

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-0509T-850

All Models: PLU01R-0509T-850, 5FLPR-SPx-xxxxxx (x-xxxxxx in the model designation could be any numbers, letters or blank, which indicates customer code.
PLU01R-0509T-850 and 5FLPR-SPx-xxxxxx are same except model name)

Brand Name: 

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

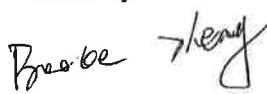
Report No.: N02A22030775L00201

Date of receipt: Nov. 22, 2021

Date of test: Nov. 22, 2021 - Nov. 26, 2021

Date of report: Apr. 02, 2022

Tested by:



Brooke Zheng/ Test Engineer

Checked by:



Sandy Chen/ Project Engineer

Approved by:



Jessie Li/ Technical Manager



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 used 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.



1. Product Description for Equipment under Test(EUT)

Model Tested:	PLU01R-0509T-850
Manufacturer:	ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO.,LTD
Product Type:	LED ceiling light
Rated Voltage/Frequency:	120V AC, 60Hz
Rated Power:	9W
Rated luminous flux:	550lm
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 $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ during measurement. And relative humidity between 10% and 65%.

Goniophotometer System

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

Photometric parameters 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 4π 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°C	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)
120.11	60	0.07625	8.549	0.9335	558.19	65.29

CCT (K)	Ra	R9	x	y	u'	v'
4759	81.7	1	0.3535	0.3675	0.2110	0.4934

Color Rendering Index



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

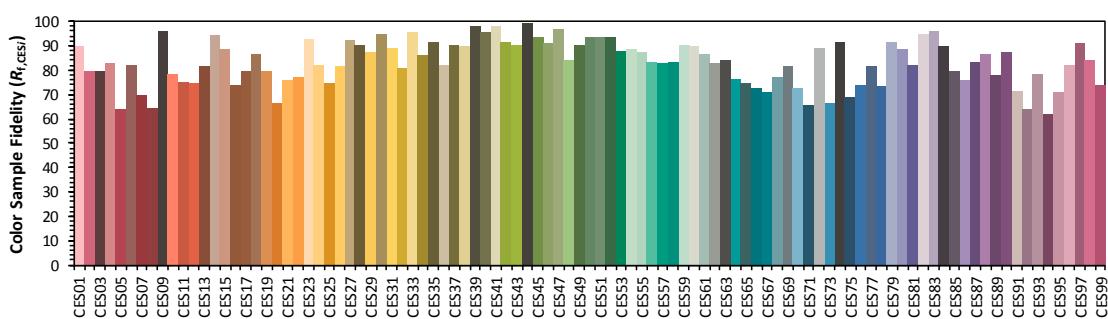
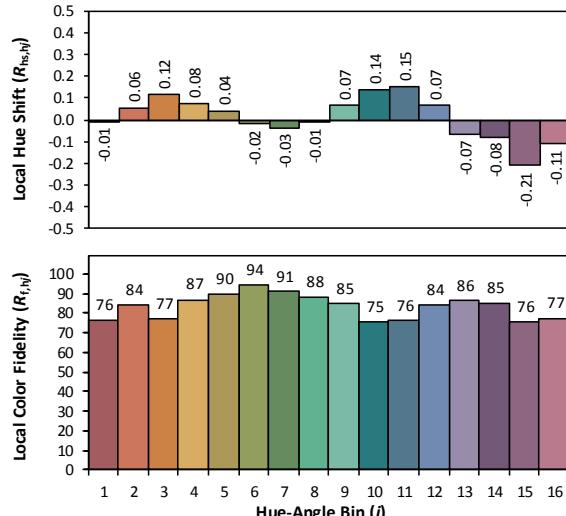
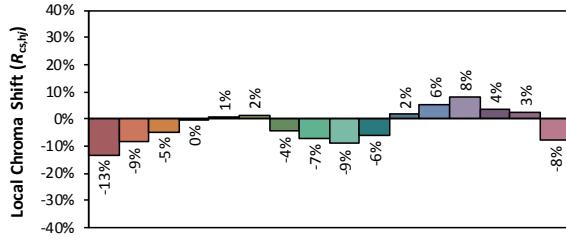
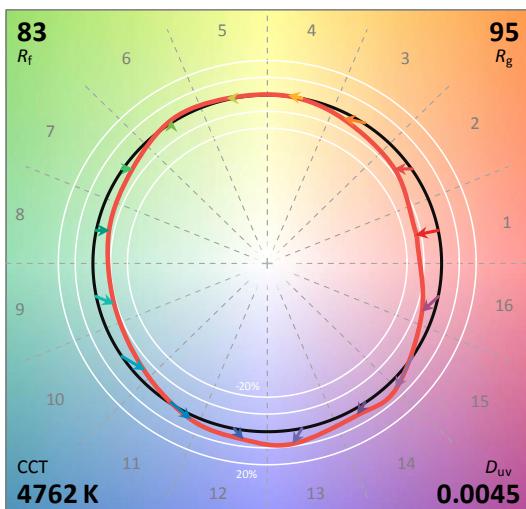
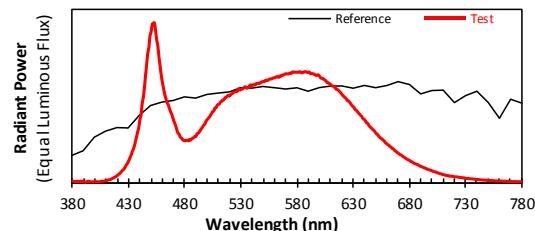
ANSI/IES TM-30-18 Color Rendition Report

