

# VISUAL COMFORT AND COMPANY TEST REPORT

## SCOPE OF WORK

LED Performance Testing

## MODEL NUMBER

700WSDUE28\*\*-LED9\*\*

## PROJECT NUMBER

G105265097

## REPORT NUMBER

105265097CHI-016

## ISSUE DATE

1/4/2023

## REVISED DATE

None

## TEST DATES

12/30/2022 through 01/04/2023.

## DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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**REPORT NUMBER**

105265097CHI-016

**MODEL NUMBER(s)**

700WSDUE28\*\*-LED9\*\*

**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-01297671-0.

**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

In Charge of Testing:



T. Quigley  
Project Engineer  
Lighting Division

Reviewer:



Jeff Davis  
N.A. Technical Lead  
Lighting Division

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## SAMPLE INFORMATION

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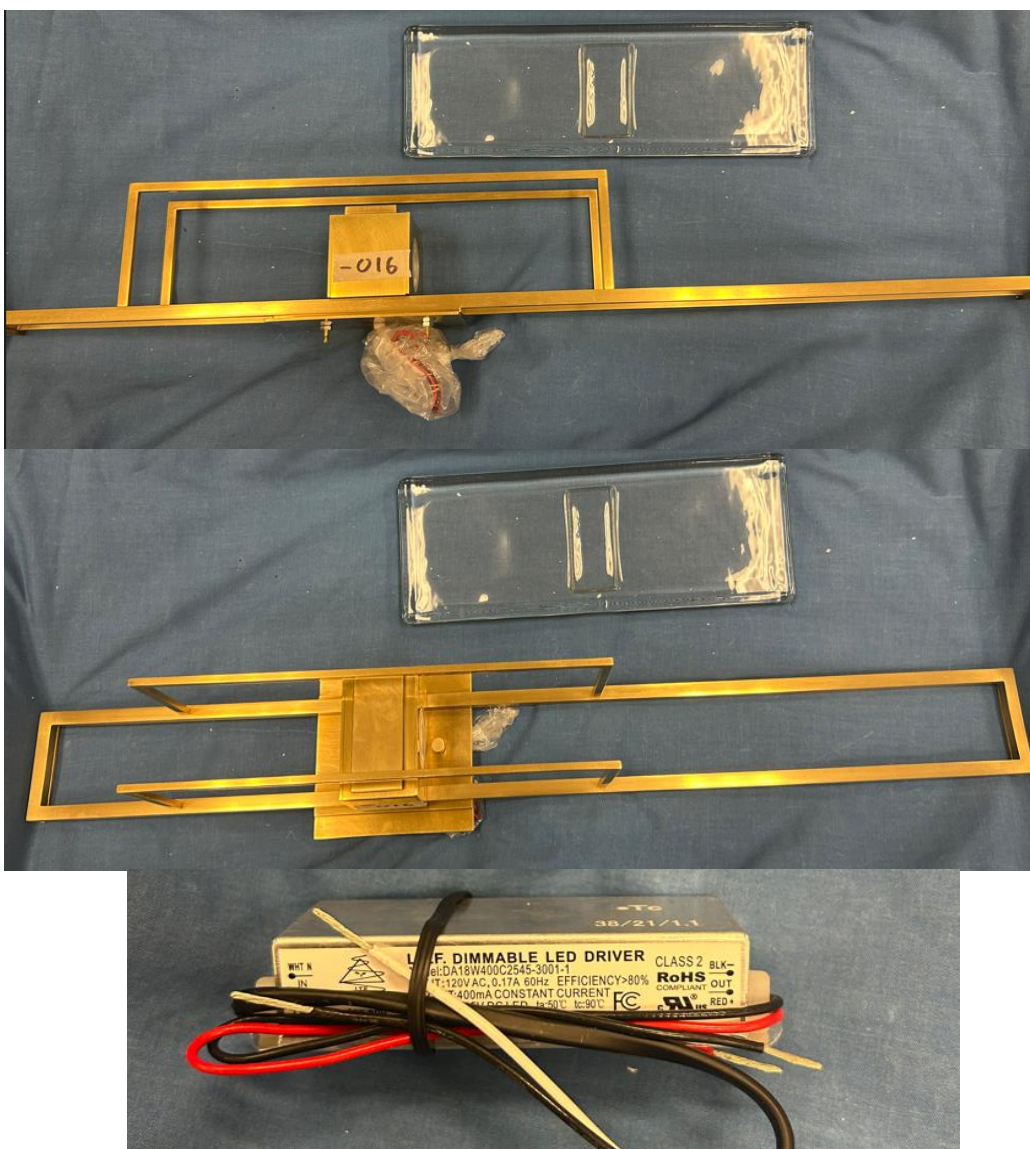
### ITEMS RECEIVED

| Item No. | Control No.          | Model No.           | Description              | Type       | Received   |
|----------|----------------------|---------------------|--------------------------|------------|------------|
| 1        | AH11232022041052-016 | 700WSDUE28**-LED9** | Duelle Large Wall Sconce | Production | 11/23/2022 |

