Date of issue	2023-10-16
Version	1.0
Total pages	22

Test report of
IES LM-79-08
Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Applicant:

Beyond LED Technology

Address:

1939 Parker Court, Stone Mountain, GA 30087

For Product:

Outdoor Pole/Arm-Mounted Decorative Luminaries

Model No.:

PT01-150L-CSP-3CCT

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.

Sam Chen

Jason zhou

Complied by: Sam Chen — **Review by: Jason zhou**

Project Engineer — **Technical Manager**

Note 1: 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 used 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.
Note 2: 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 General

1.1 Product Information

Manufacturer	Beyond LED Technology
Manufacturer Address	1939 Parker Court, Stone Mountain, GA 30087
Brand Name	Beyond LED Technology
Luminaire Type	Outdoor Pole/Arm-Mounted Decorative Luminaires
Model Number	PT01-150L-CSP-3CCT
Rated Inputs	AC 120-277V, 50/60Hz
Field-Adjustable Product	Yes, Watting setting: 80W, 100W, 150W
Color-Tunable Product	Yes, CCT setting: 3000K, 4000K, 5000K
Dimming Capability	Continuous
Integral Control Sensors	Optional
Date of Receipt Samples	2023-09-19
Date of test	2023-09-19 to 2023-09-22
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

1.3 Equipment list

Device	Manufacture	Model No.	Serial No.	Calibration due date
Goniophotometeric System	SENSING	GMS-3000	M101758514120011	2024-03-27
AC Power Source	ALL POWER	APW-105N	N.A	2024-03-27
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S13100188	2024-04-03
Total Luminous Flux Standard Lamp	OSRAM	12V/20W	LSD12201737	2024-04-03
Total Spectral Radiant Flux Standard Lamp	Everfine	D204	M133806CA1411205	2024-04-03
Digital Power Meter	YOKOGAWA	WT310	N.A	2024-03-27
Thermostatic stabilized photometric sphere	SENSING	SPR-600M	N.A	2024-03-27
Plant spectral photosynthetically radiometer	Everfine	SP-20	P612946CF1411115	2024-03-27
Digital Power Meter	YOKOGAWA	WT210	N.A	2024-03-27
Spectral radiometer	SENSING	SPR-3000	S1101108	2024-03-27
Environment Measurer	XUYAO	HS-1	N/A	2024-03-31
Environment Measurer	XUYAO	HS-1	N/A	2024-03-31
Stop watch	KISLO	K610	N/A	2024-04-19
Digital Anemometer	TECMAN	TD8901	026141	2024-09-06

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°C ±1°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=20K (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: PT01-150L-[C;CS;CM;CP;CSM;CSP]-3CCT, 3000K

