ANSI/IES LM-79-19

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model:
NYXDM6RD/M9CCT5S/DUALDIM/MD/WBW

Report Type:	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution, THD
Reviewed By:	Hexy He
Report Number:	KS2230703-38016E-EE-1
Test Date:	2023-07-10 to 2023-07-11
Report Date:	2023-08-29
Approved by:	Blake Zhang / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China. Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility:	Test facility was located at No.12, Pulong East 1st Road, Tangtou Town, Dongguan, Guangdong, China.

1. Product Description#

General Information:

One test sample was in good condition and received on 2023-07-03, and used for testing.

Model Tested:	NYXDM6RD/M9CCT5S/DUALDIM/MD/WBW
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:	120-277 V AC 50/60Hz
Rated Power:	25W/30W/40W
Nominal CCT:	2700K/3000K/3500K/4000K/5000K
Nominal Lumen Output:	3800lm/3850lm/4000lm/4000lm/4000lm

2. Standards Used

- ANSI/IES LM-79-19: Approved method :Optical and Electrical Measurements of Solid-State Lighting Products
- ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- *IES TM-30-18: IES Method for Evaluating Light Source Color Rendition (This method is not in NVLAP accreditation scope)

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
1.5m temperature integrating sphere	SENSING	SPR-600	S09008	2022-11-10	2023-11-09
High-precision rapid spectral analysis system	EVERFINE	HAAS-2000	M112048CA1361125	2022-11-10	2023-11-09
Digital power meter	YOKOGAWA	WT310	13398	2022-11-10	2023-11-09
Programmable Precision DC Power Supply	EVERFINE	WY5015	11060010	2022-11-10	2023-11-09
thermometer	SENSING	NA	NA	2022-11-10	2023-11-09
Standard Light Source	EVERFINE	D204	N/A	2023-05-12	2025-05-11
Precision frequency power supply	ALL Power	APW-105N	970613	2022-11-10	2023-11-09
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2022-11-16	2023-11-15
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2022-11-10	2023-11-09
Digital power meter	YOKOGAWA	WT-210	91j926132	2022-11-10	2023-11-09
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2022-11-10	2023-11-09
wireless remote thermohygrometer	N/A	AOK-5017B	N/A	2022-11-10	2023-11-09
Standard Light Source	EVERFINE	D908	1012003	2023-05-12	2025-05-11

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) 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 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 is maintained between 10% and 65%.The air flow around the SSL product is less than 0.2m/s.

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=2.1% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=22K (K=2), at the 95% confidence level. The uncertainty of the CRI is U=2.1(K=2), at the 95% confidence level.

The uncertainty of power meter AC current U=0.39 % of rdg, AC Voltage U=0.25% of rdg, Power U=0.42%) (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. For luminous intensity distribution, The vertical angle (γ) test intervals were set no more than 2.5 degree ,The horizontal angle (C plane) test intervals were set no more than 22.5 degree. For color spatial uniformity, The vertical angle (γ) test intervals were set no more than 90 degree ,The horizontal angle (C plane) test intervals were set no more than 10 degree

The uncertainty of the luminous intensity is U=2.00% (K=2), at the 95% confidence level.

Additional Test

The Additional Test item may not be covered by ANSI/IES LM-79-2019. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at 25°C±1.2°C.Test voltage for THD and power factor test would be equal to rated voltage or, in case of a voltage range, maximum value of that range.

The uncertainty of power meter AC current U=0.19 % of rdg, AC Voltage U=0.15% of rdg, Power U=0.46%) (K=2), at the 95% confidence level.

Fidelity Index and Gamut Index 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. Test Result

[Integrating Sphere System]

The Stabilization time: **30 minutes**

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

Test orientation: **Downward**

Test CCT: 2700K

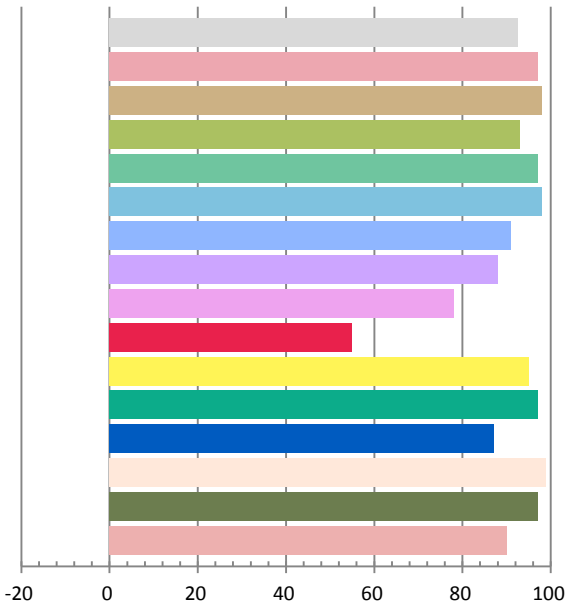
Photometric and Electrical Measurement Result

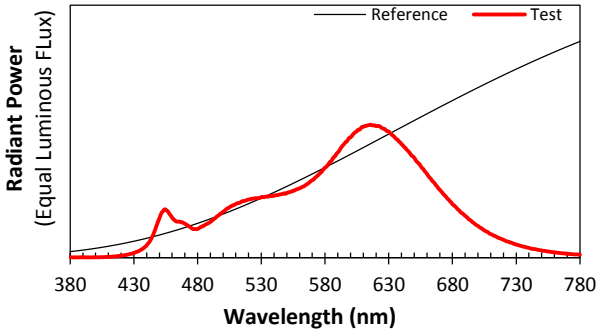
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.3167	37.50	0.9866	3823.0	101.94

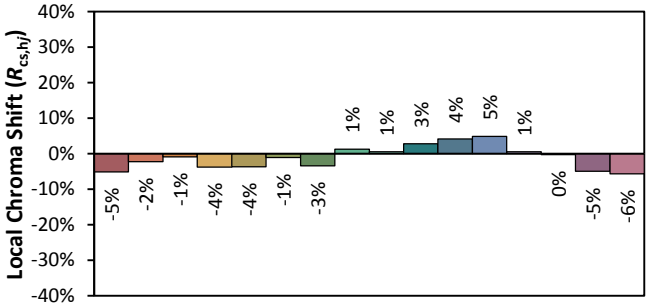
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
13.067	2702	-0.00129	0.4575	0.4066	0.2628	0.5255

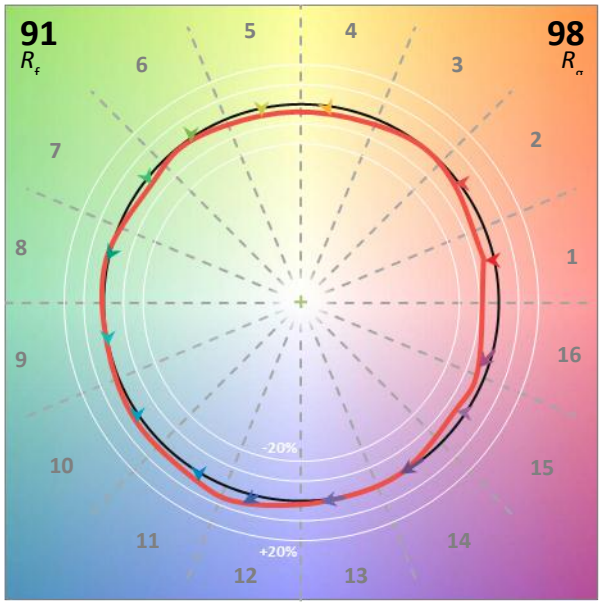
Color Rendering Index

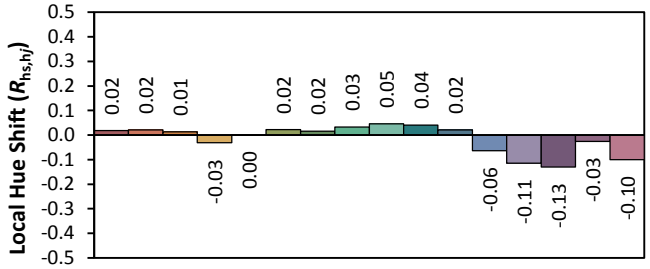
Ra			
92.6			
R1	R2	R3	R4
97	98	93	97
R5	R6	R7	R8
98	91	88	78
R9	R10	R11	R12
55	95	97	87
R13	R14	R15	
99	97	90	

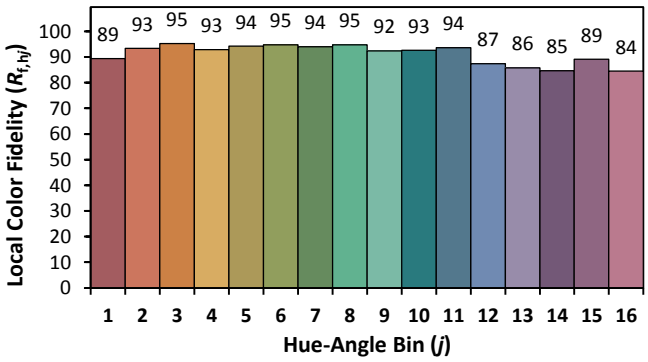


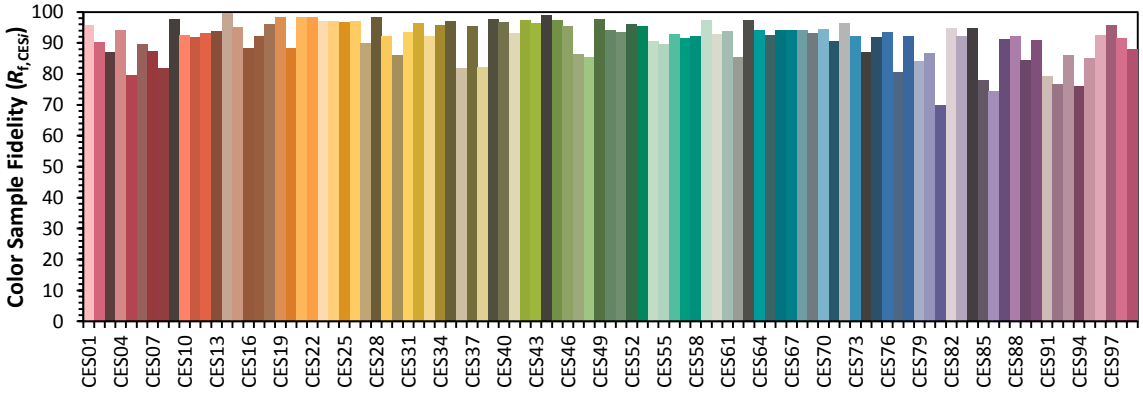

Reference
Test
Radiant Power
(Equal Luminous FLux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-5% -2% -1% -4% -4% -1% -3% 1% 1% 3% 4% 5% 1% 0% -5% -6%

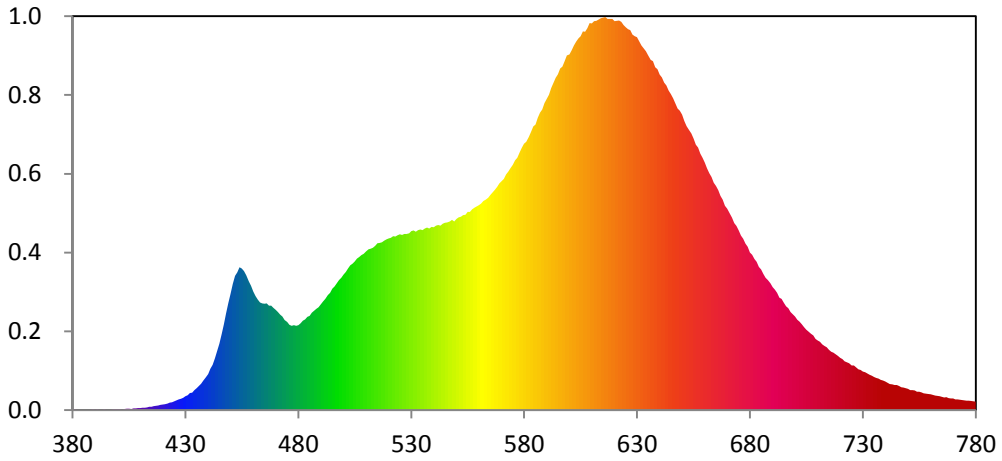

91
R_f
98
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


Local Hue Shift ($R_{hs,hj}$)
0.5 0.4 0.3 0.2 0.1 0.0 -0.1 -0.2 -0.3 -0.4 -0.5
0.02 0.02 0.01 -0.03 0.00 0.02 0.02 0.03 0.05 0.04 0.02 -0.06 -0.11 -0.13 -0.03 -0.10


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
89 93 95 93 94 95 94 95 92 93 94 87 86 85 89 84
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hue-Angle Bin (j)


Color Sample Fidelity ($R_{f,CESi}$)
100 90 80 70 60 50 40 30 20 10 0
CES01 CES04 CES07 CES10 CES13 CES16 CES19 CES22 CES25 CES28 CES31 CES34 CES37 CES40 CES43 CES46 CES49 CES52 CES55 CES58 CES61 CES64 CES67 CES70 CES73 CES76 CES79 CES82 CES85 CES88 CES91 CES94 CES97

