

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-0200-50-DY-RLV04BX

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, Guangdong Pr., China

Testing location As above

Report No. N02A22060550L00301

Date of receipt June 20, 2022

Date of test June 20, 2022- July 09, 2022

Date of report July 09, 2022

Tested by:

Jarvis Zhang

Jarvis Zhang/ Test Engineer

Checked by:

Sandy Chen

Sandy Chen/ 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.

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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)

Representative (Tested) Model:	IK-HBAX-0200-50-DY-RLV04BX
Model No.:	IK-HBAX-0200-50-DY-RLV04BX
Manufacturer:	IKIO LED LIGHTING
Product Type:	High Bay Luminaires for Commercial and Industrial Buildings
Rated Voltage/Frequency:	100-277V AC, 50/60Hz
Rated Power:	200W
Rated luminous flux:	30000lm
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 $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ 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.

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°C	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)
119.92	60	1.664	198.7	0.9962	29235	147.1	4972

Ra	R9	Rf	Rg	x	y	u'	v'	Duv
83.1	6	83	92	0.3465	0.3584	0.2097	0.4881	2.82E-03

5.2 Color Rendering Index

Ra
83.1

R1
82

R2
92

R3
95

R4
78

R5
81

R6
88

R7
85

R8
64

R9
6

R10
81

R11
77

R12
57

R13
85

R14
98

R15
75

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

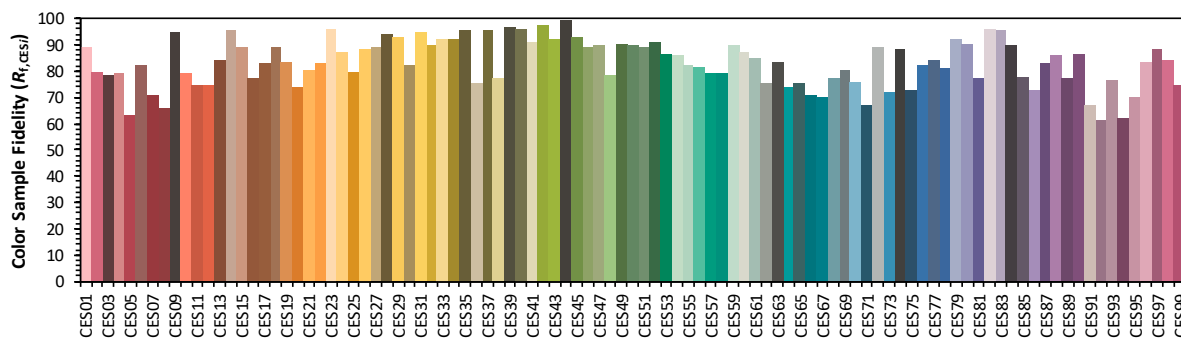
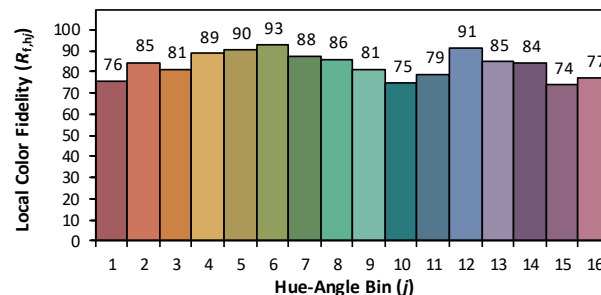
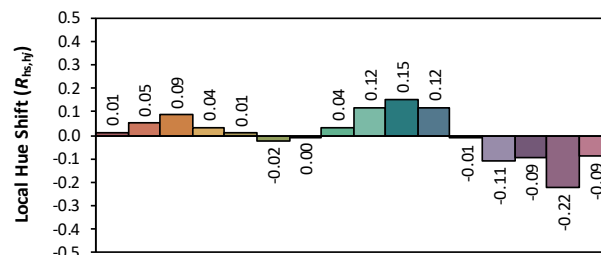
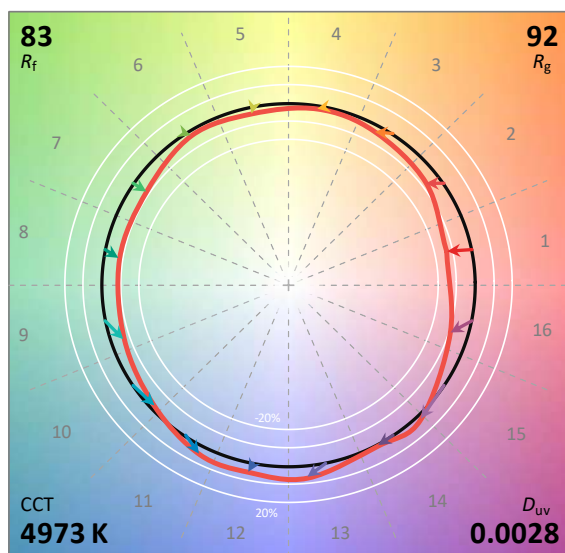
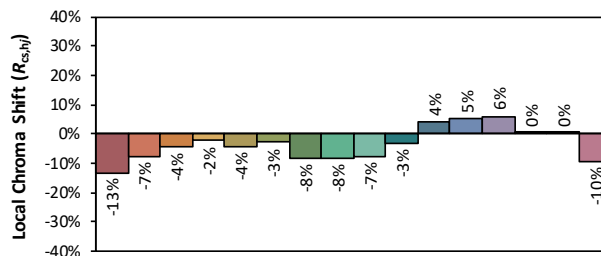
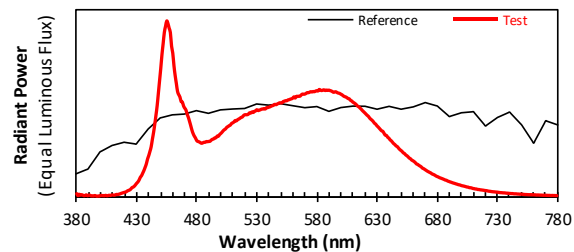
ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-50E-11M-3CA

