

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, 50th Avenue Montreal (Lachine), Quebec Canada, H8T 2V5
Test Model..... : FM-LYC; followed by up to eight characters
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...... : N02A22070475L00301
Date of receipt..... : Jul 27, 2022
Date of test : Jul 28, 2022
Date of report..... : Aug 01, 2022

Tested by:

Jarvis Zhang

Jarvis Zhang / Test Engineer

Checked by:

Ken Mo

Ken Mo / Project Engineer

Approved by:

Jessie Li

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 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.

1. Product Description for Equipment under Test(EUT)

Model No.:	FM-LYC; followed by up to eight characters
Manufacturer:	DongGuan City Rising Stars Lighting Co., LTD
Product Type:	LED LIGHTING
Rated Voltage/Frequency:	120V AC, 60HZ
Rated Power:	22W
Rated luminous flux:	1500LM
Nominal CCT:	3000K/4000K/5000K

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℃	Test orientation	Downward
Operate time(Min.)	75	stabilization time(Min.)	60

Optical and Electrical Measurement Result

Model	Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
3000K	119.89	60	0.1797	20.99	0.9742	1393.5	66.39
4000K	119.9	60	0.1709	19.91	0.9719	1465.8	73.62
5000K	119.9	60	0.1788	20.85	0.9723	1408.1	67.54

Model	CCT (K)	Ra	R9	x	y	u'	v'
3000K	3192	92.7	68	0.4251	0.402	0.2438	0.5188
4000K	3974	95.5	79	0.3812	0.376	0.2259	0.5014
5000K	5040	94.3	71	0.3445	0.3565	0.2091	0.487

Color Rendering Index of 3000K

Ra 92.7				
R1 93	R2 94	R3 93	R4 94	R5 92
R6 92	R7 95	R8 88	R9 68	R10 85
R11 94	R12 75	R13 93	R14 95	R15 91



*ANSI/IES TM-30-18 Color Rendition Report of 3000K

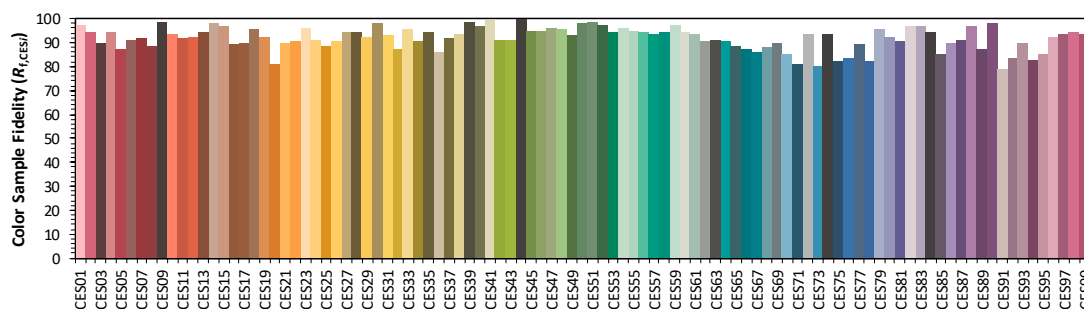
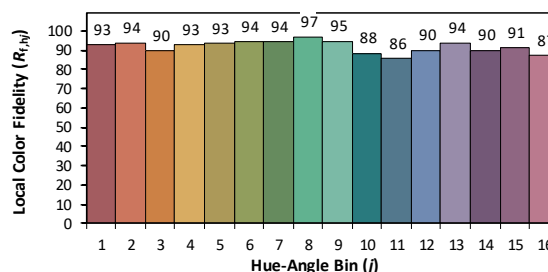
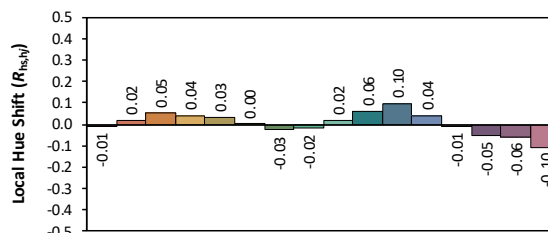
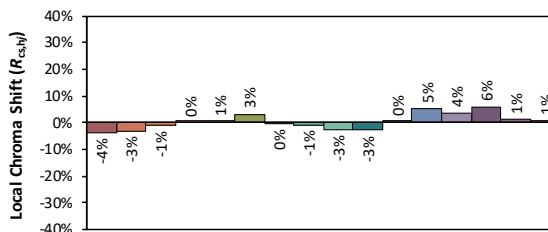
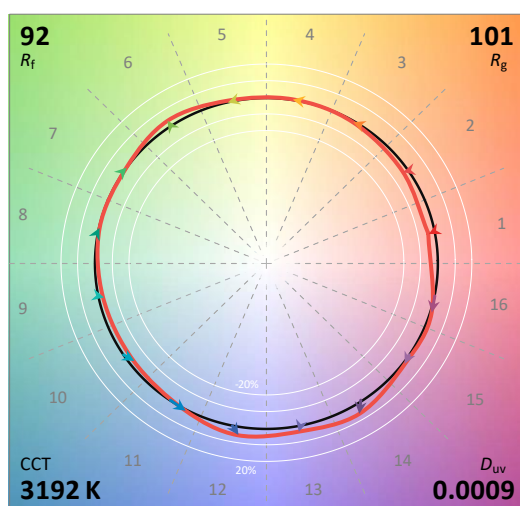
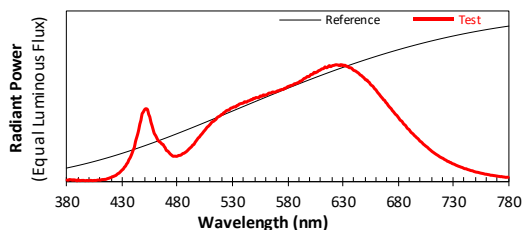
ANSI/IES TM-30-18 Color Rendition Report