Source: E2835X1X2X3X4-P

Date: 2021/11/26

Manufacturer: ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO., LTD

Model: PLU01R-0509T-850



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

x **0.3535**

y **0.3673**

u' **0.2110**

v' **0.4933**

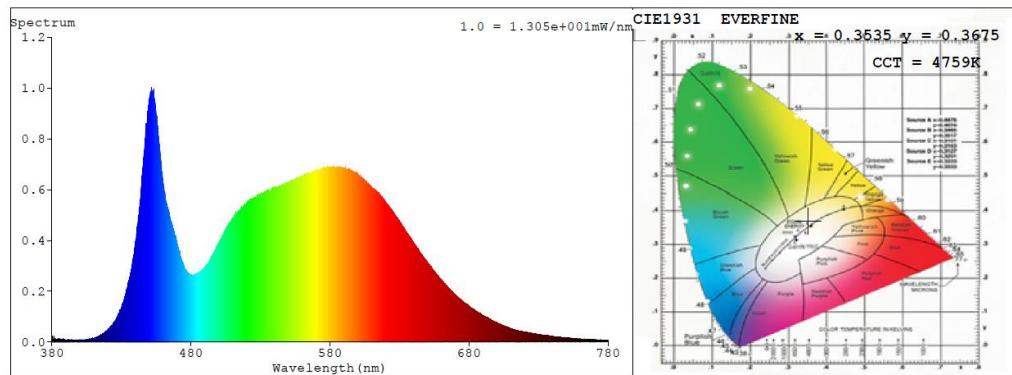
CIE 13.3-1995
(CRI)

