

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: McGRAW-EDISON

Report Number: P1435501

Luminaire Tested: **GALN-SB1C-840-U-T4LG**

Issue Date: 03/24/202

This test was performed under the Supervised Manufacturer's Testing Program. The results of this test have not been influenced by sources from within Cooper Lighting Solutions or from external interests.

Report Generated By 670245763



**Test Information**

Test Method: LM-79-08  
 Report Number: P1435501  
 Test Lab: INNOVATION CENTER(G1)  
 Issue Date: 03/24/202  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: McGRAW-EDISON  
 Catalog Number: GALN-SB1C-840-U-T4LG  
 Description: GALLEON II AREA AND ROADWAY HIGH DENSITY LUMINAIRE 615mA 1xLight  
 Square PACKAGE 80CRI 4000K FIXTURE w/ TYPE IV LOW GLARE  
 Light Source: (26) 4000K CCT, 80 CRI LEDS  
 Ballast/Driver: ELECTRONIC DRIVER

Luminaire Equipment:

| <u>Sample No.</u> | <u>Condition</u> | <u>Description</u> |
|-------------------|------------------|--------------------|
| a                 | good             | reflector          |
| b                 | good             | lens               |
| c                 | good             | housing            |
| d                 | good             | cord               |

**Summary**

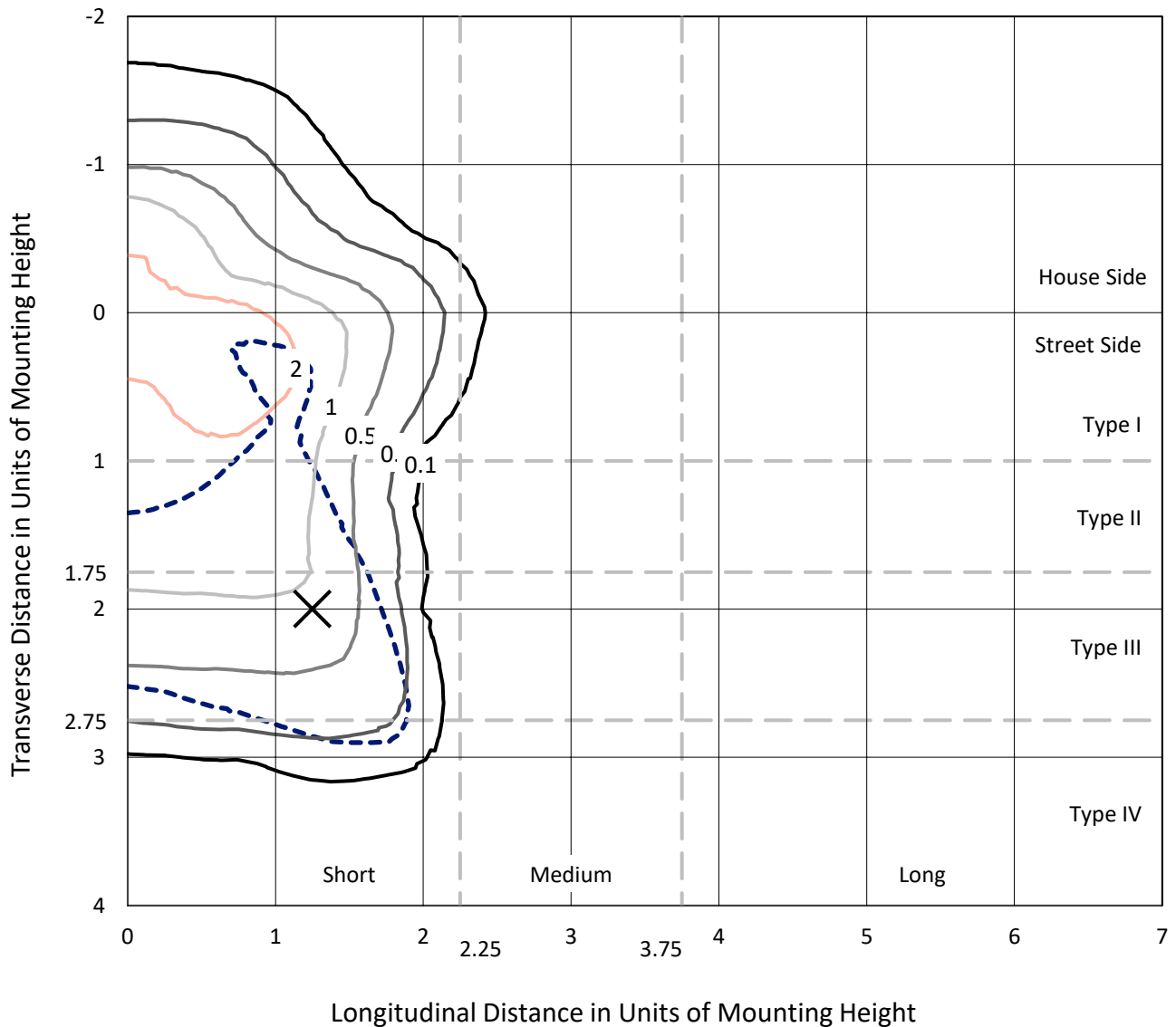
Lumens per Lamp: N/A  
 Luminaire Lumens: 7012 lumens  
 Efficiency: N/A  
 Efficacy: 128.9 lumens/watt  
 Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
 IES Classification: Type IV - Short  
 BUG Rating: B1 - U0 - G1