### TESTED SAMPLE CONFIGURATIONS

| Config No. | Tested Model No.    | Item Nos. Utilized |
|------------|---------------------|--------------------|
| 1          | 700WSDUE28**-LED9** | 1                  |

### SAMPLE PHOTOS - TESTED CONFIGURATIONS



## SUMMARY

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### PRODUCT INFORMATION AND SUMMARY OF DATA

|                      |                                 |
|----------------------|---------------------------------|
| Product Model No.:   | 700WSDUE28**-LED9**             |
| Product Description: | Duelle Large Wall Sconce        |
| LED Model No.:       | BXRE-27G1000-C-82 (927, 2-step) |
| Driver Model No.:    | DA18W400C2545-3001-01           |
| Light Source:        | LED                             |

| Criteria                             | Results         |                    |
|--------------------------------------|-----------------|--------------------|
|                                      | Goniophotometer | Integrating Sphere |
| Light Output (lumens)                | 1129.9          | 1090.9             |
| Input Power (W) @ 120VAC (Vac)       | 14.95           | 15.00              |
| Lumen Efficacy (lm/W)                | 75.6            | 72.7               |
| Input Power Factor () @ 120VAC (Vac) | 0.978           | 0.994              |

| Criteria                         | Results |
|----------------------------------|---------|
| Input ATHD (%) @ 120VAC (Vac)    | 10.43   |
| Correlated Color Temperature (K) | 2655    |
| Color Rendering Index - Ra ()    | 90.8    |
| Color Rendering Index - R9 ()    | 65.3    |
| Duv ()                           | 0.0010  |
| Chromaticity Coordinate (x)      | 0.465   |
| Chromaticity Coordinate (y)      | 0.414   |
| Chromaticity Coordinate (u')     | 0.264   |
| Chromaticity Coordinate (v')     | 0.530   |

### 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**

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| Test Configuration | Tested Model No.    | Pass/Fail/NA |
|--------------------|---------------------|--------------|
| 1                  | 700WSDUE28**-LED9** | NA           |

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

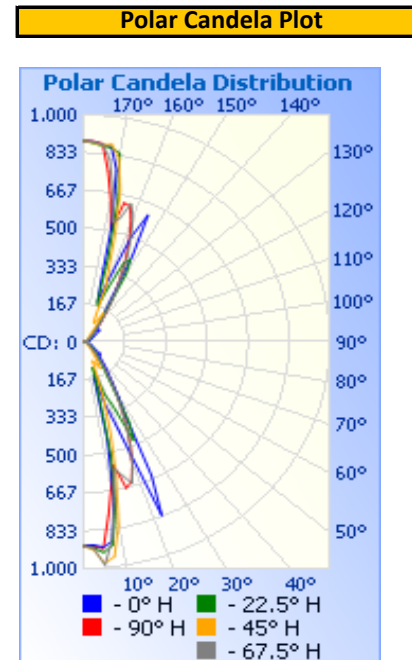
| Base Orientation | Input Voltage (Vac) | Input Current (mA) | Input Power (W) | Input Power Factor (I) |
|------------------|---------------------|--------------------|-----------------|------------------------|
| Up/Down          | 120.00              | 127.4              | 14.95           | 0.978                  |

| Light Output (lm) | Lumen Efficacy (lm/W) |
|-------------------|-----------------------|
| 1129.9            | 75.6                  |

