TESTING
NVLAP LAB CODE:600177-0

TEST REPORT OF ANSI/IES LM-79-19

APPROVED METHOD FOR OPTICAL AND ELECTRICAL MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS

Client..... : Artika for Living Inc.

Address..... : 1756, 50e Avenue Montréal (Lachine), Québec Canada H8T 2V5

Test Model..... : PLU01R-0712T-830

All Models..... : PLU01R-0712T-830, 7FLPR-SPx-xxxxxx (x-xxxxxx in the model designation could be any numbers, letters or blank, which indicates customer code. PLU01R-0712T-830 and 7FLPR-SPx-xxxxxx are same except model name.)

Brand Name..... : artika

Testing Laboratory... : Guangdong Meide Testing Technology Co., Ltd.

Address..... : 1st floor, B Area, Jinbaisheng Industrial Park, Headquarters 2 Road,Songshan Lake Hi-tech Industrial Development Zone,Dongguan City, Guangdong Pr., China.

Testing location..... : As above

Report No..... : N02A22030775L00301

Date of receipt..... : Oct. 25, 2021

Date of test ..... : Oct. 25, 2021 - Oct. 28, 2021

Date of report..... : Apr. 02, 2022

Tested by:	Checked by:	Approved by:
Brooke Zheng/ Test Engineer	Sandy Chen/ Project Engineer	Jessie Li/ Technical Manager

Guangdong Meide Testing Technology Co., Ltd. * CERTIFICATE *

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 use in part without prior written consent from Guangdong Meide Testing Technology 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 Federal Government.
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Note 3: This report contains data that are not covered by the NVLAP accreditation. It is marked * in the title.

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1. Product Description for Equipment under Test(EUT)

Model Tested:	PLU01R-0712T-830
Manufacturer:	ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO.,LTD
Product Type:	LED ceiling light
Rated Voltage/Frequency:	120V AC, 60Hz
Rated Power:	12W
Rated luminous flux:	800lm
Nominal CCT:	3000K
LED Manufacturer:	MLS CO., LTD
LED Model No:	E2835X1X2X3X4-P

2.Standards Used

- ANSI/IES LM-79-19:APPROVED METHOD:OPTICAL AND ELECTRICAL MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS
- IES TM-30-18 IES Method for Evaluating Light Source Color Rendition (This Method is not in Nvlap accreditation scope)

3.Test equipment list

Test Equipment	Serial No	Model No	Calibration due date
Full-field Speed Goniophotometer	MD-E028	GO-R5000	2022/09/17
Digital Power Meter	MD-E001	PF2010	2022/09/17
AC Testing Power Source	MD-E002	DPS1060	2022/09/17
Total Spectral Radiant Flux Standard Lamp	MD-E007	D908S	2022/10/13
Integrating Sphere System	MD-E029	2M	2022/09/17
High Accuracy Array Spectroradio Meter	MD-E011	HAAS-3000	2022/09/17
Digital Power Meter	MD-E008	PF310	2022/09/17
AC Testing Power Source	MD-E010	DPS1010	2022/09/17
Standard Lamp	MD-E036	D204	2022/10/13

Statement of Traceability: Guangdong Meide Testing Technology Co., Ltd.attested that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit(SI).

4. Test Method

Requirements of Ambient Condition

Product was tested with no seasoning. All stabilization and measurements were made in compliance with ANSI/IES LM-79-19. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at 25°C±1.2°C during measurement. And relative humidity between 10% and 65%.

Goniophotometer System

The sample was tested according to the ANSI/IES LM-79-19.

Photometric paramters were measured using a type C goniophotometer and software. The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, Luminous efficacy, zonal flux were calculated from the software taken at 1° vertical intervals and 22.5°horizontal intervals.Photometric distance was more than five times of the Largest dimension of the test SSL product.

Integrating Sphere System

The sample was tested according to the ANSI/IES LM-79-19.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4 π geometry.The self-absorption factor is applied in the final test result. 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.

