Photometric Test Report

Relevant Standards

☑ ANSI/IES LM-79-2019

Prepared For

Paragon Semiconductor Lighting Technology Co., Ltd.(ParagonLED®)

3F No 369 Sec 2 Wenhua 2Nd Rd New Taipei City, 244 TW

Catalog Number

TTL-500-50-120V-11Z

Project Number

4791276354.1.1

Report Number

4791276354.1-2a

Test Date

2024-04-16

Issue Date

2024-04-23

Prepared By

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Michael Chang

Approved By

Jason Chiang

Jason Chiang

1.0 Test List

Test Item	Test	Test Date	Model Number	Tests Conducted By
1	Integrating Sphere Test	2024-04-16	TTL-500-50-120V-11Z	Jeff Hsu
2	Goniophotometer Test	2024-04-16	TTL-500-50-120V-11Z	Jeff Hsu

1.1 Test Site

Company Name	Underwriters Laboratories Taiwan Co., Ltd.
Address	No. 35, Sec. 2, Zhongyang S. Rd., Beitou Dist., Taipei City 112, Taiwan

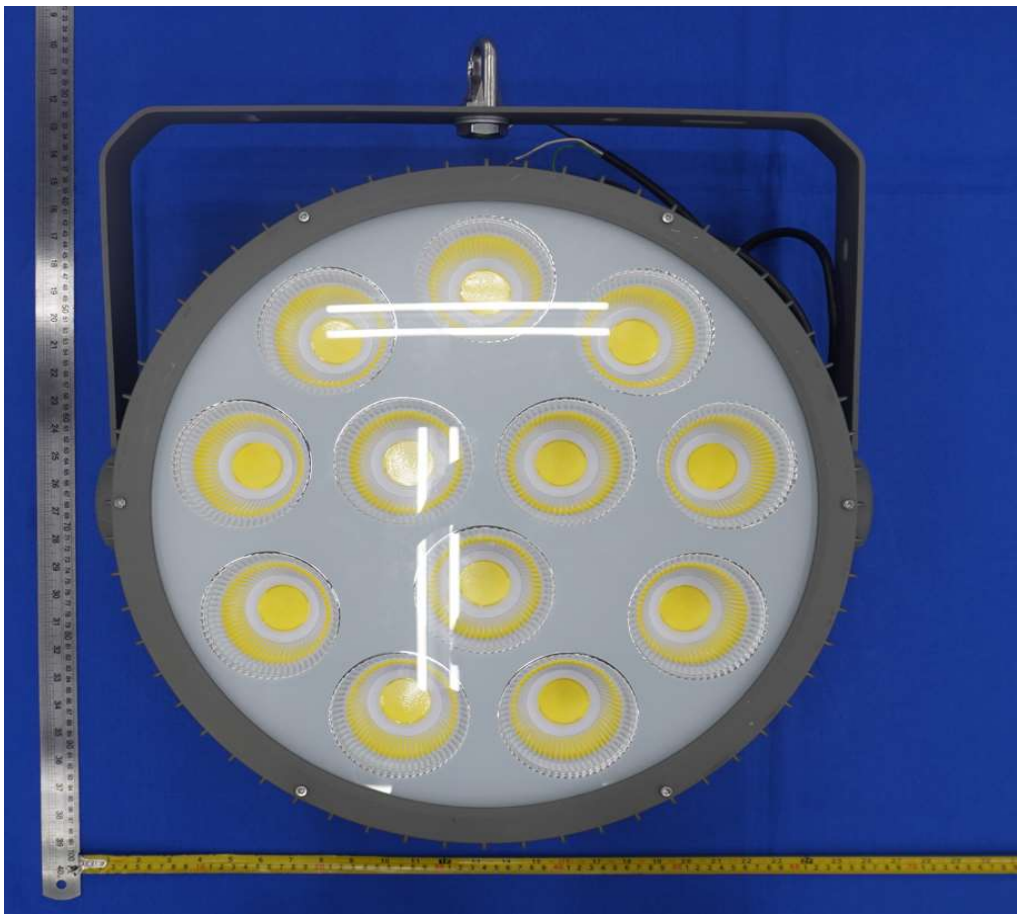
1.2 Remark

1. UL test equipment information is recorded on Meter Use in UL's Aurora database.

2.0 Production Description

Luminaire Description: High Bay Luminaire , Models TTL-500-50-120V-11Z
Electrical Rated: 120 Vac, 60 Hz, 495 W
Nominal CCT: 5000 K
Family Model and Variation: N/A
Representative (tested) Model: TTL-500-50-120V-11Z
Sample Received Date: 2024-04-16
Number of hours operated prior to measurement (0 h for rating new products): 0 h

