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: 11A19DIM/9CCTS

Laboratory: Lea ding Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ24120023d

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

Review by: Wei Fei

Engineer: Wei Fei

Dec. 26, 2024

Approved by: April Zou

Manager: April Zou

Dec. 26, 2024

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	11A19DIM/9CCTS 2700K Setting	11A19DIM/9CCTS 3000K Setting	11A19DIM/9CCTS 3500K Setting	11A19DIM/9CCTS 4000K Setting	11A19DIM/9CCTS 5000K Setting
Luminous Efficacy (Lumens /Watt)	126.1	134.3	139.2	138.8	130.6
Total Luminous Flux (Lumens)	1284.5	1361.3	1403.3	1410.7	1354.2
Power (Watts)	10.19	10.14	10.08	10.16	10.37
Power Factor	0.9606	0.9603	0.9597	0.9603	0.9618
CCT (K)	2715	3092	3487	3886	4950
CRI	94.7	96.7	97.2	97.1	94.1
Stabilization Time (Light & Power)	50 mins	50 mins	50 mins	50 mins	50 mins
Note	2700K	3000K	3500K	4000K	5000K

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Dec. 12, 2024

Date of Test : Dec. 16, 2024

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	: 11A19DIM/9CCTS
Electrical Ratings	: 120V, 60Hz,11W
Product Description	: Color- Tunable 2700K/3000K/3500K /4000K/5000K
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 (2700K 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
Voltage frequency (Hz)	60
Test Current (A)	0.088
Power Factor	0.9606
Test Power (W)	10.19
THD A%	16.42
Luminous Efficacy (lm/W)	126.1
Total Luminous Flux (lm)	1284.5
Color Rendering Index (CRI)	94.7
R9	64.3
Correlated Color Temperature (CCT)(K)	2715
Chromaticity Chroma x	0.4614
Chromaticity Chroma y	0.4154
Chromaticity Chroma u	0.2613
Chromaticity Chroma v	0.3529
Duv	0.0017
Chromaticity Chroma u ’	0.2613
Chromaticity Chroma v’	0.5294

Special Color Rendering Indices	
R1	96.6
R2	97
R3	95.5
R4	97
R5	95.4
R6	97.4
R7	93.4
R8	85.2
R9	64.3
R10	90.1
R11	98.1
R12	83.7
R13	96.3
R14	95.7

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

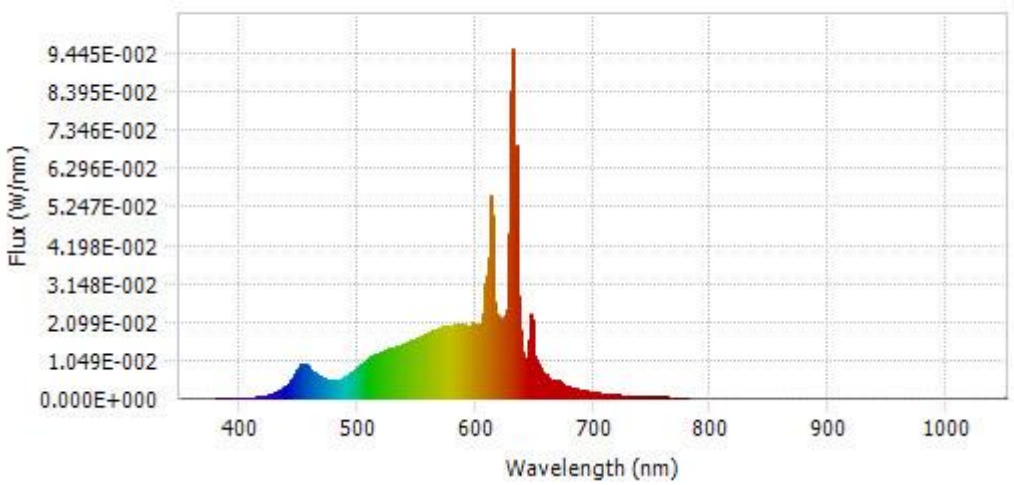
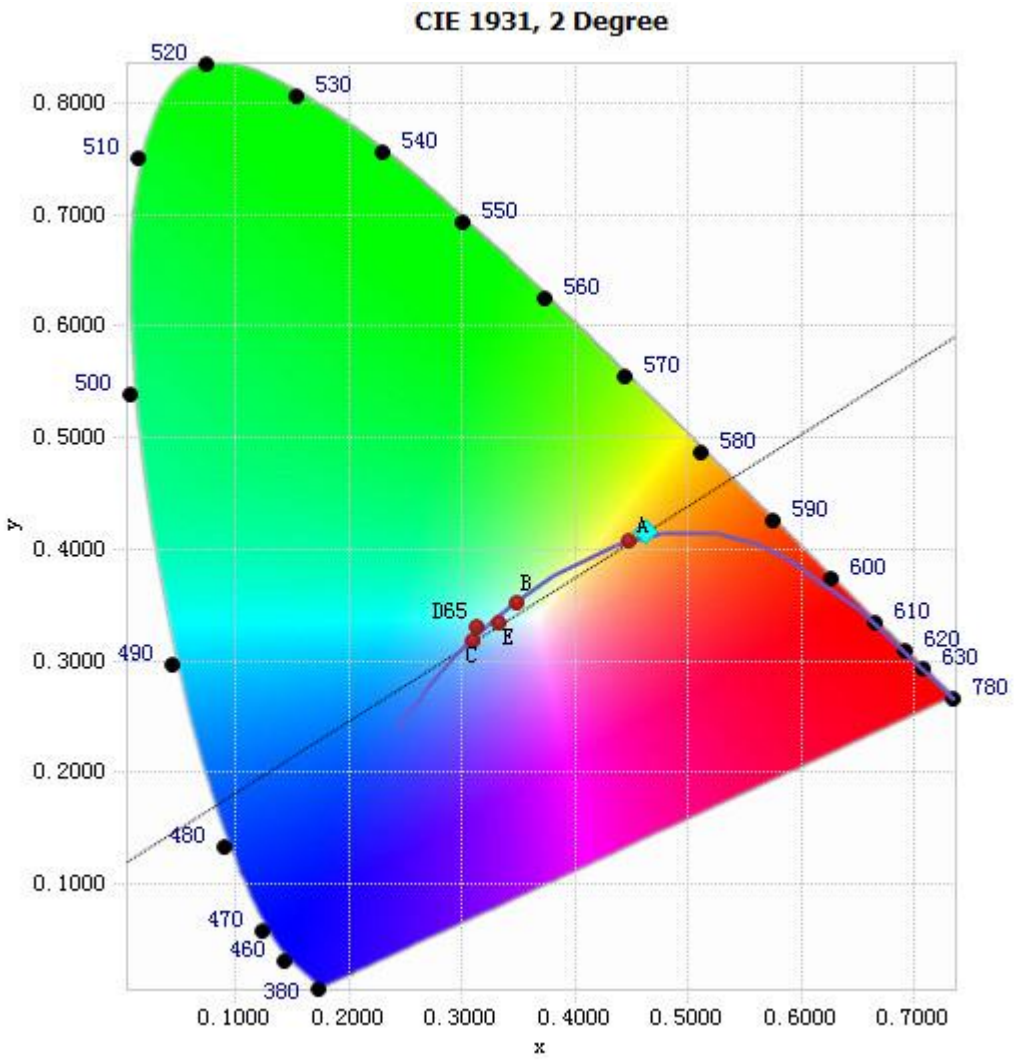


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.24E-04	485	5.00E-03	590	2.02E-02	695	1.86E-03
385	7.61E-05	490	5.80E-03	595	1.96E-02	700	1.54E-03
390	1.07E-04	495	6.86E-03	600	2.00E-02	705	1.33E-03
395	6.98E-05	500	8.22E-03	605	2.01E-02	710	1.13E-03
400	7.92E-05	505	9.55E-03	610	2.68E-02	715	9.52E-04
405	8.79E-05	510	1.08E-02	615	3.55E-02	720	8.18E-04
410	1.53E-04	515	1.18E-02	620	2.23E-02	725	7.08E-04
415	2.88E-04	520	1.25E-02	625	2.26E-02	730	6.08E-04
420	4.31E-04	525	1.32E-02	630	8.40E-02	735	5.14E-04
425	8.45E-04	530	1.38E-02	635	6.93E-02	740	4.37E-04
430	1.37E-03	535	1.43E-02	640	1.27E-02	745	3.64E-04
435	2.12E-03	540	1.49E-02	645	1.14E-02	750	3.20E-04
440	3.35E-03	545	1.56E-02	650	1.13E-02	755	2.76E-04
445	5.26E-03	550	1.62E-02	655	8.09E-03	760	2.44E-04
450	8.23E-03	555	1.70E-02	660	6.46E-03	765	2.00E-04
455	9.45E-03	560	1.78E-02	665	4.98E-03	770	1.77E-04
460	7.88E-03	565	1.85E-02	670	5.01E-03	775	1.41E-04
465	6.41E-03	570	1.92E-02	675	3.68E-03	780	1.39E-04
470	5.69E-03	575	1.96E-02	680	3.02E-03		
475	4.98E-03	580	1.99E-02	685	2.59E-03		
480	4.60E-03	585	2.05E-02	690	2.21E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4614, 0.4154)

