

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: P233961

Luminaire Tested: **CTN-6-3-D-E1-T1-7030**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P233961  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1707-171-24)  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: CTN-6-3-D-E1-T1-7030  
Description: CELESTEON HIGH MAST LUMINAIRE  
(6) 70 CRI, 3000K LEDS AND TYPE I OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 32479 lumens  
Efficiency: N/A  
Efficacy: 138.8 lumens/watt  
Luminous Opening: Circular (Dia: 2.08' x H: 0')  
IES Classification: Type I - Short - Semi-Cutoff  
BUG Rating: B5 - U0 - G5

Input Watts (W): 234  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

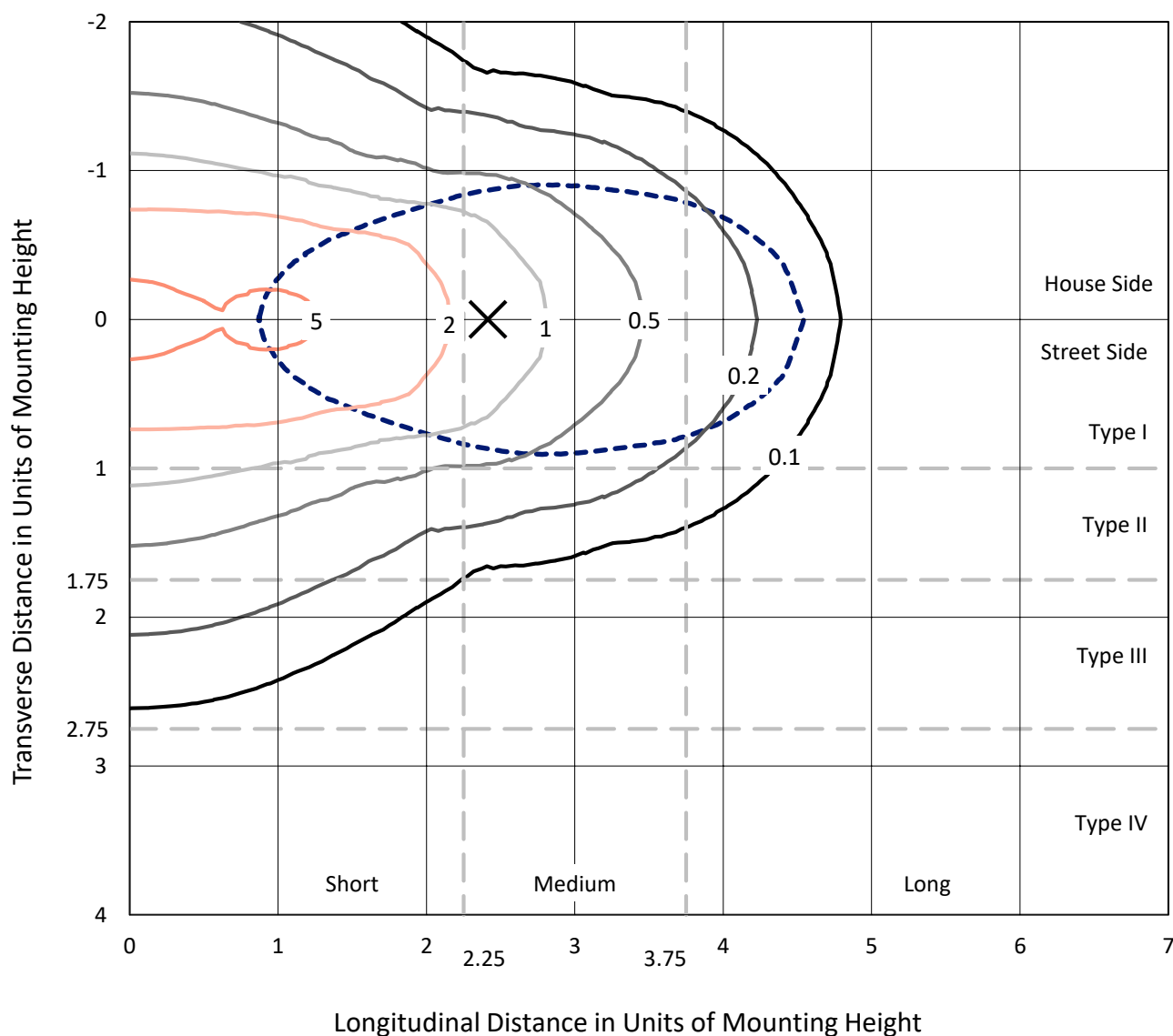


REPORT NUMBER: P233961

CATALOG NUMBER: CTN-6-3-D-E1-T1-7030

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 --- 1/2 Max cd

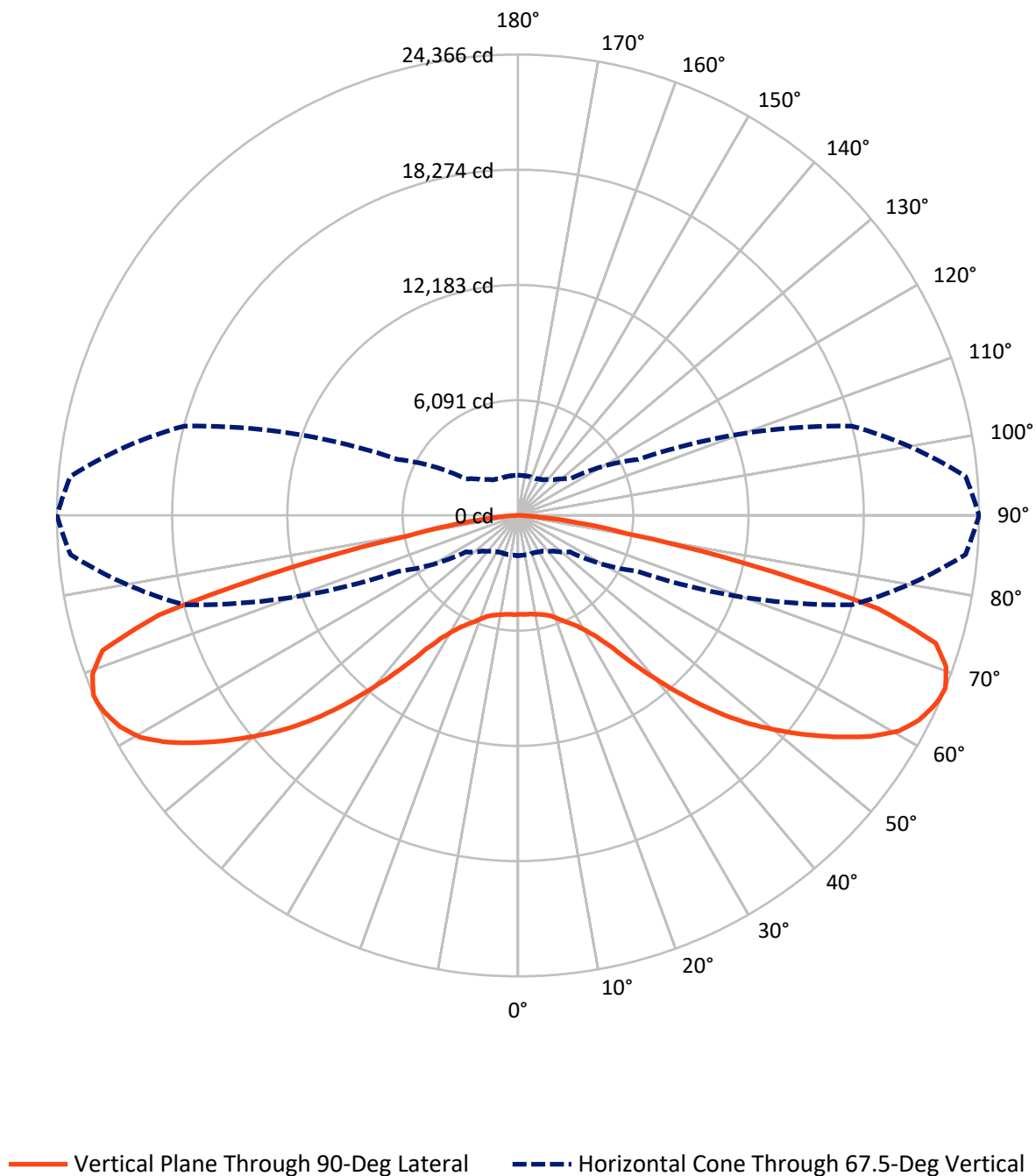


Based on 30 foot mounting height. Maximum calculated value = 5.8 fc  
 Type I - Short - Semi-Cutoff

REPORT NUMBER: P233961

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## Luminous Intensity Polar Plot



