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: 9A19DIM/9CCTS

Laboratory: Lea ding Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ24120023a

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	9A19DIM/9CCTS 2700K Setting	9A19DIM/9CCTS 3000K Setting	9A19DIM/9CCTS 3500K Setting	9A19DIM/9CCTS 4000K Setting	9A19DIM/9CCTS 5000K Setting
Luminous Efficacy (Lumens /Watt)	107.7	113.0	116.8	117.4	112.7
Total Luminous Flux (Lumens)	900.1	943.4	972.0	984.0	953.2
Power (Watts)	8.36	8.35	8.32	8.38	8.46
Power Factor	0.9229	0.9238	0.9255	0.9220	0.9169
CCT (K)	2767	3045	3362	3995	4865
CRI	94.4	96.3	97.0	97.4	96.0
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	: 9A19DIM/9CCTS
Electrical Ratings	: 120V, 60Hz, 9W
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)	0.076
Power Factor	0.9229
Test Power (W)	8.36
THD A%	36.07
Luminous Efficacy (lm/W)	107.7
Total Luminous Flux (lm)	900.1
Color Rendering Index (CRI)	94.4
R9	65.7
Correlated Color Temperature (CCT)(K)	2767
Chromaticity Chroma x	0.4529
Chromaticity Chroma y	0.4067
Chromaticity Chroma u	0.2598
Chromaticity Chroma v	0.3499
Duv	-0.0009
Chromaticity Chroma u ’	0.2598
Chromaticity Chroma v’	0.5248

Special Color Rendering Indices	
R1	96.8
R2	97
R3	95
R4	95.9
R5	95.7
R6	96.7
R7	92.8
R8	85.6
R9	65.7
R10	90.2
R11	96.2
R12	85
R13	96.5
R14	95.5

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

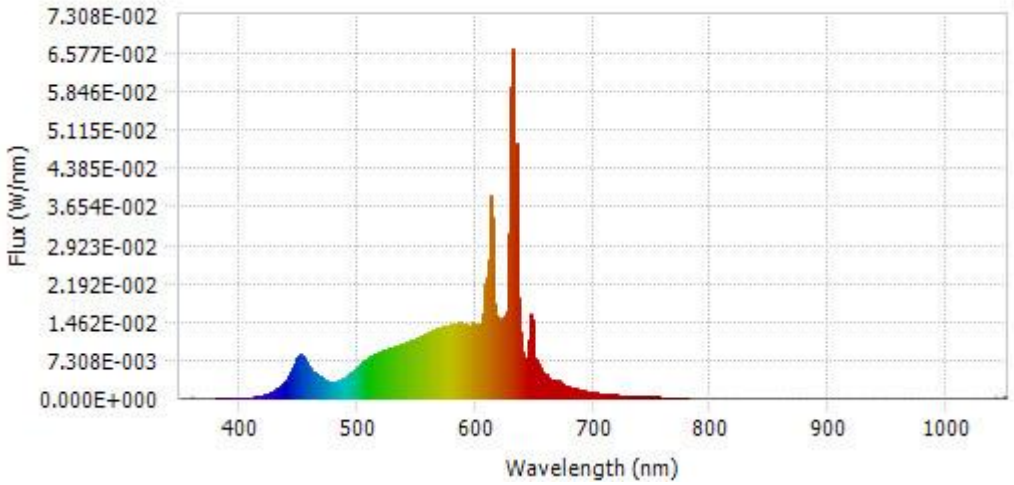
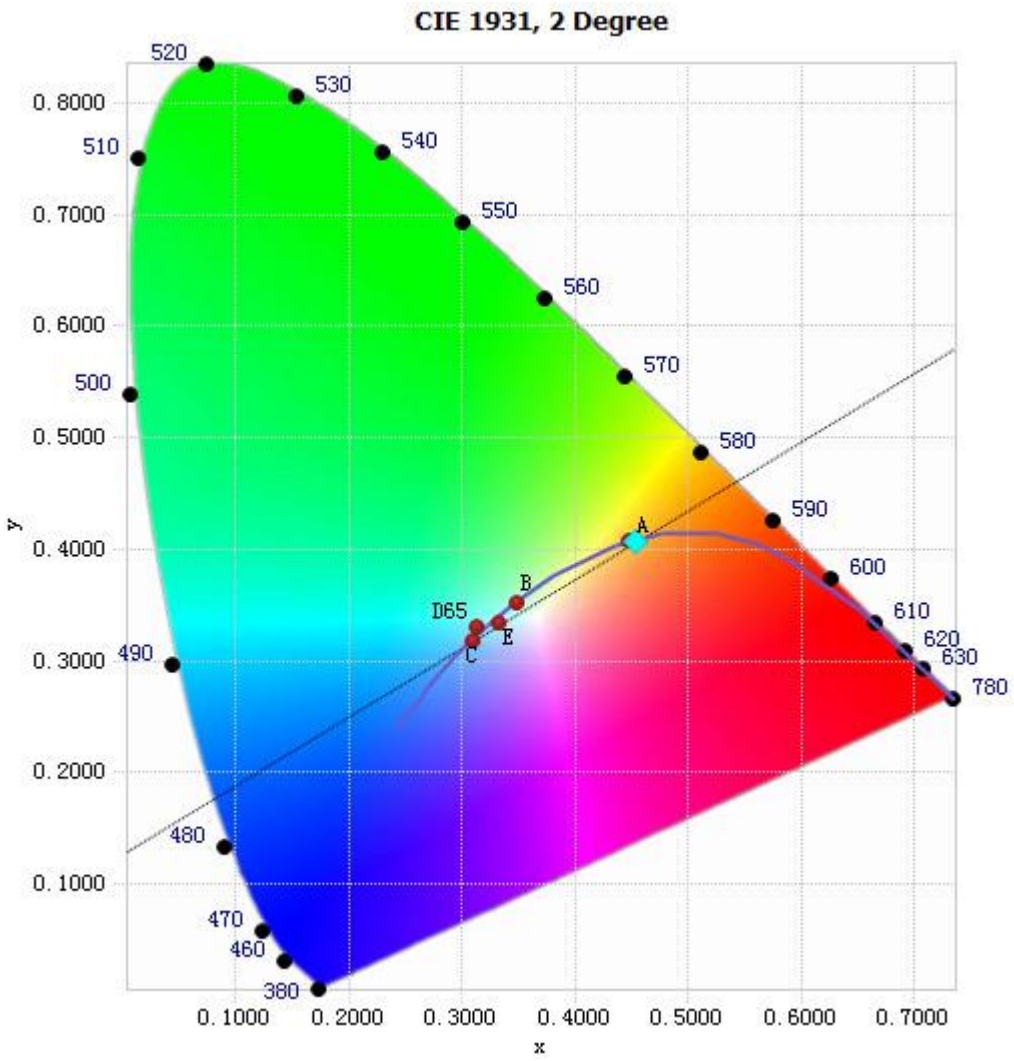


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	9.37E-05	485	3.39E-03	590	1.41E-02	695	1.29E-03
385	1.10E-04	490	3.94E-03	595	1.38E-02	700	1.09E-03
390	7.04E-05	495	4.79E-03	600	1.40E-02	705	9.11E-04
395	4.03E-05	500	5.83E-03	605	1.40E-02	710	7.81E-04
400	8.04E-05	505	6.84E-03	610	1.83E-02	715	6.67E-04
405	9.25E-05	510	7.71E-03	615	2.40E-02	720	5.78E-04
410	1.40E-04	515	8.38E-03	620	1.54E-02	725	4.91E-04
415	2.64E-04	520	8.84E-03	625	1.56E-02	730	4.24E-04
420	4.90E-04	525	9.32E-03	630	5.92E-02	735	3.51E-04
425	8.30E-04	530	9.72E-03	635	4.87E-02	740	3.08E-04
430	1.43E-03	535	1.01E-02	640	8.72E-03	745	2.57E-04
435	2.26E-03	540	1.05E-02	645	7.87E-03	750	2.23E-04
440	3.55E-03	545	1.09E-02	650	7.79E-03	755	1.94E-04
445	5.59E-03	550	1.14E-02	655	5.63E-03	760	1.73E-04
450	7.96E-03	555	1.19E-02	660	4.49E-03	765	1.48E-04
455	7.57E-03	560	1.25E-02	665	3.47E-03	770	1.20E-04
460	5.57E-03	565	1.30E-02	670	3.47E-03	775	1.06E-04
465	4.57E-03	570	1.34E-02	675	2.55E-03	780	9.50E-05
470	3.82E-03	575	1.37E-02	680	2.10E-03		
475	3.21E-03	580	1.40E-02	685	1.78E-03		
480	3.03E-03	585	1.43E-02	690	1.51E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4529, 0.4067)