Manufacturer: IKIO LED LIGHTING

Date: 2022/7/8

Model: IK-HBAX-0200-50-DY-RLV04BX



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

x 0.3464

y 0.3582

u' 0.2098

v' 0.4881

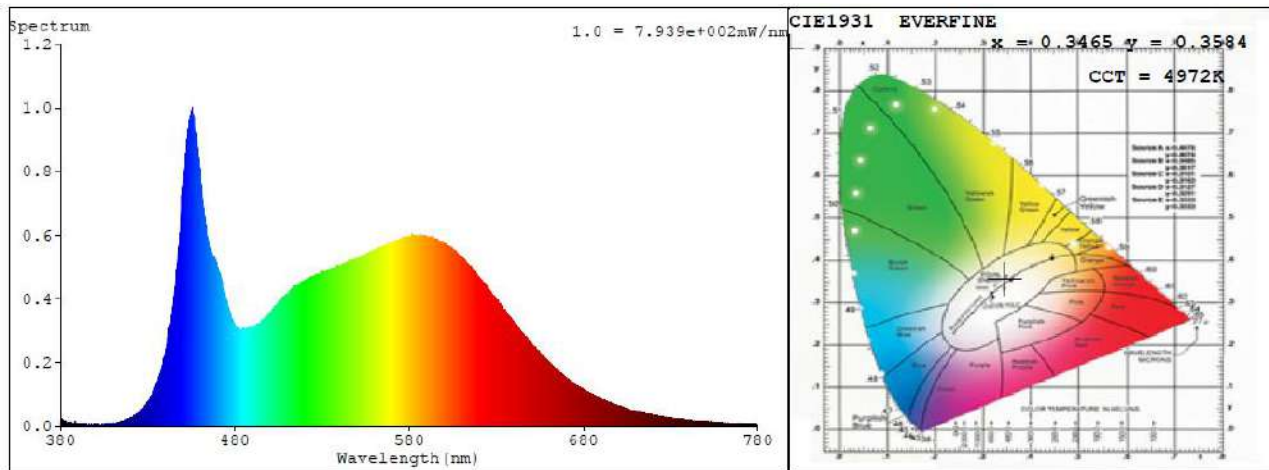
CIE 13.3-1995
(CRI)

