

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269

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Peachtree City, GA 30269

Scaled data based on original data using  
LM-79-2024 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P1445182

Luminaire Tested: TPTN-VA1-740-U-CQ-GM

Issue Date: 05/21/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1445182  
Test Lab: INNOVATION CENTER(G1)  
Issue Date: 5/21/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: MCGRAW-EDISON  
Catalog Number: TPTN-VA1-740-U-CQ-GM  
Description: TOPTIER NANO SPIDER MOUNT VISUAL COMFORT LED LUMINAIRE 27W 70CRI 4000K w/  
TYPE V CONCENTRATED DISTRIBUTION OPTIC  
Light Source: 4000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2572.3 lumens  
Efficiency: N/A  
Efficacy: 96.3 lumens/watt  
Luminous Opening: Circular (Dia: 0.71' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B1 - U0 - G1

Input Watts (W): 26.7  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 11.9%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

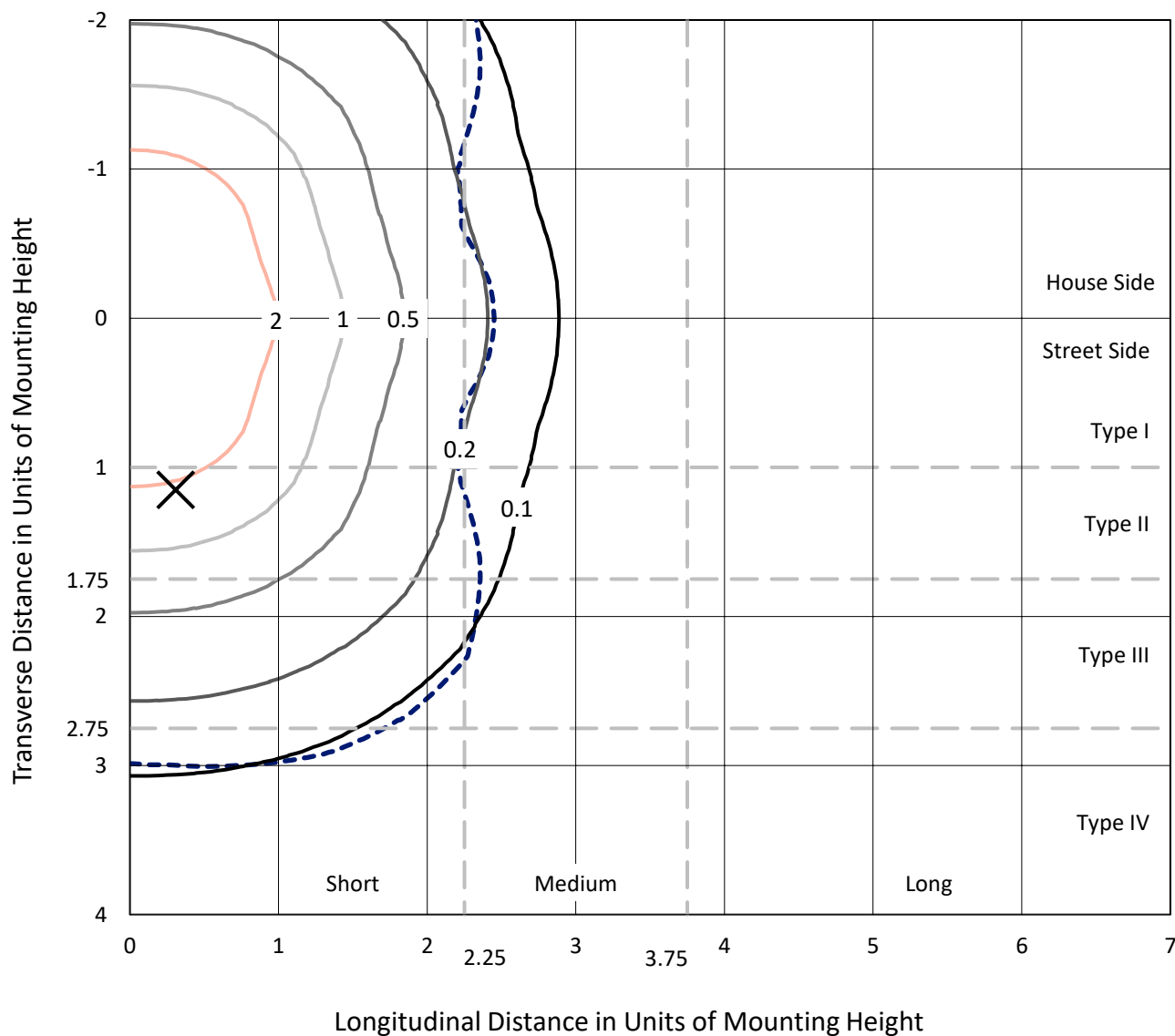
REPORT NUMBER: P1445182

CATALOG NUMBER: TPTN-VA1-740-U-CQ-GM

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

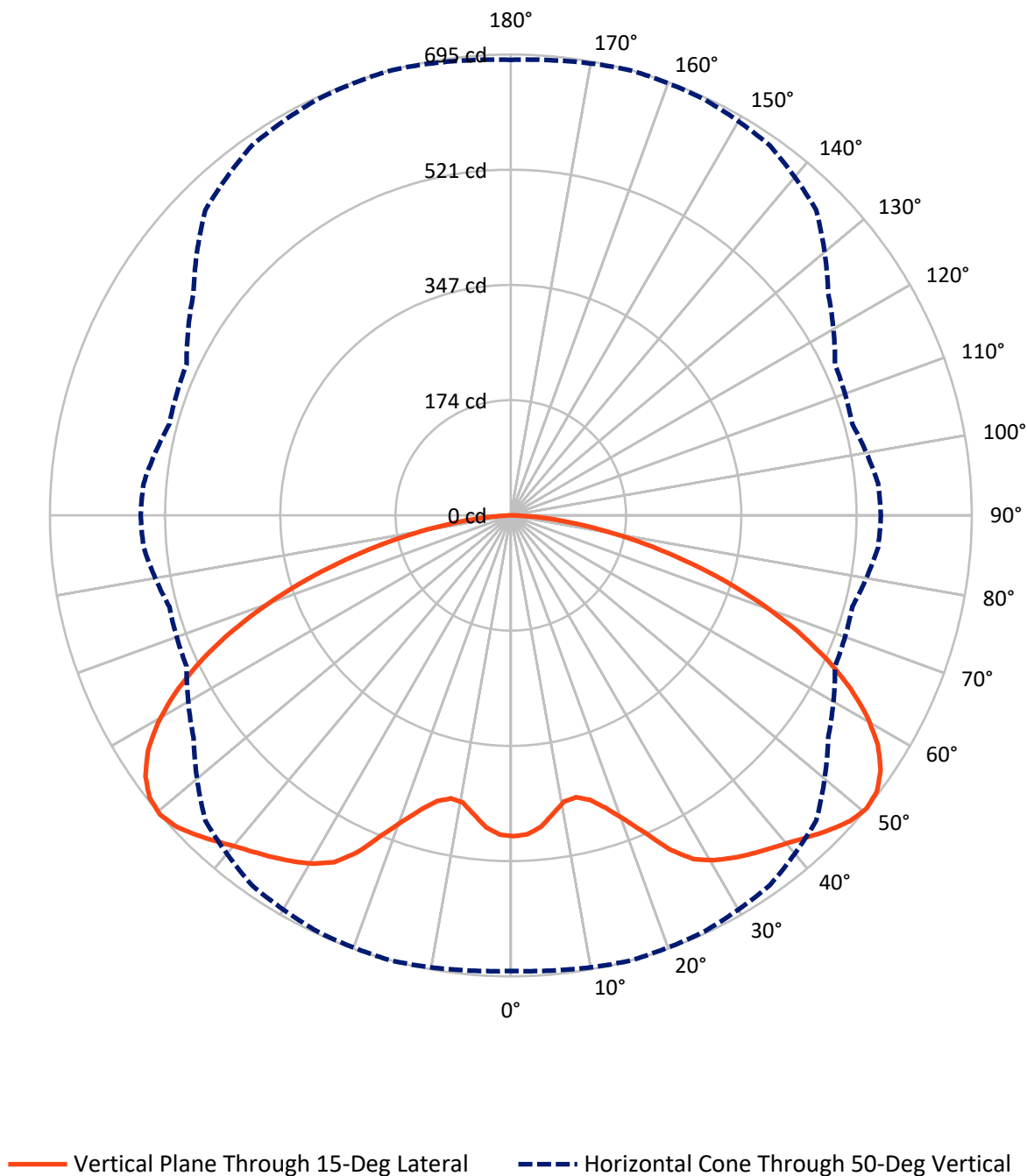


Based on 10 foot mounting height. Maximum calculated value = 4.8 fc  
Type V - Short - N/A