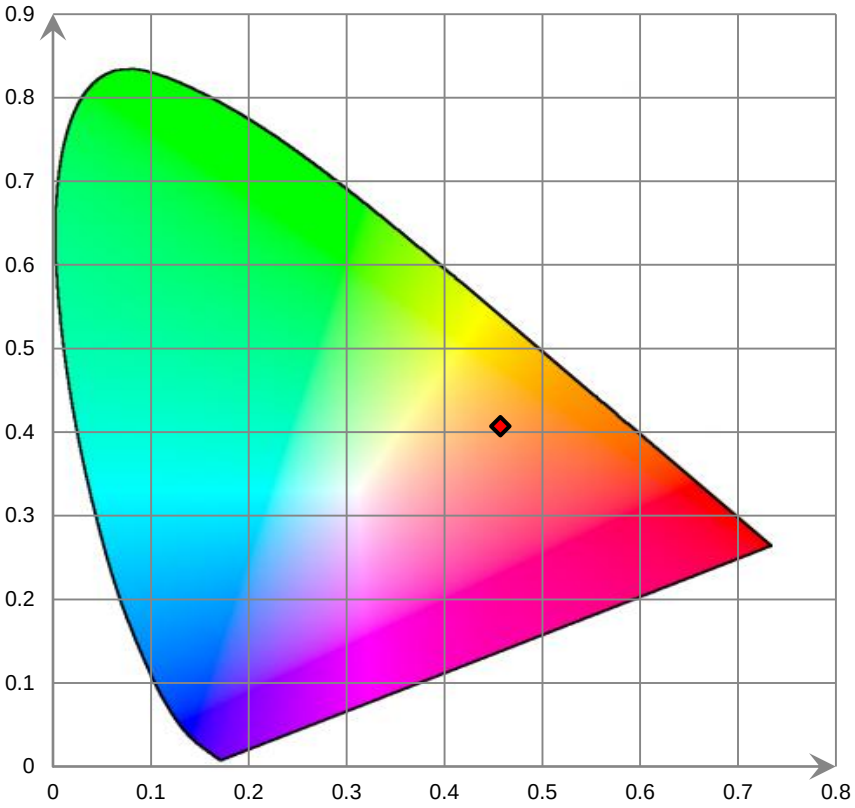
Relative Spectral Power Distribution



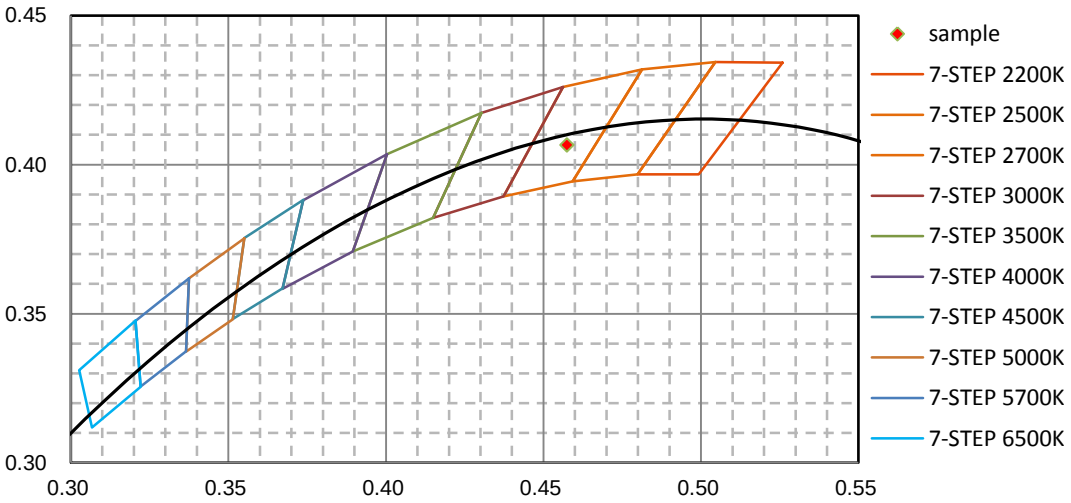
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.687E-01	421	1.317E+00	462	2.482E+01	503	3.249E+01	544	4.189E+01
381	1.952E-01	422	1.445E+00	463	2.417E+01	504	3.289E+01	545	4.204E+01
382	4.268E-02	423	1.637E+00	464	2.391E+01	505	3.338E+01	546	4.217E+01
383	1.581E-01	424	1.752E+00	465	2.387E+01	506	3.403E+01	547	4.235E+01
384	1.087E-01	425	1.924E+00	466	2.394E+01	507	3.439E+01	548	4.275E+01
385	1.211E-01	426	2.142E+00	467	2.345E+01	508	3.485E+01	549	4.239E+01
386	1.210E-01	427	2.343E+00	468	2.346E+01	509	3.511E+01	550	4.291E+01
387	1.435E-01	428	2.492E+00	469	2.293E+01	510	3.559E+01	551	4.327E+01
388	1.659E-01	429	2.753E+00	470	2.249E+01	511	3.610E+01	552	4.343E+01
389	2.117E-01	430	3.105E+00	471	2.203E+01	512	3.622E+01	553	4.379E+01
390	6.076E-02	431	3.264E+00	472	2.143E+01	513	3.643E+01	554	4.388E+01
391	1.904E-01	432	3.820E+00	473	2.097E+01	514	3.688E+01	555	4.452E+01
392	1.629E-01	433	3.897E+00	474	2.023E+01	515	3.746E+01	556	4.452E+01
393	5.667E-02	434	4.425E+00	475	1.976E+01	516	3.756E+01	557	4.509E+01
394	1.892E-01	435	4.879E+00	476	1.910E+01	517	3.771E+01	558	4.544E+01
395	8.664E-02	436	5.387E+00	477	1.891E+01	518	3.806E+01	559	4.576E+01
396	1.004E-01	437	5.900E+00	478	1.903E+01	519	3.835E+01	560	4.601E+01
397	1.216E-01	438	6.606E+00	479	1.888E+01	520	3.858E+01	561	4.642E+01
398	1.796E-01	439	7.248E+00	480	1.905E+01	521	3.868E+01	562	4.694E+01
399	1.759E-01	440	8.078E+00	481	1.946E+01	522	3.904E+01	563	4.722E+01
400	1.736E-01	441	9.256E+00	482	2.009E+01	523	3.901E+01	564	4.770E+01
401	1.926E-01	442	1.016E+01	483	2.038E+01	524	3.929E+01	565	4.837E+01
402	1.398E-01	443	1.156E+01	484	2.093E+01	525	3.946E+01	566	4.887E+01
403	1.940E-01	444	1.320E+01	485	2.118E+01	526	3.932E+01	567	4.950E+01
404	2.566E-01	445	1.490E+01	486	2.183E+01	527	3.957E+01	568	5.014E+01
405	2.883E-01	446	1.697E+01	487	2.226E+01	528	3.956E+01	569	5.095E+01
406	2.181E-01	447	1.923E+01	488	2.274E+01	529	3.968E+01	570	5.144E+01
407	3.295E-01	448	2.170E+01	489	2.308E+01	530	4.019E+01	571	5.189E+01
408	3.358E-01	449	2.400E+01	490	2.372E+01	531	4.032E+01	572	5.294E+01
409	4.229E-01	450	2.610E+01	491	2.436E+01	532	4.008E+01	573	5.360E+01
410	4.108E-01	451	2.832E+01	492	2.496E+01	533	4.042E+01	574	5.437E+01
411	4.801E-01	452	3.012E+01	493	2.580E+01	534	4.056E+01	575	5.512E+01
412	5.192E-01	453	3.092E+01	494	2.631E+01	535	4.043E+01	576	5.610E+01
413	5.908E-01	454	3.207E+01	495	2.728E+01	536	4.076E+01	577	5.670E+01
414	7.342E-01	455	3.181E+01	496	2.774E+01	537	4.103E+01	578	5.781E+01
415	7.096E-01	456	3.122E+01	497	2.844E+01	538	4.077E+01	579	5.888E+01
416	8.359E-01	457	3.027E+01	498	2.922E+01	539	4.115E+01	580	5.987E+01
417	9.282E-01	458	2.889E+01	499	2.969E+01	540	4.104E+01	581	6.031E+01
418	1.005E+00	459	2.787E+01	500	3.044E+01	541	4.145E+01	582	6.139E+01
419	1.142E+00	460	2.657E+01	501	3.099E+01	542	4.159E+01	583	6.248E+01
420	1.251E+00	461	2.557E+01	502	3.180E+01	543	4.142E+01	584	6.373E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.418E+01	626	8.563E+01	667	4.809E+01	708	1.676E+01	749	4.862E+00
586	6.569E+01	627	8.539E+01	668	4.726E+01	709	1.597E+01	750	4.752E+00
587	6.686E+01	628	8.440E+01	669	4.592E+01	710	1.561E+01	751	4.428E+00
588	6.753E+01	629	8.403E+01	670	4.522E+01	711	1.528E+01	752	4.451E+00
589	6.899E+01	630	8.377E+01	671	4.413E+01	712	1.475E+01	753	4.372E+00
590	6.989E+01	631	8.284E+01	672	4.322E+01	713	1.440E+01	754	4.076E+00
591	7.086E+01	632	8.196E+01	673	4.199E+01	714	1.407E+01	755	4.067E+00
592	7.233E+01	633	8.128E+01	674	4.133E+01	715	1.349E+01	756	3.912E+00
593	7.352E+01	634	8.060E+01	675	4.032E+01	716	1.312E+01	757	3.709E+00
594	7.465E+01	635	7.970E+01	676	3.922E+01	717	1.287E+01	758	3.689E+00
595	7.546E+01	636	7.870E+01	677	3.851E+01	718	1.251E+01	759	3.584E+00
596	7.673E+01	637	7.838E+01	678	3.740E+01	719	1.218E+01	760	3.503E+00
597	7.717E+01	638	7.706E+01	679	3.668E+01	720	1.174E+01	761	3.364E+00
598	7.839E+01	639	7.658E+01	680	3.542E+01	721	1.143E+01	762	3.248E+00
599	7.967E+01	640	7.536E+01	681	3.485E+01	722	1.091E+01	763	3.123E+00
600	7.991E+01	641	7.475E+01	682	3.398E+01	723	1.071E+01	764	3.058E+00
601	8.082E+01	642	7.359E+01	683	3.328E+01	724	1.052E+01	765	2.952E+00
602	8.196E+01	643	7.293E+01	684	3.218E+01	725	1.001E+01	766	2.789E+00
603	8.281E+01	644	7.180E+01	685	3.157E+01	726	9.959E+00	767	2.843E+00
604	8.349E+01	645	7.101E+01	686	3.053E+01	727	9.576E+00	768	2.647E+00
605	8.403E+01	646	7.006E+01	687	2.973E+01	728	9.129E+00	769	2.607E+00
606	8.506E+01	647	6.890E+01	688	2.922E+01	729	8.981E+00	770	2.596E+00
607	8.504E+01	648	6.773E+01	689	2.851E+01	730	8.625E+00	771	2.397E+00
608	8.579E+01	649	6.726E+01	690	2.765E+01	731	8.450E+00	772	2.353E+00
609	8.693E+01	650	6.637E+01	691	2.706E+01	732	8.171E+00	773	2.316E+00
610	8.687E+01	651	6.496E+01	692	2.632E+01	733	7.895E+00	774	2.236E+00
611	8.742E+01	652	6.379E+01	693	2.524E+01	734	7.692E+00	775	2.127E+00
612	8.750E+01	653	6.302E+01	694	2.493E+01	735	7.379E+00	776	2.045E+00
613	8.778E+01	654	6.215E+01	695	2.408E+01	736	7.206E+00	777	2.098E+00
614	8.801E+01	655	6.099E+01	696	2.333E+01	737	7.062E+00	778	2.029E+00
615	8.816E+01	656	5.964E+01	697	2.284E+01	738	6.716E+00	779	1.940E+00
616	8.835E+01	657	5.901E+01	698	2.201E+01	739	6.629E+00	780	1.884E+00
617	8.790E+01	658	5.763E+01	699	2.147E+01	740	6.373E+00		
618	8.792E+01	659	5.670E+01	700	2.103E+01	741	6.130E+00		
619	8.787E+01	660	5.558E+01	701	2.027E+01	742	5.830E+00		
620	8.737E+01	661	5.429E+01	702	1.983E+01	743	5.775E+00		
621	8.748E+01	662	5.323E+01	703	1.930E+01	744	5.566E+00		
622	8.751E+01	663	5.239E+01	704	1.862E+01	745	5.570E+00		
623	8.722E+01	664	5.109E+01	705	1.802E+01	746	5.353E+00		
624	8.650E+01	665	5.034E+01	706	1.760E+01	747	5.111E+00		
625	8.601E+01	666	4.939E+01	707	1.715E+01	748	4.995E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



Test CCT: 3000K

Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.1	60	0.3112	36.86	0.9866	3948.8	107.13

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
13.529	2937	-0.00326	0.4366	0.3959	0.2540	0.5181

Color Rendering Index

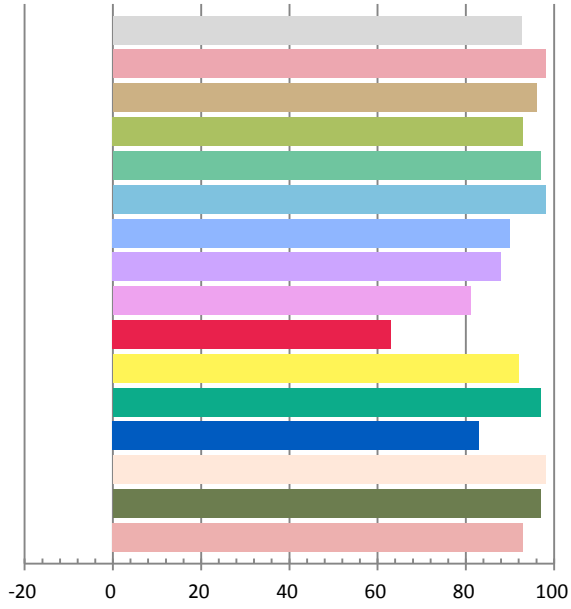
Ra
92.7

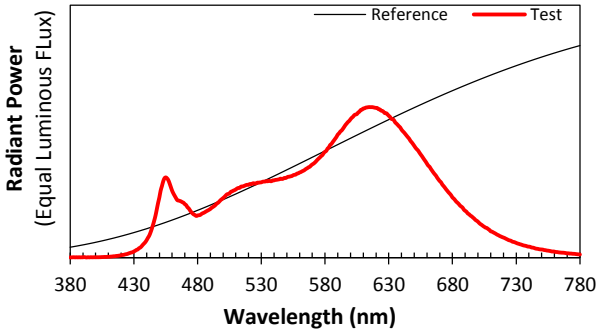
R1	R2	R3	R4
98	96	93	97

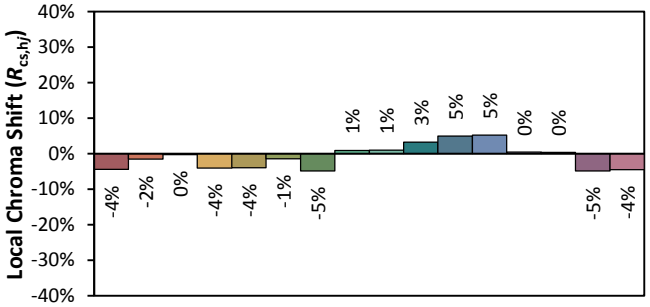
R5	R6	R7	R8
98	90	88	81

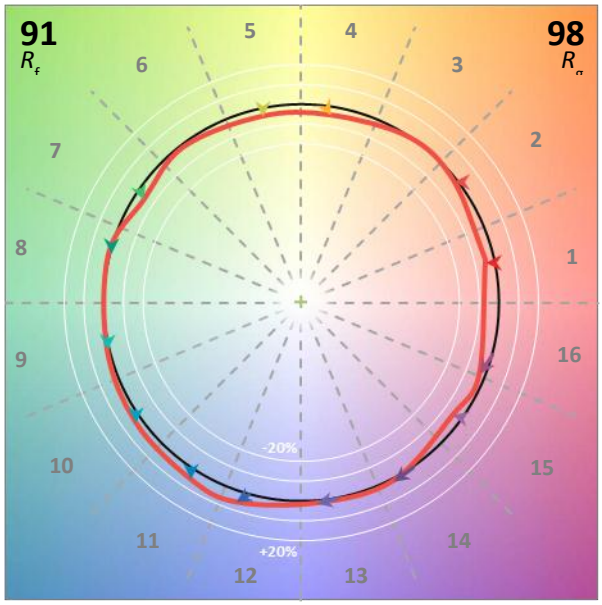
R9	R10	R11	R12
63	92	97	83

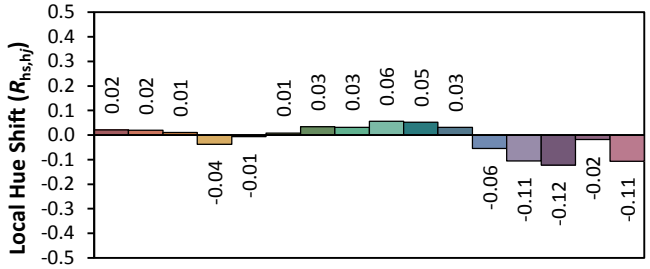
R13	R14	R15
98	97	93

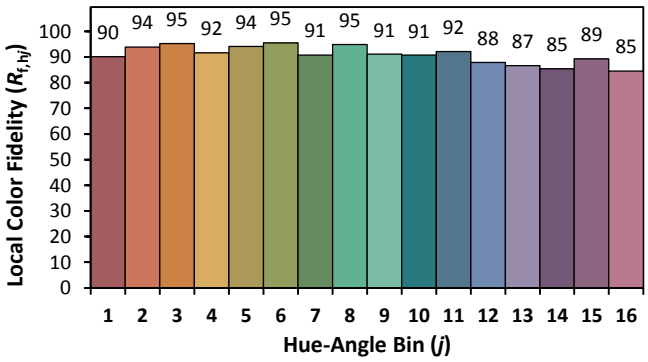


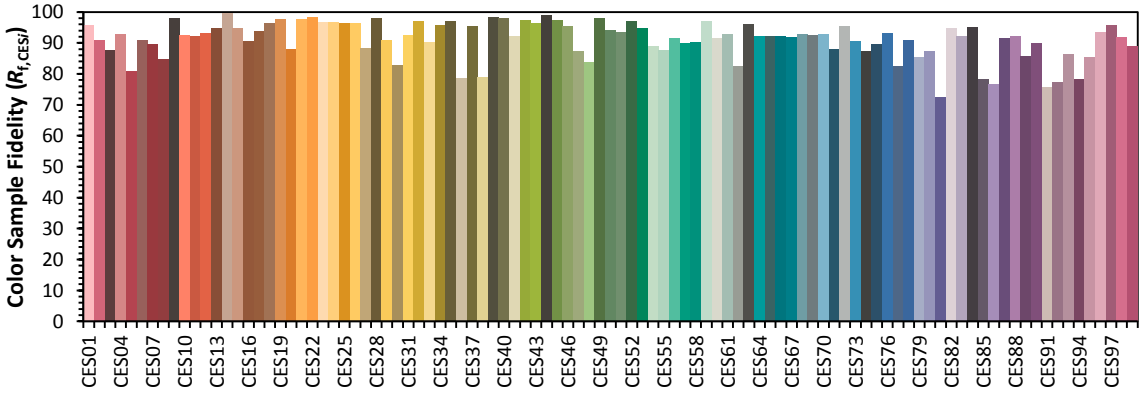

Reference
Test
Radiant Power
(Equal Luminous FLux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-4% -2% 0% -4% -4% -1% -5% 1% 1% 3% 5% 5% 0% 0% -5% -4%

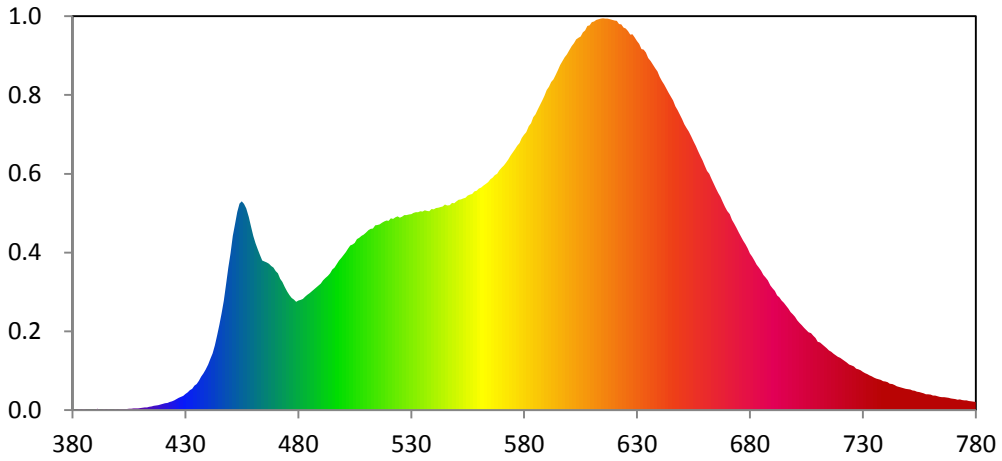

91
R_f
98
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


Local Hue Shift ($R_{hs,hj}$)
0.5 0.4 0.3 0.2 0.1 0.0 -0.1 -0.2 -0.3 -0.4 -0.5
0.02 0.02 0.01 -0.04 -0.01 0.01 0.03 0.03 0.06 0.05 0.03 -0.06 -0.11 -0.12 -0.02 -0.11


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
90 94 95 92 94 95 91 95 91 91 92 88 87 85 89 85
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hue-Angle Bin (j)


Color Sample Fidelity ($R_{f,CESi}$)
100 90 80 70 60 50 40 30 20 10 0
CES01 CES04 CES07 CES10 CES13 CES16 CES19 CES22 CES25 CES28 CES31 CES34 CES37 CES40 CES43 CES46 CES49 CES52 CES55 CES58 CES61 CES64 CES67 CES70 CES73 CES76 CES79 CES82 CES85 CES88 CES91 CES94 CES97

