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 :	IKIO LED LIGHTING
Address	8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250
Test Model	IK-HBAX-0100-50-DY-RLV02BX
Brand Name	IKIO
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, Guandong Pr., China
Testing location	As above
Report No.	N02A22060550L00101
Date of receipt	June 20,2022
Date of test	June 20,2022- July 09, 2022
Date of report	July 09, 2022

Tested by:	Checked by:	Approved by:
Jarvis Zhang	Sandy Chen	
Jarvis Zhang/ 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)

Representative (Tested) Model:	IK-HBAX-0100-50-DY-RLV02BX
Model No.:	IK-HBAX-0100-50-DY-RLV02BX
Manufacturer:	IKIO LED LIGHTING
Product Type:	High Bay Luminaires for Commercial and Industrial Buildings
Rated Voltage/Frequency:	100-277V AC, 50/60Hz
Rated Power:	100W
Rated luminous flux:	15000lm
Nominal CCT:	5000K
LED Manufacturer:	Bridgelux Inc.
LED Model No.:	BXEN-50E-11M-3CA

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)
- ANSI C82.77-10:2014 Harmonic Emission Limits – Related Power Quality Requirements for Lighting Equipment-Solid State

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 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.

THD and PF Test

The sample was tested according to the ANSI C82.77-10:2014.

The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

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.)	30

Optical and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)	CCT (K)
119.96	60	0.8454	100.2	0.9876	14577	145.54	4979

Ra	R9	Rf	Rg	x	y	u'	v'	Duv
84.6	15	85	96	0.346	0.3559	0.2104	0.4869	1.75E-03

5.2 Color Rendering Index

Ra
84.6

R1	R2	R3	R4	R5
83	90	95	83	83

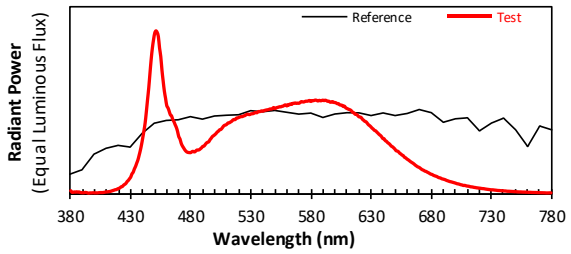
R6	R7	R8	R9	R10
85	88	69	15	76

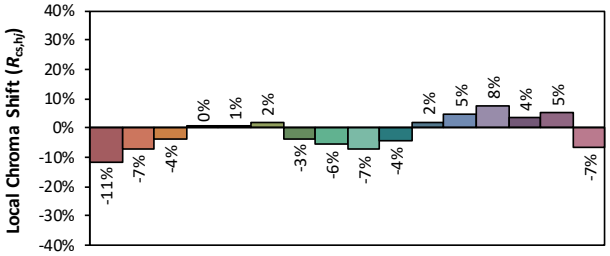
R11	R12	R13	R14	R15
82	59	85	97	78

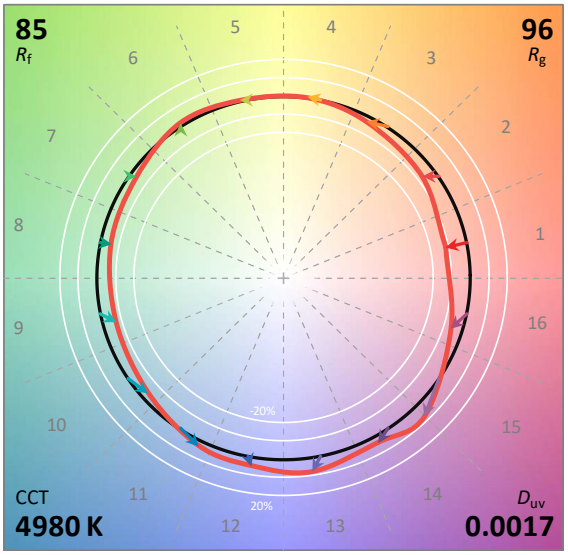
*5.3 ANSI/IES TM-30-18 Color Rendition Report

