

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: INVUE

Report Number: P673719

Luminaire Tested: **CCP-SA1D-760-U-SL2-HSS**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P673719  
Test Lab: INNOVATION CENTER(G1)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA1D-760-U-SL2-HSS  
Description: INVUE CLEAR CURVE POLE MOUNT Light Square Luminaire @800mA w/ SL2  
distribution lens and House Side Shield  
Light Source: (16) 5700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4587.4 lumens  
Efficiency: N/A  
Efficacy: 104.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

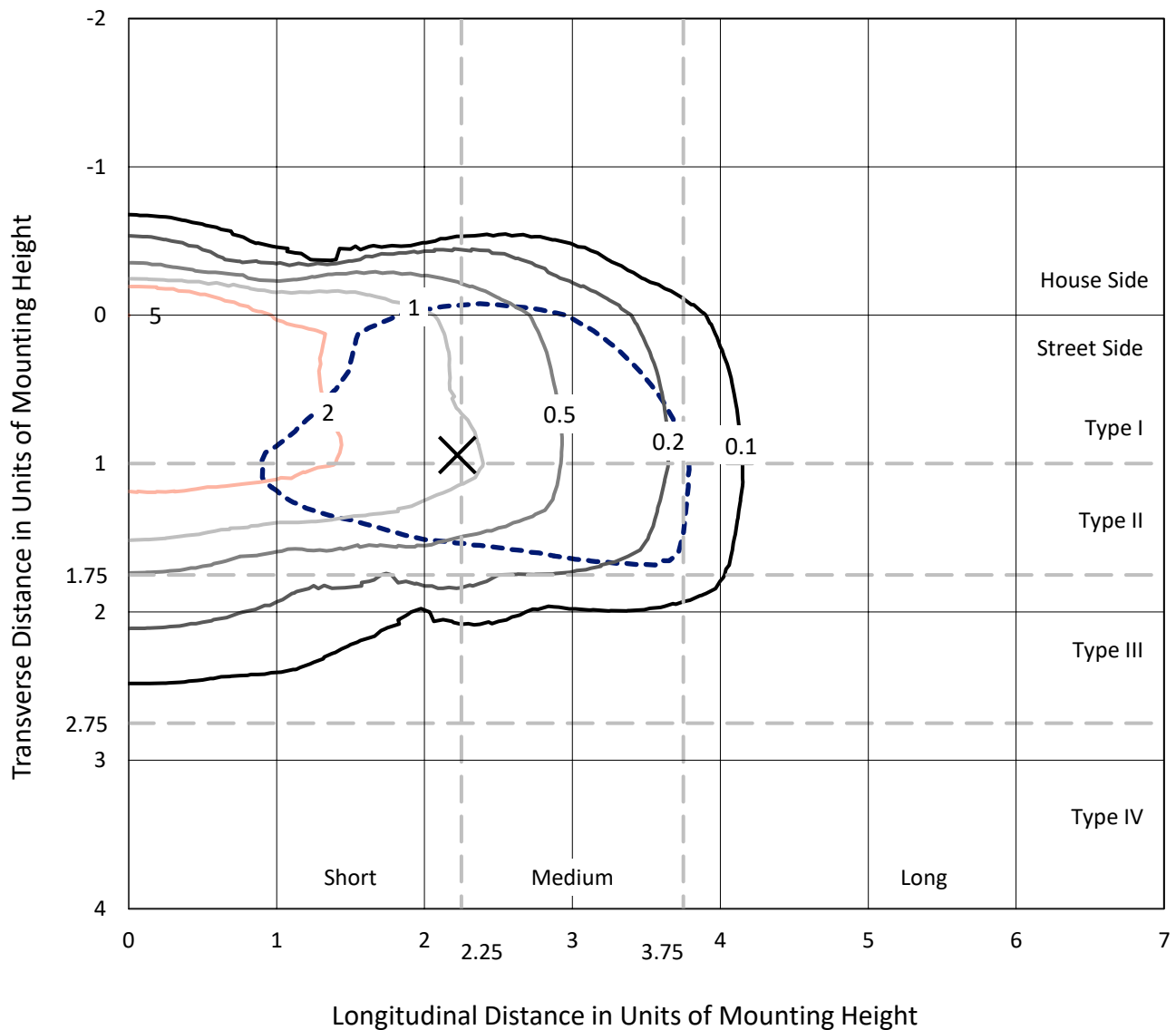
Input Watts (W): 44  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P673719

CATALOG NUMBER: CCP-SA1D-760-U-SL2-HSS

## Iso-Footcandle Lines of Horizontal Illumination

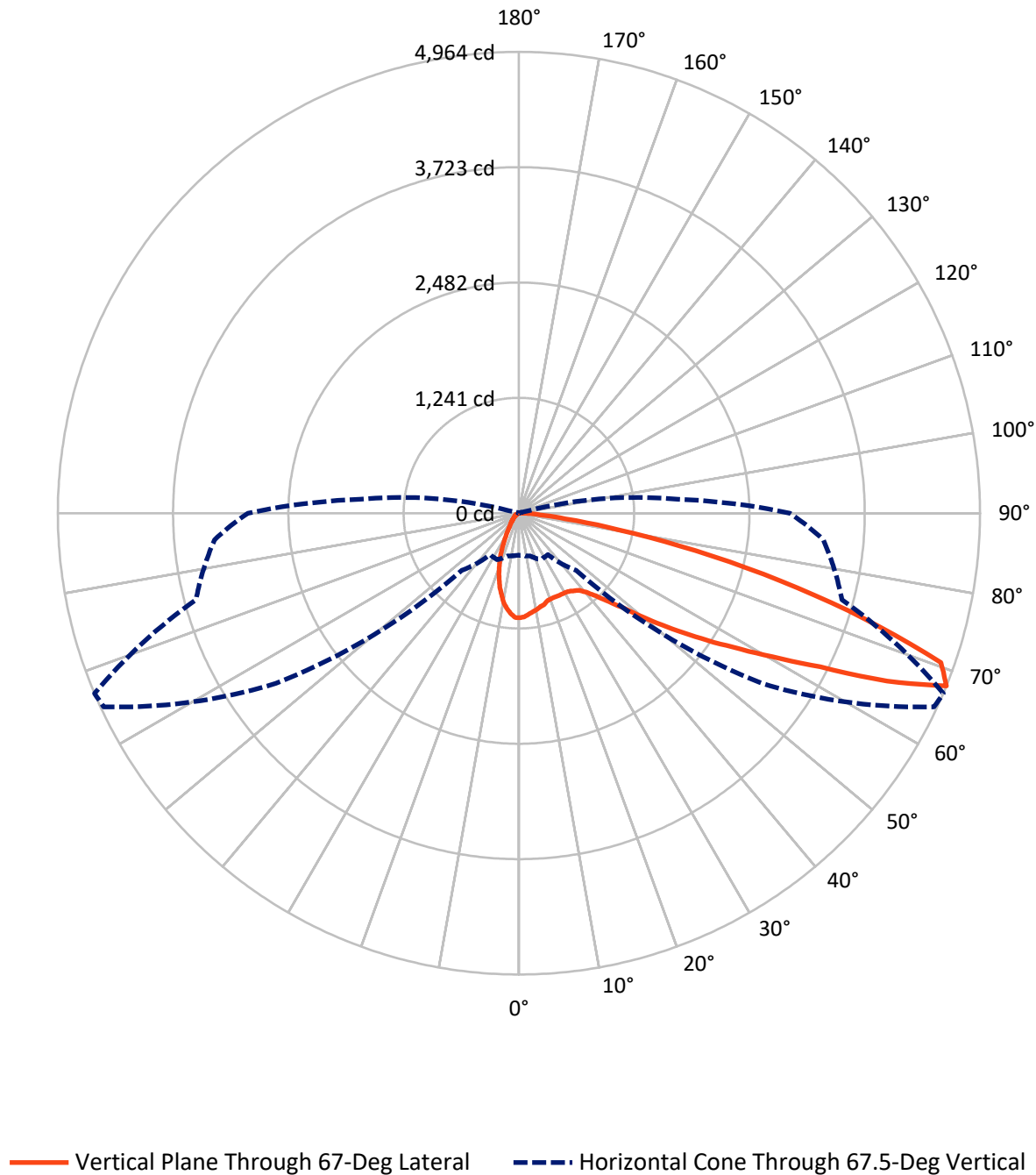
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 5 fc  
 Type II - Short - N/A

