4. Test Result

Test CCT: 3000K (Input Control Signal Applied: 0%)

Test Condition: Method: Integrating Sphere System; Orientation: Downward; Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm)	8530	5000~10000	4500~11000	Pass
Power(W)	53.77	None.	None.	N/A
Total Efficacy(lm/W)	158.65	≥120	≥116.4	Pass
CCT(K)	2978	2870~3220	No tolerances	Pass
Duv	-0.000354	None.	None.	N/A
IES R_f	73	70	69	Pass
IES R_g	96	89	88	Pass
IES Rcs,h1	-16%	-18%~23%	-19%~22%	Pass
R_a	71.5	≥70	≥69	Pass
R9	-33	/	/	Pass

Test Condition: Method: Goniophotometer; Orientation: Downward; Test Voltage: 119.9V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm)	8533.98	5000~10000	4500~11000	Pass
Power(W)	53.68	None.	None.	N/A
Total Efficacy(lm/W)	158.98	≥120	≥116.4	Pass
Zonal Lumen Distribution(0-90°)	100.00%	0-90°≥100%	0-90°≥97%	Pass
Zonal Lumen Distribution(80-90°)	5.14%	80-90°≤10%	80-90°≤13%	Pass
Power Factor	0.9857	≥0.9	≥0.87	Pass
THDi	10.99%	≤20%	≤25%	Pass

Test Condition: Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
TMP_{LED}(°C)	55.5	≤115	With tolerance of ⩽ 1.1°C or 0.4%, whichever is greater due to thermocouple tolerance	Pass
TMP_c(°C)	66.6	≤90	With tolerance of ⩽ 1.1°C or 0.4%, whichever is greater due to thermocouple tolerance	Pass
Drive Current/Individual LED source(mA)	88.6	≤150	With +5% Tolerence	Pass
L_{90} Lumen Maintenance Life (Hours)	51000	≥36000	None.	Pass
Color Maintenance	0.0013	≤0.007	≤0.0074	Pass

Test Condition: Method: Integrating THDi、PF Test ; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	THDi	11.01%	≤20%	≤25%	Pass
277	Power Factor	0.9020	≥0.9	≥0.87	Pass
277	THDi	13.76%	≤20%	≤25%	Pass
120	THDi	11.01%	≤20%	≤25%	Pass

[Integrating Sphere System]

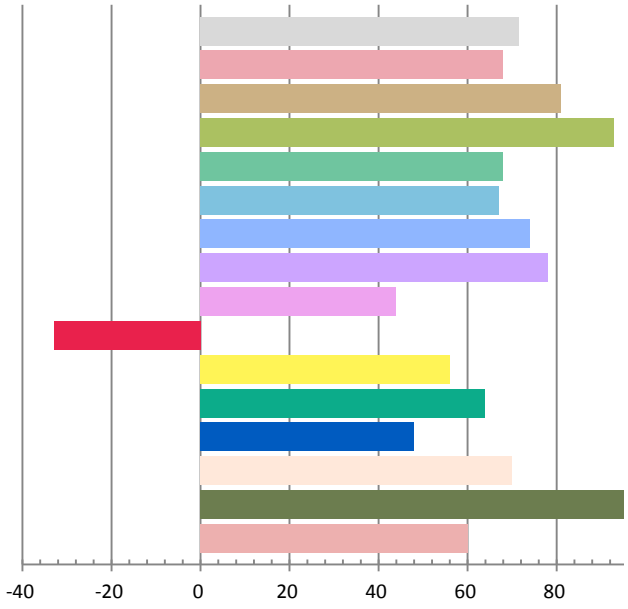
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.4546	53.77	0.9859	8530	158.65

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
24.2230	2978	-0.00035	0.4380	0.4035	0.2515	0.5213

Color Rendering Index

Ra			
71.5			
R1	R2	R3	R4
68.0	81	93	68
R5	R6	R7	R8
67	74	78	44
R9	R10	R11	R12
-33	56	64	48
R13	R14	R15	
70	96	60	



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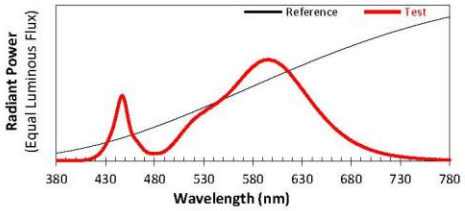
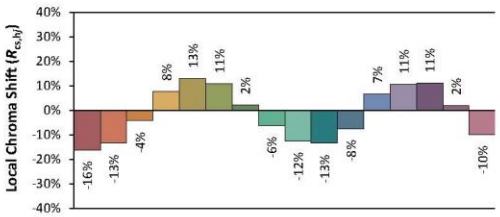
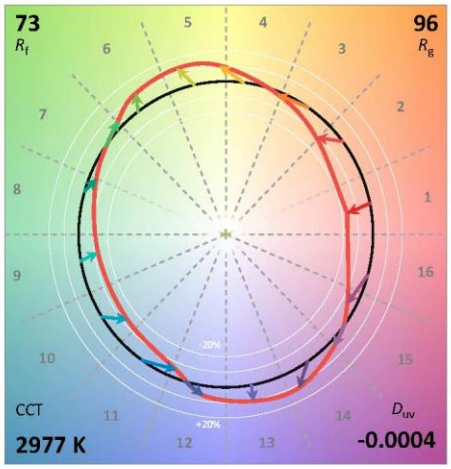
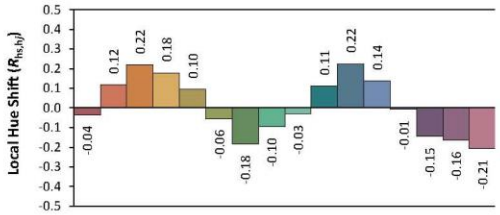
ANSI/IES TM-30-18 Color Rendition Report

