

IES LM-79-08

MEASUREMENT AND TEST REPORT For

GREEN CREATIVE LTD

Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL, Hong Kong

Test Model: LEM9027KDIM120VVN/ADS4BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Joker Gu
Report Number:	RKSB200812010-10-4
Test Date:	2020-08-27 to 2020-08-29
Report Date:	2020-09-07
Reviewed By:	Seven Xia/EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
Accreditation:	The IAS Accreditation Number TL-749.

1. Product Description

General Information:

One sample was received on 2020-08-12 and used for testing.

Model Tested: LEM9027KDIM120VVN/ADS4BL
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: LED Recessed Downlight
 Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120VAC 60Hz
 Rated Power: 31.5W
 Nominal CCT: 2700K
 Nominal Lumen Output: 2060lm

2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting Equipment
- IES TM-30-18: IES Method for Evaluating Light Source Color Rendition

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	2020-01-22	2021-01-21
Power Meter	INVENTFINE	WT500	GSJWQ20009	2020-04-02	2021-04-01
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2020-01-22	2021-01-21
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2020-04-02	2021-04-01
Standard Light Source	INVENTFINE	N/A	JWWCR020104	2019-11-19	2020-11-18
Thermal Meter	KEJIAN	TA298	N/A	2019-12-02	2020-12-01
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2019-12-20	2020-12-19
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2020-04-02	2021-04-01
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-12-20	2020-12-19
Power Meter	INVENTFINE	WT500	GSDSQ200007	2020-04-02	2021-04-01
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2020-01-22	2021-01-21
Wireless Weather Station	ZHONGXING	KG218	N/A	2019-12-02	2020-12-01
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2020-03-19	2021-03-18

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is $U_{re}=2.61\%$ ($k=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=34\text{K}$ ($k=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.5(k=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U_{re}=0.48\%$ of rdg, AC Voltage $U_{re}=0.25\%$ of rdg, Power $U_{re}=0.44\%$, ($k=2$), at the 95% confidence level.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report. The vertical angle (γ) test intervals were set no more than 1 degree while data for 5 degree intervals is reported. The horizontal angle (C plane) test intervals were set no more than 22.5 degree.

The uncertainty of the luminous flux is $U_{re}=2.6\%$ ($k=2$), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_i , 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. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

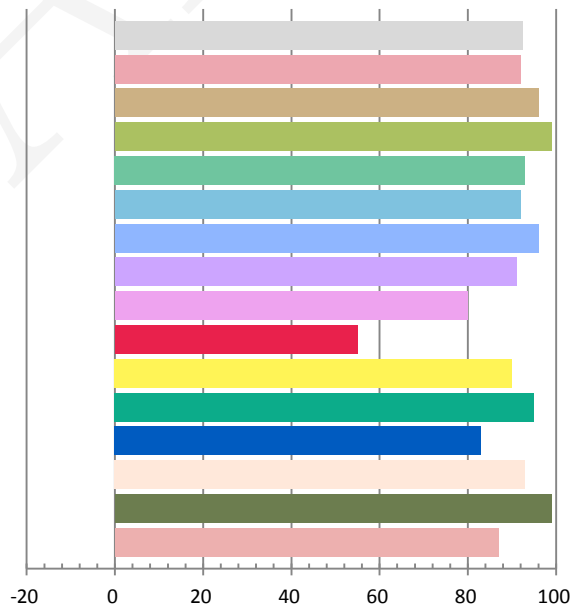
Photometric and Electrical Measurement Result

