

# VISUAL COMFORT AND COMPANY TEST REPORT

## SCOPE OF WORK

LED Performance Testing

## MODEL NUMBER

700FMHLO16NB-LED927

## PROJECT NUMBER

G104941221

## REPORT NUMBER

104941221CHI-023

## ISSUE DATE

5/11/2022

## REVISED DATE

None

## TEST DATES

2022-05-09 through 2022-05-10.

## DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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**REPORT NUMBER**

104941221CHI-023

**MODEL NUMBER(s)**

700FMHLO16NB-LED927

**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:



Nick Lau  
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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	AH05062022011728	700FMHLO16NB-LED927	Hilo 16 Flush Mount	Production	5/6/2022

## TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	700FMHLO16NB-LED927	1

## SAMPLE PHOTOS - TESTED CONFIGURATIONS



## SUMMARY

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### PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700FMHLO16NB-LED927
Product Description:	Hilo 16 Flush Mount
LED Model No.:	R9-DC-36V-XYX
Driver Model No.:	ISDU-D56-30W
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	1018.8	1064.2
Input Power (W) @ 120 (Vac)	29.95	30.01
Lumen Efficacy (lm/W)	34.0	35.5
Input Power Factor (I) @ 120 (Vac)	0.977	0.977

Criteria	Results
Input ATHD (%) @ 120 (Vac)	21.66
Correlated Color Temperature (K)	2460
Color Rendering Index - Ra (I)	92.7
Color Rendering Index - R9 (I)	61.1
Duv (I)	-0.0022
Chromaticity Coordinate (x)	0.476
Chromaticity Coordinate (y)	0.407
Chromaticity Coordinate (u')	0.275
Chromaticity Coordinate (v')	0.529

### 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	700FMHLO16NB-LED927	NA

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

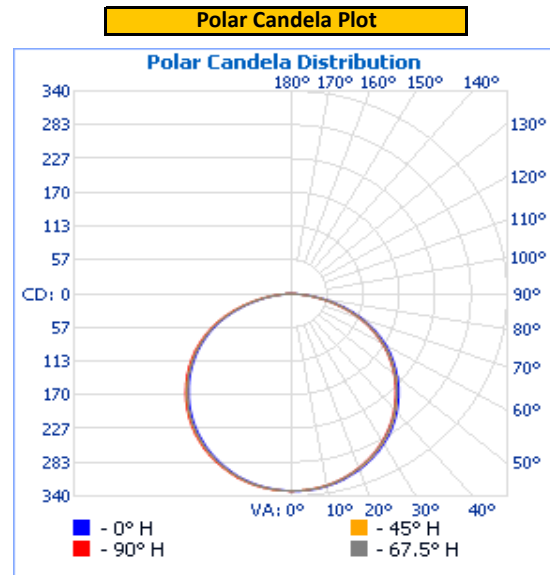
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ( )
Up	120.01	255.5	29.95	0.977

