

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: STREETWORKS

Report Number: P459914

Luminaire Tested: **NVN-SA5A-AMB-U-SL2-HSS**

Issue Date: 1/6/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P459914  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2003-697-5)  
Test Lab: INNOVATION CENTER  
Issue Date: 1/6/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: NVN-SA5A-AMB-U-SL2-HSS  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(5) NARROW BAND AMBER, 500mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4169 lumens  
Efficiency: N/A  
Efficacy: 41.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Medium - Non-Cutoff  
BUG Rating: B1 - U0 - G1

Input Watts (W): 101  
Input Voltage (V): NR  
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: 28.75 FT

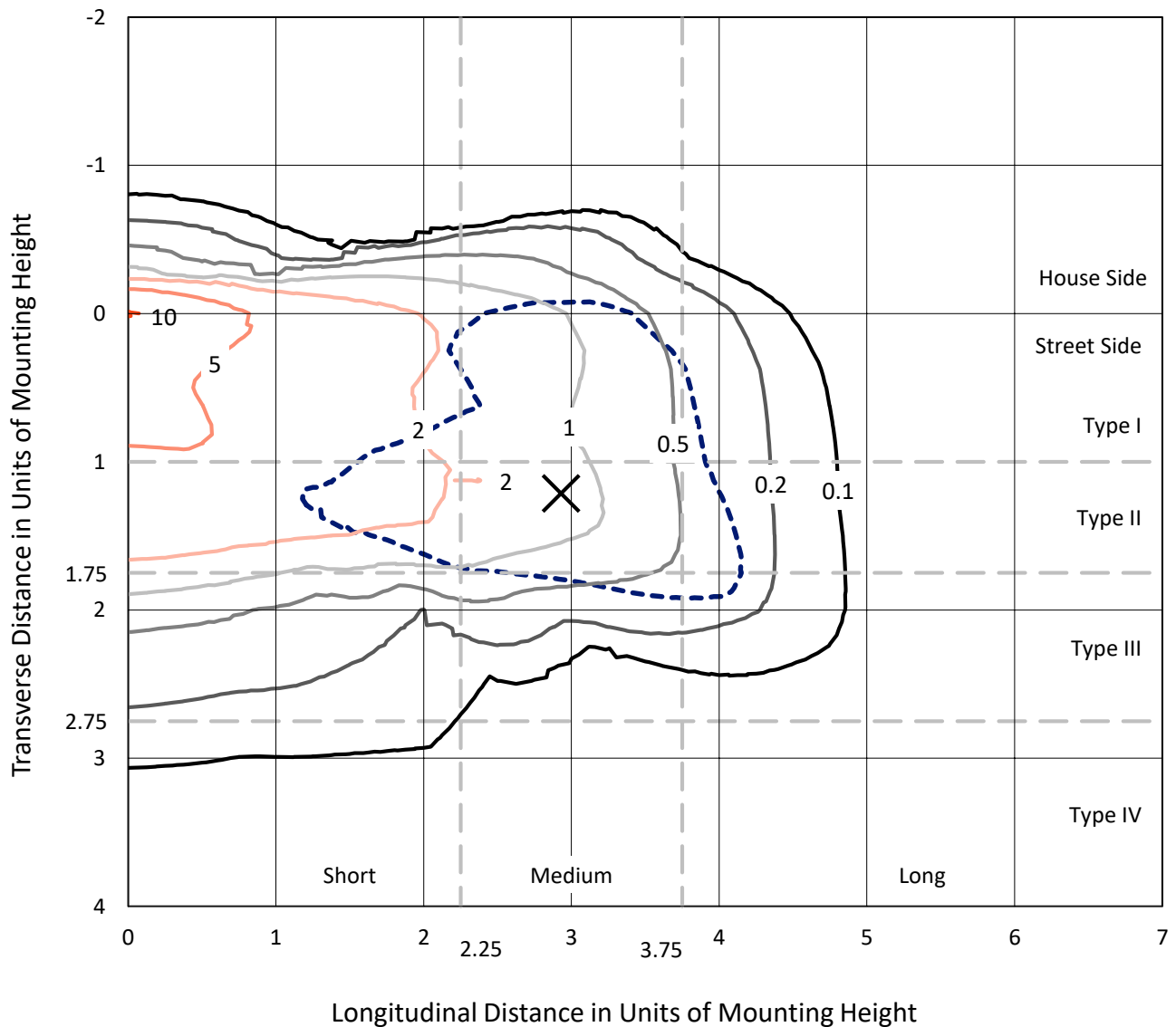


REPORT NUMBER: P459914

CATALOG NUMBER: NVN-SA5A-AMB-U-SL2-HSS

### Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

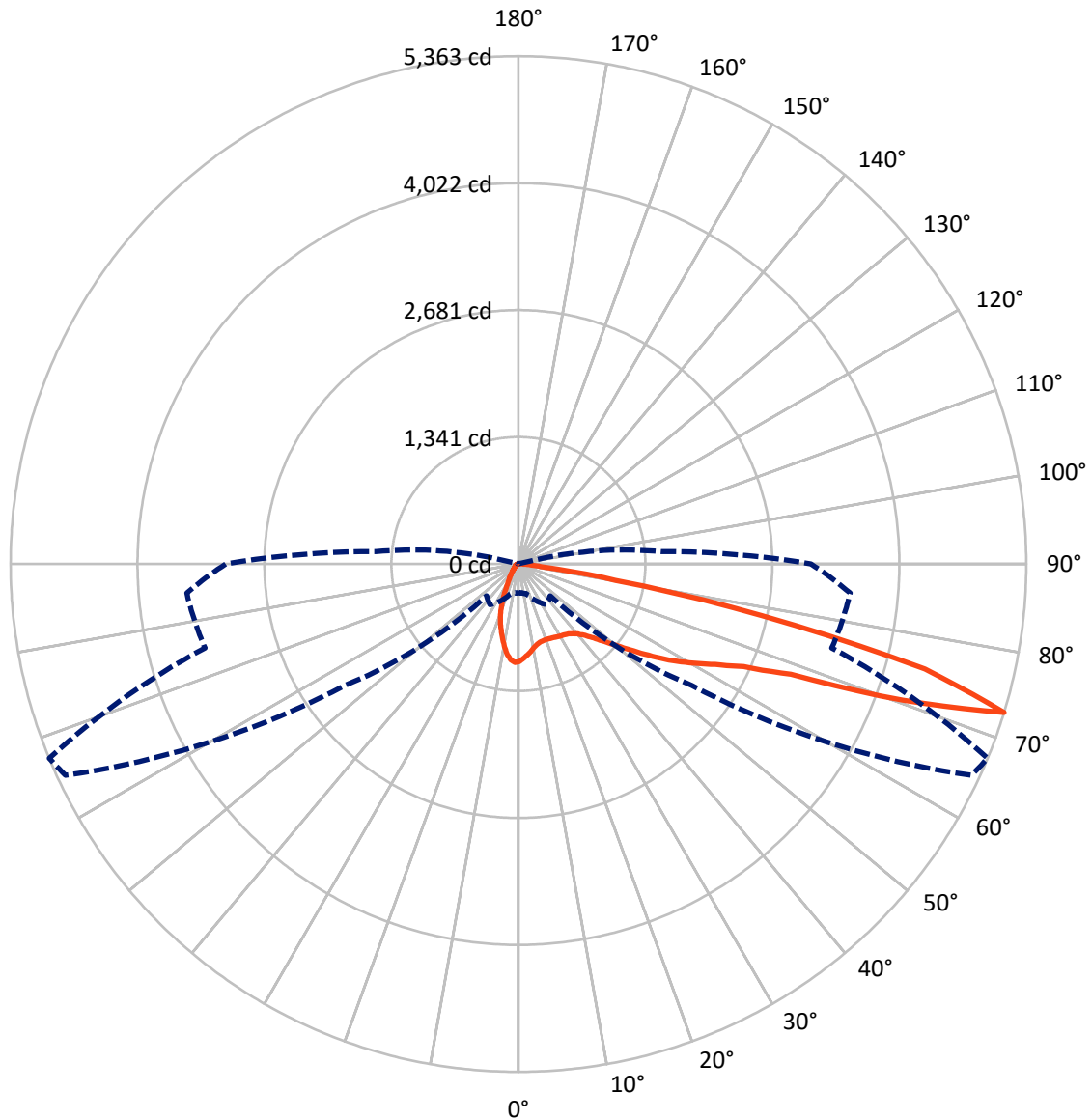


Based on 10 foot mounting height. Maximum calculated value = 10.3 fc  
 Type III - Medium - Non-Cutoff

REPORT NUMBER: P459914

CATALOG NUMBER: NVN-SA5A-AMB-U-SL2-HSS

### Luminous Intensity Polar Plot



— Vertical Plane Through 67.5-Deg Lateral    - - - Horizontal Cone Through 72.5-Deg Vertical