REPORT NUMBER: P1445182

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## Luminous Intensity Polar Plot



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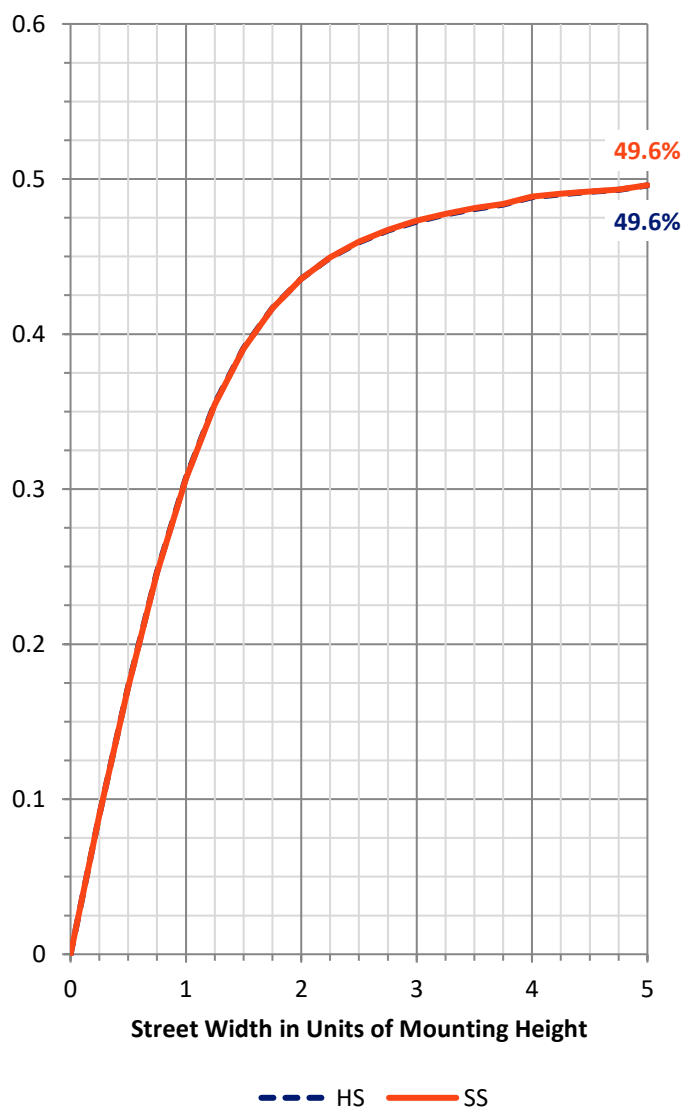
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1286.1   | 0.0    | 1286.1 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 1286.1   | 0.0    | 1286.1 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 2572.3   | 0.0    | 2572.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 44.2   | 1.7       |
| 10°-20°   | 129.8  | 5.0       |
| 20°-30°   | 242.3  | 9.4       |
| 30°-40°   | 357.7  | 13.9      |
| 40°-50°   | 470.3  | 18.3      |
| 50°-60°   | 539.4  | 21.0      |
| 60°-70°   | 465.4  | 18.1      |
| 70°-80°   | 262.9  | 10.2      |
| 80°-90°   | 60.2   | 2.3       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 2572.3 | 100.0     |
| 0°-180°   | 2572.3 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P1445182

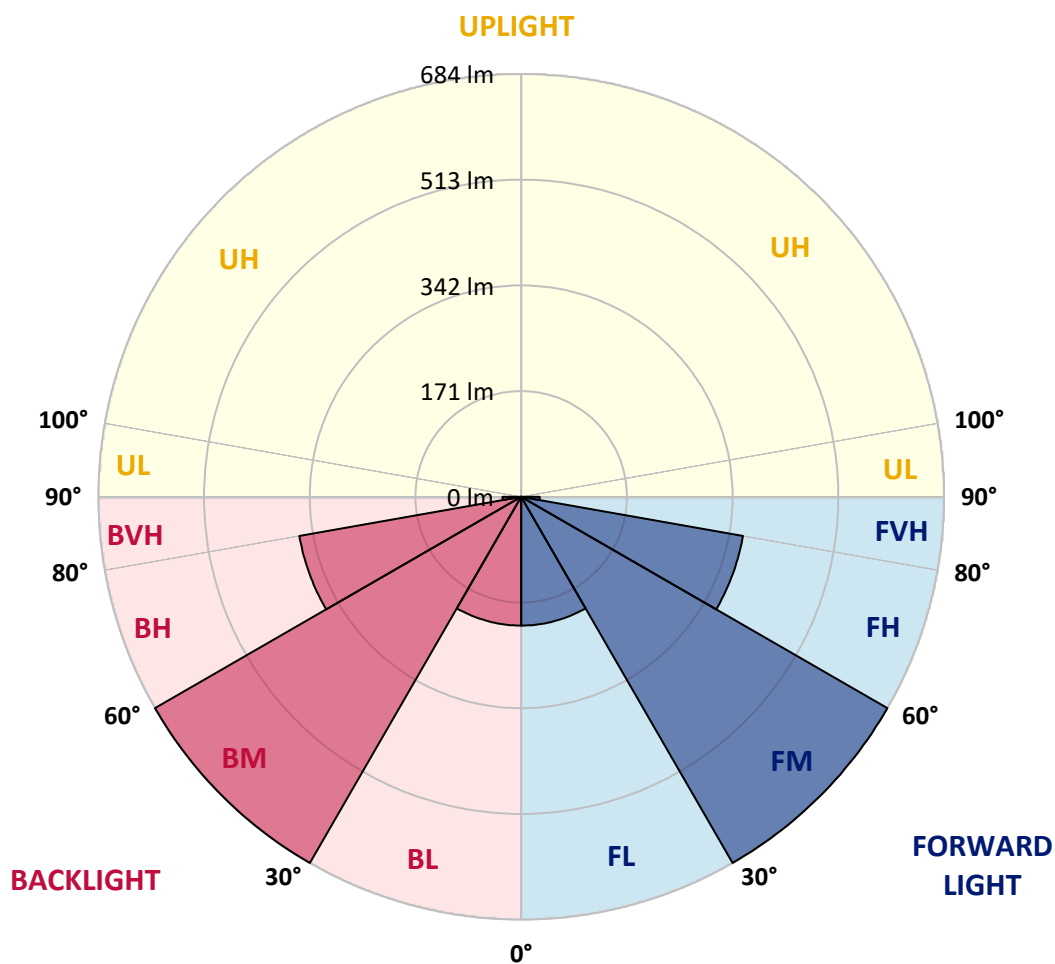
CATALOG NUMBER: TPTN-VA1-740-U-CQ-GM

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 208.2  | 8.1       |                         |      |        |
| FM   | (30°-60°)   | 683.7  | 26.6      |                         |      |        |
| FH   | (60°-80°)   | 364.2  | 14.2      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 30.1   | 1.2       |                         |      | G1/100 |
| BL   | (0°-30°)    | 208.2  | 8.1       | B1/500                  |      |        |
| BM   | (30°-60°)   | 683.7  | 26.6      | B1/1000                 |      |        |
| BH   | (60°-80°)   | 364.2  | 14.2      | B1/500                  |      | G0/660 |
| BVH  | (80°-90°)   | 30.1   | 1.2       |                         |      | G1/100 |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

