

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

ENCY2RS-L089304D-UNV-WW

PROJECT NUMBER

G104659241

REPORT NUMBER

104659241CRT-002

ISSUE DATE

8/20/2021

REVISED DATE

None

TEST DATES

8/19/21 through 8/20/21

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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PAGES

12

REPORT NUMBER

104659241CRT-002

MODEL NUMBER(s)

ENCY2RS-L089304D-UNV-WW

REPORT RENDERED TO:

VISUAL COMFORT AND COMPANY

7400 LINDER AVE

SKOKIE, IL 60077

USA

STATEMENT OF LIMITATION

NVLAP Lab Code 100402-0. 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-01166088-0.

TEST STANDARDS

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

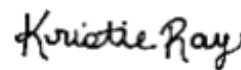
ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

In Charge of Testing:



Gerald Gray
Associate Engineer
Lighting Division

Reviewer:



Kristie Ray
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SAMPLE INFORMATION

REPORT NO. 104659241CRT-002

ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	CRT2108101057-001-1	ESS010W-0200-42	Driver	Production	8/10/2021
2	CRT2108101057-001-3	BXRE-30-G1000-C-83	LED	Production	8/10/2021
3	CRT2108101057-001-10	40°	Optic	Production	8/10/2021

TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	ENCY2RS-L089304D-UNV-WW	1,2,3

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	ENCY2RS-L089304D-UNV-WW
Product Description:	2 Inch Cylinder Downlight, 90 CRI, 3000K 40° optic
LED Model No.:	BXRE-30-G1000-C-83
Driver Model No.:	ESS010W-0200-42
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	544.3	567.4
Input Power (W) @ 120 (Vac)	7.84	7.87
Lumen Efficacy (lm/W)	69.4	72.1
Input Power Factor (I) @ 120 (Vac)	0.984	0.982

Criteria	Results
Input ATHD (%) @ 120 (Vac)	11.82
Correlated Color Temperature (K)	2835
Color Rendering Index - Ra (I)	95.0
Color Rendering Index - R9 (I)	80.2
Duv (I)	0.0025
Chromaticity Coordinate (x)	0.445
Chromaticity Coordinate (y)	0.401
Chromaticity Coordinate (u')	0.258
Chromaticity Coordinate (v')	0.521

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

REPORT NO. 104659241CRT-002

Test Configuration	Tested Model No.	Pass/Fail/NA
1	ENCY2RS-L089304D-UNV-WW	NA

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

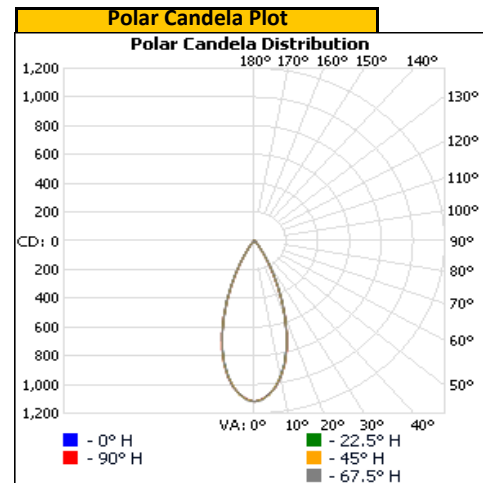
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	120.02	66.4	7.84	0.984

Light Output (lm)	Lumen Efficacy (lm/W)
544.3	69.4

INTENSITY SUMMARY - CANDELA

Angle	0	22.5	45	67.5	90
0	1118	1118	1118	1118	1118
5	1071	1072	1075	1073	1070
10	954	956	957	961	960
15	780	779	783	783	787
20	562	564	561	562	568
25	350	351	345	346	344
30	180	180	177	174	169
35	76	75	73	72	72
40	34	34	34	34	32
45	18	18	18	18	18
50	9	9	9	9	9
55	5	5	5	5	5
60	3	3	3	3	3
65	2	2	2	2	2
70	1	1	1	1	1
75	0	0	0	0	0
80	0	0	0	0	0
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