REPORT NUMBER: P673719  
CATALOG NUMBER: CCP-SA1D-760-U-SL2-HSS

## Luminous Intensity Polar Plot



REPORT NUMBER: P673719

CATALOG NUMBER: CCP-SA1D-760-U-SL2-HSS

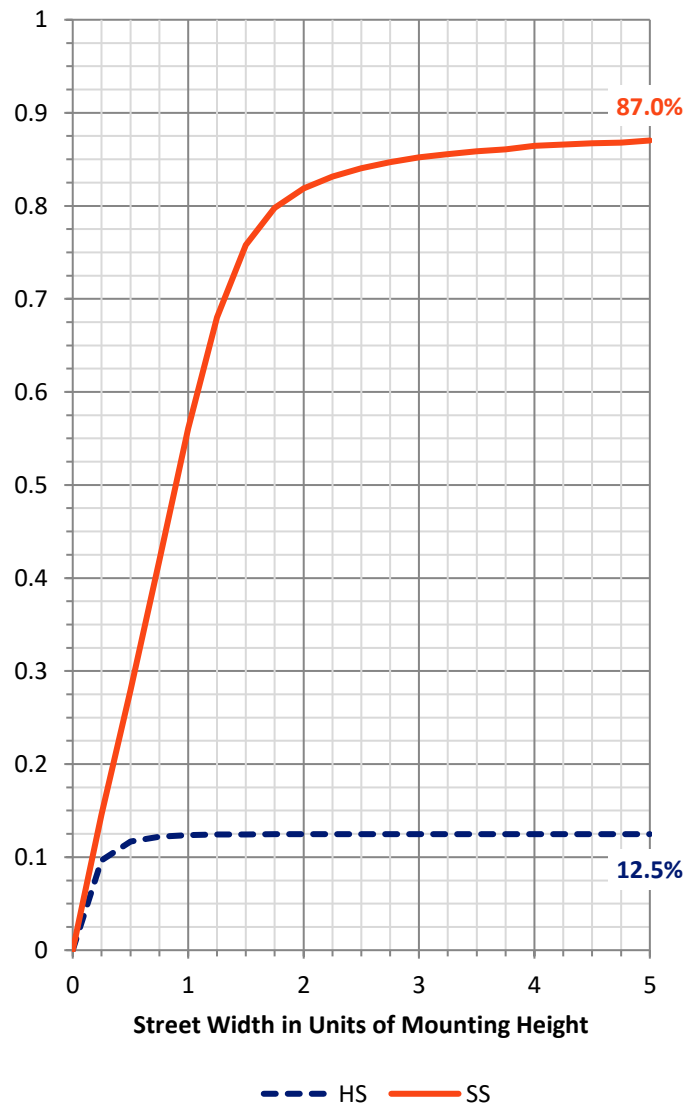
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 577.3    | 0.0    | 577.3  |
|                    | % Fixture | 12.6     | 0.0    | 12.6   |
| <b>Street Side</b> | Lumens    | 4010.0   | 0.0    | 4010.0 |
|                    | % Fixture | 87.4     | 0.0    | 87.4   |
| <b>Total</b>       | Lumens    | 4587.4   | 0.0    | 4587.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 94.8   | 2.1       |
| 10°-20°   | 210.6  | 4.6       |
| 20°-30°   | 299.5  | 6.5       |
| 30°-40°   | 436.1  | 9.5       |
| 40°-50°   | 674.9  | 14.7      |
| 50°-60°   | 1035.8 | 22.6      |
| 60°-70°   | 1122.8 | 24.5      |
| 70°-80°   | 633.4  | 13.8      |
| 80°-90°   | 79.6   | 1.7       |
| 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       |
| 0°-90°    | 4587.4 | 100.0     |
| 0°-180°   | 4587.4 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P673719

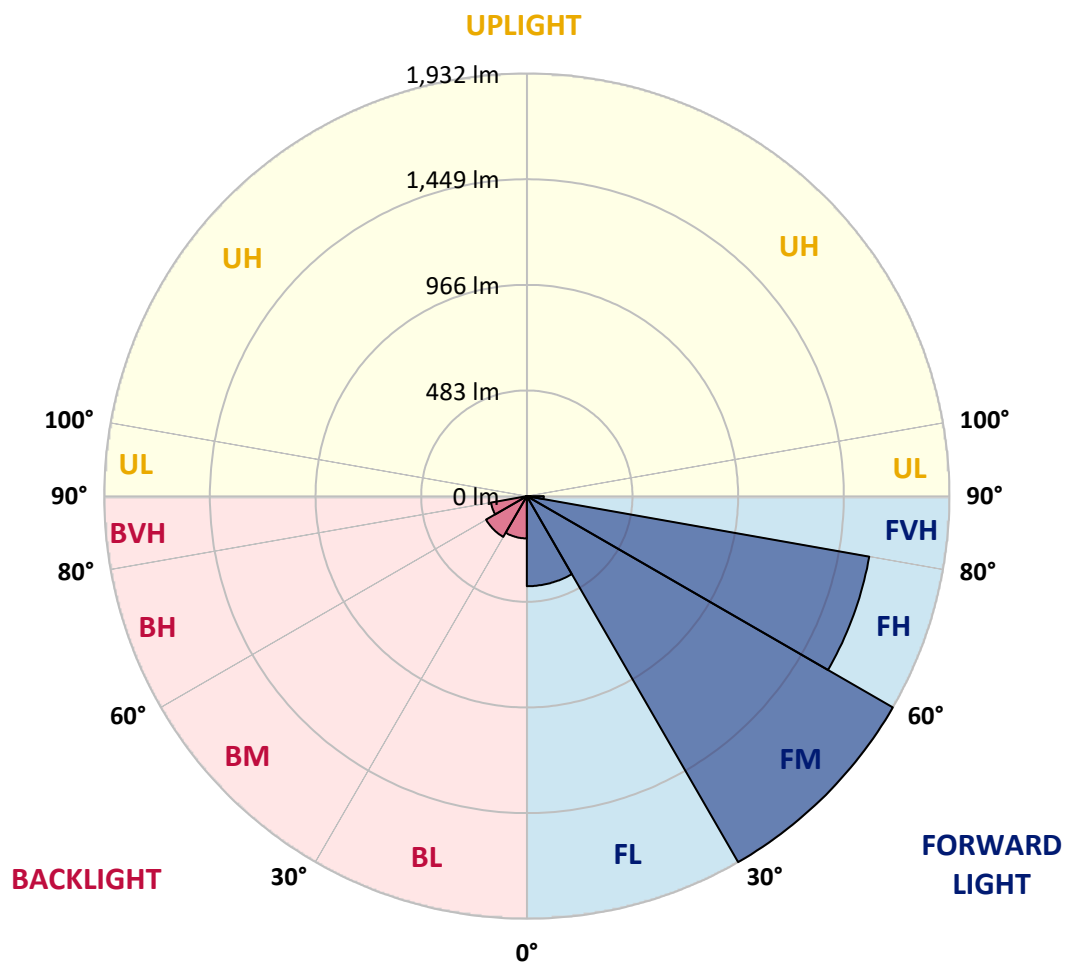
CATALOG NUMBER: CCP-SA1D-760-U-SL2-HSS

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 411.6  | 9.0       |                         |      |         |
| FM   | (30°-60°)   | 1931.7 | 42.1      |                         |      |         |
| FH   | (60°-80°)   | 1589.4 | 34.6      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 77.3   | 1.7       |                         |      | G1/100  |
| BL   | (0°-30°)    | 193.3  | 4.2       | B1/500                  |      |         |
| BM   | (30°-60°)   | 215.0  | 4.7       | B0/220                  |      |         |
| BH   | (60°-80°)   | 166.8  | 3.6       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 2.3    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type II Short



