

# VISUAL COMFORT AND COMPANY TEST REPORT

## SCOPE OF WORK

LED Performance Testing

## MODEL NUMBER

ESSF1212D48429W31KWF1EF

## PROJECT NUMBER

G104941221

## REPORT NUMBER

104941221CHI-057

## ISSUE DATE

6/29/2022

## REVISED DATE

None

## TEST DATES

2022-06-28 through 2022-06-29.

## DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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**REPORT NUMBER**

104941221CHI-057

**MODEL NUMBER(s)**

ESSF1212D48429W31KWF1EF

**REPORT RENDERED TO:**

VISUAL COMFORT AND COMPANY  
7400 LINDER AVE  
SKOKIE, IL 60077  
USA

**STATEMENT OF LIMITATION**

NVLAP Lab Code 600186-0. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

**AUTHORIZATION**

The testing performed was authorized by signed quote number Qu-01236637-1.

**TEST STANDARDS**

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

ANSI/IES LM-79-19 Optical and Electrical Measurements of Solid-State Lighting Products

ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

IES TM-30-18: IES Method for Evaluating Light Source Color Rendition

In Charge of Testing:



Nick Lau  
Engineer  
Lighting Division

Reviewer:



Jeff Davis  
N.A. Technical Lead  
Lighting Division

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**SAMPLE INFORMATION**

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ITEMS RECEIVED

| Item No. | Control No.      | Model No.                   | Description                                       | Type       | Received  |
|----------|------------------|-----------------------------|---------------------------------------------------|------------|-----------|
| 1        | AH06132022110621 | ESSF1212D48429W31K<br>WF1EF | D SERIES, 1212<br>CHANNEL, 500LM/FT<br>WD LOUVERS | Production | 6/13/2022 |

TESTED SAMPLE CONFIGURATIONS

| Config No. | Tested Model No.        | Item Nos. Utilized |
|------------|-------------------------|--------------------|
| 1          | ESSF1212D48429W31KWF1EF | 1                  |

SAMPLE PHOTOS - TESTED CONFIGURATIONS



## SUMMARY

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### PRODUCT INFORMATION AND SUMMARY OF DATA

|                      |                                             |
|----------------------|---------------------------------------------|
| Product Model No.:   | ESSF1212D48429W31KWF1EF                     |
| Product Description: | D SERIES, 1212 CHANNEL, 500LM/FT WD LOUVERS |
| LED Model No.:       | AA6434-01                                   |
| Driver Model No.:    | NA                                          |
| Light Source:        | LED                                         |

| Criteria                          | Results         |                    |
|-----------------------------------|-----------------|--------------------|
|                                   | Goniophotometer | Integrating Sphere |
| Light Output (lumens)             | 603.1           | 634.0              |
| Input Power (W) @ 24 (Vdc)        | 21.06           | 21.04              |
| Lumen Efficacy (lm/W)             | 28.6            | 30.1               |
| Input Power Factor (I) @ 24 (Vdc) | NA              | NA                 |

| Criteria                         | Results |
|----------------------------------|---------|
| Input ATHD (%) @ 24 (Vdc)        | NA      |
| Correlated Color Temperature (K) | 2997    |
| Color Rendering Index - Ra (I)   | 98.1    |
| Color Rendering Index - R9 (I)   | 92.7    |
| Duv (I)                          | 0.0001  |
| Chromaticity Coordinate (x)      | 0.437   |
| Chromaticity Coordinate (y)      | 0.404   |
| Chromaticity Coordinate (u')     | 0.251   |
| Chromaticity Coordinate (v')     | 0.522   |

## TEST METHODS

### SEASONING IN SAMPLE ORIENTATION - LED PRODUCTS

No seasoning was performed in accordance with IESNA LM-79.

### INTEGRATING SPHERE TESTING

A spectroradiometer and integrating sphere were used to measure the spectral distribution for each EUT resulting in photometric and colorimetric data. Electrical measurements of the unit were measured using a power analyzer. Each EUT was operated at the rated input voltage of the system in its designated orientation. The ambient temperature was measured at a position inside the sphere and stabilization procedures to LM-79 were followed.

### TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

A Type C Mirror Goniophotometer system was used to measure the luminous intensity (candela) at each angle of distribution for the EUT. Electrical measurements of the unit were measured using a power analyzer. Each EUT was operated at the rated input voltage of the system in its designated orientation. The ambient temperature was measured at a position near the EUT at equal height and stabilization procedures to LM-79 were followed.

**TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING**

**REPORT NO. 104941221CHI-057**

| Test Configuration | Tested Model No.        | Pass/Fail/NA |
|--------------------|-------------------------|--------------|
| 1                  | ESSF1212D48429W31KWF1EF | NA           |

**PHOTOMETRIC AND ELECTRICAL MEASUREMENTS (25°C +/- 1°C)**

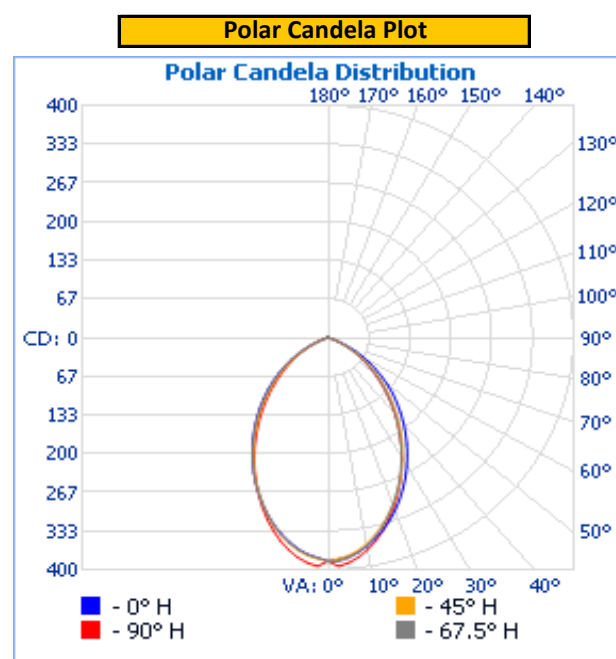
| Base Orientation | Input Voltage (Vdc) | Input Current (mA) | Input Power (W) | Input Power Factor ( ) |
|------------------|---------------------|--------------------|-----------------|------------------------|
| Up               | 24.00               | 877.6              | 21.06           | NA                     |

| Light Output (lm) | Lumen Efficacy (lm/W) |
|-------------------|-----------------------|
| 603.1             | 28.6                  |