Input Watts (W): 54.4  
 Input Voltage (V): 120  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: 0.97  
 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: P1435501  
 CATALOG NUMBER: GALN-SB1C-840-U-T4LG

### Iso-Footcandle Lines of Horizontal Illumination

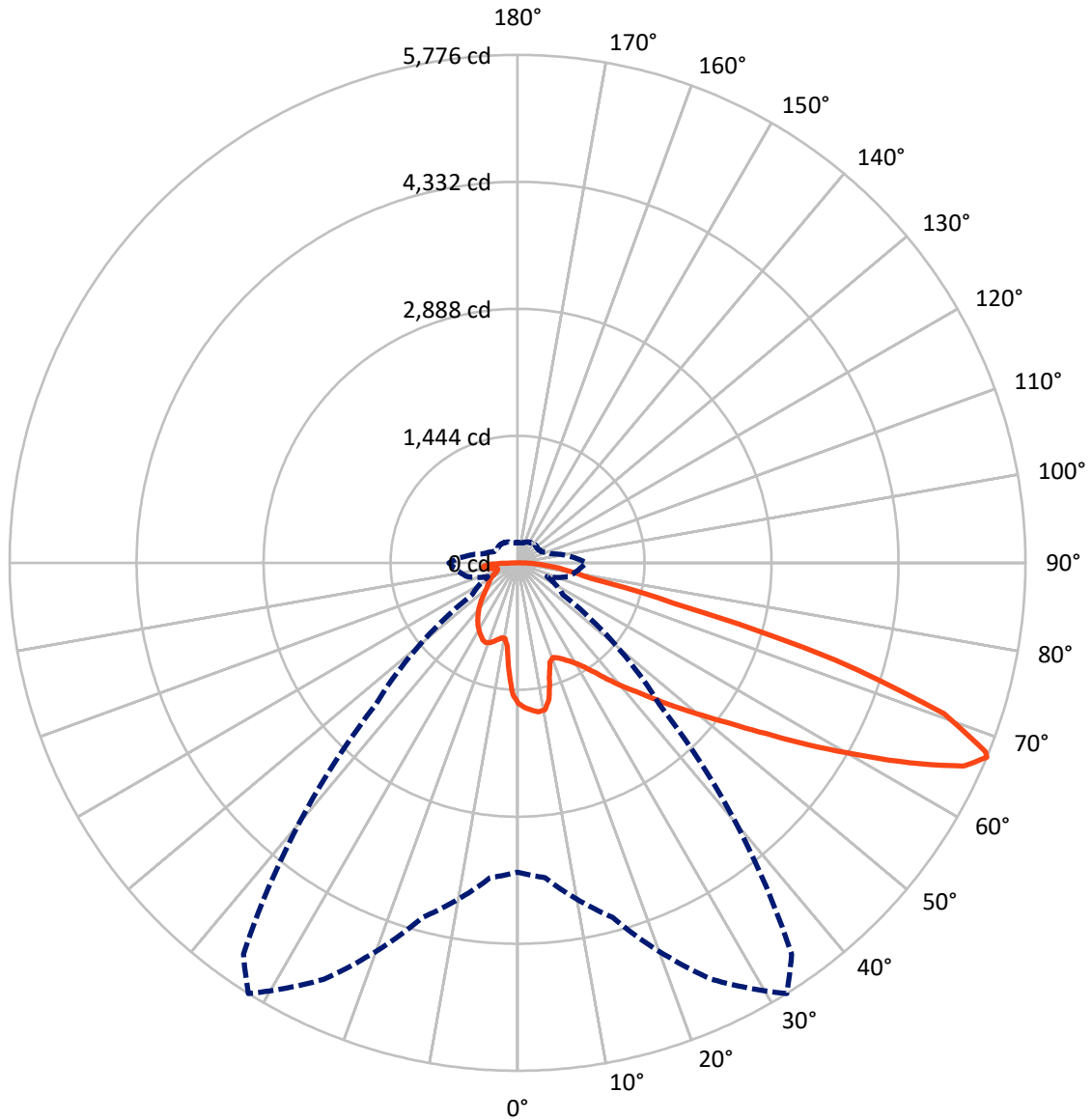
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 4.3 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 32-Deg Lateral      - - - Horizontal Cone Through 67-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1660.1   | 0.0    | 1660.1 |
|                    | % Fixture | 23.7     | 0.0    | 23.7   |
| <b>Street Side</b> | Lumens    | 5352.0   | 0.0    | 5352.0 |
|                    | % Fixture | 76.3     | 0.0    | 76.3   |
| <b>Total</b>       | Lumens    | 7012.0   | 0.0    | 7012.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 140.0  | 2.0       |
| 10°-20°   | 371.7  | 5.3       |
| 20°-30°   | 607.0  | 8.7       |
| 30°-40°   | 894.6  | 12.8      |
| 40°-50°   | 1233.7 | 17.6      |
| 50°-60°   | 1558.5 | 22.2      |
| 60°-70°   | 1508.4 | 21.5      |
| 70°-80°   | 538.3  | 7.7       |
| 80°-90°   | 159.9  | 2.3       |
| 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°    | 7012.0 | 100.0     |
| 0°-180°   | 7012.0 | 100.0     |

