

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

EC2RS-159WD312DN-UNV-W

PROJECT NUMBER

G104941221

REPORT NUMBER

104941221CHI-076

ISSUE DATE

9/9/2022

REVISED DATE

None

TEST DATES

2022-09-01 through 2022-09-08.

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104941221CHI-076

MODEL NUMBER(s)

EC2RS-159WD312DN-UNV-W

REPORT RENDERED TO:

VISUAL COMFORT AND COMPANY
7400 LINDER AVE
SKOKIE, IL 60077
USA

STATEMENT OF LIMITATION

NVLAP Lab Code 600186-0. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION

The testing performed was authorized by signed quote number Qu-01236637-1.

TEST STANDARDS

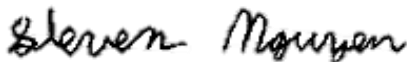
IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

ANSI/IES LM-79-19 Optical and Electrical Measurements of Solid-State Lighting Products

ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

IES TM-30-18: IES Method for Evaluating Light Source Color Rendition

In Charge of Testing:



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Reviewer:



Jeff Davis
N.A. Technical Lead
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SAMPLE INFORMATION

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ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	AH08252022081536-01	EC2RS-159WD312DN-UNV-W	2" DOWNLIGHT LUMINAIRE	Production	8/25/2022

TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
4	EC2RS-159WD312DN-UNV-W	1

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	EC2RS-159WD312DN-UNV-W
Product Description:	2" DOWNLIGHT LUMINAIRE
LED Model No.:	Bridgelux / BXRE-30G1000-C-81
Driver Model No.:	ERP / PTB20W-0400-38-VCC
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	810.7	798.8
Input Power (W) @ 120VAC (Vac)	14.90	14.82
Lumen Efficacy (lm/W)	54.4	53.9
Input Power Factor (PF) @ 120VAC (Vac)	0.984	0.985

Criteria	Results
Input ATHD (%) @ 120VAC (Vac)	15.16
Correlated Color Temperature (K)	2989
Color Rendering Index - Ra (I)	92.6
Color Rendering Index - R9 (I)	72.9
Duv (I)	-0.0021
Chromaticity Coordinate (x)	0.435
Chromaticity Coordinate (y)	0.398
Chromaticity Coordinate (u')	0.252
Chromaticity Coordinate (v')	0.519

TEST METHODS

SEASONING IN SAMPLE ORIENTATION - LED PRODUCTS

No seasoning was performed in accordance with IESNA LM-79.

INTEGRATING SPHERE TESTING

A spectroradiometer and integrating sphere were used to measure the spectral distribution for each EUT resulting in photometric and colorimetric data. Electrical measurements of the unit were measured using a power analyzer. Each EUT was operated at the rated input voltage of the system in its designated orientation. The ambient temperature was measured at a position inside the sphere and stabilization procedures to LM-79 were followed.

TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

A Type C Mirror Goniophotometer system was used to measure the luminous intensity (candela) at each angle of distribution for the EUT. Electrical measurements of the unit were measured using a power analyzer. Each EUT was operated at the rated input voltage of the system in its designated orientation. The ambient temperature was measured at a position near the EUT at equal height and stabilization procedures to LM-79 were followed.

TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

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Test Configuration	Tested Model No.	Pass/Fail/NA
4	EC2RS-159WD312DN-UNV-W	NA

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS (25°C +/- 1°C)

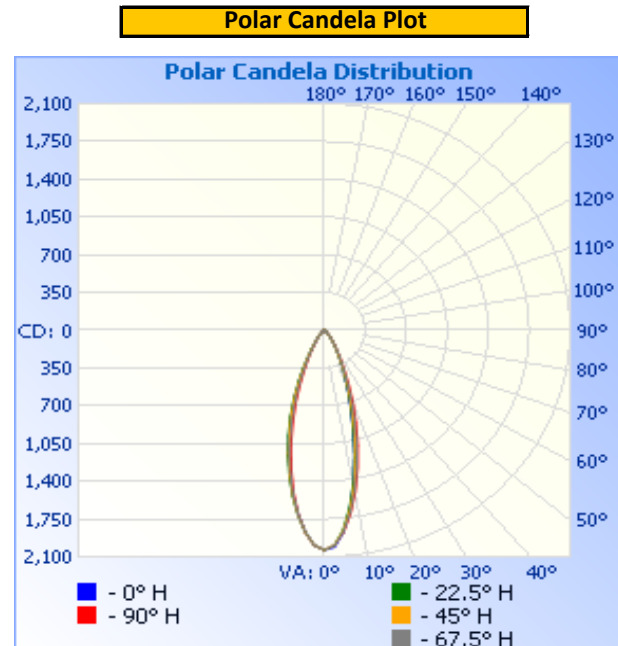
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (I)
Up	119.99	126.1	14.90	0.984