R_a 82

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								
380	0.0126	414	0.0229	448	0.8374	482	0.2648	516	0.5282
381	0.0106	415	0.0261	449	0.9108	483	0.2606	517	0.5305
382	0.0093	416	0.0305	450	0.9357	484	0.2684	518	0.539
383	0.0088	417	0.0338	451	0.9815	485	0.2647	519	0.5425
384	0.0087	418	0.0377	452	0.99	486	0.2729	520	0.5382
385	0.0116	419	0.0414	453	0.9905	487	0.2764	521	0.5483
386	0.0082	420	0.0476	454	0.9419	488	0.2814	522	0.5516
387	0.0094	421	0.0532	455	0.8856	489	0.2883	523	0.5584
388	0.0128	422	0.0595	456	0.8489	490	0.2887	524	0.5633
389	0.0082	423	0.0657	457	0.7792	491	0.3044	525	0.5642
390	0.0066	424	0.075	458	0.7259	492	0.3081	526	0.5692
391	0.0045	425	0.081	459	0.6698	493	0.3159	527	0.567
392	0.0069	426	0.0885	460	0.625	494	0.3276	528	0.5831
393	0.0078	427	0.1008	461	0.5887	495	0.3379	529	0.5761
394	0.0115	428	0.1132	462	0.5531	496	0.3478	530	0.5784
395	0.009	429	0.1226	463	0.5272	497	0.358	531	0.581
396	0.0064	430	0.1374	464	0.5015	498	0.367	532	0.5842
397	0.0075	431	0.1538	465	0.488	499	0.3824	533	0.5915
398	0.0067	432	0.1688	466	0.4701	500	0.3925	534	0.5962
399	0.0079	433	0.1896	467	0.4474	501	0.4005	535	0.5877
400	0.0083	434	0.208	468	0.4321	502	0.4086	536	0.5888
401	0.0088	435	0.2268	469	0.4123	503	0.42	537	0.5936
402	0.0077	436	0.2564	470	0.3894	504	0.4309	538	0.6044
403	0.0072	437	0.2845	471	0.3705	505	0.4422	539	0.6071
404	0.0082	438	0.3167	472	0.3531	506	0.4463	540	0.6019
405	0.0103	439	0.3426	473	0.3279	507	0.4647	541	0.6085
406	0.0112	440	0.3933	474	0.3096	508	0.4665	542	0.6071
407	0.0116	441	0.42	475	0.3018	509	0.4808	543	0.6079
408	0.0113	442	0.4902	476	0.2842	510	0.4858	544	0.6169
409	0.0129	443	0.5277	477	0.2783	511	0.4911	545	0.6153
410	0.0142	444	0.5875	478	0.2698	512	0.5017	546	0.6187
411	0.0162	445	0.663	479	0.2641	513	0.5071	547	0.6164
412	0.0198	446	0.7325	480	0.2614	514	0.5135	548	0.6234
413	0.0198	447	0.8019	481	0.2636	515	0.5157	549	0.6268



nm	mW								
550	0.6269	599	0.6694	648	0.329	697	0.0844	746	0.0184
551	0.6266	600	0.6631	649	0.3228	698	0.0815	747	0.0177
552	0.6361	601	0.6524	650	0.3135	699	0.0795	748	0.0179
553	0.6353	602	0.6481	651	0.304	700	0.077	749	0.017
554	0.6352	603	0.6476	652	0.3003	701	0.0733	750	0.0162
555	0.6412	604	0.6425	653	0.2897	702	0.0713	751	0.0161
556	0.6435	605	0.6367	654	0.2828	703	0.0695	752	0.0151
557	0.6444	606	0.6316	655	0.2762	704	0.0669	753	0.0157
558	0.6467	607	0.6213	656	0.2721	705	0.0642	754	0.015
559	0.6502	608	0.6205	657	0.2648	706	0.0622	755	0.0144
560	0.6504	609	0.6146	658	0.2589	707	0.0593	756	0.0138
561	0.6546	610	0.6096	659	0.2493	708	0.0574	757	0.013
562	0.6583	611	0.6028	660	0.2435	709	0.0553	758	0.013
563	0.656	612	0.5998	661	0.2384	710	0.0528	759	0.0124
564	0.6546	613	0.5972	662	0.2336	711	0.0514	760	0.0123
565	0.6627	614	0.5912	663	0.2259	712	0.0494	761	0.0118
566	0.6611	615	0.5811	664	0.222	713	0.0474	762	0.0118
567	0.6686	616	0.5794	665	0.214	714	0.046	763	0.0119
568	0.668	617	0.5736	666	0.2116	715	0.0454	764	0.0112
569	0.6723	618	0.5664	667	0.2024	716	0.0427	765	0.011
570	0.6758	619	0.559	668	0.1982	717	0.0421	766	0.0106
571	0.6758	620	0.5498	669	0.1907	718	0.0421	767	0.0104
572	0.6746	621	0.5428	670	0.1873	719	0.0407	768	0.0098
573	0.6779	622	0.5338	671	0.1805	720	0.0391	769	0.0098
574	0.6796	623	0.5288	672	0.176	721	0.0381	770	0.0097
575	0.678	624	0.5216	673	0.1729	722	0.0375	771	0.0097
576	0.6877	625	0.5104	674	0.1678	723	0.0376	772	0.0086
577	0.6863	626	0.5084	675	0.1622	724	0.0359	773	0.0088
578	0.6857	627	0.4999	676	0.1584	725	0.0349	774	0.0089
579	0.6855	628	0.4913	677	0.1522	726	0.0341	775	0.0085
580	0.6857	629	0.4799	678	0.1484	727	0.0329	776	0.0083
581	0.6849	630	0.4742	679	0.1445	728	0.0325	777	0.008
582	0.6875	631	0.4662	680	0.1415	729	0.0313	778	0.0081
583	0.6882	632	0.4545	681	0.1368	730	0.03	779	0.0082
584	0.6824	633	0.4499	682	0.1326	731	0.029	780	0.0082
585	0.6865	634	0.4422	683	0.1291	732	0.0279		
586	0.6849	635	0.4325	684	0.1243	733	0.0274		
587	0.689	636	0.4259	685	0.1208	734	0.0266		
588	0.6883	637	0.4174	686	0.1181	735	0.0259		
589	0.6855	638	0.41	687	0.1154	736	0.0255		
590	0.6844	639	0.3978	688	0.1125	737	0.0248		
591	0.6874	640	0.3945	689	0.1085	738	0.024		
592	0.677	641	0.3857	690	0.1045	739	0.023		
593	0.6773	642	0.3731	691	0.1013	740	0.0217		
594	0.6768	643	0.3705	692	0.0988	741	0.0217		
595	0.6743	644	0.359	693	0.0959	742	0.0209		
596	0.671	645	0.3494	694	0.093	743	0.0204		
597	0.666	646	0.3431	695	0.09	744	0.0196		
598	0.6675	647	0.3356	696	0.0862	745	0.019		