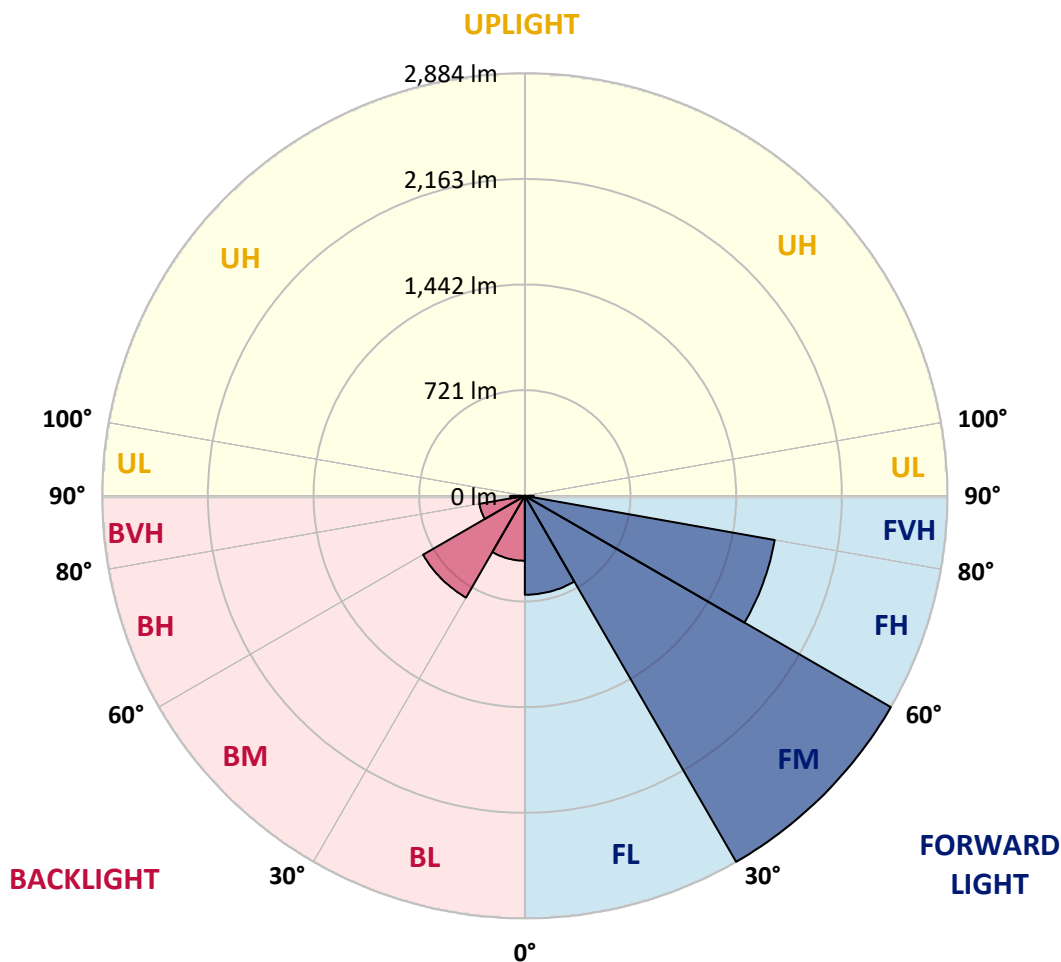


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 675.6  | 9.6       |                         |      |         |
| FM (30°-60°)   | 2884.3 | 41.1      |                         |      |         |
| FH (60°-80°)   | 1731.8 | 24.7      |                         |      | G1/1800 |
| FVH (80°-90°)  | 60.2   | 0.9       |                         |      | G1/100  |
| BL (0°-30°)    | 443.0  | 6.3       | B1/500                  |      |         |
| BM (30°-60°)   | 802.6  | 11.4      | B1/1000                 |      |         |
| BH (60°-80°)   | 314.9  | 4.5       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 99.6   | 1.4       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**  
 Type IV Short





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CATALOG NUMBER: GALN-SB1C-840-U-T4LG