**INTENSITY SUMMARY - CANDELA**

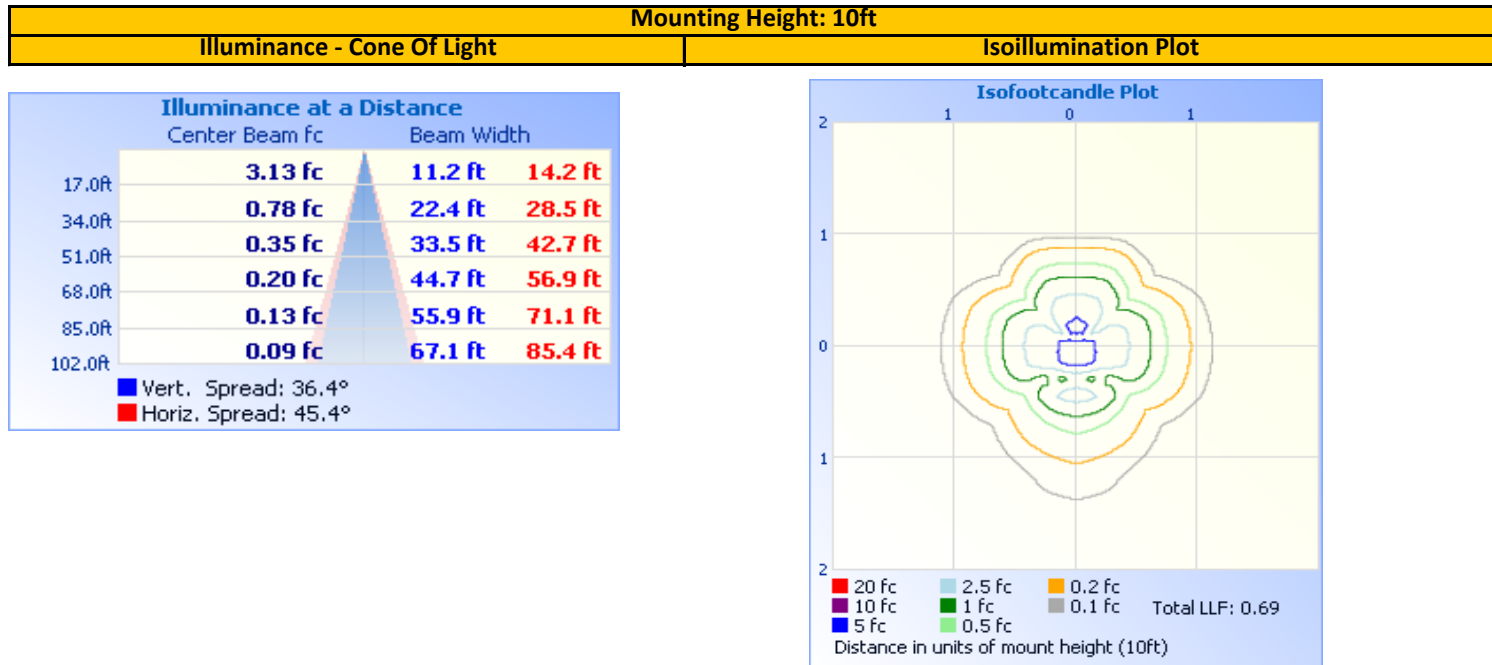
| Angle | 0   | 22.5 | 45  | 67.5 | 90  |
|-------|-----|------|-----|------|-----|
| 0     | 904 | 904  | 904 | 904  | 904 |
| 5     | 913 | 935  | 983 | 991  | 918 |
| 10    | 702 | 744  | 819 | 717  | 647 |
| 15    | 156 | 211  | 431 | 614  | 669 |
| 20    | 420 | 247  | 159 | 581  | 578 |
| 25    | 653 | 481  | 98  | 411  | 414 |
| 30    | 285 | 251  | 135 | 262  | 270 |
| 35    | 180 | 140  | 81  | 160  | 165 |
| 40    | 126 | 93   | 55  | 99   | 101 |
| 45    | 94  | 70   | 39  | 63   | 64  |
| 50    | 83  | 51   | 28  | 42   | 42  |
| 55    | 56  | 37   | 21  | 30   | 31  |
| 60    | 41  | 27   | 16  | 24   | 24  |
| 65    | 34  | 20   | 14  | 19   | 19  |
| 70    | 25  | 16   | 12  | 15   | 16  |
| 75    | 19  | 12   | 9   | 12   | 12  |
| 80    | 13  | 8    | 6   | 8    | 8   |
| 85    | 7   | 4    | 4   | 4    | 3   |
| 90    | 5   | 3    | 3   | 2    | 2   |
| 95    | 8   | 5    | 4   | 4    | 3   |
| 100   | 15  | 9    | 6   | 8    | 8   |
| 105   | 22  | 13   | 10  | 11   | 11  |
| 110   | 27  | 18   | 12  | 15   | 14  |
| 115   | 35  | 23   | 13  | 19   | 18  |
| 120   | 45  | 30   | 16  | 22   | 22  |
| 125   | 62  | 38   | 20  | 29   | 29  |
| 130   | 83  | 45   | 25  | 40   | 40  |
| 135   | 75  | 58   | 34  | 60   | 59  |
| 140   | 89  | 76   | 48  | 96   | 95  |
| 145   | 134 | 132  | 94  | 159  | 157 |
| 150   | 241 | 345  | 118 | 269  | 261 |
| 155   | 618 | 386  | 97  | 420  | 403 |
| 160   | 280 | 170  | 267 | 584  | 562 |
| 165   | 264 | 382  | 495 | 566  | 637 |
| 170   | 770 | 847  | 825 | 679  | 635 |
| 175   | 877 | 871  | 874 | 878  | 881 |
| 180   | 890 | 890  | 890 | 890  | 890 |

