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-0918T-830
All Models	:	PLU01R-0918T-830, 9FLPR-SPx-xxxxxx (x-xxxxxx in the model designation could be any numbers, letters or blank, which indicates customer code. PLU01R-0918T-830 and 9FLPR-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	:	N02A22030775L00501
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.
Note 2: This report does not imply product certification, approval, or endorsement by NVLAP, NIST,or any agency of the Federal Government.
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-0918T-830
Manufacturer:	ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO.,LTD
Product Type:	LED ceiling light
Rated Voltage/Frequency:	120V AC, 60Hz
Rated Power:	18W
Rated luminous flux:	1300lm
Nominal CCT:	3000K
LED Manufacturer:	MLS CO., LTD
LED Model No:	E2835UXXXX-3A

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)
120.04	60	0.1554	17.68	0.948	1329.1	75.16

CCT (K)	Ra	R9	x	y	u'	v'
2920	83.5	11	0.4415	0.4036	0.2537	0.5219

Color Rendering Index

Ra
83.5

R1	R2	R3	R4	R5
83	93	95	81	83

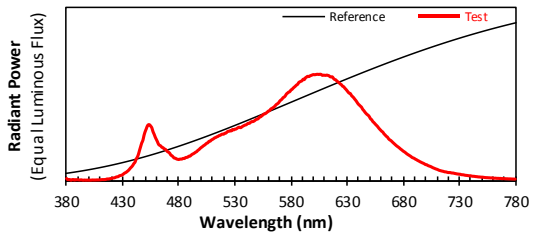
R6	R7	R8	R9	R10
92	82	59	11	84

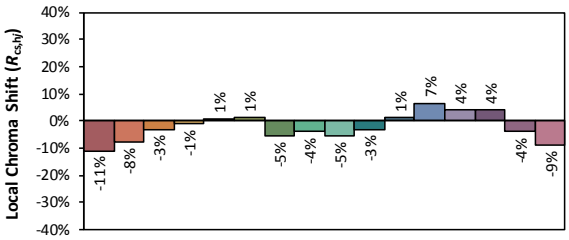
R11	R12	R13	R14	R15
81	74	85	98	75

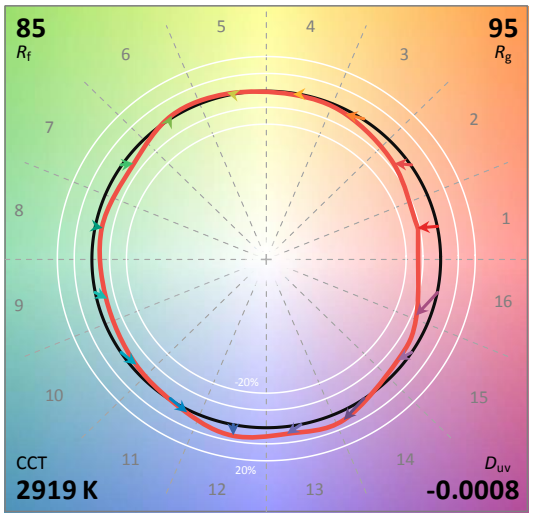
*ANSI/IES TM-30-18 Color Rendition Report

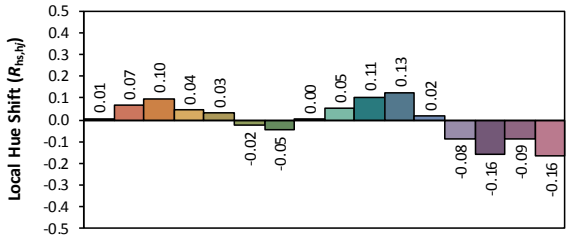
ANSI/IES TM-30-18 Color Rendition Report

