

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

EC3RS-159304DN-UNV-W

PROJECT NUMBER

G104941221

REPORT NUMBER

104941221CHI-083

ISSUE DATE

9/9/2022

REVISED DATE

None

TEST DATES

2022-08-29 through 2022-08-30.

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104941221CHI-083

MODEL NUMBER(s)

EC3RS-159304DN-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

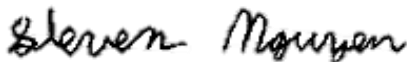
IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

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:



Steven Nguyen
Engineer
Lighting Division

Reviewer:



Jeff Davis
N.A. Technical Lead
Lighting Division

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SAMPLE INFORMATION

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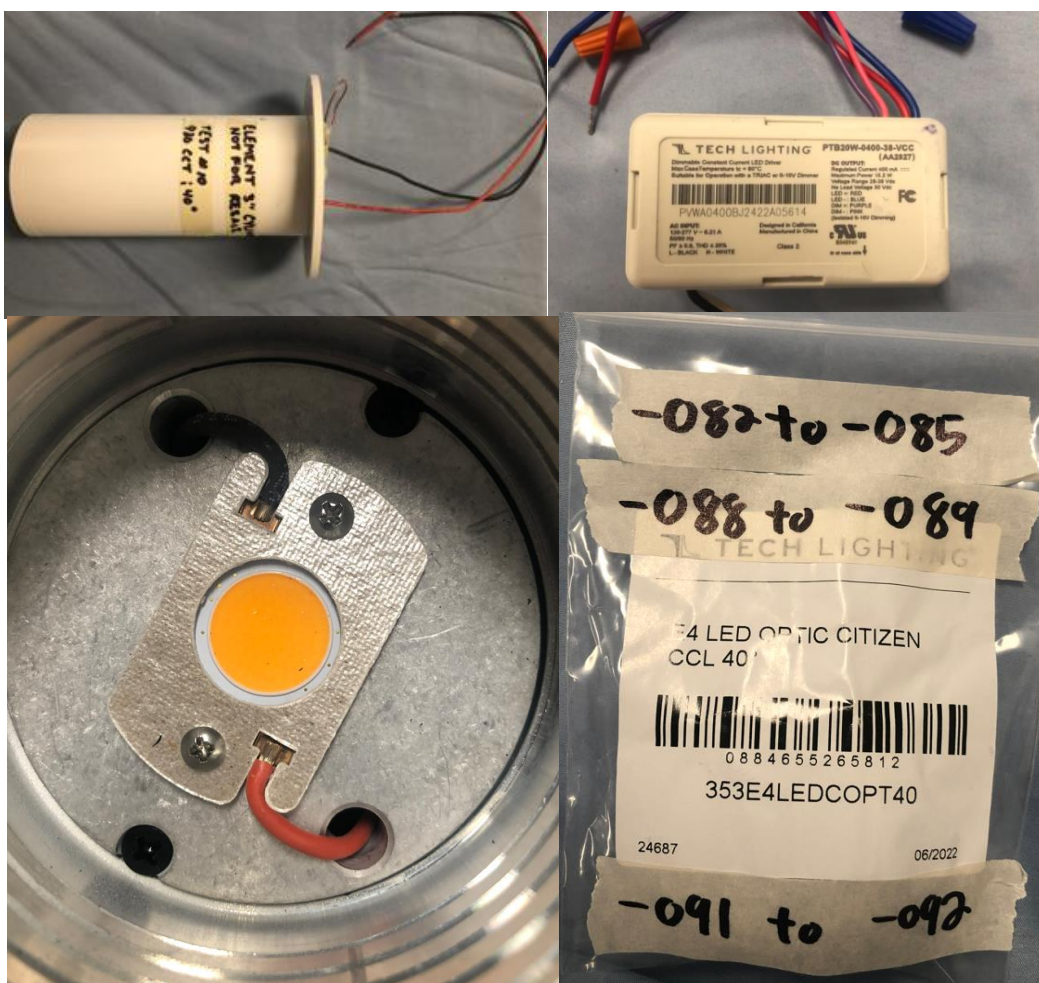
ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	AH08252022081536	EC3RS-159304DN-UNV-W	3" DOWNLIGHT LUMINAIRE	Production	8/25/2022

TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	EC3RS-159304DN-UNV-W	1

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	EC3RS-159304DN-UNV-W
Product Description:	3" DOWNLIGHT LUMINAIRE
LED Model No.:	Bridgelux / BXRE-30G2000-C-81
Driver Model No.:	ERP / PTB20W-0400-38-VCC
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	1476.4	1504.4
Input Power (W) @ 120VAC (Vac)	15.93	15.92
Lumen Efficacy (lm/W)	92.7	94.5
Input Power Factor (PF) @ 120VAC (Vac)	0.985	0.987

Criteria	Results
Input ATHD (%) @ 120VAC (Vac)	14.38
Correlated Color Temperature (K)	3007
Color Rendering Index - Ra (I)	92.2
Color Rendering Index - R9 (I)	71.3
Duv (I)	-0.0013
Chromaticity Coordinate (x)	0.435
Chromaticity Coordinate (y)	0.400
Chromaticity Coordinate (u')	0.251
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
1	EC3RS-159304DN-UNV-W	NA

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

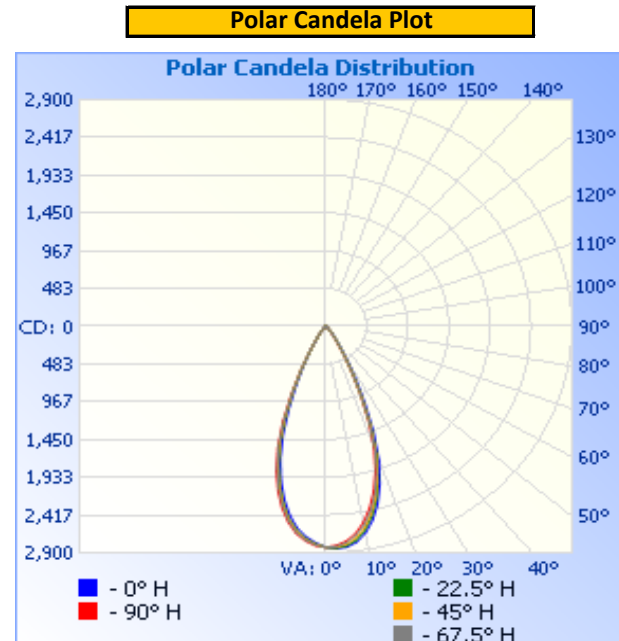
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	119.99	134.7	15.93	0.985

