

# VISUAL COMFORT AND COMPANY TEST REPORT

## SCOPE OF WORK

LED Performance Testing

## MODEL NUMBER

700BCDBS3H\*\*-LED9\*\*

## PROJECT NUMBER

G104659241

## REPORT NUMBER

104659241CHI-028

## ISSUE DATE

1/7/2022

## REVISED DATE

None

## TEST DATES

12/20/2021 through 01/05/2022.

## DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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**REPORT NUMBER**

104659241CHI-028

**MODEL NUMBER(s)**

700BCDBS3H\*\*-LED9\*\*

**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-01166088-2.

**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:



Tim Quigley  
Engineer  
Lighting Division

Reviewer:



Jeff Davis  
N.A. Technical Lead  
Lighting Division

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## SAMPLE INFORMATION

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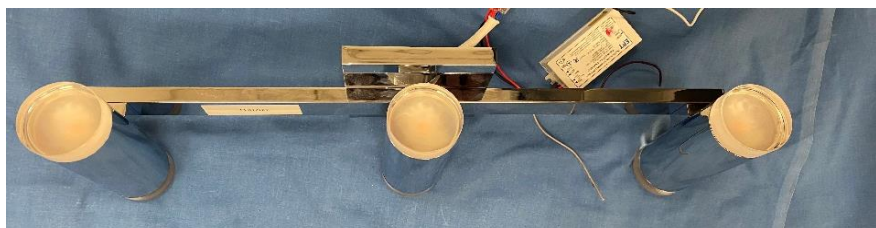
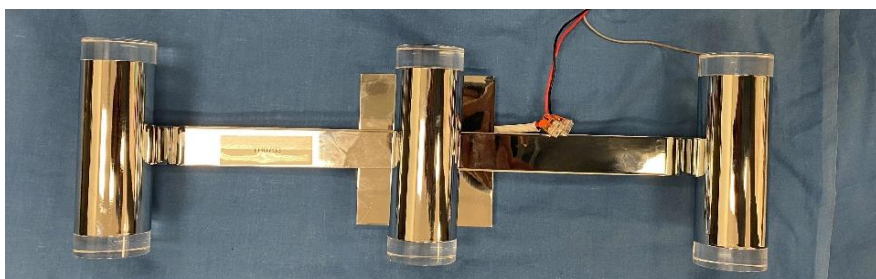
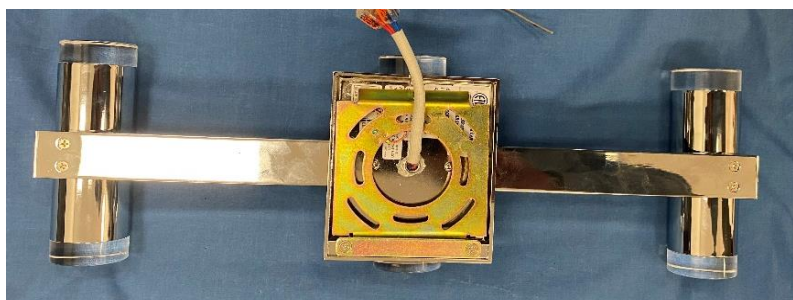
### ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	AH12142021074906	700BCDBS3H**-LED9**	DOBSON II	Production	12/14/2021

### TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	700BCDBS3H**-LED9**	1

### SAMPLE PHOTOS - TESTED CONFIGURATIONS



## SUMMARY

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### PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700BCDBS3H**-LED9**
Product Description:	DOBSON II
LED Model No.:	CITIZEN: CLU028-1202C4-303H5K2
Driver Model No.:	EPT PVD36-C090V40-UNV3-HE-P
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	2866.4	2918.7
Input Power (W) @ 120 (Vac)	34.96	34.89
Lumen Efficacy (lm/W)	82.0	83.7
Input Power Factor ( ) @ 120 (Vac)	0.994	0.994

Criteria	Results
Input ATHD (%) @ 120 (Vac)	10.60
Correlated Color Temperature (K)	3068
Color Rendering Index - Ra ( )	91.8
Color Rendering Index - R9 ( )	54.8
Duv ( )	0.0017
Chromaticity Coordinate (x)	0.435
Chromaticity Coordinate (y)	0.407
Chromaticity Coordinate (u')	0.248
Chromaticity Coordinate (v')	0.522
Input Power (W) @ 277 (Vac)	35.46
Input Power Factor ( ) @ 277 (Vac)	0.955
Input ATHD (%) @ 277 (Vac)	13.64