Source:

Date: 2022/7/28

Manufacturer:

Model: FM-LYC; followed by up to eight charact



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

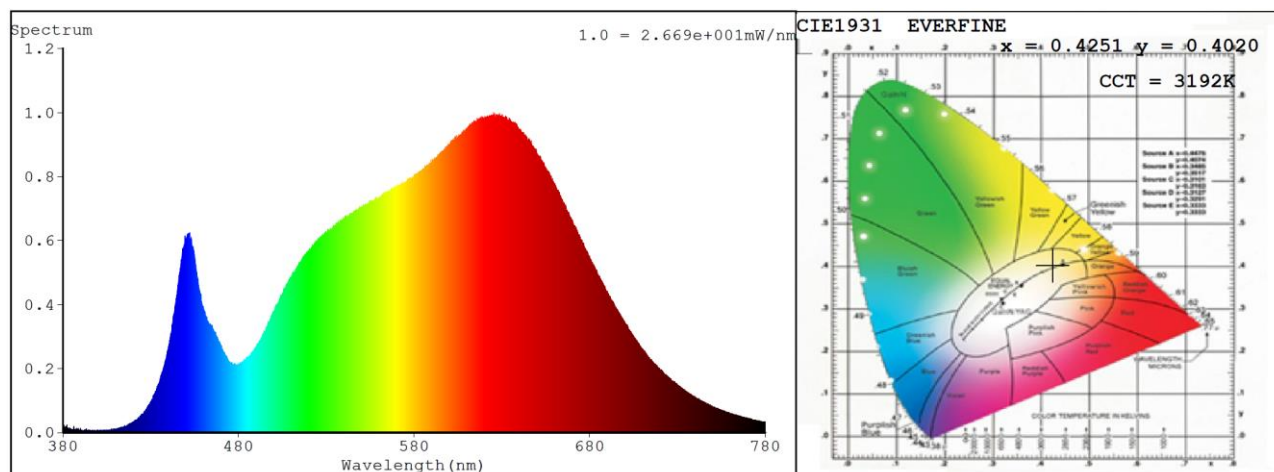
x 0.4251
 y 0.4019
 u' 0.2439
 v' 0.5188

CIE 13.3-1995
(CRI)