Fidelity Index (R_f) and Gamut Index (R_g) Calculation

The R_f, R_g was calculated according to IES TM-30-18 by using calculation tools. The calculation was based on the measured SPD from 380nm to 780nm with 1nm intervals. All the colors in this report is for reference only.

5. Integrating Sphere Test Results

5.1 Test Data

Test Ambient Temperature (Integrating sphere internal temperature)	25.1℃	Test orientation	Downward
Operate time(Min.)	60	stabilization time(Min.)	45

Optical and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.1045	11.95	0.953	833.46	69.74

CCT (K)	Ra	R9	x	y	u'	v'
2951	83.1	9	0.4384	0.4011	0.2528	0.5204

Color Rendering Index

Ra
83.1

R1	R2	R3	R4	R5
83	94	94	80	83

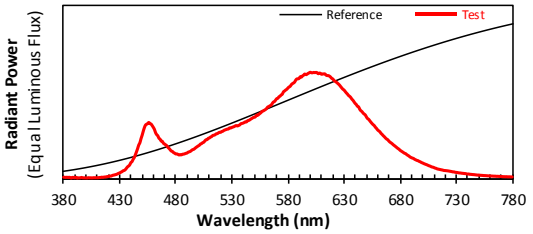
R6	R7	R8	R9	R10
93	81	58	9	85

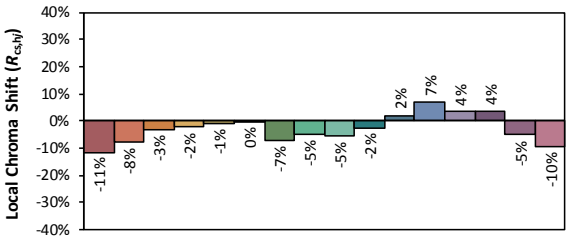
R11	R12	R13	R14	R15
80	75	86	97	75

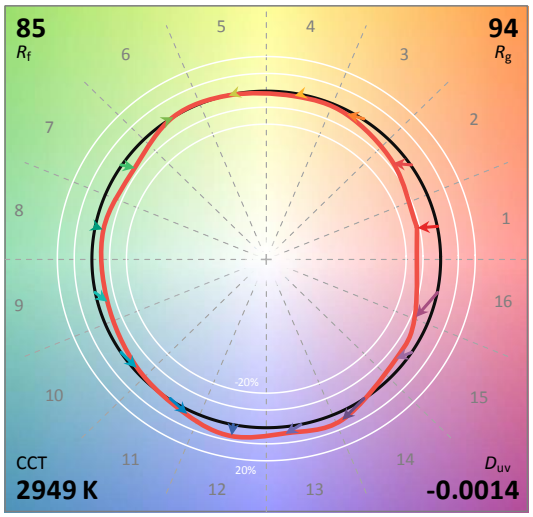
*ANSI/IES TM-30-18 Color Rendition Report

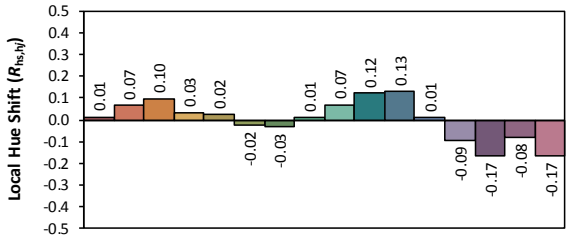
ANSI/IES TM-30-18 Color Rendition Report

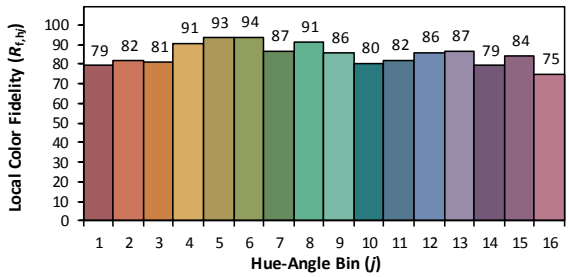
Source:	E2835X1X2X3X4-P	**Manufacturer:**	ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO.,LTD
Date:	2021/10/28	**Model:**	PLU01R-0712T-830