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

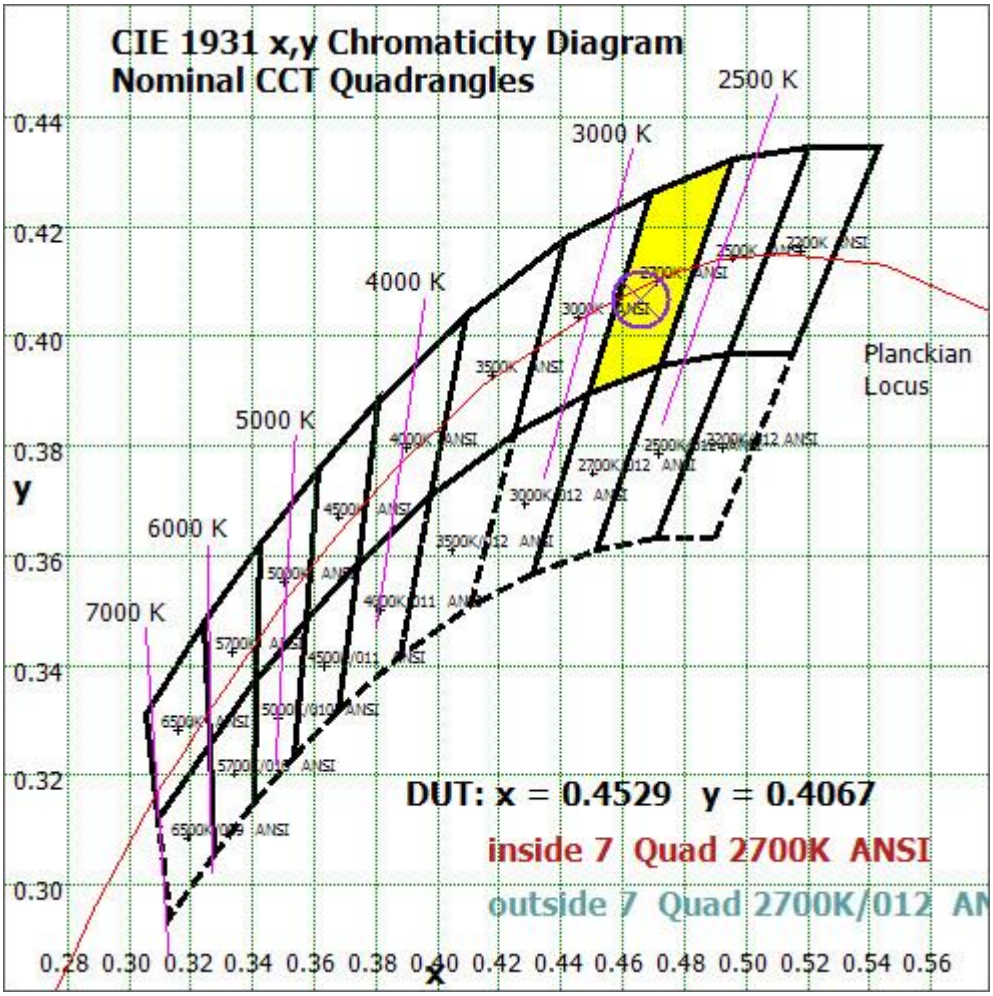


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

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:** 9A19DIM/9CCTS

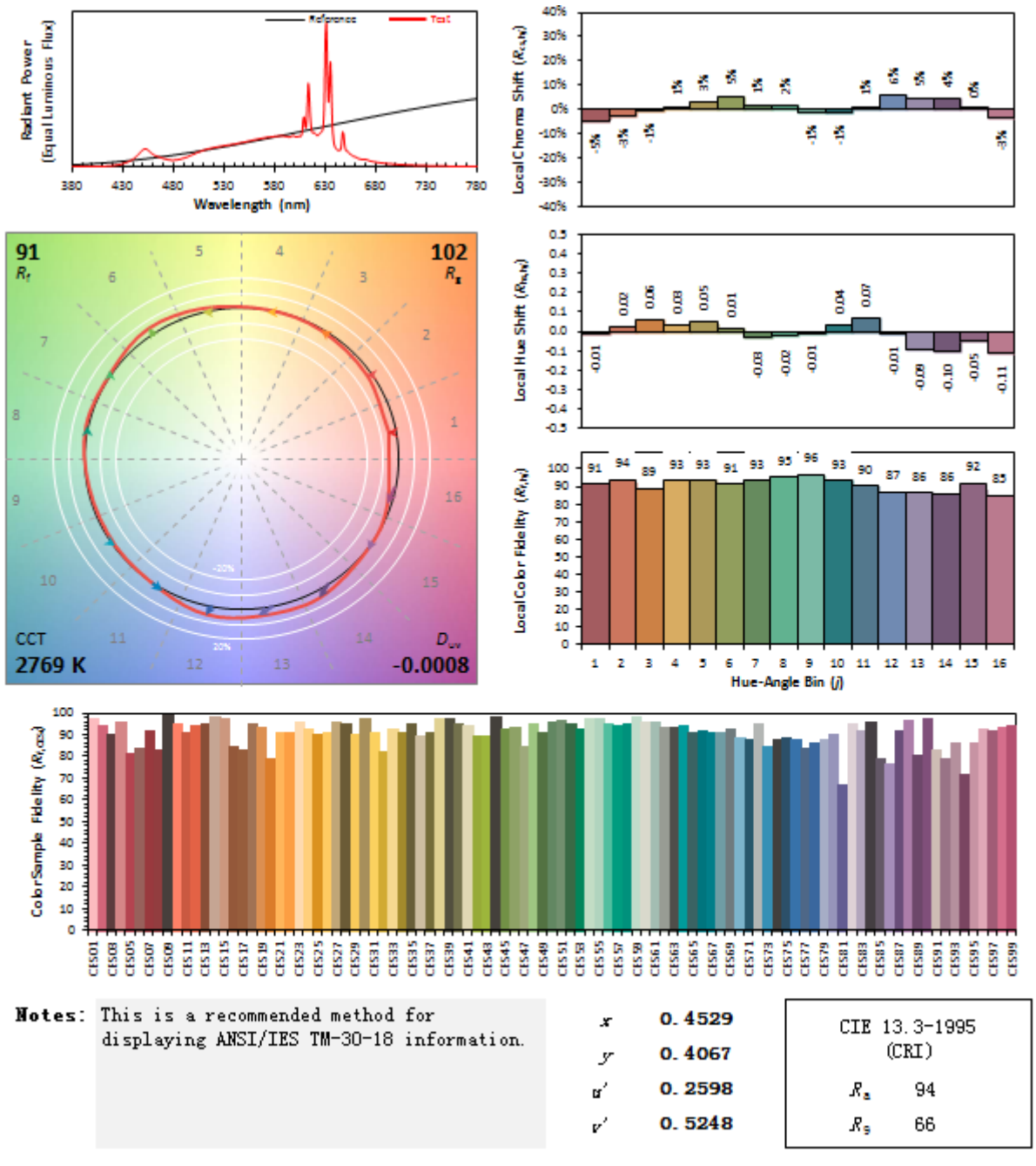


Chart 4: Full Report Created with the IES TM-30 Calculator

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)	0.080
Power Factor	0.8798
Power (W)	8.40
Luminous Efficacy (lm/W)	108.1
Total Luminous Flux (lm)	907.7
Beam Angle (°)	224.9 (0^o-180^o) / 224.7 (90^o-270^o)
Center Beam Candle Power (cd)	112
Maximum Beam Candle Power (cd)	112.0 (At: C=225.0, Gamma=5.0)
Spacing Criteria	1.51 (0^o-180^o) / 1.49 (90^o-270^o)
Zonal Lumens in the 0 °-60 °Zone	36.81%
Zonal Lumens in the 60 °-90 °Zone	30.50%
Zonal Lumens in the 90 °-120 °Zone	21.86%
Zonal Lumens in the 120 °-180 °Zone	10.83%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

γ(°)	Lumens	% Total
0- 10	10.661	1.17%
10- 20	31.518	3.47%
20- 30	51.044	5.62%
30- 40	68.233	7.52%
40- 50	81.832	9.02%
50- 60	90.856	10.01%
60- 70	94.858	10.45%
70- 80	93.853	10.34%
80- 90	88.159	9.71%
90-100	78.621	8.66%
100-110	66.573	7.33%
110-120	53.245	5.87%
120-130	39.895	4.40%
130-140	27.648	3.05%
140-150	17.347	1.91%
150-160	9.47	1.04%
160-170	3.601	0.40%
170-180	0.299	0.03%
Total	907.7	100%

γ(°)	Lumens	% Total
0-130	849.348	93.57%
130-180	58.365	6.43%
0-180	907.7	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