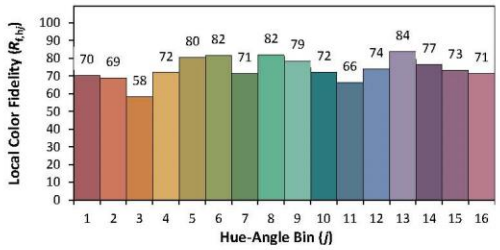
Source:	User SPD	**Manufacturer:**	DG3230116-02634E-EE
Date:	2023/1/30	**Model:**	WM21-52W-CT-MV-D-AOU

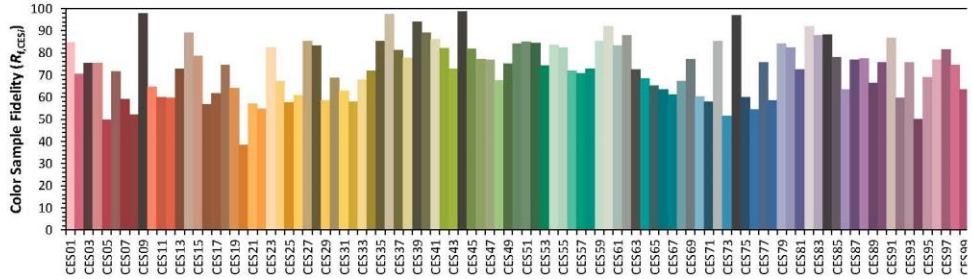












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

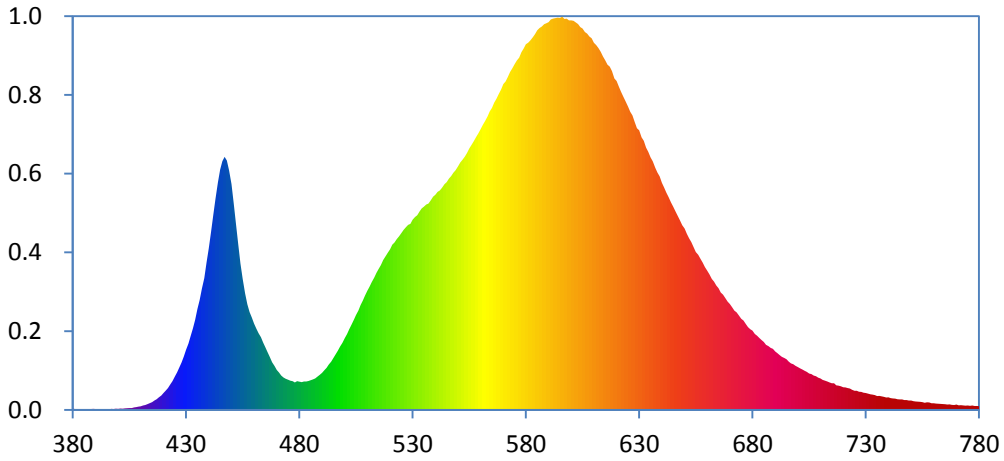
x	0.4380
y	0.4034
u'	0.2515
v'	0.5213

CIE 13.3-1995 (CRI)