Light Output (lm)	Lumen Efficacy (lm/W)
810.7	54.4

INTENSITY SUMMARY - CANDELA

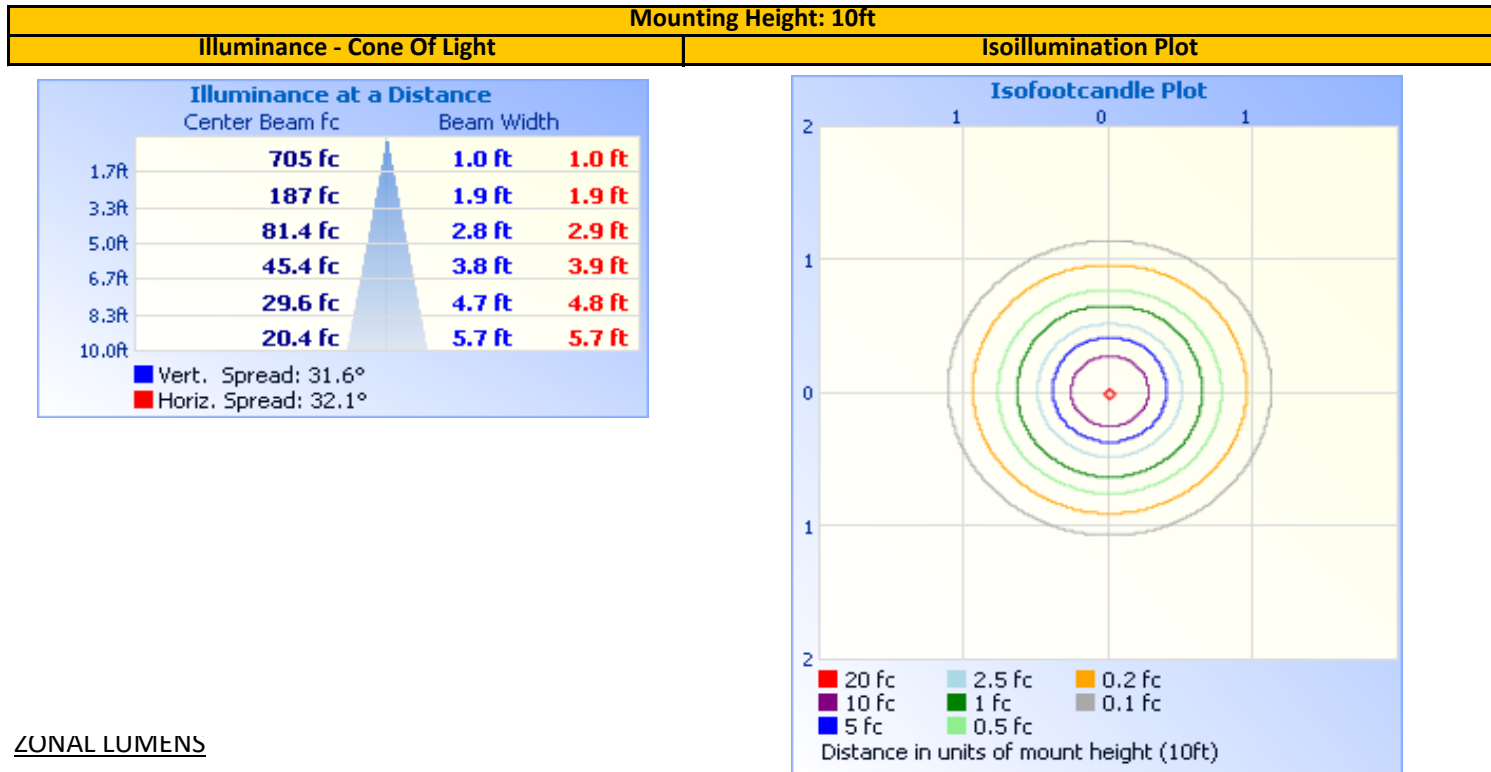
Angle	0	22.5	45	67.5	90
0	2036	2036	2036	2036	2036
5	1875	1851	1862	1873	1879
10	1440	1432	1461	1502	1520
15	952	955	1001	1063	1103
20	584	587	619	670	712
25	349	342	356	382	408
30	201	198	201	215	225
35	116	114	120	126	130
40	64	64	68	74	79
45	34	35	37	40	44
50	26	26	27	28	30
55	17	17	17	18	18
60	11	11	11	12	12
65	8	8	8	9	9
70	3	3	3	3	3
75	2	2	2	2	2
80	1	1	1	1	1
85	1	1	1	1	1
90	0	0	0	0	0
95	0	0	0	0	0
100	0	0	0	0	0
105	0	0	0	0	0
110	0	0	0	0	0
115	0	0	0	0	0
120	0	0	0	0	0
125	0	0	0	0	0
130	0	0	0	0	0
135	0	0	0	0	0
140	0	0	0	0	0
145	0	0	0	0	0
150	0	0	0	0	0
155	0	0	0	0	0
160	0	0	0	0	0
165	0	0	0	0	0
170	0	0	0	0	0
175	0	0	0	0	0
180	0	0	0	0	0

