

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai, China

**Test Model: AD9.5LEM9027DIM010UNVVNRCC**

<b>Report Type:</b>	Electrical and Photometric tests including: Input Current, Power, Power Factor, Luminous Flux, Luminous Efficacy, CRI, CCT, Chromaticity Coordinate, Spectral Power Distribution
<b>Test Engineer:</b>	George Yang <i>George Yang</i>
<b>Report Number:</b>	RKS180131081-10-8
<b>Test Date:</b>	2018-05-07
<b>Report Date:</b>	2018-05-08
<b>Reviewed By:</b>	Ray Gao/EE Engineer <i>Ry Gao</i>
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
<b>Test Facility:</b>	Test facility was located at No.248 Chenghu Road, Kunshan, Jiangsu province, China.
<b>Accreditation:</b>	The IAS Accreditation Number TL-749.

**Note:** 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 used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Kunshan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

## 1. Product Description

### General Information:

One sample was received on 2018- 03-10 and used for testing.

Model Tested: AD9.5LEM9027DIM010UNVVNRCC  
 Manufacturer: GREEN CREATIVE LTD  
 Brand Name: GREEN CREATIVE  
 Product Designation: LED Downlight  
 Aging Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120-277VAC, 50/60Hz  
 Rated Power: 31.5W  
 Nominal CCT: 2700K  
 Nominal Lumen Output: 2350lm

## 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-30-15: 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	2018-01-24	2019-01-24
Power Meter	INVENTFINE	WT500	GSJWQ20009	2018-03-23	2019-03-22
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2018-01-24	2019-01-24
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2018-03-23	2019-03-22
Standard Light Source	INVENTFINE	N/A	JWWCR020106	2018-01-24	2019-01-24
Thermal Meter	KEJIAN	TA298	N/A	2017-11-14	2018-11-14
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2018-03-23	2019-03-22

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.

$4\pi$  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  $U=2.6\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=24\text{K}$  ( $K=2$ ), 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  $U=0.16\%$  of rdg, AC Voltage  $U=0.18\%$  of rdg, Power  $U=0.14\%$  ( $K=2$ ), at the 95% confidence level.

### Fidelity Index and Gamut Index Calculation

The  $R_i$ ,  $R_g$  was calculated according to IES TM-30-15 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 hour**

Test orientation: **Downward**

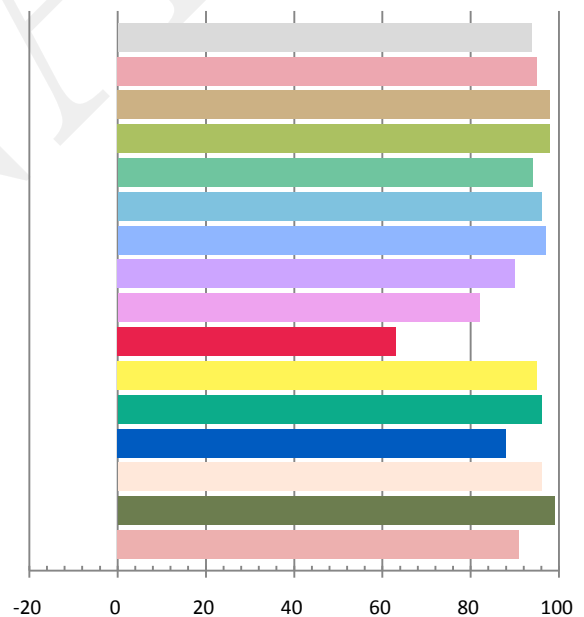
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2642	31.49	0.9932	2546	80.85

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
9.080	2724	-0.00213	0.4543	0.4036	0.2620	0.5238