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

Type V Short



REPORT NUMBER: P1445182

CATALOG NUMBER: TPTN-VA1-740-U-CQ-GM

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 55°   | 65°   | 75°   | 85°   | 90°   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 483.6 | 483.6 | 483.6 | 483.6 | 483.6 | 483.6 | 483.6 | 483.6 | 483.6 | 483.6 | 483.6 |
| 2.5°  | 481.3 | 481.3 | 481.3 | 481.3 | 481.3 | 481.7 | 481.3 | 481.7 | 482.2 | 482.2 | 482.6 |
| 5°    | 471.7 | 471.2 | 471.7 | 471.7 | 472.6 | 473.5 | 474.4 | 475.3 | 476.7 | 477.2 | 477.2 |
| 7.5°  | 454.8 | 454.4 | 454.4 | 454.4 | 455.7 | 457.1 | 460.7 | 463.9 | 466.7 | 468.0 | 469.0 |
| 10°   | 439.8 | 439.8 | 438.8 | 437.9 | 438.4 | 440.7 | 444.8 | 450.3 | 454.8 | 458.0 | 458.5 |
| 12.5° | 436.1 | 436.1 | 436.1 | 436.6 | 437.5 | 440.2 | 445.2 | 449.8 | 454.4 | 457.1 | 457.6 |
| 15°   | 443.0 | 443.9 | 444.8 | 448.0 | 449.3 | 449.8 | 452.5 | 456.2 | 459.8 | 463.0 | 463.5 |
| 17.5° | 457.6 | 458.5 | 463.5 | 466.7 | 465.3 | 462.1 | 461.2 | 463.9 | 469.0 | 472.1 | 472.6 |
| 20°   | 486.7 | 485.8 | 489.0 | 489.9 | 484.9 | 476.7 | 471.7 | 473.1 | 479.0 | 484.0 | 484.5 |
| 22.5° | 523.2 | 522.8 | 520.0 | 519.1 | 509.6 | 494.5 | 484.5 | 482.6 | 489.5 | 496.8 | 497.7 |
| 25°   | 563.4 | 562.5 | 557.9 | 549.2 | 534.6 | 514.1 | 499.1 | 493.1 | 499.1 | 508.2 | 509.6 |
| 27.5° | 596.2 | 594.9 | 586.7 | 571.6 | 554.7 | 532.4 | 512.3 | 501.3 | 505.5 | 515.9 | 517.8 |
| 30°   | 619.0 | 617.7 | 603.1 | 583.5 | 567.5 | 542.9 | 520.0 | 506.8 | 510.9 | 521.9 | 523.7 |
| 32.5° | 637.7 | 634.1 | 615.4 | 593.5 | 577.1 | 551.1 | 526.0 | 510.9 | 514.6 | 527.3 | 528.7 |
| 35°   | 650.1 | 645.0 | 626.3 | 604.4 | 585.7 | 559.7 | 531.5 | 515.0 | 517.8 | 531.0 | 533.3 |
| 37.5° | 657.4 | 654.2 | 636.8 | 615.4 | 596.2 | 570.2 | 536.9 | 518.7 | 521.0 | 535.1 | 537.4 |
| 40°   | 663.7 | 662.4 | 647.8 | 629.1 | 609.0 | 582.5 | 544.7 | 522.8 | 524.6 | 539.7 | 541.9 |
| 42.5° | 671.0 | 671.0 | 661.5 | 645.0 | 625.9 | 599.0 | 555.2 | 528.7 | 528.7 | 546.1 | 548.3 |
| 45°   | 679.3 | 680.2 | 675.6 | 662.8 | 646.0 | 617.7 | 566.6 | 535.1 | 533.3 | 552.4 | 554.7 |
| 47.5° | 685.6 | 687.0 | 688.4 | 680.2 | 666.0 | 637.3 | 578.0 | 539.7 | 536.0 | 557.0 | 559.3 |
| 50°   | 686.6 | 688.8 | 694.8 | 691.6 | 680.6 | 651.0 | 583.9 | 539.2 | 532.8 | 555.6 | 557.9 |
| 52.5° | 678.3 | 679.7 | 691.1 | 693.4 | 685.6 | 655.5 | 583.0 | 531.5 | 522.3 | 547.0 | 549.2 |
| 55°   | 660.6 | 662.4 | 676.5 | 683.4 | 678.8 | 649.6 | 573.4 | 515.9 | 504.5 | 530.1 | 532.4 |
| 57.5° | 632.3 | 634.6 | 652.3 | 662.8 | 660.6 | 634.1 | 557.0 | 493.6 | 481.3 | 507.3 | 509.1 |
| 60°   | 597.1 | 599.9 | 617.7 | 632.7 | 633.2 | 609.5 | 532.4 | 466.2 | 450.3 | 476.7 | 479.0 |
| 62.5° | 553.8 | 555.6 | 574.8 | 591.2 | 593.5 | 575.2 | 502.3 | 430.6 | 414.7 | 440.7 | 443.0 |
| 65°   | 503.2 | 504.5 | 523.7 | 541.9 | 546.5 | 531.5 | 461.7 | 391.9 | 374.1 | 398.2 | 399.6 |
| 67.5° | 447.1 | 448.0 | 466.2 | 482.6 | 490.4 | 477.2 | 417.0 | 348.5 | 330.7 | 350.8 | 352.6 |
| 70°   | 383.6 | 388.2 | 402.4 | 418.3 | 425.2 | 416.0 | 365.9 | 300.6 | 283.7 | 301.5 | 303.4 |
| 72.5° | 321.6 | 323.4 | 336.7 | 352.2 | 357.6 | 351.7 | 309.3 | 252.3 | 235.4 | 250.9 | 251.4 |
| 75°   | 259.1 | 259.1 | 269.1 | 282.8 | 290.6 | 286.9 | 251.4 | 202.1 | 189.3 | 199.4 | 199.8 |
| 77.5° | 194.8 | 197.5 | 206.7 | 219.9 | 223.1 | 220.3 | 195.7 | 154.6 | 144.2 | 152.4 | 152.8 |
| 80°   | 139.6 | 139.6 | 147.3 | 155.6 | 161.0 | 158.3 | 141.4 | 111.8 | 102.2 | 107.7 | 105.8 |
| 82.5° | 88.0  | 89.0  | 93.1  | 100.8 | 104.0 | 103.6 | 93.1  | 73.0  | 66.6  | 68.0  | 65.2  |
| 85°   | 46.1  | 46.1  | 49.7  | 54.3  | 57.0  | 57.5  | 52.9  | 42.0  | 37.0  | 35.1  | 31.0  |
| 87.5° | 13.7  | 14.1  | 16.0  | 19.2  | 21.4  | 22.4  | 21.9  | 18.7  | 16.4  | 11.9  | 6.8   |
| 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: SP1-2411-284-2