REPORT NUMBER: P233961

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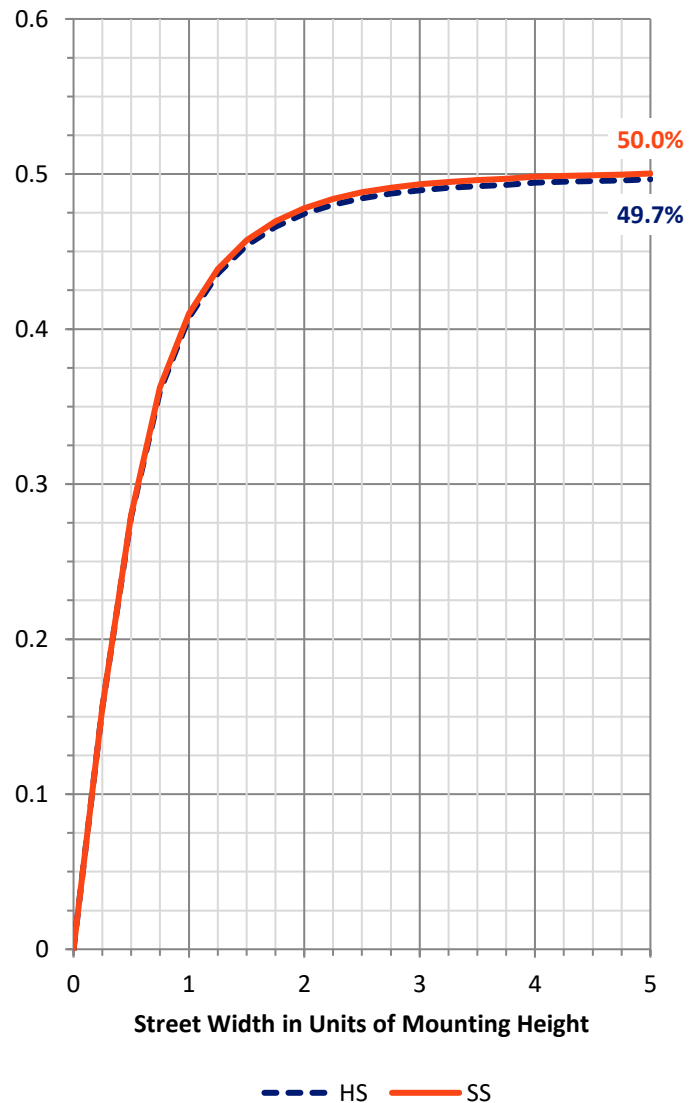
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 16239.5  | 0.0    | 16239.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Street Side</b> | Lumens    | 16239.5  | 0.0    | 16239.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Total</b>       | Lumens    | 32479.0  | 0.0    | 32479.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 497.1   | 1.5       |
| 10°-20°   | 1479.0  | 4.6       |
| 20°-30°   | 2447.3  | 7.5       |
| 30°-40°   | 3585.7  | 11.0      |
| 40°-50°   | 5275.3  | 16.2      |
| 50°-60°   | 6840.8  | 21.1      |
| 60°-70°   | 7270.3  | 22.4      |
| 70°-80°   | 4488.0  | 13.8      |
| 80°-90°   | 595.3   | 1.8       |
| 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°    | 32479.0 | 100.0     |
| 0°-180°   | 32479.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P233961

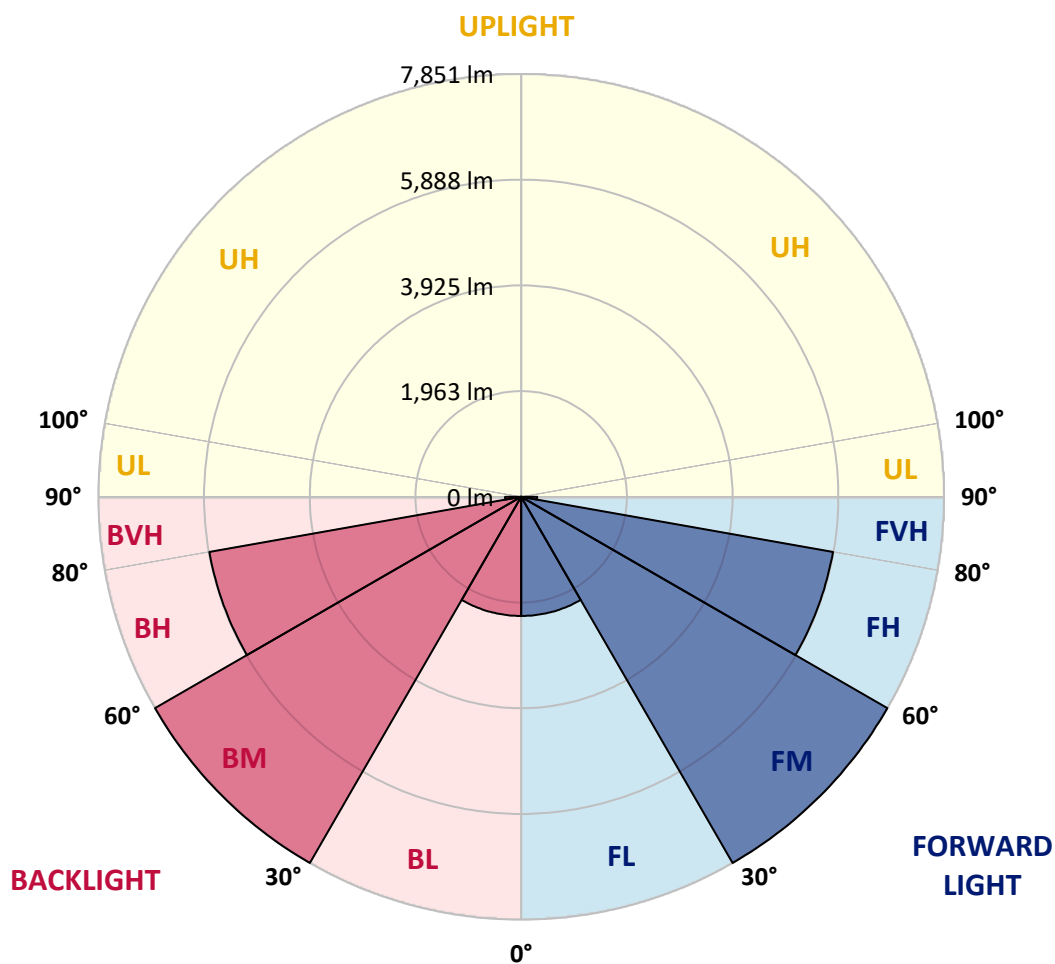
CATALOG NUMBER: CTN-6-3-D-E1-T1-7030

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2211.7 | 6.8       |                         |      |         |
| FM   | (30°-60°)   | 7850.9 | 24.2      |                         |      |         |
| FH   | (60°-80°)   | 5879.2 | 18.1      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 297.7  | 0.9       |                         |      | G3/500  |
| BL   | (0°-30°)    | 2211.7 | 6.8       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 7850.9 | 24.2      | B4/8500                 |      |         |
| BH   | (60°-80°)   | 5879.2 | 18.1      | B5                      |      | G5      |
| BVH  | (80°-90°)   | 297.7  | 0.9       |                         |      | G3/500  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B5-U0-G5**