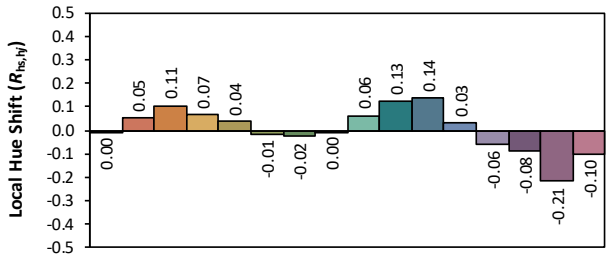
ANSI/IES TM-30-18 Color Rendition Report

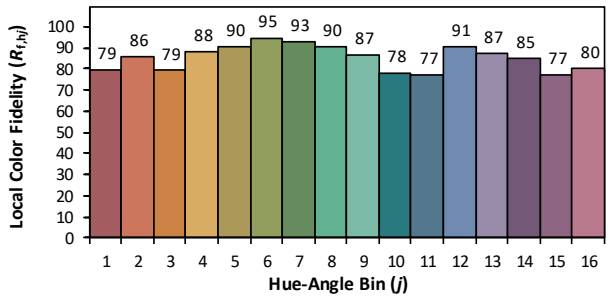
Source:	BXEN-50E-11M-3CA	Manufacturer:	IKIO LED LIGHTING
Date:	2022/7/8	Model:	IK-HBAX-0100-50-DY-RLV02BX

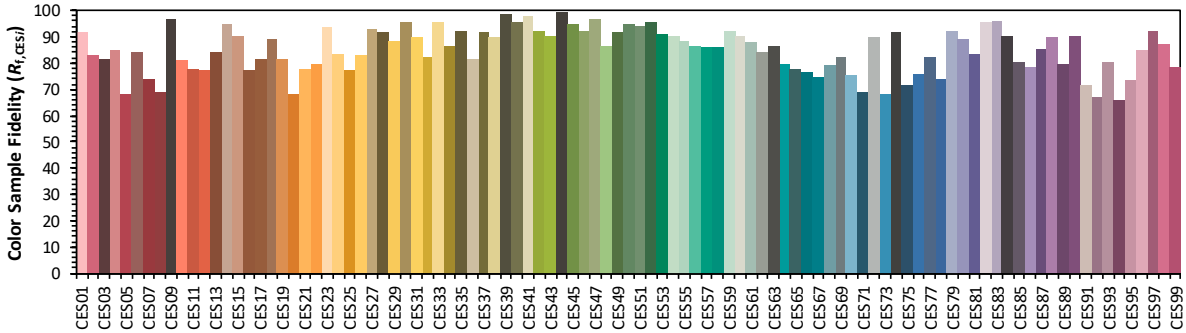












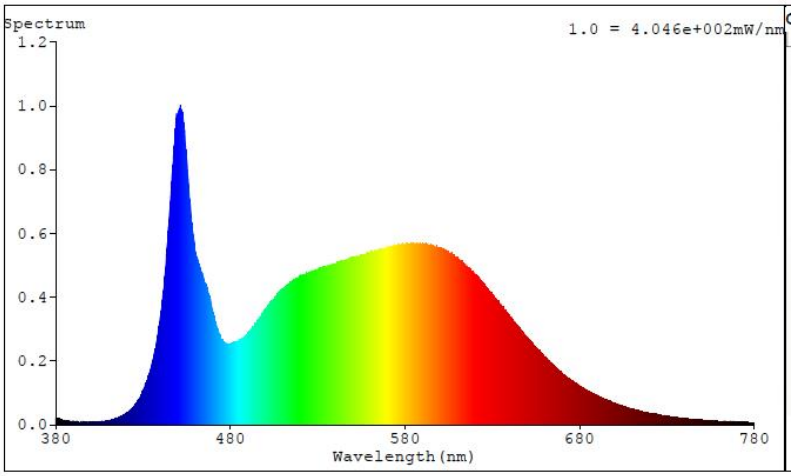
Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

