

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: P1383763

Luminaire Tested: **VAL-T-SB4A-727-U-SL2-HSS**

Issue Date: 02/18/2026

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.

**Test Information**

Test Method: LM-79-08  
 Report Number: P1383763  
 Test Lab: INNOVATION CENTER(G1)  
 Issue Date: 02/18/2026  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: VAL-T-SB4A-727-U-SL2-HSS  
 Description: GALLEON II WALL SLIM HIGH DENSITY LED ARRAYS 45 SQUARE 114W 70CRI  
 2700K FIXTURE w/ TYPE II SPILL CONTROL DISTRIBUTION OPTIC AND HOUSE SIDE  
 SHIELD  
 Light Source: (104) 2700K CCT, 70 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               |

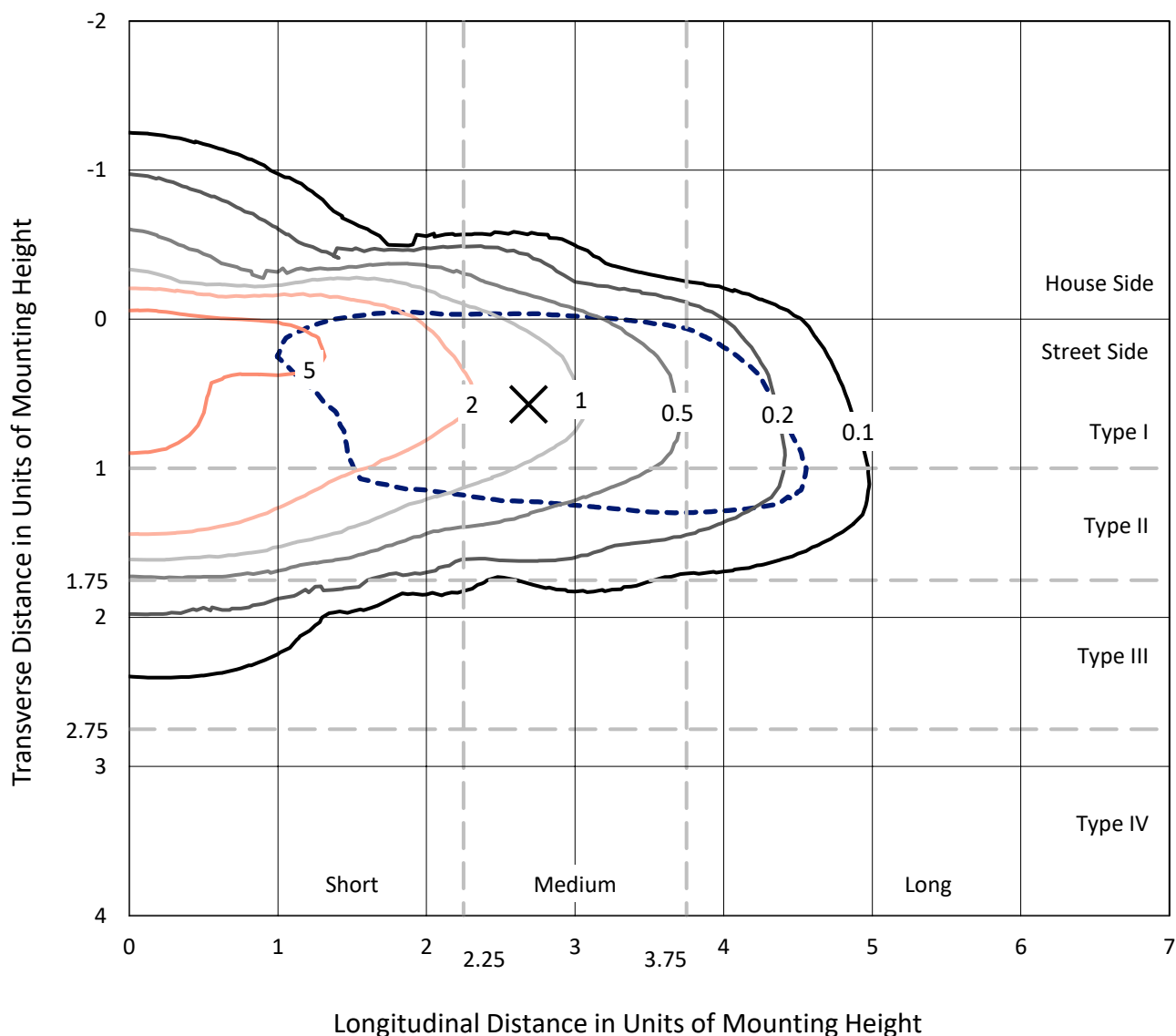
**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 13385.9 lumens  
 Efficiency: N/A  
 Efficacy: 117.4 lumens/watt  
 Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
 IES Classification: Type II - Medium  
 BUG Rating: B2 - U0 - G2  
  
 Input Watts (W): 114  
 Input Voltage (V): 120  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: 0.98  
 Total Harmonic Distortion (THDi): 8.2%  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 28.75 FT

REPORT NUMBER: P1383763  
 CATALOG NUMBER: VAL-T-SB4A-727-U-SL2-HSS

## Iso-Footcandle Lines of Horizontal Illumination

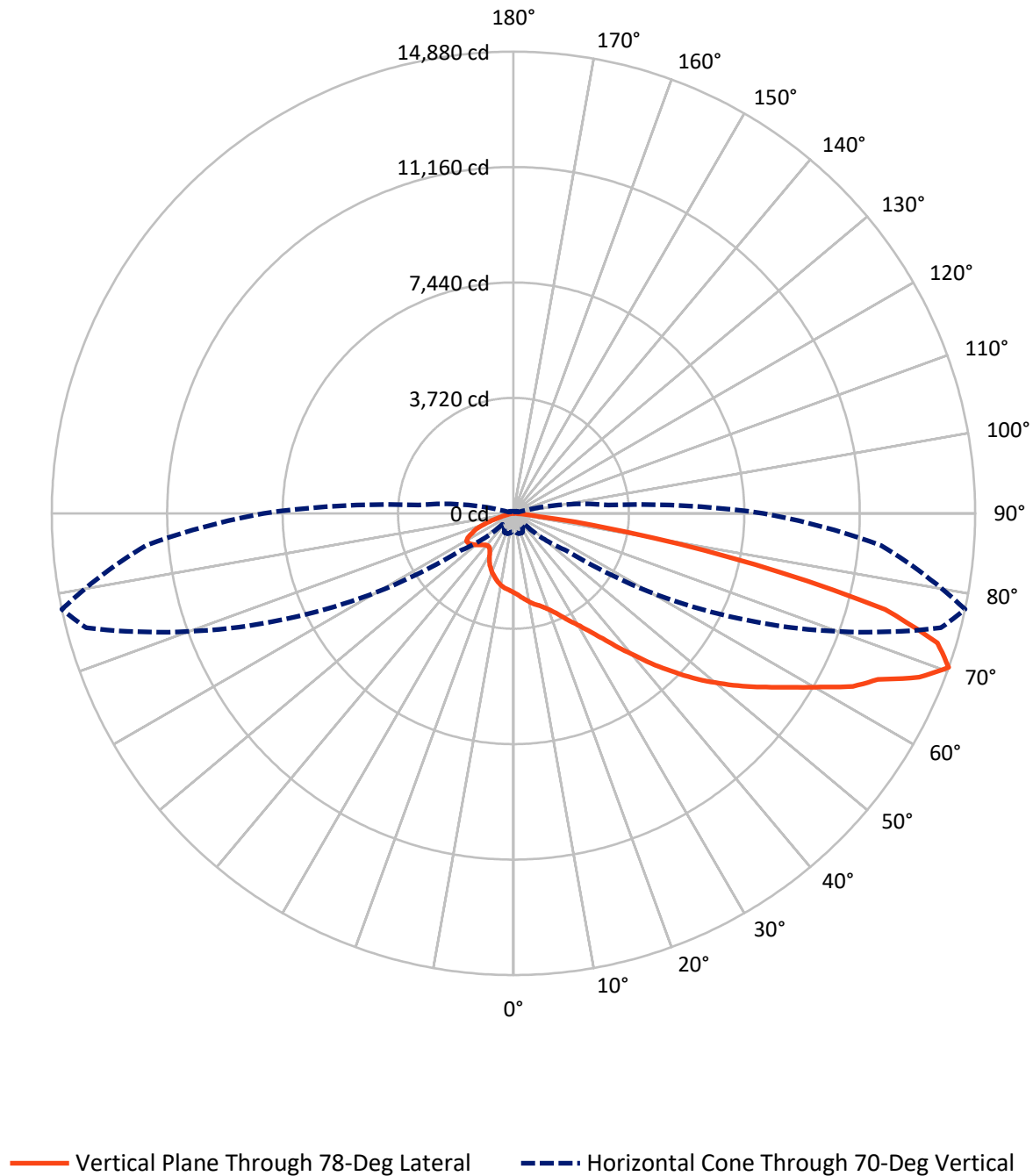
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 7.6 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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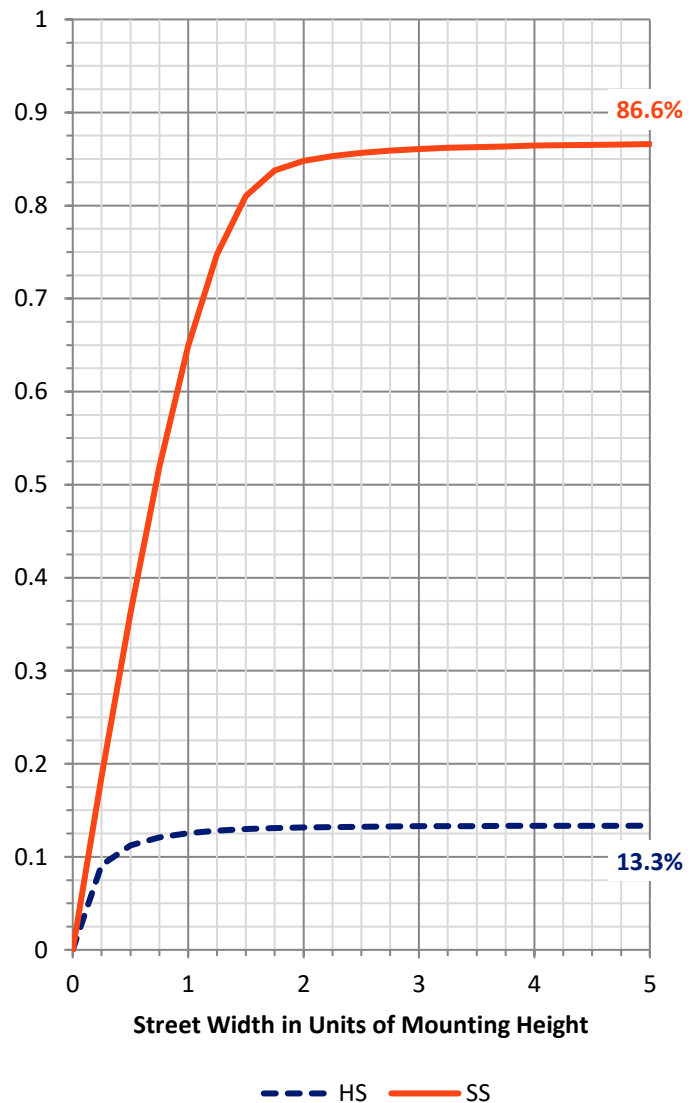
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1800.5   | 0.0    | 1800.5  |
|                    | % Fixture | 13.5     | 0.0    | 13.5    |
| <b>Street Side</b> | Lumens    | 11585.4  | 0.0    | 11585.4 |
|                    | % Fixture | 86.5     | 0.0    | 86.5    |
| <b>Total</b>       | Lumens    | 13385.9  | 0.0    | 13385.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 233.3   | 1.7       |
| 10°-20°   | 578.0   | 4.3       |
| 20°-30°   | 958.8   | 7.2       |
| 30°-40°   | 1528.5  | 11.4      |
| 40°-50°   | 2332.6  | 17.4      |
| 50°-60°   | 3105.8  | 23.2      |
| 60°-70°   | 2899.3  | 21.7      |
| 70°-80°   | 1639.6  | 12.2      |
| 80°-90°   | 110.0   | 0.8       |
| 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°    | 13385.9 | 100.0     |
| 0°-180°   | 13385.9 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P1383763

