



Shenzhen Belling Efficiency Testing Lab Co., Ltd



Report No.: BL220112011-9

Date of issue 2022-01-20
Version 1.0
Total pages 19

**Test report of
IES LM-79-08**

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

Applicant:

P.Q.L., Inc.

Address:

2285 Ward Avenue / Simi Valley, CA 93065

For Product:

Outdoor Pole/Arm-Mounted Area and Roadway Luminaires

Model No.:

STL3P-300W-3000K-B-MB-HC-P (TYPE III),
STL3P-300W-5700K-B-MB-HC-P (TYPE III)

Test laboratory: Shenzhen Belling Efficiency Testing Lab Co., Ltd, 1Floor, No.1 Building, Meibaohe Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong Prov.518101 China.

Complied by: Sam Chen

Review by: Jason Zhou

Project Engineer

Technical Manager

Note: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Shenzhen Belling Efficiency Testing Lab Co., Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement By NVLAP, NIST, or any agency of the U.S. Government.



1 General

1.1 Product Information

Manufacturer	P.Q.L., Inc.
Manufacturer Address	2285 Ward Avenue Simi Valley, CA 93065
Brand Name	P.Q.L., Inc.
Luminaire Type	Outdoor Pole/Arm-Mounted Area and Roadway Luminaires
Model Number	STL3P-300W-3000K-B-MB-HC-P (TYPE III), STL3P-300W-5700K-B-MB-HC-P (TYPE III)
Rated Inputs	AC 277-480V 50/60Hz
Rated Power	300 W
Nominal CCT	3000K, 5700K
Dimming Capability	Continuous
Integral Control Sensors	No
Date of Receipt Samples	2022-01-12
Date of test	2022-01-13 to 2022-01-18
Burning Time Before Test	0hour(For New Products)

1.2 Standards or methods

- ANSI C78.377-2017:Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-10:2014:Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment - Solid State
- 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
- IES TM-15-11: Backlight, Uplight, and Glare (BUG) Ratings

Note: This report contains data that are not covered by the NVLAP accreditation. See the following description:

TM-15-11 test are not in NVLAP accreditation scope.



1.3 Equipment list

Device	Manufacture	Model No.	Serial No.	Calibration due date
Goniophotometric System	SENSING	GMS-3000	N.A	2022-03-31
AC Power Source	ALL POWER	APW-110N	992257	2022-03-31
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S1510065	2022-04-07
Total Spectral Radiant Flux Standard Lamp	SENSING	12V/20W	LSD12201731	2022-04-07
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2022-03-31
Integral Sphere	SENSING	SPR-600M	N.A	2022-03-31
Digital Power Meter	YOKOGAWA	WT210	91L929742	2022-03-31
Optical Color and Electrical Measurement System	SENSING	SPR-3000	S1101108	2022-03-31
Environment Measurer	XUYAO	HS-1	N/A	2022-04-03
Environment Measurer	XUYAO	HS-1	N/A	2022-04-03
Stop watch	KISLO	K610	N/A	2022-04-22
Digital Anemometer	TECMAN	TD8901	026141	2022-09-08

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab Co., Ltd 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.

Integrating Sphere Uncertainty: The uncertainty of the light output (luminous flux) measurements is $U=1.8\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=20\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=1.8(K=2)$, at the 95% confidence level. The uncertainty of power meter AC current $U=0.18\%$ of rdg, AC Voltage $U=0.16\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level.



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.

Goniophotometer Uncertainty :The uncertainty of the luminous intensity is $U=1.6\%$ ($K=2$), at the 95% confidence level.



3 Test Result Summary

3.1 Integrating Sphere System (Total operating time for integrating sphere test: 1.0 hour)

3.1.1 Model Number: STL3P-300W-3000K-B-MB-HC-P (TYPE III)

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
277.03	60	1.088	300.73	0.998

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
43369.99	144.2	3050

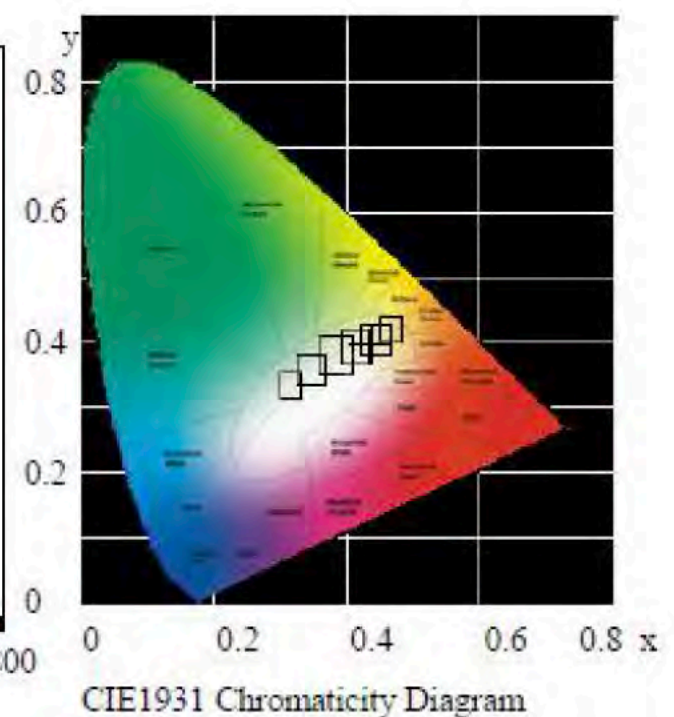
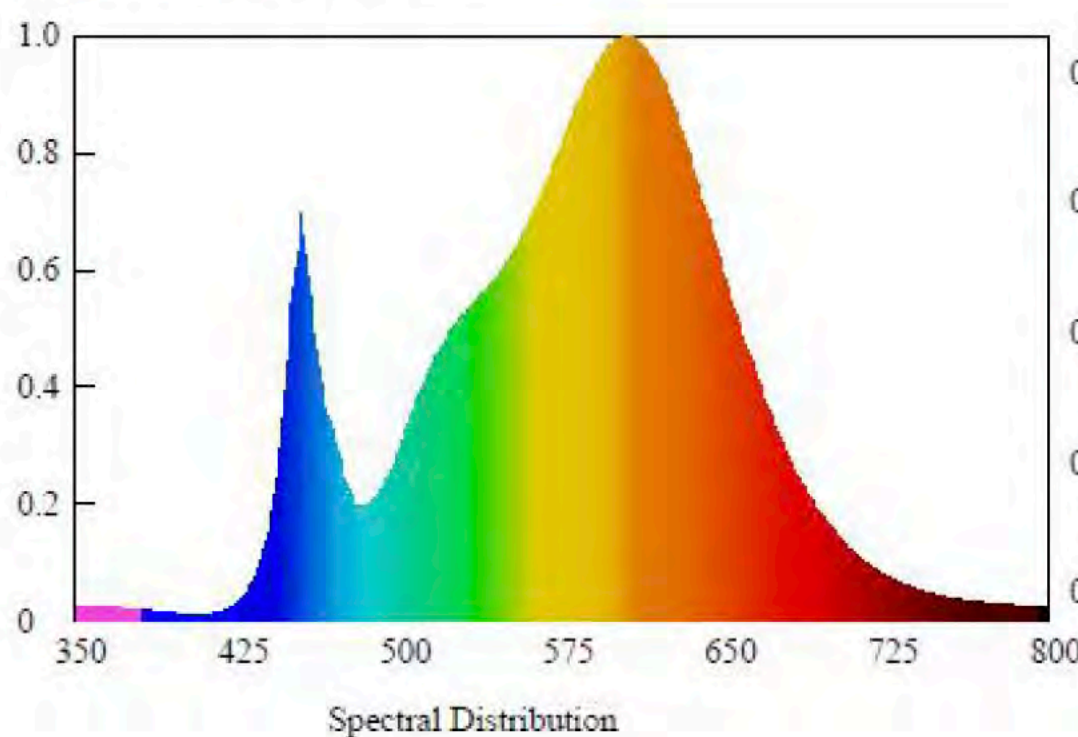
Chromaticity Coordinate