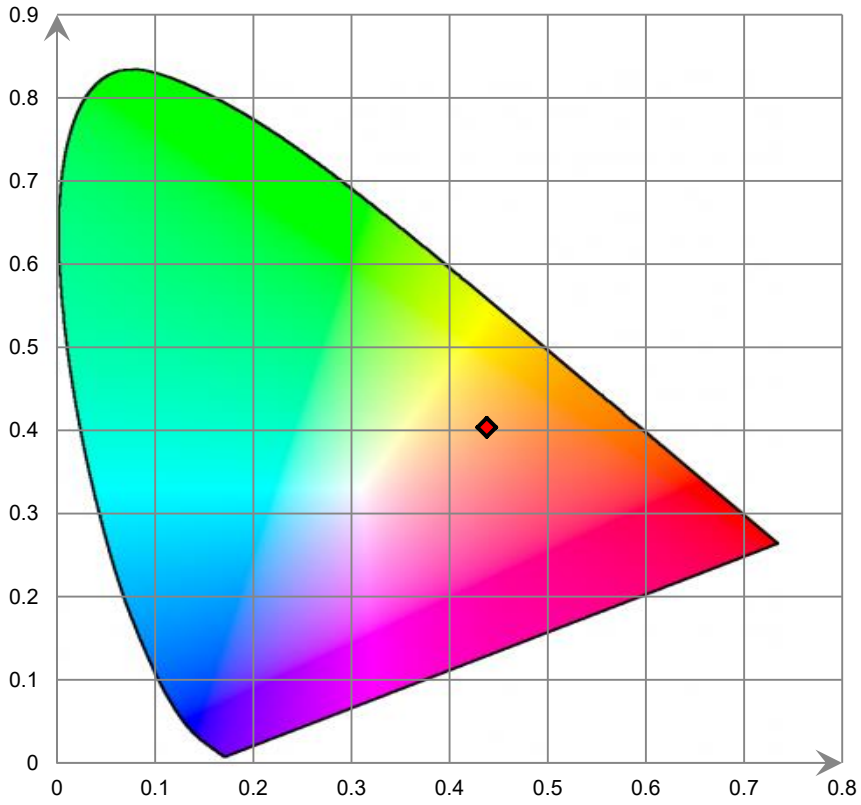
R_a	71
R_9	-33

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

Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



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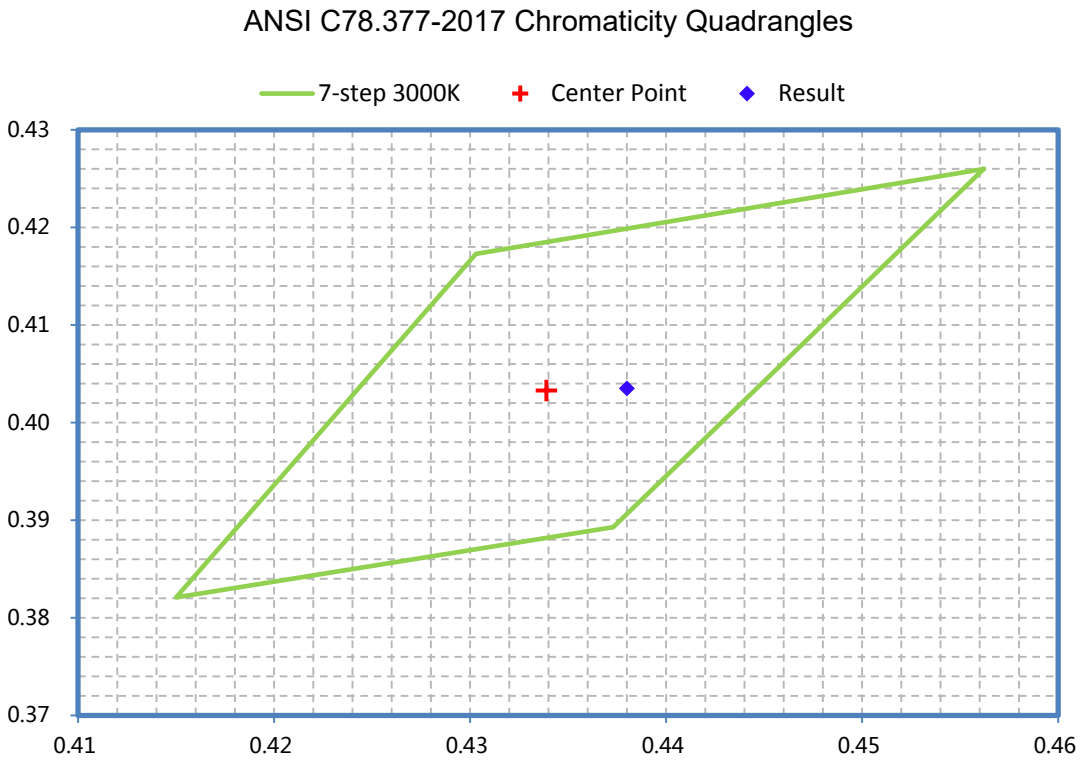

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[Goniophotometer System]

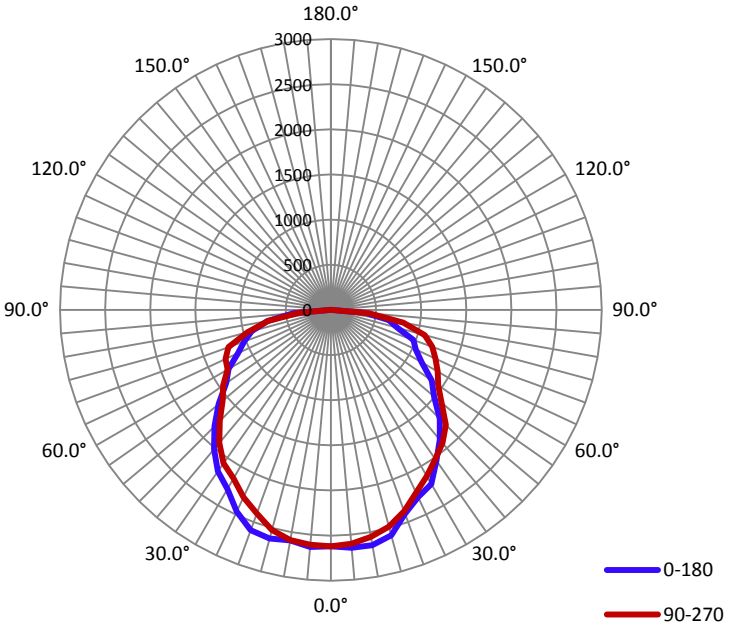
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
119.9	60	0.4542	53.68	0.9857

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
8533.98	158.98	2663.0	1.30	1.24

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	115.2	128.7	126.3	112.2	120.6
Field Angle (10% I_{max}):	174.4	173.2	173.4	175.1	174.0

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Dusk to Dawn Area Light

DDAL-SW3B52

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	2619	2619	2619	2619	2619	2619	2619	2619
5.0°	2645	2628	2621	2602	2601	2619	2633	2636
10.0°	2646	2632	2599	2554	2553	2572	2585	2591
15.0°	2585	2560	2537	2467	2486	2505	2589	2633
20.0°	2402	2437	2427	2340	2373	2449	2589	2603
25.0°	2288	2246	2281	2232	2233	2380	2455	2478
30.0°	2227	2119	2175	2132	2125	2236	2255	2324
35.0°	2040	1989	2048	2018	2017	2099	2137	2227
40.0°	1877	1856	1868	1897	1925	1943	1964	2055
45.0°	1705	1710	1735	1722	1800	1786	1752	1869
50.0°	1491	1553	1577	1550	1599	1608	1622	1628
55.0°	1366	1371	1431	1447	1451	1483	1427	1488
60.0°	1163	1211	1340	1311	1366	1331	1281	1295
65.0°	1038	1136	1316	1253	1279	1280	1138	1096
70.0°	972	1050	1093	1162	1196	1149	1005	1028
75.0°	763	893	952	1031	1076	1053	908	834
80.0°	652	686	735	786	814	779	750	762
85.0°	386	397	387	405	425	440	480	460
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

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Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	2619	2619	2619	2619	2619	2619	2619	2619
5.0°	2636	2628	2612	2601	2611	2627	2646	2649
10.0°	2593	2575	2572	2551	2589	2638	2647	2649
15.0°	2621	2542	2494	2473	2523	2571	2584	2572
20.0°	2595	2520	2376	2359	2398	2473	2404	2396
25.0°	2465	2426	2243	2240	2289	2274	2281	2303
30.0°	2291	2260	2156	2131	2157	2111	2191	2224
35.0°	2182	2067	2073	2014	2072	1949	2023	2018
40.0°	2012	1926	1923	1886	1921	1817	1809	1872
45.0°	1821	1791	1773	1746	1740	1692	1641	1707
50.0°	1621	1626	1637	1578	1563	1551	1460	1542
55.0°	1414	1468	1461	1417	1456	1423	1320	1316
60.0°	1307	1281	1329	1322	1321	1303	1180	1163
65.0°	1134	1264	1280	1240	1287	1166	1059	1041
70.0°	1020	1056	1265	1179	1208	1068	922	883
75.0°	907	995	1000	1015	956	894	898	820
80.0°	713	728	730	750	707	665	641	605
85.0°	417	404	364	359	350	360	353	347
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