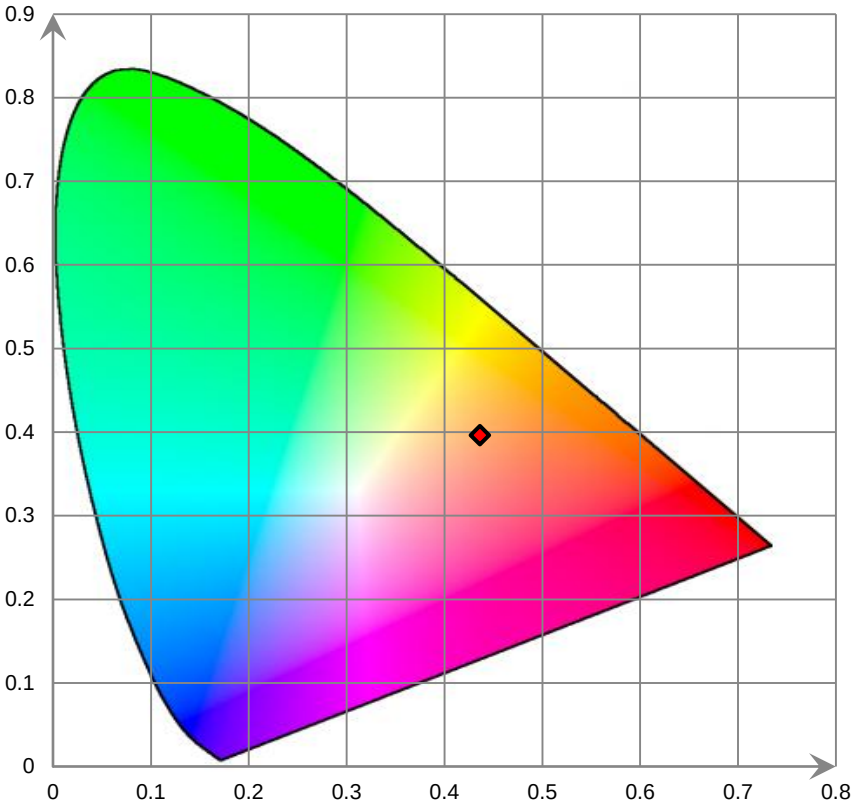
Relative Spectral Power Distribution



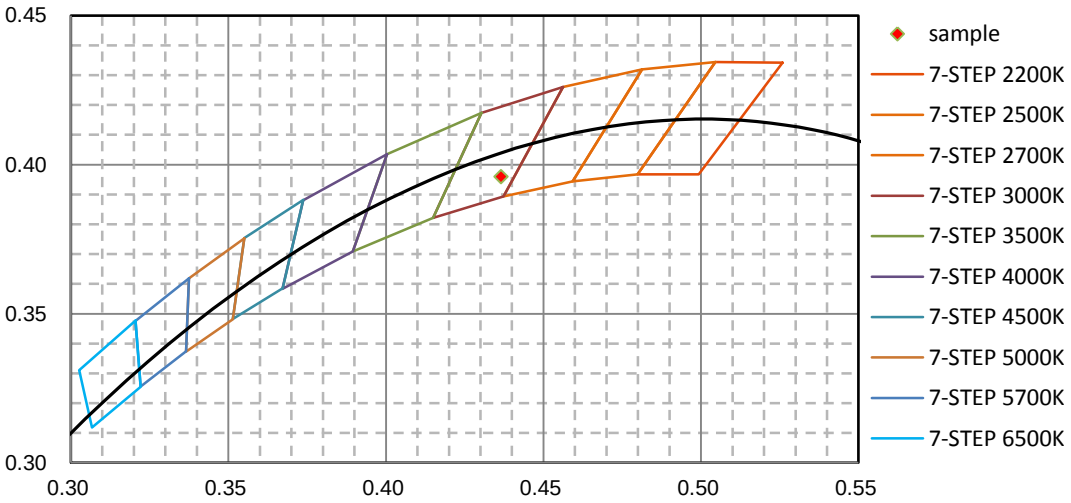
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	9.898E-02	421	1.487E+00	462	3.537E+01	503	3.617E+01	544	4.477E+01
381	9.422E-02	422	1.547E+00	463	3.409E+01	504	3.640E+01	545	4.518E+01
382	1.511E-01	423	1.771E+00	464	3.288E+01	505	3.672E+01	546	4.501E+01
383	1.735E-01	424	1.927E+00	465	3.264E+01	506	3.759E+01	547	4.508E+01
384	1.114E-01	425	2.088E+00	466	3.243E+01	507	3.786E+01	548	4.557E+01
385	1.701E-01	426	2.410E+00	467	3.214E+01	508	3.828E+01	549	4.550E+01
386	1.012E-01	427	2.637E+00	468	3.169E+01	509	3.859E+01	550	4.587E+01
387	1.687E-01	428	2.895E+00	469	3.134E+01	510	3.900E+01	551	4.622E+01
388	1.111E-01	429	3.060E+00	470	3.054E+01	511	3.954E+01	552	4.629E+01
389	1.474E-01	430	3.493E+00	471	3.002E+01	512	3.983E+01	553	4.652E+01
390	1.372E-01	431	3.856E+00	472	2.883E+01	513	3.989E+01	554	4.667E+01
391	2.578E-01	432	4.367E+00	473	2.816E+01	514	4.059E+01	555	4.713E+01
392	1.280E-01	433	4.634E+00	474	2.706E+01	515	4.069E+01	556	4.735E+01
393	5.207E-02	434	5.330E+00	475	2.603E+01	516	4.086E+01	557	4.749E+01
394	1.776E-01	435	5.714E+00	476	2.528E+01	517	4.116E+01	558	4.808E+01
395	9.036E-02	436	6.408E+00	477	2.466E+01	518	4.148E+01	559	4.821E+01
396	1.785E-01	437	7.284E+00	478	2.429E+01	519	4.166E+01	560	4.868E+01
397	1.492E-01	438	8.052E+00	479	2.377E+01	520	4.162E+01	561	4.893E+01
398	1.482E-01	439	8.862E+00	480	2.409E+01	521	4.213E+01	562	4.937E+01
399	1.856E-01	440	9.972E+00	481	2.423E+01	522	4.201E+01	563	4.970E+01
400	1.567E-01	441	1.127E+01	482	2.438E+01	523	4.235E+01	564	5.013E+01
401	1.781E-01	442	1.246E+01	483	2.493E+01	524	4.255E+01	565	5.072E+01
402	1.691E-01	443	1.424E+01	484	2.536E+01	525	4.227E+01	566	5.111E+01
403	2.036E-01	444	1.637E+01	485	2.567E+01	526	4.254E+01	567	5.165E+01
404	2.118E-01	445	1.869E+01	486	2.610E+01	527	4.288E+01	568	5.198E+01
405	2.697E-01	446	2.125E+01	487	2.656E+01	528	4.287E+01	569	5.270E+01
406	2.928E-01	447	2.410E+01	488	2.694E+01	529	4.299E+01	570	5.331E+01
407	3.481E-01	448	2.768E+01	489	2.735E+01	530	4.305E+01	571	5.376E+01
408	3.401E-01	449	3.129E+01	490	2.782E+01	531	4.339E+01	572	5.439E+01
409	3.631E-01	450	3.447E+01	491	2.848E+01	532	4.348E+01	573	5.514E+01
410	4.369E-01	451	3.831E+01	492	2.896E+01	533	4.353E+01	574	5.596E+01
411	4.567E-01	452	4.087E+01	493	2.947E+01	534	4.374E+01	575	5.667E+01
412	5.484E-01	453	4.359E+01	494	3.007E+01	535	4.365E+01	576	5.736E+01
413	5.911E-01	454	4.537E+01	495	3.089E+01	536	4.391E+01	577	5.812E+01
414	7.210E-01	455	4.587E+01	496	3.133E+01	537	4.375E+01	578	5.872E+01
415	7.388E-01	456	4.536E+01	497	3.206E+01	538	4.370E+01	579	5.983E+01
416	8.858E-01	457	4.434E+01	498	3.283E+01	539	4.418E+01	580	6.057E+01
417	9.533E-01	458	4.247E+01	499	3.343E+01	540	4.416E+01	581	6.109E+01
418	1.051E+00	459	4.033E+01	500	3.404E+01	541	4.444E+01	582	6.241E+01
419	1.170E+00	460	3.828E+01	501	3.469E+01	542	4.449E+01	583	6.307E+01
420	1.313E+00	461	3.670E+01	502	3.545E+01	543	4.465E+01	584	6.442E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.503E+01	626	8.338E+01	667	4.690E+01	708	1.630E+01	749	4.673E+00
586	6.608E+01	627	8.259E+01	668	4.572E+01	709	1.580E+01	750	4.605E+00
587	6.707E+01	628	8.267E+01	669	4.472E+01	710	1.503E+01	751	4.519E+00
588	6.806E+01	629	8.195E+01	670	4.377E+01	711	1.482E+01	752	4.279E+00
589	6.910E+01	630	8.116E+01	671	4.307E+01	712	1.440E+01	753	4.212E+00
590	7.040E+01	631	8.050E+01	672	4.180E+01	713	1.402E+01	754	4.014E+00
591	7.112E+01	632	7.937E+01	673	4.096E+01	714	1.361E+01	755	3.947E+00
592	7.214E+01	633	7.923E+01	674	4.005E+01	715	1.312E+01	756	3.813E+00
593	7.273E+01	634	7.865E+01	675	3.904E+01	716	1.281E+01	757	3.675E+00
594	7.368E+01	635	7.742E+01	676	3.815E+01	717	1.236E+01	758	3.472E+00
595	7.476E+01	636	7.672E+01	677	3.724E+01	718	1.204E+01	759	3.476E+00
596	7.587E+01	637	7.596E+01	678	3.649E+01	719	1.171E+01	760	3.389E+00
597	7.673E+01	638	7.515E+01	679	3.557E+01	720	1.144E+01	761	3.173E+00
598	7.760E+01	639	7.445E+01	680	3.439E+01	721	1.114E+01	762	3.160E+00
599	7.823E+01	640	7.325E+01	681	3.375E+01	722	1.074E+01	763	3.009E+00
600	7.920E+01	641	7.234E+01	682	3.290E+01	723	1.040E+01	764	2.910E+00
601	8.003E+01	642	7.160E+01	683	3.198E+01	724	9.995E+00	765	2.833E+00
602	8.064E+01	643	7.069E+01	684	3.134E+01	725	9.787E+00	766	2.785E+00
603	8.153E+01	644	6.978E+01	685	3.059E+01	726	9.563E+00	767	2.761E+00
604	8.189E+01	645	6.889E+01	686	2.970E+01	727	9.078E+00	768	2.671E+00
605	8.213E+01	646	6.804E+01	687	2.915E+01	728	8.934E+00	769	2.542E+00
606	8.305E+01	647	6.682E+01	688	2.851E+01	729	8.695E+00	770	2.422E+00
607	8.352E+01	648	6.596E+01	689	2.738E+01	730	8.381E+00	771	2.419E+00
608	8.449E+01	649	6.498E+01	690	2.674E+01	731	8.065E+00	772	2.269E+00
609	8.464E+01	650	6.395E+01	691	2.619E+01	732	7.858E+00	773	2.285E+00
610	8.533E+01	651	6.286E+01	692	2.523E+01	733	7.610E+00	774	2.176E+00
611	8.542E+01	652	6.200E+01	693	2.481E+01	734	7.408E+00	775	2.135E+00
612	8.584E+01	653	6.125E+01	694	2.406E+01	735	7.128E+00	776	2.094E+00
613	8.595E+01	654	6.014E+01	695	2.360E+01	736	6.903E+00	777	1.973E+00
614	8.609E+01	655	5.907E+01	696	2.293E+01	737	6.766E+00	778	1.891E+00
615	8.613E+01	656	5.808E+01	697	2.233E+01	738	6.583E+00	779	1.800E+00
616	8.609E+01	657	5.697E+01	698	2.154E+01	739	6.308E+00	780	1.747E+00
617	8.611E+01	658	5.589E+01	699	2.107E+01	740	6.245E+00		
618	8.597E+01	659	5.490E+01	700	2.050E+01	741	6.104E+00		
619	8.579E+01	660	5.371E+01	701	1.972E+01	742	5.772E+00		
620	8.566E+01	661	5.261E+01	702	1.913E+01	743	5.679E+00		
621	8.561E+01	662	5.198E+01	703	1.865E+01	744	5.498E+00		
622	8.488E+01	663	5.079E+01	704	1.806E+01	745	5.209E+00		
623	8.482E+01	664	4.975E+01	705	1.758E+01	746	5.050E+00		
624	8.409E+01	665	4.870E+01	706	1.710E+01	747	4.958E+00		
625	8.392E+01	666	4.775E+01	707	1.690E+01	748	4.762E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



Test CCT: 3500K

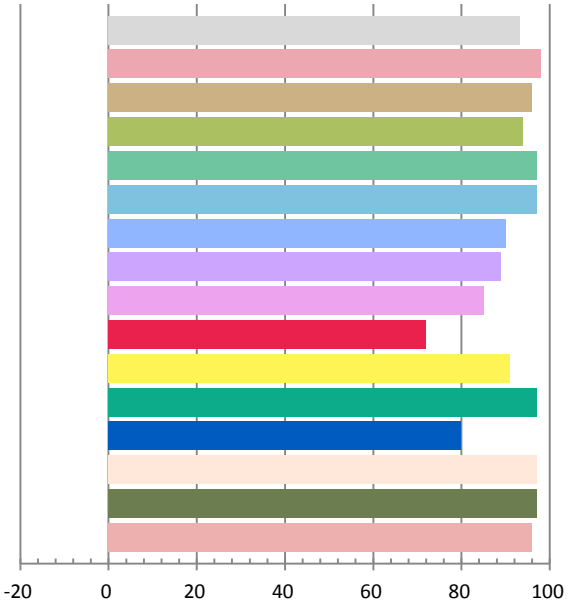
Photometric and Electrical Measurement Result

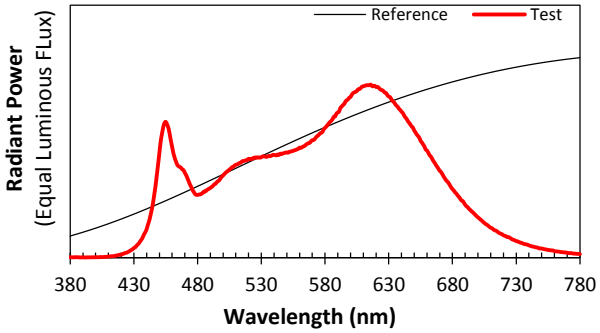
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.1	60	0.3055	36.17	0.9861	4108.9	113.6

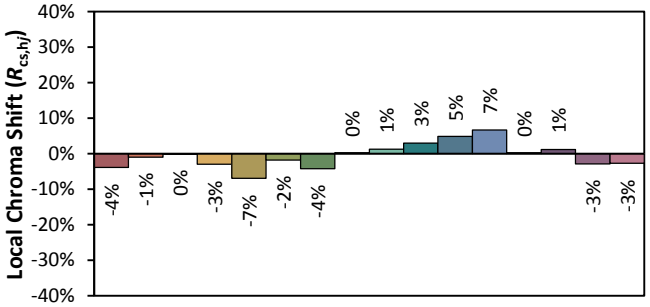
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
14.079	3338	-0.00439	0.4097	0.3829	0.2419	0.5086

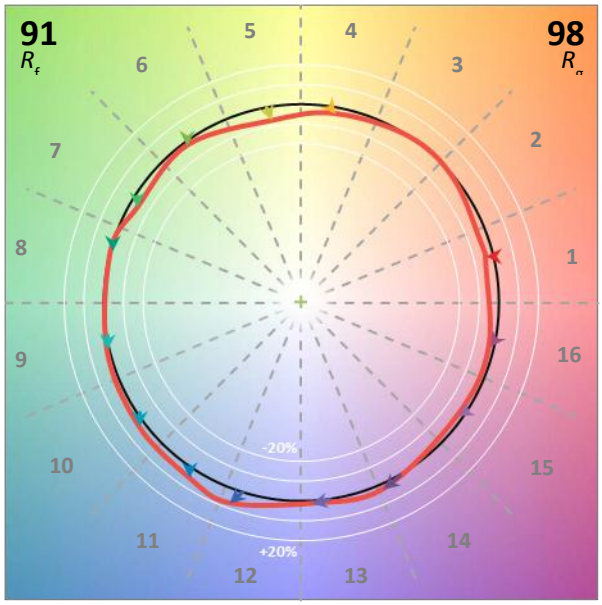
Color Rendering Index

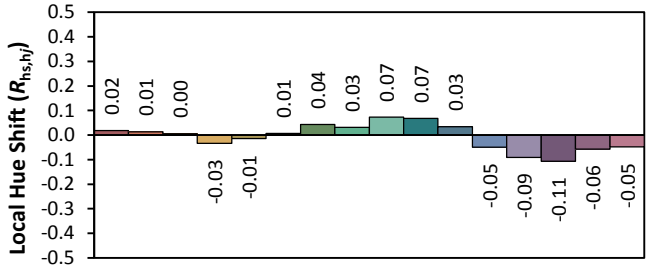
Ra			
93.2			
R1	R2	R3	R4
98	96	94	97
R5	R6	R7	R8
97	90	89	85
R9	R10	R11	R12
72	91	97	80
R13	R14	R15	
97	97	96	