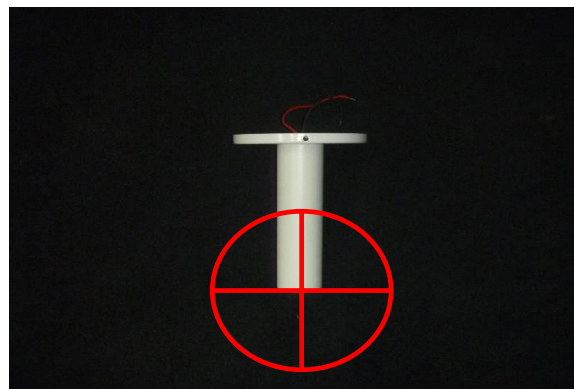
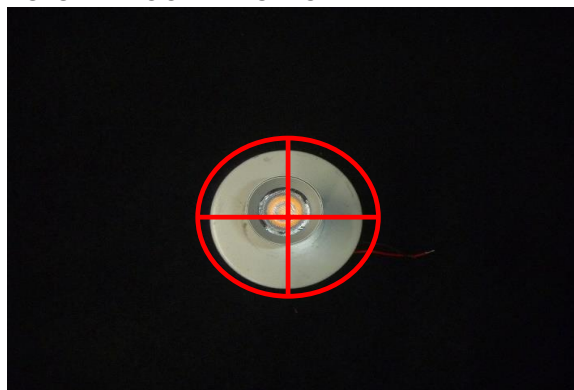
REPORT NO. 104659241CR1-002

ORIENTATION AND ALIGNMENT OF EUT

Luminous Opening		
Length (ft)	Width (ft)	Height (ft)
0.14	0.14	0.00
0°-180° H	90°-270° H	0°-180° V