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 32°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 |
| 2.5°  | 1662.8 | 1658.2 | 1653.5 | 1656.6 | 1650.4 | 1648.8 | 1641.0 | 1637.9 | 1628.6 | 1627.0 | 1609.9 |
| 5°    | 1697.1 | 1687.7 | 1686.2 | 1689.3 | 1683.1 | 1683.1 | 1676.8 | 1672.2 | 1658.2 | 1650.4 | 1625.5 |
| 7.5°  | 1697.1 | 1695.5 | 1698.6 | 1709.5 | 1711.1 | 1711.1 | 1711.1 | 1712.7 | 1698.6 | 1687.7 | 1648.8 |
| 10°   | 1600.6 | 1585.0 | 1619.2 | 1673.7 | 1700.2 | 1715.8 | 1743.8 | 1760.9 | 1750.0 | 1742.2 | 1689.3 |
| 12.5° | 1312.5 | 1314.1 | 1368.6 | 1485.3 | 1591.2 | 1636.4 | 1753.1 | 1815.4 | 1820.1 | 1807.6 | 1740.7 |
| 15°   | 1113.2 | 1121.0 | 1149.0 | 1233.1 | 1354.6 | 1421.5 | 1698.6 | 1863.7 | 1901.0 | 1888.6 | 1803.0 |
| 17.5° | 1052.5 | 1057.2 | 1069.6 | 1117.9 | 1186.4 | 1240.9 | 1550.7 | 1894.8 | 1999.1 | 1983.6 | 1873.0 |
| 20°   | 1043.2 | 1046.3 | 1061.8 | 1102.3 | 1149.0 | 1180.2 | 1399.7 | 1869.9 | 2091.0 | 2084.8 | 1936.9 |
| 22.5° | 1044.7 | 1047.8 | 1068.1 | 1124.1 | 1172.4 | 1198.9 | 1351.4 | 1812.3 | 2187.5 | 2193.8 | 2002.3 |
| 25°   | 1047.8 | 1049.4 | 1080.5 | 1155.3 | 1216.0 | 1248.7 | 1382.6 | 1760.9 | 2268.5 | 2321.4 | 2073.9 |
| 27.5° | 1065.0 | 1069.6 | 1111.7 | 1195.7 | 1267.4 | 1304.7 | 1455.8 | 1778.0 | 2357.2 | 2466.2 | 2159.5 |
| 30°   | 1111.7 | 1114.8 | 1166.2 | 1253.4 | 1331.2 | 1370.1 | 1542.9 | 1846.6 | 2466.2 | 2615.7 | 2243.6 |
| 32.5° | 1184.8 | 1188.0 | 1247.1 | 1337.4 | 1421.5 | 1468.2 | 1656.6 | 1977.3 | 2587.7 | 2772.9 | 2327.7 |
| 35°   | 1286.0 | 1287.6 | 1354.6 | 1451.1 | 1539.8 | 1592.8 | 1788.9 | 2125.3 | 2713.8 | 2906.8 | 2389.9 |
| 37.5° | 1405.9 | 1416.8 | 1485.3 | 1586.5 | 1690.9 | 1739.1 | 1944.6 | 2298.1 | 2825.9 | 3020.5 | 2425.7 |
| 40°   | 1571.0 | 1574.1 | 1641.0 | 1739.1 | 1849.7 | 1896.4 | 2100.3 | 2461.6 | 2948.9 | 3087.5 | 2458.4 |
| 42.5° | 1740.7 | 1767.2 | 1823.2 | 1932.2 | 2014.7 | 2052.1 | 2277.8 | 2611.0 | 3047.0 | 3090.6 | 2444.4 |
| 45°   | 1968.0 | 1988.2 | 2044.3 | 2140.8 | 2223.3 | 2266.9 | 2469.3 | 2748.0 | 3096.8 | 3064.1 | 2413.3 |
| 47.5° | 2228.0 | 2240.5 | 2285.6 | 2372.8 | 2464.7 | 2495.8 | 2668.6 | 2825.9 | 3115.5 | 3045.4 | 2399.3 |
| 50°   | 2534.7 | 2534.7 | 2567.4 | 2642.2 | 2726.2 | 2769.8 | 2852.4 | 2872.6 | 3170.0 | 3012.7 | 2435.1 |
| 52.5° | 2793.2 | 2805.6 | 2849.2 | 2955.1 | 3039.2 | 3089.0 | 2995.6 | 2944.2 | 3059.4 | 2830.6 | 2446.0 |
| 55°   | 3040.7 | 3054.8 | 3152.8 | 3285.2 | 3428.4 | 3482.9 | 3174.6 | 2908.4 | 2687.3 | 2564.3 | 2371.3 |
| 57.5° | 3277.4 | 3307.0 | 3430.0 | 3688.4 | 3904.9 | 3900.2 | 3402.0 | 2587.7 | 2193.8 | 2270.0 | 2207.8 |
| 60°   | 3607.5 | 3638.6 | 3834.8 | 4160.2 | 4424.9 | 4314.3 | 3405.1 | 2153.3 | 1709.5 | 1812.3 | 1901.0 |
| 62.5° | 3883.1 | 3936.0 | 4224.0 | 4765.9 | 5008.7 | 4835.9 | 3123.3 | 1648.8 | 1135.0 | 1264.3 | 1469.8 |
| 65°   | 3858.1 | 3928.2 | 4375.1 | 5211.1 | 5573.9 | 5413.6 | 2710.7 | 1043.2 | 585.4  | 864.1  | 1029.2 |
| 67°   | 3518.7 | 3595.0 | 4174.2 | 5226.7 | 5776.3 | 5433.8 | 2288.7 | 630.6  | 372.1  | 599.4  | 714.6  |
| 67.5° | 3324.1 | 3436.2 | 4074.6 | 5197.1 | 5739.0 | 5348.2 | 2098.8 | 527.8  | 350.3  | 557.4  | 650.8  |
| 70°   | 2044.3 | 2224.9 | 3057.9 | 4594.6 | 5144.2 | 4476.3 | 1166.2 | 298.9  | 284.9  | 373.7  | 450.0  |
| 72.5° | 615.0  | 669.5  | 1180.2 | 2947.3 | 3775.6 | 3317.9 | 524.7  | 230.4  | 255.3  | 300.5  | 347.2  |
| 75°   | 298.9  | 319.2  | 487.3  | 1205.1 | 1838.8 | 1829.4 | 292.7  | 197.7  | 236.7  | 252.2  | 274.0  |
| 77.5° | 191.5  | 204.0  | 303.6  | 674.2  | 842.3  | 750.5  | 211.7  | 172.8  | 210.2  | 207.1  | 204.0  |
| 80°   | 119.9  | 126.1  | 194.6  | 390.8  | 621.2  | 518.5  | 155.7  | 141.7  | 180.6  | 160.4  | 144.8  |
| 82.5° | 77.8   | 85.6   | 124.6  | 238.2  | 443.7  | 386.1  | 102.8  | 101.2  | 149.5  | 127.7  | 112.1  |
| 85°   | 51.4   | 57.6   | 79.4   | 140.1  | 263.1  | 275.6  | 66.9   | 70.1   | 115.2  | 96.5   | 85.6   |
| 87.5° | 18.7   | 23.4   | 40.5   | 62.3   | 123.0  | 152.6  | 28.0   | 26.5   | 56.1   | 45.2   | 35.8   |
| 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: P1435501  
 CATALOG NUMBER: GALN-SB1C-840-U-T4LG