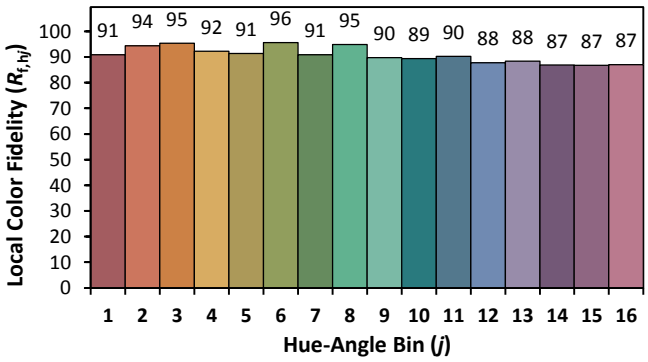


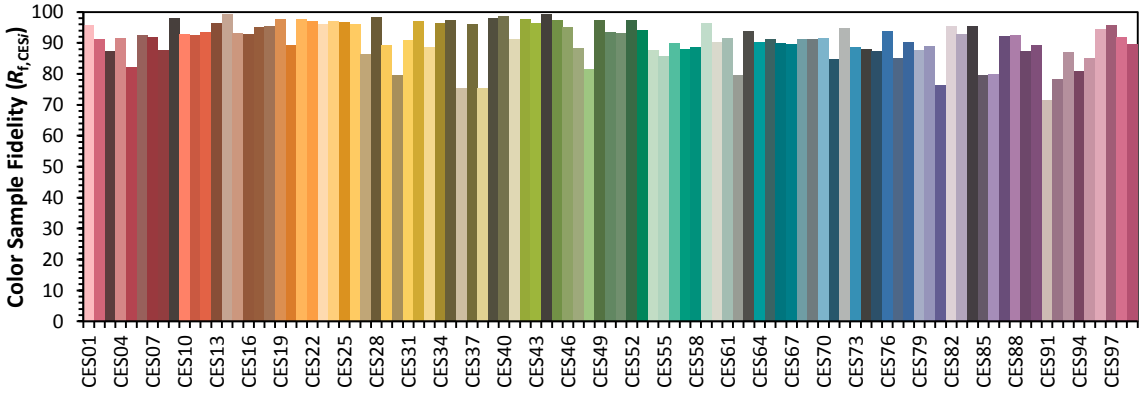

Reference
Test
Radiant Power
(Equal Luminous FLux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-4% -1% 0% -3% -7% -2% -4% 0% 1% 3% 5% 7% 0% 1% -3% -3%

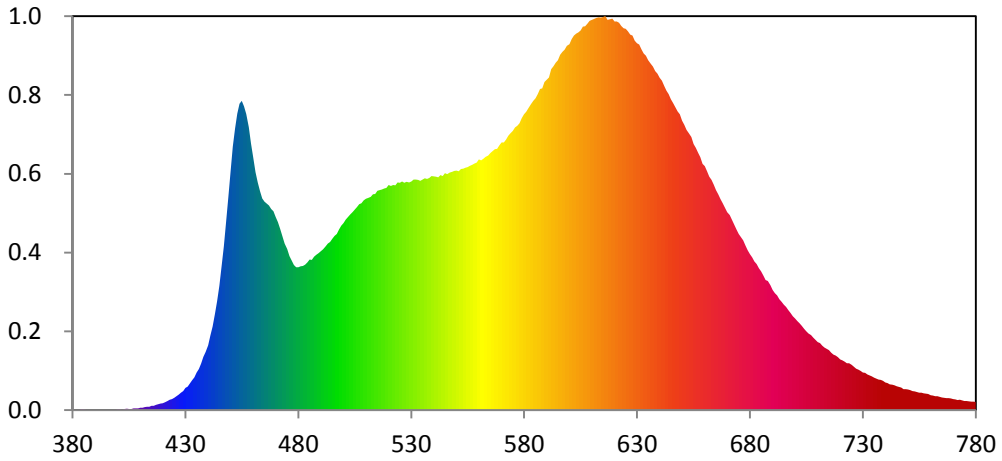

91
R_f
98
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


Local Hue Shift ($R_{hs,hj}$)
0.5 0.4 0.3 0.2 0.1 0.0 -0.1 -0.2 -0.3 -0.4 -0.5
0.02 0.01 0.00 -0.03 -0.01 0.01 0.04 0.03 0.07 0.07 0.03 -0.05 -0.09 -0.11 -0.06 -0.05


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
91 94 95 92 91 96 91 95 90 89 90 88 88 87 87 87
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hue-Angle Bin (j)


Color Sample Fidelity ($R_{f,CESi}$)
100 90 80 70 60 50 40 30 20 10 0
CES01 CES04 CES07 CES10 CES13 CES16 CES19 CES22 CES25 CES28 CES31 CES34 CES37 CES40 CES43 CES46 CES49 CES52 CES55 CES58 CES61 CES64 CES67 CES70 CES73 CES76 CES79 CES82 CES85 CES88 CES91 CES94 CES97

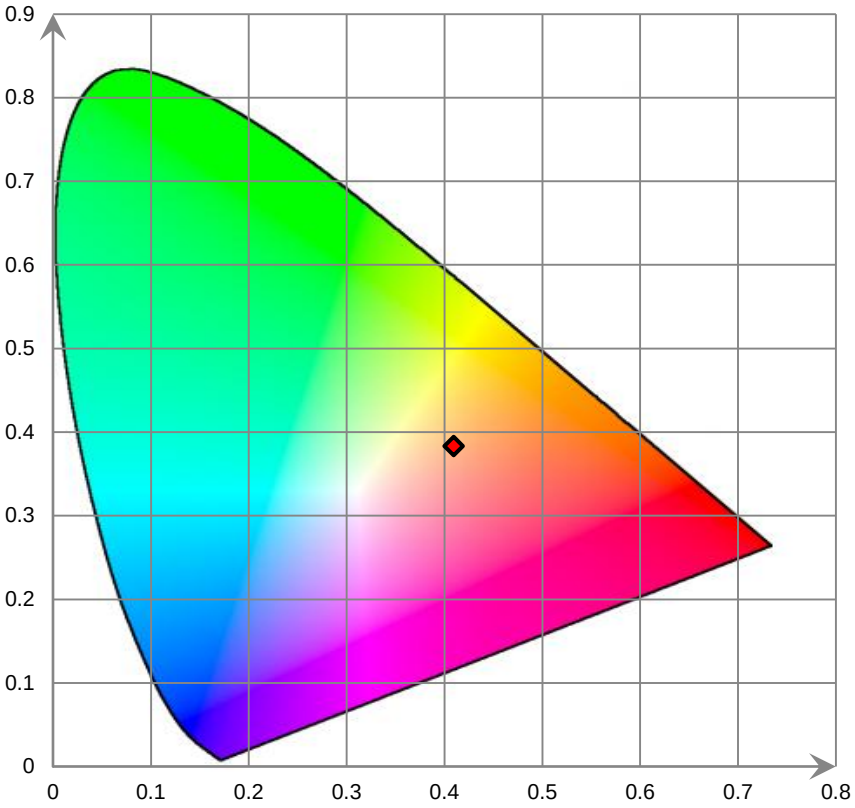
Relative Spectral Power Distribution



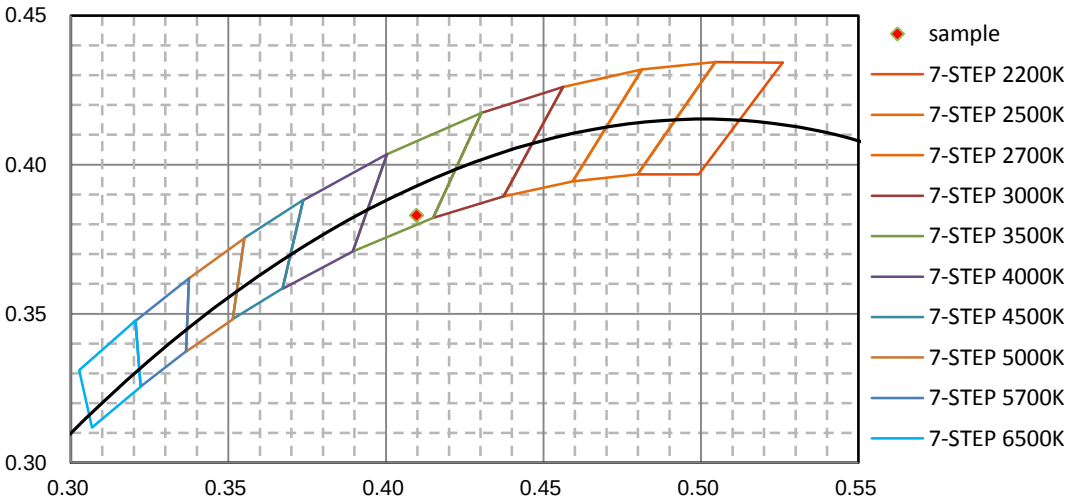
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.897E-01	421	1.628E+00	462	4.757E+01	503	4.093E+01	544	4.891E+01
381	1.338E-01	422	1.874E+00	463	4.579E+01	504	4.137E+01	545	4.951E+01
382	1.280E-01	423	2.139E+00	464	4.424E+01	505	4.188E+01	546	4.935E+01
383	7.746E-02	424	2.267E+00	465	4.356E+01	506	4.246E+01	547	4.965E+01
384	1.830E-01	425	2.527E+00	466	4.319E+01	507	4.304E+01	548	4.978E+01
385	1.649E-01	426	2.846E+00	467	4.275E+01	508	4.325E+01	549	5.001E+01
386	1.304E-01	427	3.236E+00	468	4.204E+01	509	4.387E+01	550	5.006E+01
387	1.211E-01	428	3.617E+00	469	4.159E+01	510	4.419E+01	551	4.993E+01
388	2.667E-02	429	3.956E+00	470	4.036E+01	511	4.441E+01	552	5.043E+01
389	1.201E-01	430	4.577E+00	471	3.926E+01	512	4.462E+01	553	5.046E+01
390	4.117E-02	431	4.873E+00	472	3.786E+01	513	4.514E+01	554	5.070E+01
391	1.084E-01	432	5.551E+00	473	3.635E+01	514	4.520E+01	555	5.083E+01
392	1.082E-02	433	6.236E+00	474	3.481E+01	515	4.589E+01	556	5.111E+01
393	9.466E-02	434	6.824E+00	475	3.365E+01	516	4.599E+01	557	5.129E+01
394	1.204E-01	435	7.825E+00	476	3.220E+01	517	4.613E+01	558	5.158E+01
395	8.980E-02	436	8.585E+00	477	3.123E+01	518	4.635E+01	559	5.177E+01
396	9.202E-02	437	9.691E+00	478	3.030E+01	519	4.645E+01	560	5.239E+01
397	9.899E-02	438	1.109E+01	479	2.986E+01	520	4.707E+01	561	5.224E+01
398	1.430E-01	439	1.211E+01	480	2.987E+01	521	4.684E+01	562	5.258E+01
399	1.140E-01	440	1.355E+01	481	3.003E+01	522	4.706E+01	563	5.294E+01
400	1.676E-01	441	1.562E+01	482	3.013E+01	523	4.699E+01	564	5.319E+01
401	1.657E-01	442	1.747E+01	483	3.039E+01	524	4.760E+01	565	5.377E+01
402	1.462E-01	443	2.004E+01	484	3.084E+01	525	4.752E+01	566	5.417E+01
403	1.874E-01	444	2.274E+01	485	3.149E+01	526	4.778E+01	567	5.453E+01
404	2.713E-01	445	2.595E+01	486	3.141E+01	527	4.755E+01	568	5.465E+01
405	1.982E-01	446	3.006E+01	487	3.203E+01	528	4.773E+01	569	5.538E+01
406	2.226E-01	447	3.422E+01	488	3.244E+01	529	4.761E+01	570	5.594E+01
407	2.957E-01	448	3.931E+01	489	3.278E+01	530	4.780E+01	571	5.597E+01
408	3.448E-01	449	4.447E+01	490	3.319E+01	531	4.819E+01	572	5.657E+01
409	3.311E-01	450	4.980E+01	491	3.362E+01	532	4.819E+01	573	5.736E+01
410	4.675E-01	451	5.512E+01	492	3.415E+01	533	4.810E+01	574	5.792E+01
411	4.983E-01	452	5.882E+01	493	3.479E+01	534	4.796E+01	575	5.840E+01
412	6.120E-01	453	6.202E+01	494	3.514E+01	535	4.820E+01	576	5.913E+01
413	6.476E-01	454	6.408E+01	495	3.584E+01	536	4.844E+01	577	5.941E+01
414	6.688E-01	455	6.468E+01	496	3.641E+01	537	4.832E+01	578	5.995E+01
415	8.287E-01	456	6.350E+01	497	3.685E+01	538	4.856E+01	579	6.107E+01
416	8.791E-01	457	6.195E+01	498	3.777E+01	539	4.892E+01	580	6.184E+01
417	1.035E+00	458	5.916E+01	499	3.854E+01	540	4.889E+01	581	6.239E+01
418	1.210E+00	459	5.571E+01	500	3.911E+01	541	4.881E+01	582	6.325E+01
419	1.345E+00	460	5.277E+01	501	3.982E+01	542	4.869E+01	583	6.397E+01
420	1.391E+00	461	4.975E+01	502	4.040E+01	543	4.913E+01	584	6.468E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.520E+01	626	7.919E+01	667	4.412E+01	708	1.515E+01	749	4.363E+00
586	6.609E+01	627	7.855E+01	668	4.322E+01	709	1.464E+01	750	4.285E+00
587	6.717E+01	628	7.834E+01	669	4.228E+01	710	1.420E+01	751	4.181E+00
588	6.727E+01	629	7.728E+01	670	4.135E+01	711	1.396E+01	752	3.966E+00
589	6.863E+01	630	7.673E+01	671	4.075E+01	712	1.346E+01	753	3.900E+00
590	6.912E+01	631	7.645E+01	672	3.978E+01	713	1.303E+01	754	3.775E+00
591	6.956E+01	632	7.547E+01	673	3.872E+01	714	1.281E+01	755	3.618E+00
592	7.127E+01	633	7.457E+01	674	3.776E+01	715	1.248E+01	756	3.584E+00
593	7.190E+01	634	7.410E+01	675	3.683E+01	716	1.197E+01	757	3.454E+00
594	7.266E+01	635	7.319E+01	676	3.618E+01	717	1.155E+01	758	3.396E+00
595	7.315E+01	636	7.241E+01	677	3.546E+01	718	1.136E+01	759	3.348E+00
596	7.432E+01	637	7.184E+01	678	3.443E+01	719	1.105E+01	760	3.046E+00
597	7.494E+01	638	7.090E+01	679	3.342E+01	720	1.057E+01	761	2.972E+00
598	7.535E+01	639	7.033E+01	680	3.261E+01	721	1.038E+01	762	2.902E+00
599	7.616E+01	640	6.951E+01	681	3.196E+01	722	1.012E+01	763	2.856E+00
600	7.653E+01	641	6.890E+01	682	3.107E+01	723	9.762E+00	764	2.753E+00
601	7.761E+01	642	6.778E+01	683	3.050E+01	724	9.760E+00	765	2.631E+00
602	7.835E+01	643	6.678E+01	684	2.963E+01	725	9.428E+00	766	2.565E+00
603	7.870E+01	644	6.610E+01	685	2.896E+01	726	9.008E+00	767	2.490E+00
604	7.900E+01	645	6.500E+01	686	2.812E+01	727	8.623E+00	768	2.455E+00
605	7.938E+01	646	6.421E+01	687	2.721E+01	728	8.406E+00	769	2.425E+00
606	8.020E+01	647	6.333E+01	688	2.699E+01	729	8.188E+00	770	2.277E+00
607	8.028E+01	648	6.245E+01	689	2.610E+01	730	7.835E+00	771	2.176E+00
608	8.080E+01	649	6.186E+01	690	2.512E+01	731	7.744E+00	772	2.083E+00
609	8.141E+01	650	6.053E+01	691	2.443E+01	732	7.411E+00	773	2.151E+00
610	8.162E+01	651	5.963E+01	692	2.395E+01	733	7.200E+00	774	1.997E+00
611	8.180E+01	652	5.860E+01	693	2.319E+01	734	6.993E+00	775	1.884E+00
612	8.201E+01	653	5.790E+01	694	2.264E+01	735	6.769E+00	776	1.851E+00
613	8.215E+01	654	5.708E+01	695	2.202E+01	736	6.534E+00	777	1.814E+00
614	8.209E+01	655	5.560E+01	696	2.154E+01	737	6.348E+00	778	1.747E+00
615	8.223E+01	656	5.485E+01	697	2.090E+01	738	6.258E+00	779	1.719E+00
616	8.239E+01	657	5.384E+01	698	2.031E+01	739	6.117E+00	780	1.650E+00
617	8.159E+01	658	5.291E+01	699	1.963E+01	740	5.783E+00		
618	8.177E+01	659	5.148E+01	700	1.916E+01	741	5.595E+00		
619	8.185E+01	660	5.099E+01	701	1.863E+01	742	5.356E+00		
620	8.125E+01	661	4.997E+01	702	1.811E+01	743	5.262E+00		
621	8.129E+01	662	4.881E+01	703	1.758E+01	744	5.125E+00		
622	8.103E+01	663	4.815E+01	704	1.700E+01	745	4.919E+00		
623	8.031E+01	664	4.715E+01	705	1.648E+01	746	4.820E+00		
624	7.989E+01	665	4.600E+01	706	1.597E+01	747	4.710E+00		
625	7.972E+01	666	4.515E+01	707	1.567E+01	748	4.335E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