REPORT NUMBER: P459914

CATALOG NUMBER: NVN-SA5A-AMB-U-SL2-HSS

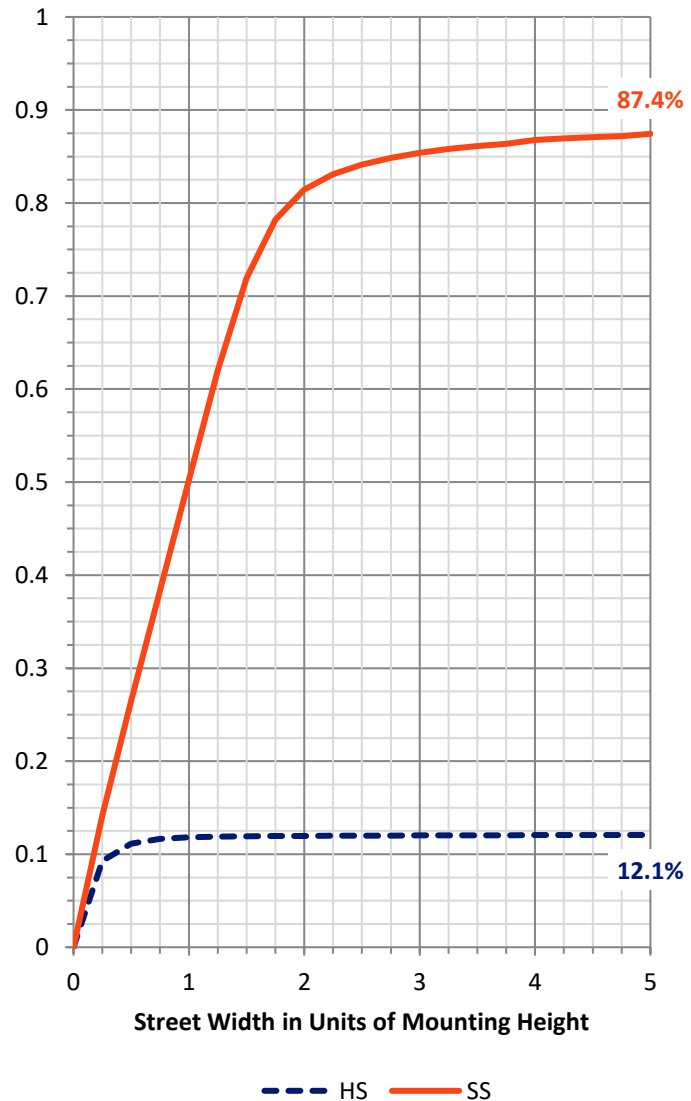
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 508.6    | 0.0    | 508.6  |
|                    | % Fixture | 12.2     | 0.0    | 12.2   |
| <b>Street Side</b> | Lumens    | 3660.5   | 0.0    | 3660.5 |
|                    | % Fixture | 87.8     | 0.0    | 87.8   |
| <b>Total</b>       | Lumens    | 4169.0   | 0.0    | 4169.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 85.0   | 2.0       |
| 10°-20°   | 179.2  | 4.3       |
| 20°-30°   | 253.2  | 6.1       |
| 30°-40°   | 362.7  | 8.7       |
| 40°-50°   | 547.2  | 13.1      |
| 50°-60°   | 877.2  | 21.0      |
| 60°-70°   | 1037.0 | 24.9      |
| 70°-80°   | 757.5  | 18.2      |
| 80°-90°   | 70.0   | 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°    | 4169.0 | 100.0     |
| 0°-180°   | 4169.0 | 100.0     |



REPORT NUMBER: P459914

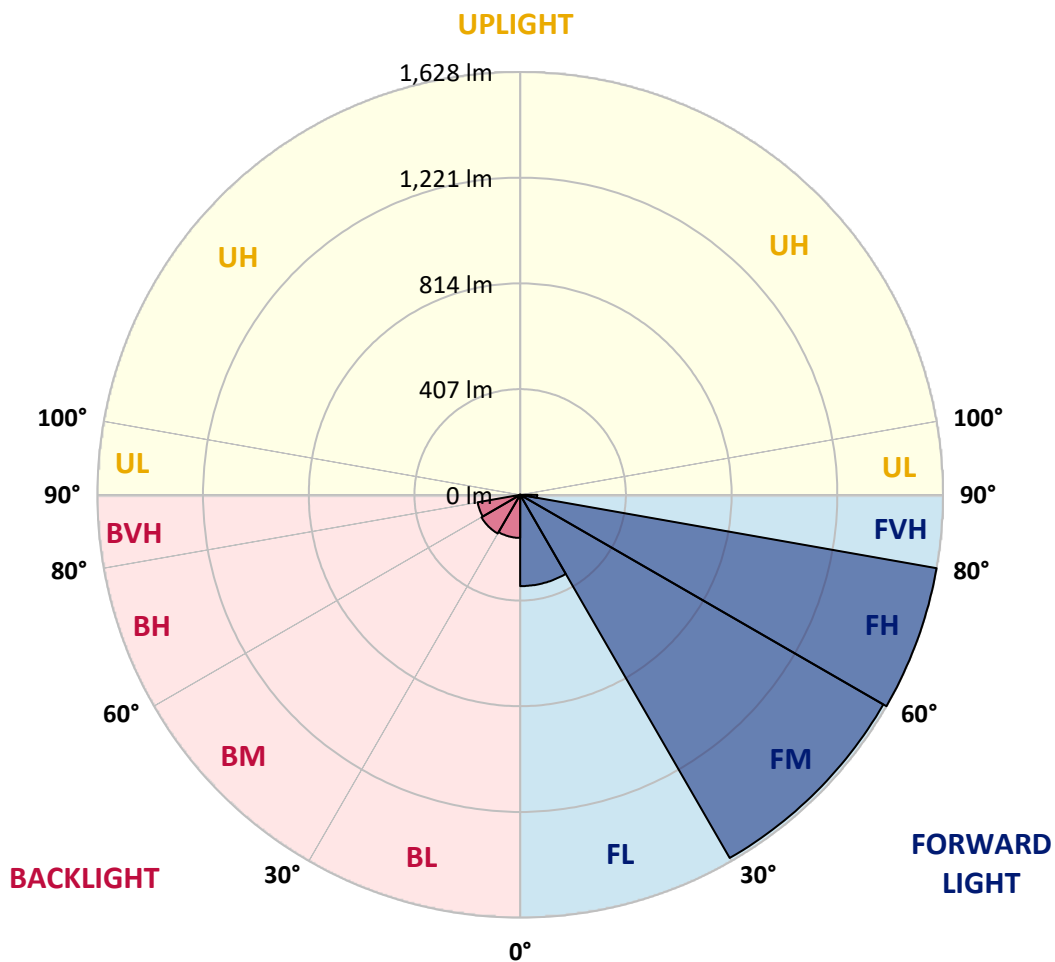
CATALOG NUMBER: NVN-SA5A-AMB-U-SL2-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 351.7  | 8.4       |                         |      |         |
| FM   | (30°-60°)   | 1614.8 | 38.7      |                         |      |         |
| FH   | (60°-80°)   | 1628.3 | 39.1      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 65.7   | 1.6       |                         |      | G1/100  |
| BL   | (0°-30°)    | 165.8  | 4.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 172.2  | 4.1       | B0/220                  |      |         |
| BH   | (60°-80°)   | 166.2  | 4.0       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 4.4    | 0.1       |                         |      | 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 III Medium