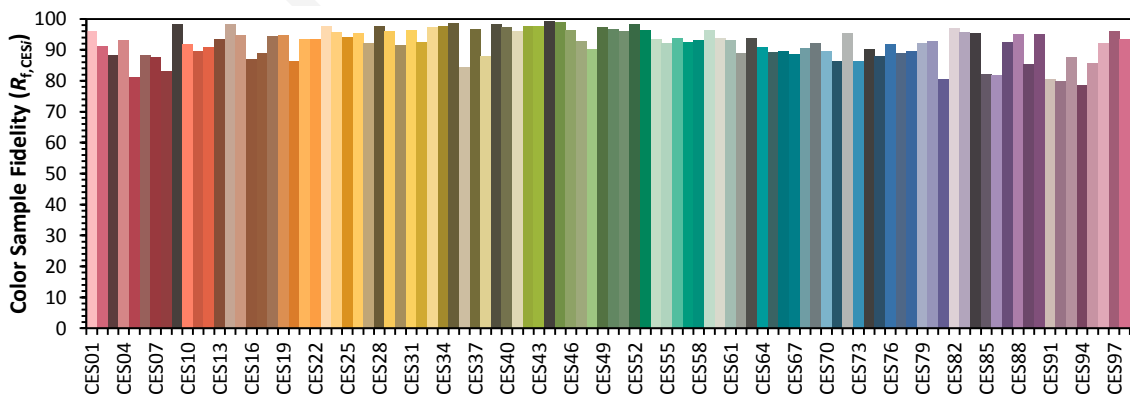
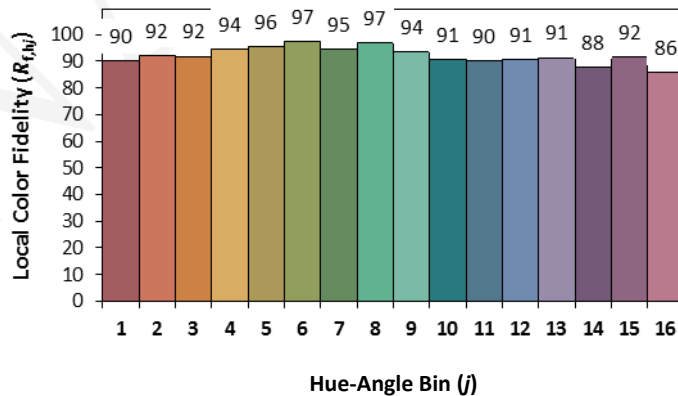
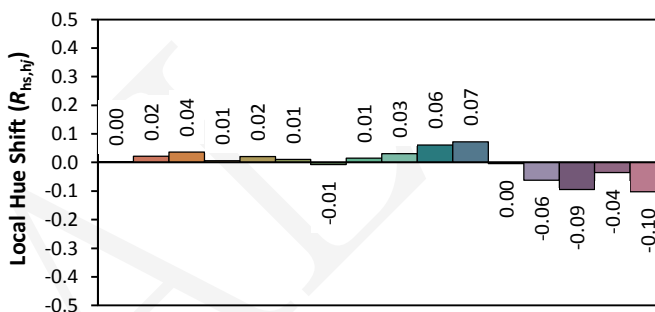
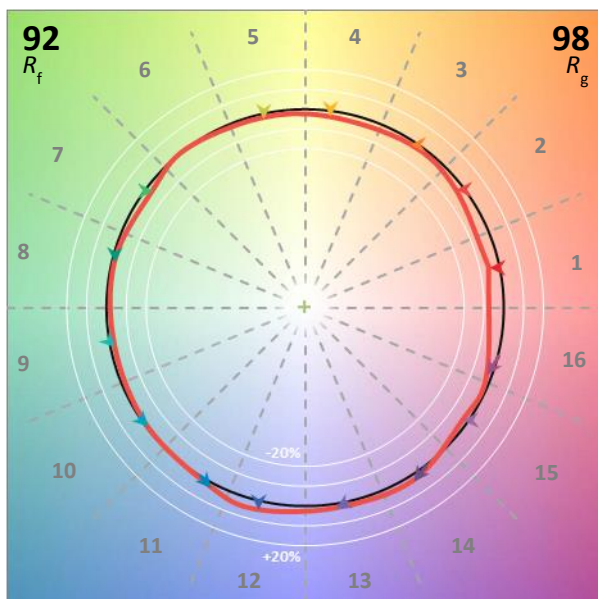
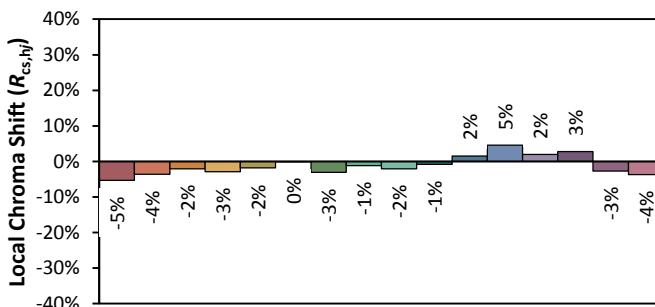
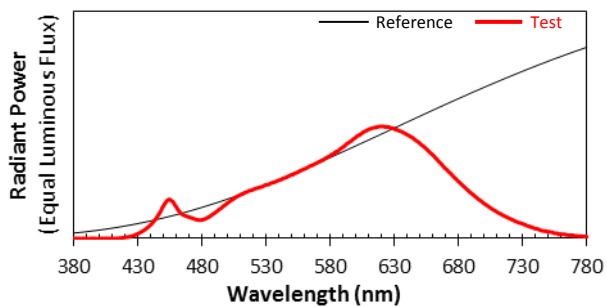
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.2656	31.52	0.989	2104.96	66.78

