LM-79-19 TEST REPORT

for

GREEN CREATIVE LTD

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

LED Lamp

Model: 9.5PLO/8CCTS/DIR

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ23070004h

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Review by: Wei Fei

Engineer: Wei Fei

Jul. 24, 2023

Approved by: April Zou

Manager: April Zou

Jul. 24, 2023

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

TEST SUMMARY

Tested Model	9.5PLO/8CCTS/DIR 3000K Setting	9.5PLO/8CCTS/DIR 3500K Setting	9.5PLO/8CCTS/DIR 4000K Setting
Luminous Efficacy (Lumens /Watt)	112.4	121.1	115.8
Total Luminous Flux (Lumens)	1271.4	1339.8	1309.9
Power (Watts)/2	11.31	11.06	11.31
Power Factor	0.9950	0.9950	0.9950
CCT (K)	3048	3487	4029
CRI	82.7	83.9	83.4
Stabilization Time (Light & Power)	50 mins	50 mins	50 mins
Note	3000K	3500K	4000K

Table 1: Executive Data Summary

Test specifications:	
Date of Receipt	: Jul. 06, 2023
Date of Test	: Jul. 12, 2023
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	: IESNA LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

TABLE OF CONTENT

SAMPLE PHOTO

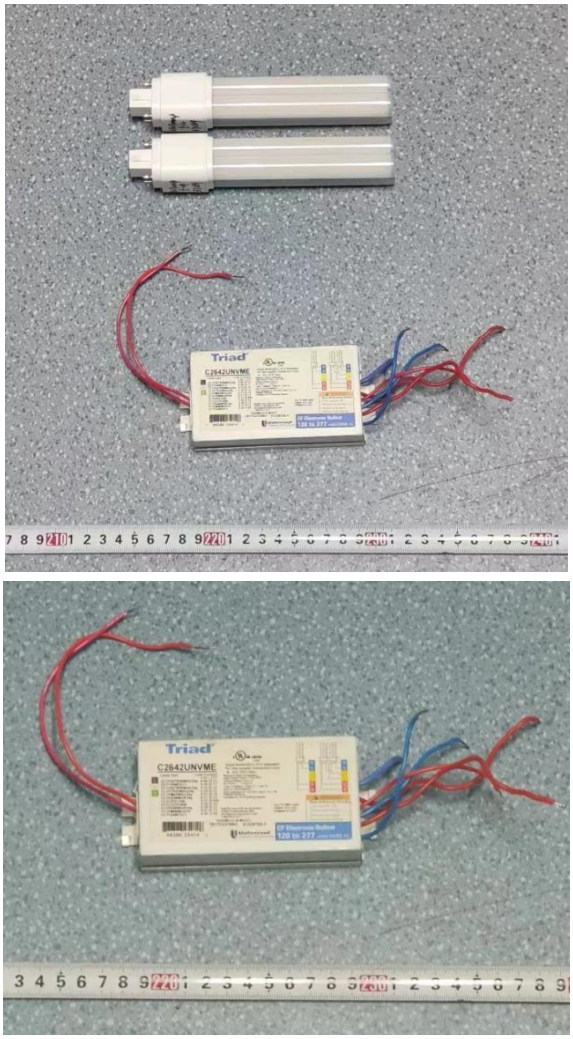


Figure 1- Overview of the sample

Equipment Under Test(EUT)	
Name	: LED Lamp
Model	: 9.5PLO/8CCTS/DIR
Electrical Ratings	: 120-277V, 50/60Hz, 9.5W
Product Description	: Color- Tunable 3000K/3500K/4000K LED Lamps supplied by a high frequency fluorescent lamp ballast: C2642UNVME
Manufacturer	: GREEN CREATIVE LTD
Address	: Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL, Hong Kong

TEST RESULTS (3000K Setting)

Test ambient temperature was 26.0 ℃.

Base orientation was base up Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.189	0.084
Power Factor	0.9950	0.9770
Test Power (W)/2	11.31	11.39
THD A%	8.38	8.46
Luminous Efficacy (lm/W)	112.4	111.8
Total Luminous Flux (lm)	1271.4	1272.9
Color Rendering Index (CRI)	82.7	
R9	7.6	
Correlated Color Temperature (CCT)(K)	3048	
Chromaticity Chroma x	0.4311	
Chromaticity Chroma y	0.3980	
Chromaticity Chroma u	0.2494	
Chromaticity Chroma v	0.3454	
Duv	-0.0016	
Chromaticity Chroma u ’	0.2494	
Chromaticity Chroma v’	0.5181	

Special Color Rendering Indices	
R1	82.1
R2	93.7
R3	93
R4	79.5
R5	82.7
R6	92.4
R7	80.6
R8	57.8
R9	7.6
R10	85.8
R11	79.1
R12	74.6
R13	85.3
R14	96.8

Table 2: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u’,v’) diagram, u’ = u = 4x/(-2x+12y+3), v’ = 3v/2 = 9y/(-2x+12y+3).

Spectral Power Distribution - Sphere Spectroradiometer Method

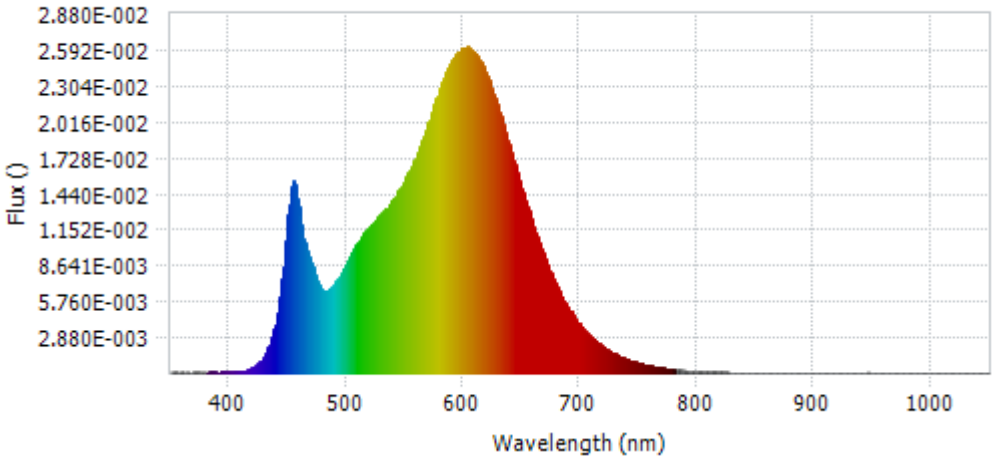
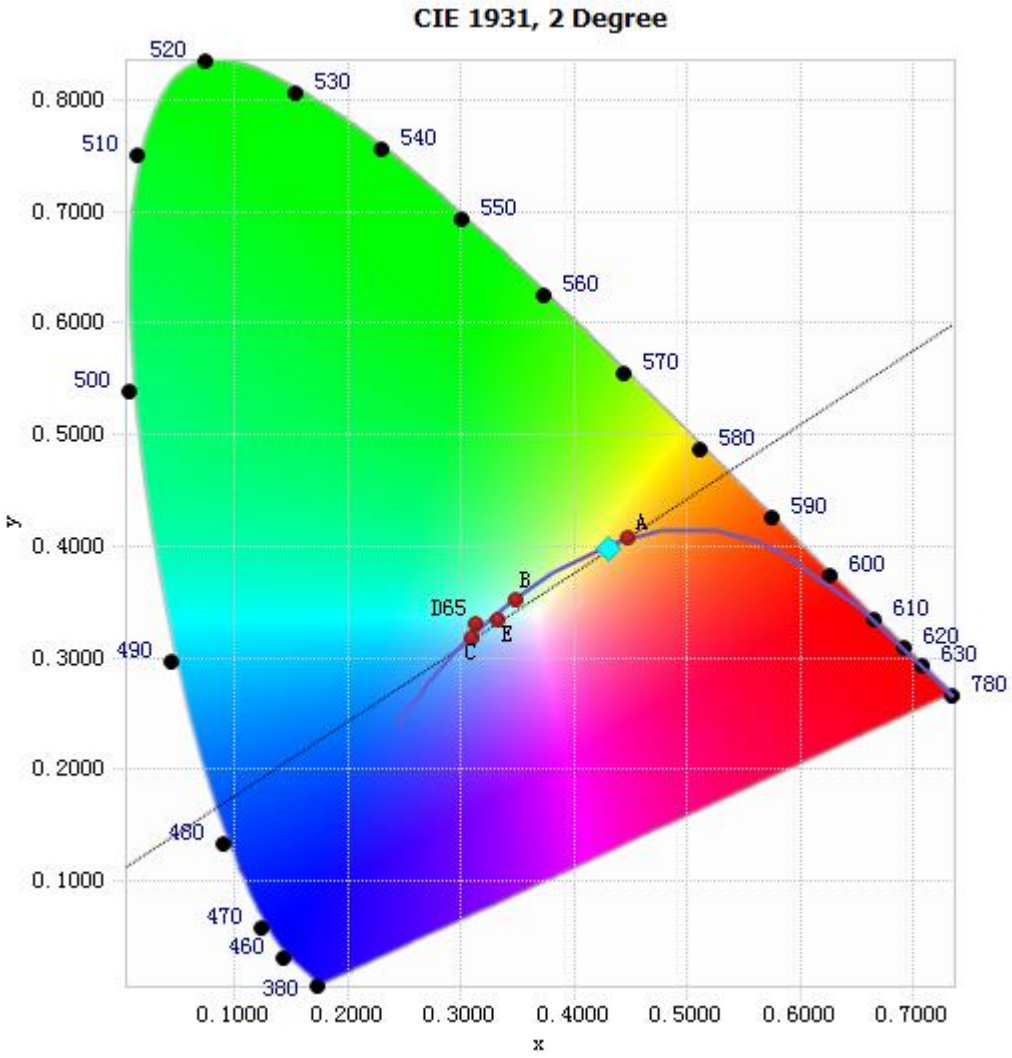