Duv	x	y	u'	v'
-0.00181	0.4309	0.3975	0.2495	0.5179

Color Rendering

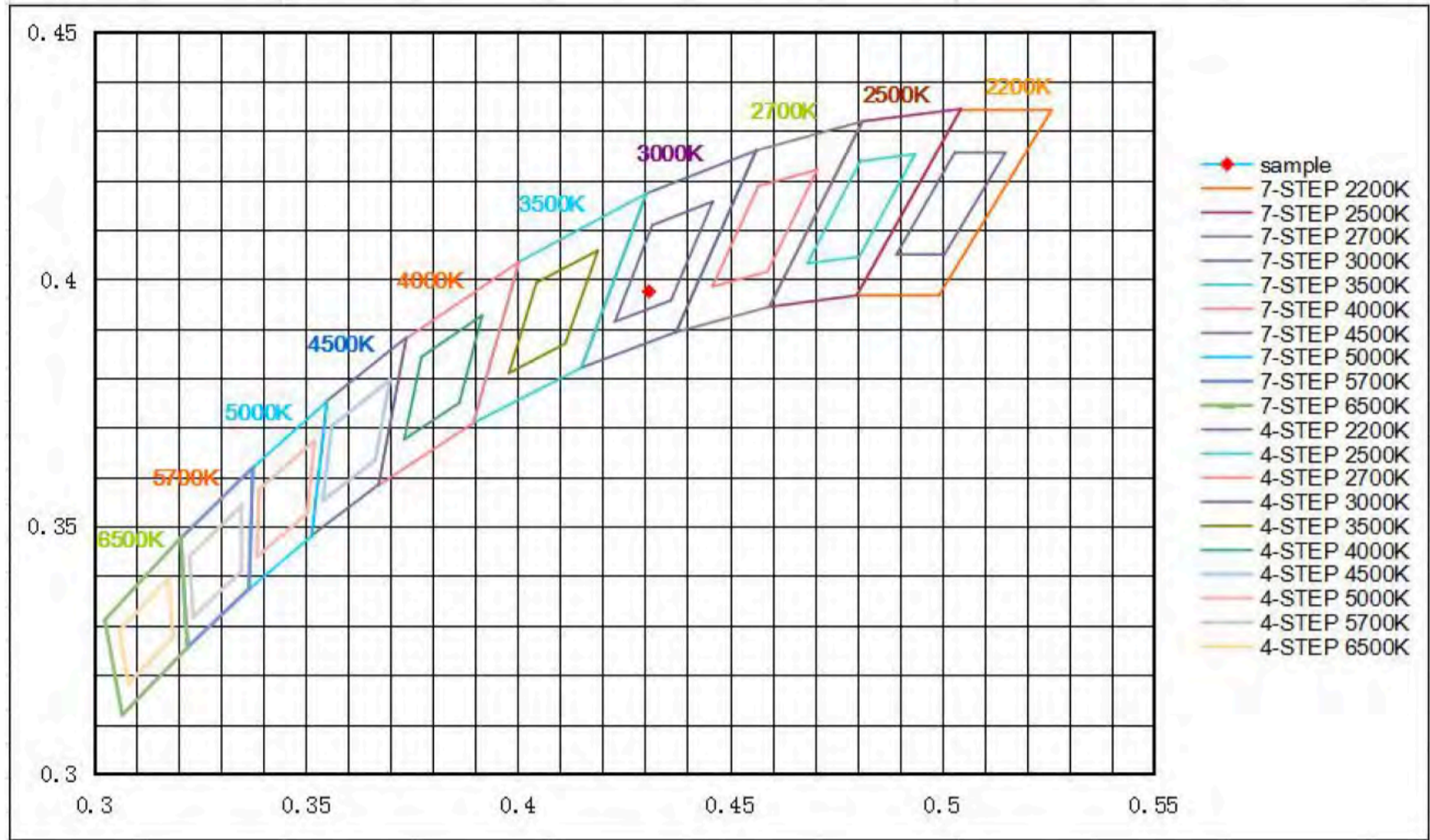
CRI	R9	Rf	Rg	Rcs,h1(%)
83.7	14	84	96	-11