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.251	2720	0.00186	0.4615	0.4161	0.2611	0.5297

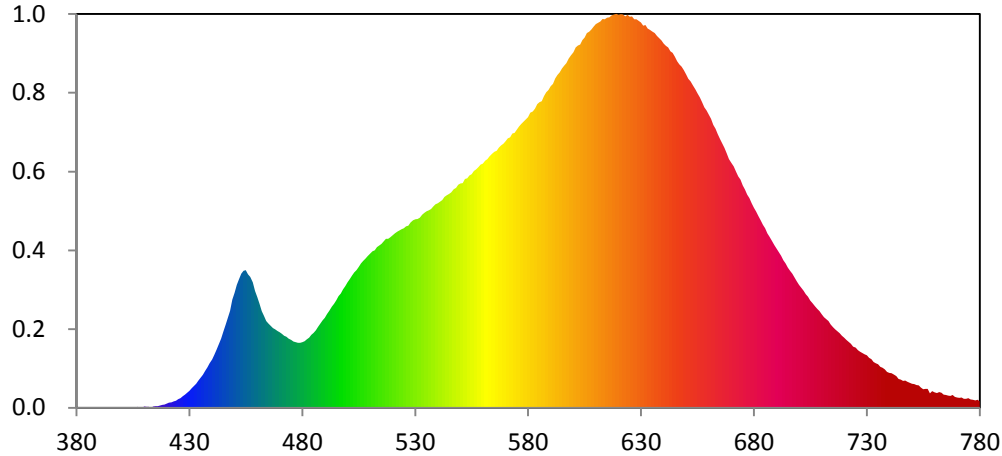
Color Rendering Index

Ra			
92.4			
R1	R2	R3	R4
92	96	99	93
R5	R6	R7	R8
92	96	91	80
R9	R10	R11	R12
55	90	95	83
R13	R14	R15	
93	99	87	





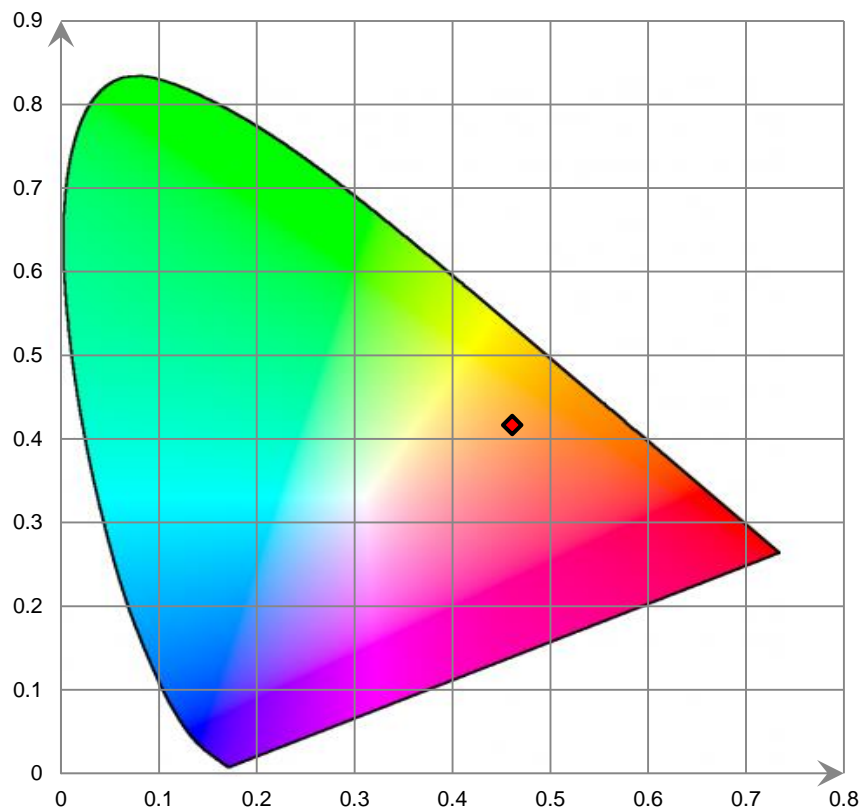
Relative Spectral Power Distribution



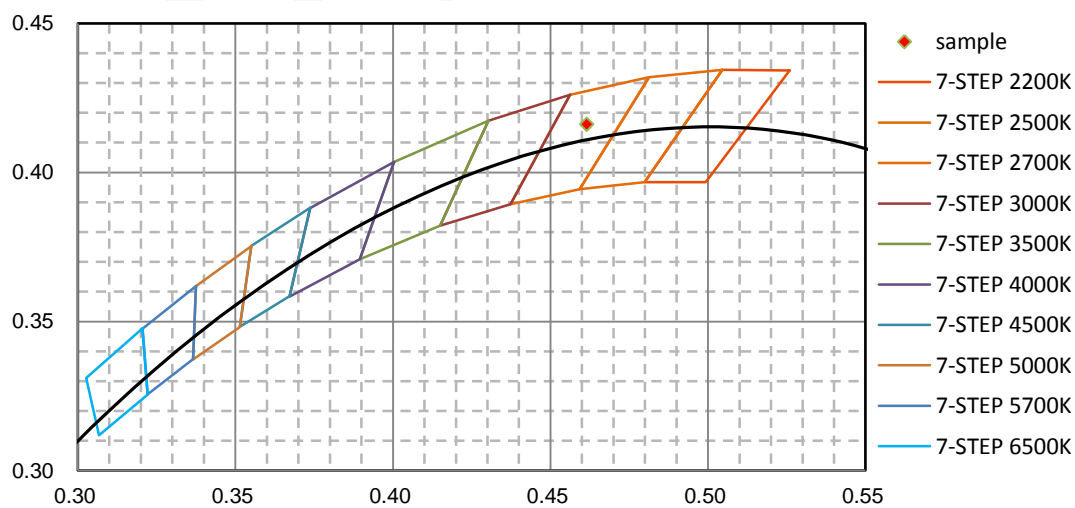
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.940E-02	421	5.773E-01	462	1.118E+01	503	1.567E+01	544	2.460E+01
381	7.010E-02	422	6.133E-01	463	1.064E+01	504	1.594E+01	545	2.476E+01
382	7.450E-02	423	7.523E-01	464	1.006E+01	505	1.629E+01	546	2.495E+01
383	5.600E-03	424	8.255E-01	465	9.730E+00	506	1.673E+01	547	2.531E+01
384	8.750E-02	425	1.005E+00	466	9.491E+00	507	1.700E+01	548	2.547E+01
385	2.540E-02	426	1.113E+00	467	9.242E+00	508	1.728E+01	549	2.581E+01
386	1.400E-03	427	1.325E+00	468	9.096E+00	509	1.756E+01	550	2.598E+01
387	7.430E-02	428	1.501E+00	469	8.894E+00	510	1.782E+01	551	2.600E+01
388	2.230E-02	429	1.741E+00	470	8.753E+00	511	1.812E+01	552	2.649E+01
389	3.720E-02	430	1.960E+00	471	8.575E+00	512	1.822E+01	553	2.659E+01
390	5.590E-02	431	2.240E+00	472	8.344E+00	513	1.860E+01	554	2.689E+01
391	4.580E-02	432	2.505E+00	473	8.229E+00	514	1.877E+01	555	2.706E+01
392	8.700E-03	433	2.766E+00	474	7.997E+00	515	1.896E+01	556	2.741E+01
393	8.800E-03	434	3.147E+00	475	7.848E+00	516	1.925E+01	557	2.762E+01
394	4.900E-03	435	3.487E+00	476	7.675E+00	517	1.957E+01	558	2.788E+01
395	8.420E-02	436	3.824E+00	477	7.610E+00	518	1.955E+01	559	2.816E+01
