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-01

Project Number

4791276354.1.1

Report Number

4791276354.1-1a

Test Date

2024-04-15

Issue Date

2024-04-23

Prepared By

Michael Chang

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	2024-04-15	TTL-350-50-120V-01	Jeff Hsu
2	Goniophotometer Test	2024-04-15	TTL-350-50-120V-01	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

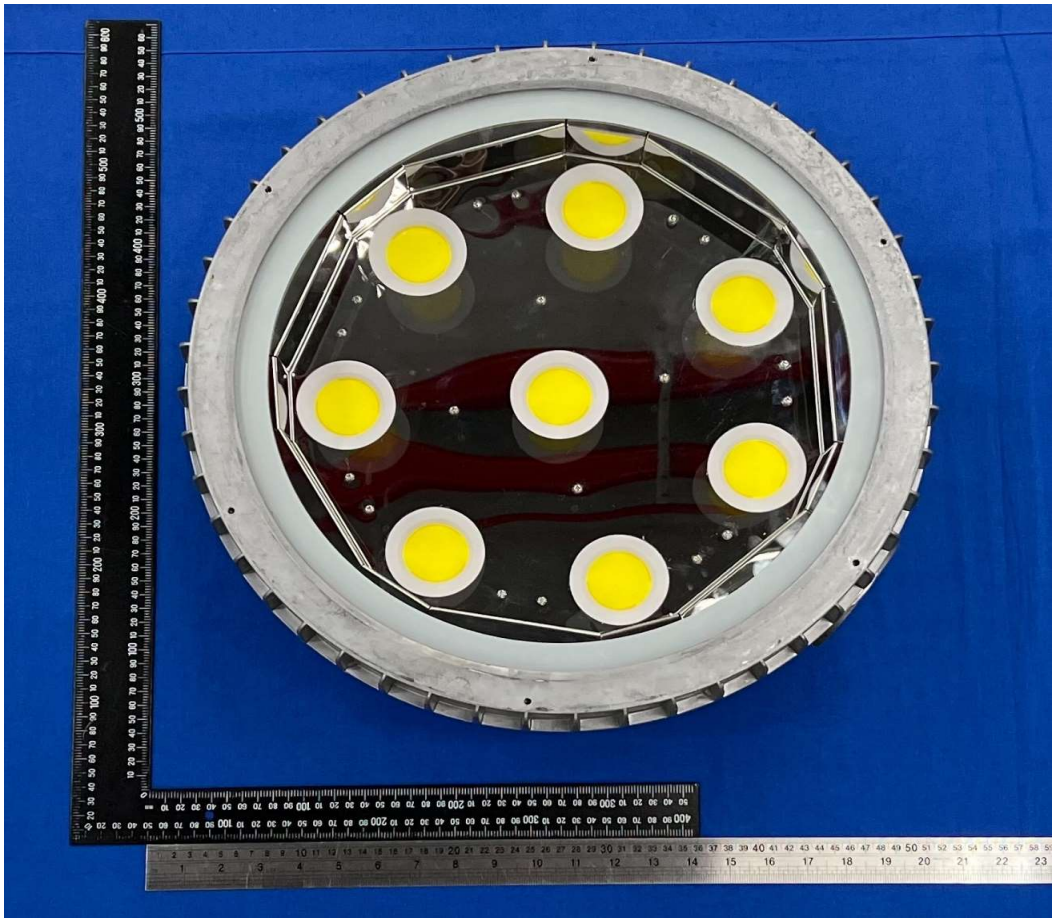
1.2 Remark

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-01
Electrical Rated: 120 Vac, 60 Hz, 345 W
Nominal CCT: 5000 K
Family Model and Variation: N/A
Representative (tested) Model: TTL-350-50-120V-01
Sample Received Date: 2024-04-12
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-01	Sample No.	7110130
Operate time (Min.)	70	Stabilization time (Min.)	60

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.

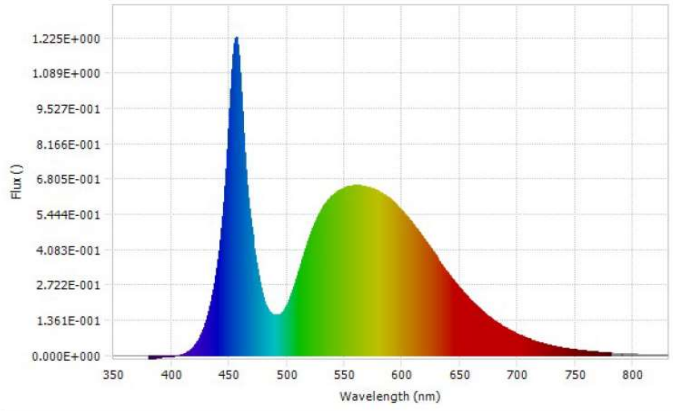
Integrating Sphere Test Conditions

Ambient Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.8	120.01	60	3.267	345.62	0.8815	Base up

