

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/GU24

Laboratory: Lea ding Testing Laboratories

NVLAP CODE: 200960-0

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, YuhangDist,
Hangzhou, Zhejiang Province, China 311100

Tel: +86571 86376106

www.ltlqa.com

Report No.: HZ24120023b

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/9CCT S/GU24 2700K Setting	9A19DIM/9CCT S/GU24 3000K Setting	9A19DIM/9CCTS /GU24 3500K Setting	9A19DIM/9CCT S/GU24 4000K Setting	9A19DIM/9CCT S/GU24 5000K Setting
Luminous Efficacy (Lumens /Watt)	99.6	103.4	106.7	106.2	101.9
Total Luminous Flux (Lumens)	858.2	888.5	910.4	910.0	880.1
Power (Watts)	8.62	8.59	8.53	8.57	8.64
Power Factor	0.9185	0.9204	0.9246	0.9227	0.9179
CCT (K)	2726	3040	3521	3932	4975
CRI	92.2	95.8	96.8	95.8	94.3
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

LM-79-19 TEST REPORT.....	1
TEST SUMMARY	2
SAMPLE PHOTO	5
TEST RESULTS (2700K Setting)	6
Sphere-Spectroradiometer Method.....	6
Spectral Power Distribution - Sphere Spectroradiometer Method	7
Chromaticity Diagram - Sphere Spectroradiometer Method.....	8
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	9
Color Rendition Report – Sphere Spectroradiometer Method	10
Goniophotometer Method	11
Zonal Lumen Tabulation- Goniophotometer Method	12
Illuminance Plots- Goniophotometer Method	13
Luminous Intensity Distribution Plots- Goniophotometer Method.....	14
Luminous Intensity Data- Goniophotometer Method	15
TEST RESULTS (3000K Setting)	16
Sphere-Spectroradiometer Method.....	16
Spectral Power Distribution - Sphere Spectroradiometer Method	17
Chromaticity Diagram - Sphere Spectroradiometer Method.....	18
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	19
Color Rendition Report – Sphere Spectroradiometer Method	20
TEST RESULTS (3500K Setting)	21
Sphere-Spectroradiometer Method.....	21
Spectral Power Distribution - Sphere Spectroradiometer Method	22
Chromaticity Diagram - Sphere Spectroradiometer Method.....	23
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	24
Color Rendition Report – Sphere Spectroradiometer Method	25
TEST RESULTS (4000K Setting)	26

Sphere-Spectroradiometer Method.....	26
Spectral Power Distribution - Sphere Spectroradiometer Method	27
Chromaticity Diagram - Sphere Spectroradiometer Method.....	28
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	29
Color Rendition Report – Sphere Spectroradiometer Method	30
TEST RESULTS (5000K Setting)	31
Sphere-Spectroradiometer Method.....	31
Spectral Power Distribution - Sphere Spectroradiometer Method	32
Chromaticity Diagram - Sphere Spectroradiometer Method.....	33
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	34
Color Rendition Report – Sphere Spectroradiometer Method	35
EQUIPMENT LIST	36
TEST METHODS	36
Seasoning of SSL Product.....	36
Sphere-Spectroradiometer Method- Photometric and Electrical Measurements.....	36
Goniophotometer Method	37
Photometric and Electrical Measurements	37
Color Characteristics Measurements.....	37

SAMPLE PHOTO



Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Lamp
Model	: 9A19DIM/9CCTS/GU24
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 °C.

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)	0.078
Power Factor	0.9185
Test Power (W)	8.62
THD A%	39.26
Luminous Efficacy (lm/W)	99.6
Total Luminous Flux (lm)	858.2
Color Rendering Index (CRI)	92.2
R9	54.5
Correlated Color Temperature (CCT)(K)	2726
Chromaticity Chroma x	0.4579
Chromaticity Chroma y	0.4106
Chromaticity Chroma u	0.2612
Chromaticity Chroma v	0.3514
Duv	0.0003
Chromaticity Chroma u'	0.2612
Chromaticity Chroma v'	0.5270

Special Color Rendering Indices	
R1	93.2
R2	95.7
R3	96.3
R4	93
R5	92.3
R6	95.9
R7	90.9
R8	80.1
R9	54.5
R10	87.6
R11	93.9
R12	82.1
R13	93.4
R14	96.4

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

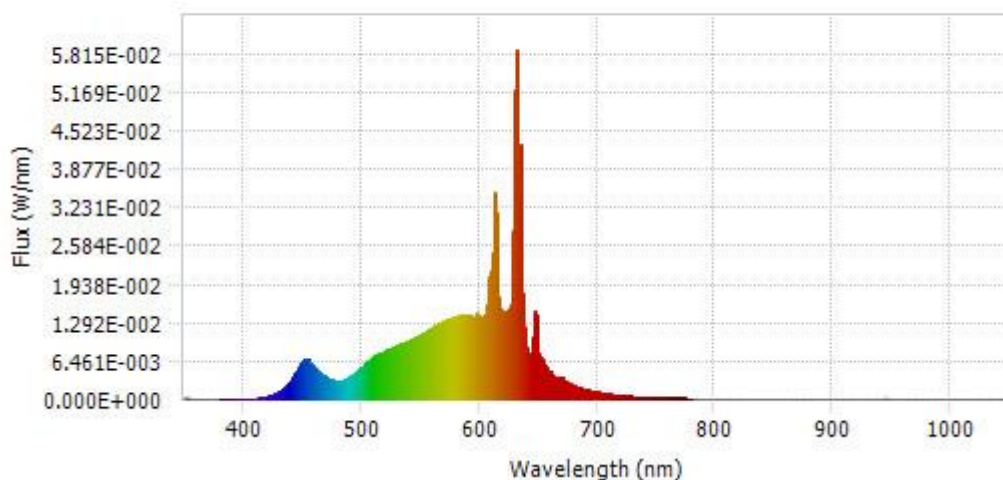
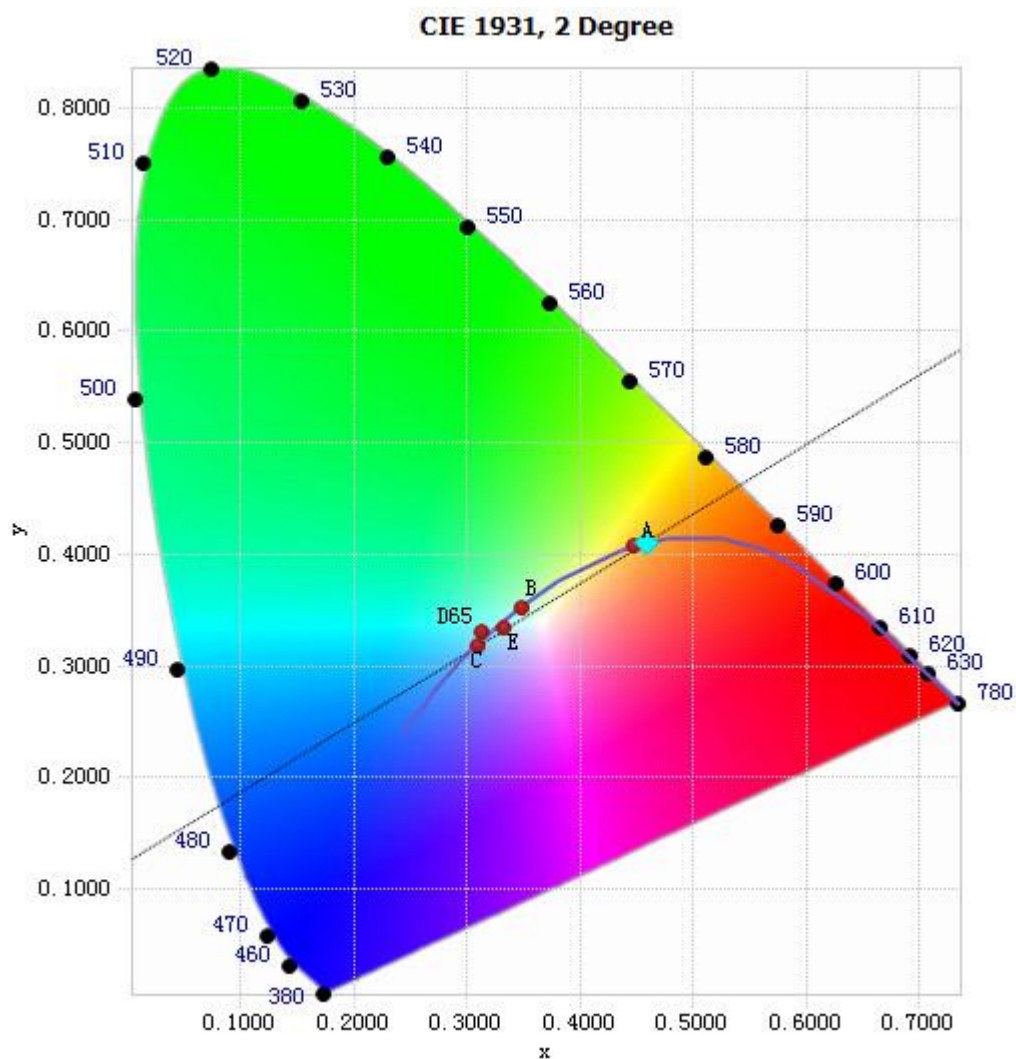


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.38E-05	485	3.16E-03	590	1.41E-02	695	1.38E-03
385	3.95E-05	490	3.72E-03	595	1.38E-02	700	1.17E-03
390	7.24E-05	495	4.43E-03	600	1.39E-02	705	9.95E-04
395	7.74E-05	500	5.31E-03	605	1.40E-02	710	8.46E-04
400	1.91E-05	505	6.23E-03	610	1.77E-02	715	7.16E-04
405	6.87E-05	510	6.96E-03	615	2.26E-02	720	6.24E-04
410	6.26E-05	515	7.62E-03	620	1.49E-02	725	5.35E-04
415	1.58E-04	520	8.07E-03	625	1.50E-02	730	4.47E-04
420	3.70E-04	525	8.51E-03	630	5.21E-02	735	3.87E-04
425	6.94E-04	530	8.93E-03	635	4.30E-02	740	3.29E-04
430	1.16E-03	535	9.26E-03	640	8.73E-03	745	2.83E-04
435	1.89E-03	540	9.72E-03	645	7.91E-03	750	2.33E-04
440	2.98E-03	545	1.02E-02	650	7.76E-03	755	2.09E-04
445	4.68E-03	550	1.08E-02	655	5.76E-03	760	1.81E-04
450	6.42E-03	555	1.14E-02	660	4.65E-03	765	1.51E-04
455	6.56E-03	560	1.20E-02	665	3.66E-03	770	1.34E-04
460	5.35E-03	565	1.26E-02	670	3.55E-03	775	1.13E-04
465	4.38E-03	570	1.31E-02	675	2.69E-03	780	9.97E-05
470	3.66E-03	575	1.35E-02	680	2.25E-03		
475	3.20E-03	580	1.38E-02	685	1.91E-03		
480	2.98E-03	585	1.42E-02	690	1.64E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4579, 0.4106)