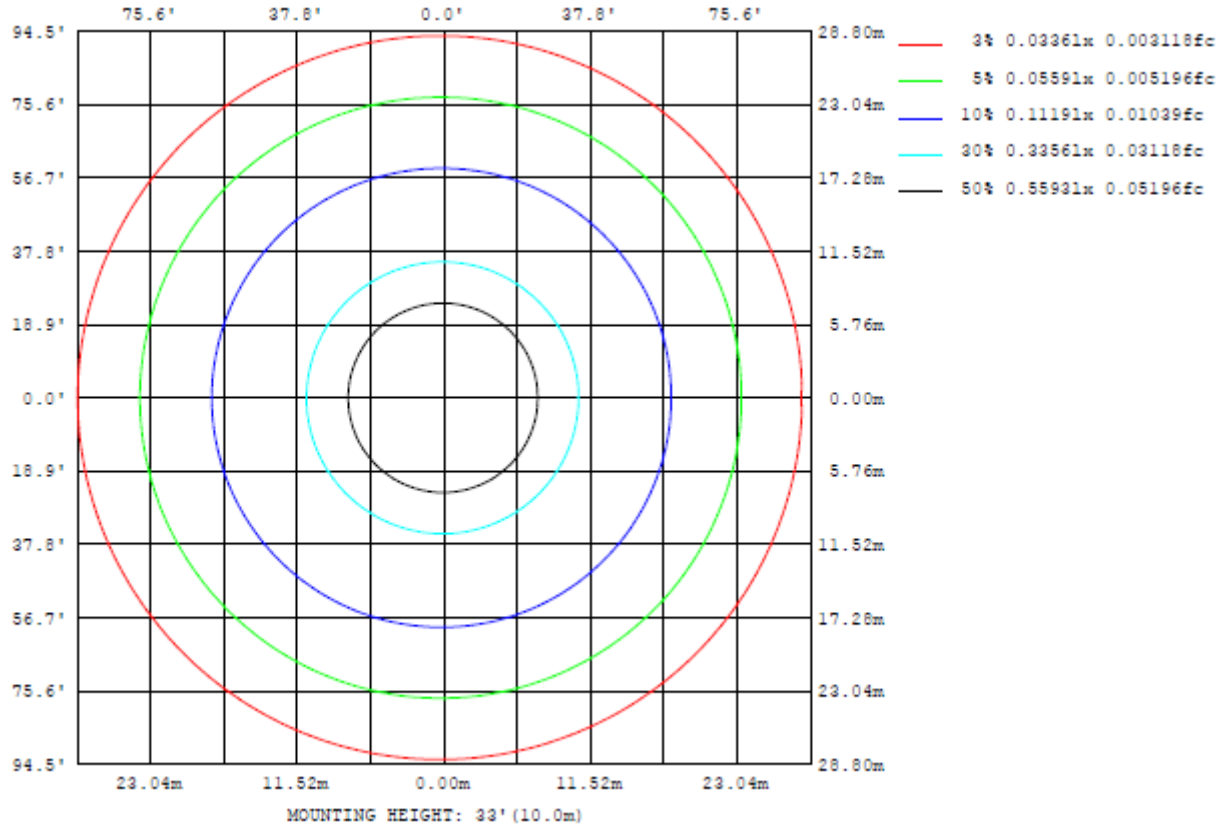


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

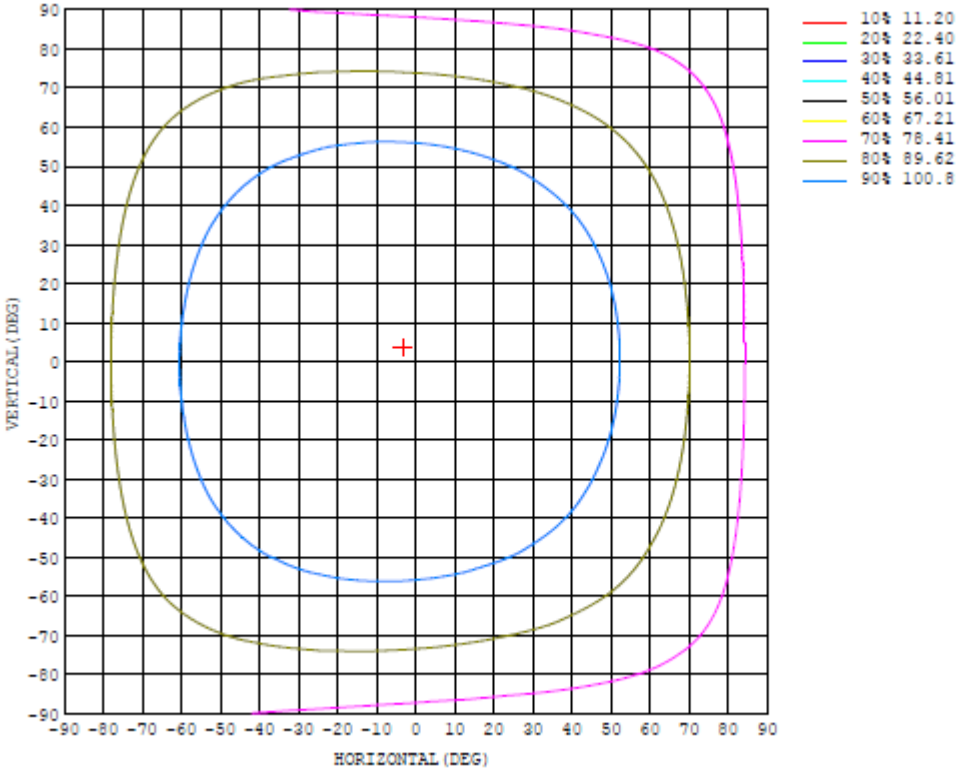


Chart 6: Isocandela Plot

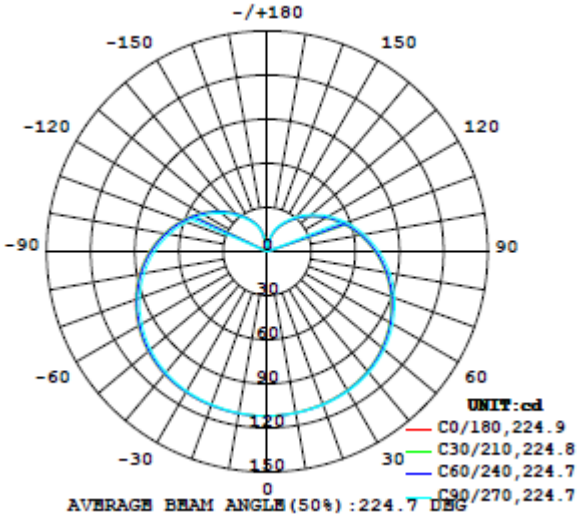


Chart 7: Polar Candela Distribution

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	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112			
5	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112			
10	111	111	111	111	111	112	112	112	112	112	112	112	111	111	111	111			
15	111	111	111	111	111	111	111	112	112	112	112	111	111	111	111	111			
20	110	111	111	111	111	111	111	111	111	111	111	111	111	111	110	110			
25	110	110	110	110	110	111	111	111	111	111	111	110	110	110	110	110			
30	109	109	109	109	110	110	110	111	111	110	110	110	110	109	109	109			
35	108	108	108	108	109	109	109	110	110	110	109	109	108	108	108	108			
40	106	106	107	107	107	108	108	109	109	108	108	108	107	107	106	106			
45	104	104	105	105	106	106	107	107	108	107	107	106	106	105	105	104			
50	102	102	102	103	104	105	105	106	106	105	105	104	104	103	102	102			
55	99.3	99.4	99.9	101	101	102	103	103	104	103	103	102	101	101	100	99.5			
60	96.3	96.4	97.0	97.7	98.6	99.6	100	101	101	101	100	99.7	98.7	97.8	97.1	96.6			
65	93.0	93.2	93.7	94.4	95.4	96.6	97.6	98.1	98.3	98.0	97.4	96.5	95.6	94.8	93.8	93.4			
70	89.5	89.7	90.3	91.1	92.2	93.3	94.4	95.1	95.4	95.0	94.3	93.3	92.3	91.5	90.6	89.9			
75	85.9	86.0	86.6	87.4	88.5	89.7	91.0	91.6	91.9	91.5	90.8	89.8	88.8	87.8	87.0	86.3			
80	81.8	82.0	82.6	83.4	84.6	86.0	86.9	87.8	88.2	87.8	87.2	86.1	85.0	84.0	83.1	82.3			
85	77.7	77.8	78.4	79.2	80.4	81.8	83.1	83.7	84.2	83.9	83.2	82.2	81.1	79.9	79.0	78.3			
90	73.3	73.4	74.0	74.9	76.0	77.4	78.6	79.4	80.0	79.6	79.0	77.9	76.8	75.6	74.6	73.9			
95	68.9	69.0	69.5	70.4	71.5	72.9	74.0	74.8	75.4	75.1	74.5	73.5	72.4	71.2	70.3	69.5			
100	64.3	64.3	65.0	65.7	66.9	68.3	69.6	70.3	70.8	70.7	70.0	69.0	67.8	66.8	65.6	65.0			
105	59.8	59.8	60.3	61.2	62.2	63.6	64.8	65.6	66.2	66.0	65.4	64.4	63.3	62.2	61.2	60.4			
110	55.2	55.1	55.7	56.5	57.6	58.9	60.0	60.8	61.5	61.4	60.8	59.8	58.7	57.6	56.5	55.8			
115	50.6	50.5	51.0	51.8	52.9	54.2	55.3	56.1	56.7	56.6	56.1	55.2	54.0	53.0	52.0	51.2			
120	46.0	45.9	46.4	47.2	48.2	49.4	50.6	51.4	52.0	51.9	51.4	50.5	49.5	48.4	47.4	46.7			
125	41.6	41.5	41.9	42.7	43.6	44.8	45.9	46.7	47.3	47.2	46.8	45.9	44.9	43.9	42.9	42.2			
130	37.2	37.1	37.5	38.2	39.2	40.3	41.3	42.1	42.7	42.6	42.2	41.5	40.5	39.5	38.6	37.9			
135	33.0	32.9	33.3	34.0	34.8	35.9	36.8	37.6	38.2	38.2	37.8	37.0	36.1	35.2	34.3	33.6			
140	29.0	28.9	29.2	29.8	30.7	31.6	32.5	33.3	33.9	33.8	33.5	32.9	32.0	31.1	30.3	29.7			
145	25.2	25.0	25.4	25.9	26.7	27.6	28.5	29.1	29.7	29.7	29.4	28.8	28.0	27.2	26.4	25.8			
150	21.7	21.6	21.8	22.3	23.0	23.8	24.6	25.2	25.8	25.8	25.5	25.0	24.3	23.5	22.8	22.3			
155	18.4	18.2	18.5	19.0	19.6	20.4	21.1	21.6	22.1	22.2	22.0	21.5	20.9	20.1	19.5	18.9			
160	15.0	14.7	15.0	15.5	16.2	16.9	17.6	18.2	18.7	18.5	18.4	17.8	17.4	16.7	16.1	15.6			
165	10.9	10.6	11.1	11.6	12.3	13.1	13.8	14.4	14.6	12.9	13.3	12.2	13.0	12.4	12.1	11.5			
170	4.52	4.74	4.85	6.16	7.19	8.21	9.27	9.58	9.72	8.52	5.72	4.30	5.39	6.79	6.42	5.44			
175	0.15	0.14	0.14	0.14	0.15	0.19	0.78	1.34	2.67	2.84	2.41	1.45	0.37	0.15	0.15	0.15			
180	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14			

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)	0.075
Power Factor	0.9238
Test Power (W)	8.35
THD A%	37.87
Luminous Efficacy (lm/W)	113.0
Total Luminous Flux (lm)	943.4
Color Rendering Index (CRI)	96.3
R9	77.2
Correlated Color Temperature (CCT)(K)	3045
Chromaticity Chroma x	0.4312
Chromaticity Chroma y	0.3978
Chromaticity Chroma u	0.2496
Chromaticity Chroma v	0.3453
Duv	-0.0017
Chromaticity Chroma u ’	0.2496
Chromaticity Chroma v’	0.5180

Special Color Rendering Indices	
R1	99.3
R2	98.3
R3	94.9
R4	97.1
R5	98.4
R6	96.2
R7	94.8
R8	91
R9	77.2
R10	93.3
R11	95.5
R12	83.4
R13	99.1
R14	95.5

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

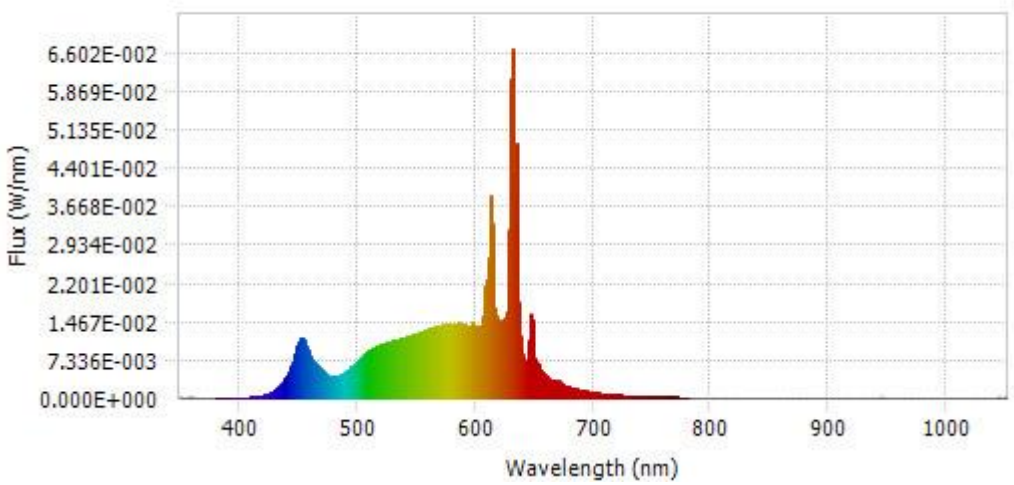
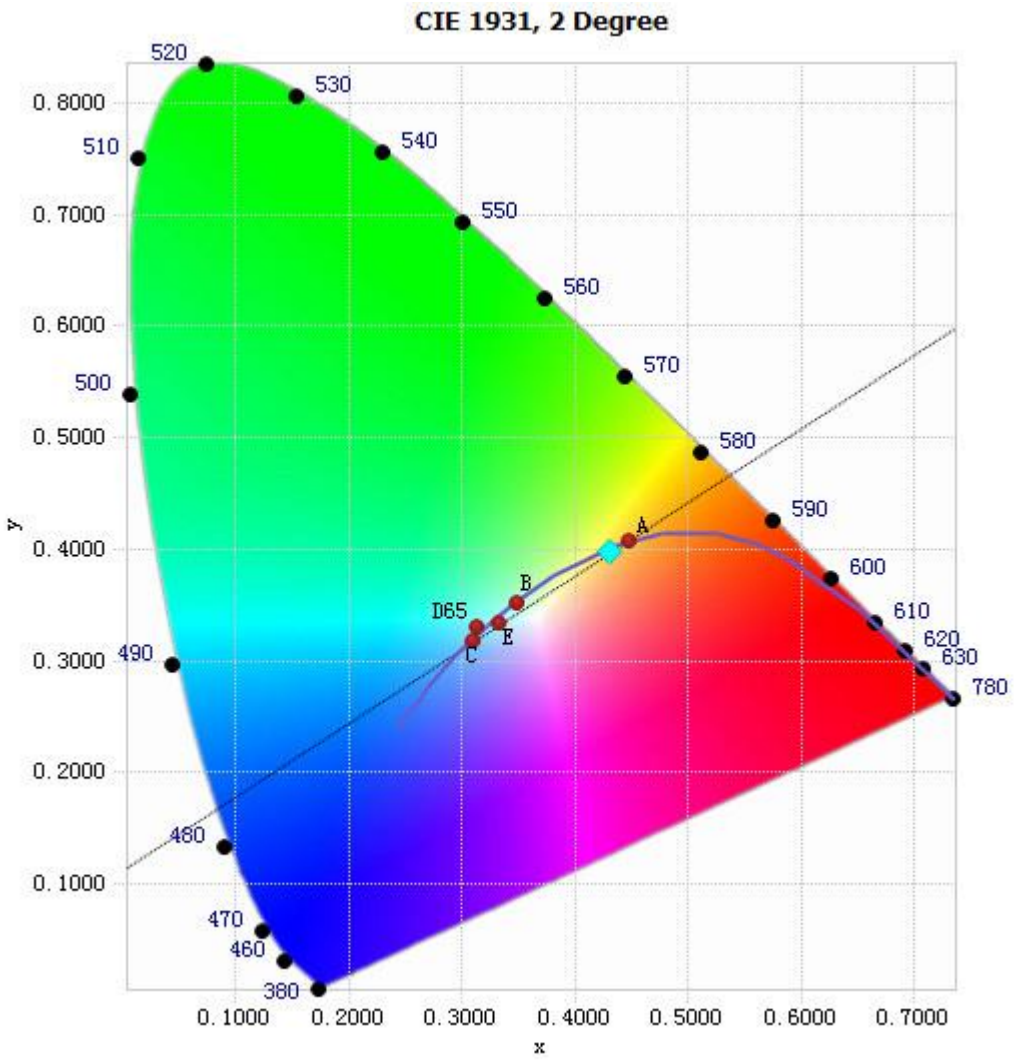


