



IES LM-79-08

MEASUREMENT AND TEST REPORT

For

ATG Electronics Corp.

9020 Rancho Park Court Rancho Cucamonga, CA 91730

Test Model: RTUS22-S-30W-5K-PE

Report Type:	Electrical and Photometric tests including: Input Current, Power, Power Factor, Luminous Flux, Luminous Efficacy, CRI, CCT, Chromaticity Coordinate, Spectral Power Distribution
Test Engineer:	Carl Du <i>Carl Du</i>
Report Number:	RSZ160908507-10A2
Test Date:	2016-09-12
Report Date:	2016-09-22
Approved By:	Blake Zhang / EE Engineer <i>Blake Zhang</i>
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Accreditation:	The IAS Accreditation Number TL-460.

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. (Dongguan). 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 2016-09-08 and used for testing.

Model Tested: RTUS22-S-30W-5K-PE
 Manufacturer: ATG Electronics Co.,Ltd
 Brand Name: ATG
 Product Designation: 2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces
 Burning Time Before Test: 0hour(For New Products)
 Driver Model: WP-UL-T40-48-0.73A

Rated Values:

Rated Voltage/Frequency: 120-277V AC 50/60Hz
 Rated Power: 30 W
 Nominal CCT: 5000K
 Nominal Lumen Output: 3900 lm

2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- IES TM-30-15: IES Method for Evaluating Light Source Color Rendition (This method is not in IAS accreditation scope)

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	R98	2015-11-09	2016-11-08
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2016-03-10	2017-03-09
Digital Power Meter	EVERFINE	PF2010A	1011004	600V/20A	2016-07-11	2017-07-10
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	30V/5A	2016-07-07	2017-07-06
Temperature/humidity/clock	Victor	VC230	EE023	0~40°C0~90%	2016-03-21	2017-03-20
Standard Light Source	SENSING	N/A	LSD090808	N/A	2015-09-25	2016-09-24
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	0-150V, 0-300V	2016-03-04	2017-03-03

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) 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 $U=1.8\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=20\text{K}$ ($K=2$), at the 95% confidence level.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.15\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_f , R_g was calculated according to IES TM-30-15 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: **1.0 hour**

Test orientation: **Downward**

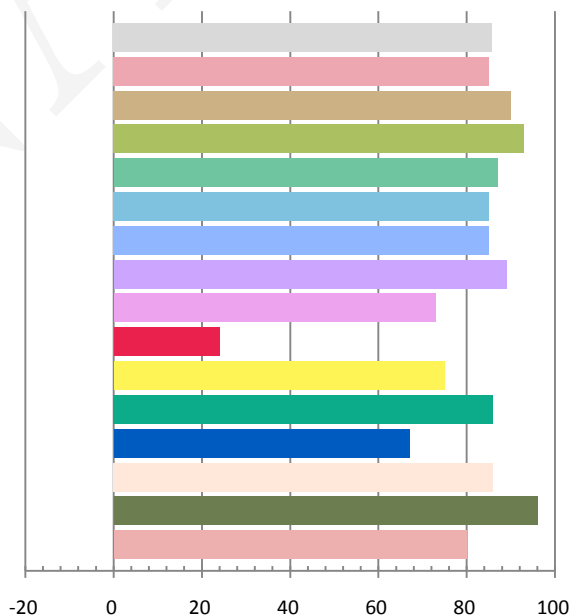
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2549	30.48	0.9963	4110.4	134.86

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
13.196	4986	-0.000571	0.3454	0.3507	0.2120	0.4843

