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-350-50-120V-11Z

Project Number

4791276382.1.1

Report Number

4791276382.1-1a

Test Date

2024-04-19

Issue Date

2024-07-03

Prepared By	Approved By
Silvia Wu	Michael Chang
Silvia Wu	Michael Chang

1.0 Test List

Test Item	Test	Test Date	Model Number	Tests Conducted By
1	Integrating Sphere Test	2024-04-19	TTL-350-50-120V-11Z	Jeff Hsu
2	Goniophotometer Test	2024-04-19	TTL-350-50-120V-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

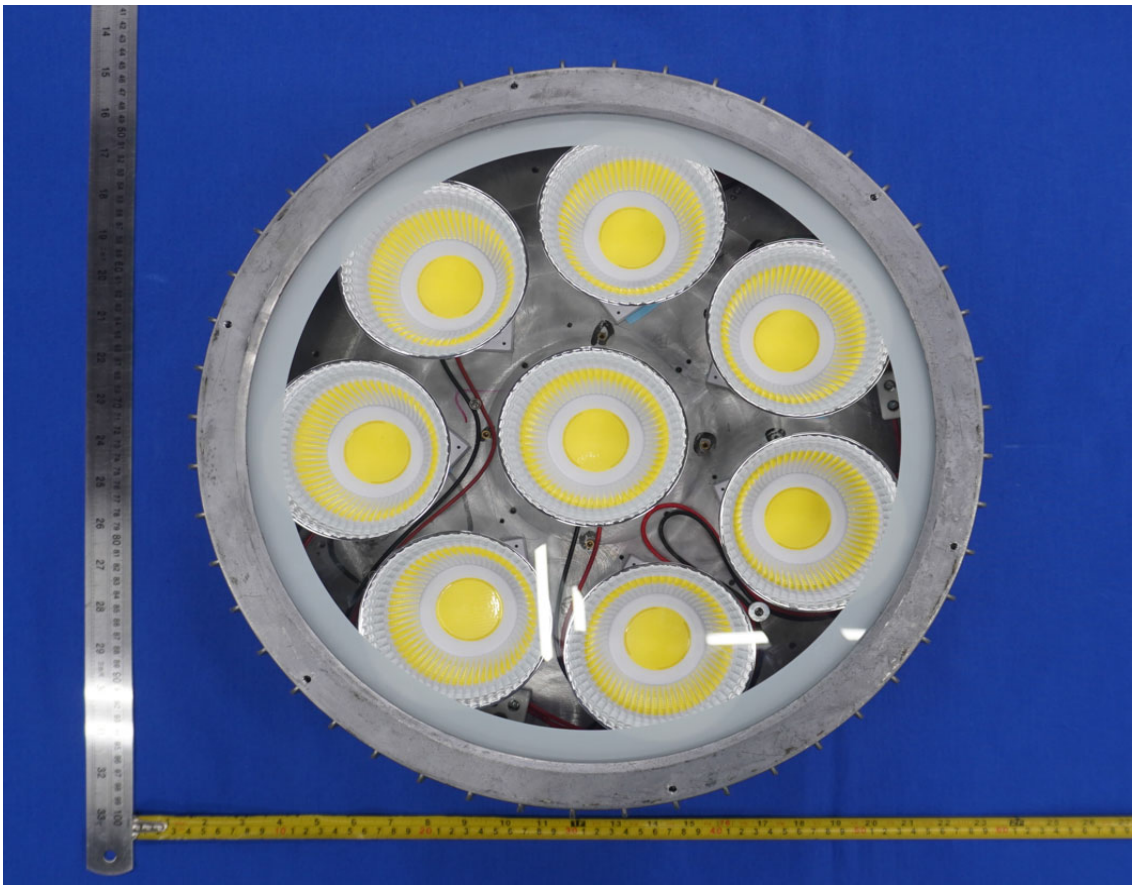
1.2 Remark

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-350-50-120V-11Z
Electrical Rated: 120 Vac, 60 Hz, 350W
Nominal CCT: 5000K
Family Model and Variation: N/A
Representative (tested) Model: TTL-350-50-120V-11Z
Sample Received Date: 2024-04-18
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-350-50-120V-11Z	Sample No.	7130530
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.