Entire luminous intensity matrix found in .IES file



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ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary					
Zone	Lumens	Luminaire	Zone	Lumens	Total
0-30	661.8	81.6%	0-10	166.2	20.5%
0-40	747.5	92.2%	10-20	298.5	36.8%
0-60	799.8	98.7%	20-30	197.2	24.3%
60-90	10.8	1.3%	30-40	85.7	10.6%
70-100	2.7	0.3%	40-50	35.4	4.4%
90-120	0.0	0.0%	50-60	16.8	2.1%
0-90	810.7	100.0%	60-70	8.1	1.0%
90-180	0.0	0.0%	70-80	2.2	0.3%
0-180	810.7	100.0%	80-90	0.6	0.1%
			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%

INTEGRATING SPHERE TESTING

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Test Configuration	Tested Model No.	Pass/Fail/NA
4	EC2RS-159WD312DN-UNV-W	NA

PHOTOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS (25°C +/- 1°C)

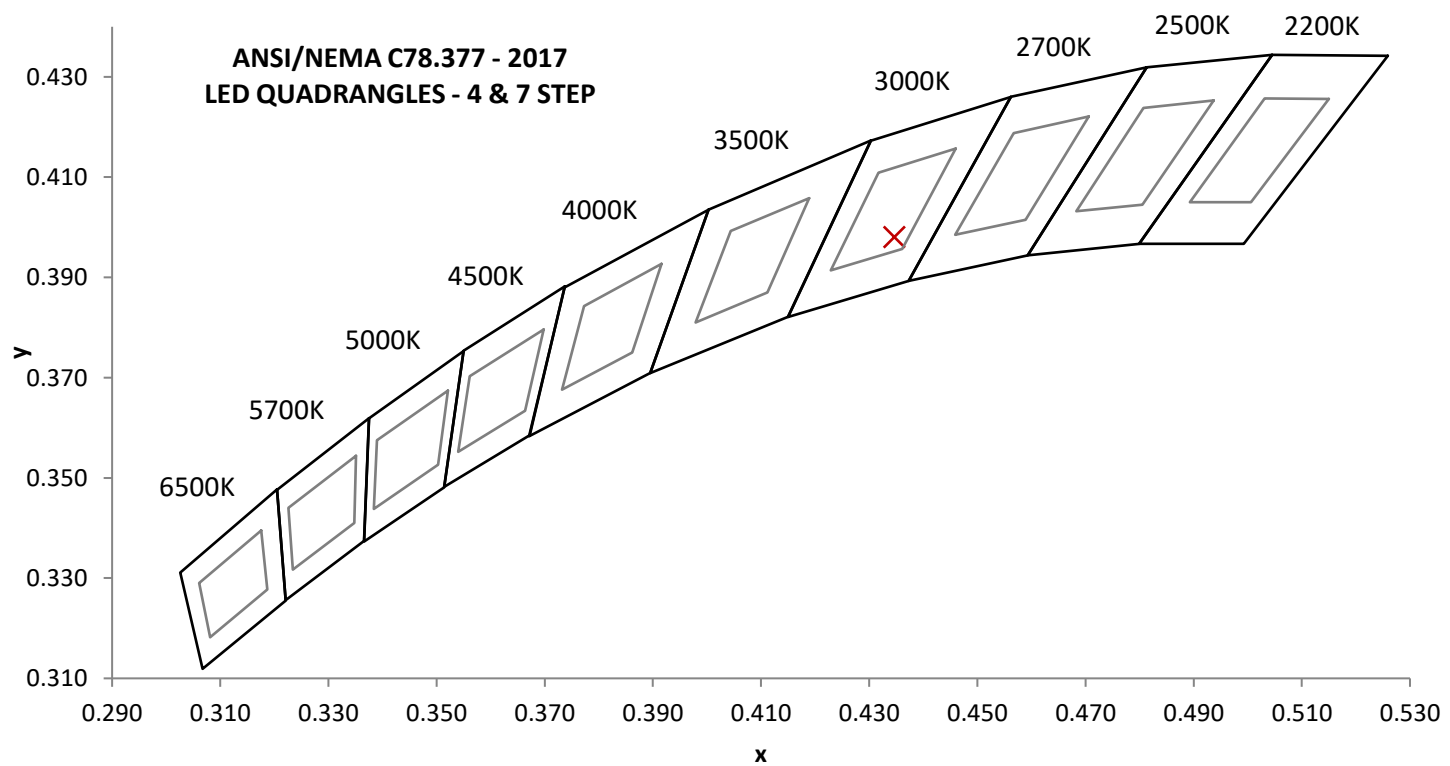
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.02	125.4	14.82	0.985	15.16