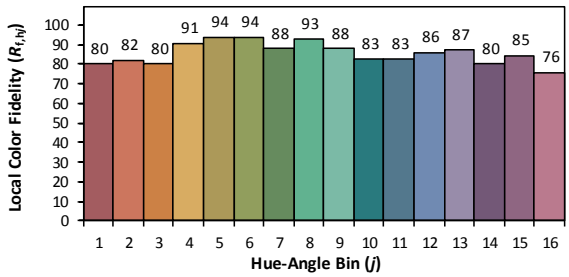
Source:	E2835UXXXX-3A	**Manufacturer:**	ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO.,LTD
Date:	2021/10/28	**Model:**	PLU01R-0918T-830

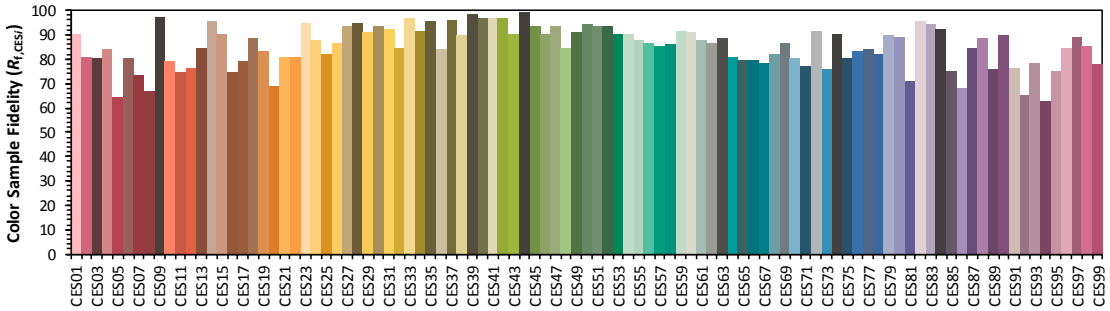












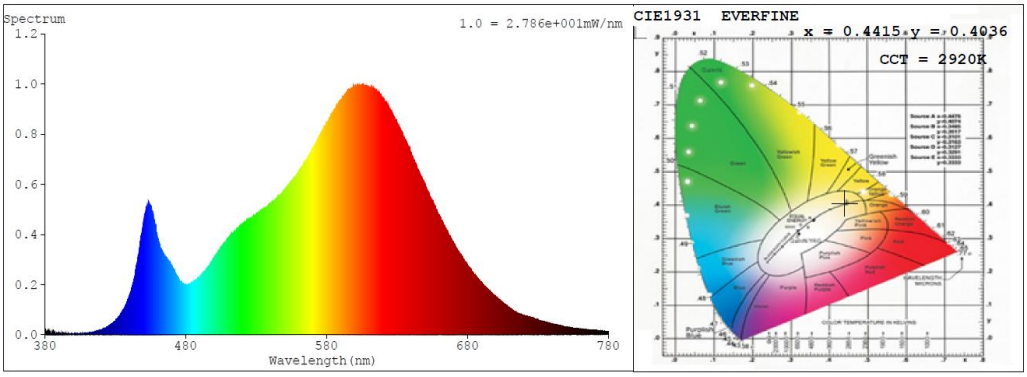
Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4416
y	0.4035
u'	0.2538
v'	0.5219