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 | 1602.1 |
| 2.5°  | 1606.8 | 1602.1 | 1580.3 | 1561.6 | 1547.6 | 1528.9 | 1508.7 | 1485.3 | 1469.8 | 1472.9 | 1468.2 |
| 5°    | 1614.6 | 1602.1 | 1560.1 | 1496.2 | 1434.0 | 1356.1 | 1256.5 | 1197.3 | 1152.2 | 1128.8 | 1135.0 |
| 7.5°  | 1631.7 | 1609.9 | 1521.2 | 1391.9 | 1230.0 | 1071.2 | 973.1  | 917.1  | 890.6  | 879.7  | 878.1  |
| 10°   | 1661.3 | 1623.9 | 1471.3 | 1230.0 | 1018.3 | 910.8  | 875.0  | 859.4  | 856.3  | 856.3  | 854.8  |
| 12.5° | 1697.1 | 1637.9 | 1387.3 | 1072.7 | 917.1  | 878.1  | 871.9  | 873.5  | 878.1  | 882.8  | 875.0  |
| 15°   | 1740.7 | 1644.2 | 1282.9 | 977.8  | 896.8  | 887.5  | 896.8  | 907.7  | 915.5  | 921.7  | 913.9  |
| 17.5° | 1784.3 | 1637.9 | 1184.8 | 932.6  | 899.9  | 912.4  | 931.1  | 948.2  | 952.9  | 962.2  | 956.0  |
| 20°   | 1815.4 | 1616.1 | 1100.8 | 915.5  | 907.7  | 935.7  | 959.1  | 977.8  | 987.1  | 993.3  | 987.1  |
| 22.5° | 1838.8 | 1588.1 | 1040.1 | 898.4  | 907.7  | 942.0  | 970.0  | 991.8  | 1002.7 | 1008.9 | 1001.1 |
| 25°   | 1859.0 | 1549.2 | 993.3  | 873.5  | 889.0  | 921.7  | 952.9  | 974.7  | 990.2  | 999.6  | 994.9  |
| 27.5° | 1883.9 | 1518.0 | 949.7  | 836.1  | 850.1  | 881.2  | 913.9  | 940.4  | 970.0  | 985.6  | 982.4  |
| 30°   | 1911.9 | 1502.5 | 907.7  | 795.6  | 804.9  | 836.1  | 875.0  | 910.8  | 951.3  | 971.5  | 971.5  |
| 32.5° | 1944.6 | 1491.6 | 868.8  | 756.7  | 764.5  | 798.7  | 836.1  | 868.8  | 912.4  | 945.1  | 943.5  |
| 35°   | 1958.7 | 1479.1 | 837.6  | 720.9  | 736.4  | 764.5  | 794.1  | 815.8  | 861.0  | 899.9  | 903.0  |
| 37.5° | 1972.7 | 1474.4 | 822.1  | 692.8  | 705.3  | 727.1  | 742.7  | 753.6  | 795.6  | 836.1  | 837.6  |
| 40°   | 1989.8 | 1496.2 | 833.0  | 674.2  | 663.3  | 685.1  | 692.8  | 699.1  | 720.9  | 747.3  | 747.3  |
| 42.5° | 1978.9 | 1511.8 | 857.9  | 657.0  | 611.9  | 636.8  | 639.9  | 638.4  | 639.9  | 641.5  | 639.9  |
| 45°   | 1950.9 | 1496.2 | 857.9  | 630.6  | 557.4  | 583.9  | 582.3  | 574.5  | 562.1  | 529.4  | 524.7  |
| 47.5° | 1944.6 | 1486.9 | 825.2  | 587.0  | 502.9  | 524.7  | 527.8  | 512.2  | 476.4  | 442.2  | 431.3  |
| 50°   | 1971.1 | 1504.0 | 773.8  | 534.0  | 456.2  | 474.9  | 482.7  | 456.2  | 415.7  | 379.9  | 373.7  |
| 52.5° | 2010.0 | 1525.8 | 699.1  | 476.4  | 417.3  | 435.9  | 445.3  | 415.7  | 373.7  | 345.6  | 342.5  |
| 55°   | 2005.4 | 1525.8 | 615.0  | 423.5  | 387.7  | 401.7  | 417.3  | 386.1  | 353.4  | 337.9  | 336.3  |
| 57.5° | 1904.2 | 1468.2 | 552.7  | 386.1  | 359.7  | 372.1  | 392.4  | 362.8  | 331.6  | 334.7  | 339.4  |
| 60°   | 1706.4 | 1318.7 | 506.0  | 361.2  | 334.7  | 347.2  | 369.0  | 334.7  | 294.3  | 283.4  | 283.4  |
| 62.5° | 1405.9 | 1086.8 | 468.6  | 336.3  | 311.4  | 327.0  | 337.9  | 292.7  | 266.2  | 253.8  | 253.8  |
| 65°   | 1054.1 | 840.8  | 429.7  | 316.1  | 291.2  | 308.3  | 295.8  | 274.0  | 247.6  | 238.2  | 239.8  |
| 67°   | 781.6  | 652.4  | 397.0  | 298.9  | 278.7  | 286.5  | 277.1  | 261.6  | 235.1  | 227.3  | 235.1  |
| 67.5° | 702.2  | 619.7  | 389.2  | 294.3  | 275.6  | 281.8  | 272.5  | 260.0  | 232.0  | 224.2  | 232.0  |
| 70°   | 482.7  | 476.4  | 347.2  | 272.5  | 258.5  | 252.2  | 256.9  | 241.3  | 218.0  | 214.9  | 222.6  |
| 72.5° | 367.4  | 379.9  | 311.4  | 253.8  | 239.8  | 232.0  | 242.9  | 227.3  | 204.0  | 208.6  | 216.4  |
| 75°   | 288.0  | 306.7  | 278.7  | 227.3  | 218.0  | 219.5  | 241.3  | 235.1  | 216.4  | 221.1  | 222.6  |
| 77.5° | 213.3  | 247.6  | 238.2  | 197.7  | 189.9  | 211.7  | 272.5  | 291.2  | 258.5  | 250.7  | 239.8  |
| 80°   | 155.7  | 177.5  | 200.8  | 163.5  | 158.8  | 204.0  | 336.3  | 372.1  | 319.2  | 288.0  | 280.3  |
| 82.5° | 115.2  | 124.6  | 165.0  | 130.8  | 115.2  | 182.2  | 373.7  | 437.5  | 379.9  | 320.7  | 311.4  |
| 85°   | 82.5   | 96.5   | 130.8  | 96.5   | 76.3   | 149.5  | 365.9  | 428.2  | 376.8  | 303.6  | 295.8  |
| 87.5° | 29.6   | 42.0   | 56.1   | 43.6   | 38.9   | 102.8  | 302.1  | 308.3  | 235.1  | 107.4  | 109.0  |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