Color Rendering Index

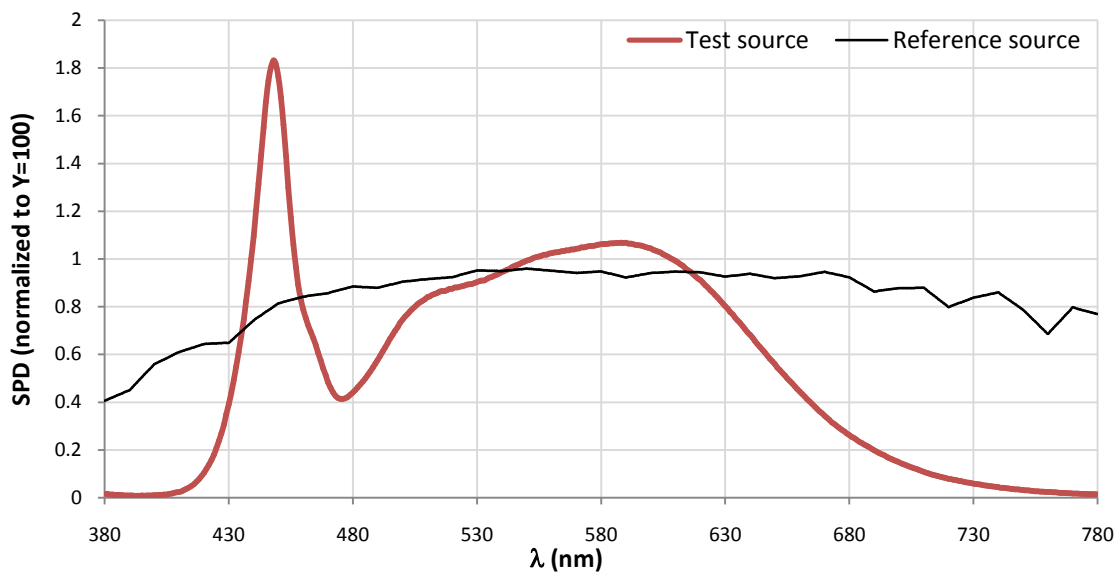
Ra			
85.8			
R1	R2	R3	R4
85	90	93	87
R5	R6	R7	R8
85	85	89	73
R9	R10	R11	R12
24	75	86	67
R13	R14	R15	
86	96	80	