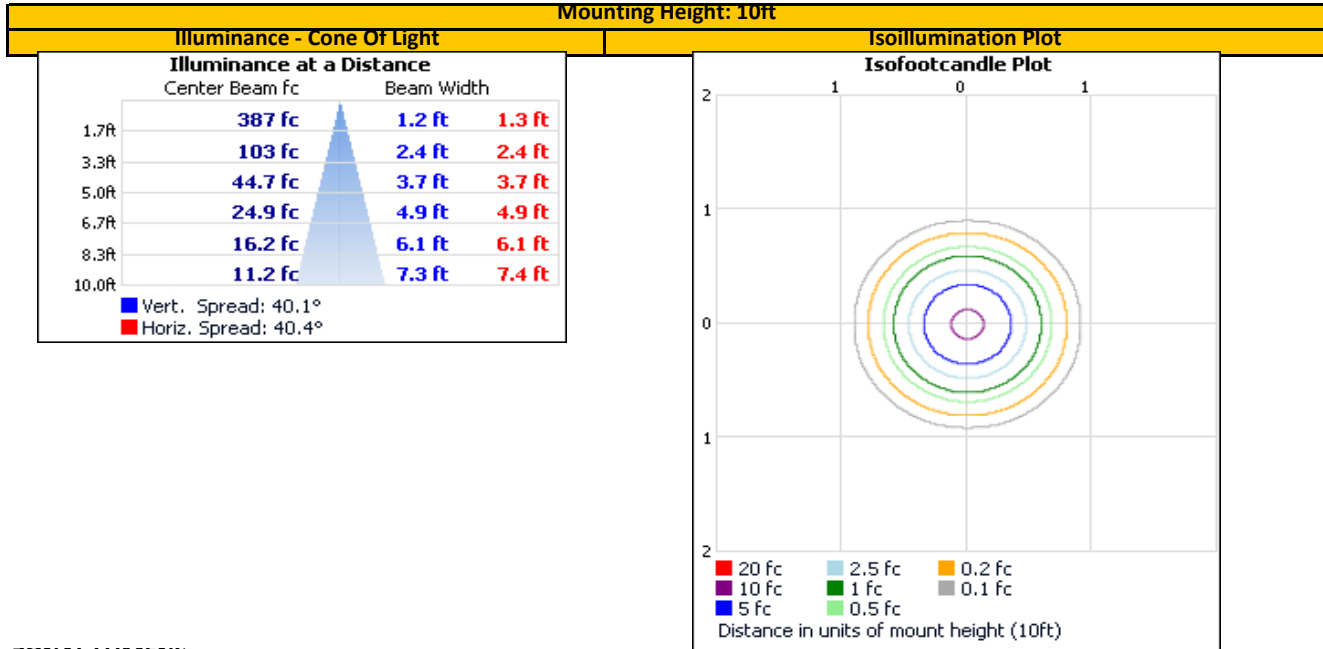
Test Distance (ft)
29.6

PHOTOMETRIC CENTER OF EUT



REPORT NO. 104659241CR1-002

ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary					
Zone	Lumens	Luminaire	Zone	Lumens	Total
0-30	470.5	86.5%	0-10	98.5	18.1%
0-40	522.4	96.0%	10-20	213.1	39.1%
0-60	541.8	99.5%	20-30	159.0	29.2%
60-90	2.5	0.5%	30-40	51.9	9.5%
70-100	0.4	0.1%	40-50	14.6	2.7%
90-120	0.0	0.0%	50-60	4.8	0.9%
0-90	544.3	100.0%	60-70	2.1	0.4%
90-180	0.0	0.0%	70-80	0.4	0.1%
0-180	544.3	100.0%	80-90	0.0	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%

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UNIFIED GLARE RATING (UGR) SUMMARY

Reflectances					
Ceiling Cavity	70	70	50	50	30
Walls	50	30	50	30	30
Floor Cavity	20	20	20	20	20

Room Size	
X=2H	Y=2H
	3H
	4H
	6H
	8H
	12H

UGR Viewed Crosswise				
6.7	7.7	7.1	8.0	8.3
7.4	8.2	7.8	8.6	8.9
7.4	8.1	7.8	8.5	8.9
7.2	7.9	7.7	8.3	8.7
7.2	7.8	7.6	8.2	8.6
7.1	7.7	7.6	8.1	8.6

4H	2H
	3H
	4H
	6H
	8H
	12H

7.0	7.7	7.4	8.1	8.5
7.7	8.3	8.1	8.7	9.1
7.6	8.2	8.0	8.6	9.0
7.5	8.0	8.0	8.4	8.9
7.4	7.9	7.9	8.3	8.8
7.4	7.7	7.9	8.2	8.7

8H	4H
	6H
	8H
	12H

7.5	7.9	7.9	8.4	8.8
7.3	7.7	7.9	8.2	8.7
7.3	7.6	7.8	8.1	8.6
7.2	7.5	7.7	8.0	8.5

12H	4H
	6H
	8H

7.4	7.8	7.9	8.3	8.7
7.3	7.6	7.8	8.0	8.6
7.2	7.5	7.7	8.0	8.5

Room Size	
X=2H	Y=2H
	3H
	4H
	6H
	8H
	12H

UGR Viewed Endwise				
6.7	7.6	7.0	7.9	8.2
7.3	8.1	7.7	8.4	8.8
7.2	8.0	7.6	8.3	8.7
7.1	7.8	7.5	8.2	8.6
7.0	7.7	7.5	8.1	8.5
7.0	7.6	7.4	8.0	8.4

4H	2H
	3H
	4H
	6H
	8H
	12H

6.9	7.7	7.3	8.0	8.4
7.5	8.2	8.0	8.6	9.0
7.5	8.0	7.9	8.4	8.9
7.3	7.8	7.8	8.3	8.7
7.3	7.7	7.8	8.2	8.6
7.2	7.6	7.7	8.1	8.6

