53
67.5	1640.06	1474.40	1292.17	1093.37	894.58	712.35	496.99	331.33	149.10
90.0	1623.49	1457.83	1292.17	1093.37	894.58	712.35	530.12	331.33	149.10
112.5	1623.49	1441.27	1275.60	1076.81	894.58	695.78	496.99	331.33	149.10
135.0	1606.93	1441.27	1275.60	1076.81	894.58	695.78	496.99	314.76	149.10
157.5	1606.93	1457.83	1275.60	1076.81	878.01	695.78	480.42	298.19	132.53
180.0	1590.36	1441.27	1275.60	1076.81	894.58	679.22	480.42	298.19	149.10
202.5	1623.49	1457.83	1275.60	1093.37	894.58	695.78	496.99	314.76	132.53
225.0	1623.49	1457.83	1275.60	1093.37	911.14	695.78	496.99	314.76	149.10
247.5	1640.06	1457.83	1292.17	1093.37	894.58	712.35	513.55	331.33	149.10
270.0	1640.06	1474.40	1275.60	1093.37	911.14	712.35	513.55	314.76	149.10
292.5	1623.49	1457.83	1292.17	1109.94	894.58	712.35	513.55	314.76	149.10
315.0	1623.49	1457.83	1292.17	1109.94	894.58	695.78	496.99	331.33	149.10
337.5	1640.06	1457.83	1275.60	1093.37	894.58	712.35	496.99	314.76	149.10
360.0	1640.06	1457.83	1275.60	1093.37	894.58	695.78	496.99	314.76	149.10

C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	0.00	0.00	0.00	0.00	0.00	0.00	16.57	16.57	16.57
22.5	16.57	0.00	16.57	0.00	16.57	0.00	16.57	0.00	16.57
45.0	16.57	0.00	16.57	16.57	16.57	16.57	16.57	0.00	0.00
67.5	16.57	0.00	0.00	0.00	16.57	16.57	16.57	16.57	16.57
90.0	16.57	16.57	0.00	0.00	16.57	16.57	16.57	0.00	16.57
112.5	16.57	16.57	16.57	16.57	0.00	0.00	16.57	0.00	16.57
135.0	16.57	0.00	16.57	16.57	16.57	16.57	16.57	16.57	0.00
157.5	0.00	0.00	16.57	0.00	16.57	16.57	0.00	0.00	16.57
180.0	0.00	16.57	16.57	0.00	0.00	0.00	16.57	0.00	0.00
202.5	16.57	16.57	16.57	0.00	16.57	0.00	16.57	16.57	16.57
225.0	16.57	0.00	16.57	16.57	16.57	16.57	16.57	0.00	16.57
247.5	16.57	16.57	16.57	0.00	16.57	16.57	16.57	16.57	16.57
270.0	16.57	16.57	0.00	16.57	16.57	16.57	16.57	16.57	16.57
292.5	16.57	16.57	16.57	16.57	16.57	16.57	16.57	0.00	16.57
315.0	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57
337.5	0.00	0.00	16.57	0.00	16.57	16.57	16.57	16.57	16.57
360.0	0.00	0.00	0.00	0.00	0.00	0.00	16.57	16.57	16.57

C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	0.00	16.57	16.57	0.00	0.00	16.57	16.57	16.57	0.00
22.5	16.57	16.57	16.57	16.57	16.57	16.57	0.00	16.57	16.57
45.0	16.57	16.57	0.00	16.57	16.57	16.57	16.57	0.00	16.57
67.5	16.57	16.57	0.00	16.57	16.57	16.57	0.00	16.57	0.00
90.0	16.57	16.57	16.57	16.57	0.00	16.57	0.00	16.57	16.57
112.5	16.57	16.57	16.57	16.57	0.00	0.00	0.00	16.57	0.00
135.0	16.57	16.57	0.00	16.57	33.13	16.57	0.00	16.57	0.00
157.5	16.57	16.57	16.57	0.00	16.57	16.57	16.57	0.00	16.57
180.0	16.57	16.57	16.57	0.00	16.57	16.57	16.57	16.57	16.57
202.5	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57
225.0	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57
247.5	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57
270.0	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57
292.5	16.57	16.57	16.57	16.57	16.57	0.00	16.57	16.57	16.57
315.0	16.57	16.57	0.00	16.57	16.57	16.57	16.57	16.57	0.00
337.5	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57
360.0	0.00	16.57	16.57	0.00	0.00	16.57	16.57	16.57	0.00