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Dusk to Dawn Area Light

DDAL-SW3B52

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	62.7	0.73
5-10	187.0	2.20
10-15	305.1	3.57
15-20	412.0	4.83
20-25	499.4	5.85
25-30	570.7	6.69
30-35	627.4	7.35
35-40	662.0	7.76
40-45	677.8	7.94
45-50	671.2	7.86
50-55	650.8	7.63
55-60	621.9	7.29
60-65	600.3	7.03
65-70	574.3	6.73
70-75	529.6	6.21
75-80	443.7	5.19
80-85	306.7	3.60
85-90	131.6	1.54
90-95	0.0	0.00
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.00
115-120	0.0	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	0.00
135-140	0.0	0.00
140-145	0.0	0.00
145-150	0.0	0.00
150-155	0.0	0.00
155-160	0.0	0.00
160-165	0.0	0.00
165-170	0.0	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	62.7	0.73
0-10	249.7	2.93
0-15	554.8	6.50
0-20	966.8	11.33
0-25	1466.2	17.18
0-30	2036.9	23.87
0-35	2664.2	31.22
0-40	3326.2	38.98
0-45	4004.0	46.92
0-50	4675.2	54.78
0-55	5326.0	62.41
0-60	5947.9	69.70
0-65	6548.2	76.73
0-70	7122.5	83.46
0-75	7652.0	89.67
0-80	8095.7	94.86
0-85	8402.4	98.46
0-90	8534.0	100.00
0-95	8534.0	100.00
0-100	8534.0	100.00
0-105	8534.0	100.00
0-110	8534.0	100.00
0-115	8534.0	100.00
0-120	8534.0	100.00
0-125	8534.0	100.00
0-130	8534.0	100.00
0-135	8534.0	100.00
0-140	8534.0	100.00
0-145	8534.0	100.00
0-150	8534.0	100.00
0-155	8534.0	100.00
0-160	8534.0	100.00
0-165	8534.0	100.00
0-170	8534.0	100.00
0-175	8534.0	100.00
0-180	8534.0	100.00

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Test CCT: 4000K (Input Control Signal Applied: 50%)

Test Condition: Method: Integrating Sphere System; Orientation: Downward; Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm)	8903.7	5000~10000	4500~11000	Pass
Power(W)	52.36	None.	None.	N/A
Total Efficacy(lm/W)	170.04	≥120	≥116.4	Pass
CCT(K)	3869	3710~4260	No tolerances	Pass
Duv	0.00125	None.	None.	N/A
IES R_f	76	70	69	Pass
IES R_g	95	89	88	Pass
IES Rcs,h1	-16%	-18%~23%	-19%~22%	Pass
R_a	74.4	≥70	≥69	Pass
R9	-23	/	/	Pass

Test Condition: Method: Integrating THDi、PF Test ; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.9873	≥0.9	≥0.87	Pass
120	THDi	11.10%	≤20%	≤25%	Pass
277	Power Factor	0.8975	≥0.9	≥0.87	Pass
277	THDi	13.99%	≤20%	≤25%	Pass

Note:
1. The test results were measured directly from the test equipment.
2. The DLC requirements were listed according to DLC Technical Requirements V5.1.
3. The conclusion is only for information. When determining the compliance of the result, tolerances and/or allowances may be applied to the measured value.

[Integrating Sphere System]

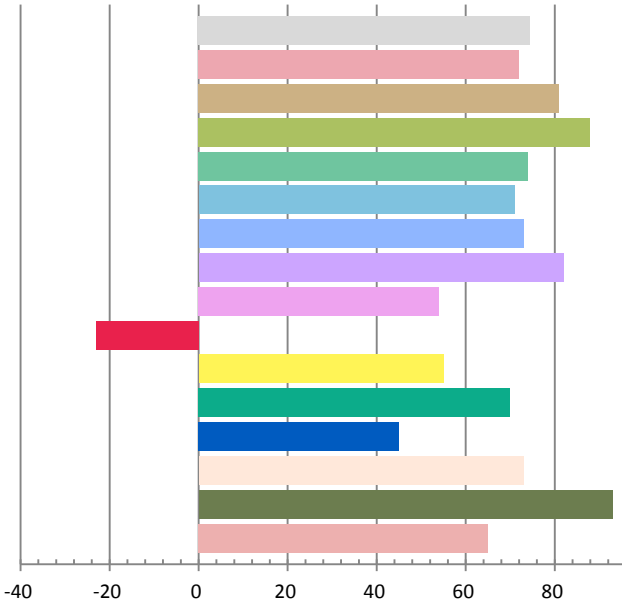
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.442	52.36	0.9873	8903.7	170.04

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
25.5530	3869	0.00125	0.3874	0.3837	0.2269	0.5056