8H	4H
	6H
	8H
	12H

7.3	7.8	7.8	8.2	8.7
7.2	7.5	7.7	8.0	8.5
7.1	7.4	7.7	8.0	8.4
7.1	7.3	7.6	7.8	8.4

12H	4H
	6H
	8H

7.3	7.6	7.8	8.1	8.6
7.1	7.4	7.7	7.9	8.5
7.1	7.3	7.6	7.8	8.4

Maximum UGR	
	9.1

INTEGRATING SPHERE TESTING

REPORT NO. 104659241CRT-002

Test Configuration	Tested Model No.	Pass/Fail/NA
1	ENCY2RS-L089304D-UNV-WW	NA

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

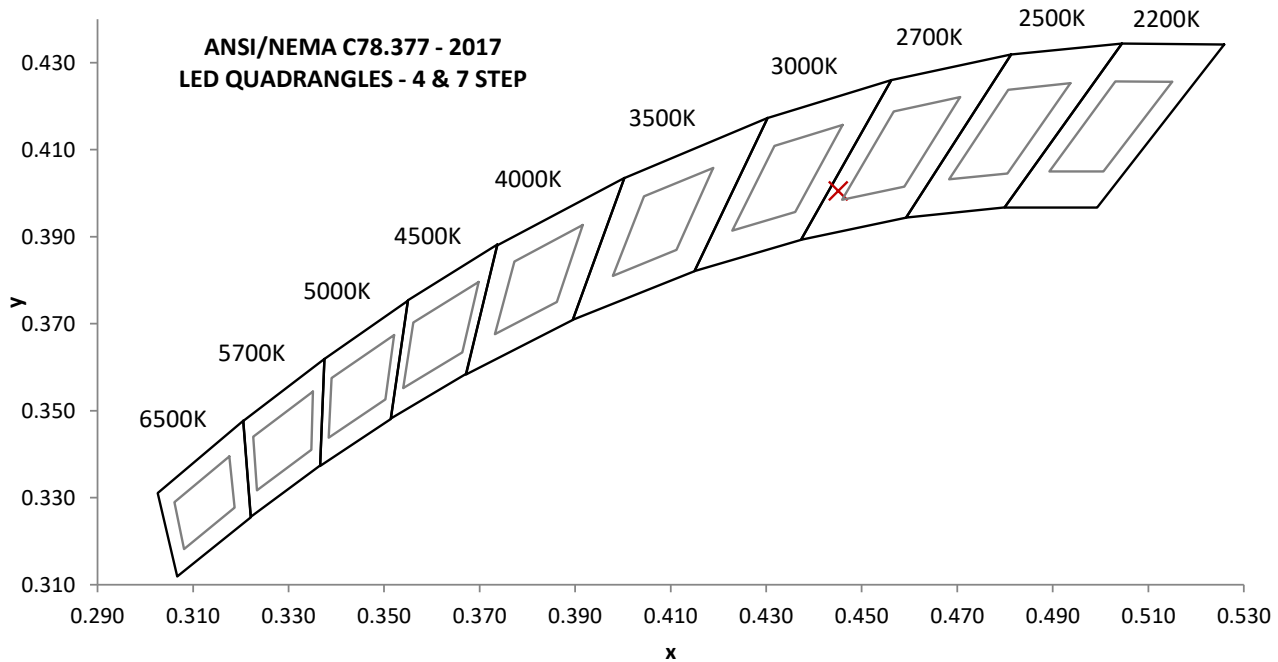
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()	Input ATHD (%)
120.04	66.8	7.87	0.982	11.82

Measured at 120.04(Vac)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra ()	CRI - R9 ()
567.4	72.1	2835	95.0	80.2