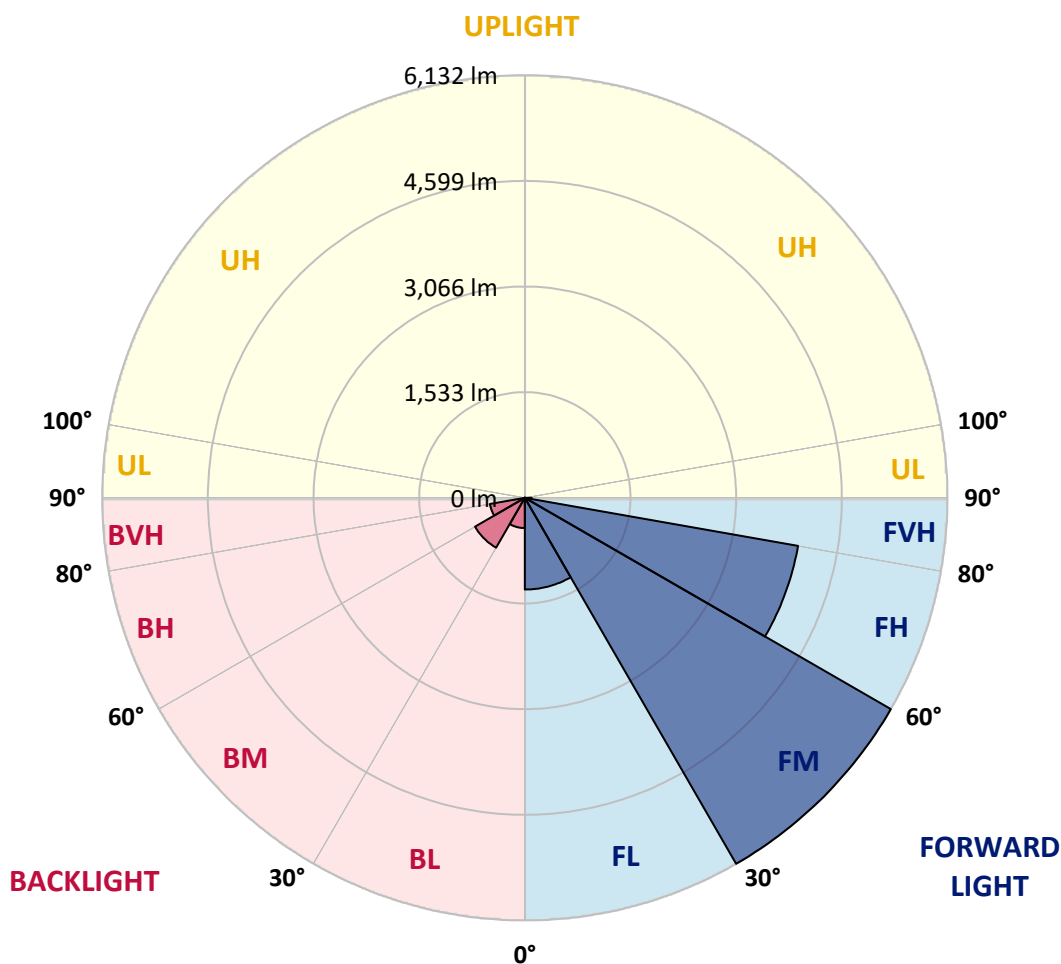
CATALOG NUMBER: VAL-T-SB4A-727-U-SL2-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1331.0 | 9.9       |                         |      |         |
| FM   | (30°-60°)   | 6131.8 | 45.8      |                         |      |         |
| FH   | (60°-80°)   | 4024.9 | 30.1      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 97.7   | 0.7       |                         |      | G1/100  |
| BL   | (0°-30°)    | 439.2  | 3.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 835.1  | 6.2       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 513.9  | 3.8       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 12.3   | 0.1       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type II Medium