Color Rendering Index

Ra			
74.4			
R1	R2	R3	R4
72.0	81	88	74
R5	R6	R7	R8
71	73	82	54
R9	R10	R11	R12
-23	55	70	45
R13	R14	R15	
73	93	65	



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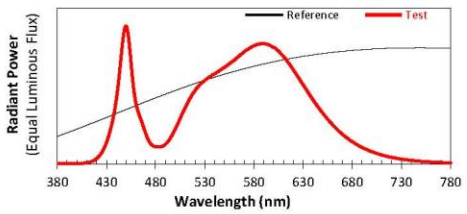
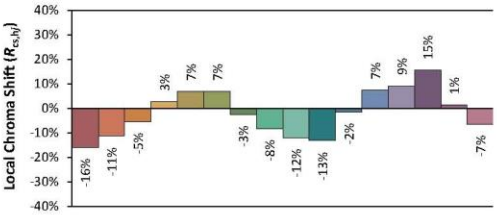
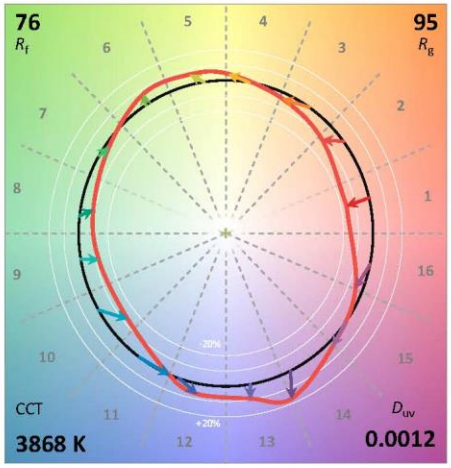
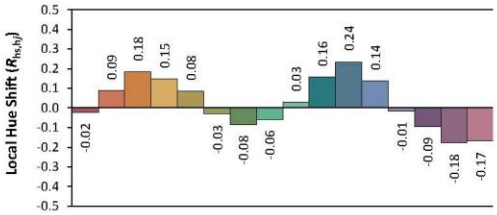
ANSI/IES TM-30-18 Color Rendition Report

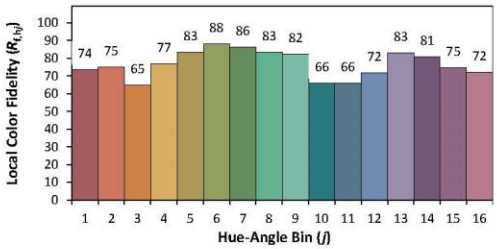
Source:	User SPD	**Manufacturer:**	DG3230116-02634E-EE
Date:	2023/1/30	**Model:**	WM21-52W-CT-MV-D-A0U

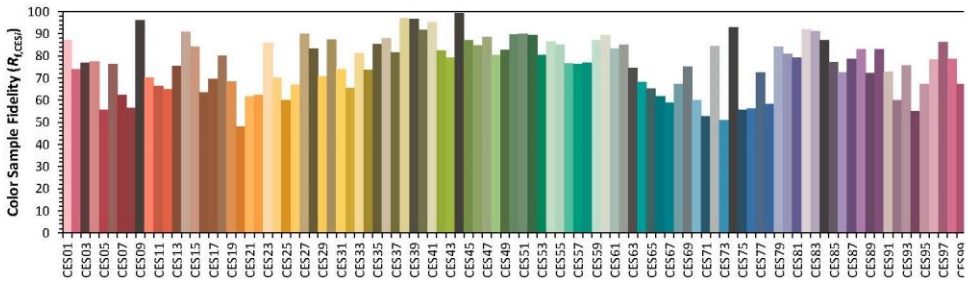












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

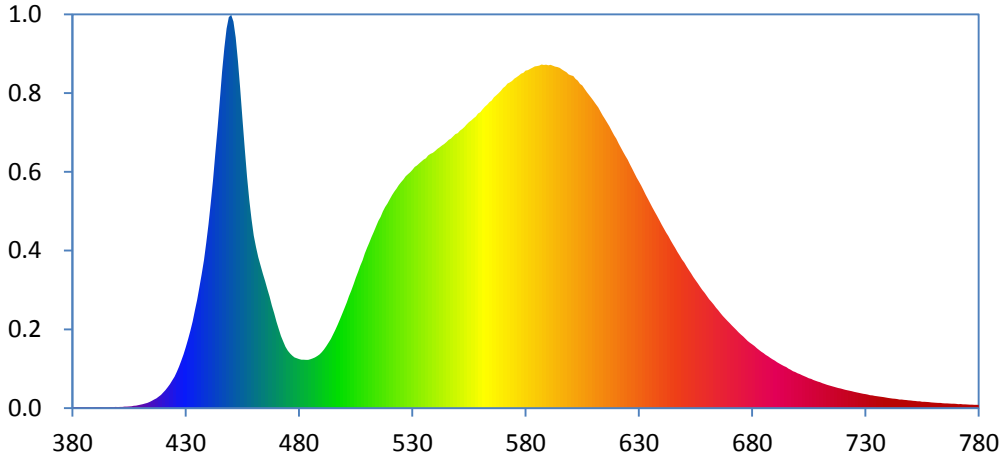
x	0.3874
y	0.3835
u'	0.2269
v'	0.5056

CIE 13.3-1995 (CRI)