Photos of Luminaire Characteristics



3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	TTL-500-50-120V-11Z	Sample No.	7116878
Operate time (Min.)	60	Stabilization time (Min.)	50

Test Method

1. The samples were tested according to ANSI/IES LM-79-19.
2. Photometric parameters were measured using a 2-m integrating sphere with more than 97% coating reflectance, 4π geometry, a spectroradiometer, and software.
3. The ambient temperature condition inside the sphere was maintained at 25 °C ± 0.7 °C (U=0.5 °C, k=2), laboratory humidity should be monitor and maintained between 10 to 65 %RH.
4. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Self-absorption correction is applied in measurements. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

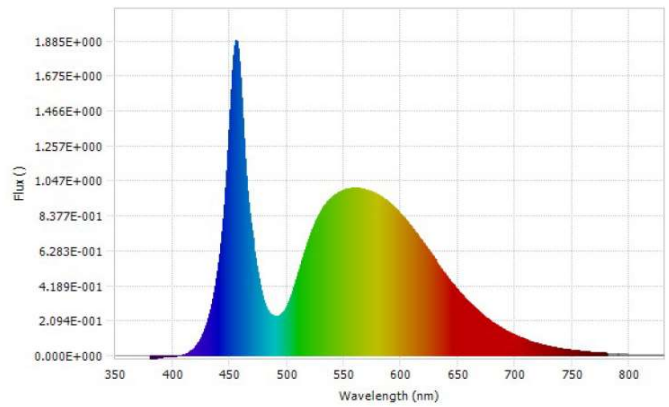
Integrating Sphere Test Conditions

Ambient Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	120.19	60	4.711	500.03	0.8831	Base up

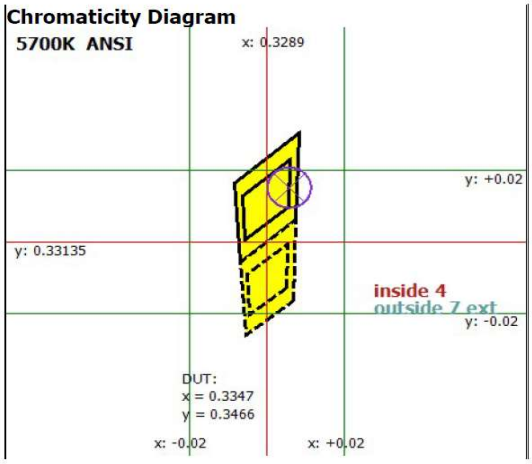
Test Results

CCT (K)	CRI (R_a)	R_9	Duv	Luminous Flux (lm)	Luminous Efficacy (lm/W)
5,404	76.00	-12.0000	0.0019	60020.70	120.0

Spectral Flux Graph



Chromaticity Diagram



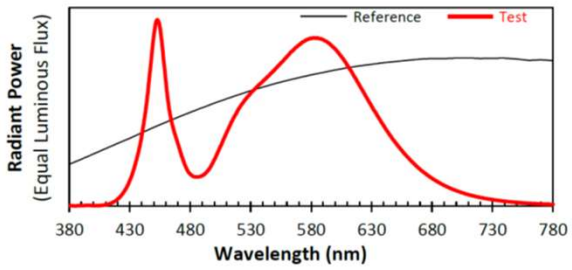
3.1 Integrating Sphere Test (Cont'd)

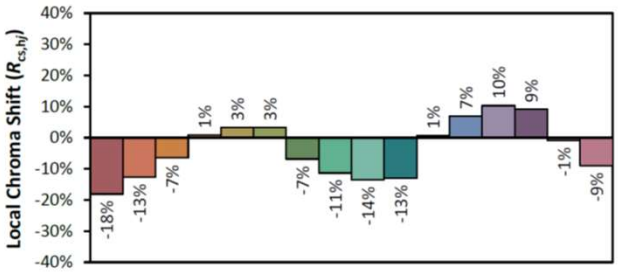
Chrom x	0.3347	**Chrom y**	0.3466
Chrom u	0.2063	**Chrom v**	0.3205
Chrom u'	0.2063	**Chrom v'**	0.4807
R_1	73	**R_2**	82
R_3	84	**R_4**	73
R_5	72	**R_6**	72
R_7	85	**R_8**	62
R_9	-12	**R_{10}**	53
R_{11}	67	**R_{12}**	41
R_{13}	76	**R_{14}**	91
R_{15}	70	**$R_{cs,h1}$**	-18%
R_f	75	**R_g**	91

