

# 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-850

**All Models**..... : PLU01R-0918T-850, 9FLPR-SPx-xxxxxx (x-xxxxxx in the model designation could be any numbers, letters or blank, which indicates customer code.  
PLU01R-0918T-850 and 9FLPR-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

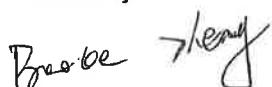
**Report No**..... : N02A22030775L00601

**Date of receipt**..... : Nov. 22, 2021

**Date of test**..... : Nov. 22, 2021 - Nov. 25, 2021

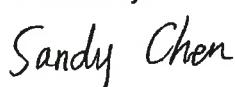
**Date of report**..... : Nov. 26, 2021

**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-0918T-850
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:	5000K
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).



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## 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  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  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  $4\pi$  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

<b>Test Ambient Temperature (Integrating sphere internal temperature)</b>	25.1°C	<b>Test orientation</b>	Downward
<b>Operate time(Min.)</b>	60	<b>stabilization time(Min.)</b>	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	0.1561	17.75	0.9472	1383.1	77.91

CCT (K)	Ra	R9	x	y	u'	v'
4806	82.9	10	0.3516	0.3631	0.2114	0.4911

#### Color Rendering Index





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

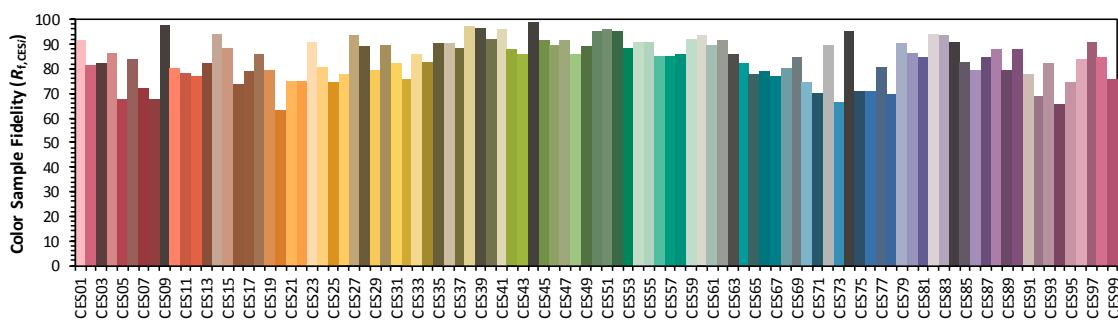
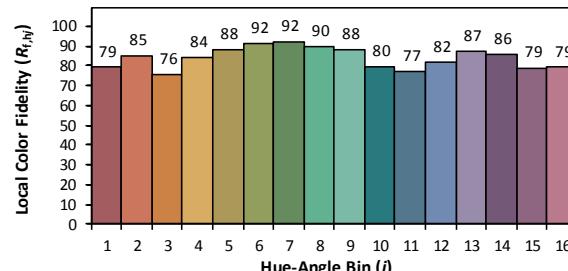
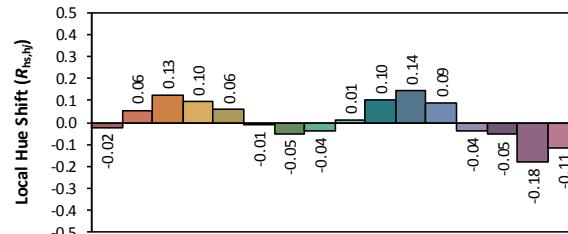
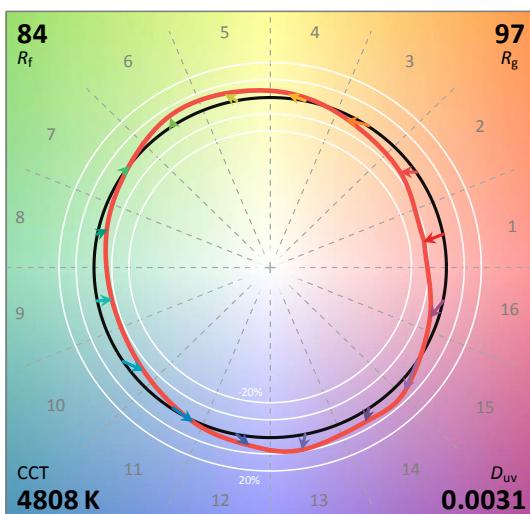
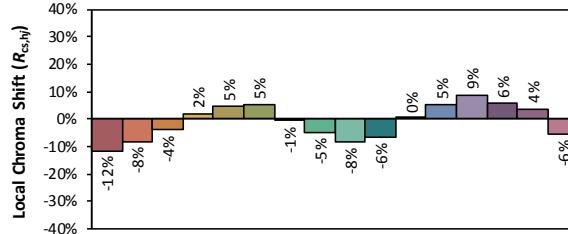
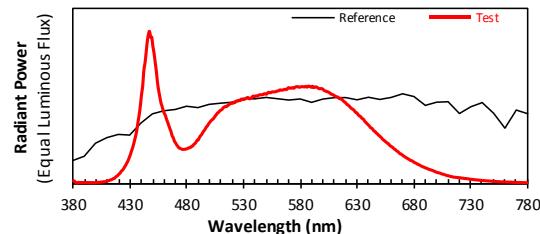
### ANSI/IES TM-30-18 Color Rendition Report