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

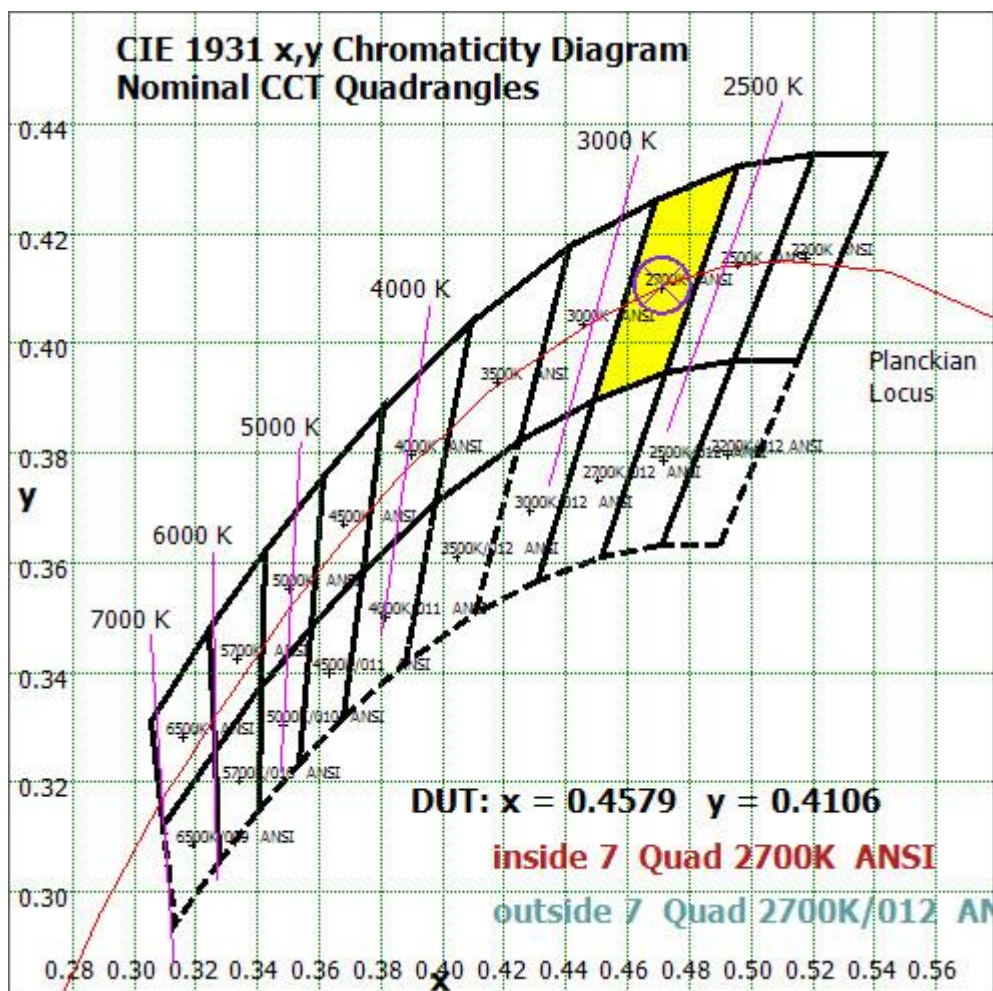


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

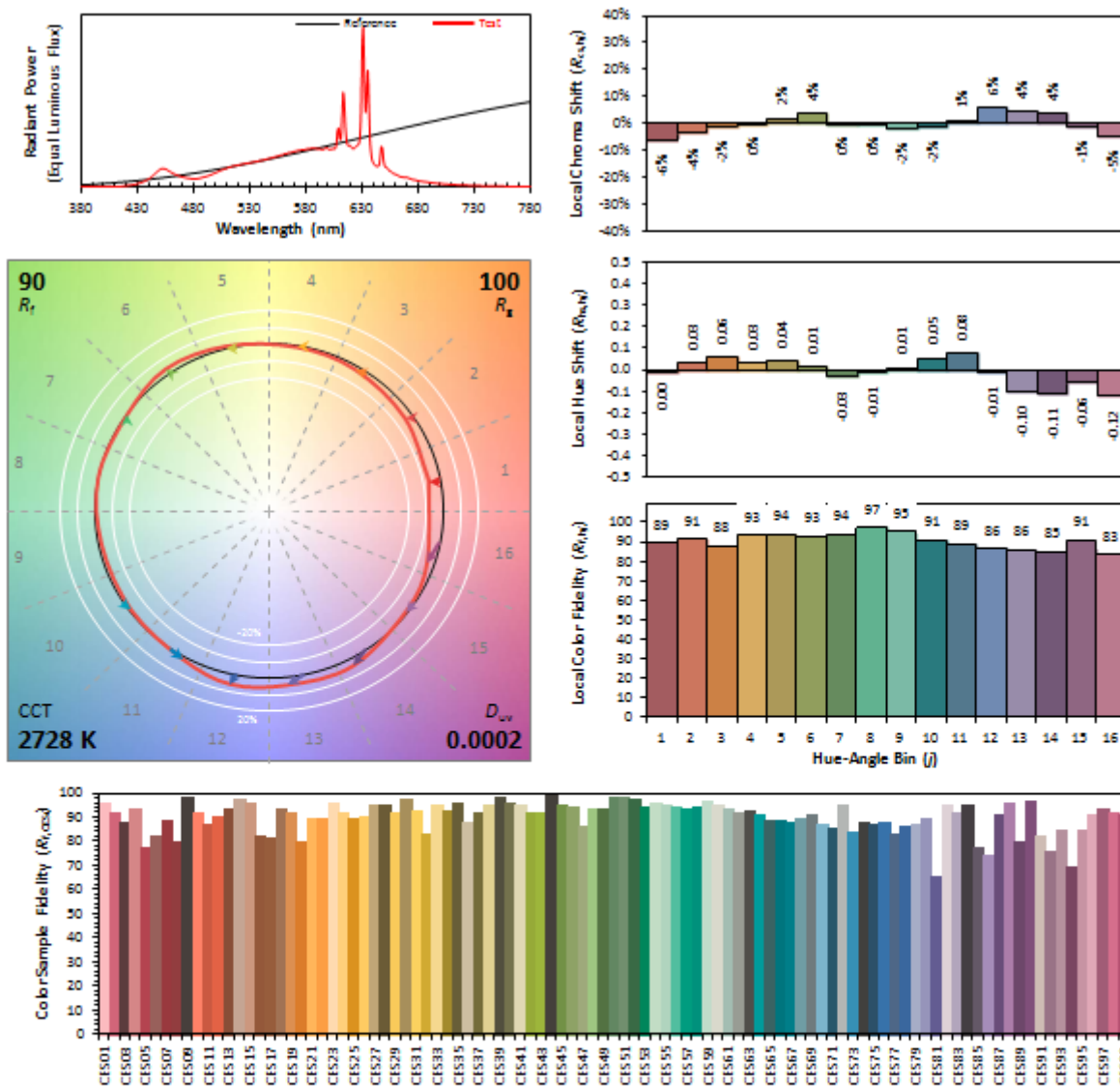
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/16

Model: 9A19DIM/9CCTS/GU24



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

x 0.4579
 y 0.4106
 u' 0.2612
 v' 0.5270

CIE 13.3-1995
(CRI)

R_a 92
 R_s 55

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 °C.

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)	0.082
Power Factor	0.8782
Power (W)	8.65
Luminous Efficacy (lm/W)	100.0
Total Luminous Flux (lm)	865.0
Beam Angle (°)	210.7 (0°-180°) / 209.8 (90°-270°)
Center Beam Candle Power (cd)	112
Maximum Beam Candle Power (cd)	112.8 (At: C=180.0, Gamma=13.5)
Spacing Criteria	1.50 (0°-180°) / 1.50 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	38.89%
Zonal Lumens in the 60 °-90 °Zone	30.80%
Zonal Lumens in the 90 °-120 °Zone	20.67%
Zonal Lumens in the 120 °-180 °Zone	9.64%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	10.735	1.24%
10- 20	31.858	3.68%
20- 30	51.752	5.98%
30- 40	69.103	7.99%
40- 50	82.408	9.53%
50- 60	90.577	10.47%
60- 70	93.136	10.77%
70- 80	90.307	10.44%
80- 90	82.999	9.60%
90-100	72.325	8.36%
100-110	59.762	6.91%
110-120	46.701	5.40%
120-130	34.268	3.96%
130-140	23.339	2.70%
140-150	14.465	1.67%
150-160	7.84	0.91%
160-170	3.106	0.36%
170-180	0.337	0.04%
Total	865.0	100%

$\gamma(^{\circ})$	Lumens	% Total
0-130	815.931	94.33%
130-180	49.087	5.67%
0-180	865.0	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