Test Date: 11/20/2024

Luminaire Tested: TTN-D0-740-U-WQ

Data in this report applies to families of products including TTN-D0-740-U-WQ

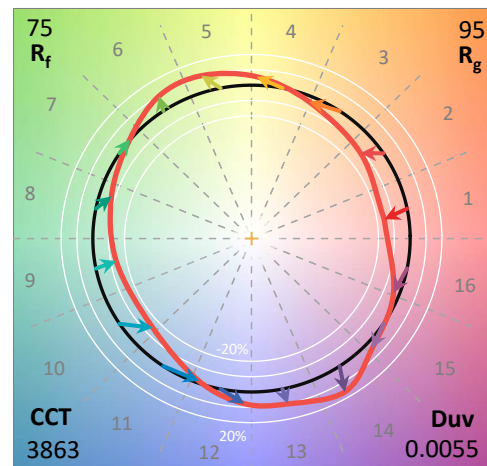
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2411-284-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 11/20/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **TTN-D0-740-U-WQ**  
 Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE. 4000K, 70 CRI LEDS AND WIDE DISTRIBUTION

### Spectral Parameters

CCT (K): 3863  
 CIE  $u'$ : 0.2247  
 CIE  $v'$ : 0.5111  
 Duv: 0.0055  
 CIE x: 0.3911  
 CIE y: 0.3954  
 CIE z: 0.2136  
 Peak Wavelength (nm): 448  
 Dominant Wavelength (nm): 577  
 Purity: 36.03443  
 R<sub>f</sub>: 74.7  
 R<sub>g</sub>: 95.4

CRI (Ra): 71.9  
 R1: 69.4  
 R2: 76.9  
 R3: 83.3  
 R4: 72.7  
 R5: 68.4  
 R6: 67.5  
 R7: 82.0  
 R8: 55.3  
 R9: -23.5  
 R10: 45.4  
 R11: 68.7  
 R12: 38.7  
 R13: 70.0  
 R14: 90.3  
 R15: 62.1



### Test Conditions

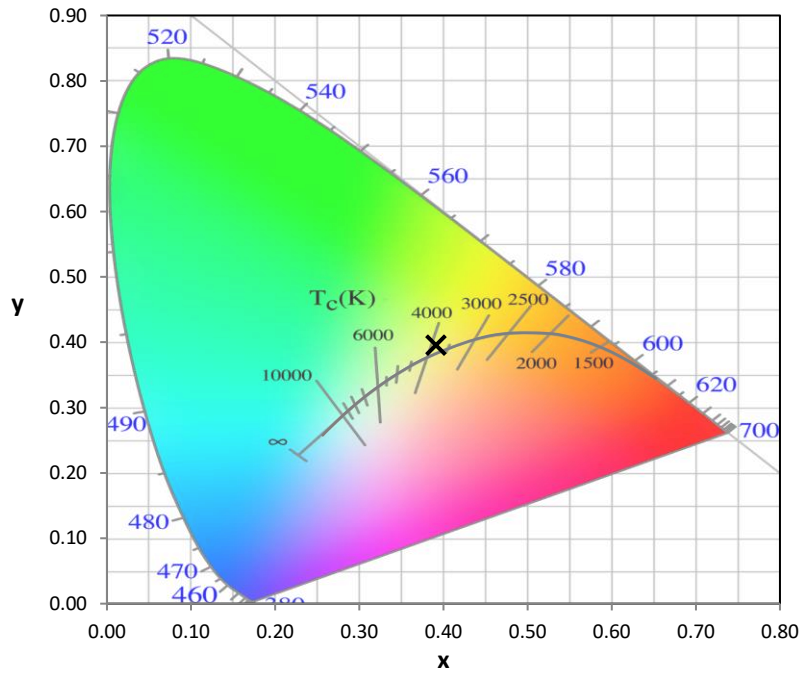
Stabilization Time: 37M  
 Operation Time: 1H 37M  
 Sphere Temperature (°C): 25.0

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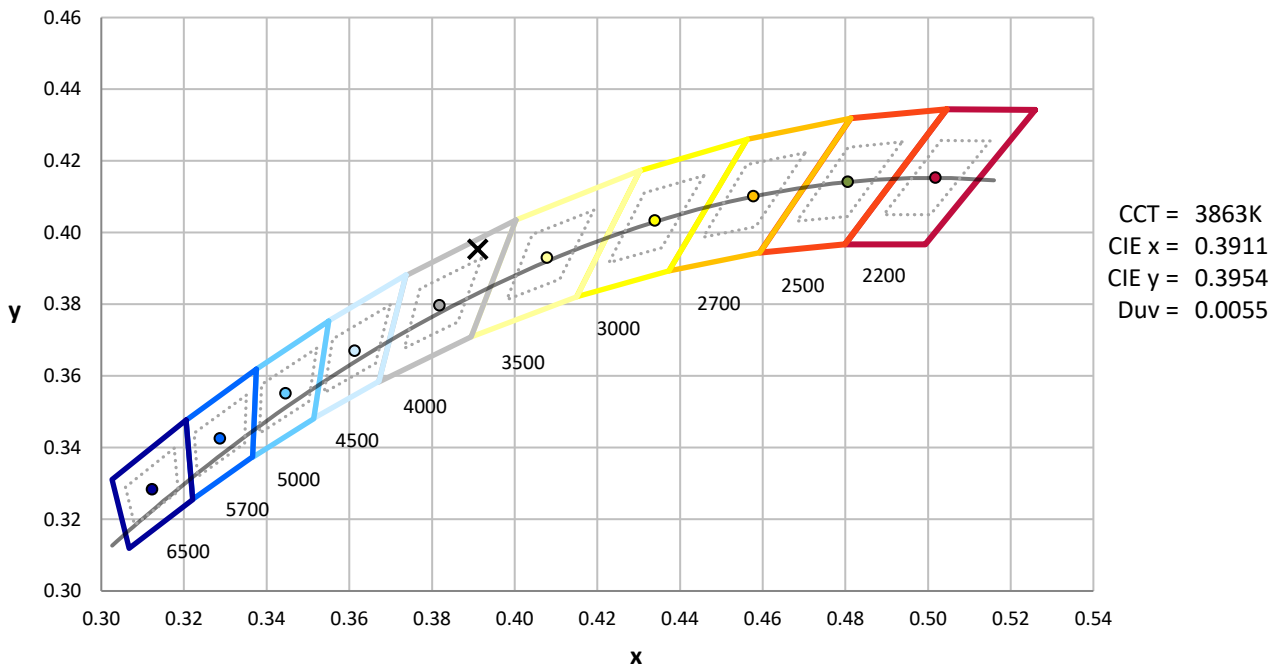
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/22/2024       | 10/22/2025           |
| DC Power Source                | IN0208                | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | IN0085                | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | IN0046                | 10/22/2024       | 10/22/2025           |

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**CIE 1931 Chromaticity Diagram**



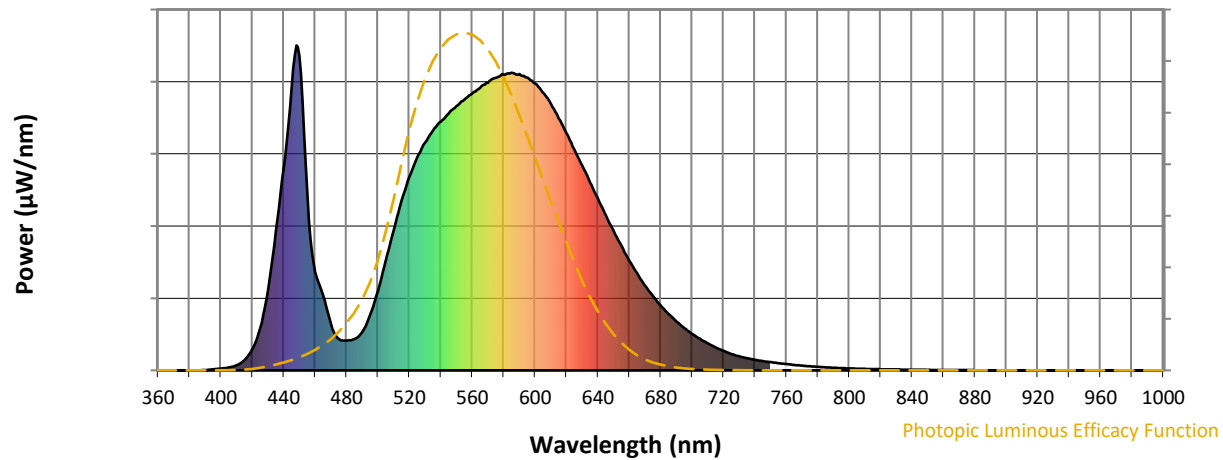
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