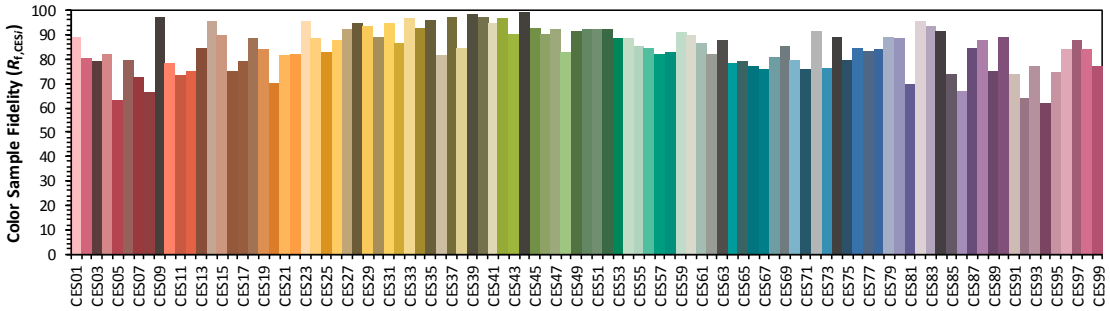












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

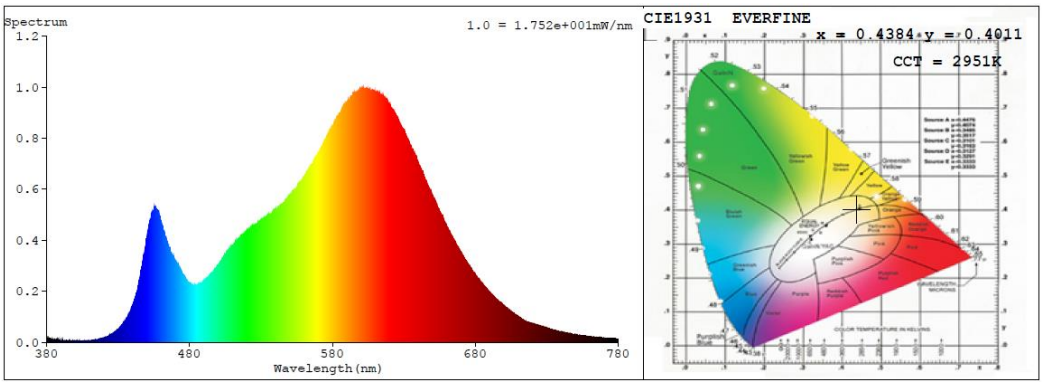
x	0.4385
y	0.4010
u'	0.2529
v'	0.5204

CIE 13.3-1995 (CRI)