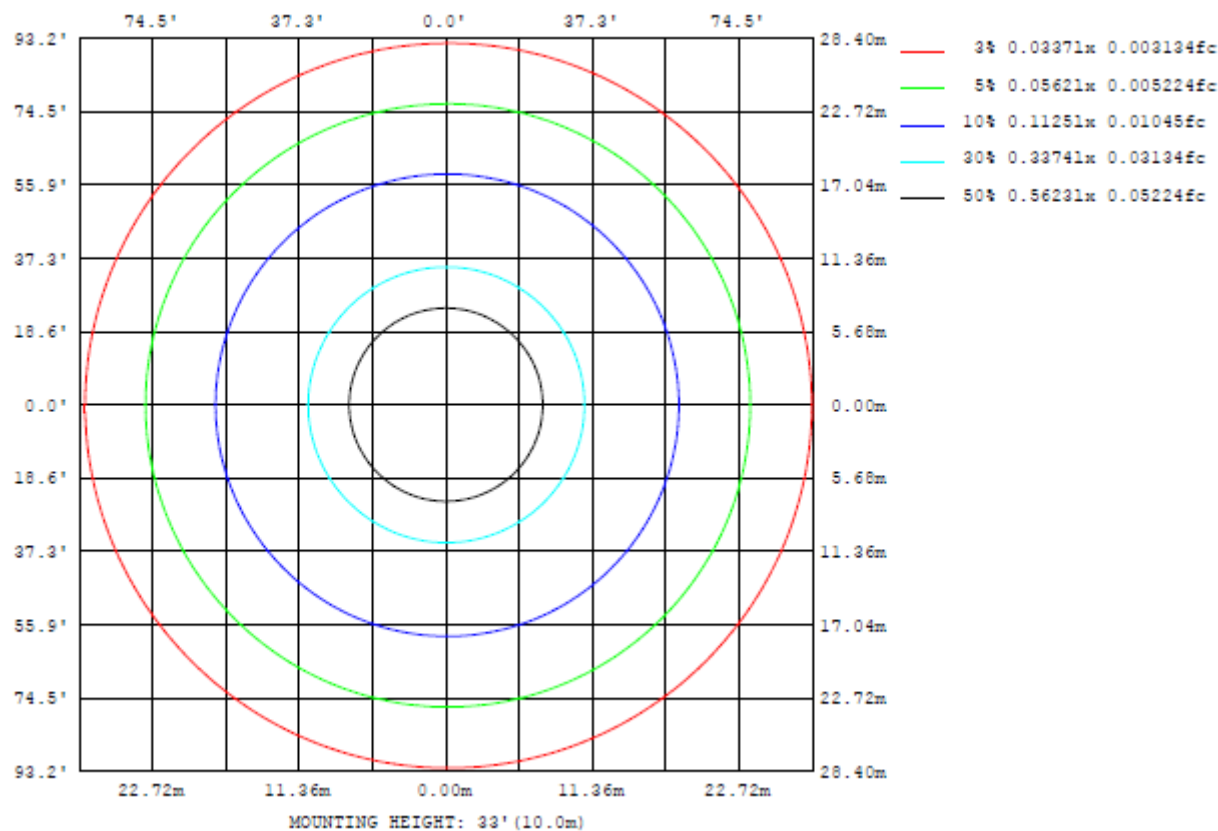


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

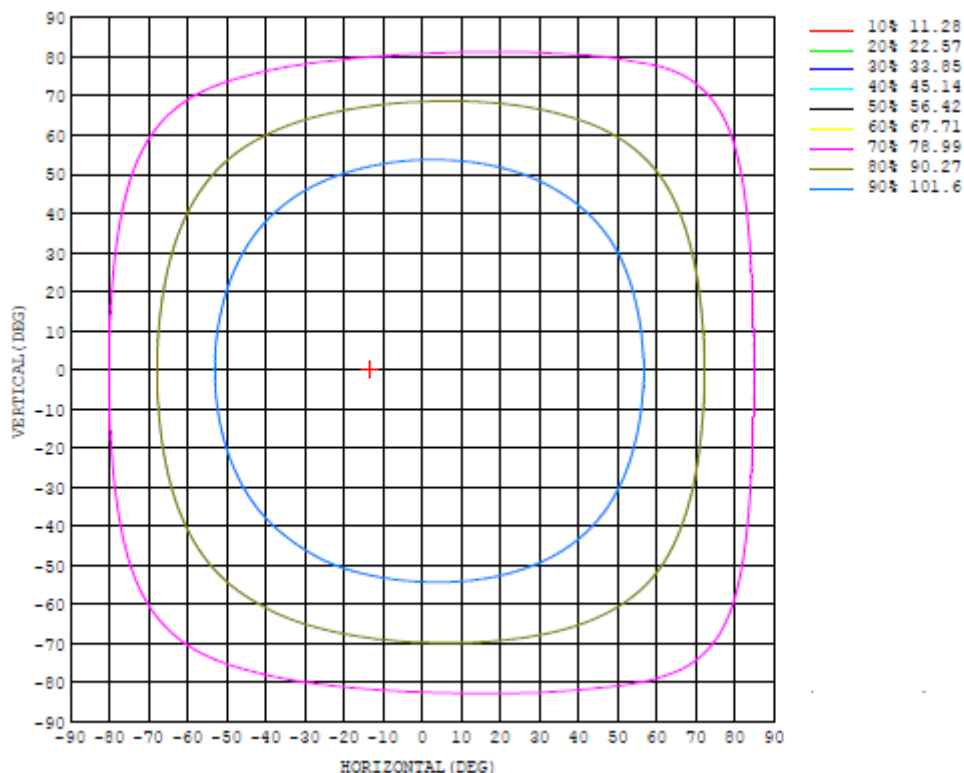


Chart 6: Isocandela Plot

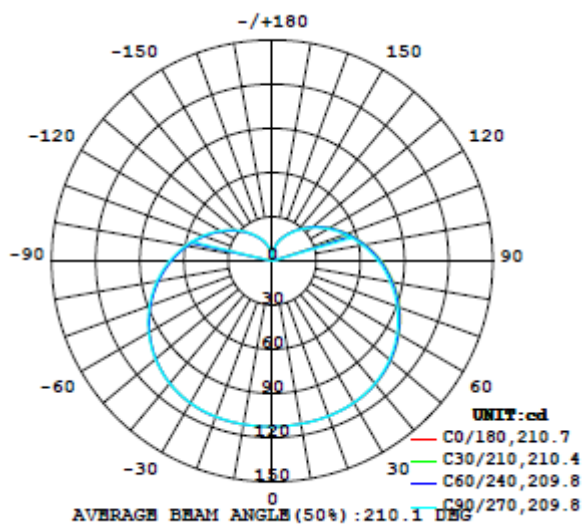


Chart 7: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1

UNIT: cd

C (DEG) y (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	113	112	112	112	112	113	112	113	113	112	113	113	113	113	112	112			
10	112	112	112	112	112	112	112	113	113	113	113	113	113	112	113	112	112		
15	112	112	112	112	112	112	112	113	113	113	113	113	113	112	112	112	112		
20	112	112	112	112	112	112	112	113	113	113	113	113	113	112	112	112	112		
25	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112		
30	111	111	111	111	111	111	111	111	111	111	111	112	111	111	111	111	111		
35	111	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110		
40	109	109	109	109	108	108	108	108	108	108	108	109	108	108	108	109	109		
45	107	107	107	107	106	106	106	106	106	106	106	106	106	106	107	107	107		
50	105	105	105	105	104	104	103	103	104	103	103	103	104	104	104	105	105		
55	102	102	102	102	101	101	100	100	100	100	100	100	101	101	102	102	102		
60	99.4	99.3	99.0	98.4	97.8	97.4	96.8	96.7	96.8	96.5	96.4	96.6	97.2	97.7	98.2	99.1	99.1		
65	96.0	95.9	95.4	94.9	94.2	93.6	92.8	92.5	92.7	92.5	92.4	92.6	93.3	94.0	94.8	95.5	95.5		
70	92.0	91.9	91.5	90.8	90.1	89.5	88.8	88.5	88.5	88.1	88.0	88.3	89.0	89.8	90.6	91.6	91.6		
75	87.8	87.8	87.2	86.6	85.9	85.2	84.3	84.0	83.9	83.6	83.3	83.8	84.5	85.5	86.5	87.4	87.4		
80	83.4	83.4	82.8	82.1	81.4	80.6	79.7	79.3	79.2	78.8	78.5	78.9	79.8	80.8	81.8	82.9	82.9		
85	78.7	78.7	78.0	77.5	76.8	75.9	75.0	74.5	74.3	73.9	73.6	74.0	74.9	76.0	77.1	78.4	78.4		
90	74.0	74.1	73.4	72.8	72.1	71.2	70.2	69.6	69.4	68.9	68.7	69.1	69.9	71.1	72.1	73.3	73.3		
95	69.0	69.0	68.5	67.8	67.1	66.2	65.3	64.7	64.4	63.9	63.7	64.0	65.0	66.0	67.2	68.6	68.6		
100	63.9	64.0	63.6	62.9	62.2	61.4	60.4	59.7	59.4	59.0	58.8	59.1	60.0	61.1	62.2	63.4	63.4		
105	59.0	59.1	58.7	58.1	57.4	56.5	55.6	54.9	54.6	54.1	53.9	54.3	55.1	56.2	57.3	58.5	58.5		
110	54.0	54.2	53.9	53.3	52.7	51.8	50.9	50.2	49.9	49.3	49.1	49.4	50.3	51.4	52.4	53.6	53.6		
115	49.4	49.5	49.1	48.6	48.0	47.2	46.2	45.5	45.2	44.7	44.6	44.8	45.6	46.6	47.7	48.8	48.8		
120	44.5	44.8	44.5	44.1	43.5	42.7	41.8	41.1	40.8	40.3	40.1	40.4	41.1	42.1	43.1	44.1	44.1		
125	40.1	40.3	40.1	39.6	39.1	38.3	37.5	36.8	36.4	36.0	35.9	36.2	36.9	37.7	38.7	39.7	39.7		
130	35.8	36.0	35.8	35.4	34.8	34.2	33.4	32.7	32.4	32.0	31.8	32.1	32.8	33.6	34.5	35.4	35.4		
135	31.7	31.9	31.7	31.4	30.9	30.3	29.6	28.9	28.5	28.2	28.1	28.3	28.9	29.7	30.5	31.4	31.4		
140	27.8	28.0	27.9	27.6	27.1	26.6	25.9	25.3	25.0	24.6	24.5	24.7	25.2	26.0	26.8	27.5	27.5		
145	24.2	24.4	24.3	24.1	23.7	23.1	22.5	21.9	21.6	21.3	21.2	21.4	21.9	22.6	23.3	24.0	24.0		
150	20.9	21.1	21.0	20.8	20.4	20.0	19.4	18.9	18.6	18.3	18.2	18.4	18.8	19.5	20.1	20.7	20.7		
155	17.9	18.0	18.0	17.8	17.5	17.1	16.5	15.9	15.2	15.6	15.5	15.7	16.1	16.6	17.2	17.7	17.7		
160	15.2	15.3	15.3	15.1	14.8	14.2	13.5	10.3	12.5	12.6	12.6	12.8	13.2	13.8	14.4	14.9	14.9		
165	12.2	12.3	12.4	12.2	11.9	10.8	10.2	7.81	9.24	9.47	9.53	9.80	10.2	10.7	11.3	11.7	11.7		
170	8.74	8.86	9.06	8.92	8.56	6.48	5.10	3.39	4.92	5.49	5.40	5.87	6.22	7.04	7.75	8.18	8.18		
175	3.12	3.81	3.78	3.59	2.77	1.60	0.37	0.15	0.14	0.15	0.15	0.15	0.15	0.18	1.17	2.64	2.64		
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	0.14		

Table 6: Luminous Intensity Data

TEST RESULTS (3000K Setting)

Test ambient temperature was 26.0 °C.

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)	0.078
Power Factor	0.9204
Test Power (W)	8.59
THD A%	38.71
Luminous Efficacy (lm/W)	103.4
Total Luminous Flux (lm)	888.5
Color Rendering Index (CRI)	95.8
R9	74.3
Correlated Color Temperature (CCT)(K)	3040
Chromaticity Chroma x	0.4308
Chromaticity Chroma y	0.3963
Chromaticity Chroma u	0.2499
Chromaticity Chroma v	0.3449
Duv	-0.0023
Chromaticity Chroma u'	0.2499
Chromaticity Chroma v'	0.5174

Special Color Rendering Indices	
R1	98.7
R2	98.3
R3	95.6
R4	96.9
R5	97.7
R6	96
R7	93.9
R8	89.4
R9	74.3
R10	93.3
R11	96.1
R12	83.4
R13	98.6
R14	96