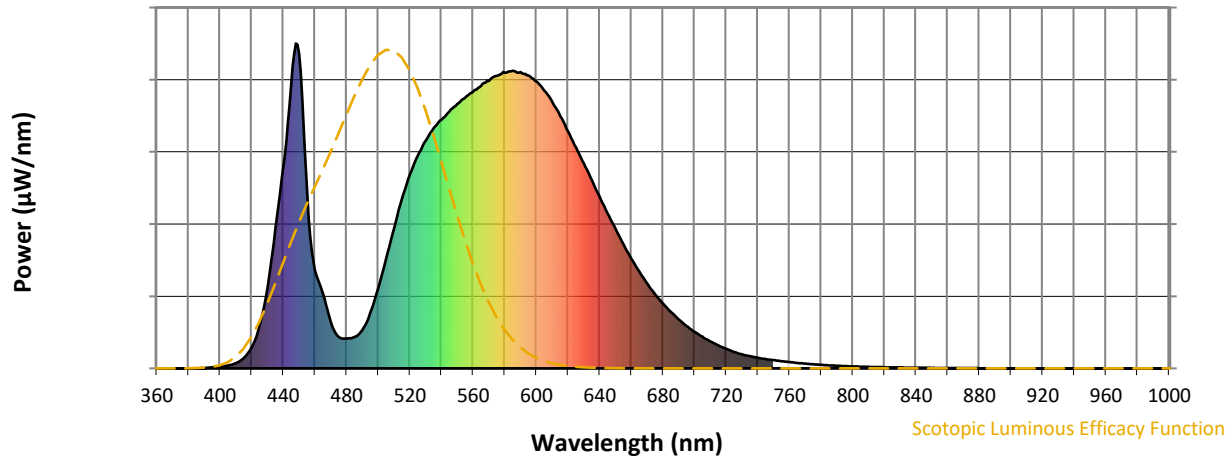


### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 118                                  | NR                             | 620               | 730                                  | NR                             | 750               | 25                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 170                                  | NR                             | 625               | 680                                  | NR                             | 755               | 22                                   | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 245                                  | NR                             | 630               | 630                                  | NR                             | 760               | 19                                   | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 338                                  | NR                             | 635               | 579                                  | NR                             | 765               | 17                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 431                                  | NR                             | 640               | 529                                  | NR                             | 770               | 14                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 521                                  | NR                             | 645               | 477                                  | NR                             | 775               | 13                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 1                                    | NR                             | 520               | 596                                  | NR                             | 650               | 429                                  | NR                             | 780               | 11                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 3                                    | NR                             | 525               | 655                                  | NR                             | 655               | 383                                  | NR                             | 785               | 9                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 6                                    | NR                             | 530               | 701                                  | NR                             | 660               | 338                                  | NR                             | 790               | 8                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 9                                    | NR                             | 535               | 739                                  | NR                             | 665               | 298                                  | NR                             | 795               | 7                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 16                                   | NR                             | 540               | 766                                  | NR                             | 670               | 261                                  | NR                             | 800               | 6                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 32                                   | NR                             | 545               | 791                                  | NR                             | 675               | 228                                  | NR                             | 805               | 5                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 65                                   | NR                             | 550               | 813                                  | NR                             | 680               | 200                                  | NR                             | 810               | 5                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 131                                  | NR                             | 555               | 833                                  | NR                             | 685               | 173                                  | NR                             | 815               | 4                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 245                                  | NR                             | 560               | 852                                  | NR                             | 690               | 151                                  | NR                             | 820               | 3                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 432                                  | NR                             | 565               | 870                                  | NR                             | 695               | 130                                  | NR                             | 825               | 3                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 622                                  | NR                             | 570               | 885                                  | NR                             | 700               | 112                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 870                                  | NR                             | 575               | 900                                  | NR                             | 705               | 97                                   | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 969                                  | NR                             | 580               | 911                                  | NR                             | 710               | 83                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 544                                  | NR                             | 585               | 916                                  | NR                             | 715               | 71                                   | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 304                                  | NR                             | 590               | 912                                  | NR                             | 720               | 60                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 231                                  | NR                             | 595               | 901                                  | NR                             | 725               | 51                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 142                                  | NR                             | 600               | 882                                  | NR                             | 730               | 43                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 96                                   | NR                             | 605               | 855                                  | NR                             | 735               | 37                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 92                                   | NR                             | 610               | 820                                  | NR                             | 740               | 32                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 96                                   | NR                             | 615               | 776                                  | NR                             | 745               | 29                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-2411-284-2