### Color Rendering Index

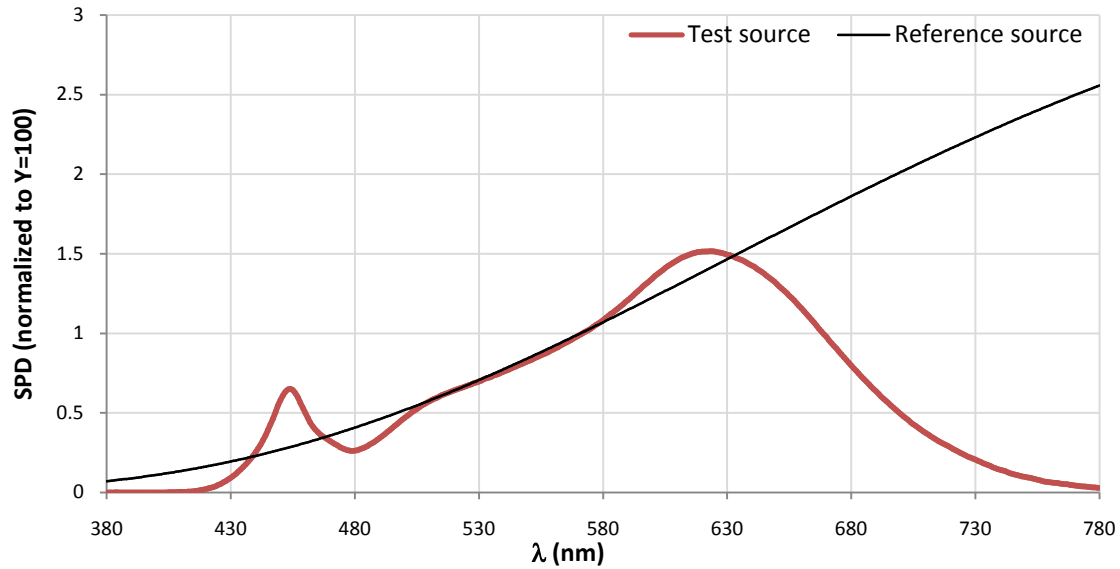
<b>Ra</b>			
<b>93.8</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
95	98	98	94
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
96	97	90	82
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
63	95	96	88
<b>R13</b>	<b>R14</b>	<b>R15</b>	
96	99	91	



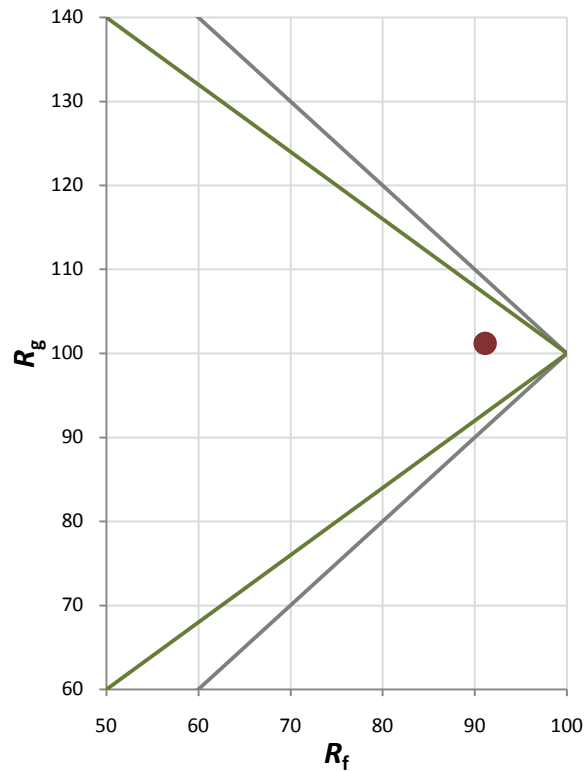
### Fidelity Index and Gamut Index

Fidelity Index $R_f$	91
Gamut Index $R_g$	101

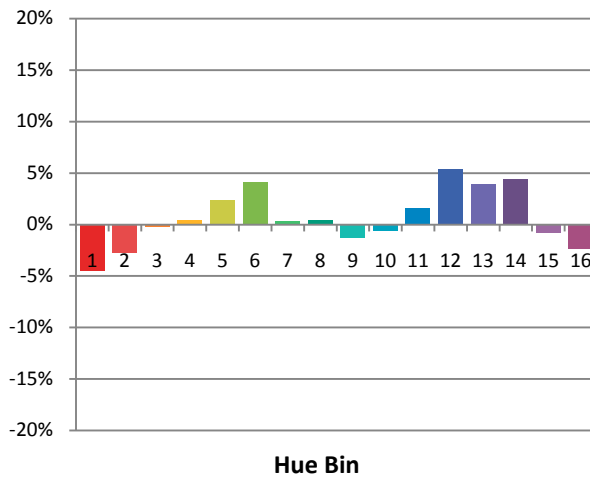
### Spectral Power Distribution Comparison