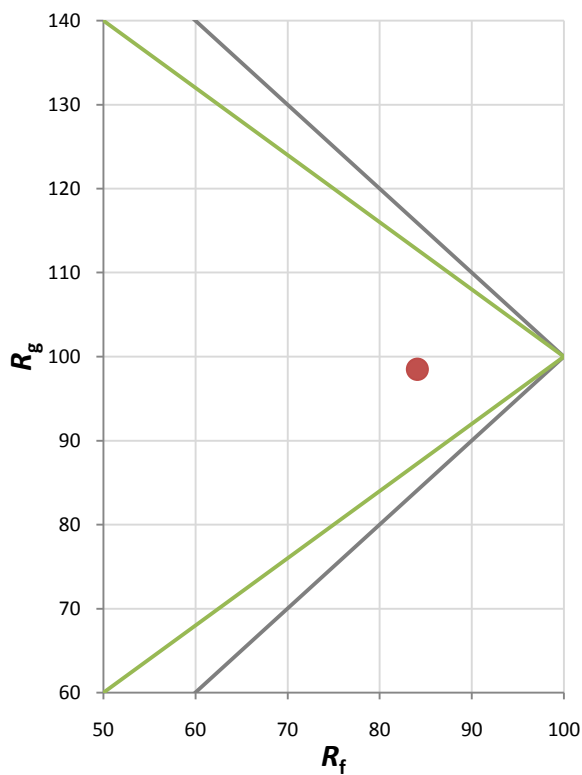
Fidelity Index and Gamut Index

Fidelity Index R_f	84
Gamut Index R_g	99

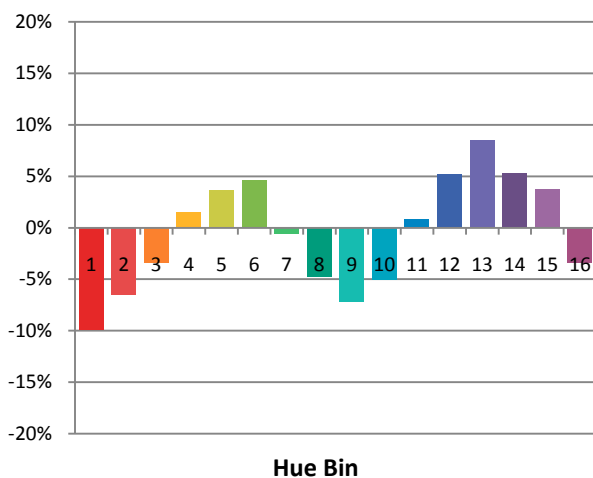
Spectral Power Distribution Comparison



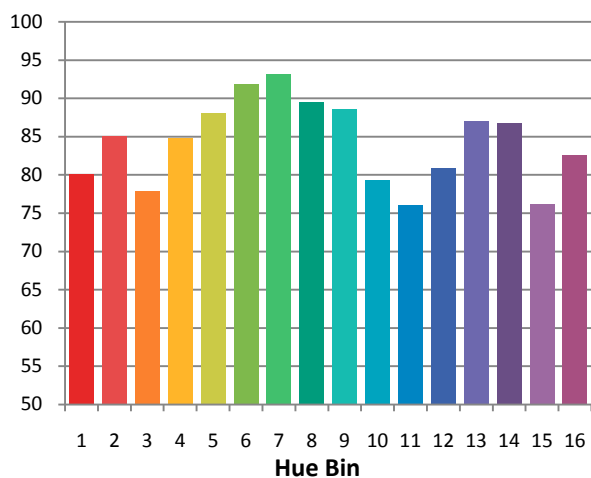
Plot of R_g versus R_f



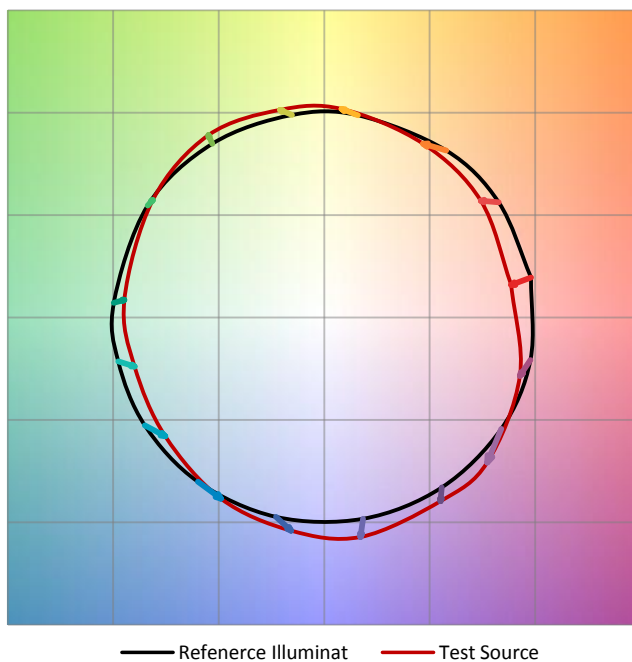
Chroma Shift by Hue



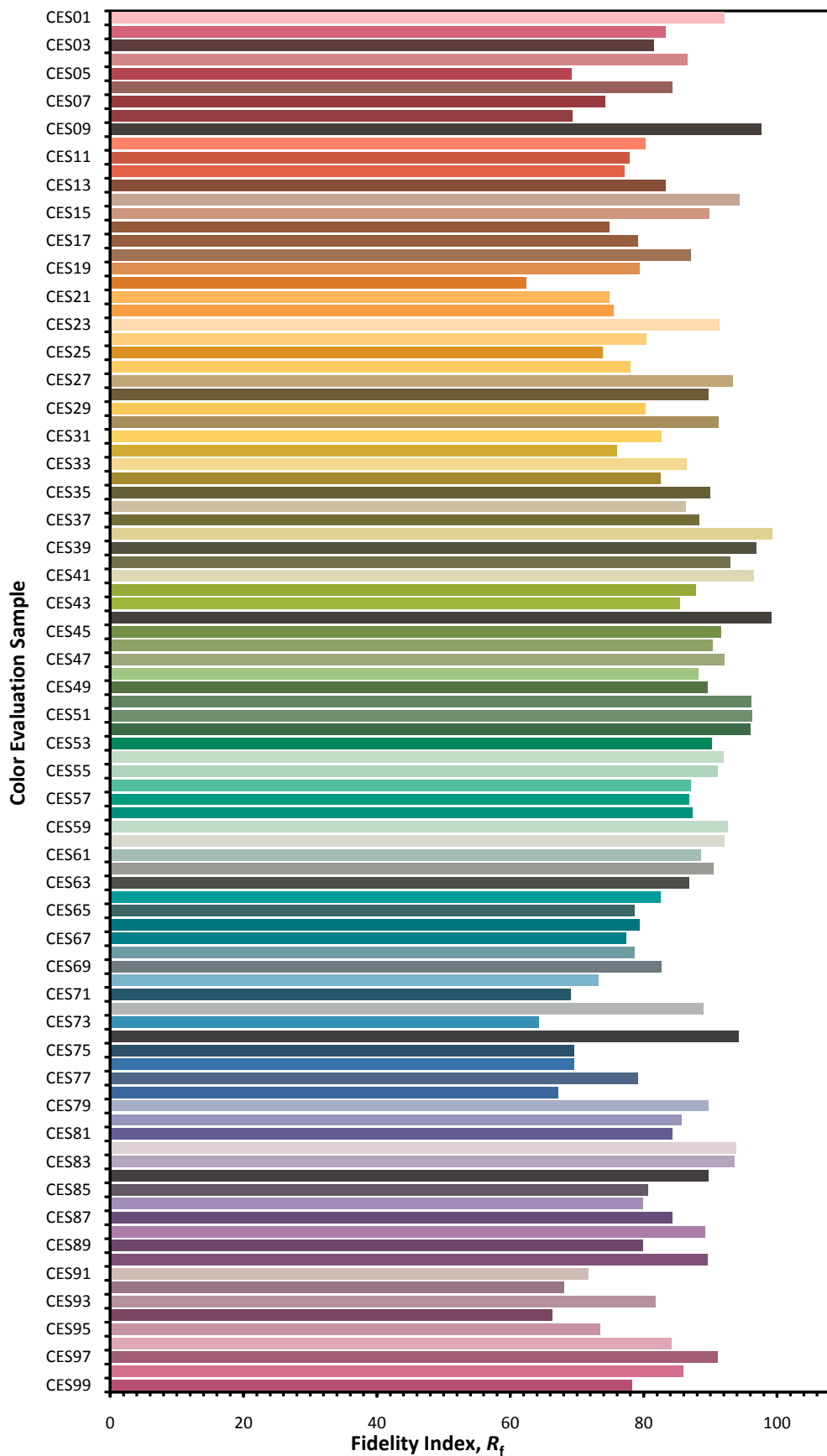
R_f by Hue



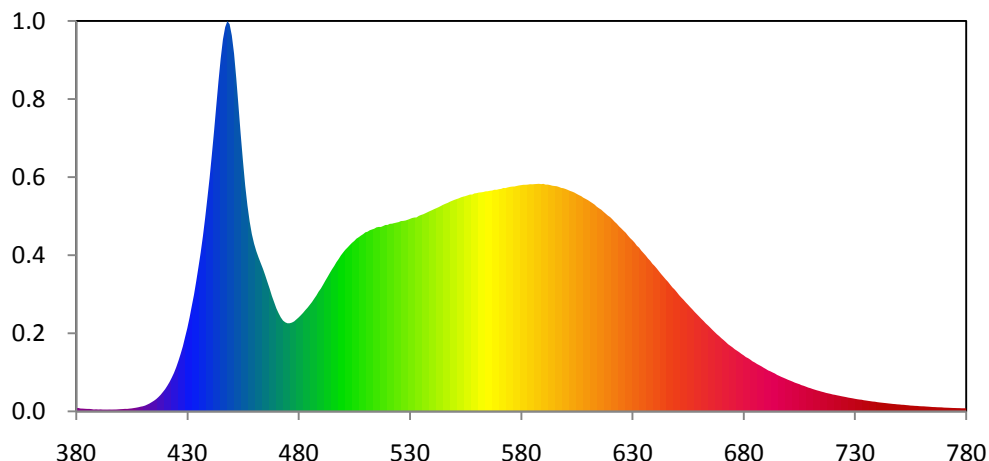
Color Vector Graphic



Color Fidelity by CES Sample



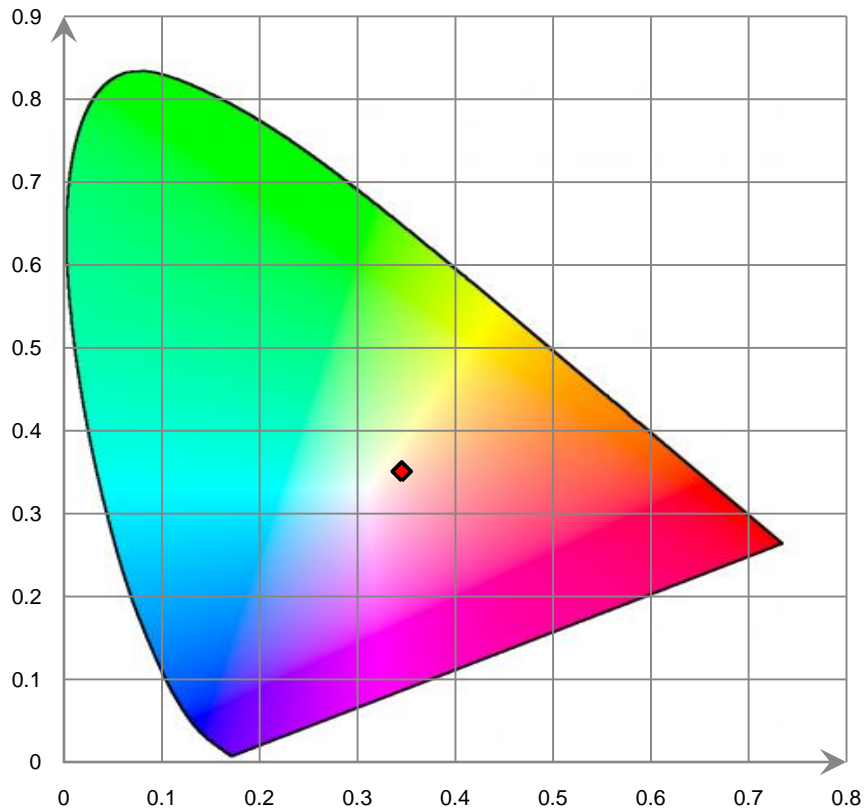
Relative Spectral Power Distribution



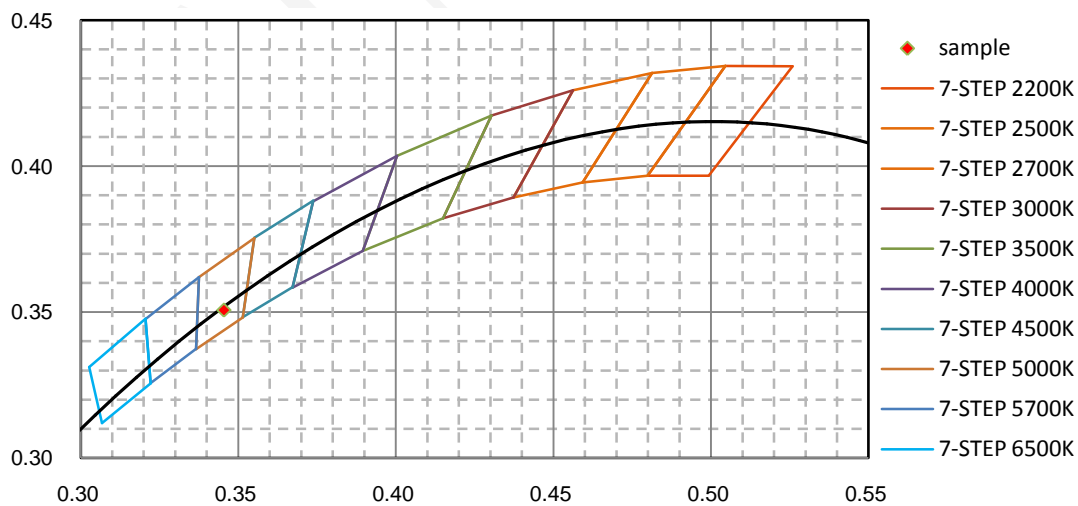
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	9.375E-01	421	7.222E+00	462	4.346E+01	503	4.695E+01	544	5.803E+01
381	9.727E-01	422	8.286E+00	463	4.185E+01	504	4.760E+01	545	5.836E+01
382	8.017E-01	423	9.519E+00	464	4.023E+01	505	4.811E+01	546	5.864E+01
383	7.816E-01	424	1.086E+01	465	3.843E+01	506	4.877E+01	547	5.888E+01
384	7.385E-01	425	1.244E+01	466	3.650E+01	507	4.917E+01	548	5.921E+01
385	6.944E-01	426	1.428E+01	467	3.464E+01	508	4.964E+01	549	5.947E+01
386	6.907E-01	427	1.624E+01	468	3.260E+01	509	5.004E+01	550	5.973E+01
387	6.367E-01	428	1.836E+01	469	3.085E+01	510	5.055E+01	551	5.995E+01
388	5.427E-01	429	2.098E+01	470	2.911E+01	511	5.074E+01	552	6.017E+01