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	7.04E-05	485	4.29E-03	590	1.41E-02	695	1.24E-03
385	7.06E-05	490	4.98E-03	595	1.36E-02	700	1.04E-03
390	5.49E-05	495	5.89E-03	600	1.37E-02	705	8.74E-04
395	6.12E-05	500	7.01E-03	605	1.37E-02	710	7.48E-04
400	8.14E-05	505	8.08E-03	610	1.78E-02	715	6.47E-04
405	6.73E-05	510	8.99E-03	615	2.31E-02	720	5.56E-04
410	1.36E-04	515	9.71E-03	620	1.49E-02	725	4.69E-04
415	2.62E-04	520	1.01E-02	625	1.54E-02	730	3.96E-04
420	4.62E-04	525	1.06E-02	630	6.11E-02	735	3.32E-04
425	8.59E-04	530	1.09E-02	635	4.88E-02	740	2.94E-04
430	1.51E-03	535	1.12E-02	640	8.40E-03	745	2.52E-04
435	2.55E-03	540	1.16E-02	645	7.70E-03	750	2.13E-04
440	4.13E-03	545	1.20E-02	650	7.53E-03	755	1.89E-04
445	6.82E-03	550	1.23E-02	655	5.43E-03	760	1.62E-04
450	1.06E-02	555	1.27E-02	660	4.33E-03	765	1.40E-04
455	1.10E-02	560	1.31E-02	665	3.33E-03	770	1.21E-04
460	8.08E-03	565	1.35E-02	670	3.36E-03	775	9.95E-05
465	6.36E-03	570	1.39E-02	675	2.45E-03	780	8.93E-05
470	5.33E-03	575	1.40E-02	680	2.05E-03		
475	4.33E-03	580	1.42E-02	685	1.72E-03		
480	3.96E-03	585	1.43E-02	690	1.43E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4312, 0.3978)

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

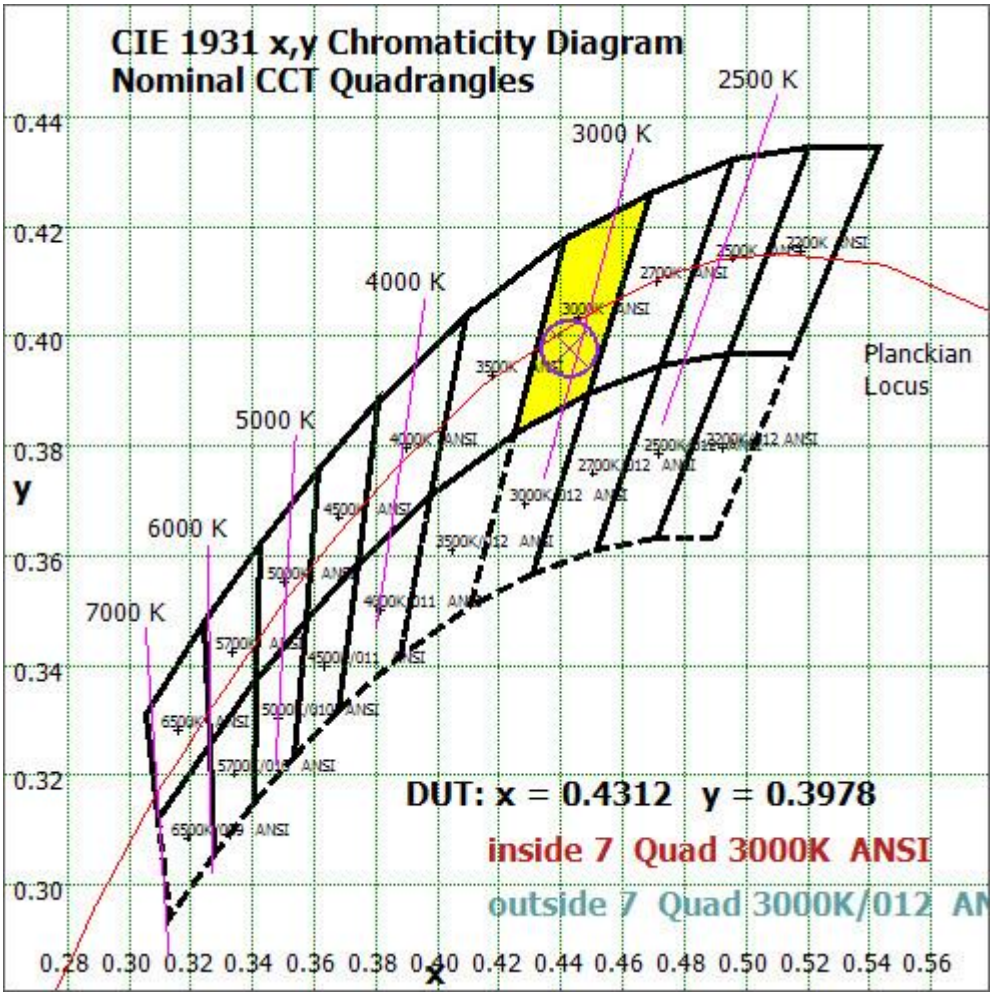


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

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:** 9A19DIM/9CCTS

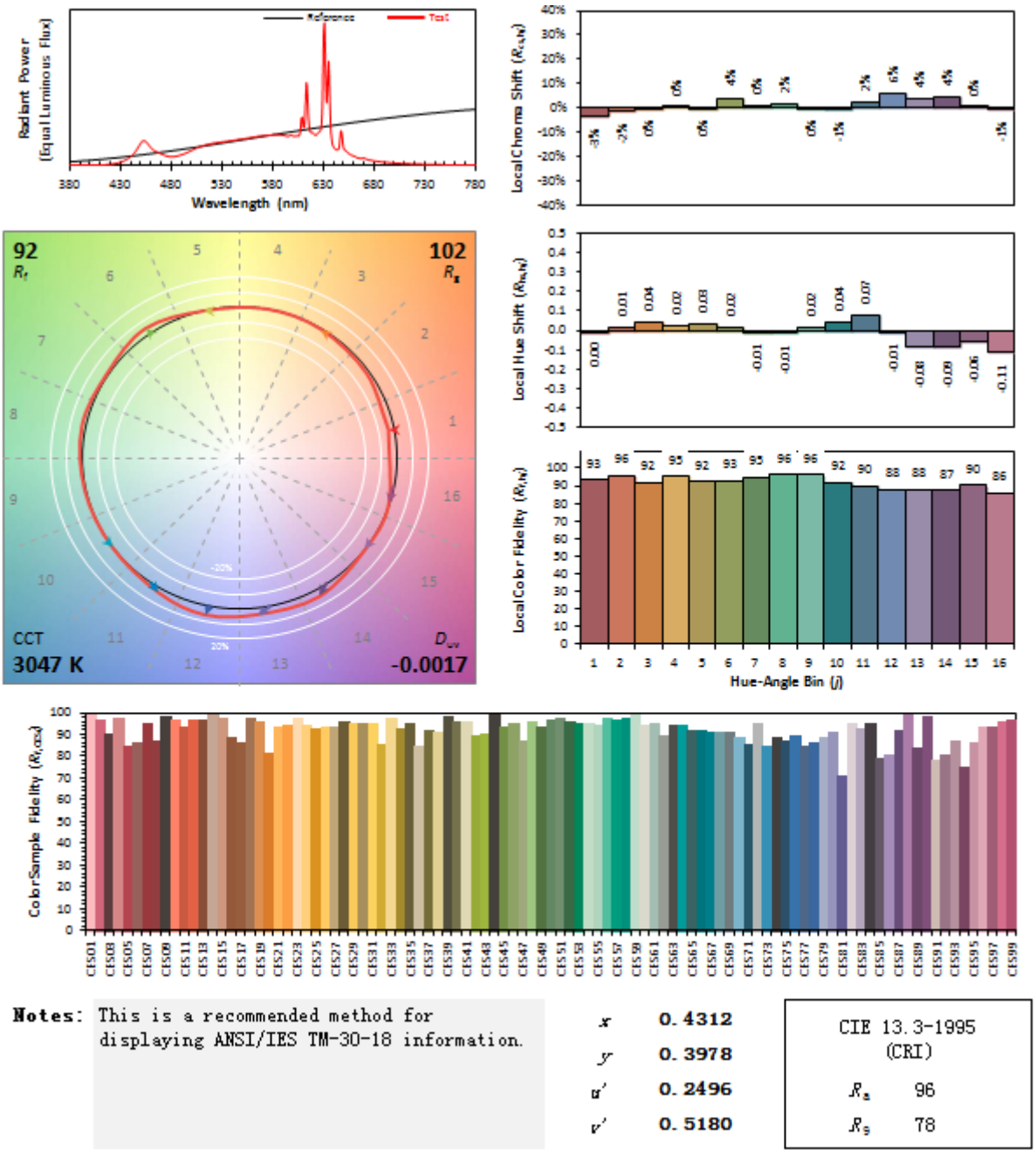


Chart 11: Full Report Created with the IES TM-30 Calculator

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)	0.075
Power Factor	0.9255
Test Power (W)	8.32
THD A%	37.56
Luminous Efficacy (lm/W)	116.8
Total Luminous Flux (lm)	972.0
Color Rendering Index (CRI)	97
R9	86.7
Correlated Color Temperature (CCT)(K)	3362
Chromaticity Chroma x	0.4110
Chromaticity Chroma y	0.3892
Chromaticity Chroma u	0.2401
Chromaticity Chroma v	0.3410
Duv	-0.0019
Chromaticity Chroma u ’	0.2401
Chromaticity Chroma v’	0.5115