Entire luminous intensity matrix found in .IES file



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ILLUMINANCE SUMMARY



ZONAL LUMENS

| Zonal Lumen Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |        |         |        |           |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|---------|--------|-----------|------|-------|-------|------|-------|-------|------|-------|-------|-------|------|------|--------|------|------|--------|------|------|------|-------|-------|--------|-------|-------|-------|---------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|------|--------|-------|------|--------|-------|------|------|------|--------|-----|------|-------|-------|-------|---------|-----|------|-------|-------|-------|---------|------|------|-------|------|------|---------|------|------|-------|------|------|---------|------|------|-------|------|------|---------|------|------|-------|------|------|---------|-------|-------|-------|-----|------|---------|-------|-------|-------|-----|------|---------|------|------|
| <table><tr><th>Zone</th><th>Lumens</th><th>Luminaire</th></tr><tr><td>0-30</td><td>387.7</td><td>34.3%</td></tr><tr><td>0-40</td><td>481.4</td><td>42.6%</td></tr><tr><td>0-60</td><td>549.0</td><td>48.6%</td></tr><tr><td>60-90</td><td>28.4</td><td>2.5%</td></tr><tr><td>70-100</td><td>17.5</td><td>1.5%</td></tr><tr><td>90-120</td><td>28.1</td><td>2.5%</td></tr><tr><td>0-90</td><td>577.3</td><td>51.1%</td></tr><tr><td>90-180</td><td>552.6</td><td>48.9%</td></tr><tr><td>0-180</td><td>1,129.9</td><td>100.0%</td></tr></table> |         |        | Zone    | Lumens | Luminaire | 0-30 | 387.7 | 34.3% | 0-40 | 481.4 | 42.6% | 0-60 | 549.0 | 48.6% | 60-90 | 28.4 | 2.5% | 70-100 | 17.5 | 1.5% | 90-120 | 28.1 | 2.5% | 0-90 | 577.3 | 51.1% | 90-180 | 552.6 | 48.9% | 0-180 | 1,129.9 | 100.0% | <table><tr><th>Zone</th><th>Lumens</th><th>Total</th><th>Zone</th><th>Lumens</th><th>Total</th></tr><tr><td>0-10</td><td>75.7</td><td>6.7%</td><td>90-100</td><td>4.0</td><td>0.4%</td></tr><tr><td>10-20</td><td>146.0</td><td>12.9%</td><td>100-110</td><td>9.5</td><td>0.8%</td></tr><tr><td>20-30</td><td>166.0</td><td>14.7%</td><td>110-120</td><td>14.7</td><td>1.3%</td></tr><tr><td>30-40</td><td>93.7</td><td>8.3%</td><td>120-130</td><td>22.6</td><td>2.0%</td></tr><tr><td>40-50</td><td>44.0</td><td>3.9%</td><td>130-140</td><td>39.4</td><td>3.5%</td></tr><tr><td>50-60</td><td>23.6</td><td>2.1%</td><td>140-150</td><td>89.1</td><td>7.9%</td></tr><tr><td>60-70</td><td>14.9</td><td>1.3%</td><td>150-160</td><td>156.4</td><td>13.8%</td></tr><tr><td>70-80</td><td>9.6</td><td>0.8%</td><td>160-170</td><td>146.8</td><td>13.0%</td></tr><tr><td>80-90</td><td>3.9</td><td>0.3%</td><td>170-180</td><td>70.2</td><td>6.2%</td></tr></table> |  |  |  |  |  |  | Zone | Lumens | Total | Zone | Lumens | Total | 0-10 | 75.7 | 6.7% | 90-100 | 4.0 | 0.4% | 10-20 | 146.0 | 12.9% | 100-110 | 9.5 | 0.8% | 20-30 | 166.0 | 14.7% | 110-120 | 14.7 | 1.3% | 30-40 | 93.7 | 8.3% | 120-130 | 22.6 | 2.0% | 40-50 | 44.0 | 3.9% | 130-140 | 39.4 | 3.5% | 50-60 | 23.6 | 2.1% | 140-150 | 89.1 | 7.9% | 60-70 | 14.9 | 1.3% | 150-160 | 156.4 | 13.8% | 70-80 | 9.6 | 0.8% | 160-170 | 146.8 | 13.0% | 80-90 | 3.9 | 0.3% | 170-180 | 70.2 | 6.2% |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |        | Zone    | Lumens | Luminaire |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |        | 0-30    | 387.7  | 34.3%     |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |        | 0-40    | 481.4  | 42.6%     |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |        | 0-60    | 549.0  | 48.6%     |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |        | 60-90   | 28.4   | 2.5%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |        | 70-100  | 17.5   | 1.5%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |        | 90-120  | 28.1   | 2.5%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |        | 0-90    | 577.3  | 51.1%     |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |        | 90-180  | 552.6  | 48.9%     |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 0-180                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1,129.9 | 100.0% |         |        |           |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| Zone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Lumens  | Total  | Zone    | Lumens | Total     |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 0-10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 75.7    | 6.7%   | 90-100  | 4.0    | 0.4%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 10-20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 146.0   | 12.9%  | 100-110 | 9.5    | 0.8%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 20-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 166.0   | 14.7%  | 110-120 | 14.7   | 1.3%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 30-40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 93.7    | 8.3%   | 120-130 | 22.6   | 2.0%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 40-50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 44.0    | 3.9%   | 130-140 | 39.4   | 3.5%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 50-60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 23.6    | 2.1%   | 140-150 | 89.1   | 7.9%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 60-70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 14.9    | 1.3%   | 150-160 | 156.4  | 13.8%     |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 70-80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 9.6     | 0.8%   | 160-170 | 146.8  | 13.0%     |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |
| 80-90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3.9     | 0.3%   | 170-180 | 70.2   | 6.2%      |      |       |       |      |       |       |      |       |       |       |      |      |        |      |      |        |      |      |      |       |       |        |       |       |       |         |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |      |        |       |      |        |       |      |      |      |        |     |      |       |       |       |         |     |      |       |       |       |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |      |      |       |      |      |         |       |       |       |     |      |         |       |       |       |     |      |         |      |      |