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

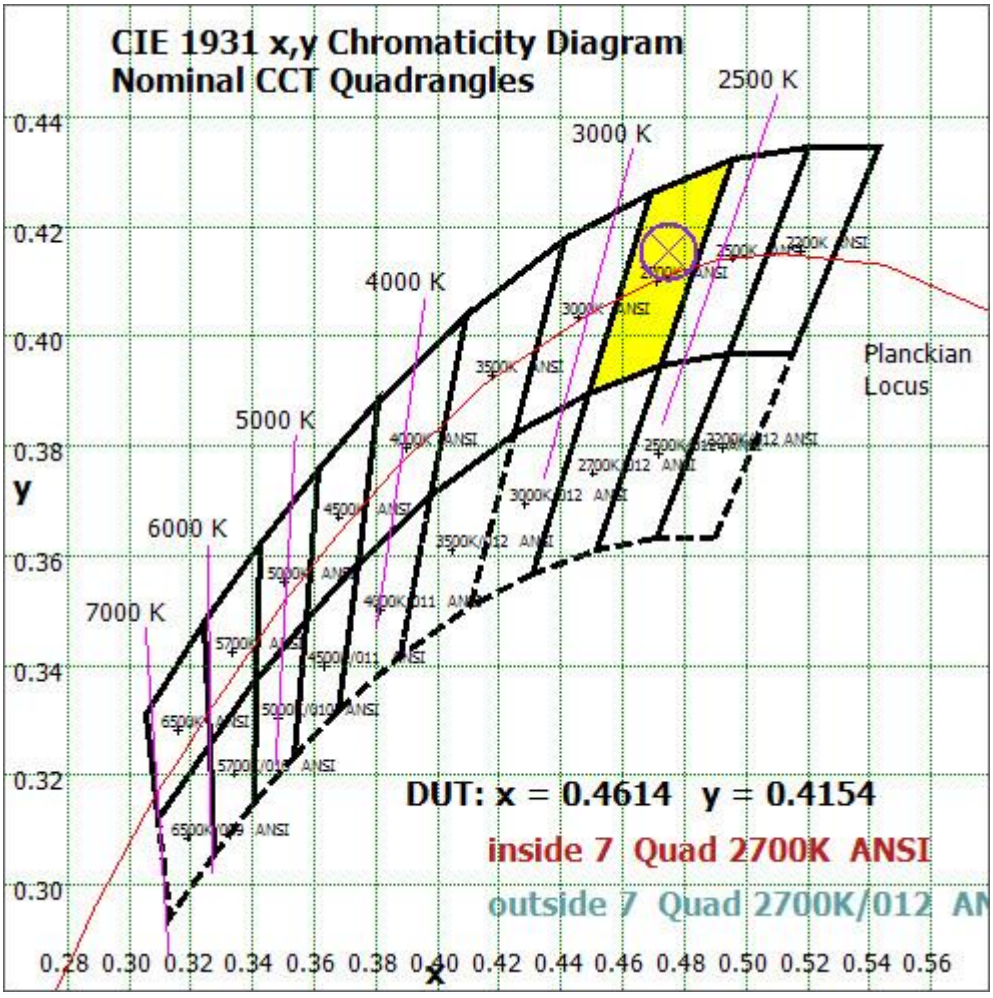


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

ANSI/IES TM-30-18 Color Rendition Report

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

Date: 2024/12/16 **Model:** 11A19DIM/9CCTS

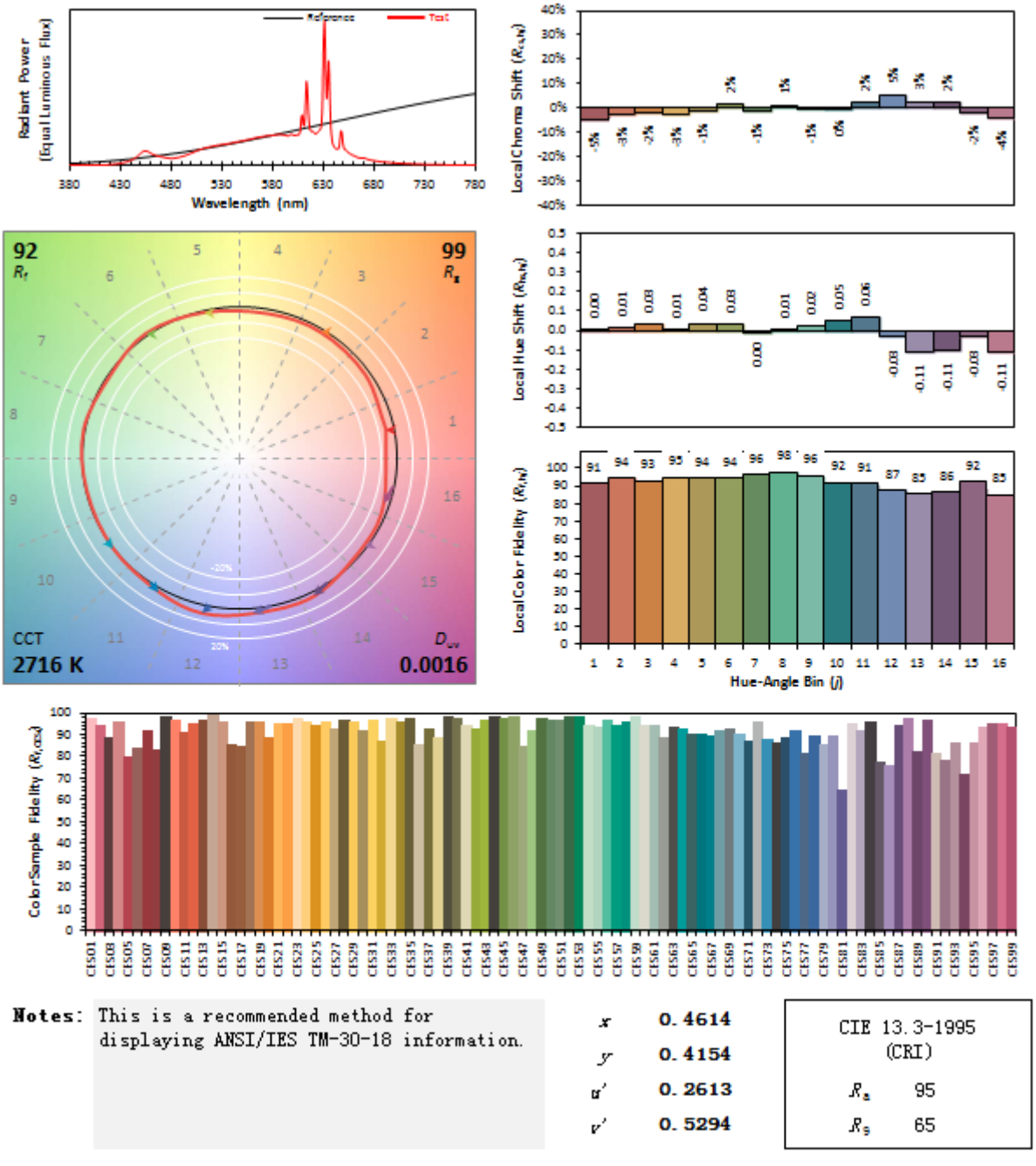


Chart 4: Full Report Created with the IES TM-30 Calculator

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)	0.089
Power Factor	0.9608
Power (W)	10.21
Luminous Efficacy (lm/W)	126.4
Total Luminous Flux (lm)	1290.6
Beam Angle (°)	225.1 (0^o-180^o) / 224.3 (90^o-270^o)
Center Beam Candle Power (cd)	117
Maximum Beam Candle Power (cd)	159.5 (At: C=292.5, Gamma=17.5)
Spacing Criteria	1.50 (0^o-180^o) / 1.52 (90^o-270^o)
Zonal Lumens in the 0 °-60 °Zone	36.83%
Zonal Lumens in the 60 °-90 °Zone	30.56%
Zonal Lumens in the 90 °-120 °Zone	21.84%
Zonal Lumens in the 120 °-180 °Zone	10.77%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

γ(°)	Lumens	% Total
0- 10	15.088	1.17%
10- 20	44.627	3.46%
20- 30	72.344	5.61%
30- 40	96.91	7.51%
40- 50	116.681	9.04%
50- 60	129.642	10.04%
60- 70	135.26	10.48%
70- 80	133.67	10.36%
80- 90	125.493	9.72%
90-100	111.826	8.66%
100-110	94.538	7.32%
110-120	75.489	5.85%
120-130	56.708	4.39%
130-140	39.169	3.03%
140-150	24.469	1.90%
150-160	13.271	1.03%
160-170	5.032	0.39%
170-180	0.414	0.03%
Total	1290.6	100%

γ(°)	Lumens	% Total
0-130	1208.276	93.62%
130-180	82.355	6.38%
0-180	1290.6	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