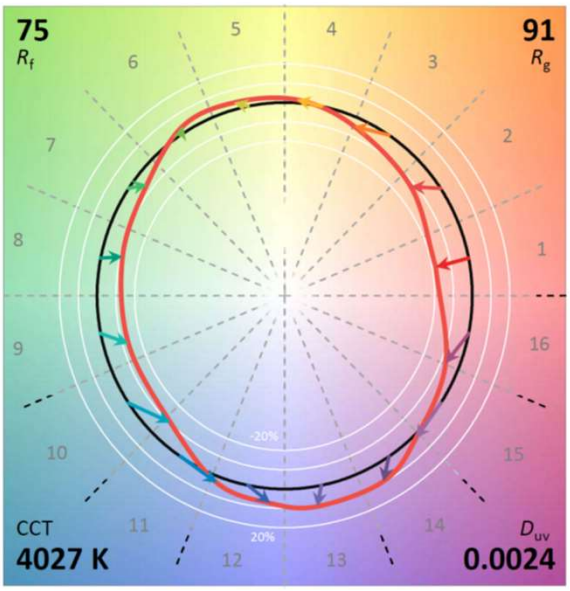
3.1 Integrating Sphere Test (Cont'd)

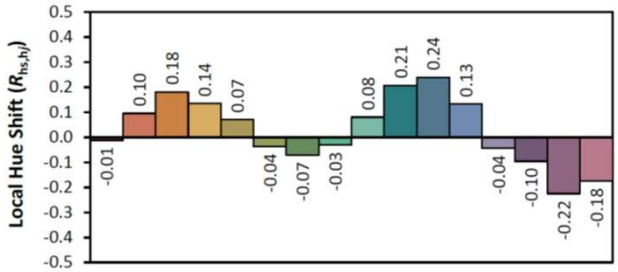
ANSI/IES TM-30-18 Color Rendition Report

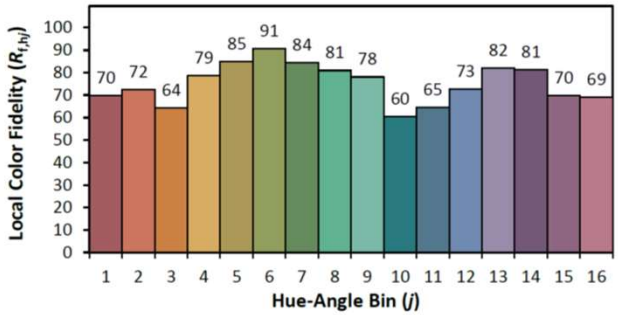
Date: 2024-04-16 **Model:** TTL-500-50-120V-11Z

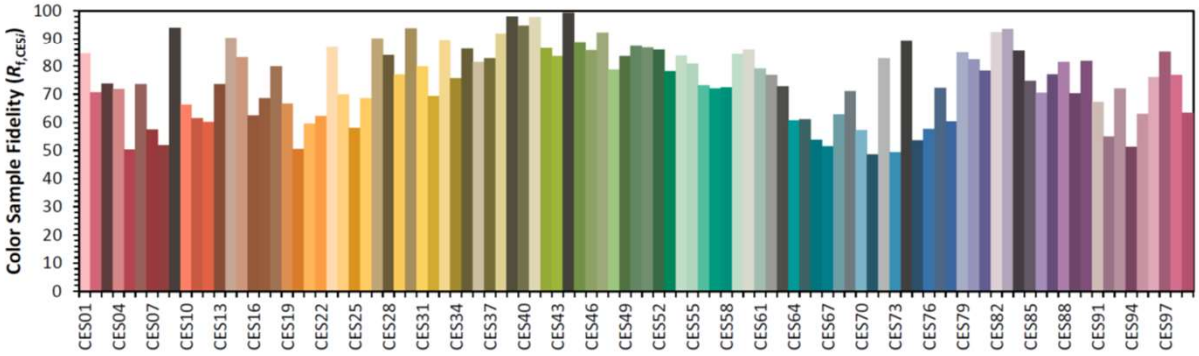












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	**0.3809**
y	**0.3822**
u'	**0.2233**
v'	**0.5040**