R_a 83

R_g 6

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	0.0183	414	0.0134	448	0.5796	482	0.3079	516	0.4403
381	0.007	415	0.0148	449	0.6497	483	0.3038	517	0.445
382	0.015	416	0.017	450	0.7193	484	0.3003	518	0.4477
383	0.01	417	0.0196	451	0.7962	485	0.3026	519	0.4556
384	0.0122	418	0.0218	452	0.8585	486	0.3057	520	0.4597
385	0.0101	419	0.024	453	0.9216	487	0.3059	521	0.46
386	0.0067	420	0.0261	454	0.9553	488	0.3098	522	0.4603
387	0.0081	421	0.0279	455	0.9849	489	0.3092	523	0.4633
388	0.0115	422	0.0325	456	0.9705	490	0.3106	524	0.4708
389	0.0062	423	0.036	457	0.9441	491	0.3113	525	0.4694
390	0.0099	424	0.0386	458	0.9202	492	0.3175	526	0.476
391	0.0095	425	0.0436	459	0.8439	493	0.3225	527	0.4723
392	0.0054	426	0.0515	460	0.8052	494	0.3242	528	0.4789
393	0.0063	427	0.0548	461	0.7342	495	0.3307	529	0.4811
394	0.0048	428	0.0601	462	0.6793	496	0.3308	530	0.488
395	0.0077	429	0.0682	463	0.6344	497	0.3405	531	0.4832
396	0.0056	430	0.0768	464	0.5897	498	0.3398	532	0.4855
397	0.0037	431	0.0842	465	0.5722	499	0.3488	533	0.4879
398	0.0053	432	0.0951	466	0.5585	500	0.355	534	0.4914
399	0.0047	433	0.1099	467	0.5337	501	0.3619	535	0.492
400	0.0088	434	0.1189	468	0.5307	502	0.3701	536	0.4944
401	0.0067	435	0.1334	469	0.509	503	0.3763	537	0.4918
402	0.0079	436	0.1481	470	0.4965	504	0.3808	538	0.4991
403	0.0059	437	0.1658	471	0.4862	505	0.3896	539	0.4998
404	0.009	438	0.185	472	0.4632	506	0.3936	540	0.5024
405	0.0066	439	0.2118	473	0.4451	507	0.3988	541	0.5043
406	0.0071	440	0.2314	474	0.4223	508	0.4022	542	0.5081
407	0.0094	441	0.2549	475	0.3983	509	0.4113	543	0.5106
408	0.0078	442	0.2802	476	0.3733	510	0.4148	544	0.5132
409	0.0102	443	0.3215	477	0.3538	511	0.4198	545	0.5186
410	0.0108	444	0.36	478	0.3399	512	0.4276	546	0.516
411	0.0097	445	0.4064	479	0.3289	513	0.4256	547	0.5199
412	0.0109	446	0.4568	480	0.3149	514	0.4323	548	0.5231
413	0.0137	447	0.5102	481	0.3105	515	0.4358	549	0.5266