REPORT NUMBER: P1383763

CATALOG NUMBER: VAL-T-SB4A-727-U-SL2-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°     | 78°     | 85°     |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|
| 0°    | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5  | 2557.5  | 2557.5  |
| 2.5°  | 2880.0 | 2838.8 | 2838.8 | 2820.0 | 2801.3 | 2767.5 | 2726.3 | 2681.3 | 2643.8  | 2625.0  | 2595.0  |
| 5°    | 3086.3 | 3075.0 | 3071.3 | 3041.3 | 3011.3 | 2962.5 | 2910.0 | 2823.8 | 2745.0  | 2718.8  | 2651.3  |
| 7.5°  | 3078.8 | 3071.3 | 3086.3 | 3123.8 | 3150.0 | 3131.3 | 3086.3 | 2981.3 | 2857.5  | 2812.5  | 2711.3  |
| 10°   | 2846.3 | 2823.8 | 2876.3 | 2958.8 | 3078.8 | 3202.5 | 3221.3 | 3120.0 | 2962.5  | 2910.0  | 2767.5  |
| 12.5° | 2636.3 | 2636.3 | 2662.5 | 2737.5 | 2887.5 | 3108.8 | 3281.3 | 3247.5 | 3067.5  | 3003.8  | 2816.3  |
| 15°   | 2610.0 | 2591.3 | 2598.8 | 2632.5 | 2737.5 | 2955.0 | 3243.8 | 3345.0 | 3165.0  | 3078.8  | 2861.3  |
| 17.5° | 2730.0 | 2707.5 | 2688.8 | 2673.8 | 2688.8 | 2831.3 | 3127.5 | 3427.5 | 3281.3  | 3187.5  | 2921.3  |
| 20°   | 2917.5 | 2917.5 | 2868.8 | 2808.8 | 2760.0 | 2786.3 | 3033.8 | 3480.0 | 3420.0  | 3318.8  | 3011.3  |
| 22.5° | 3187.5 | 3153.8 | 3123.8 | 3030.0 | 2910.0 | 2853.8 | 2992.5 | 3536.3 | 3611.3  | 3487.5  | 3135.0  |
| 25°   | 3412.5 | 3423.8 | 3390.0 | 3273.8 | 3105.0 | 2981.3 | 3026.3 | 3558.8 | 3828.8  | 3705.0  | 3288.8  |
| 27.5° | 3667.5 | 3656.3 | 3626.3 | 3510.0 | 3315.0 | 3138.8 | 3120.0 | 3603.8 | 4080.0  | 3948.8  | 3468.8  |
| 30°   | 3903.8 | 3903.8 | 3866.3 | 3735.0 | 3536.3 | 3345.0 | 3258.8 | 3678.8 | 4331.3  | 4211.3  | 3671.3  |
| 32.5° | 4166.3 | 4170.0 | 4095.0 | 3956.3 | 3753.8 | 3536.3 | 3435.0 | 3791.3 | 4642.5  | 4552.5  | 3945.0  |
| 35°   | 4380.0 | 4387.5 | 4368.8 | 4218.8 | 3952.5 | 3735.0 | 3618.8 | 3967.5 | 5006.3  | 4953.8  | 4308.8  |
| 37.5° | 4545.0 | 4556.3 | 4518.8 | 4451.3 | 4203.8 | 3926.3 | 3813.8 | 4185.0 | 5445.0  | 5478.8  | 4781.3  |
| 40°   | 4736.3 | 4736.3 | 4736.3 | 4635.0 | 4451.3 | 4136.3 | 4012.5 | 4455.0 | 5917.5  | 6022.5  | 5306.3  |
| 42.5° | 4905.0 | 4916.3 | 4935.0 | 4856.3 | 4687.5 | 4436.3 | 4256.3 | 4758.8 | 6446.3  | 6682.5  | 5955.0  |
| 45°   | 4991.3 | 5013.8 | 5081.3 | 5047.5 | 4920.0 | 4676.3 | 4515.0 | 5055.0 | 7027.5  | 7320.0  | 6652.5  |
| 47.5° | 5043.8 | 5070.0 | 5160.0 | 5201.3 | 5148.8 | 4860.0 | 4758.8 | 5407.5 | 7582.5  | 7987.6  | 7368.8  |
| 50°   | 5085.0 | 5122.5 | 5223.8 | 5302.5 | 5351.3 | 5013.8 | 4998.8 | 5767.5 | 8137.6  | 8613.8  | 8021.3  |
| 52.5° | 4965.0 | 5002.5 | 5193.8 | 5445.0 | 5486.3 | 5246.3 | 5250.0 | 6157.5 | 8700.1  | 9251.3  | 8625.1  |
| 55°   | 4537.5 | 4563.8 | 4830.0 | 5336.3 | 5647.5 | 5516.3 | 5591.3 | 6663.8 | 9315.1  | 9885.1  | 9202.6  |
| 57.5° | 3228.8 | 3390.0 | 3862.5 | 4665.0 | 5448.8 | 5902.5 | 6138.8 | 7222.5 | 10031.3 | 10578.8 | 9787.6  |
| 60°   | 1342.5 | 1458.8 | 1916.3 | 3330.0 | 4713.8 | 5955.0 | 6892.5 | 8141.3 | 10845.1 | 11366.3 | 10451.3 |
| 62.5° | 873.8  | 885.0  | 930.0  | 1428.8 | 2992.5 | 5223.8 | 7181.3 | 9442.6 | 11992.6 | 12281.3 | 10815.1 |
| 65°   | 780.0  | 795.0  | 817.5  | 888.8  | 1102.5 | 3525.0 | 6206.3 | 9881.3 | 12926.3 | 12907.6 | 10608.8 |
| 67.5° | 693.8  | 712.5  | 753.8  | 761.3  | 615.0  | 1297.5 | 4170.0 | 9236.3 | 13897.6 | 14100.1 | 11171.3 |
| 70°   | 592.5  | 600.0  | 675.0  | 682.5  | 483.8  | 510.0  | 2100.0 | 8017.6 | 14257.6 | 14880.1 | 11891.3 |
| 72.5° | 412.5  | 435.0  | 570.0  | 600.0  | 386.3  | 330.0  | 765.0  | 5835.0 | 13252.6 | 14287.6 | 11846.3 |
| 75°   | 243.8  | 255.0  | 326.3  | 408.8  | 300.0  | 232.5  | 345.0  | 3588.8 | 11403.8 | 12375.1 | 10541.3 |
| 77.5° | 176.3  | 187.5  | 236.3  | 318.8  | 191.3  | 157.5  | 213.8  | 1875.0 | 7920.1  | 7961.3  | 5951.3  |
| 80°   | 56.3   | 63.8   | 146.3  | 213.8  | 138.8  | 101.3  | 131.3  | 633.8  | 4001.3  | 3776.3  | 1818.8  |
| 82.5° | 30.0   | 30.0   | 90.0   | 112.5  | 86.3   | 63.8   | 75.0   | 262.5  | 1282.5  | 821.3   | 288.8   |
| 85°   | 15.0   | 15.0   | 37.5   | 45.0   | 33.8   | 30.0   | 37.5   | 93.8   | 135.0   | 123.8   | 82.5    |
| 87.5° | 0.0    | 0.0    | 3.8    | 3.8    | 3.8    | 7.5    | 15.0   | 26.3   | 33.8    | 33.8    | 37.5    |
| 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: P1383763

CATALOG NUMBER: VAL-T-SB4A-727-U-SL2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 | 2557.5 |
| 2.5°  | 2561.3 | 2531.3 | 2486.3 | 2433.8 | 2396.3 | 2343.8 | 2298.8 | 2280.0 | 2246.3 | 2238.8 | 2231.3 |
| 5°    | 2587.5 | 2527.5 | 2426.3 | 2310.0 | 2208.8 | 2088.8 | 1991.3 | 1916.3 | 1863.8 | 1841.3 | 1830.0 |
| 7.5°  | 2628.8 | 2531.3 | 2366.3 | 2175.0 | 1991.3 | 1811.3 | 1631.3 | 1492.5 | 1413.8 | 1338.8 | 1342.5 |
| 10°   | 2651.3 | 2535.0 | 2287.5 | 2021.3 | 1747.5 | 1470.0 | 1200.0 | 993.8  | 885.0  | 821.3  | 806.3  |
| 12.5° | 2670.0 | 2516.3 | 2197.5 | 1830.0 | 1440.0 | 1042.5 | 772.5  | 637.5  | 581.3  | 573.8  | 570.0  |
| 15°   | 2681.3 | 2493.8 | 2085.0 | 1608.8 | 1091.3 | 705.0  | 573.8  | 536.3  | 521.3  | 517.5  | 517.5  |
| 17.5° | 2707.5 | 2467.5 | 1968.8 | 1335.0 | 757.5  | 562.5  | 513.8  | 495.0  | 483.8  | 480.0  | 480.0  |
| 20°   | 2752.5 | 2471.3 | 1848.8 | 1035.0 | 588.8  | 513.8  | 476.3  | 457.5  | 442.5  | 442.5  | 442.5  |
| 22.5° | 2827.5 | 2486.3 | 1695.0 | 776.3  | 517.5  | 468.8  | 435.0  | 412.5  | 405.0  | 408.8  | 408.8  |
| 25°   | 2928.8 | 2523.8 | 1537.5 | 600.0  | 476.3  | 423.8  | 390.0  | 371.3  | 367.5  | 371.3  | 371.3  |
| 27.5° | 3056.3 | 2565.0 | 1342.5 | 517.5  | 438.8  | 386.3  | 352.5  | 341.3  | 337.5  | 345.0  | 345.0  |
| 30°   | 3195.0 | 2613.8 | 1110.0 | 476.3  | 405.0  | 356.3  | 326.3  | 315.0  | 315.0  | 326.3  | 326.3  |
| 32.5° | 3390.0 | 2692.5 | 900.0  | 442.5  | 378.8  | 333.8  | 303.8  | 292.5  | 296.3  | 307.5  | 307.5  |
| 35°   | 3652.5 | 2793.8 | 738.8  | 420.0  | 360.0  | 315.0  | 288.8  | 273.8  | 277.5  | 281.3  | 285.0  |
| 37.5° | 3993.8 | 2932.5 | 637.5  | 405.0  | 341.3  | 303.8  | 270.0  | 258.8  | 258.8  | 262.5  | 262.5  |
| 40°   | 4376.3 | 3097.5 | 588.8  | 393.8  | 326.3  | 285.0  | 255.0  | 240.0  | 240.0  | 247.5  | 247.5  |
| 42.5° | 4863.8 | 3273.8 | 551.3  | 378.8  | 307.5  | 270.0  | 236.3  | 225.0  | 221.3  | 228.8  | 228.8  |
| 45°   | 5426.3 | 3528.8 | 528.8  | 363.8  | 288.8  | 251.3  | 221.3  | 206.3  | 202.5  | 206.3  | 210.0  |
| 47.5° | 5996.3 | 3798.8 | 506.3  | 345.0  | 277.5  | 236.3  | 210.0  | 191.3  | 187.5  | 187.5  | 187.5  |
| 50°   | 6532.5 | 4068.8 | 491.3  | 322.5  | 266.3  | 221.3  | 195.0  | 180.0  | 172.5  | 172.5  | 172.5  |
| 52.5° | 7012.5 | 4320.0 | 483.8  | 303.8  | 255.0  | 210.0  | 187.5  | 168.8  | 157.5  | 157.5  | 157.5  |
| 55°   | 7470.0 | 4563.8 | 472.5  | 281.3  | 243.8  | 195.0  | 176.3  | 157.5  | 146.3  | 142.5  | 142.5  |
| 57.5° | 7931.3 | 4788.8 | 442.5  | 258.8  | 221.3  | 183.8  | 165.0  | 146.3  | 135.0  | 127.5  | 127.5  |
| 60°   | 8310.1 | 4927.5 | 397.5  | 232.5  | 195.0  | 168.8  | 153.8  | 135.0  | 120.0  | 108.8  | 108.8  |
| 62.5° | 8336.3 | 4785.0 | 330.0  | 206.3  | 172.5  | 153.8  | 138.8  | 120.0  | 101.3  | 86.3   | 86.3   |
| 65°   | 7890.1 | 4290.0 | 262.5  | 172.5  | 153.8  | 135.0  | 116.3  | 101.3  | 82.5   | 67.5   | 63.8   |
| 67.5° | 7991.3 | 3892.5 | 202.5  | 146.3  | 135.0  | 108.8  | 93.8   | 82.5   | 67.5   | 56.3   | 56.3   |
| 70°   | 8051.3 | 3063.8 | 161.3  | 120.0  | 112.5  | 86.3   | 75.0   | 71.3   | 56.3   | 45.0   | 45.0   |
| 72.5° | 7526.3 | 1897.5 | 131.3  | 101.3  | 86.3   | 60.0   | 60.0   | 56.3   | 45.0   | 33.8   | 30.0   |
| 75°   | 6637.5 | 1132.5 | 101.3  | 78.8   | 60.0   | 45.0   | 45.0   | 41.3   | 30.0   | 22.5   | 22.5   |
| 77.5° | 4012.5 | 596.3  | 78.8   | 60.0   | 41.3   | 33.8   | 30.0   | 26.3   | 18.8   | 15.0   | 11.3   |
| 80°   | 1241.3 | 210.0  | 60.0   | 41.3   | 30.0   | 26.3   | 18.8   | 11.3   | 7.5    | 7.5    | 3.8    |
| 82.5° | 172.5  | 75.0   | 45.0   | 33.8   | 22.5   | 15.0   | 11.3   | 7.5    | 3.8    | 3.8    | 3.8    |
| 85°   | 60.0   | 41.3   | 30.0   | 22.5   | 15.0   | 11.3   | 7.5    | 3.8    | 3.8    | 0.0    | 0.0    |
| 87.5° | 33.8   | 30.0   | 22.5   | 15.0   | 11.3   | 7.5    | 7.5    | 3.8    | 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    |