**INTENSITY SUMMARY - CANDELA**

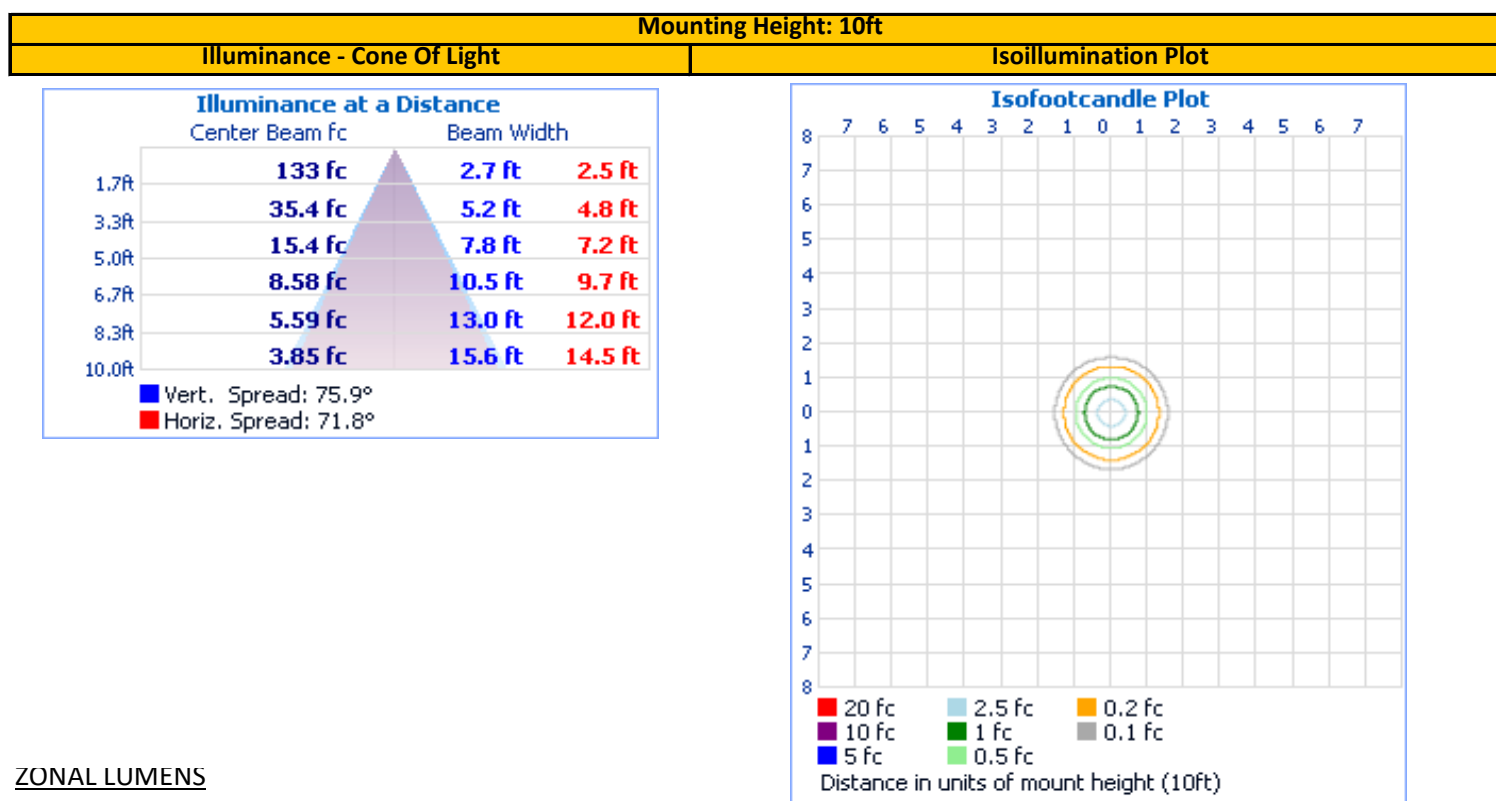
| Angle | 0     | 22.5  | 45    | 67.5  | 90    |
|-------|-------|-------|-------|-------|-------|
| 0     | 385.1 | 385.1 | 385.1 | 385.1 | 385.1 |
| 5     | 378.9 | 375.7 | 377.4 | 381.5 | 389.5 |
| 10    | 364.9 | 360.3 | 360.6 | 363.6 | 371.1 |
| 15    | 343.9 | 337.4 | 336.5 | 338.3 | 344.3 |
| 20    | 317.9 | 309.7 | 308.1 | 307.6 | 312.0 |
| 25    | 288.1 | 278.9 | 276.4 | 274.1 | 276.7 |
| 30    | 256.4 | 246.2 | 242.4 | 239.2 | 240.1 |
| 35    | 223.6 | 212.8 | 208.4 | 203.6 | 203.6 |
| 40    | 190.7 | 179.3 | 174.1 | 169.4 | 168.1 |
| 45    | 158.5 | 147.0 | 141.2 | 136.1 | 134.3 |
| 50    | 126.8 | 115.7 | 109.9 | 104.7 | 102.8 |
| 55    | 94.8  | 85.9  | 80.5  | 75.8  | 74.2  |
| 60    | 65.0  | 58.3  | 53.1  | 49.3  | 49.1  |
| 65    | 36.5  | 33.0  | 28.9  | 26.4  | 27.4  |
| 70    | 13.2  | 11.6  | 10.1  | 9.5   | 10.0  |
| 75    | 2.1   | 1.7   | 1.8   | 1.9   | 1.7   |
| 80    | 0.9   | 0.8   | 0.9   | 0.9   | 0.9   |
| 85    | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   |
| 90    | 0     | 0     | 0     | 0     | 0     |
| 95    | 0     | 0     | 0     | 0     | 0     |
| 100   | 0     | 0     | 0     | 0     | 0     |
| 105   | 0     | 0     | 0     | 0     | 0     |
| 110   | 0     | 0     | 0     | 0     | 0     |
| 115   | 0     | 0     | 0     | 0     | 0     |
| 120   | 0     | 0     | 0     | 0     | 0     |
| 125   | 0     | 0     | 0     | 0     | 0     |
| 130   | 0     | 0     | 0     | 0     | 0     |
| 135   | 0     | 0     | 0     | 0     | 0     |
| 140   | 0     | 0     | 0     | 0     | 0     |
| 145   | 0     | 0     | 0     | 0     | 0     |
| 150   | 0     | 0     | 0     | 0     | 0     |
| 155   | 0     | 0     | 0     | 0     | 0     |
| 160   | 0     | 0     | 0     | 0     | 0     |
| 165   | 0     | 0     | 0     | 0     | 0     |
| 170   | 0     | 0     | 0     | 0     | 0     |
| 175   | 0     | 0     | 0     | 0     | 0     |
| 180   | 0     | 0     | 0     | 0     | 0     |