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.5264	599	0.5792	648	0.2735	697	0.0707	746	0.0171
551	0.5266	600	0.5751	649	0.266	698	0.0683	747	0.0161
552	0.5337	601	0.5715	650	0.2603	699	0.0671	748	0.016
553	0.5357	602	0.566	651	0.2546	700	0.0646	749	0.0152
554	0.5386	603	0.5619	652	0.2468	701	0.0625	750	0.0156
555	0.5382	604	0.5596	653	0.2429	702	0.0612	751	0.0147
556	0.5429	605	0.5558	654	0.2353	703	0.0595	752	0.0145
557	0.5444	606	0.5508	655	0.2307	704	0.0576	753	0.0135
558	0.5475	607	0.549	656	0.2246	705	0.0555	754	0.0133
559	0.5492	608	0.5411	657	0.2175	706	0.0547	755	0.0131
560	0.5534	609	0.5373	658	0.2135	707	0.0519	756	0.0126
561	0.56	610	0.5307	659	0.2064	708	0.0514	757	0.0123
562	0.5536	611	0.5264	660	0.2027	709	0.0498	758	0.0125
563	0.5628	612	0.5215	661	0.1979	710	0.0472	759	0.0122
564	0.5624	613	0.5152	662	0.1922	711	0.0463	760	0.0114
565	0.5637	614	0.5082	663	0.1847	712	0.0445	761	0.0117
566	0.5639	615	0.5041	664	0.182	713	0.044	762	0.0115
567	0.5706	616	0.4974	665	0.1766	714	0.0416	763	0.0105
568	0.5755	617	0.4908	666	0.1726	715	0.0414	764	0.0108
569	0.5748	618	0.4832	667	0.1679	716	0.0398	765	0.0105
570	0.5758	619	0.4766	668	0.1611	717	0.039	766	0.0101
571	0.5791	620	0.4702	669	0.158	718	0.0381	767	0.01
572	0.5836	621	0.4631	670	0.1534	719	0.0372	768	0.0095
573	0.5833	622	0.4563	671	0.1489	720	0.0358	769	0.0091
574	0.5862	623	0.4508	672	0.1444	721	0.0352	770	0.0093
575	0.5888	624	0.4413	673	0.1407	722	0.034	771	0.009
576	0.5876	625	0.4347	674	0.1371	723	0.0322	772	0.0087
577	0.5899	626	0.429	675	0.1337	724	0.0315	773	0.0083
578	0.589	627	0.4217	676	0.1286	725	0.0304	774	0.0085
579	0.5924	628	0.4127	677	0.1259	726	0.0294	775	0.0075
580	0.5943	629	0.4074	678	0.1227	727	0.0286	776	0.0082
581	0.5928	630	0.3985	679	0.1183	728	0.0282	777	0.0077
582	0.6015	631	0.392	680	0.1146	729	0.0272	778	0.0078
583	0.5976	632	0.3846	681	0.1121	730	0.0268	779	0.0074
584	0.5953	633	0.3767	682	0.1084	731	0.0258	780	0.0069
585	0.5976	634	0.3698	683	0.1057	732	0.0248		
586	0.5993	635	0.3668	684	0.1033	733	0.0238		
587	0.595	636	0.3558	685	0.1005	734	0.0236		
588	0.5981	637	0.3457	686	0.0977	735	0.0227		
589	0.596	638	0.3441	687	0.0944	736	0.0226		
590	0.5975	639	0.3341	688	0.0929	737	0.0219		
591	0.5952	640	0.3289	689	0.0889	738	0.0209		
592	0.5931	641	0.3197	690	0.0866	739	0.0207		
593	0.5893	642	0.3141	691	0.0839	740	0.0199		
594	0.5856	643	0.3062	692	0.0818	741	0.0192		
595	0.5878	644	0.2983	693	0.0792	742	0.0185		
596	0.588	645	0.2931	694	0.0771	743	0.0186		
597	0.5836	646	0.2855	695	0.0751	744	0.0174		
598	0.5812	647	0.2817	696	0.0727	745	0.0172		

6. Goniophotometer Test results

6.1 Test Data

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

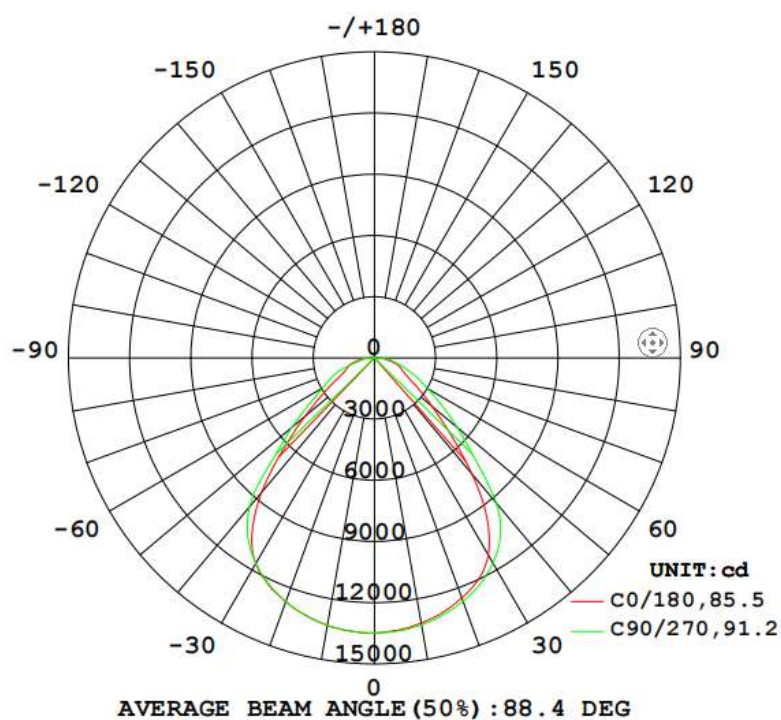
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
119.9	60	1.6649	0.9973	199.2