Test CCT: 4000K

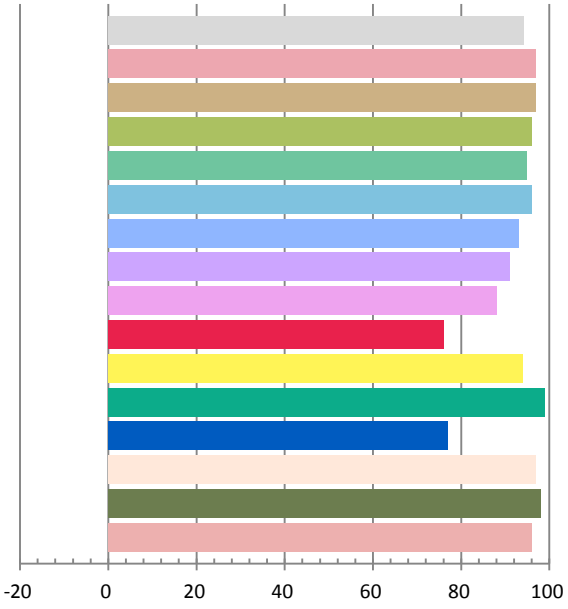
Photometric and Electrical Measurement Result

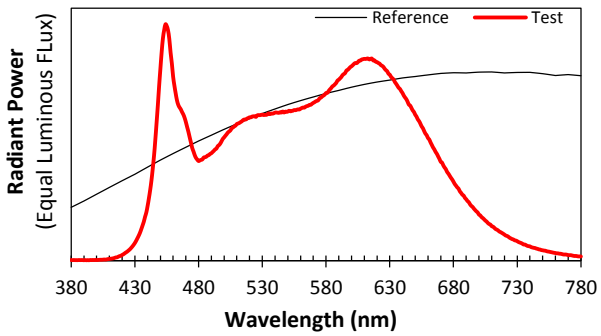
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.3072	36.37	0.9863	4206.2	115.65

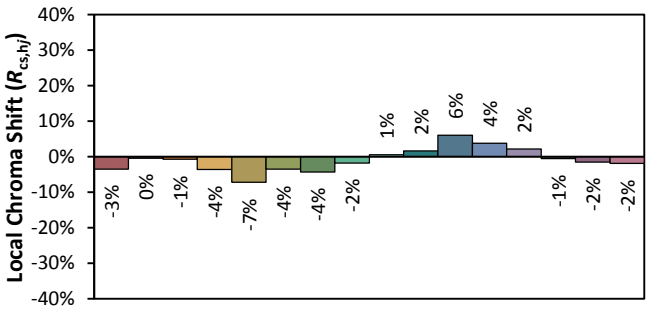
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
14.375	4031	-0.00316	0.3769	0.3679	0.2263	0.4971

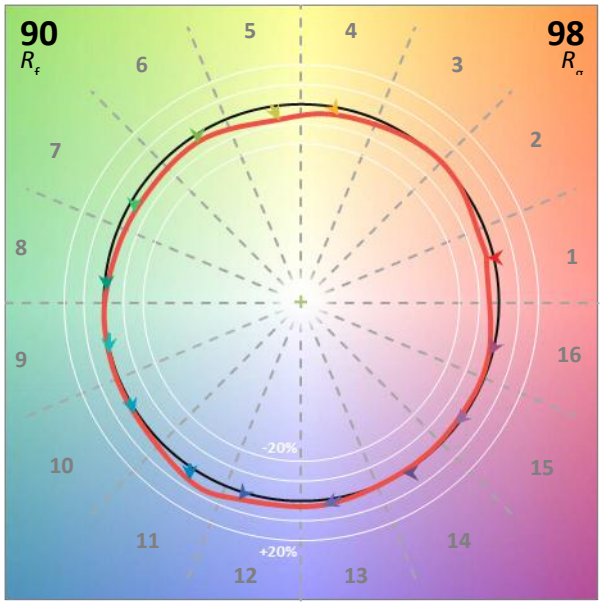
Color Rendering Index

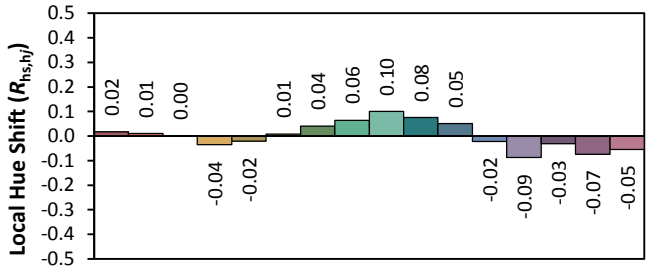
Ra			
94.1			
R1	R2	R3	R4
97	97	96	95
R5	R6	R7	R8
96	93	91	88
R9	R10	R11	R12
76	94	99	77
R13	R14	R15	
97	98	96	

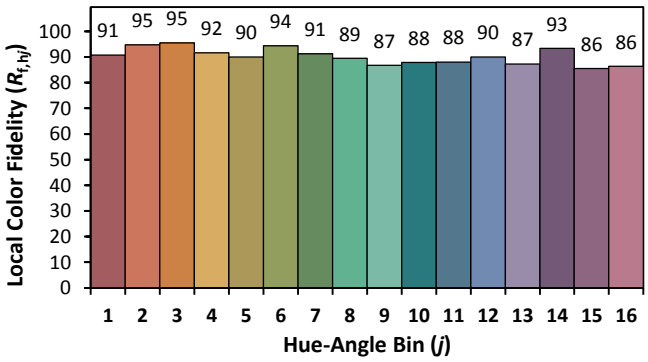


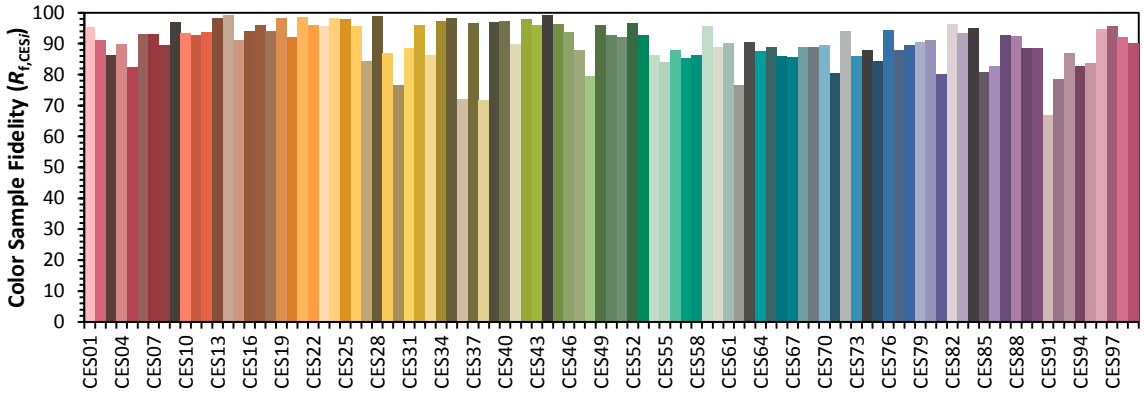

Reference
Test
Radiant Power
(Equal Luminous FLux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-3% 0% -1% -4% -7% -4% -4% -2% 1% 2% 6% 4% 2% -1% -2% -2%

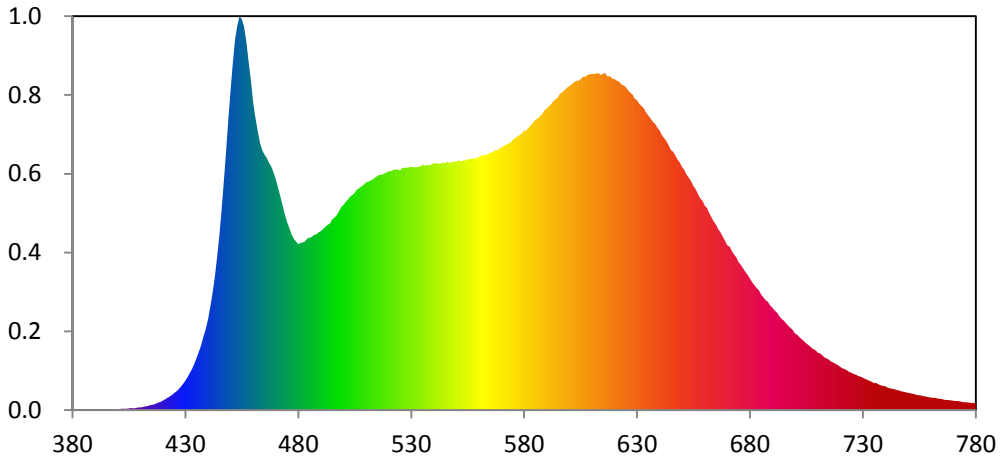

90
R_f
98
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


Local Hue Shift ($R_{hs,hj}$)
0.5 0.4 0.3 0.2 0.1 0.0 -0.1 -0.2 -0.3 -0.4 -0.5
0.02 0.01 0.00 -0.04 -0.02 0.01 0.04 0.06 0.10 0.08 0.05 -0.02 -0.09 -0.03 -0.07 -0.05


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
91 95 95 92 90 94 91 89 87 88 88 90 87 93 86 86
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hue-Angle Bin (j)


Color Sample Fidelity ($R_{f,CESi}$)
100 90 80 70 60 50 40 30 20 10 0
CES01 CES04 CES07 CES10 CES13 CES16 CES19 CES22 CES25 CES28 CES31 CES34 CES37 CES40 CES43 CES46 CES49 CES52 CES55 CES58 CES61 CES64 CES67 CES70 CES73 CES76 CES79 CES82 CES85 CES88 CES91 CES94 CES97

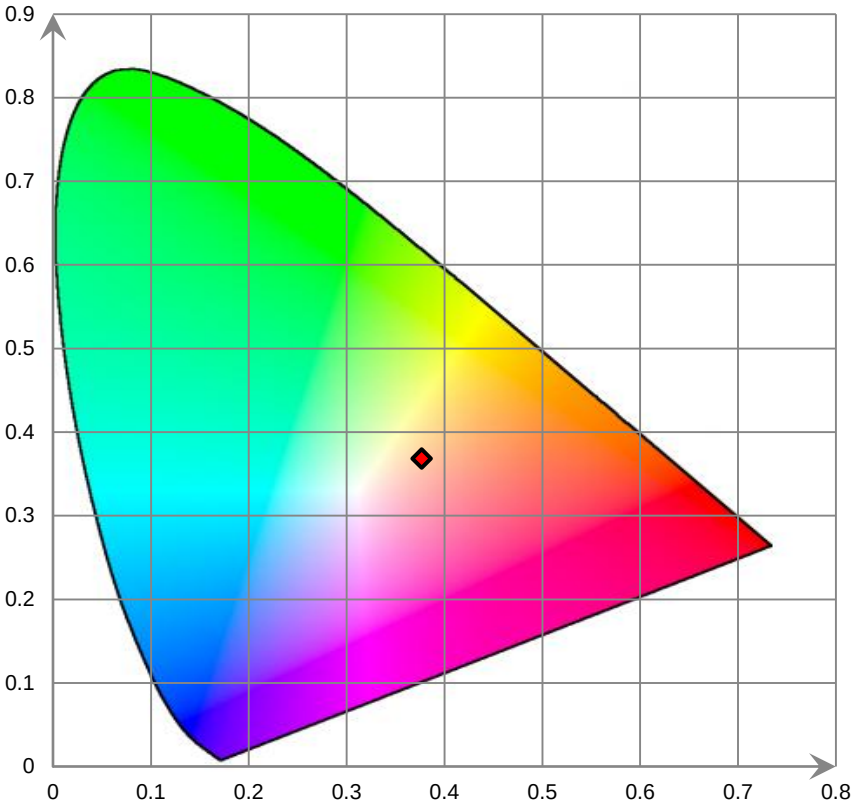
Relative Spectral Power Distribution



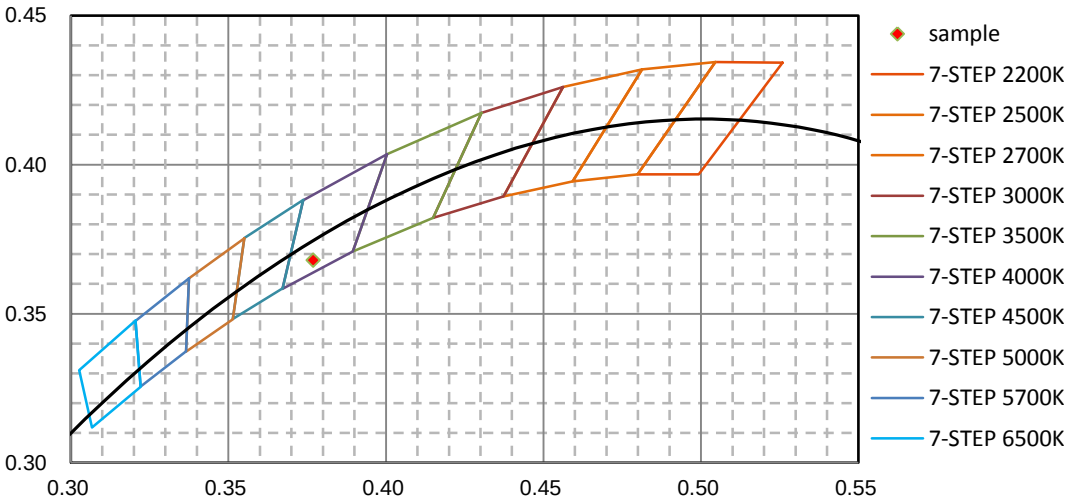
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.088E-01	421	2.302E+00	462	6.119E+01	503	4.684E+01	544	5.429E+01
381	1.424E-01	422	2.646E+00	463	5.866E+01	504	4.723E+01	545	5.413E+01
382	1.890E-01	423	2.968E+00	464	5.701E+01	505	4.765E+01	546	5.453E+01
383	1.501E-01	424	3.282E+00	465	5.607E+01	506	4.839E+01	547	5.416E+01
384	1.527E-01	425	3.681E+00	466	5.536E+01	507	4.870E+01	548	5.449E+01
385	1.354E-01	426	4.087E+00	467	5.433E+01	508	4.908E+01	549	5.441E+01
386	1.876E-01	427	4.583E+00	468	5.345E+01	509	4.939E+01	550	5.450E+01
387	1.584E-01	428	5.128E+00	469	5.223E+01	510	4.995E+01	551	5.481E+01
388	1.796E-01	429	5.744E+00	470	5.068E+01	511	5.014E+01	552	5.458E+01
389	1.625E-01	430	6.427E+00	471	4.886E+01	512	5.035E+01	553	5.473E+01
390	1.223E-01	431	7.253E+00	472	4.709E+01	513	5.067E+01	554	5.481E+01
391	1.693E-01	432	8.143E+00	473	4.507E+01	514	5.097E+01	555	5.507E+01
392	1.041E-01	433	9.089E+00	474	4.311E+01	515	5.141E+01	556	5.500E+01
393	1.547E-01	434	1.016E+01	475	4.118E+01	516	5.160E+01	557	5.516E+01
394	1.082E-01	435	1.144E+01	476	3.989E+01	517	5.160E+01	558	5.531E+01
395	1.934E-01	436	1.281E+01	477	3.851E+01	518	5.194E+01	559	5.525E+01
396	1.686E-01	437	1.419E+01	478	3.751E+01	519	5.215E+01	560	5.555E+01
397	2.048E-01	438	1.602E+01	479	3.692E+01	520	5.240E+01	561	5.581E+01
398	1.759E-01	439	1.763E+01	480	3.639E+01	521	5.239E+01	562	5.598E+01
399	2.241E-01	440	2.005E+01	481	3.665E+01	522	5.268E+01	563	5.594E+01
400	1.746E-01	441	2.276E+01	482	3.683E+01	523	5.276E+01	564	5.630E+01
401	2.128E-01	442	2.578E+01	483	3.702E+01	524	5.279E+01	565	5.651E+01
402	2.520E-01	443	2.930E+01	484	3.768E+01	525	5.255E+01	566	5.663E+01
403	2.865E-01	444	3.357E+01	485	3.781E+01	526	5.311E+01	567	5.696E+01
404	2.868E-01	445	3.829E+01	486	3.798E+01	527	5.321E+01	568	5.698E+01
405	3.264E-01	446	4.391E+01	487	3.841E+01	528	5.318E+01	569	5.736E+01
406	3.831E-01	447	5.021E+01	488	3.858E+01	529	5.327E+01	570	5.768E+01
407	3.392E-01	448	5.670E+01	489	3.900E+01	530	5.340E+01	571	5.794E+01
408	4.328E-01	449	6.377E+01	490	3.926E+01	531	5.323E+01	572	5.827E+01
409	5.445E-01	450	7.011E+01	491	3.972E+01	532	5.331E+01	573	5.844E+01
410	5.804E-01	451	7.617E+01	492	4.016E+01	533	5.330E+01	574	5.870E+01
411	6.597E-01	452	8.128E+01	493	4.069E+01	534	5.349E+01	575	5.938E+01
412	7.308E-01	453	8.435E+01	494	4.097E+01	535	5.386E+01	576	5.961E+01
413	8.221E-01	454	8.643E+01	495	4.184E+01	536	5.357E+01	577	6.006E+01
414	9.589E-01	455	8.578E+01	496	4.223E+01	537	5.380E+01	578	6.036E+01
415	1.128E+00	456	8.425E+01	497	4.280E+01	538	5.375E+01	579	6.072E+01
416	1.189E+00	457	8.110E+01	498	4.363E+01	539	5.388E+01	580	6.129E+01
417	1.414E+00	458	7.614E+01	499	4.450E+01	540	5.414E+01	581	6.135E+01
418	1.625E+00	459	7.213E+01	500	4.505E+01	541	5.416E+01	582	6.201E+01
419	1.752E+00	460	6.732E+01	501	4.565E+01	542	5.409E+01	583	6.260E+01
420	2.049E+00	461	6.404E+01	502	4.621E+01	543	5.404E+01	584	6.309E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.372E+01	626	7.018E+01	667	3.901E+01	708	1.336E+01	749	3.827E+00
586	6.403E+01	627	6.965E+01	668	3.807E+01	709	1.314E+01	750	3.752E+00
587	6.451E+01	628	6.924E+01	669	3.718E+01	710	1.256E+01	751	3.648E+00
588	6.501E+01	629	6.835E+01	670	3.614E+01	711	1.240E+01	752	3.599E+00
589	6.584E+01	630	6.800E+01	671	3.583E+01	712	1.200E+01	753	3.436E+00
590	6.617E+01	631	6.722E+01	672	3.484E+01	713	1.154E+01	754	3.315E+00
591	6.667E+01	632	6.672E+01	673	3.406E+01	714	1.131E+01	755	3.245E+00
592	6.716E+01	633	6.625E+01	674	3.343E+01	715	1.102E+01	756	3.136E+00
593	6.786E+01	634	6.532E+01	675	3.242E+01	716	1.061E+01	757	3.033E+00
594	6.824E+01	635	6.468E+01	676	3.180E+01	717	1.038E+01	758	2.929E+00
595	6.862E+01	636	6.395E+01	677	3.104E+01	718	1.010E+01	759	2.831E+00
596	6.950E+01	637	6.320E+01	678	3.029E+01	719	9.808E+00	760	2.749E+00
597	6.977E+01	638	6.277E+01	679	2.964E+01	720	9.493E+00	761	2.642E+00
598	7.024E+01	639	6.196E+01	680	2.884E+01	721	9.151E+00	762	2.631E+00
599	7.075E+01	640	6.130E+01	681	2.799E+01	722	9.000E+00	763	2.517E+00
600	7.108E+01	641	6.037E+01	682	2.739E+01	723	8.732E+00	764	2.484E+00
601	7.150E+01	642	5.966E+01	683	2.675E+01	724	8.348E+00	765	2.384E+00
602	7.196E+01	643	5.902E+01	684	2.627E+01	725	8.110E+00	766	2.248E+00
603	7.228E+01	644	5.809E+01	685	2.532E+01	726	7.853E+00	767	2.200E+00
604	7.220E+01	645	5.705E+01	686	2.474E+01	727	7.711E+00	768	2.208E+00
605	7.262E+01	646	5.670E+01	687	2.407E+01	728	7.406E+00	769	2.124E+00
606	7.312E+01	647	5.583E+01	688	2.375E+01	729	7.301E+00	770	2.004E+00
607	7.316E+01	648	5.493E+01	689	2.292E+01	730	7.081E+00	771	1.961E+00
608	7.355E+01	649	5.433E+01	690	2.242E+01	731	6.787E+00	772	1.967E+00
609	7.366E+01	650	5.335E+01	691	2.177E+01	732	6.593E+00	773	1.862E+00
610	7.379E+01	651	5.266E+01	692	2.136E+01	733	6.416E+00	774	1.750E+00
611	7.374E+01	652	5.165E+01	693	2.058E+01	734	6.182E+00	775	1.665E+00
612	7.387E+01	653	5.100E+01	694	2.000E+01	735	5.869E+00	776	1.677E+00
613	7.391E+01	654	5.011E+01	695	1.961E+01	736	5.859E+00	777	1.603E+00
614	7.356E+01	655	4.910E+01	696	1.900E+01	737	5.613E+00	778	1.508E+00
615	7.380E+01	656	4.842E+01	697	1.848E+01	738	5.367E+00	779	1.511E+00
616	7.390E+01	657	4.737E+01	698	1.798E+01	739	5.264E+00	780	1.484E+00
617	7.319E+01	658	4.642E+01	699	1.758E+01	740	5.177E+00		
618	7.325E+01	659	4.584E+01	700	1.681E+01	741	4.906E+00		
619	7.272E+01	660	4.482E+01	701	1.652E+01	742	4.771E+00		
620	7.261E+01	661	4.429E+01	702	1.592E+01	743	4.646E+00		
621	7.227E+01	662	4.322E+01	703	1.555E+01	744	4.581E+00		
622	7.205E+01	663	4.230E+01	704	1.510E+01	745	4.386E+00		
623	7.152E+01	664	4.137E+01	705	1.462E+01	746	4.277E+00		
624	7.124E+01	665	4.064E+01	706	1.426E+01	747	4.088E+00		
625	7.085E+01	666	3.972E+01	707	1.374E+01	748	4.011E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