**INTEGRATING SPHERE TESTING**

**REPORT NO. 105265097CHI-016**

| Test Configuration | Tested Model No.    | Pass/Fail/NA |
|--------------------|---------------------|--------------|
| 1                  | 700WSDUE28**-LED9** | NA           |

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

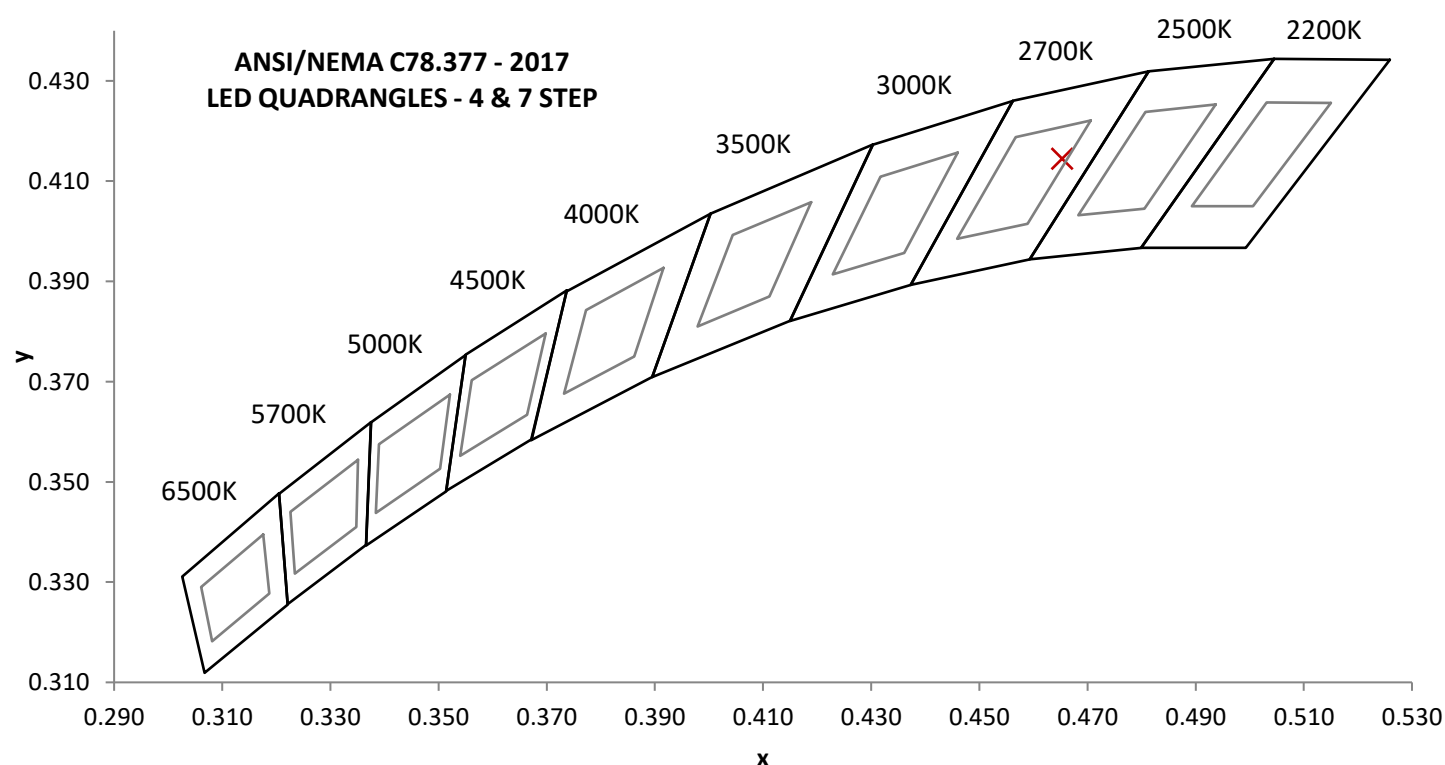
| Base Orientation |
|------------------|
| Up/Down          |