McGraw-Edison

Report Number: SP1-2407-184-11

Test Date: 10/11/2024

Luminaire Tested: GSS-SB1A-840-U-5WQ

Data in this report applies to families of products including GSS-SB1A-840-U-5WQ

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-11  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/15/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GSS-SB1A-840-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 80 CRI 4000K CCT 26 LEDS

**Spectral Parameters**

CCT (K): 3897  
 CIE u': 0.2249  
 CIE v': 0.5084  
 Duv: 0.0039  
 CIE x: 0.3882  
 CIE y: 0.3900  
 CIE z: 0.2218  
 Peak Wavelength (nm): 445  
 Dominant Wavelength (nm): 577  
 Purity: 33.54925  
 Rf: 81.8  
 Rg: 98.6

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 80.2 |      |      |
| R1:       | 78.9 | R9:  | 6.7  |
| R2:       | 83.5 | R10: | 61.9 |
| R3:       | 88.3 | R11: | 81.9 |
| R4:       | 82.1 | R12: | 58.9 |
| R5:       | 78.8 | R13: | 79.2 |
| R6:       | 78.4 | R14: | 93.2 |
| R7:       | 85.8 | R15: | 71.9 |
| R8:       | 65.8 |      |      |



**Test Conditions**

Stabilization Time: 24M  
 Operation Time: 1H 24M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-11