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

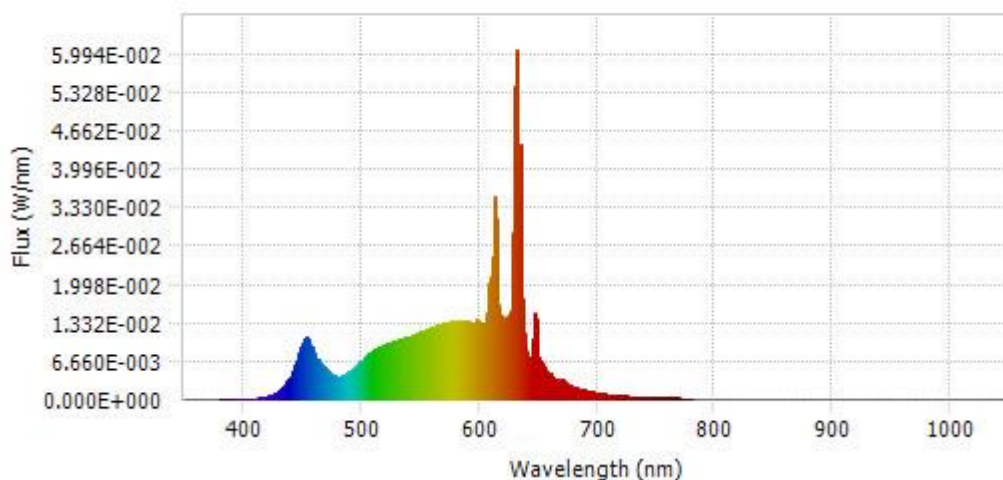
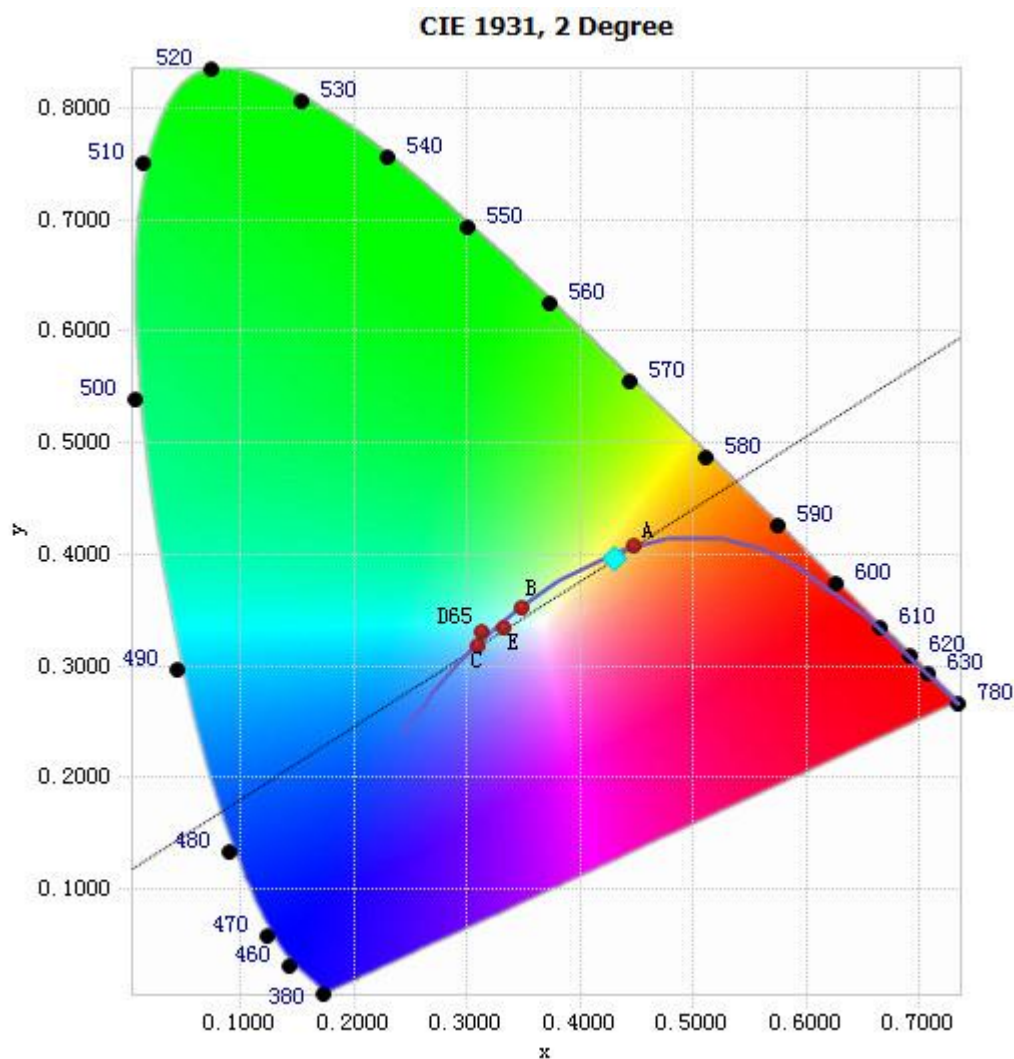


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	5.88E-05	485	4.15E-03	590	1.35E-02	695	1.29E-03
385	6.92E-05	490	4.67E-03	595	1.30E-02	700	1.08E-03
390	3.08E-05	495	5.53E-03	600	1.32E-02	705	9.14E-04
395	9.12E-05	500	6.59E-03	605	1.32E-02	710	7.76E-04
400	6.64E-05	505	7.51E-03	610	1.70E-02	715	6.76E-04
405	4.69E-05	510	8.38E-03	615	2.19E-02	720	5.72E-04
410	1.04E-04	515	8.97E-03	620	1.43E-02	725	4.93E-04
415	2.12E-04	520	9.42E-03	625	1.46E-02	730	4.25E-04
420	4.21E-04	525	9.86E-03	630	5.44E-02	735	3.53E-04
425	8.28E-04	530	1.02E-02	635	4.44E-02	740	3.12E-04
430	1.44E-03	535	1.05E-02	640	8.22E-03	745	2.66E-04
435	2.43E-03	540	1.08E-02	645	7.43E-03	750	2.23E-04
440	3.97E-03	545	1.12E-02	650	7.40E-03	755	1.92E-04
445	6.50E-03	550	1.15E-02	655	5.40E-03	760	1.75E-04
450	9.77E-03	555	1.20E-02	660	4.33E-03	765	1.42E-04
455	1.04E-02	560	1.24E-02	665	3.38E-03	770	1.24E-04
460	7.96E-03	565	1.28E-02	670	3.36E-03	775	1.16E-04
465	6.19E-03	570	1.31E-02	675	2.49E-03	780	9.41E-05
470	5.21E-03	575	1.34E-02	680	2.07E-03		
475	4.32E-03	580	1.35E-02	685	1.77E-03		
480	3.90E-03	585	1.37E-02	690	1.49E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4308, 0.3963)

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

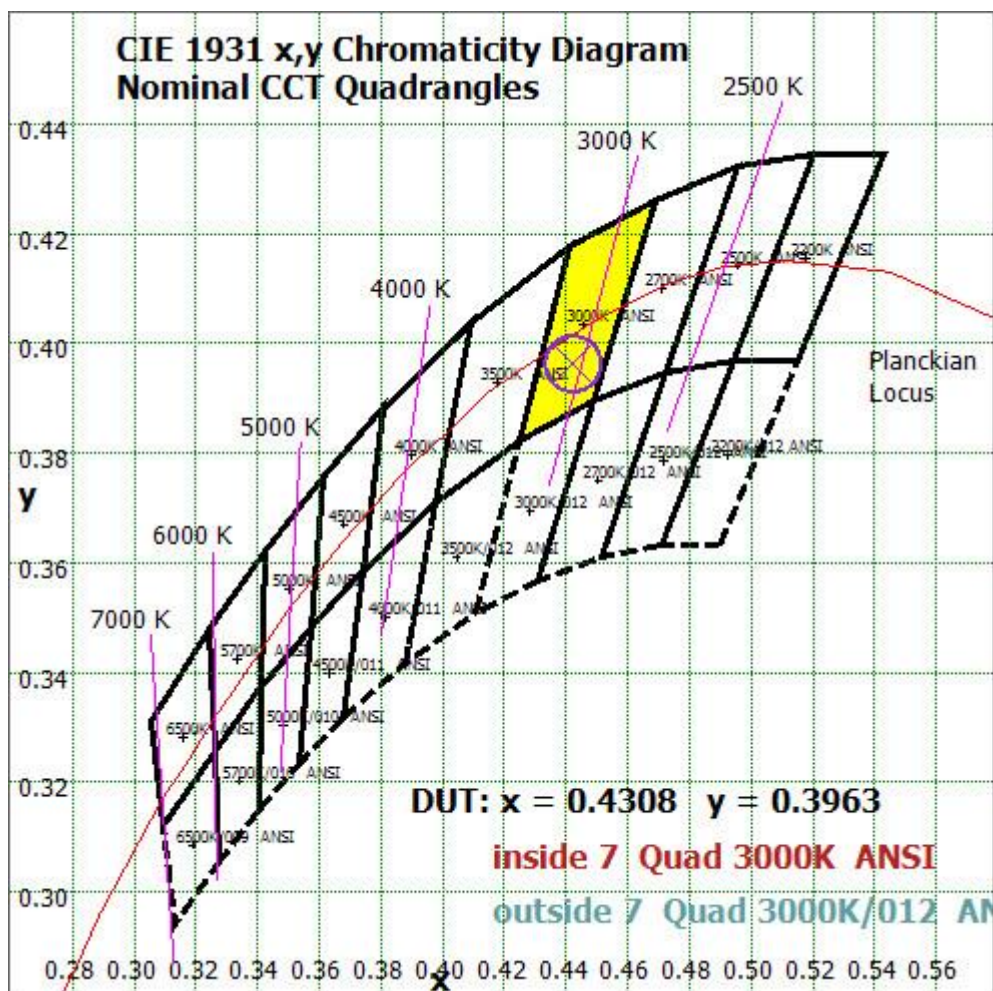


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

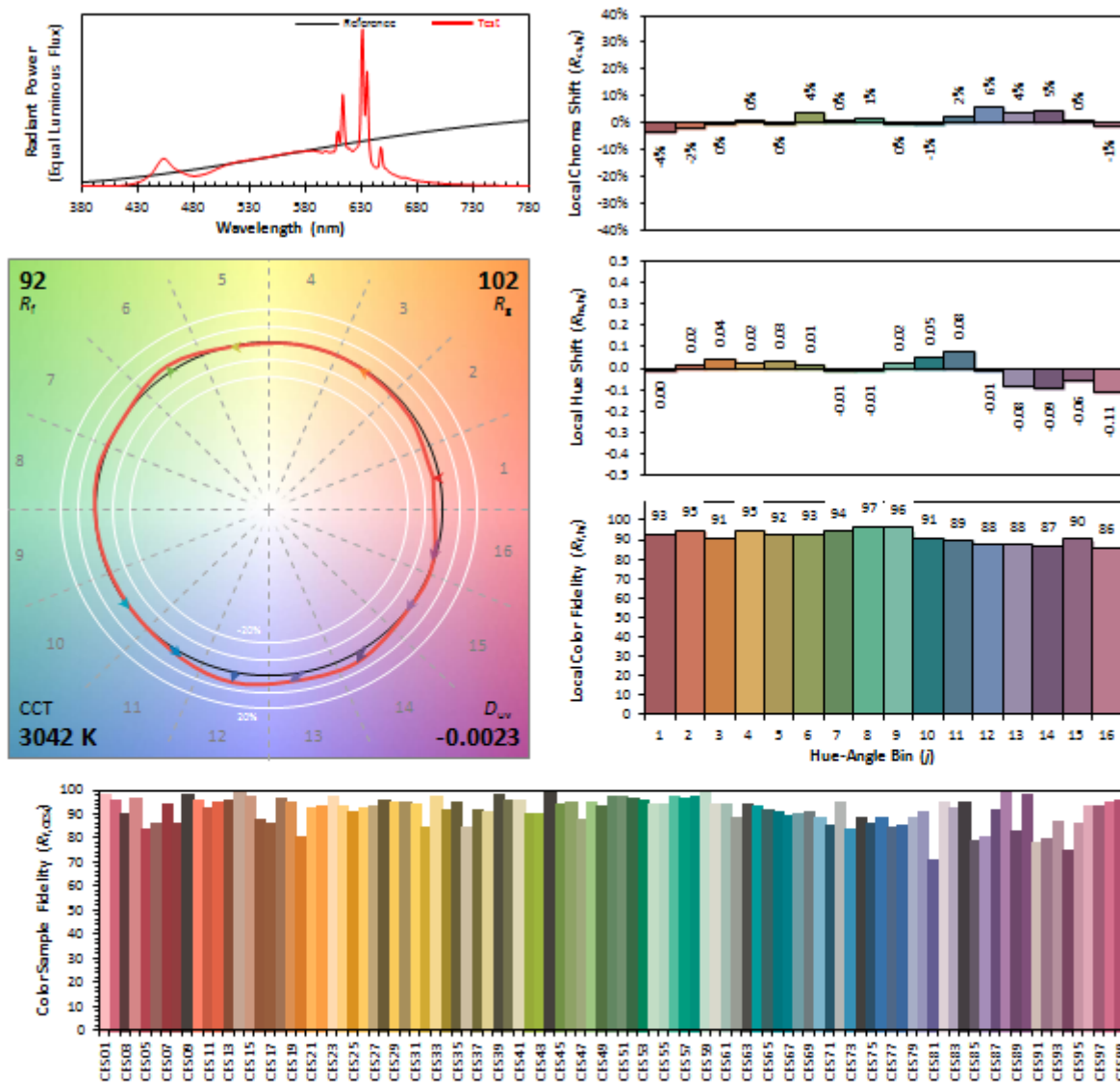
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/16

Model: 9A19DIM/9CCTS/GU24



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

 x 0.4308

 y 0.3963

 u' 0.2499

 v' 0.5174

CIE 13.3-1995
(CRI)

 R_a 96

 R_s 75

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 7 due to rounding.