Light Output (lm)	Lumen Efficacy (lm/W)
1476.4	92.7

INTENSITY SUMMARY - CANDELA

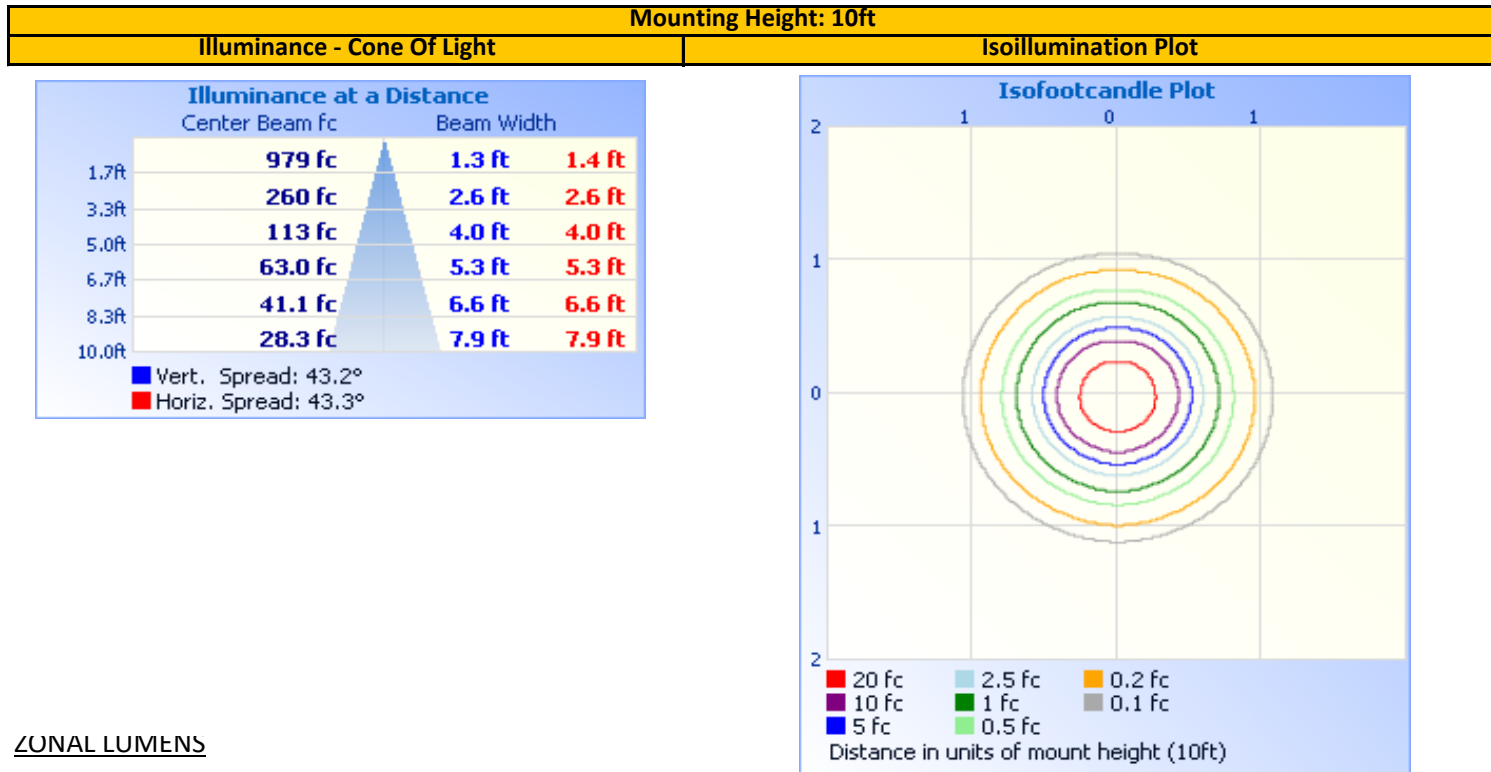
Angle	0	22.5	45	67.5	90
0	2828	2828	2828	2828	2828
5	2836	2818	2800	2779	2759
10	2686	2648	2620	2581	2548
15	2355	2297	2267	2225	2180
20	1827	1753	1738	1703	1657
25	1086	1010	1001	988	966
30	517	468	452	435	424
35	222	204	196	190	181
40	107	97	93	89	85
45	52	48	46	43	41
50	23	21	20	19	18
55	9	9	8	8	8
60	6	6	6	6	6
65	4	4	4	4	4
70	2	2	2	2	2
75	1	1	1	1	1
80	1	1	1	1	1
85	0	0	0	0	0
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	1,297.9	87.9%	0-10	257.3	17.4%
0-40	1,427.2	96.7%	10-20	598.6	40.5%
0-60	1,470.9	99.6%	20-30	442.0	29.9%
60-90	5.5	0.4%	30-40	129.3	8.8%
70-100	1.8	0.1%	40-50	35.3	2.4%
90-120	0.0	0.0%	50-60	8.4	0.6%
0-90	1,476.4	100.0%	60-70	3.7	0.2%
90-180	0.0	0.0%	70-80	1.4	0.1%
0-180	1,476.4	100.0%	80-90	0.4	0.0%
			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