Entire luminous intensity matrix found in .IES file



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# ILLUMINANCE SUMMARY



# ZONAL LUMENS

| Zonal Lumen Summary |        |           |         |        |       |
|---------------------|--------|-----------|---------|--------|-------|
| Zone                | Lumens | Luminaire | Zone    | Lumens | Total |
| 0-30                | 257.6  | 42.7%     | 0-10    | 35.6   | 5.9%  |
| 0-40                | 388.0  | 64.3%     | 10-20   | 94.8   | 15.7% |
| 0-60                | 569.7  | 94.5%     | 20-30   | 127.2  | 21.1% |
| 60-90               | 33.4   | 5.5%      | 30-40   | 130.3  | 21.6% |
| 70-100              | 3.6    | 0.6%      | 40-50   | 109.4  | 18.1% |
| 90-120              | 0.0    | 0.0%      | 50-60   | 72.4   | 12.0% |
| 0-90                | 603.1  | 100.0%    | 60-70   | 29.7   | 4.9%  |
| 90-180              | 0.0    | 0.0%      | 70-80   | 3.3    | 0.5%  |
| 0-180               | 603.1  | 100.0%    | 80-90   | 0.4    | 0.1%  |
|                     |        |           | 90-100  | 0.0    | 0.0%  |
|                     |        |           | 100-110 | 0.0    | 0.0%  |
|                     |        |           | 110-120 | 0.0    | 0.0%  |
|                     |        |           | 120-130 | 0.0    | 0.0%  |
|                     |        |           | 130-140 | 0.0    | 0.0%  |
|                     |        |           | 140-150 | 0.0    | 0.0%  |
|                     |        |           | 150-160 | 0.0    | 0.0%  |
|                     |        |           | 160-170 | 0.0    | 0.0%  |
|                     |        |           | 170-180 | 0.0    | 0.0%  |

# INTEGRATING SPHERE TESTING

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| Test Configuration | Tested Model No.        | Pass/Fail/NA |
|--------------------|-------------------------|--------------|
| 1                  | ESSF1212D48429W31KWF1EF | NA           |

## PHOTOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS (25°C +/- 1°C)

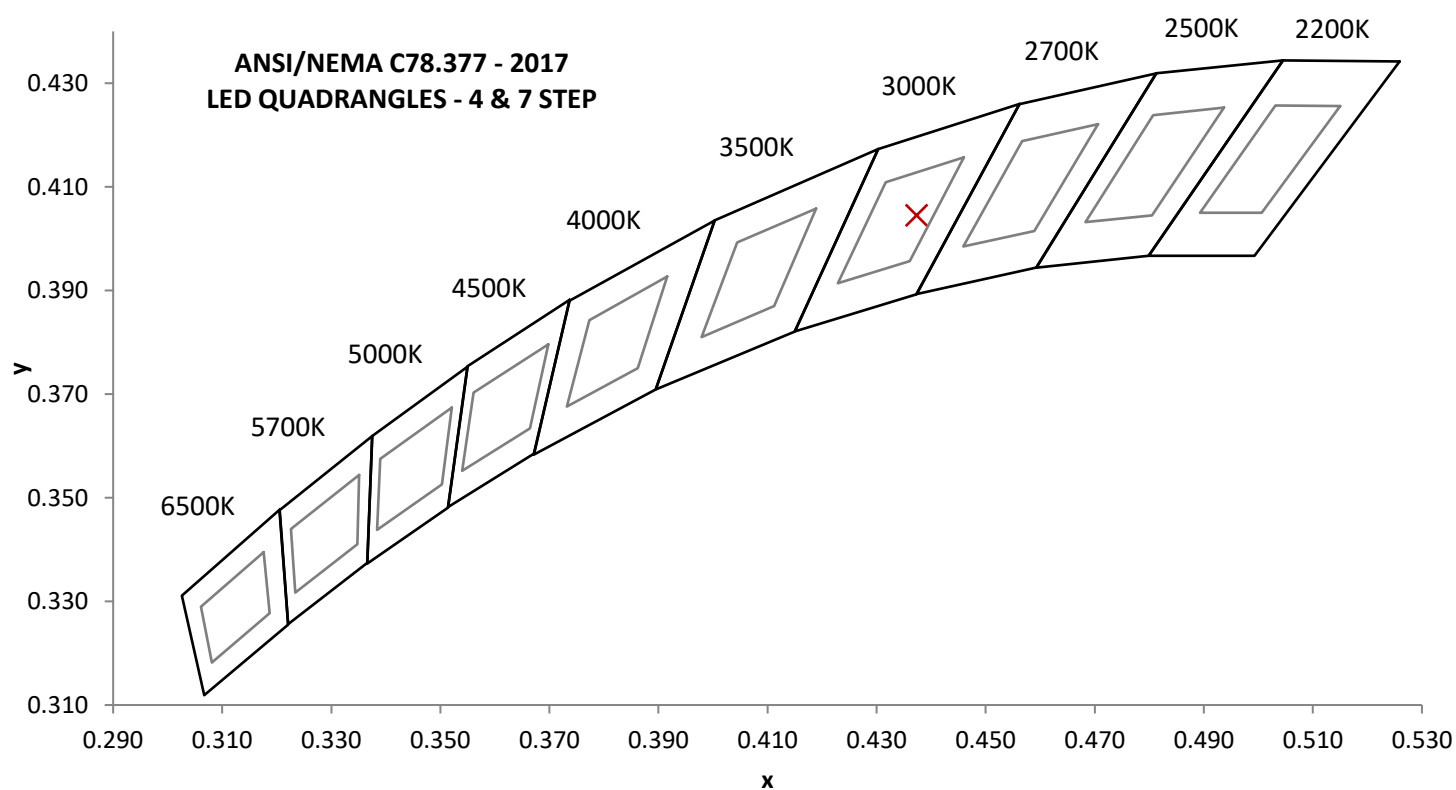
| Base Orientation |
|------------------|
| Up               |

| Input Voltage (Vdc) | Input Current (mA) | Input Power (W) | Input Power Factor ( ) | Input ATHD (%) |
|---------------------|--------------------|-----------------|------------------------|----------------|
| 23.99               | 877.0              | 21.04           | NA                     | NA             |

Measured at 23.99(Vdc)

| Light Output (lm) | Lumen Efficacy (lm/W) | CCT (K) | CRI - Ra ( ) | CRI - R9 ( ) |
|-------------------|-----------------------|---------|--------------|--------------|
| 634.0             | 30.1                  | 2997    | 98.1         | 92.7         |

| Duv ( ) | 1931 Chrom (x) | 1931 Chrom (y) | 1976 Chrom (u') | 1976 Chrom (v') |
|---------|----------------|----------------|-----------------|-----------------|
| 0.0001  | 0.437          | 0.404          | 0.251           | 0.522           |