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

Report Prepared for

Cooper Lighting Solutions

McGraw-Edison

Report Number: SP1-2407-184-3

Test Date: 10/09/2024

Luminaire Tested: GSS-SB1A-727-U-5WQ

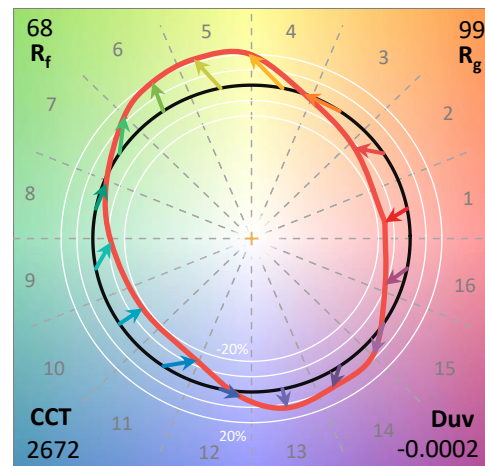
Data in this report applies to families of products including GSS-SB1A-727-U-5WQ

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/15/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GSS-SB1A-727-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 70 CRI  
 2700K CCT 26 LEDS

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 2672     | CRI (Ra): | 71.1 |      |       |
| CIE u':                   | 0.2638   | R1:       | 68.3 | R9:  | -27.8 |
| CIE v':                   | 0.5276   | R2:       | 79.8 | R10: | 54.4  |
| Duv:                      | -0.0002  | R3:       | 91.2 | R11: | 65.8  |
| CIE x:                    | 0.4619   | R4:       | 69.4 | R12: | 45.6  |
| CIE y:                    | 0.4106   | R5:       | 66.5 | R13: | 69.8  |
| CIE z:                    | 0.1275   | R6:       | 72.6 | R14: | 94.5  |
| Peak Wavelength (nm):     | 601      | R7:       | 77.0 | R15: | 60.1  |
| Dominant Wavelength (nm): | 584      | R8:       | 44.1 |      |       |
| Purity:                   | 61.88407 |           |      |      |       |
| Rf:                       | 67.9     |           |      |      |       |
| Rg:                       | 98.6     |           |      |      |       |



### Test Conditions

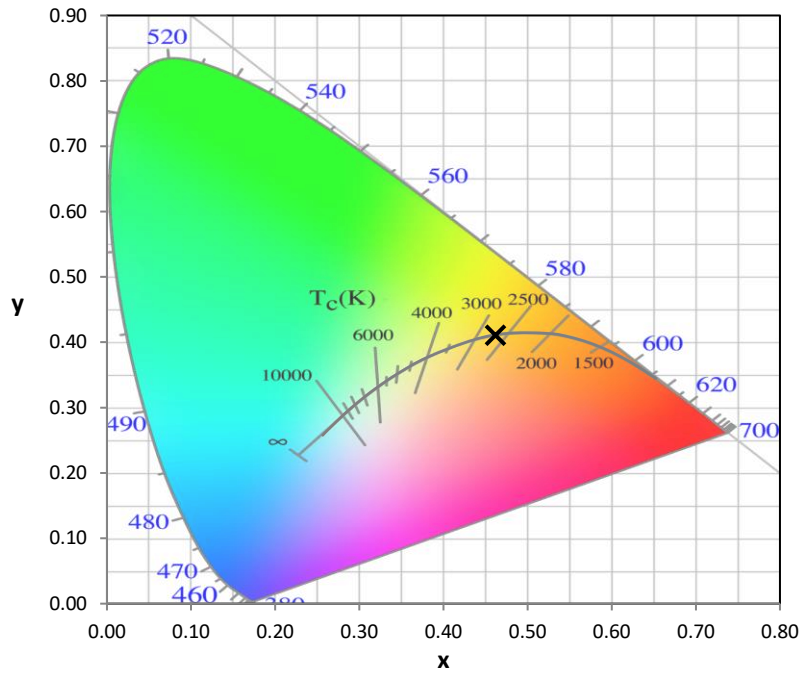
Stabilization Time: 21M  
 Operation Time: 1H 21M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-3

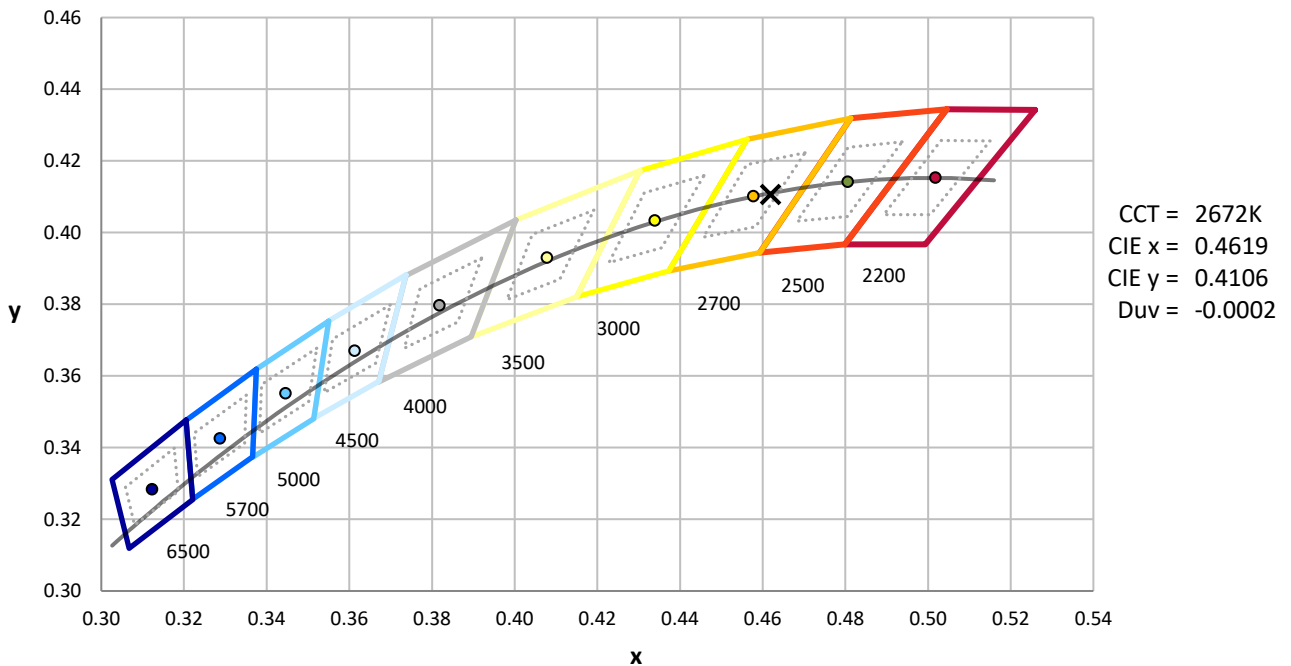
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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           |