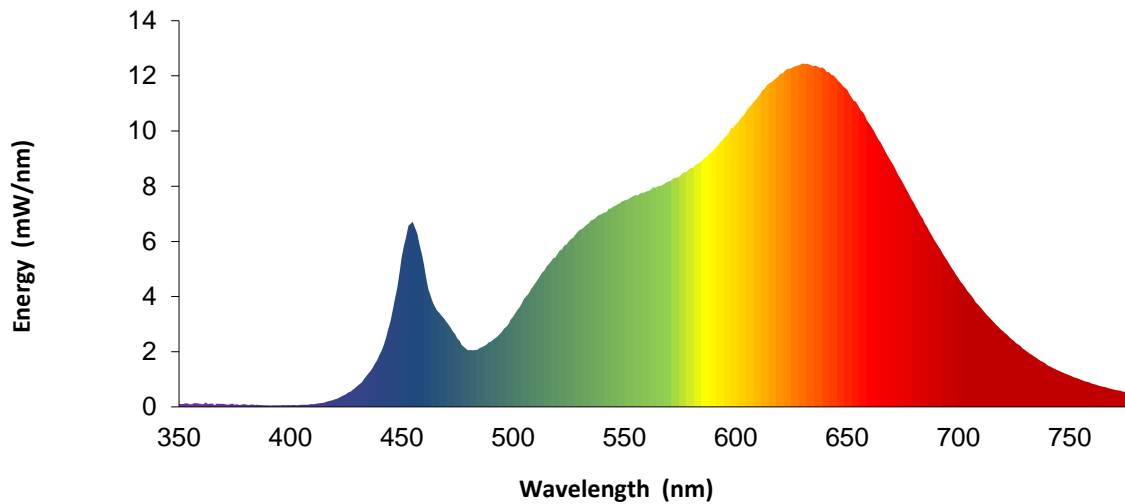
Duv ()	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
0.0025	0.445	0.401	0.258	0.521



REPORT NO. 104659241CRT-002

SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.1		460	5.1		570	8.2		680	7.4
355	0.1		465	3.6		575	8.4		685	6.7
360	0.1		470	3.1		580	8.7		690	6.0
365	0.1		475	2.5		585	8.9		695	5.3
370	0.1		480	2.1		590	9.3		700	4.7
375	0.1		485	2.1		595	9.8		705	4.1
380	0.1		490	2.4		600	10.3		710	3.6
385	0.1		495	2.7		605	10.8		715	3.2
390	0.1		500	3.3		610	11.2		720	2.7
395	0.1		505	3.9		615	11.7		725	2.4
400	0.1		510	4.5		620	12.1		730	2.1
405	0.1		515	5.1		625	12.3		735	1.8
410	0.1		520	5.6		630	12.4		740	1.5
415	0.1		525	6.0		635	12.4		745	1.3
420	0.3		530	6.4		640	12.2		750	1.1
425	0.5		535	6.8		645	11.9		755	1.0
430	0.7		540	7.0		650	11.5		760	0.8
435	1.2		545	7.3		655	10.9		765	0.7
440	1.9		550	7.5		660	10.3		770	0.6
445	3.1		555	7.7		665	9.6		775	0.5
450	5.4		560	7.8		670	8.9		780	0.5
455	6.7		565	8.0		675	8.1		---	---