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	8.19E-05	485	6.73E-03	590	2.51E-02	695	4.50E-03
385	6.90E-05	490	7.19E-03	595	2.57E-02	700	3.86E-03
390	7.67E-05	495	7.91E-03	600	2.61E-02	705	3.29E-03
395	9.37E-05	500	8.84E-03	605	2.60E-02	710	2.83E-03
400	6.50E-05	505	9.74E-03	610	2.56E-02	715	2.44E-03
405	9.17E-05	510	1.05E-02	615	2.49E-02	720	2.08E-03
410	1.37E-04	515	1.12E-02	620	2.38E-02	725	1.78E-03
415	2.68E-04	520	1.17E-02	625	2.26E-02	730	1.53E-03
420	4.61E-04	525	1.23E-02	630	2.11E-02	735	1.30E-03
425	8.48E-04	530	1.28E-02	635	1.96E-02	740	1.10E-03
430	1.47E-03	535	1.33E-02	640	1.81E-02	745	9.54E-04
435	2.55E-03	540	1.40E-02	645	1.64E-02	750	8.12E-04
440	4.35E-03	545	1.46E-02	650	1.48E-02	755	6.94E-04
445	7.57E-03	550	1.54E-02	655	1.33E-02	760	5.94E-04
450	1.27E-02	555	1.64E-02	660	1.18E-02	765	5.10E-04
455	1.54E-02	560	1.75E-02	665	1.04E-02	770	4.33E-04
460	1.26E-02	565	1.87E-02	670	9.13E-03	775	3.72E-04
465	1.01E-02	570	2.01E-02	675	7.98E-03	780	3.26E-04
470	8.88E-03	575	2.15E-02	680	6.95E-03		
475	7.36E-03	580	2.28E-02	685	6.04E-03		
480	6.53E-03	585	2.42E-02	690	5.21E-03		

Table 3: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4311, 0.3980)

Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

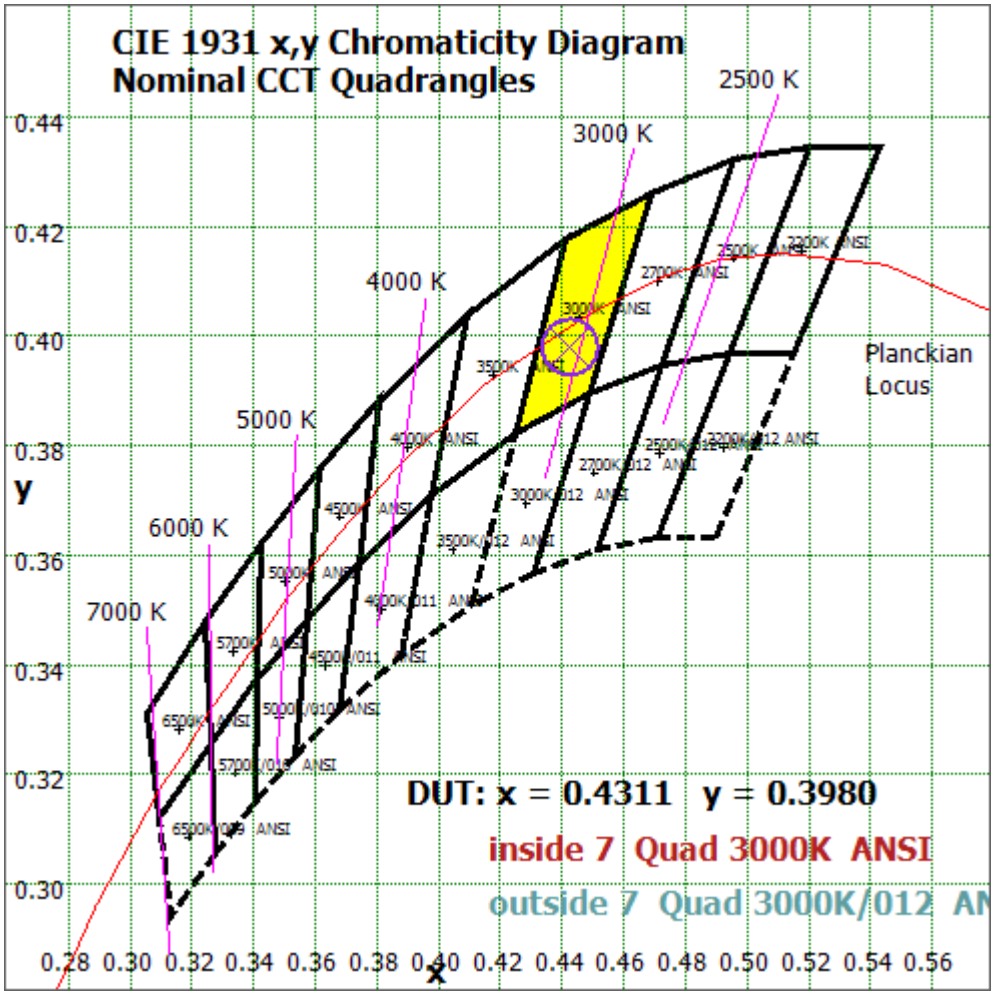


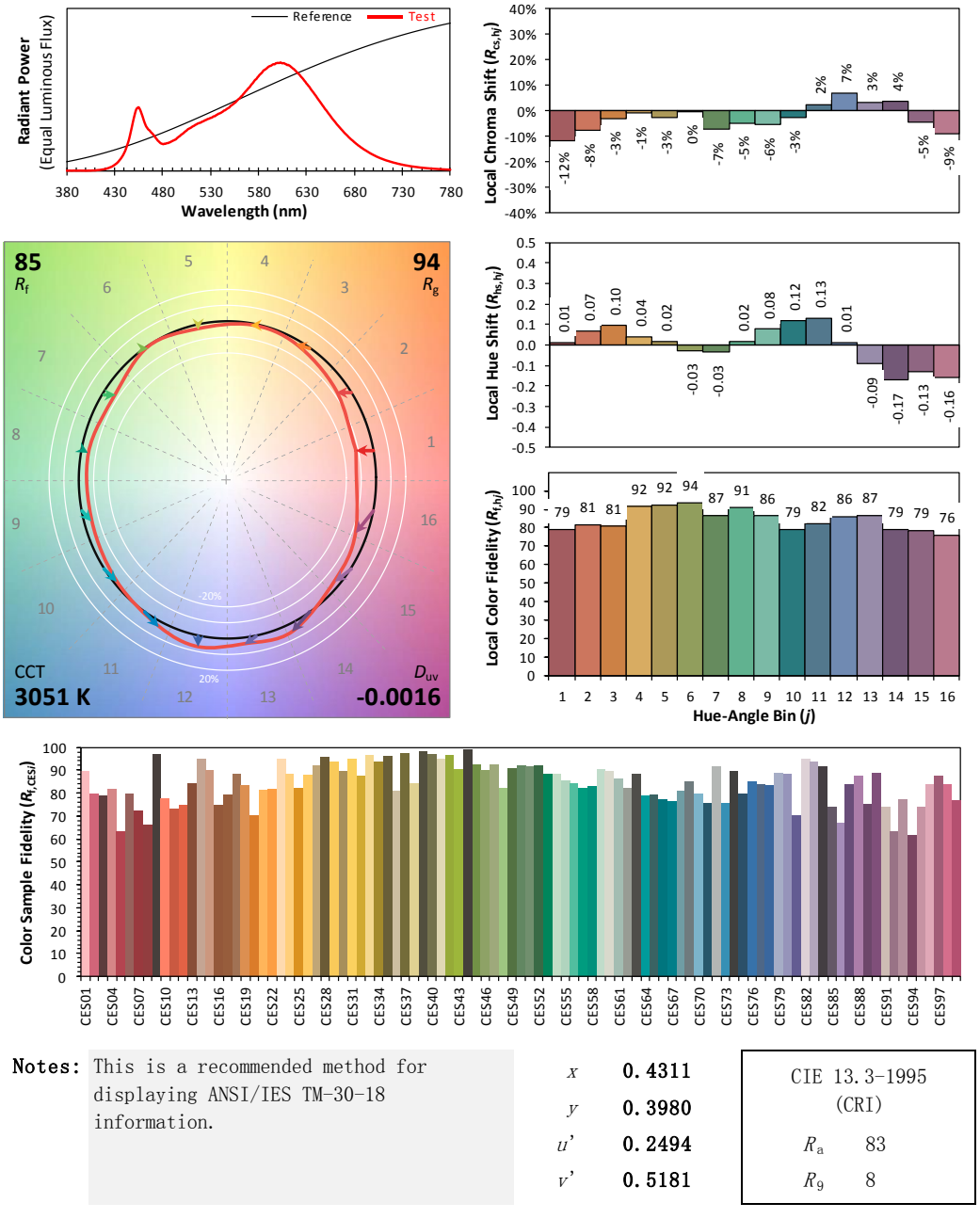
Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

ANSI/IES TM-30-18 Color Rendition Report

Source: LED **Manufacturer:** GREEN CREATIVE LTD

Date: 2023/07/12 **Model:** 9.5PLO/8CCTS/DIR



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

x	0.4311
y	0.3980
u'	0.2494
v'	0.5181

CIE 13.3-1995 (CRI)

R_a	83
R_9	8

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Chart 4: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 2 due to rounding.