R_a 93
 R_g 69

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

Relative Spectral Power Distribution of 3000K



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0113	414	0.0166	448	0.5738	482	0.221	516	0.5413
381	0.0096	415	0.0167	449	0.5882	483	0.2231	517	0.549
382	0.0152	416	0.0207	450	0.6059	484	0.2292	518	0.5532
383	0.0141	417	0.024	451	0.6167	485	0.2369	519	0.5593
384	0.0129	418	0.0267	452	0.6173	486	0.2392	520	0.5688
385	0.0089	419	0.0306	453	0.6095	487	0.2455	521	0.5709
386	0.0143	420	0.0335	454	0.5706	488	0.2518	522	0.5837
387	0.0094	421	0.0396	455	0.5487	489	0.2602	523	0.5877
388	0.0105	422	0.041	456	0.5055	490	0.27	524	0.598
389	0.0041	423	0.0465	457	0.4755	491	0.2796	525	0.6034
390	0.0137	424	0.0491	458	0.4417	492	0.2878	526	0.6062
391	0.0071	425	0.0569	459	0.4094	493	0.2966	527	0.6073
392	0.0066	426	0.065	460	0.3942	494	0.3096	528	0.6193
393	0.0078	427	0.0695	461	0.3766	495	0.314	529	0.6244
394	0.0081	428	0.0783	462	0.3566	496	0.3307	530	0.6268
395	0.0082	429	0.088	463	0.3429	497	0.3438	531	0.6328
396	0.0062	430	0.0978	464	0.3354	498	0.3569	532	0.6343
397	0.0061	431	0.1052	465	0.3287	499	0.3699	533	0.6338
398	0.0075	432	0.1211	466	0.3167	500	0.3772	534	0.6457
399	0.0063	433	0.1299	467	0.3145	501	0.3911	535	0.6472
400	0.0067	434	0.1481	468	0.2978	502	0.4011	536	0.6568
401	0.0078	435	0.1595	469	0.2853	503	0.4125	537	0.6599
402	0.0077	436	0.1829	470	0.2636	504	0.4252	538	0.6632
403	0.0063	437	0.1977	471	0.2596	505	0.4357	539	0.6642
404	0.0071	438	0.2177	472	0.2507	506	0.4479	540	0.6685
405	0.0078	439	0.2416	473	0.2387	507	0.4607	541	0.6783
406	0.0073	440	0.2679	474	0.2293	508	0.4681	542	0.6749
407	0.0089	441	0.2893	475	0.2217	509	0.4777	543	0.6754
408	0.0112	442	0.3369	476	0.2143	510	0.4882	544	0.6838
409	0.0108	443	0.3697	477	0.214	511	0.5007	545	0.6856
410	0.0104	444	0.4015	478	0.2143	512	0.508	546	0.6904
411	0.0132	445	0.4403	479	0.213	513	0.5125	547	0.6964
412	0.015	446	0.4886	480	0.2145	514	0.5208	548	0.6948
413	0.0153	447	0.5213	481	0.2199	515	0.5276	549	0.7069