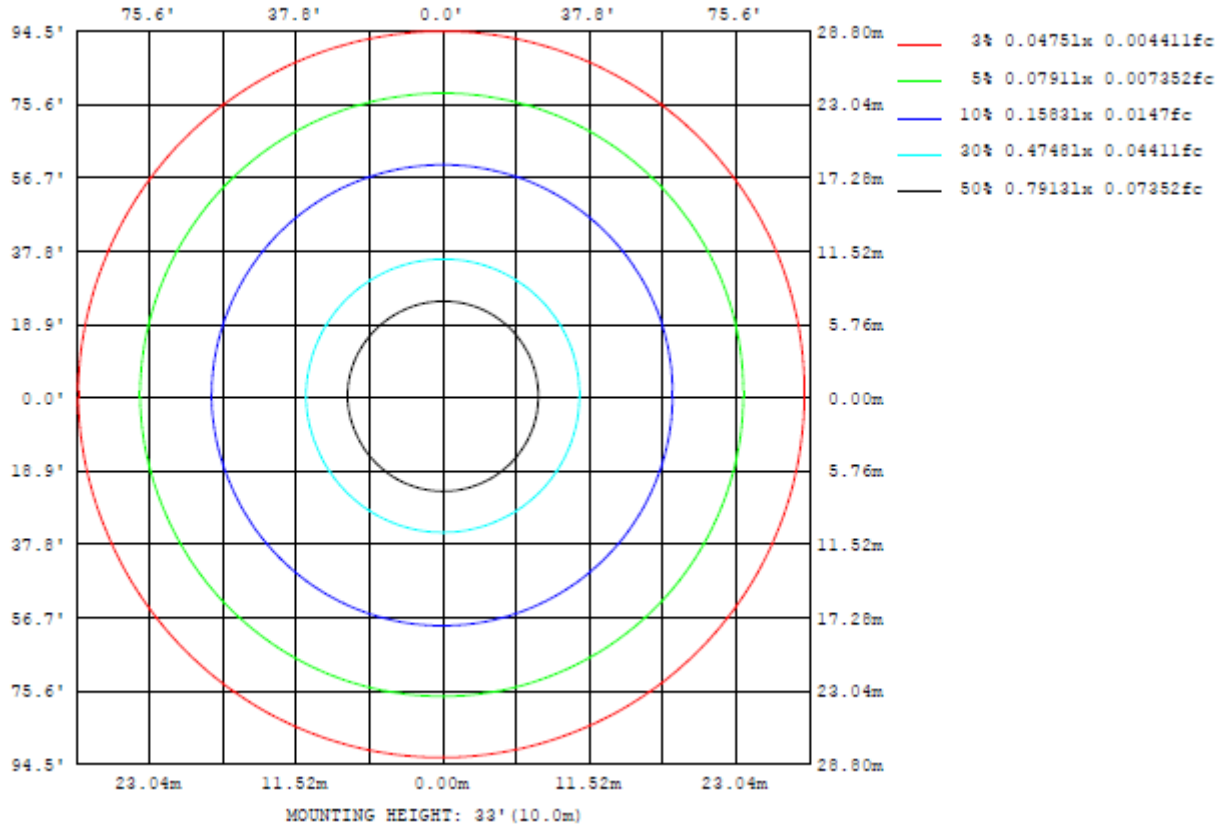


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

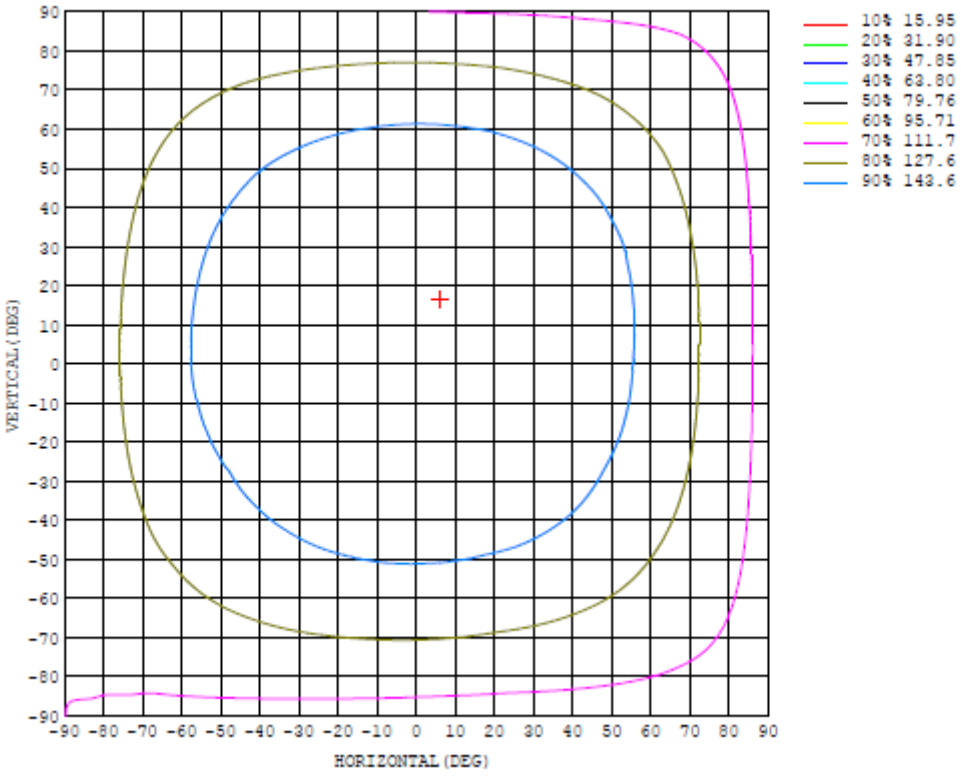


Chart 6: Isocandela Plot

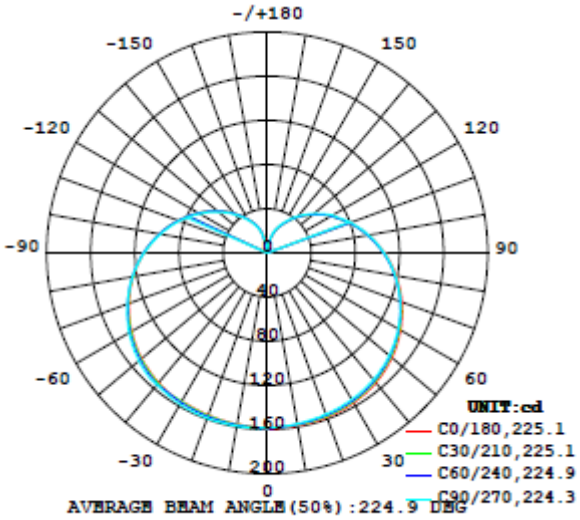


Chart 7: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1 UNIT: cd

C (DEG) / γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5			
0	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158			
5	159	158	158	158	158	158	158	157	158	158	158	158	159	159	159	158			
10	159	158	158	157	157	157	157	157	157	158	158	159	159	159	159	159			
15	158	157	157	156	156	156	156	156	157	157	158	159	159	159	159	159			
20	158	157	156	155	155	155	155	155	156	157	158	158	159	159	159	159			
25	157	156	155	155	154	154	154	155	155	156	157	158	159	159	159	158			
30	157	155	155	153	153	153	153	154	155	156	156	157	158	159	158	158			
35	155	154	153	152	152	151	152	152	155	155	155	156	157	157	157	156			
40	153	152	151	150	150	150	150	151	153	154	155	155	156	156	155	155			
45	151	149	148	148	147	147	148	148	151	152	153	154	155	155	154	153			
50	148	146	145	144	144	144	145	146	149	150	151	151	152	152	151	150			
55	144	142	142	141	141	141	142	143	146	146	147	148	149	149	148	147			
60	140	138	138	137	137	137	138	139	142	143	144	144	145	145	144	142			
65	135	134	133	133	133	133	134	135	138	139	140	140	140	140	139	138			
70	130	129	128	128	128	129	129	130	133	134	135	135	135	135	134	133			
75	125	123	123	123	123	124	125	126	129	129	130	130	130	130	128	127			
80	119	118	117	117	118	119	119	121	123	124	124	124	124	124	123	121			
85	113	112	112	111	112	113	114	115	118	118	118	118	118	117	116	115			
90	107	106	105	105	106	107	108	109	112	112	112	112	112	111	110	109			
95	100.0	99.2	99.0	99.2	99.9	101	102	103	105	106	106	106	105	104	103	102			
100	93.3	92.6	92.6	92.8	93.5	94.7	95.6	96.5	99.0	99.1	99.3	98.8	98.4	97.5	96.4	95.3			
105	86.7	86.0	86.0	86.3	87.2	88.2	89.1	90.1	92.5	92.6	92.6	92.1	91.6	90.6	89.5	88.6			
110	79.8	79.4	79.3	79.7	80.7	81.6	82.5	83.5	85.8	85.8	85.8	85.3	84.6	83.7	82.6	81.6			
115	73.1	72.6	72.8	73.2	74.1	75.1	76.1	77.0	78.9	79.1	79.1	78.4	77.6	76.8	75.7	74.8			
120	67.3	66.8	67.0	67.5	68.4	69.3	70.1	71.4	72.3	72.4	72.2	71.7	70.9	70.0	68.9	68.0			
125	60.6	60.3	60.5	61.1	61.9	63.0	63.8	64.7	65.7	65.7	65.6	64.9	64.1	63.3	62.1	61.4			
130	54.3	53.9	54.2	54.8	55.7	56.6	57.4	58.2	59.1	59.2	59.0	58.3	57.5	56.6	55.7	55.0			
135	48.1	47.8	48.1	48.6	49.5	50.5	51.2	51.9	52.8	52.8	52.7	52.0	51.3	50.4	49.5	48.8			
140	42.2	42.0	42.2	42.7	43.6	44.5	45.2	45.8	46.7	46.7	46.6	45.9	45.2	44.3	43.4	42.8			
145	36.6	36.4	36.7	37.1	38.0	38.8	39.5	40.0	40.8	40.9	40.7	40.1	39.4	38.6	37.8	37.2			
150	31.4	31.2	31.4	31.9	32.7	33.5	34.1	34.6	35.3	35.4	35.2	34.6	34.0	33.2	32.5	31.9			
155	26.5	26.4	26.7	27.1	27.8	28.6	29.1	29.5	30.2	30.3	30.1	29.6	29.0	28.2	27.6	27.0			
160	21.7	21.5	21.9	22.3	23.0	23.8	24.2	24.7	25.3	25.0	25.0	24.2	23.8	23.3	22.7	22.2			
165	16.0	15.6	16.3	16.9	17.7	18.4	19.0	19.6	19.7	17.4	17.0	16.3	17.8	17.3	17.1	16.7			
170	7.82	7.78	8.45	9.64	10.2	11.5	12.7	12.9	12.9	11.4	7.90	5.66	7.10	9.33	9.07	8.09			
175	0.21	0.21	0.21	0.21	0.21	0.25	0.81	1.41	2.64	2.80	2.35	1.18	0.27	0.23	0.22	0.22			
180	0.21	0.21	0.21	0.21	0.20	0.21	0.21	0.20	0.20	0.20	0.21	0.20	0.21	0.21	0.20	0.21			

Table 6: Luminous Intensity Data

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
Voltage frequency (Hz)	60
Test Current (A)	0.088
Power Factor	0.9603
Test Power (W)	10.14
THD A%	16.51
Luminous Efficacy (lm/W)	134.3
Total Luminous Flux (lm)	1361.3
Color Rendering Index (CRI)	96.7
R9	77.5
Correlated Color Temperature (CCT)(K)	3092
Chromaticity Chroma x	0.4300
Chromaticity Chroma y	0.4008
Chromaticity Chroma u	0.2475
Chromaticity Chroma v	0.3460
Duv	-0.0003
Chromaticity Chroma u ’	0.2475
Chromaticity Chroma v’	0.5191

Special Color Rendering Indices	
R1	99.3
R2	98.8
R3	95.7
R4	98.8
R5	98.1
R6	96.4
R7	95.2
R8	91.1
R9	77.5
R10	94.1
R11	97.2
R12	81.6
R13	99.3
R14	95.9

Table 7: 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

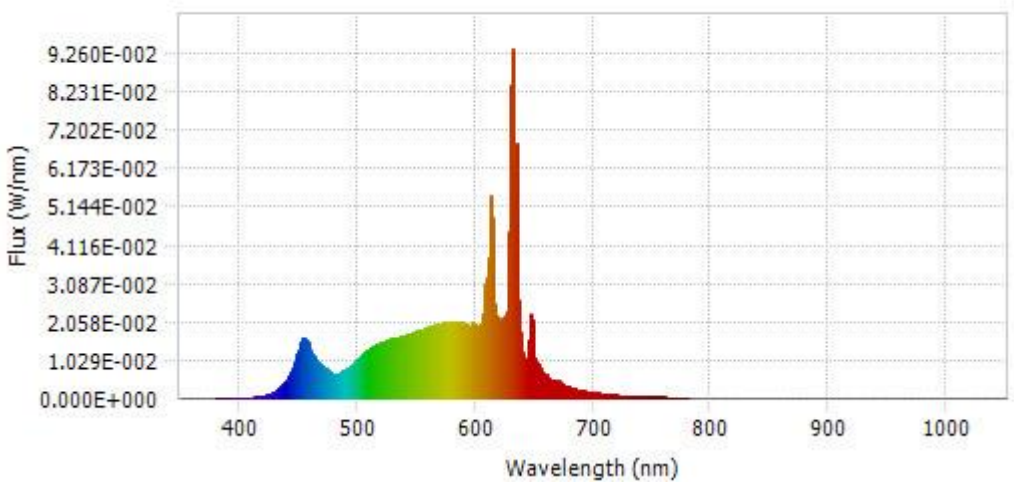
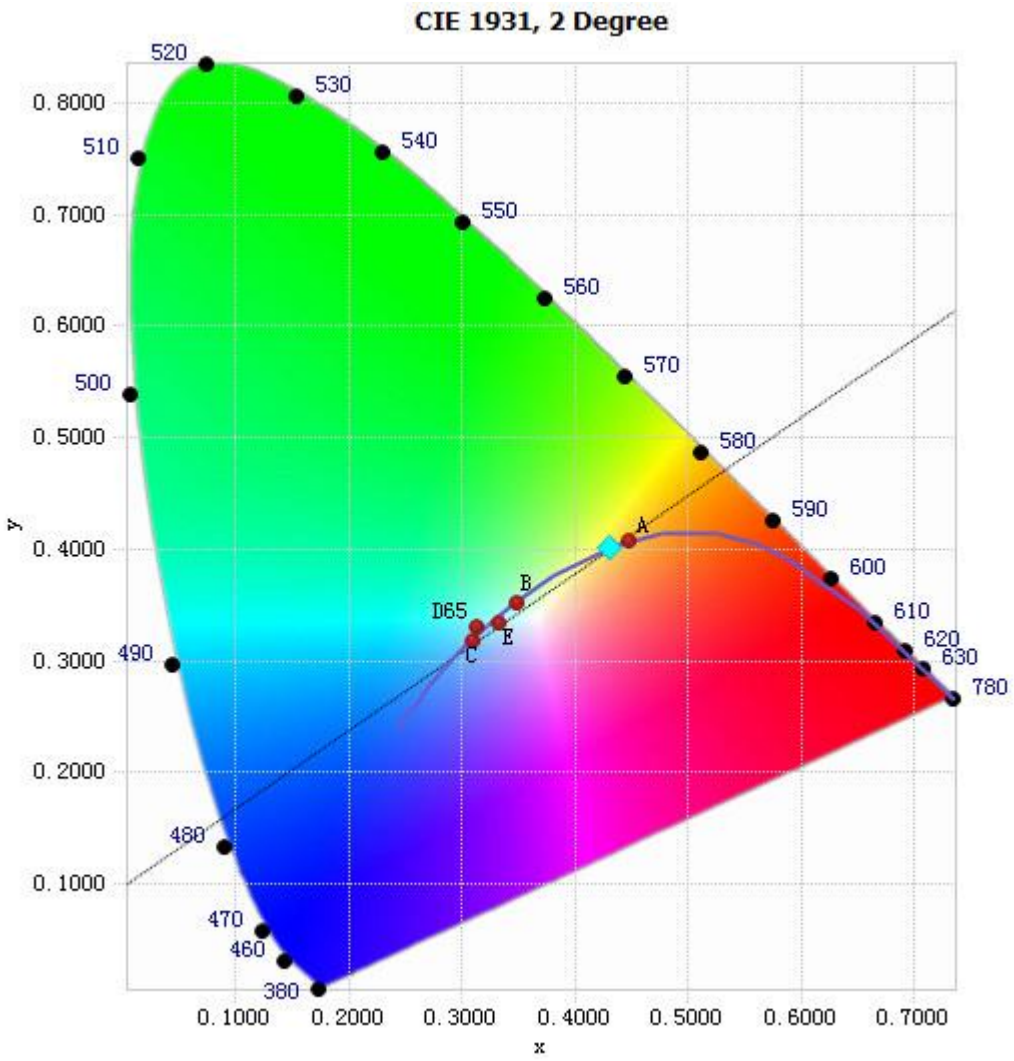