Goniophotometer Method

Test ambient temperature was 25.1 ℃.

The photometric distance is 2.47 m.

Luminous data was taken at 0.5 °vertical intervals and 10 °horizontal intervals.

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.190
Power Factor	0.9959
Power (W)/2	11.35
Luminous Efficacy (lm/W)	112.9
Total Luminous Flux (lm)	1281.8
Beam Angle (°)	335.5 (0^o-180^o) / 327.6 (90^o-270^o)
Center Beam Candle Power (cd)	11.6
Maximum Beam Candle Power (cd)	141.7 (At: C=0.0, Gamma=88.5)
Spacing Criteria	4.87 (0^o-180^o) / 4.90 (90^o-270^o)
Zonal Lumens in the 0 °-60 °Zone	19.72%
Zonal Lumens in the 60 °-90 °Zone	32.31%
Zonal Lumens in the 90 °-120 °Zone	31.46%
Zonal Lumens in the 120 °-180 °Zone	16.51%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

γ(°)	Lumens	% Total
0- 10	1.685	0.13%
10- 20	9.357	0.73%
20- 30	24.632	1.92%
30- 40	46.326	3.61%
40- 50	72.015	5.62%
50- 60	98.794	7.71%
60- 70	123.027	9.60%
70- 80	141.033	11.00%
80- 90	150.111	11.71%
90-100	148.977	11.62%
100-110	137.313	10.71%
110-120	116.933	9.12%
120-130	91.162	7.11%
130-140	63.561	4.96%
140-150	37.652	2.94%
150-160	16.034	1.25%
160-170	3.082	0.24%
170-180	0.063	0.00%
Total	1281.8	100%

γ(°)	Lumens	% Total
0- 60	252.809	19.72%
60- 90	414.171	32.31%
0-90	666.98	52.04%
90- 180	614.777	47.96%
0- 180	1281.8	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