CIE 13.3-1995 (CRI)	
R_a	83
R_9	11

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	0.0199	414	0.0098	448	0.3765	482	0.2013	516	0.4222
381	0.0087	415	0.0111	449	0.4228	483	0.2025	517	0.4242
382	0.01	416	0.0151	450	0.4575	484	0.2082	518	0.4317
383	0.0086	417	0.0149	451	0.4839	485	0.2064	519	0.4353
384	0.0029	418	0.0164	452	0.5113	486	0.2151	520	0.4345
385	0.0084	419	0.0184	453	0.5232	487	0.217	521	0.4428
386	0.0098	420	0.0204	454	0.522	488	0.2198	522	0.4446
387	0.0038	421	0.0234	455	0.5095	489	0.2284	523	0.4544
388	0.0088	422	0.025	456	0.4941	490	0.229	524	0.4612
389	0.0074	423	0.0271	457	0.4591	491	0.238	525	0.4626
390	0.0082	424	0.0324	458	0.4355	492	0.2464	526	0.4675
391	0.006	425	0.0353	459	0.4077	493	0.2514	527	0.4655
392	0.0058	426	0.0368	460	0.3856	494	0.258	528	0.479
393	0.0072	427	0.0448	461	0.3637	495	0.2659	529	0.4745
394	0.0049	428	0.0474	462	0.3396	496	0.2716	530	0.4818
395	0.0037	429	0.0505	463	0.3304	497	0.2827	531	0.4825
396	0.0052	430	0.0561	464	0.3238	498	0.2901	532	0.4896
397	0.0039	431	0.0645	465	0.3114	499	0.3008	533	0.4963
398	0.0044	432	0.0719	466	0.308	500	0.3096	534	0.5004
399	0.0047	433	0.077	467	0.2968	501	0.317	535	0.4948
400	0.0038	434	0.0857	468	0.2932	502	0.3259	536	0.5008
401	0.0042	435	0.0943	469	0.2828	503	0.3325	537	0.5085
402	0.0044	436	0.106	470	0.2708	504	0.3412	538	0.5139
403	0.006	437	0.1188	471	0.2652	505	0.3503	539	0.5196
404	0.0052	438	0.1291	472	0.2553	506	0.3544	540	0.5223
405	0.0055	439	0.1424	473	0.2385	507	0.3683	541	0.5297
406	0.0055	440	0.1599	474	0.2324	508	0.3686	542	0.5368
407	0.0063	441	0.1724	475	0.2213	509	0.3793	543	0.5361
408	0.0062	442	0.201	476	0.211	510	0.3854	544	0.5454
409	0.0064	443	0.2186	477	0.2096	511	0.3918	545	0.552
410	0.0071	444	0.245	478	0.2025	512	0.3999	546	0.5523
411	0.0085	445	0.2825	479	0.1998	513	0.4039	547	0.5567
412	0.0095	446	0.3177	480	0.1974	514	0.4104	548	0.564
413	0.0092	447	0.3529	481	0.2008	515	0.4139	549	0.5731