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.00	60	1.229	146.75	0.995

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
19253.16	131.2	2900

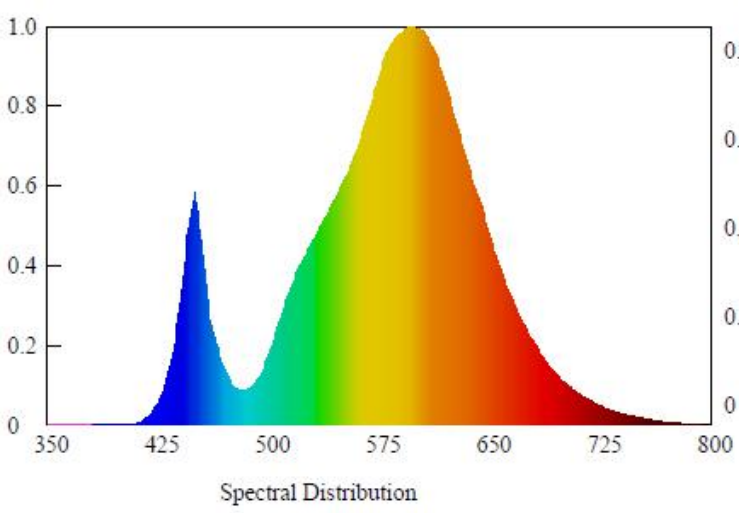
Chromaticity Coordinate

Duv	x	y	u'	v'
-0.00127	0.4423	0.4026	0.2547	0.5216

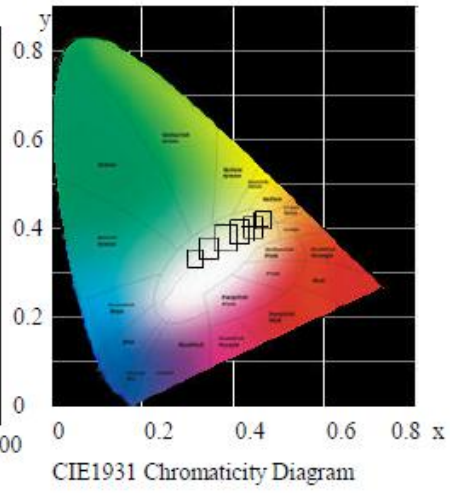
Color Rendering

CRI	R9	Rf	Rg	Rcs,h1(%)
72.5	-29	75	95	-16

Spectral Distribution

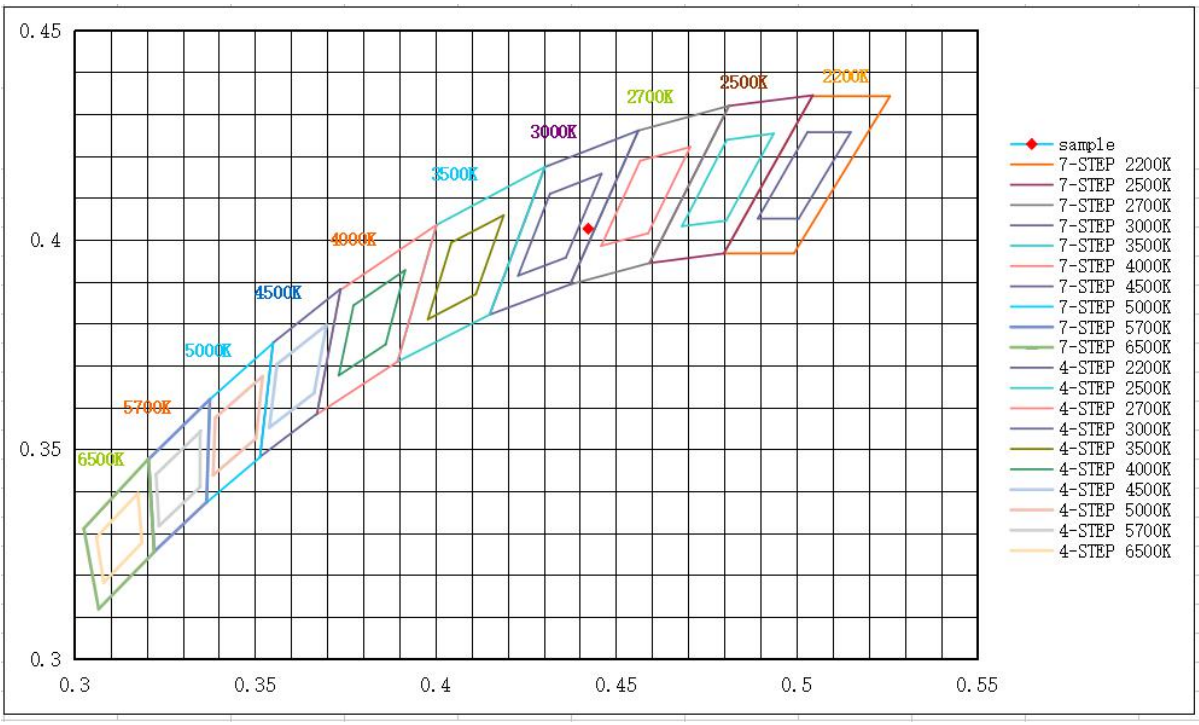


Spectral Distribution



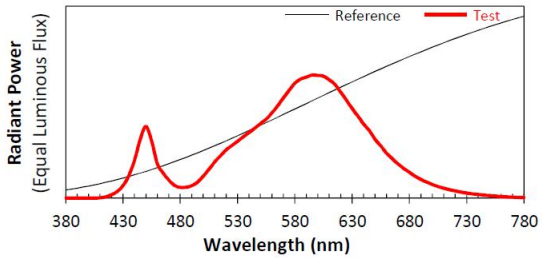
CIE1931 Chromaticity Diagram

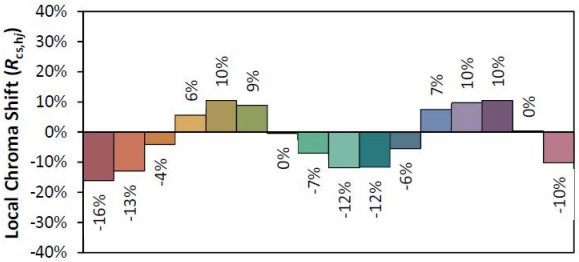
7/4 Step Quadrangle

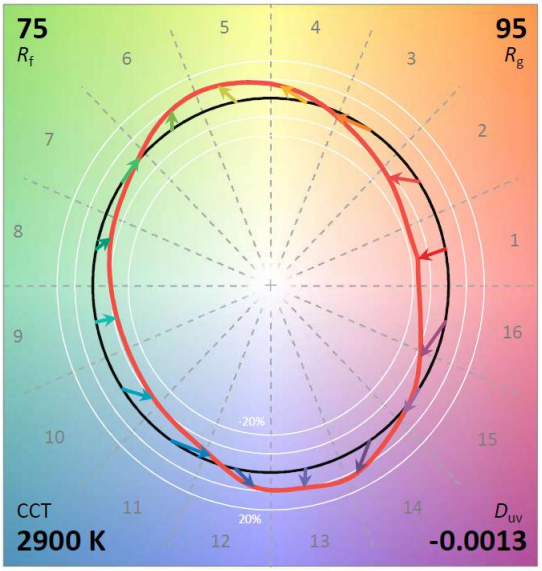


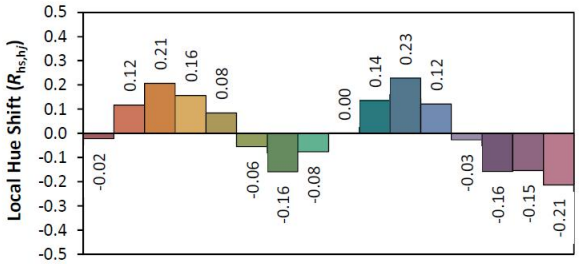
ANSI/IES TM-30-18 Color Rendition Report

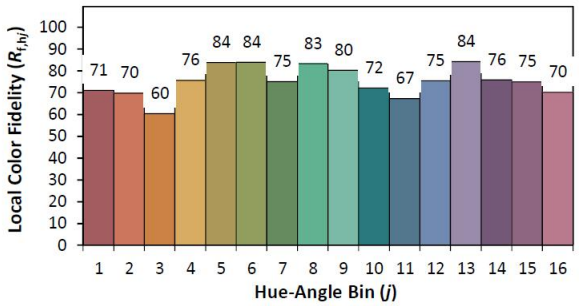
Source:	BL230919001-9	**Manufacturer:**	RZ Lighting Co Ltd
Date:	2023-10-16	**Model:**	PT01-150L-[C;CS;CM;CP;CSM;CSP]-3CCT, 3000K

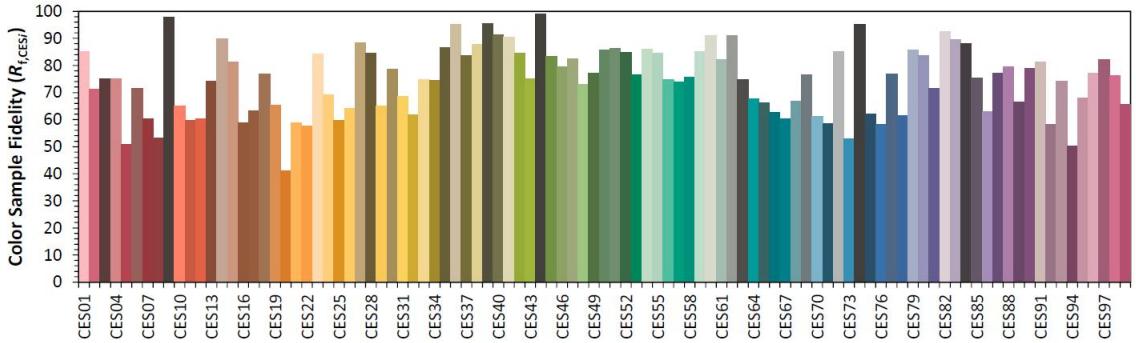












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4423
y	0.4026
u'	0.2547
v'	0.5216

CIE 13.3-1995 (CRI)