R_a	83
R_9	9

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

Relative Spectral Power Distribution



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0105	414	0.0107	448	0.3334	482	0.2244	516	0.4175
381	0.0097	415	0.0091	449	0.3718	483	0.2193	517	0.4194
382	0.0086	416	0.0116	450	0.4038	484	0.223	518	0.4262
383	0.0099	417	0.0125	451	0.4415	485	0.2203	519	0.4322
384	0.0075	418	0.0139	452	0.4751	486	0.2259	520	0.4318
385	0.0099	419	0.0166	453	0.4995	487	0.2272	521	0.4393
386	0.0064	420	0.0173	454	0.5079	488	0.2304	522	0.4424
387	0.0023	421	0.0218	455	0.5145	489	0.2346	523	0.4504
388	0.0094	422	0.0204	456	0.5243	490	0.2373	524	0.4546
389	0.0068	423	0.0246	457	0.5138	491	0.245	525	0.4584
390	0.0043	424	0.0289	458	0.5094	492	0.2488	526	0.4621
391	0.0102	425	0.031	459	0.4947	493	0.2531	527	0.4635
392	0.0014	426	0.034	460	0.4782	494	0.2614	528	0.4742
393	0.0042	427	0.0367	461	0.4588	495	0.269	529	0.4728
394	0.0047	428	0.0413	462	0.4287	496	0.2724	530	0.4779
395	0.005	429	0.047	463	0.4102	497	0.2805	531	0.4818
396	0.0084	430	0.0507	464	0.3992	498	0.2894	532	0.4856
397	0.0048	431	0.0572	465	0.3765	499	0.2966	533	0.4917
398	0.0048	432	0.0624	466	0.3678	500	0.3043	534	0.4952
399	0.0041	433	0.0705	467	0.3501	501	0.3105	535	0.4919
400	0.0041	434	0.0741	468	0.3474	502	0.3217	536	0.4967
401	0.0031	435	0.0814	469	0.3295	503	0.326	537	0.5012
402	0.0059	436	0.0944	470	0.3219	504	0.3349	538	0.512
403	0.0048	437	0.1077	471	0.3141	505	0.3393	539	0.5153
404	0.0048	438	0.1159	472	0.306	506	0.3521	540	0.5184
405	0.0044	439	0.1273	473	0.2909	507	0.3622	541	0.5236
406	0.0045	440	0.1483	474	0.2812	508	0.3637	542	0.5302
407	0.0061	441	0.1571	475	0.2685	509	0.3757	543	0.529
408	0.0051	442	0.1792	476	0.2565	510	0.3787	544	0.5405
409	0.006	443	0.1951	477	0.2526	511	0.3877	545	0.5435
410	0.005	444	0.2214	478	0.242	512	0.392	546	0.5493
411	0.006	445	0.2499	479	0.2365	513	0.4024	547	0.557
412	0.0075	446	0.2795	480	0.2289	514	0.4049	548	0.5631
413	0.0081	447	0.3132	481	0.2294	515	0.4087	549	0.5702

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.5734	599	0.9905	648	0.6034	697	0.1592	746	0.0345
551	0.5776	600	0.996	649	0.5949	698	0.1551	747	0.033
552	0.5934	601	0.9912	650	0.5763	699	0.1486	748	0.0319
553	0.5917	602	0.9912	651	0.5614	700	0.1445	749	0.0305
554	0.5999	603	0.9943	652	0.5542	701	0.1393	750	0.0306
555	0.6088	604	0.9926	653	0.5404	702	0.1349	751	0.0293
556	0.6171	605	0.9942	654	0.5271	703	0.1308	752	0.0281
557	0.6286	606	0.9919	655	0.5148	704	0.1268	753	0.0277
558	0.6327	607	0.9822	656	0.5039	705	0.1217	754	0.0266
559	0.6395	608	0.9879	657	0.4948	706	0.1172	755	0.0258
560	0.646	609	0.9854	658	0.4799	707	0.1138	756	0.0254
561	0.6559	610	0.977	659	0.4685	708	0.108	757	0.0247
562	0.6694	611	0.9798	660	0.4546	709	0.1053	758	0.0239
563	0.674	612	0.9803	661	0.4457	710	0.1022	759	0.0231
564	0.6813	613	0.9802	662	0.437	711	0.0969	760	0.0224
565	0.6868	614	0.9696	663	0.4224	712	0.0942	761	0.0219
566	0.7014	615	0.9648	664	0.4124	713	0.0891	762	0.0214
567	0.7158	616	0.9645	665	0.4005	714	0.0865	763	0.0206
568	0.7209	617	0.9596	666	0.3905	715	0.0844	764	0.0202
569	0.7339	618	0.9512	667	0.3789	716	0.0819	765	0.02
570	0.7478	619	0.9392	668	0.3692	717	0.0796	766	0.0188
571	0.7512	620	0.9332	669	0.3625	718	0.0774	767	0.0191
572	0.7653	621	0.9206	670	0.3502	719	0.0741	768	0.0182
573	0.7716	622	0.9111	671	0.3401	720	0.0732	769	0.0178
574	0.7832	623	0.9043	672	0.3328	721	0.0721	770	0.017
575	0.7899	624	0.8954	673	0.3245	722	0.0708	771	0.0166
576	0.8119	625	0.8859	674	0.3147	723	0.0694	772	0.0157
577	0.8196	626	0.8755	675	0.3068	724	0.0674	773	0.0154
578	0.8291	627	0.8621	676	0.2983	725	0.0654	774	0.0149
579	0.8361	628	0.8491	677	0.2894	726	0.0635	775	0.0153
580	0.8477	629	0.837	678	0.2809	727	0.0607	776	0.0141
581	0.8576	630	0.8294	679	0.274	728	0.0604	777	0.0144
582	0.8638	631	0.8164	680	0.2637	729	0.0573	778	0.0141
583	0.8788	632	0.8032	681	0.2564	730	0.0556	779	0.0133
584	0.8886	633	0.7922	682	0.2494	731	0.0545	780	0.0134
585	0.8952	634	0.7786	683	0.2424	732	0.052		
586	0.904	635	0.7703	684	0.2354	733	0.0506		
587	0.9225	636	0.7595	685	0.2313	734	0.05		
588	0.9332	637	0.744	686	0.2223	735	0.0477		
589	0.9343	638	0.7327	687	0.2155	736	0.047		
590	0.9385	639	0.7176	688	0.2087	737	0.0454		
591	0.954	640	0.7029	689	0.1999	738	0.0447		
592	0.9499	641	0.6927	690	0.1948	739	0.0427		
593	0.9618	642	0.6763	691	0.19	740	0.0399		
594	0.968	643	0.6714	692	0.1864	741	0.0407		
595	0.9793	644	0.6497	693	0.1787	742	0.0384		
596	0.9732	645	0.6353	694	0.1738	743	0.0374		
597	0.9776	646	0.6271	695	0.1684	744	0.0362		
598	0.9849	647	0.6133	696	0.1657	745	0.0351		