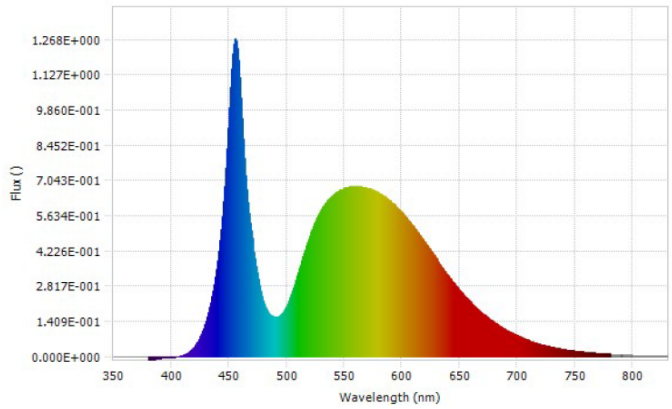
Integrating Sphere Test Conditions

Ambient Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.80	120.08	60	3.299	349.82	0.88	Base up

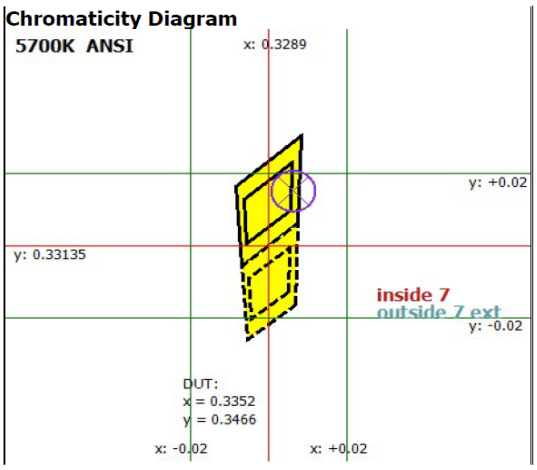
Test Results

CCT (K)	CRI (R_a)	R_9	Duv	Luminous Flux (lm)	Luminous Efficacy (lm/W)
5,386	76	-12	0.0016	40692.40	116.3

Spectral Flux Graph



Chromaticity Diagram



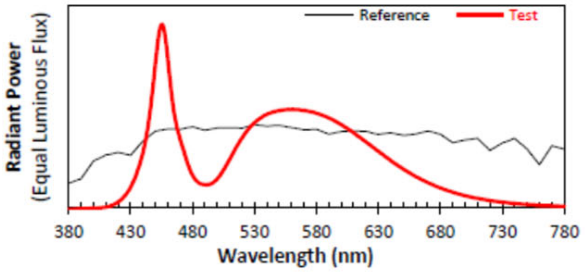
3.1 Integrating Sphere Test (Cont'd)

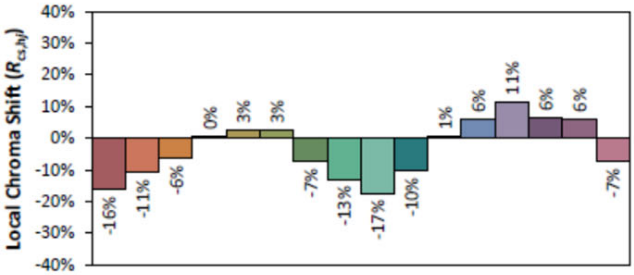
Chrom x	0.3352	**Chrom y**	0.3466
Chrom u	0.2066	**Chrom v**	0.3205
Chrom u'	0.2066	**Chrom v'**	0.4807
R_1	73	**R_2**	82
R_3	84	**R_4**	73
R_5	72	**R_6**	72
R_7	85	**R_8**	62
R_9	-12	**R_{10}**	53
R_{11}	67	**R_{12}**	41
R_{13}	76	**R_{14}**	91
R_{15}	70	**$R_{cs,h1}$**	-16%
R_f	75	**R_g**	92