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

SEE ANNEX A FOR TM-30 REPORT

EQUIPMENT LIST

REPORT NO. 104659241CRT-002

#	Equipment	Model No	Control No.	Last Cal	Cal Due
1	Elgar AC Power Supply	CW1251	---	VBU	VBU
2	Sorenson DC Power Supply	XFR 150-8	---	VBU	VBU
3	Traceable Hygrothermometer	4800	L206	2/12/2021	2/12/2022
4	Yokogawa Power Analyzer	WT1600	E474	6/15/2021	6/15/2022
5	Fluke Thermometer	53 II	D587	2/5/2021	2/5/2022
6	3M Integrating Sphere Spectrometer System	CDS 1100	O235	7/26/2021	10/26/2021
7	Fisher Scientific Stopwatch	14-649-9	N1132	3/26/2021	3/26/2022
8	LSI High Speed Mirror Goniophotometer	6440	---	8/16/2021	11/16/2021
9	Elgar AC Power Supply	CW1251	---	VBU	VBU
10	Yokogawa Power Analyzer	WT210	E464	5/11/2021	5/11/2022
11	Traceable Hygrothermometer	4800	L204	2/21/2021	2/21/2022
12	Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
13	Omega Thermometer	DPI8-C24	M263	3/23/2021	3/23/2022
14	Bosch Distance Laser	Pro GLM 20	L211	3/3/2021	3/3/2022
15	M-D Building Products Digital Level	Smart Tool	L112	5/26/2021	5/26/2022

REVISION HISTORY

#	Revision Date	Updated By	Reviewed By	Description of Change
---	None	---	---	---
---	---	---	---	---
---	---	---	---	---

ANNEX A - TM-30 CALCULATIONS

REPORT NO. 104659241CRT-002

Test Configuration	Tested Model No.	Pass/Fail/NA
1	ENCY2RS-L089304D-UNV-WW	NA

TM-30 REPORT

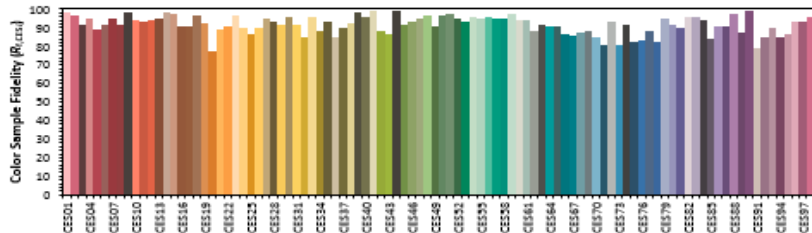
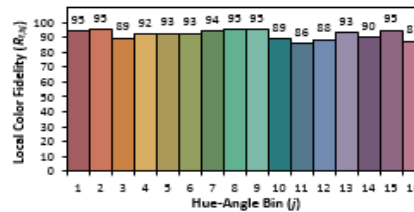
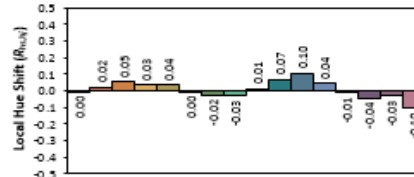
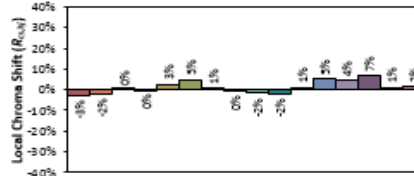
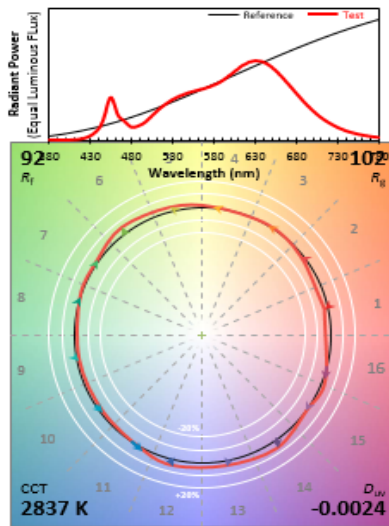
ANSI/IES TM-30-18 Color Rendition Report

Source: 104659241CRT-002

Manufacturer: VISUAL COMFORT AND COMPANY

Date: 8/20/2021

Model: ENCY2RS-L089304D-UNV-WW



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

x 0.4451
y 0.4005
u' 0.2575
v' 0.5212

Colors are for visual orientation purposes only. Created with the IES TM-30-18 Calculator Version 2.00.