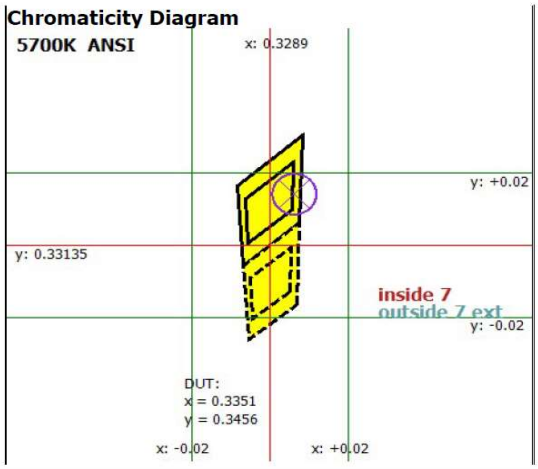
Test Results

CCT (K)	CRI (R_a)	R_9	Duv	Luminous Flux (lm)	Luminous Efficacy (lm/W)
5,386	76.00	-10	0.0012	39256.10	113.6

Spectral Flux Graph



Chromaticity Diagram



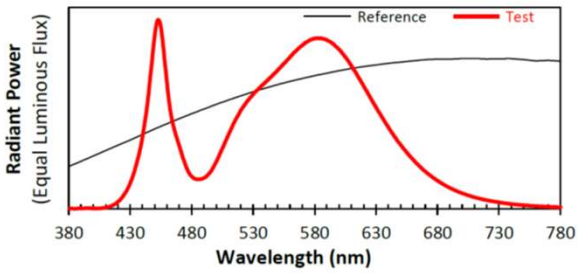
3.1 Integrating Sphere Test (Cont'd)

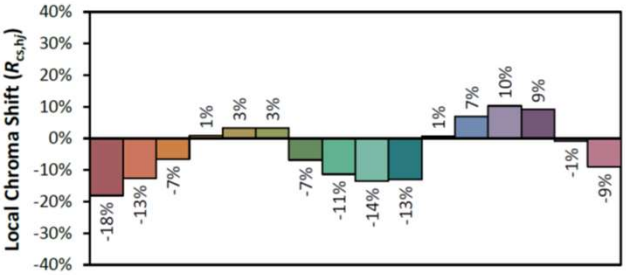
Chrom x	0.3351	**Chrom y**	0.3456
Chrom u	0.2069	**Chrom v**	0.3202
Chrom u'	0.2069	**Chrom v'**	0.4802
R_1	74	**R_2**	82
R_3	85	**R_4**	73
R_5	73	**R_6**	73
R_7	85	**R_8**	63
R_9	-10	**R_{10}**	54
R_{11}	67	**R_{12}**	42
R_{13}	76	**R_{14}**	91
R_{15}	71	**$R_{cs,h1}$**	-18%
R_f	75	**R_g**	91

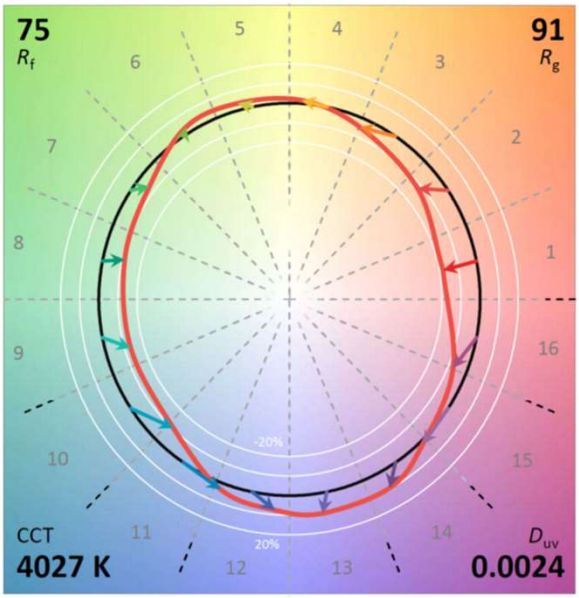
3.1 Integrating Sphere Test (Cont'd)

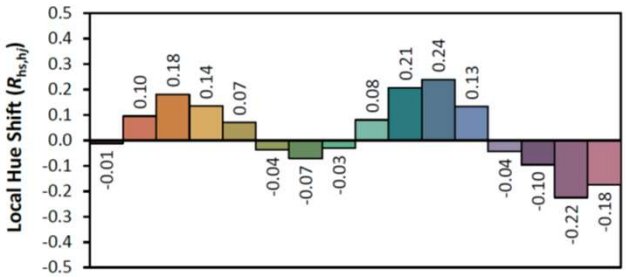
ANSI/IES TM-30-18 Color Rendition Report