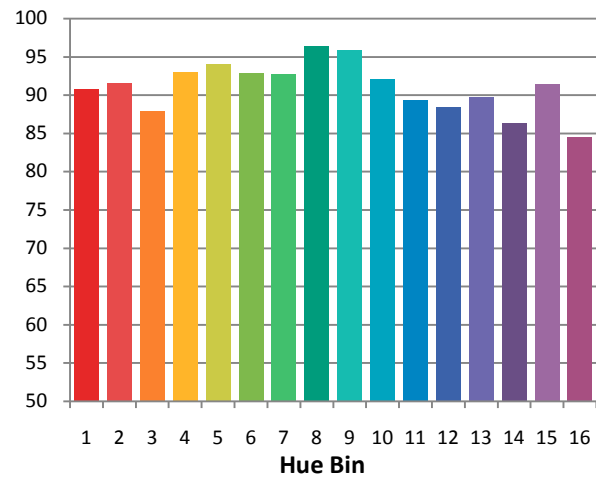
### Plot of $R_g$ versus $R_f$



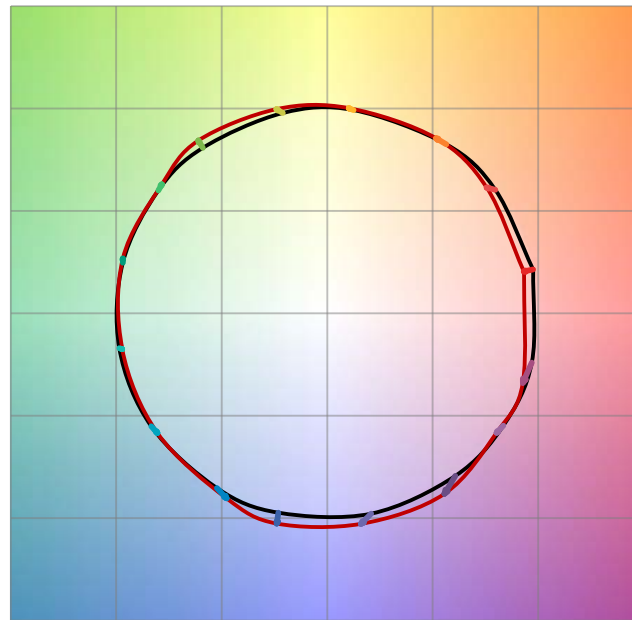
Chroma Shift by Hue



$R_t$  by Hue

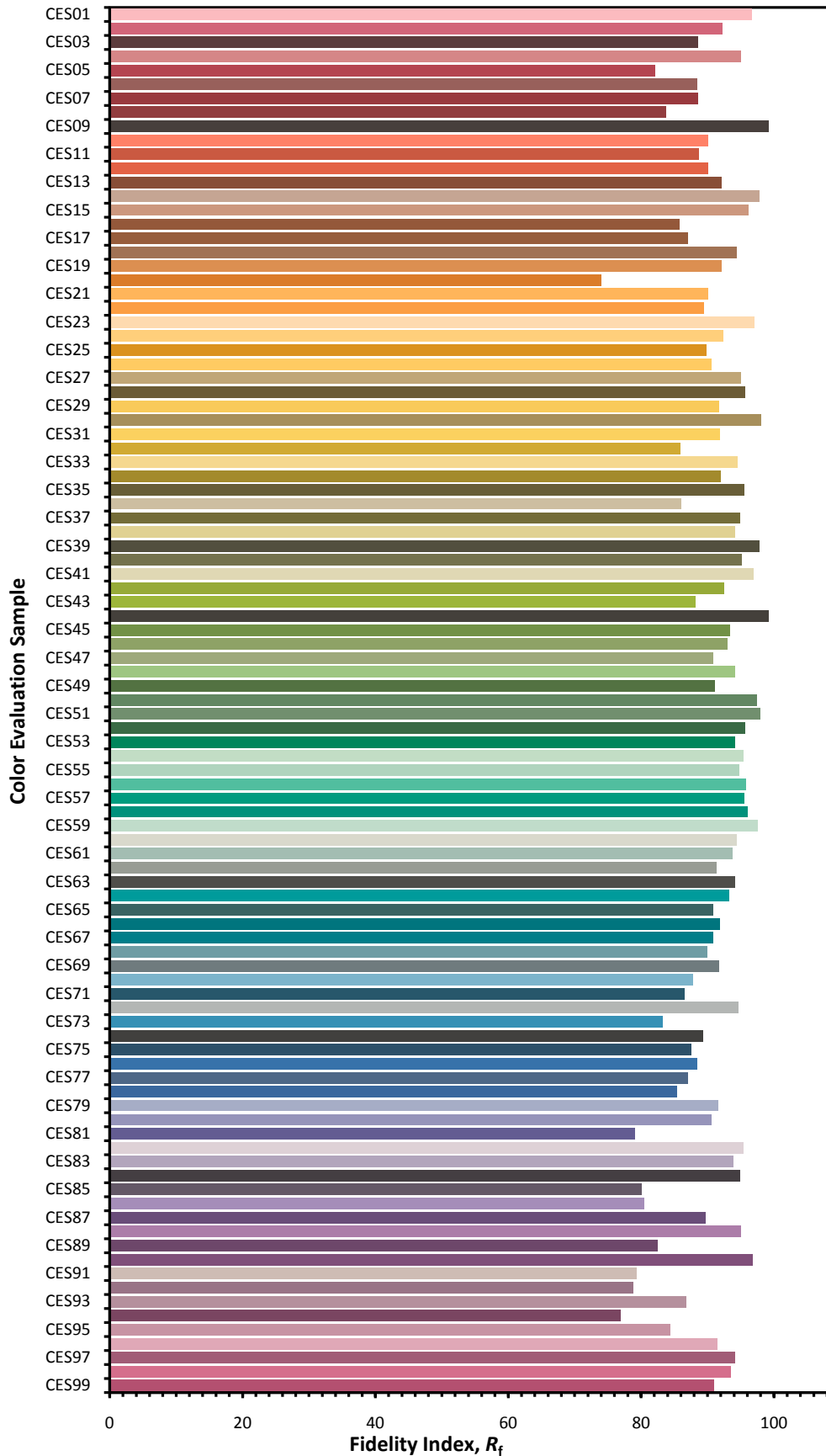


Color Vector Graphic

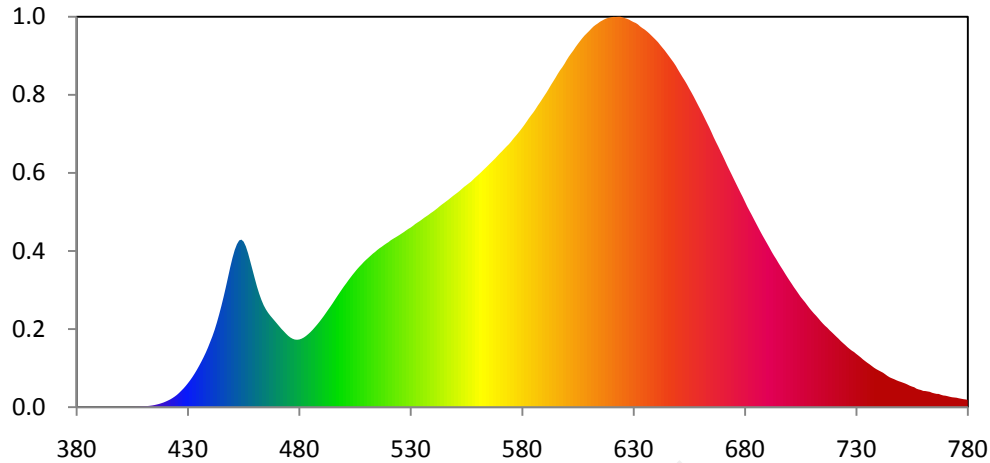


— Reference Illuminat — Test Source

### Color Fidelity by CES Sample



### Relative Spectral Power Distribution

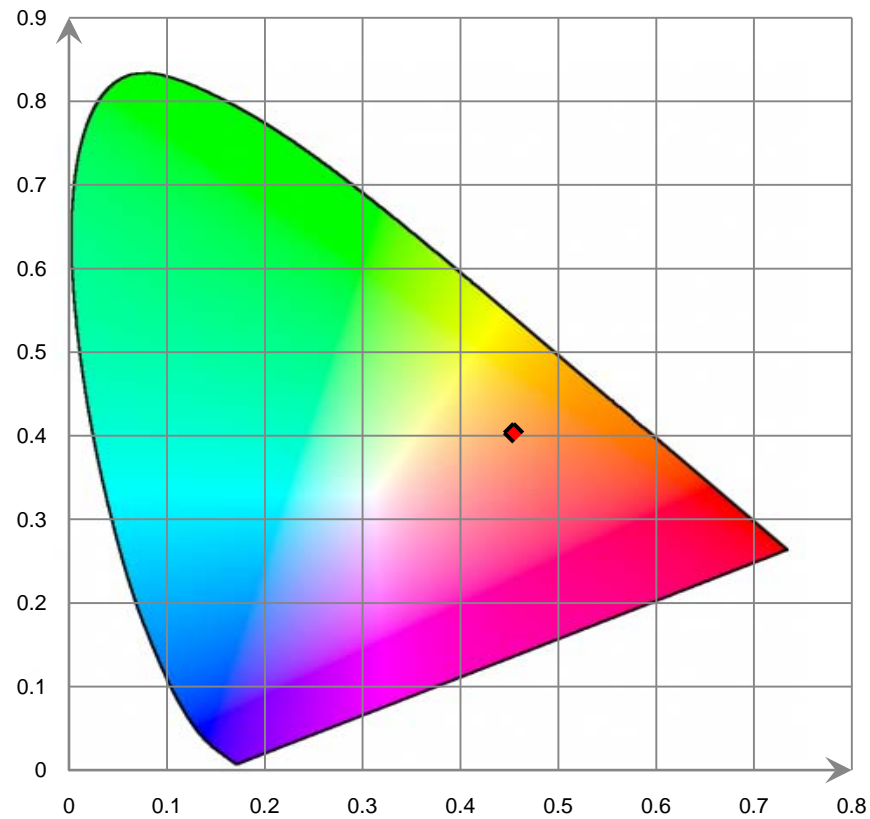


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.690E-02	421	9.566E-01	462	1.641E+01	503	1.878E+01	544	2.932E+01
381	3.060E-02	422	1.111E+00	463	1.550E+01	504	1.919E+01	545	2.955E+01
382	2.780E-02	423	1.306E+00	464	1.474E+01	505	1.959E+01	546	2.979E+01
383	3.040E-02	424	1.522E+00	465	1.414E+01	506	1.999E+01	547	3.004E+01
384	3.590E-02	425	1.760E+00	466	1.365E+01	507	2.034E+01	548	3.031E+01