396	6.280E-02	437	4.263E+00	478	7.531E+00	519	1.974E+01	560	2.829E+01
397	3.380E-02	438	4.655E+00	479	7.534E+00	520	1.995E+01	561	2.861E+01
398	1.070E-02	439	5.154E+00	480	7.614E+00	521	2.019E+01	562	2.878E+01
399	5.000E-04	440	5.604E+00	481	7.719E+00	522	2.037E+01	563	2.912E+01
400	0.000E+00	441	6.157E+00	482	7.912E+00	523	2.052E+01	564	2.944E+01
401	2.430E-02	442	6.747E+00	483	8.117E+00	524	2.069E+01	565	2.965E+01
402	3.670E-02	443	7.367E+00	484	8.441E+00	525	2.079E+01	566	2.975E+01
403	2.040E-02	444	8.013E+00	485	8.671E+00	526	2.101E+01	567	3.012E+01
404	2.940E-02	445	8.808E+00	486	8.969E+00	527	2.108E+01	568	3.039E+01
405	7.100E-02	446	9.581E+00	487	9.357E+00	528	2.145E+01	569	3.057E+01
406	3.080E-02	447	1.041E+01	488	9.728E+00	529	2.171E+01	570	3.086E+01
407	1.126E-01	448	1.124E+01	489	1.011E+01	530	2.183E+01	571	3.121E+01
408	3.220E-02	449	1.253E+01	490	1.042E+01	531	2.186E+01	572	3.130E+01
409	8.120E-02	450	1.329E+01	491	1.086E+01	532	2.202E+01	573	3.176E+01
410	1.416E-01	451	1.424E+01	492	1.121E+01	533	2.233E+01	574	3.183E+01
411	9.220E-02	452	1.490E+01	493	1.169E+01	534	2.257E+01	575	3.222E+01
412	1.059E-01	453	1.552E+01	494	1.203E+01	535	2.274E+01	576	3.256E+01
413	4.490E-02	454	1.587E+01	495	1.244E+01	536	2.287E+01	577	3.287E+01
414	1.477E-01	455	1.592E+01	496	1.291E+01	537	2.302E+01	578	3.312E+01
415	1.729E-01	456	1.546E+01	497	1.323E+01	538	2.332E+01	579	3.340E+01
416	1.881E-01	457	1.514E+01	498	1.370E+01	539	2.357E+01	580	3.365E+01
417	2.413E-01	458	1.452E+01	499	1.407E+01	540	2.368E+01	581	3.418E+01