Source: E2835UXXXX-3A

Date: 2021/11/25

Manufacturer: ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO., LTD

Model: PLU01R-0918T-850



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

$x$  **0.3516**

$y$  **0.3629**

$u'$  **0.2114**

$v'$  **0.4910**

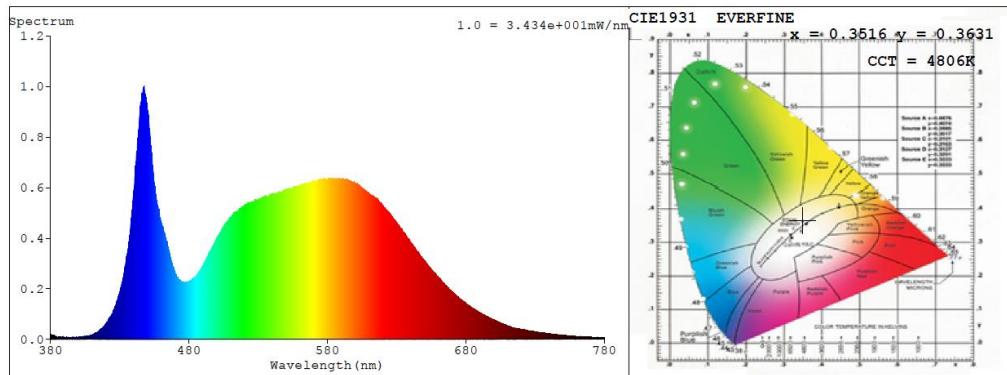
CIE 13.3-1995  
(CRI)