TEST RESULTS (3500K Setting)

Test ambient temperature was 26.0 °C.

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	0.9246
Test Power (W)	8.53
THD A%	37.71
Luminous Efficacy (lm/W)	106.7
Total Luminous Flux (lm)	910.4
Color Rendering Index (CRI)	96.8
R9	94.3
Correlated Color Temperature (CCT)(K)	3521
Chromaticity Chroma x	0.4008
Chromaticity Chroma y	0.3814
Chromaticity Chroma u	0.2367
Chromaticity Chroma v	0.3378
Duv	-0.0032
Chromaticity Chroma u'	0.2367
Chromaticity Chroma v'	0.5066

Special Color Rendering Indices	
R1	96.6
R2	98.9
R3	93.4
R4	95.5
R5	98.3
R6	95.4
R7	97.7
R8	98.9
R9	94.3
R10	95.9
R11	92.5
R12	81.2
R13	97.6
R14	94.7

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

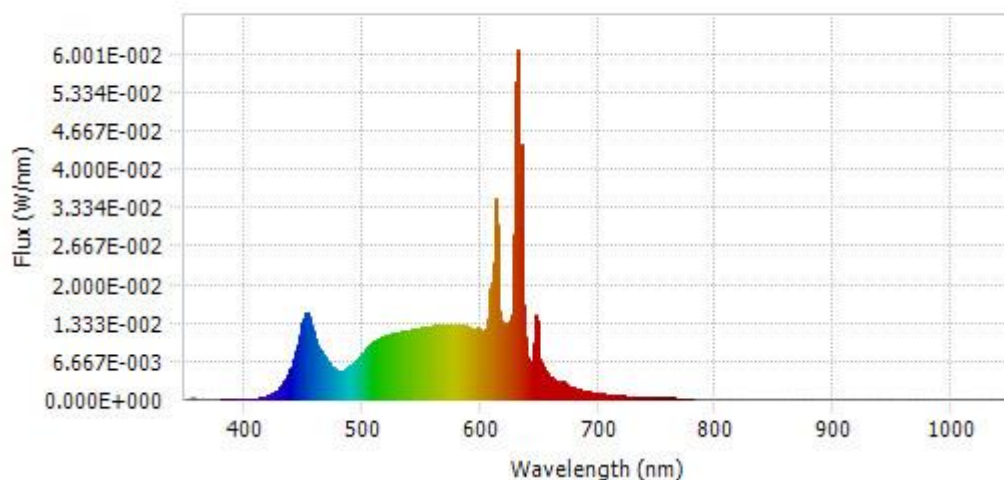
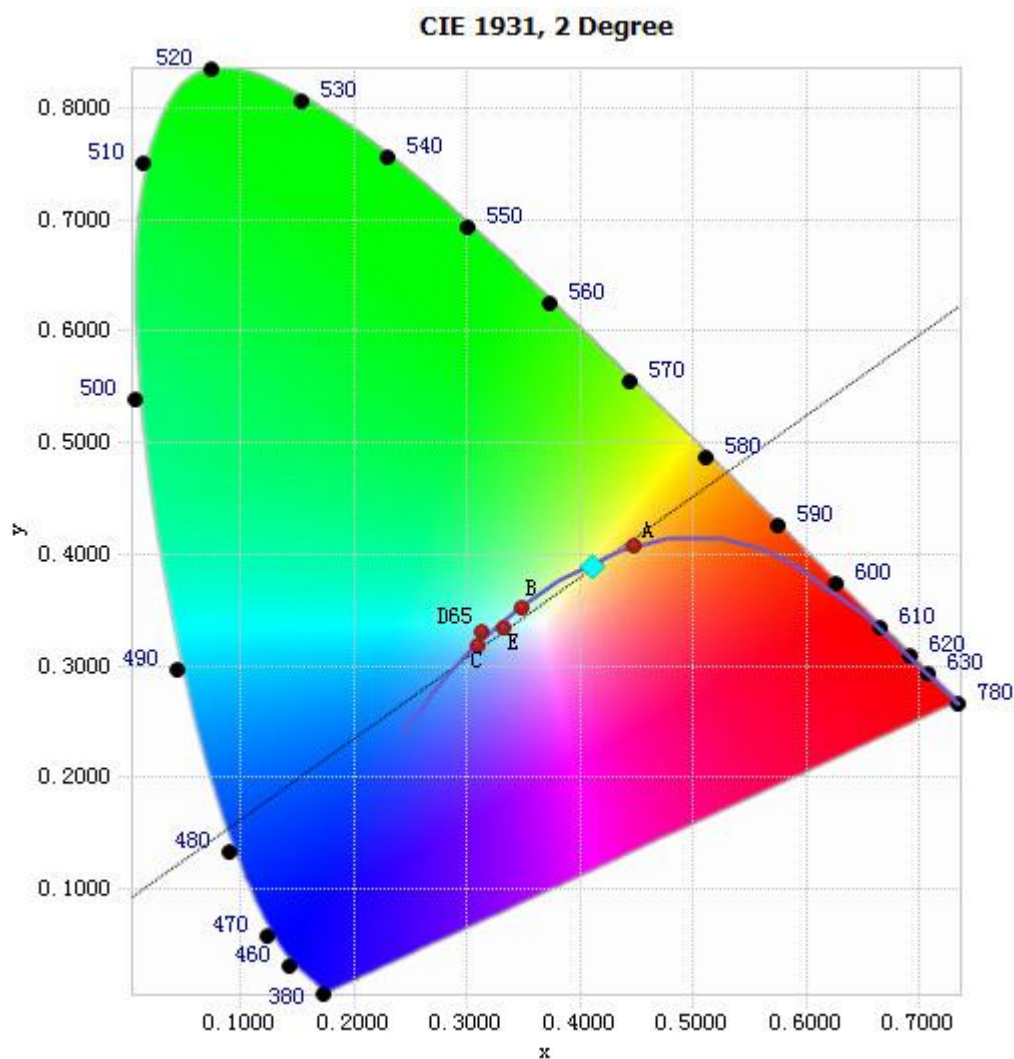


Chart 12: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	3.85E-05	485	5.10E-03	590	1.25E-02	695	1.13E-03
385	7.92E-05	490	5.75E-03	595	1.20E-02	700	9.48E-04
390	6.46E-05	495	6.73E-03	600	1.20E-02	705	8.23E-04
395	4.63E-05	500	7.94E-03	605	1.20E-02	710	6.92E-04
400	5.51E-05	505	9.01E-03	610	1.57E-02	715	5.99E-04
405	1.96E-05	510	9.91E-03	615	2.07E-02	720	5.08E-04
410	1.11E-04	515	1.06E-02	620	1.32E-02	725	4.36E-04
415	2.48E-04	520	1.10E-02	625	1.36E-02	730	3.77E-04
420	5.81E-04	525	1.13E-02	630	5.50E-02	735	3.23E-04
425	1.07E-03	530	1.16E-02	635	4.42E-02	740	2.80E-04
430	1.94E-03	535	1.18E-02	640	7.42E-03	745	2.37E-04
435	3.34E-03	540	1.20E-02	645	6.79E-03	750	2.07E-04
440	5.60E-03	545	1.22E-02	650	6.77E-03	755	1.77E-04
445	9.30E-03	550	1.23E-02	655	4.87E-03	760	1.58E-04
450	1.41E-02	555	1.25E-02	660	3.88E-03	765	1.26E-04
455	1.43E-02	560	1.27E-02	665	2.96E-03	770	1.20E-04
460	1.05E-02	565	1.29E-02	670	3.01E-03	775	9.82E-05
465	8.18E-03	570	1.29E-02	675	2.22E-03	780	9.04E-05
470	6.69E-03	575	1.29E-02	680	1.84E-03		
475	5.37E-03	580	1.28E-02	685	1.55E-03		
480	4.79E-03	585	1.29E-02	690	1.31E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4008, 0.3814)