Type I Short



REPORT NUMBER: P233961

CATALOG NUMBER: CTN-6-3-D-E1-T1-7030

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°     | 85°     | 90°     |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|
| 0°    | 5230.5 | 5230.5 | 5230.5 | 5230.5 | 5230.5 | 5230.5 | 5230.5 | 5230.5 | 5230.5  | 5230.5  | 5230.5  |
| 2.5°  | 5245.1 | 5228.6 | 5235.4 | 5259.7 | 5171.1 | 5214.9 | 5199.4 | 5238.3 | 5217.9  | 5235.4  | 5244.1  |
| 5°    | 5208.1 | 5187.7 | 5197.4 | 5243.2 | 5162.4 | 5207.1 | 5195.5 | 5239.3 | 5213.0  | 5237.3  | 5247.0  |
| 7.5°  | 5176.0 | 5154.6 | 5172.1 | 5210.1 | 5148.8 | 5198.4 | 5188.7 | 5248.0 | 5226.6  | 5257.7  | 5267.5  |
| 10°   | 5155.6 | 5132.2 | 5148.8 | 5190.6 | 5125.4 | 5203.3 | 5194.5 | 5273.3 | 5262.6  | 5305.4  | 5317.1  |
| 12.5° | 5105.0 | 5080.6 | 5092.3 | 5147.8 | 5118.6 | 5199.4 | 5220.8 | 5311.3 | 5308.4  | 5359.9  | 5372.6  |
| 15°   | 5014.5 | 4990.1 | 5005.7 | 5079.7 | 5090.4 | 5202.3 | 5268.5 | 5375.5 | 5393.0  | 5444.6  | 5455.3  |
| 17.5° | 4900.6 | 4883.1 | 4906.5 | 5004.7 | 5071.9 | 5242.2 | 5337.5 | 5473.8 | 5516.6  | 5569.1  | 5583.7  |
| 20°   | 4744.9 | 4735.2 | 4777.0 | 4911.3 | 5039.8 | 5271.4 | 5420.3 | 5612.0 | 5689.8  | 5775.4  | 5786.2  |
| 22.5° | 4532.8 | 4521.1 | 4608.7 | 4797.5 | 4982.4 | 5278.2 | 5501.0 | 5755.0 | 5899.0  | 6009.0  | 6037.2  |
| 25°   | 4294.4 | 4290.5 | 4410.2 | 4658.3 | 4904.5 | 5273.3 | 5579.9 | 5907.8 | 6127.7  | 6272.7  | 6303.8  |
| 27.5° | 4059.8 | 4071.5 | 4216.5 | 4509.4 | 4840.3 | 5284.0 | 5670.4 | 6103.4 | 6413.8  | 6594.8  | 6608.4  |
| 30°   | 3860.4 | 3870.1 | 4026.8 | 4362.5 | 4779.0 | 5296.7 | 5782.3 | 6336.9 | 6770.0  | 7014.2  | 7054.1  |
| 32.5° | 3672.5 | 3694.9 | 3854.5 | 4202.9 | 4710.9 | 5321.0 | 5927.3 | 6641.5 | 7206.9  | 7592.3  | 7641.9  |
| 35°   | 3517.8 | 3537.3 | 3693.0 | 4040.4 | 4602.8 | 5340.5 | 6119.0 | 7026.9 | 7857.9  | 8499.2  | 8576.1  |
| 37.5° | 3380.6 | 3404.0 | 3538.3 | 3890.5 | 4474.4 | 5347.3 | 6309.7 | 7501.8 | 8739.6  | 9760.4  | 9999.7  |
| 40°   | 3281.3 | 3299.8 | 3415.6 | 3740.7 | 4336.2 | 5316.1 | 6527.7 | 8033.1 | 9730.2  | 11265.8 | 11528.5 |
| 42.5° | 3199.6 | 3215.2 | 3310.5 | 3593.7 | 4180.5 | 5254.8 | 6731.0 | 8562.5 | 10777.3 | 12860.7 | 13203.2 |
| 45°   | 3116.9 | 3120.8 | 3212.3 | 3467.2 | 4022.9 | 5157.5 | 6883.8 | 9069.4 | 11879.8 | 14487.8 | 14888.7 |
| 47.5° | 3042.9 | 3038.1 | 3110.1 | 3342.7 | 3853.5 | 4994.0 | 6943.2 | 9489.8 | 12951.2 | 16012.6 | 16450.5 |
| 50°   | 2973.8 | 2953.4 | 3015.7 | 3223.9 | 3689.1 | 4759.5 | 6868.3 | 9780.8 | 14078.1 | 17485.9 | 17874.2 |
| 52.5° | 2870.7 | 2861.0 | 2920.3 | 3107.2 | 3524.6 | 4479.3 | 6621.1 | 9934.5 | 15279.9 | 18881.4 | 19287.2 |
| 55°   | 2778.2 | 2771.4 | 2832.7 | 2988.4 | 3363.1 | 4194.1 | 6194.9 | 9892.7 | 16464.2 | 20227.2 | 20676.8 |
| 57.5° | 2676.1 | 2671.2 | 2728.6 | 2859.0 | 3185.0 | 3929.4 | 5667.4 | 9622.2 | 17521.9 | 21389.1 | 22024.5 |
| 60°   | 2575.8 | 2578.8 | 2615.7 | 2727.6 | 3004.0 | 3637.5 | 5066.0 | 9151.2 | 18365.6 | 22441.0 | 23134.9 |
| 62.5° | 2459.1 | 2456.1 | 2483.4 | 2576.8 | 2796.7 | 3322.2 | 4473.4 | 8498.2 | 18860.0 | 23359.7 | 23803.4 |
| 65°   | 2301.4 | 2290.7 | 2321.9 | 2381.2 | 2545.7 | 2999.1 | 3889.5 | 7708.1 | 18872.6 | 23816.1 | 24193.6 |
| 66°   | 2234.3 | 2222.6 | 2250.8 | 2292.7 | 2447.4 | 2868.7 | 3674.5 | 7373.3 | 18679.0 | 23829.7 | 24298.7 |
| 67.5° | 2130.2 | 2116.5 | 2135.0 | 2154.5 | 2293.6 | 2660.5 | 3359.2 | 6993.8 | 18254.7 | 23744.0 | 24365.9 |
| 70°   | 1871.3 | 1873.2 | 1892.7 | 1885.9 | 1956.9 | 2197.3 | 2774.4 | 6289.3 | 16208.2 | 23397.6 | 24005.8 |
| 72.5° | 1456.8 | 1440.2 | 1412.0 | 1384.7 | 1418.8 | 1630.0 | 2101.0 | 5278.2 | 13272.3 | 21903.9 | 23086.2 |
| 75°   | 940.0  | 937.1  | 936.1  | 969.2  | 974.1  | 1117.1 | 1623.2 | 4258.4 | 10346.2 | 17975.4 | 19677.4 |
| 77.5° | 587.8  | 582.9  | 624.7  | 705.5  | 718.2  | 722.1  | 1064.6 | 3236.6 | 7479.4  | 11502.2 | 12394.6 |
| 80°   | 421.4  | 421.4  | 424.3  | 435.0  | 503.1  | 513.8  | 735.7  | 2031.9 | 4253.5  | 5607.1  | 5891.2  |
| 82.5° | 319.2  | 314.3  | 315.3  | 320.2  | 326.0  | 350.3  | 442.8  | 902.1  | 1699.1  | 2841.5  | 3215.2  |
| 85°   | 230.6  | 237.4  | 249.1  | 240.4  | 217.0  | 219.9  | 251.1  | 310.4  | 653.0   | 1100.6  | 1190.1  |
| 87.5° | 83.7   | 96.3   | 99.3   | 103.2  | 99.3   | 100.2  | 103.2  | 97.3   | 132.3   | 271.5   | 313.3   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2104-215-6

Luminaire Tested: CST-CA6-230-730-U-T4

Test Date: 04/22/2021

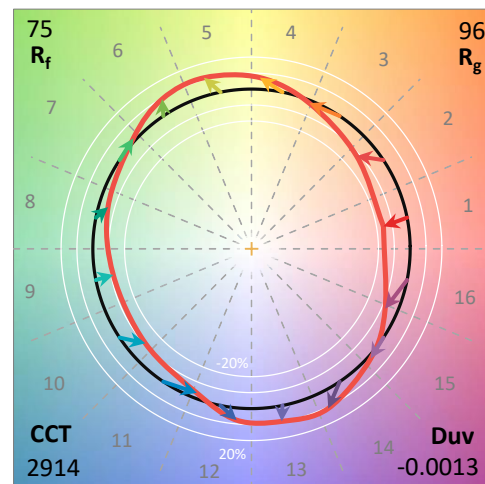


### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-215-6  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/22/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **CST-CA6-230-730-U-T4**  
 Description: STREETWORKS HIGH MAST LUMINAIRE

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2914    | CRI (Ra): | 73.2 |      |       |
| CIE u':                   | 0.2541  | R1:       | 70.1 | R9:  | -27.2 |
| CIE v':                   | 0.5212  | R2:       | 83.3 | R10: | 61.9  |
| Duv:                      | -0.0013 | R3:       | 94.2 | R11: | 65.4  |
| CIE x:                    | 0.4410  | R4:       | 69.4 | R12: | 53.3  |
| CIE y:                    | 0.4020  | R5:       | 69.3 | R13: | 72.6  |
| CIE z:                    | 0.1571  | R6:       | 77.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 599     | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 583     | R8:       | 44.9 |      |       |
| Purity:                   | 53.4    |           |      |      |       |
| Rf:                       | 75.3    |           |      |      |       |
| Rg:                       | 95.7    |           |      |      |       |



### Test Conditions

Stabilization Time: 72M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/15%  
 Sphere Temperature (°C): 24.0