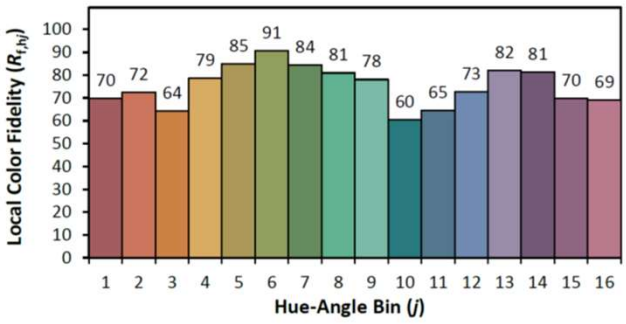
Date: 2024-04-16 **Model:** TTL-350-50-120V-01

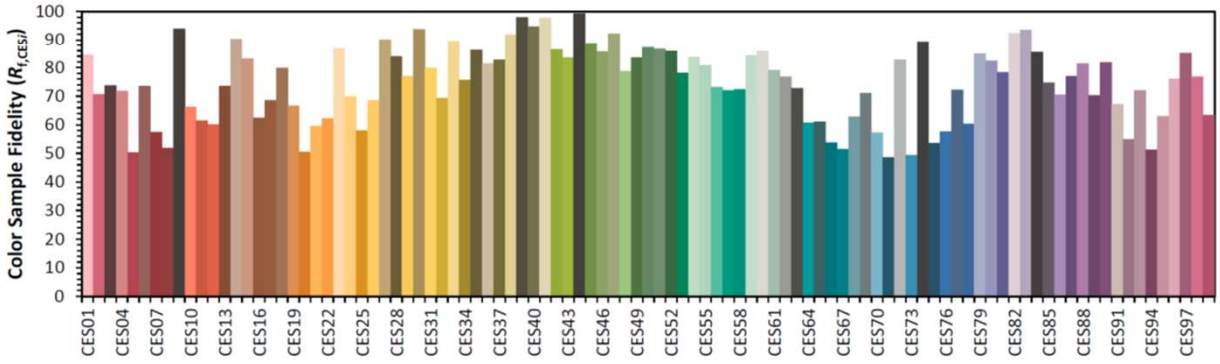












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

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-350-50-120V-01	Sample No.	7110130
Operate time (Min.)	71	Stabilization time (Min.)	61

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

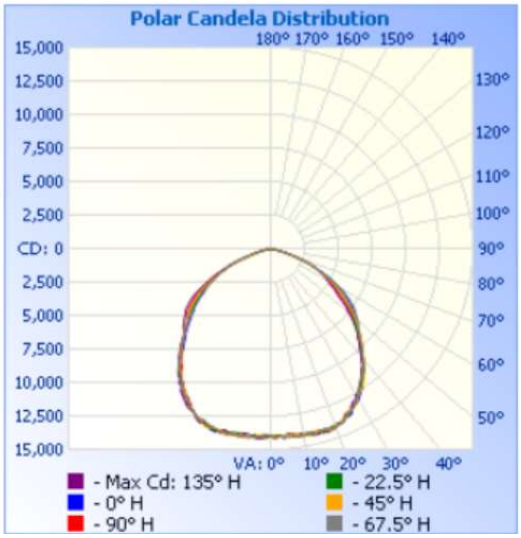
Ambient Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.5	120.09	60	3.342	355.43	0.886	Base Up

Test Result

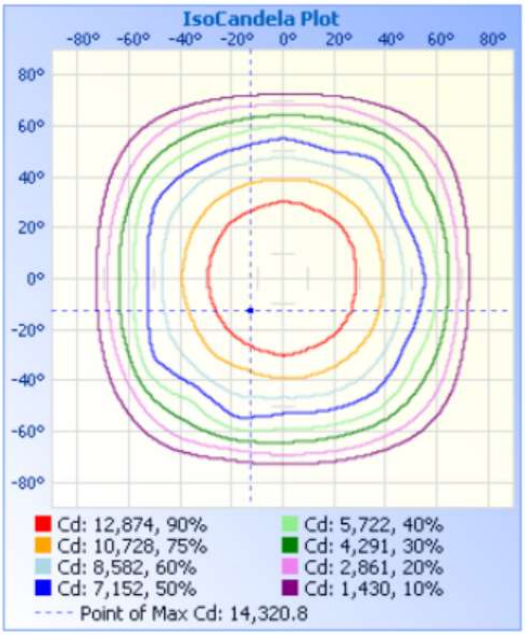
Flux (lm)	Zonal Lumen Requirement (20-50°)	Field Angle, ° (10%)		Beam Angle, ° (50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
37213.3	55.6	144.5	144.5	105.9	107.3	104.70