Spectral Distribution





7/4 Step Quadrangle





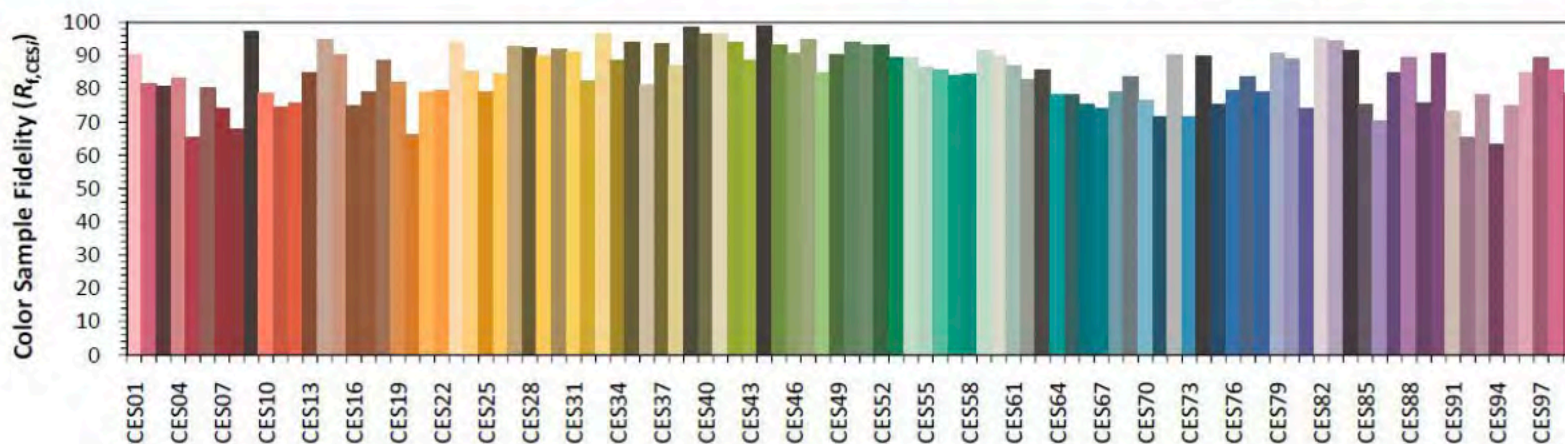
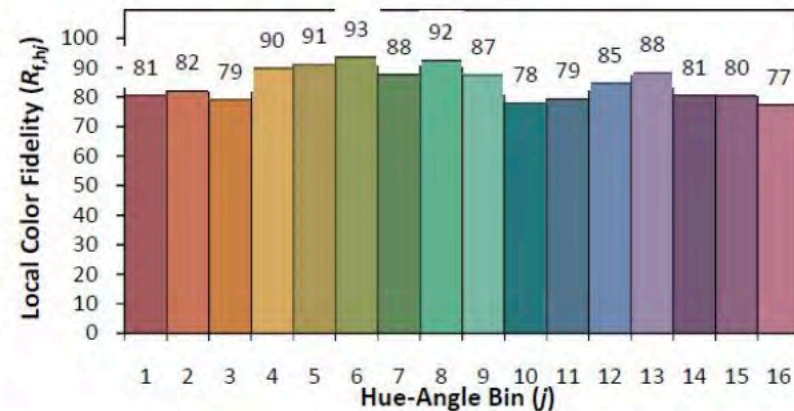
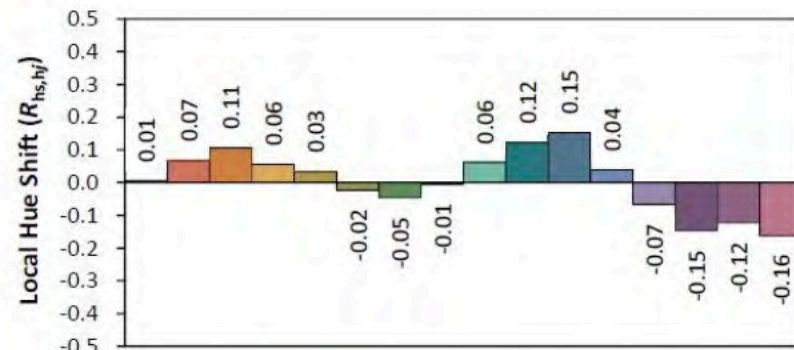
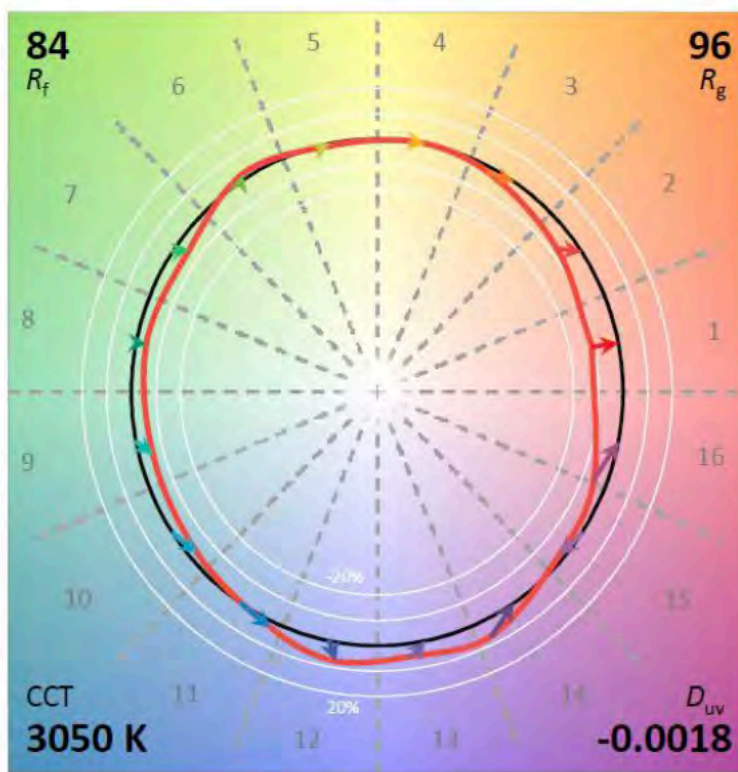
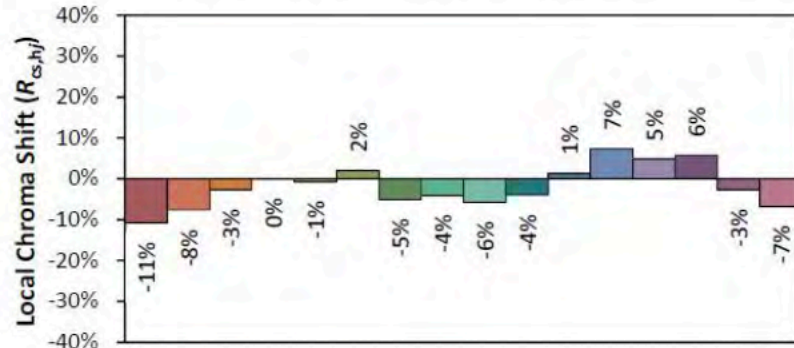
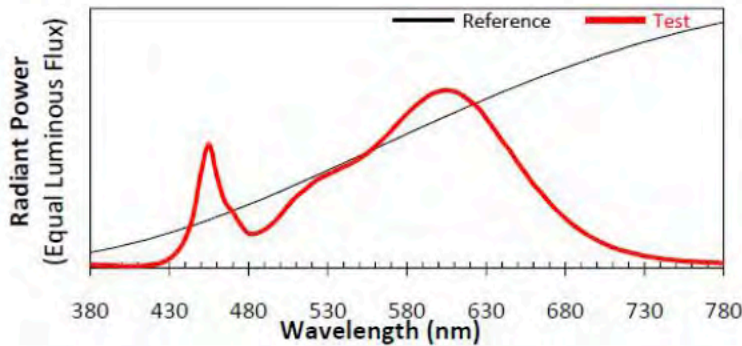
ANSI/IES TM-30-18 Color Rendition Report

Source: BL220112011-9

Manufacturer: P.Q.L., Inc.

Date: 2022-01-20

Model: STL3P-300W-3000K-B-MB-HC-P (TYPE III)



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4309
 y 0.3975
 u' 0.2495
 v' 0.5179

CIE 13.3-1995 (CRI)	
R_a	84
R_g	14

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



3.1.2 Model Number: STL3P-300W-5700K-B-MB-HC-P (TYPE III)

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
277.04	60	1.080	298.63	0.998