## 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	700BCDBS3H**-LED9**	NA

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

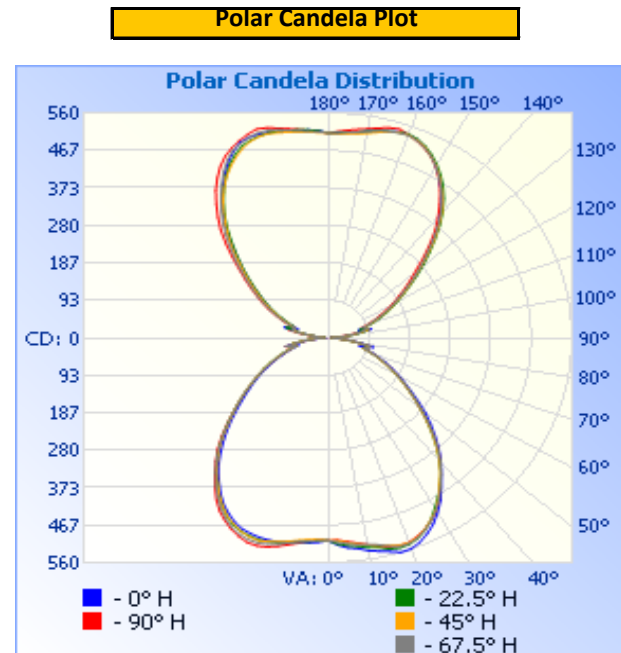
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (I)
Up/Down	120.02	293.2	34.96	0.994

Light Output (lm)	Lumen Efficacy (lm/W)
2866.4	82.0

**INTENSITY SUMMARY - CANDELA**

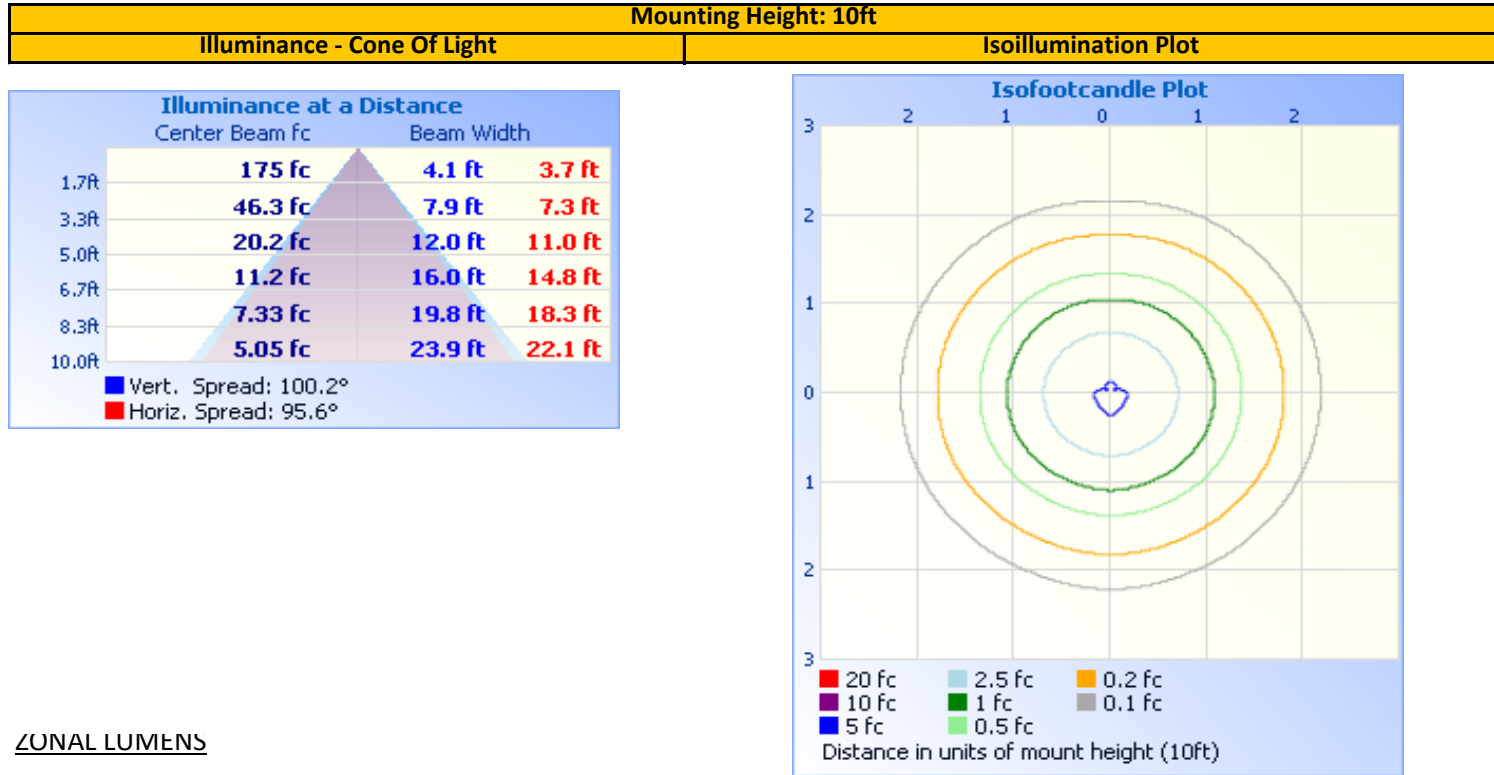
Angle	0	22.5	45	67.5	90
0	505	505	505	505	505
5	525	519	511	514	509
10	538	530	524	522	523
15	551	544	535	537	539
20	559	547	543	545	542
25	538	527	526	527	526
30	502	490	495	496	497
35	454	448	445	450	452
40	403	398	398	402	400
45	348	339	339	344	344
50	292	280	280	283	280
55	234	225	226	227	227
60	188	179	180	182	182
65	146	139	138	140	140
70	108	101	102	103	104
75	74	94	94	97	85
80	78	70	72	74	74
85	31	27	28	30	27
90	7	8	8	8	6
95	32	36	34	31	22
100	77	82	78	73	64
105	72	75	92	93	86
110	105	110	105	101	96
115	143	148	142	139	132
120	182	186	182	178	173
125	228	232	228	222	216
130	284	287	282	278	266
135	342	347	345	339	331
140	402	409	406	402	393
145	451	460	454	453	449
150	495	499	496	494	494
155	525	527	525	523	522
160	539	540	538	537	539
165	532	532	531	533	542
170	522	523	517	523	528
175	513	514	510	514	519
180	510	510	510	510	510