REPORT NUMBER: SP1-2407-184-3

**CIE 1931 Chromaticity Diagram**



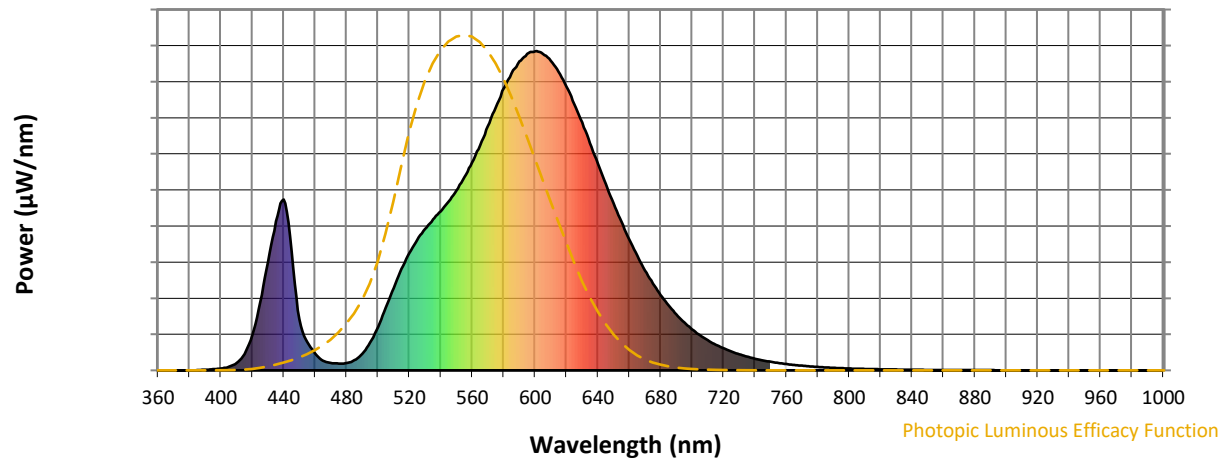
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2407-184-3

### Photopic Flux vs. Wavelength

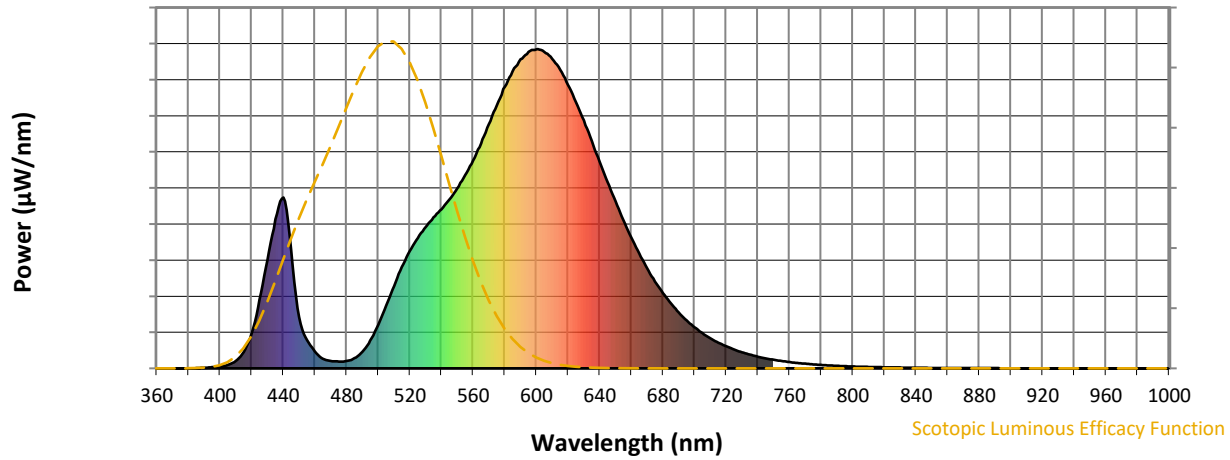


### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 0                             | NR                             | 490               | 52                            | NR                             | 620               | 888                           | NR                             | 750               | 27                            | NR                             | 880               | 1                             | NR                             |
| 365               | 0                             | NR                             | 495               | 87                            | NR                             | 625               | 834                           | NR                             | 755               | 23                            | NR                             | 885               | 1                             | NR                             |
| 370               | 0                             | NR                             | 500               | 135                           | NR                             | 630               | 776                           | NR                             | 760               | 20                            | NR                             | 890               | 1                             | NR                             |
| 375               | 0                             | NR                             | 505               | 196                           | NR                             | 635               | 712                           | NR                             | 765               | 17                            | NR                             | 895               | 0                             | NR                             |
| 380               | 0                             | NR                             | 510               | 258                           | NR                             | 640               | 648                           | NR                             | 770               | 15                            | NR                             | 900               | 0                             | NR                             |
| 385               | 1                             | NR                             | 515               | 317                           | NR                             | 645               | 583                           | NR                             | 775               | 12                            | NR                             | 905               | 0                             | NR                             |
| 390               | 2                             | NR                             | 520               | 368                           | NR                             | 650               | 523                           | NR                             | 780               | 11                            | NR                             | 910               | 0                             | NR                             |
| 395               | 4                             | NR                             | 525               | 408                           | NR                             | 655               | 465                           | NR                             | 785               | 9                             | NR                             | 915               | 0                             | NR                             |
| 400               | 6                             | NR                             | 530               | 443                           | NR                             | 660               | 410                           | NR                             | 790               | 8                             | NR                             | 920               | 0                             | NR                             |
| 405               | 11                            | NR                             | 535               | 473                           | NR                             | 665               | 360                           | NR                             | 795               | 7                             | NR                             | 925               | 0                             | NR                             |
| 410               | 23                            | NR                             | 540               | 498                           | NR                             | 670               | 313                           | NR                             | 800               | 6                             | NR                             | 930               | 0                             | NR                             |
| 415               | 51                            | NR                             | 545               | 530                           | NR                             | 675               | 272                           | NR                             | 805               | 5                             | NR                             | 935               | 0                             | NR                             |
| 420               | 111                           | NR                             | 550               | 563                           | NR                             | 680               | 236                           | NR                             | 810               | 4                             | NR                             | 940               | 0                             | NR                             |
| 425               | 214                           | NR                             | 555               | 605                           | NR                             | 685               | 203                           | NR                             | 815               | 4                             | NR                             | 945               | 0                             | NR                             |
| 430               | 339                           | NR                             | 560               | 651                           | NR                             | 690               | 175                           | NR                             | 820               | 3                             | NR                             | 950               | 0                             | NR                             |
| 435               | 467                           | NR                             | 565               | 705                           | NR                             | 695               | 150                           | NR                             | 825               | 3                             | NR                             | 955               | 0                             | NR                             |
| 440               | 535                           | NR                             | 570               | 765                           | NR                             | 700               | 128                           | NR                             | 830               | 3                             | NR                             | 960               | 0                             | NR                             |
| 445               | 372                           | NR                             | 575               | 824                           | NR                             | 705               | 110                           | NR                             | 835               | 2                             | NR                             | 965               | 0                             | NR                             |
| 450               | 160                           | NR                             | 580               | 882                           | NR                             | 710               | 94                            | NR                             | 840               | 2                             | NR                             | 970               | 0                             | NR                             |
| 455               | 89                            | NR                             | 585               | 930                           | NR                             | 715               | 80                            | NR                             | 845               | 2                             | NR                             | 975               | 0                             | NR                             |
| 460               | 53                            | NR                             | 590               | 968                           | NR                             | 720               | 69                            | NR                             | 850               | 1                             | NR                             | 980               | 0                             | NR                             |
| 465               | 31                            | NR                             | 595               | 991                           | NR                             | 725               | 59                            | NR                             | 855               | 1                             | NR                             | 985               | 0                             | NR                             |
| 470               | 23                            | NR                             | 600               | 999                           | NR                             | 730               | 50                            | NR                             | 860               | 1                             | NR                             | 990               | 0                             | NR                             |
| 475               | 21                            | NR                             | 605               | 992                           | NR                             | 735               | 43                            | NR                             | 865               | 1                             | NR                             | 995               | 0                             | NR                             |
| 480               | 23                            | NR                             | 610               | 969                           | NR                             | 740               | 36                            | NR                             | 870               | 1                             | NR                             | 1000              | 0                             | NR                             |
| 485               | 32                            | NR                             | 615               | 935                           | NR                             | 745               | 31                            | NR                             | 875               | 1                             | NR                             |                   |                               |                                |