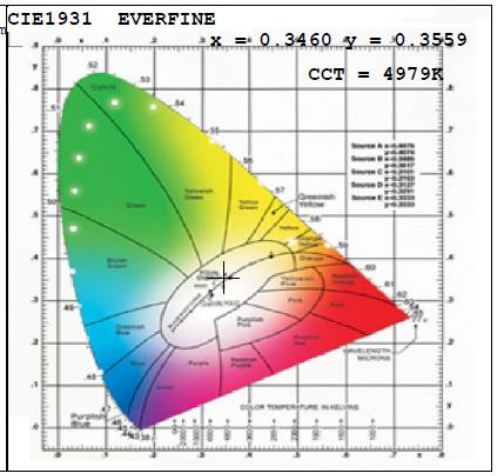
x	0.3460
y	0.3557
u'	0.2104
v'	0.4868

CIE 13.3-1995 (CRI)	
R_a	85
R_9	15

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

5.4 Relative Spectral Power Distribution





nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0209	414	0.0188	448	0.8833	482	0.2587	516	0.4519
381	0.0117	415	0.0214	449	0.9353	483	0.2552	517	0.4509
382	0.0109	416	0.0235	450	0.9757	484	0.2599	518	0.4601
383	0.0129	417	0.0264	451	0.9885	485	0.2665	519	0.461
384	0.0121	418	0.0273	452	0.9791	486	0.2669	520	0.4641
385	0.0137	419	0.0315	453	0.9544	487	0.2685	521	0.4672
386	0.0121	420	0.0344	454	0.8843	488	0.2744	522	0.4695
387	0.0131	421	0.0378	455	0.8333	489	0.2805	523	0.4696
388	0.0095	422	0.0441	456	0.7507	490	0.289	524	0.4735
389	0.0086	423	0.0459	457	0.6846	491	0.2907	525	0.4753
390	0.0079	424	0.0541	458	0.6233	492	0.2998	526	0.4801
391	0.0082	425	0.0592	459	0.5801	493	0.3088	527	0.4833
392	0.01	426	0.065	460	0.5356	494	0.3138	528	0.4829
393	0.0093	427	0.0761	461	0.5227	495	0.317	529	0.4814
394	0.0074	428	0.0829	462	0.5023	496	0.3294	530	0.485
395	0.0052	429	0.0934	463	0.4802	497	0.3381	531	0.4865
396	0.0073	430	0.1033	464	0.4735	498	0.3486	532	0.4875
397	0.0071	431	0.1226	465	0.4517	499	0.3538	533	0.4911
398	0.0077	432	0.132	466	0.4383	500	0.3598	534	0.4953
399	0.0081	433	0.152	467	0.4201	501	0.3666	535	0.4923
400	0.0071	434	0.1676	468	0.4035	502	0.3756	536	0.4991
401	0.0077	435	0.188	469	0.3793	503	0.381	537	0.4996
402	0.0071	436	0.2076	470	0.3479	504	0.3892	538	0.5007
403	0.0081	437	0.2354	471	0.3342	505	0.3914	539	0.5041
404	0.0088	438	0.2651	472	0.3084	506	0.3987	540	0.5021
405	0.0094	439	0.3001	473	0.2921	507	0.409	541	0.5054
406	0.0092	440	0.3406	474	0.2805	508	0.416	542	0.5076
407	0.0096	441	0.3839	475	0.2686	509	0.4186	543	0.5094
408	0.011	442	0.4313	476	0.2598	510	0.4228	544	0.5105
409	0.0125	443	0.499	477	0.2543	511	0.4307	545	0.5124
410	0.0132	444	0.5722	478	0.2521	512	0.4316	546	0.5154
411	0.0142	445	0.6434	479	0.2514	513	0.4362	547	0.5155
412	0.0152	446	0.7303	480	0.2515	514	0.4405	548	0.5175
413	0.0166	447	0.8146	481	0.2568	515	0.4478	549	0.5241