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	440.0	15.3%	0-10	49.2	1.7%
0-40	718.9	25.1%	10-20	151.3	5.3%
0-60	1,185.2	41.3%	20-30	239.5	8.4%
60-90	272.9	9.5%	30-40	278.9	9.7%
70-100	164.3	5.7%	40-50	261.7	9.1%
90-120	253.2	8.8%	50-60	204.5	7.1%
0-90	1,458.0	50.9%	60-70	140.6	4.9%
90-180	1,408.3	49.1%	70-80	94.0	3.3%
0-180	2,866.4	100.0%	80-90	38.2	1.3%
			90-100	32.0	1.1%
			100-110	89.5	3.1%
			110-120	131.7	4.6%
			120-130	193.3	6.7%
			130-140	251.0	8.8%
			140-150	273.9	9.6%
			150-160	236.9	8.3%
			160-170	150.6	5.3%
			170-180	49.4	1.7%

**INTEGRATING SPHERE TESTING**

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Test Configuration	Tested Model No.	Pass/Fail/NA
1	700BCDBS3H**-LED9**	NA

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

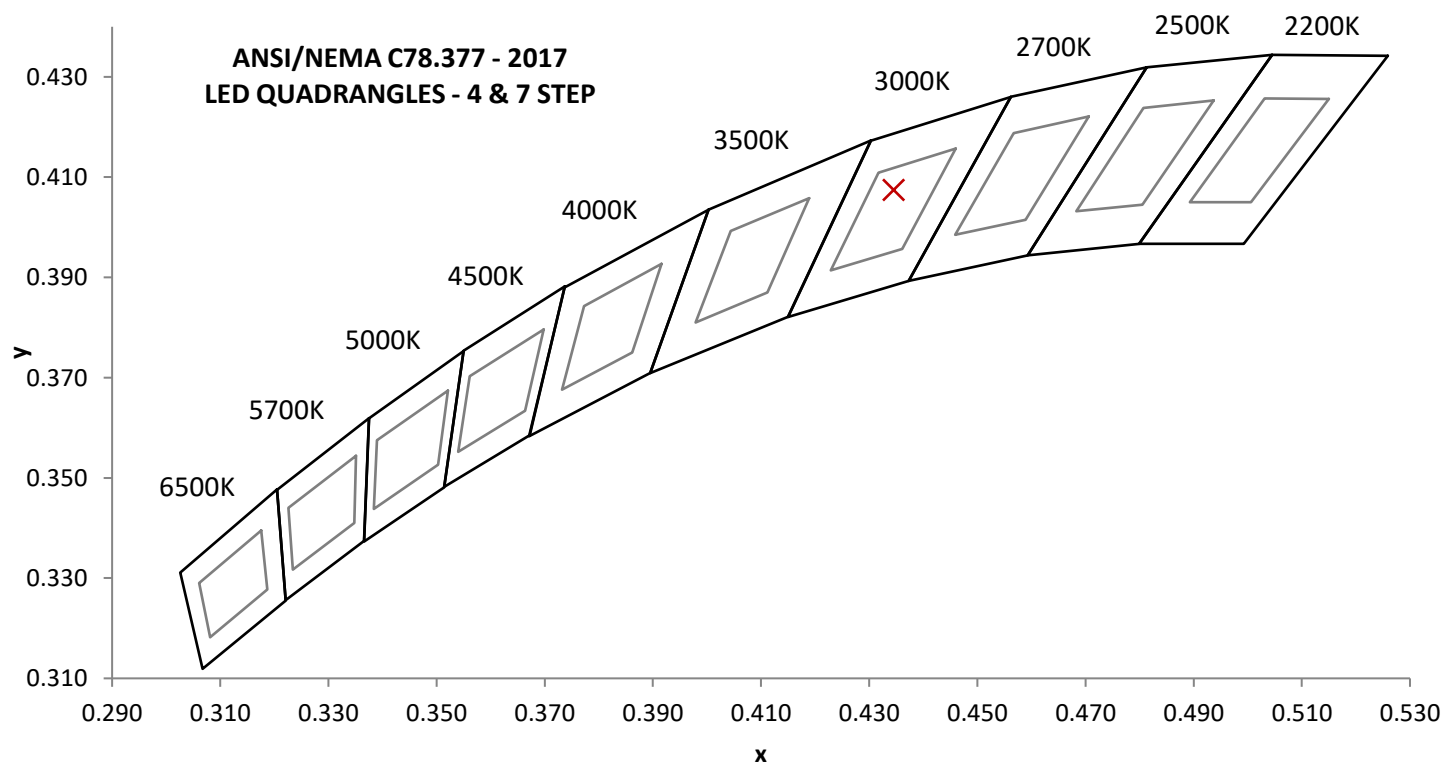
Base Orientation
Up/Down

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (I)	Input ATHD (%)
120.02	292.6	34.89	0.994	10.60
277.05	134.0	35.46	0.955	13.64

**Measured at 120.02(Vac)**

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra (I)	CRI - R9 (I)
2918.7	83.7	3068	91.8	54.8

Duv (I)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
0.0017	0.435	0.407	0.248	0.522