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.7047	599	0.891	648	0.8911	697	0.3723	746	0.0922
551	0.7125	600	0.8973	649	0.8834	698	0.365	747	0.0909
552	0.713	601	0.9089	650	0.8726	699	0.3551	748	0.0886
553	0.7117	602	0.9108	651	0.8625	700	0.343	749	0.084
554	0.7133	603	0.9145	652	0.8629	701	0.3369	750	0.0812
555	0.726	604	0.928	653	0.8493	702	0.3286	751	0.0787
556	0.7253	605	0.9235	654	0.8429	703	0.3176	752	0.0774
557	0.7251	606	0.9291	655	0.8278	704	0.3104	753	0.0758
558	0.7363	607	0.9323	656	0.8179	705	0.3022	754	0.073
559	0.7313	608	0.9417	657	0.8122	706	0.2951	755	0.0705
560	0.7352	609	0.9448	658	0.8012	707	0.2882	756	0.0685
561	0.7367	610	0.9504	659	0.7874	708	0.2781	757	0.0667
562	0.7439	611	0.957	660	0.7797	709	0.2705	758	0.0644
563	0.751	612	0.9589	661	0.7657	710	0.2626	759	0.0614
564	0.7516	613	0.9638	662	0.7526	711	0.2542	760	0.0606
565	0.7524	614	0.9745	663	0.7427	712	0.2477	761	0.0592
566	0.7594	615	0.9681	664	0.7295	713	0.2409	762	0.0573
567	0.7605	616	0.9694	665	0.7177	714	0.2343	763	0.0559
568	0.7581	617	0.979	666	0.7075	715	0.228	764	0.0522
569	0.7611	618	0.9852	667	0.6944	716	0.2224	765	0.0519
570	0.7651	619	0.9766	668	0.6893	717	0.2161	766	0.0509
571	0.7711	620	0.9814	669	0.6726	718	0.2089	767	0.0492
572	0.7708	621	0.986	670	0.6642	719	0.204	768	0.0481
573	0.7772	622	0.9874	671	0.6492	720	0.1991	769	0.0463
574	0.7799	623	0.9907	672	0.637	721	0.1953	770	0.0449
575	0.7828	624	0.9928	673	0.6268	722	0.1879	771	0.0428
576	0.7814	625	0.9913	674	0.6176	723	0.1829	772	0.0419
577	0.7913	626	0.99	675	0.6024	724	0.178	773	0.0399
578	0.7931	627	0.9852	676	0.5929	725	0.1703	774	0.0408
579	0.7982	628	0.9936	677	0.5802	726	0.1692	775	0.0382
580	0.8057	629	0.9874	678	0.5694	727	0.1616	776	0.0372
581	0.809	630	0.9916	679	0.5617	728	0.16	777	0.0357
582	0.8123	631	0.9843	680	0.5493	729	0.1528	778	0.034
583	0.8164	632	0.989	681	0.5365	730	0.1492	779	0.0349
584	0.8177	633	0.9795	682	0.5223	731	0.146	780	0.035
585	0.8217	634	0.9799	683	0.5156	732	0.1413		
586	0.8296	635	0.9736	684	0.5069	733	0.1363		
587	0.832	636	0.9675	685	0.4913	734	0.1328		
588	0.8335	637	0.9673	686	0.4826	735	0.1284		
589	0.8393	638	0.9631	687	0.4747	736	0.1257		
590	0.8401	639	0.9535	688	0.4596	737	0.1216		
591	0.8509	640	0.9448	689	0.448	738	0.119		
592	0.8544	641	0.9417	690	0.4424	739	0.1151		
593	0.8589	642	0.9369	691	0.4296	740	0.1098		
594	0.8675	643	0.9294	692	0.417	741	0.1073		
595	0.8761	644	0.9239	693	0.4096	742	0.1069		
596	0.8786	645	0.9146	694	0.4013	743	0.1018		
597	0.8852	646	0.9051	695	0.3899	744	0.0991		
598	0.8933	647	0.9006	696	0.3823	745	0.0962		

6. Goniophotometer Test results of 3000K

6.1 Test Data

Test Ambient Temperature	25.2℃	Test orientation	Downward
Operate time(Min.)	90	stabilization time(Min.)	60

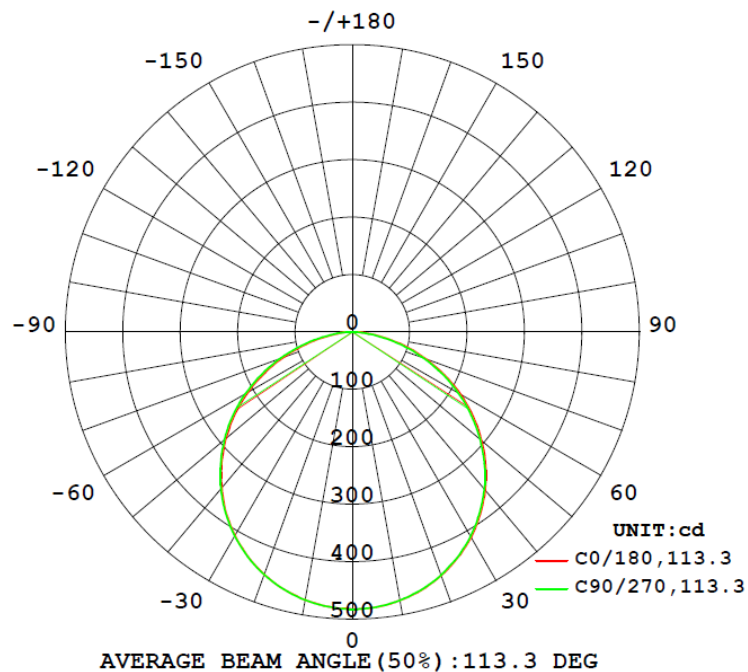
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120.2	60	0.1752	0.9872	20.79