$R_a$  83

$R_g$  10

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	0.0205	414	0.0294	448	0.9566	482	0.2359	516	0.5118
381	0.016	415	0.0341	449	0.9562	483	0.2368	517	0.5149
382	0.0067	416	0.0355	450	0.8964	484	0.244	518	0.5229
383	0.0065	417	0.0436	451	0.8534	485	0.2463	519	0.5253
384	0.0091	418	0.0494	452	0.7937	486	0.2567	520	0.5246
385	0.0092	419	0.0544	453	0.737	487	0.2621	521	0.531
386	0.0082	420	0.0635	454	0.664	488	0.271	522	0.5287
387	0.0092	421	0.0693	455	0.6128	489	0.2841	523	0.5358
388	0.0083	422	0.0812	456	0.5723	490	0.2862	524	0.5404
389	0.0083	423	0.088	457	0.5322	491	0.3018	525	0.5399
390	0.0086	424	0.0969	458	0.5076	492	0.3131	526	0.5449
391	0.008	425	0.1102	459	0.4811	493	0.3221	527	0.5428
392	0.0086	426	0.1216	460	0.4611	494	0.3343	528	0.5529
393	0.0079	427	0.136	461	0.4462	495	0.3457	529	0.5505
394	0.0086	428	0.1498	462	0.4218	496	0.3554	530	0.5506
395	0.0077	429	0.1691	463	0.4023	497	0.3694	531	0.5525
396	0.0085	430	0.1881	464	0.3809	498	0.3768	532	0.5568
397	0.0078	431	0.2113	465	0.36	499	0.39	533	0.5614
398	0.0075	432	0.2337	466	0.3405	500	0.3996	534	0.5633
399	0.0072	433	0.2593	467	0.3126	501	0.409	535	0.5547
400	0.0082	434	0.2895	468	0.3009	502	0.4168	536	0.5579
401	0.0101	435	0.3204	469	0.2777	503	0.4225	537	0.5602
402	0.0103	436	0.3591	470	0.2676	504	0.4315	538	0.5703
403	0.0095	437	0.4098	471	0.2537	505	0.4428	539	0.5721
404	0.0117	438	0.4555	472	0.2448	506	0.4514	540	0.5696
405	0.0121	439	0.5136	473	0.234	507	0.4624	541	0.5743
406	0.013	440	0.5856	474	0.2318	508	0.4664	542	0.5721
407	0.0142	441	0.6386	475	0.2278	509	0.4759	543	0.5761
408	0.0142	442	0.7402	476	0.2251	510	0.4812	544	0.5806
409	0.0168	443	0.7861	477	0.2246	511	0.4852	545	0.5807
410	0.0187	444	0.854	478	0.2253	512	0.4963	546	0.5815
411	0.0206	445	0.9263	479	0.2274	513	0.5008	547	0.5815
412	0.0236	446	0.9728	480	0.2283	514	0.5042	548	0.587
413	0.0267	447	0.9951	481	0.2322	515	0.5042	549	0.5873