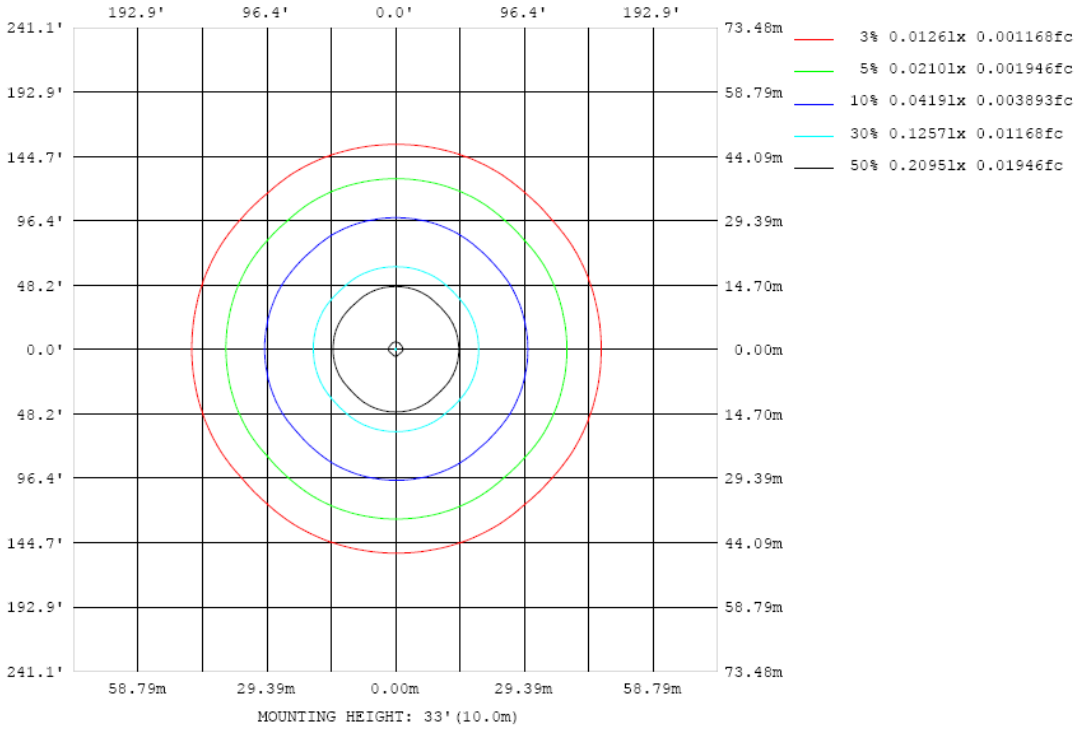


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

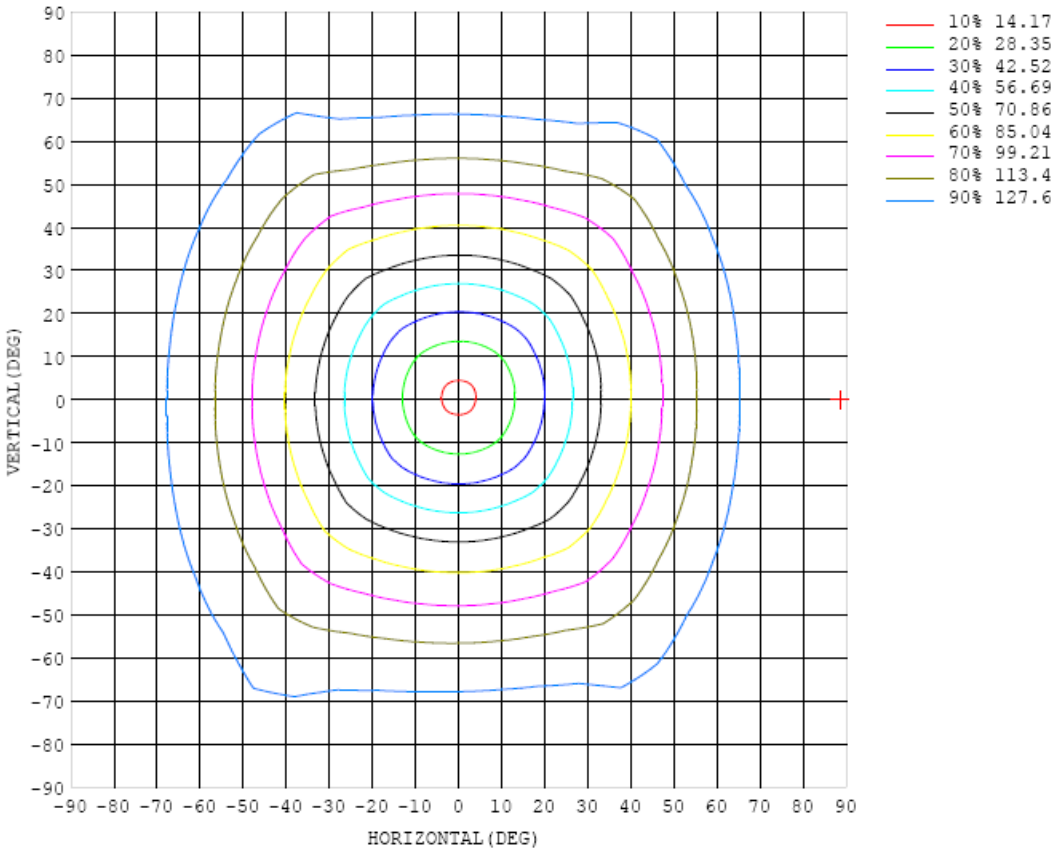


Chart 6: Isocandela Plot

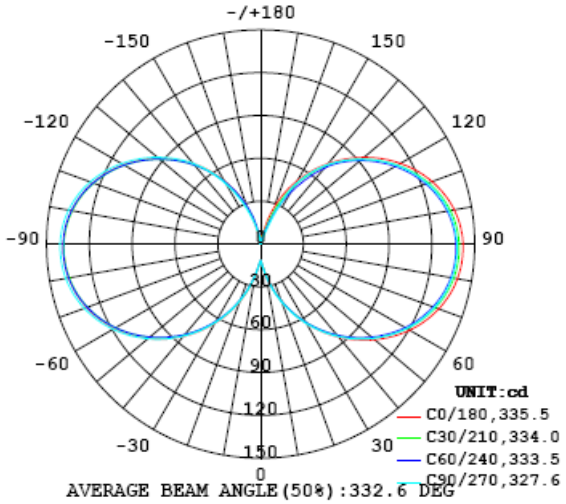


Chart 7: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1 UNIT: cd

C(DEG) / γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6
5	15.3	15.3	15.4	15.4	15.3	15.4	15.5	15.7	15.8	15.8	15.7	15.7	15.6	15.5	15.4	15.4	15.4	15.4	15.3
10	22.7	22.8	22.8	22.7	22.6	22.7	23.0	23.2	23.4	23.4	23.4	23.3	23.1	22.8	22.6	22.8	22.9	22.9	22.8
15	32.2	32.3	32.2	32.1	31.7	31.8	32.3	32.7	32.9	32.9	32.9	32.6	32.4	31.9	31.7	32.1	32.3	32.4	32.3
20	42.7	42.7	42.6	42.3	41.7	41.7	42.5	43.0	43.2	43.3	43.2	42.9	42.5	41.8	41.5	42.2	42.6	42.8	42.7
25	53.4	53.5	53.3	52.8	51.9	51.9	52.9	53.5	53.9	53.9	53.8	53.4	52.9	51.9	51.6	52.6	53.1	53.4	53.4
30	64.2	64.3	64.0	63.3	62.1	62.0	63.3	64.0	64.4	64.4	64.3	63.8	63.1	62.0	61.5	62.8	63.6	64.0	64.1
35	74.9	74.9	74.5	73.7	72.1	71.9	73.4	74.3	74.7	74.7	74.5	74.0	73.2	71.8	71.3	72.9	73.9	74.4	74.4
40	85.1	85.1	84.6	83.6	81.8	81.5	83.3	84.2	84.6	84.6	84.3	83.8	82.9	81.2	80.6	82.6	83.8	84.3	84.4
45	94.9	94.9	94.3	93.2	91.0	90.5	92.6	93.6	94.0	94.0	93.7	93.0	92.1	90.2	89.6	91.9	93.2	93.8	93.9
50	104	104	104	102	99.8	99.2	101	103	103	103	102	102	101	98.7	98.0	101	102	103	103
55	113	113	112	111	108	107	110	111	111	111	111	110	109	107	106	109	110	111	111
60	121	121	120	118	115	114	117	118	118	118	118	117	116	114	113	116	117	118	118
65	127	127	126	125	122	121	123	125	125	125	124	123	122	120	119	122	124	124	125
70	133	133	132	130	127	126	129	130	130	130	129	128	127	125	124	127	129	129	130
75	137	137	136	135	131	130	133	134	134	134	133	132	131	129	128	131	133	133	134
80	140	140	139	137	134	132	135	136	137	136	136	135	134	131	130	134	136	136	137
85	142	141	141	139	135	134	137	138	138	138	137	136	135	133	132	135	137	138	138
90	142	142	141	139	135	134	137	138	138	138	137	136	135	133	132	136	137	138	138
95	141	140	140	138	134	133	136	137	137	136	136	135	134	131	131	134	136	136	137
100	138	138	137	135	131	130	133	134	134	134	133	132	131	129	128	132	133	134	134
105	134	133	132	131	127	126	129	130	130	130	129	128	127	125	124	128	129	130	130
110	128	128	127	125	122	120	123	124	125	124	124	123	122	120	119	122	124	125	125
115	121	121	120	118	115	114	117	118	118	118	117	117	116	113	112	116	117	118	119
120	113	113	112	110	107	106	109	110	110	110	110	109	108	106	105	108	110	111	111
125	104	104	103	102	98.9	97.9	100	101	102	102	101	101	99.7	97.6	96.9	99.7	101	102	103
130	94.5	94.4	93.6	92.2	89.7	88.9	90.9	92.1	92.5	92.5	92.2	91.5	90.6	85.5	84.7	90.5	92.1	92.9	93.6
135	84.2	84.1	83.4	82.2	80.0	79.3	81.1	82.0	82.7	82.7	82.4	81.7	81.0	71.2	69.8	80.3	82.3	83.1	83.8
140	73.6	73.5	72.8	71.7	69.3	66.7	69.4	69.9	72.4	72.4	72.1	70.7	70.3	58.7	56.0	69.2	71.9	72.8	73.5
145	62.6	62.4	61.8	59.7	56.2	52.0	55.3	57.1	61.4	61.0	61.5	59.6	58.4	48.4	44.4	58.3	60.5	61.5	62.7
150	51.0	51.0	50.6	46.9	42.7	36.8	41.3	43.7	48.6	47.9	48.8	47.5	46.4	37.4	34.0	45.8	47.9	49.8	51.2
155	39.3	39.2	38.4	33.5	29.6	22.8	27.2	28.0	30.9	25.0	31.3	30.7	28.4	26.9	25.5	31.5	32.9	37.1	39.5
160	26.7	26.5	25.3	17.8	10.3	8.23	12.1	12.7	12.9	2.14	7.53	9.65	8.16	11.1	16.3	19.2	20.1	20.7	27.4
165	12.9	12.2	10.6	6.87	3.56	0.34	2.64	2.50	1.12	0.28	2.03	4.27	4.96	4.86	7.09	7.93	8.13	10.5	10.9
170	1.95	1.52	1.01	0.46	0.14	0.14	0.15	0.16	0.16	0.16	0.16	0.17	0.16	0.15	0.17	0.22	0.35	0.94	2.36
175	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.16	0.15	0.14
180	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.08	0.08	0.08

Table 6: Luminous Intensity Data

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6		
5	15.3	15.2	15.0	14.8	14.7	14.8	14.8	14.8	14.8	14.7	14.7	14.7	14.7	14.7	14.9	15.0	15.1		
10	22.7	22.5	22.2	21.9	21.6	21.8	21.9	21.9	21.9	21.8	21.7	21.6	21.5	21.6	21.9	22.1	22.4		
15	32.2	31.9	31.6	31.0	30.7	31.1	31.3	31.4	31.3	31.2	31.0	30.8	30.5	30.6	31.1	31.5	31.8		
20	42.6	42.3	41.8	41.0	40.6	41.2	41.6	41.8	41.7	41.6	41.3	41.0	40.4	40.5	41.3	41.8	42.2		
25	53.4	53.0	52.4	51.3	50.9	51.8	52.4	52.6	52.6	52.4	52.0	51.6	50.7	50.8	51.8	52.5	52.9		
30	64.0	63.6	62.9	61.7	61.1	62.3	63.1	63.4	63.4	63.2	62.8	62.2	61.1	61.0	62.4	63.2	63.7		
35	74.4	74.0	73.2	71.7	71.1	72.6	73.6	74.0	74.0	73.8	73.3	72.7	71.3	71.2	72.8	73.8	74.3		
40	84.5	84.1	83.2	81.5	80.8	82.7	83.8	84.2	84.2	84.0	83.6	82.8	81.2	81.0	83.0	84.1	84.6		
45	94.0	93.6	92.7	90.7	90.0	92.3	93.5	94.0	94.0	93.8	93.3	92.5	90.6	90.5	92.7	93.9	94.4		
50	103	103	102	99.5	98.8	101	103	103	103	103	103	102	99.7	99.5	102	103	104		
55	111	111	110	108	107	110	111	112	112	112	111	110	108	108	111	112	112		
60	119	118	117	115	114	117	119	119	119	119	119	118	116	116	118	120	120		
65	125	125	124	121	121	124	126	126	126	126	126	125	122	122	125	127	127		
70	130	130	129	127	126	129	131	132	132	131	131	131	128	128	131	132	133		
75	134	134	133	131	130	134	135	136	136	136	136	135	132	132	135	137	137		
80	137	137	136	134	133	137	138	139	139	139	139	138	135	135	138	140	140		
85	138	138	138	135	134	138	140	140	140	140	140	140	137	137	140	141	141		
90	139	139	138	135	135	138	140	141	140	141	140	140	137	137	140	142	142		
95	137	137	137	134	134	137	139	139	139	139	139	139	136	136	139	140	141		
100	135	135	134	132	131	135	136	137	137	137	137	136	133	133	136	138	138		
105	131	131	130	127	127	130	132	133	133	133	132	132	129	129	132	133	134		
110	126	125	125	122	122	125	127	127	127	127	127	126	123	123	126	128	128		
115	119	119	118	116	115	118	120	120	120	120	120	119	117	117	119	121	121		
120	111	111	110	108	108	111	112	113	113	113	112	111	109	109	111	113	113		
125	103	103	102	99.7	99.4	102	103	104	104	104	103	103	100	100	102	104	104		
130	93.8	93.5	92.5	90.6	90.3	92.5	93.9	94.5	94.6	94.4	93.9	92.9	90.9	90.6	92.8	94.1	94.5		
135	84.0	83.6	82.6	80.9	80.6	82.6	83.8	84.4	84.5	84.3	83.7	82.8	80.9	80.8	82.6	83.8	84.3		
140	73.6	73.2	72.3	70.8	70.6	72.2	73.2	73.7	73.9	73.7	73.1	71.5	70.2	69.8	72.0	73.1	73.6		
145	62.8	62.4	61.6	60.4	60.1	61.4	62.4	62.1	61.6	61.9	61.1	60.2	58.2	58.7	60.4	61.9	62.5		
150	51.5	51.3	50.4	49.6	49.5	50.4	51.1	50.2	48.6	46.6	45.7	47.2	46.5	46.6	49.1	50.1	51.0		
155	39.8	39.8	38.3	37.4	38.7	39.3	39.5	38.2	35.2	31.2	30.0	33.0	34.8	34.6	37.5	38.6	39.1		
160	27.8	27.9	27.0	25.6	27.9	28.3	28.1	26.6	22.1	17.4	15.9	18.5	23.1	23.3	25.1	26.8	27.3		
165	12.5	15.0	15.2	14.9	17.4	17.7	17.6	15.9	11.6	6.67	4.60	6.77	12.1	14.5	13.2	14.6	14.7		
170	2.53	2.75	2.58	4.50	5.83	6.39	6.73	6.43	4.12	1.83	1.65	1.92	3.56	4.80	3.79	3.19	3.29		
175	0.14	0.14	0.14	0.13	0.14	0.13	0.13	0.13	0.12	0.12	0.14	0.14	0.14	0.13	0.13	0.11	0.11		
180	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08		