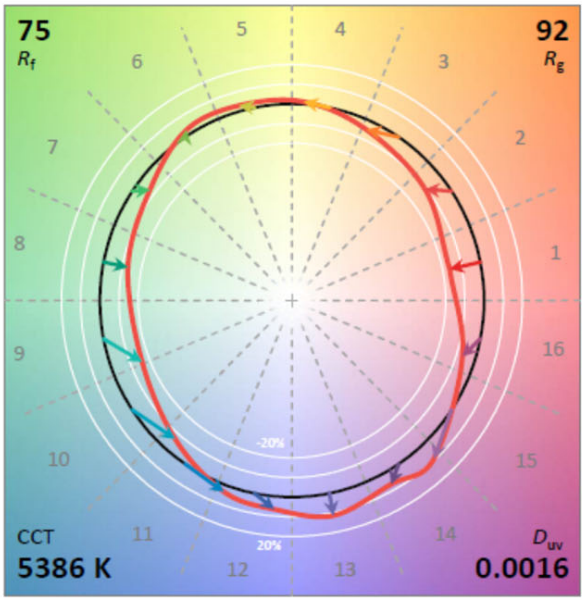
3.1 Integrating Sphere Test (Cont'd)

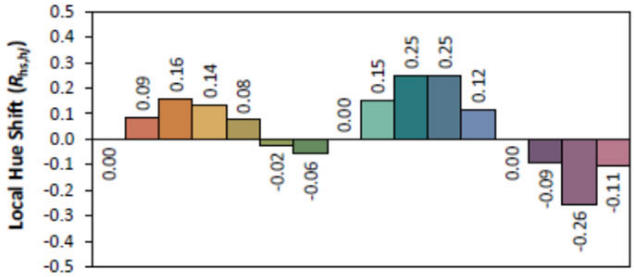
ANSI/IES TM-30-18 Color Rendition Report

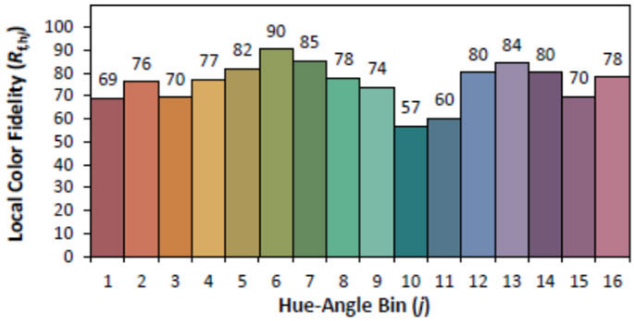
Date: 2024-04-19 **Model:** TTL-350-50-120V-11Z