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.66E-04	485	6.82E-03	590	2.01E-02	695	1.81E-03
385	1.10E-04	490	7.64E-03	595	1.94E-02	700	1.50E-03
390	8.84E-05	495	8.85E-03	600	1.97E-02	705	1.29E-03
395	7.87E-05	500	1.03E-02	605	1.97E-02	710	1.09E-03
400	9.19E-05	505	1.18E-02	610	2.57E-02	715	9.12E-04
405	9.87E-05	510	1.31E-02	615	3.37E-02	720	7.82E-04
410	1.88E-04	515	1.42E-02	620	2.14E-02	725	6.85E-04
415	3.35E-04	520	1.48E-02	625	2.19E-02	730	5.78E-04
420	5.89E-04	525	1.54E-02	630	8.39E-02	735	5.04E-04
425	1.06E-03	530	1.60E-02	635	6.82E-02	740	4.33E-04
430	1.78E-03	535	1.64E-02	640	1.21E-02	745	3.69E-04
435	2.94E-03	540	1.68E-02	645	1.09E-02	750	3.13E-04
440	4.74E-03	545	1.74E-02	650	1.08E-02	755	2.70E-04
445	7.82E-03	550	1.79E-02	655	7.88E-03	760	2.45E-04
450	1.30E-02	555	1.84E-02	660	6.23E-03	765	1.92E-04
455	1.61E-02	560	1.91E-02	665	4.80E-03	770	1.81E-04
460	1.32E-02	565	1.96E-02	670	4.80E-03	775	1.59E-04
465	1.02E-02	570	1.99E-02	675	3.54E-03	780	1.25E-04
470	8.75E-03	575	2.01E-02	680	2.94E-03		
475	7.40E-03	580	2.03E-02	685	2.47E-03		
480	6.44E-03	585	2.05E-02	690	2.09E-03		

Table 8: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4300, 0.4008)

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

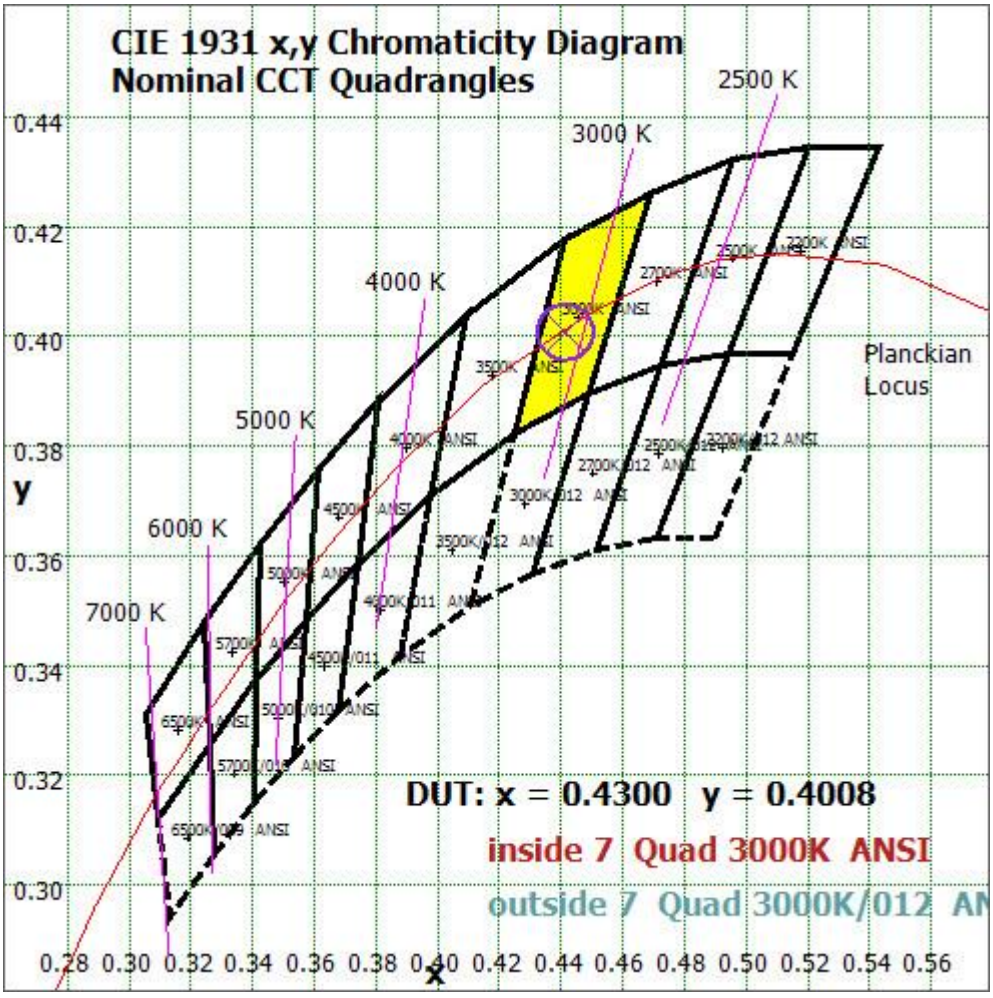


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

ANSI/IES TM-30-18 Color Rendition Report

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

Date: 2024/12/16 **Model:** 11A19DIM/9CCTS

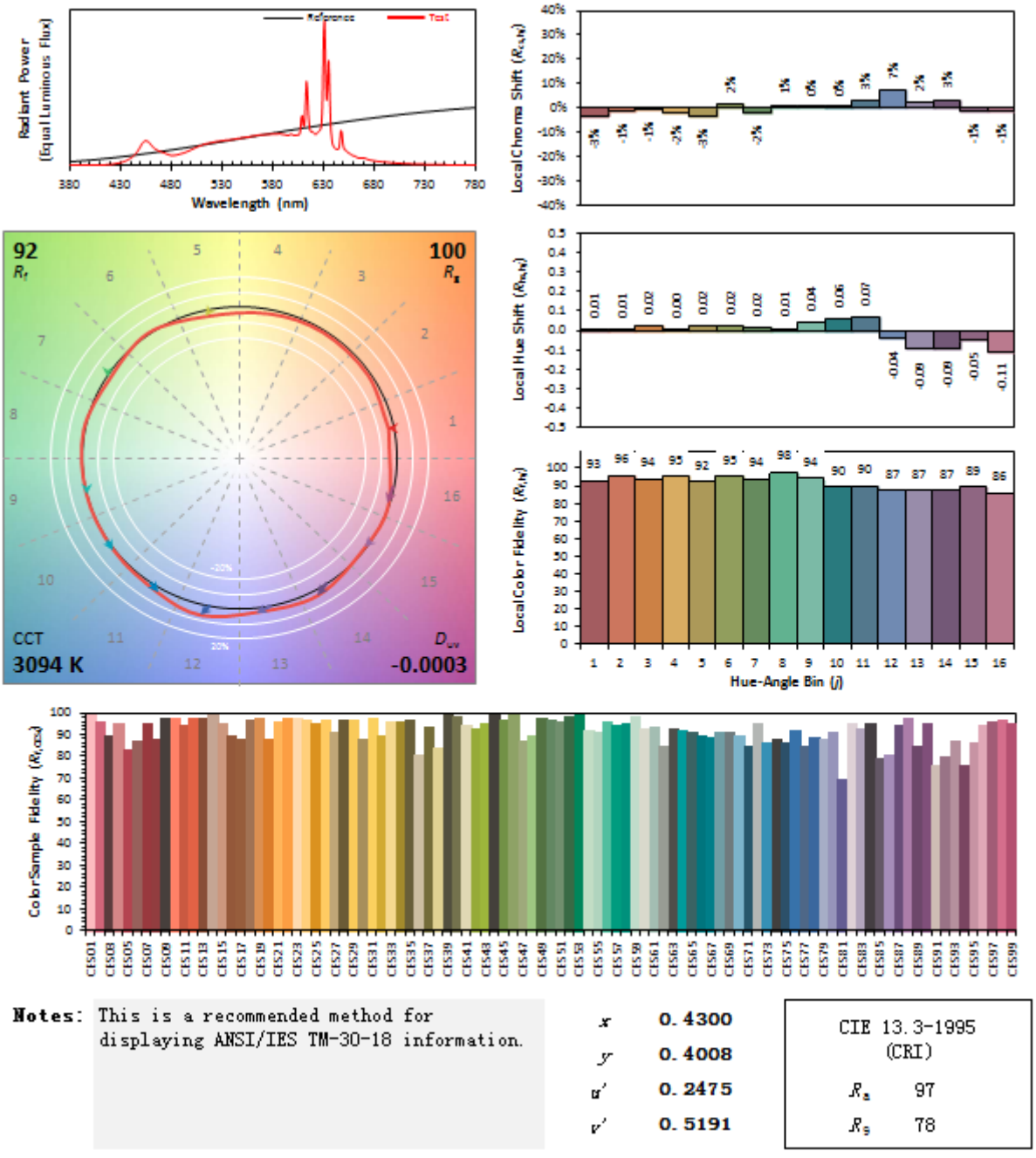


Chart 11: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 7 due to rounding.