Table 7: Luminous Intensity Data

TEST RESULTS (3500K Setting)

Test ambient temperature was 26.0 ℃.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.185	0.083
Power Factor	0.9950	0.9760
Test Power (W)/2	11.06	11.15
THD A%	8.45	8.41
Luminous Efficacy (lm/W)	121.1	120.3
Total Luminous Flux (lm)	1339.8	1341.0
Color Rendering Index (CRI)	83.9	
R9	12.8	
Correlated Color Temperature (CCT)(K)	3487	
Chromaticity Chroma x	0.4036	
Chromaticity Chroma y	0.3850	
Chromaticity Chroma u	0.2370	
Chromaticity Chroma v	0.3391	
Duv	-0.0022	
Chromaticity Chroma u ’	0.2370	
Chromaticity Chroma v’	0.5086	

Special Color Rendering Indices	
R1	84.1
R2	95.6
R3	92.1
R4	79.8
R5	84.3
R6	92.7
R7	81.2
R8	61.1
R9	12.8
R10	89.1
R11	79.3
R12	70.8
R13	87.7
R14	96.4

Table 8: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u’,v’) diagram, u’ = u = 4x/(-2x+12y+3), v’ = 3v/2 = 9y/(-2x+12y+3).

Spectral Power Distribution - Sphere Spectroradiometer Method

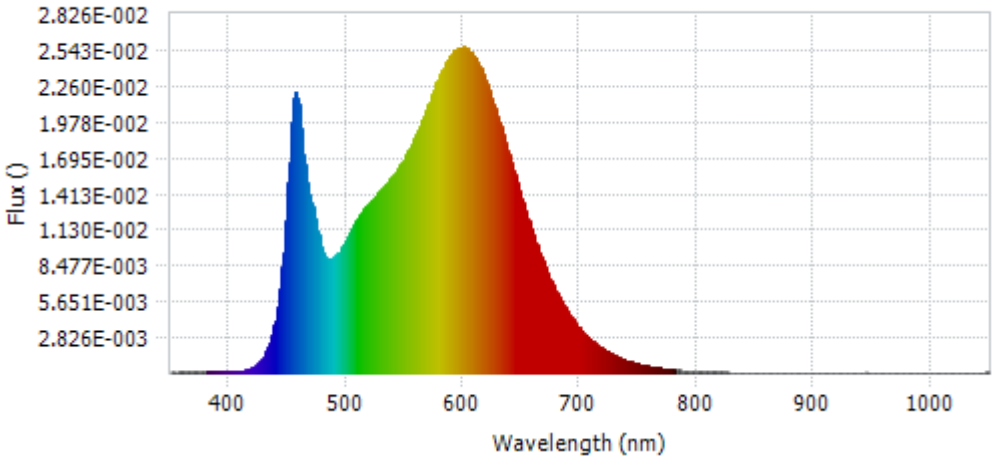
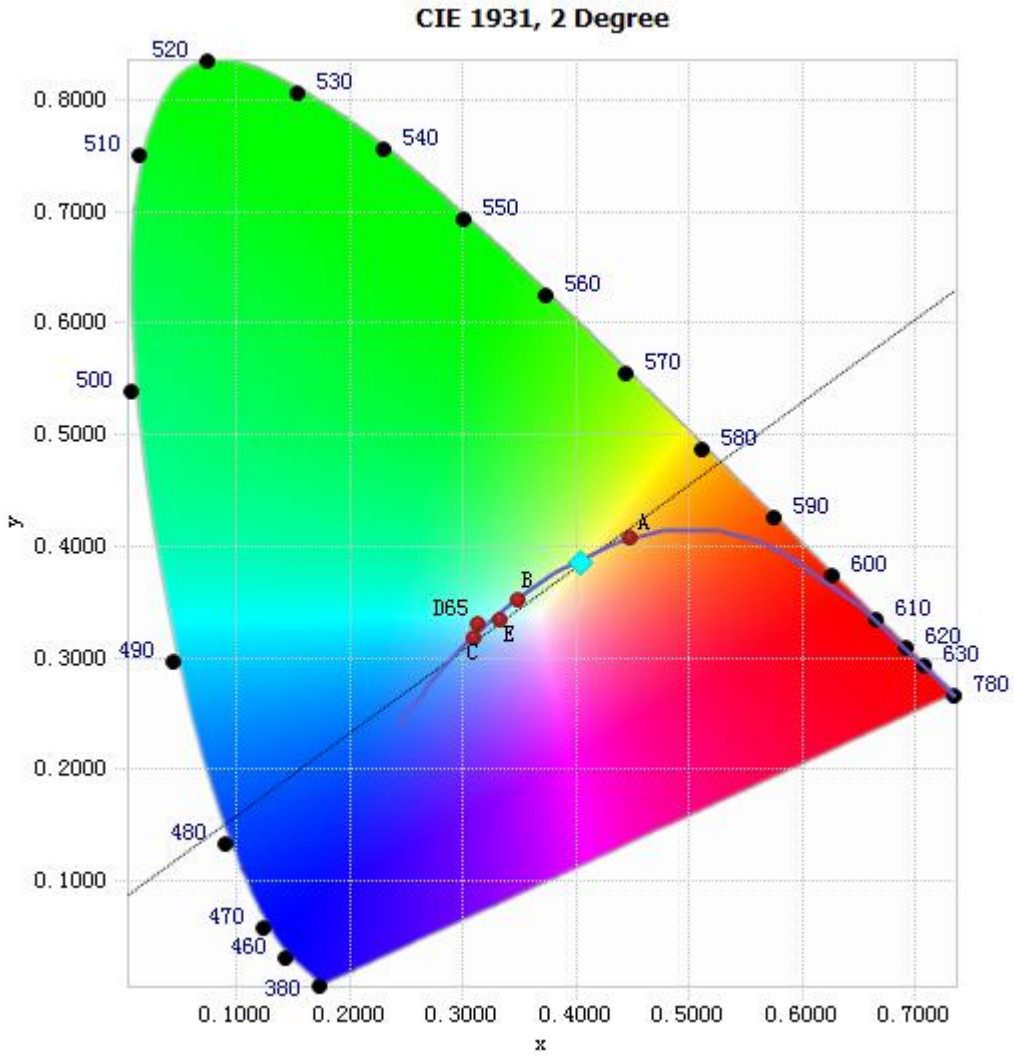