CIE 13.3-1995 (CRI)

R_a	72
R_9	-36

3.0 LM-79 Measurement and Test Results

3.2 Goniophotometer Test

Model No.	TTL-500-50-120V-11Z	Sample No.	7116878
Operate time (Min.)	64	Stabilization time (Min.)	54

Test Method

1. The sample was tested according to the ANSI/IES LM-79-2019.
2. Photometric paramters were measured using a type C goniophotometer and software.
3. The ambient temperature shall be maintained at 25 °C ± 0.5 °C (U=0.7 °C, K=2), measured at a point not more than 1.5 m from the sample and at the same height as the sample.
4. Laboratory humidity should be monitor and maintained between 10 to 65 %RH; the instantaneous tangential velocity of any point on the DUT shalll be less than an upper toleraance limit of 0.2 m/s.
5. The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

Goniophotometer Test Conditions

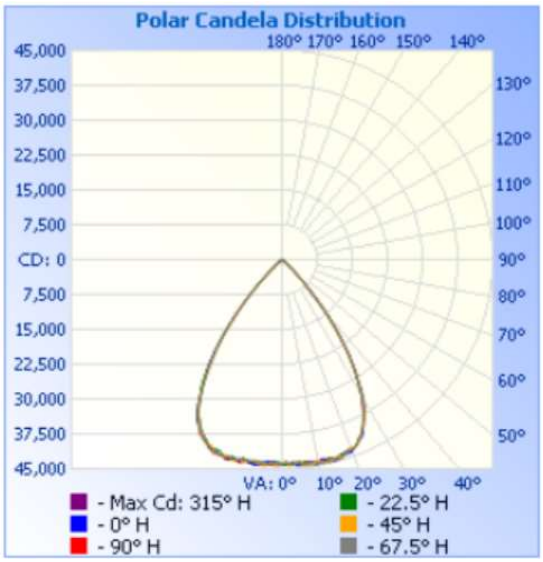
Ambient Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.7	120.17	60	4.793	510.58	0.887	Base Up

Test Result

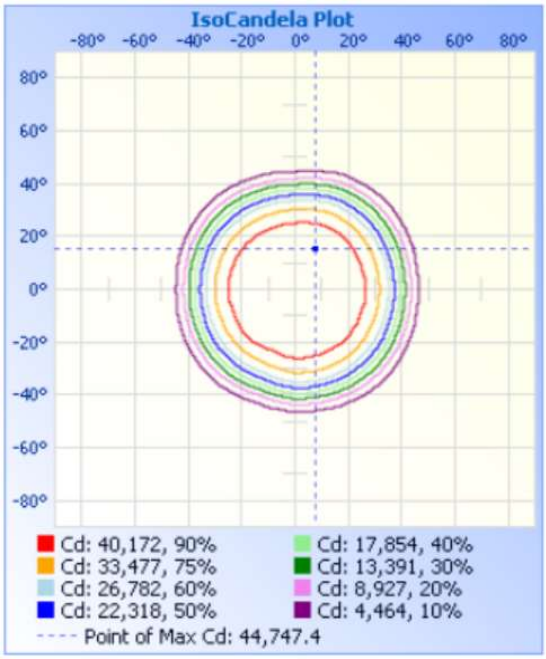
Flux (lm)	Zonal Lumen Requirement (20-50°)	Field Angle, ° (10%)		Beam Angle, ° (50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
56281.1	68.5	87.2	90.9	67.3	72.4	110.23