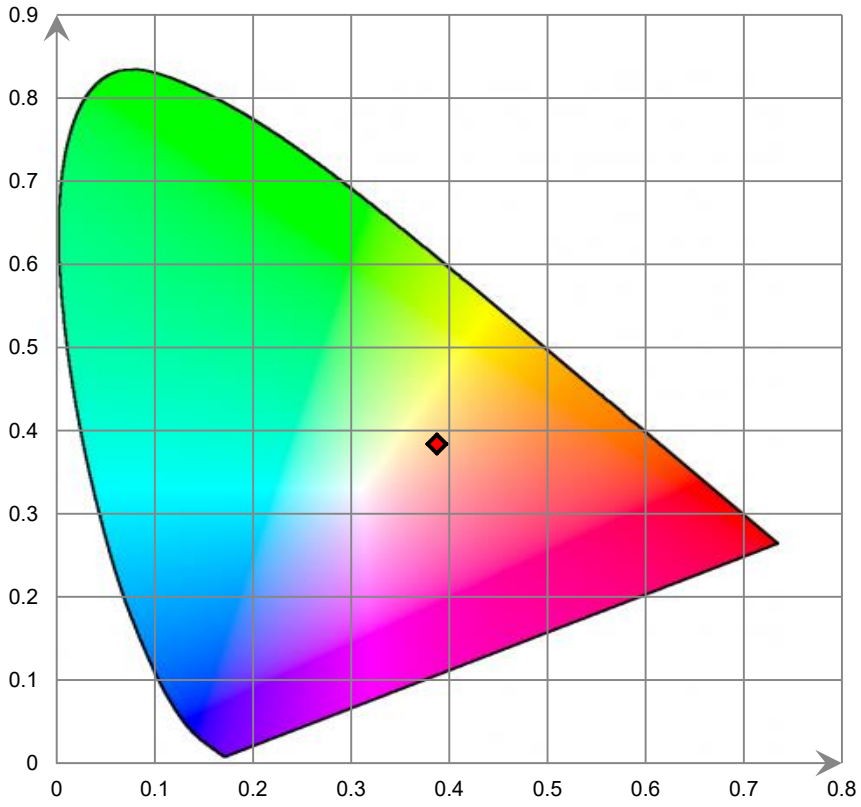
R_a	74
R_9	-24

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

Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



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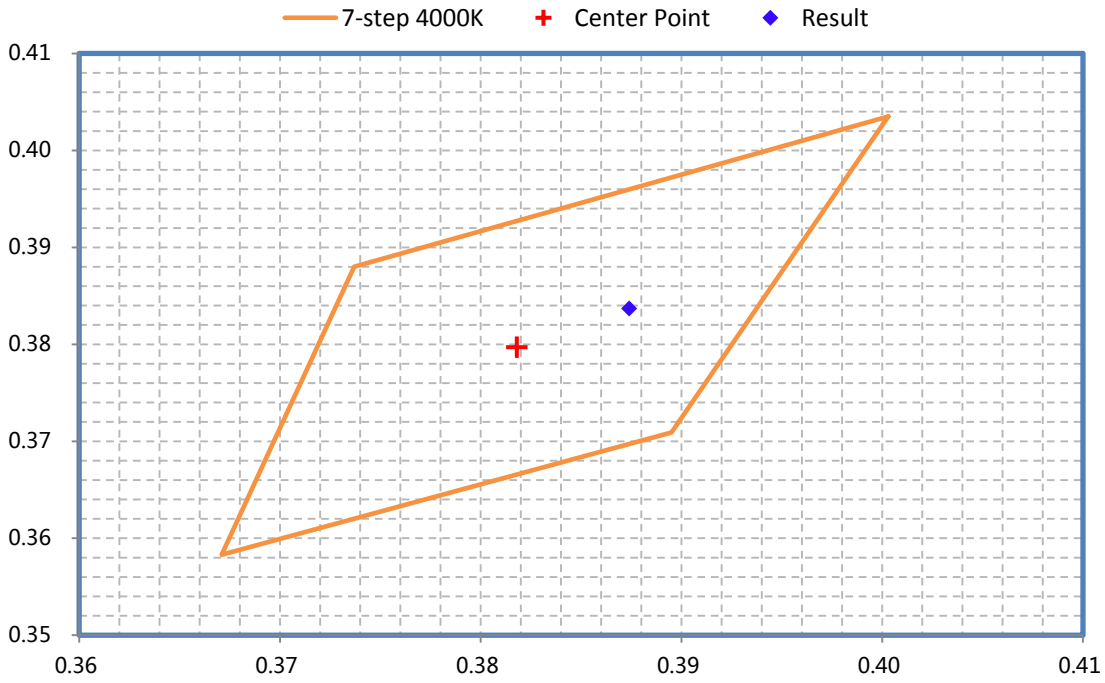
ANSI C78.377-2017 Chromaticity Quadrangles



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Test CCT: 5000K (Input Control Signal Applied: 100%)				
Test Condition: Method: Integrating Sphere System; Orientation: Downward; Test Voltage: 120V 60Hz;				
Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm)	8712.9	5000~10000	4500~11000	Pass
Power(W)	53.43	None.	None.	N/A
Total Efficacy(lm/W)	163.07	≥120	≥116.4	Pass
CCT(K)	4983	4746~5312	No tolerances	Pass
Duv	0.00635	None.	None.	N/A
IES R_f	75	70	69	Pass
IES R_g	94	89	88	Pass
IES Rcs,h1	-17%	-18%~23%	-19%~22%	Pass
R_a	73.1	≥70	≥69	Pass
R9	-31	/	/	Pass

Test Condition: Method: Integrating THDi、PF Test ; Orientation: Downward;					
Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.9878	≥0.9	≥0.87	Pass
120	THDi	10.75%	≤20%	≤25%	Pass
277	Power Factor	0.9006	≥0.9	≥0.87	Pass
277	THDi	13.85%	≤20%	≤25%	Pass

Note:
1. The test results were measured directly from the test equipment.
2. The DLC requirements were listed according to DLC Technical Requirements V5.1.
3. The conclusion is only for information. When determining the compliance of the result, tolerances and/or allowances may be applied to the measured value.

[Integrating Sphere System]

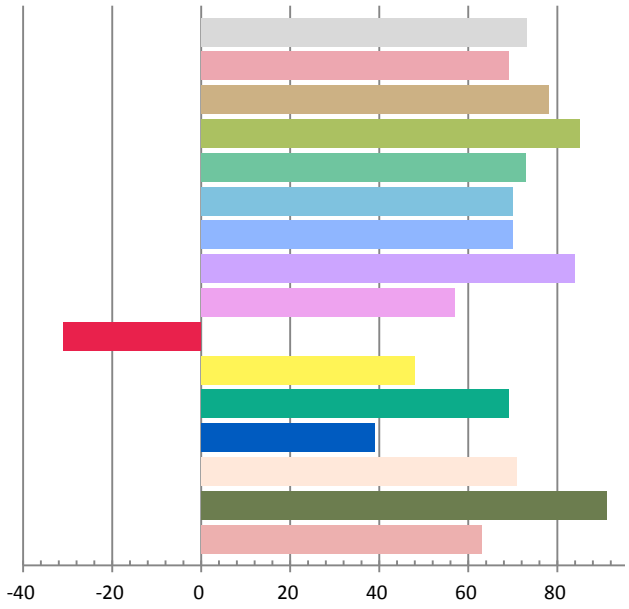
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.4509	53.43	0.9878	8712.9	163.07

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
25.3620	4983	0.00635	0.3469	0.3660	0.2072	0.4917