389	5.806E-01	430	2.351E+01	471	2.773E+01	512	5.115E+01	553	6.046E+01
390	5.335E-01	431	2.648E+01	472	2.654E+01	513	5.137E+01	554	6.064E+01
391	5.713E-01	432	2.973E+01	473	2.564E+01	514	5.159E+01	555	6.080E+01
392	5.145E-01	433	3.298E+01	474	2.515E+01	515	5.197E+01	556	6.101E+01
393	5.174E-01	434	3.675E+01	475	2.488E+01	516	5.208E+01	557	6.123E+01
394	5.085E-01	435	4.076E+01	476	2.490E+01	517	5.207E+01	558	6.124E+01
395	5.281E-01	436	4.486E+01	477	2.508E+01	518	5.233E+01	559	6.155E+01
396	5.136E-01	437	4.948E+01	478	2.540E+01	519	5.264E+01	560	6.163E+01
397	5.255E-01	438	5.457E+01	479	2.596E+01	520	5.266E+01	561	6.178E+01
398	5.455E-01	439	6.013E+01	480	2.652E+01	521	5.296E+01	562	6.186E+01
399	5.884E-01	440	6.589E+01	481	2.715E+01	522	5.300E+01	563	6.194E+01
400	6.232E-01	441	7.230E+01	482	2.782E+01	523	5.316E+01	564	6.213E+01
401	6.582E-01	442	7.911E+01	483	2.857E+01	524	5.331E+01	565	6.216E+01
402	7.118E-01	443	8.620E+01	484	2.926E+01	525	5.346E+01	566	6.231E+01
403	6.989E-01	444	9.328E+01	485	3.006E+01	526	5.373E+01	567	6.237E+01
404	7.824E-01	445	9.966E+01	486	3.086E+01	527	5.378E+01	568	6.258E+01
405	8.349E-01	446	1.051E+02	487	3.181E+01	528	5.389E+01	569	6.257E+01
406	9.476E-01	447	1.085E+02	488	3.271E+01	529	5.410E+01	570	6.274E+01