nm	mW								
550	0.5845	599	0.6209	648	0.3264	697	0.0862	746	0.0186
551	0.5898	600	0.6175	649	0.3186	698	0.083	747	0.0181
552	0.5971	601	0.6099	650	0.3119	699	0.0799	748	0.0177
553	0.5952	602	0.606	651	0.3055	700	0.0768	749	0.0172
554	0.5943	603	0.6037	652	0.297	701	0.0736	750	0.0162
555	0.5992	604	0.6006	653	0.2887	702	0.0726	751	0.0161
556	0.6001	605	0.598	654	0.2835	703	0.0705	752	0.0158
557	0.5998	606	0.5936	655	0.2768	704	0.0678	753	0.0151
558	0.601	607	0.5863	656	0.2711	705	0.0641	754	0.0147
559	0.6033	608	0.5842	657	0.2646	706	0.0631	755	0.0141
560	0.6055	609	0.5803	658	0.2601	707	0.0607	756	0.0136
561	0.6073	610	0.5764	659	0.2505	708	0.0581	757	0.013
562	0.6129	611	0.571	660	0.2455	709	0.0557	758	0.0131
563	0.6112	612	0.5685	661	0.2403	710	0.053	759	0.0127
564	0.6118	613	0.5664	662	0.2352	711	0.0523	760	0.0123
565	0.6126	614	0.5603	663	0.2268	712	0.0495	761	0.0124
566	0.616	615	0.5543	664	0.2233	713	0.0475	762	0.0116
567	0.6161	616	0.5564	665	0.2149	714	0.0468	763	0.0115
568	0.6152	617	0.5488	666	0.2112	715	0.0441	764	0.011
569	0.6241	618	0.5412	667	0.2044	716	0.043	765	0.0112
570	0.6273	619	0.5344	668	0.1964	717	0.0428	766	0.0114
571	0.6234	620	0.5293	669	0.1944	718	0.0416	767	0.0104
572	0.6249	621	0.5197	670	0.1884	719	0.0412	768	0.01
573	0.6276	622	0.5153	671	0.183	720	0.0402	769	0.0098
574	0.6233	623	0.5087	672	0.1779	721	0.0393	770	0.0097
575	0.6275	624	0.5006	673	0.1726	722	0.0388	771	0.0089
576	0.6326	625	0.4929	674	0.1685	723	0.0368	772	0.0086
577	0.6336	626	0.4882	675	0.1637	724	0.0365	773	0.0089
578	0.6341	627	0.4835	676	0.16	725	0.0346	774	0.0087
579	0.6302	628	0.475	677	0.1541	726	0.0348	775	0.0084
580	0.6314	629	0.4653	678	0.1514	727	0.0339	776	0.0079
581	0.6341	630	0.4625	679	0.1487	728	0.0325	777	0.0081
582	0.6337	631	0.452	680	0.143	729	0.0315	778	0.0077
583	0.6333	632	0.4439	681	0.1381	730	0.0305	779	0.0074
584	0.6326	633	0.4403	682	0.1354	731	0.0292	780	0.0074
585	0.6362	634	0.4314	683	0.131	732	0.0287		
586	0.6306	635	0.425	684	0.1263	733	0.0276		
587	0.6373	636	0.4196	685	0.124	734	0.0271		
588	0.6359	637	0.4074	686	0.1193	735	0.026		
589	0.6339	638	0.4	687	0.1156	736	0.0254		
590	0.6292	639	0.3921	688	0.1116	737	0.0247		
591	0.6366	640	0.3845	689	0.1093	738	0.0234		
592	0.6284	641	0.3773	690	0.1053	739	0.0236		
593	0.6308	642	0.3668	691	0.1031	740	0.0222		
594	0.6326	643	0.3636	692	0.0998	741	0.0218		
595	0.6287	644	0.3554	693	0.0969	742	0.0211		
596	0.6234	645	0.3454	694	0.0928	743	0.0206		
597	0.6207	646	0.3412	695	0.0916	744	0.0197		
598	0.6214	647	0.3324	696	0.0891	745	0.0193		

## 6. Goniophotometer Test results

### 6.1 Test Data

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

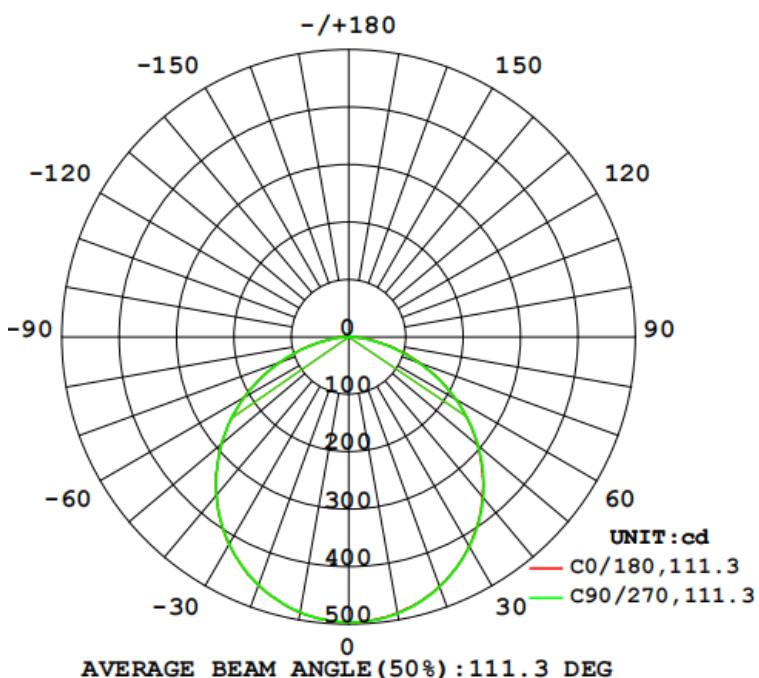
#### Electrical Measurement

<b>Input Voltage (V)</b>	<b>Frequency (Hz)</b>	<b>Input Current(A)</b>	<b>Power Factor</b>	<b>Power(W)</b>
120	60	0.1570	0.9530	17.95