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

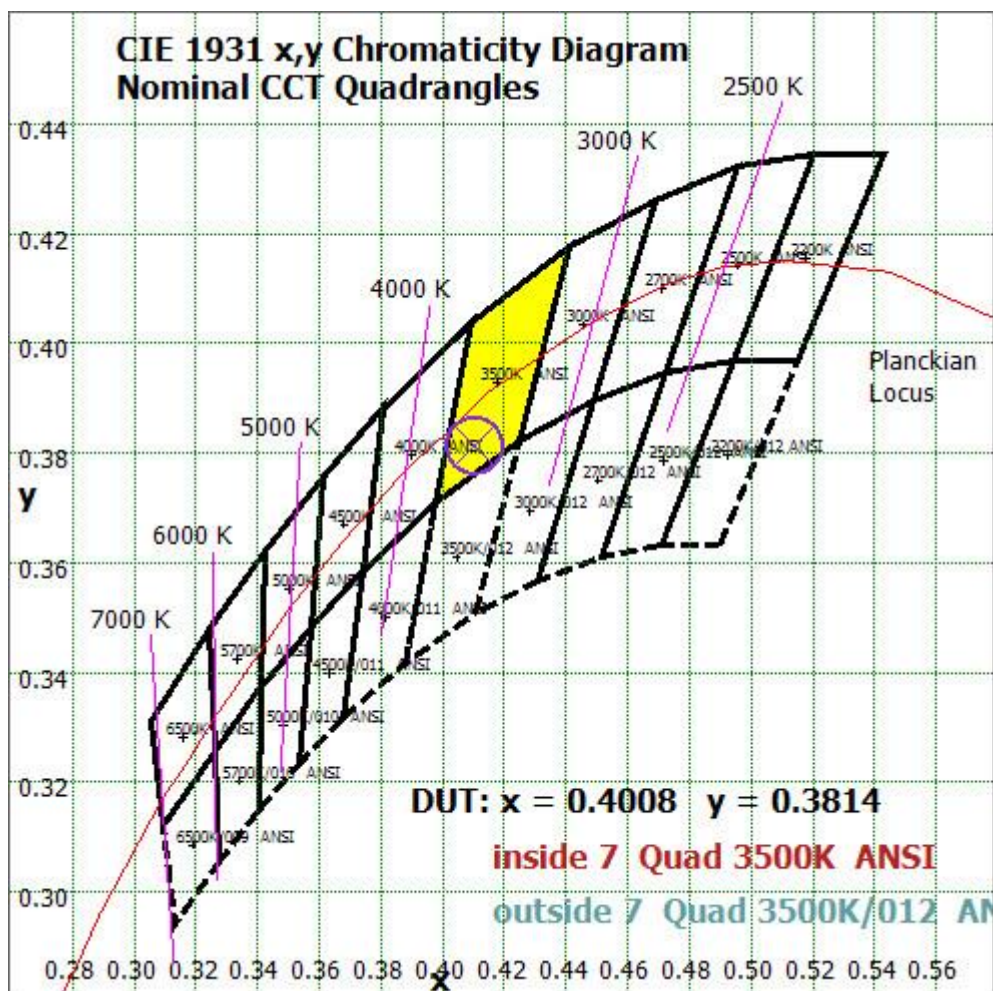


Chart14: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

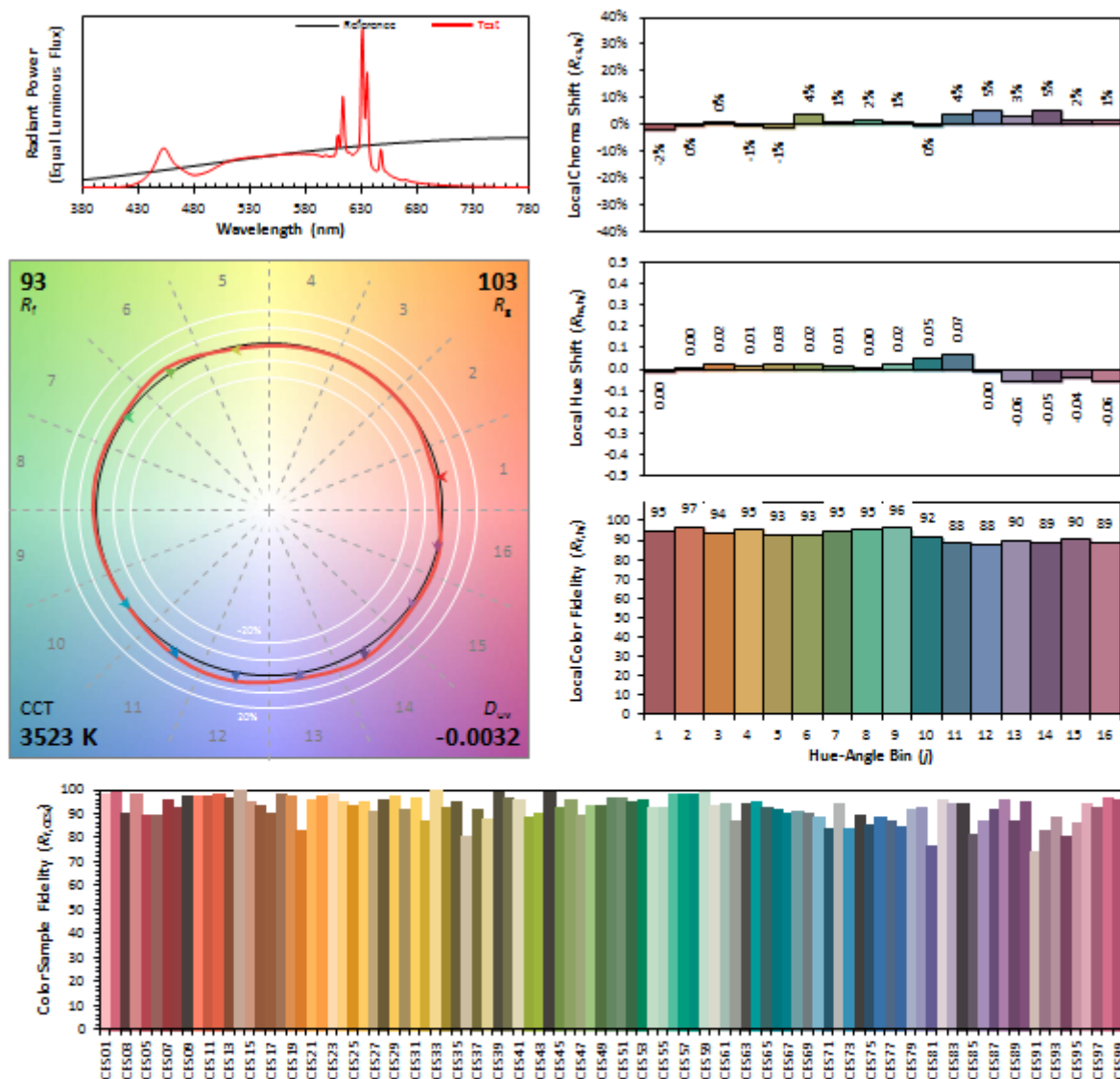
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/16

Model: 9A19DIM/9CCTS/GU24



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

x 0.4008
 y 0.3814
 u' 0.2367
 v' 0.5066

CIE 13.3-1995
(CRI)
 R_a 97
 R_g 95

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 9 due to rounding.

TEST RESULTS (4000K Setting)

Test ambient temperature was 26.0 °C.

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	0.9227
Test Power (W)	8.57
THD A%	38.18
Luminous Efficacy (lm/W)	106.2
Total Luminous Flux (lm)	910.0
Color Rendering Index (CRI)	95.8
R9	92.8
Correlated Color Temperature (CCT)(K)	3932
Chromaticity Chroma x	0.3814
Chromaticity Chroma y	0.3718
Chromaticity Chroma u	0.2278
Chromaticity Chroma v	0.333
Duv	-0.0026
Chromaticity Chroma u'	0.2278
Chromaticity Chroma v'	0.4995

Special Color Rendering Indices	
R1	94.8
R2	99.1
R3	91.5
R4	93.9
R5	97.2
R6	95.6
R7	98.3
R8	95.7
R9	92.8
R10	95.8
R11	90.7
R12	78.6
R13	96.3
R14	93.7

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

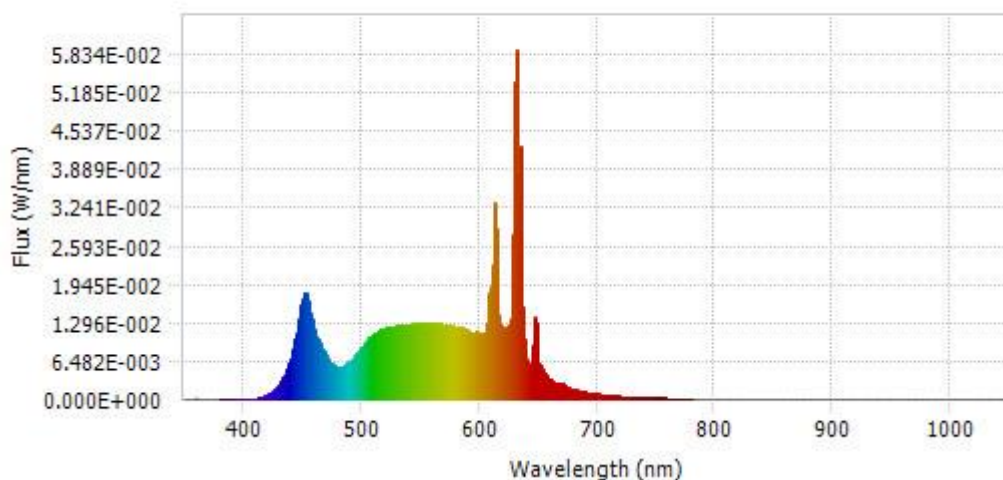
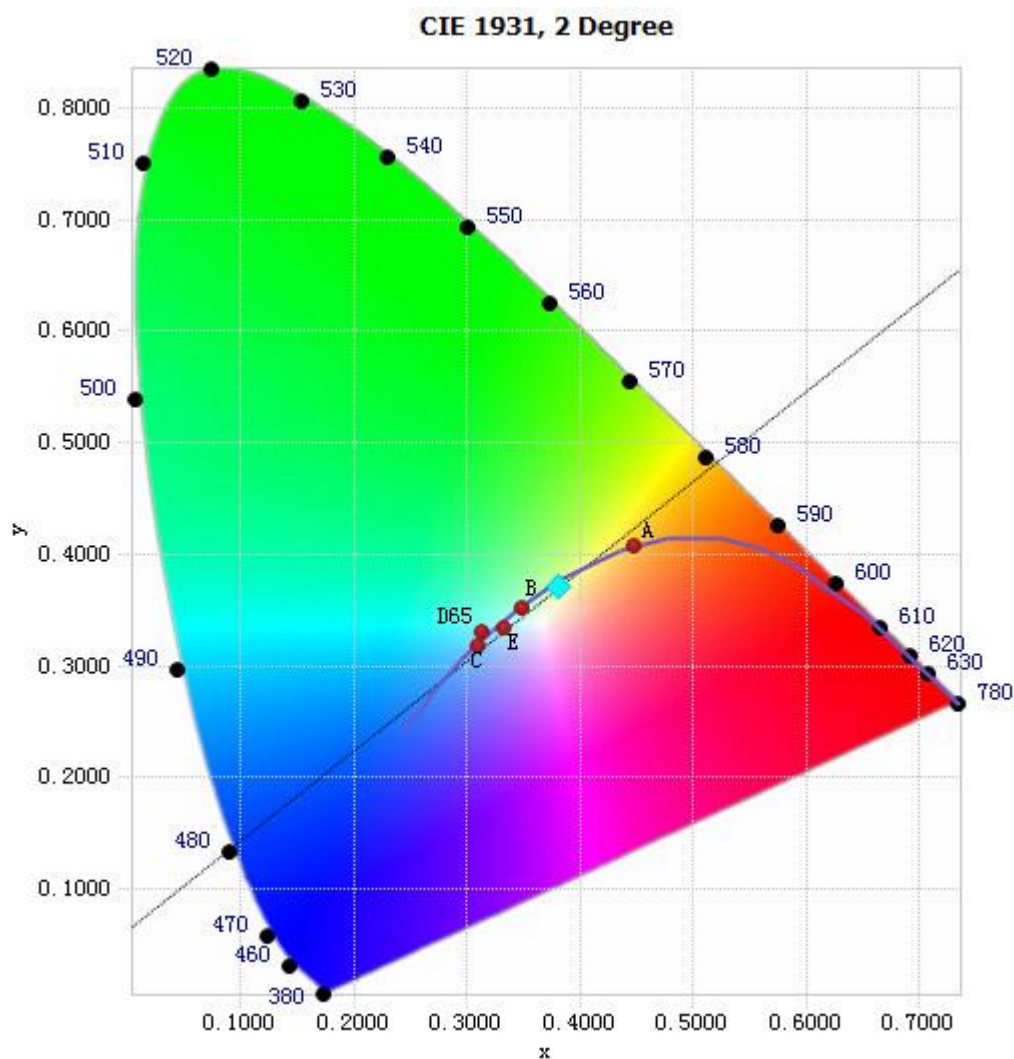


Chart16: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	9.65E-05	485	5.65E-03	590	1.16E-02	695	1.01E-03
385	7.55E-05	490	6.42E-03	595	1.10E-02	700	8.46E-04
390	7.10E-05	495	7.40E-03	600	1.11E-02	705	7.23E-04
395	9.79E-05	500	8.70E-03	605	1.10E-02	710	6.41E-04
400	4.47E-05	505	9.86E-03	610	1.47E-02	715	5.39E-04
405	6.72E-05	510	1.08E-02	615	1.95E-02	720	4.59E-04
410	1.11E-04	515	1.16E-02	620	1.22E-02	725	3.94E-04
415	3.14E-04	520	1.19E-02	625	1.27E-02	730	3.33E-04
420	6.59E-04	525	1.22E-02	630	5.36E-02	735	2.92E-04
425	1.33E-03	530	1.24E-02	635	4.29E-02	740	2.58E-04
430	2.35E-03	535	1.25E-02	640	6.78E-03	745	2.15E-04
435	4.10E-03	540	1.26E-02	645	6.17E-03	750	1.88E-04
440	6.84E-03	545	1.27E-02	650	6.22E-03	755	1.66E-04
445	1.13E-02	550	1.27E-02	655	4.41E-03	760	1.42E-04
450	1.68E-02	555	1.27E-02	660	3.49E-03	765	1.23E-04
455	1.66E-02	560	1.28E-02	665	2.69E-03	770	1.07E-04
460	1.19E-02	565	1.27E-02	670	2.76E-03	775	9.49E-05
465	9.32E-03	570	1.26E-02	675	1.98E-03	780	7.26E-05
470	7.49E-03	575	1.24E-02	680	1.63E-03		
475	5.93E-03	580	1.22E-02	685	1.39E-03		
480	5.30E-03	585	1.21E-02	690	1.20E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3814, 0.3718)