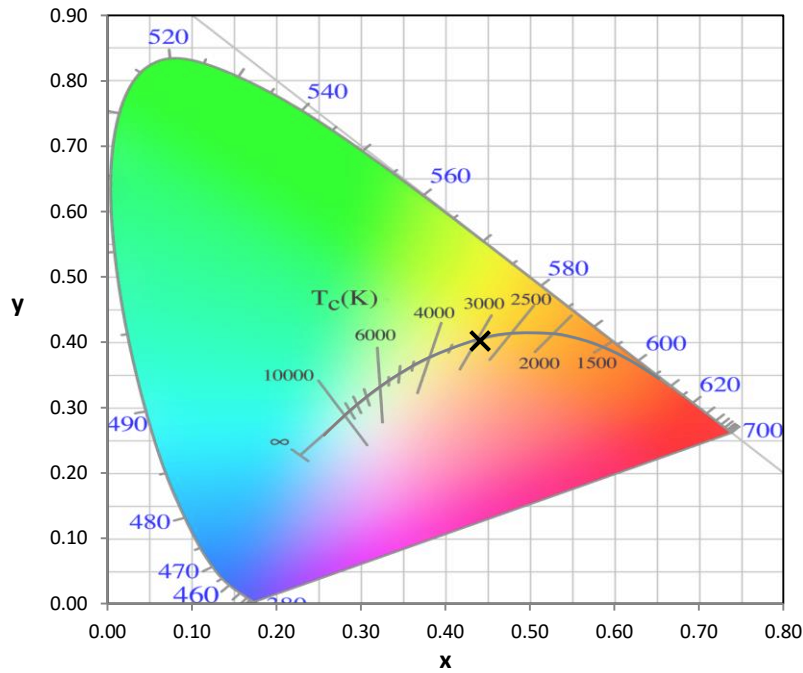
REPORT NUMBER: SP1-2104-215-6

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

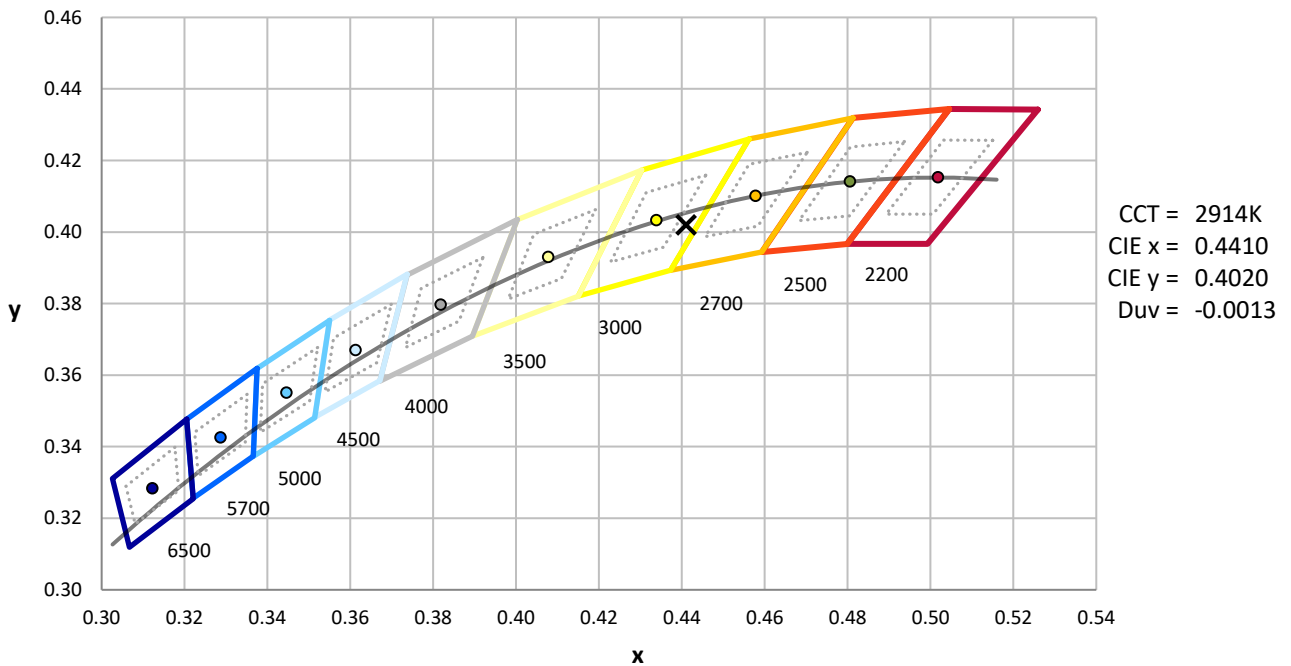


REPORT NUMBER: SP1-2104-215-6

**CIE 1931 Chromaticity Diagram**



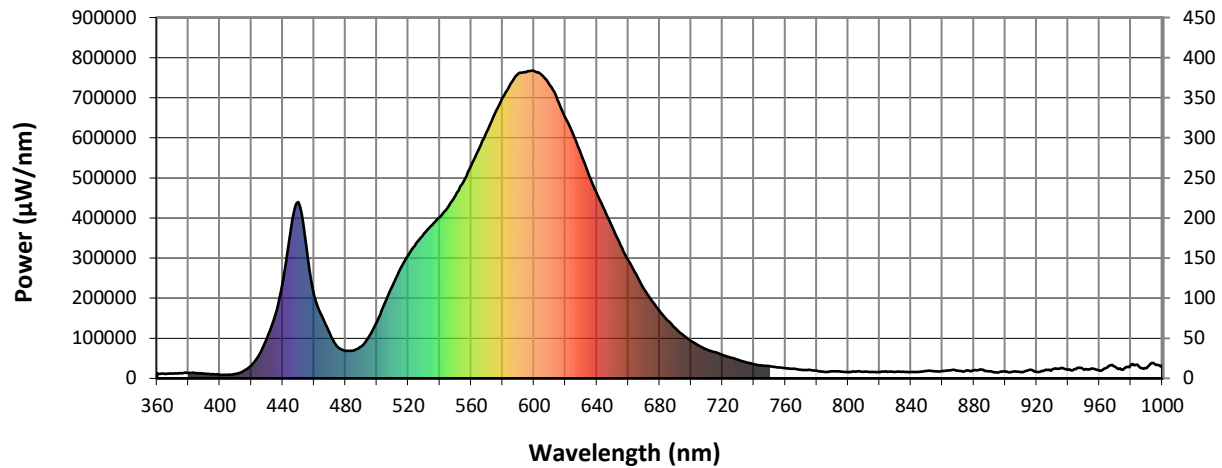
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 7-step quadrangle