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
44389.32	148.6	5742

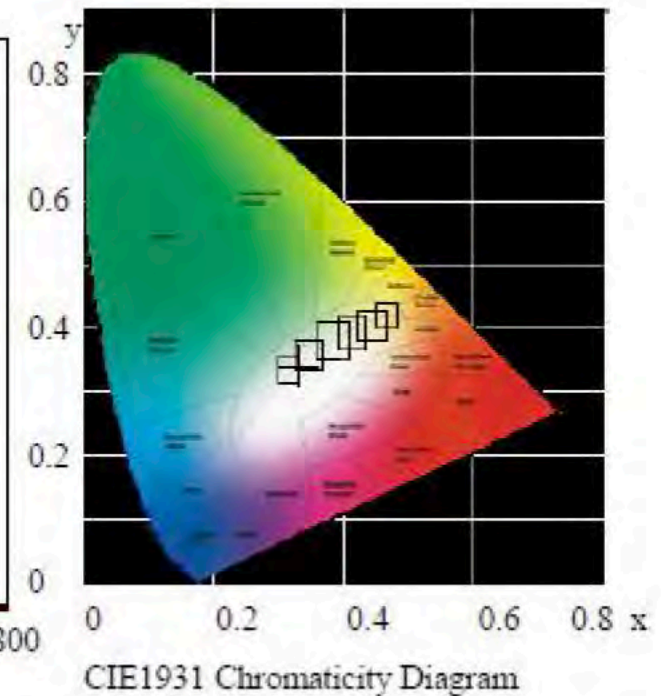
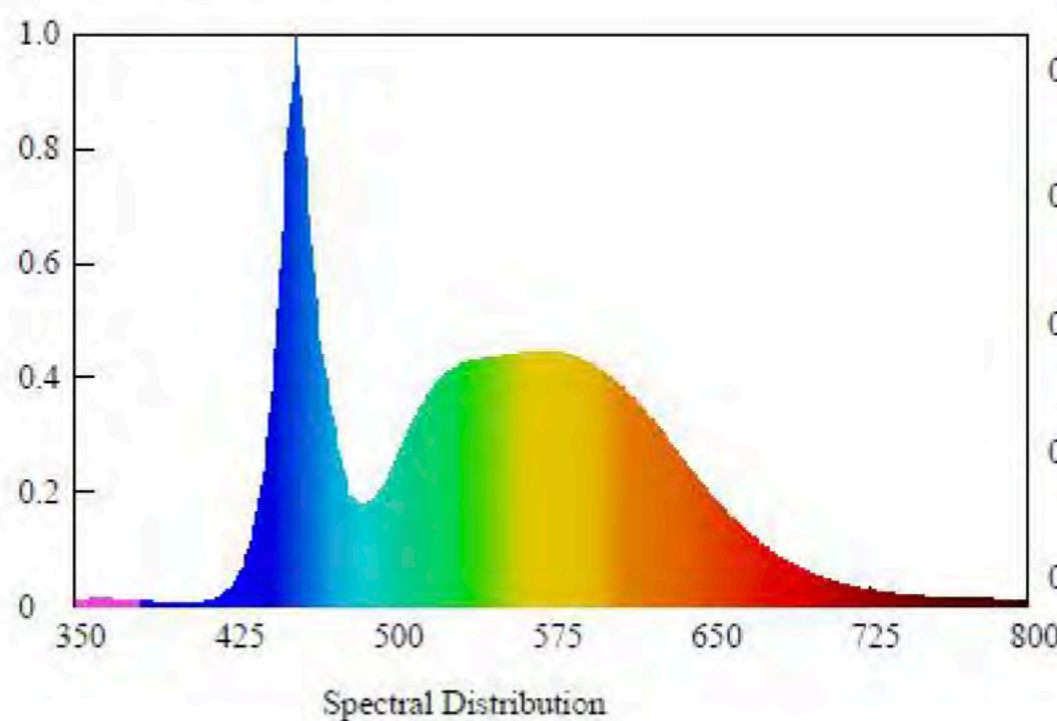
Chromaticity Coordinate

Duv	x	y	u'	v'
+0.00166	0.3271	0.3396	0.2038	0.476

Color Rendering

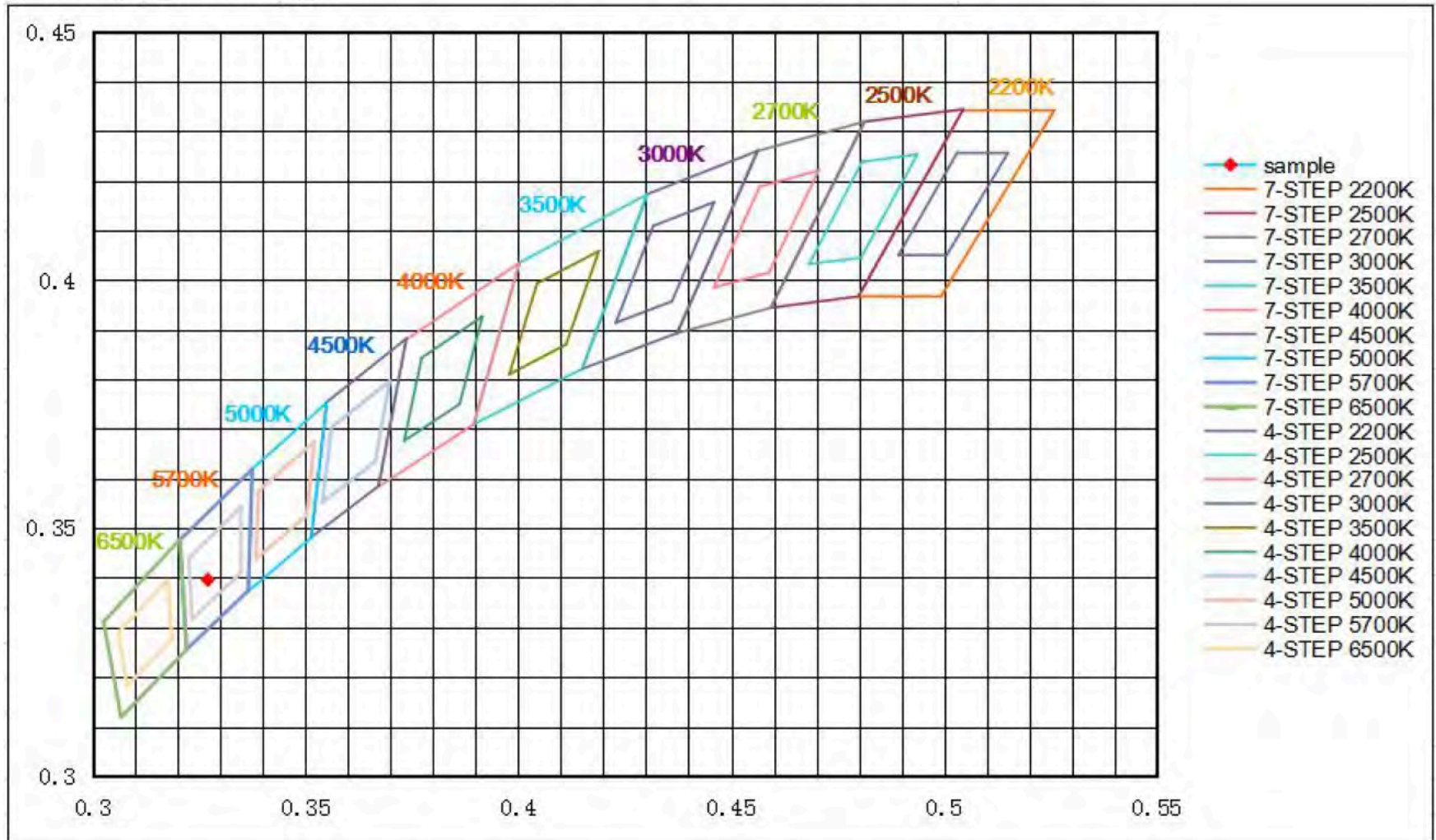
CRI	R9	Rf	Rg	Rcs,h1(%)
83.1	14	82	94	-13