REPORT NUMBER: P673719

CATALOG NUMBER: CCP-SA1D-760-U-SL2-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 67°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 |
| 2.5°  | 1076.6 | 1082.1 | 1089.8 | 1100.9 | 1108.6 | 1104.2 | 1107.5 | 1126.3 | 1116.4 | 1125.2 | 1120.8 |
| 5°    | 1016.9 | 1022.4 | 1033.5 | 1032.4 | 1041.2 | 1057.8 | 1079.9 | 1104.2 | 1093.1 | 1119.7 | 1129.6 |
| 7.5°  | 955.0  | 952.8  | 952.8  | 976.0  | 994.8  | 1018.0 | 1030.1 | 1069.9 | 1071.0 | 1094.3 | 1118.6 |
| 10°   | 898.6  | 905.2  | 916.3  | 925.1  | 942.8  | 976.0  | 1011.4 | 1042.3 | 1054.5 | 1100.9 | 1107.5 |
| 12.5° | 864.4  | 867.7  | 880.9  | 888.7  | 911.9  | 943.9  | 981.5  | 1021.3 | 1031.3 | 1078.8 | 1110.8 |
| 15°   | 850.0  | 857.7  | 862.1  | 876.5  | 888.7  | 918.5  | 946.1  | 991.5  | 1020.2 | 1057.8 | 1097.6 |
| 17.5° | 861.0  | 857.7  | 859.9  | 864.4  | 878.7  | 905.2  | 935.1  | 980.4  | 990.4  | 1053.4 | 1113.0 |
| 20°   | 875.4  | 876.5  | 869.9  | 867.7  | 864.4  | 889.8  | 914.1  | 972.7  | 983.7  | 1053.4 | 1123.0 |
| 22.5° | 914.1  | 901.9  | 914.1  | 896.4  | 878.7  | 889.8  | 913.0  | 973.8  | 981.5  | 1052.3 | 1132.9 |
| 25°   | 961.6  | 963.8  | 967.1  | 929.6  | 904.1  | 896.4  | 920.7  | 977.1  | 983.7  | 1061.1 | 1137.4 |
| 27.5° | 1029.0 | 1039.0 | 1022.4 | 1003.6 | 952.8  | 914.1  | 919.6  | 974.9  | 987.0  | 1056.7 | 1148.4 |
| 30°   | 1119.7 | 1111.9 | 1114.1 | 1071.0 | 1021.3 | 960.5  | 945.0  | 980.4  | 989.3  | 1062.2 | 1169.4 |
| 32.5° | 1198.2 | 1189.3 | 1204.8 | 1189.3 | 1110.8 | 1026.8 | 974.9  | 991.5  | 1001.4 | 1075.5 | 1187.1 |
| 35°   | 1246.8 | 1257.8 | 1282.2 | 1298.7 | 1232.4 | 1113.0 | 1024.6 | 1021.3 | 1025.7 | 1082.1 | 1200.4 |
| 37.5° | 1321.9 | 1341.8 | 1361.7 | 1403.7 | 1346.3 | 1219.2 | 1103.1 | 1060.0 | 1052.3 | 1114.1 | 1207.0 |
| 40°   | 1403.7 | 1398.2 | 1456.8 | 1506.5 | 1504.3 | 1368.4 | 1212.5 | 1128.5 | 1117.5 | 1165.0 | 1251.2 |
| 42.5° | 1472.3 | 1466.7 | 1532.0 | 1613.7 | 1622.6 | 1512.1 | 1337.4 | 1225.8 | 1215.8 | 1243.5 | 1305.4 |
| 45°   | 1561.8 | 1566.2 | 1643.6 | 1740.9 | 1772.9 | 1702.2 | 1506.5 | 1365.1 | 1359.5 | 1350.7 | 1408.2 |
| 47.5° | 1641.4 | 1665.7 | 1732.0 | 1847.0 | 1963.0 | 1898.9 | 1705.5 | 1568.4 | 1529.7 | 1509.8 | 1567.3 |
| 50°   | 1696.6 | 1718.8 | 1799.4 | 1922.1 | 2134.3 | 2175.2 | 1928.8 | 1785.1 | 1786.2 | 1737.5 | 1768.5 |
| 52.5° | 1696.6 | 1695.5 | 1760.8 | 1922.1 | 2253.7 | 2463.7 | 2227.2 | 2058.1 | 2066.9 | 2016.1 | 2018.3 |
| 55°   | 1533.1 | 1529.7 | 1609.3 | 1780.7 | 2240.5 | 2741.2 | 2679.3 | 2404.0 | 2381.9 | 2283.6 | 2293.5 |
| 57.5° | 1234.6 | 1242.4 | 1303.2 | 1508.7 | 2068.0 | 2870.5 | 3217.5 | 2793.1 | 2718.0 | 2514.6 | 2514.6 |
| 60°   | 900.8  | 894.2  | 939.5  | 1083.2 | 1656.9 | 2821.8 | 3659.7 | 3251.8 | 3133.5 | 2705.8 | 2677.1 |
| 62.5° | 685.3  | 684.2  | 696.3  | 745.0  | 1051.1 | 2460.4 | 3849.8 | 3835.4 | 3643.1 | 2893.7 | 2852.8 |
| 65°   | 553.8  | 556.0  | 572.5  | 606.8  | 642.2  | 1677.9 | 3749.2 | 4531.8 | 4356.0 | 3173.3 | 3039.6 |
| 67.5° | 452.1  | 457.6  | 477.5  | 551.5  | 543.8  | 868.8  | 3193.2 | 4930.8 | 4963.9 | 3600.0 | 3290.5 |
| 70°   | 348.2  | 357.0  | 380.2  | 485.2  | 523.9  | 578.1  | 2213.9 | 4731.8 | 4820.2 | 3865.3 | 3139.1 |
| 72.5° | 236.5  | 235.4  | 285.2  | 393.5  | 529.4  | 529.4  | 1232.4 | 3811.1 | 3895.1 | 3563.5 | 2726.8 |
| 75°   | 128.2  | 136.0  | 189.0  | 297.3  | 485.2  | 511.8  | 701.9  | 2788.7 | 2907.0 | 2771.0 | 2108.9 |
| 77.5° | 69.6   | 70.7   | 105.0  | 194.5  | 403.4  | 488.5  | 468.7  | 1896.7 | 1943.1 | 1671.2 | 1155.0 |
| 80°   | 36.5   | 37.6   | 55.3   | 127.1  | 278.5  | 453.2  | 390.2  | 1130.7 | 1086.5 | 641.1  | 381.3  |
| 82.5° | 16.6   | 17.7   | 27.6   | 79.6   | 178.0  | 357.0  | 337.1  | 546.0  | 504.0  | 179.1  | 116.1  |
| 85°   | 6.6    | 6.6    | 12.2   | 47.5   | 103.9  | 175.7  | 288.5  | 274.1  | 228.8  | 54.2   | 57.5   |
| 87.5° | 2.2    | 2.2    | 3.3    | 18.8   | 42.0   | 105.0  | 153.6  | 144.8  | 99.5   | 19.9   | 30.9   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P673719