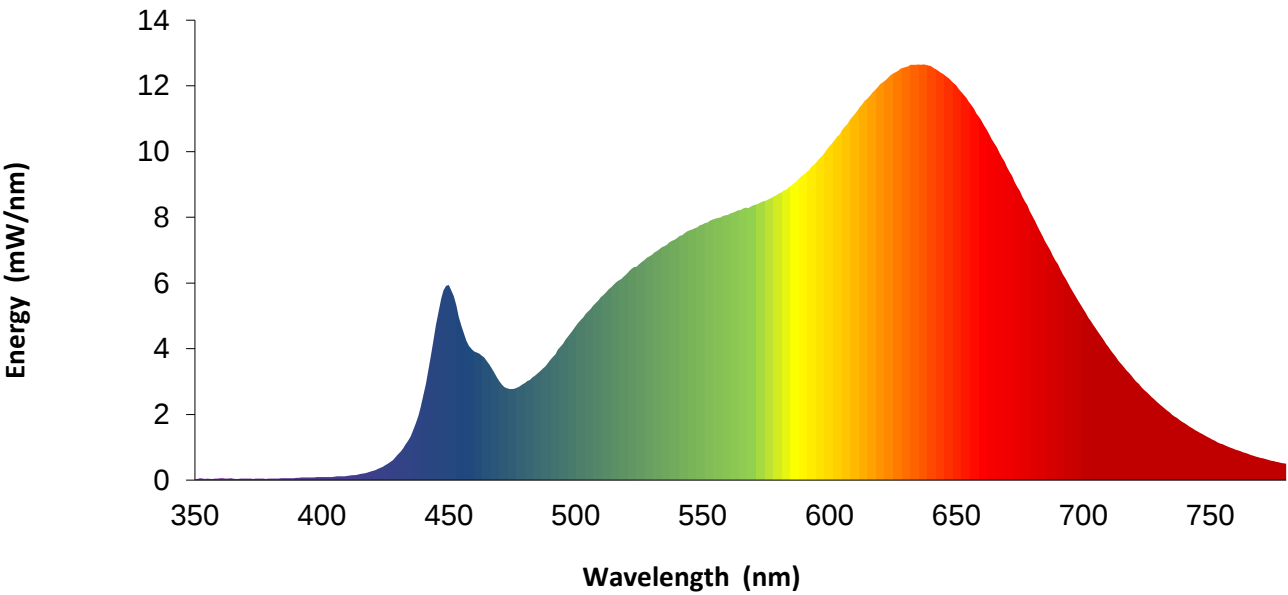


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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

| nm  | mW/nm |  | nm  | mW/nm |  | nm  | mW/nm |  | nm  | mW/nm |
|-----|-------|--|-----|-------|--|-----|-------|--|-----|-------|
| 350 | 0.0   |  | 460 | 3.9   |  | 570 | 8.4   |  | 680 | 8.0   |
| 355 | 0.0   |  | 465 | 3.6   |  | 575 | 8.5   |  | 685 | 7.3   |
| 360 | 0.1   |  | 470 | 3.0   |  | 580 | 8.7   |  | 690 | 6.6   |
| 365 | 0.0   |  | 475 | 2.8   |  | 585 | 9.0   |  | 695 | 5.9   |
| 370 | 0.0   |  | 480 | 3.0   |  | 590 | 9.3   |  | 700 | 5.2   |
| 375 | 0.0   |  | 485 | 3.2   |  | 595 | 9.7   |  | 705 | 4.6   |
| 380 | 0.0   |  | 490 | 3.7   |  | 600 | 10.2  |  | 710 | 4.0   |
| 385 | 0.1   |  | 495 | 4.2   |  | 605 | 10.6  |  | 715 | 3.5   |
| 390 | 0.1   |  | 500 | 4.7   |  | 610 | 11.1  |  | 720 | 3.1   |
| 395 | 0.1   |  | 505 | 5.1   |  | 615 | 11.6  |  | 725 | 2.7   |
| 400 | 0.1   |  | 510 | 5.6   |  | 620 | 12.1  |  | 730 | 2.3   |
| 405 | 0.1   |  | 515 | 5.9   |  | 625 | 12.4  |  | 735 | 2.0   |
| 410 | 0.1   |  | 520 | 6.3   |  | 630 | 12.6  |  | 740 | 1.7   |
| 415 | 0.2   |  | 525 | 6.6   |  | 635 | 12.7  |  | 745 | 1.5   |
| 420 | 0.3   |  | 530 | 6.9   |  | 640 | 12.6  |  | 750 | 1.3   |
| 425 | 0.5   |  | 535 | 7.1   |  | 645 | 12.4  |  | 755 | 1.1   |
| 430 | 0.8   |  | 540 | 7.4   |  | 650 | 12.0  |  | 760 | 0.9   |
| 435 | 1.3   |  | 545 | 7.6   |  | 655 | 11.5  |  | 765 | 0.8   |
| 440 | 2.6   |  | 550 | 7.8   |  | 660 | 10.9  |  | 770 | 0.7   |
| 445 | 4.7   |  | 555 | 8.0   |  | 665 | 10.3  |  | 775 | 0.6   |
| 450 | 5.9   |  | 560 | 8.1   |  | 670 | 9.5   |  | 780 | 0.5   |
| 455 | 4.7   |  | 565 | 8.2   |  | 675 | 8.8   |  | --- | ---   |

Without correction of sample absorption.