| Input Voltage (Vac) | Input Current (mA) | Input Power (W) | Input Power Factor (I) | Input ATHD (%) |
|---------------------|--------------------|-----------------|------------------------|----------------|
| 119.99              | 125.8              | 15.00           | 0.994                  | 10.43          |

Measured at 119.99(Vac)

| Light Output (lm) | Lumen Efficacy (lm/W) | CCT (K) | CRI - Ra (I) | CRI - R9 (I) |
|-------------------|-----------------------|---------|--------------|--------------|
| 1090.9            | 72.7                  | 2655    | 90.8         | 65.3         |

| Duv (I) | 1931 Chrom (x) | 1931 Chrom (y) | 1976 Chrom (u') | 1976 Chrom (v') |
|---------|----------------|----------------|-----------------|-----------------|
| 0.0010  | 0.465          | 0.414          | 0.264           | 0.530           |

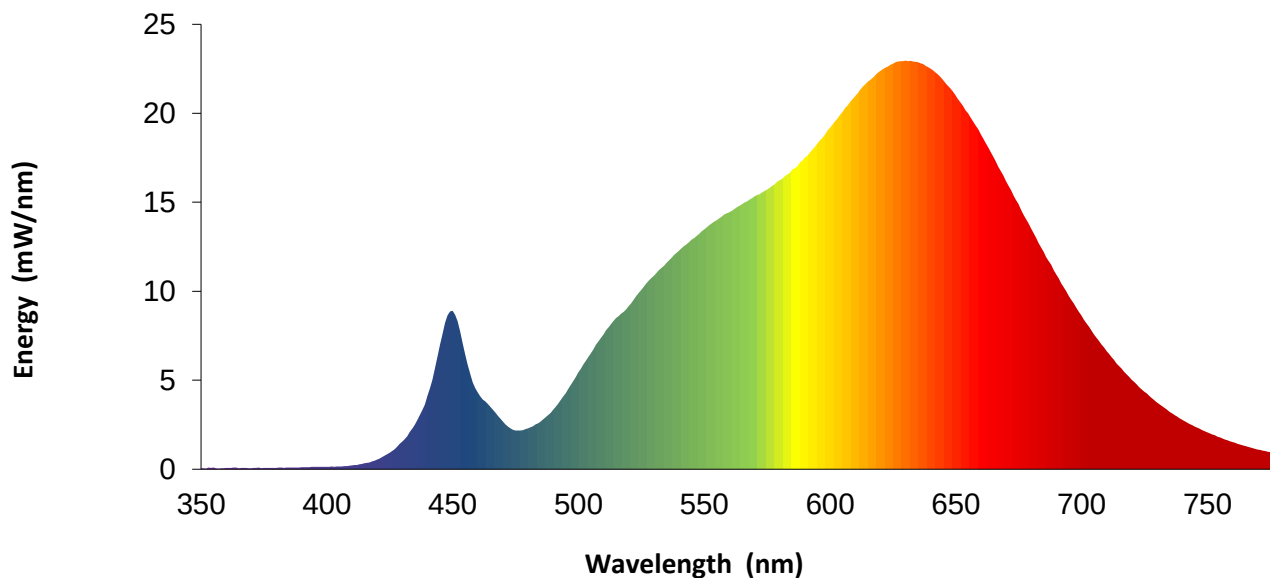


REPORT NO. 105265097CHI-016

SPECTRAL DISTRIBUTION OVER WAVELENGTHS

| nm  | mW/nm |  | nm  | mW/nm |  | nm  | mW/nm |  | nm  | mW/nm |
|-----|-------|--|-----|-------|--|-----|-------|--|-----|-------|
| 350 | 0.1   |  | 460 | 4.3   |  | 570 | 15.3  |  | 680 | 13.5  |
| 355 | 0.1   |  | 465 | 3.5   |  | 575 | 15.7  |  | 685 | 12.2  |
| 360 | 0.1   |  | 470 | 2.7   |  | 580 | 16.2  |  | 690 | 10.9  |
| 365 | 0.1   |  | 475 | 2.2   |  | 585 | 16.8  |  | 695 | 9.7   |
| 370 | 0.1   |  | 480 | 2.3   |  | 590 | 17.5  |  | 700 | 8.6   |
| 375 | 0.1   |  | 485 | 2.7   |  | 595 | 18.3  |  | 705 | 7.6   |
| 380 | 0.1   |  | 490 | 3.3   |  | 600 | 19.2  |  | 710 | 6.6   |
| 385 | 0.1   |  | 495 | 4.3   |  | 605 | 20.1  |  | 715 | 5.8   |
| 390 | 0.1   |  | 500 | 5.4   |  | 610 | 21.0  |  | 720 | 5.0   |
| 395 | 0.1   |  | 505 | 6.5   |  | 615 | 21.8  |  | 725 | 4.4   |