R_a	73
R_9	-29

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

3.1.2 Model Number: PT01-150L-[C;CS;CM;CP;CSM;CSP]-3CCT, 4000K

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.06	60	1.201	143.52	0.995

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
20049.72	139.7	3732

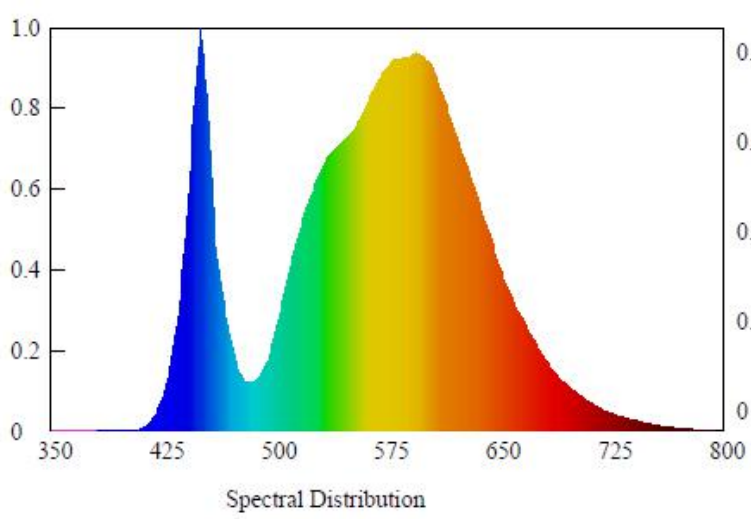
Chromaticity Coordinate

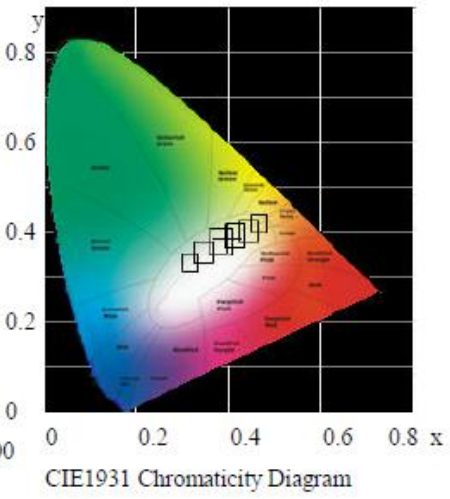
Duv	x	y	u'	v'
-0.00004	0.3930	0.3841	0.2304	0.5066

Color Rendering

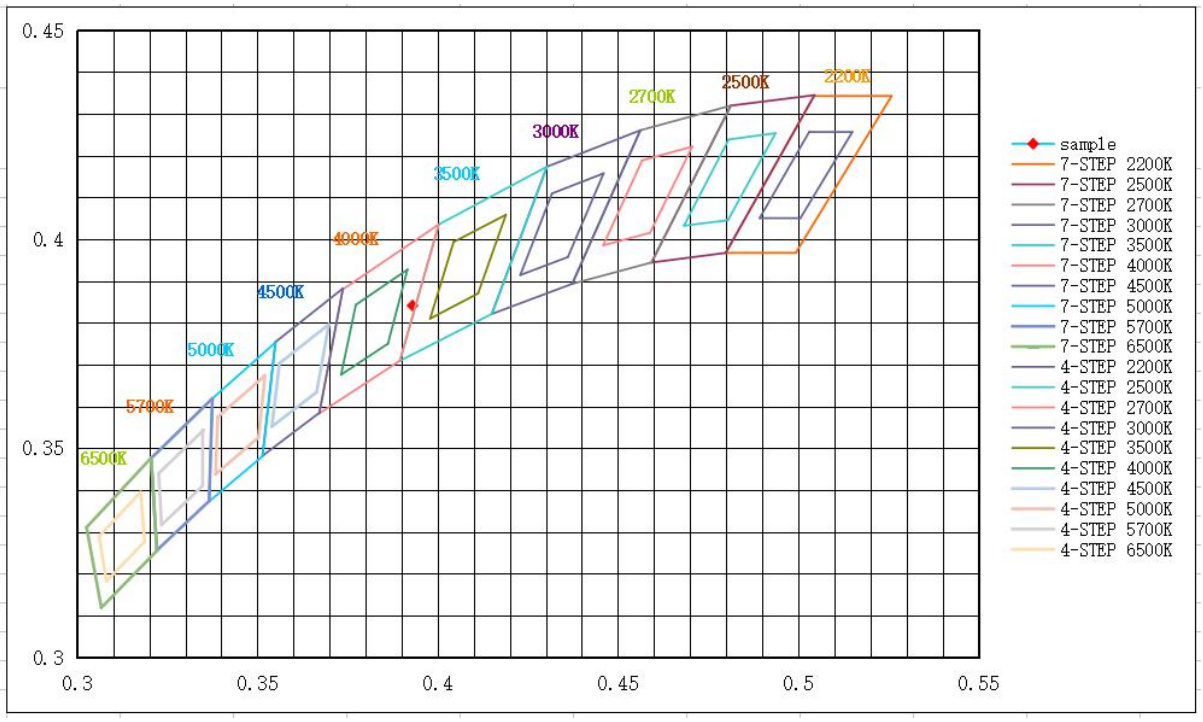
CRI	R9	Rf	Rg	Rcs,h1(%)
74.5	-20	76	95	-16

Spectral Distribution



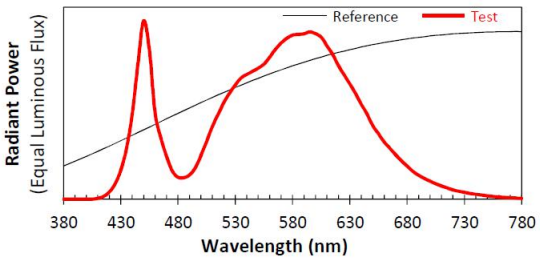


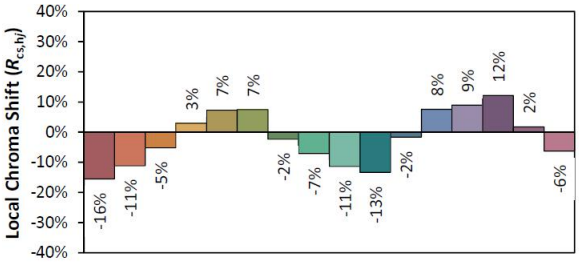
7/4 Step Quadrangle

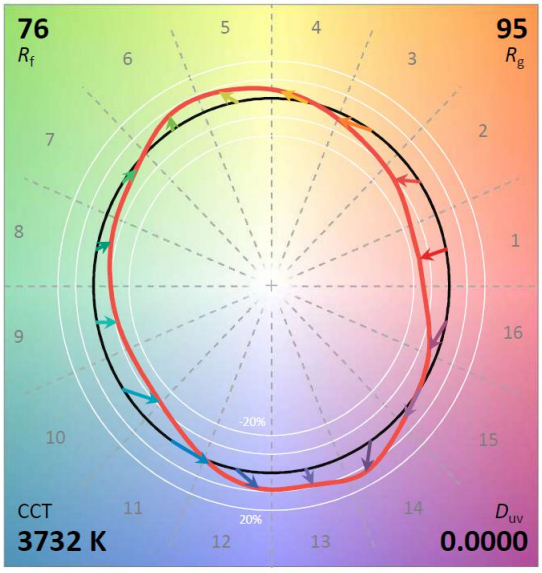


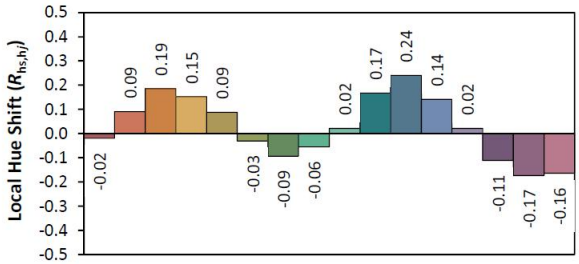
ANSI/IES TM-30-18 Color Rendition Report