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

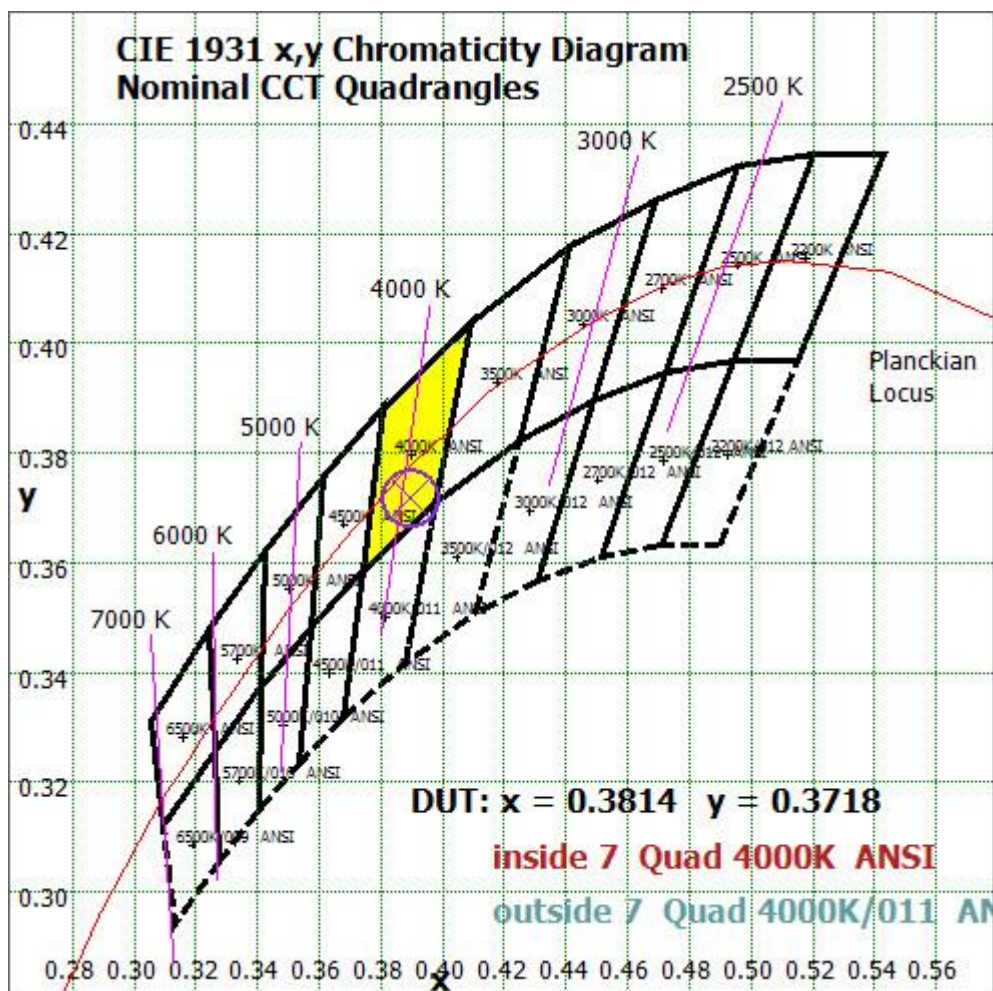


Chart 18: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

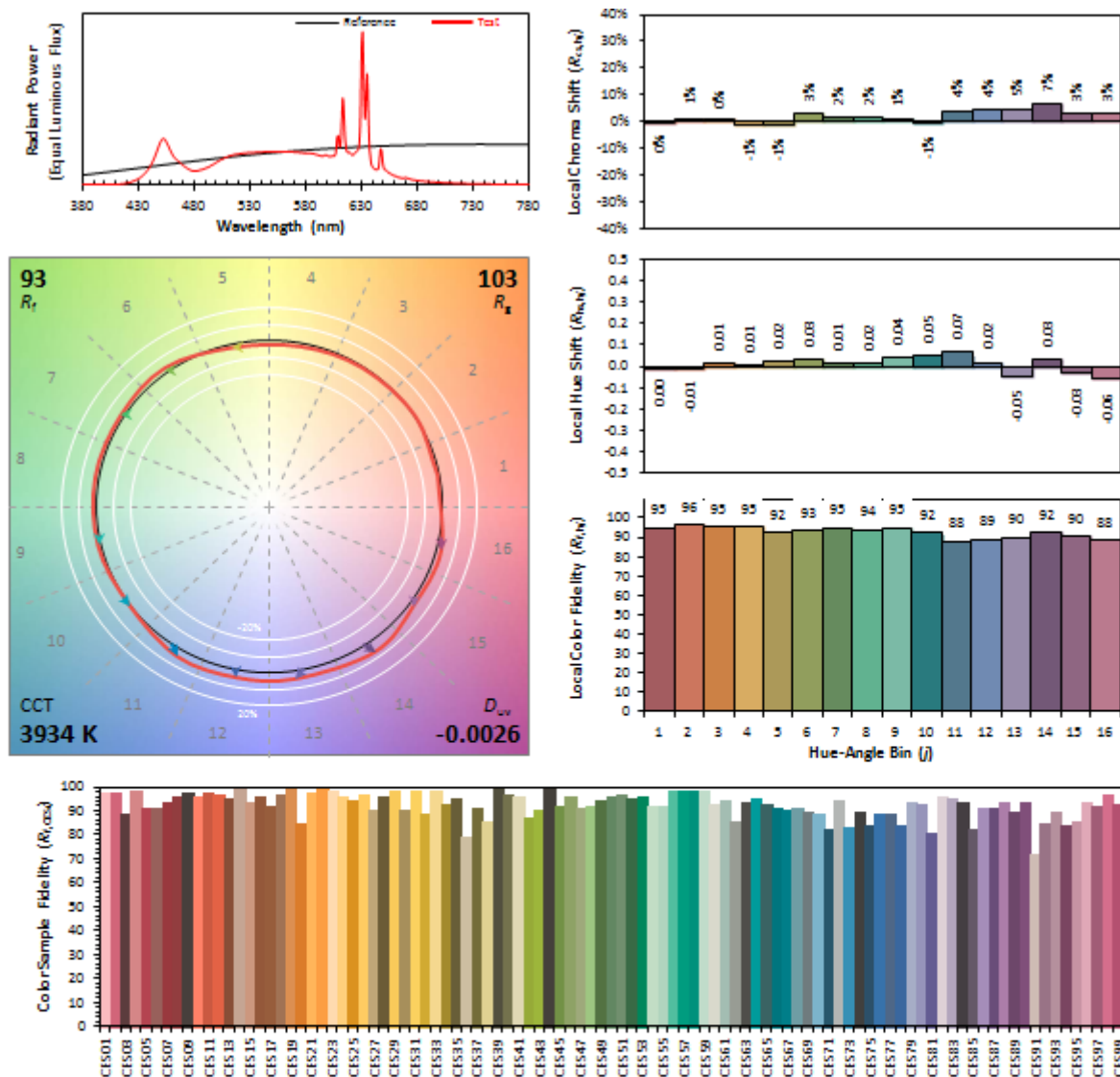
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/16

Model: 9A19DIM/9CCTS/GU24



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

x 0.3814
 y 0.3718
 u' 0.2278
 v' 0.4995

CIE 13.3-1995
(CRI)

R_a 96
 R_g 92

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

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 °C.

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)	0.079
Power Factor	0.9179
Test Power (W)	8.64
THD A%	39.37
Luminous Efficacy (lm/W)	101.9
Total Luminous Flux (lm)	880.1
Color Rendering Index (CRI)	94.3
R9	81.3
Correlated Color Temperature (CCT)(K)	4975
Chromaticity Chroma x	0.3460
Chromaticity Chroma y	0.3546
Chromaticity Chroma u	0.2109
Chromaticity Chroma v	0.3242
Duv	0.0011
Chromaticity Chroma u'	0.2109
Chromaticity Chroma v'	0.4862

Special Color Rendering Indices	
R1	95.3
R2	97.9
R3	88.1
R4	93.5
R5	98.7
R6	95.1
R7	95.4
R8	90.6
R9	81.3
R10	91.4
R11	90.1
R12	71.4
R13	97
R14	92.1

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

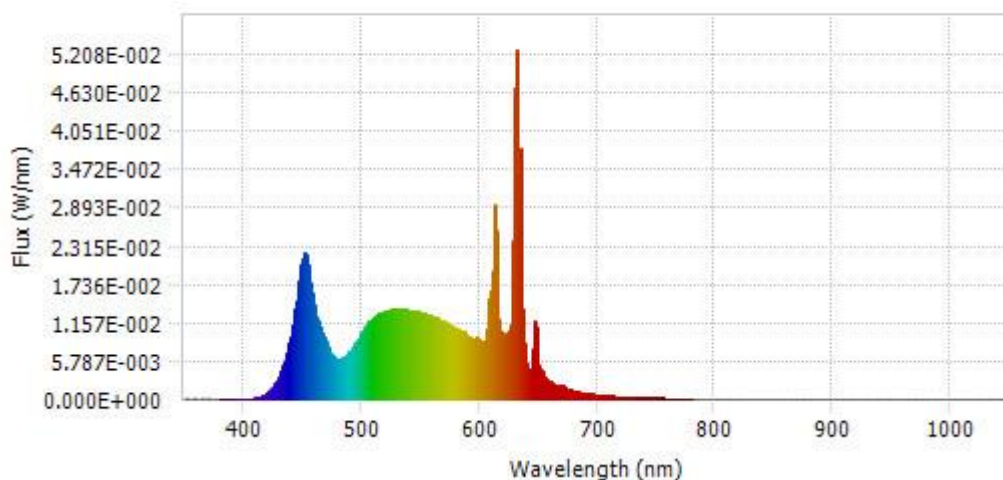
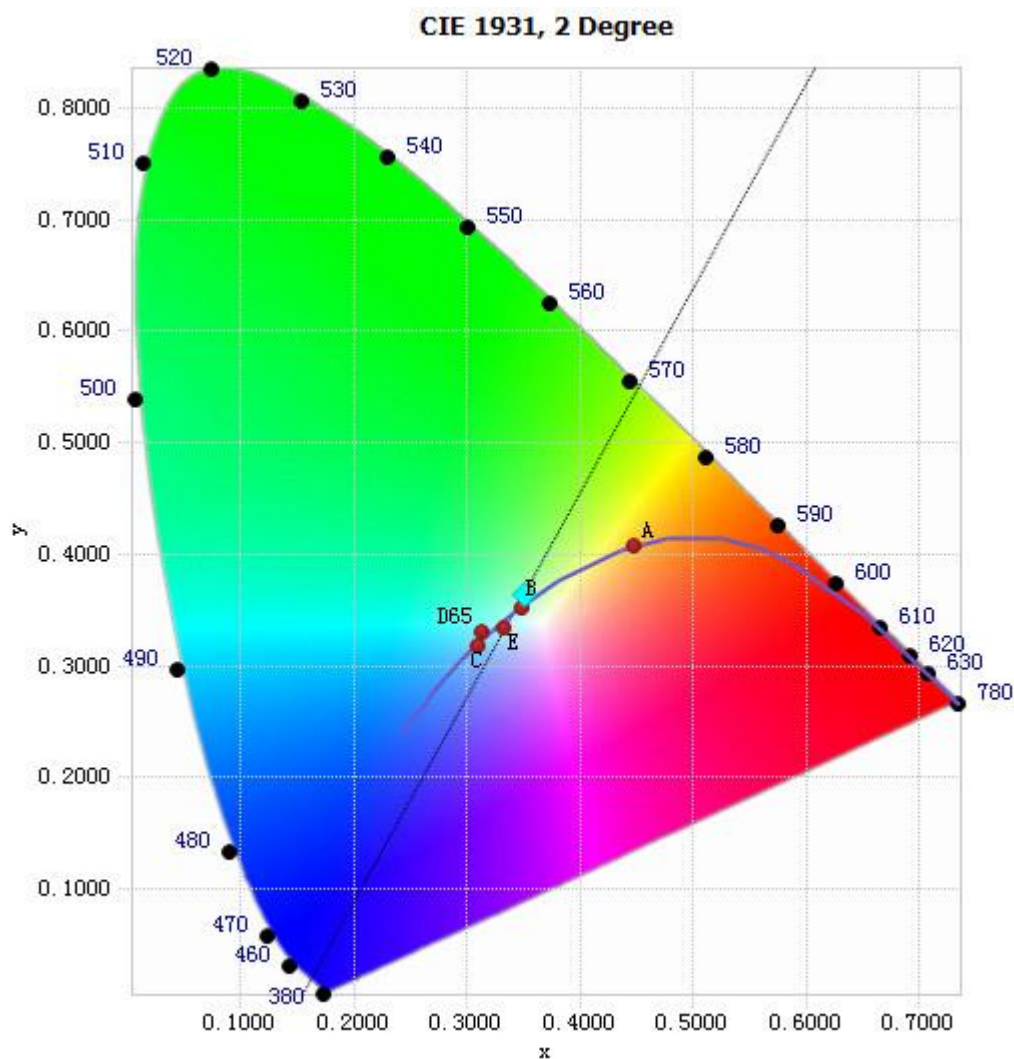