CATALOG NUMBER: CCP-SA1D-760-U-SL2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 | 1125.2 |
| 2.5°  | 1116.4 | 1128.5 | 1125.2 | 1123.0 | 1102.0 | 1099.8 | 1097.6 | 1077.7 | 1084.3 | 1067.7 | 1078.8 |
| 5°    | 1123.0 | 1129.6 | 1111.9 | 1078.8 | 1048.9 | 1015.8 | 990.4  | 972.7  | 940.6  | 928.5  | 926.2  |
| 7.5°  | 1116.4 | 1116.4 | 1079.9 | 1026.8 | 968.2  | 914.1  | 845.6  | 796.9  | 760.5  | 732.8  | 742.8  |
| 10°   | 1107.5 | 1094.3 | 1056.7 | 962.7  | 856.6  | 774.8  | 676.4  | 604.6  | 550.4  | 532.8  | 521.7  |
| 12.5° | 1107.5 | 1084.3 | 1000.3 | 872.1  | 735.0  | 611.2  | 494.1  | 400.1  | 348.2  | 317.2  | 312.8  |
| 15°   | 1097.6 | 1063.3 | 959.4  | 787.0  | 616.8  | 448.8  | 315.0  | 234.3  | 190.1  | 178.0  | 173.5  |
| 17.5° | 1099.8 | 1058.9 | 898.6  | 686.4  | 478.6  | 298.4  | 192.3  | 148.1  | 137.1  | 131.5  | 132.6  |
| 20°   | 1104.2 | 1058.9 | 844.5  | 588.0  | 344.9  | 185.7  | 132.6  | 124.9  | 119.4  | 117.2  | 118.3  |
| 22.5° | 1118.6 | 1037.9 | 789.2  | 487.4  | 233.2  | 133.7  | 117.2  | 109.4  | 105.0  | 101.7  | 100.6  |
| 25°   | 1120.8 | 1034.6 | 736.1  | 388.0  | 160.3  | 112.7  | 102.8  | 94.0   | 88.4   | 84.0   | 82.9   |
| 27.5° | 1117.5 | 1020.2 | 662.1  | 288.5  | 120.5  | 100.6  | 87.3   | 78.5   | 70.7   | 67.4   | 66.3   |
| 30°   | 1129.6 | 993.7  | 599.1  | 207.8  | 101.7  | 87.3   | 74.1   | 64.1   | 57.5   | 53.1   | 53.1   |
| 32.5° | 1130.7 | 970.5  | 529.4  | 148.1  | 92.8   | 77.4   | 63.0   | 51.9   | 45.3   | 43.1   | 43.1   |
| 35°   | 1131.8 | 949.5  | 452.1  | 112.7  | 82.9   | 66.3   | 51.9   | 43.1   | 38.7   | 35.4   | 35.4   |
| 37.5° | 1135.2 | 934.0  | 381.3  | 95.1   | 74.1   | 56.4   | 43.1   | 35.4   | 30.9   | 29.8   | 29.8   |
| 40°   | 1141.8 | 913.0  | 307.3  | 84.0   | 64.1   | 47.5   | 36.5   | 29.8   | 25.4   | 24.3   | 23.2   |
| 42.5° | 1159.5 | 907.5  | 245.4  | 75.2   | 57.5   | 39.8   | 29.8   | 24.3   | 21.0   | 18.8   | 17.7   |
| 45°   | 1232.4 | 921.8  | 190.1  | 69.6   | 48.6   | 33.2   | 25.4   | 19.9   | 15.5   | 14.4   | 13.3   |
| 47.5° | 1351.8 | 969.4  | 150.3  | 61.9   | 40.9   | 27.6   | 21.0   | 15.5   | 12.2   | 11.1   | 9.9    |
| 50°   | 1533.1 | 1077.7 | 122.7  | 55.3   | 34.3   | 23.2   | 16.6   | 12.2   | 8.8    | 7.7    | 7.7    |
| 52.5° | 1770.7 | 1223.6 | 106.1  | 48.6   | 27.6   | 19.9   | 13.3   | 8.8    | 6.6    | 5.5    | 5.5    |
| 55°   | 2013.9 | 1396.0 | 99.5   | 42.0   | 23.2   | 16.6   | 9.9    | 6.6    | 4.4    | 3.3    | 3.3    |
| 57.5° | 2237.1 | 1507.6 | 96.2   | 34.3   | 19.9   | 12.2   | 7.7    | 4.4    | 2.2    | 1.1    | 1.1    |
| 60°   | 2376.4 | 1589.4 | 86.2   | 27.6   | 15.5   | 9.9    | 5.5    | 2.2    | 1.1    | 0.0    | 0.0    |
| 62.5° | 2559.9 | 1672.3 | 70.7   | 21.0   | 11.1   | 6.6    | 3.3    | 1.1    | 0.0    | 0.0    | 0.0    |
| 65°   | 2802.0 | 1765.2 | 55.3   | 16.6   | 8.8    | 4.4    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    |
| 67.5° | 2918.0 | 1716.5 | 37.6   | 12.2   | 5.5    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    |
| 70°   | 2685.9 | 1445.7 | 26.5   | 8.8    | 3.3    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    |
| 72.5° | 2258.1 | 1132.9 | 19.9   | 5.5    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 75°   | 1664.6 | 708.5  | 15.5   | 4.4    | 2.2    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 77.5° | 883.1  | 264.2  | 11.1   | 3.3    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 260.9  | 77.4   | 7.7    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 86.2   | 23.2   | 4.4    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 44.2   | 8.8    | 2.2    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 25.4   | 3.3    | 2.2    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2012-088-5-R3

Luminaire Tested: CCW-SA1A-760-U-SL2-HSS

Test Date: 01/19/2021

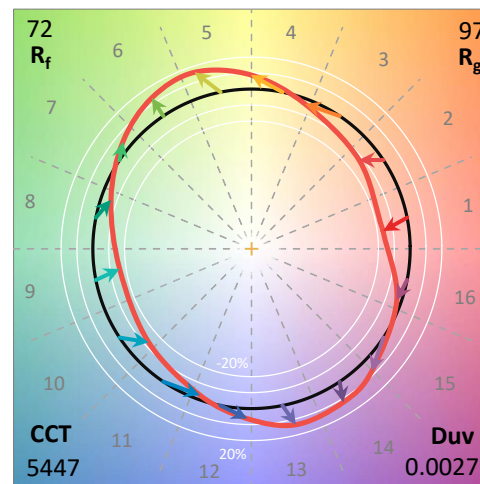
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-5-R3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/19/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA1A-760-U-SL2-HSS**  
 Description: INVUE WALL PACK

\*\*\*THIS IS A REVISION OF SP1-2012-088-5-R2. TO UPDATE THE CATALOG  
 INFORMATION.\*\*\*TESTED IN SITU. INVUE WALL PACK LIGHT SQUARE T2 OPTICS 1-SQUARE WITH  
 HOUSE SIDE SHIELD

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 5447   | CRI (Ra): | 71.9 |      |       |
| CIE u':                   | 0.2053 | R1:       | 70.7 | R9:  | -27.5 |
| CIE v':                   | 0.4809 | R2:       | 74.8 | R10: | 41.5  |
| Duv:                      | 0.0027 | R3:       | 78.7 | R11: | 74.9  |
| CIE x:                    | 0.3337 | R4:       | 74.0 | R12: | 49.9  |
| CIE y:                    | 0.3473 | R5:       | 72.5 | R13: | 70.2  |
| CIE z:                    | 0.3190 | R6:       | 67.7 | R14: | 88.1  |
| Peak Wavelength (nm):     | 443    | R7:       | 77.7 |      |       |
| Dominant Wavelength (nm): | 556    | R8:       | 58.8 |      |       |
| Purity:                   | 4.5    |           |      |      |       |
| Rf:                       | 72.3   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



### Test Conditions

Stabilization Time: 75M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.4/18%  
 Sphere Temperature (°C): 25.3