Test CCT: 5000K

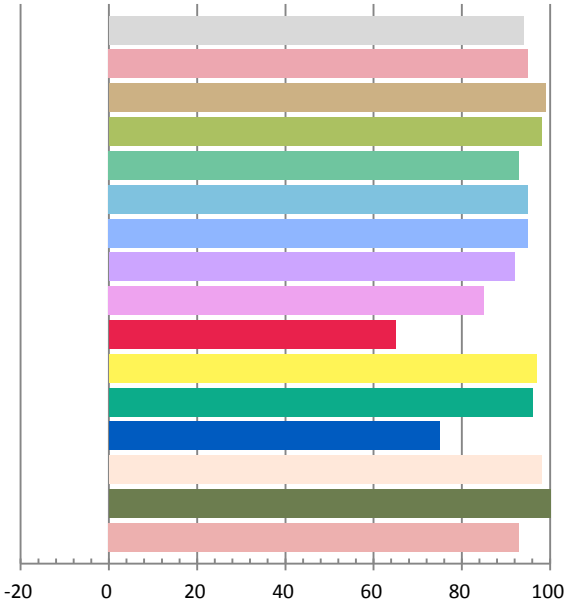
Photometric and Electrical Measurement Result

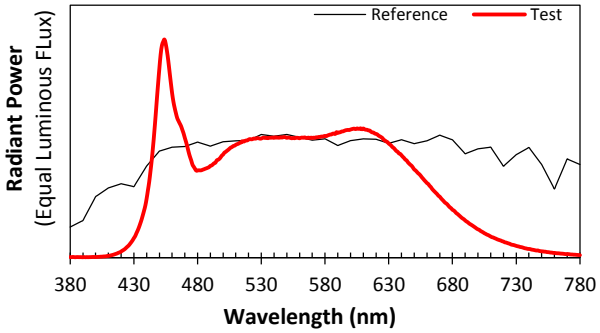
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.3172	37.57	0.9868	4195.9	111.67

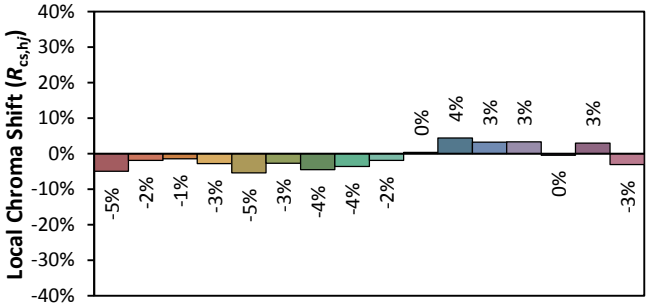
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
14.238	5060	0.00158	0.3437	0.3537	0.2097	0.4855

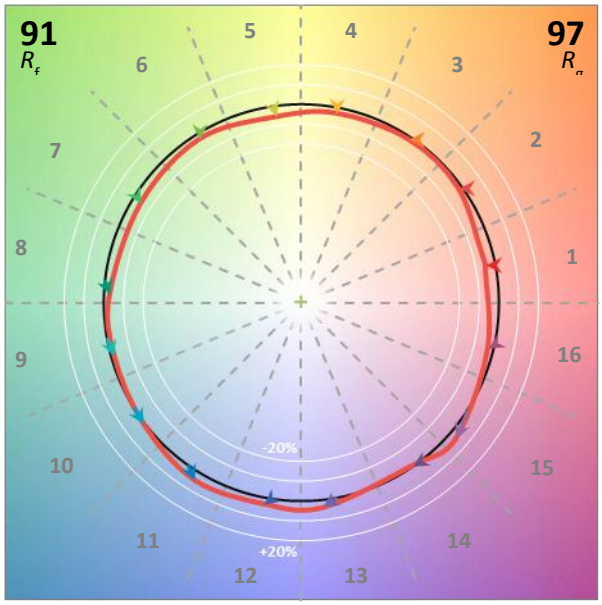
Color Rendering Index

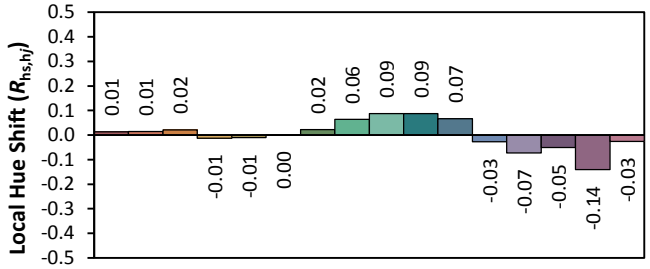
Ra			
94.0			
R1	R2	R3	R4
95	99	98	93
R5	R6	R7	R8
95	95	92	85
R9	R10	R11	R12
65	97	96	75
R13	R14	R15	
98	100	93	

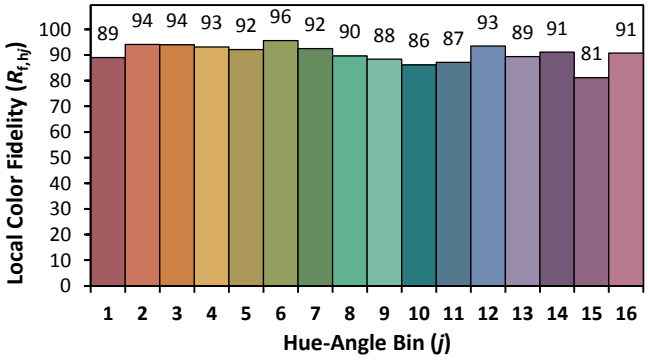


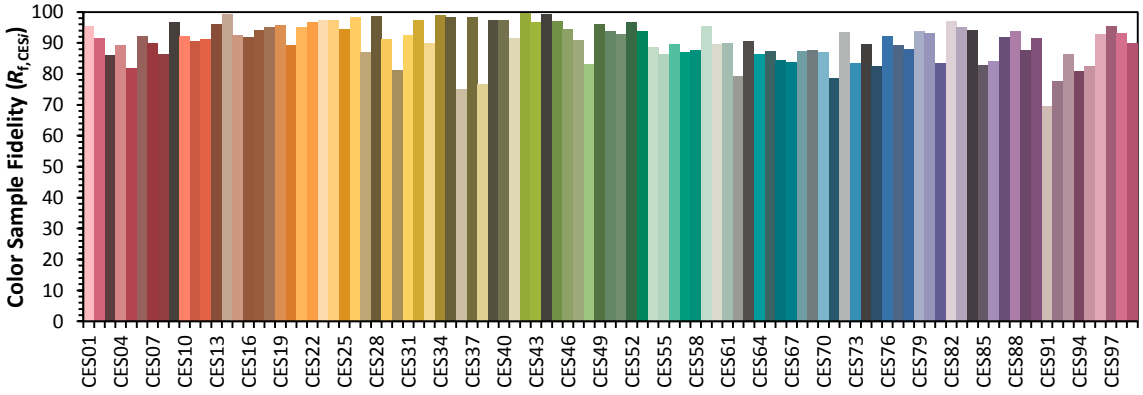

Reference
Test
Radiant Power
(Equal Luminous FLux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-5% -2% -1% -3% -5% -3% -4% -4% -2% 0% 4% 3% 3% 0% 3% -3%

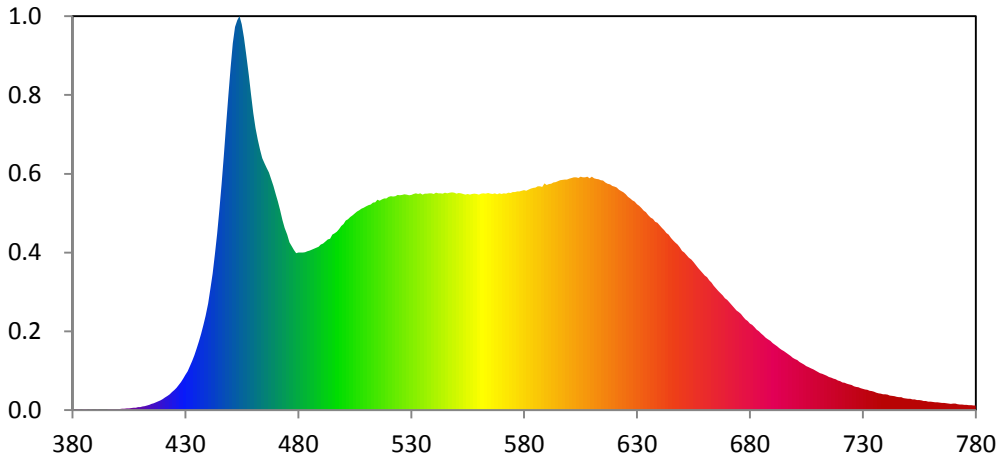

91
R_f
97
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


Local Hue Shift ($R_{hs,hj}$)
0.5 0.4 0.3 0.2 0.1 0.0 -0.1 -0.2 -0.3 -0.4 -0.5
0.01 0.01 0.02 -0.01 -0.01 0.00 0.02 0.06 0.09 0.09 0.07 -0.03 -0.07 -0.05 -0.14 -0.03


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
89 94 94 93 92 96 92 90 88 86 87 93 89 91 81 91
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hue-Angle Bin (j)


Color Sample Fidelity ($R_{f,CESi}$)
100 90 80 70 60 50 40 30 20 10 0
CES01 CES04 CES07 CES10 CES13 CES16 CES19 CES22 CES25 CES28 CES31 CES34 CES37 CES40 CES43 CES46 CES49 CES52 CES55 CES58 CES61 CES64 CES67 CES70 CES73 CES76 CES79 CES82 CES85 CES88 CES91 CES94 CES97