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.5753	599	0.989	648	0.6185	697	0.1669	746	0.0366
551	0.5815	600	0.9926	649	0.6107	698	0.1623	747	0.0345
552	0.596	601	0.9914	650	0.5973	699	0.1571	748	0.0342
553	0.5971	602	0.9925	651	0.5785	700	0.15	749	0.0328
554	0.6065	603	0.9948	652	0.5702	701	0.1487	750	0.0321
555	0.6141	604	0.9953	653	0.5532	702	0.142	751	0.0319
556	0.6235	605	0.9938	654	0.5436	703	0.1374	752	0.03
557	0.6259	606	0.9959	655	0.5316	704	0.134	753	0.0288
558	0.6333	607	0.9935	656	0.5203	705	0.1296	754	0.0277
559	0.642	608	0.9854	657	0.5099	706	0.1239	755	0.0274
560	0.6514	609	0.9873	658	0.4963	707	0.1187	756	0.0265
561	0.6552	610	0.9864	659	0.4834	708	0.1147	757	0.0261
562	0.6699	611	0.9855	660	0.4725	709	0.1098	758	0.0249
563	0.6753	612	0.9877	661	0.4614	710	0.1067	759	0.0251
564	0.6827	613	0.985	662	0.4537	711	0.1023	760	0.0241
565	0.6898	614	0.9815	663	0.4376	712	0.0972	761	0.0218
566	0.7008	615	0.9722	664	0.4277	713	0.0938	762	0.0228
567	0.7125	616	0.9712	665	0.4153	714	0.0911	763	0.0218
568	0.7195	617	0.971	666	0.408	715	0.0883	764	0.0209
569	0.7284	618	0.9563	667	0.3929	716	0.0862	765	0.021
570	0.7435	619	0.9471	668	0.3826	717	0.0823	766	0.02
571	0.754	620	0.9433	669	0.376	718	0.0816	767	0.0203
572	0.7623	621	0.9321	670	0.3665	719	0.0789	768	0.0186
573	0.7763	622	0.9243	671	0.356	720	0.0758	769	0.0189
574	0.7824	623	0.9157	672	0.3465	721	0.0752	770	0.018
575	0.7936	624	0.9049	673	0.3369	722	0.0752	771	0.0178
576	0.8108	625	0.8982	674	0.3274	723	0.072	772	0.0169
577	0.8196	626	0.8846	675	0.3193	724	0.0711	773	0.0169
578	0.8288	627	0.8796	676	0.3118	725	0.07	774	0.016
579	0.8325	628	0.8664	677	0.303	726	0.067	775	0.0159
580	0.8478	629	0.8553	678	0.2938	727	0.0651	776	0.0158
581	0.8542	630	0.8426	679	0.2862	728	0.0628	777	0.0148
582	0.8658	631	0.829	680	0.277	729	0.0614	778	0.0147
583	0.8753	632	0.8183	681	0.2703	730	0.0598	779	0.0141
584	0.8844	633	0.8151	682	0.2628	731	0.059	780	0.0141
585	0.8951	634	0.7966	683	0.2538	732	0.0554		
586	0.9017	635	0.7864	684	0.2461	733	0.0547		
587	0.9183	636	0.7756	685	0.2394	734	0.0536		
588	0.9249	637	0.7613	686	0.2328	735	0.0508		
589	0.9303	638	0.7487	687	0.2258	736	0.0491		
590	0.9358	639	0.733	688	0.2171	737	0.0483		
591	0.9503	640	0.7176	689	0.2124	738	0.0466		
592	0.9458	641	0.7073	690	0.2078	739	0.045		
593	0.9628	642	0.6969	691	0.2005	740	0.0453		
594	0.9693	643	0.6868	692	0.1955	741	0.0427		
595	0.9771	644	0.6676	693	0.1886	742	0.0406		
596	0.9733	645	0.6558	694	0.1837	743	0.0404		
597	0.9807	646	0.6412	695	0.1772	744	0.0389		
598	0.9846	647	0.6288	696	0.1721	745	0.0373		

6. Goniophotometer Test results

6.1 Test Data

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

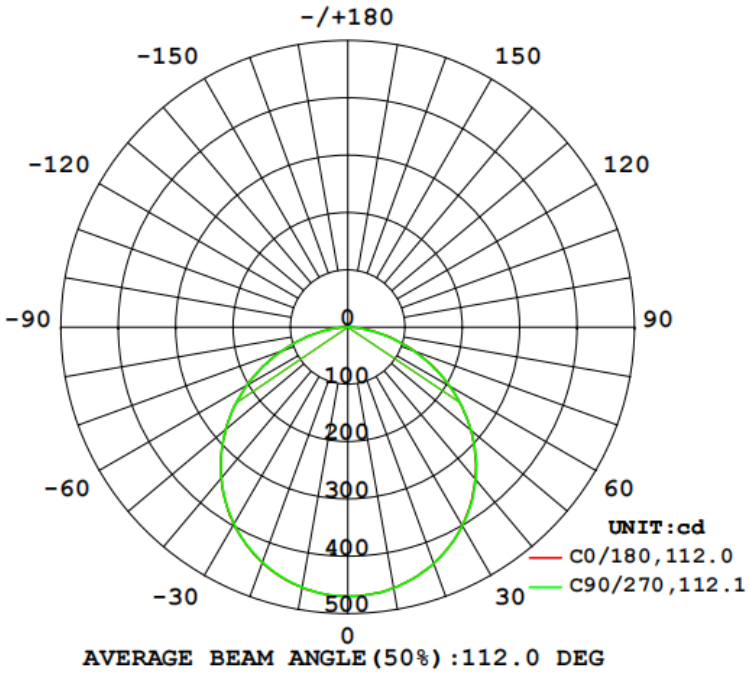
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120.1	60	0.1556	0.9483	17.72