| 400 | 0.1   |  | 510 | 7.6   |  | 620 | 22.4  |  | 730 | 3.8   |
| 405 | 0.2   |  | 515 | 8.5   |  | 625 | 22.8  |  | 735 | 3.2   |
| 410 | 0.2   |  | 520 | 9.2   |  | 630 | 23.0  |  | 740 | 2.8   |
| 415 | 0.3   |  | 525 | 10.1  |  | 635 | 22.9  |  | 745 | 2.4   |
| 420 | 0.5   |  | 530 | 10.9  |  | 640 | 22.5  |  | 750 | 2.1   |
| 425 | 0.9   |  | 535 | 11.6  |  | 645 | 21.9  |  | 755 | 1.8   |
| 430 | 1.6   |  | 540 | 12.3  |  | 650 | 21.0  |  | 760 | 1.5   |
| 435 | 2.5   |  | 545 | 12.9  |  | 655 | 20.0  |  | 765 | 1.3   |
| 440 | 4.1   |  | 550 | 13.5  |  | 660 | 18.8  |  | 770 | 1.1   |
| 445 | 7.0   |  | 555 | 14.0  |  | 665 | 17.6  |  | 775 | 1.0   |
| 450 | 8.9   |  | 560 | 14.4  |  | 670 | 16.2  |  | 780 | 0.8   |
| 455 | 6.5   |  | 565 | 14.9  |  | 675 | 14.9  |  | --- | ---   |

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. 105265097CHI-016

| #  | 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      | 10/4/2022 | 10/4/2023 |
| 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       |
| 6  | Sorenson DC Power Supply         | XHR 150-7 | 146922      | VBU       | VBU       |
| 7  | Multi Channel Spectroradiometer  | OL770     | CHI0092     | VBU       | VBU       |
| 8  | Newport Humidity Recorder        | iServer   | 146379      | 5/11/2022 | 5/11/2023 |
| 9  | Labsphere Spectroradiometer      | CDS2600   | CHI0539     | VBU       | VBU       |
| 10 | 3 Meter Sphere                   | SPR600    | CHI0088     | VBU       | VBU       |
| 11 | Elgar AC Power Supply            | CW1251    | 146112      | 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  |
| 26 | Xitron Power Analyzer            | XT-2640   | CHI0611     | 7/6/2022  | 7/6/2023  |