6. Goniophotometer Test results

6.1 Test Data

Test Ambient Temperature	25.1℃	Test orientation	Downward
Operate time(Min.)	90	stabilization time(Min.)	60

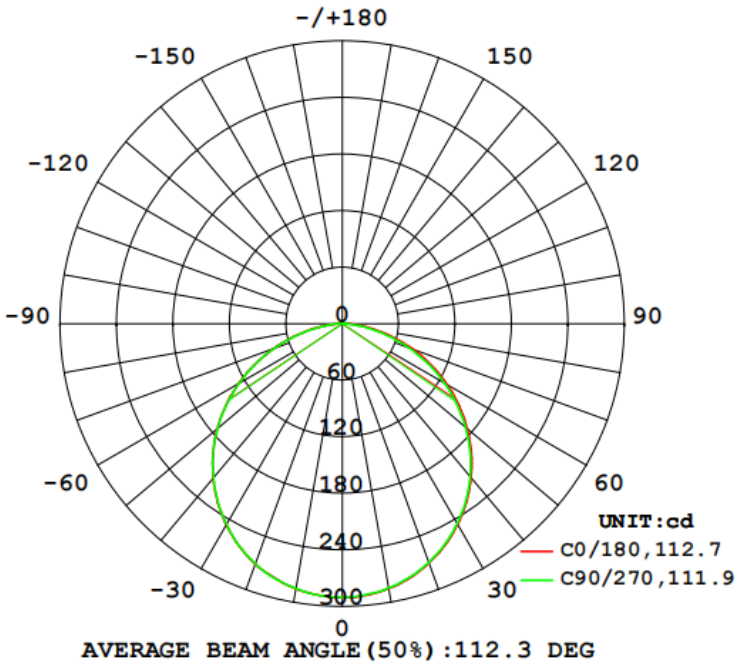
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120	60	0.1050	0.9505	11.98

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Imax(cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
825.51	68.93	290.5	1.26	1.26