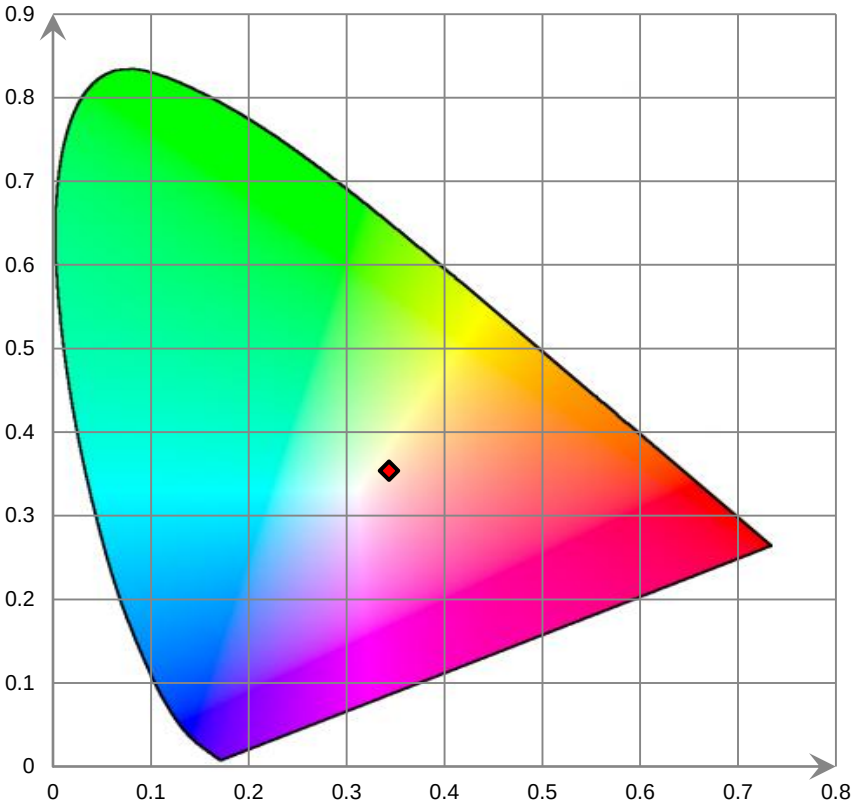
Relative Spectral Power Distribution



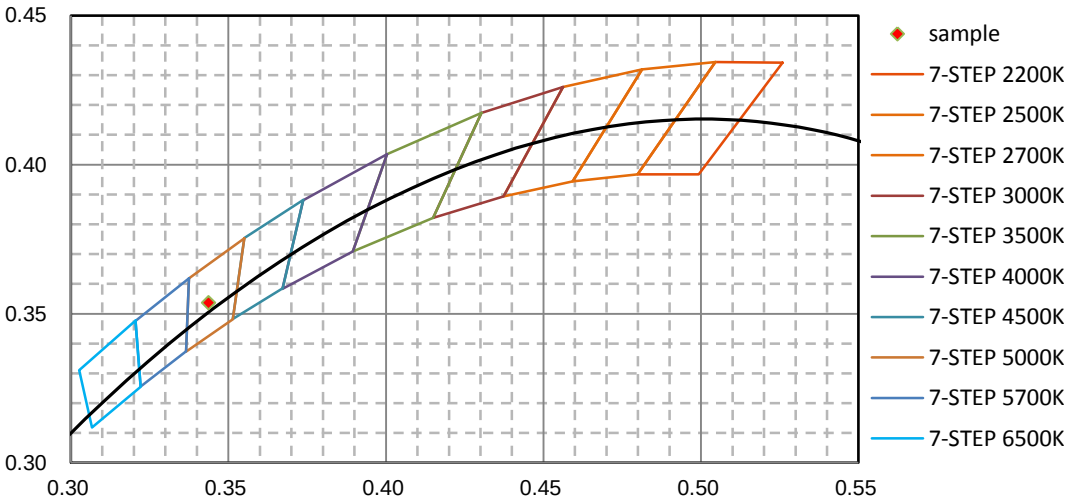
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.419E-01	421	3.367E+00	462	7.282E+01	503	5.194E+01	544	5.829E+01
381	1.918E-01	422	3.742E+00	463	7.020E+01	504	5.240E+01	545	5.856E+01
382	2.896E-01	423	4.180E+00	464	6.786E+01	505	5.296E+01	546	5.839E+01
383	2.167E-01	424	4.782E+00	465	6.651E+01	506	5.350E+01	547	5.851E+01
384	1.591E-01	425	5.353E+00	466	6.522E+01	507	5.379E+01	548	5.865E+01
385	2.217E-01	426	5.925E+00	467	6.398E+01	508	5.427E+01	549	5.850E+01
386	2.345E-01	427	6.693E+00	468	6.218E+01	509	5.444E+01	550	5.825E+01
387	1.921E-01	428	7.513E+00	469	6.038E+01	510	5.487E+01	551	5.841E+01
388	2.149E-01	429	8.403E+00	470	5.817E+01	511	5.518E+01	552	5.834E+01
389	1.762E-01	430	9.453E+00	471	5.613E+01	512	5.537E+01	553	5.818E+01
390	1.490E-01	431	1.042E+01	472	5.377E+01	513	5.584E+01	554	5.804E+01
391	2.173E-01	432	1.183E+01	473	5.123E+01	514	5.595E+01	555	5.819E+01
392	1.405E-01	433	1.319E+01	474	4.906E+01	515	5.662E+01	556	5.805E+01
393	2.065E-01	434	1.474E+01	475	4.727E+01	516	5.640E+01	557	5.823E+01
394	1.682E-01	435	1.652E+01	476	4.517E+01	517	5.669E+01	558	5.829E+01
395	1.998E-01	436	1.841E+01	477	4.416E+01	518	5.695E+01	559	5.821E+01
396	2.121E-01	437	2.055E+01	478	4.314E+01	519	5.700E+01	560	5.804E+01
397	2.460E-01	438	2.284E+01	479	4.225E+01	520	5.741E+01	561	5.827E+01
398	2.801E-01	439	2.533E+01	480	4.238E+01	521	5.764E+01	562	5.838E+01
399	2.603E-01	440	2.870E+01	481	4.246E+01	522	5.754E+01	563	5.828E+01
400	2.491E-01	441	3.265E+01	482	4.242E+01	523	5.760E+01	564	5.848E+01
401	2.650E-01	442	3.671E+01	483	4.248E+01	524	5.792E+01	565	5.825E+01
402	3.303E-01	443	4.189E+01	484	4.275E+01	525	5.785E+01	566	5.819E+01
403	3.488E-01	444	4.741E+01	485	4.296E+01	526	5.794E+01	567	5.838E+01
404	4.211E-01	445	5.385E+01	486	4.323E+01	527	5.814E+01	568	5.815E+01
405	4.253E-01	446	6.084E+01	487	4.345E+01	528	5.803E+01	569	5.836E+01
406	5.130E-01	447	6.853E+01	488	4.372E+01	529	5.786E+01	570	5.821E+01
407	5.474E-01	448	7.675E+01	489	4.400E+01	530	5.793E+01	571	5.834E+01
408	5.992E-01	449	8.461E+01	490	4.459E+01	531	5.822E+01	572	5.826E+01
409	7.431E-01	450	9.211E+01	491	4.483E+01	532	5.836E+01	573	5.851E+01
410	7.809E-01	451	9.878E+01	492	4.533E+01	533	5.818E+01	574	5.847E+01
411	9.270E-01	452	1.032E+02	493	4.593E+01	534	5.834E+01	575	5.867E+01
412	1.056E+00	453	1.050E+02	494	4.614E+01	535	5.806E+01	576	5.867E+01
413	1.226E+00	454	1.061E+02	495	4.728E+01	536	5.828E+01	577	5.887E+01
414	1.385E+00	455	1.039E+02	496	4.756E+01	537	5.830E+01	578	5.886E+01
415	1.614E+00	456	1.003E+02	497	4.800E+01	538	5.833E+01	579	5.903E+01
416	1.818E+00	457	9.571E+01	498	4.870E+01	539	5.837E+01	580	5.919E+01
417	2.049E+00	458	9.032E+01	499	4.960E+01	540	5.823E+01	581	5.908E+01
418	2.347E+00	459	8.499E+01	500	5.013E+01	541	5.855E+01	582	5.941E+01
419	2.573E+00	460	8.000E+01	501	5.102E+01	542	5.836E+01	583	5.963E+01
420	2.950E+00	461	7.592E+01	502	5.142E+01	543	5.839E+01	584	5.985E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.989E+01	626	5.738E+01	667	3.144E+01	708	1.094E+01	749	3.118E+00
586	6.028E+01	627	5.695E+01	668	3.085E+01	709	1.059E+01	750	3.026E+00
587	6.030E+01	628	5.649E+01	669	3.006E+01	710	1.023E+01	751	2.980E+00
588	6.012E+01	629	5.615E+01	670	2.963E+01	711	9.919E+00	752	2.873E+00
589	6.102E+01	630	5.545E+01	671	2.884E+01	712	9.764E+00	753	2.846E+00
590	6.065E+01	631	5.500E+01	672	2.815E+01	713	9.443E+00	754	2.674E+00
591	6.090E+01	632	5.441E+01	673	2.753E+01	714	9.219E+00	755	2.638E+00
592	6.099E+01	633	5.370E+01	674	2.681E+01	715	8.891E+00	756	2.543E+00
593	6.133E+01	634	5.326E+01	675	2.637E+01	716	8.664E+00	757	2.426E+00
594	6.140E+01	635	5.253E+01	676	2.584E+01	717	8.455E+00	758	2.401E+00
595	6.164E+01	636	5.183E+01	677	2.506E+01	718	8.252E+00	759	2.260E+00
596	6.190E+01	637	5.147E+01	678	2.443E+01	719	7.937E+00	760	2.261E+00
597	6.202E+01	638	5.066E+01	679	2.396E+01	720	7.784E+00	761	2.156E+00
598	6.211E+01	639	5.043E+01	680	2.324E+01	721	7.424E+00	762	2.093E+00
599	6.206E+01	640	4.975E+01	681	2.290E+01	722	7.304E+00	763	2.073E+00
600	6.230E+01	641	4.904E+01	682	2.232E+01	723	7.087E+00	764	2.011E+00
601	6.248E+01	642	4.844E+01	683	2.162E+01	724	6.866E+00	765	1.921E+00
602	6.265E+01	643	4.765E+01	684	2.119E+01	725	6.678E+00	766	1.898E+00
603	6.272E+01	644	4.726E+01	685	2.062E+01	726	6.343E+00	767	1.827E+00
604	6.248E+01	645	4.638E+01	686	2.006E+01	727	6.197E+00	768	1.736E+00
605	6.283E+01	646	4.572E+01	687	1.949E+01	728	6.091E+00	769	1.670E+00
606	6.269E+01	647	4.512E+01	688	1.901E+01	729	5.891E+00	770	1.684E+00
607	6.264E+01	648	4.460E+01	689	1.861E+01	730	5.691E+00	771	1.680E+00
608	6.289E+01	649	4.376E+01	690	1.803E+01	731	5.502E+00	772	1.577E+00
609	6.241E+01	650	4.287E+01	691	1.754E+01	732	5.390E+00	773	1.484E+00
610	6.282E+01	651	4.239E+01	692	1.718E+01	733	5.164E+00	774	1.476E+00
611	6.241E+01	652	4.174E+01	693	1.661E+01	734	5.060E+00	775	1.394E+00
612	6.221E+01	653	4.104E+01	694	1.621E+01	735	4.909E+00	776	1.388E+00
613	6.217E+01	654	4.055E+01	695	1.583E+01	736	4.679E+00	777	1.324E+00
614	6.186E+01	655	3.985E+01	696	1.542E+01	737	4.500E+00	778	1.272E+00
615	6.181E+01	656	3.902E+01	697	1.499E+01	738	4.400E+00	779	1.223E+00
616	6.128E+01	657	3.832E+01	698	1.456E+01	739	4.212E+00	780	1.173E+00
617	6.092E+01	658	3.757E+01	699	1.408E+01	740	4.185E+00		
618	6.082E+01	659	3.693E+01	700	1.373E+01	741	4.103E+00		
619	6.036E+01	660	3.623E+01	701	1.346E+01	742	3.893E+00		
620	6.016E+01	661	3.579E+01	702	1.297E+01	743	3.784E+00		
621	5.991E+01	662	3.493E+01	703	1.261E+01	744	3.669E+00		
622	5.933E+01	663	3.432E+01	704	1.227E+01	745	3.524E+00		
623	5.899E+01	664	3.342E+01	705	1.184E+01	746	3.417E+00		
624	5.860E+01	665	3.271E+01	706	1.154E+01	747	3.448E+00		
625	5.815E+01	666	3.208E+01	707	1.117E+01	748	3.215E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

The Stabilization time: **30 minutes**

Total operating time for luminous intensity distribution: **1.5 hour**

Test orientation: **Downward**

Test CCT: 2700K.

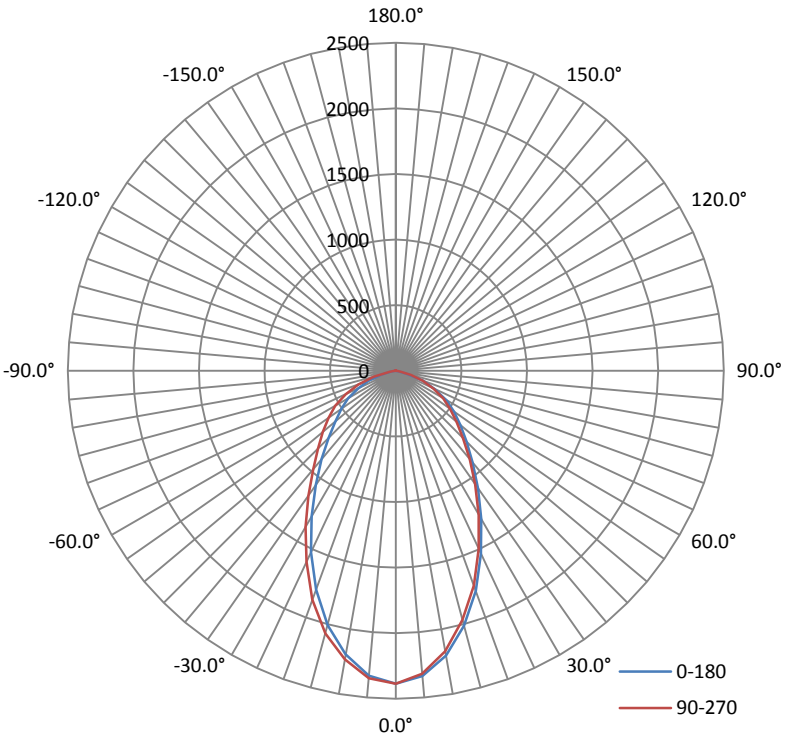
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60	0.3164	37.50	0.9864

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3823.61	101.96	2388	0.90	0.89

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	184.7	184.6	182.0	182.9	183.6
Field Angle (10% I_{max}):	230.1	243.6	243.6	241.2	239.6

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0°	2386	2386	2386	2386	2386	2386	2386	2386
1°	2383	2384	2385	2386	2385	2388	2387	2386
2°	2375	2378	2381	2382	2382	2384	2385	2383
3°	2365	2367	2371	2374	2376	2377	2377	2375
4°	2350	2355	2359	2364	2365	2369	2366	2366
5°	2332	2337	2345	2349	2351	2354	2353	2352
6°	2309	2316	2323	2330	2333	2336	2335	2333
7°	2285	2293	2300	2307	2311	2315	2314	2312
8°	2257	2264	2277	2283	2287	2291	2291	2287
9°	2227	2238	2248	2253	2262	2263	2263	2260
10°	2195	2206	2217	2226	2234	2235	2237	2232
11°	2161	2173	2184	2196	2203	2204	2203	2198
12°	2124	2136	2150	2163	2171	2173	2169	2166
13°	2087	2098	2113	2131	2140	2140	2133	2131
14°	2047	2059	2075	2095	2106	2105	2097	2093
15°	2006	2018	2037	2059	2072	2070	2055	2054
16°	1962	1975	1995	2021	2034	2029	2014	2011
17°	1918	1932	1953	1980	1994	1989	1973	1968
18°	1872	1886	1909	1938	1950	1946	1928	1923
19°	1824	1838	1864	1891	1905	1903	1884	1876
20°	1776	1791	1818	1844	1856	1857	1837	1830
21°	1726	1743	1770	1794	1805	1809	1789	1781
22°	1677	1694	1721	1745	1755	1761	1742	1732
23°	1626	1643	1670	1694	1706	1713	1693	1683
24°	1576	1595	1621	1644	1655	1663	1644	1633
25°	1525	1543	1573	1594	1607	1614	1596	1583
26°	1475	1494	1524	1545	1560	1563	1547	1534
27°	1425	1445	1475	1496	1514	1515	1499	1485
28°	1375	1396	1426	1448	1465	1466	1451	1435
29°	1328	1347	1378	1401	1420	1419	1405	1388
30°	1280	1300	1331	1356	1373	1372	1357	1340
31°	1234	1254	1284	1310	1328	1328	1314	1293
32°	1188	1210	1241	1267	1285	1285	1272	1248
33°	1144	1169	1197	1224	1241	1244	1229	1205
34°	1103	1126	1156	1184	1200	1204	1189	1163
35°	1062	1085	1115	1143	1160	1166	1149	1123
36°	1023	1048	1077	1105	1121	1130	1112	1084
37°	987	1011	1040	1069	1085	1096	1078	1047
38°	949	973	1004	1032	1048	1060	1043	1010
39°	912	937	969	996	1014	1027	1009	975
40°	877	903	934	963	978	994	977	939
41°	844	870	902	930	946	965	945	906
42°	812	838	872	901	916	937	917	875
43°	781	808	844	872	887	911	889	845
44°	752	780	817	845	861	886	863	816
45°	725	754	794	821	837	864	839	789
46°	698	729	771	796	812	842	815	764
47°	672	705	749	774	790	821	792	738
48°	648	681	728	751	767	801	770	713

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
49°	620	659	709	731	746	782	749	690
50°	602	639	691	712	725	764	729	668
51°	584	621	672	693	704	745	709	647
52°	562	604	654	675	683	726	690	627
53°	542	586	636	656	662	706	670	609
54°	522	566	620	637	641	684	649	590
55°	505	549	605	622	624	666	630	571
56°	489	534	590	607	607	649	613	553
57°	472	518	574	593	591	631	596	535
58°	455	502	557	576	572	613	578	516
59°	437	485	538	556	552	594	558	496
60°	418	466	518	537	531	576	536	474
61°	398	448	497	516	511	555	515	453
62°	378	430	476	496	490	533	492	431
63°	357	407	452	472	467	509	468	407
64°	335	385	427	448	443	484	443	383
65°	314	362	403	425	420	459	419	359
66°	294	340	377	401	397	432	393	334
67°	274	318	353	378	373	405	368	310
68°	256	296	329	354	350	378	343	286
69°	237	275	304	330	327	351	318	264
70°	220	255	281	306	304	324	295	242
71°	202	234	258	282	281	298	271	220
72°	183	213	235	258	257	272	248	198
73°	164	191	212	232	232	244	223	176
74°	145	169	189	205	205	215	199	153
75°	112	142	163	176	176	183	172	124
76°	81	108	129	137	136	142	133	90
77°	61	76	95	96	95	103	93	63
78°	51	63	65	64	62	69	62	54
79°	42	50	54	54	53	58	52	44
80°	38	38	44	45	44	46	42	35
81°	34	33	34	35	34	34	32	31
82°	29	29	30	31	30	30	28	26
83°	25	25	26	27	27	26	24	22
84°	20	20	22	23	23	22	20	18
85°	16	16	17	19	19	18	16	14
86°	12	12	13	15	15	14	11	10
87°	8	8	9	11	11	10	7	7
88°	4	5	6	7	7	6	4	4
89°	3	3	3	3	4	3	1	1
90°	1	0	0	0	0	0	0	0
91°	0	0	0	0	0	0	0	0
92°	0	0	0	0	0	0	0	0
93°	0	0	0	0	0	0	0	0
94°	0	0	0	0	0	0	0	0
95°	0	0	0	0	0	0	0	0
96°	0	0	0	0	0	0	0	0
97°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
98°	0	0	0	0	0	0	0	0
99°	0	0	0	0	0	0	0	0
100°	0	0	0	0	0	0	0	0
101°	0	0	0	0	0	0	0	0
102°	0	0	0	0	0	0	0	0
103°	0	0	0	0	0	0	0	0
104°	0	0	0	0	0	0	0	0
105°	0	0	0	0	0	0	0	0
106°	0	0	0	0	0	0	0	0
107°	0	0	0	0	0	0	0	0
108°	0	0	0	0	0	0	0	0
109°	0	0	0	0	0	0	0	0
110°	0	0	0	0	0	0	0	0
111°	0	0	0	0	0	0	0	0
112°	0	0	0	0	0	0	0	0
113°	0	0	0	0	0	0	0	0
114°	0	0	0	0	0	0	0	0
115°	0	0	0	0	0	0	0	0
116°	0	0	0	0	0	0	0	0
117°	0	0	0	0	0	0	0	0
118°	0	0	0	0	0	0	0	0
119°	0	0	0	0	0	0	0	0
120°	0	0	0	0	0	0	0	0
121°	1	1	1	1	1	1	1	0
122°	1	1	1	1	1	1	1	1
123°	1	1	1	1	1	1	1	1
124°	1	1	1	1	1	1	1	1
125°	1	1	1	1	1	1	1	1
126°	1	1	1	1	1	1	1	1
127°	1	1	1	1	1	1	1	1
128°	1	1	1	1	1	1	1	1
129°	1	1	1	1	1	1	1	1
130°	1	1	1	1	1	1	1	1
131°	1	1	1	1	1	1	1	1
132°	1	1	1	1	1	1	1	1
133°	1	1	1	1	1	1	1	1
134°	1	1	1	1	1	1	1	1
135°	1	1	1	1	1	1	1	1
136°	1	1	1	1	1	1	1	1
137°	1	1	1	1	1	1	1	1
138°	1	1	1	1	1	1	1	1
139°	1	1	2	2	2	2	1	1
140°	2	2	2	2	2	2	2	2
141°	2	2	2	2	2	2	2	2
142°	2	2	2	2	2	2	2	2
143°	2	2	2	2	2	2	2	2
144°	2	2	2	2	2	2	2	2
145°	2	2	2	2	2	2	2	2
146°	2	2	2	2	2	2	2	2