6. Goniophotometer Test results

6.1 Test Data

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

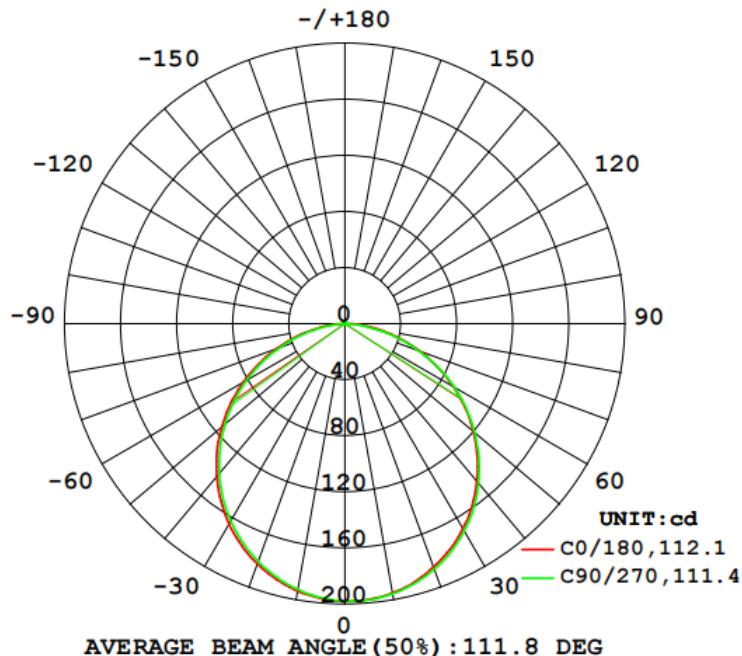
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120	60	0.0741	0.9634	8.569

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	I _{max} (cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
558.96	65.23	198.3	1.24	1.23

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	195.1	195.9	195.7	195.3	193.7	192.6	192.7	193.8	0- 10	18.72	18.72	3.35, 3.35
20	184.8	186.9	186.5	185.2	182.4	180.7	180.7	182.9	10- 20	53.57	72.30	12.9, 12.9
30	168.9	171.1	170.7	168.5	165.3	162.5	162.8	165.6	20- 30	81.13	153.4	27.4, 27.4
40	146.8	149.2	148.5	146.0	142.4	139.3	139.5	143.0	30- 40	97.71	251.1	44.9, 44.9
50	119.9	121.9	121.2	118.4	114.8	111.6	111.9	115.8	40- 50	101.1	352.2	63, 63
60	89.15	90.82	89.81	87.12	83.89	80.76	81.08	85.34	50- 60	90.94	443.2	79.3, 79.3
70	56.54	57.19	55.37	53.74	51.47	48.60	48.80	53.06	60- 70	68.84	512.0	91.6, 91.6
80	24.85	23.39	20.44	20.66	20.63	17.85	16.99	21.08	70- 80	38.72	550.7	98.5, 98.5
90	0.0015	0.0002	0.0076	0.0037	0	0	0.0000	0	80- 90	8.146	558.9	100, 100
100	0.0146	0.0014	0.0039	0	0.0063	0.0000	0.0049	0.0001	90-100	0.0049	558.9	100, 100
110	0.0210	0.0411	0.0078	0.0069	0.0259	0.0112	0.0029	0.0211	100-110	0.0162	558.9	100, 100
120	0.0195	0.0289	0.0078	0.0088	0.0244	0.0161	0.0064	0.0157	110-120	0.0150	558.9	100, 100
130	0.0156	0.0220	0.0083	0.0039	0.0225	0.0230	0.0024	0.0152	120-130	0.0128	558.9	100, 100
140	0.0117	0.0171	0.0069	0.0049	0.0215	0.0176	0.0024	0.0069	130-140	0.0093	559.0	100, 100
150	0.0098	0.0083	0.0064	0.0088	0.0176	0.0030	0	0	140-150	0.0054	559.0	100, 100
160	0.0049	0.0059	0.0083	0.0059	0.0142	0.0093	0.0005	0.0059	150-160	0.0027	559.0	100, 100
170	0.0064	0.0059	0.0039	0.0005	0	0.0093	0.0010	0.0083	160-170	0.0017	559.0	100, 100
180	0	0	0	0	0	0	0	0	170-180	0.0003	559.0	100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