Light Output (lm)	Lumen Efficacy (lm/W)
1018.8	34.0

**INTENSITY SUMMARY - CANDELA**

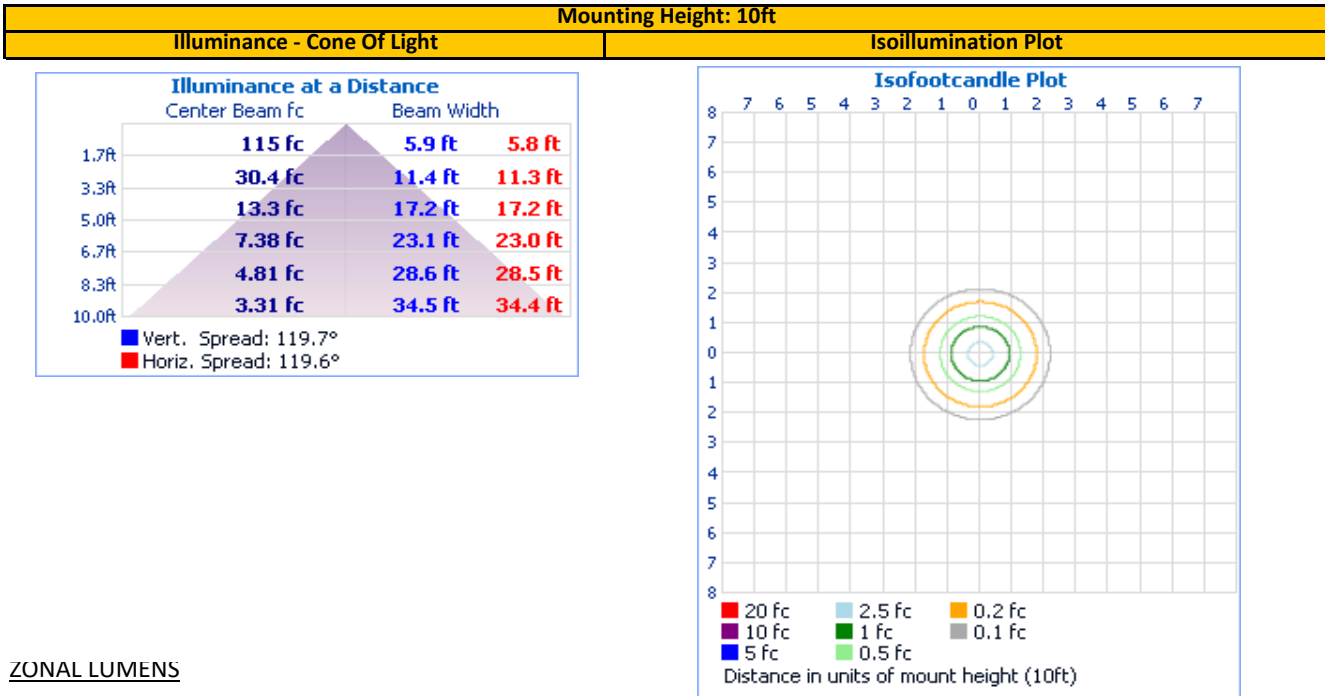
Angle	0	22.5	45	67.5	90
0	331.3	331.3	331.3	331.3	331.3
5	331.1	330.8	330.4	330.4	330.1
10	328.2	327.6	327.4	327.0	326.7
15	322.8	321.5	321.3	320.8	320.2
20	315.1	312.9	312.5	312.0	311.1
25	304.4	302.5	301.9	301.0	300.2
30	291.6	289.2	288.8	287.6	286.5
35	276.6	273.7	273.4	272.3	270.8
40	259.1	256.2	255.6	254.5	253.0
45	239.7	236.6	235.7	234.8	233.2
50	218.7	215.6	214.9	213.6	212.1
55	196.5	193.0	192.3	191.0	189.4
60	172.6	168.9	167.6	166.4	164.9
65	145.8	142.7	141.6	140.0	138.6
70	117.5	113.9	112.8	111.2	109.5
75	86.0	82.4	81.5	79.6	77.7
80	52.9	50.2	49.4	48.0	46.2
85	23.3	20.5	19.8	18.4	16.8
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	260.1	25.5%	90-100	0.0	0.0%
0-40	429.6	42.2%	10-20	90.4	8.9%
0-60	778.6	76.4%	20-30	138.3	13.6%
60-90	240.1	23.6%	30-40	169.5	16.6%
70-100	103.4	10.2%	40-50	179.9	17.7%
90-120	0.0	0.0%	50-60	169.1	16.6%
0-90	1,018.8	100.0%	60-70	136.7	13.4%
90-180	0.0	0.0%	70-80	82.4	8.1%
0-180	1,018.8	100.0%	80-90	21.0	2.1%
			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
1	700FMHLO16NB-LED927	NA

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

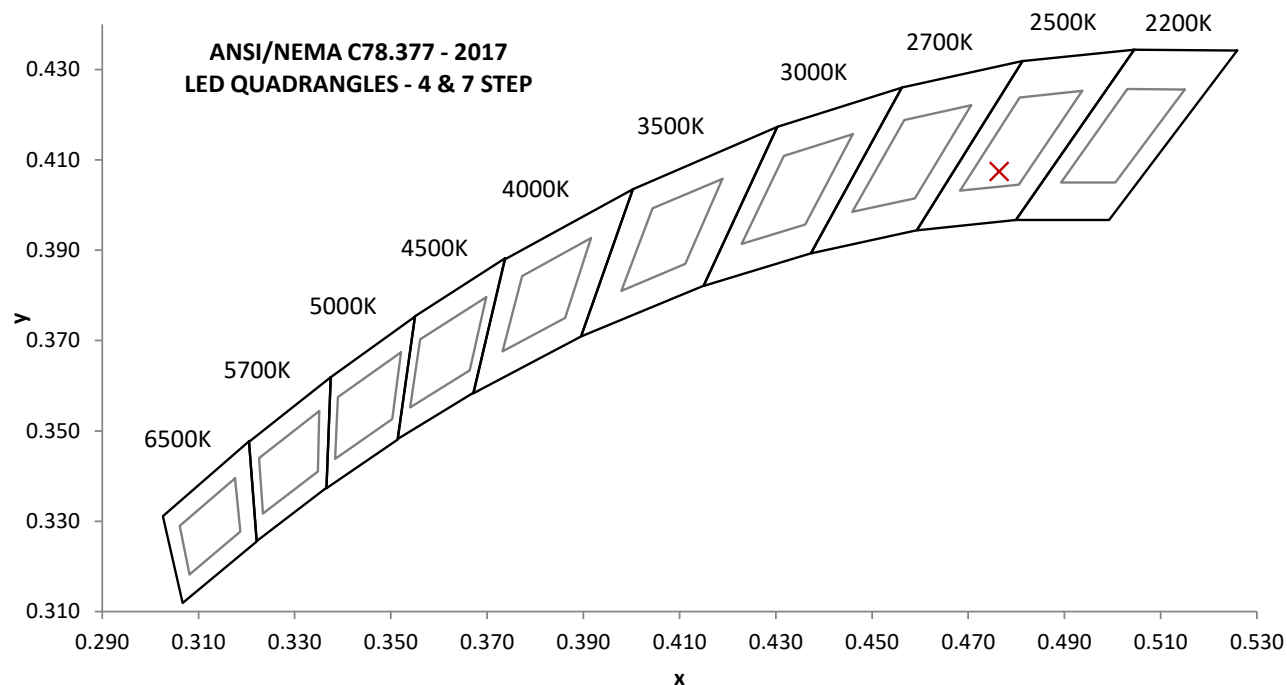
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ( )	Input ATHD (%)
120.06	255.9	30.01	0.977	21.66