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

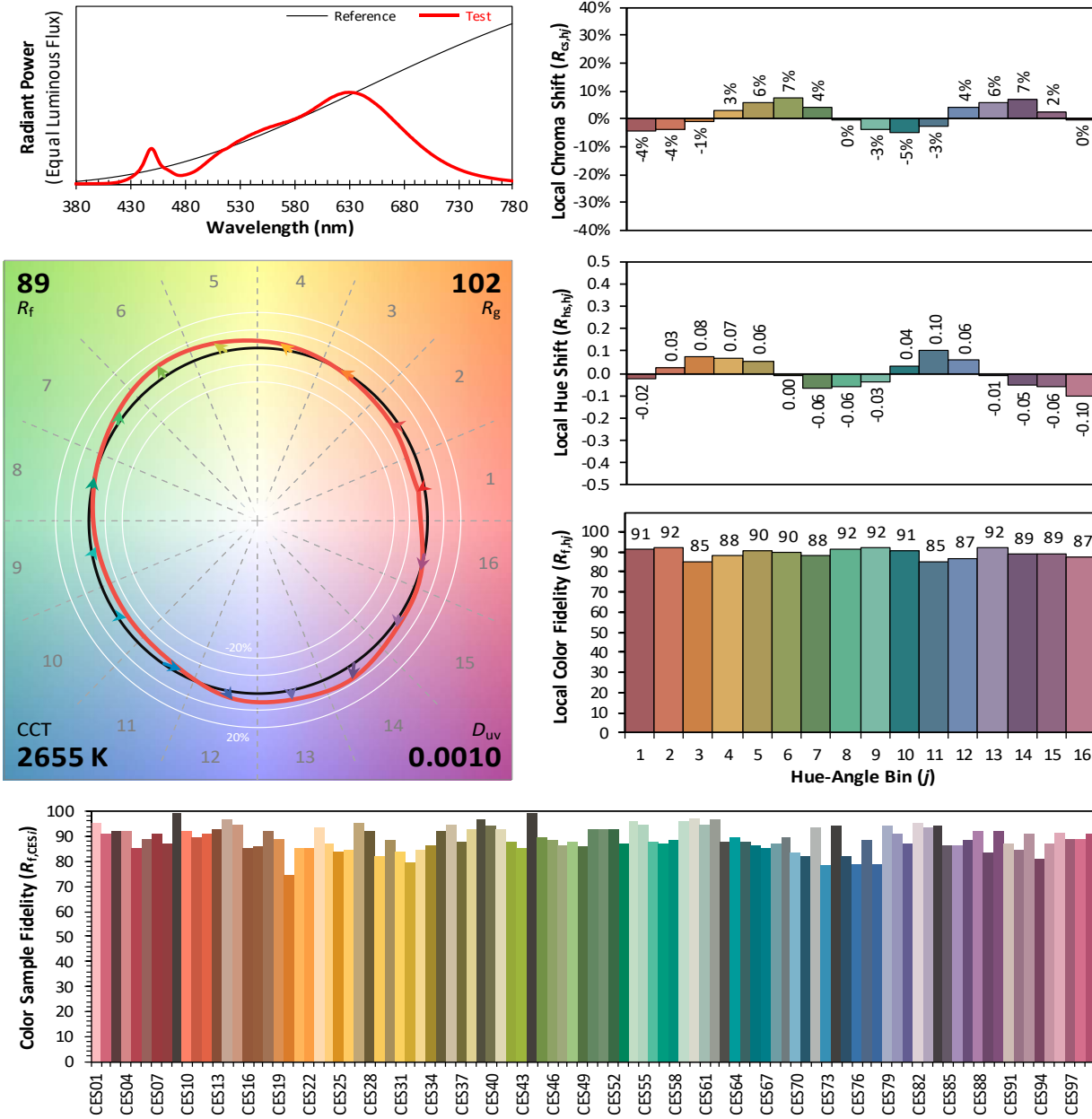
## REVISION HISTORY

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

| Test Configuration | Tested Model No.    | Pass/Fail/NA |
|--------------------|---------------------|--------------|
| 1                  | 700WSDUE28**-LED9** | NA           |

ANSI/IES TM-30-18 Color Rendition Report

|         |          |               |                            |
|---------|----------|---------------|----------------------------|
| Source: | User SPD | Manufacturer: | VISUAL COMFORT AND COMPANY |
| Date:   | 1/4/2023 | Model:        | 700WSDUE28**-LED9**        |



|                                                                                   |      |        |                                                 |
|-----------------------------------------------------------------------------------|------|--------|-------------------------------------------------|
| Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information. | x    | 0.4653 | CIE 13.3-1995 (CRI)<br><br>$R_a$ 91<br>$R_g$ 65 |
|                                                                                   | y    | 0.4145 |                                                 |
|                                                                                   | $u'$ | 0.2643 |                                                 |
|                                                                                   | $v'$ | 0.5296 |                                                 |
|                                                                                   |      |        |                                                 |