REPORT NUMBER: P459914

CATALOG NUMBER: NVN-SA5A-AMB-U-SL2-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 67.5°  | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 |
| 2.5°  | 966.0  | 970.6  | 970.6  | 977.5  | 979.8  | 982.1  | 995.9  | 1000.5 | 998.2  | 1011.9 | 1021.1 |
| 5°    | 901.8  | 901.8  | 906.4  | 917.9  | 927.0  | 933.9  | 950.0  | 963.7  | 966.0  | 982.1  | 1007.3 |
| 7.5°  | 849.0  | 853.6  | 853.6  | 860.5  | 874.3  | 885.7  | 906.4  | 929.3  | 933.9  | 954.6  | 984.4  |
| 10°   | 807.7  | 805.4  | 812.3  | 819.2  | 830.7  | 842.1  | 865.1  | 890.3  | 899.5  | 922.4  | 956.9  |
| 12.5° | 768.7  | 771.0  | 773.3  | 784.8  | 798.5  | 810.0  | 833.0  | 862.8  | 872.0  | 901.8  | 943.1  |
| 15°   | 745.8  | 745.8  | 748.1  | 754.9  | 768.7  | 784.8  | 812.3  | 844.4  | 855.9  | 890.3  | 938.5  |
| 17.5° | 738.9  | 738.9  | 736.6  | 738.9  | 750.3  | 766.4  | 798.5  | 837.5  | 849.0  | 885.7  | 945.4  |
| 20°   | 741.2  | 741.2  | 736.6  | 734.3  | 741.2  | 757.2  | 793.9  | 835.2  | 849.0  | 892.6  | 963.7  |
| 22.5° | 754.9  | 752.6  | 748.1  | 741.2  | 741.2  | 757.2  | 796.2  | 839.8  | 853.6  | 901.8  | 979.8  |
| 25°   | 789.4  | 780.2  | 775.6  | 761.8  | 752.6  | 759.5  | 798.5  | 846.7  | 860.5  | 908.7  | 1002.8 |
| 27.5° | 821.5  | 819.2  | 819.2  | 805.4  | 775.6  | 768.7  | 807.7  | 858.2  | 869.7  | 917.9  | 1032.6 |
| 30°   | 876.6  | 872.0  | 872.0  | 855.9  | 819.2  | 787.1  | 816.9  | 867.4  | 881.1  | 924.7  | 1062.4 |
| 32.5° | 945.4  | 947.7  | 943.1  | 922.4  | 876.6  | 821.5  | 833.0  | 878.8  | 890.3  | 929.3  | 1092.2 |
| 35°   | 1021.1 | 1023.4 | 1034.9 | 1011.9 | 952.3  | 874.3  | 858.2  | 899.5  | 906.4  | 938.5  | 1115.2 |
| 37.5° | 1083.1 | 1083.1 | 1112.9 | 1117.5 | 1044.1 | 938.5  | 899.5  | 933.9  | 931.6  | 950.0  | 1138.1 |
| 40°   | 1151.9 | 1151.9 | 1186.3 | 1213.9 | 1161.1 | 1025.7 | 952.3  | 975.2  | 970.6  | 975.2  | 1170.3 |
| 42.5° | 1225.3 | 1229.9 | 1266.6 | 1314.8 | 1287.3 | 1138.1 | 1028.0 | 1039.5 | 1030.3 | 1016.5 | 1204.7 |
| 45°   | 1296.5 | 1307.9 | 1358.4 | 1422.7 | 1420.4 | 1271.2 | 1126.7 | 1129.0 | 1112.9 | 1085.4 | 1275.8 |
| 47.5° | 1379.1 | 1388.3 | 1459.4 | 1539.7 | 1560.4 | 1422.7 | 1252.9 | 1243.7 | 1223.0 | 1179.4 | 1372.2 |
| 50°   | 1519.0 | 1523.6 | 1574.1 | 1668.2 | 1707.2 | 1590.2 | 1395.1 | 1379.1 | 1356.1 | 1301.1 | 1503.0 |
| 52.5° | 1686.6 | 1684.3 | 1707.2 | 1805.9 | 1911.4 | 1785.2 | 1581.0 | 1558.1 | 1521.3 | 1450.2 | 1663.6 |
| 55°   | 1760.0 | 1766.9 | 1801.3 | 1920.6 | 2124.8 | 2069.8 | 1789.8 | 1757.7 | 1718.7 | 1626.9 | 1828.8 |
| 57.5° | 1631.5 | 1631.5 | 1700.3 | 1888.5 | 2244.2 | 2446.1 | 2023.9 | 1973.4 | 1925.2 | 1808.2 | 2017.0 |
| 60°   | 1305.6 | 1303.4 | 1386.0 | 1613.1 | 2154.7 | 2774.2 | 2349.7 | 2198.3 | 2124.8 | 1968.8 | 2205.1 |
| 62.5° | 915.6  | 897.2  | 933.9  | 1124.4 | 1764.6 | 2778.8 | 2957.8 | 2432.3 | 2333.6 | 2134.0 | 2404.8 |
| 65°   | 656.3  | 644.8  | 651.7  | 704.5  | 1011.9 | 2512.6 | 3630.1 | 2788.0 | 2611.3 | 2308.4 | 2645.7 |
| 67.5° | 536.9  | 523.2  | 520.9  | 585.1  | 582.8  | 1663.6 | 3832.0 | 3490.1 | 3104.6 | 2563.1 | 2918.8 |
| 70°   | 429.1  | 422.2  | 419.9  | 511.7  | 539.2  | 541.5  | 3572.8 | 4990.8 | 4307.0 | 2941.7 | 3283.6 |
| 72.5° | 305.2  | 305.2  | 323.5  | 424.5  | 523.2  | 475.0  | 2235.0 | 5277.7 | 5362.6 | 3425.9 | 3515.4 |
| 75°   | 183.6  | 181.3  | 227.2  | 337.3  | 504.8  | 458.9  | 690.7  | 4355.2 | 4433.2 | 3207.9 | 2719.1 |
| 77.5° | 87.2   | 87.2   | 126.2  | 227.2  | 447.5  | 431.4  | 394.7  | 2604.4 | 2622.8 | 1948.1 | 1379.1 |
| 80°   | 34.4   | 34.4   | 55.1   | 140.0  | 339.6  | 426.8  | 367.1  | 1073.9 | 1034.9 | 536.9  | 190.5  |
| 82.5° | 13.8   | 13.8   | 22.9   | 78.0   | 211.1  | 351.1  | 325.8  | 355.7  | 266.2  | 62.0   | 50.5   |
| 85°   | 2.3    | 4.6    | 9.2    | 45.9   | 119.3  | 185.9  | 263.9  | 220.3  | 140.0  | 36.7   | 36.7   |
| 87.5° | 0.0    | 2.3    | 4.6    | 13.8   | 34.4   | 78.0   | 133.1  | 101.0  | 64.2   | 11.5   | 16.1   |
| 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: P459914

CATALOG NUMBER: NVN-SA5A-AMB-U-SL2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 | 1030.3 |
| 2.5°  | 1023.4 | 1028.0 | 1037.2 | 1041.8 | 1044.1 | 1034.9 | 1034.9 | 1025.7 | 1023.4 | 1023.4 | 1023.4 |
| 5°    | 1011.9 | 1021.1 | 1028.0 | 1011.9 | 986.7  | 954.6  | 917.9  | 894.9  | 872.0  | 876.6  | 867.4  |
| 7.5°  | 998.2  | 1009.6 | 1000.5 | 947.7  | 883.4  | 823.8  | 759.5  | 722.8  | 679.2  | 674.6  | 663.2  |
| 10°   | 977.5  | 989.0  | 954.6  | 862.8  | 764.1  | 676.9  | 582.8  | 525.5  | 479.6  | 442.9  | 433.7  |
| 12.5° | 972.9  | 979.8  | 899.5  | 773.3  | 644.8  | 520.9  | 399.3  | 291.4  | 227.2  | 195.0  | 195.0  |
| 15°   | 975.2  | 975.2  | 849.0  | 683.8  | 516.3  | 344.2  | 192.7  | 140.0  | 117.0  | 114.7  | 112.4  |
| 17.5° | 986.7  | 972.9  | 798.5  | 596.6  | 378.6  | 179.0  | 114.7  | 105.6  | 101.0  | 101.0  | 101.0  |
| 20°   | 1007.3 | 972.9  | 754.9  | 504.8  | 238.6  | 112.4  | 98.7   | 94.1   | 91.8   | 89.5   | 89.5   |
| 22.5° | 1028.0 | 963.7  | 699.9  | 399.3  | 137.7  | 94.1   | 87.2   | 84.9   | 80.3   | 78.0   | 78.0   |
| 25°   | 1050.9 | 954.6  | 647.1  | 286.8  | 96.4   | 82.6   | 75.7   | 71.1   | 66.5   | 64.2   | 64.2   |
| 27.5° | 1071.6 | 945.4  | 585.1  | 181.3  | 84.9   | 73.4   | 66.5   | 59.7   | 52.8   | 50.5   | 50.5   |
| 30°   | 1085.4 | 929.3  | 525.5  | 114.7  | 75.7   | 66.5   | 57.4   | 48.2   | 41.3   | 39.0   | 39.0   |
| 32.5° | 1087.7 | 908.7  | 452.0  | 84.9   | 68.8   | 57.4   | 45.9   | 39.0   | 34.4   | 32.1   | 32.1   |
| 35°   | 1080.8 | 883.4  | 371.7  | 75.7   | 62.0   | 50.5   | 39.0   | 32.1   | 27.5   | 27.5   | 27.5   |
| 37.5° | 1071.6 | 858.2  | 289.1  | 68.8   | 55.1   | 43.6   | 32.1   | 27.5   | 25.2   | 22.9   | 22.9   |
| 40°   | 1069.3 | 833.0  | 192.7  | 64.2   | 50.5   | 36.7   | 27.5   | 22.9   | 20.7   | 18.4   | 18.4   |
| 42.5° | 1076.2 | 814.6  | 135.4  | 59.7   | 43.6   | 32.1   | 25.2   | 20.7   | 16.1   | 16.1   | 13.8   |
| 45°   | 1110.6 | 810.0  | 98.7   | 55.1   | 39.0   | 27.5   | 20.7   | 16.1   | 13.8   | 11.5   | 11.5   |
| 47.5° | 1168.0 | 819.2  | 80.3   | 50.5   | 34.4   | 22.9   | 18.4   | 13.8   | 11.5   | 9.2    | 9.2    |
| 50°   | 1250.6 | 853.6  | 73.4   | 45.9   | 27.5   | 20.7   | 13.8   | 11.5   | 9.2    | 9.2    | 9.2    |
| 52.5° | 1379.1 | 908.7  | 68.8   | 41.3   | 22.9   | 16.1   | 11.5   | 9.2    | 6.9    | 6.9    | 6.9    |
| 55°   | 1516.8 | 972.9  | 66.5   | 36.7   | 20.7   | 13.8   | 9.2    | 6.9    | 6.9    | 4.6    | 4.6    |
| 57.5° | 1675.1 | 1057.8 | 62.0   | 32.1   | 18.4   | 13.8   | 9.2    | 6.9    | 4.6    | 4.6    | 4.6    |
| 60°   | 1874.7 | 1172.6 | 55.1   | 27.5   | 16.1   | 11.5   | 6.9    | 4.6    | 4.6    | 4.6    | 4.6    |
| 62.5° | 2081.2 | 1291.9 | 48.2   | 22.9   | 13.8   | 9.2    | 6.9    | 4.6    | 4.6    | 4.6    | 4.6    |
| 65°   | 2333.6 | 1429.6 | 41.3   | 18.4   | 11.5   | 9.2    | 6.9    | 4.6    | 4.6    | 2.3    | 2.3    |
| 67.5° | 2638.8 | 1569.5 | 32.1   | 16.1   | 11.5   | 6.9    | 6.9    | 4.6    | 4.6    | 2.3    | 2.3    |
| 70°   | 3028.9 | 1748.5 | 27.5   | 13.8   | 9.2    | 6.9    | 6.9    | 4.6    | 4.6    | 2.3    | 2.3    |
| 72.5° | 3088.6 | 1509.9 | 22.9   | 13.8   | 9.2    | 6.9    | 6.9    | 4.6    | 4.6    | 2.3    | 2.3    |
| 75°   | 2111.1 | 720.5  | 20.7   | 11.5   | 9.2    | 9.2    | 6.9    | 4.6    | 4.6    | 2.3    | 2.3    |
| 77.5° | 920.1  | 169.8  | 18.4   | 11.5   | 9.2    | 9.2    | 9.2    | 6.9    | 4.6    | 2.3    | 2.3    |
| 80°   | 107.8  | 32.1   | 16.1   | 11.5   | 9.2    | 11.5   | 9.2    | 6.9    | 4.6    | 2.3    | 2.3    |
| 82.5° | 43.6   | 20.7   | 16.1   | 13.8   | 11.5   | 9.2    | 9.2    | 6.9    | 4.6    | 2.3    | 2.3    |
| 85°   | 32.1   | 16.1   | 16.1   | 16.1   | 11.5   | 6.9    | 6.9    | 4.6    | 4.6    | 2.3    | 2.3    |
| 87.5° | 16.1   | 6.9    | 4.6    | 4.6    | 4.6    | 4.6    | 4.6    | 2.3    | 2.3    | 2.3    | 2.3    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