407	1.044E+00	448	1.102E+02	489	3.380E+01	530	5.434E+01	571	6.283E+01
408	1.172E+00	449	1.093E+02	490	3.468E+01	531	5.460E+01	572	6.309E+01
409	1.326E+00	450	1.061E+02	491	3.576E+01	532	5.473E+01	573	6.306E+01
410	1.449E+00	451	1.010E+02	492	3.688E+01	533	5.478E+01	574	6.324E+01
411	1.637E+00	452	9.404E+01	493	3.794E+01	534	5.519E+01	575	6.340E+01
412	1.922E+00	453	8.614E+01	494	3.904E+01	535	5.546E+01	576	6.347E+01
413	2.222E+00	454	7.815E+01	495	4.010E+01	536	5.565E+01	577	6.350E+01
414	2.600E+00	455	7.069E+01	496	4.104E+01	537	5.596E+01	578	6.365E+01
415	2.996E+00	456	6.383E+01	497	4.213E+01	538	5.625E+01	579	6.380E+01
416	3.464E+00	457	5.819E+01	498	4.302E+01	539	5.656E+01	580	6.388E+01
417	4.036E+00	458	5.365E+01	499	4.403E+01	540	5.683E+01	581	6.398E+01
418	4.680E+00	459	5.006E+01	500	4.486E+01	541	5.713E+01	582	6.399E+01
419	5.451E+00	460	4.737E+01	501	4.564E+01	542	5.741E+01	583	6.404E+01
420	6.256E+00	461	4.525E+01	502	4.627E+01	543	5.769E+01	584	6.413E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.411E+01	626	5.104E+01	667	2.238E+01	708	6.977E+00	749	1.986E+00
586	6.417E+01	627	5.044E+01	668	2.177E+01	709	6.731E+00	750	1.948E+00
587	6.421E+01	628	4.965E+01	669	2.125E+01	710	6.544E+00	751	1.871E+00