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Imax (cd)	ZL (20-50°)
29138	146.3	13492	58.7%

6.2 Luminous Intensity Distribution

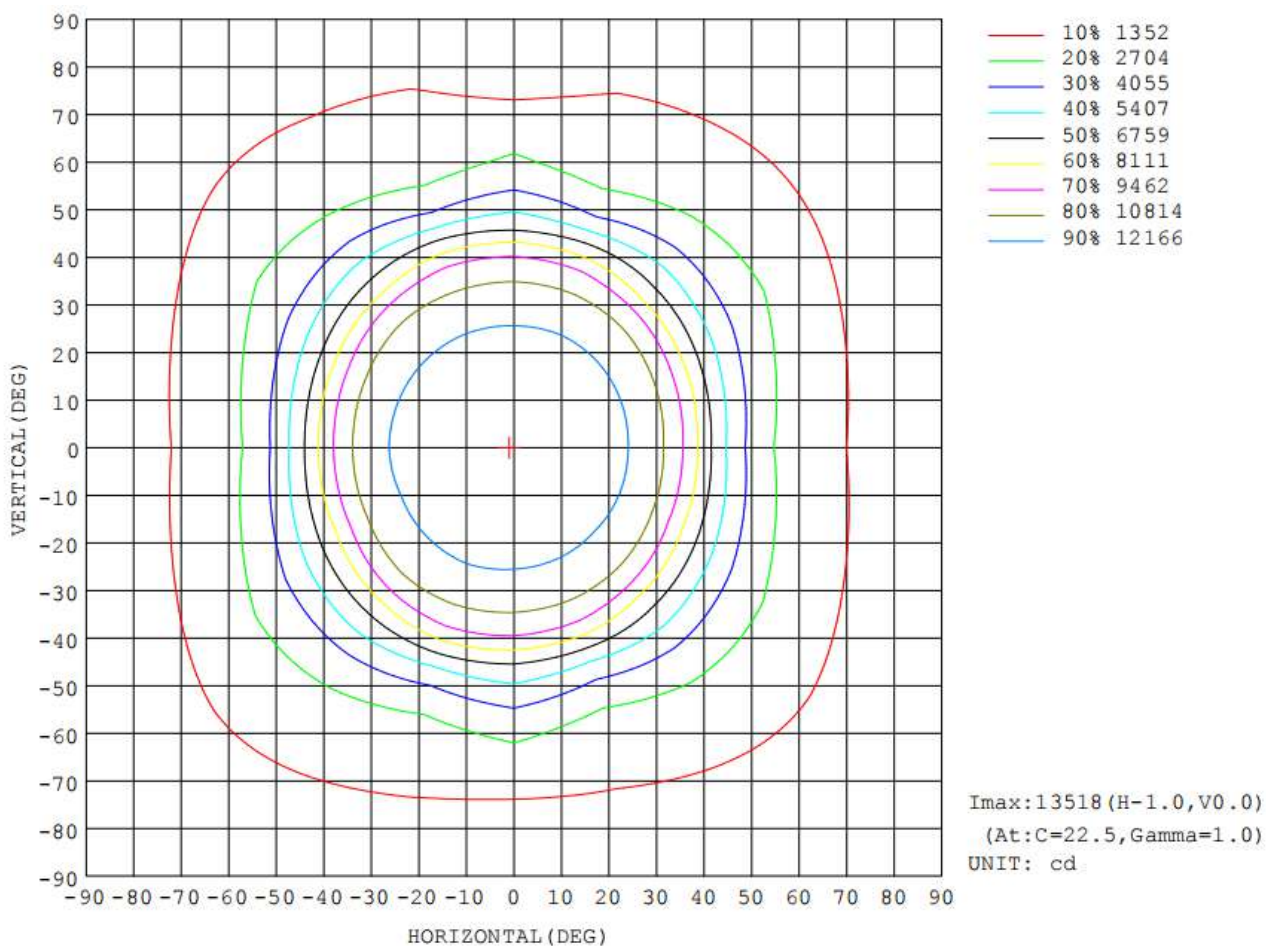




6.3 Zonal Flux Diagram

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	Φ lum, lamp
10	1321	1324	1329	1332	1331	1331	1331	1327	0- 10	1278	1278	4.38, 4.38
20	1252	1258	1269	1274	1272	1272	1272	1265	10- 20	3681	4958	17, 17
30	1115	1138	1163	1166	1165	1164	1162	1149	20- 30	5617	10575	36.3, 36.3
40	745.9	800.7	928.7	891.6	862.7	895.4	953.5	821.4	30- 40	6454	17029	58.4, 58.4
50	367.4	459.2	530.6	509.7	444.6	510.3	527.5	469.9	40- 50	5024	22054	75.7, 75.7
60	190.1	251.9	301.0	272.7	219.8	257.3	291.8	246.5	50- 60	3073	25127	86.2, 86.2
70	134.4	158.1	172.0	168.7	143.1	172.9	180.2	165.0	60- 70	1981	27108	93, 93
80	68.31	84.95	92.73	96.53	85.40	97.77	66.79	86.72	70- 80	1325	28434	97.6, 97.6