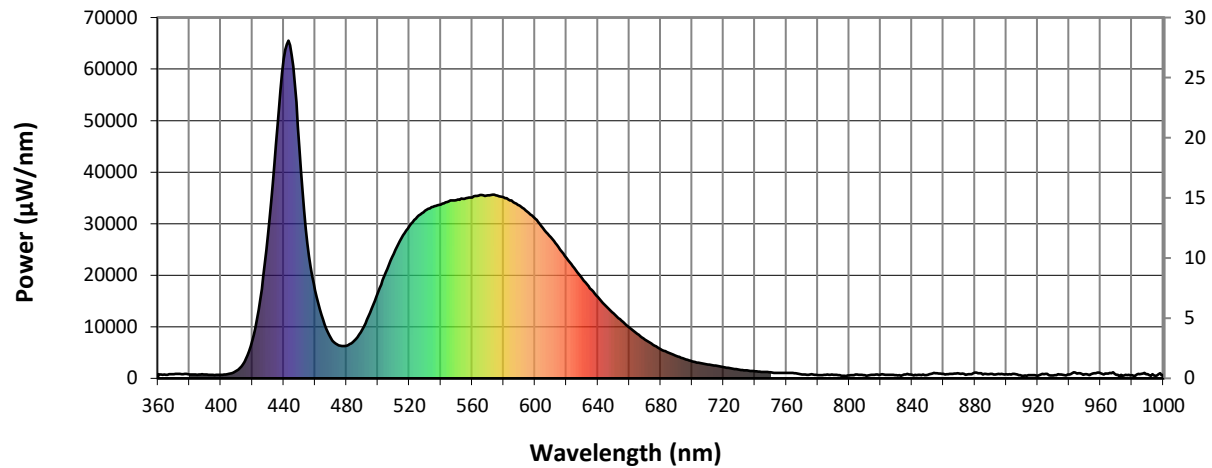
REPORT NUMBER: SP1-2012-088-5-R3

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |



REPORT NUMBER: SP1-2012-088-5-R3

### Photopic Flux vs. Wavelength

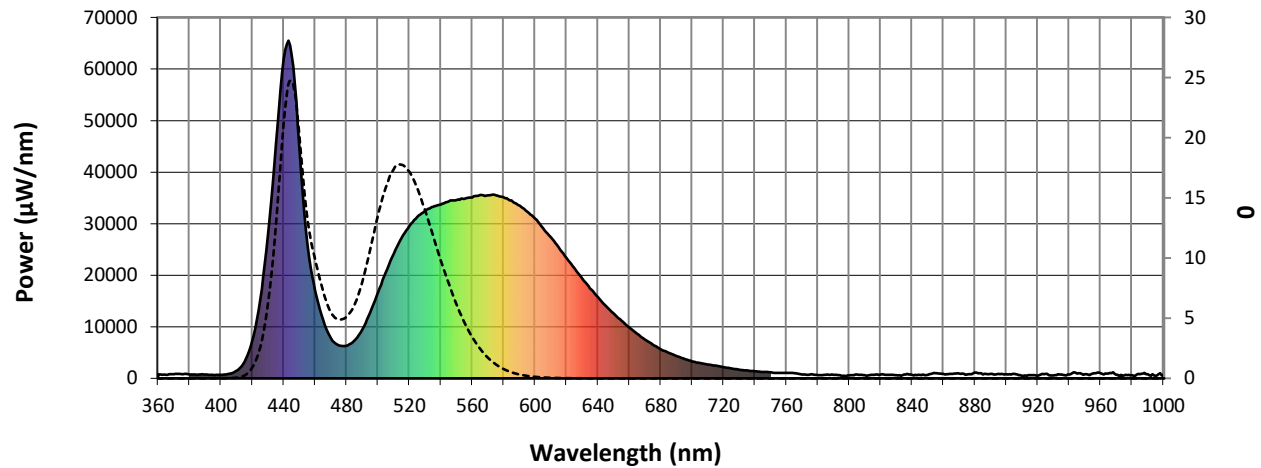


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 828              | 0.0              | 490       | 9471             | 1.3              | 620       | 23317            | 6.1              | 750       | 1157             | 0.0              | 880       | 1136             | 0.0              |
| 365       | 696              | 0.0              | 495       | 12752            | 2.3              | 625       | 21413            | 4.7              | 755       | 1067             | 0.0              | 885       | 773              | 0.0              |
| 370       | 807              | 0.0              | 500       | 16685            | 3.7              | 630       | 19344            | 3.5              | 760       | 1059             | 0.0              | 890       | 872              | 0.0              |
| 375       | 837              | 0.0              | 505       | 20565            | 5.8              | 635       | 17464            | 2.6              | 765       | 1009             | 0.0              | 895       | 891              | 0.0              |
| 380       | 757              | 0.0              | 510       | 24119            | 8.3              | 640       | 15745            | 1.9              | 770       | 774              | 0.0              | 900       | 807              | 0.0              |
| 385       | 706              | 0.0              | 515       | 27181            | 11.3             | 645       | 14060            | 1.4              | 775       | 761              | 0.0              | 905       | 899              | 0.0              |
| 390       | 746              | 0.0              | 520       | 29555            | 14.3             | 650       | 12579            | 0.9              | 780       | 653              | 0.0              | 910       | 506              | 0.0              |
| 395       | 660              | 0.0              | 525       | 31307            | 16.8             | 655       | 11181            | 0.6              | 785       | 704              | 0.0              | 915       | 598              | 0.0              |
| 400       | 671              | 0.0              | 530       | 32558            | 19.2             | 660       | 9847             | 0.4              | 790       | 663              | 0.0              | 920       | 510              | 0.0              |
| 405       | 848              | 0.0              | 535       | 33301            | 20.7             | 665       | 8641             | 0.3              | 795       | 493              | 0.0              | 925       | 874              | 0.0              |
| 410       | 1490             | 0.0              | 540       | 33727            | 22.0             | 670       | 7535             | 0.2              | 800       | 584              | 0.0              | 930       | 549              | 0.0              |
| 415       | 3203             | 0.0              | 545       | 34356            | 22.9             | 675       | 6542             | 0.1              | 805       | 739              | 0.0              | 935       | 720              | 0.0              |
| 420       | 7298             | 0.0              | 550       | 34589            | 23.5             | 680       | 5664             | 0.1              | 810       | 601              | 0.0              | 940       | 754              | 0.0              |
| 425       | 15315            | 0.1              | 555       | 34855            | 23.8             | 685       | 4962             | 0.0              | 815       | 677              | 0.0              | 945       | 931              | 0.0              |
| 430       | 27886            | 0.2              | 560       | 35083            | 23.8             | 690       | 4369             | 0.0              | 820       | 726              | 0.0              | 950       | 811              | 0.0              |
| 435       | 45485            | 0.5              | 565       | 35553            | 23.6             | 695       | 3785             | 0.0              | 825       | 693              | 0.0              | 955       | 955              | 0.0              |
| 440       | 61965            | 1.0              | 570       | 35511            | 23.1             | 700       | 3318             | 0.0              | 830       | 619              | 0.0              | 960       | 1025             | 0.0              |
| 445       | 62721            | 1.3              | 575       | 35515            | 22.1             | 705       | 2962             | 0.0              | 835       | 738              | 0.0              | 965       | 916              | 0.0              |
| 450       | 44754            | 1.2              | 580       | 35114            | 20.9             | 710       | 2689             | 0.0              | 840       | 681              | 0.0              | 970       | 695              | 0.0              |
| 455       | 26152            | 0.9              | 585       | 34546            | 19.2             | 715       | 2476             | 0.0              | 845       | 691              | 0.0              | 975       | 568              | 0.0              |
| 460       | 17101            | 0.7              | 590       | 33522            | 17.3             | 720       | 2192             | 0.0              | 850       | 710              | 0.0              | 980       | 643              | 0.0              |
| 465       | 11400            | 0.6              | 595       | 32326            | 15.3             | 725       | 1939             | 0.0              | 855       | 1025             | 0.0              | 985       | 804              | 0.0              |
| 470       | 7763             | 0.5              | 600       | 30973            | 13.3             | 730       | 1698             | 0.0              | 860       | 889              | 0.0              | 990       | 812              | 0.0              |
| 475       | 6419             | 0.5              | 605       | 29160            | 11.3             | 735       | 1533             | 0.0              | 865       | 885              | 0.0              | 995       | 496              | 0.0              |
| 480       | 6330             | 0.6              | 610       | 27373            | 9.4              | 740       | 1375             | 0.0              | 870       | 905              | 0.0              | 1000      | 659              | 0.0              |
| 485       | 7299             | 0.9              | 615       | 25423            | 7.7              | 745       | 1254             | 0.0              | 875       | 739              | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2012-088-5-R3