Measured at 120.02(Vac)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
798.8	53.9	2989	92.6	72.9

Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
-0.0021	0.435	0.398	0.252	0.519

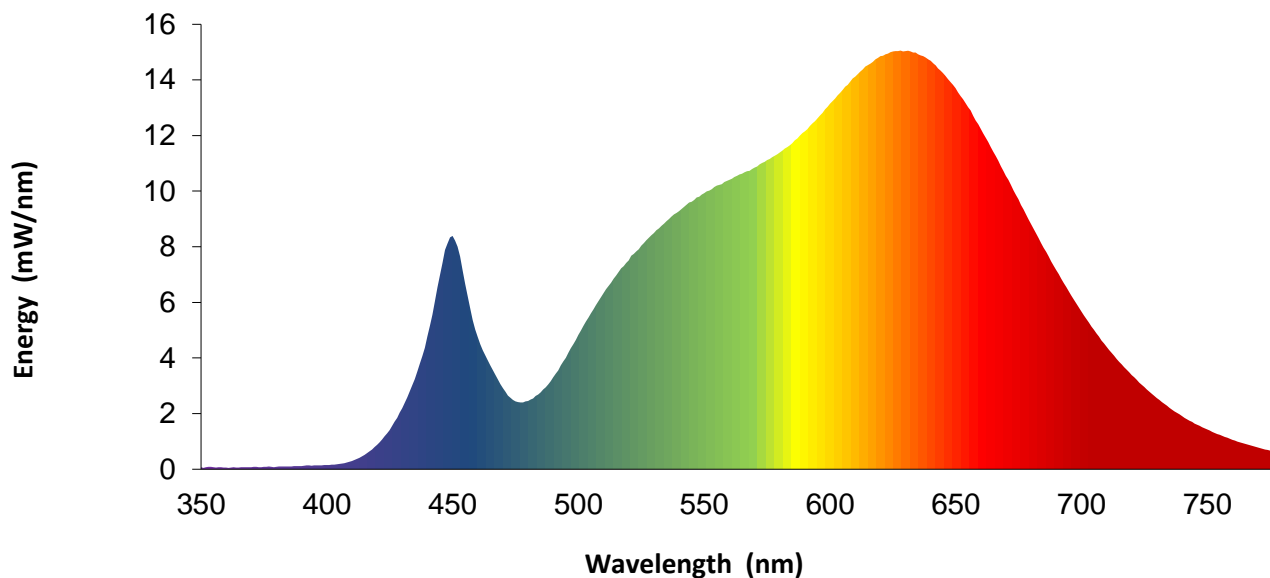


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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.1		460	4.8		570	10.9		680	8.8
355	0.1		465	3.7		575	11.1		685	8.0
360	0.1		470	2.9		580	11.4		690	7.2
365	0.1		475	2.4		585	11.7		695	6.4
370	0.1		480	2.5		590	12.2		700	5.7
375	0.1		485	2.8		595	12.6		705	5.0
380	0.1		490	3.3		600	13.1		710	4.4
385	0.1		495	4.0		605	13.6		715	3.9
390	0.1		500	4.8		610	14.1		720	3.4
395	0.1		505	5.6		615	14.5		725	3.0
400	0.2		510	6.3		620	14.9		730	2.6
405	0.2		515	7.0		625	15.0		735	2.2
410	0.3		520	7.5		630	15.0		740	1.9
415	0.5		525	8.0		635	14.9		745	1.6
420	0.9		530	8.5		640	14.7		750	1.4
425	1.4		535	8.9		645	14.2		755	1.2
430	2.2		540	9.3		650	13.7		760	1.1
435	3.2		545	9.6		655	13.0		765	0.9
440	4.8		550	9.9		660	12.2		770	0.8
445	7.0		555	10.2		665	11.4		775	0.7
450	8.4		560	10.4		670	10.6		780	0.6
455	6.7		565	10.6		675	9.7		---	---

Without correction of sample absorption.



Portrayed color in graphic is estimated by wavelength (nm) and may not be exact - it is a visual representation only

EQUIPMENT LIST

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#	Equipment	Model No	Control No.	Last Cal	Cal Due
1	Yokogawa Power Meter	WT310E	CHI0664	3/30/2022	3/30/2023
2	Omega Thermometer	DPI8-C24	146920	10/4/2021	10/4/2022
3	LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU
4	Newport Thermohygrometer	iServer	CHI0452	2/3/2022	2/3/2023
5	Chroma Power Supply	61604	CHI0371	VBU	VBU
8	Newport Humidity Recorder	iServer	146961	9/21/2021	9/21/2022
9	Labsphere Spectroradiometer	CDS2600	CHI0539	VBU	VBU
10	3 Meter Sphere	SPR600	CHI0088	VBU	VBU
11	Elgar AC Power Supply	CW1251	146112	VBU	VBU
12	Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU
13	Yokogawa Power Meter	WT1600	146769	4/5/2022	4/5/2023
17	Omega thermometer	USB TC08	EQAH002615	4/5/2022	4/5/2023
26	Xitron Power Analyzer	XT-2640	CHI0611	7/6/2022	7/6/2023

Note: Standard sources listed above are traceable to NIST: National Institute of Standards and Technology

REVISION HISTORY

#	Revision Date	Updated By	Reviewed By	Description of Change
---	None	---	---	---
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Test Configuration	Tested Model No.	Pass/Fail/NA
4	EC2RS-159WD312DN-UNV-W	NA