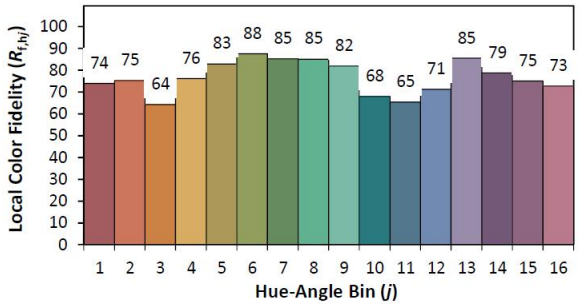
Source:	BL230919001-9	**Manufacturer:**	RZ Lighting Co Ltd
Date:	2023-10-16	**Model:**	PT01-150L-[C;CS;CM;CP;CSM;CSP]-3CCT, 4000K

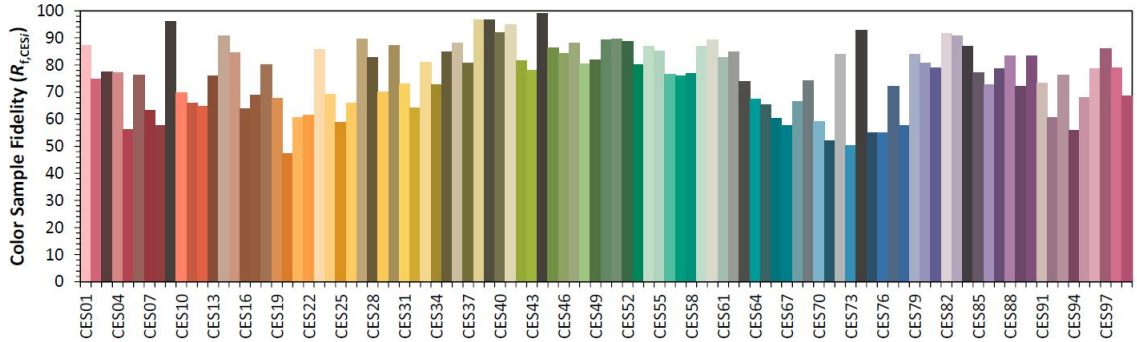












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3930
y	0.3841
u'	0.2304
v'	0.5066

CIE 13.3-1995 (CRI)

R_a	75
R_9	-20

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

3.1.3 Model Number: PT01-150L-[C;CS;CM;CP;CSM;CSP]-3CCT, 5000K

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.05	60	1.226	146.45	0.995

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
19668.29	134.3	4891

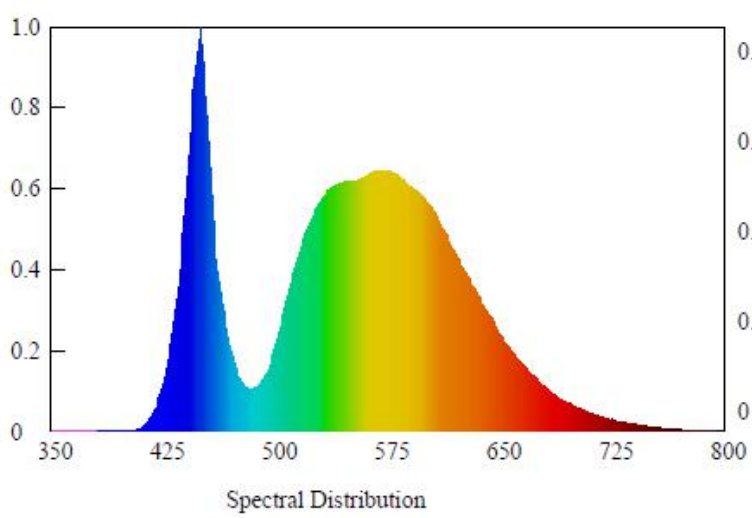
Chromaticity Coordinate

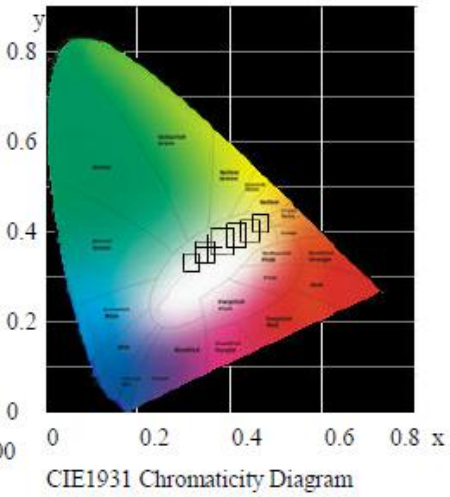
Duv	x	y	u'	v'
+0.0041	0.3492	0.3632	0.2098	0.4908

Color Rendering

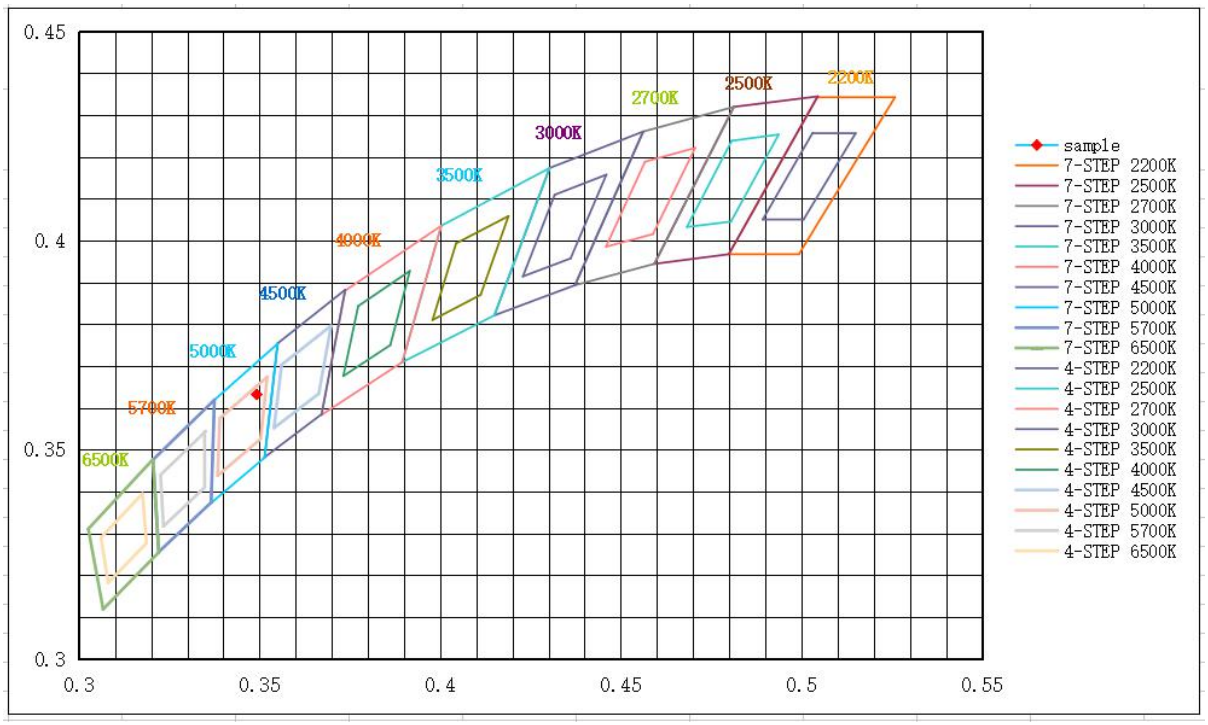
CRI	R9	Rf	Rg	Rcs,h1(%)
72.3	-26	74	95	-17