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
Voltage frequency (Hz)	60
Test Current (A)	0.088
Power Factor	0.9597
Test Power (W)	10.08
THD A%	16.58
Luminous Efficacy (lm/W)	139.2
Total Luminous Flux (lm)	1403.3
Color Rendering Index (CRI)	97.2
R9	84.7
Correlated Color Temperature (CCT)(K)	3487
Chromaticity Chroma x	0.4054
Chromaticity Chroma y	0.3897
Chromaticity Chroma u	0.2362
Chromaticity Chroma v	0.3406
Duv	-0.0005
Chromaticity Chroma u ’	0.2362
Chromaticity Chroma v’	0.5109

Special Color Rendering Indices	
R1	99.1
R2	98.8
R3	94.8
R4	99
R5	98.3
R6	96.2
R7	96.8
R8	94.5
R9	84.7
R10	94
R11	96.6
R12	78.2
R13	99.8
R14	95.6

Table 9: 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

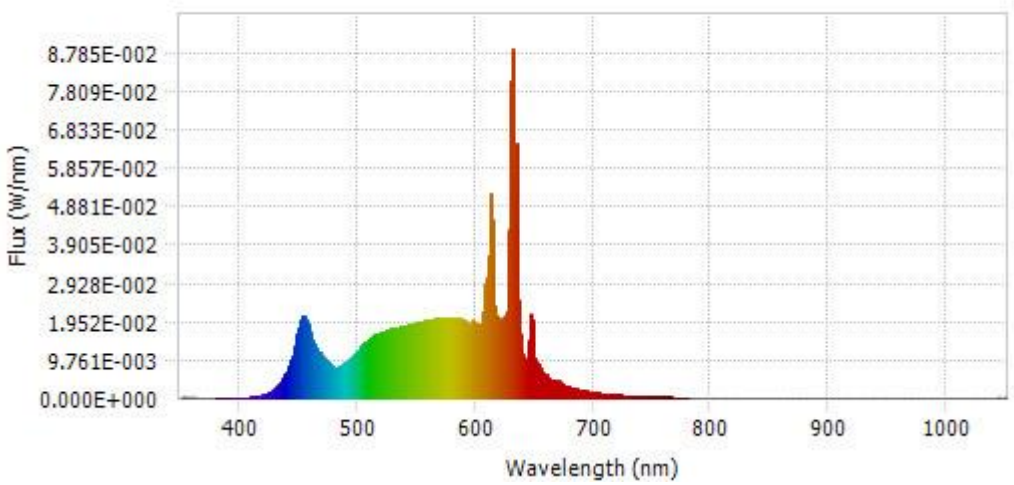
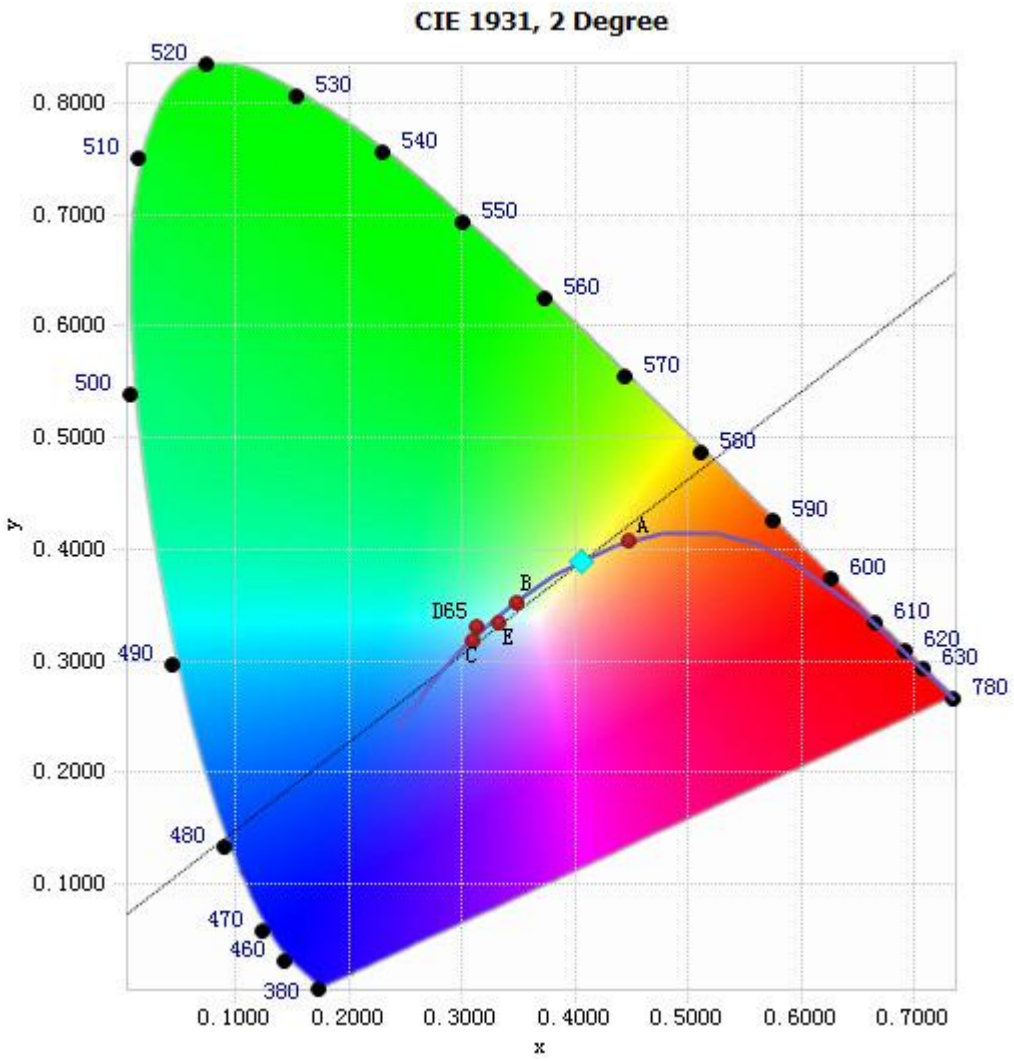


Chart 12: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.12E-04	485	8.07E-03	590	1.97E-02	695	1.69E-03
385	1.32E-04	490	8.98E-03	595	1.89E-02	700	1.42E-03
390	7.52E-05	495	1.03E-02	600	1.90E-02	705	1.22E-03
395	6.97E-05	500	1.19E-02	605	1.89E-02	710	1.05E-03
400	1.07E-04	505	1.36E-02	610	2.43E-02	715	8.92E-04
405	9.48E-05	510	1.50E-02	615	3.16E-02	720	7.75E-04
410	1.91E-04	515	1.61E-02	620	2.02E-02	725	6.63E-04
415	4.10E-04	520	1.66E-02	625	2.07E-02	730	5.69E-04
420	7.63E-04	525	1.72E-02	630	8.05E-02	735	4.69E-04
425	1.35E-03	530	1.76E-02	635	6.47E-02	740	4.08E-04
430	2.43E-03	535	1.80E-02	640	1.14E-02	745	3.64E-04
435	4.02E-03	540	1.84E-02	645	1.04E-02	750	3.02E-04
440	6.59E-03	545	1.88E-02	650	1.02E-02	755	2.70E-04
445	1.09E-02	550	1.91E-02	655	7.41E-03	760	2.32E-04
450	1.76E-02	555	1.94E-02	660	5.90E-03	765	1.94E-04
455	2.11E-02	560	1.98E-02	665	4.55E-03	770	1.66E-04
460	1.68E-02	565	2.01E-02	670	4.55E-03	775	1.52E-04
465	1.27E-02	570	2.03E-02	675	3.37E-03	780	1.28E-04
470	1.09E-02	575	2.03E-02	680	2.78E-03		
475	9.02E-03	580	2.03E-02	685	2.34E-03		
480	7.83E-03	585	2.03E-02	690	2.02E-03		

Table 10: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4054, 0.3897)