3.2 Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot



3.2 Goniophotometer Test (Cont'd)

Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	35,160.7	62.5%
0-40	50,629.4	90%
0-60	55,744.7	99.1%
60-90	526.0	0.9%
70-100	227.7	0.4%
90-120	0.1	0%
0-90	56,270.7	100%
90-180	0.1	0%
0-180	56,270.8	100%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	1,050.5	1.9%	90-95	0.1	0%
5-10	3,153.0	5.6%	95-100	0	0%
10-15	5,237.9	9.3%	100-105	0	0%
15-20	7,232.4	12.9%	105-110	0	0%
20-25	8,866.4	15.8%	110-115	0	0%
25-30	9,620.5	17.1%	115-120	0	0%
30-35	8,871.2	15.8%	120-125	0	0%
35-40	6,597.5	11.7%	125-130	0	0%
40-45	3,415.1	6.1%	130-135	0	0%
45-50	1,100.3	2.0%	135-140	0	0%
50-55	380.2	0.7%	140-145	0	0%
55-60	219.7	0.4%	145-150	0	0%
60-65	166.0	0.3%	150-155	0	0%
65-70	132.3	0.2%	155-160	0	0%
70-75	99.8	0.2%	160-165	0	0%
75-80	73.5	0.1%	165-170	0	0%
80-85	46.7	0.1%	170-175	0	0%
85-90	7.6	0.0%	175-180	0	0%

3.2 Goniophotometer Test (Cont'd)

Candela Table - Type C

Candela Table - Type C																	
γ/C	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	43991	43991	43991	43991	43991	43991	43991	43991	43991	43991	43991	43991	43991	43991	43991	43991	43991
1	44145	44140	43598	43342	43556	43750	43804	43513	44243	43548	44289	44219	44123	43906	44254	44128	44145
2	43763	44103	44352	43837	44207	44180	44136	44129	43466	43646	44239	43525	44242	43592	44304	44209	43763
3	43694	43671	44287	44220	44106	43443	43694	44060	43479	43917	43583	44078	44218	43951	43695	44243	43694
4	44367	43761	43641	43870	43705	43414	43397	44159	43586	43821	44250	44159	44230	44279	44131	43784	44367
5	44397	44270	43591	43513	43760	43683	44151	44096	43687	44133	44209	43886	44407	44284	44168	43587	44397
6	44027	43714	44463	44135	44244	43522	44007	44195	44242	43787	44184	43724	44250	44270	43739	43752	44027
7	44417	43962	44324	44291	43675	43724	43756	44250	44350	44054	44095	43610	43703	43934	43874	44340	44417
8	43851	44372	44399	44246	44116	44147	44095	44199	44430	44129	43620	43700	44233	43570	44306	44454	43851
9	44464	44406	44354	43791	44327	44182	44190	43845	44242	43764	43894	43904	44243	43734	44458	44391	44464
10	44581	44450	44175	44416	44141	43530	44266	43663	44110	43566	43785	44137	43742	43614	44565	43889	44581
13	44645	43803	44621	44400	44409	43832	43714	44401	43940	44212	44424	43979	44102	44279	**44747**	44561	44645
15	44626	44548	44233	44262	44542	44394	44168	43587	44263	44270	43724	43794	44572	43834	44068	44094	44626
20	43861	43414	43082	43529	43549	42926	42654	42713	43375	43620	43070	43759	43797	43847	43235	44054	43861
25	40922	40474	40542	40404	40763	40510	40433	39606	40890	40652	40875	41399	41428	41348	41150	41460	40922
30	34581	34132	34396	34494	34132	33277	33181	32773	35793	35281	35404	35121	35818	35895	35721	36522	34581
35	24754	24433	24229	24586	24669	23968	23726	23060	26770	26405	25933	25641	26482	26695	27009	27530	24754
40	13544	13175	13514	13554	13605	12870	12820	11857	15648	15303	15009	14808	15331	15723	15890	16468	13544
45	4416	4244	4423	4396	4495	4148	3883	3619	5912	5784	5424	5240	5606	5830	6029	6471	4416
50	1215	1191	1225	1244	1249	1185	1153	1085	1526	1527	1429	1429	1520	1541	1643	1715	1215
55	557	550	559	565	554	538	546	524	627	602	592	596	607	626	634	661	557
60	373	381	378	387	382	380	383	378	426	407	402	394	406	403	420	419	373
65	282	285	287	288	290	290	286	285	305	306	300	295	301	304	304	307	282
70	214	220	228	228	231	228	225	212	246	249	234	231	229	232	241	239	214
75	146	151	156	161	163	156	162	146	161	163	152	163	159	162	154	168	146
80	113	107	118	120	119	112	107	113	115	121	118	119	119	121	125	132	113
85	30	35	34	37	29	32	24	24	62	56	54	48	61	60	61	72	30
90	1	2	0	1	0	0	0	2	0	0	5	7	0	2	2	0	1
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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