#### Optical Measurement

<b>Luminous Flux (lm)</b>	<b>Efficacy(lm/W)</b>	<b>I<sub>max</sub>(cd)</b>	<b>Spacing Criteria (C0/180°)</b>	<b>Spacing Criteria (C90/270°)</b>
1392.6	77.56	502.4	1.25	1.25

### 6.2 Luminous Intensity Distribution





### 6.3 Zonal Flux Diagram

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315	$\gamma$	$\Phi$ zone	$\Phi$ total	%lum, lamp
10	488.1	489.0	488.6	487.3	486.9	486.3	486.6	487.5	0- 10	47.04	47.04	3.38, 3.38
20	462.2	463.5	462.7	461.0	459.8	458.9	459.6	461.0	10- 20	134.7	181.7	13,13
30	420.7	421.5	421.0	419.1	417.0	416.1	416.8	419.1	20- 30	204.0	385.7	27.7, 27.7
40	363.6	364.2	364.9	361.9	359.5	358.0	359.6	362.3	30- 40	245.6	631.2	45.3, 45.3
50	294.1	295.3	295.1	291.9	289.9	288.2	289.8	293.3	40- 50	253.5	884.7	63.5, 63.5
60	215.0	215.2	214.6	211.7	210.8	208.9	210.4	214.1	50- 60	226.7	1111	79.8, 79.8
70	130.8	129.8	129.0	126.1	126.6	124.5	126.1	129.9	60- 70	168.8	1280	91.9, 91.9
80	51.95	49.92	48.61	47.91	48.36	45.92	46.55	50.23	70- 80	92.31	1373	98.6, 98.6
90	0	0.0018	0.0109	0.0024	0	0	0	0	80- 90	19.92	1393	100,100
100	0.0299	0.0175	0	0	0	0	0	0.0245	90-100	0.0029	1393	100,100
110	0.0223	0.0137	0	0	0	0	0.0014	0.0212	100-110	0.0076	1393	100,100
120	0.0213	0.0142	0	0	0	0	0.0001	0.0301	110-120	0.0072	1393	100,100
130	0.0261	0.0156	0	0	0	0.0033	0	0.0075	120-130	0.0061	1393	100,100
140	0.0261	0.0166	0	0	0	0.0066	0.0065	0.0135	130-140	0.0060	1393	100,100
150	0.0062	0.0142	0.0042	0	0.0043	0.0066	0	0.0169	140-150	0.0037	1393	100,100
160	0.0213	0.0137	0.0071	0.0071	0	0	0.0089	0.0155	150-160	0.0028	1393	100,100
170	0	0	0	0	0.0109	0.0137	0.0146	0	160-170	0.0019	1393	100,100
180	0	0	0	0	0	0	0	0	170-180	0.0004	1393	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		
$\gamma$ (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	497	497	497	497	497	497	497	497	497	497	497	497	497	497	497	497	497	
5	495	495	495	495	495	499	494	494	494	494	493	494	494	498	494	494		
10	488	489	489	489	489	492	487	488	487	487	486	487	487	491	488	488		
15	477	479	478	478	478	482	476	476	475	476	475	476	475	479	476	477		
20	462	463	463	464	463	467	461	461	460	460	459	460	460	464	461	462		
25	443	445	444	445	444	448	442	441	440	440	439	440	440	444	442	443		
30	421	422	422	422	421	425	419	418	417	417	416	417	417	421	419	420		
35	394	395	395	396	395	398	392	391	390	390	389	389	390	394	392	393		
40	364	365	364	366	365	367	362	360	359	360	358	359	360	364	362	364		
45	330	332	332	332	333	328	326	326	326	326	324	324	326	330	329	330		
50	294	296	295	296	295	296	292	289	290	290	288	289	290	294	293	294		
55	256	257	256	257	256	257	253	250	251	251	250	250	251	255	255	256		
60	215	216	215	215	215	215	212	209	211	211	209	209	210	214	214	216		
65	173	174	173	173	172	172	169	168	169	168	167	167	168	172	172	174		
70	131	131	130	130	129	129	126	126	127	126	125	125	126	129	130	132		
75	90.2	90.0	88.8	88.2	87.7	87.8	86.2	85.0	85.7	84.7	83.5	83.6	84.8	87.4	88.7	90.7		
80	52.0	51.3	49.9	49.0	48.6	48.7	47.9	47.5	48.4	47.2	45.9	45.8	46.6	48.6	50.2	52.4		
85	19.4	18.2	16.1	14.5	13.9	14.3	15.1	15.8	17.0	15.9	14.2	13.2	13.2	14.5	16.6	19.3		
90	0.00	0.00	0.00	0.01	0.01	0.02	0.00	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	0.00	0.00	0.00	0.00	0.00	
100	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.07		
105	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01		
110	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02		
115	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03		
120	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00		
125	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	
130	0.03	0.02	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	0.03		
135	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	
140	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	0.01	0.01	0.02	0.02	
145	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.02	
150	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.00	
155	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.00	0.02	0.02	
160	0.02	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.02	0.02	
165	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	
170	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.00	0.00	
175	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	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	0.00	