418	3.141E-01	459	1.353E+01	500	1.452E+01	541	2.387E+01	582	3.431E+01
419	3.802E-01	460	1.283E+01	501	1.489E+01	542	2.403E+01	583	3.464E+01
420	4.713E-01	461	1.205E+01	502	1.529E+01	543	2.441E+01	584	3.516E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.540E+01	626	4.531E+01	667	3.009E+01	708	1.145E+01	749	2.904E+00
586	3.549E+01	627	4.497E+01	668	2.946E+01	709	1.119E+01	750	2.765E+00
587	3.609E+01	628	4.497E+01	669	2.881E+01	710	1.082E+01	751	2.746E+00
588	3.653E+01	629	4.480E+01	670	2.838E+01	711	1.050E+01	752	2.644E+00
589	3.681E+01	630	4.463E+01	671	2.794E+01	712	1.025E+01	753	2.588E+00
590	3.726E+01	631	4.425E+01	672	2.737E+01	713	1.003E+01	754	2.323E+00
591	3.749E+01	632	4.430E+01	673	2.681E+01	714	9.644E+00	755	2.144E+00
592	3.813E+01	633	4.393E+01	674	2.643E+01	715	9.345E+00	756	2.164E+00
593	3.855E+01	634	4.376E+01	675	2.577E+01	716	9.093E+00	757	2.189E+00
594	3.883E+01	635	4.359E+01	676	2.529E+01	717	8.863E+00	758	1.668E+00
595	3.928E+01	636	4.341E+01	677	2.469E+01	718	8.624E+00	759	1.921E+00
596	3.960E+01	637	4.307E+01	678	2.427E+01	719	8.328E+00	760	1.792E+00
597	3.993E+01	638	4.280E+01	679	2.367E+01	720	8.115E+00	761	1.700E+00
598	4.043E+01	639	4.255E+01	680	2.318E+01	721	7.854E+00	762	1.812E+00
599	4.081E+01	640	4.219E+01	681	2.272E+01	722	7.628E+00	763	1.720E+00
600	4.115E+01	641	4.192E+01	682	2.221E+01	723	7.411E+00	764	1.522E+00
601	4.173E+01	642	4.173E+01	683	2.172E+01	724	7.080E+00	765	1.468E+00
602	4.194E+01	643	4.128E+01	684	2.121E+01	725	6.980E+00	766	1.417E+00