REPORT NO. 104941221CHI-083

Test Configuration	Tested Model No.	Pass/Fail/NA
1	EC3RS-159304DN-UNV-W	NA

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

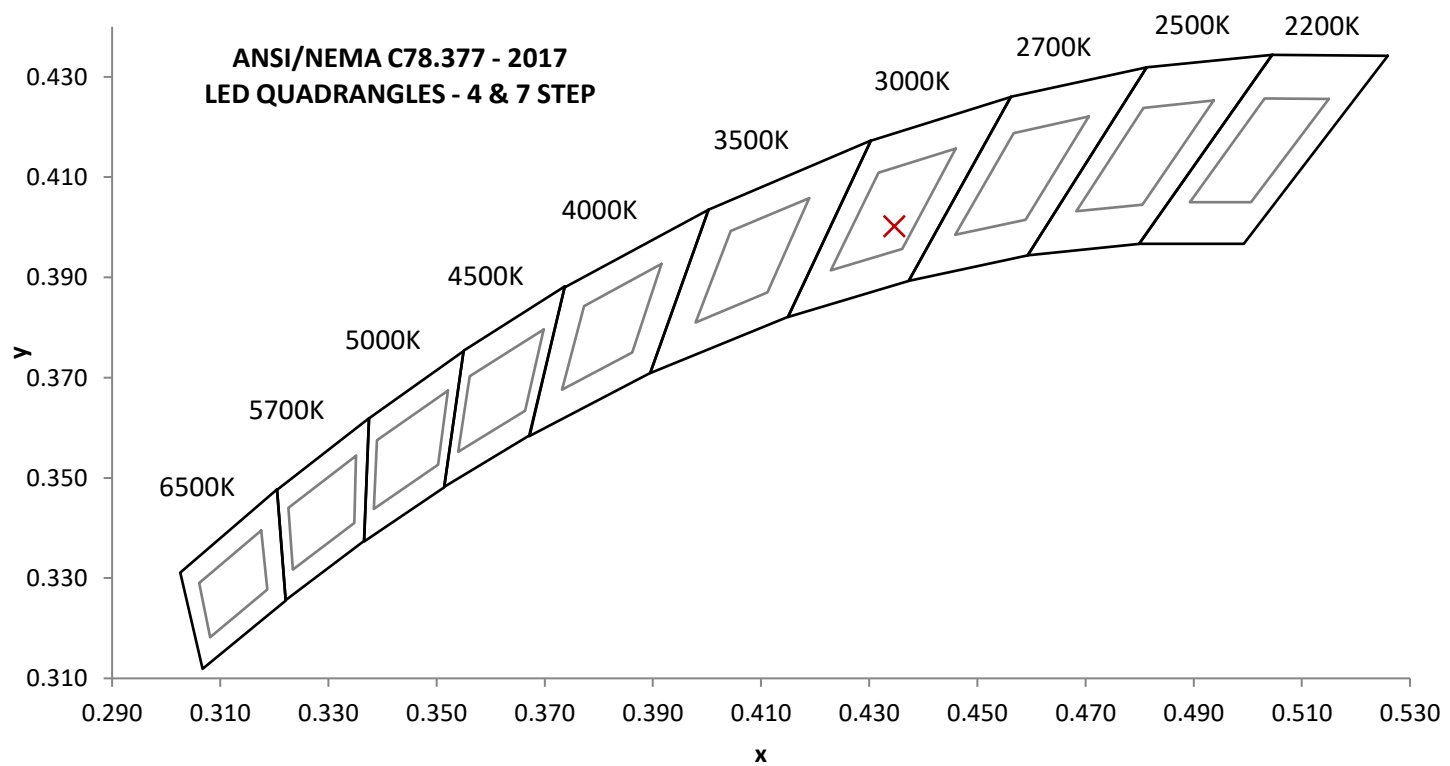
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (I)	Input ATHD (%)
120.02	134.4	15.92	0.987	14.38

Measured at 120.02(Vac)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra (I)	CRI - R9 (I)
1504.4	94.5	3007	92.2	71.3

Duv (I)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
-0.0013	0.435	0.400	0.251	0.519