Spectral Distribution





7/4 Step Quadrangle





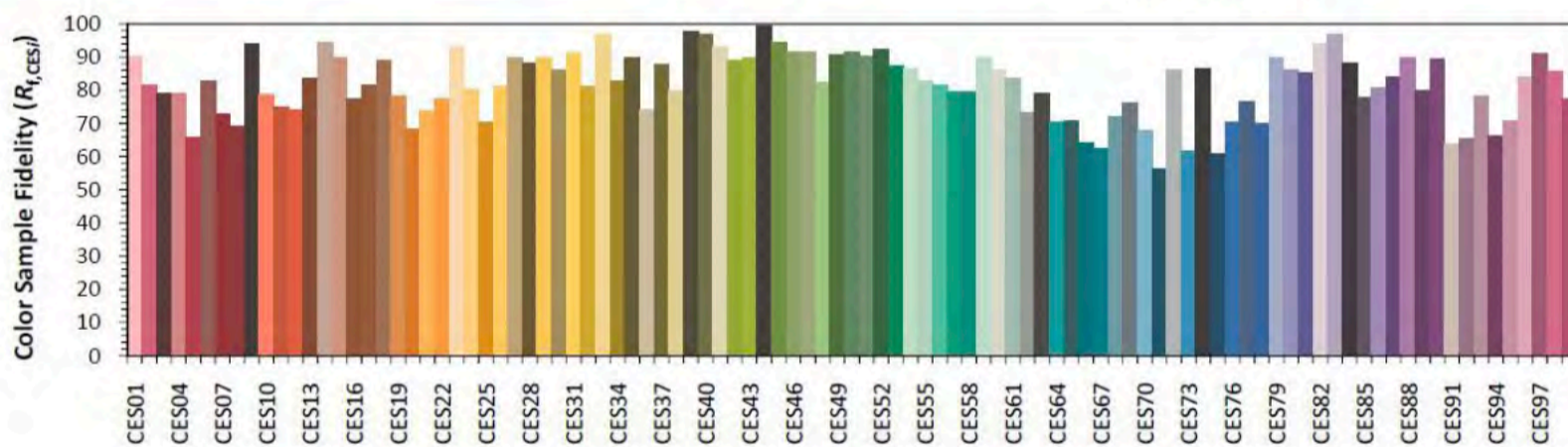
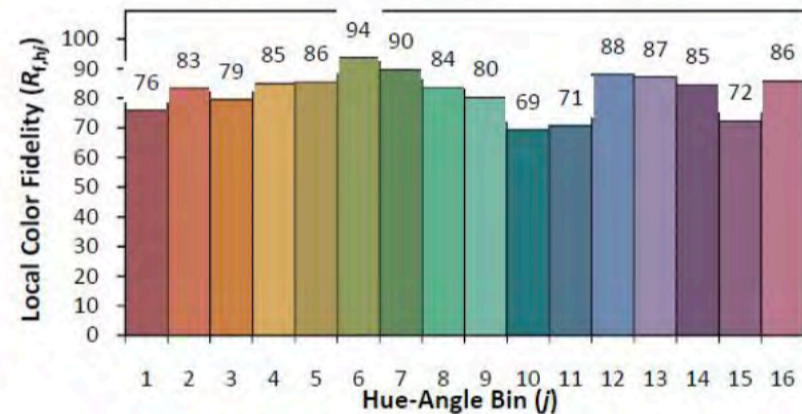
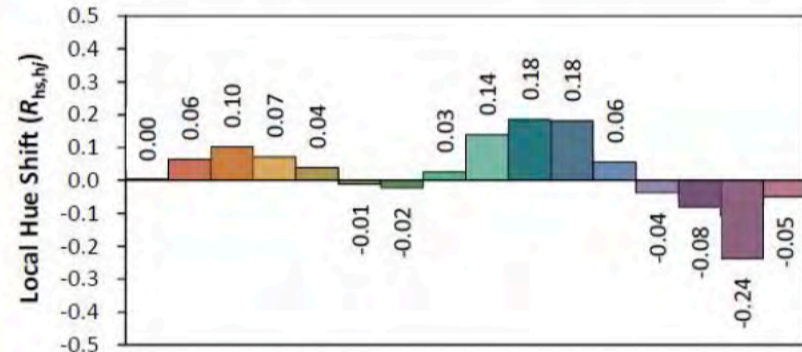
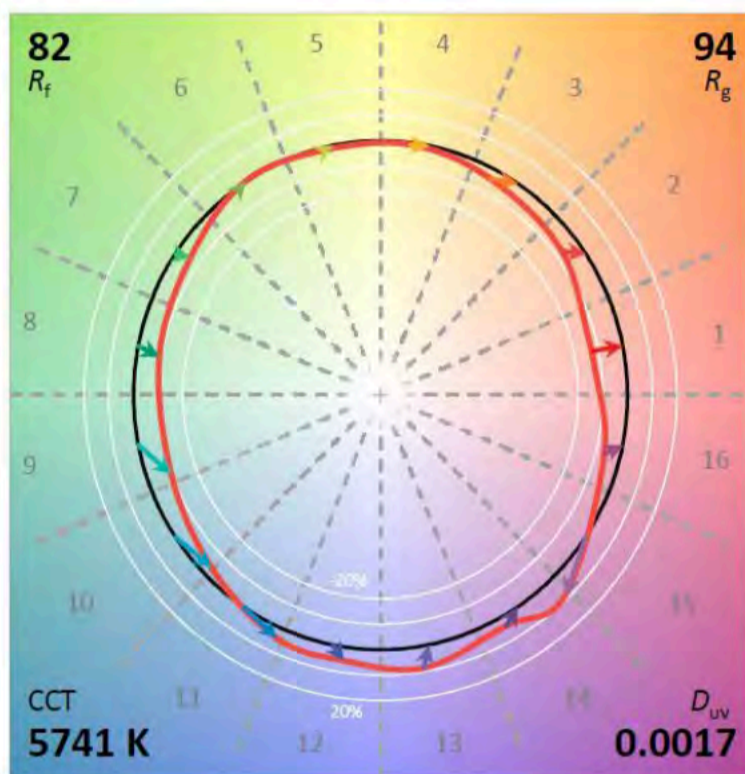
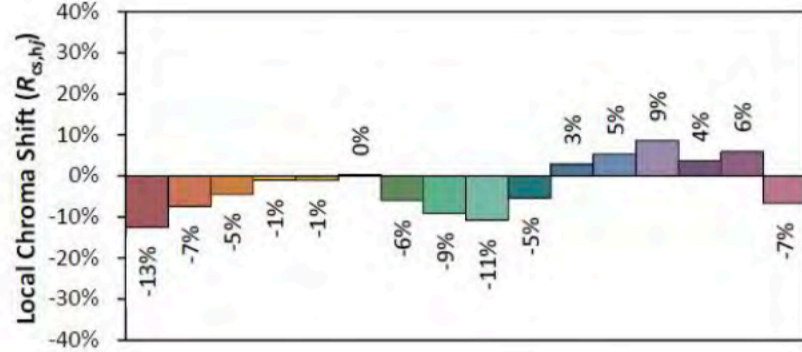
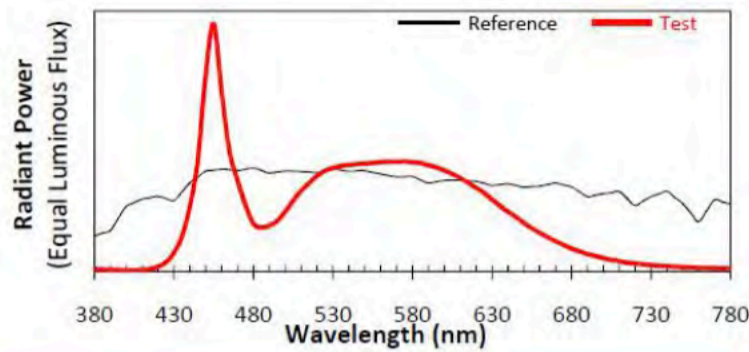
ANSI/IES TM-30-18 Color Rendition Report

Source: BL220112011-9

Manufacturer: P.Q.L., Inc.