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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CIE 1931 Chromaticity Diagram



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



CCT = 3897K  
 CIE x = 0.3882  
 CIE y = 0.3900  
 Duv = 0.0039

Point lies inside the ANSI 4000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 242                      | NR            | 620    | 792                      | NR            | 750    | 29                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 320                      | NR            | 625    | 748                      | NR            | 755    | 25                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 401                      | NR            | 630    | 703                      | NR            | 760    | 22                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 479                      | NR            | 635    | 651                      | NR            | 765    | 19                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 546                      | NR            | 640    | 599                      | NR            | 770    | 16                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 602                      | NR            | 645    | 545                      | NR            | 775    | 14                       | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 645                      | NR            | 650    | 493                      | NR            | 780    | 12                       | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 674                      | NR            | 655    | 443                      | NR            | 785    | 10                       | NR            | 915    | 0                        | NR            |
| 400    | 6                        | NR            | 530    | 699                      | NR            | 660    | 394                      | NR            | 790    | 9                        | NR            | 920    | 0                        | NR            |
| 405    | 11                       | NR            | 535    | 718                      | NR            | 665    | 349                      | NR            | 795    | 8                        | NR            | 925    | 0                        | NR            |
| 410    | 22                       | NR            | 540    | 732                      | NR            | 670    | 307                      | NR            | 800    | 7                        | NR            | 930    | 0                        | NR            |
| 415    | 43                       | NR            | 545    | 749                      | NR            | 675    | 269                      | NR            | 805    | 6                        | NR            | 935    | 0                        | NR            |
| 420    | 86                       | NR            | 550    | 762                      | NR            | 680    | 235                      | NR            | 810    | 5                        | NR            | 940    | 0                        | NR            |
| 425    | 164                      | NR            | 555    | 778                      | NR            | 685    | 204                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 288                      | NR            | 560    | 792                      | NR            | 690    | 178                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 478                      | NR            | 565    | 809                      | NR            | 695    | 153                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 766                      | NR            | 570    | 827                      | NR            | 700    | 132                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 1000                     | NR            | 575    | 845                      | NR            | 705    | 114                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 726                      | NR            | 580    | 862                      | NR            | 710    | 98                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 425                      | NR            | 585    | 875                      | NR            | 715    | 84                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 324                      | NR            | 590    | 887                      | NR            | 720    | 73                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 225                      | NR            | 595    | 890                      | NR            | 725    | 63                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 157                      | NR            | 600    | 887                      | NR            | 730    | 54                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 147                      | NR            | 605    | 875                      | NR            | 735    | 46                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 154                      | NR            | 610    | 856                      | NR            | 740    | 40                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 184                      | NR            | 615    | 828                      | NR            | 745    | 34                       | NR            | 875    | 1                        | NR            |        |                          |               |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.57