Spectral Distribution



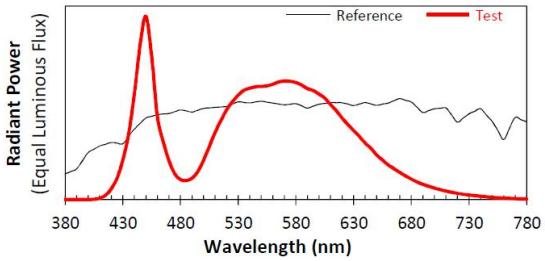


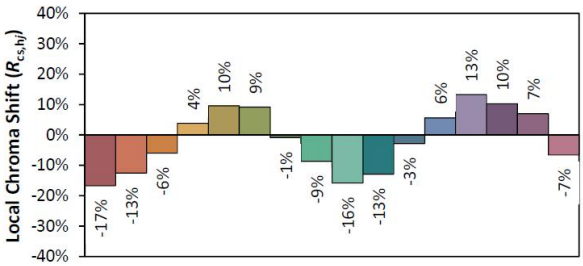
7/4 Step Quadrangle

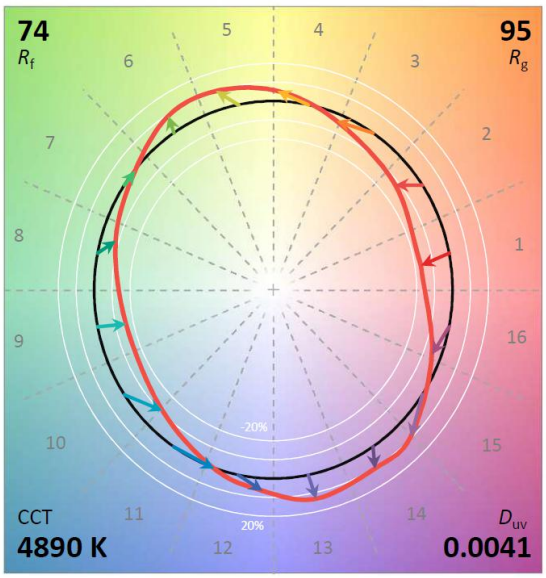


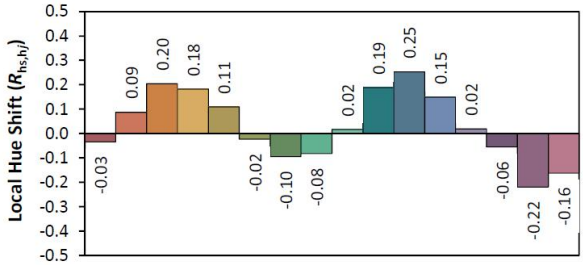
ANSI/IES TM-30-18 Color Rendition Report

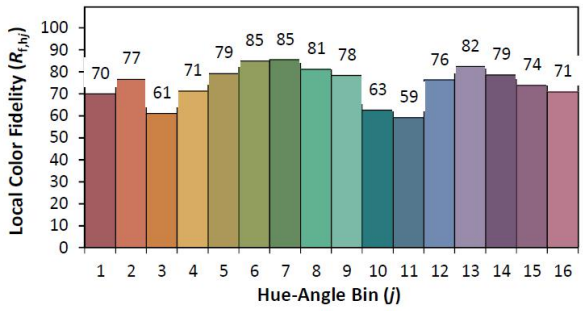
Source:	BL230919001-9	**Manufacturer:**	RZ Lighting Co Ltd
Date:	2023-10-16	**Model:**	PT01-150L-[C;CS;CM;CP;CSM;CSP]-3CCT, 5000K

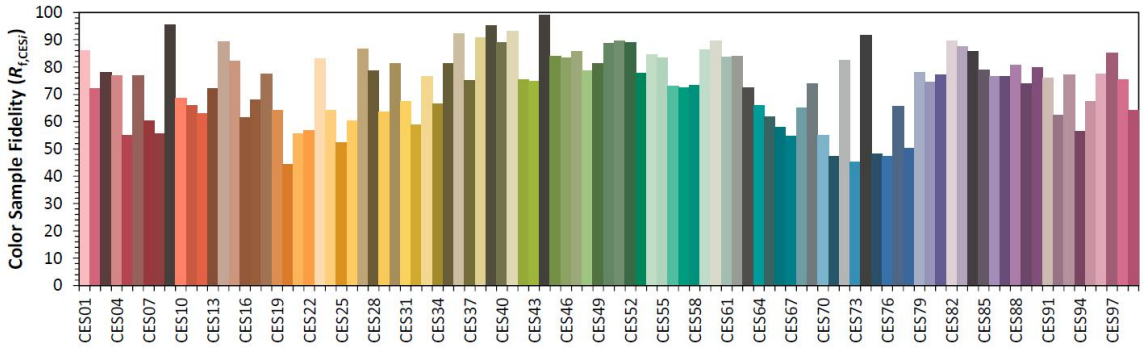












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3492
y	0.3632
u'	0.2098
v'	0.4908

CIE 13.3-1995 (CRI)

R_a	72
R_9	-27

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: PT01-150L-[C;CS;CM;CP;CSM;CSP]-3CCT, 3000K

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.03	60	1.2230	146.14	0.9952

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-90°(%lm)
19149.38	131.03	99.53

IESNA Luminaire Flux Distribution Table:

	Lumens	% Luminaire
FL - Front-Low (0-30)	1758.4	9.2
FM - Front-Medium (30-60)	5629.7	29.4
FH - Front-High (60-80)	1849.3	9.7
FVH - Front-Very High (80-90)	47.0	0.2

BL - Back-Low (0-30)	1711.9	8.9
BM - Back-Medium (30-60)	5592.1	29.2
BH - Back-High (60-80)	2417.4	12.6
BVH - Back-Very High (80-90)	53.3	0.3

UL - Uplight-Low (90-100)	39.1	0.2
UH - Uplight-High (100-180)	51.2	0.3
Total	19149.4	100.0