603	4.207E+01	644	4.110E+01	685	2.080E+01	726	6.669E+00	767	1.365E+00
604	4.258E+01	645	4.064E+01	686	2.020E+01	727	6.468E+00	768	1.487E+00
605	4.289E+01	646	4.014E+01	687	1.980E+01	728	6.336E+00	769	1.262E+00
606	4.339E+01	647	3.978E+01	688	1.933E+01	729	6.171E+00	770	1.166E+00
607	4.355E+01	648	3.951E+01	689	1.882E+01	730	6.063E+00	771	1.154E+00
608	4.380E+01	649	3.911E+01	690	1.841E+01	731	5.769E+00	772	1.201E+00
609	4.413E+01	650	3.860E+01	691	1.800E+01	732	5.615E+00	773	1.029E+00
610	4.442E+01	651	3.809E+01	692	1.758E+01	733	5.285E+00	774	1.038E+00
611	4.458E+01	652	3.779E+01	693	1.710E+01	734	5.150E+00	775	1.097E+00
612	4.473E+01	653	3.735E+01	694	1.669E+01	735	5.055E+00	776	9.780E-01
613	4.501E+01	654	3.688E+01	695	1.623E+01	736	4.752E+00	777	9.196E-01
614	4.498E+01	655	3.638E+01	696	1.587E+01	737	4.636E+00	778	8.409E-01
615	4.518E+01	656	3.594E+01	697	1.552E+01	738	4.434E+00	779	9.116E-01
616	4.523E+01	657	3.538E+01	698	1.506E+01	739	4.165E+00	780	7.496E-01
617	4.543E+01	658	3.478E+01	699	1.465E+01	740	4.051E+00		
618	4.553E+01	659	3.443E+01	700	1.422E+01	741	4.005E+00		
619	4.561E+01	660	3.394E+01	701	1.391E+01	742	3.869E+00		
620	4.552E+01	661	3.345E+01	702	1.357E+01	743	3.678E+00		
621	4.560E+01	662	3.277E+01	703	1.315E+01	744	3.349E+00		
622	4.555E+01	663	3.233E+01	704	1.285E+01	745	3.272E+00		
623	4.533E+01	664	3.169E+01	705	1.242E+01	746	3.109E+00		
624	4.551E+01	665	3.113E+01	706	1.213E+01	747	3.151E+00		
625	4.529E+01	666	3.062E+01	707	1.175E+01	748	3.004E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0hour**