STREETWORKS

Report Number: SP1-2005-791-1-R5

Test Date: 05/26/2020

Luminaire Tested: Light Squares Family Amber Color

Data in this report applies to families of products including Light Squares Family Amber Color

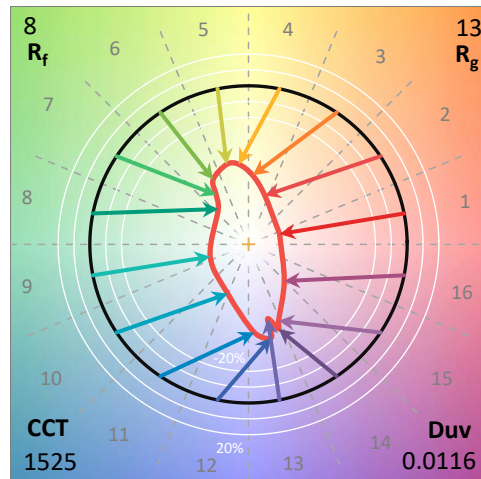
**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2005-791-1-R5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 02/07/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: STREETWORKS  
 Catalog Number: **Light Squares Family Amber Color**  
 Description: Light Squares Family Amber Color

**Spectral Parameters**

CCT (K): 1525  
 CIE u': 0.3546  
 CIE v': 0.5459  
 Duv: 0.0116  
 CIE x: 0.5918  
 CIE y: 0.4049  
 CIE z: 0.0033  
 Peak Wavelength (nm): 597  
 Dominant Wavelength (nm): 593  
 Purity: 99.6  
 Rf: 8.4  
 Rg: 12.9

|           |        |      |        |
|-----------|--------|------|--------|
| CRI (Ra): | -20.7  |      |        |
| R1:       | -32.5  | R9:  | -382.8 |
| R2:       | 55.0   | R10: | 34.9   |
| R3:       | 15.4   | R11: | -92.4  |
| R4:       | -67.7  | R12: | 2.7    |
| R5:       | -38.7  | R13: | -12.7  |
| R6:       | 47.4   | R14: | 45.0   |
| R7:       | -9.2   |      |        |
| R8:       | -135.0 |      |        |



**Test Conditions**

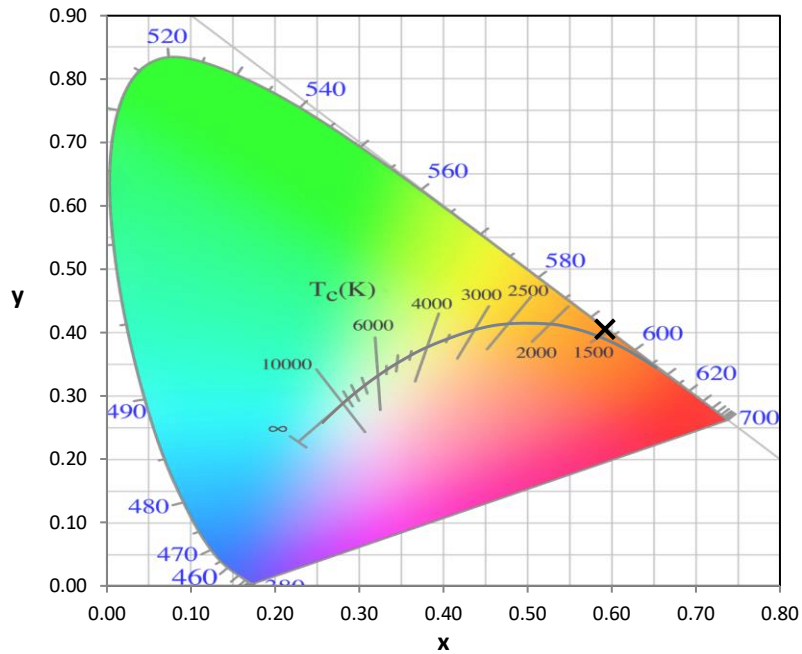
Stabilization Time: 65M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/42%  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2005-791-1-R5

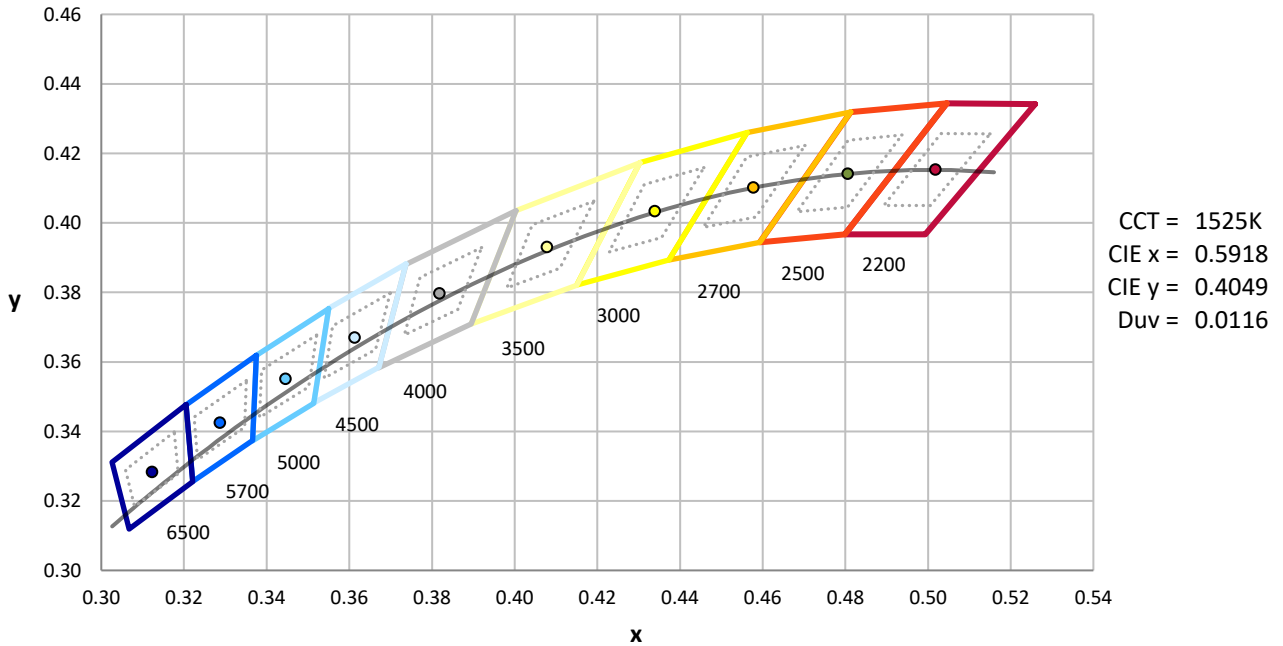
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 1/17/2020        | 7/17/2020            |
| Power Meter                    | XITRON 2801 IN0071    | 12/3/2019        | 12/3/2020            |
| AC Power Source                | CHROMA 61603 IN0063   | 12/3/2019        | 12/3/2020            |
| DC Power Source                | AGILENT E3634A IN0208 | 12/3/2019        | 12/3/2020            |
| Sphere Thermometer             | ONSET IN0085          | 12/3/2019        | 12/3/2020            |
| Room Thermometer               | ONSET IN0046          | 12/3/2019        | 12/3/2020            |