### Scotopic Flux vs. Wavelength



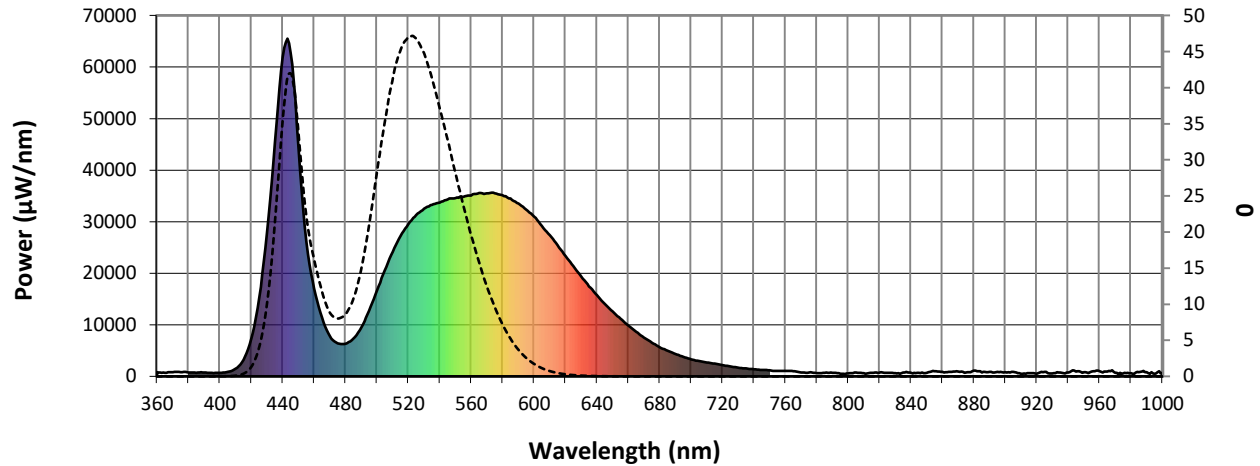
Scotopic Lumens: 1610.2

S/P: 0.74

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 828              | 0.0              | 490       | 9471             | 14.6             | 620       | 23317            | 0.3              | 750       | 1157             | 0.0              | 880       | 1136             | 0.0              |
| 365       | 696              | 0.0              | 495       | 12752            | 20.6             | 625       | 21413            | 0.2              | 755       | 1067             | 0.0              | 885       | 773              | 0.0              |
| 370       | 807              | 0.0              | 500       | 16685            | 27.9             | 630       | 19344            | 0.1              | 760       | 1059             | 0.0              | 890       | 872              | 0.0              |
| 375       | 837              | 0.0              | 505       | 20565            | 35.0             | 635       | 17464            | 0.1              | 765       | 1009             | 0.0              | 895       | 891              | 0.0              |
| 380       | 757              | 0.0              | 510       | 24119            | 40.9             | 640       | 15745            | 0.0              | 770       | 774              | 0.0              | 900       | 807              | 0.0              |
| 385       | 706              | 0.0              | 515       | 27181            | 45.1             | 645       | 14060            | 0.0              | 775       | 761              | 0.0              | 905       | 899              | 0.0              |
| 390       | 746              | 0.0              | 520       | 29555            | 47.0             | 650       | 12579            | 0.0              | 780       | 653              | 0.0              | 910       | 506              | 0.0              |
| 395       | 660              | 0.0              | 525       | 31307            | 46.8             | 655       | 11181            | 0.0              | 785       | 704              | 0.0              | 915       | 598              | 0.0              |
| 400       | 671              | 0.0              | 530       | 32558            | 44.9             | 660       | 9847             | 0.0              | 790       | 663              | 0.0              | 920       | 510              | 0.0              |
| 405       | 848              | 0.0              | 535       | 33301            | 41.5             | 665       | 8641             | 0.0              | 795       | 493              | 0.0              | 925       | 874              | 0.0              |
| 410       | 1490             | 0.1              | 540       | 33727            | 37.3             | 670       | 7535             | 0.0              | 800       | 584              | 0.0              | 930       | 549              | 0.0              |
| 415       | 3203             | 0.3              | 545       | 34356            | 32.9             | 675       | 6542             | 0.0              | 805       | 739              | 0.0              | 935       | 720              | 0.0              |
| 420       | 7298             | 1.2              | 550       | 34589            | 28.3             | 680       | 5664             | 0.0              | 810       | 601              | 0.0              | 940       | 754              | 0.0              |
| 425       | 15315            | 3.7              | 555       | 34855            | 23.8             | 685       | 4962             | 0.0              | 815       | 677              | 0.0              | 945       | 931              | 0.0              |
| 430       | 27886            | 9.5              | 560       | 35083            | 19.6             | 690       | 4369             | 0.0              | 820       | 726              | 0.0              | 950       | 811              | 0.0              |
| 435       | 45485            | 20.3             | 565       | 35553            | 16.0             | 695       | 3785             | 0.0              | 825       | 693              | 0.0              | 955       | 955              | 0.0              |
| 440       | 61965            | 34.6             | 570       | 35511            | 12.5             | 700       | 3318             | 0.0              | 830       | 619              | 0.0              | 960       | 1025             | 0.0              |
| 445       | 62721            | 42.0             | 575       | 35515            | 9.7              | 705       | 2962             | 0.0              | 835       | 738              | 0.0              | 965       | 916              | 0.0              |
| 450       | 44754            | 34.7             | 580       | 35114            | 7.2              | 710       | 2689             | 0.0              | 840       | 681              | 0.0              | 970       | 695              | 0.0              |
| 455       | 26152            | 22.9             | 585       | 34546            | 5.3              | 715       | 2476             | 0.0              | 845       | 691              | 0.0              | 975       | 568              | 0.0              |
| 460       | 17101            | 16.5             | 590       | 33522            | 3.7              | 720       | 2192             | 0.0              | 850       | 710              | 0.0              | 980       | 643              | 0.0              |
| 465       | 11400            | 12.0             | 595       | 32326            | 2.6              | 725       | 1939             | 0.0              | 855       | 1025             | 0.0              | 985       | 804              | 0.0              |
| 470       | 7763             | 8.9              | 600       | 30973            | 1.7              | 730       | 1698             | 0.0              | 860       | 889              | 0.0              | 990       | 812              | 0.0              |
| 475       | 6419             | 8.0              | 605       | 29160            | 1.1              | 735       | 1533             | 0.0              | 865       | 885              | 0.0              | 995       | 496              | 0.0              |
| 480       | 6330             | 8.5              | 610       | 27373            | 0.7              | 740       | 1375             | 0.0              | 870       | 905              | 0.0              | 1000      | 659              | 0.0              |
| 485       | 7299             | 10.6             | 615       | 25423            | 0.5              | 745       | 1254             | 0.0              | 875       | 739              | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2012-088-5-R3

### Melanopic Flux vs. Wavelength



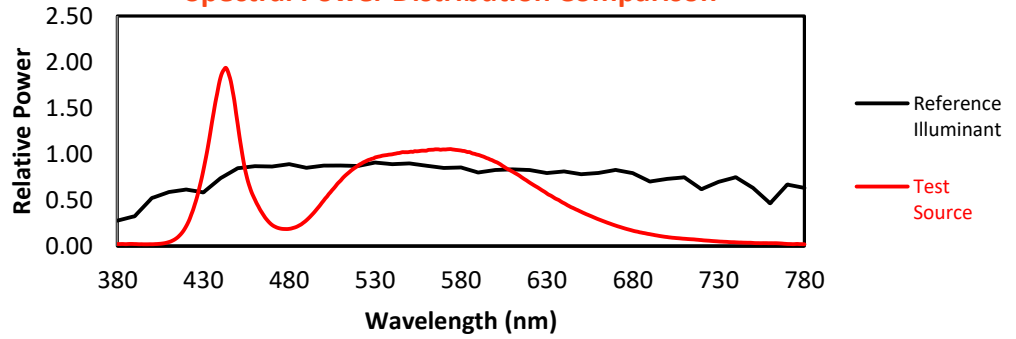
**Melanopic Lumens: 4010.3**      **S/P: 1.85**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 828              | 0.0              | 490       | 9471             | 7.9              | 620       | 23317            | 0.0              | 750       | 1157             | 0.0              | 880       | 1136             | 0.0              |
| 365       | 696              | 0.0              | 495       | 12752            | 10.5             | 625       | 21413            | 0.0              | 755       | 1067             | 0.0              | 885       | 773              | 0.0              |
| 370       | 807              | 0.0              | 500       | 16685            | 13.4             | 630       | 19344            | 0.0              | 760       | 1059             | 0.0              | 890       | 872              | 0.0              |
| 375       | 837              | 0.0              | 505       | 20565            | 15.8             | 635       | 17464            | 0.0              | 765       | 1009             | 0.0              | 895       | 891              | 0.0              |
| 380       | 757              | 0.0              | 510       | 24119            | 17.3             | 640       | 15745            | 0.0              | 770       | 774              | 0.0              | 900       | 807              | 0.0              |
| 385       | 706              | 0.0              | 515       | 27181            | 17.8             | 645       | 14060            | 0.0              | 775       | 761              | 0.0              | 905       | 899              | 0.0              |
| 390       | 746              | 0.0              | 520       | 29555            | 17.2             | 650       | 12579            | 0.0              | 780       | 653              | 0.0              | 910       | 506              | 0.0              |
| 395       | 660              | 0.0              | 525       | 31307            | 15.9             | 655       | 11181            | 0.0              | 785       | 704              | 0.0              | 915       | 598              | 0.0              |
| 400       | 671              | 0.0              | 530       | 32558            | 14.1             | 660       | 9847             | 0.0              | 790       | 663              | 0.0              | 920       | 510              | 0.0              |
| 405       | 848              | 0.0              | 535       | 33301            | 12.0             | 665       | 8641             | 0.0              | 795       | 493              | 0.0              | 925       | 874              | 0.0              |
| 410       | 1490             | 0.1              | 540       | 33727            | 9.9              | 670       | 7535             | 0.0              | 800       | 584              | 0.0              | 930       | 549              | 0.0              |
| 415       | 3203             | 0.2              | 545       | 34356            | 8.0              | 675       | 6542             | 0.0              | 805       | 739              | 0.0              | 935       | 720              | 0.0              |
| 420       | 7298             | 0.8              | 550       | 34589            | 6.2              | 680       | 5664             | 0.0              | 810       | 601              | 0.0              | 940       | 754              | 0.0              |
| 425       | 15315            | 2.4              | 555       | 34855            | 4.7              | 685       | 4962             | 0.0              | 815       | 677              | 0.0              | 945       | 931              | 0.0              |
| 430       | 27886            | 5.9              | 560       | 35083            | 3.5              | 690       | 4369             | 0.0              | 820       | 726              | 0.0              | 950       | 811              | 0.0              |
| 435       | 45485            | 12.1             | 565       | 35553            | 2.5              | 695       | 3785             | 0.0              | 825       | 693              | 0.0              | 955       | 955              | 0.0              |
| 440       | 61965            | 20.7             | 570       | 35511            | 1.7              | 700       | 3318             | 0.0              | 830       | 619              | 0.0              | 960       | 1025             | 0.0              |
| 445       | 62721            | 24.7             | 575       | 35515            | 1.2              | 705       | 2962             | 0.0              | 835       | 738              | 0.0              | 965       | 916              | 0.0              |
| 450       | 44754            | 20.6             | 580       | 35114            | 0.8              | 710       | 2689             | 0.0              | 840       | 681              | 0.0              | 970       | 695              | 0.0              |
| 455       | 26152            | 13.7             | 585       | 34546            | 0.5              | 715       | 2476             | 0.0              | 845       | 691              | 0.0              | 975       | 568              | 0.0              |
| 460       | 17101            | 10.1             | 590       | 33522            | 0.3              | 720       | 2192             | 0.0              | 850       | 710              | 0.0              | 980       | 643              | 0.0              |
| 465       | 11400            | 7.4              | 595       | 32326            | 0.2              | 725       | 1939             | 0.0              | 855       | 1025             | 0.0              | 985       | 804              | 0.0              |
| 470       | 7763             | 5.6              | 600       | 30973            | 0.1              | 730       | 1698             | 0.0              | 860       | 889              | 0.0              | 990       | 812              | 0.0              |
| 475       | 6419             | 4.9              | 605       | 29160            | 0.1              | 735       | 1533             | 0.0              | 865       | 885              | 0.0              | 995       | 496              | 0.0              |
| 480       | 6330             | 5.1              | 610       | 27373            | 0.0              | 740       | 1375             | 0.0              | 870       | 905              | 0.0              | 1000      | 659              | 0.0              |
| 485       | 7299             | 6.0              | 615       | 25423            | 0.0              | 745       | 1254             | 0.0              | 875       | 739              | 0.0              |           |                  |                  |