Special Color Rendering Indices	
R1	98.5
R2	98.8
R3	94
R4	97
R5	99.5
R6	96
R7	96.8
R8	95.6
R9	86.7
R10	94.3
R11	94.4
R12	80.9
R13	99.3
R14	95.1

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

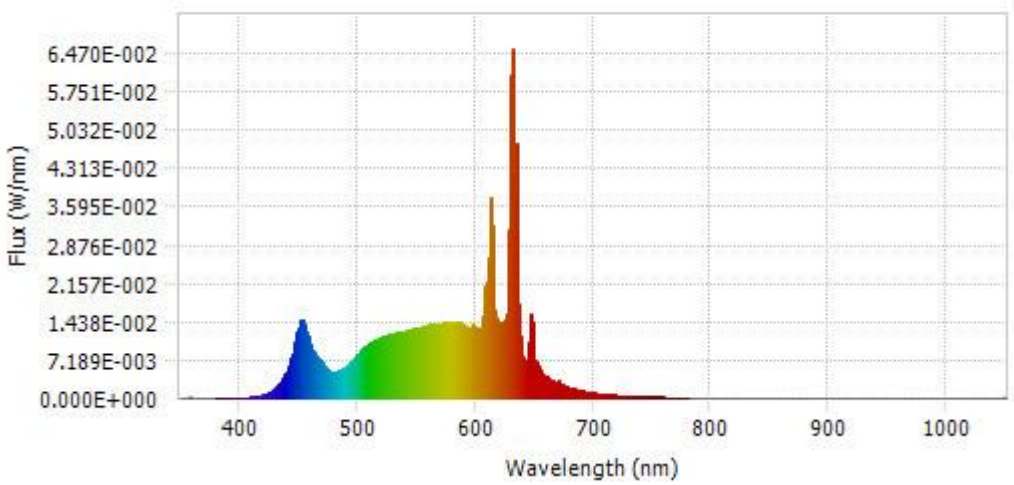
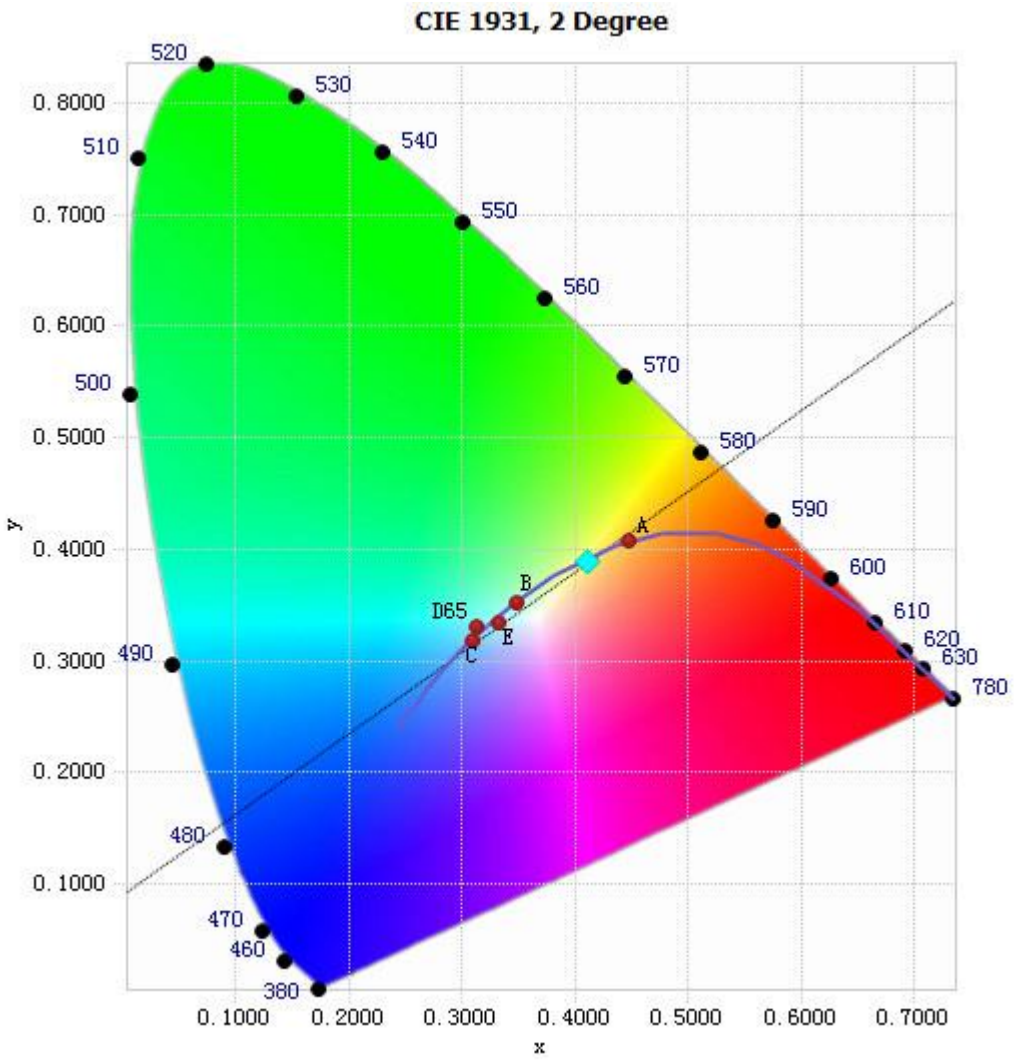


Chart 12: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	7.30E-05	485	5.14E-03	590	1.37E-02	695	1.17E-03
385	7.74E-05	490	5.80E-03	595	1.32E-02	700	9.99E-04
390	8.28E-05	495	6.86E-03	600	1.32E-02	705	8.33E-04
395	7.61E-05	500	8.10E-03	605	1.32E-02	710	7.15E-04
400	5.99E-05	505	9.22E-03	610	1.71E-02	715	6.05E-04
405	6.21E-05	510	1.02E-02	615	2.22E-02	720	5.31E-04
410	1.56E-04	515	1.10E-02	620	1.43E-02	725	4.54E-04
415	2.67E-04	520	1.13E-02	625	1.48E-02	730	3.78E-04
420	5.33E-04	525	1.17E-02	630	6.04E-02	735	3.26E-04
425	9.88E-04	530	1.21E-02	635	4.79E-02	740	2.73E-04
430	1.73E-03	535	1.22E-02	640	8.02E-03	745	2.37E-04
435	2.98E-03	540	1.26E-02	645	7.32E-03	750	2.03E-04
440	5.01E-03	545	1.28E-02	650	7.18E-03	755	1.82E-04
445	8.37E-03	550	1.30E-02	655	5.21E-03	760	1.46E-04
450	1.33E-02	555	1.33E-02	660	4.14E-03	765	1.36E-04
455	1.40E-02	560	1.36E-02	665	3.17E-03	770	1.11E-04
460	1.01E-02	565	1.38E-02	670	3.23E-03	775	9.61E-05
465	7.92E-03	570	1.40E-02	675	2.33E-03	780	8.90E-05
470	6.57E-03	575	1.41E-02	680	1.93E-03		
475	5.29E-03	580	1.40E-02	685	1.62E-03		
480	4.79E-03	585	1.41E-02	690	1.39E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4110, 0.3892)