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Imax(cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
1329.8	75.05	469.8	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	462.3	462.1	462.0	460.9	461.0	460.9	460.8	461.3	0- 10	44.43	44.43	3.34,3.34
20	438.5	439.5	438.6	436.7	437.0	436.0	436.1	437.3	10- 20	127.4	171.8	12.9,12.9
30	399.6	400.8	400.2	397.3	397.3	396.7	396.8	398.7	20- 30	193.4	365.3	27.5,27.5
40	346.0	347.8	347.0	343.4	343.3	342.9	343.6	345.4	30- 40	233.5	598.8	45,45
50	280.3	281.4	281.0	276.8	278.1	277.5	278.3	280.1	40- 50	241.6	840.3	63.2,63.2
60	204.5	205.7	204.4	201.0	203.3	202.6	203.3	205.6	50- 60	216.6	1057	79.5,79.5
70	125.4	124.4	123.0	120.4	123.5	122.8	123.2	125.3	60- 70	161.9	1219	91.7,91.7
80	48.88	48.29	46.30	45.18	48.79	47.83	47.51	49.32	70- 80	89.31	1308	98.4,98.4
90	0.0492	0.0508	0.0544	0.0564	0.1002	0.1000	0.1125	0.0951	80- 90	20.20	1328	99.9,99.9
100	0.0846	0.1130	0.0929	0.0822	0.1548	0.1624	0.1524	0.1577	90-100	0.1066	1328	99.9,99.9
110	0.1248	0.1494	0.1364	0.1190	0.1744	0.1794	0.1691	0.1742	100-110	0.1492	1329	99.9,99.9
120	0.1794	0.1986	0.1885	0.1793	0.1706	0.1773	0.1820	0.1742	110-120	0.1657	1329	99.9,99.9
130	0.2536	0.2795	0.2670	0.2577	0.2251	0.2311	0.2378	0.2314	120-130	0.1916	1329	99.9,99.9
140	0.3179	0.3331	0.3210	0.3141	0.3425	0.3473	0.3426	0.3507	130-140	0.2255	1329	100,100
150	0.3462	0.3428	0.3317	0.3240	0.4596	0.4629	0.4553	0.4783	140-150	0.2327	1329	100,100
160	0.3685	0.3797	0.3839	0.3775	0.5031	0.5272	0.5270	0.5551	150-160	0.1976	1330	100,100
170	0.4317	0.4102	0.4323	0.4294	0.5245	0.5064	0.5363	0.5377	160-170	0.1320	1330	100,100
180	0.4783	0.4556	0.4747	0.4973	0.4762	0.4530	0.4755	0.4944	170-180	0.0459	1330	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	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470			
5	468	468	468	468	468	468	467	467	467	467	467	467	467	468	468	468			
10	462	462	462	462	462	462	461	460	461	461	461	461	461	461	461	462			
15	452	452	453	453	452	452	451	450	451	450	450	450	451	451	451	452			
20	439	438	439	439	439	438	437	436	437	436	436	436	436	437	437	438			
25	421	421	422	422	421	421	419	418	419	418	418	418	418	420	420	421			
30	400	400	401	401	400	400	397	396	397	396	397	396	397	398	399	400			
35	374	375	376	376	375	374	372	371	372	371	372	371	372	374	374	375			
40	346	346	348	348	347	346	343	342	343	342	343	343	344	345	345	347			