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 242                      | NR            | 620    | 792                      | NR            | 750    | 29                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 320                      | NR            | 625    | 748                      | NR            | 755    | 25                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 401                      | NR            | 630    | 703                      | NR            | 760    | 22                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 479                      | NR            | 635    | 651                      | NR            | 765    | 19                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 546                      | NR            | 640    | 599                      | NR            | 770    | 16                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 602                      | NR            | 645    | 545                      | NR            | 775    | 14                       | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 645                      | NR            | 650    | 493                      | NR            | 780    | 12                       | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 674                      | NR            | 655    | 443                      | NR            | 785    | 10                       | NR            | 915    | 0                        | NR            |
| 400    | 6                        | NR            | 530    | 699                      | NR            | 660    | 394                      | NR            | 790    | 9                        | NR            | 920    | 0                        | NR            |
| 405    | 11                       | NR            | 535    | 718                      | NR            | 665    | 349                      | NR            | 795    | 8                        | NR            | 925    | 0                        | NR            |
| 410    | 22                       | NR            | 540    | 732                      | NR            | 670    | 307                      | NR            | 800    | 7                        | NR            | 930    | 0                        | NR            |
| 415    | 43                       | NR            | 545    | 749                      | NR            | 675    | 269                      | NR            | 805    | 6                        | NR            | 935    | 0                        | NR            |
| 420    | 86                       | NR            | 550    | 762                      | NR            | 680    | 235                      | NR            | 810    | 5                        | NR            | 940    | 0                        | NR            |
| 425    | 164                      | NR            | 555    | 778                      | NR            | 685    | 204                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 288                      | NR            | 560    | 792                      | NR            | 690    | 178                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 478                      | NR            | 565    | 809                      | NR            | 695    | 153                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 766                      | NR            | 570    | 827                      | NR            | 700    | 132                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 1000                     | NR            | 575    | 845                      | NR            | 705    | 114                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 726                      | NR            | 580    | 862                      | NR            | 710    | 98                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 425                      | NR            | 585    | 875                      | NR            | 715    | 84                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 324                      | NR            | 590    | 887                      | NR            | 720    | 73                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 225                      | NR            | 595    | 890                      | NR            | 725    | 63                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 157                      | NR            | 600    | 887                      | NR            | 730    | 54                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 147                      | NR            | 605    | 875                      | NR            | 735    | 46                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 154                      | NR            | 610    | 856                      | NR            | 740    | 40                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 184                      | NR            | 615    | 828                      | NR            | 745    | 34                       | NR            | 875    | 1                        | NR            |        |                          |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 3.06**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 242                      | NR            | 620    | 792                      | NR            | 750    | 29                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 320                      | NR            | 625    | 748                      | NR            | 755    | 25                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 401                      | NR            | 630    | 703                      | NR            | 760    | 22                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 479                      | NR            | 635    | 651                      | NR            | 765    | 19                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 546                      | NR            | 640    | 599                      | NR            | 770    | 16                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 602                      | NR            | 645    | 545                      | NR            | 775    | 14                       | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 645                      | NR            | 650    | 493                      | NR            | 780    | 12                       | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 674                      | NR            | 655    | 443                      | NR            | 785    | 10                       | NR            | 915    | 0                        | NR            |
| 400    | 6                        | NR            | 530    | 699                      | NR            | 660    | 394                      | NR            | 790    | 9                        | NR            | 920    | 0                        | NR            |
| 405    | 11                       | NR            | 535    | 718                      | NR            | 665    | 349                      | NR            | 795    | 8                        | NR            | 925    | 0                        | NR            |
| 410    | 22                       | NR            | 540    | 732                      | NR            | 670    | 307                      | NR            | 800    | 7                        | NR            | 930    | 0                        | NR            |
| 415    | 43                       | NR            | 545    | 749                      | NR            | 675    | 269                      | NR            | 805    | 6                        | NR            | 935    | 0                        | NR            |
| 420    | 86                       | NR            | 550    | 762                      | NR            | 680    | 235                      | NR            | 810    | 5                        | NR            | 940    | 0                        | NR            |
| 425    | 164                      | NR            | 555    | 778                      | NR            | 685    | 204                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 288                      | NR            | 560    | 792                      | NR            | 690    | 178                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 478                      | NR            | 565    | 809                      | NR            | 695    | 153                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 766                      | NR            | 570    | 827                      | NR            | 700    | 132                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 1000                     | NR            | 575    | 845                      | NR            | 705    | 114                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 726                      | NR            | 580    | 862                      | NR            | 710    | 98                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 425                      | NR            | 585    | 875                      | NR            | 715    | 84                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 324                      | NR            | 590    | 887                      | NR            | 720    | 73                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 225                      | NR            | 595    | 890                      | NR            | 725    | 63                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 157                      | NR            | 600    | 887                      | NR            | 730    | 54                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 147                      | NR            | 605    | 875                      | NR            | 735    | 46                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 154                      | NR            | 610    | 856                      | NR            | 740    | 40                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 184                      | NR            | 615    | 828                      | NR            | 745    | 34                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 81.8$   
 $R_g = 98.6$   
 CIE  $R_a = 80.2$   
 $R_9 = 6.7$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 73 | CES51 = 93 | CES76 = 66 |
| CES02 = 61 | CES27 = 91 | CES52 = 93 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 83 | CES78 = 66 |
| CES04 = 69 | CES29 = 71 | CES54 = 89 | CES79 = 88 |
| CES05 = 48 | CES30 = 77 | CES55 = 88 | CES80 = 85 |
| CES06 = 50 | CES31 = 74 | CES56 = 80 | CES81 = 83 |
| CES07 = 41 | CES32 = 70 | CES57 = 79 | CES82 = 93 |
| CES08 = 40 | CES33 = 77 | CES58 = 80 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 92 | CES84 = 91 |
| CES10 = 74 | CES35 = 88 | CES60 = 95 | CES85 = 84 |
| CES11 = 57 | CES36 = 98 | CES61 = 91 | CES86 = 78 |
| CES12 = 63 | CES37 = 85 | CES62 = 90 | CES87 = 84 |
| CES13 = 42 | CES38 = 85 | CES63 = 81 | CES88 = 85 |
| CES14 = 74 | CES39 = 95 | CES64 = 81 | CES89 = 78 |
| CES15 = 71 | CES40 = 90 | CES65 = 76 | CES90 = 84 |
| CES16 = 47 | CES41 = 90 | CES66 = 78 | CES91 = 85 |
| CES17 = 49 | CES42 = 84 | CES67 = 76 | CES92 = 71 |
| CES18 = 56 | CES43 = 81 | CES68 = 80 | CES93 = 84 |
| CES19 = 71 | CES44 = 99 | CES69 = 86 | CES94 = 65 |
| CES20 = 65 | CES45 = 87 | CES70 = 73 | CES95 = 77 |
| CES21 = 86 | CES46 = 85 | CES71 = 70 | CES96 = 83 |
| CES22 = 78 | CES47 = 84 | CES72 = 90 | CES97 = 87 |
| CES23 = 91 | CES48 = 79 | CES73 = 65 | CES98 = 81 |
| CES24 = 90 | CES49 = 84 | CES74 = 98 | CES99 = 75 |
| CES25 = 71 | CES50 = 91 | CES75 = 68 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)