588	6.426E+01	629	4.893E+01	670	2.066E+01	711	6.314E+00	752	1.847E+00
589	6.417E+01	630	4.834E+01	671	2.013E+01	712	6.117E+00	753	1.777E+00
590	6.425E+01	631	4.764E+01	672	1.958E+01	713	5.919E+00	754	1.720E+00
591	6.404E+01	632	4.679E+01	673	1.896E+01	714	5.760E+00	755	1.646E+00
592	6.403E+01	633	4.625E+01	674	1.852E+01	715	5.570E+00	756	1.611E+00
593	6.390E+01	634	4.539E+01	675	1.807E+01	716	5.409E+00	757	1.556E+00
594	6.373E+01	635	4.470E+01	676	1.754E+01	717	5.227E+00	758	1.528E+00
595	6.364E+01	636	4.400E+01	677	1.713E+01	718	5.081E+00	759	1.463E+00
596	6.357E+01	637	4.319E+01	678	1.671E+01	719	4.955E+00	760	1.428E+00
597	6.337E+01	638	4.253E+01	679	1.623E+01	720	4.775E+00	761	1.418E+00
598	6.312E+01	639	4.169E+01	680	1.582E+01	721	4.676E+00	762	1.366E+00
599	6.300E+01	640	4.104E+01	681	1.533E+01	722	4.535E+00	763	1.338E+00
600	6.279E+01	641	4.032E+01	682	1.502E+01	723	4.413E+00	764	1.279E+00
601	6.254E+01	642	3.950E+01	683	1.461E+01	724	4.265E+00	765	1.226E+00
602	6.225E+01	643	3.872E+01	684	1.412E+01	725	4.158E+00	766	1.212E+00
603	6.204E+01	644	3.799E+01	685	1.381E+01	726	4.036E+00	767	1.171E+00
604	6.177E+01	645	3.726E+01	686	1.339E+01	727	3.890E+00	768	1.147E+00
605	6.140E+01	646	3.661E+01	687	1.306E+01	728	3.780E+00	769	1.134E+00