BUG Rating	B4-U3-G2

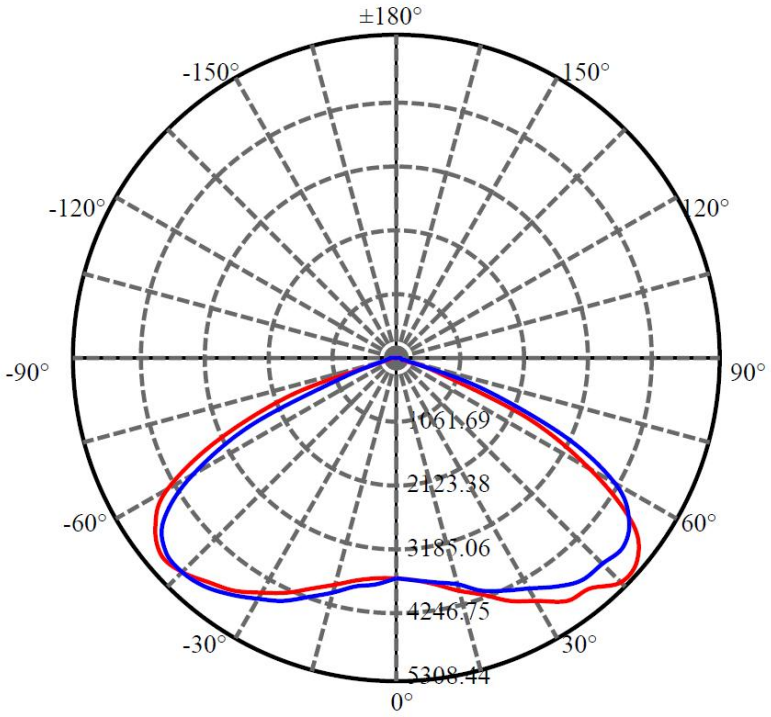
Zonal Flux Diagram

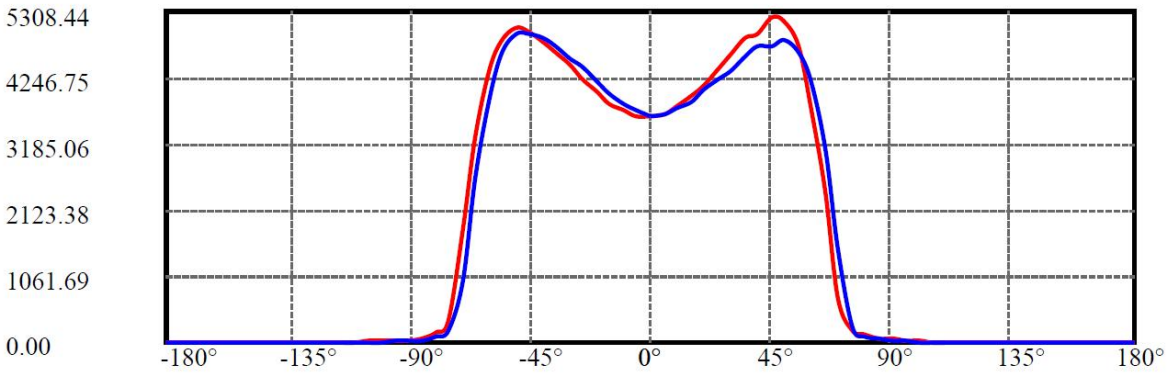
Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	3614.322	0.000	0	0.00%	0.00%
5.0	3658.748	86.947	86.947	0.00%	0.45%
10.0	3772.009	265.822	352.769	0.00%	1.84%
15.0	3928.272	456.775	809.545	0.00%	4.23%
20.0	4108.219	662.320	1471.864	0.00%	7.69%
25.0	4309.866	882.902	2354.766	0.00%	12.30%
30.0	4505.029	1115.532	3470.298	0.00%	18.12%
35.0	4719.907	1358.436	4828.735	0.00%	25.22%
40.0	4882.521	1602.093	6430.827	0.00%	33.58%
45.0	5051.089	1839.289	8270.116	0.00%	43.19%
50.0	5119.893	2055.196	10325.312	0.00%	53.92%
55.0	4946.561	2188.782	12514.094	0.00%	65.35%
60.0	4476.198	2178.044	14692.138	0.00%	76.72%
65.0	3486.145	1935.661	16627.799	0.00%	86.83%
70.0	2006.503	1390.774	18018.572	0.00%	94.09%
75.0	701.780	707.902	18726.474	0.00%	97.79%
80.0	166.504	232.329	18958.803	0.00%	99.00%
85.0	74.400	65.459	19024.262	0.00%	99.35%
90.0	52.648	34.787	19059.049	0.00%	99.53%
95.0	34.269	23.799	19082.848	0.00%	99.65%
100.0	22.096	15.316	19098.163	0.00%	99.73%
105.0	11.644	9.028	19107.191	0.00%	99.78%
110.0	6.444	4.728	19111.919	0.00%	99.80%
115.0	7.237	3.464	19115.383	0.00%	99.82%
120.0	8.376	3.796	19119.179	0.00%	99.84%
125.0	9.328	4.092	19123.271	0.00%	99.86%
130.0	9.924	4.186	19127.457	0.00%	99.89%
135.0	10.215	4.069	19131.526	0.00%	99.91%
140.0	10.254	3.790	19135.316	0.00%	99.93%
145.0	10.043	3.386	19138.702	0.00%	99.94%
150.0	9.937	2.942	19141.644	0.00%	99.96%
155.0	9.646	2.478	19144.123	0.00%	99.97%
160.0	9.103	1.966	19146.089	0.00%	99.98%
165.0	8.680	1.466	19147.555	0.00%	99.99%
170.0	8.442	1.016	19148.57	0.00%	100.00%
175.0	8.402	0.603	19149.173	0.00%	100.00%
180.0	8.767	0.205	19149.378	0.00%	100.00%

Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





C0/C180:

C90/C270:

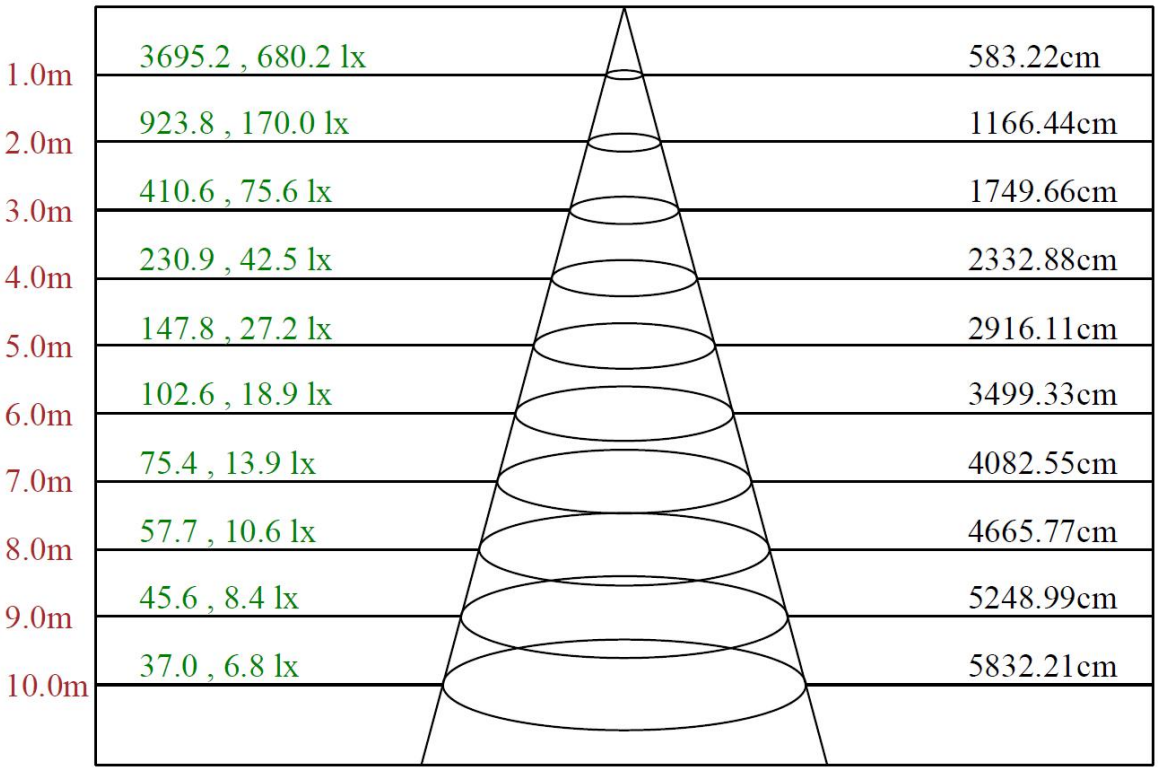
Field angle(10%Imax):C0/180Left:74.5 Right:72.0