Portrayed color in graphic is estimated by wavelength (nm) and may not be exact - it is a visual representation only

**EQUIPMENT LIST**

**REPORT NO. 104941221CHI-057**

| #  | Equipment                        | Model No | Control No. | Last Cal  | Cal Due   |
|----|----------------------------------|----------|-------------|-----------|-----------|
| 1  | Yokogawa Power Meter             | WT310E   | CHI0664     | 3/30/2022 | 3/30/2023 |
| 2  | Omega Thermometer                | DPI8-C24 | 146920      | 10/4/2021 | 10/4/2022 |
| 3  | LSI High Speed Mirror Goniometer | 6440T    | 146928      | VBU       | VBU       |
| 4  | Newport Thermohygrometer         | iServer  | CHI0452     | 2/3/2022  | 2/3/2023  |
| 5  | Chroma Power Supply              | 61604    | CHI0371     | VBU       | VBU       |
| 8  | Newport Humidity Recorder        | iServer  | 146961      | 9/21/2021 | 9/21/2022 |
| 9  | Labsphere Spectroradiometer      | CDS2600  | CHI0539     | VBU       | VBU       |
| 10 | 3 Meter Sphere                   | SPR600   | CHI0088     | VBU       | VBU       |
| 12 | Sorenson DC Power Supply         | XFR150-8 | 146846      | VBU       | VBU       |
| 13 | Yokogawa Power Meter             | WT1600   | 146769      | 4/5/2022  | 4/5/2023  |
| 17 | Omega thermometer                | USB TC08 | EQAH002615  | 4/5/2022  | 4/5/2023  |

Note: Standard sources listed above are traceable to NIST: National Institute of Standards and Technology