REPORT NUMBER: SP1-2104-215-6

### Photopic Flux vs. Wavelength

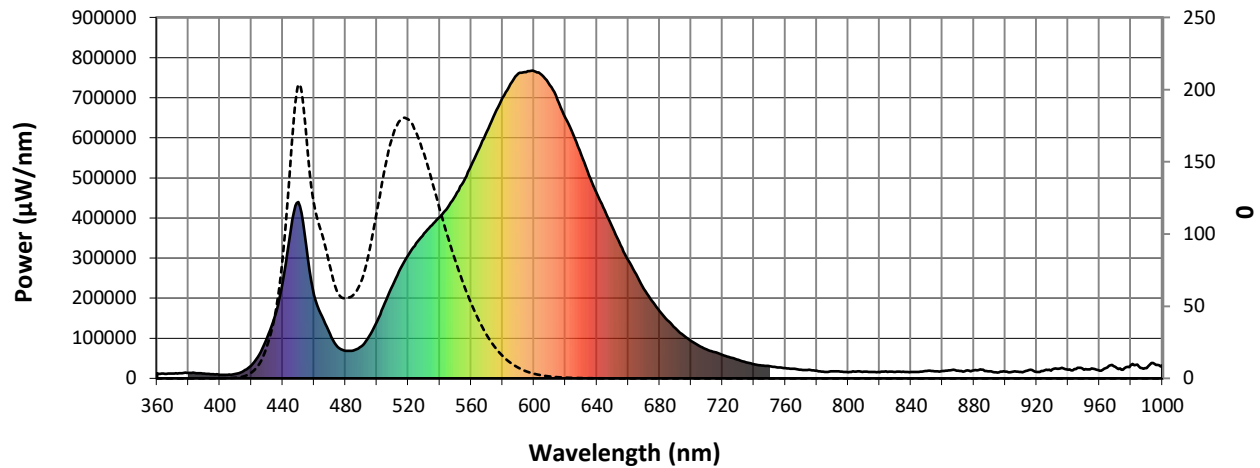


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 12827            | 0.0              | 490       | 80096            | 11.4             | 620       | 649050           | 168.9            | 750       | 30187            | 0.0              | 880       | 19756            | 0.0              |
| 365       | 11336            | 0.0              | 495       | 104447           | 18.9             | 625       | 608162           | 134.2            | 755       | 27442            | 0.0              | 885       | 21245            | 0.0              |
| 370       | 11776            | 0.0              | 500       | 142477           | 31.4             | 630       | 557990           | 101.0            | 760       | 25382            | 0.0              | 890       | 17771            | 0.0              |
| 375       | 13009            | 0.0              | 505       | 187724           | 52.5             | 635       | 506861           | 76.2             | 765       | 23778            | 0.0              | 895       | 14356            | 0.0              |
| 380       | 13906            | 0.0              | 510       | 232209           | 79.8             | 640       | 460827           | 55.1             | 770       | 21474            | 0.0              | 900       | 16683            | 0.0              |
| 385       | 12960            | 0.0              | 515       | 273388           | 113.2            | 645       | 418064           | 40.3             | 775       | 21394            | 0.0              | 905       | 16548            | 0.0              |
| 390       | 11750            | 0.0              | 520       | 308378           | 149.5            | 650       | 376246           | 27.5             | 780       | 18945            | 0.0              | 910       | 15630            | 0.0              |
| 395       | 10399            | 0.0              | 525       | 336804           | 180.8            | 655       | 332016           | 19.0             | 785       | 16318            | 0.0              | 915       | 20907            | 0.0              |
| 400       | 9192             | 0.0              | 530       | 361609           | 212.9            | 660       | 294638           | 12.3             | 790       | 17841            | 0.0              | 920       | 16083            | 0.0              |
| 405       | 8943             | 0.0              | 535       | 382440           | 237.2            | 665       | 259105           | 8.2              | 795       | 16506            | 0.0              | 925       | 20203            | 0.0              |
| 410       | 11120            | 0.0              | 540       | 401976           | 261.9            | 670       | 223041           | 4.9              | 800       | 15058            | 0.0              | 930       | 22625            | 0.0              |
| 415       | 18193            | 0.0              | 545       | 426232           | 283.7            | 675       | 193569           | 3.2              | 805       | 16851            | 0.0              | 935       | 24828            | 0.0              |
| 420       | 32317            | 0.1              | 550       | 455969           | 309.9            | 680       | 167520           | 1.9              | 810       | 16679            | 0.0              | 940       | 21275            | 0.0              |
| 425       | 59220            | 0.3              | 555       | 490448           | 335.0            | 685       | 144697           | 1.2              | 815       | 15851            | 0.0              | 945       | 23270            | 0.0              |
| 430       | 100522           | 0.8              | 560       | 530799           | 360.7            | 690       | 125032           | 0.7              | 820       | 15536            | 0.0              | 950       | 21756            | 0.0              |
| 435       | 155311           | 1.8              | 565       | 572799           | 380.9            | 695       | 107458           | 0.5              | 825       | 16381            | 0.0              | 955       | 24823            | 0.0              |
| 440       | 239817           | 3.8              | 570       | 615361           | 400.1            | 700       | 93549            | 0.3              | 830       | 16149            | 0.0              | 960       | 19499            | 0.0              |
| 445       | 368265           | 7.7              | 575       | 659689           | 410.5            | 705       | 81608            | 0.2              | 835       | 16687            | 0.0              | 965       | 27077            | 0.0              |
| 450       | 439895           | 11.4             | 580       | 700037           | 416.0            | 710       | 71559            | 0.1              | 840       | 16206            | 0.0              | 970       | 28727            | 0.0              |
| 455       | 329010           | 11.0             | 585       | 734518           | 408.1            | 715       | 65193            | 0.1              | 845       | 16062            | 0.0              | 975       | 21725            | 0.0              |
| 460       | 207545           | 8.5              | 590       | 760906           | 393.4            | 720       | 58466            | 0.0              | 850       | 18530            | 0.0              | 980       | 33536            | 0.0              |
| 465       | 154577           | 8.0              | 595       | 763605           | 362.0            | 725       | 52265            | 0.0              | 855       | 17709            | 0.0              | 985       | 30537            | 0.0              |
| 470       | 110708           | 6.9              | 600       | 766048           | 330.1            | 730       | 46287            | 0.0              | 860       | 18086            | 0.0              | 990       | 25187            | 0.0              |
| 475       | 78445            | 6.2              | 605       | 756483           | 293.0            | 735       | 40164            | 0.0              | 865       | 19763            | 0.0              | 995       | 35676            | 0.0              |
| 480       | 68887            | 6.5              | 610       | 730981           | 251.1            | 740       | 35097            | 0.0              | 870       | 19416            | 0.0              | 1000      | 32909            | 0.0              |
| 485       | 69832            | 8.3              | 615       | 694682           | 209.7            | 745       | 32334            | 0.0              | 875       | 19352            | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-215-6

### Scotopic Flux vs. Wavelength



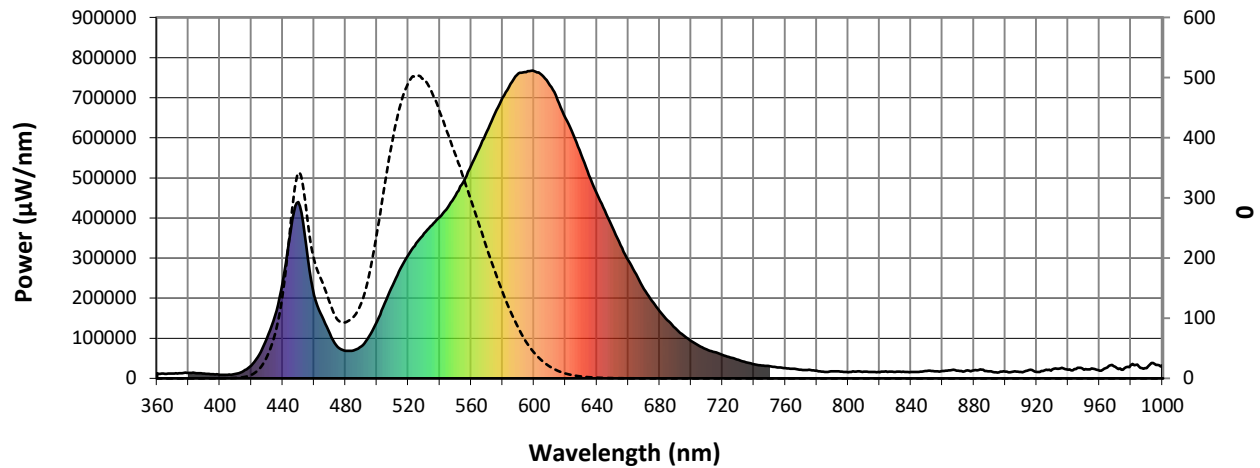
Scotopic Lumens: 43125.2

S/P: 1.19

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 12827                         | 0.0                            | 490               | 80096                         | 123.3                          | 620               | 649050                        | 8.1                            | 750               | 30187                         | 0.0                            | 880               | 19756                         | 0.0                            |
| 365               | 11336                         | 0.0                            | 495               | 104447                        | 168.8                          | 625               | 608162                        | 5.1                            | 755               | 27442                         | 0.0                            | 885               | 21245                         | 0.0                            |
| 370               | 11776                         | 0.0                            | 500               | 142477                        | 238.3                          | 630               | 557990                        | 3.2                            | 760               | 25382                         | 0.0                            | 890               | 17771                         | 0.0                            |
| 375               | 13009                         | 0.0                            | 505               | 187724                        | 319.1                          | 635               | 506861                        | 1.9                            | 765               | 23778                         | 0.0                            | 895               | 14356                         | 0.0                            |
| 380               | 13906                         | 0.0                            | 510               | 232209                        | 393.6                          | 640               | 460827                        | 1.2                            | 770               | 21474                         | 0.0                            | 900               | 16683                         | 0.0                            |
| 385               | 12960                         | 0.0                            | 515               | 273388                        | 453.1                          | 645               | 418064                        | 0.7                            | 775               | 21394                         | 0.0                            | 905               | 16548                         | 0.0                            |
| 390               | 11750                         | 0.0                            | 520               | 308378                        | 490.2                          | 650               | 376246                        | 0.4                            | 780               | 18945                         | 0.0                            | 910               | 15630                         | 0.0                            |
| 395               | 10399                         | 0.1                            | 525               | 336804                        | 503.9                          | 655               | 332016                        | 0.3                            | 785               | 16318                         | 0.0                            | 915               | 20907                         | 0.0                            |
| 400               | 9192                          | 0.1                            | 530               | 361609                        | 498.6                          | 660               | 294638                        | 0.2                            | 790               | 17841                         | 0.0                            | 920               | 16083                         | 0.0                            |
| 405               | 8943                          | 0.3                            | 535               | 382440                        | 476.6                          | 665               | 259105                        | 0.1                            | 795               | 16506                         | 0.0                            | 925               | 20203                         | 0.0                            |
| 410               | 11120                         | 0.7                            | 540               | 401976                        | 444.2                          | 670               | 223041                        | 0.1                            | 800               | 15058                         | 0.0                            | 930               | 22625                         | 0.0                            |
| 415               | 18193                         | 1.9                            | 545               | 426232                        | 408.7                          | 675               | 193569                        | 0.0                            | 805               | 16851                         | 0.0                            | 935               | 24828                         | 0.0                            |
| 420               | 32317                         | 5.3                            | 550               | 455969                        | 372.8                          | 680               | 167520                        | 0.0                            | 810               | 16679                         | 0.0                            | 940               | 21275                         | 0.0                            |
| 425               | 59220                         | 14.5                           | 555               | 490448                        | 335.2                          | 685               | 144697                        | 0.0                            | 815               | 15851                         | 0.0                            | 945               | 23270                         | 0.0                            |
| 430               | 100522                        | 34.2                           | 560               | 530799                        | 296.7                          | 690               | 125032                        | 0.0                            | 820               | 15536                         | 0.0                            | 950               | 21756                         | 0.0                            |
| 435               | 155311                        | 69.4                           | 565               | 572799                        | 257.0                          | 695               | 107458                        | 0.0                            | 825               | 16381                         | 0.0                            | 955               | 24823                         | 0.0                            |
| 440               | 239817                        | 134.0                          | 570               | 615361                        | 217.2                          | 700               | 93549                         | 0.0                            | 830               | 16149                         | 0.0                            | 960               | 19499                         | 0.0                            |
| 445               | 368265                        | 246.6                          | 575               | 659689                        | 179.7                          | 705               | 81608                         | 0.0                            | 835               | 16687                         | 0.0                            | 965               | 27077                         | 0.0                            |
| 450               | 439895                        | 340.9                          | 580               | 700037                        | 144.2                          | 710               | 71559                         | 0.0                            | 840               | 16206                         | 0.0                            | 970               | 28727                         | 0.0                            |
| 455               | 329010                        | 287.5                          | 585               | 734518                        | 112.3                          | 715               | 65193                         | 0.0                            | 845               | 16062                         | 0.0                            | 975               | 21725                         | 0.0                            |
| 460               | 207545                        | 200.5                          | 590               | 760906                        | 84.7                           | 720               | 58466                         | 0.0                            | 850               | 18530                         | 0.0                            | 980               | 33536                         | 0.0                            |
| 465               | 154577                        | 163.3                          | 595               | 763605                        | 60.9                           | 725               | 52265                         | 0.0                            | 855               | 17709                         | 0.0                            | 985               | 30537                         | 0.0                            |
| 470               | 110708                        | 127.5                          | 600               | 766048                        | 43.2                           | 730               | 46287                         | 0.0                            | 860               | 18086                         | 0.0                            | 990               | 25187                         | 0.0                            |
| 475               | 78445                         | 98.1                           | 605               | 756483                        | 29.7                           | 735               | 40164                         | 0.0                            | 865               | 19763                         | 0.0                            | 995               | 35676                         | 0.0                            |
| 480               | 68887                         | 93.1                           | 610               | 730981                        | 19.8                           | 740               | 35097                         | 0.0                            | 870               | 19416                         | 0.0                            | 1000              | 32909                         | 0.0                            |
| 485               | 69832                         | 101.2                          | 615               | 694682                        | 12.8                           | 745               | 32334                         | 0.0                            | 875               | 19352                         | 0.0                            |                   |                               |                                |