90	3.288	3.692	2.011	10.85	12.79	10.52	1.688	3.467	80- 90	514.1	28948	99.3, 99.3
100	3.053	0.6795	1.443	0.6169	3.466	0.7094	1.570	0.6678	90-100	31.23	28979	99.5, 99.5
110	0.7331	2.215	1.614	2.388	0.4588	2.707	1.690	2.166	100-110	12.57	28992	99.5, 99.5
120	3.419	3.049	2.450	3.413	3.987	3.415	2.747	2.928	110-120	27.01	29019	99.6, 99.6
130	3.833	3.552	2.449	4.168	4.611	4.028	3.016	3.347	120-130	30.85	29049	99.7, 99.7
140	4.036	3.757	2.893	4.592	5.066	4.608	3.072	3.708	130-140	30.71	29080	99.8, 99.8
150	3.942	4.115	2.847	4.794	5.106	5.035	3.345	3.947	140-150	26.19	29106	99.9, 99.9
160	3.733	3.220	2.586	3.587	4.965	4.475	2.543	3.732	150-160	18.87	29125	100, 100
170	3.285	3.084	2.518	3.445	3.984	4.098	3.439	3.501	160-170	9.714	29135	100, 100
180	3.251	3.844	2.475	3.638	3.386	3.408	3.303	3.313	170-180	3.098	29138	100, 100
DEG	LUMINOUS INTENSITY: X10cd									UNIT: lm		