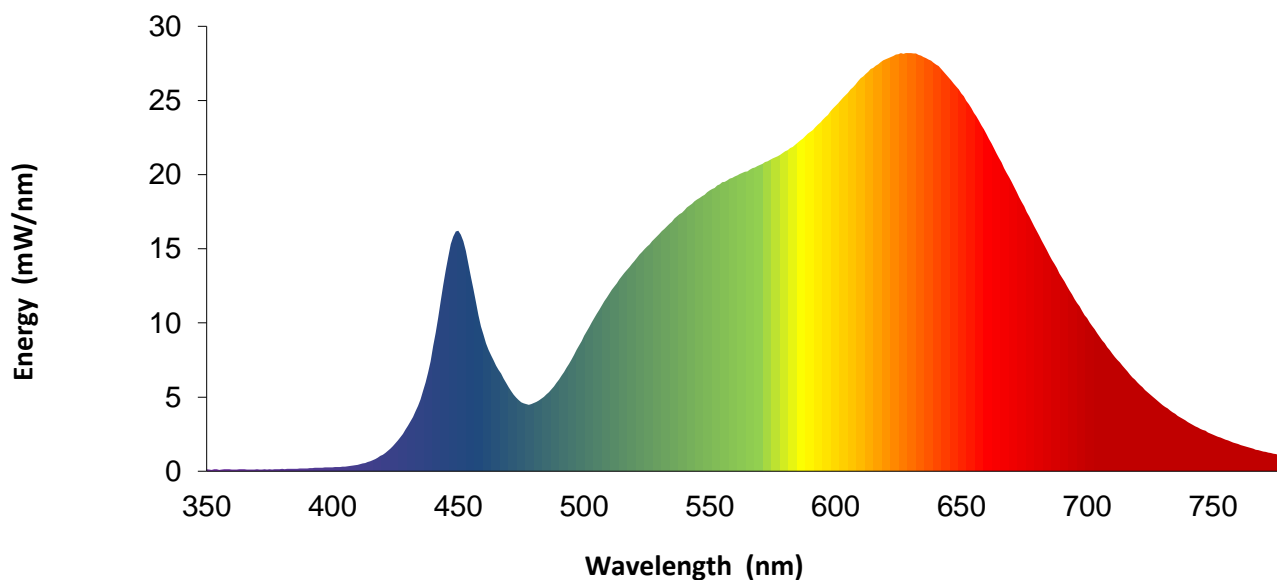


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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.1		460	9.2		570	20.7		680	16.2
355	0.1		465	7.1		575	21.1		685	14.6
360	0.1		470	5.7		580	21.6		690	13.1
365	0.1		475	4.6		585	22.2		695	11.6
370	0.1		480	4.6		590	22.9		700	10.3
375	0.1		485	5.2		595	23.7		705	9.1
380	0.2		490	6.2		600	24.6		710	7.9
385	0.2		495	7.5		605	25.5		715	6.9
390	0.2		500	9.1		610	26.5		720	6.0
395	0.2		505	10.6		615	27.2		725	5.2
400	0.3		510	12.0		620	27.8		730	4.5
405	0.3		515	13.2		625	28.1		735	3.9
410	0.4		520	14.2		630	28.2		740	3.3
415	0.7		525	15.1		635	27.9		745	2.9
420	1.1		530	16.0		640	27.4		750	2.5
425	1.9		535	16.8		645	26.6		755	2.1
430	3.1		540	17.6		650	25.5		760	1.8
435	4.8		545	18.3		655	24.2		765	1.6
440	8.4		550	18.9		660	22.7		770	1.3
445	13.5		555	19.5		665	21.1		775	1.1
450	16.2		560	19.9		670	19.5		780	1.0
455	13.1		565	20.2		675	17.9		---	---