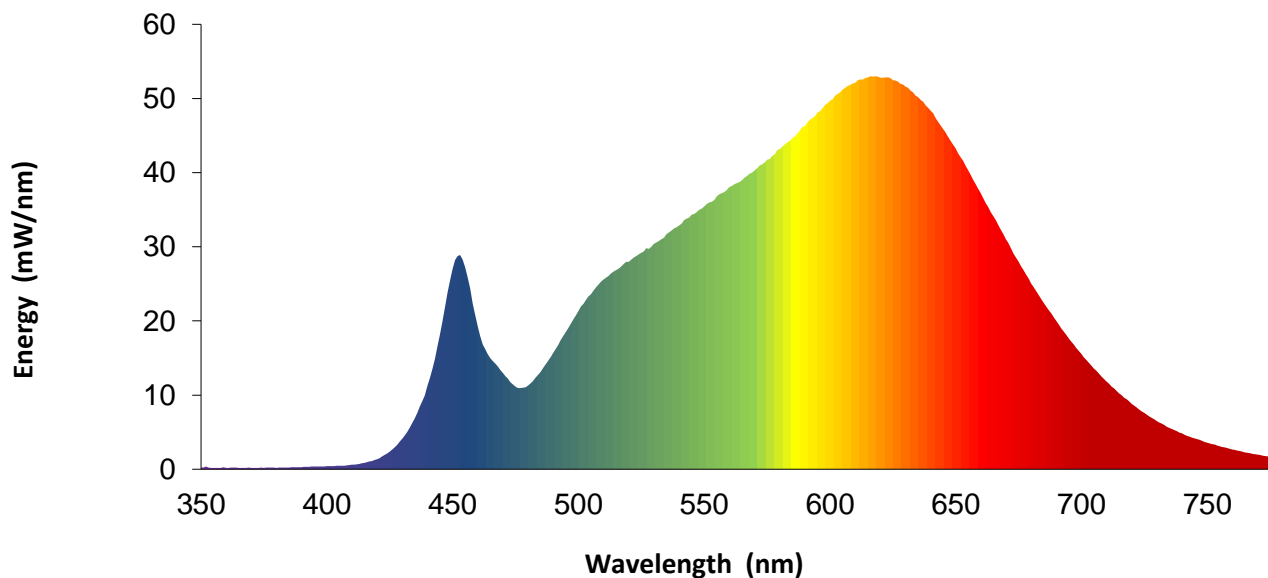


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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.2		460	19.3		570	40.3		680	25.1
355	0.2		465	15.0		575	41.8		685	22.4
360	0.2		470	13.0		580	43.2		690	20.0
365	0.2		475	11.1		585	44.7		695	17.7
370	0.2		480	11.3		590	46.3		700	15.5
375	0.2		485	13.1		595	48.1		705	13.6
380	0.2		490	15.7		600	49.7		710	11.8
385	0.2		495	18.5		605	51.2		715	10.2
390	0.3		500	21.3		610	52.1		720	8.8
395	0.4		505	23.6		615	52.9		725	7.6
400	0.4		510	25.6		620	52.8		730	6.5
405	0.5		515	26.8		625	52.5		735	5.6
410	0.6		520	28.0		630	51.6		740	4.8
415	0.9		525	29.2		635	50.2		745	4.1
420	1.3		530	30.4		640	48.3		750	3.6
425	2.3		535	31.7		645	45.9		755	3.1
430	4.1		540	32.9		650	43.3		760	2.7
435	6.9		545	34.3		655	40.3		765	2.3
440	11.3		550	35.5		660	37.2		770	2.0
445	18.2		555	36.8		665	34.1		775	1.7
450	27.0		560	38.0		670	31.0		780	1.4
455	27.3		565	39.0		675	28.0		---	---

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	WT210	146919	7/1/2021	7/1/2022
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	146379	4/13/2021	4/13/2022
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	146767	4/8/2021	4/8/2022
17	Omega thermometer	USB TC08	EQAH002615	4/6/2021	4/6/2022
26	Xitron Power Analyzer	XT-2640	CHI0611	6/9/2021	6/9/2022