REPORT NUMBER: SP1-2005-791-1-R5

CIE 1931 Chromaticity Diagram



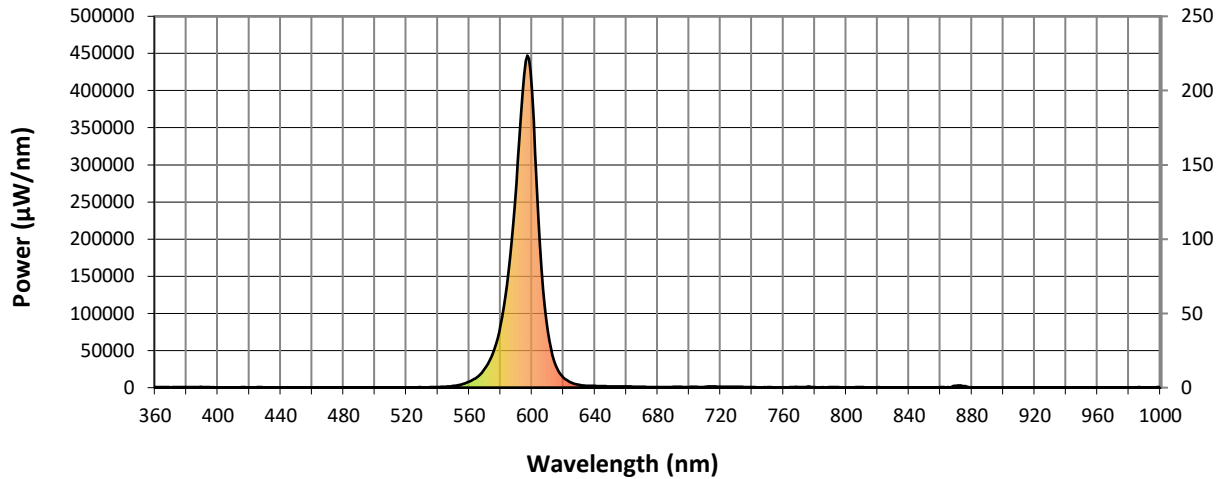
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies outside the range

REPORT NUMBER: SP1-2005-791-1-R5

**Photopic Flux vs. Wavelength**

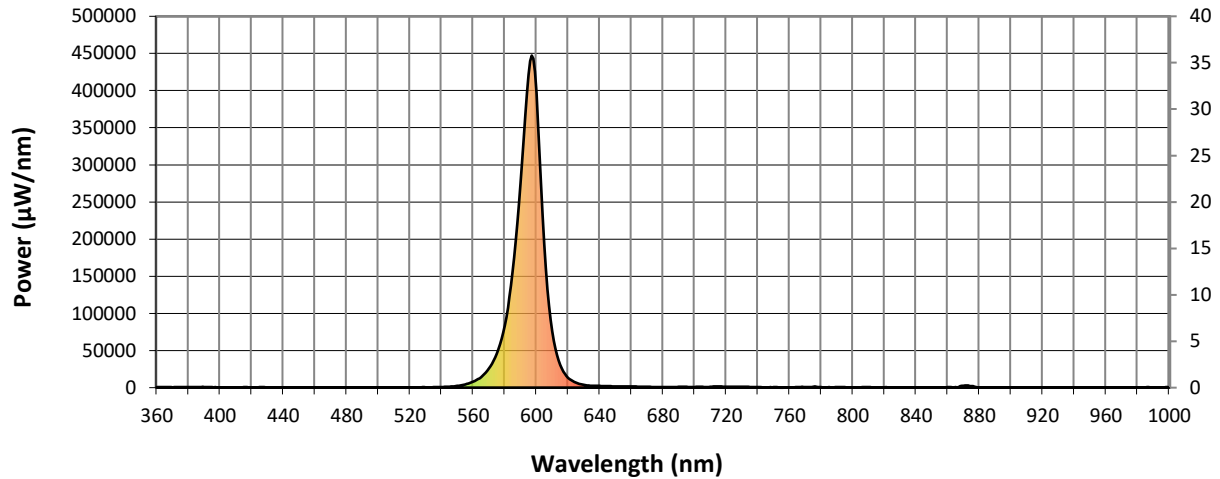


#####

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 818           | NR            | 490    | 224           | NR            | 620    | 13485         | NR            | 750    | 666           | NR            | 880    | 467           | NR            |
| 365    | 765           | NR            | 495    | 377           | NR            | 625    | 6667          | NR            | 755    | 63            | NR            | 885    | 232           | NR            |
| 370    | 529           | NR            | 500    | 342           | NR            | 630    | 3617          | NR            | 760    | 170           | NR            | 890    | 396           | NR            |
| 375    | 859           | NR            | 505    | 327           | NR            | 635    | 2624          | NR            | 765    | 772           | NR            | 895    | 250           | NR            |
| 380    | 838           | NR            | 510    | 403           | NR            | 640    | 2321          | NR            | 770    | 684           | NR            | 900    | 194           | NR            |
| 385    | 931           | NR            | 515    | 396           | NR            | 645    | 2019          | NR            | 775    | 1108          | NR            | 905    | 303           | NR            |
| 390    | 814           | NR            | 520    | 478           | NR            | 650    | 1694          | NR            | 780    | 562           | NR            | 910    | 335           | NR            |
| 395    | 695           | NR            | 525    | 468           | NR            | 655    | 1437          | NR            | 785    | 582           | NR            | 915    | 255           | NR            |
| 400    | 338           | NR            | 530    | 527           | NR            | 660    | 1541          | NR            | 790    | 675           | NR            | 920    | 182           | NR            |
| 405    | 555           | NR            | 535    | 574           | NR            | 665    | 1318          | NR            | 795    | 578           | NR            | 925    | 228           | NR            |
| 410    | 491           | NR            | 540    | 823           | NR            | 670    | 1092          | NR            | 800    | 147           | NR            | 930    | 239           | NR            |
| 415    | 563           | NR            | 545    | 1340          | NR            | 675    | 936           | NR            | 805    | 559           | NR            | 935    | 148           | NR            |
| 420    | 360           | NR            | 550    | 2313          | NR            | 680    | 727           | NR            | 810    | 727           | NR            | 940    | 308           | NR            |
| 425    | 598           | NR            | 555    | 4294          | NR            | 685    | 833           | NR            | 815    | 444           | NR            | 945    | 313           | NR            |
| 430    | 464           | NR            | 560    | 8017          | NR            | 690    | 1005          | NR            | 820    | 479           | NR            | 950    | 345           | NR            |
| 435    | 440           | NR            | 565    | 14123         | NR            | 695    | 1012          | NR            | 825    | 224           | NR            | 955    | 229           | NR            |
| 440    | 368           | NR            | 570    | 25560         | NR            | 700    | 962           | NR            | 830    | 333           | NR            | 960    | 363           | NR            |
| 445    | 428           | NR            | 575    | 45938         | NR            | 705    | 994           | NR            | 835    | 379           | NR            | 965    | 412           | NR            |
| 450    | 279           | NR            | 580    | 84007         | NR            | 710    | 1014          | NR            | 840    | 285           | NR            | 970    | 272           | NR            |
| 455    | 407           | NR            | 585    | 155807        | NR            | 715    | 1458          | NR            | 845    | 333           | NR            | 975    | 345           | NR            |
| 460    | 365           | NR            | 590    | 275552        | NR            | 720    | 1076          | NR            | 850    | 385           | NR            | 980    | 449           | NR            |
| 465    | 328           | NR            | 595    | 421402        | NR            | 725    | 1113          | NR            | 855    | 558           | NR            | 985    | 501           | NR            |
| 470    | 249           | NR            | 600    | 396839        | NR            | 730    | 1144          | NR            | 860    | 663           | NR            | 990    | 343           | NR            |
| 475    | 277           | NR            | 605    | 193475        | NR            | 735    | 799           | NR            | 865    | 591           | NR            | 995    | 152           | NR            |
| 480    | 229           | NR            | 610    | 75719         | NR            | 740    | 692           | NR            | 870    | 2634          | NR            | 1000   | 132           | NR            |
| 485    | 185           | NR            | 615    | 30466         | NR            | 745    | 414           | NR            | 875    | 2146          | NR            |        |               |               |