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.5179	599	0.5554	648	0.2867	697	0.074	746	0.0167
551	0.5212	600	0.5546	649	0.2801	698	0.0719	747	0.0163
552	0.5245	601	0.5525	650	0.2726	699	0.0698	748	0.0158
553	0.5262	602	0.5474	651	0.263	700	0.0677	749	0.0155
554	0.5288	603	0.5481	652	0.2606	701	0.0652	750	0.0145
555	0.5284	604	0.5409	653	0.2564	702	0.0625	751	0.0144
556	0.5316	605	0.5392	654	0.2477	703	0.0616	752	0.0138
557	0.533	606	0.5378	655	0.243	704	0.0591	753	0.0133
558	0.5381	607	0.5303	656	0.2363	705	0.0567	754	0.0131
559	0.54	608	0.5328	657	0.2327	706	0.0553	755	0.0131
560	0.534	609	0.523	658	0.2232	707	0.0525	756	0.0124
561	0.5424	610	0.519	659	0.2196	708	0.0529	757	0.0122
562	0.5398	611	0.5153	660	0.2128	709	0.0511	758	0.0122
563	0.5462	612	0.5121	661	0.2082	710	0.049	759	0.0118
564	0.5429	613	0.5091	662	0.2028	711	0.0481	760	0.0115
565	0.5496	614	0.5026	663	0.1969	712	0.0468	761	0.0111
566	0.5493	615	0.4948	664	0.192	713	0.0444	762	0.0108
567	0.552	616	0.4916	665	0.1875	714	0.0437	763	0.0108
568	0.5494	617	0.4831	666	0.182	715	0.0426	764	0.0102
569	0.5511	618	0.483	667	0.1755	716	0.0407	765	0.01
570	0.5499	619	0.4765	668	0.1704	717	0.0399	766	0.0098
571	0.5539	620	0.4687	669	0.1653	718	0.0382	767	0.0098
572	0.5598	621	0.4667	670	0.1624	719	0.0375	768	0.0095
573	0.5587	622	0.4631	671	0.1577	720	0.0363	769	0.0088
574	0.5578	623	0.4532	672	0.1516	721	0.0356	770	0.0089
575	0.5605	624	0.4472	673	0.1471	722	0.0343	771	0.0084
576	0.5627	625	0.4407	674	0.144	723	0.0333	772	0.0083
577	0.5624	626	0.4377	675	0.1393	724	0.0329	773	0.0082
578	0.5649	627	0.4292	676	0.1372	725	0.0314	774	0.0079
579	0.5668	628	0.42	677	0.1329	726	0.0302	775	0.0077
580	0.561	629	0.4146	678	0.1294	727	0.0291	776	0.0071
581	0.566	630	0.4077	679	0.1248	728	0.0282	777	0.0071
582	0.5656	631	0.3995	680	0.1208	729	0.0272	778	0.0072
583	0.5677	632	0.3938	681	0.1189	730	0.0261	779	0.0076
584	0.5693	633	0.386	682	0.1143	731	0.026	780	0.0076
585	0.5671	634	0.383	683	0.1113	732	0.0256		
586	0.5639	635	0.3753	684	0.1088	733	0.0245		
587	0.5679	636	0.3684	685	0.1063	734	0.0238		
588	0.5652	637	0.3607	686	0.1018	735	0.0227		
589	0.5663	638	0.3551	687	0.099	736	0.0219		
590	0.5689	639	0.3469	688	0.0975	737	0.0216		
591	0.5661	640	0.3364	689	0.0932	738	0.0209		
592	0.5686	641	0.3353	690	0.0912	739	0.0205		
593	0.5661	642	0.3239	691	0.0892	740	0.0202		
594	0.5621	643	0.3198	692	0.0869	741	0.0193		
595	0.5627	644	0.3116	693	0.0831	742	0.0191		
596	0.5572	645	0.3065	694	0.0807	743	0.0181		
597	0.557	646	0.2996	695	0.0779	744	0.0172		
598	0.5606	647	0.2909	696	0.0756	745	0.0173		

6. Goniophotometer Test results

6.1 Test Data

Test Ambient Temperature	25.2℃	Test orientation	Downward
Operate time(Min.)	90	stabilization time(Min.)	30

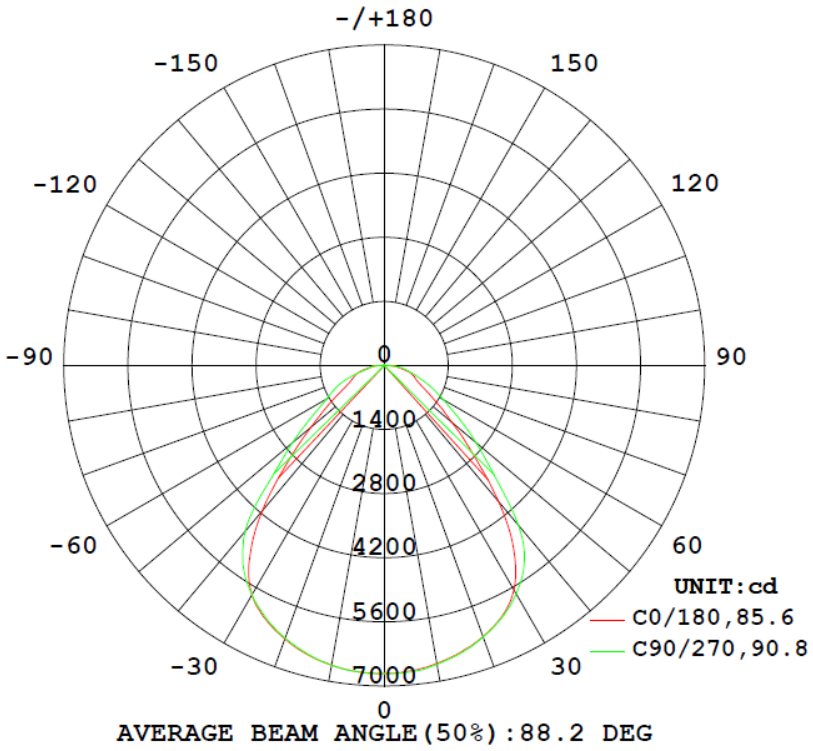
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120.1	60	0.8385	0.9929	100