45	315	315	316	316	315	314	311	310	312	311	311	311	312	313	314	316			
50	280	281	281	282	281	279	277	275	278	277	278	278	278	280	280	282			
55	243	244	244	245	244	242	240	238	242	241	241	241	242	243	244	246			
60	205	205	206	205	204	203	201	199	203	202	203	203	203	204	206	207			
65	165	165	165	165	164	162	161	160	164	163	163	163	163	165	166	168			
70	125	125	124	126	123	122	120	120	124	123	123	123	123	124	125	127			
75	85.1	85.4	85.2	84.6	83.5	82.5	81.4	81.2	84.5	83.8	83.9	83.8	84.0	84.8	85.9	87.5			
80	48.9	49.0	48.3	47.2	46.3	45.6	45.2	45.5	48.8	48.3	47.8	47.5	47.5	48.2	49.3	50.9			
85	18.4	18.0	16.2	14.6	13.7	13.7	14.5	15.6	18.7	18.2	16.8	15.7	15.4	16.0	17.6	19.7			
90	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.10	0.10	0.10	0.12	0.11	0.10	0.10	0.10			
95	0.06	0.06	0.07	0.06	0.06	0.06	0.06	0.06	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12			
100	0.08	0.10	0.11	0.12	0.09	0.08	0.08	0.08	0.15	0.16	0.16	0.16	0.15	0.15	0.16	0.16			
105	0.10	0.12	0.13	0.12	0.11	0.10	0.10	0.10	0.17	0.18	0.18	0.17	0.17	0.17	0.17	0.18			
110	0.12	0.14	0.15	0.14	0.14	0.13	0.12	0.12	0.17	0.18	0.18	0.17	0.17	0.17	0.17	0.18			
115	0.15	0.17	0.17	0.17	0.17	0.16	0.14	0.15	0.17	0.18	0.18	0.17	0.17	0.17	0.17	0.18			
120	0.18	0.20	0.20	0.21	0.19	0.19	0.18	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.17	0.18			
125	0.21	0.23	0.24	0.25	0.23	0.24	0.22	0.21	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.20			
130	0.25	0.27	0.28	0.26	0.27	0.28	0.26	0.26	0.23	0.23	0.23	0.24	0.24	0.24	0.23	0.24			
135	0.29	0.31	0.31	0.32	0.30	0.29	0.29	0.28	0.28	0.28	0.29	0.29	0.29	0.29	0.29	0.30			
140	0.32	0.33	0.33	0.33	0.32	0.33	0.31	0.30	0.34	0.34	0.35	0.34	0.34	0.35	0.35	0.37			
145	0.35	0.35	0.32	0.34	0.33	0.34	0.33	0.33	0.42	0.41	0.41	0.40	0.40	0.41	0.41	0.44			
150	0.35	0.33	0.34	0.35	0.33	0.37	0.32	0.33	0.46	0.46	0.46	0.46	0.46	0.45	0.48	0.46			
155	0.33	0.34	0.35	0.38	0.36	0.40	0.35	0.33	0.50	0.50	0.50	0.52	0.49	0.49	0.51	0.51			
160	0.37	0.39	0.38	0.37	0.38	0.39	0.38	0.36	0.50	0.50	0.53	0.54	0.53	0.53	0.56	0.55			
165	0.40	0.40	0.40	0.41	0.40	0.44	0.40	0.38	0.52	0.52	0.52	0.54	0.54	0.52	0.54	0.56			
170	0.43	0.42	0.41	0.41	0.43	0.44	0.43	0.41	0.52	0.52	0.51	0.53	0.54	0.53	0.54	0.56			
175	0.44	0.44	0.45	0.46	0.47	0.49	0.49	0.46	0.50	0.50	0.49	0.53	0.53	0.52	0.53	0.52			
180	0.48	0.45	0.46	0.47	0.47	0.49	0.50	0.47	0.48	0.48	0.45	0.47	0.48	0.49	0.49	0.49			