6.4 Luminous Distribution Intensity (cd) Data

Table--1

UNIT: cd

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		
γ (DEG)	0	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198		
0	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198		
5	197	198	198	198	198	198	198	198	197	197	197	196	196	196	196	197	197	
10	195	195	196	196	196	195	195	194	194	193	193	193	193	193	194	194	194	
15	191	191	192	192	192	191	191	190	189	188	187	187	188	188	189	190		
20	185	186	187	187	186	186	185	184	182	181	181	180	181	182	183	184		
25	178	179	180	180	179	178	178	176	175	173	172	172	172	174	175	176		
30	169	170	171	171	171	169	169	167	165	164	162	162	163	164	166	167		
35	158	160	161	161	160	159	158	156	154	153	152	151	152	153	155	157		
40	147	148	149	149	149	147	146	144	142	140	139	139	139	141	143	145		
45	134	135	136	136	135	134	133	131	129	127	126	126	126	128	130	132		
50	120	121	122	122	121	120	118	116	115	113	112	111	112	113	116	118		
55	105	106	107	107	106	105	103	101	99.7	97.9	96.5	96.1	96.8	98.4	101	103		
60	89.1	90.2	90.8	90.7	89.8	88.7	87.1	85.2	83.9	82.1	80.8	80.4	81.1	82.8	85.3	87.7		
65	72.9	73.7	74.2	73.8	72.8	71.8	70.5	68.9	67.7	66.0	64.7	64.3	65.0	66.6	69.3	71.6		
70	56.5	57.1	57.2	56.4	55.4	54.6	53.7	52.4	51.5	49.8	48.6	48.1	48.8	50.4	53.1	55.4		
75	40.3	40.7	40.1	38.9	37.8	37.3	36.9	36.2	35.6	34.1	32.8	32.2	32.7	34.3	36.9	39.3		
80	24.9	24.9	23.4	21.6	20.4	20.3	20.7	20.8	20.6	19.4	17.8	16.8	17.0	18.5	21.1	23.9		
85	10.8	10.00	7.07	4.72	3.89	4.38	5.59	6.75	7.12	6.15	4.46	3.10	2.64	3.49	5.93	9.39		
90	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
95	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	0.01	0.00	0.00		
100	0.01	0.07	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.03		
105	0.02	0.05	0.05	0.02	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.01	0.02	0.02		
110	0.02	0.04	0.04	0.02	0.01	0.00	0.01	0.01	0.03	0.01	0.01	0.00	0.00	0.01	0.02	0.02		
115	0.02	0.03	0.03	0.02	0.01	0.00	0.01	0.01	0.03	0.01	0.01	0.00	0.00	0.01	0.02	0.02		
120	0.02	0.03	0.03	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.00	0.01	0.01	0.02	0.02		
125	0.02	0.03	0.03	0.02	0.01	0.01	0.00	0.02	0.02	0.02	0.02	0.00	0.01	0.01	0.02	0.02		
130	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.02	0.02		
135	0.01	0.02	0.02	0.01	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.01	0.01		
140	0.01	0.02	0.02	0.00	0.01	0.00	0.00	0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.01	0.01		
145	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.01		
150	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
155	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.02	0.00	0.01	0.00	0.00		
160	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00		
165	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.00	0.01	0.01	0.01		
170	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01		
175	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01		
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