REPORT NUMBER: SP1-2407-184-3

### Scotopic Flux vs. Wavelength



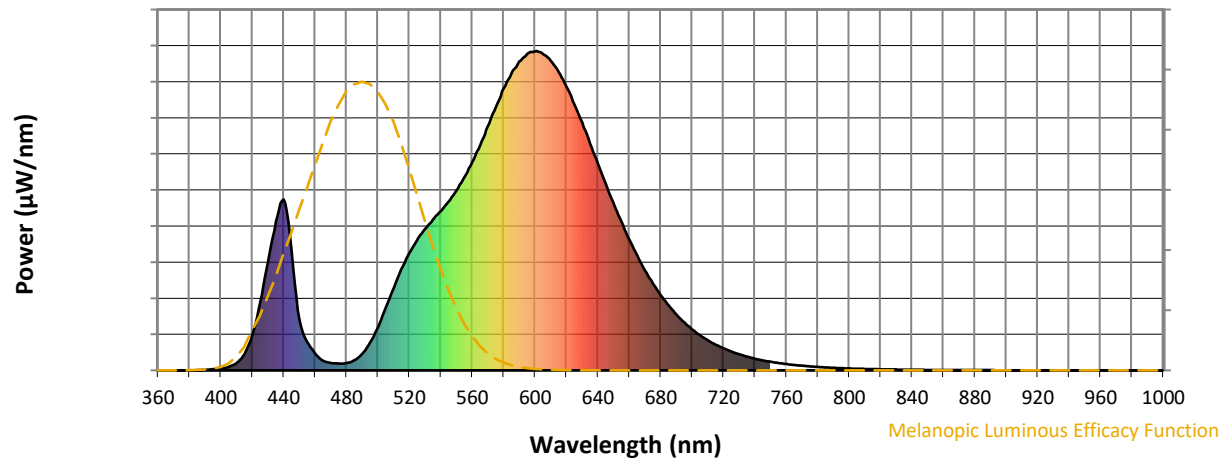
Scotopic Lumens: NR

S/P: 1.02

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 52                          | NR               | 620       | 888                         | NR               | 750       | 27                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 87                          | NR               | 625       | 834                         | NR               | 755       | 23                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 135                         | NR               | 630       | 776                         | NR               | 760       | 20                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 196                         | NR               | 635       | 712                         | NR               | 765       | 17                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 258                         | NR               | 640       | 648                         | NR               | 770       | 15                          | NR               | 900       | 0                           | NR               |
| 385       | 1                           | NR               | 515       | 317                         | NR               | 645       | 583                         | NR               | 775       | 12                          | NR               | 905       | 0                           | NR               |
| 390       | 2                           | NR               | 520       | 368                         | NR               | 650       | 523                         | NR               | 780       | 11                          | NR               | 910       | 0                           | NR               |
| 395       | 4                           | NR               | 525       | 408                         | NR               | 655       | 465                         | NR               | 785       | 9                           | NR               | 915       | 0                           | NR               |
| 400       | 6                           | NR               | 530       | 443                         | NR               | 660       | 410                         | NR               | 790       | 8                           | NR               | 920       | 0                           | NR               |
| 405       | 11                          | NR               | 535       | 473                         | NR               | 665       | 360                         | NR               | 795       | 7                           | NR               | 925       | 0                           | NR               |
| 410       | 23                          | NR               | 540       | 498                         | NR               | 670       | 313                         | NR               | 800       | 6                           | NR               | 930       | 0                           | NR               |
| 415       | 51                          | NR               | 545       | 530                         | NR               | 675       | 272                         | NR               | 805       | 5                           | NR               | 935       | 0                           | NR               |
| 420       | 111                         | NR               | 550       | 563                         | NR               | 680       | 236                         | NR               | 810       | 4                           | NR               | 940       | 0                           | NR               |
| 425       | 214                         | NR               | 555       | 605                         | NR               | 685       | 203                         | NR               | 815       | 4                           | NR               | 945       | 0                           | NR               |
| 430       | 339                         | NR               | 560       | 651                         | NR               | 690       | 175                         | NR               | 820       | 3                           | NR               | 950       | 0                           | NR               |
| 435       | 467                         | NR               | 565       | 705                         | NR               | 695       | 150                         | NR               | 825       | 3                           | NR               | 955       | 0                           | NR               |
| 440       | 535                         | NR               | 570       | 765                         | NR               | 700       | 128                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 372                         | NR               | 575       | 824                         | NR               | 705       | 110                         | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 160                         | NR               | 580       | 882                         | NR               | 710       | 94                          | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 89                          | NR               | 585       | 930                         | NR               | 715       | 80                          | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 53                          | NR               | 590       | 968                         | NR               | 720       | 69                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 31                          | NR               | 595       | 991                         | NR               | 725       | 59                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 23                          | NR               | 600       | 999                         | NR               | 730       | 50                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 21                          | NR               | 605       | 992                         | NR               | 735       | 43                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 23                          | NR               | 610       | 969                         | NR               | 740       | 36                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 32                          | NR               | 615       | 935                         | NR               | 745       | 31                          | NR               | 875       | 1                           | NR               |           |                             |                  |

REPORT NUMBER: SP1-2407-184-3

### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 1.71

| λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 52                       | NR            | 620    | 888                      | NR            | 750    | 27                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 87                       | NR            | 625    | 834                      | NR            | 755    | 23                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 135                      | NR            | 630    | 776                      | NR            | 760    | 20                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 196                      | NR            | 635    | 712                      | NR            | 765    | 17                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 258                      | NR            | 640    | 648                      | NR            | 770    | 15                       | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 317                      | NR            | 645    | 583                      | NR            | 775    | 12                       | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 368                      | NR            | 650    | 523                      | NR            | 780    | 11                       | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 408                      | NR            | 655    | 465                      | NR            | 785    | 9                        | NR            | 915    | 0                        | NR            |
| 400    | 6                        | NR            | 530    | 443                      | NR            | 660    | 410                      | NR            | 790    | 8                        | NR            | 920    | 0                        | NR            |
| 405    | 11                       | NR            | 535    | 473                      | NR            | 665    | 360                      | NR            | 795    | 7                        | NR            | 925    | 0                        | NR            |
| 410    | 23                       | NR            | 540    | 498                      | NR            | 670    | 313                      | NR            | 800    | 6                        | NR            | 930    | 0                        | NR            |
| 415    | 51                       | NR            | 545    | 530                      | NR            | 675    | 272                      | NR            | 805    | 5                        | NR            | 935    | 0                        | NR            |
| 420    | 111                      | NR            | 550    | 563                      | NR            | 680    | 236                      | NR            | 810    | 4                        | NR            | 940    | 0                        | NR            |
| 425    | 214                      | NR            | 555    | 605                      | NR            | 685    | 203                      | NR            | 815    | 4                        | NR            | 945    | 0                        | NR            |
| 430    | 339                      | NR            | 560    | 651                      | NR            | 690    | 175                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 467                      | NR            | 565    | 705                      | NR            | 695    | 150                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 535                      | NR            | 570    | 765                      | NR            | 700    | 128                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 372                      | NR            | 575    | 824                      | NR            | 705    | 110                      | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 160                      | NR            | 580    | 882                      | NR            | 710    | 94                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 89                       | NR            | 585    | 930                      | NR            | 715    | 80                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 53                       | NR            | 590    | 968                      | NR            | 720    | 69                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 31                       | NR            | 595    | 991                      | NR            | 725    | 59                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 23                       | NR            | 600    | 999                      | NR            | 730    | 50                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 21                       | NR            | 605    | 992                      | NR            | 735    | 43                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 23                       | NR            | 610    | 969                      | NR            | 740    | 36                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 32                       | NR            | 615    | 935                      | NR            | 745    | 31                       | NR            | 875    | 1                        | NR            |        |                          |               |