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	11,593.8	31.2%
0-40	18,920.0	50.8%
0-60	32,155.5	86.4%
60-90	5,052.1	13.6%
70-100	1,066.4	2.9%
90-120	0.2	0%
0-90	37,207.5	100%
90-180	0.2	0%
0-180	37,207.7	100%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	336.2	0.9%	90-95	0.2	0%
5-10	1,008.1	2.7%	95-100	0	0%
10-15	1,676.5	4.5%	100-105	0	0%
15-20	2,329.7	6.3%	105-110	0	0%
20-25	2,905.2	7.8%	110-115	0	0%
25-30	3,338.2	9.0%	115-120	0	0%
30-35	3,609.9	9.7%	120-125	0	0%
35-40	3,716.2	10.0%	125-130	0	0%
40-45	3,632.7	9.8%	130-135	0	0%
45-50	3,466.3	9.3%	135-140	0	0%
50-55	3,250.5	8.7%	140-145	0	0%
55-60	2,886.0	7.8%	145-150	0	0%
60-65	2,340.0	6.3%	150-155	0	0%
65-70	1,645.8	4.4%	155-160	0	0%
70-75	809.6	2.2%	160-165	0	0%
75-80	227.5	0.6%	165-170	0	0%
80-85	25.0	0.1%	170-175	0	0%
85-90	4.1	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	14033	14033	14033	14033	14033	14033	14033	14033	14033	14033	14033	14033	14033	14033	14033	14033	14033
1	13920	13949	13963	14138	14137	14092	14091	14124	14011	13946	14194	13938	13908	14184	13918	13948	13920
2	14080	13950	14057	14174	13938	13937	14066	14149	14171	14146	14158	13969	13890	13959	13924	14143	14080
3	13999	13958	14100	13947	13934	13968	13962	13980	14190	13923	13951	14140	14100	14038	14063	14157	13999
4	14184	14116	14081	14060	14123	14150	14114	14152	14192	13975	13972	14173	14132	14190	14145	14125	14184
5	13924	13951	13943	14160	13960	14161	13967	14154	13987	13946	14104	14159	13944	14014	14142	13976	13924
6	13933	14030	13975	14150	13940	14159	13923	14188	14158	14105	14154	14121	14128	14017	14063	13966	13933
7	14132	14007	14121	14150	13951	14184	14142	14191	14186	14155	14180	13933	14129	14175	13904	13994	14132
8	14119	14159	13995	14203	14020	13962	14163	14049	14166	14165	14222	14136	14156	14166	13925	14172	14119
9	13978	14075	14172	14185	14145	14138	14186	14009	14020	14006	14021	14212	14127	14178	13941	14182	13978
10	14047	13982	13987	14160	14175	14200	13997	13995	14017	13965	14208	14200	14166	14076	14133	14218	14047
15	14258	14076	14141	14077	14053	14215	14283	14058	14073	14198	14052	14242	14014	14126	13995	14244	14258
17	14057	14206	14061	14056	14270	14147	**14321**	14060	14238	14188	14018	14017	14187	14282	14235	14089	14057
20	14063	13987	13982	14215	14038	14066	14146	14161	14039	14055	14084	13840	14017	13930	14105	14117	14063
25	13805	13717	13524	13552	13440	13709	13628	13517	13424	13524	13463	13497	13525	13638	13480	13744	13805
30	13016	12784	12896	12769	12701	12634	12645	12687	12839	12624	12619	12726	12579	12880	12928	12835	13016
35	11782	11814	12030	11676	11759	11678	11731	11522	11767	11713	11517	11584	11592	11818	11748	11892	11782
40	10521	10671	10811	10645	10651	10488	10542	10248	10390	10365	10441	10338	10306	10453	10617	10694	10521
45	9372	9320	9468	9357	9219	9122	9184	8974	8930	9133	9139	9033	9023	8985	9160	9219	9372
50	8316	8005	8193	8464	7859	8425	7675	8308	7693	7896	8053	7758	8072	7566	8402	7951	8316
55	7288	6838	6860	7508	6501	7548	6107	7456	6567	6783	7011	6394	7167	6063	7572	6649	7288
60	5881	5566	5595	6096	5218	6117	4991	5945	5301	5454	5655	5109	5866	4882	6097	5379	5881
65	4171	4004	4008	4147	4142	4193	3909	4097	3922	3856	3807	3847	4027	3850	4294	4170	4171
70	2459	2543	2605	2372	2543	2136	2511	2093	2445	2404	2205	2430	2045	2448	2243	2759	2459
75	974	944	921	988	872	979	752	864	835	803	774	800	921	796	1042	996	974
80	116	116	138	116	143	103	140	87	93	89	86	94	92	116	105	138	116
85	15	17	14	17	15	14	11	11	14	13	12	13	13	13	17	17	15
90	4	4	2	4	4	4	3	3	4	3	5	4	4	3	3	2	4
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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