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-850
All Models	:	PLU01R-0712T-850, 7FLPR-SPx-xxxxxx (x-xxxxxx in the model designation could be any numbers, letters or blank, which indicates customer code. PLU01R-0712T-850 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	:	N02A22030775L00401
Date of receipt	:	Dec. 22, 2021
Date of test	:	Nov. 22, 2021 - Nov. 25, 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. Meide 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)

The client submitted 1 sample of model PLU01R-0712T-850. Sample was numbered C02A21100318L00601-S01. The sample was received on 2021-11-22, is undamaged condition.

Model Tested:	PLU01R-0712T-850
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:	5000K
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)
120.13	60	0.107	11.95	0.93	868.97	72.69

CCT (K)	Ra	R9	x	y	u'	v'
4847	81.5	1	0.3506	0.3651	0.2100	0.4919

Color Rendering Index

Ra
81.5

R1	R2	R3	R4	R5
79	87	93	80	79

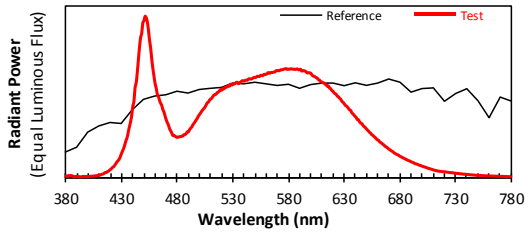
R6	R7	R8	R9	R10
82	87	65	1	69

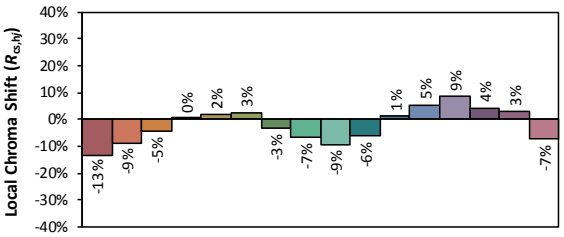
R11	R12	R13	R14	R15
79	56	81	96	73

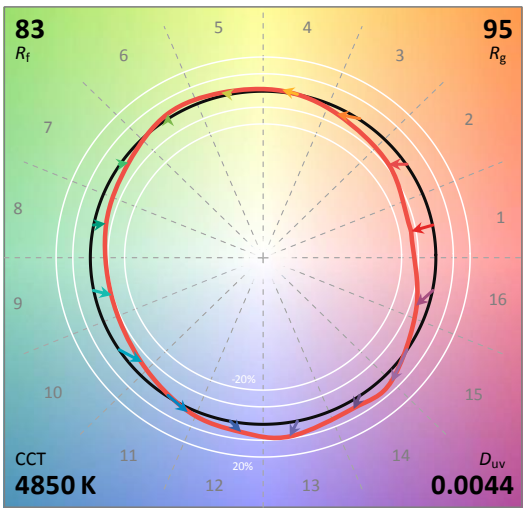
*ANSI/IES TM-30-18 Color Rendition Report

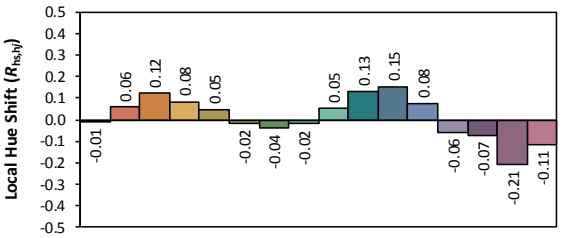
ANSI/IES TM-30-18 Color Rendition Report

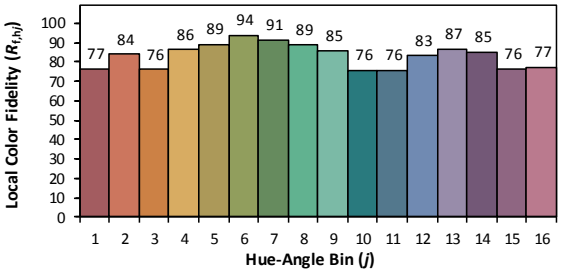
Source:	E2835X1X2X3X4-P	**Manufacturer:**	ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO.,LTD
Date:	2021/11/25	**Model:**	PLU01R-0712T-850