### Scotopic Flux vs. Wavelength



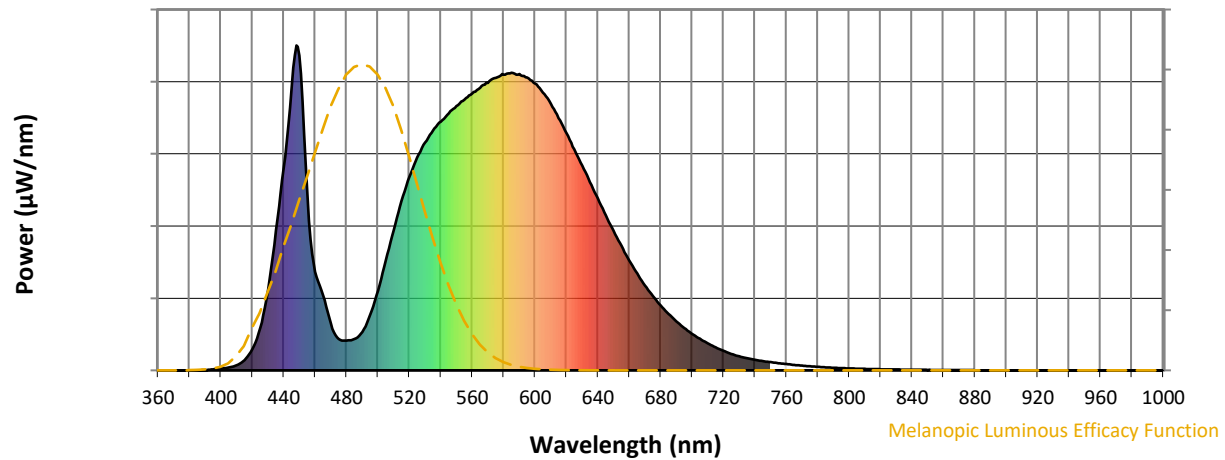
Scotopic Lumens: NR

S/P: 1.45

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 118                      | NR            | 620    | 730                      | NR            | 750    | 25                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 170                      | NR            | 625    | 680                      | NR            | 755    | 22                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 245                      | NR            | 630    | 630                      | NR            | 760    | 19                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 338                      | NR            | 635    | 579                      | NR            | 765    | 17                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 431                      | NR            | 640    | 529                      | NR            | 770    | 14                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 521                      | NR            | 645    | 477                      | NR            | 775    | 13                       | NR            | 905    | 0                        | NR            |
| 390    | 1                        | NR            | 520    | 596                      | NR            | 650    | 429                      | NR            | 780    | 11                       | NR            | 910    | 0                        | NR            |
| 395    | 3                        | NR            | 525    | 655                      | NR            | 655    | 383                      | NR            | 785    | 9                        | NR            | 915    | 0                        | NR            |
| 400    | 6                        | NR            | 530    | 701                      | NR            | 660    | 338                      | NR            | 790    | 8                        | NR            | 920    | 0                        | NR            |
| 405    | 9                        | NR            | 535    | 739                      | NR            | 665    | 298                      | NR            | 795    | 7                        | NR            | 925    | 0                        | NR            |
| 410    | 16                       | NR            | 540    | 766                      | NR            | 670    | 261                      | NR            | 800    | 6                        | NR            | 930    | 0                        | NR            |
| 415    | 32                       | NR            | 545    | 791                      | NR            | 675    | 228                      | NR            | 805    | 5                        | NR            | 935    | 0                        | NR            |
| 420    | 65                       | NR            | 550    | 813                      | NR            | 680    | 200                      | NR            | 810    | 5                        | NR            | 940    | 0                        | NR            |
| 425    | 131                      | NR            | 555    | 833                      | NR            | 685    | 173                      | NR            | 815    | 4                        | NR            | 945    | 0                        | NR            |
| 430    | 245                      | NR            | 560    | 852                      | NR            | 690    | 151                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 432                      | NR            | 565    | 870                      | NR            | 695    | 130                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 622                      | NR            | 570    | 885                      | NR            | 700    | 112                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 870                      | NR            | 575    | 900                      | NR            | 705    | 97                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 969                      | NR            | 580    | 911                      | NR            | 710    | 83                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 544                      | NR            | 585    | 916                      | NR            | 715    | 71                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 304                      | NR            | 590    | 912                      | NR            | 720    | 60                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 231                      | NR            | 595    | 901                      | NR            | 725    | 51                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 142                      | NR            | 600    | 882                      | NR            | 730    | 43                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 96                       | NR            | 605    | 855                      | NR            | 735    | 37                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 92                       | NR            | 610    | 820                      | NR            | 740    | 32                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 96                       | NR            | 615    | 776                      | NR            | 745    | 29                       | NR            | 875    | 1                        | NR            |        |                          |               |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: NR**
**M/P: 2.72**

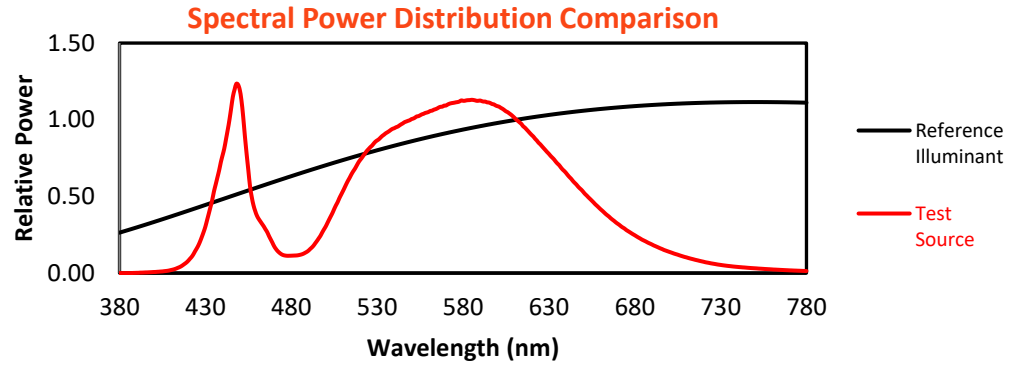
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|
| 360               | 0                                      | NR                             | 490               | 118                                    | NR                             | 620               | 730                                    | NR                             | 750               | 25                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 170                                    | NR                             | 625               | 680                                    | NR                             | 755               | 22                                     | NR                             | 885               | 0                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 245                                    | NR                             | 630               | 630                                    | NR                             | 760               | 19                                     | NR                             | 890               | 0                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 338                                    | NR                             | 635               | 579                                    | NR                             | 765               | 17                                     | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 431                                    | NR                             | 640               | 529                                    | NR                             | 770               | 14                                     | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 521                                    | NR                             | 645               | 477                                    | NR                             | 775               | 13                                     | NR                             | 905               | 0                                      | NR                             |
| 390               | 1                                      | NR                             | 520               | 596                                    | NR                             | 650               | 429                                    | NR                             | 780               | 11                                     | NR                             | 910               | 0                                      | NR                             |
| 395               | 3                                      | NR                             | 525               | 655                                    | NR                             | 655               | 383                                    | NR                             | 785               | 9                                      | NR                             | 915               | 0                                      | NR                             |
| 400               | 6                                      | NR                             | 530               | 701                                    | NR                             | 660               | 338                                    | NR                             | 790               | 8                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 9                                      | NR                             | 535               | 739                                    | NR                             | 665               | 298                                    | NR                             | 795               | 7                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 16                                     | NR                             | 540               | 766                                    | NR                             | 670               | 261                                    | NR                             | 800               | 6                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 32                                     | NR                             | 545               | 791                                    | NR                             | 675               | 228                                    | NR                             | 805               | 5                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 65                                     | NR                             | 550               | 813                                    | NR                             | 680               | 200                                    | NR                             | 810               | 5                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 131                                    | NR                             | 555               | 833                                    | NR                             | 685               | 173                                    | NR                             | 815               | 4                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 245                                    | NR                             | 560               | 852                                    | NR                             | 690               | 151                                    | NR                             | 820               | 3                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 432                                    | NR                             | 565               | 870                                    | NR                             | 695               | 130                                    | NR                             | 825               | 3                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 622                                    | NR                             | 570               | 885                                    | NR                             | 700               | 112                                    | NR                             | 830               | 3                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 870                                    | NR                             | 575               | 900                                    | NR                             | 705               | 97                                     | NR                             | 835               | 2                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 969                                    | NR                             | 580               | 911                                    | NR                             | 710               | 83                                     | NR                             | 840               | 2                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 544                                    | NR                             | 585               | 916                                    | NR                             | 715               | 71                                     | NR                             | 845               | 2                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 304                                    | NR                             | 590               | 912                                    | NR                             | 720               | 60                                     | NR                             | 850               | 1                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 231                                    | NR                             | 595               | 901                                    | NR                             | 725               | 51                                     | NR                             | 855               | 1                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 142                                    | NR                             | 600               | 882                                    | NR                             | 730               | 43                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 96                                     | NR                             | 605               | 855                                    | NR                             | 735               | 37                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 92                                     | NR                             | 610               | 820                                    | NR                             | 740               | 32                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 96                                     | NR                             | 615               | 776                                    | NR                             | 745               | 29                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