6.4 Isocandela Diagram





6.5 Luminous Distribution Intensity Data

Table--1 UNIT: Xl0cd

C (DEG) Y (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	1348	1348	1348	1348	1348	1348	1348	1348	1348	1348	1348	1348	1348	1348	1348	1348			
5	1339	1342	1341	1342	1343	1344	1344	1345	1344	1346	1345	1344	1344	1344	1342	1342			
10	1321	1324	1324	1328	1329	1331	1332	1332	1331	1334	1331	1329	1331	1330	1327	1327			
15	1292	1296	1298	1300	1304	1308	1309	1308	1307	1310	1308	1306	1305	1306	1302	1300			
20	1252	1258	1258	1263	1269	1275	1274	1274	1272	1274	1272	1271	1272	1273	1265	1263			
25	1202	1207	1208	1216	1224	1230	1229	1226	1228	1228	1225	1226	1224	1223	1217	1212			
30	1115	1126	1138	1151	1163	1168	1166	1164	1165	1164	1164	1162	1162	1158	1149	1136			
35	964	971	1019	1057	1075	1082	1077	1048	1046	1057	1074	1077	1080	1068	1042	999			
40	746	764	801	883	929	937	892	849	863	866	895	951	954	918	821	779			
45	525	582	618	639	695	703	678	663	630	653	680	721	707	677	627	583			
50	367	429	459	433	531	474	510	502	445	483	510	460	527	429	470	431			
55	264	330	334	306	399	335	366	380	311	363	351	316	383	300	327	332			
60	190	257	252	216	301	238	273	295	220	287	257	222	292	212	246	262			
65	154	201	196	169	234	183	208	225	166	227	205	168	239	165	202	209			
70	134	161	158	147	172	155	169	176	143	183	173	156	180	159	165	160			
75	106	123	122	124	126	133	135	136	120	133	135	148	107	141	126	111			
80	68.3	85.9	85.0	81.3	92.7	92.3	96.5	98.9	85.4	90.3	97.8	90.8	66.8	80.0	86.7	80.0			
85	36.2	44.3	44.9	42.0	54.1	49.4	58.2	62.2	52.9	60.5	59.6	45.8	48.7	39.7	44.3	43.8			
90	3.29	3.87	3.69	2.64	2.01	5.76	10.9	13.9	12.8	13.4	10.5	5.65	1.69	2.45	3.47	3.68			
95	3.68	3.53	2.98	1.36	1.44	1.16	3.14	3.83	3.75	3.98	3.34	1.97	1.52	1.20	2.93	3.58			
100	3.05	1.87	0.68	1.49	1.44	1.66	0.62	1.52	3.47	2.11	0.71	1.84	1.57	1.61	0.67	2.14			
105	0.44	0.44	0.90	1.33	1.75	1.76	1.27	0.40	0.32	0.48	0.81	1.60	1.93	1.45	0.96	0.55			
110	0.73	2.37	2.22	1.54	1.61	1.94	2.39	2.92	0.46	2.60	2.71	1.86	1.69	1.52	2.17	2.34			
115	3.23	3.06	2.69	1.96	1.84	2.35	2.94	3.54	3.77	3.30	3.03	2.45	2.12	1.85	2.62	3.19			
120	3.42	3.28	3.05	2.62	2.45	3.00	3.41	3.66	3.99	3.53	3.42	3.21	2.75	2.56	2.93	3.36			
125	3.55	3.55	3.30	2.77	2.37	3.20	3.79	3.82	4.28	3.94	3.74	3.59	3.02	2.96	3.17	3.68			
130	3.83	3.75	3.55	3.26	2.45	3.98	4.17	4.09	4.61	4.44	4.03	4.11	3.02	3.30	3.35	3.89			
135	4.01	3.92	3.77	3.72	2.72	4.12	4.43	4.37	4.91	4.78	4.41	4.48	3.02	3.81	3.48	3.96			
140	4.04	3.98	3.76	3.96	2.89	3.96	4.59	4.61	5.07	5.01	4.61	4.51	3.07	4.13	3.71	3.92			
145	3.89	3.93	4.05	3.63	2.94	3.69	4.74	4.61	5.04	4.96	5.01	4.16	3.18	4.67	3.92	3.93			
150	3.94	3.96	4.11	3.91	2.85	4.51	4.79	4.67	5.11	5.07	5.04	4.37	3.35	5.25	3.95	3.95			
155	3.93	3.92	3.90	3.90	2.74	4.47	4.48	4.56	5.22	5.13	5.06	4.49	2.93	3.37	3.40	3.96			
160	3.73	3.62	3.22	2.84	2.59	3.01	3.59	4.25	4.96	4.90	4.48	4.82	2.54	2.91	3.73	3.33			
165	3.01	3.08	3.46	2.75	2.73	3.01	4.15	3.23	3.54	3.58	3.84	4.54	2.91	2.75	3.00	3.24			
170	3.28	3.38	3.08	3.14	2.52	3.51	3.45	3.85	3.98	3.99	4.10	3.78	3.44	2.50	3.50	3.11			
175	2.73	3.11	3.71	3.25	2.42	3.32	3.75	2.85	3.10	3.10	3.27	4.08	3.40	2.48	3.54	3.48			
180	3.25	3.40	3.84	3.30	2.47	3.31	3.64	3.10	3.39	3.33	3.41	3.80	3.30	2.47	3.31	3.63			

7. THD and PF Test

Model Number	Voltage (V AC)	Frequency (Hz)	Power Factor	THD (%)
IK-HBAX-0200-50-DY-RLV04BX	120.0	60	0.996	3.45
	277.0	60	0.924	9.87