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

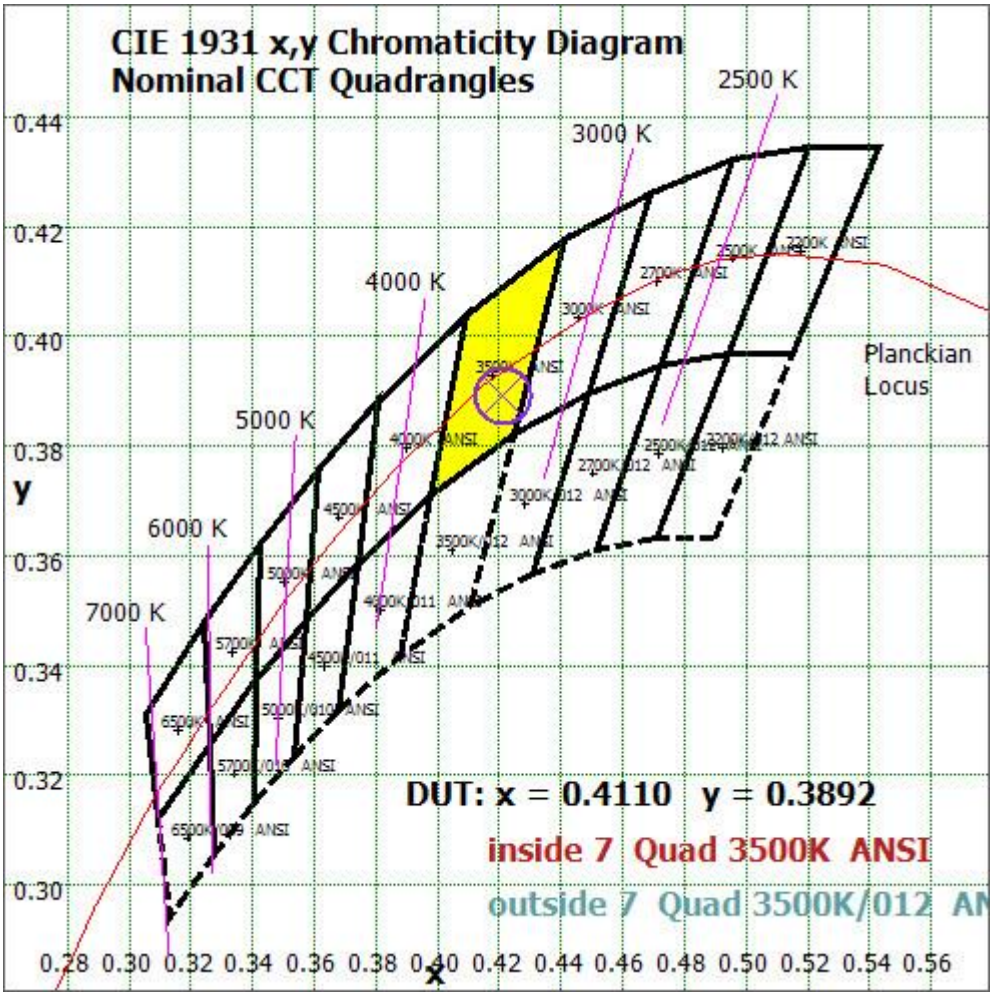


Chart14: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

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:** 9A19DIM/9CCTS

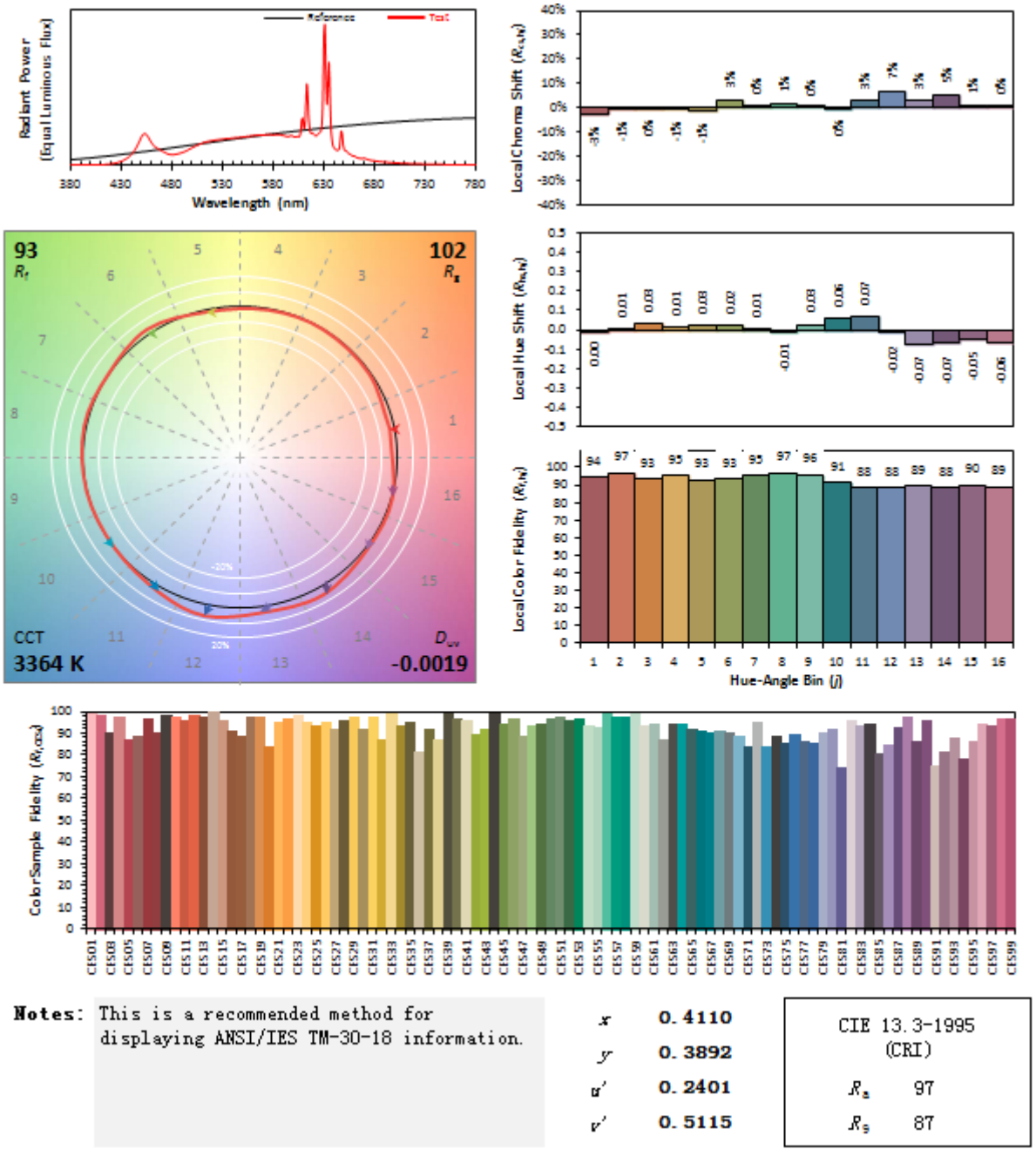


Chart 15: Full Report Created with the IES TM-30 Calculator

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)	0.075
Power Factor	0.9220
Test Power (W)	8.38
THD A%	38.41
Luminous Efficacy (lm/W)	117.4
Total Luminous Flux (lm)	984.0
Color Rendering Index (CRI)	97.4
R9	95.3
Correlated Color Temperature (CCT)(K)	3995
Chromaticity Chroma x	0.3804
Chromaticity Chroma y	0.3764
Chromaticity Chroma u	0.2252
Chromaticity Chroma v	0.3343
Duv	0.0002
Chromaticity Chroma u ’	0.2252
Chromaticity Chroma v’	0.5014

Special Color Rendering Indices	
R1	98.1
R2	98.3
R3	92.2
R4	97
R5	99
R6	95.8
R7	99.1
R8	99.6
R9	95.3
R10	92.6
R11	94.1
R12	75.1
R13	99.1
R14	94.3

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

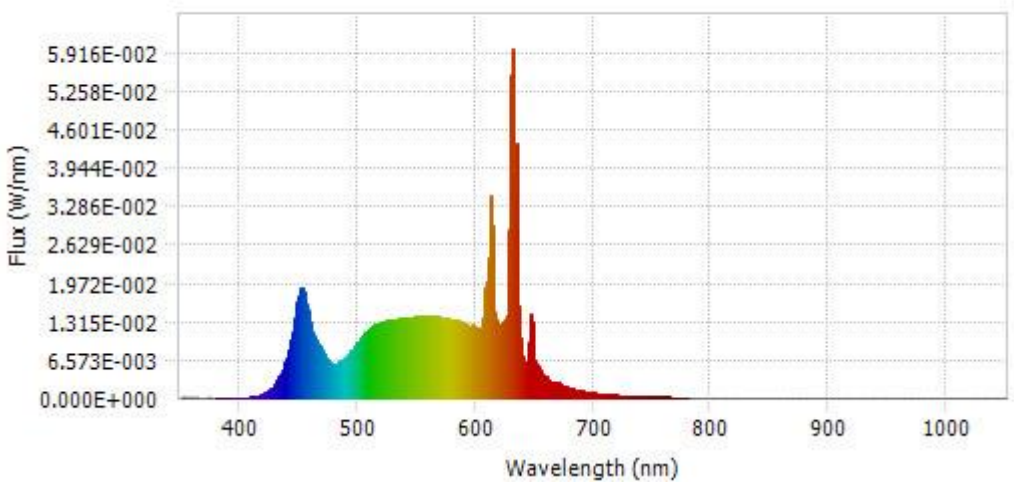
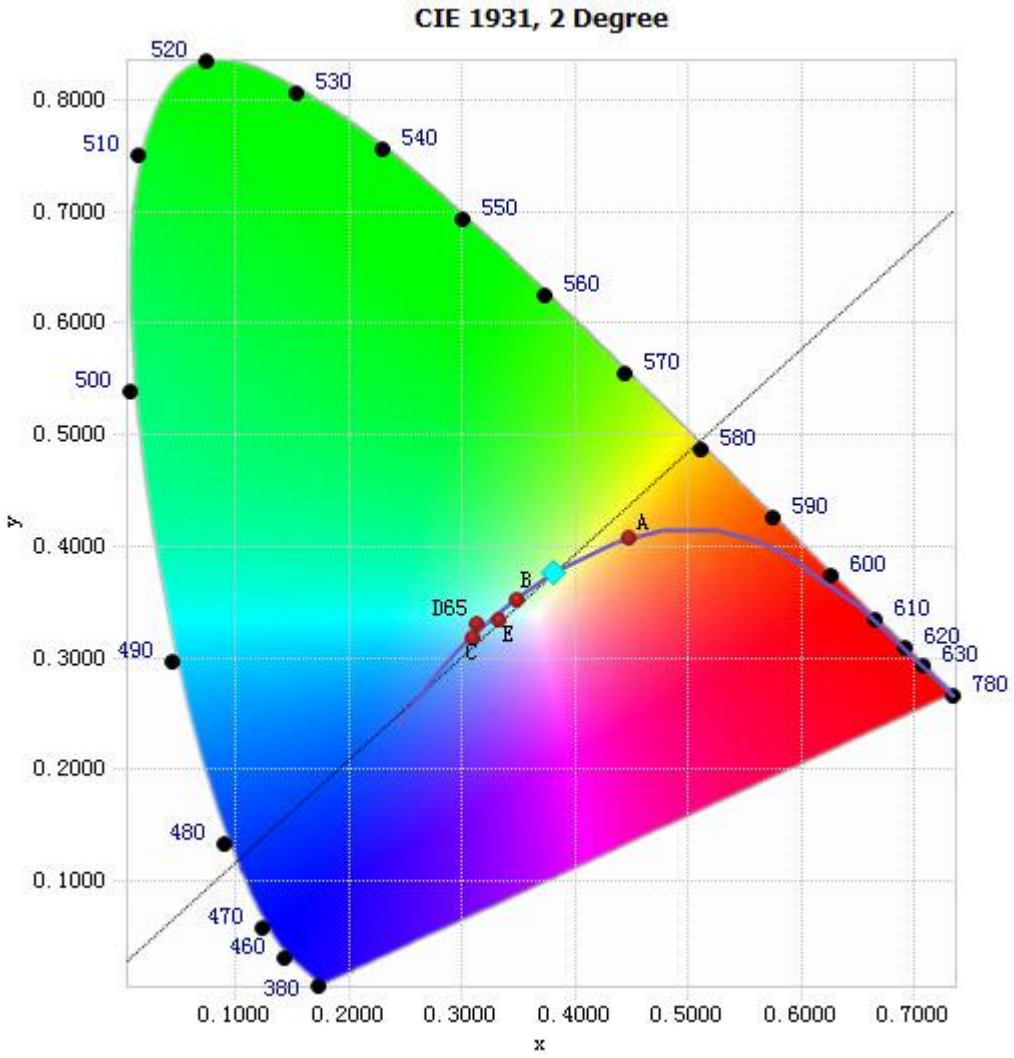


Chart16: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	6.79E-05	485	6.17E-03	590	1.28E-02	695	1.03E-03
385	8.83E-05	490	6.92E-03	595	1.21E-02	700	8.83E-04
390	8.07E-05	495	8.12E-03	600	1.20E-02	705	7.44E-04
395	7.97E-05	500	9.45E-03	605	1.19E-02	710	6.40E-04
400	6.93E-05	505	1.07E-02	610	1.54E-02	715	5.53E-04
405	1.09E-04	510	1.18E-02	615	2.00E-02	720	4.81E-04
410	1.55E-04	515	1.25E-02	620	1.28E-02	725	4.03E-04
415	3.51E-04	520	1.29E-02	625	1.33E-02	730	3.51E-04
420	6.56E-04	525	1.32E-02	630	5.52E-02	735	3.01E-04
425	1.30E-03	530	1.35E-02	635	4.36E-02	740	2.54E-04
430	2.29E-03	535	1.36E-02	640	7.06E-03	745	2.18E-04
435	3.95E-03	540	1.37E-02	645	6.51E-03	750	1.94E-04
440	6.76E-03	545	1.38E-02	650	6.39E-03	755	1.60E-04
445	1.12E-02	550	1.39E-02	655	4.60E-03	760	1.44E-04
450	1.74E-02	555	1.40E-02	660	3.65E-03	765	1.16E-04
455	1.80E-02	560	1.40E-02	665	2.78E-03	770	1.04E-04
460	1.29E-02	565	1.40E-02	670	2.86E-03	775	8.90E-05
465	9.92E-03	570	1.39E-02	675	2.05E-03	780	8.32E-05
470	8.22E-03	575	1.37E-02	680	1.69E-03		
475	6.50E-03	580	1.35E-02	685	1.43E-03		
480	5.82E-03	585	1.33E-02	690	1.22E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3804, 0.3764)