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	I _{max} (cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
1387.39	66.74	482.3	1.26	1.27

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	474.7	474.7	474.2	474.0	473.5	473.4	473.8	474.2	0- 10	45.65	45.65	3.29,3.29
20	451.4	451.1	450.5	449.4	449.4	449.0	449.6	450.4	10- 20	131.0	176.7	12.7,12.7
30	413.0	412.2	411.2	409.4	409.3	408.9	410.5	411.8	20- 30	199.3	375.9	27.1,27.1
40	359.8	358.3	357.1	354.5	354.6	354.7	357.0	358.7	30- 40	241.2	617.1	44.5,44.5
50	293.9	291.7	290.3	286.7	287.6	288.0	291.3	293.1	40- 50	250.6	867.7	62.5,62.5
60	217.9	215.2	213.2	208.7	210.6	211.7	216.2	218.2	50- 60	226.3	1094	78.8,78.8
70	135.2	132.2	129.8	124.3	126.7	128.7	133.7	135.9	60- 70	170.8	1265	91.2,91.2
80	54.87	52.04	49.97	45.41	46.30	48.69	53.62	55.27	70- 80	94.89	1360	98,98
90	0.2236	0.0815	0.1104	0.0634	0.1270	0.1301	0.1314	0.3663	80- 90	22.45	1382	99.6,99.6
100	0.1437	0.5959	0.6399	0.5394	0.3078	0.5286	0.5276	0.3861	90-100	0.2441	1382	99.6,99.6
110	0.4131	0.7921	0.8391	0.7941	0.5482	0.5203	0.6186	0.4940	100-110	0.6215	1383	99.7,99.7
120	0.6497	1.007	1.097	1.108	0.7593	0.6746	0.5912	0.6547	110-120	0.7397	1384	99.7,99.7
130	1.018	1.674	0.8927	1.913	1.081	1.070	0.4134	1.145	120-130	0.8865	1385	99.8,99.8
140	1.414	1.705	1.156	2.060	1.393	0.9830	1.179	1.049	130-140	0.9568	1386	99.9,99.9
150	1.508	1.170	1.539	1.116	1.449	1.089	1.065	1.074	140-150	0.9064	1386	99.9,99.9
160	0.9393	0.9747	1.101	1.108	1.113	0.9400	0.9665	1.150	150-160	0.5480	1387	100,100
170	0.9606	0.6760	1.123	0.6201	0.9889	1.001	0.8008	0.8652	160-170	0.2891	1387	100,100
180	0.3941	0.5872	0.5099	0.7147	0.6098	0.4972	0.5159	0.6307	170-180	0.0820	1387	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	482	482	482	482	482	482	482	482	482	482	482	482	482	482	482	482			
5	480	481	481	481	480	480	480	480	480	480	480	480	480	480	480	481			
10	475	475	475	475	474	474	474	474	474	473	473	474	474	474	474	475			
15	465	465	465	465	464	464	464	463	464	463	463	463	464	464	464	465			
20	451	451	451	451	451	450	449	449	449	449	449	449	450	450	450	451			
25	434	434	434	433	433	433	431	431	431	431	431	431	432	432	433	434			
30	413	413	412	412	411	411	409	409	409	409	409	410	411	411	412	413			
35	388	388	387	387	386	385	384	384	384	383	383	384	386	386	387	388			
40	360	359	358	358	357	356	354	354	355	354	355	356	357	358	359	360			