606	6.107E+01	647	3.578E+01	688	1.271E+01	729	3.687E+00	770	1.073E+00
607	6.077E+01	648	3.501E+01	689	1.232E+01	730	3.552E+00	771	1.053E+00
608	6.032E+01	649	3.439E+01	690	1.196E+01	731	3.443E+00	772	1.025E+00
609	6.000E+01	650	3.363E+01	691	1.157E+01	732	3.347E+00	773	9.913E-01
610	5.966E+01	651	3.283E+01	692	1.131E+01	733	3.283E+00	774	9.645E-01
611	5.924E+01	652	3.214E+01	693	1.099E+01	734	3.140E+00	775	9.448E-01
612	5.882E+01	653	3.149E+01	694	1.070E+01	735	3.070E+00	776	9.208E-01
613	5.839E+01	654	3.078E+01	695	1.030E+01	736	2.962E+00	777	9.201E-01
614	5.780E+01	655	3.011E+01	696	1.002E+01	737	2.873E+00	778	8.770E-01
615	5.735E+01	656	2.943E+01	697	9.721E+00	738	2.780E+00	779	8.822E-01
616	5.696E+01	657	2.877E+01	698	9.464E+00	739	2.730E+00	780	8.839E-01
617	5.637E+01	658	2.806E+01	699	9.195E+00	740	2.618E+00		
618	5.583E+01	659	2.743E+01	700	8.910E+00	741	2.530E+00		
619	5.528E+01	660	2.678E+01	701	8.665E+00	742	2.459E+00		
620	5.485E+01	661	2.613E+01	702	8.396E+00	743	2.395E+00		
621	5.423E+01	662	2.551E+01	703	8.119E+00	744	2.321E+00		
622	5.355E+01	663	2.483E+01	704	7.890E+00	745	2.254E+00		
623	5.299E+01	664	2.425E+01	705	7.691E+00	746	2.187E+00		
624	5.225E+01	665	2.364E+01	706	7.401E+00	747	2.104E+00		
625	5.167E+01	666	2.300E+01	707	7.223E+00	748	2.067E+00		