385	2.070E-02	426	2.049E+00	467	1.322E+01	508	2.067E+01	549	3.056E+01
386	2.740E-02	427	2.371E+00	468	1.284E+01	509	2.102E+01	550	3.080E+01
387	2.760E-02	428	2.702E+00	469	1.247E+01	510	2.134E+01	551	3.104E+01
388	1.920E-02	429	3.070E+00	470	1.208E+01	511	2.162E+01	552	3.130E+01
389	2.060E-02	430	3.471E+00	471	1.170E+01	512	2.192E+01	553	3.160E+01
390	1.910E-02	431	3.892E+00	472	1.132E+01	513	2.221E+01	554	3.188E+01
391	1.030E-02	432	4.357E+00	473	1.098E+01	514	2.246E+01	555	3.212E+01
392	7.600E-03	433	4.859E+00	474	1.064E+01	515	2.274E+01	556	3.237E+01
393	1.060E-02	434	5.392E+00	475	1.033E+01	516	2.299E+01	557	3.261E+01
394	1.750E-02	435	5.969E+00	476	1.008E+01	517	2.321E+01	558	3.292E+01
395	1.940E-02	436	6.569E+00	477	9.894E+00	518	2.345E+01	559	3.323E+01
396	9.400E-03	437	7.207E+00	478	9.786E+00	519	2.368E+01	560	3.352E+01