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.15E-04	485	8.94E-03	590	2.51E-02	695	4.06E-03
385	1.07E-04	490	9.22E-03	595	2.56E-02	700	3.49E-03
390	1.15E-04	495	9.74E-03	600	2.57E-02	705	2.99E-03
395	1.01E-04	500	1.05E-02	605	2.53E-02	710	2.56E-03
400	9.94E-05	505	1.14E-02	610	2.48E-02	715	2.20E-03
405	1.28E-04	510	1.22E-02	615	2.39E-02	720	1.88E-03
410	1.56E-04	515	1.29E-02	620	2.27E-02	725	1.62E-03
415	2.59E-04	520	1.34E-02	625	2.14E-02	730	1.37E-03
420	4.49E-04	525	1.39E-02	630	1.99E-02	735	1.16E-03
425	8.31E-04	530	1.45E-02	635	1.84E-02	740	9.91E-04
430	1.46E-03	535	1.49E-02	640	1.69E-02	745	8.53E-04
435	2.64E-03	540	1.55E-02	645	1.53E-02	750	7.30E-04
440	4.67E-03	545	1.62E-02	650	1.37E-02	755	6.22E-04
445	8.41E-03	550	1.69E-02	655	1.22E-02	760	5.29E-04
450	1.51E-02	555	1.79E-02	660	1.09E-02	765	4.57E-04
455	2.17E-02	560	1.88E-02	665	9.54E-03	770	3.87E-04
460	2.03E-02	565	2.00E-02	670	8.33E-03	775	3.37E-04
465	1.56E-02	570	2.12E-02	675	7.29E-03	780	2.83E-04
470	1.34E-02	575	2.23E-02	680	6.33E-03		
475	1.13E-02	580	2.34E-02	685	5.47E-03		
480	9.41E-03	585	2.45E-02	690	4.71E-03		

Table 9: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4036, 0.3850)

Chart 9: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

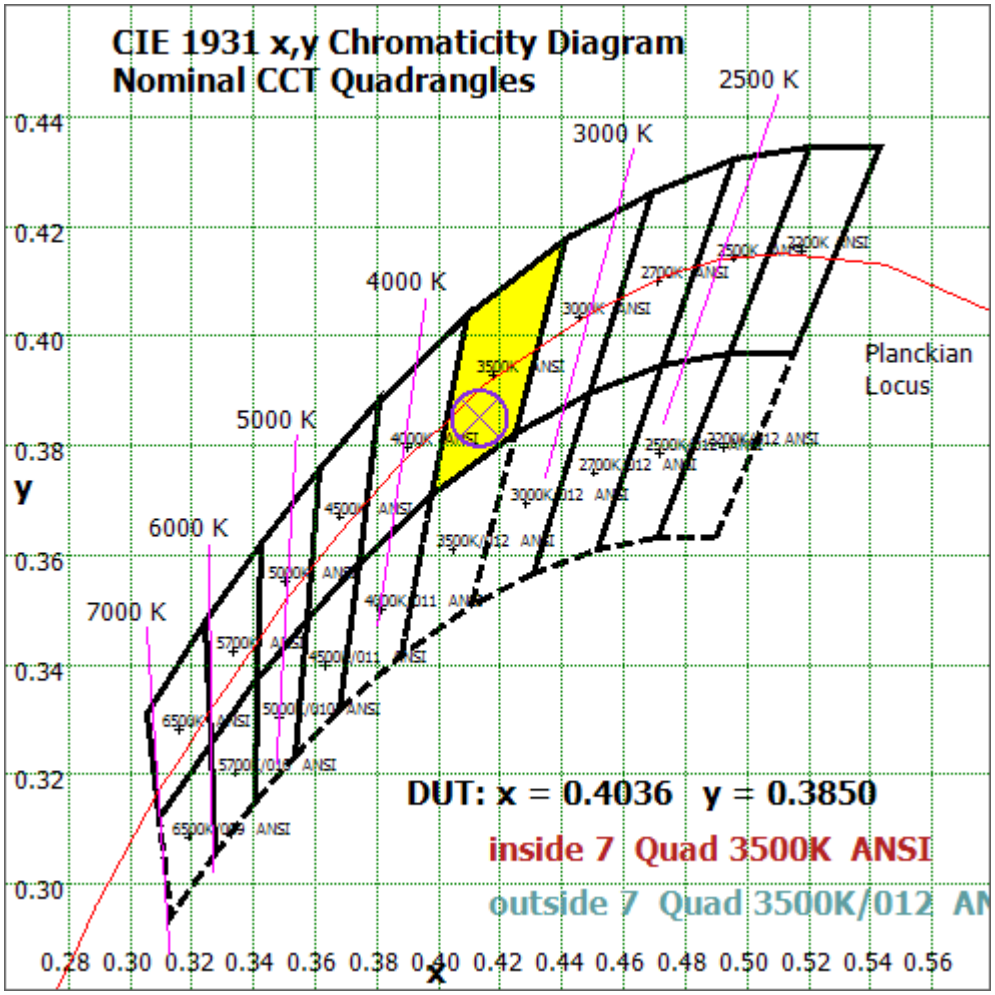


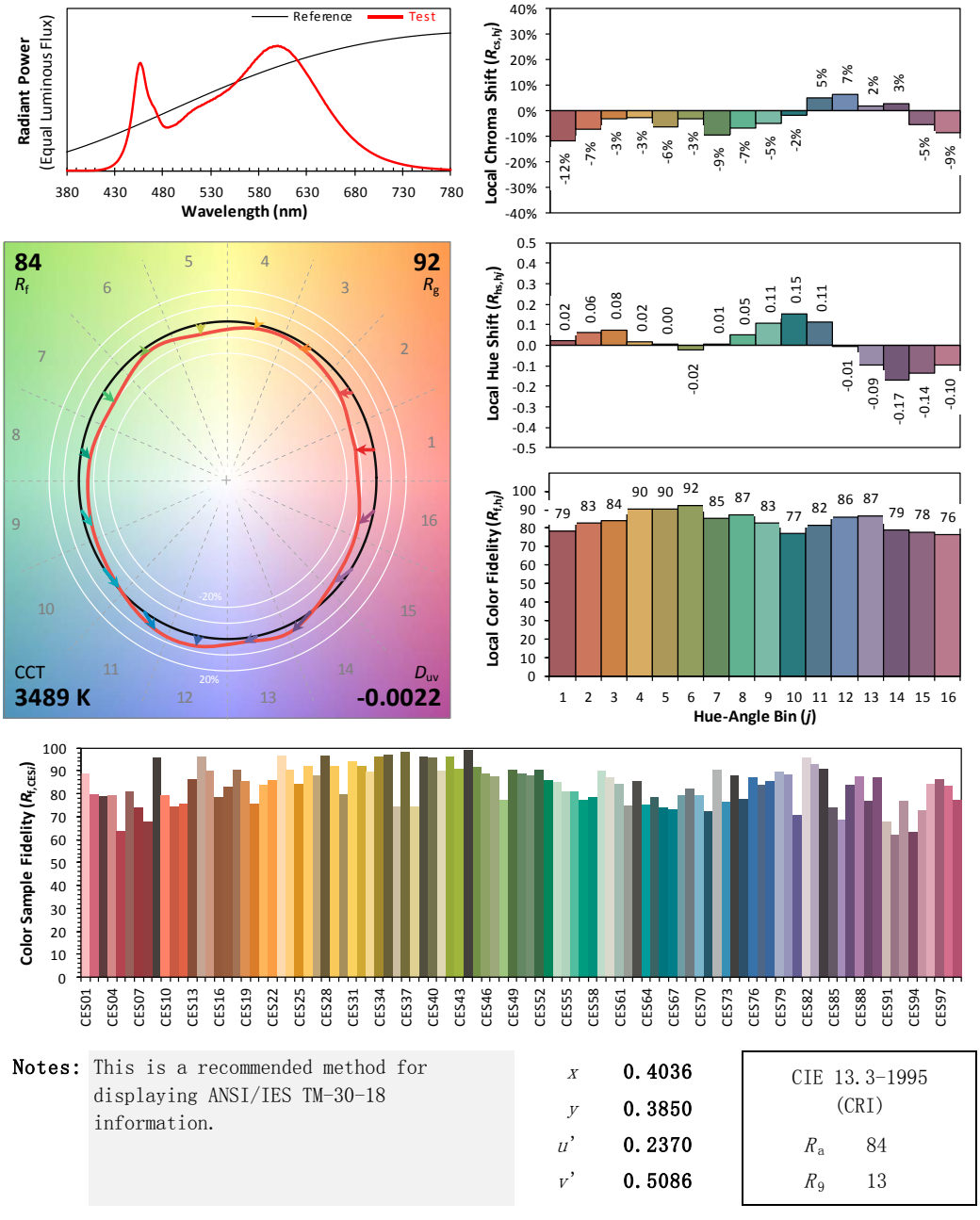
Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

ANSI/IES TM-30-18 Color Rendition Report

Source: LED **Manufacturer:** GREEN CREATIVE LTD

Date: 2023/07/12 **Model:** 9.5PLO/8CCTS/DIR



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

x	0.4036
y	0.3850
u'	0.2370
v'	0.5086

CIE 13.3-1995 (CRI)

R_a	84
R_9	13

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Chart 11: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 8 due to rounding.