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

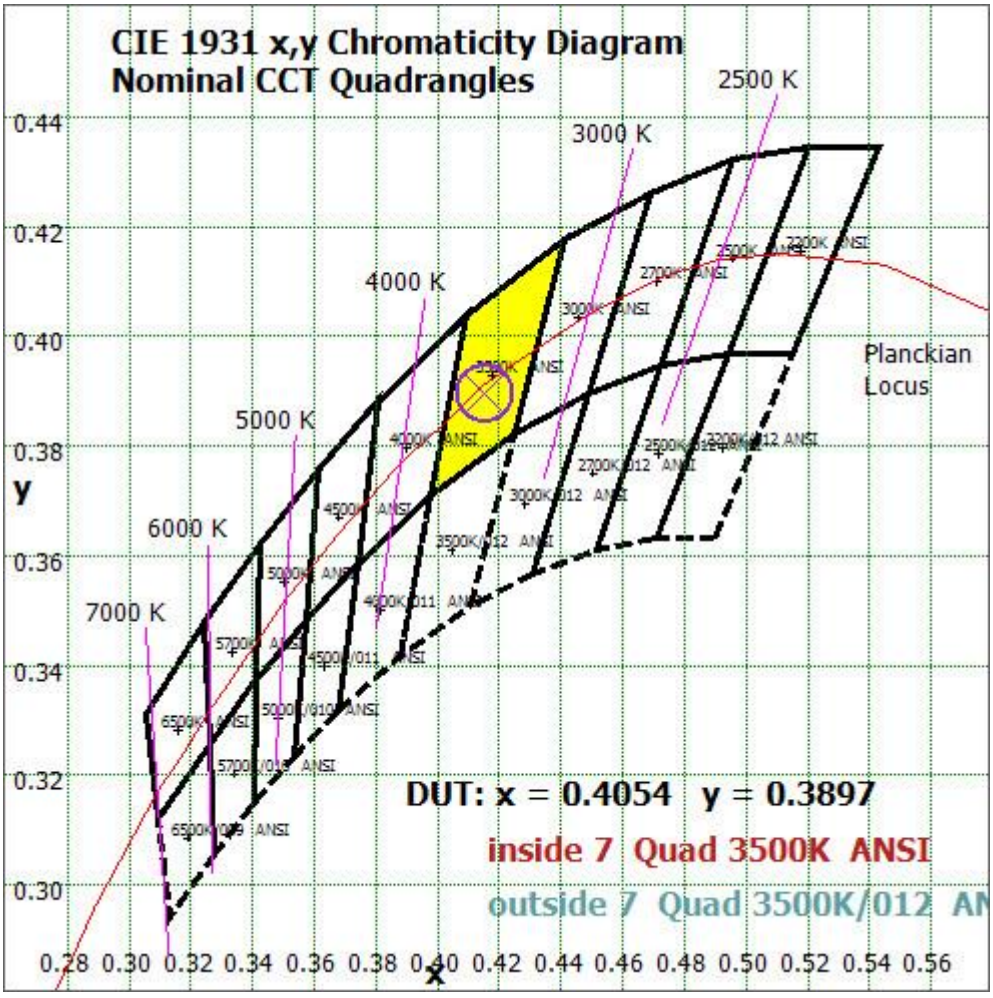


Chart14: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

ANSI/IES TM-30-18 Color Rendition Report

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

Date: 2024/12/16 **Model:** 11A19DIM/9CCTS

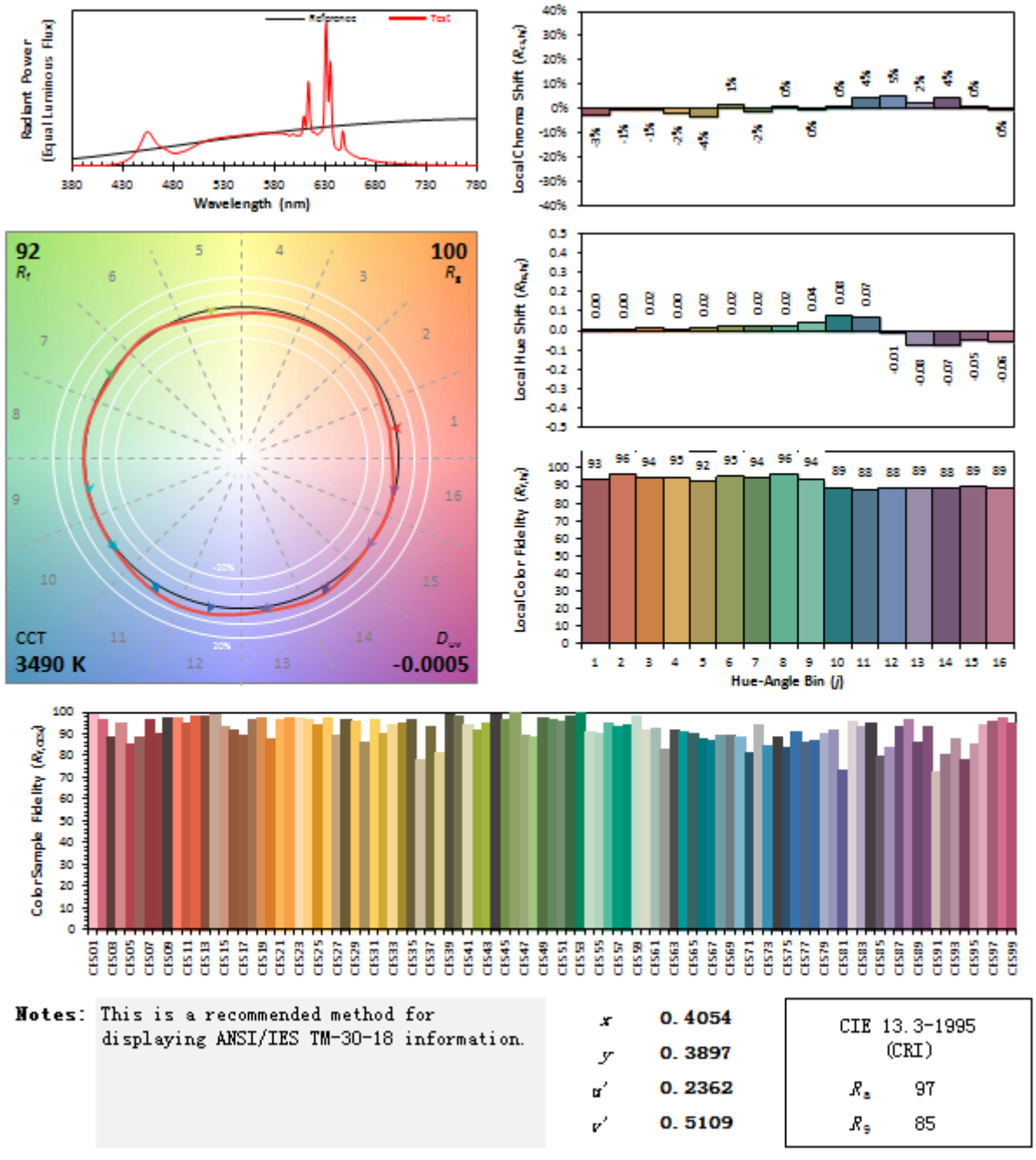


Chart 15: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 9 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
Voltage frequency (Hz)	60
Test Current (A)	0.088
Power Factor	0.9603
Test Power (W)	10.16
THD A%	16.54
Luminous Efficacy (lm/W)	138.8
Total Luminous Flux (lm)	1410.7
Color Rendering Index (CRI)	97.1
R9	87.6
Correlated Color Temperature (CCT)(K)	3886
Chromaticity Chroma x	0.3858
Chromaticity Chroma y	0.3808
Chromaticity Chroma u	0.2270
Chromaticity Chroma v	0.3361
Duv	0.0004
Chromaticity Chroma u ’	0.2270
Chromaticity Chroma v’	0.5041

Special Color Rendering Indices	
R1	99.1
R2	98.1
R3	93.7
R4	98.8
R5	97.5
R6	95.8
R7	97.9
R8	96.1
R9	87.6
R10	92.3
R11	96.6
R12	74.5
R13	99.2
R14	95.2

Table 11: 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

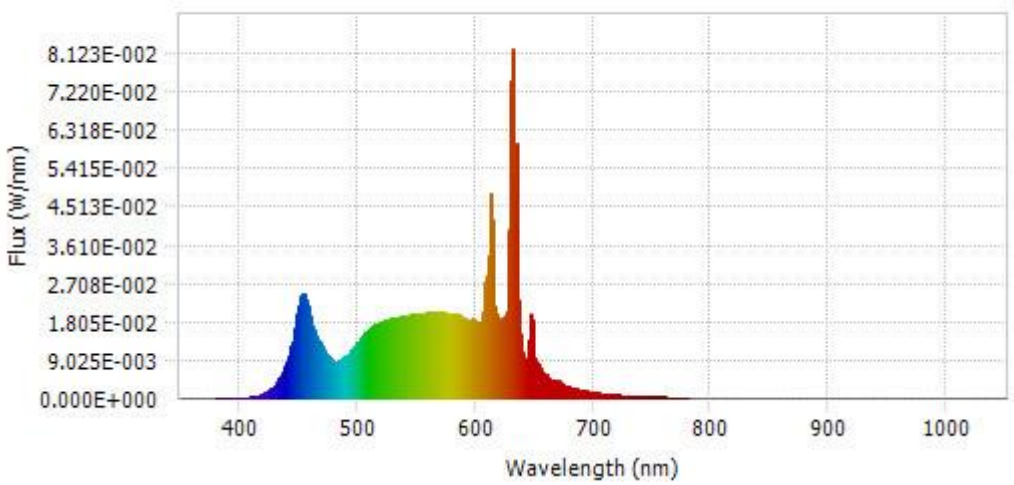
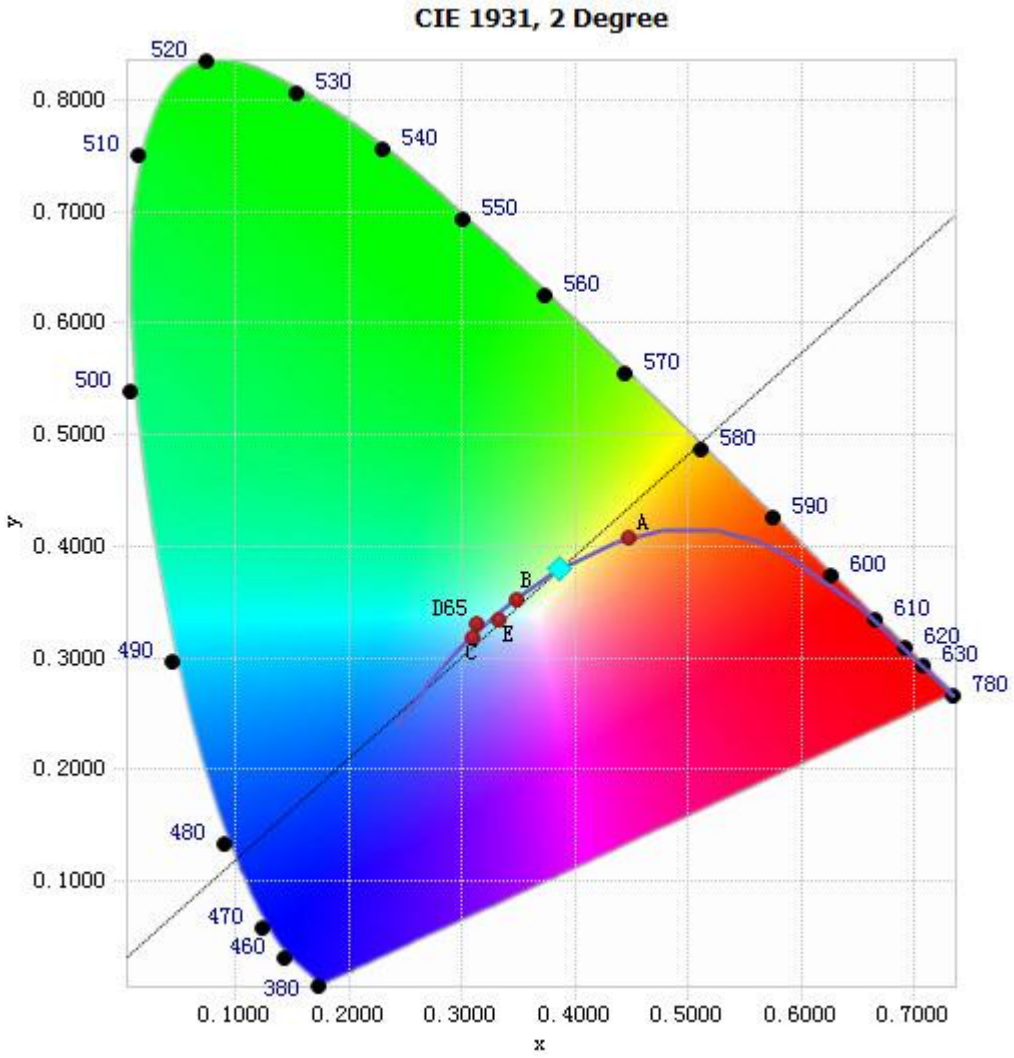


Chart16: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.32E-04	485	8.92E-03	590	1.90E-02	695	1.60E-03
385	1.11E-04	490	9.87E-03	595	1.81E-02	700	1.36E-03
390	1.04E-04	495	1.13E-02	600	1.80E-02	705	1.16E-03
395	1.17E-04	500	1.31E-02	605	1.78E-02	710	9.80E-04
400	1.03E-04	505	1.48E-02	610	2.27E-02	715	8.54E-04
405	1.25E-04	510	1.62E-02	615	2.94E-02	720	7.31E-04
410	2.43E-04	515	1.73E-02	620	1.89E-02	725	6.25E-04
415	4.81E-04	520	1.79E-02	625	1.92E-02	730	5.40E-04
420	9.16E-04	525	1.84E-02	630	7.44E-02	735	4.54E-04
425	1.75E-03	530	1.88E-02	635	5.99E-02	740	3.97E-04
430	2.99E-03	535	1.91E-02	640	1.06E-02	745	3.41E-04
435	5.07E-03	540	1.94E-02	645	9.62E-03	750	2.91E-04
440	8.32E-03	545	1.96E-02	650	9.44E-03	755	2.48E-04
445	1.34E-02	550	1.97E-02	655	6.83E-03	760	2.23E-04
450	2.15E-02	555	2.00E-02	660	5.50E-03	765	1.94E-04
455	2.47E-02	560	2.02E-02	665	4.24E-03	770	1.59E-04
460	1.94E-02	565	2.02E-02	670	4.25E-03	775	1.43E-04
465	1.47E-02	570	2.02E-02	675	3.14E-03	780	1.23E-04
470	1.23E-02	575	2.00E-02	680	2.59E-03		
475	1.01E-02	580	1.97E-02	685	2.21E-03		
480	8.65E-03	585	1.97E-02	690	1.87E-03		

Table 12: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3858, 0.3808)