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## 7. Photo of sample



Figure 1

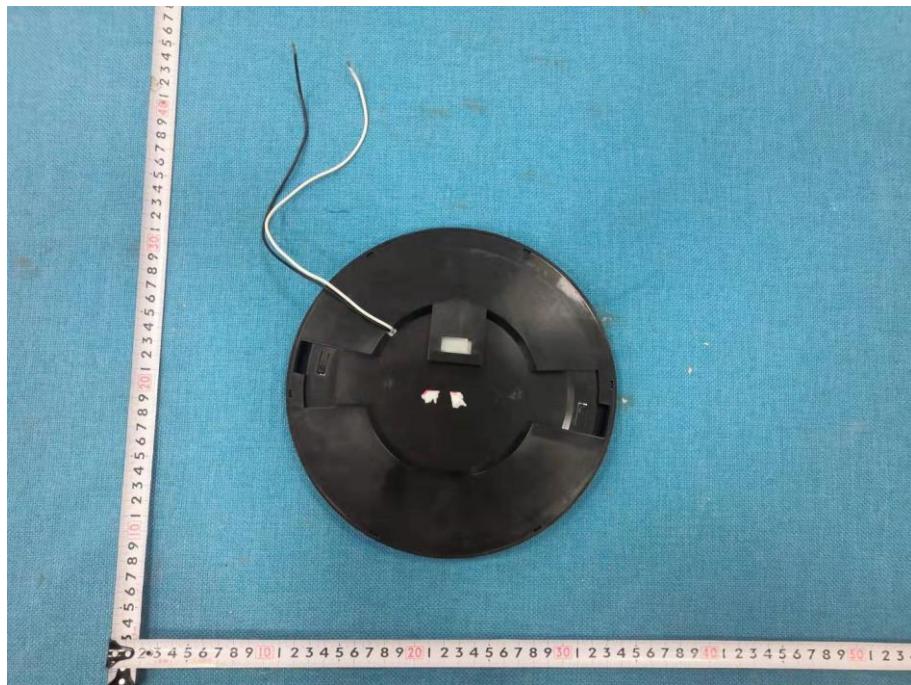


Figure 2

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