6.2 Luminous Intensity Distribution



6.3 Zonal Flux Diagram

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	285.3	285.1	284.7	285.1	285.5	285.6	285.3	285.6	0- 10	27.47	27.47	3.33,3.33
20	270.2	269.4	269.4	270.0	271.3	271.3	271.1	271.8	10- 20	78.79	106.3	12.9,12.9
30	245.8	244.7	244.6	245.3	246.6	246.4	246.3	247.5	20- 30	119.5	225.8	27.3,27.3
40	213.2	212.0	211.4	212.5	213.9	213.4	213.3	214.9	30- 40	144.1	369.9	44.8,44.8
50	173.7	171.9	171.0	172.1	173.8	173.1	173.2	175.0	40- 50	149.4	519.4	62.9,62.9
60	128.4	126.4	124.9	127.8	127.7	126.9	127.0	129.6	50- 60	134.5	653.9	79.2,79.2
70	80.37	77.52	75.46	76.70	78.07	76.91	77.09	80.38	60- 70	101.7	755.6	91.5,91.5
80	33.49	29.67	27.42	28.97	30.99	29.19	29.32	32.72	70- 80	56.37	811.9	98.4,98.4
90	0.0281	0.0280	0.0393	0.0312	0.0612	0.0582	0.0587	0.0559	80- 90	12.68	824.6	99.9,99.9
100	0.0560	0.1029	0.0428	0.0469	0.0960	0.0996	0.0887	0.1114	90-100	0.0622	824.7	99.9,99.9
110	0.0854	0.1021	0.0702	0.0696	0.1045	0.1081	0.1019	0.1168	100-110	0.0949	824.8	99.9,99.9
120	0.1176	0.1298	0.1139	0.1071	0.1041	0.1073	0.1084	0.1213	110-120	0.1041	824.9	99.9,99.9
130	0.1643	0.1761	0.1691	0.1518	0.1395	0.1411	0.1542	0.1457	120-130	0.1198	825.0	99.9,99.9
140	0.2030	0.2119	0.2038	0.1849	0.2114	0.2135	0.2216	0.2322	130-140	0.1411	825.1	100,100
150	0.1954	0.2218	0.2124	0.2050	0.2852	0.2934	0.2892	0.2860	140-150	0.1444	825.3	100,100
160	0.2272	0.2303	0.2488	0.2313	0.3076	0.3197	0.3379	0.3500	150-160	0.1233	825.4	100,100
170	0.2499	0.2528	0.2728	0.2618	0.3263	0.3187	0.3366	0.3289	160-170	0.0813	825.5	100,100
180	0.2863	0.2804	0.2976	0.3023	0.2893	0.2748	0.2912	0.3018	170-180	0.0283	825.5	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