**REVISION HISTORY**

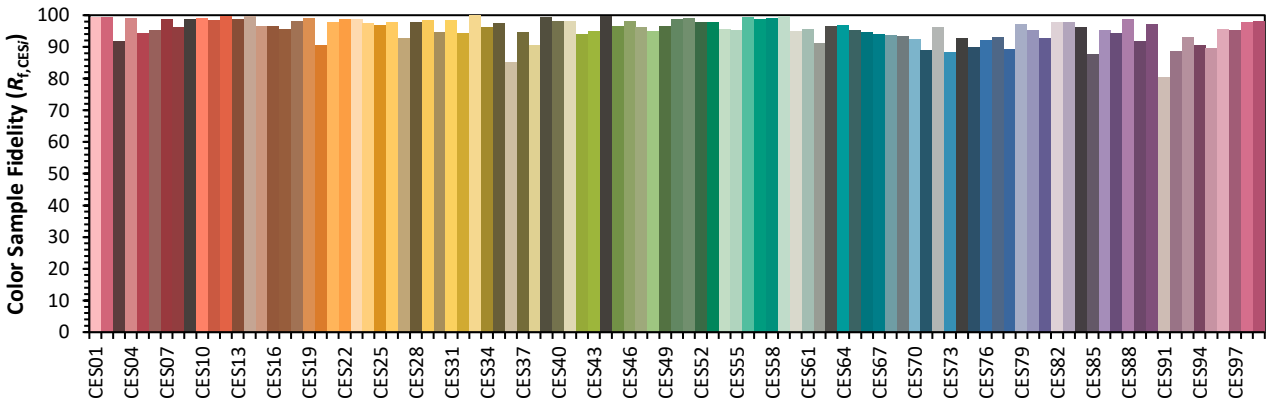
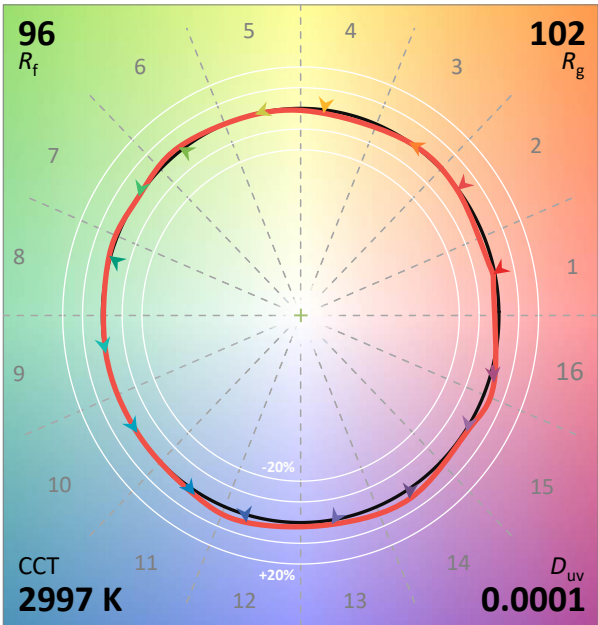
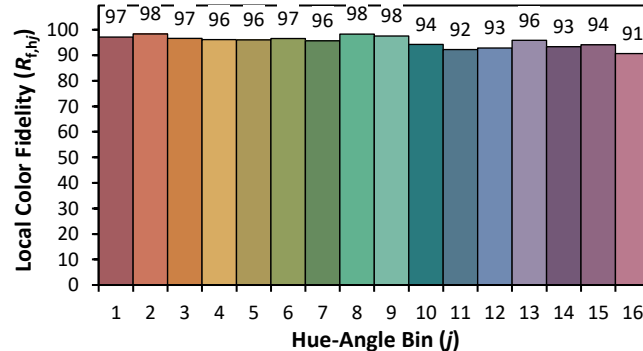
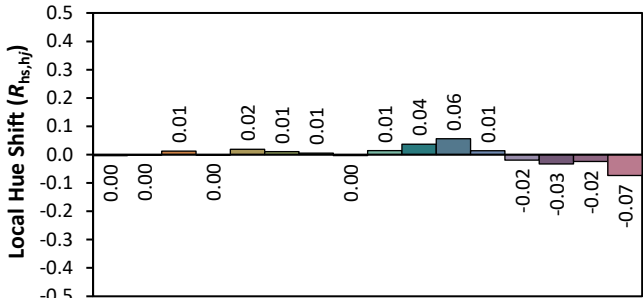
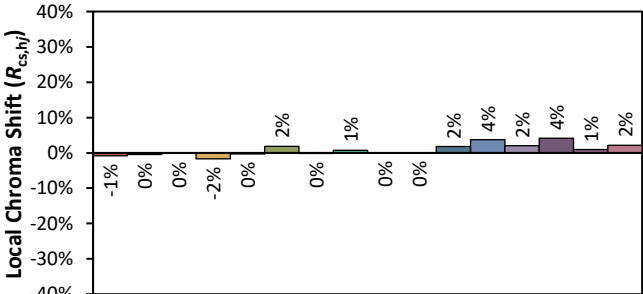
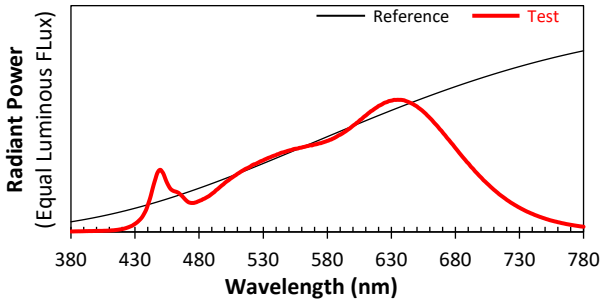
| #   | Revision Date | Updated By | Reviewed By | Description of Change |
|-----|---------------|------------|-------------|-----------------------|
| --- | None          | ---        | ---         | ---                   |
| --- | ---           | ---        | ---         | ---                   |
| --- | ---           | ---        | ---         | ---                   |

| Test Configuration | Tested Model No.        | Pass/Fail/NA |
|--------------------|-------------------------|--------------|
| 1                  | ESSF1212D48429W31KWF1EF | NA           |

ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD  
Date: 6/29/2022

Manufacturer: VISUAL COMFORT AND COMPANY  
Model: ESSF1212D48429W31KWF1EF



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

x 0.4373  
y 0.4045  
u' 0.2506  
v' 0.5216