Date: 2022-01-20

Model: STL3P-300W-5700K-B-MB-HC-P (TYPE III)



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3271
 y 0.3396
 u' 0.2038
 v' 0.4760

CIE 13.3-1995 (CRI)	
R_a	83
R_g	14

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



3.2 Goniophotometer System (Total operating time for luminous intensity distribution: 1.0 hour)

3.2.1 Model Number: STL3P-300W-3000K-B-MB-HC-P (TYPE III)

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
277.03	60	1.076	297.55	0.9978

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-90°(%lm)	Zonal Lumen in 80-90°(%lm)
43217.43	145.24	99.81	0.67

IESNA Luminaire Flux Distribution Table:

	Lumens	% Luminaire
FL - Front-Low (0-30)	5059.3	11.7
FM - Front-Medium (30-60)	16733.8	38.7
FH - Front-High (60-80)	4050.7	9.4
FVH - Front-Very High (80-90)	96.9	0.2

BL - Back-Low (0-30)	4014.5	9.3
BM - Back-Medium (30-60)	10025.1	23.2
BH - Back-High (60-80)	2963.1	6.9
BVH - Back-Very High (80-90)	192.4	0.4

UL - Uplight-Low (90-100)	15.1	0.0
UH - Uplight-High (100-180)	66.4	0.2
Total	43217.3	100.0

BUG Rating	B5-U3-G4
------------	----------



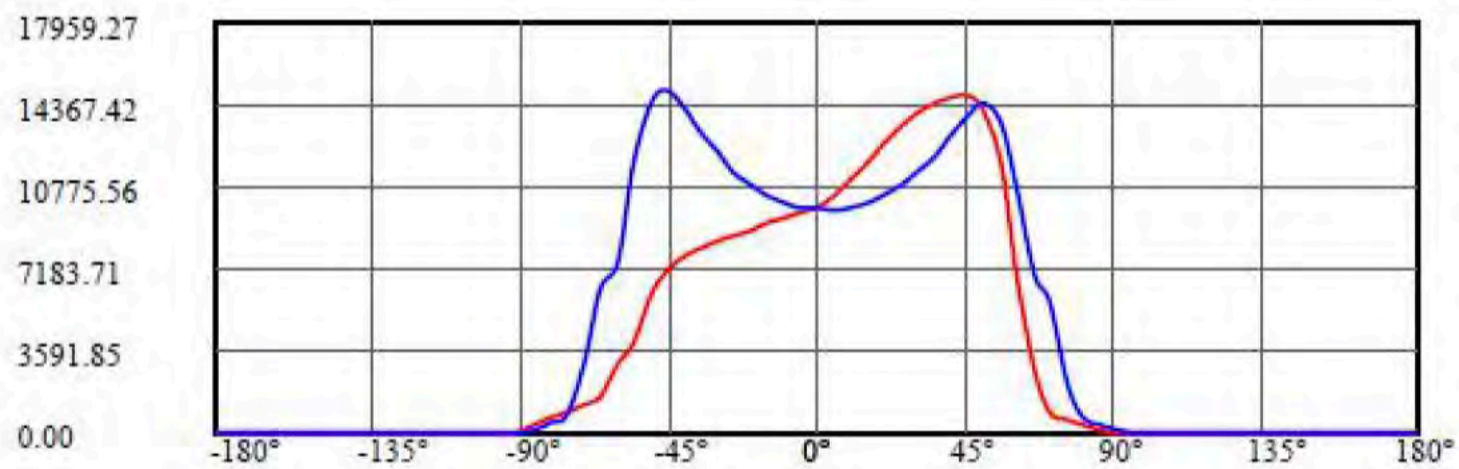
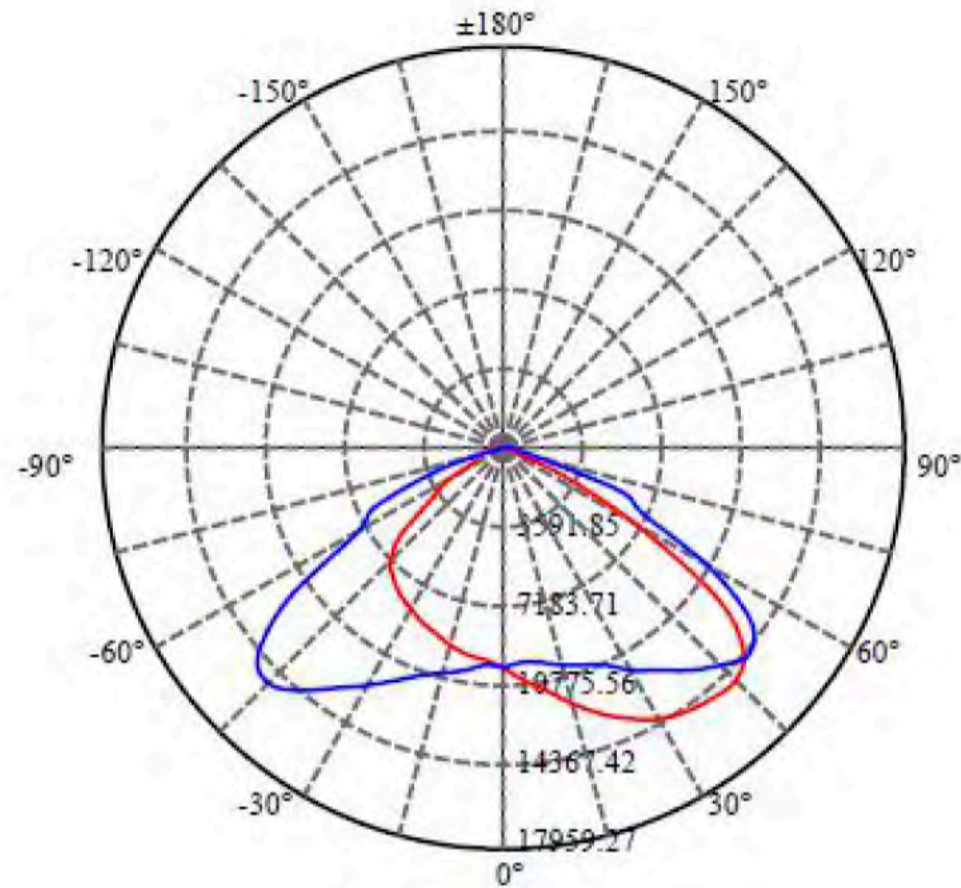
Zonal Flux Diagram

Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	9787.944	0.000	0	0.00%	0.00%
5.0	9872.983	235.041	235.041	0.00%	0.54%
10.0	10085.631	713.982	949.023	0.00%	2.20%
15.0	10378.291	1213.906	2162.929	0.00%	5.00%
20.0	10727.099	1739.381	3902.31	0.00%	9.03%
25.0	11149.872	2294.490	6196.8	0.00%	14.34%
30.0	11584.577	2877.063	9073.864	0.00%	21.00%
35.0	12038.952	3478.730	12552.594	0.00%	29.05%
40.0	12429.281	4082.340	16634.934	0.00%	38.49%
45.0	12626.966	4639.367	21274.301	0.00%	49.23%
50.0	12305.056	5037.880	26312.181	0.00%	60.88%
55.0	10947.142	5055.802	31367.983	0.00%	72.58%
60.0	8368.825	4464.831	35832.814	0.00%	82.91%
65.0	5568.430	3388.173	39220.987	0.00%	90.75%
70.0	2866.441	2135.764	41356.75	0.00%	95.69%
75.0	1127.245	1043.885	42400.636	0.00%	98.11%
80.0	539.483	445.970	42846.606	0.00%	99.14%
85.0	242.417	212.461	43059.067	0.00%	99.63%
90.0	38.327	76.870	43135.937	0.00%	99.81%
95.0	6.136	12.174	43148.111	0.00%	99.84%
100.0	4.740	2.955	43151.066	0.00%	99.85%
105.0	5.766	2.811	43153.877	0.00%	99.85%
110.0	7.413	3.445	43157.322	0.00%	99.86%
115.0	9.363	4.248	43161.57	0.00%	99.87%
120.0	11.666	5.112	43166.682	0.00%	99.88%
125.0	13.818	5.891	43172.573	0.00%	99.90%
130.0	15.768	6.433	43179.006	0.00%	99.91%
135.0	17.113	6.644	43185.65	0.00%	99.93%
140.0	17.836	6.471	43192.121	0.00%	99.94%
145.0	17.987	5.977	43198.097	0.00%	99.96%
150.0	17.903	5.285	43203.382	0.00%	99.97%
155.0	17.634	4.497	43207.88	0.00%	99.98%
160.0	16.726	3.604	43211.483	0.00%	99.99%
165.0	15.734	2.675	43214.158	0.00%	99.99%
170.0	15.062	1.827	43215.985	0.00%	100.00%
175.0	15.079	1.078	43217.064	0.00%	100.00%
180.0	15.822	0.369	43217.433	0.00%	100.00%



Luminous Intensity Distribution Diagram Light Distribution Curve [Unit:cd]



C0/C180: 

C90/C270: 