TEST RESULTS (4000K Setting)

Test ambient temperature was 26.0 ℃.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.189	0.084
Power Factor	0.9950	0.9768
Test Power (W)/2	11.31	11.39
THD A%	8.35	8.59
Luminous Efficacy (lm/W)	115.8	115.1
Total Luminous Flux (lm)	1309.9	1311.3
Color Rendering Index (CRI)	83.4	
R9	9.9	
Correlated Color Temperature (CCT)(K)	4029	
Chromaticity Chroma x	0.3788	
Chromaticity Chroma y	0.3749	
Chromaticity Chroma u	0.2248	
Chromaticity Chroma v	0.3337	
Duv	-0.0004	
Chromaticity Chroma u ’	0.2248	
Chromaticity Chroma v’	0.5005	

Special Color Rendering Indices	
R1	83.3
R2	94.9
R3	92.8
R4	78.4
R5	82.9
R6	91.1
R7	82.1
R8	62.1
R9	9.9
R10	87
R11	77.7
R12	65.3
R13	87
R14	96.6

Table 10: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u’,v’) diagram, u’ = u = 4x/(-2x+12y+3), v’ = 3v/2 = 9y/(-2x+12y+3).

Spectral Power Distribution - Sphere Spectroradiometer Method

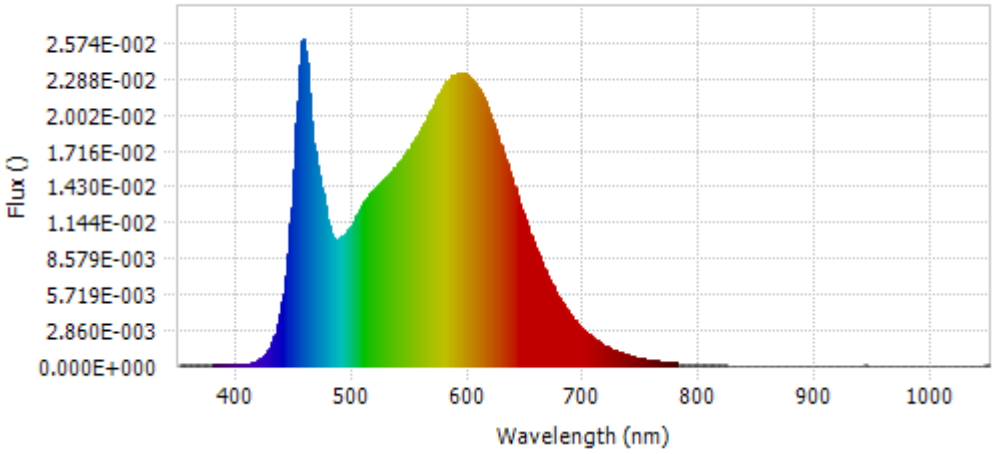
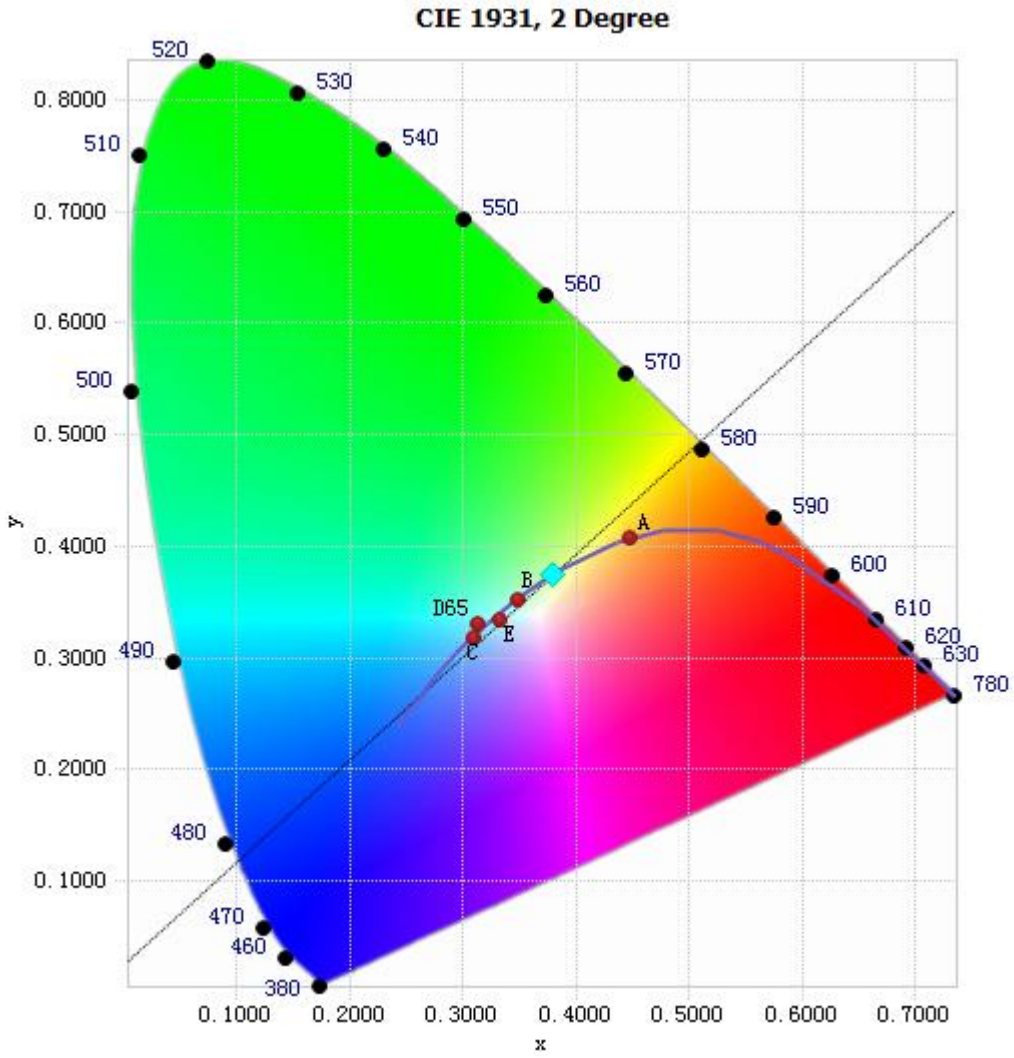


Chart 12: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.21E-04	485	1.01E-02	590	2.34E-02	695	3.31E-03
385	1.10E-04	490	1.03E-02	595	2.34E-02	700	2.84E-03
390	1.04E-04	495	1.07E-02	600	2.32E-02	705	2.42E-03
395	1.23E-04	500	1.14E-02	605	2.26E-02	710	2.07E-03
400	1.27E-04	505	1.23E-02	610	2.18E-02	715	1.79E-03
405	1.42E-04	510	1.30E-02	615	2.09E-02	720	1.54E-03
410	1.89E-04	515	1.37E-02	620	1.96E-02	725	1.31E-03
415	3.29E-04	520	1.42E-02	625	1.83E-02	730	1.12E-03
420	5.69E-04	525	1.47E-02	630	1.69E-02	735	9.54E-04
425	1.03E-03	530	1.52E-02	635	1.55E-02	740	8.09E-04
430	1.85E-03	535	1.56E-02	640	1.41E-02	745	6.91E-04
435	3.30E-03	540	1.62E-02	645	1.27E-02	750	5.96E-04
440	5.81E-03	545	1.68E-02	650	1.14E-02	755	5.14E-04
445	1.00E-02	550	1.74E-02	655	1.01E-02	760	4.38E-04
450	1.75E-02	555	1.82E-02	660	8.95E-03	765	3.79E-04
455	2.52E-02	560	1.90E-02	665	7.84E-03	770	3.22E-04
460	2.42E-02	565	2.00E-02	670	6.83E-03	775	2.76E-04
465	1.84E-02	570	2.08E-02	675	5.96E-03	780	2.40E-04
470	1.57E-02	575	2.17E-02	680	5.16E-03		
475	1.32E-02	580	2.24E-02	685	4.45E-03		
480	1.09E-02	585	2.31E-02	690	3.86E-03		

Table 11: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3788, 0.3749)