REPORT NUMBER: SP1-2104-215-6

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 15555.2      M/P: 0.43**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 12827            | 0.0              | 490       | 80096            | 66.7             | 620       | 649050           | 0.5              | 750       | 30187            | 0.0              | 880       | 19756            | 0.0              |
| 365       | 11336            | 0.0              | 495       | 104447           | 86.2             | 625       | 608162           | 0.3              | 755       | 27442            | 0.0              | 885       | 21245            | 0.0              |
| 370       | 11776            | 0.0              | 500       | 142477           | 114.5            | 630       | 557990           | 0.2              | 760       | 25382            | 0.0              | 890       | 17771            | 0.0              |
| 375       | 13009            | 0.0              | 505       | 187724           | 144.1            | 635       | 506861           | 0.1              | 765       | 23778            | 0.0              | 895       | 14356            | 0.0              |
| 380       | 13906            | 0.0              | 510       | 232209           | 166.7            | 640       | 460827           | 0.1              | 770       | 21474            | 0.0              | 900       | 16683            | 0.0              |
| 385       | 12960            | 0.0              | 515       | 273388           | 178.6            | 645       | 418064           | 0.0              | 775       | 21394            | 0.0              | 905       | 16548            | 0.0              |
| 390       | 11750            | 0.0              | 520       | 308378           | 179.5            | 650       | 376246           | 0.0              | 780       | 18945            | 0.0              | 910       | 15630            | 0.0              |
| 395       | 10399            | 0.1              | 525       | 336804           | 170.8            | 655       | 332016           | 0.0              | 785       | 16318            | 0.0              | 915       | 20907            | 0.0              |
| 400       | 9192             | 0.1              | 530       | 361609           | 156.3            | 660       | 294638           | 0.0              | 790       | 17841            | 0.0              | 920       | 16083            | 0.0              |
| 405       | 8943             | 0.2              | 535       | 382440           | 137.6            | 665       | 259105           | 0.0              | 795       | 16506            | 0.0              | 925       | 20203            | 0.0              |
| 410       | 11120            | 0.4              | 540       | 401976           | 117.6            | 670       | 223041           | 0.0              | 800       | 15058            | 0.0              | 930       | 22625            | 0.0              |
| 415       | 18193            | 1.2              | 545       | 426232           | 99.0             | 675       | 193569           | 0.0              | 805       | 16851            | 0.0              | 935       | 24828            | 0.0              |
| 420       | 32317            | 3.7              | 550       | 455969           | 81.9             | 680       | 167520           | 0.0              | 810       | 16679            | 0.0              | 940       | 21275            | 0.0              |
| 425       | 59220            | 9.2              | 555       | 490448           | 66.1             | 685       | 144697           | 0.0              | 815       | 15851            | 0.0              | 945       | 23270            | 0.0              |
| 430       | 100522           | 21.2             | 560       | 530799           | 52.4             | 690       | 125032           | 0.0              | 820       | 15536            | 0.0              | 950       | 21756            | 0.0              |
| 435       | 155311           | 41.4             | 565       | 572799           | 40.2             | 695       | 107458           | 0.0              | 825       | 16381            | 0.0              | 955       | 24823            | 0.0              |
| 440       | 239817           | 80.1             | 570       | 615361           | 30.1             | 700       | 93549            | 0.0              | 830       | 16149            | 0.0              | 960       | 19499            | 0.0              |
| 445       | 368265           | 145.3            | 575       | 659689           | 22.0             | 705       | 81608            | 0.0              | 835       | 16687            | 0.0              | 965       | 27077            | 0.0              |
| 450       | 439895           | 202.7            | 580       | 700037           | 15.7             | 710       | 71559            | 0.0              | 840       | 16206            | 0.0              | 970       | 28727            | 0.0              |
| 455       | 329010           | 172.4            | 585       | 734518           | 10.9             | 715       | 65193            | 0.0              | 845       | 16062            | 0.0              | 975       | 21725            | 0.0              |
| 460       | 207545           | 122.3            | 590       | 760906           | 7.5              | 720       | 58466            | 0.0              | 850       | 18530            | 0.0              | 980       | 33536            | 0.0              |
| 465       | 154577           | 101.0            | 595       | 763605           | 4.9              | 725       | 52265            | 0.0              | 855       | 17709            | 0.0              | 985       | 30537            | 0.0              |
| 470       | 110708           | 79.3             | 600       | 766048           | 3.2              | 730       | 46287            | 0.0              | 860       | 18086            | 0.0              | 990       | 25187            | 0.0              |
| 475       | 78445            | 59.9             | 605       | 756483           | 2.1              | 735       | 40164            | 0.0              | 865       | 19763            | 0.0              | 995       | 35676            | 0.0              |
| 480       | 68887            | 55.4             | 610       | 730981           | 1.3              | 740       | 35097            | 0.0              | 870       | 19416            | 0.0              | 1000      | 32909            | 0.0              |
| 485       | 69832            | 57.6             | 615       | 694682           | 0.8              | 745       | 32334            | 0.0              | 875       | 19352            | 0.0              |           |                  |                  |