Test orientation: **Downward**

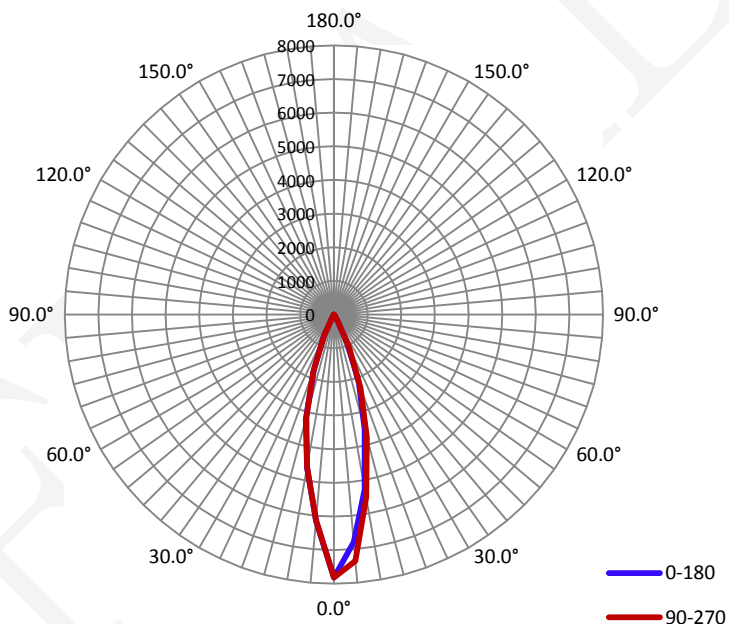
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2650	31.54	0.9920

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2106.3	66.83	7814.7	0.44	0.45

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	26.5	26.7	27.1	26.5	26.7
Field Angle(10% I_{max}):	51.1	54.9	51.1	55.2	53.1

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	7815	7815	7815	7815	7815	7815	7815	7815
5.0°	6788	7115	7300	7401	7348	7049	6690	6439
10.0°	5282	5323	5418	5563	5518	5399	5277	5023
15.0°	3532	3683	3810	3838	3776	3722	3555	3334
20.0°	2158	2324	2337	2357	2309	2314	2174	1999
25.0°	978	1131	1274	1136	1029	1093	1116	828
30.0°	273	520	650	522	230	501	562	294
35.0°	57	79	263	82	61	83	273	71
40.0°	18	28	53	32	24	28	37	22
45.0°	0	8	7	0	0	0	0	0
50.0°	0	0	0	0	0	0	0	0
55.0°	0	0	0	0	0	0	0	0
60.0°	0	0	0	0	0	0	0	0
65.0°	0	0	0	0	0	0	0	0
70.0°	0	0	0	0	0	0	0	0
75.0°	0	0	0	0	0	0	0	0
80.0°	0	0	0	0	0	0	0	0
85.0°	0	0	0	0	0	0	0	0
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