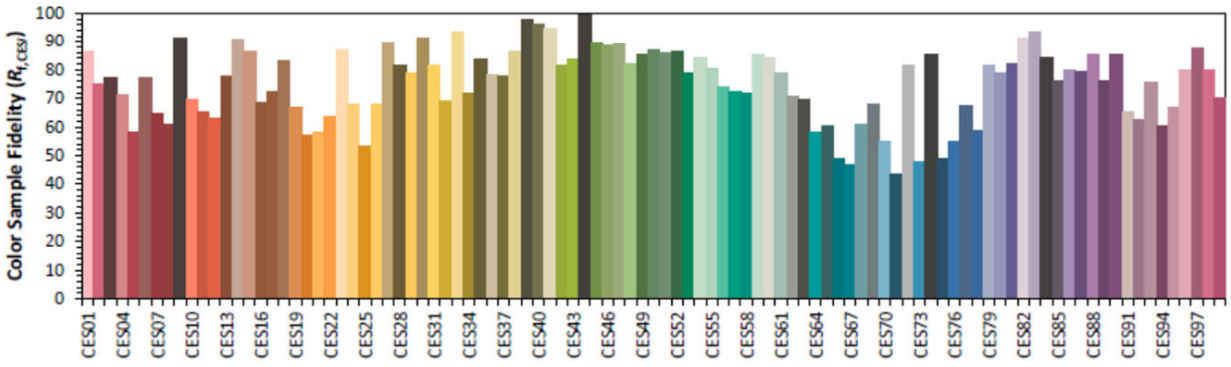












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3352
y	0.3466
u'	0.2066
v'	0.4807

CIE 13.3-1995 (CRI)

R_a	76
R_9	-12

3.0 LM-79 Measurement and Test Results

3.2 Goniophotometer Test

Model No.	TTL-350-50-120V-11Z	Sample No.	7130530
Operate time (Min.)	75	Stabilization time (Min.)	65

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

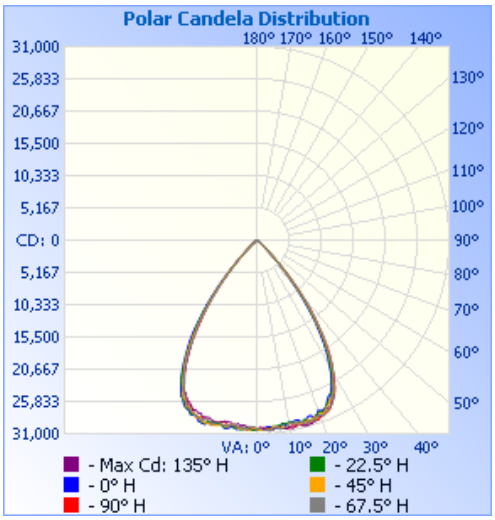
Ambient Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.5	120.09	60	3.344	355.61	0.89	Base Up

Test Result

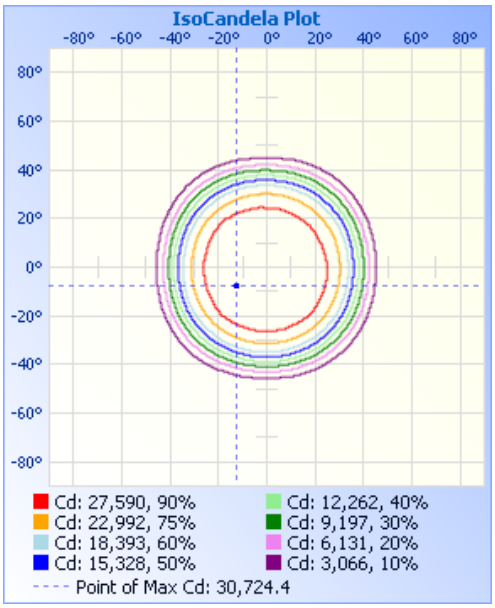
Flux (lm)	Zonal Lumen Requirement (20-50°)	Field Angle, ° (10%)		Beam Angle, ° (50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
38533.6	68.3	90.9	87.2	72.6	67.6	108.36