:C90/270Left:73.1 Right:74.1

Beam Angle(50%Imax):C0/180Left:67.3 Right:64.3

:C90/270Left:65.5 Right:67.0

Lux distance Curve



Max , Ave Beam angle of C337.5 plane 142.14

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	3614.32	3657.16	3784.18	3972.60	4122.91	4389.65	4624.64	4865.98	4948.55
22.5	3614.32	3671.98	3790.53	3951.43	4148.31	4374.83	4605.59	4808.82	4931.61
45.0	3614.32	3676.21	3805.35	3981.07	4144.08	4332.49	4535.73	4808.82	4918.91
67.5	3614.32	3608.47	3771.48	3911.20	4110.20	4298.62	4451.05	4656.40	4921.03
90.0	3614.32	3652.93	3746.08	3858.28	4048.81	4228.76	4360.01	4571.72	4747.43
112.5	3614.32	3667.75	3729.14	3883.68	4036.11	4245.69	4391.77	4542.08	4741.08
135.0	3614.32	3657.16	3731.26	3890.03	4044.58	4148.31	4402.35	4618.29	4825.76
157.5	3614.32	3629.64	3710.09	3849.81	3972.60	4218.17	4370.60	4605.59	4823.64
180.0	3614.32	3616.94	3718.56	3834.99	4014.94	4235.11	4438.34	4664.87	4800.35
202.5	3614.32	3640.22	3735.49	3868.86	4029.76	4290.15	4440.46	4722.02	4861.75
225.0	3614.32	3644.46	3735.49	3896.39	4112.32	4237.23	4525.14	4715.67	4912.56
247.5	3614.32	3597.88	3701.62	3885.80	4050.93	4271.10	4470.10	4677.57	4870.22
270.0	3614.32	3727.02	3826.52	4002.24	4184.30	4408.71	4550.55	4736.84	4885.04
292.5	3614.32	3703.74	3854.04	4014.94	4228.76	4427.76	4586.54	4777.07	4868.10
315.0	3614.32	3695.27	3868.86	4027.64	4243.58	4425.64	4643.69	4885.04	5020.53
337.5	3614.32	3693.15	3843.46	4023.41	4239.34	4425.64	4683.92	4861.75	5043.81
360.0	3614.32	3657.16	3784.18	3972.60	4122.91	4389.65	4624.64	4865.98	4948.55

C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	5204.71	5147.55	4747.43	3766.61	2412.56	726.14	202.60	118.77	74.10
22.5	5139.08	5177.19	4846.93	4191.71	2898.63	1214.96	281.56	125.12	75.79
45.0	5147.55	5187.77	5122.14	4571.72	3703.74	2169.32	561.65	127.87	74.52
67.5	5086.15	5141.20	4872.33	4787.65	3184.43	1429.84	358.41	144.17	90.82
90.0	4760.13	4861.75	4664.87	4173.72	3108.85	1508.38	259.55	111.57	56.53
112.5	4897.74	4937.96	4906.21	4529.38	3790.53	2355.19	815.90	159.62	64.99
135.0	4952.78	5105.21	5088.27	4933.73	4345.19	3339.61	1760.31	275.00	68.17
157.5	4954.90	5168.72	5086.15	4745.31	3951.43	2704.50	1072.27	215.73	76.21
180.0	4990.89	5052.28	4838.46	4383.30	3284.56	1828.05	362.22	149.04	74.73
202.5	5060.75	5156.01	5109.44	4715.67	3822.29	2475.86	1074.39	195.83	89.34
225.0	5045.93	5213.17	5162.37	4921.03	4290.15	3252.81	1703.15	337.88	84.26
247.5	5077.69	5211.06	5054.40	4654.28	3686.80	2389.06	1068.04	193.28	78.33
270.0	4952.78	4952.78	4654.28	3912.69	2641.62	974.26	192.23	89.76	38.32
292.5	5069.22	5069.22	4817.29	4203.78	3365.44	1663.14	392.92	130.62	76.00
315.0	5230.11	5227.99	5122.14	4707.21	3967.31	2456.81	736.51	147.13	76.43
337.5	5247.05	5308.44	5052.28	4421.41	3324.79	1616.14	386.78	142.69	91.88
360.0	5204.71	5147.55	4747.43	3766.61	2412.56	726.14	202.60	118.77	74.10

C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	63.72	33.87	17.78	9.10	6.14	7.62	8.89	9.53	9.95
22.5	58.43	33.03	15.88	6.56	6.77	8.26	9.32	9.95	10.37
45.0	63.51	29.85	10.16	6.35	6.77	7.62	8.89	9.74	10.37
67.5	72.40	35.35	14.18	6.35	6.35	7.20	8.05	9.10	9.95
90.0	41.92	27.73	15.67	11.64	5.93	6.77	8.05	8.89	9.53
112.5	43.82	33.45	21.81	9.32	5.72	6.35	7.83	8.68	9.53
135.0	41.07	42.98	45.30	13.13	6.35	6.99	8.26	9.32	10.16
157.5	41.49	37.68	32.18	22.86	6.35	7.83	8.68	9.74	10.16
180.0	38.11	32.39	26.04	18.84	8.05	6.77	8.26	9.32	9.95
202.5	45.52	36.20	30.06	21.81	6.14	6.56	7.62	8.89	9.95
225.0	48.27	40.65	41.71	15.67	6.56	6.77	8.05	9.10	9.74
247.5	43.40	31.54	18.42	12.49	6.35	7.20	8.05	9.10	9.74
270.0	27.73	19.90	15.88	11.01	5.93	6.99	7.83	8.89	9.10
292.5	76.64	48.06	17.57	8.26	6.77	7.62	8.68	9.32	9.74
315.0	62.45	33.45	14.18	6.35	6.99	7.83	8.89	9.95	10.37
337.5	73.88	32.18	16.72	6.56	5.93	7.41	8.68	9.74	10.16
360.0	63.72	33.87	17.78	9.10	6.14	7.62	8.89	9.53	9.95