45	328	328	326	326	325	324	322	322	323	322	322	324	326	327	327	328			
50	294	293	292	291	290	289	287	286	288	287	288	289	291	292	293	294			
55	257	256	255	254	253	251	249	248	251	250	251	253	255	256	257	258			
60	218	217	215	214	213	211	209	208	211	211	212	214	216	217	218	219			
65	177	176	174	173	172	170	167	167	169	169	171	173	175	177	178	178			
70	135	134	132	131	130	127	124	124	127	127	129	131	134	135	136	137			
75	94.3	92.9	91.3	90.2	88.9	86.3	84.0	83.2	84.9	85.4	87.2	89.6	92.4	93.6	94.4	95.1			
80	54.9	53.6	52.0	51.1	50.0	47.5	45.4	44.6	46.3	46.9	48.7	51.0	53.6	54.7	55.3	55.9			
85	21.7	20.6	19.4	18.6	17.7	15.7	14.2	13.7	15.1	15.5	16.9	18.7	20.7	22.1	22.6	22.9			
90	0.22	0.13	0.08	0.10	0.11	0.08	0.06	0.07	0.13	0.14	0.13	0.12	0.13	0.17	0.37	0.49			
95	0.07	0.07	0.09	0.37	0.41	0.23	0.08	0.08	0.14	0.15	0.15	0.24	0.29	0.35	0.14	0.14			
100	0.14	0.49	0.60	0.51	0.64	0.56	0.54	0.50	0.31	0.50	0.53	0.46	0.53	0.46	0.39	0.34			
105	0.27	0.75	0.83	0.70	0.70	0.70	0.74	0.78	0.51	0.57	0.56	0.60	0.60	0.53	0.53	0.47			
110	0.41	0.90	0.79	0.80	0.84	0.88	0.79	0.78	0.55	0.48	0.52	0.53	0.62	0.55	0.49	0.54			
115	0.56	0.96	0.90	0.90	0.98	0.97	0.92	1.10	0.50	0.66	0.59	0.51	0.57	0.54	0.60	0.71			
120	0.65	1.07	1.01	1.05	1.10	1.01	1.11	1.22	0.76	0.65	0.67	0.65	0.59	0.63	0.65	0.67			
125	0.81	1.13	1.36	1.17	0.80	1.41	1.48	1.35	0.92	0.87	0.85	0.65	0.42	0.73	0.90	0.87			
130	1.02	1.33	1.67	1.47	0.89	1.08	1.91	1.46	1.08	1.02	1.07	0.90	0.41	0.86	1.15	1.04			
135	1.20	1.48	1.89	1.05	1.20	1.08	1.99	1.54	1.14	1.04	1.17	0.96	0.69	0.87	1.24	1.20			
140	1.41	1.71	1.70	1.64	1.16	2.30	2.06	1.69	1.39	1.27	0.98	0.99	1.18	1.01	1.05	1.42			
145	1.55	1.49	1.55	2.13	1.52	2.29	1.58	1.43	1.52	1.09	1.18	0.92	0.82	1.08	1.18	1.30			
150	1.51	1.71	1.17	1.85	1.54	1.93	1.12	1.59	1.45	1.29	1.09	1.03	1.06	1.01	1.07	1.37			
155	1.15	1.16	1.11	1.58	1.09	1.33	1.47	1.03	1.27	1.01	1.17	0.74	0.95	0.88	1.03	1.32			
160	0.94	0.70	0.97	1.49	1.10	1.27	1.11	0.65	1.11	1.08	0.94	0.98	0.97	0.98	1.15	0.93			
165	1.21	0.81	1.08	0.93	0.88	1.08	0.99	0.77	1.41	1.36	1.15	0.91	0.92	1.07	0.90	1.17			
170	0.96	0.87	0.68	0.84	1.12	0.93	0.62	1.00	0.99	1.01	1.00	0.85	0.80	1.10	0.87	1.05			
175	0.76	1.13	1.00	0.85	0.69	0.80	0.95	0.98	0.78	0.77	0.75	0.81	1.05	1.11	0.89	0.86			
180	0.39	0.41	0.59	0.47	0.51	0.66	0.71	0.72	0.61	0.61	0.50	0.50	0.52	0.65	0.63	0.63			