Color Rendering Index

Ra			
73.1			
R1	R2	R3	R4
69.0	78	85	73
R5	R6	R7	R8
70	70	84	57
R9	R10	R11	R12
-31	48	69	39
R13	R14	R15	
71	91	63	



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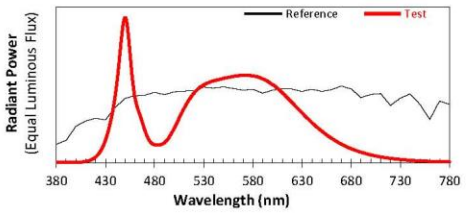
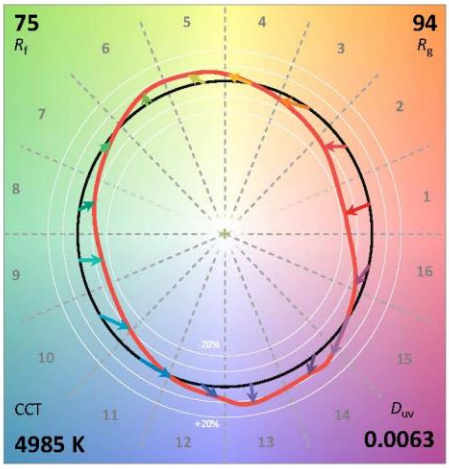
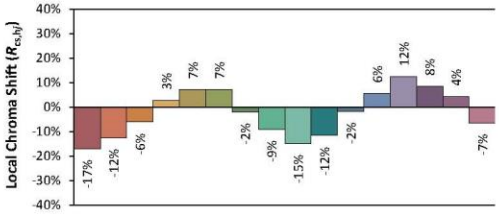
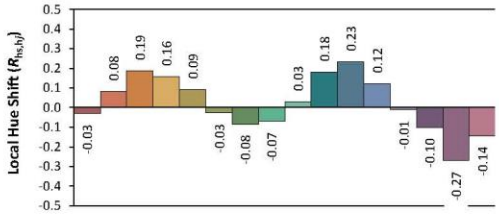
ANSI/IES TM-30-18 Color Rendition Report

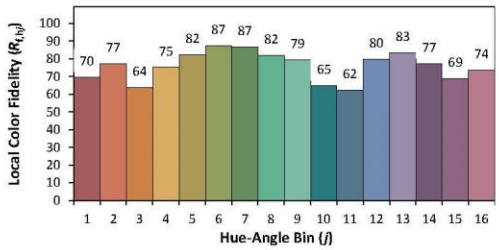
Source:	User SPD	**Manufacturer:**	DG3230116-02634E-EE
Date:	2023/1/30	**Model:**	WM21-52W-CT-MV-D-AOU

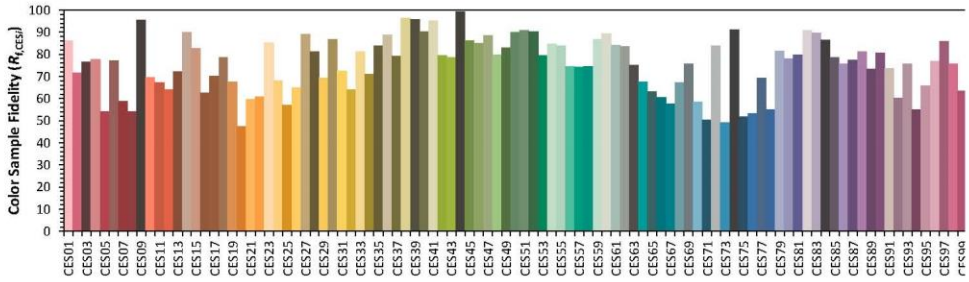












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3468
y	0.3658
u'	0.2072
v'	0.4917

CIE 13.3-1995 (CRI)

R_a	73
R_9	-31

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

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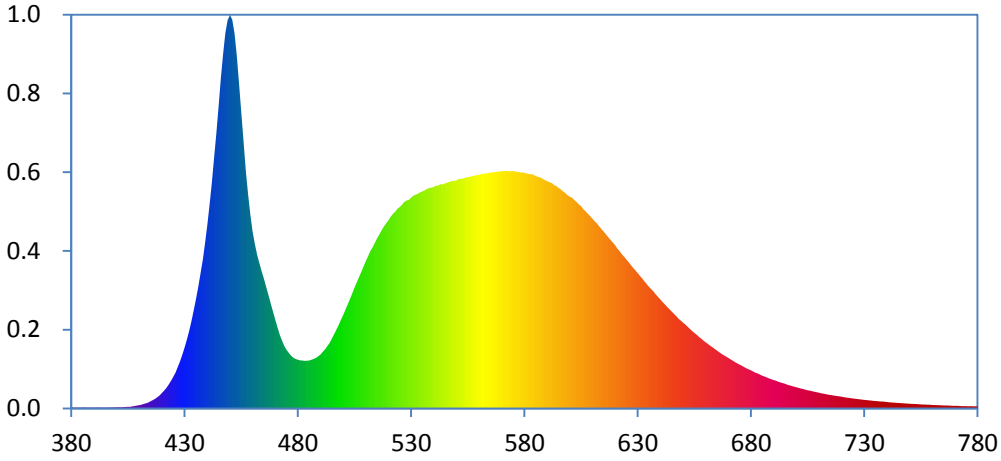
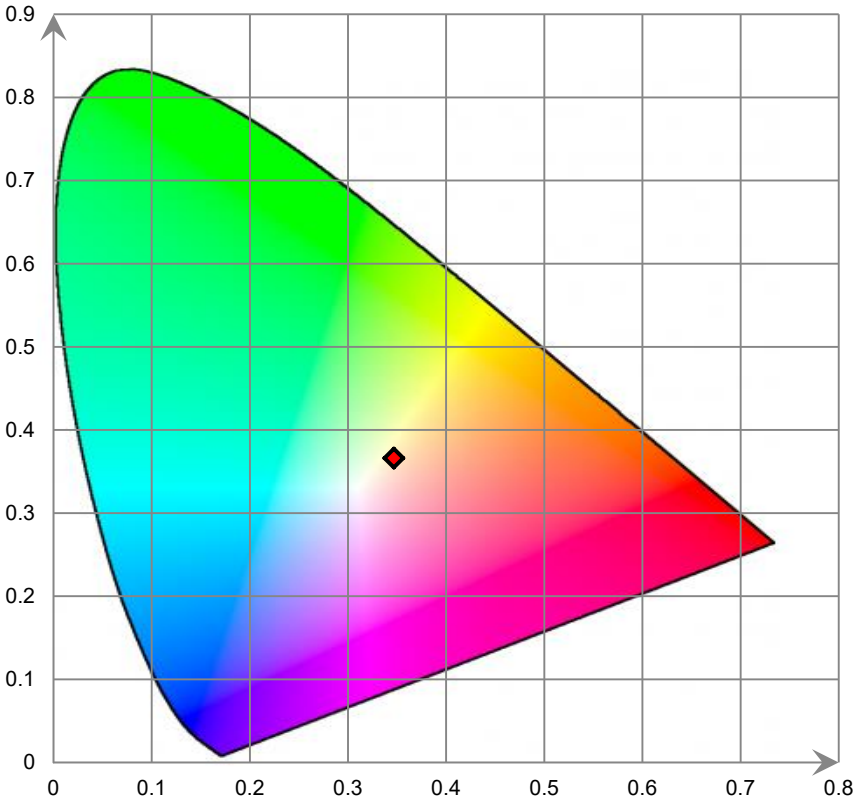
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