C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	10.16	10.37	10.16	9.95	9.74	9.10	8.68	8.68	8.47
22.5	10.37	10.37	9.95	9.74	9.53	9.10	8.89	8.47	8.68
45.0	10.59	10.37	9.95	9.95	9.74	9.10	8.68	8.47	8.47
67.5	9.95	10.37	10.16	9.74	9.32	8.89	8.68	8.47	8.47
90.0	9.95	9.74	9.74	9.95	9.53	8.68	8.47	8.47	8.26
112.5	10.16	10.16	9.95	9.95	9.74	9.10	8.47	8.26	8.26
135.0	10.59	10.59	10.37	10.16	9.95	9.10	8.68	8.26	8.26
157.5	10.59	10.37	10.37	10.37	9.74	9.10	8.68	8.47	8.26
180.0	10.37	10.59	10.37	10.16	9.95	9.32	8.68	8.47	8.26
202.5	10.37	10.59	10.37	10.37	10.16	9.53	8.68	8.68	8.26
225.0	10.59	10.59	10.37	10.16	9.95	9.53	8.89	8.68	8.26
247.5	10.16	10.37	10.16	9.74	9.53	9.32	8.89	8.47	8.26
270.0	9.32	9.32	9.53	9.10	8.89	8.68	8.47	8.26	8.47
292.5	9.74	9.74	9.32	9.53	9.32	8.89	8.68	8.26	8.47
315.0	10.16	10.16	9.95	10.16	9.74	9.10	8.89	8.26	8.68
337.5	10.37	10.37	9.95	9.95	9.53	9.10	8.47	8.47	8.68
360.0	10.16	10.37	10.16	9.95	9.74	9.10	8.68	8.68	8.47

C/γ(°)	180.0
0.0	8.77
22.5	8.77
45.0	8.77
67.5	8.77
90.0	8.77
112.5	8.77
135.0	8.77
157.5	8.77
180.0	8.77
202.5	8.77
225.0	8.77
247.5	8.77
270.0	8.77
292.5	8.77
315.0	8.77
337.5	8.77
360.0	8.77

4 Additional Test

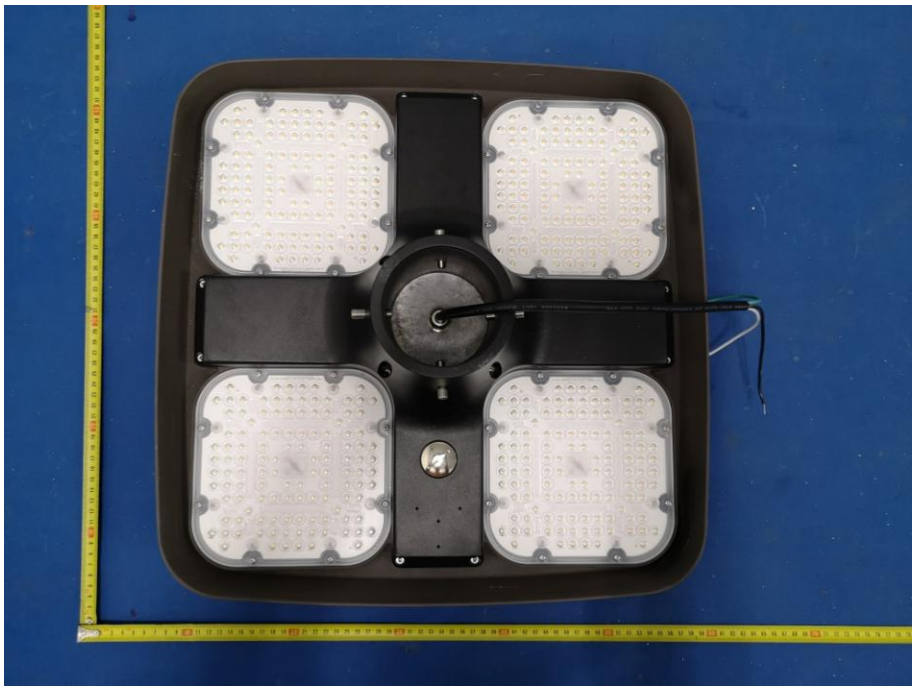
Electrical data

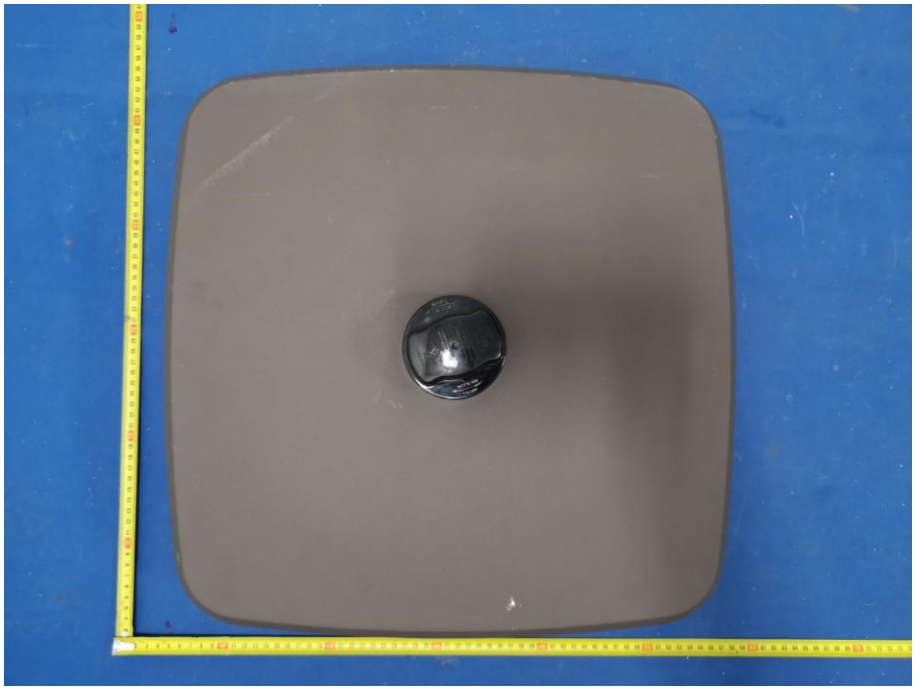
Model Number	CCT(K)	Test Voltage (V)	Frequency (Hz)	Power Factor	THD(%)
PT01-150L-[C;CS;CM; CP;CSM;CSP]-3CCT	3000	120	60	0.995	6.4
		277	60	0.934	11.4
	4000	277	60	0.935	11.1
	5000	277	60	0.935	10.9

5 Data reporting for white-tunable submissions

ANSI CCT Quadrangle (omit any outside product range) / Worst-Case Value	Actual CCT (K)	Power Consumption (W)	Lumen Output (lm)	Input Control Signal Applied
3000K	2900	146.75	19253.16	0%
4000K	3732	143.52	20049.72	50%
5000K	4891	146.45	19668.29	100%
Lowest Efficacy	2900	146.75	19253.16	0%
Maximum Power	2900	146.75	19253.16	0%

Photo Document





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