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Imax (cd)	ZL (20-50°)
14504	144.99	6745	58.6%

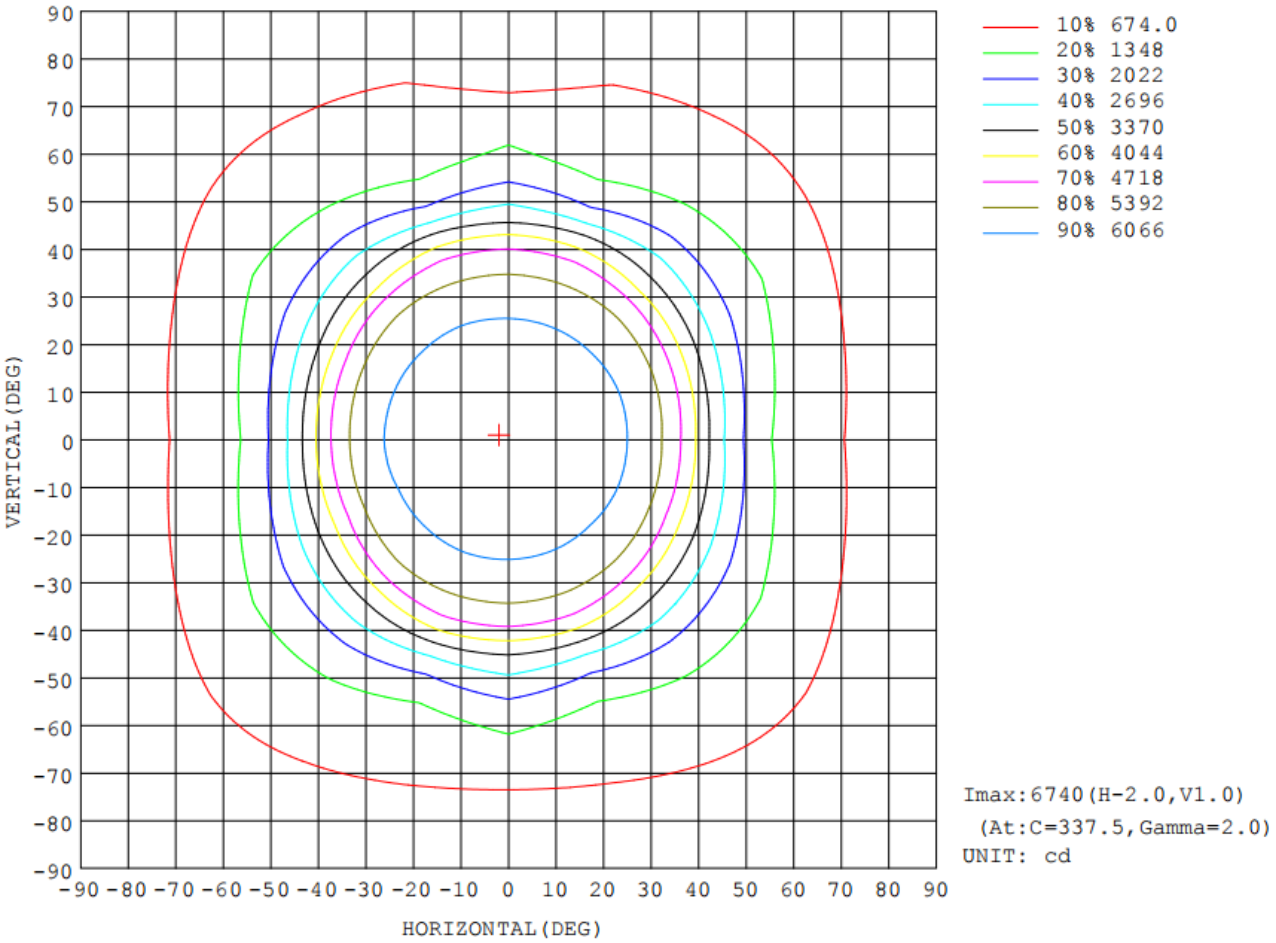
6.2 Luminous Intensity Distribution



6.3 Zonal Flux Diagram

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	6606	6622	6630	6628	6645	6643	6646	6628	0- 10	638.1	638.1	4.4,4.4
20	6301	6289	6310	6308	6355	6339	6334	6314	10- 20	1837	2475	17.1,17.1
30	5662	5705	5764	5745	5786	5783	5784	5752	20- 30	2801	5276	36.4,36.4
40	3894	4096	4564	4240	4161	4349	4733	4223	30- 40	3215	8491	58.5,58.5
50	1932	2335	2616	2417	2093	2467	2619	2424	40- 50	2490	10981	75.7,75.7
60	993.8	1273	1482	1316	1047	1256	1461	1265	50- 60	1525	12506	86.2,86.2
70	687.0	801.3	838.5	807.6	702.1	844.2	884.8	839.5	60- 70	986.6	13493	93,93
80	361.7	435.0	454.9	445.5	389.8	467.0	339.2	451.9	70- 80	654.7	14148	97.5,97.5