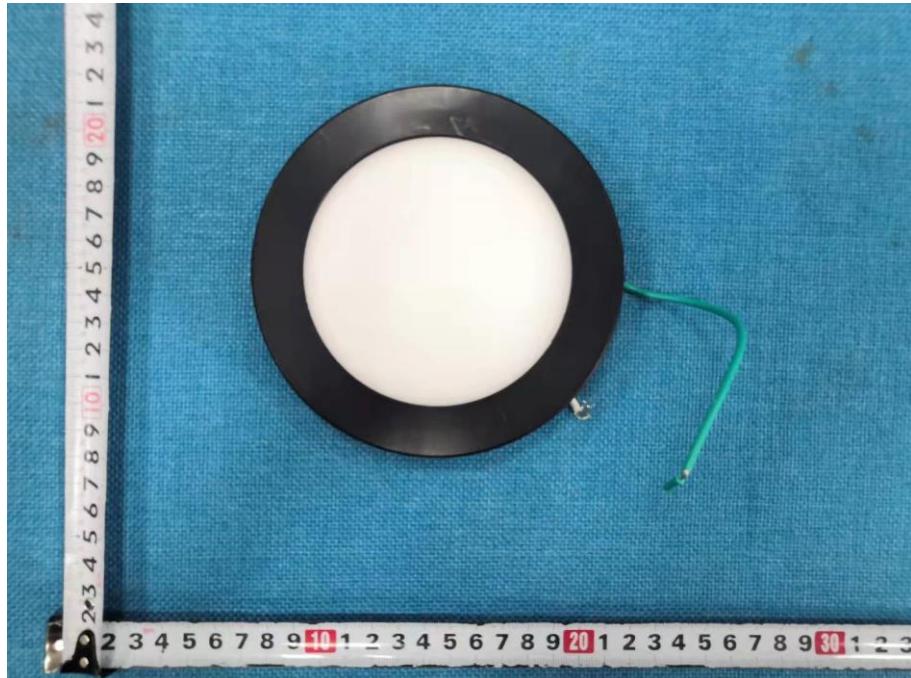


Figure 1

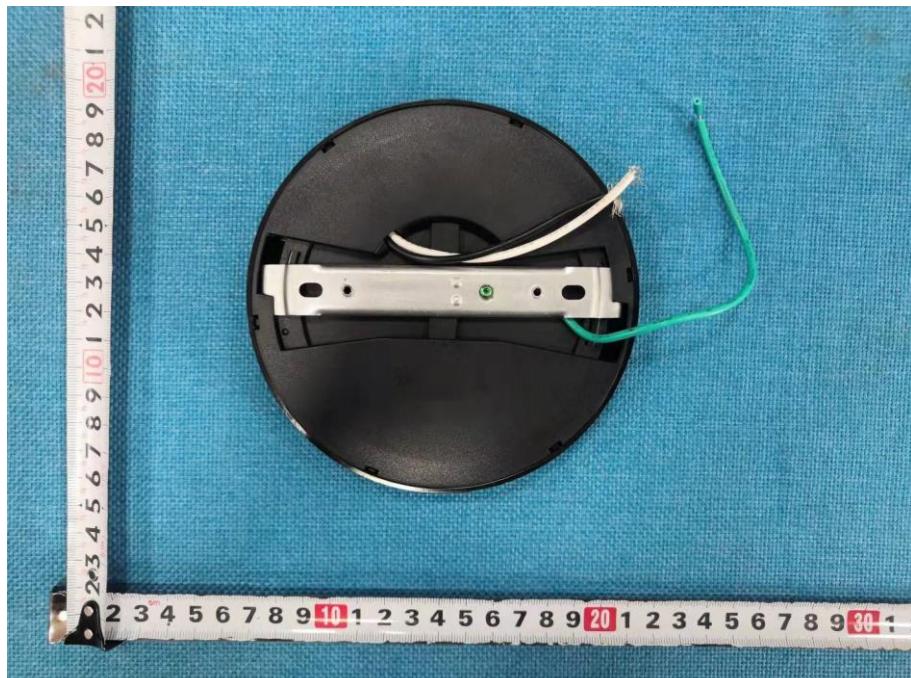


Figure 2

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