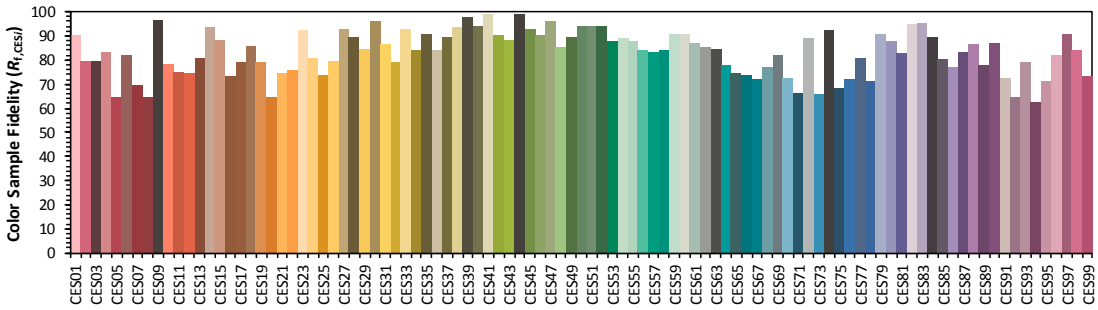












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

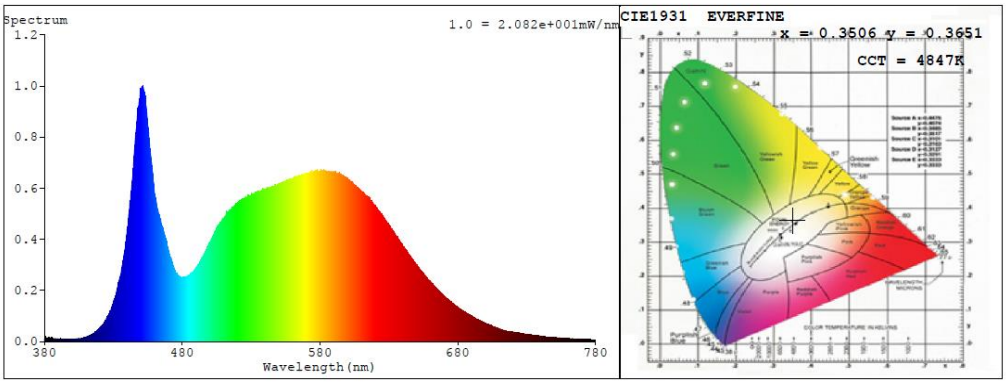
x	0.3506
y	0.3649
u'	0.2100
v'	0.4918

CIE 13.3-1995 (CRI)