REPORT NUMBER: SP1-2005-791-1-R5

**Scotopic Flux vs. Wavelength**



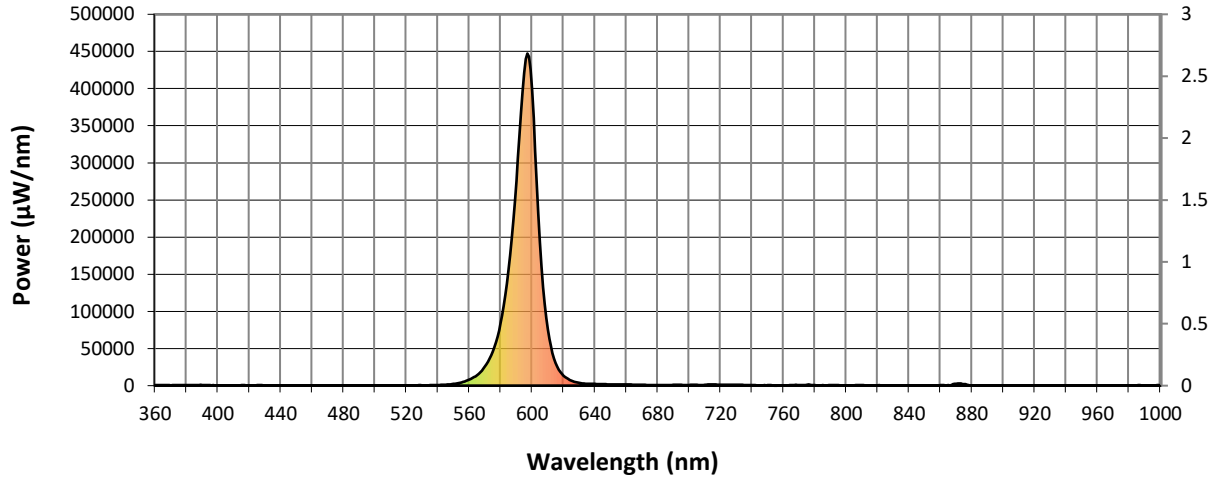
**Scotopic Lumens: 939.9**

**S/P: 0.23**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 818                                  | NR                             | 490               | 224                                  | NR                             | 620               | 13485                                | NR                             | 750               | 666                                  | NR                             | 880               | 467                                  | NR                             |
| 365               | 765                                  | NR                             | 495               | 377                                  | NR                             | 625               | 6667                                 | NR                             | 755               | 63                                   | NR                             | 885               | 232                                  | NR                             |
| 370               | 529                                  | NR                             | 500               | 342                                  | NR                             | 630               | 3617                                 | NR                             | 760               | 170                                  | NR                             | 890               | 396                                  | NR                             |
| 375               | 859                                  | NR                             | 505               | 327                                  | NR                             | 635               | 2624                                 | NR                             | 765               | 772                                  | NR                             | 895               | 250                                  | NR                             |
| 380               | 838                                  | NR                             | 510               | 403                                  | NR                             | 640               | 2321                                 | NR                             | 770               | 684                                  | NR                             | 900               | 194                                  | NR                             |
| 385               | 931                                  | NR                             | 515               | 396                                  | NR                             | 645               | 2019                                 | NR                             | 775               | 1108                                 | NR                             | 905               | 303                                  | NR                             |
| 390               | 814                                  | NR                             | 520               | 478                                  | NR                             | 650               | 1694                                 | NR                             | 780               | 562                                  | NR                             | 910               | 335                                  | NR                             |
| 395               | 695                                  | NR                             | 525               | 468                                  | NR                             | 655               | 1437                                 | NR                             | 785               | 582                                  | NR                             | 915               | 255                                  | NR                             |
| 400               | 338                                  | NR                             | 530               | 527                                  | NR                             | 660               | 1541                                 | NR                             | 790               | 675                                  | NR                             | 920               | 182                                  | NR                             |
| 405               | 555                                  | NR                             | 535               | 574                                  | NR                             | 665               | 1318                                 | NR                             | 795               | 578                                  | NR                             | 925               | 228                                  | NR                             |
| 410               | 491                                  | NR                             | 540               | 823                                  | NR                             | 670               | 1092                                 | NR                             | 800               | 147                                  | NR                             | 930               | 239                                  | NR                             |
| 415               | 563                                  | NR                             | 545               | 1340                                 | NR                             | 675               | 936                                  | NR                             | 805               | 559                                  | NR                             | 935               | 148                                  | NR                             |
| 420               | 360                                  | NR                             | 550               | 2313                                 | NR                             | 680               | 727                                  | NR                             | 810               | 727                                  | NR                             | 940               | 308                                  | NR                             |
| 425               | 598                                  | NR                             | 555               | 4294                                 | NR                             | 685               | 833                                  | NR                             | 815               | 444                                  | NR                             | 945               | 313                                  | NR                             |
| 430               | 464                                  | NR                             | 560               | 8017                                 | NR                             | 690               | 1005                                 | NR                             | 820               | 479                                  | NR                             | 950               | 345                                  | NR                             |
| 435               | 440                                  | NR                             | 565               | 14123                                | NR                             | 695               | 1012                                 | NR                             | 825               | 224                                  | NR                             | 955               | 229                                  | NR                             |
| 440               | 368                                  | NR                             | 570               | 25560                                | NR                             | 700               | 962                                  | NR                             | 830               | 333                                  | NR                             | 960               | 363                                  | NR                             |
| 445               | 428                                  | NR                             | 575               | 45938                                | NR                             | 705               | 994                                  | NR                             | 835               | 379                                  | NR                             | 965               | 412                                  | NR                             |
| 450               | 279                                  | NR                             | 580               | 84007                                | NR                             | 710               | 1014                                 | NR                             | 840               | 285                                  | NR                             | 970               | 272                                  | NR                             |
| 455               | 407                                  | NR                             | 585               | 155807                               | NR                             | 715               | 1458                                 | NR                             | 845               | 333                                  | NR                             | 975               | 345                                  | NR                             |
| 460               | 365                                  | NR                             | 590               | 275552                               | NR                             | 720               | 1076                                 | NR                             | 850               | 385                                  | NR                             | 980               | 449                                  | NR                             |
| 465               | 328                                  | NR                             | 595               | 421402                               | NR                             | 725               | 1113                                 | NR                             | 855               | 558                                  | NR                             | 985               | 501                                  | NR                             |
| 470               | 249                                  | NR                             | 600               | 396839                               | NR                             | 730               | 1144                                 | NR                             | 860               | 663                                  | NR                             | 990               | 343                                  | NR                             |
| 475               | 277                                  | NR                             | 605               | 193475                               | NR                             | 735               | 799                                  | NR                             | 865               | 591                                  | NR                             | 995               | 152                                  | NR                             |
| 480               | 229                                  | NR                             | 610               | 75719                                | NR                             | 740               | 692                                  | NR                             | 870               | 2634                                 | NR                             | 1000              | 132                                  | NR                             |
| 485               | 185                                  | NR                             | 615               | 30466                                | NR                             | 745               | 414                                  | NR                             | 875               | 2146                                 | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-2005-791-1-R5

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 115.1**

**M/P: 0.03**

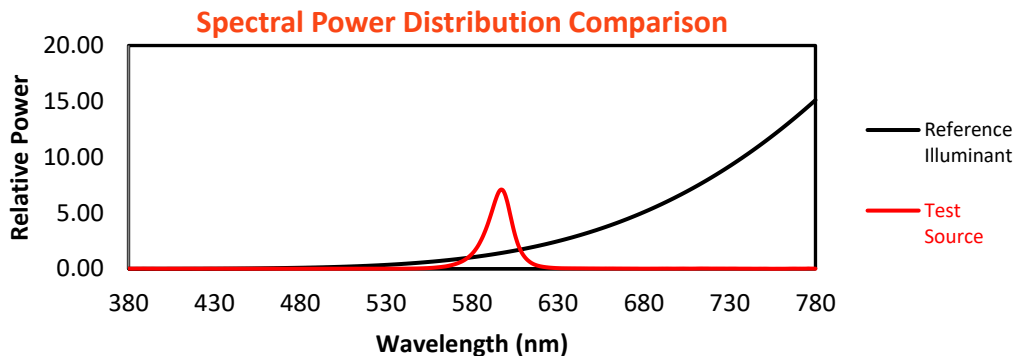
| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 818           | NR            | 490    | 224           | NR            | 620    | 13485         | NR            | 750    | 666           | NR            | 880    | 467           | NR            |
| 365    | 765           | NR            | 495    | 377           | NR            | 625    | 6667          | NR            | 755    | 63            | NR            | 885    | 232           | NR            |
| 370    | 529           | NR            | 500    | 342           | NR            | 630    | 3617          | NR            | 760    | 170           | NR            | 890    | 396           | NR            |
| 375    | 859           | NR            | 505    | 327           | NR            | 635    | 2624          | NR            | 765    | 772           | NR            | 895    | 250           | NR            |
| 380    | 838           | NR            | 510    | 403           | NR            | 640    | 2321          | NR            | 770    | 684           | NR            | 900    | 194           | NR            |
| 385    | 931           | NR            | 515    | 396           | NR            | 645    | 2019          | NR            | 775    | 1108          | NR            | 905    | 303           | NR            |
| 390    | 814           | NR            | 520    | 478           | NR            | 650    | 1694          | NR            | 780    | 562           | NR            | 910    | 335           | NR            |
| 395    | 695           | NR            | 525    | 468           | NR            | 655    | 1437          | NR            | 785    | 582           | NR            | 915    | 255           | NR            |
| 400    | 338           | NR            | 530    | 527           | NR            | 660    | 1541          | NR            | 790    | 675           | NR            | 920    | 182           | NR            |
| 405    | 555           | NR            | 535    | 574           | NR            | 665    | 1318          | NR            | 795    | 578           | NR            | 925    | 228           | NR            |
| 410    | 491           | NR            | 540    | 823           | NR            | 670    | 1092          | NR            | 800    | 147           | NR            | 930    | 239           | NR            |
| 415    | 563           | NR            | 545    | 1340          | NR            | 675    | 936           | NR            | 805    | 559           | NR            | 935    | 148           | NR            |
| 420    | 360           | NR            | 550    | 2313          | NR            | 680    | 727           | NR            | 810    | 727           | NR            | 940    | 308           | NR            |
| 425    | 598           | NR            | 555    | 4294          | NR            | 685    | 833           | NR            | 815    | 444           | NR            | 945    | 313           | NR            |
| 430    | 464           | NR            | 560    | 8017          | NR            | 690    | 1005          | NR            | 820    | 479           | NR            | 950    | 345           | NR            |
| 435    | 440           | NR            | 565    | 14123         | NR            | 695    | 1012          | NR            | 825    | 224           | NR            | 955    | 229           | NR            |
| 440    | 368           | NR            | 570    | 25560         | NR            | 700    | 962           | NR            | 830    | 333           | NR            | 960    | 363           | NR            |
| 445    | 428           | NR            | 575    | 45938         | NR            | 705    | 994           | NR            | 835    | 379           | NR            | 965    | 412           | NR            |
| 450    | 279           | NR            | 580    | 84007         | NR            | 710    | 1014          | NR            | 840    | 285           | NR            | 970    | 272           | NR            |
| 455    | 407           | NR            | 585    | 155807        | NR            | 715    | 1458          | NR            | 845    | 333           | NR            | 975    | 345           | NR            |
| 460    | 365           | NR            | 590    | 275552        | NR            | 720    | 1076          | NR            | 850    | 385           | NR            | 980    | 449           | NR            |
| 465    | 328           | NR            | 595    | 421402        | NR            | 725    | 1113          | NR            | 855    | 558           | NR            | 985    | 501           | NR            |
| 470    | 249           | NR            | 600    | 396839        | NR            | 730    | 1144          | NR            | 860    | 663           | NR            | 990    | 343           | NR            |
| 475    | 277           | NR            | 605    | 193475        | NR            | 735    | 799           | NR            | 865    | 591           | NR            | 995    | 152           | NR            |
| 480    | 229           | NR            | 610    | 75719         | NR            | 740    | 692           | NR            | 870    | 2634          | NR            | 1000   | 132           | NR            |
| 485    | 185           | NR            | 615    | 30466         | NR            | 745    | 414           | NR            | 875    | 2146          | NR            |        |               |               |