6.4 Luminous Distribution Intensity (cd) Data

Table--1 UNIT: cd

C (DEG) / γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5			
0	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290			
5	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289			
10	285	285	285	285	285	285	285	285	286	285	286	286	285	286	286	286			
15	279	278	278	278	278	279	279	279	279	279	280	280	280	280	280	280			
20	270	270	269	270	269	270	270	270	271	271	271	271	271	272	272	272			
25	259	258	258	258	258	259	259	259	260	260	260	260	260	261	261	261			
30	246	245	245	245	245	245	245	245	247	246	246	247	246	247	247	247			
35	231	230	229	229	229	230	230	230	231	231	231	231	231	232	232	232			
40	213	212	212	212	211	212	212	212	214	213	213	213	213	214	215	215			
45	194	193	193	192	192	193	193	193	195	194	194	194	194	195	196	196			
50	174	173	172	171	171	172	172	172	174	173	173	173	173	174	175	176			
55	152	151	150	149	148	149	150	150	151	151	151	150	151	152	153	154			
60	128	127	126	125	125	125	128	128	128	127	127	127	127	128	130	130			
65	105	104	103	101	101	101	102	102	103	102	102	102	102	104	105	106			
70	80.4	79.1	77.5	76.1	75.5	75.9	76.7	77.3	78.1	77.3	76.9	76.6	77.1	78.8	80.4	81.5			
75	56.2	54.7	52.8	51.2	50.6	51.1	52.0	52.7	53.7	52.7	51.9	51.7	52.3	54.0	55.9	57.2			
80	33.5	31.9	29.7	28.0	27.4	27.9	29.0	30.0	31.0	30.2	29.2	28.8	29.3	30.8	32.7	34.3			
85	13.9	12.3	9.67	8.10	7.58	8.14	9.30	10.5	11.6	10.9	9.65	8.79	8.80	9.83	11.9	14.1			
90	0.03	0.03	0.03	0.03	0.04	0.04	0.03	0.03	0.06	0.06	0.06	0.07	0.06	0.06	0.06	0.06			
95	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07			
100	0.06	0.09	0.10	0.04	0.04	0.04	0.05	0.05	0.10	0.10	0.10	0.09	0.09	0.09	0.11	0.12			
105	0.08	0.09	0.10	0.07	0.06	0.06	0.06	0.06	0.10	0.11	0.11	0.10	0.10	0.10	0.12	0.13			
110	0.09	0.11	0.10	0.09	0.07	0.07	0.07	0.07	0.10	0.11	0.11	0.10	0.10	0.10	0.12	0.13			
115	0.10	0.13	0.11	0.10	0.09	0.09	0.08	0.09	0.10	0.11	0.11	0.10	0.10	0.11	0.12	0.13			
120	0.12	0.14	0.13	0.12	0.11	0.11	0.11	0.11	0.10	0.11	0.11	0.11	0.11	0.11	0.12	0.13			
125	0.14	0.15	0.16	0.14	0.15	0.14	0.13	0.13	0.12	0.12	0.12	0.12	0.13	0.12	0.13	0.14			
130	0.16	0.18	0.18	0.17	0.17	0.16	0.15	0.16	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.16			
135	0.19	0.20	0.19	0.19	0.18	0.18	0.17	0.17	0.18	0.17	0.18	0.18	0.18	0.19	0.19	0.19			
140	0.20	0.21	0.21	0.20	0.20	0.19	0.18	0.18	0.21	0.21	0.21	0.21	0.22	0.23	0.23	0.24			
145	0.21	0.22	0.20	0.21	0.21	0.21	0.20	0.20	0.26	0.25	0.26	0.24	0.26	0.26	0.26	0.28			
150	0.20	0.20	0.22	0.21	0.21	0.22	0.21	0.20	0.29	0.29	0.29	0.29	0.29	0.28	0.29	0.29			
155	0.22	0.20	0.23	0.23	0.23	0.23	0.21	0.21	0.31	0.32	0.31	0.33	0.30	0.30	0.33	0.33			
160	0.23	0.21	0.23	0.24	0.25	0.25	0.23	0.21	0.31	0.31	0.32	0.34	0.34	0.33	0.35	0.35			
165	0.24	0.23	0.26	0.23	0.24	0.25	0.25	0.24	0.33	0.32	0.32	0.34	0.34	0.34	0.33	0.35			
170	0.25	0.24	0.25	0.25	0.27	0.28	0.26	0.25	0.33	0.32	0.32	0.33	0.34	0.34	0.33	0.34			
175	0.27	0.27	0.28	0.29	0.29	0.30	0.29	0.28	0.31	0.31	0.31	0.33	0.33	0.34	0.33	0.32			
180	0.29	0.28	0.28	0.29	0.30	0.30	0.30	0.28	0.29	0.29	0.27	0.28	0.29	0.30	0.30	0.30			