R_a	81
R_9	1

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	0.0111	414	0.0262	448	0.8846	482	0.2512	516	0.5225
381	0.0071	415	0.0318	449	0.9496	483	0.2516	517	0.5248
382	0.0135	416	0.0319	450	0.9617	484	0.2552	518	0.5327
383	0.0121	417	0.0369	451	0.9887	485	0.2552	519	0.5404
384	0.0132	418	0.0401	452	0.9801	486	0.2642	520	0.5363
385	0.0133	419	0.0466	453	0.9565	487	0.2648	521	0.5466
386	0.0092	420	0.0516	454	0.9069	488	0.2707	522	0.5448
387	0.0045	421	0.0582	455	0.8445	489	0.281	523	0.5532
388	0.0077	422	0.0652	456	0.7963	490	0.2812	524	0.5542
389	0.0078	423	0.0697	457	0.7286	491	0.2942	525	0.558
390	0.0094	424	0.0797	458	0.6712	492	0.3033	526	0.5653
391	0.0051	425	0.0897	459	0.6237	493	0.3104	527	0.5614
392	0.0068	426	0.0998	460	0.5788	494	0.3235	528	0.5735
393	0.0046	427	0.1072	461	0.5502	495	0.3333	529	0.568
394	0.0058	428	0.1173	462	0.5125	496	0.3429	530	0.572
395	0.0084	429	0.1345	463	0.4984	497	0.3544	531	0.574
396	0.008	430	0.1518	464	0.4746	498	0.364	532	0.5772
397	0.0074	431	0.1682	465	0.4565	499	0.3777	533	0.5839
398	0.0083	432	0.1852	466	0.4436	500	0.3873	534	0.5845
399	0.0068	433	0.2085	467	0.418	501	0.3974	535	0.5759
400	0.0065	434	0.2309	468	0.4029	502	0.4083	536	0.5816
401	0.0078	435	0.25	469	0.379	503	0.4168	537	0.5861
402	0.0093	436	0.2847	470	0.3562	504	0.425	538	0.592
403	0.0099	437	0.3146	471	0.3382	505	0.4332	539	0.5946
404	0.0082	438	0.3441	472	0.3243	506	0.4464	540	0.5919
405	0.0119	439	0.3832	473	0.3013	507	0.4595	541	0.5958
406	0.0105	440	0.4396	474	0.2887	508	0.4637	542	0.598
407	0.0128	441	0.4669	475	0.2742	509	0.4751	543	0.5974
408	0.0131	442	0.5522	476	0.2594	510	0.4824	544	0.6042
409	0.0162	443	0.5808	477	0.26	511	0.4869	545	0.6067
410	0.0155	444	0.6447	478	0.2539	512	0.4981	546	0.605
411	0.0183	445	0.7237	479	0.2507	513	0.5058	547	0.606
412	0.0213	446	0.7991	480	0.247	514	0.5108	548	0.6104
413	0.0227	447	0.8594	481	0.25	515	0.5119	549	0.6142

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.6139	599	0.643	648	0.3143	697	0.0791	746	0.0176
551	0.6164	600	0.641	649	0.3096	698	0.0771	747	0.0167
552	0.6217	601	0.6319	650	0.301	699	0.075	748	0.0161
553	0.6207	602	0.6244	651	0.2938	700	0.0723	749	0.0151
554	0.6205	603	0.622	652	0.2866	701	0.0693	750	0.0147
555	0.628	604	0.6186	653	0.2783	702	0.0678	751	0.0148
556	0.6258	605	0.6132	654	0.273	703	0.0651	752	0.0146
557	0.6259	606	0.6105	655	0.2641	704	0.0629	753	0.0144
558	0.6337	607	0.6012	656	0.2603	705	0.0602	754	0.0137
559	0.6315	608	0.598	657	0.2524	706	0.0575	755	0.0129
560	0.6354	609	0.5905	658	0.2477	707	0.056	756	0.0127
561	0.6374	610	0.587	659	0.24	708	0.0535	757	0.0127
562	0.6449	611	0.5831	660	0.2327	709	0.052	758	0.0118
563	0.6405	612	0.5805	661	0.2306	710	0.0494	759	0.0117
564	0.6428	613	0.5735	662	0.221	711	0.0474	760	0.0117
565	0.6457	614	0.5689	663	0.2162	712	0.0455	761	0.0118
566	0.6448	615	0.5605	664	0.211	713	0.044	762	0.0106
567	0.6476	616	0.5627	665	0.2057	714	0.0422	763	0.0104
568	0.6489	617	0.5497	666	0.2003	715	0.0408	764	0.0106
569	0.6559	618	0.5459	667	0.1929	716	0.0395	765	0.0101
570	0.6571	619	0.535	668	0.1891	717	0.0392	766	0.0102
571	0.6559	620	0.5309	669	0.1843	718	0.0381	767	0.0095
572	0.6562	621	0.5215	670	0.1782	719	0.0371	768	0.0093
573	0.6613	622	0.5149	671	0.1735	720	0.0369	769	0.0092
574	0.6613	623	0.5117	672	0.1683	721	0.0363	770	0.0088
575	0.6625	624	0.5	673	0.1638	722	0.0352	771	0.0087
576	0.6656	625	0.4965	674	0.1596	723	0.0343	772	0.0086
577	0.6675	626	0.4876	675	0.1535	724	0.0333	773	0.0086
578	0.6681	627	0.4818	676	0.1491	725	0.0321	774	0.0076
579	0.6636	628	0.4704	677	0.1448	726	0.0317	775	0.0075
580	0.666	629	0.4626	678	0.142	727	0.0311	776	0.0078
581	0.6646	630	0.4563	679	0.1388	728	0.0307	777	0.0071
582	0.6673	631	0.4455	680	0.1336	729	0.0292	778	0.0073
583	0.6671	632	0.4403	681	0.1298	730	0.028	779	0.007
584	0.6646	633	0.4344	682	0.1264	731	0.0275	780	0.0071
585	0.6655	634	0.4258	683	0.1221	732	0.0263		
586	0.6633	635	0.4162	684	0.1196	733	0.0265		
587	0.6654	636	0.413	685	0.1155	734	0.0249		
588	0.6666	637	0.3995	686	0.1124	735	0.0242		
589	0.6624	638	0.3916	687	0.1085	736	0.0242		
590	0.6612	639	0.3848	688	0.1059	737	0.0226		
591	0.6648	640	0.3759	689	0.1031	738	0.0218		
592	0.6534	641	0.37	690	0.0996	739	0.0224		
593	0.6562	642	0.357	691	0.0965	740	0.0203		
594	0.6554	643	0.3556	692	0.0934	741	0.0204		
595	0.6538	644	0.3434	693	0.0908	742	0.0196		
596	0.6481	645	0.3358	694	0.0866	743	0.019		
597	0.6422	646	0.3319	695	0.0849	744	0.0184		
598	0.6434	647	0.3229	696	0.0829	745	0.0177		