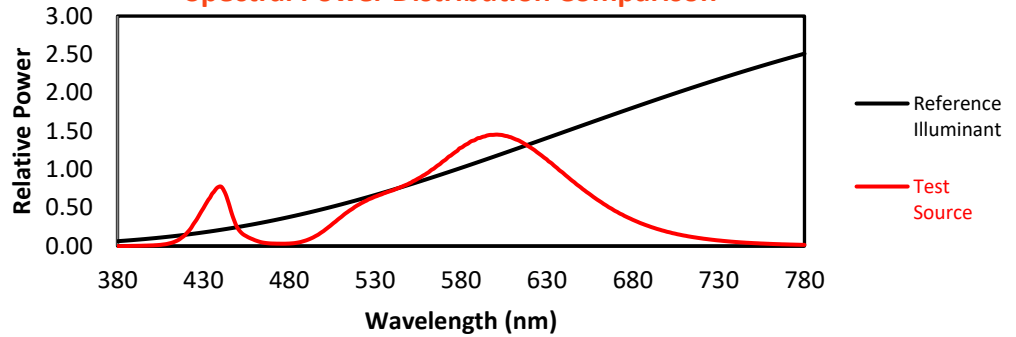
REPORT NUMBER: SP1-2407-184-3

TM-30-18

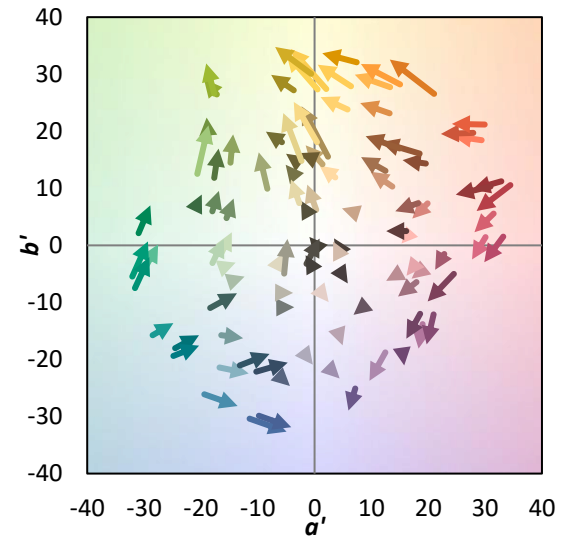
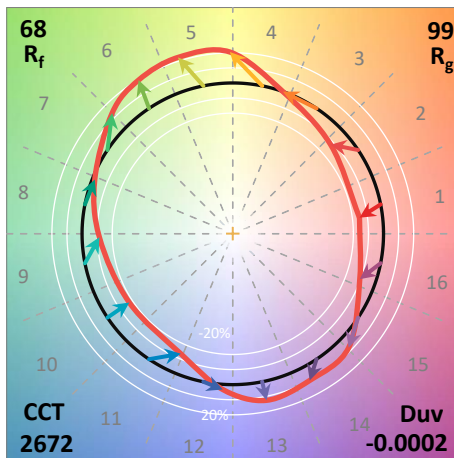
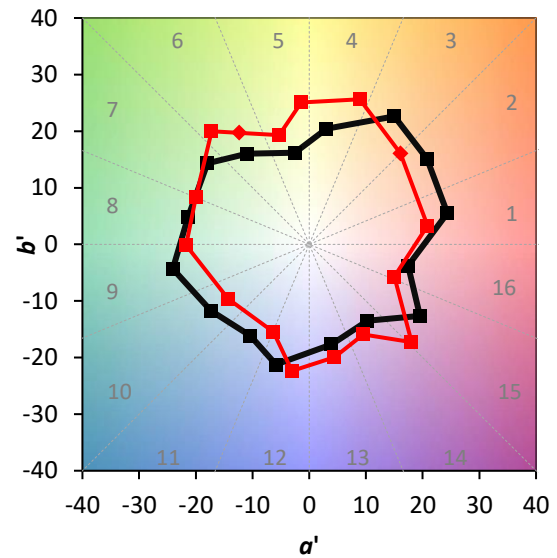
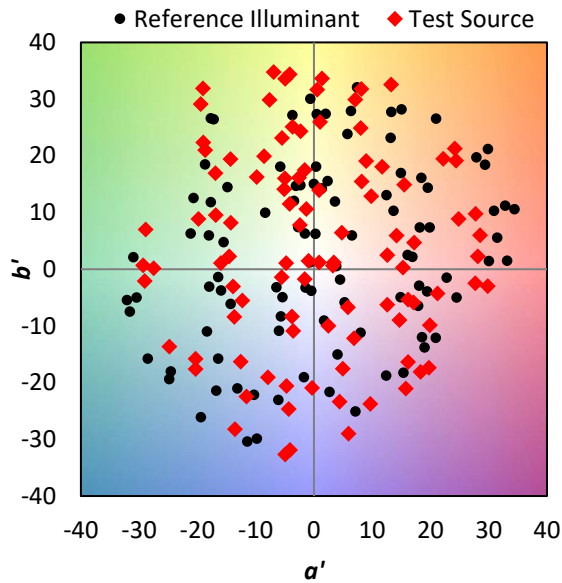
### Summary