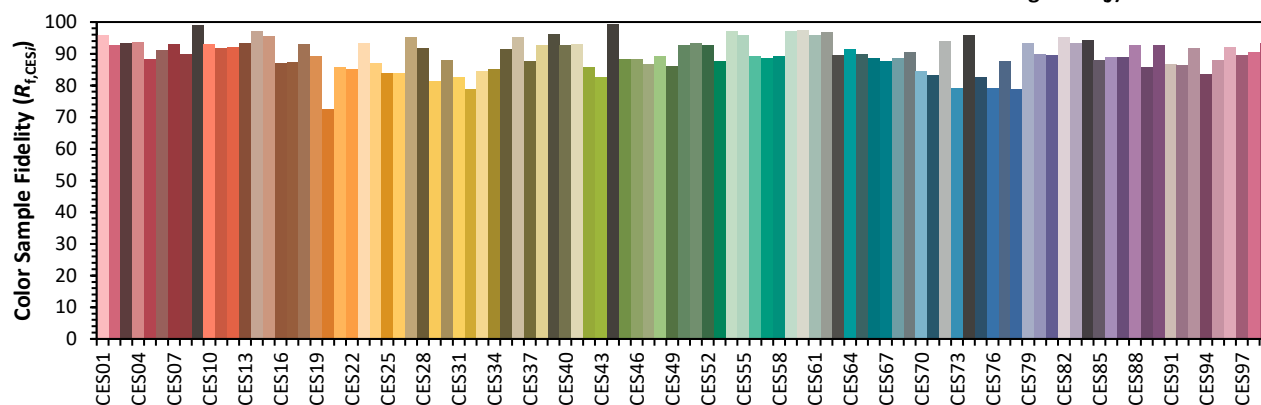
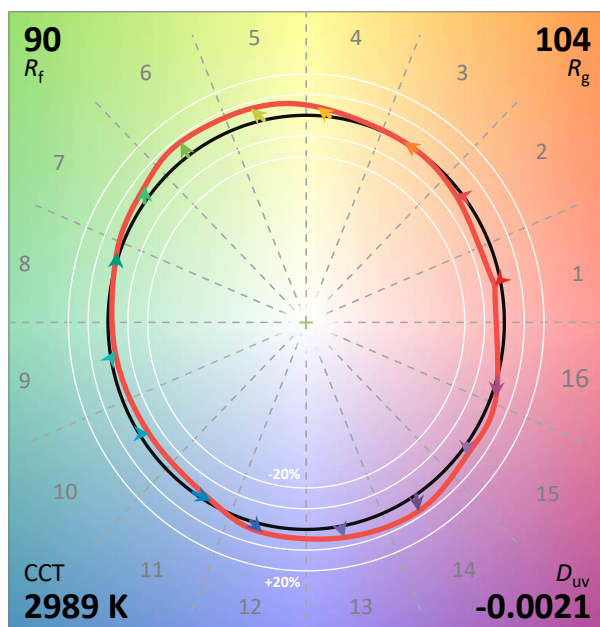
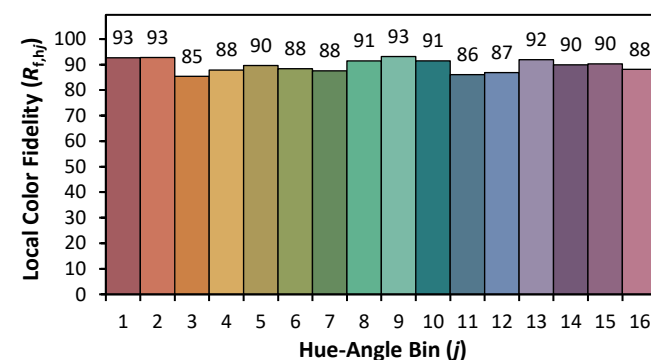
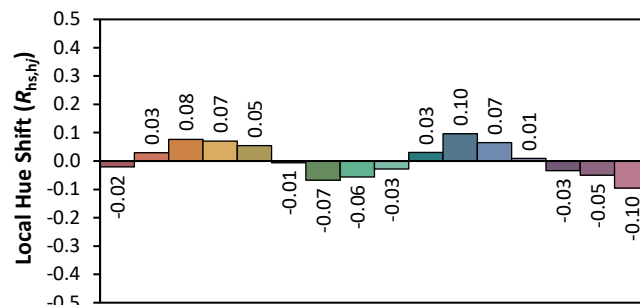
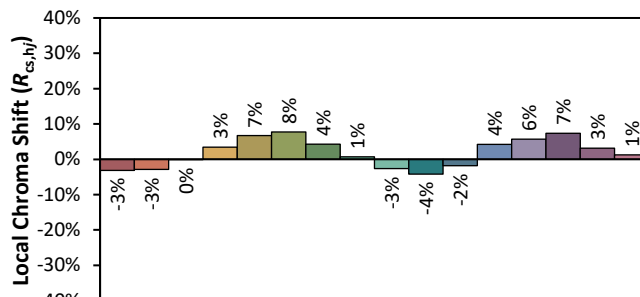
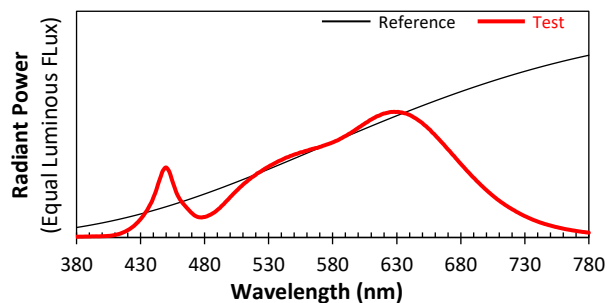
ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: VISUAL COMFORT AND COMPANY

Date: 9/1/2022

Model: EC2RS-159WD312DN-UNV-W



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4346

y 0.3980

u' 0.2517

v' 0.5186