8. Photo of sample

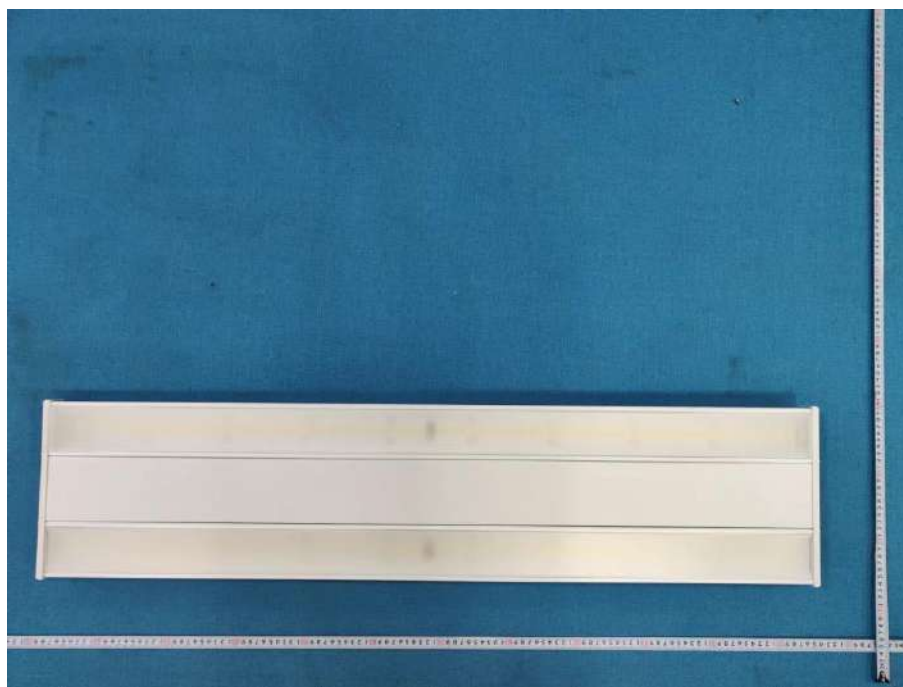


Figure 1

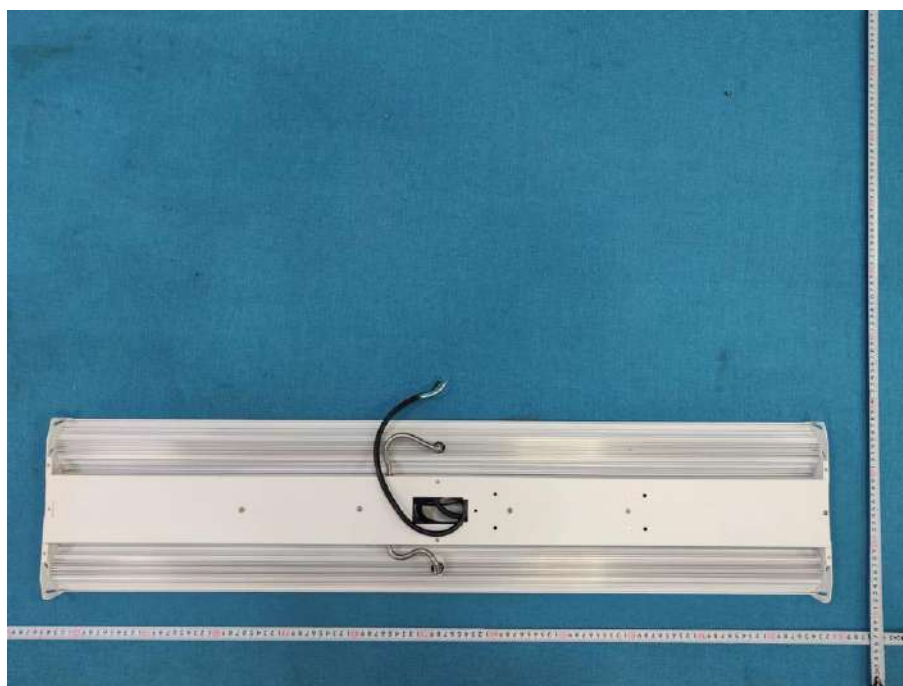


Figure 2

***** END OF REPORT*****