6. Goniophotometer Test results

6.1 Test Data

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

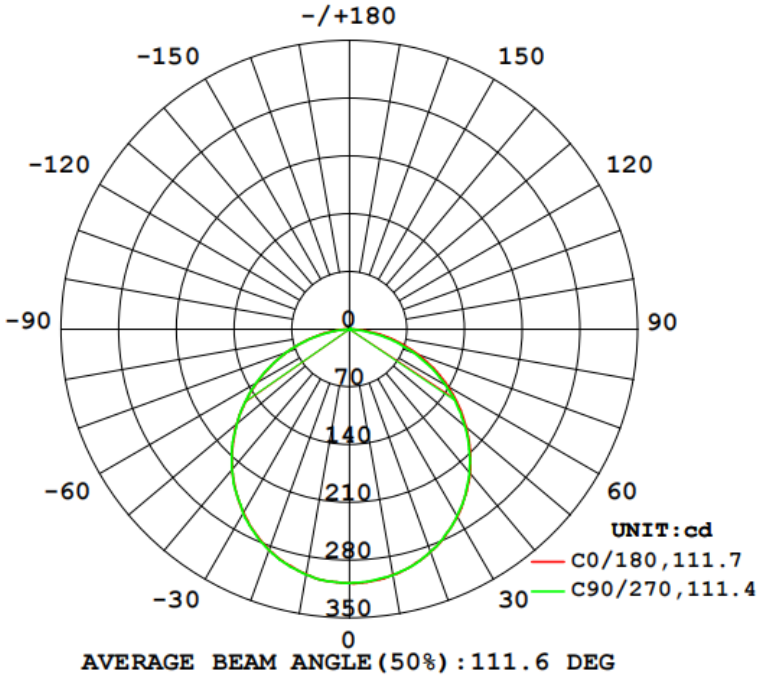
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120	60	0.1070	0.9300	11.94

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Imax(cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
869.28	72.8	308.1	1.24	1.24