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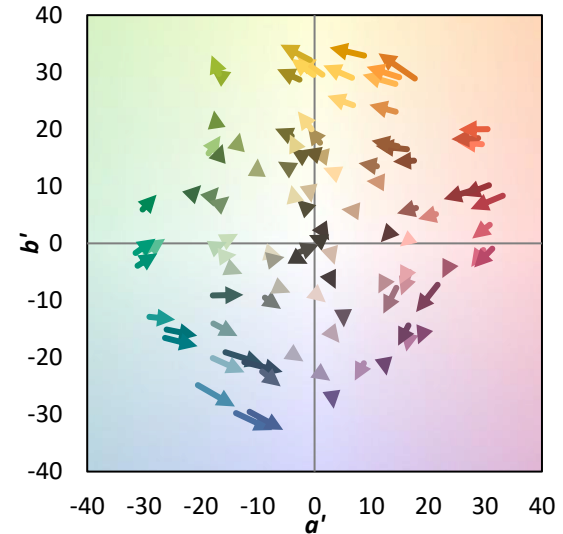
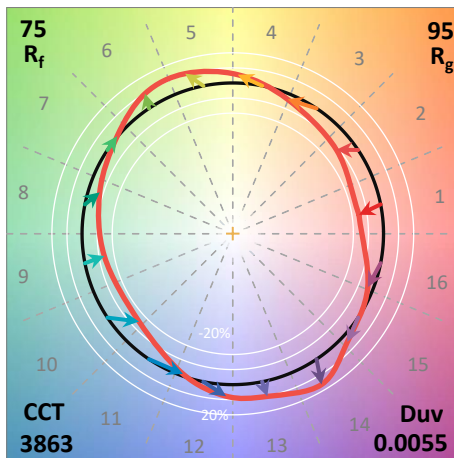
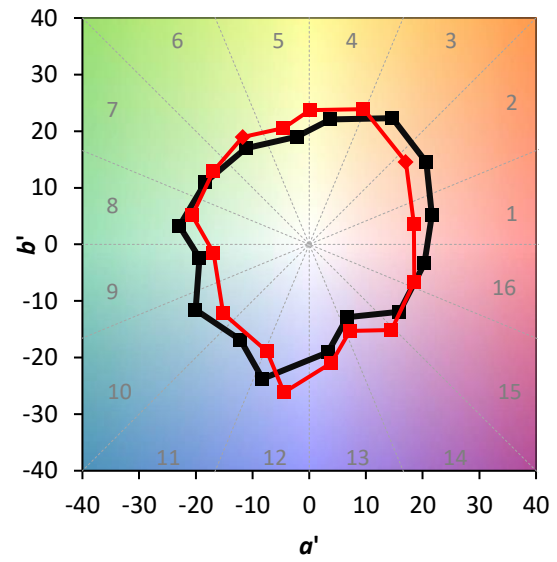
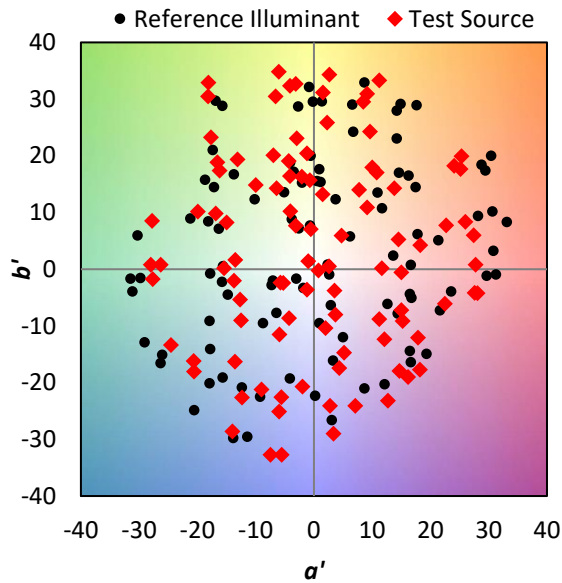
TM-30-18

### Summary

$R_f = 74.7$   
 $R_g = 95.4$   
 $CIE R_a = 71.9$   
 $R_g = -23.5$

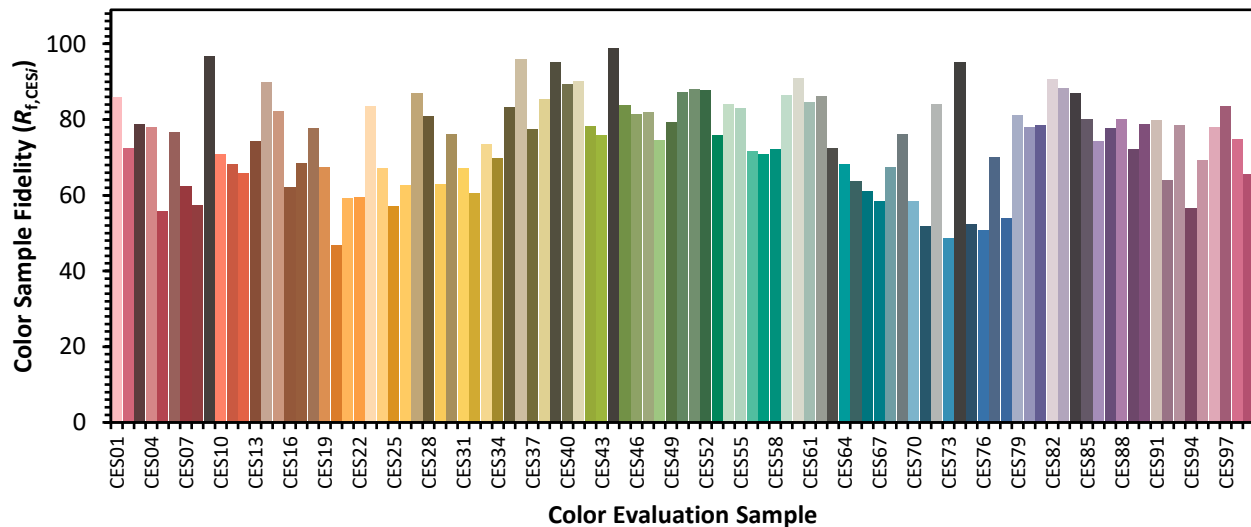


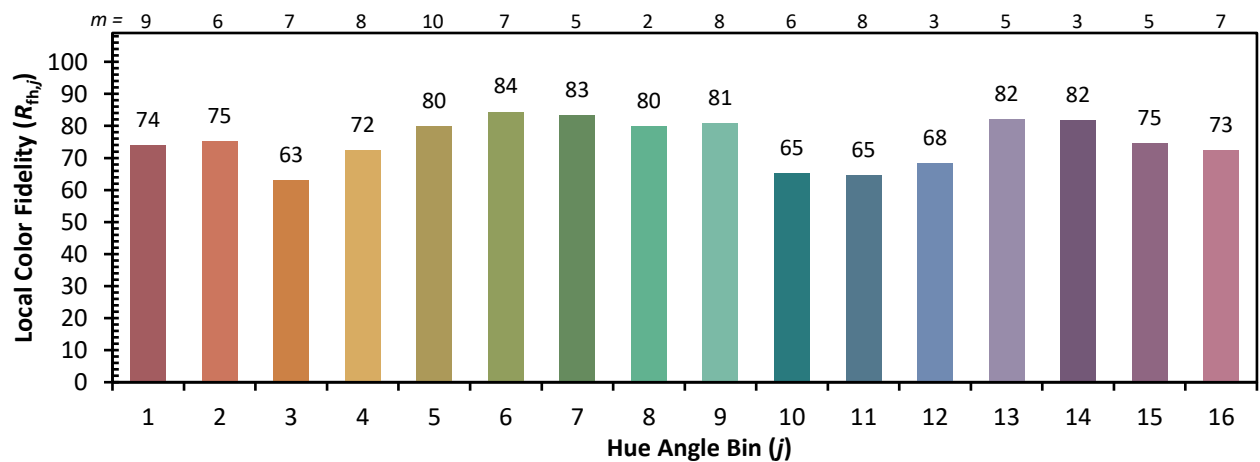
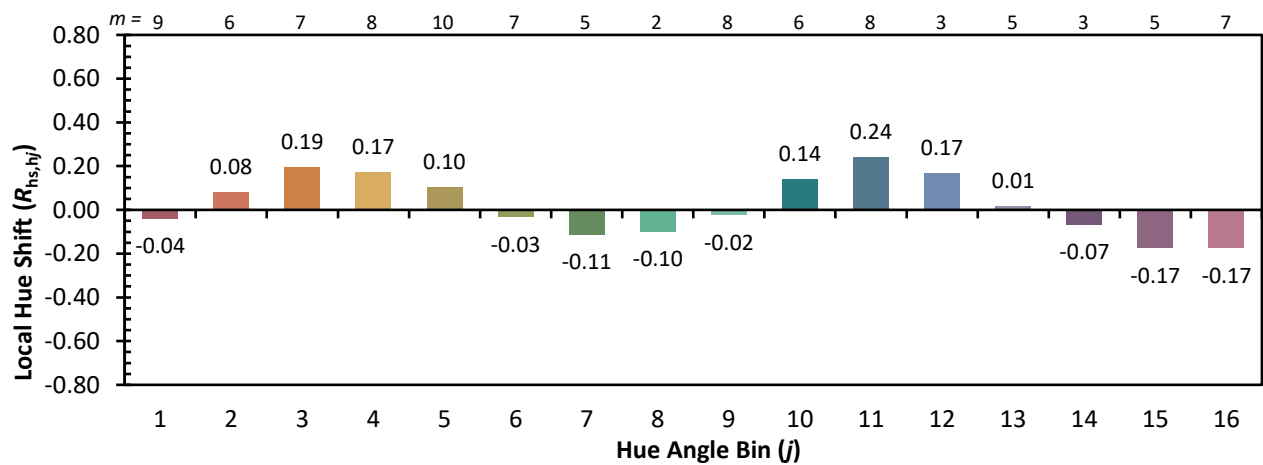
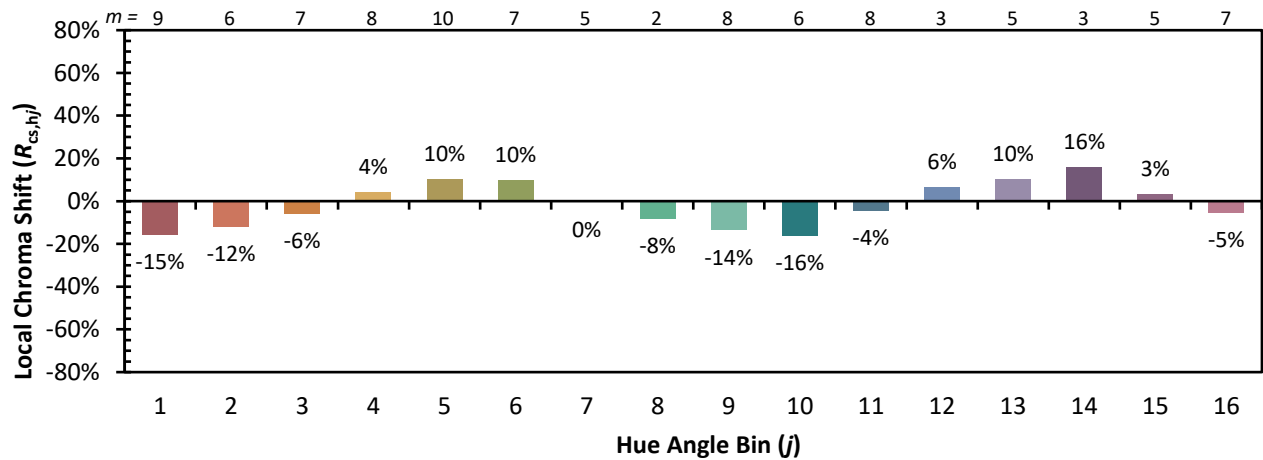
### Color Vector Graphics