REPORT NUMBER: SP1-2005-791-1-R5

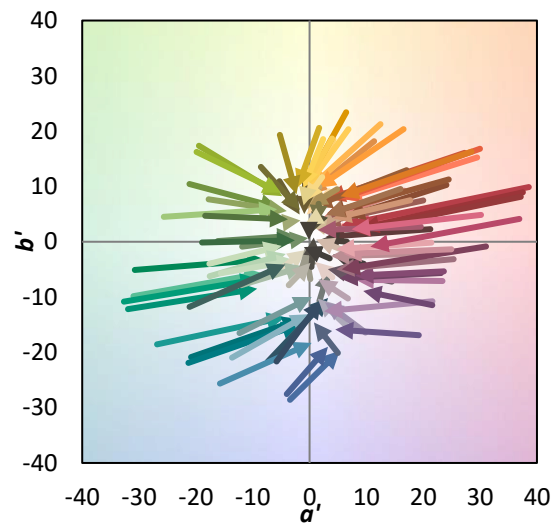
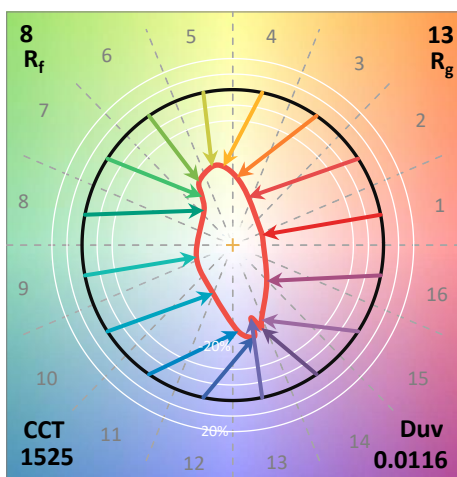
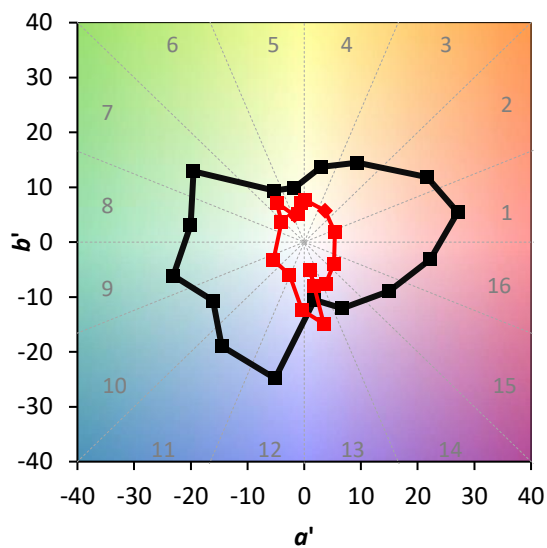
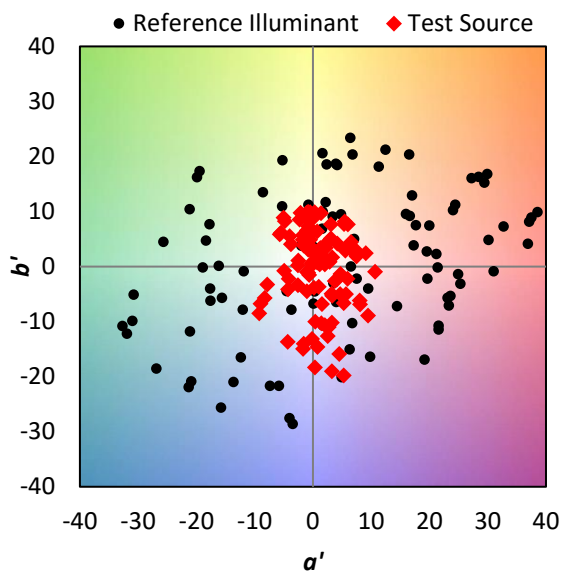
TM-30-18