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

REPORT NO. 104941221CHI-083

#	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
1	EC3RS-159304DN-UNV-W	NA

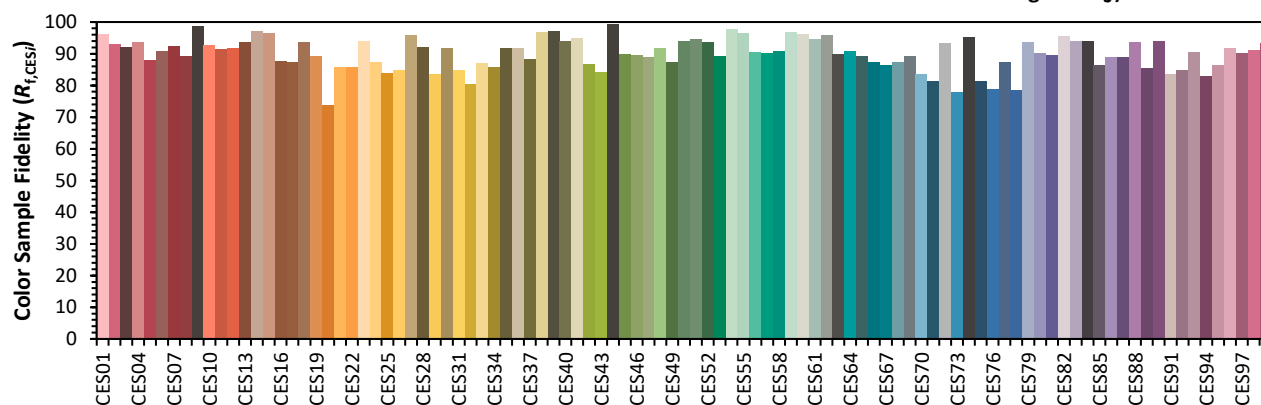
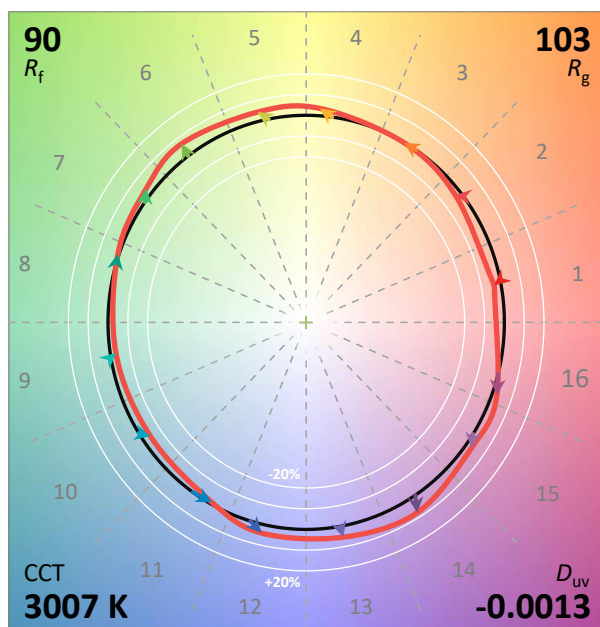
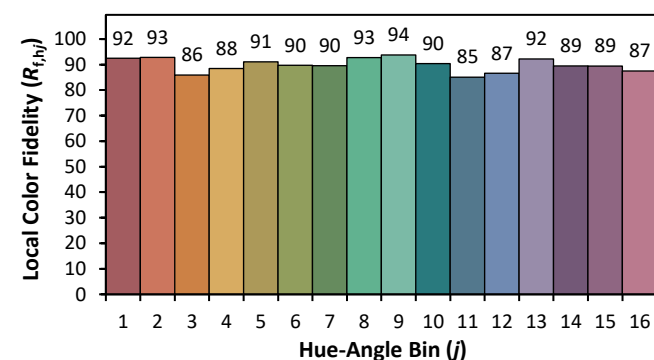
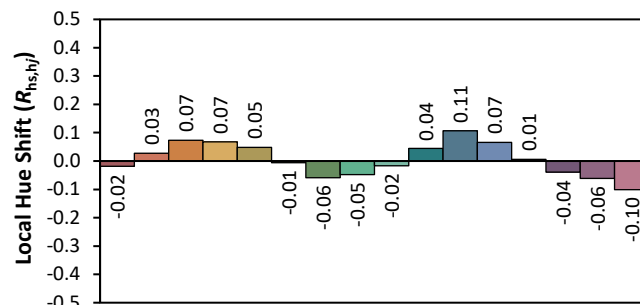
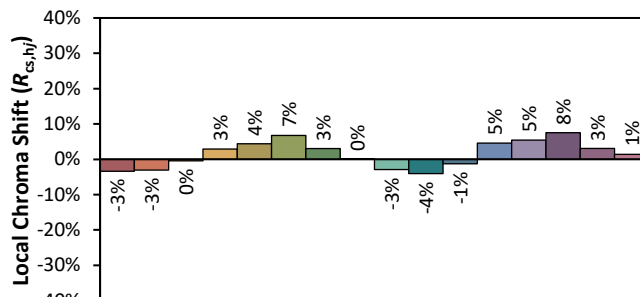
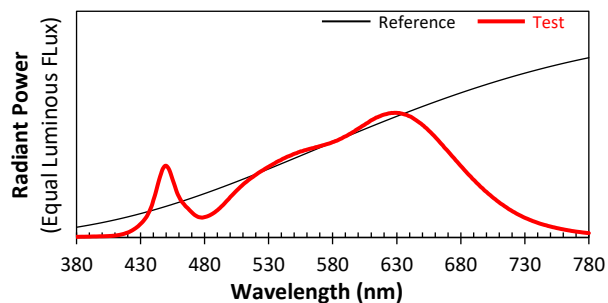
ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: VISUAL COMFORT AND COMPANY

Date: 8/29/2022

Model: EC3RS-159304DN-UNV-W



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

x 0.4346

y 0.4001

u' 0.2508

v' 0.5195