397	5.800E-03	438	7.888E+00	479	9.754E+00	520	2.388E+01	561	3.381E+01
398	3.500E-03	439	8.631E+00	480	9.794E+00	521	2.413E+01	562	3.412E+01
399	2.100E-03	440	9.444E+00	481	9.907E+00	522	2.434E+01	563	3.444E+01
400	1.610E-02	441	1.027E+01	482	1.008E+01	523	2.453E+01	564	3.475E+01
401	2.090E-02	442	1.119E+01	483	1.031E+01	524	2.472E+01	565	3.506E+01
402	2.150E-02	443	1.225E+01	484	1.057E+01	525	2.493E+01	566	3.538E+01
403	2.550E-02	444	1.341E+01	485	1.087E+01	526	2.514E+01	567	3.570E+01
404	2.920E-02	445	1.463E+01	486	1.120E+01	527	2.535E+01	568	3.602E+01
405	4.100E-02	446	1.595E+01	487	1.157E+01	528	2.559E+01	569	3.637E+01
406	5.880E-02	447	1.733E+01	488	1.195E+01	529	2.581E+01	570	3.671E+01
407	6.970E-02	448	1.880E+01	489	1.234E+01	530	2.599E+01	571	3.703E+01
408	6.920E-02	449	2.027E+01	490	1.276E+01	531	2.623E+01	572	3.738E+01