7. Photo of sample

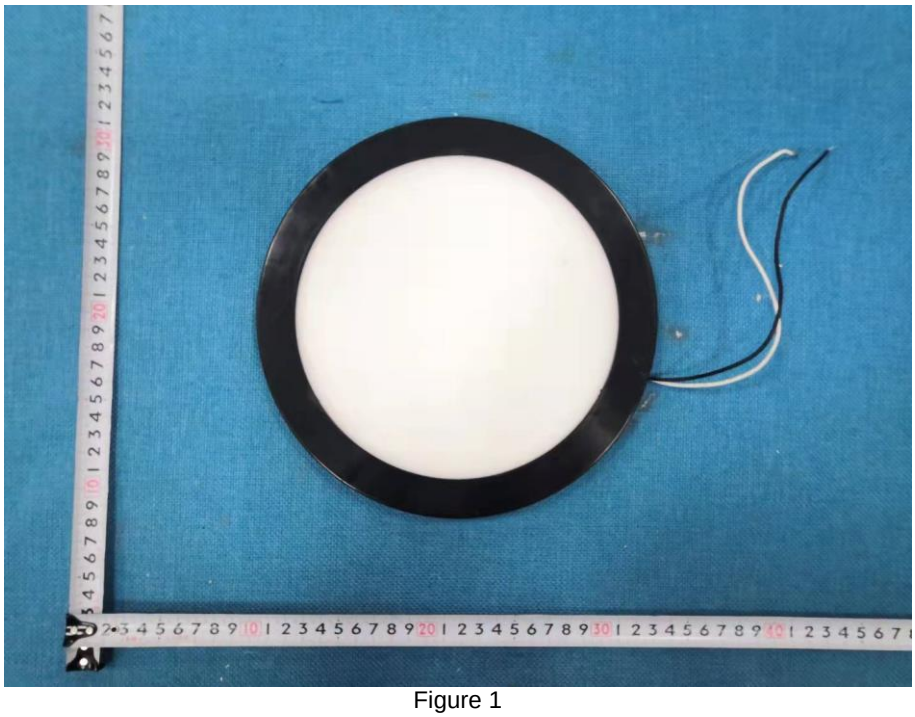


Figure 1

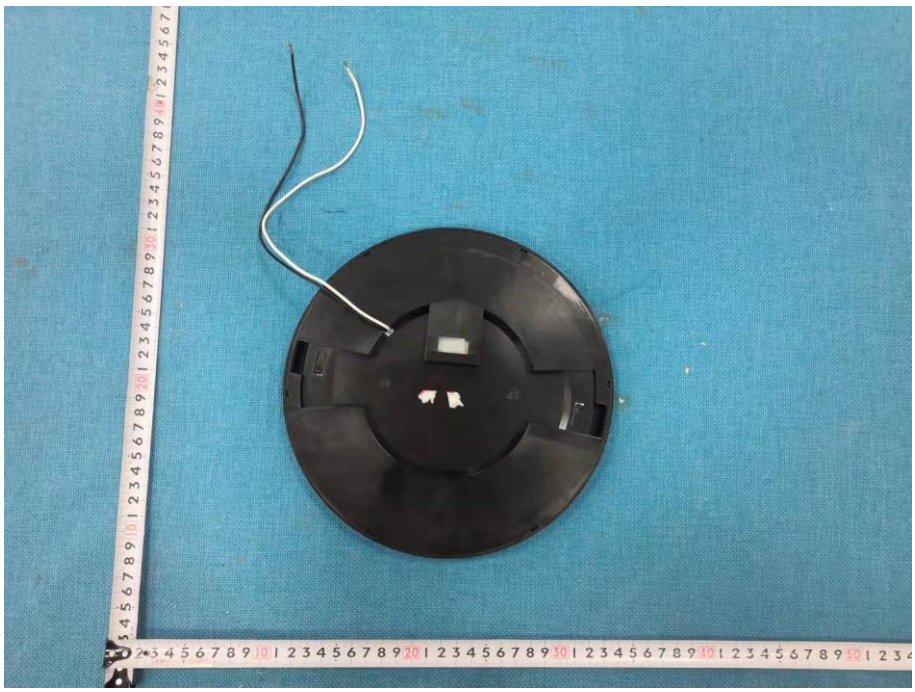


Figure 2

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