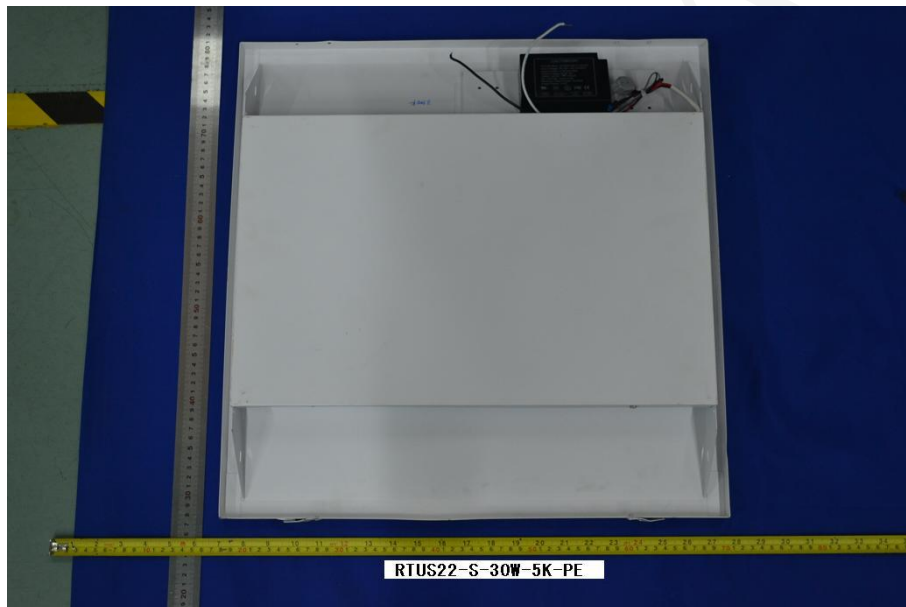
CIE 1931 x y Chromaticity Diagram

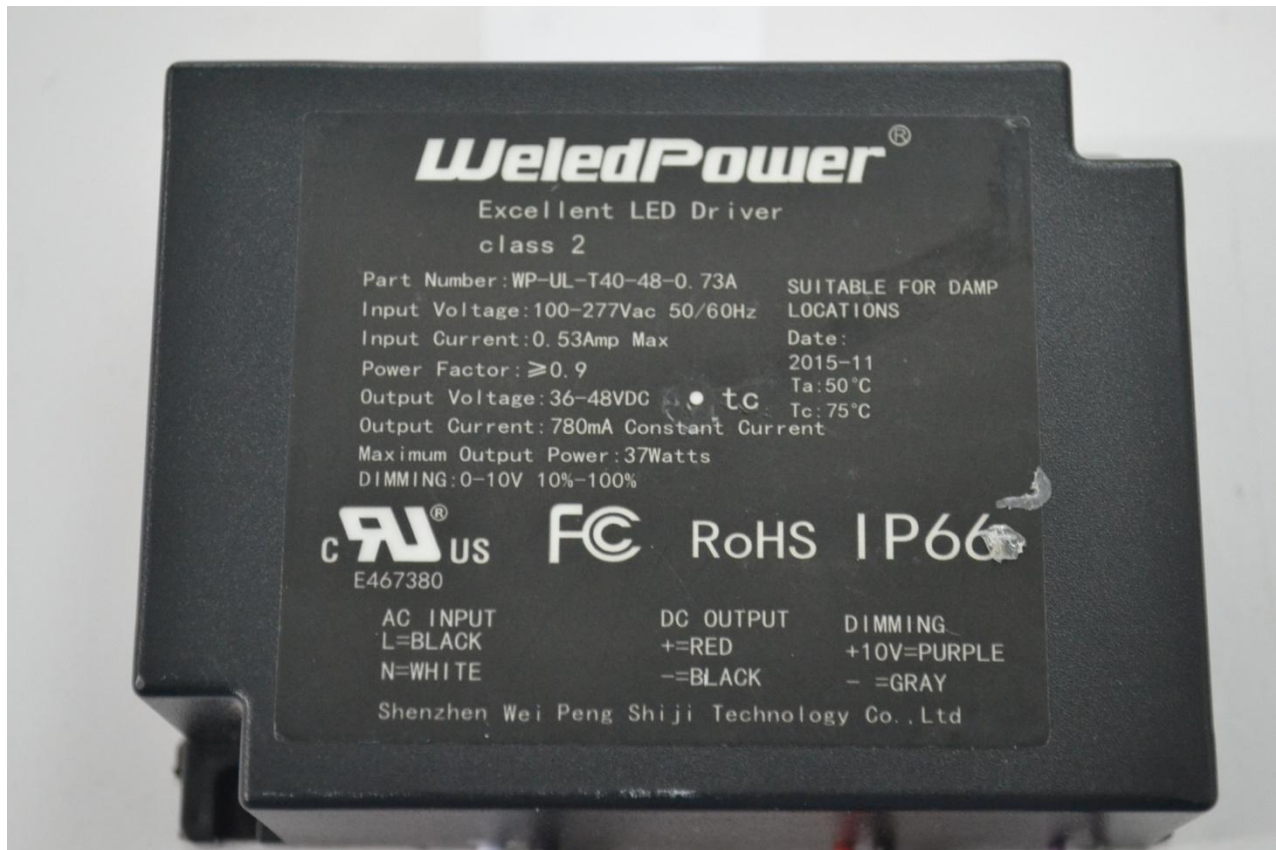


7-Step Chromaticity Quadrangles



6. Product Photo





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