409	1.110E-01	450	2.160E+01	491	1.320E+01	532	2.649E+01	573	3.771E+01
410	1.457E-01	451	2.274E+01	492	1.366E+01	533	2.671E+01	574	3.802E+01
411	1.488E-01	452	2.358E+01	493	1.413E+01	534	2.692E+01	575	3.840E+01
412	1.673E-01	453	2.413E+01	494	1.458E+01	535	2.715E+01	576	3.881E+01
413	2.103E-01	454	2.424E+01	495	1.505E+01	536	2.739E+01	577	3.920E+01
414	2.555E-01	455	2.394E+01	496	1.555E+01	537	2.761E+01	578	3.958E+01
415	3.121E-01	456	2.326E+01	497	1.604E+01	538	2.783E+01	579	3.997E+01
416	3.869E-01	457	2.226E+01	498	1.652E+01	539	2.808E+01	580	4.040E+01
417	4.629E-01	458	2.107E+01	499	1.700E+01	540	2.829E+01	581	4.083E+01
418	5.671E-01	459	1.985E+01	500	1.746E+01	541	2.853E+01	582	4.130E+01
419	6.741E-01	460	1.862E+01	501	1.789E+01	542	2.879E+01	583	4.178E+01
420	8.085E-01	461	1.744E+01	502	1.835E+01	543	2.907E+01	584	4.221E+01