Chart 17: 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

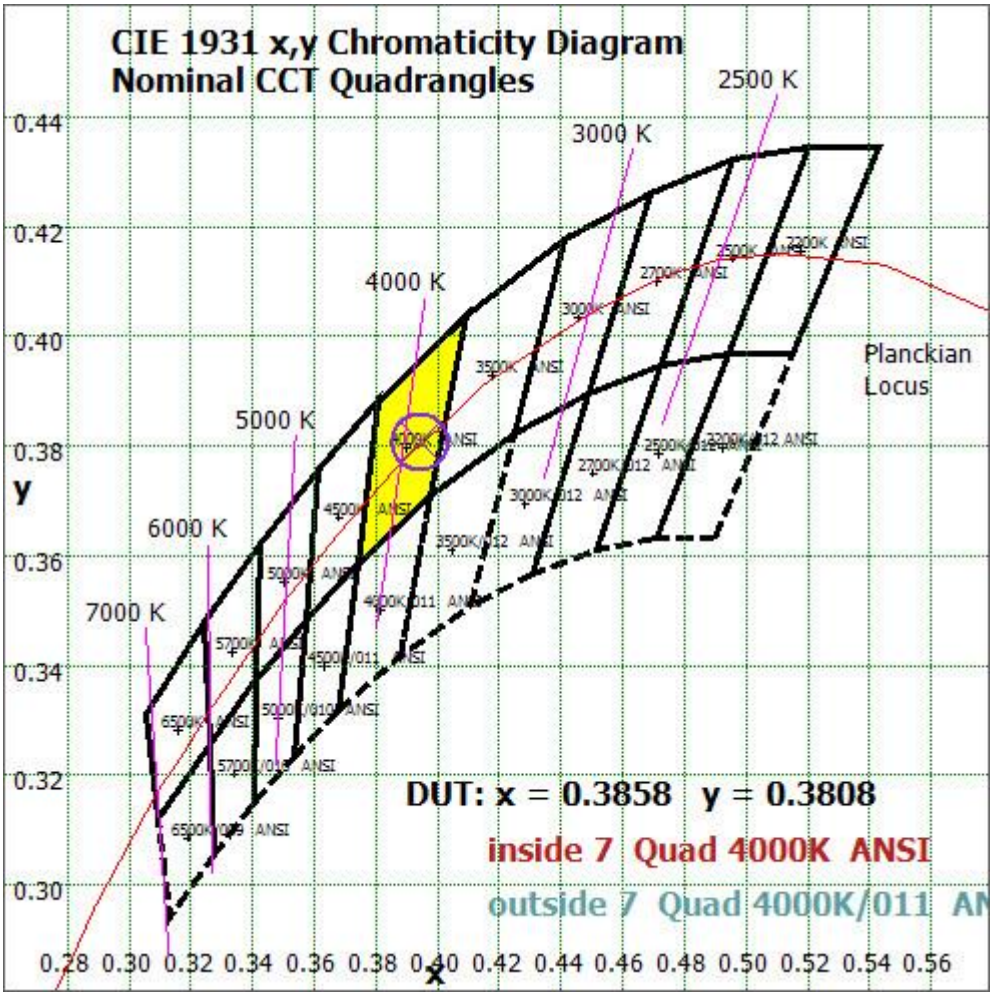


Chart 18: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

ANSI/IES TM-30-18 Color Rendition Report

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

Date: 2024/12/16 **Model:** 11A19DIM/9CCTS

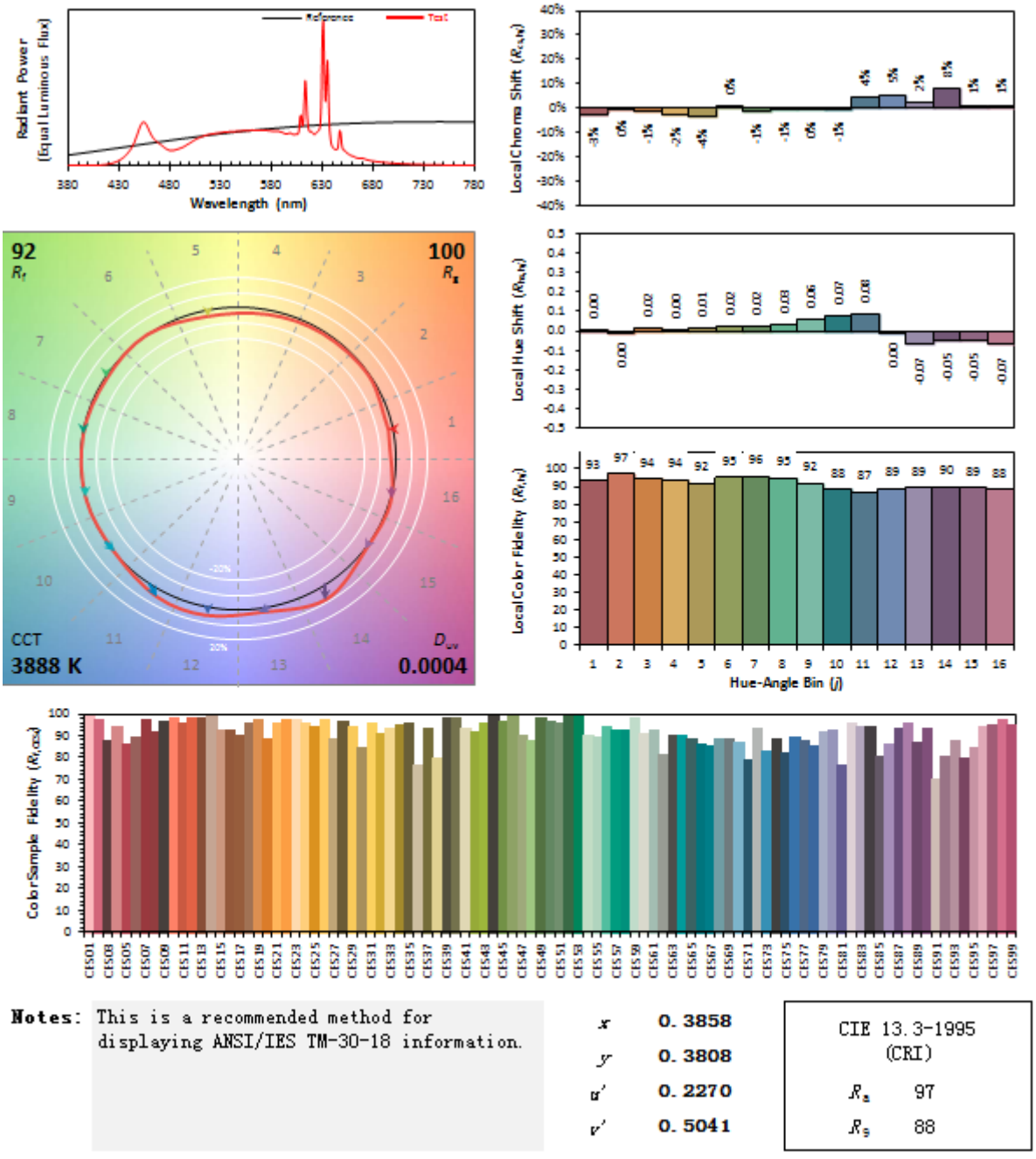


Chart 19: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 11 due to rounding.

TEST RESULTS (5000K 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
Voltage frequency (Hz)	60
Test Current (A)	0.090
Power Factor	0.9618
Test Power (W)	10.37
THD A%	16.24
Luminous Efficacy (lm/W)	130.6
Total Luminous Flux (lm)	1354.2
Color Rendering Index (CRI)	94.1
R9	79.3
Correlated Color Temperature (CCT)(K)	4950
Chromaticity Chroma x	0.3474
Chromaticity Chroma y	0.3633
Chromaticity Chroma u	0.2085
Chromaticity Chroma v	0.3271
Duv	0.0049
Chromaticity Chroma u ’	0.2085
Chromaticity Chroma v’	0.4906

Special Color Rendering Indices	
R1	95
R2	94.4
R3	92
R4	94.7
R5	92.6
R6	91.6
R7	98.3
R8	93.7
R9	79.3
R10	84.5
R11	93.3
R12	65.2
R13	94.2
R14	94.9

Table 13: 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

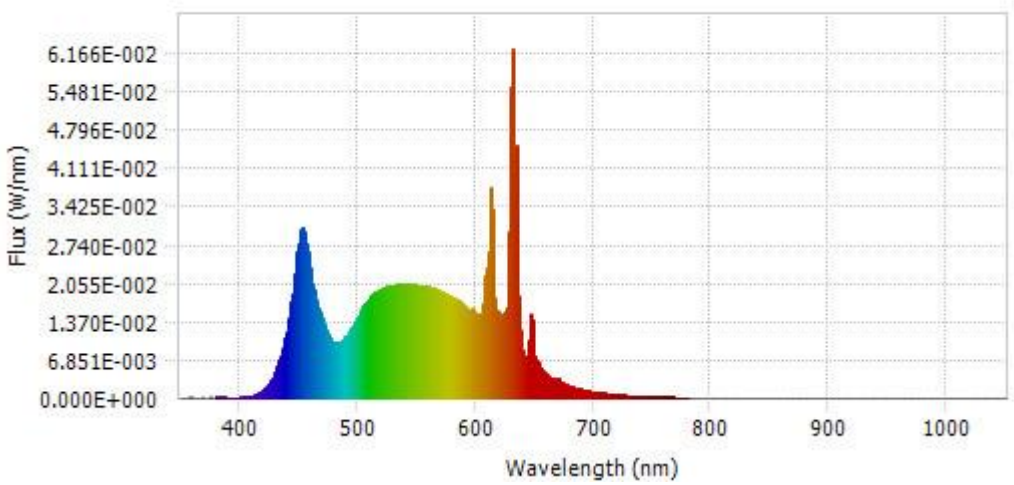
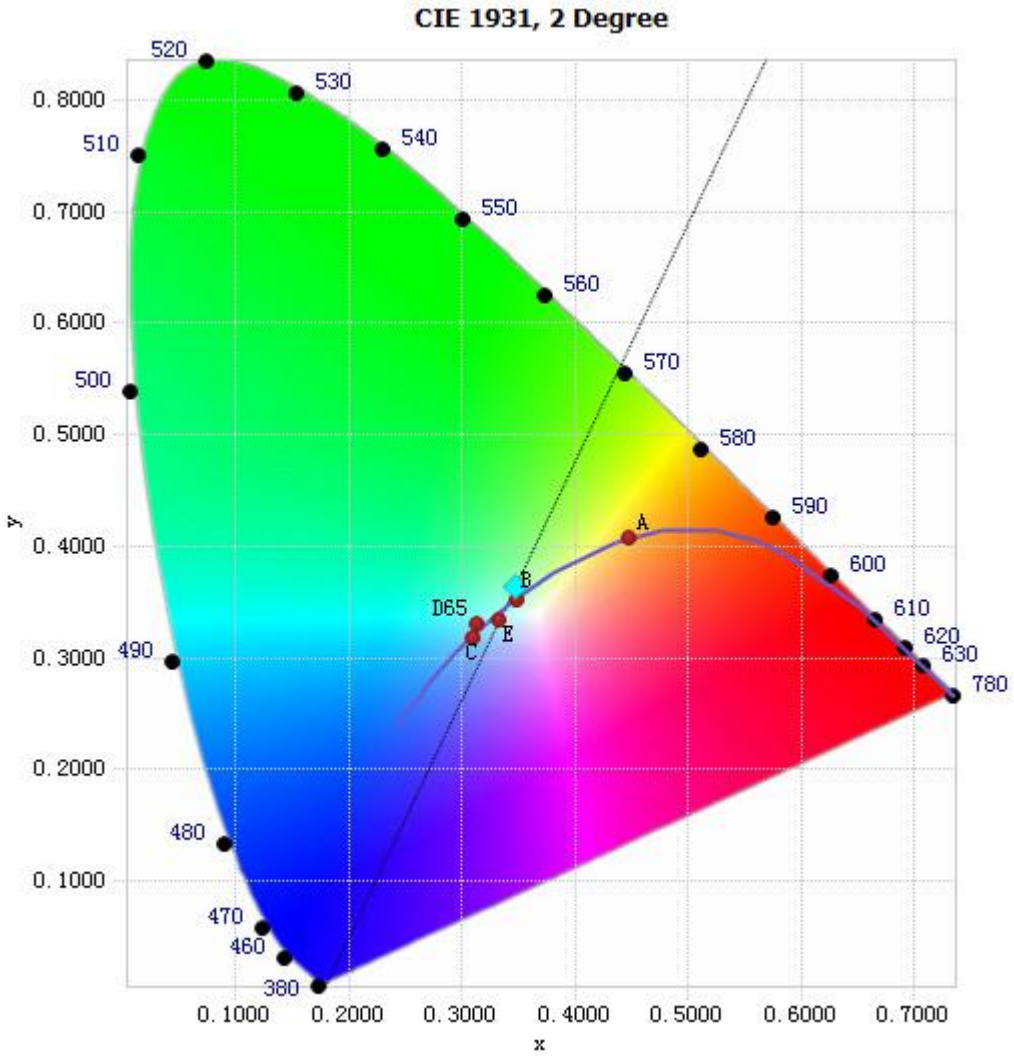