**Summary**

$R_f = 8.4$   
 $R_g = 12.9$   
 CIE  $R_a = -20.7$   
 $R_9 = -382.8$



**Color Vector Graphics**



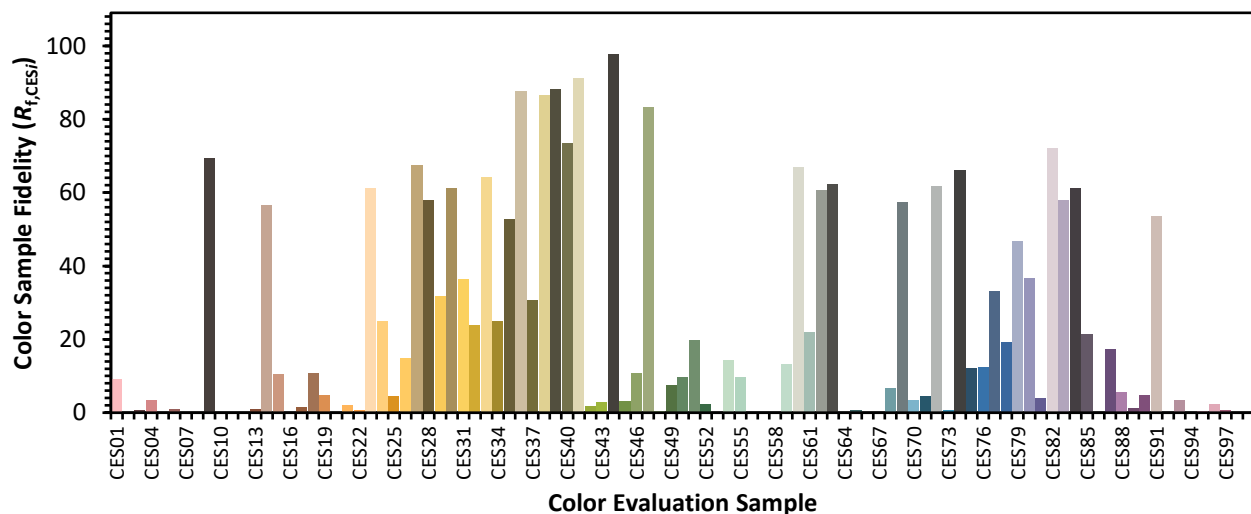


REPORT NUMBER: SP1-2005-791-1-R5

TM-30-18

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

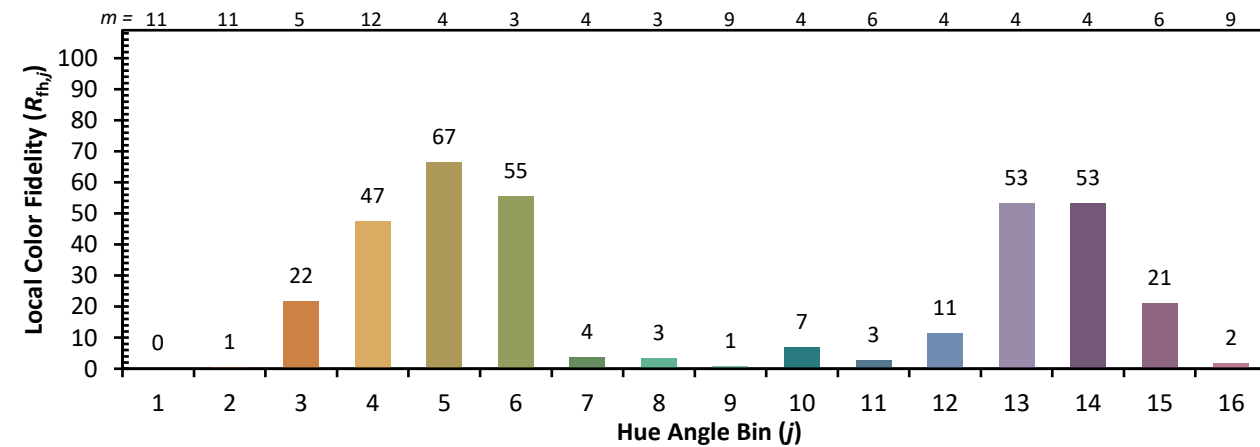
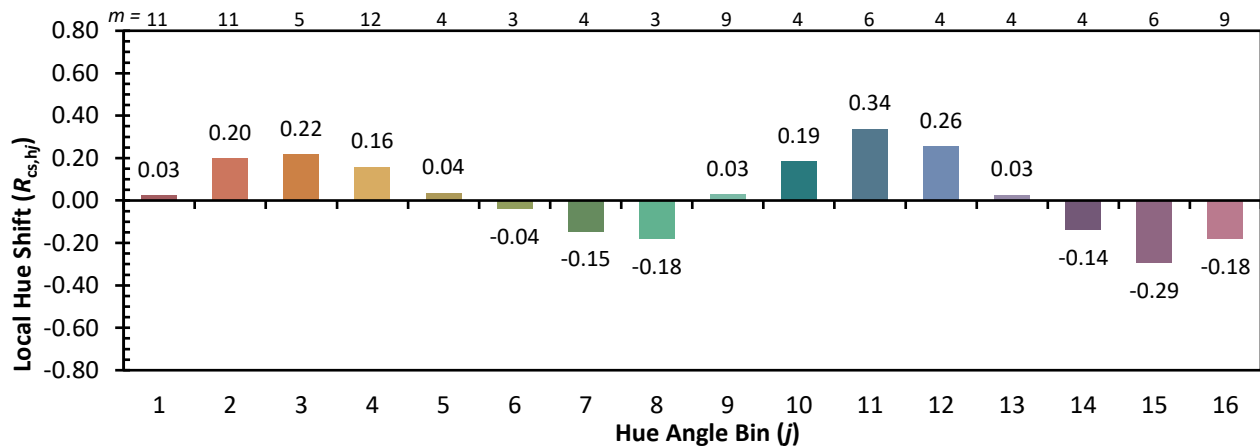
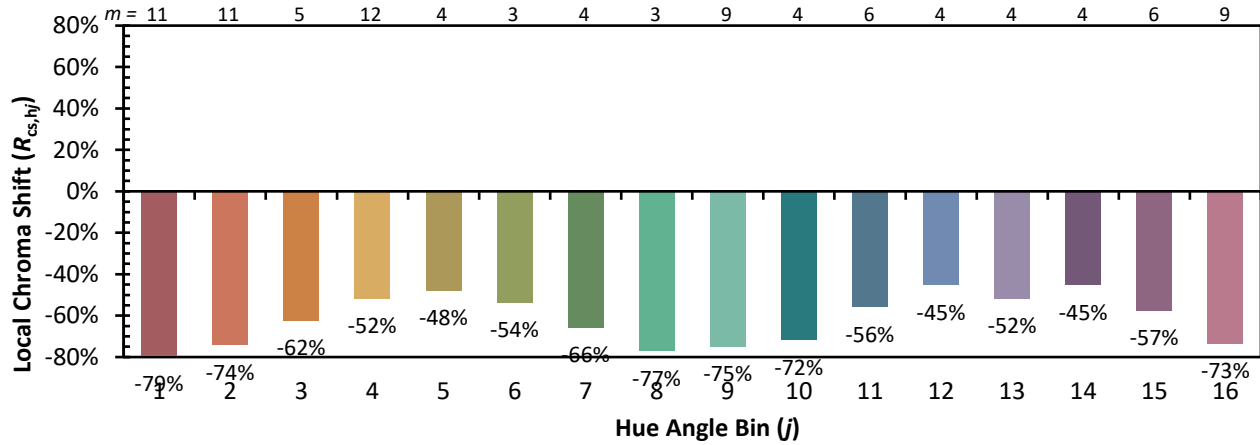
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 90 | CES26 = 15 | CES51 = 20 | CES76 = 12 |
| CES02 = 69 | CES27 = 67 | CES52 = 2  | CES77 = 33 |
| CES03 = 31 | CES28 = 58 | CES53 = 0  | CES78 = 19 |
| CES04 = 77 | CES29 = 32 | CES54 = 14 | CES79 = 47 |
| CES05 = 52 | CES30 = 61 | CES55 = 10 | CES80 = 37 |
| CES06 = 56 | CES31 = 36 | CES56 = 0  | CES81 = 4  |
| CES07 = 41 | CES32 = 24 | CES57 = 0  | CES82 = 72 |
| CES08 = 38 | CES33 = 64 | CES58 = 0  | CES83 = 58 |
| CES09 = 29 | CES34 = 25 | CES59 = 13 | CES84 = 61 |
| CES10 = 87 | CES35 = 53 | CES60 = 67 | CES85 = 21 |
| CES11 = 70 | CES36 = 88 | CES61 = 22 | CES86 = 0  |
| CES12 = 75 | CES37 = 31 | CES62 = 61 | CES87 = 17 |
| CES13 = 47 | CES38 = 86 | CES63 = 62 | CES88 = 5  |
| CES14 = 76 | CES39 = 88 | CES64 = 0  | CES89 = 1  |
| CES15 = 74 | CES40 = 74 | CES65 = 1  | CES90 = 5  |
| CES16 = 49 | CES41 = 91 | CES66 = 0  | CES91 = 54 |
| CES17 = 55 | CES42 = 2  | CES67 = 0  | CES92 = 0  |
| CES18 = 59 | CES43 = 3  | CES68 = 7  | CES93 = 3  |
| CES19 = 80 | CES44 = 98 | CES69 = 57 | CES94 = 0  |
| CES20 = 71 | CES45 = 3  | CES70 = 3  | CES95 = 0  |
| CES21 = 94 | CES46 = 11 | CES71 = 5  | CES96 = 2  |
| CES22 = 86 | CES47 = 83 | CES72 = 62 | CES97 = 1  |
| CES23 = 93 | CES48 = 0  | CES73 = 1  | CES98 = 0  |
| CES24 = 95 | CES49 = 7  | CES74 = 66 | CES99 = 0  |
| CES25 = 78 | CES50 = 10 | CES75 = 12 |            |



REPORT NUMBER: SP1-2005-791-1-R5

TM-30-18

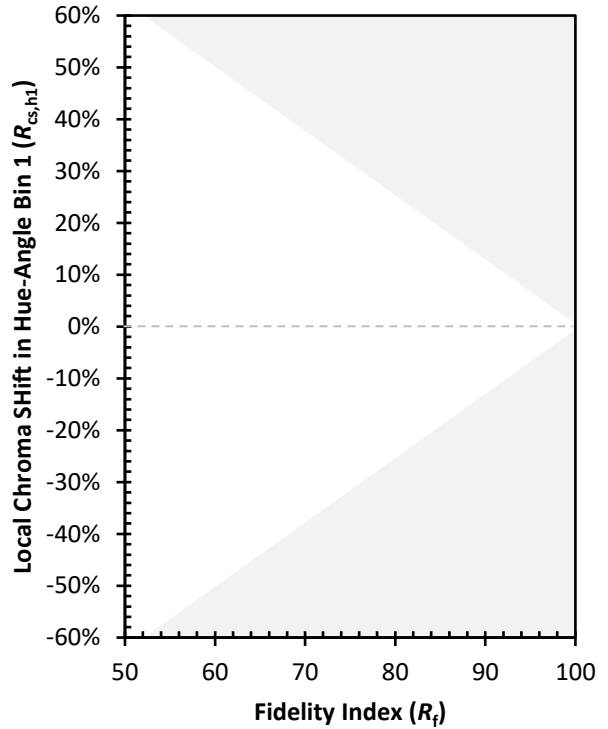
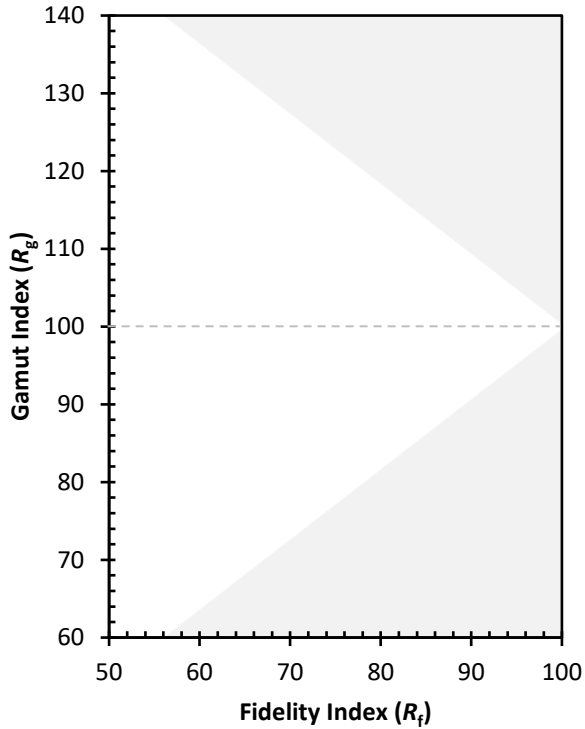
Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-2005-791-1-R5

TM-30-18

Measure Comparisons



(END OF REPORT)