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
147°	2	2	2	3	3	2	2	2
148°	2	2	3	3	3	3	2	2
149°	2	2	3	3	3	3	3	2
150°	2	3	3	3	3	3	3	2
151°	3	3	3	3	3	3	3	3
152°	3	3	3	3	3	3	3	3
153°	3	3	3	3	3	3	3	3
154°	3	3	3	3	3	3	3	3
155°	3	3	3	3	3	3	3	3
156°	3	3	3	3	3	3	3	3
157°	3	3	3	3	3	3	3	3
158°	3	3	3	4	4	3	3	3
159°	3	3	3	4	4	4	3	3
160°	3	3	3	4	4	4	3	3
161°	3	3	4	4	4	4	3	3
162°	3	3	4	4	4	4	3	3
163°	3	3	3	4	4	4	3	3
164°	3	3	3	4	4	4	3	3
165°	3	3	3	4	4	3	3	3
166°	3	3	3	3	4	3	3	3
167°	3	3	3	3	3	3	3	3
168°	3	3	3	3	3	3	3	3
169°	3	3	3	3	3	3	3	3
170°	3	3	3	3	3	3	3	3
171°	3	3	3	3	3	3	3	3
172°	3	3	3	3	3	3	3	3
173°	3	3	3	3	3	3	3	3
174°	3	3	3	3	3	3	3	3
175°	3	3	3	3	3	3	3	3
176°	3	3	3	3	3	3	3	3
177°	3	3	3	3	3	3	3	3
178°	3	3	3	3	3	2	3	3
179°	3	3	3	2	2	2	2	2
180°	3	2	2	2	2	2	2	2

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0°	2386	2386	2386	2386	2386	2386	2386	2386
1°	2383	2381	2380	2379	2378	2380	2380	2381
2°	2375	2374	2373	2370	2368	2369	2369	2370
3°	2366	2364	2361	2359	2355	2357	2355	2356
4°	2353	2350	2346	2342	2340	2339	2337	2340
5°	2335	2331	2326	2322	2317	2317	2317	2319
6°	2313	2309	2302	2297	2294	2292	2291	2293
7°	2290	2284	2277	2272	2267	2265	2264	2266
8°	2263	2257	2251	2244	2237	2235	2234	2236
9°	2234	2226	2221	2213	2206	2203	2202	2204
10°	2203	2194	2188	2179	2172	2170	2168	2170
11°	2169	2158	2153	2143	2135	2133	2133	2134
12°	2134	2123	2116	2104	2095	2092	2094	2095
13°	2095	2086	2076	2061	2054	2050	2054	2055
14°	2054	2045	2034	2020	2011	2007	2010	2014
15°	2011	2003	1993	1977	1965	1963	1969	1971
16°	1970	1960	1946	1932	1922	1918	1923	1927
17°	1924	1915	1902	1887	1876	1871	1877	1882
18°	1879	1869	1854	1841	1832	1823	1829	1835
19°	1831	1822	1805	1796	1787	1775	1780	1784
20°	1784	1773	1757	1749	1741	1727	1732	1738
21°	1736	1723	1708	1700	1697	1680	1682	1687
22°	1686	1673	1657	1652	1647	1630	1633	1638
23°	1637	1624	1605	1604	1599	1581	1582	1588
24°	1588	1574	1555	1555	1548	1531	1533	1538
25°	1537	1523	1505	1506	1498	1483	1482	1487
26°	1487	1473	1455	1456	1448	1435	1433	1438
27°	1439	1426	1408	1407	1398	1388	1386	1390
28°	1392	1377	1360	1358	1351	1342	1338	1344
29°	1345	1331	1319	1315	1309	1301	1296	1301
30°	1304	1289	1278	1272	1266	1259	1254	1258
31°	1262	1247	1237	1229	1224	1217	1212	1215
32°	1221	1205	1194	1186	1179	1174	1169	1171
33°	1178	1163	1153	1143	1138	1132	1128	1128
34°	1136	1122	1113	1103	1096	1091	1088	1088
35°	1096	1083	1075	1064	1057	1053	1050	1048
36°	1057	1046	1038	1026	1020	1017	1014	1011
37°	1020	1009	1002	989	983	982	978	973
38°	983	974	967	953	946	946	944	936
39°	947	939	933	918	911	912	910	902
40°	912	907	901	885	877	879	878	867
41°	879	875	870	851	844	847	848	835
42°	847	846	841	820	813	818	819	804
43°	818	818	814	791	784	791	794	776
44°	789	792	789	763	755	765	769	747
45°	763	766	766	736	727	740	746	721
46°	737	743	743	711	702	717	726	696
47°	713	721	721	685	676	695	705	672
48°	688	700	701	662	652	673	686	648

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
49°	666	681	683	639	629	654	668	625
50°	644	662	665	618	607	635	650	605
51°	623	644	647	597	586	617	632	584
52°	604	627	630	578	566	600	615	565
53°	583	610	612	559	545	583	597	546
54°	563	592	594	540	525	565	581	528
55°	544	576	578	523	507	549	565	511
56°	526	560	562	507	491	534	550	495
57°	507	543	545	489	473	517	533	478
58°	488	525	527	472	455	499	516	460
59°	467	506	509	453	437	480	498	440
60°	445	486	489	435	419	460	479	421
61°	424	466	470	415	400	440	460	402
62°	400	446	451	396	383	420	441	382
63°	375	423	428	374	362	396	418	361
64°	351	399	405	350	339	372	396	340
65°	328	376	383	328	319	350	374	321
66°	304	351	359	306	298	327	352	302
67°	282	326	337	285	278	305	330	283
68°	261	303	315	265	258	284	309	264
69°	240	280	294	245	238	263	287	245
70°	221	257	274	225	218	243	266	226
71°	201	235	254	206	199	225	245	207
72°	180	213	233	187	180	206	224	188
73°	150	189	211	167	160	187	202	169
74°	120	156	188	144	140	161	179	142
75°	90	123	151	120	120	135	146	116
76°	63	90	114	96	91	109	113	89
77°	49	59	77	71	68	78	80	63
78°	41	45	53	52	52	53	55	49
79°	37	38	41	42	42	43	43	41
80°	33	34	35	37	38	38	37	37
81°	29	29	31	33	34	34	33	32
82°	24	25	27	29	30	30	29	28
83°	20	21	23	25	26	26	25	24
84°	16	17	19	21	22	22	21	19
85°	12	12	15	17	18	18	16	15
86°	8	8	10	13	14	14	12	11
87°	4	5	6	9	10	10	8	7
88°	1	1	3	5	6	6	4	3
89°	0	0	0	0	0	1	1	1
90°	0	0	0	0	0	0	0	0
91°	0	0	0	0	0	0	0	0
92°	0	0	0	0	0	0	0	0
93°	0	0	0	0	0	0	0	0
94°	0	0	0	0	0	0	0	0
95°	0	0	0	0	0	0	0	0
96°	0	0	0	0	0	0	0	0
97°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
98°	0	0	0	0	0	0	0	0
99°	0	0	0	0	0	0	0	0
100°	0	0	0	0	0	0	0	0
101°	0	0	0	0	0	0	0	0
102°	0	0	0	0	0	0	0	0
103°	0	0	0	0	0	0	0	0
104°	0	0	0	0	0	0	0	0
105°	0	0	0	0	0	0	0	0
106°	0	0	0	0	0	0	0	0
107°	0	0	0	0	0	0	0	0
108°	0	0	0	0	0	0	0	0
109°	0	0	0	0	0	0	0	0
110°	0	0	0	0	0	0	0	0
111°	0	0	0	0	0	0	0	0
112°	0	0	0	0	0	0	0	0
113°	0	0	0	0	0	0	0	0
114°	0	0	0	0	0	0	0	0
115°	0	0	0	0	0	0	0	0
116°	0	0	0	0	0	0	0	0
117°	0	0	0	0	0	0	0	0
118°	0	0	0	0	0	0	0	0
119°	0	0	0	0	0	0	0	0
120°	0	0	0	0	0	0	0	0
121°	0	0	0	0	0	0	0	0
122°	0	0	0	0	0	0	0	0
123°	0	0	0	0	0	0	0	0
124°	0	0	0	0	0	0	0	0
125°	0	0	0	0	0	0	0	0
126°	0	0	0	0	0	0	0	0
127°	0	0	0	0	0	0	0	0
128°	0	0	0	0	0	0	0	0
129°	0	0	0	0	0	0	0	0
130°	0	0	0	0	0	0	0	0
131°	0	0	0	1	1	1	0	1
132°	0	0	0	1	1	1	1	1
133°	1	1	1	1	1	1	1	1
134°	1	1	1	1	1	1	1	1
135°	1	1	1	1	1	1	1	1
136°	1	1	1	1	1	1	1	1
137°	1	1	1	1	1	1	1	1
138°	1	1	1	1	1	1	1	1
139°	1	1	1	1	1	1	1	1
140°	1	1	1	1	1	1	1	1
141°	1	1	1	1	1	1	1	1
142°	1	1	1	1	1	1	1	1
143°	1	1	1	1	1	1	1	1
144°	1	1	1	1	1	1	1	1
145°	1	1	1	1	1	1	1	1
146°	1	1	1	1	1	1	1	1

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
147°	1	1	1	1	1	1	1	1
148°	1	1	1	1	1	1	1	1
149°	1	1	1	1	1	1	1	1
150°	1	1	1	1	1	1	1	1
151°	1	1	1	1	1	1	1	1
152°	1	1	1	1	1	1	1	1
153°	1	1	1	1	1	1	1	1
154°	1	1	1	1	1	1	1	1
155°	1	1	1	1	1	1	1	1
156°	1	1	1	1	1	1	1	1
157°	1	1	1	1	1	1	1	1
158°	1	1	1	1	1	1	1	1
159°	1	1	1	1	1	1	1	1
160°	1	1	1	1	1	1	1	2
161°	1	1	1	1	1	1	1	2
162°	1	1	1	1	1	1	1	2
163°	2	1	1	1	1	1	1	2
164°	2	2	1	2	1	1	1	2
165°	2	2	2	2	2	2	2	2
166°	2	2	2	2	2	2	2	2
167°	2	2	2	2	2	2	2	2
168°	2	2	2	2	2	2	2	2
169°	2	2	2	2	2	2	2	2
170°	2	2	2	2	2	2	2	2
171°	2	2	2	2	2	2	2	2
172°	2	2	2	2	2	2	2	2
173°	2	2	2	2	2	2	2	2
174°	2	2	2	2	2	2	2	2
175°	2	2	2	2	2	2	2	2
176°	2	2	2	2	2	2	2	2
177°	2	2	2	2	2	2	2	2
178°	2	2	2	2	2	2	2	2
179°	2	2	2	2	2	2	2	2
180°	3	3	2	2	2	2	2	2

Zonal Lumen Density Measurement

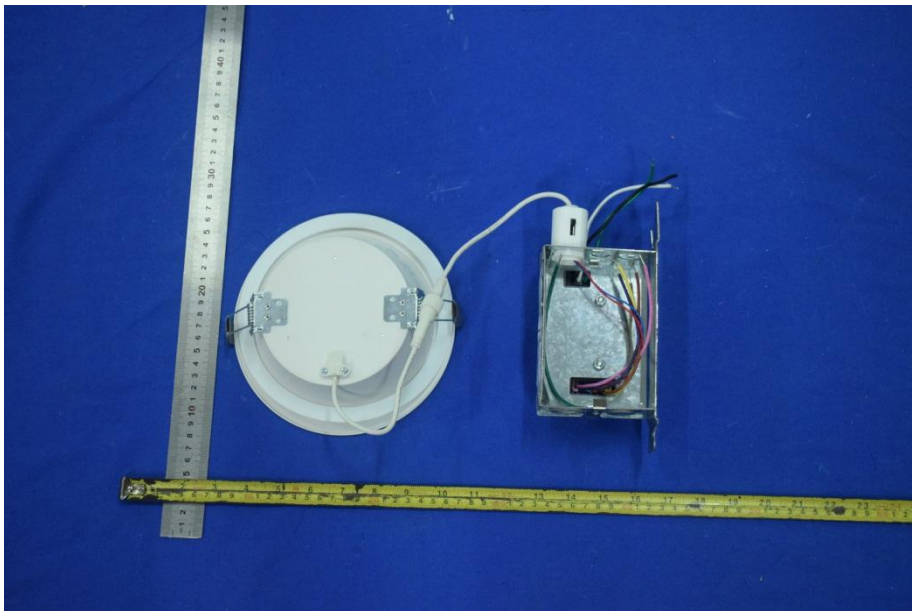
Deg	Flux (lm)	%
0-5	56.4	1.48
5-10	162.1	4.24
10-15	249.7	6.53
15-20	312.9	8.18
20-25	348.4	9.11
25-30	358.8	9.39
30-35	352.3	9.21
35-40	334.6	8.75
40-45	311.5	8.15
45-50	289.3	7.56
50-55	267.7	7.00
55-60	243.6	6.37
60-65	207.7	5.44
65-70	159.1	4.16
70-75	106.5	2.78
75-80	40.1	1.05
80-85	14.5	0.38
85-90	3.7	0.10
90-95	0.1	0.00
95-100	0.1	0.00
100-105	0.1	0.00
105-110	0.1	0.01
110-115	0.1	0.00
115-120	0.2	0.01
120-125	0.2	0.00
125-130	0.2	0.01
130-135	0.3	0.01
135-140	0.4	0.00
140-145	0.5	0.02
145-150	0.5	0.01
150-155	0.5	0.01
155-160	0.5	0.02
160-165	0.4	0.01
165-170	0.3	0.00
170-175	0.2	0.01
175-180	0.1	0.00

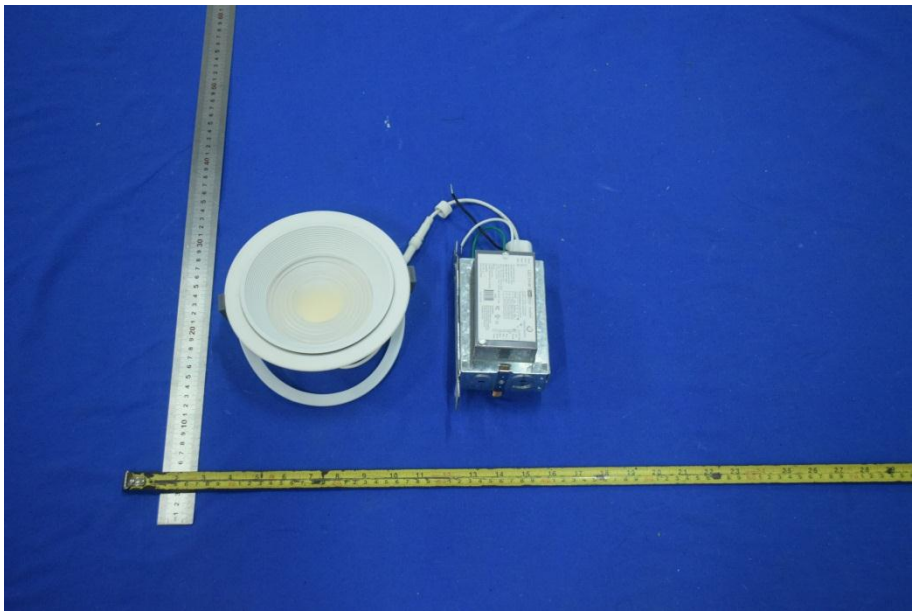
Deg	Flux (lm)	%
0-5	56.4	1.48
0-10	218.5	5.72
0-15	468.3	12.25
0-20	781.2	20.43
0-25	1129.6	29.54
0-30	1488.4	38.93
0-35	1840.6	48.14
0-40	2175.3	56.89
0-45	2486.8	65.04
0-50	2776.1	72.60
0-55	3043.8	79.60
0-60	3287.3	85.97
0-65	3495.0	91.41
0-70	3654.2	95.57
0-75	3760.6	98.35
0-80	3800.7	99.40
0-85	3815.2	99.78
0-90	3818.9	99.88
0-95	3819.0	99.88
0-100	3819.0	99.88
0-105	3819.2	99.88
0-110	3819.3	99.89
0-115	3819.4	99.89
0-120	3819.6	99.90
0-125	3819.8	99.90
0-130	3820.1	99.91
0-135	3820.4	99.92
0-140	3820.7	99.92
0-145	3821.2	99.94
0-150	3821.7	99.95
0-155	3822.2	99.96
0-160	3822.7	99.98
0-165	3823.1	99.99
0-170	3823.4	99.99
0-175	3823.6	100.00
0-180	3823.6	100.00

[Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Total Harmonic Distortion:	120	60	13.56%

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. This report includes some test methods are not in NVLAP accreditation scope marked *.
3. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K=2 with the 95% confidence interval.
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**********END OF REPORT**********