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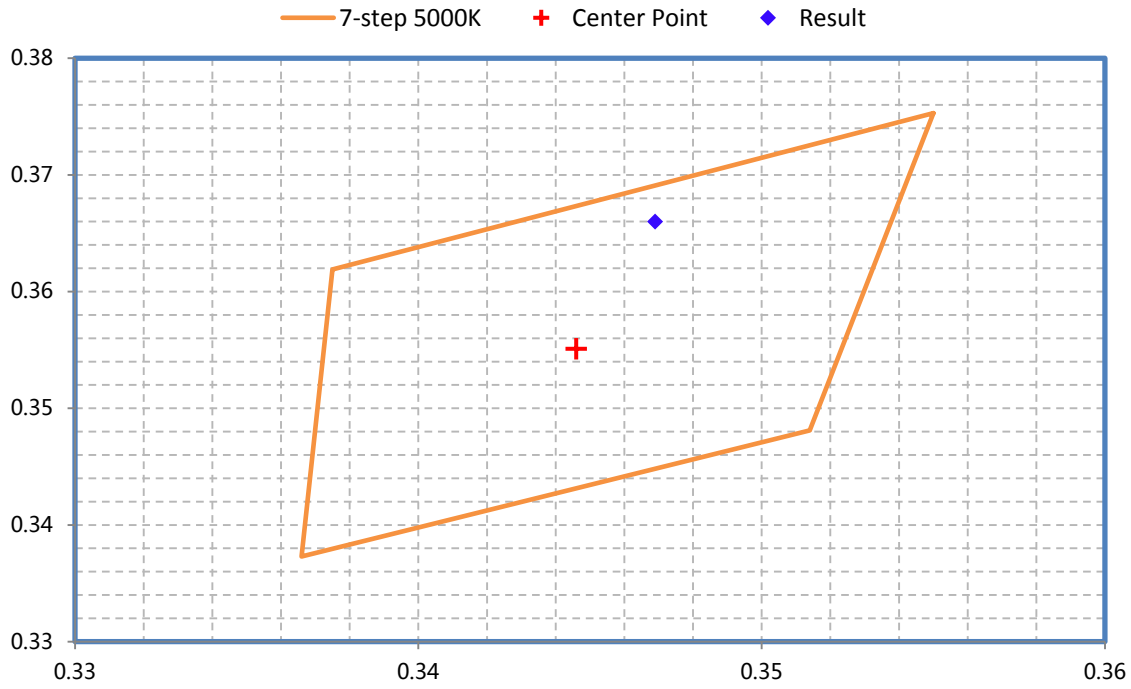
ANSI C78.377-2017 Chromaticity Quadrangles



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5. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
1.5m temperature integrating sphere	SENSING	SPR-600	S09008	2022-09-27	2023-09-26
High-precision rapid spectral analysis system	EVERFINE	HAAS-2000	M112048CA1361125	2022-09-27	2023-09-26
Digital power meter	YOKOGAWA	WT310	13398	2022-11-18	2023-11-17
Programmable Precision DC Power Supply	EVERFINE	WY5015	11060010	2022-11-18	2023-11-17
thermometer	SENSING	NA	NA	2022-11-18	2023-11-17
Standard Light Source	EVERFINE	D204	N/A	2021-10-15	2023-10-14
Precision frequency power supply	ALL Power	APW-105N	970613	2022-11-18	2023-11-17
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2022-11-18	2023-11-17
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2022-11-18	2023-11-17
Digital power meter	YOKOGAWA	WT-210	91j926132	2022-11-18	2023-11-17
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2022-10-26	2023-10-25
wireless remote thermohygrometer	N/A	433MHz	N/A	2022-11-18	2023-11-17
Standard Light Source	EVERFINE	D908	1012003	2021-10-15	2023-10-14
Multimeter	FLUKE	17B	1573 1328	2022-06-07	2023-06-06
Hybrid Recorder	YOKOGAWA	DR240	10#	2022-11-18	2023-11-17
AC POWER SUPPLY	HengPu	HPA 1103	0003394	2022-11-18	2023-11-17

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

6. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The ambient temperature of the sample was maintained at 25°C±1°C during measurement. And relative humidity is less than 65%. The product was operated in its intended orientation in application during all testing.

Integrating Sphere System
The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement. 4π geometry was used during measurement.

Goniophotometer System
Type C goniophotometer was used for measuring luminous intensity distribution. The vertical angle (γ) test intervals were set no more than 1 degree while data for 5 degree intervals is reported. The horizontal angle (C plane) test intervals were set no more than 22.5 degree.

ISTMT Test
The LED which has the highest temperature was measured at the location of LED case which is specified by LED source manufacturer and detailed by LM-80 report. The drive current of LED package/module/ array was calculated as the total output current of the driver measured by multimeter, divided by the number of branches in parallel of LEDs.