90	15.40	17.38	3.637	54.77	30.98	29.66	2.191	21.31	80- 90	251.6	14399	99.3,99.3
100	14.68	3.545	3.246	6.286	15.61	2.968	3.966	2.687	90-100	13.18	14412	99.4,99.4
110	1.603	14.00	12.07	13.44	3.139	14.66	12.33	14.27	100-110	7.409	14420	99.4,99.4
120	17.97	17.47	17.55	17.67	20.92	19.08	15.56	17.25	110-120	15.65	14435	99.5,99.5
130	21.51	21.62	21.11	23.59	24.57	23.73	18.72	20.71	120-130	17.83	14453	99.7,99.7
140	23.37	23.05	21.71	24.78	26.96	25.35	15.90	21.72	130-140	17.99	14471	99.8,99.8
150	24.30	23.14	20.11	23.99	27.45	26.79	21.80	22.79	140-150	14.97	14486	99.9,99.9
160	23.71	18.73	16.89	19.53	26.05	23.57	15.97	21.13	150-160	10.60	14497	100,100
170	21.68	17.86	14.70	15.81	21.59	22.32	17.15	15.22	160-170	5.521	14502	100,100
180	20.75	20.18	14.36	19.19	21.51	21.70	16.98	16.40	170-180	1.666	14504	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