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	302.4	303.3	302.6	301.7	301.6	302.2	302.2	303.7	0- 10	29.12	29.12	3.35,3.35
20	287.0	288.2	286.9	285.3	284.9	284.7	285.3	287.4	10- 20	83.42	112.5	12.9,12.9
30	262.3	263.1	261.0	258.3	257.2	256.7	258.0	261.2	20- 30	126.3	238.8	27.5,27.5
40	227.9	228.7	226.5	222.7	221.7	221.1	222.2	226.0	30- 40	152.0	390.8	45,45
50	185.2	186.3	183.4	179.9	178.9	178.2	178.9	183.3	40- 50	157.1	547.9	63,63
60	137.5	139.7	133.9	131.3	130.1	130.0	130.8	135.0	50- 60	141.1	688.9	79.3,79.3
70	87.04	86.26	81.83	79.56	80.08	79.58	80.23	84.21	60- 70	106.8	795.8	91.5,91.5
80	37.78	35.22	30.25	29.81	32.21	31.07	30.66	34.92	70- 80	60.26	856.0	98.5,98.5
90	0	0.0002	0.0018	0.0038	0	0	0	0	80- 90	13.20	869.2	100,100
100	0.0668	0.0376	0	0	0	0	0	0.0141	90-100	0.0048	869.2	100,100
110	0.0546	0.0325	0	0	0	0	0	0.0122	100-110	0.0114	869.2	100,100
120	0.0541	0.0216	0	0	0	0	0	0.0127	110-120	0.0090	869.3	100,100
130	0.0410	0.0296	0.0066	0	0	0	0.0019	0.0146	120-130	0.0077	869.3	100,100
140	0.0287	0.0310	0.0146	0	0	0.0000	0.0071	0.0103	130-140	0.0069	869.3	100,100
150	0.0217	0.0291	0.0207	0.0000	0.0009	0.0005	0.0055	0.0061	140-150	0.0047	869.3	100,100
160	0.0217	0.0183	0.0216	0.0085	0	0.0001	0.0066	0.0057	150-160	0.0028	869.3	100,100
170	0	0.0089	0	0.0021	0.0094	0.0089	0.0085	0	160-170	0.0016	869.3	100,100
180	0	0	0	0	0	0	0	0	170-180	0.0003	869.3	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

6.4 Luminous Distribution Intensity (cd) Data

Table--1 UNIT: cd

γ (DEG) \ C (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	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308			
5	306	307	307	307	306	306	306	306	306	305	306	306	306	306	307	307			
10	302	303	303	304	303	302	302	301	302	302	302	301	302	302	304	304			
15	297	297	296	297	297	295	295	294	295	294	295	294	295	295	297	297			
20	287	288	288	288	287	285	285	284	285	284	285	283	285	286	287	288			
25	276	276	277	276	275	274	273	271	272	272	272	271	273	274	275	276			
30	262	263	263	262	261	260	258	257	257	257	257	257	258	259	261	262			
35	246	247	247	246	245	243	242	240	240	240	240	240	240	242	245	245			
40	228	228	229	227	227	224	223	221	222	221	221	221	222	223	226	227			
45	207	208	208	207	206	203	202	200	201	200	200	200	202	203	205	207			
50	185	186	186	184	183	181	180	178	179	178	178	178	179	181	183	185			
55	162	163	163	161	159	157	156	154	155	155	154	155	155	158	160	162			
60	137	138	140	136	134	132	131	130	130	130	130	130	131	133	135	137			
65	113	114	112	110	108	106	106	105	105	105	105	105	105	107	110	112			
70	87.0	87.6	86.3	84.0	81.8	79.9	79.6	79.5	80.1	80.0	79.6	79.5	80.2	81.9	84.2	86.6			
75	61.6	62.0	60.2	57.8	55.6	54.0	54.0	54.5	55.4	55.3	54.6	54.3	54.9	56.4	59.0	61.5			
80	37.8	37.5	35.2	32.4	30.3	29.3	29.8	30.8	32.2	31.9	31.1	30.4	30.7	32.2	34.9	37.5			
85	15.6	14.7	11.5	8.58	7.67	7.36	8.43	9.83	10.9	10.5	9.08	7.84	7.73	9.11	12.1	15.3			
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
95	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01			
100	0.07	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03			
105	0.06	0.03	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02			
110	0.05	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02			
115	0.05	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01			
120	0.05	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01			
125	0.05	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01			
130	0.04	0.02	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01			
135	0.04	0.02	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01			
140	0.03	0.02	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01			
145	0.02	0.02	0.00	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01			
150	0.02	0.00	0.03	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00			
155	0.00	0.00	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02			
160	0.02	0.00	0.02	0.00	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01			
165	0.02	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.01			
170	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00			
175	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00			
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			