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	700BCDBS3H**-LED9**	NA

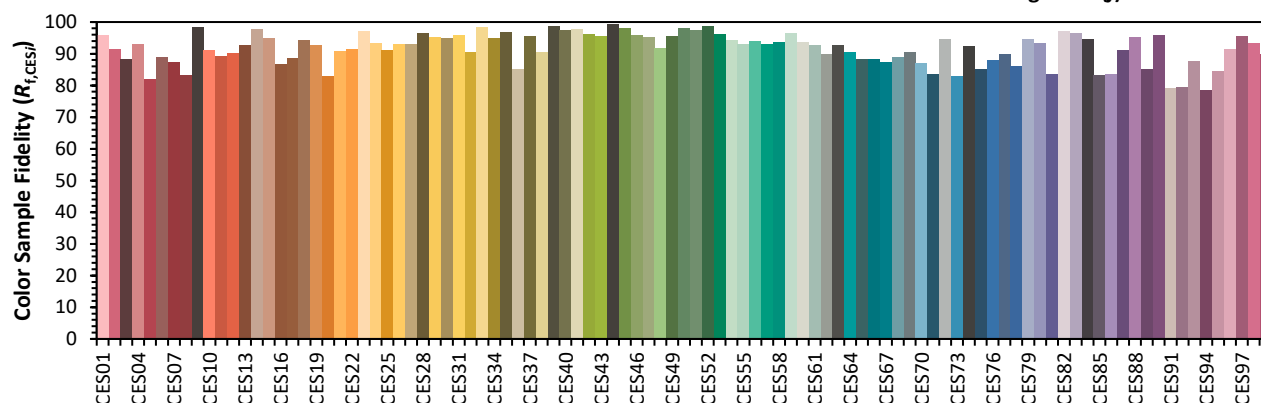
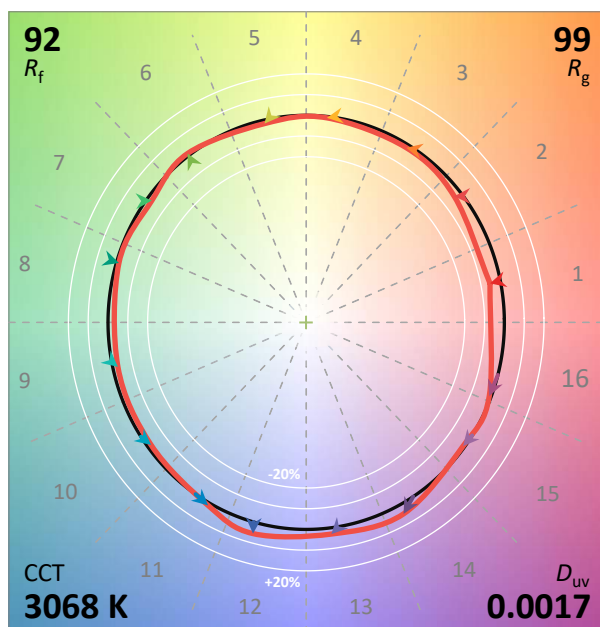
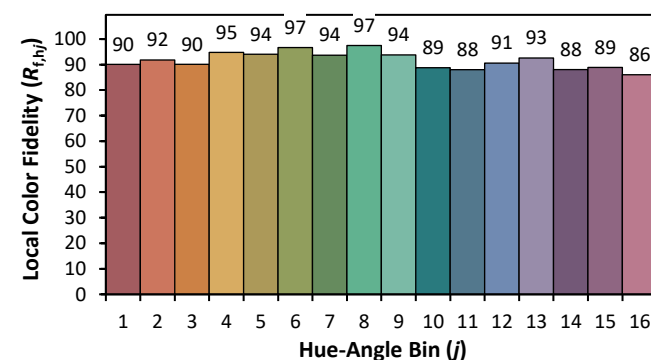
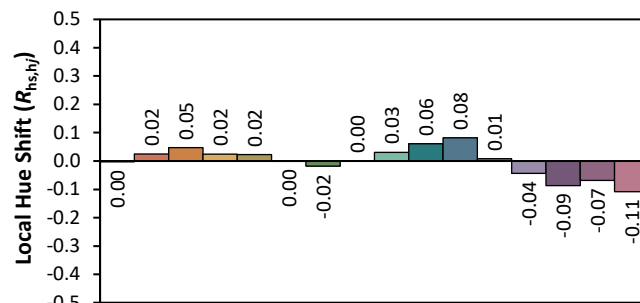
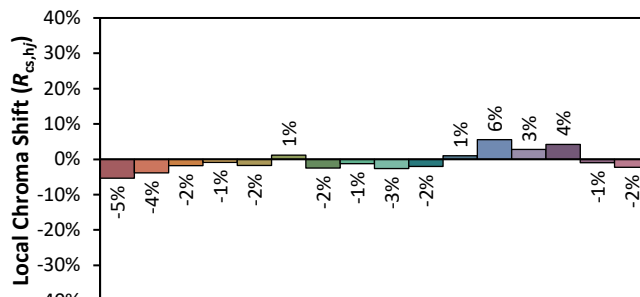
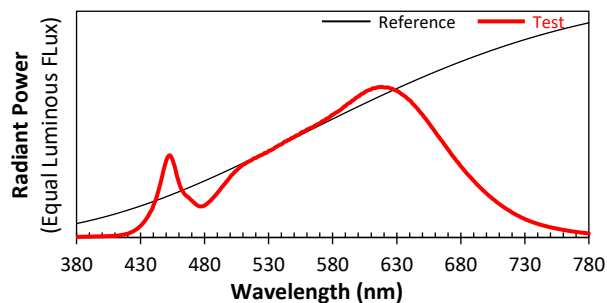
## ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: VISUAL COMFORT AND COMPANY

Date: 12/20/2021

Model: 700BCDBS3H\*\*-LED9\*\*



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

 $x$  0.4345 $y$  0.4074 $u'$  0.2476 $v'$  0.5223