6.4 Isocandela Diagram



6.5 Luminous Distribution Intensity 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	6730	6730	6730	6730	6730	6730	6730	6730	6730	6730	6730	6730	6730	6730	6730	6730			
5	6691	6707	6702	6701	6716	6709	6700	6713	6713	6714	6715	6712	6714	6715	6702	6716			
10	6606	6622	6622	6629	6630	6625	6628	6648	6645	6650	6643	6639	6646	6632	6628	6642			
15	6477	6494	6479	6491	6499	6498	6495	6524	6531	6533	6520	6515	6512	6499	6505	6516			
20	6301	6306	6289	6305	6310	6321	6308	6337	6355	6349	6339	6341	6334	6324	6314	6327			
25	6058	6058	6040	6063	6077	6088	6073	6086	6124	6114	6098	6108	6096	6085	6065	6087			
30	5662	5691	5705	5742	5764	5773	5745	5766	5786	5791	5783	5790	5784	5766	5752	5753			
35	4937	4976	5152	5276	5322	5322	5263	5117	5129	5186	5324	5359	5372	5330	5251	5084			
40	3894	3937	4096	4448	4564	4546	4240	4075	4161	4195	4349	4688	4733	4622	4223	4059			
45	2757	3029	3140	3234	3403	3336	3228	3156	2985	3151	3293	3505	3508	3441	3220	3044			
50	1932	2240	2335	2198	2616	2239	2417	2365	2093	2329	2467	2228	2619	2188	2424	2249			
55	1379	1722	1691	1555	1961	1583	1750	1808	1477	1771	1698	1539	1918	1528	1691	1727			
60	994	1336	1273	1106	1482	1127	1316	1401	1047	1406	1256	1083	1461	1079	1265	1366			
65	791	1035	990	869	1146	881	1006	1071	814	1109	1018	842	1186	837	1027	1077			
70	687	822	801	749	839	755	808	839	702	870	844	797	885	793	839	832			
75	556	634	627	627	615	639	633	645	579	616	657	724	525	707	641	589			
80	362	451	435	412	455	423	445	462	390	431	467	429	339	410	452	419			
85	216	257	244	214	241	216	258	270	240	276	269	220	242	209	255	259			
90	15.4	18.4	17.4	12.1	3.64	16.9	54.8	30.7	31.0	35.3	29.7	18.0	2.19	13.1	21.3	21.1			
95	17.7	17.1	13.5	2.14	7.91	6.82	14.7	19.6	18.7	18.7	13.9	3.96	4.14	4.07	12.1	16.5			
100	14.7	7.27	3.55	7.88	3.25	6.65	6.29	5.21	15.6	9.75	2.97	4.92	3.97	4.74	2.69	10.6			
105	1.64	2.63	7.30	9.31	9.47	9.71	11.5	2.21	1.77	3.31	7.31	9.91	9.71	9.38	5.14	3.31			
110	1.60	11.4	14.0	11.5	12.1	12.0	13.4	15.1	3.14	15.2	14.7	12.6	12.3	11.6	14.3	8.85			
115	17.0	16.3	15.4	14.2	14.9	15.1	14.8	16.7	19.0	18.2	16.6	15.4	13.1	14.3	15.6	18.2			
120	18.0	17.7	17.5	16.6	17.6	17.2	17.7	18.3	20.9	20.5	19.1	18.0	15.6	16.7	17.2	19.8			
125	19.6	19.5	19.2	17.4	18.4	18.7	20.9	19.3	23.0	22.8	21.4	20.4	17.2	18.5	18.9	21.6			
130	21.5	20.9	21.6	21.9	21.1	24.3	23.6	20.5	24.6	24.8	23.7	22.6	18.7	21.0	20.7	22.5			
135	22.8	21.9	23.0	23.9	22.2	23.1	25.1	21.7	27.1	26.7	25.1	25.3	19.3	22.9	21.6	23.8			
140	23.4	23.1	23.0	25.4	21.7	23.7	24.8	23.2	27.0	27.3	25.3	24.6	15.9	23.1	21.7	24.2			
145	24.2	23.7	23.1	24.1	21.1	22.7	24.4	22.7	26.8	26.4	26.7	23.9	22.1	22.6	23.1	23.9			
150	24.3	24.2	23.1	22.2	20.1	23.5	24.0	23.0	27.5	27.3	26.8	23.9	21.8	22.5	22.8	24.2			
155	24.4	24.0	22.7	23.0	18.7	23.2	20.4	23.2	27.6	27.0	26.4	24.2	19.7	18.9	19.9	24.3			
160	23.7	23.0	18.7	21.1	16.9	15.0	19.5	21.5	26.1	25.8	23.6	24.7	16.0	16.7	21.1	21.5			
165	20.2	19.8	19.3	15.6	15.6	15.5	19.4	19.4	21.8	22.1	24.1	22.4	17.3	16.7	15.9	20.9			
170	21.7	21.5	17.9	15.2	14.7	17.2	15.8	19.3	21.6	22.0	22.3	18.0	17.1	14.6	15.2	20.1			
175	16.2	17.7	17.0	16.3	14.0	16.4	18.9	16.3	17.4	17.5	19.7	20.2	17.0	14.3	16.7	17.3			
180	20.8	22.0	20.2	17.1	14.4	16.4	19.2	18.2	21.5	20.9	21.7	20.2	17.0	14.3	16.4	19.3			

7. THD and PF Test

Model Number	Voltage (V AC)	Frequency (Hz)	Power Factor	THD (%)
IK-HBAX-0100-50-DY-RLV02BX	120.0	60	0.986	12.5
	277.0	60	0.921	13