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	24,034.2	62.4%
0-40	34,613.8	89.8%
0-60	38,107.4	98.9%
60-90	419.1	1.1%
70-100	181.6	0.5%
90-120	0.1	0%
0-90	38,526.5	100%
90-180	0.1	0%
0-180	38,526.5	100%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	722.1	1.9%	90-95	0.1	0%
5-10	2,150.9	5.6%	95-100	0	0%
10-15	3,564.6	9.3%	100-105	0	0%
15-20	4,936.7	12.8%	105-110	0	0%
20-25	6,073.0	15.8%	110-115	0	0%
25-30	6,587.0	17.1%	115-120	0	0%
30-35	6,081.5	15.8%	120-125	0	0%
35-40	4,498.0	11.7%	125-130	0	0%
40-45	2,307.5	6.0%	130-135	0	0%
45-50	749.7	1.9%	135-140	0	0%
50-55	269.5	0.7%	140-145	0	0%
55-60	166.8	0.4%	145-150	0	0%
60-65	131.0	0.3%	150-155	0	0%
65-70	106.5	0.3%	155-160	0	0%
70-75	80.9	0.2%	160-165	0	0%
75-80	57.2	0.1%	165-170	0	0%
80-85	37.5	0.1%	170-175	0	0%
85-90	6.0	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	30208	30208	30208	30208	30208	30208	30208	30208	30208	30208	30208	30208	30208	30208	30208	30208	30208
1	30410	30438	30457	30044	30018	30451	30043	30007	30333	30449	30004	29916	29990	29995	29992	30345	30410
2	30307	30455	30428	30464	30112	30483	30090	30046	30240	30444	30374	29837	30104	29872	30220	29839	30307
3	29945	30398	30369	30448	30127	30517	30463	30350	30426	30033	30335	30260	30105	29806	29907	29787	29945
4	29904	30367	30493	30490	30121	30165	30558	30331	30180	30341	30296	30194	30162	29723	29693	30263	29904
5	30244	29900	29997	30471	30172	30102	30483	30454	30133	30451	30244	30110	30169	30105	29789	30209	30244
6	30168	29966	29954	29992	30030	30086	30037	30140	30436	30134	30209	30070	30008	29818	29528	30082	30168
7	30115	29797	30300	30464	30252	30204	30094	30524	30173	30247	29730	29634	29897	29452	29944	29494	30115
8	29594	29728	30257	30400	30446	30444	30456	30165	30183	29856	29783	29920	29965	29853	29492	29904	29594
9	30018	29689	30237	30191	30482	30229	30542	30360	30461	30332	30151	30088	30008	29841	29461	29939	30018
10	29674	29675	29813	29900	30487	30441	30297	30413	30497	30372	30187	30102	29571	29601	29434	29777	29674
15	29963	29692	30220	30466	30656	30652	30724	30329	30313	30023	30381	29932	30058	29833	29431	29729	29963
17	29351	30032	30211	30197	30575	30242	30604	30128	30534	30425	30285	30140	29585	29504	29703	29665	29351
20	28999	29287	29567	29756	29970	30020	29938	30316	29785	29580	29556	29636	29569	29308	28900	28762	28999
25	27459	28013	28039	28718	28402	28493	28723	28600	28112	28185	27954	27350	27426	26952	27038	27138	27459
30	23596	23998	24506	24685	24644	24838	24534	24115	24064	23734	23469	23058	22884	23007	22865	23494	23596
35	17045	17645	17992	18448	18572	18566	18052	17937	17848	17173	16576	16278	15880	16340	16309	16948	17045
40	9427	10101	10657	10705	10746	10605	10436	9840	9889	9311	8892	8900	8680	8889	8939	9294	9427
45	3281	3610	3924	3951	4031	3855	3743	3321	3420	3059	2868	2805	2675	2872	2995	3288	3281
50	975	1063	1121	1132	1100	1073	991	929	903	844	792	787	789	827	865	957	975
55	442	456	461	467	453	448	430	422	423	413	407	399	403	410	420	429	442
60	310	318	318	322	318	320	315	308	309	302	300	301	296	302	304	307	310
65	235	240	243	244	246	241	236	231	233	232	227	228	225	230	229	235	235
70	188	191	195	195	196	193	186	186	186	185	179	180	184	182	185	189	188
75	126	128	131	131	128	128	125	123	121	117	116	118	119	119	121	126	126
80	92	96	96	98	96	95	92	90	89	87	88	85	88	88	92	94	92
85	36	39	44	48	46	43	39	35	38	31	27	27	28	29	30	40	36
90	2	0	1	1	0	0	1	0	0	1	1	1	2	3	1	0	2
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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