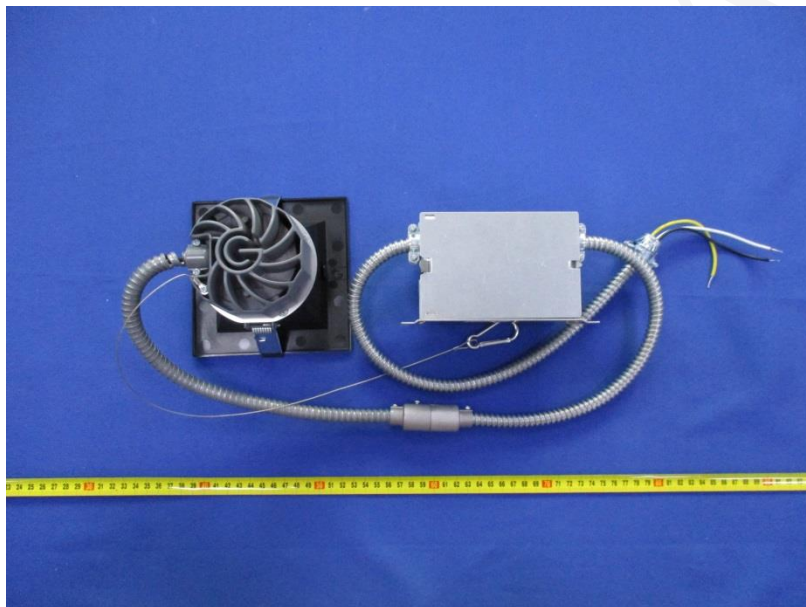
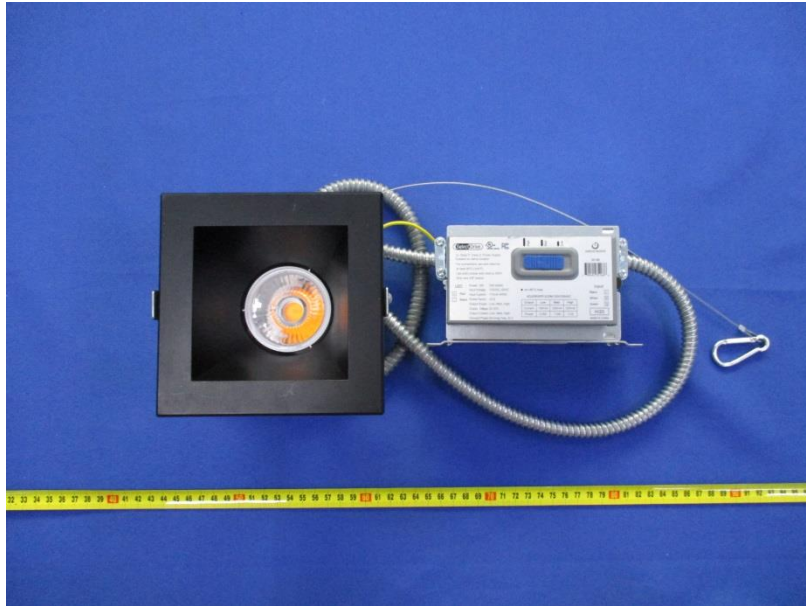
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	7815	7815	7815	7815	7815	7815	7815	7815
5.0°	6159	6050	6053	6089	6129	6098	6218	6305
10.0°	4615	4528	4486	4601	4604	4614	4667	4876
15.0°	3217	3119	3067	3098	3172	3143	3163	3244
20.0°	1721	1877	1833	1855	1817	1928	1967	2019
25.0°	727	748	886	702	667	761	994	936
30.0°	118	230	350	196	117	226	497	460
35.0°	38	50	118	50	45	56	220	74
40.0°	0	17	28	17	13	16	32	26
45.0°	0	0	0	0	0	0	0	0
50.0°	0	0	0	0	0	0	0	0
55.0°	0	0	0	0	0	0	0	0
60.0°	0	0	0	0	0	0	0	0
65.0°	0	0	0	0	0	0	0	0
70.0°	0	0	0	0	0	0	0	0
75.0°	0	0	0	0	0	0	0	0
80.0°	0	0	0	0	0	0	0	0
85.0°	0	0	0	0	0	0	0	0
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	172.0	8.17
5-10	413.7	19.64
10-15	497.8	23.63
15-20	450.5	21.39
20-25	314.6	14.94
25-30	164.1	7.79
30-35	67.8	3.22
35-40	20.9	0.99
40-45	4.7	0.22
45-50	0.2	0.01
50-55	0.0	0.00
55-60	0.0	0.00
60-65	0.0	0.00
65-70	0.0	0.00
70-75	0.0	0.00
75-80	0.0	0.00
80-85	0.0	0.00
85-90	0.0	0.00
90-95	0.0	0.00
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.00
115-120	0.0	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	0.00
135-140	0.0	0.00
140-145	0.0	0.00
145-150	0.0	0.00
150-155	0.0	0.00
155-160	0.0	0.00
160-165	0.0	0.00
165-170	0.0	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	172.0	8.17
0-10	585.7	27.81
0-15	1083.5	51.44
0-20	1534.0	72.83
0-25	1848.6	87.77
0-30	2012.8	95.56
0-35	2080.5	98.78
0-40	2101.4	99.77
0-45	2106.1	99.99
0-50	2106.3	100.00
0-55	2106.3	100.00
0-60	2106.3	100.00
0-65	2106.3	100.00
0-70	2106.3	100.00
0-75	2106.3	100.00
0-80	2106.3	100.00
0-85	2106.3	100.00
0-90	2106.3	100.00
0-95	2106.3	100.00
0-100	2106.3	100.00
0-105	2106.3	100.00
0-110	2106.3	100.00
0-115	2106.3	100.00
0-120	2106.3	100.00
0-125	2106.3	100.00
0-130	2106.3	100.00
0-135	2106.3	100.00
0-140	2106.3	100.00
0-145	2106.3	100.00
0-150	2106.3	100.00
0-155	2106.3	100.00
0-160	2106.3	100.00
0-165	2106.3	100.00
0-170	2106.3	100.00
0-175	2106.3	100.00
0-180	2106.3	100.00

6. Product Photo



Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
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*****END OF REPORT*****