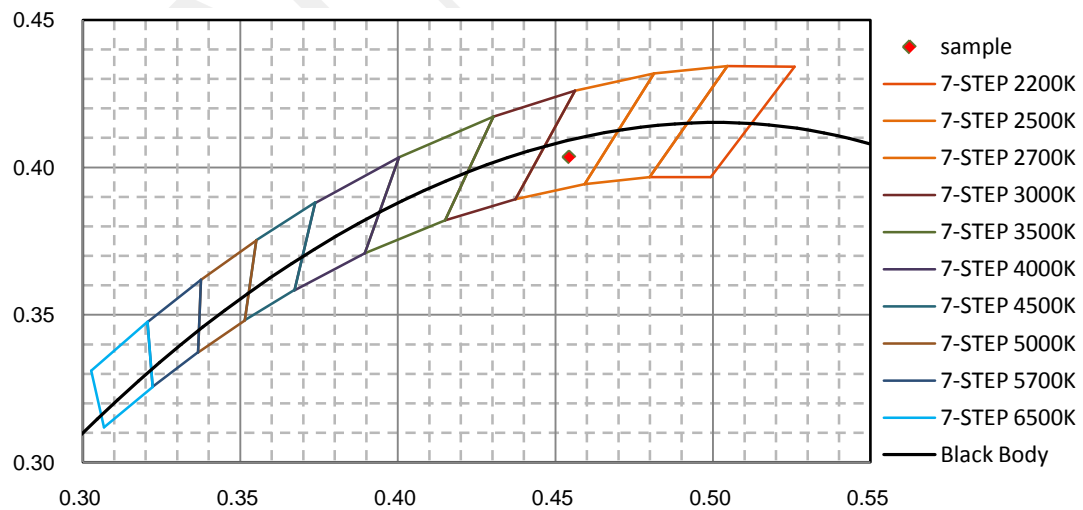


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.263E+01	626	5.629E+01	667	3.837E+01	708	1.474E+01	749	3.764E+00
586	4.310E+01	627	5.620E+01	668	3.773E+01	709	1.430E+01	750	3.655E+00
587	4.361E+01	628	5.606E+01	669	3.705E+01	710	1.392E+01	751	3.537E+00
588	4.408E+01	629	5.588E+01	670	3.640E+01	711	1.355E+01	752	3.418E+00
589	4.457E+01	630	5.571E+01	671	3.570E+01	712	1.321E+01	753	3.269E+00
590	4.506E+01	631	5.557E+01	672	3.499E+01	713	1.284E+01	754	3.106E+00
591	4.555E+01	632	5.536E+01	673	3.434E+01	714	1.245E+01	755	2.983E+00
592	4.609E+01	633	5.507E+01	674	3.368E+01	715	1.210E+01	756	2.880E+00
593	4.664E+01	634	5.484E+01	675	3.301E+01	716	1.177E+01	757	2.680E+00
594	4.715E+01	635	5.463E+01	676	3.235E+01	717	1.148E+01	758	2.563E+00
595	4.766E+01	636	5.437E+01	677	3.170E+01	718	1.114E+01	759	2.486E+00
596	4.822E+01	637	5.408E+01	678	3.105E+01	719	1.084E+01	760	2.358E+00
597	4.873E+01	638	5.377E+01	679	3.041E+01	720	1.053E+01	761	2.334E+00
598	4.917E+01	639	5.345E+01	680	2.973E+01	721	1.021E+01	762	2.278E+00
599	4.966E+01	640	5.313E+01	681	2.905E+01	722	9.912E+00	763	2.221E+00
600	5.022E+01	641	5.279E+01	682	2.844E+01	723	9.576E+00	764	2.086E+00
601	5.074E+01	642	5.239E+01	683	2.784E+01	724	9.279E+00	765	1.997E+00
602	5.118E+01	643	5.200E+01	684	2.721E+01	725	8.999E+00	766	1.925E+00
603	5.162E+01	644	5.161E+01	685	2.660E+01	726	8.692E+00	767	1.914E+00
604	5.210E+01	645	5.117E+01	686	2.598E+01	727	8.421E+00	768	1.792E+00
605	5.254E+01	646	5.074E+01	687	2.537E+01	728	8.172E+00	769	1.692E+00
606	5.297E+01	647	5.030E+01	688	2.478E+01	729	7.968E+00	770	1.659E+00
607	5.337E+01	648	4.986E+01	689	2.421E+01	730	7.701E+00	771	1.587E+00
608	5.376E+01	649	4.938E+01	690	2.365E+01	731	7.451E+00	772	1.504E+00
609	5.408E+01	650	4.881E+01	691	2.308E+01	732	7.189E+00	773	1.434E+00
610	5.439E+01	651	4.827E+01	692	2.249E+01	733	6.900E+00	774	1.402E+00
611	5.474E+01	652	4.774E+01	693	2.194E+01	734	6.651E+00	775	1.368E+00
612	5.506E+01	653	4.724E+01	694	2.144E+01	735	6.409E+00	776	1.285E+00
613	5.531E+01	654	4.669E+01	695	2.089E+01	736	6.190E+00	777	1.225E+00
614	5.553E+01	655	4.609E+01	696	2.037E+01	737	5.942E+00	778	1.164E+00
615	5.577E+01	656	4.553E+01	697	1.987E+01	738	5.699E+00	779	1.122E+00
616	5.594E+01	657	4.493E+01	698	1.934E+01	739	5.496E+00	780	1.051E+00
617	5.612E+01	658	4.431E+01	699	1.882E+01	740	5.320E+00		
618	5.626E+01	659	4.368E+01	700	1.833E+01	741	5.153E+00		
619	5.634E+01	660	4.306E+01	701	1.785E+01	742	4.984E+00		
620	5.641E+01	661	4.244E+01	702	1.735E+01	743	4.752E+00		
621	5.646E+01	662	4.177E+01	703	1.690E+01	744	4.516E+00		
622	5.646E+01	663	4.112E+01	704	1.643E+01	745	4.316E+00		
623	5.648E+01	664	4.046E+01	705	1.596E+01	746	4.173E+00		
624	5.648E+01	665	3.977E+01	706	1.556E+01	747	4.042E+00		
625	5.641E+01	666	3.903E+01	707	1.517E+01	748	3.893E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



## 6. Product Photo



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