$R_f = 67.9$   
 $R_g = 98.6$   
 $CIE\ R_a = 71.1$   
 $R_g = -27.8$

### Spectral Power Distribution Comparison



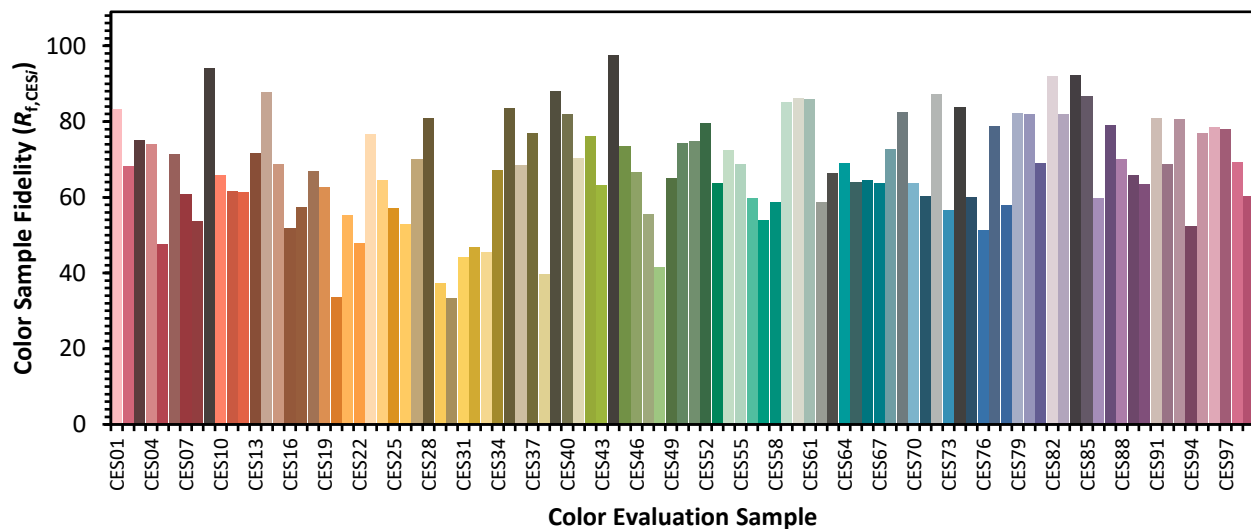
### Color Vector Graphics

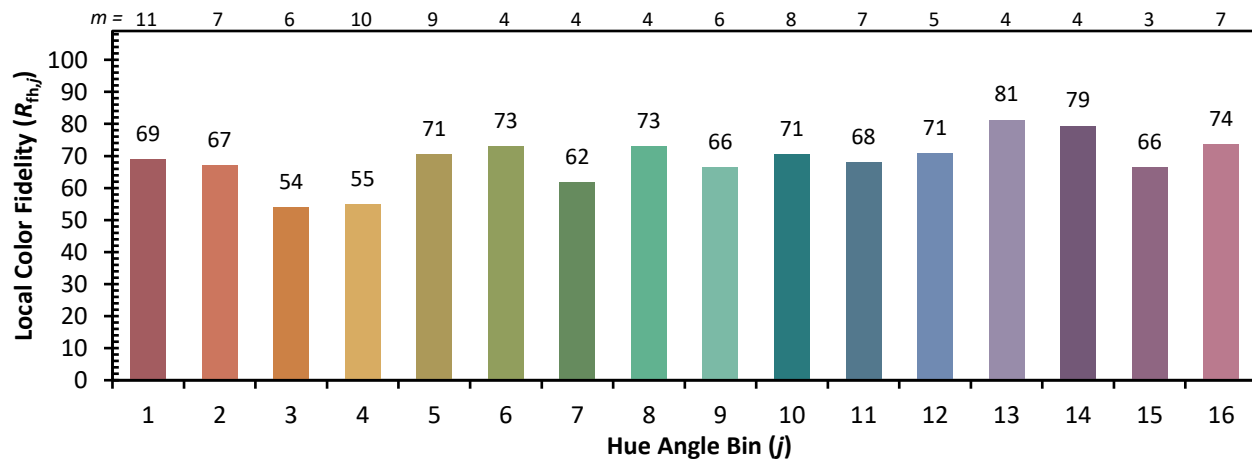
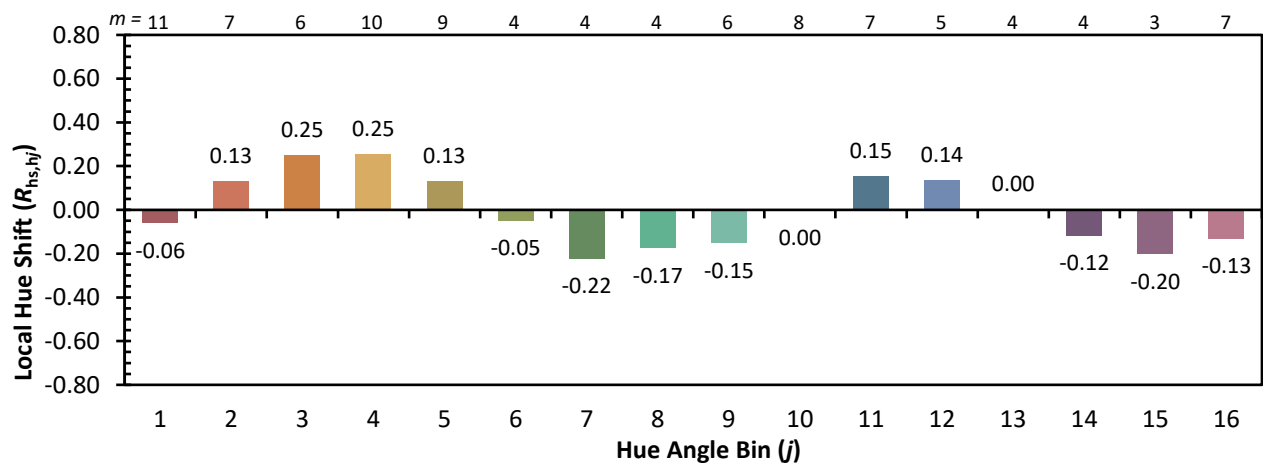
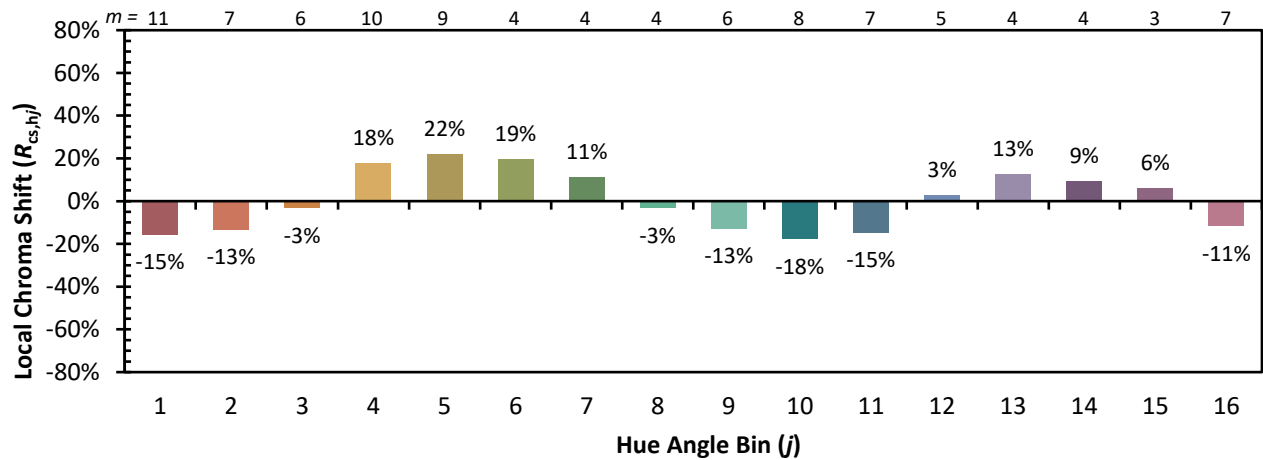




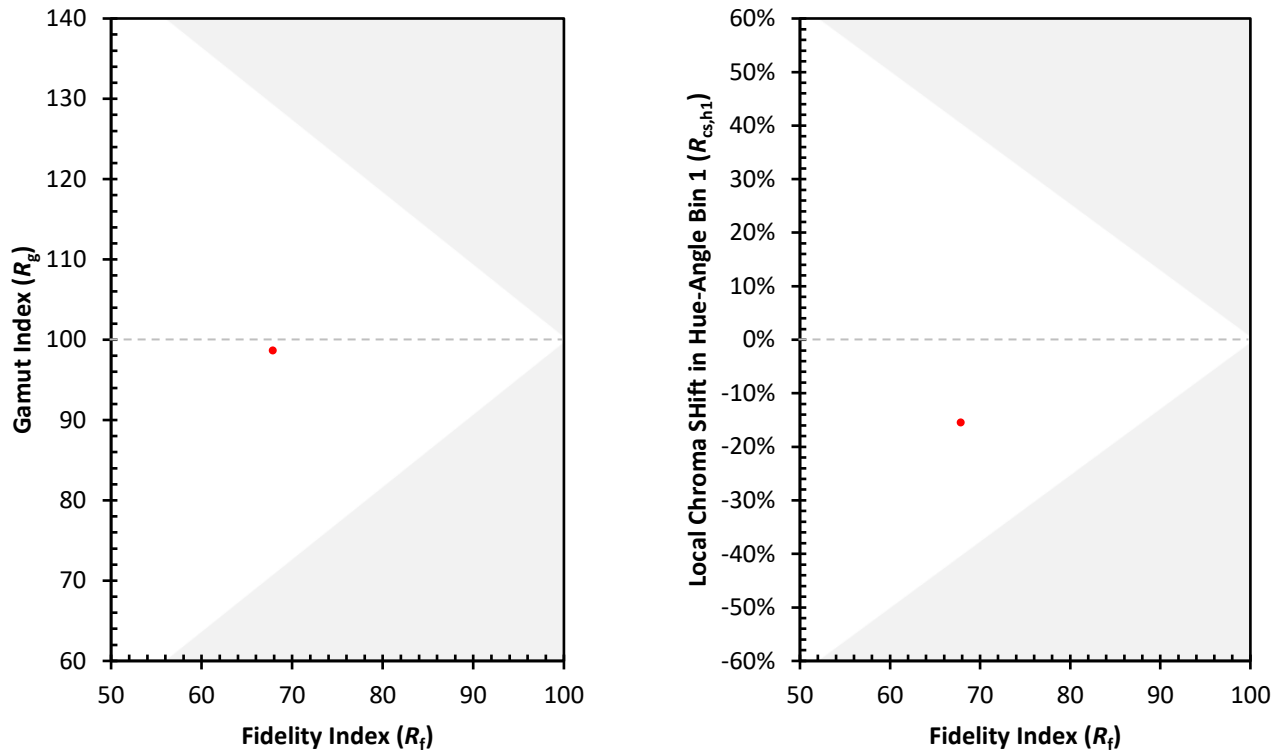
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 53 | CES51 = 75 | CES76 = 51 |
| CES02 = 63 | CES27 = 70 | CES52 = 80 | CES77 = 79 |
| CES03 = 31 | CES28 = 81 | CES53 = 64 | CES78 = 58 |
| CES04 = 71 | CES29 = 37 | CES54 = 73 | CES79 = 82 |
| CES05 = 50 | CES30 = 33 | CES55 = 69 | CES80 = 82 |
| CES06 = 52 | CES31 = 44 | CES56 = 60 | CES81 = 69 |
| CES07 = 42 | CES32 = 47 | CES57 = 54 | CES82 = 92 |
| CES08 = 41 | CES33 = 45 | CES58 = 59 | CES83 = 82 |
| CES09 = 29 | CES34 = 67 | CES59 = 85 | CES84 = 92 |
| CES10 = 77 | CES35 = 84 | CES60 = 86 | CES85 = 87 |
| CES11 = 60 | CES36 = 68 | CES61 = 86 | CES86 = 60 |
| CES12 = 66 | CES37 = 77 | CES62 = 59 | CES87 = 79 |
| CES13 = 44 | CES38 = 40 | CES63 = 66 | CES88 = 70 |
| CES14 = 74 | CES39 = 88 | CES64 = 69 | CES89 = 66 |
| CES15 = 72 | CES40 = 82 | CES65 = 64 | CES90 = 64 |
| CES16 = 48 | CES41 = 70 | CES66 = 65 | CES91 = 81 |
| CES17 = 51 | CES42 = 76 | CES67 = 64 | CES92 = 69 |
| CES18 = 57 | CES43 = 63 | CES68 = 73 | CES93 = 81 |
| CES19 = 73 | CES44 = 97 | CES69 = 83 | CES94 = 53 |
| CES20 = 67 | CES45 = 74 | CES70 = 64 | CES95 = 77 |
| CES21 = 88 | CES46 = 67 | CES71 = 60 | CES96 = 79 |
| CES22 = 80 | CES47 = 55 | CES72 = 87 | CES97 = 78 |
| CES23 = 92 | CES48 = 42 | CES73 = 57 | CES98 = 69 |
| CES24 = 92 | CES49 = 65 | CES74 = 84 | CES99 = 60 |
| CES25 = 73 | CES50 = 74 | CES75 = 60 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)