7. Photo of sample

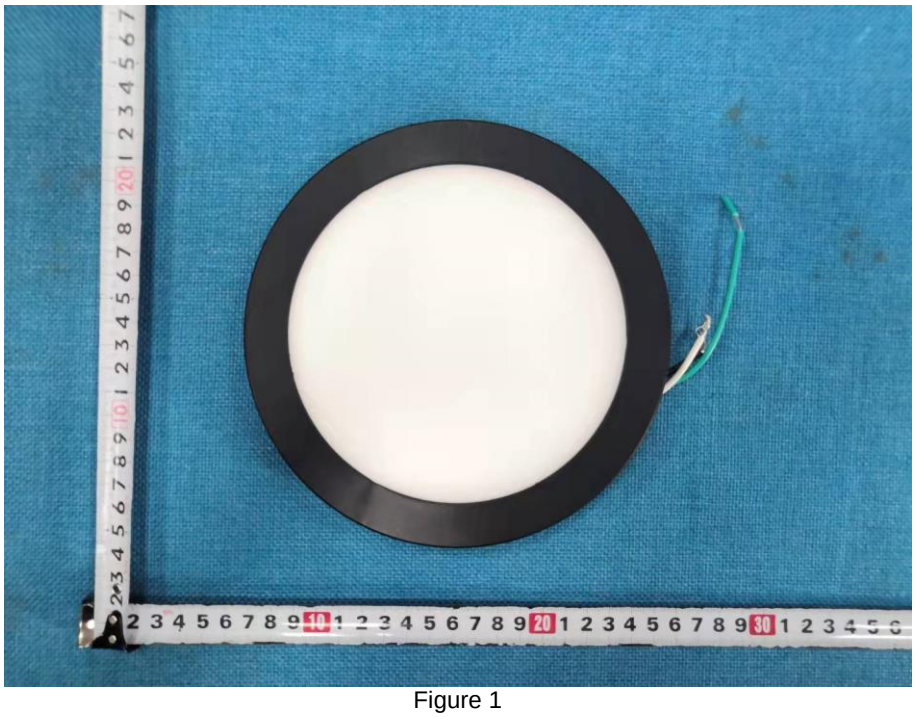


Figure 1

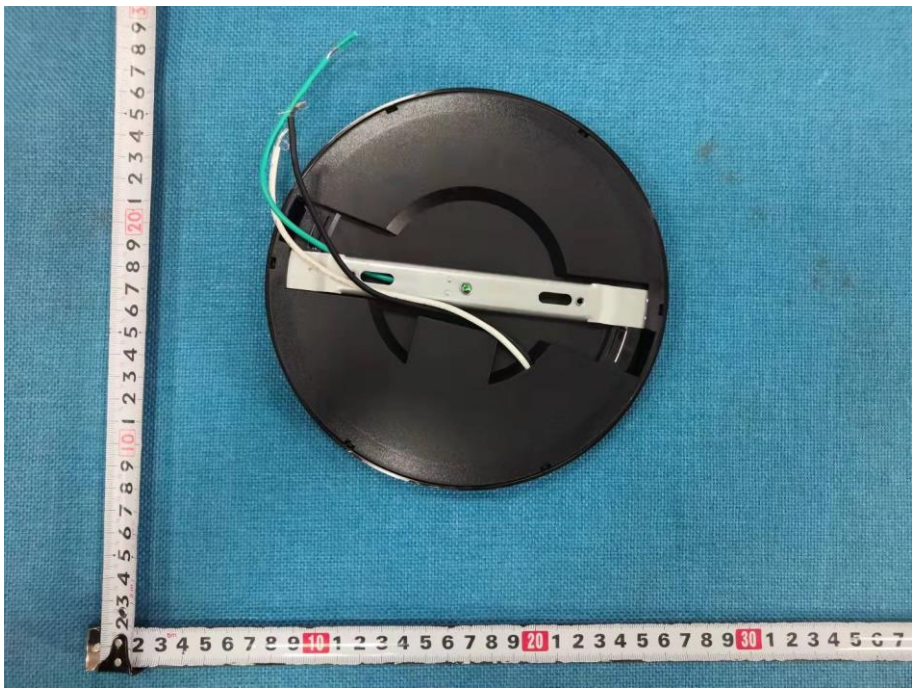


Figure 2

****** END OF THE TEST REPORT******