7. Photo of sample

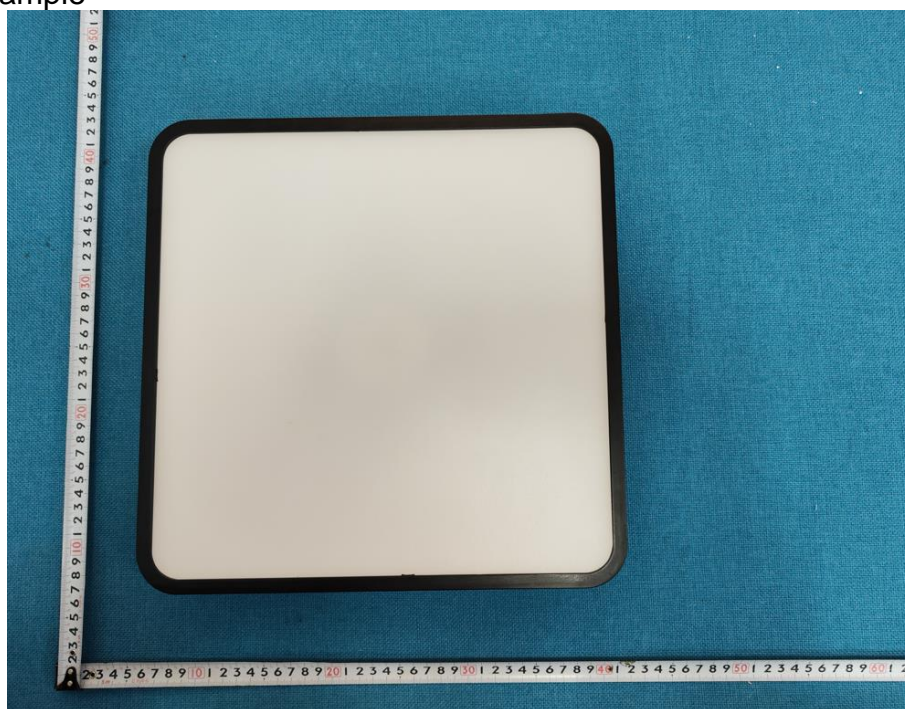


Figure 1 Overview

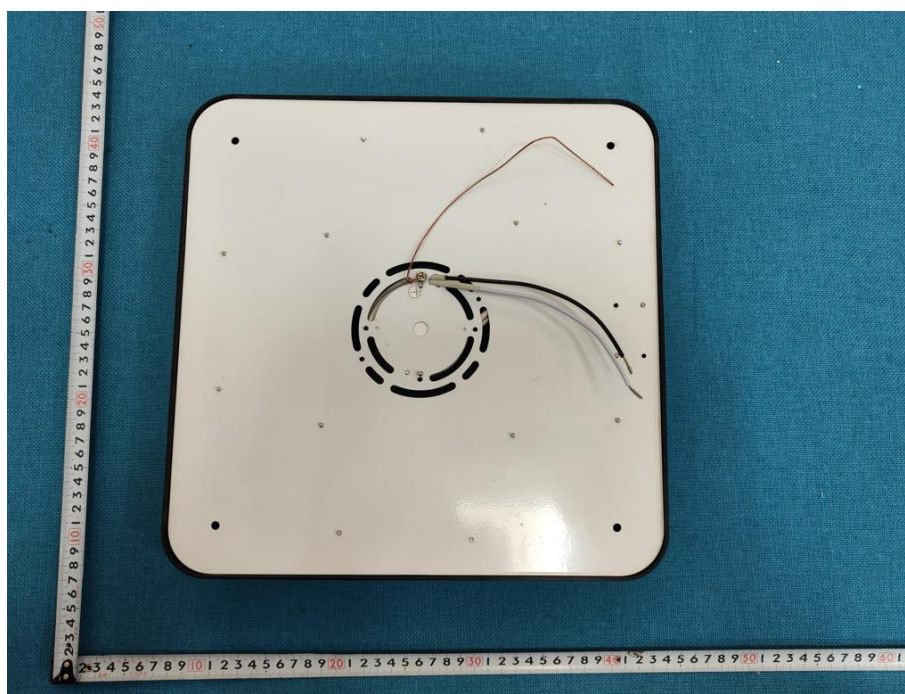


Figure 2 Overview

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