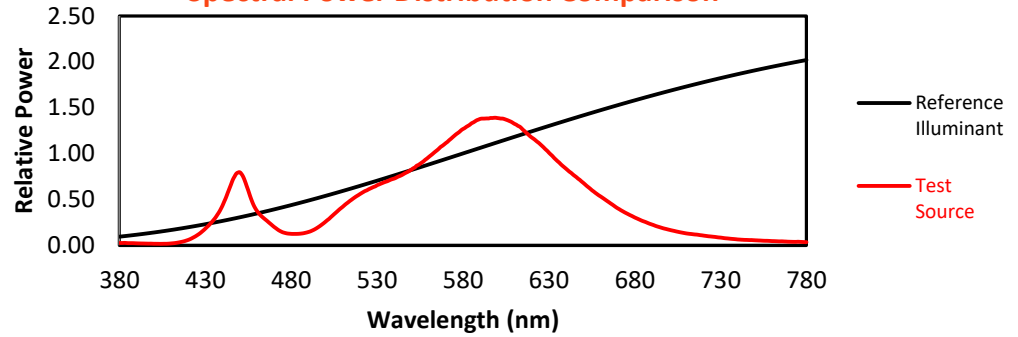
REPORT NUMBER: SP1-2104-215-6

TM-30-18

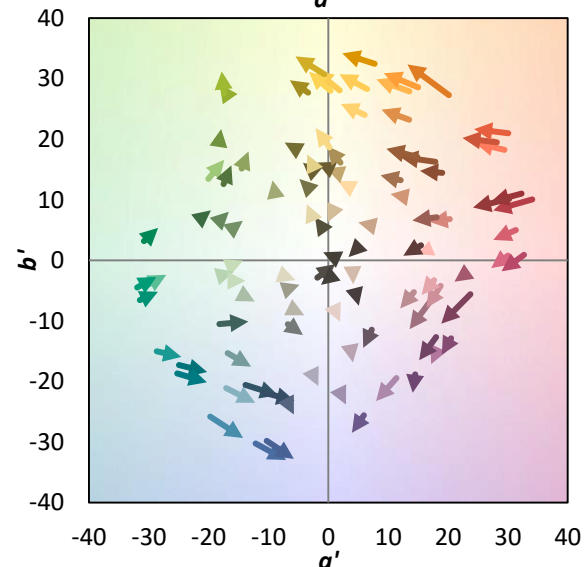
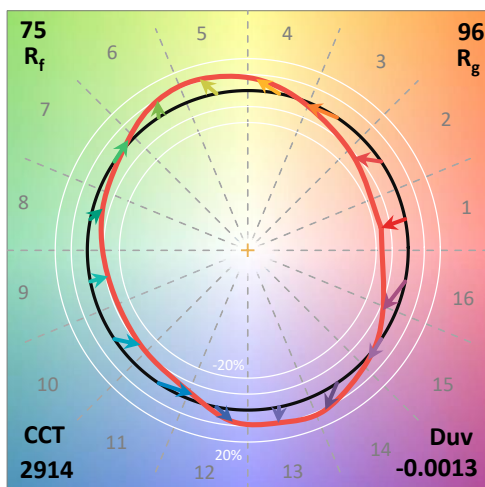
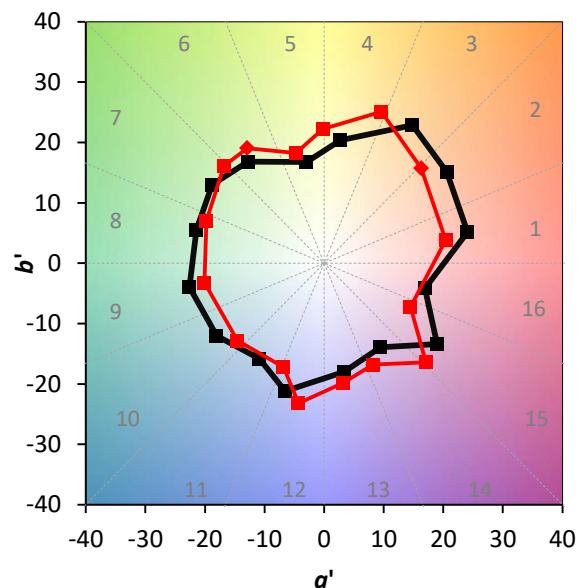
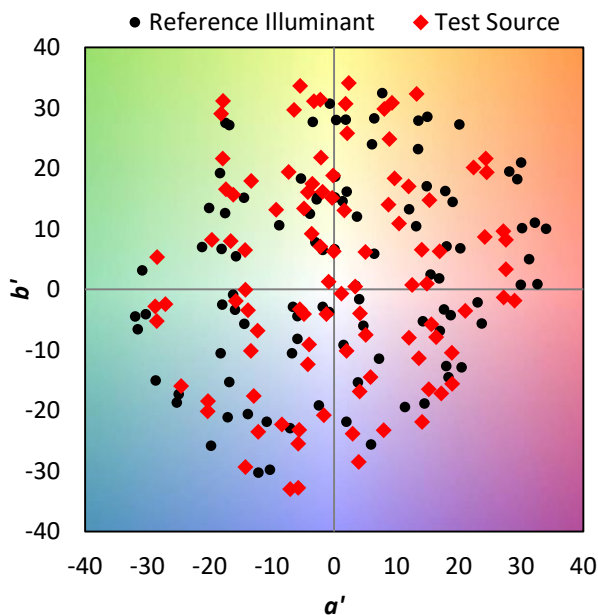
### Summary