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

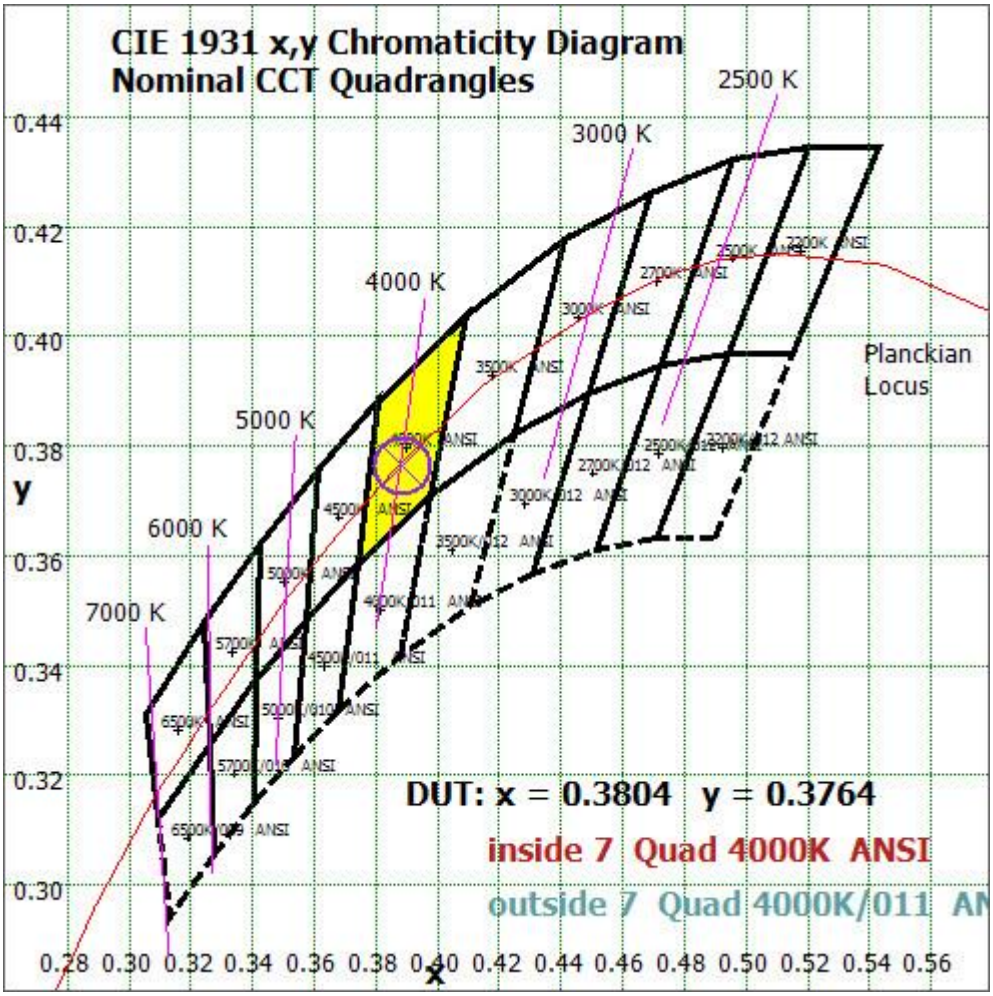


Chart 18: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

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:** 9A19DIM/9CCTS

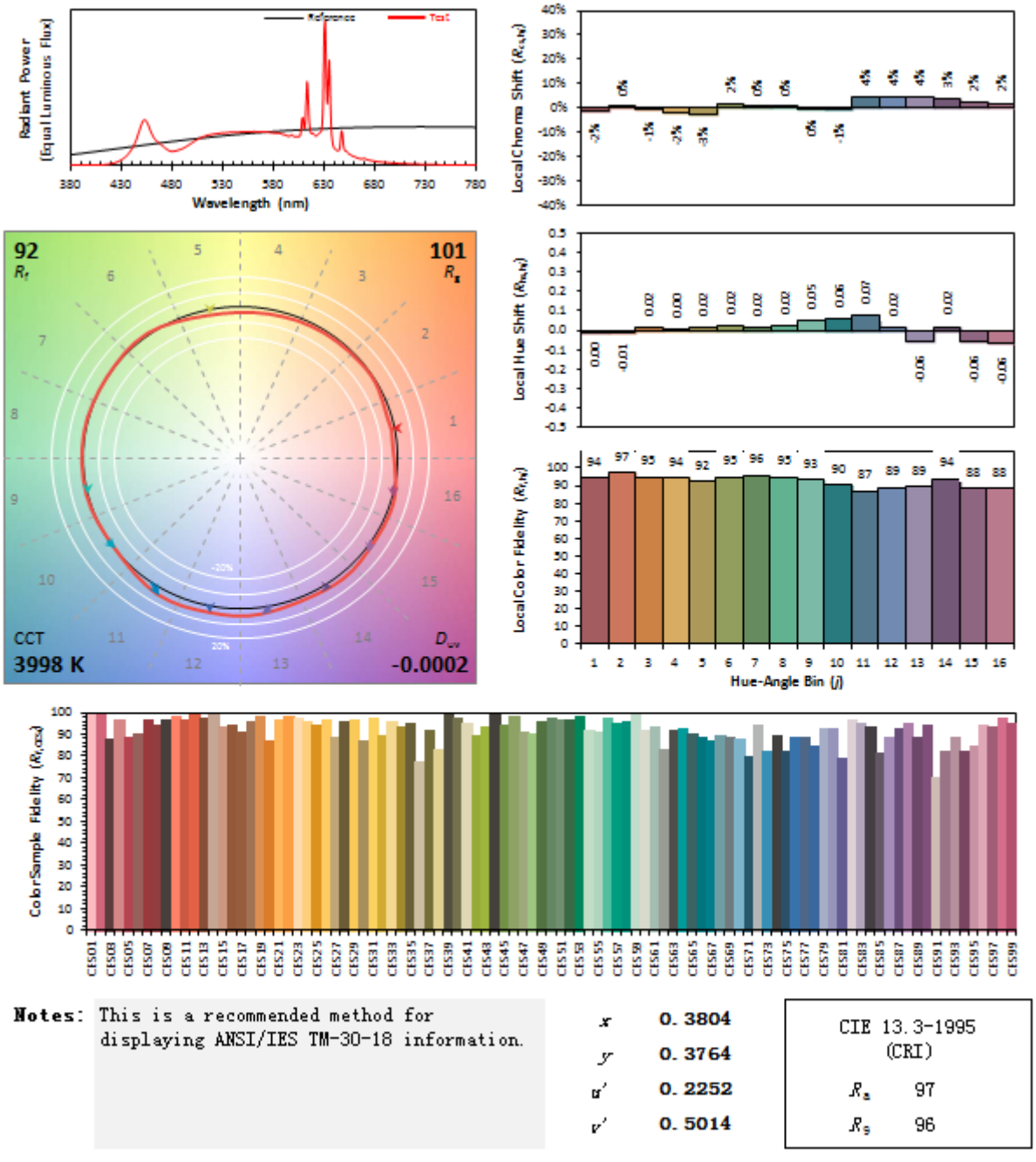


Chart 19: Full Report Created with the IES TM-30 Calculator

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)	0.077
Power Factor	0.9169
Test Power (W)	8.46
THD A%	39.64
Luminous Efficacy (lm/W)	112.7
Total Luminous Flux (lm)	953.2
Color Rendering Index (CRI)	96
R9	93
Correlated Color Temperature (CCT)(K)	4865
Chromaticity Chroma x	0.3499
Chromaticity Chroma y	0.3636
Chromaticity Chroma u	0.2101
Chromaticity Chroma v	0.3274
Duv	0.0040
Chromaticity Chroma u ’	0.2101
Chromaticity Chroma v’	0.4911

Special Color Rendering Indices	
R1	98.2
R2	95.5
R3	90.6
R4	97.3
R5	95.7
R6	93
R7	98.8
R8	99.2
R9	93
R10	86.8
R11	94.4
R12	67.6
R13	96.6
R14	93.9

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

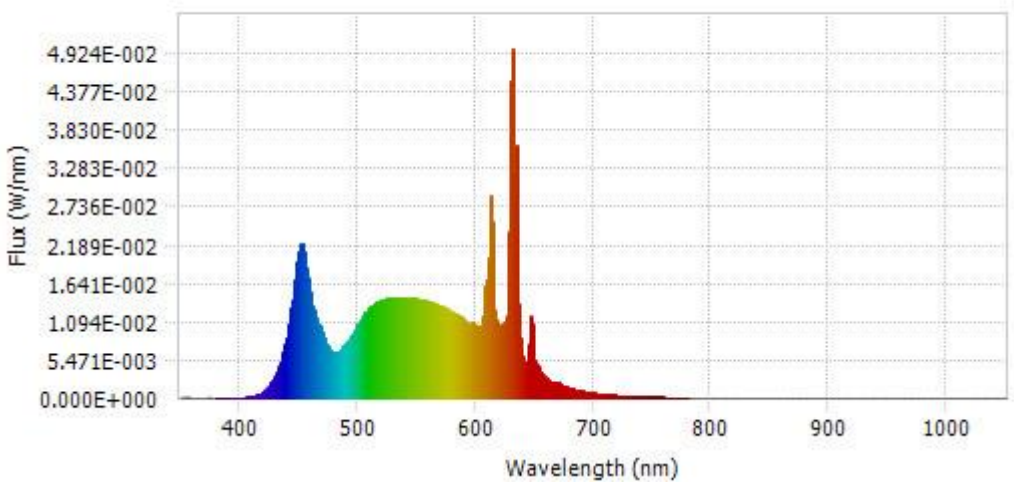
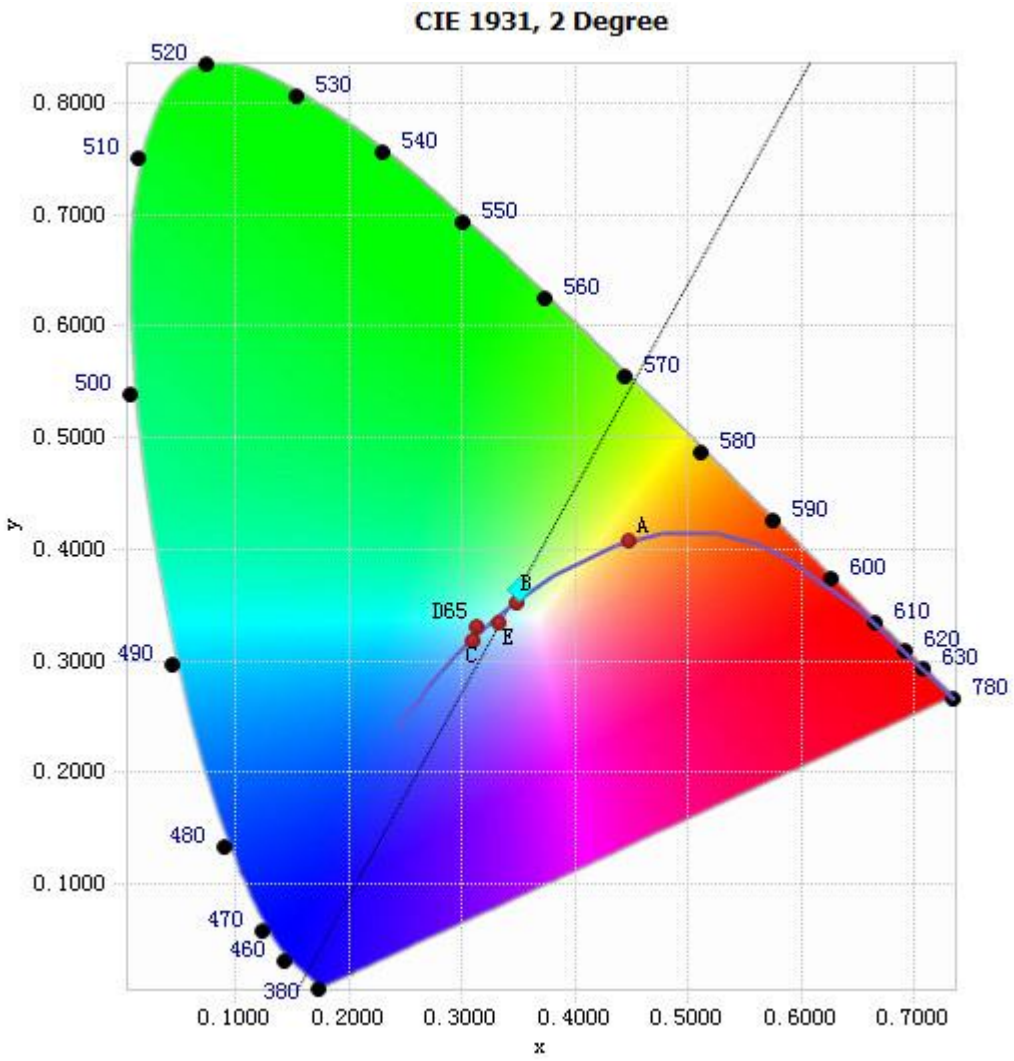