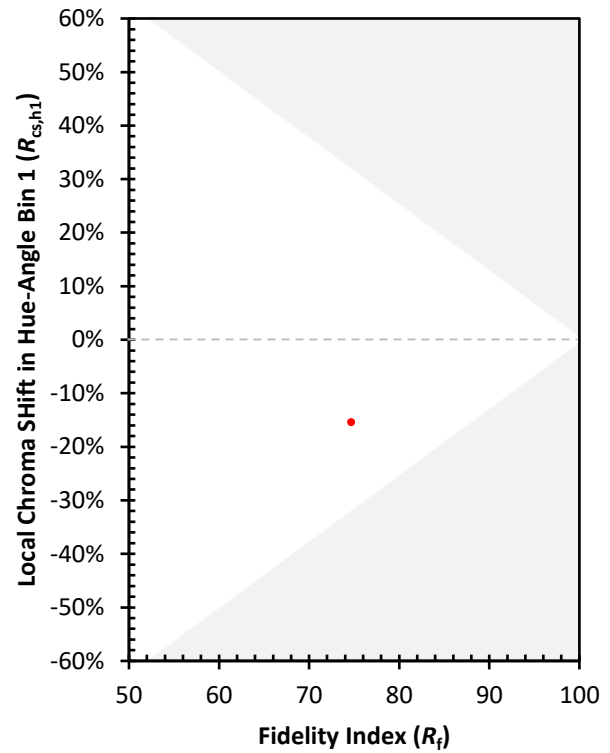
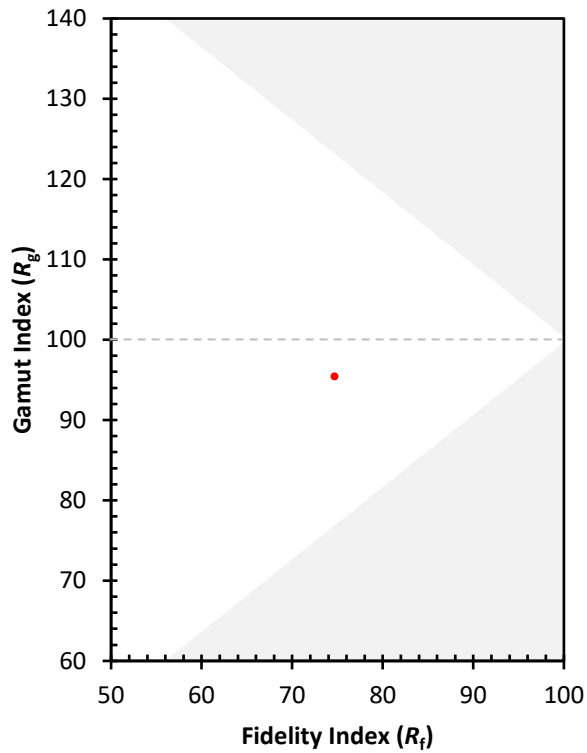
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 63 | CES51 = 88 | CES76 = 51 |
| CES02 = 61 | CES27 = 87 | CES52 = 88 | CES77 = 70 |
| CES03 = 30 | CES28 = 81 | CES53 = 76 | CES78 = 54 |
| CES04 = 70 | CES29 = 63 | CES54 = 84 | CES79 = 81 |
| CES05 = 47 | CES30 = 76 | CES55 = 83 | CES80 = 78 |
| CES06 = 50 | CES31 = 67 | CES56 = 72 | CES81 = 79 |
| CES07 = 40 | CES32 = 61 | CES57 = 71 | CES82 = 91 |
| CES08 = 39 | CES33 = 73 | CES58 = 72 | CES83 = 88 |
| CES09 = 29 | CES34 = 70 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 83 | CES60 = 91 | CES85 = 80 |
| CES11 = 57 | CES36 = 96 | CES61 = 85 | CES86 = 74 |
| CES12 = 63 | CES37 = 77 | CES62 = 86 | CES87 = 78 |
| CES13 = 42 | CES38 = 85 | CES63 = 72 | CES88 = 80 |
| CES14 = 74 | CES39 = 95 | CES64 = 68 | CES89 = 72 |
| CES15 = 71 | CES40 = 89 | CES65 = 64 | CES90 = 79 |
| CES16 = 46 | CES41 = 90 | CES66 = 61 | CES91 = 80 |
| CES17 = 49 | CES42 = 78 | CES67 = 58 | CES92 = 64 |
| CES18 = 56 | CES43 = 76 | CES68 = 67 | CES93 = 78 |
| CES19 = 71 | CES44 = 99 | CES69 = 76 | CES94 = 57 |
| CES20 = 65 | CES45 = 84 | CES70 = 58 | CES95 = 69 |
| CES21 = 86 | CES46 = 81 | CES71 = 52 | CES96 = 78 |
| CES22 = 78 | CES47 = 82 | CES72 = 84 | CES97 = 84 |
| CES23 = 92 | CES48 = 75 | CES73 = 49 | CES98 = 75 |
| CES24 = 91 | CES49 = 79 | CES74 = 95 | CES99 = 66 |
| CES25 = 72 | CES50 = 87 | CES75 = 52 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)