Chart20: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	9.44E-05	485	6.37E-03	590	9.61E-03	695	7.74E-04
385	8.72E-05	490	7.19E-03	595	8.94E-03	700	6.51E-04
390	8.17E-05	495	8.39E-03	600	8.89E-03	705	5.74E-04
395	4.69E-05	500	9.89E-03	605	8.81E-03	710	4.80E-04
400	6.49E-05	505	1.11E-02	610	1.23E-02	715	4.19E-04
405	8.40E-05	510	1.21E-02	615	1.70E-02	720	3.59E-04
410	1.57E-04	515	1.29E-02	620	9.97E-03	725	3.15E-04
415	3.94E-04	520	1.32E-02	625	1.04E-02	730	2.68E-04
420	9.64E-04	525	1.35E-02	630	4.70E-02	735	2.33E-04
425	1.82E-03	530	1.35E-02	635	3.79E-02	740	2.10E-04
430	3.34E-03	535	1.35E-02	640	5.33E-03	745	1.75E-04
435	5.65E-03	540	1.34E-02	645	4.88E-03	750	1.58E-04
440	9.29E-03	545	1.33E-02	650	5.03E-03	755	1.34E-04
445	1.50E-02	550	1.31E-02	655	3.45E-03	760	1.15E-04
450	2.13E-02	555	1.28E-02	660	2.68E-03	765	9.67E-05
455	2.02E-02	560	1.25E-02	665	1.99E-03	770	9.04E-05
460	1.41E-02	565	1.21E-02	670	2.14E-03	775	7.75E-05
465	1.09E-02	570	1.17E-02	675	1.51E-03	780	7.18E-05
470	8.65E-03	575	1.12E-02	680	1.24E-03		
475	6.68E-03	580	1.07E-02	685	1.04E-03		
480	5.98E-03	585	1.03E-02	690	8.84E-04		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3460, 0.3546)

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

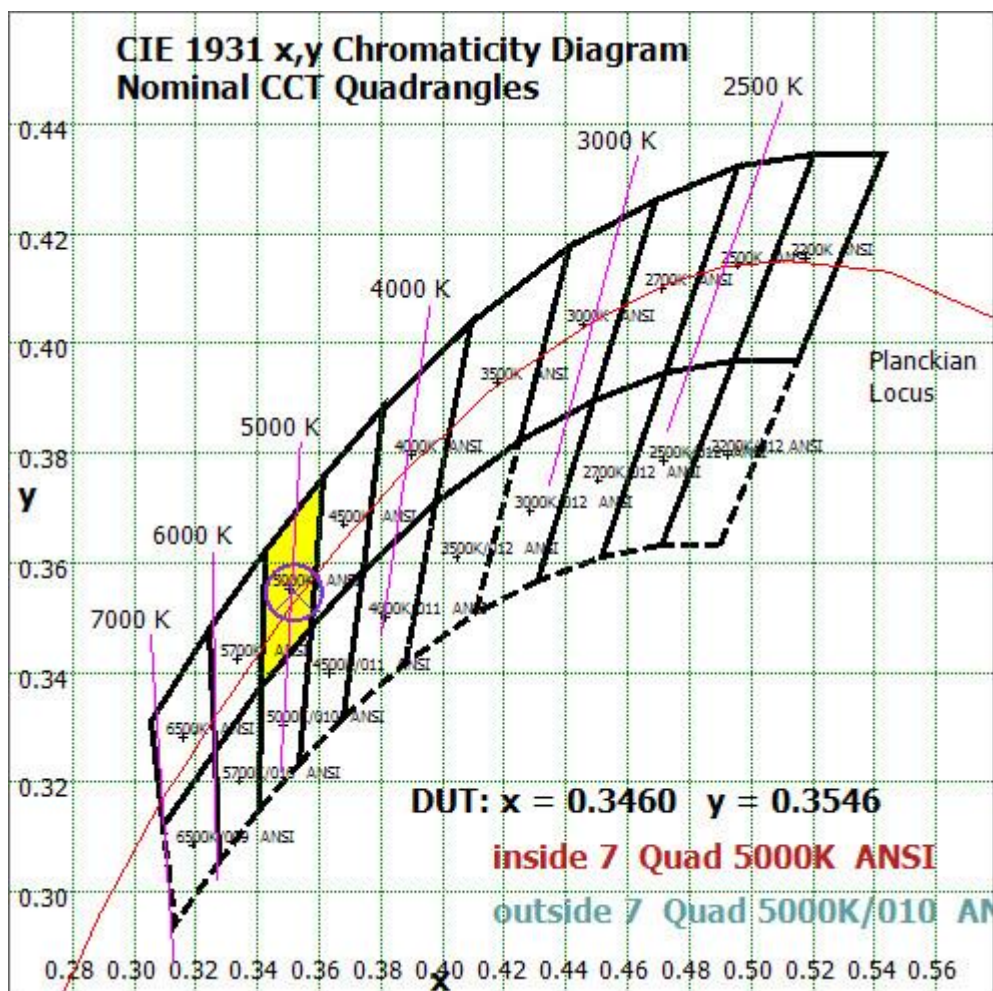


Chart 22: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

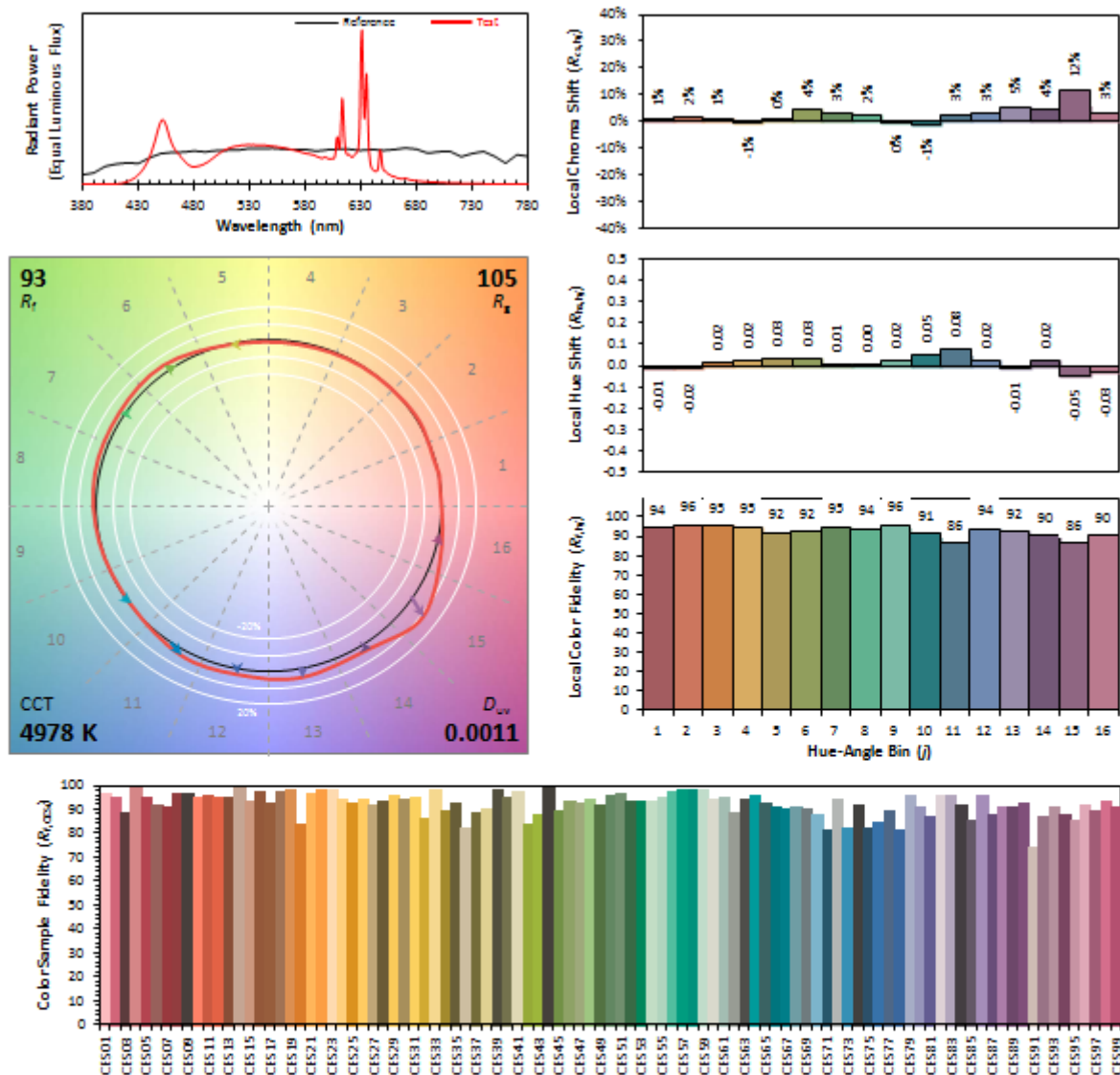
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/16

Model: 9A19DIM/9CCTS/GU24



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

x 0.3460
 y 0.3546
 u' 0.2109
 v' 0.4862

CIE 13.3-1995
(CRI)

R_a 94
 R_g 81

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

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 expanded 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 expanded 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 ***

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.