Chart20: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.23E-04	485	1.01E-02	590	1.66E-02	695	1.35E-03
385	1.46E-04	490	1.11E-02	595	1.56E-02	700	1.15E-03
390	1.25E-04	495	1.25E-02	600	1.53E-02	705	1.01E-03
395	1.15E-04	500	1.45E-02	605	1.49E-02	710	8.48E-04
400	1.12E-04	505	1.63E-02	610	1.88E-02	715	7.29E-04
405	1.65E-04	510	1.77E-02	615	2.40E-02	720	6.30E-04
410	3.53E-04	515	1.89E-02	620	1.52E-02	725	5.33E-04
415	7.42E-04	520	1.94E-02	625	1.53E-02	730	4.63E-04
420	1.40E-03	525	1.99E-02	630	5.54E-02	735	4.07E-04
425	2.64E-03	530	2.02E-02	635	4.53E-02	740	3.48E-04
430	4.59E-03	535	2.03E-02	640	8.54E-03	745	2.89E-04
435	7.53E-03	540	2.03E-02	645	7.66E-03	750	2.64E-04
440	1.19E-02	545	2.04E-02	650	7.55E-03	755	2.16E-04
445	1.87E-02	550	2.02E-02	655	5.54E-03	760	1.90E-04
450	2.77E-02	555	2.02E-02	660	4.43E-03	765	1.70E-04
455	2.99E-02	560	1.98E-02	665	3.47E-03	770	1.49E-04
460	2.32E-02	565	1.96E-02	670	3.44E-03	775	1.27E-04
465	1.76E-02	570	1.91E-02	675	2.58E-03	780	1.16E-04
470	1.43E-02	575	1.86E-02	680	2.15E-03		
475	1.14E-02	580	1.80E-02	685	1.81E-03		
480	9.92E-03	585	1.75E-02	690	1.56E-03		

Table 14: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3474, 0.3633)

Chart 21: 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

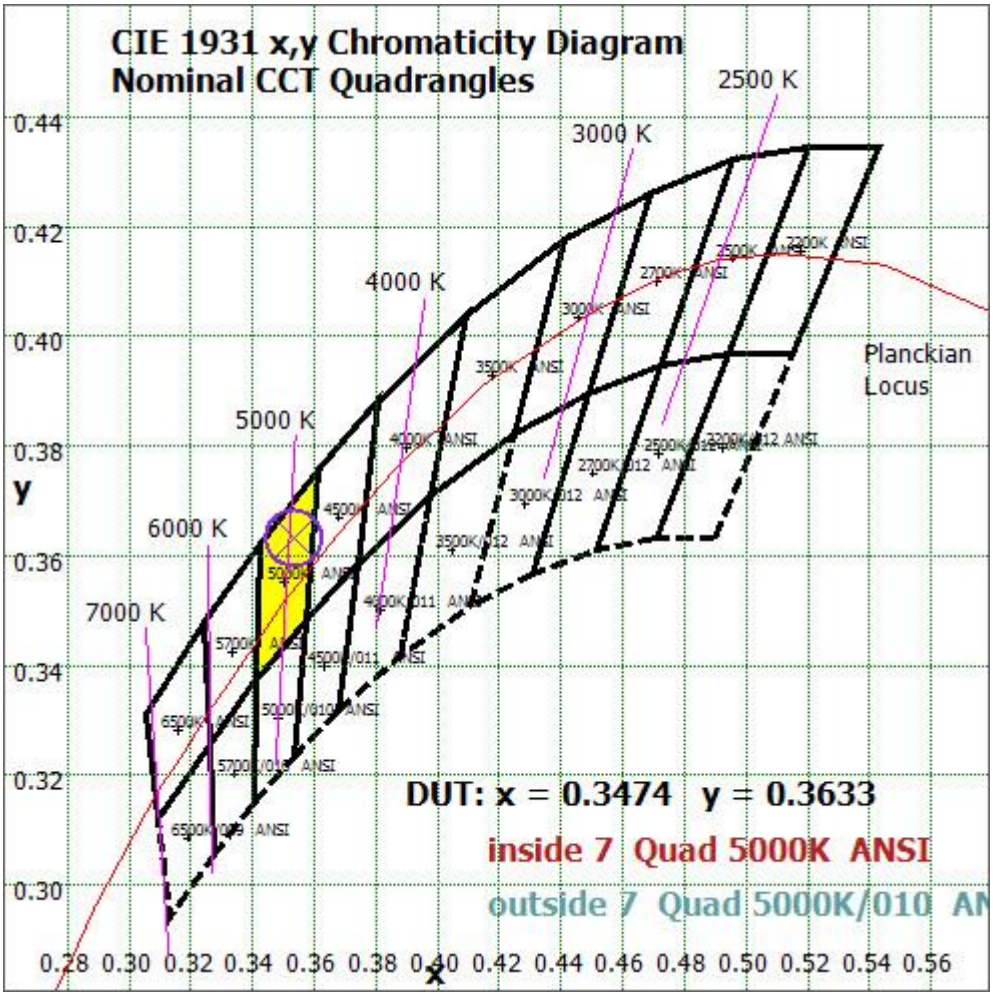


Chart 22: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

ANSI/IES TM-30-18 Color Rendition Report

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

Date: 2024/12/16 **Model:** 11A19DIM/9CCTS

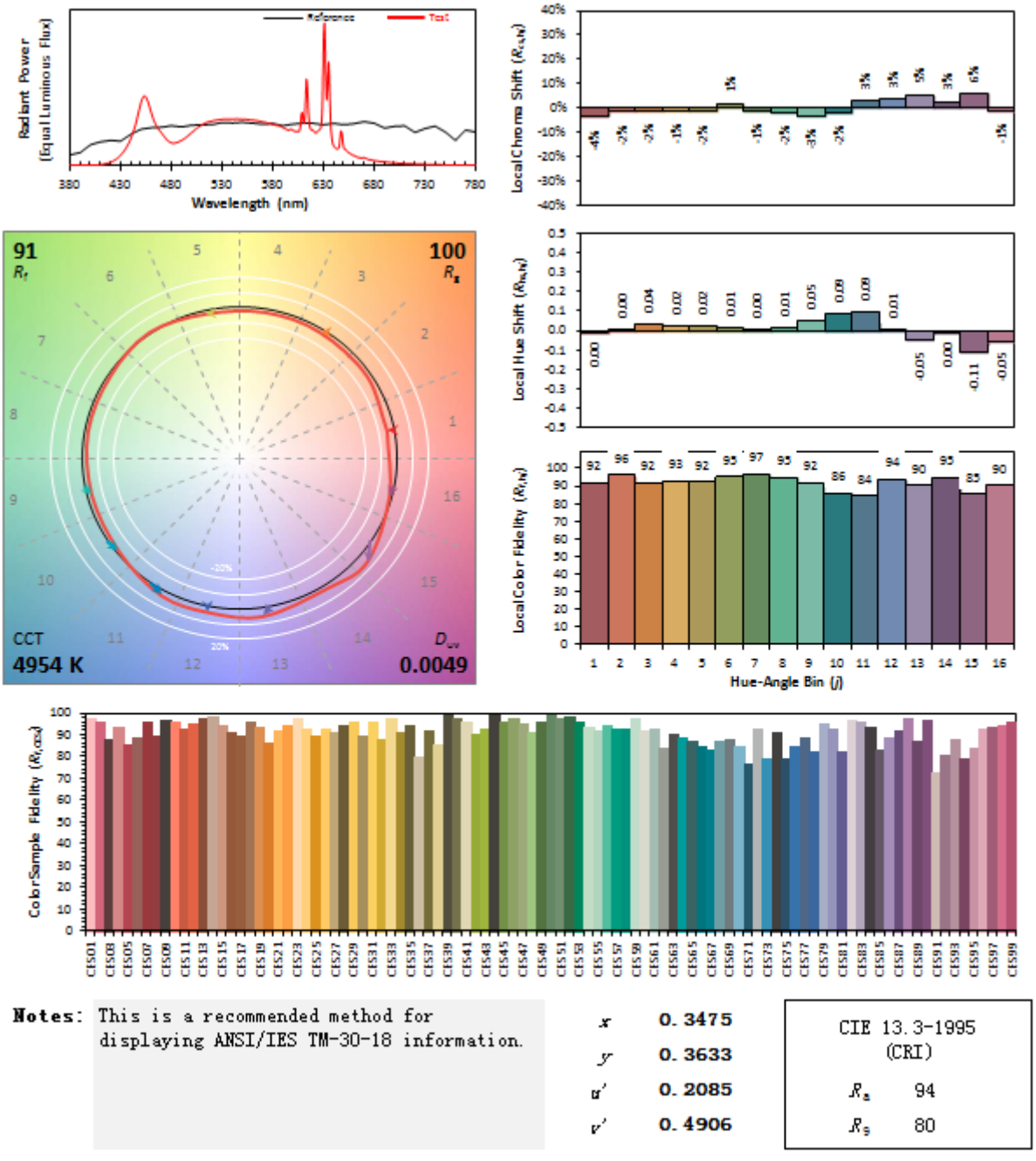


Chart 23: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 13 due to rounding.

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jun. 18, 2024	-
Digital Power Meter	PF2010A	HZTE028-01	Aug. 08, 2024	Aug. 07, 2025
AC Power Supply	DPS1060	HZTE001-06	Aug. 08, 2024	Aug. 07, 2025
DC Power Supply	WY12010	HZTE004-03	Aug. 08, 2024	Aug. 07, 2025
Temperature recorder	JM624U	HZTE018-08	Aug. 08, 2024	Aug. 07, 2025
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 08, 2024	Aug. 07, 2025
Standard source	D908	HZTE012-01	Aug. 14, 2018	-
Integrate Sphere system	3M	HZTE015-04	Dec. 10, 2024	-
Digital Power Meter	WT210	HZTE008-01	Aug. 08, 2024	Aug. 07, 2025
AC Power Supply	PCR 500L	HZTE001-07	Aug. 08, 2024	Aug. 07, 2025
DC Power Supply	IT6154	HZTE004-04	Aug. 08, 2024	Aug. 07, 2025
Standard source	SCL-1400	HZTE012-06	Nov. 04, 2021	-
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 08, 2024	Aug. 07, 2025
Temperature Meter	TES1310	HZTE017-01	Aug. 08, 2024	Aug. 07, 2025

Table 15: 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 ***

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