Field angle(10%Imax):C0/180Left:66.0 Right:68.4

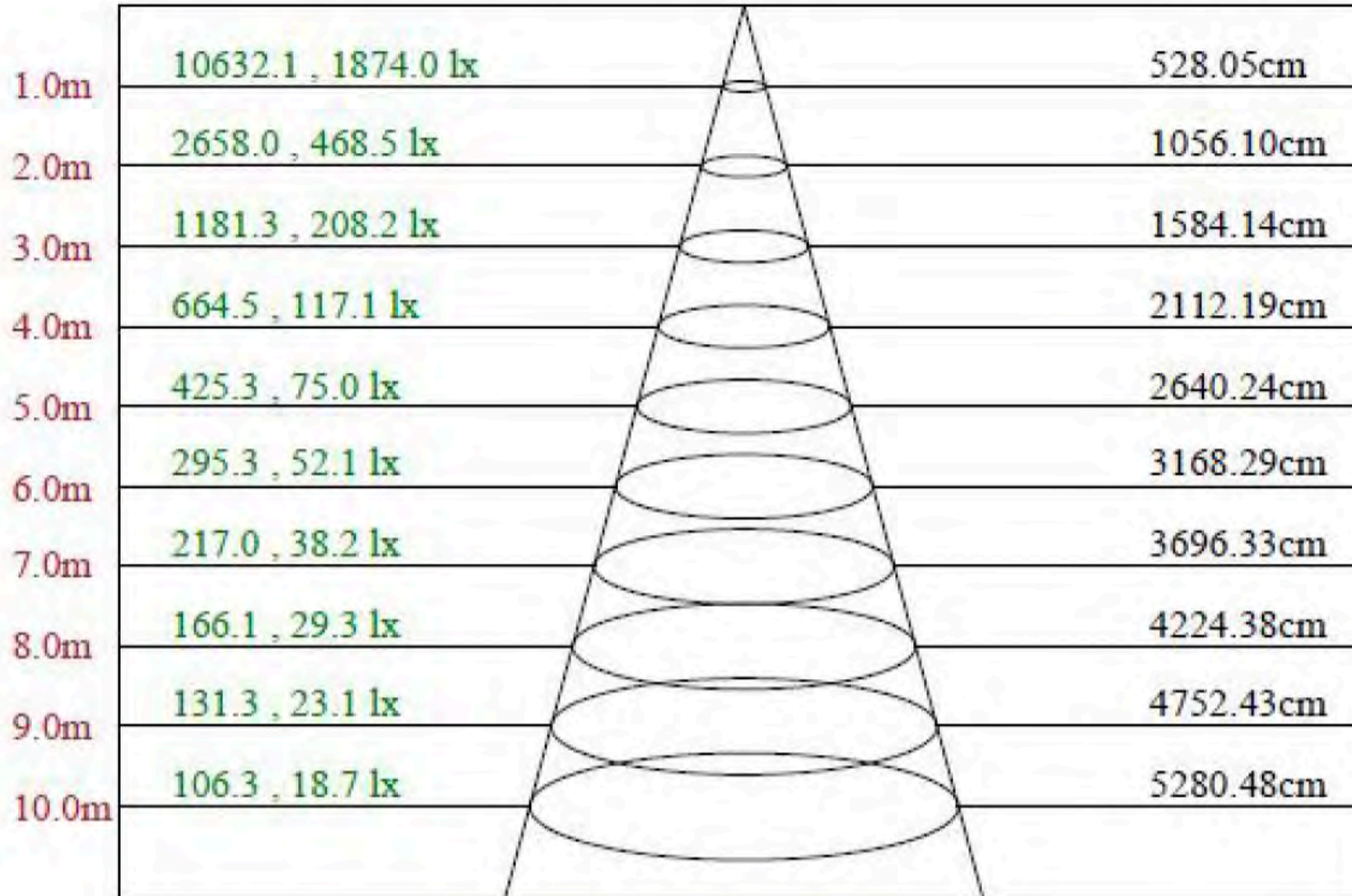
:C90/270Left:73.6 Right:77.1

Beam Angle(50%Imax):C0/180Left:42.5 Right:59.5

:C90/270Left:60.1 Right:64.3



Lux distance Curve



Max , Ave Beam angle of C292.5 plane 138.51



$C/\gamma(^{\circ})$	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	11.03	12.10	13.18	13.99	15.06	14.79	14.79	14.26	15.33
22.5	12.91	13.72	14.52	15.06	15.33	15.33	15.06	14.79	15.87
45.0	15.87	16.68	16.68	16.68	16.68	15.87	15.60	15.06	16.14
67.5	18.83	19.10	18.83	18.56	17.75	16.41	15.60	15.33	16.41
90.0	15.60	16.68	16.68	16.94	16.14	15.06	14.26	13.72	13.72
112.5	19.37	19.90	19.37	18.83	18.02	16.41	15.33	14.26	13.45
135.0	22.32	22.32	21.79	20.98	19.90	18.29	16.14	15.06	14.26
157.5	23.13	23.40	22.86	22.06	21.25	19.37	17.21	16.14	15.06
180.0	21.52	22.32	22.32	22.06	21.52	20.17	18.02	16.68	15.33
202.5	20.17	21.79	22.06	21.79	21.25	19.90	18.02	16.68	15.60
225.0	20.71	21.52	21.79	21.52	20.98	19.90	18.02	16.68	15.60
247.5	20.98	21.52	20.98	20.71	20.44	19.10	17.48	16.41	15.33
270.0	16.41	16.41	16.94	16.41	15.87	15.06	14.52	14.52	15.06
292.5	13.45	13.99	14.26	14.26	14.26	13.72	13.72	13.72	14.52
315.0	11.30	12.10	12.91	13.45	13.72	13.99	13.99	13.99	14.52
337.5	10.22	11.83	12.64	13.18	13.99	14.26	13.99	13.72	15.06
360.0	11.03	12.10	13.18	13.99	15.06	14.79	14.79	14.26	15.33
$C/\gamma(^{\circ})$	180.0								
0.0	15.82								
22.5	15.82								
45.0	15.82								
67.5	15.82								
90.0	15.82								
112.5	15.82								
135.0	15.82								
157.5	15.82								
180.0	15.82								
202.5	15.82								
225.0	15.82								
247.5	15.82								
270.0	15.82								
292.5	15.82								
315.0	15.82								
337.5	15.82								
360.0	15.82								



4 Additional Test

Electrical data at 480V

Model Number	Test Voltage (V)	Frequency(Hz)	Power Factor	THD
STL3P-300W-3000K-B-MB-HC-P	480	60	0.962	5.6%
STL3P-300W-5700K-B-MB-HC-P	480	60	0.968	4.1%

5 Performance Assessment

Model name	CCT(K)	Total Luminous(lm)	Power(W)	Luminous Efficacy(lm/W)
STL3P-300W-3000K-B-MB-HC-P	3000K	43369.99	300.73	144.2
STL3P-300W-3500K-B-MB-HC-P	3500K	43573.86 * ¹	299.68 * ²	145.4 * ³
STL3P-300W-4000K-B-MB-HC-P	4000K	43777.72 * ¹	299.68 * ²	146.1 * ³
STL3P-300W-4500K-B-MB-HC-P	4500K	43981.59 * ¹	299.68 * ²	146.8 * ³
STL3P-300W-5000K-B-MB-HC-P	5000K	44185.45 * ¹	299.68 * ²	147.4 * ³
STL3P-300W-5700K-B-MB-HC-P	5700K	44389.32	298.63	148.6

*1: This value is calculated and the calculation formula is as below:

$$43573.86=(44389.32-43369.99) /5+43369.99$$

$$43777.72=(44389.32-43369.99) /5+43573.86$$

$$43981.59=(44389.32-43369.99) /5+43777.72$$

$$44185.45=(44389.32-43369.99) /5+43981.59$$

*2: This value is calculated and the calculation formula is as below:

$$299.68=(300.73+298.63)/2$$

*3: This value is calculated and the calculation formula is as below:

$$145.4=43573.86 /299.68$$

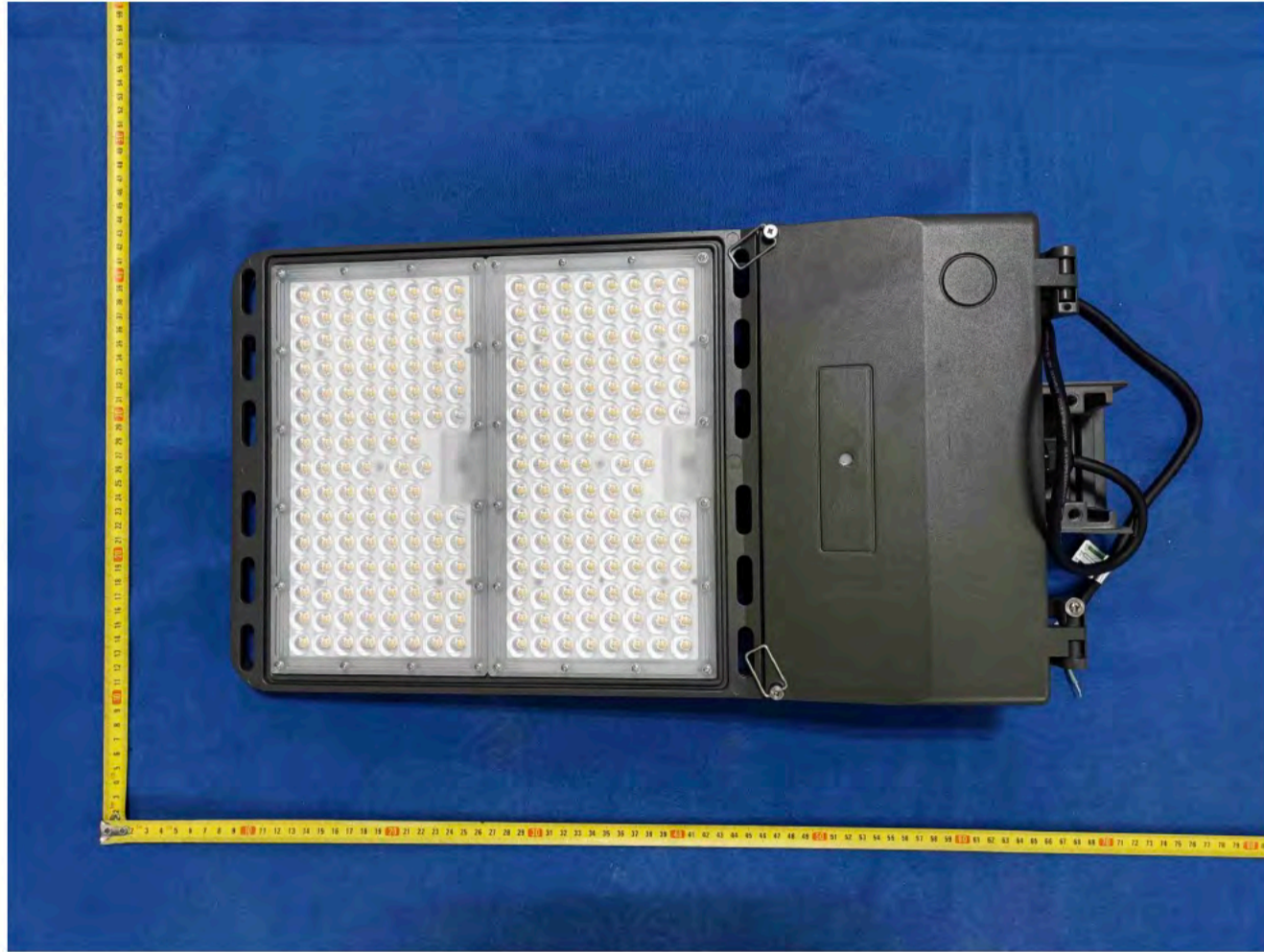
$$146.1=43777.72 /299.68$$

$$146.8=43981.59 /299.68$$

$$147.4=44185.45 /299.68$$



Photo Document



End of test report