$R_f = 75.3$   
 $R_g = 95.7$   
 CIE  $R_a = 73.2$   
 $R_g = -27.2$

### Spectral Power Distribution Comparison

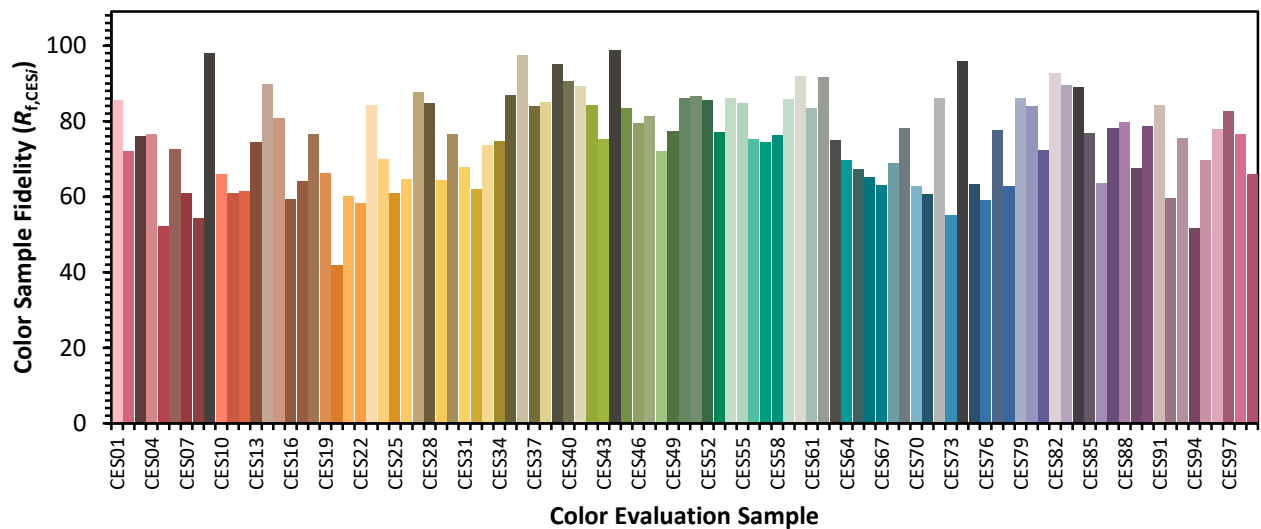


### Color Vector Graphics



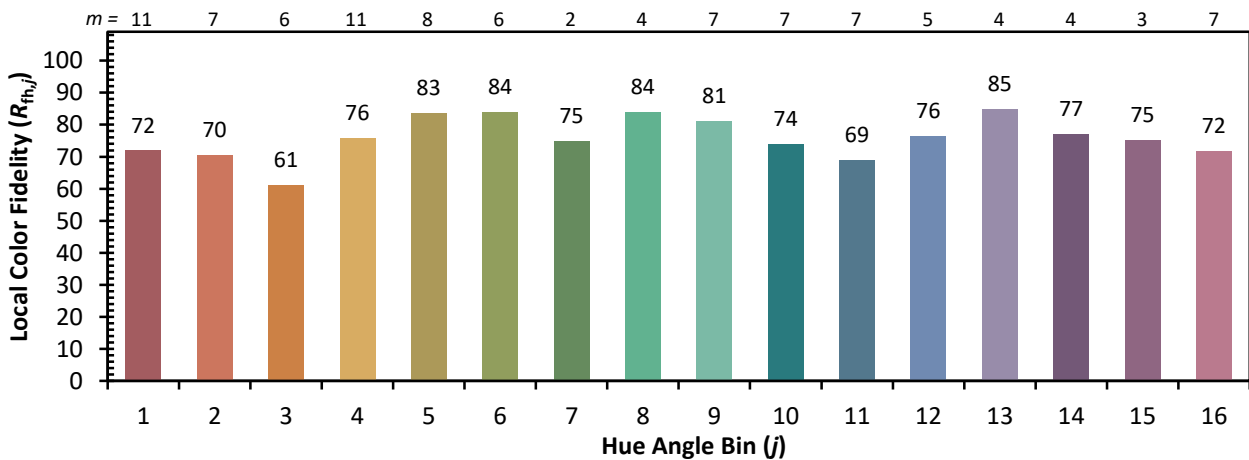
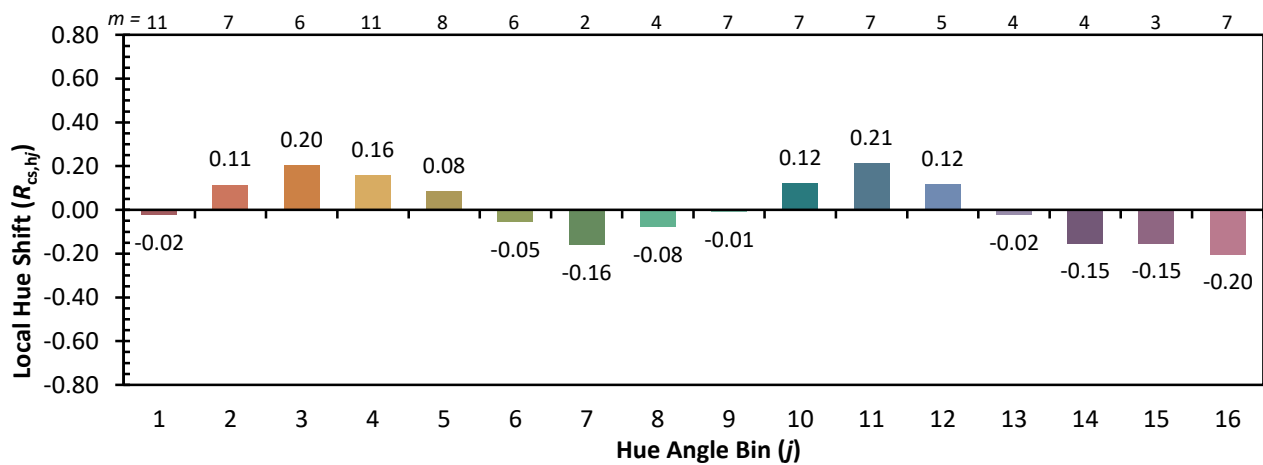
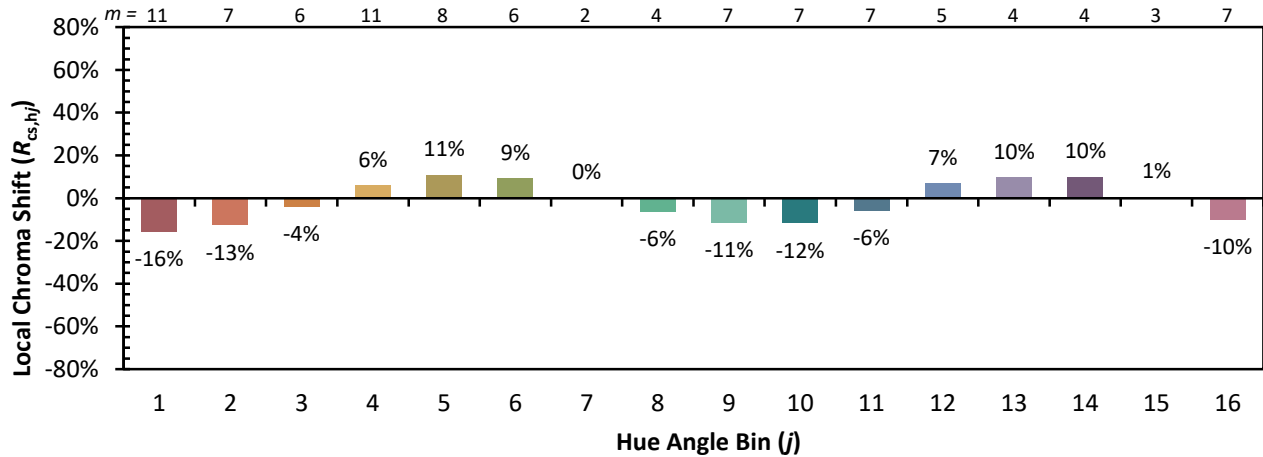
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 65 | CES51 = 87 | CES76 = 59 |
| CES02 = 63 | CES27 = 88 | CES52 = 86 | CES77 = 78 |
| CES03 = 31 | CES28 = 85 | CES53 = 77 | CES78 = 63 |
| CES04 = 71 | CES29 = 64 | CES54 = 86 | CES79 = 86 |
| CES05 = 49 | CES30 = 77 | CES55 = 85 | CES80 = 84 |
| CES06 = 51 | CES31 = 68 | CES56 = 75 | CES81 = 72 |
| CES07 = 42 | CES32 = 62 | CES57 = 75 | CES82 = 93 |
| CES08 = 40 | CES33 = 74 | CES58 = 76 | CES83 = 89 |
| CES09 = 29 | CES34 = 75 | CES59 = 86 | CES84 = 89 |
| CES10 = 76 | CES35 = 87 | CES60 = 92 | CES85 = 77 |
| CES11 = 59 | CES36 = 98 | CES61 = 84 | CES86 = 64 |
| CES12 = 65 | CES37 = 84 | CES62 = 92 | CES87 = 78 |
| CES13 = 43 | CES38 = 85 | CES63 = 75 | CES88 = 80 |
| CES14 = 74 | CES39 = 95 | CES64 = 70 | CES89 = 67 |
| CES15 = 71 | CES40 = 90 | CES65 = 67 | CES90 = 79 |
| CES16 = 47 | CES41 = 89 | CES66 = 65 | CES91 = 84 |
| CES17 = 50 | CES42 = 84 | CES67 = 63 | CES92 = 60 |
| CES18 = 56 | CES43 = 75 | CES68 = 69 | CES93 = 75 |
| CES19 = 73 | CES44 = 99 | CES69 = 78 | CES94 = 52 |
| CES20 = 66 | CES45 = 83 | CES70 = 63 | CES95 = 70 |
| CES21 = 87 | CES46 = 80 | CES71 = 61 | CES96 = 78 |
| CES22 = 79 | CES47 = 81 | CES72 = 86 | CES97 = 83 |
| CES23 = 92 | CES48 = 72 | CES73 = 55 | CES98 = 77 |
| CES24 = 91 | CES49 = 77 | CES74 = 96 | CES99 = 66 |
| CES25 = 73 | CES50 = 86 | CES75 = 63 |            |

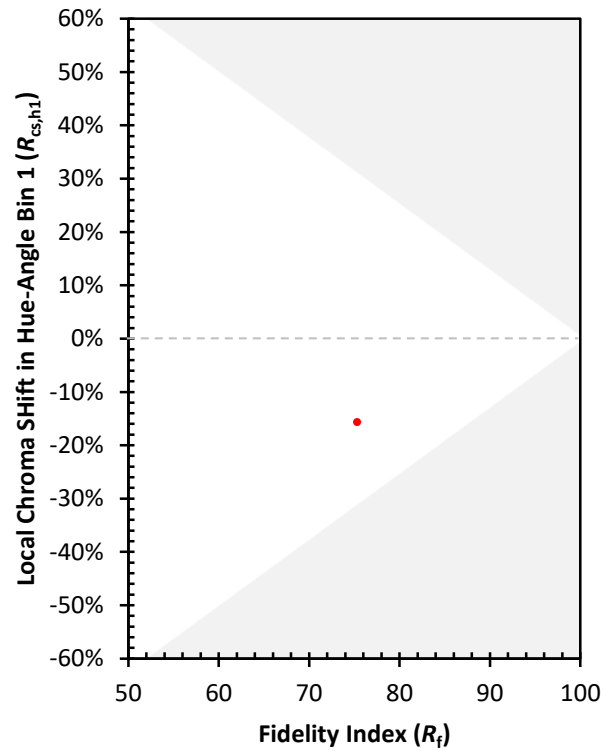
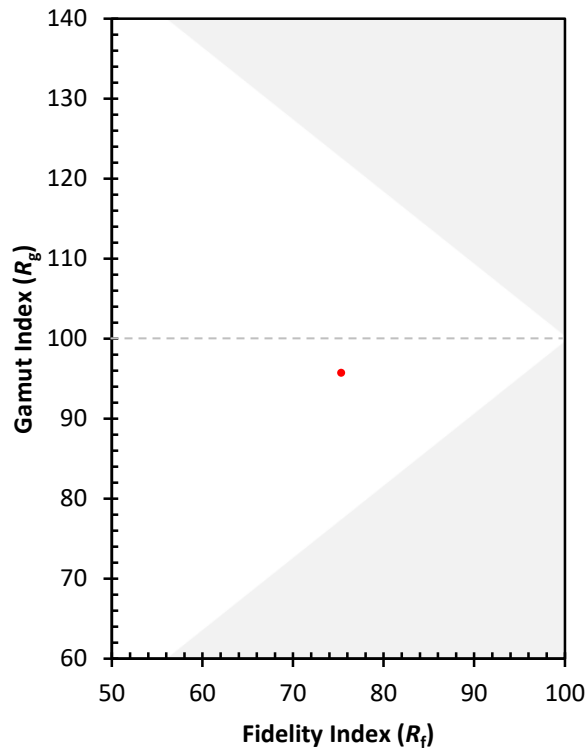




Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)