Chart 13: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

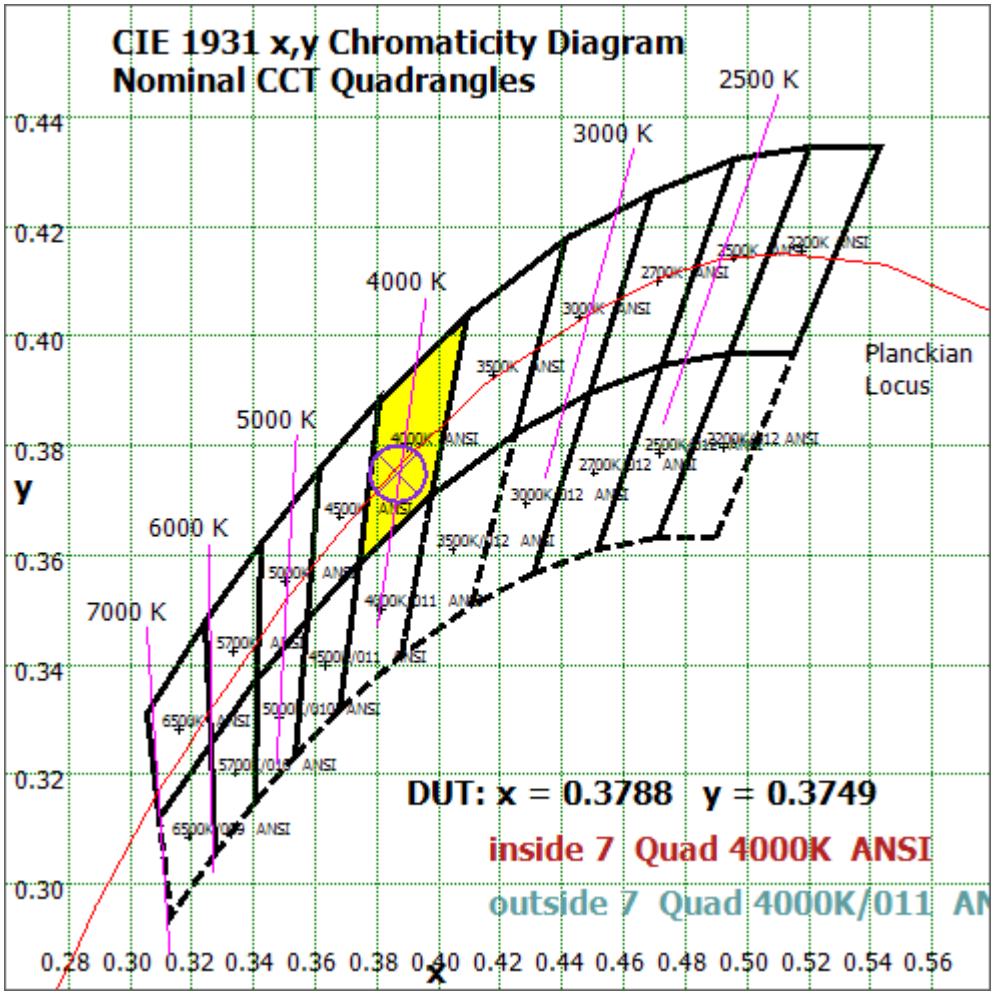


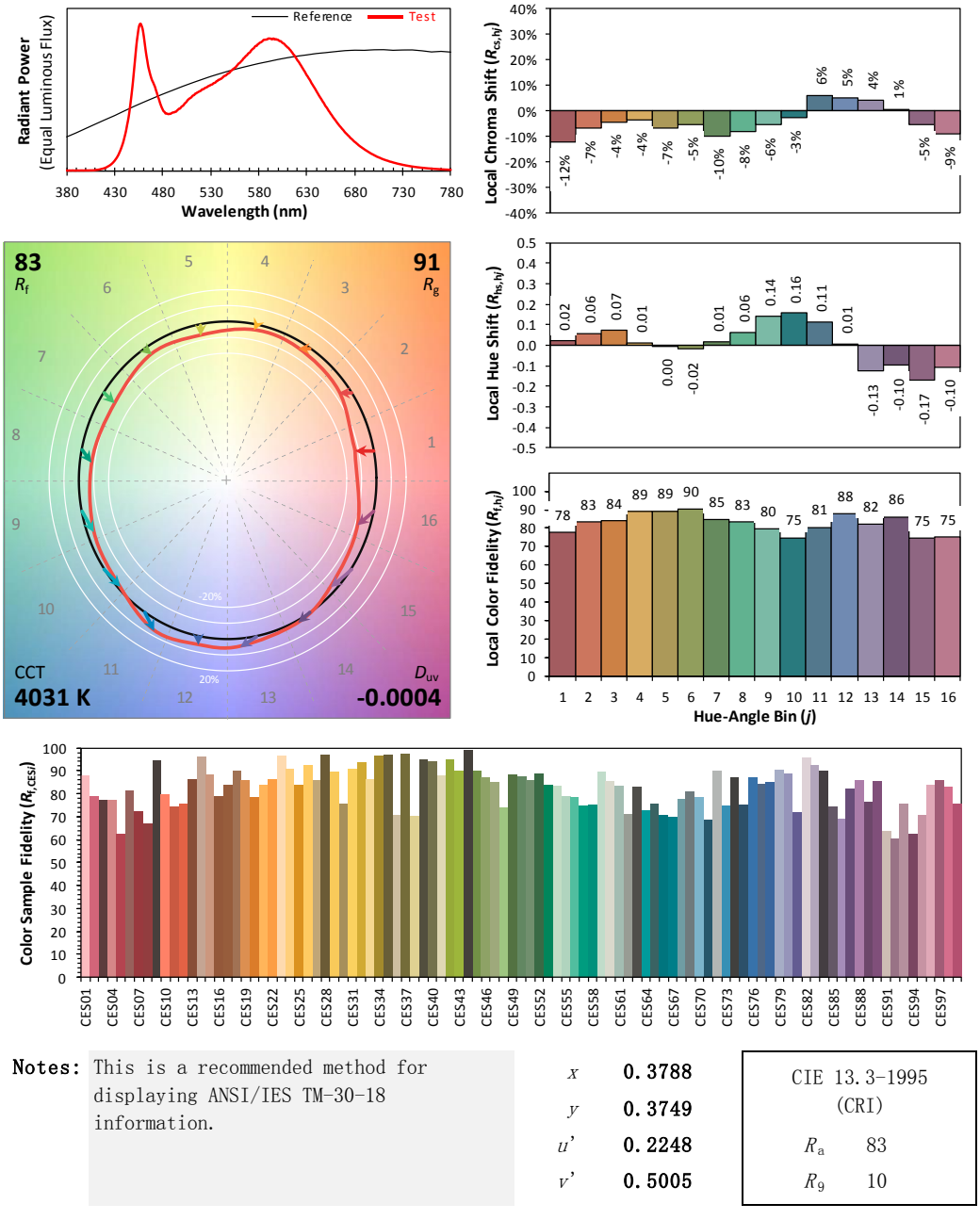
Chart14: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

ANSI/IES TM-30-18 Color Rendition Report

Source: LED **Manufacturer:** GREEN CREATIVE LTD

Date: 2023/07/12 **Model:** 9.5PLO/8CCTS/DIR



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.	x	0.3788	CIE 13.3-1995 (CRI)
	y	0.3749	R_a 83
	u'	0.2248	R_9 10
	v'	0.5005	

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Chart 15: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 10 due to rounding.

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Aug. 05, 2022	Aug. 04, 2023
Digital Power Meter	PF2010A	HZTE028-01	Aug. 05, 2022	Aug. 04, 2023
AC Power Supply	DPS1060	HZTE001-06	Aug. 05, 2022	Aug. 04, 2023
DC Power Supply	WY12010	HZTE004-03	Aug. 05, 2022	Aug. 04, 2023
Temperature recorder	JM624U	HZTE018-08	Aug. 05, 2022	Aug. 04, 2023
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 05, 2022	Aug. 04, 2023
Standard source	D908	HZTE012-01	Aug. 05, 2022	Aug. 04, 2023
Integrate Sphere system	3M	HZTE015-04	Aug. 05, 2022	Aug. 04, 2023
Digital Power Meter	WT210	HZTE008-01	Aug. 05, 2022	Aug. 04, 2023
AC Power Supply	PCR 500L	HZTE001-07	Aug. 05, 2022	Aug. 04, 2023
DC Power Supply	IT6154	HZTE004-04	Aug. 05, 2022	Aug. 04, 2023
Standard source	SCL-1400	HZTE012-02	Aug. 05, 2022	Aug. 04, 2023
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 05, 2022	Aug. 04, 2023
Temperature Meter	TES1310	HZTE017-01	Aug. 05, 2022	Aug. 04, 2023

Table 12: Test Equipment List

TEST METHODS

Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning.
Therefore, no seasoning was performed.

Sphere-Spectroradiometer Method- Photometric and Electrical Measurements

A Labsphere Model CDS 2100 Spectroradiometer and 3 Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit. The coating reflectance of each sphere is 98%. The measure geometry is 4π. Self-absorption correction is conducted in testing. Bandwidth of spectroradiometer is 350nm-1050nm.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED Lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 20 min, taken 10 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

The standard reference of the integrated sphere system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Standards and Technology.

The uncertainty of integrating sphere system reported in this document is expended uncertainty is 2.1% with a

coverage factor k=2.

Goniophotometer Method

Photometric and Electrical Measurements

An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured at the same height of the sample mounted on the Goniophotometer equipment. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.
The stabilization time typically ranges from 30 min (small integrated LED Lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 20 min, taken 10 minutes apart, is less than 0.5 %.
Electrical measurements including voltage, current, and power were measured using the Everfine Digital Power Meter.
Some graphics were created with Photometric Plus software.
The standard reference of the Goniophotometer system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Metrology P.R. China.
The uncertainty of goniophotometer system reported in this document is expended uncertainty is 2.3% with a coverage factor k=2.

Color Characteristics Measurements

The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as values that are spatially average, weighted to intensity, over the angular range where light is intentionally emitted from the SSL product. The color characteristics measurements are using gonio-spectroradiometer.

*** End of Report ***