7. Photo of sample

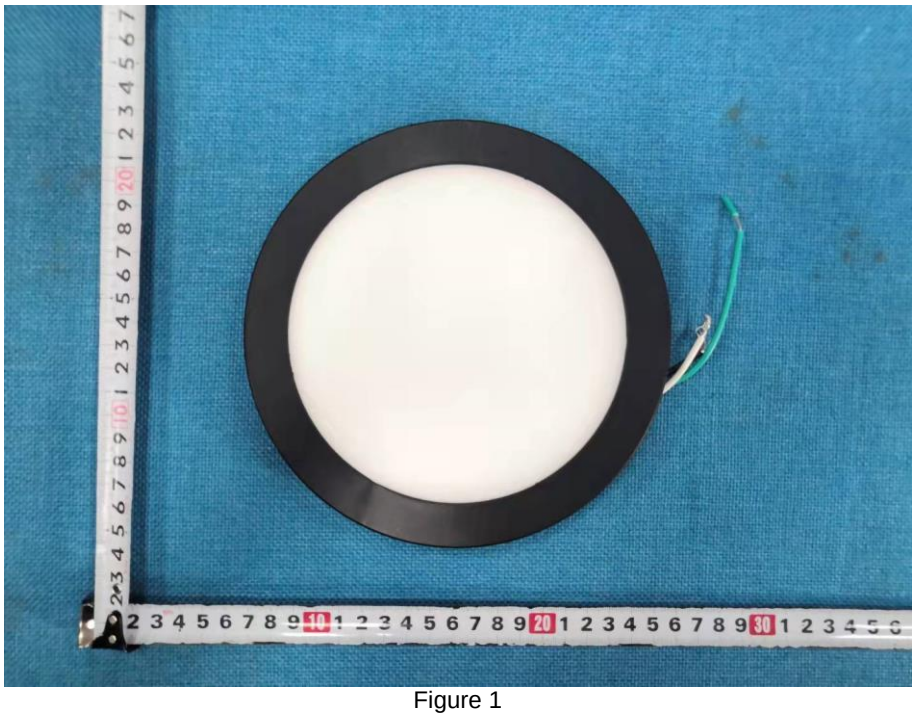


Figure 1

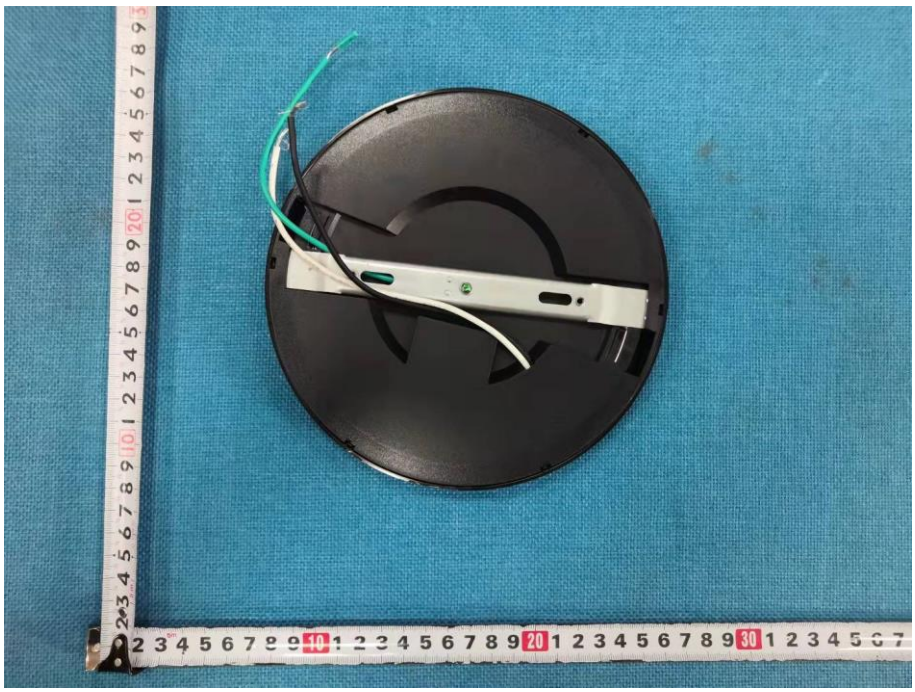


Figure 2

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