8. Photo of sample

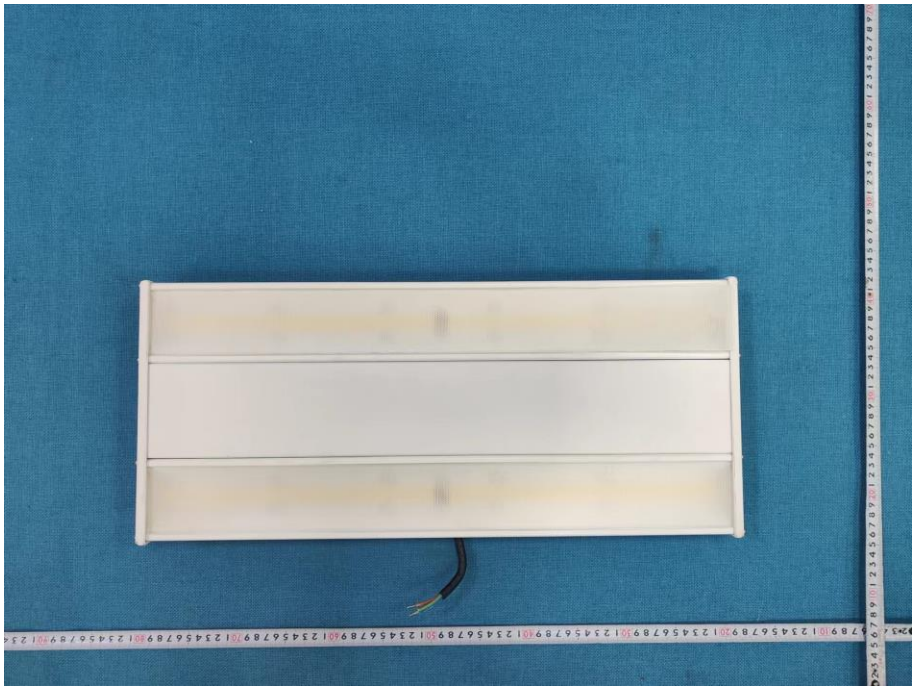


Figure 1

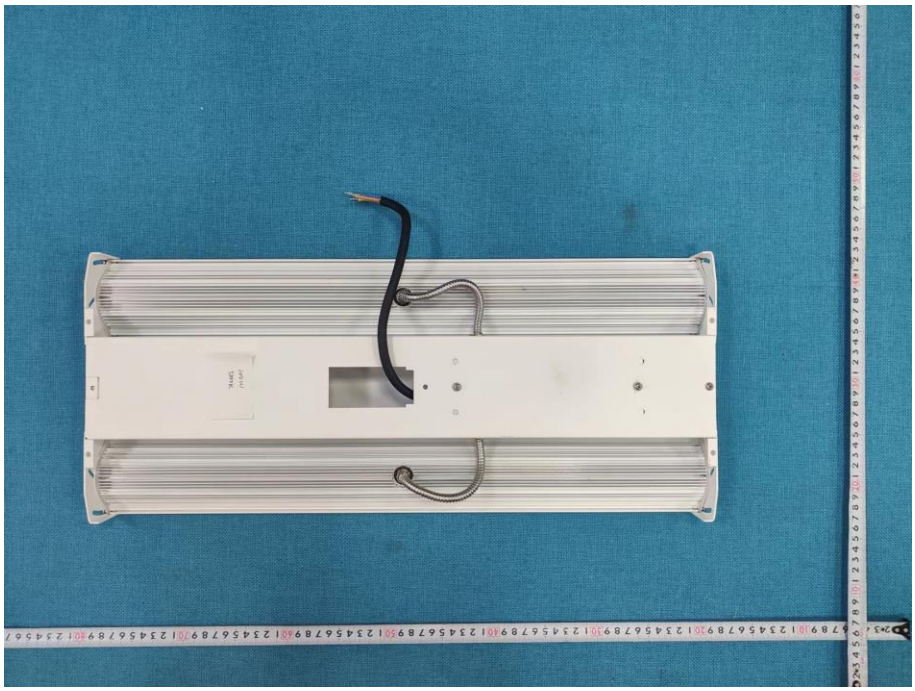


Figure 2

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