C/γ(°)	180.0
0.0	0.00
22.5	16.57
45.0	16.57
67.5	0.00
90.0	0.00
112.5	0.00
135.0	16.57
157.5	0.00
180.0	0.00
202.5	16.57
225.0	16.57
247.5	0.00
270.0	0.00
292.5	0.00
315.0	16.57
337.5	0.00
360.0	0.00

5-Additional Test

55181/3000K

Test item	Test Voltage (V)	Frequency(Hz)	Test Result
Power Factor	277	60	0.955
Total harmonic Distortion	277	60	18.73%
Off State Power (W)	120	60	0

55184/5000K

Test item	Test Voltage (V)	Frequency(Hz)	Test Result
Power Factor	277	60	0.968
Total harmonic Distortion	277	60	18.56%
Off State Power (W)	120	60	0

The test data was only good for the test sample. It may have deviation for other test sample.

Attachment A – Product PHOTO

FRONT PHOTO



REVERSE PHOTO

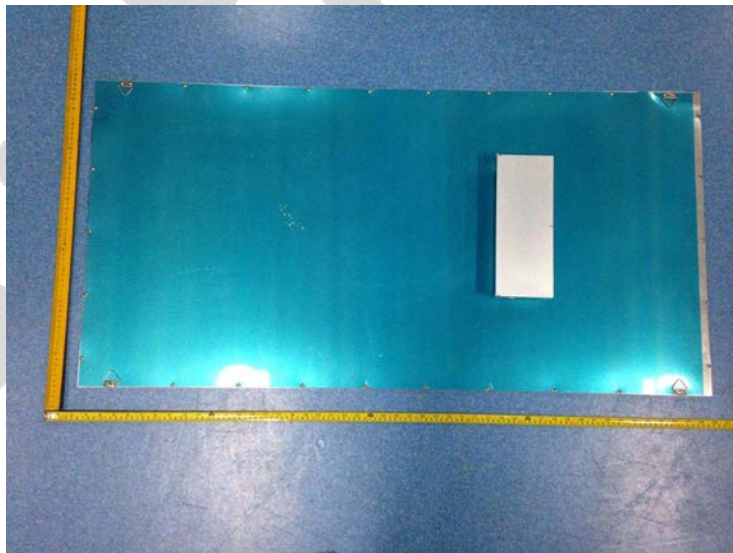


PHOTO 1 3000K

FRONT PHOTO



REVERSE PHOTO

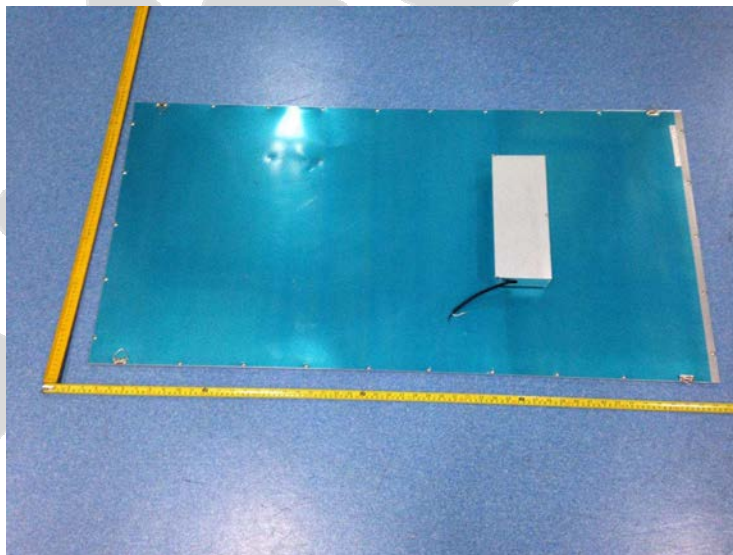


PHOTO 2 5000K

-----End of Report-----