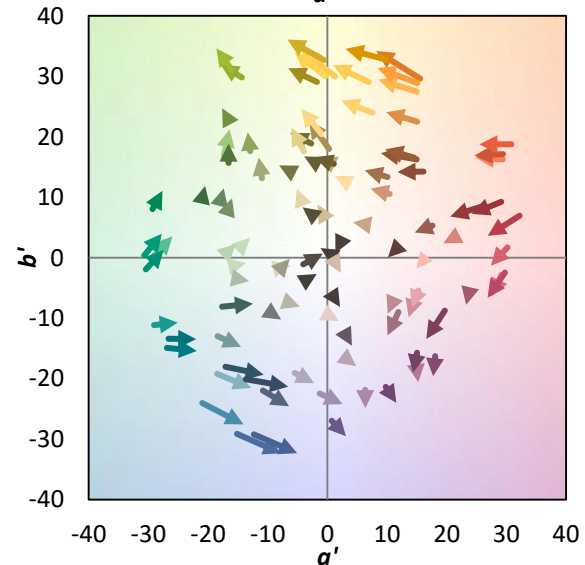
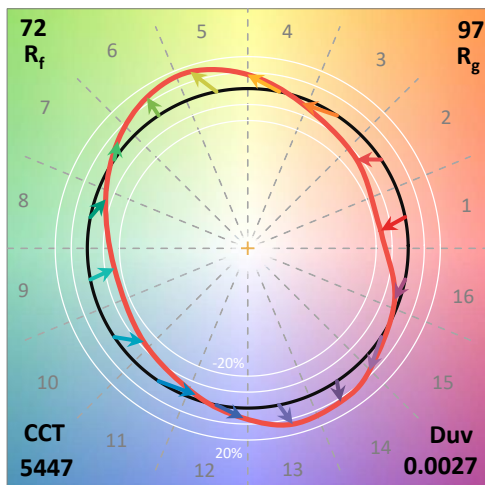
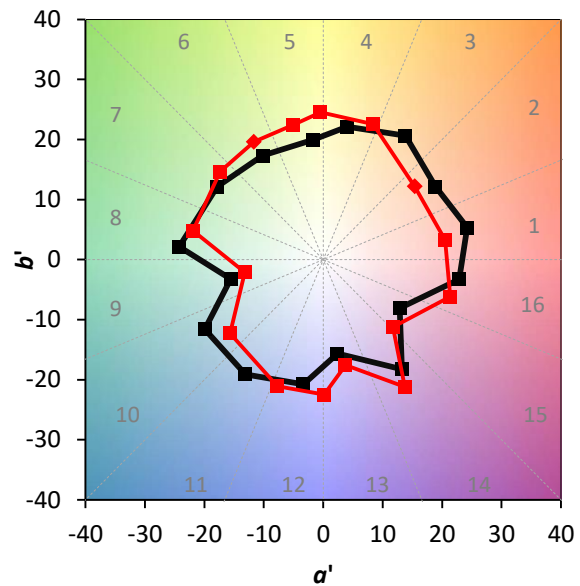
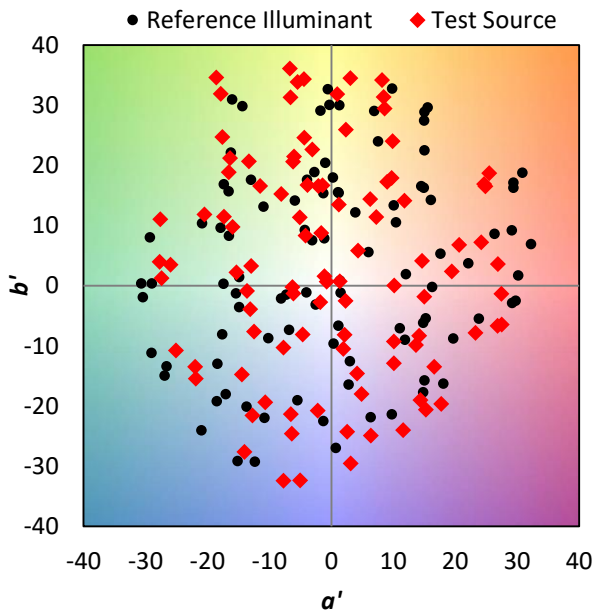
### Summary