Chart20: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.21E-04	485	6.88E-03	590	1.13E-02	695	8.86E-04
385	6.22E-05	490	7.73E-03	595	1.05E-02	700	7.38E-04
390	8.84E-05	495	8.94E-03	600	1.03E-02	705	6.33E-04
395	7.78E-05	500	1.05E-02	605	1.01E-02	710	5.45E-04
400	5.93E-05	505	1.17E-02	610	1.31E-02	715	4.64E-04
405	1.10E-04	510	1.27E-02	615	1.72E-02	720	4.02E-04
410	2.08E-04	515	1.35E-02	620	1.07E-02	725	3.48E-04
415	4.47E-04	520	1.39E-02	625	1.10E-02	730	3.03E-04
420	9.53E-04	525	1.42E-02	630	4.53E-02	735	2.60E-04
425	1.70E-03	530	1.43E-02	635	3.62E-02	740	2.25E-04
430	3.05E-03	535	1.43E-02	640	5.86E-03	745	1.99E-04
435	5.25E-03	540	1.43E-02	645	5.34E-03	750	1.67E-04
440	8.71E-03	545	1.43E-02	650	5.31E-03	755	1.44E-04
445	1.40E-02	550	1.41E-02	655	3.76E-03	760	1.20E-04
450	2.08E-02	555	1.40E-02	660	2.99E-03	765	1.09E-04
455	2.09E-02	560	1.38E-02	665	2.28E-03	770	9.51E-05
460	1.50E-02	565	1.35E-02	670	2.35E-03	775	8.27E-05
465	1.14E-02	570	1.32E-02	675	1.70E-03	780	7.39E-05
470	9.30E-03	575	1.28E-02	680	1.40E-03		
475	7.34E-03	580	1.23E-02	685	1.19E-03		
480	6.55E-03	585	1.20E-02	690	1.02E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3499, 0.3636)

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

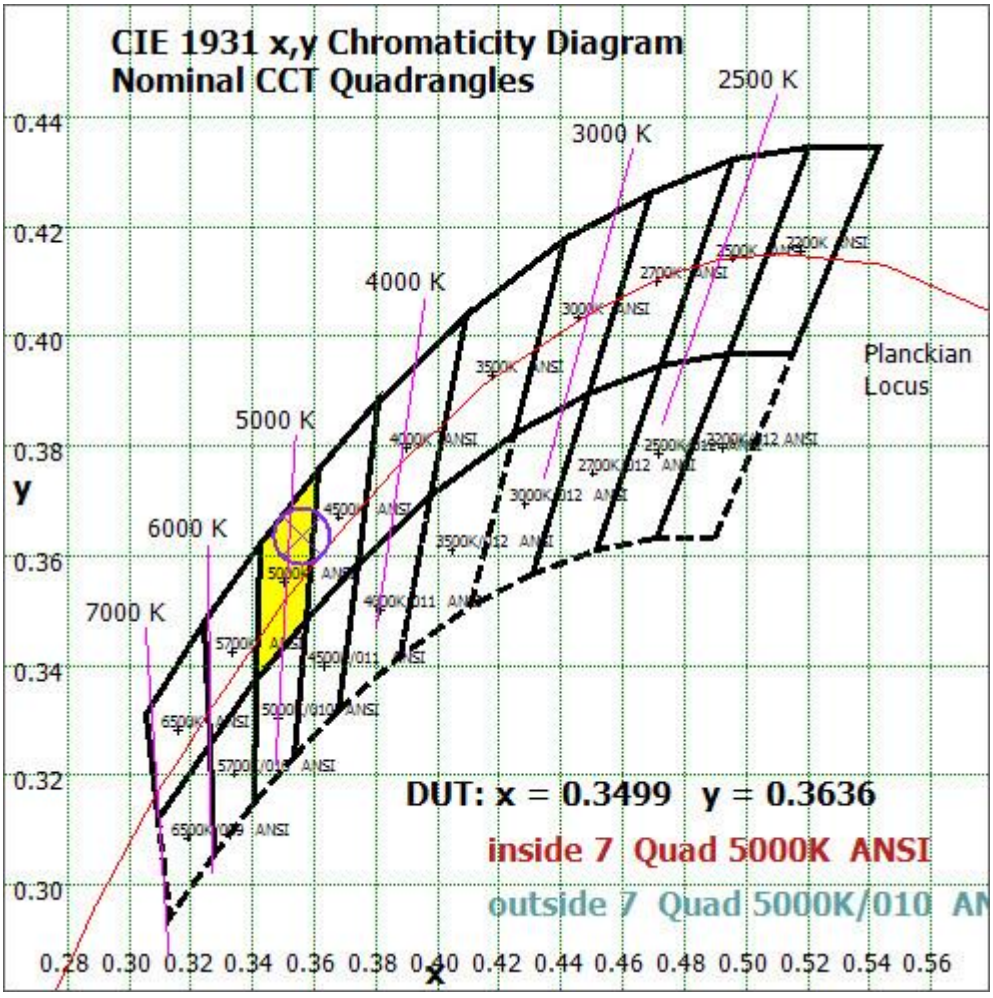


Chart 22: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

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:** 9A19DIM/9CCTS

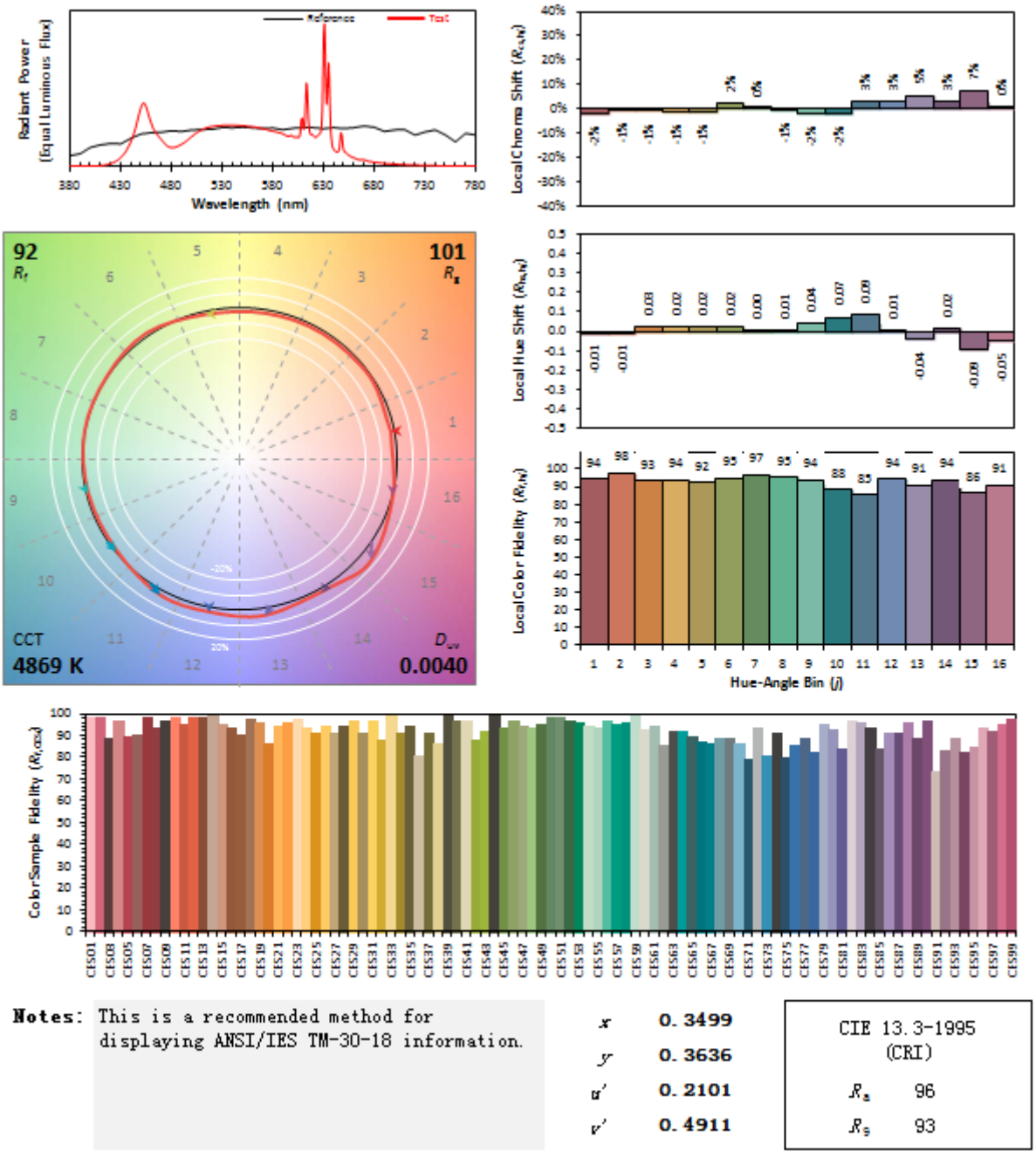


Chart 23: Full Report Created with the IES TM-30 Calculator

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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