$R_f = 72.3$   
 $R_g = 97.2$   
 CIE  $R_a = 71.9$   
 $R_g = -27.5$

### Spectral Power Distribution Comparison

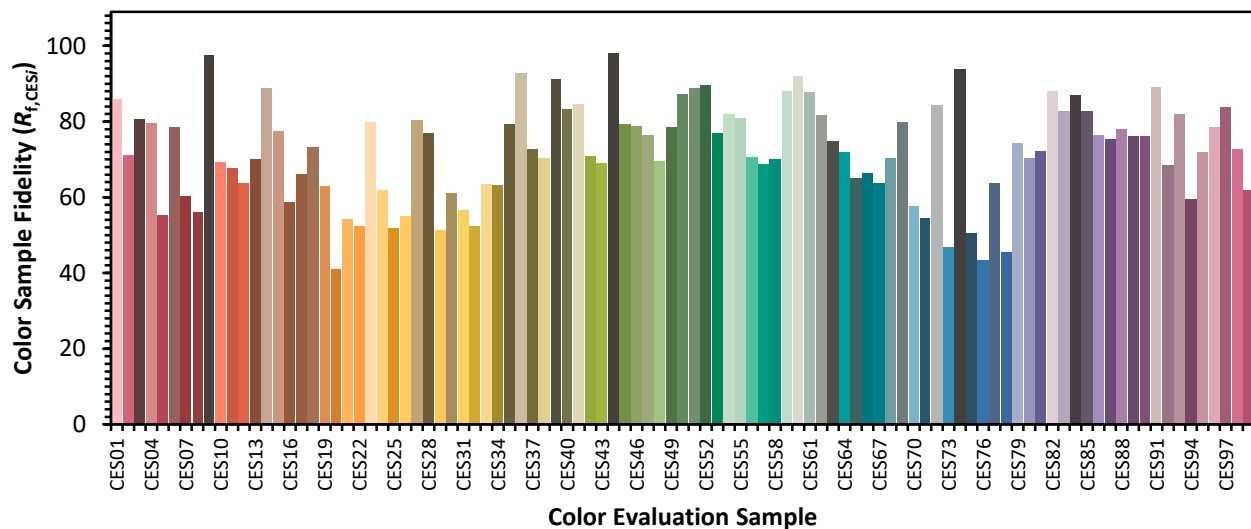


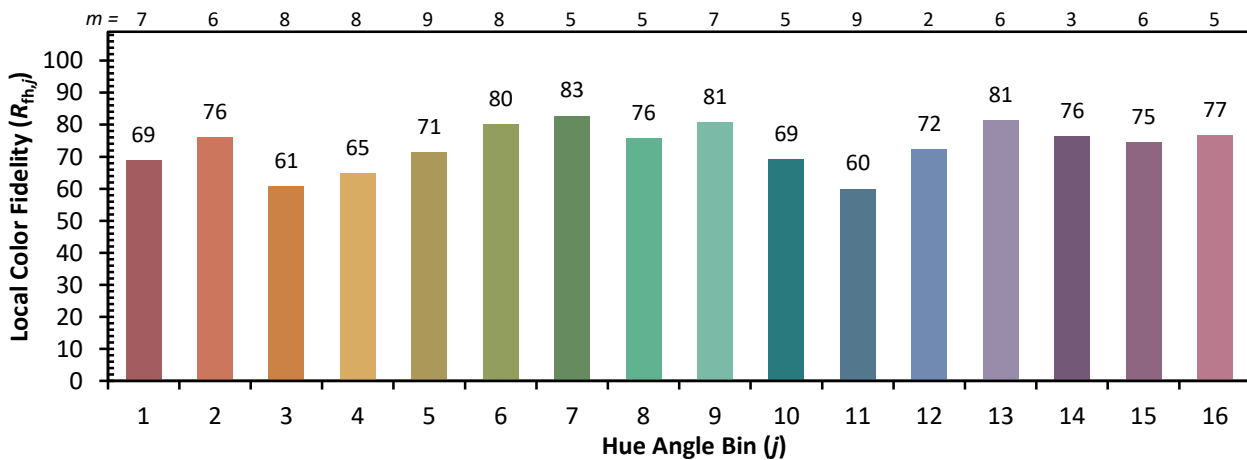
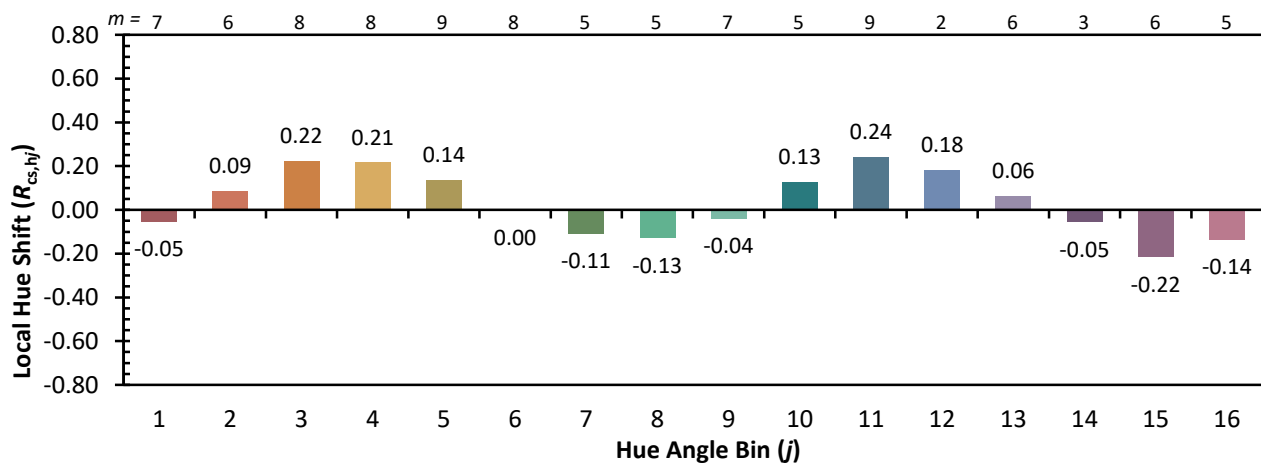
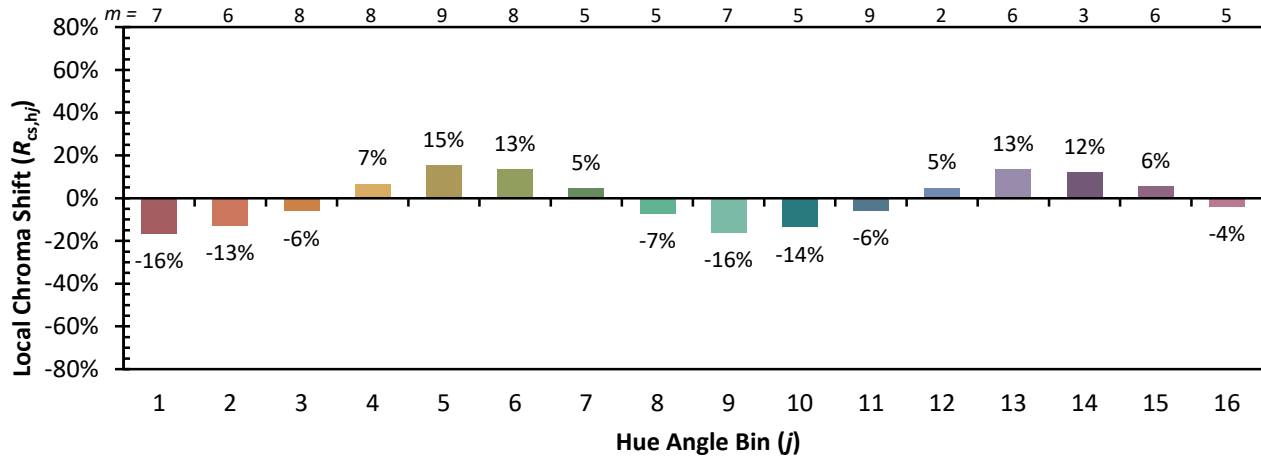
### Color Vector Graphics



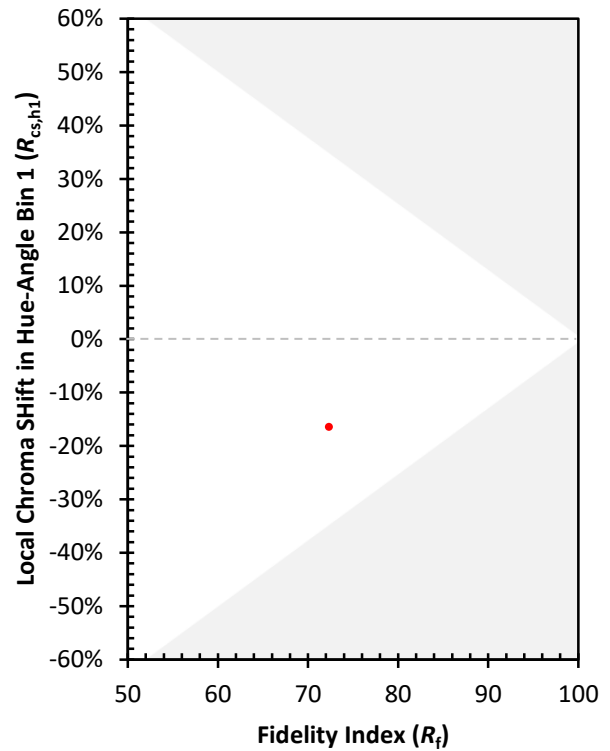
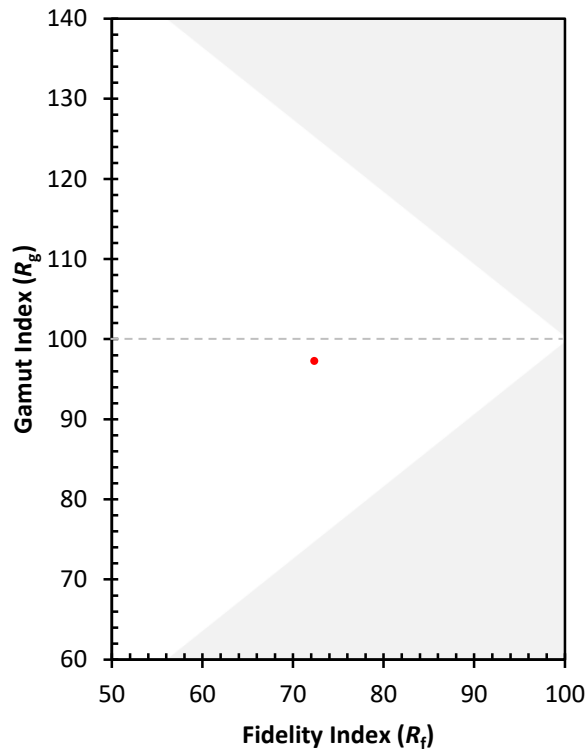
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 55 | CES51 = 89 | CES76 = 43 |
| CES02 = 59 | CES27 = 80 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 51 | CES54 = 82 | CES79 = 74 |
| CES05 = 46 | CES30 = 61 | CES55 = 81 | CES80 = 70 |
| CES06 = 50 | CES31 = 56 | CES56 = 71 | CES81 = 72 |
| CES07 = 38 | CES32 = 52 | CES57 = 69 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 83 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 83 |
| CES11 = 55 | CES36 = 93 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 73 | CES62 = 82 | CES87 = 75 |
| CES13 = 41 | CES38 = 70 | CES63 = 75 | CES88 = 78 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 85 | CES66 = 66 | CES91 = 89 |
| CES17 = 48 | CES42 = 71 | CES67 = 64 | CES92 = 69 |
| CES18 = 55 | CES43 = 69 | CES68 = 70 | CES93 = 82 |
| CES19 = 71 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 72 |
| CES21 = 85 | CES46 = 79 | CES71 = 54 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 69 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 79 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 50 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)