Measured at 120.06(Vac)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra ( )	CRI - R9 ( )
1064.2	35.5	2460	92.7	61.1

Duv ( )	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
-0.0022	0.476	0.407	0.275	0.529

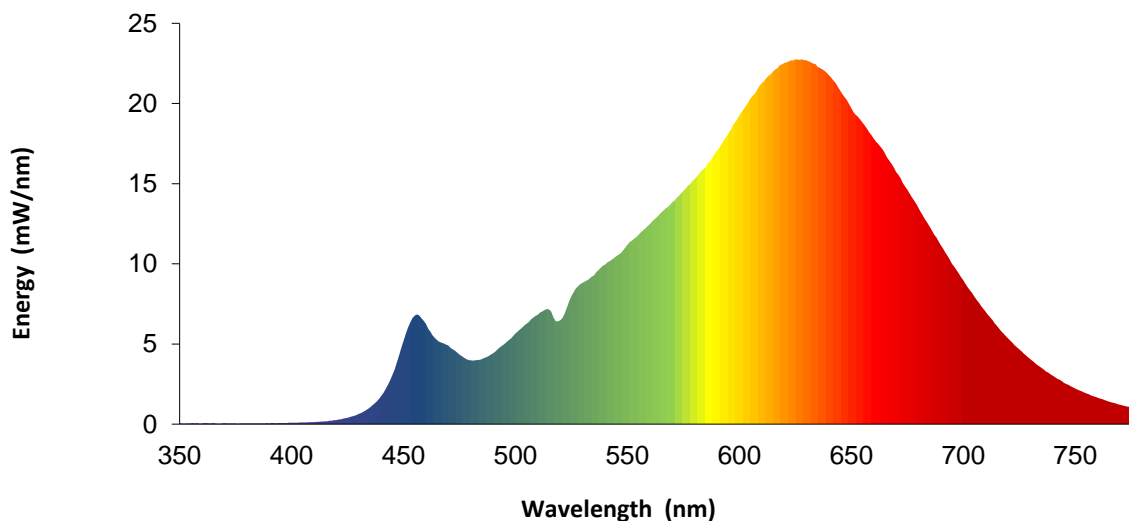


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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.1		460	6.2		570	13.8		680	13.5
355	0.1		465	5.2		575	14.5		685	12.3
360	0.0		470	4.9		580	15.3		690	11.2
365	0.1		475	4.3		585	16.0		695	10.0
370	0.1		480	4.0		590	17.1		700	9.0
375	0.1		485	4.1		595	18.1		705	7.9
380	0.0		490	4.4		600	19.2		710	7.0
385	0.1		495	5.0		605	20.3		715	6.1
390	0.1		500	5.6		610	21.3		720	5.3
395	0.1		505	6.3		615	22.0		725	4.7
400	0.1		510	6.8		620	22.5		730	4.1
405	0.1		515	7.2		625	22.8		735	3.5
410	0.1		520	6.5		630	22.7		740	3.0
415	0.2		525	8.0		635	22.3		745	2.6
420	0.3		530	8.8		640	21.8		750	2.2
425	0.4		535	9.3		645	20.8		755	1.9
430	0.6		540	10.0		650	19.7		760	1.7
435	1.0		545	10.5		655	18.8		765	1.4
440	1.8		550	11.2		660	17.8		770	1.2
445	3.1		555	11.8		665	16.9		775	1.0
450	5.2		560	12.5		670	15.7		780	0.9
455	6.8		565	13.2		675	14.6		---	---

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	VBV	VBV
4	Newport Thermohygrometer	iServer	CHI0452	2/3/2022	2/3/2023
5	Chroma Power Supply	61604	CHI0371	VBV	VBV
8	Newport Humidity Recorder	iServer	146961	9/21/2021	9/21/2022
9	Labsphere Spectroradiometer	CDS2600	CHI0539	VBV	VBV
10	3 Meter Sphere	SPR600	CHI0088	VBV	VBV
11	Elgar AC Power Supply	CW1251	146112	VBV	VBV
12	Sorenson DC Power Supply	XFR150-8	146846	VBV	VBV
13	Yokogawa Power Meter	WT1600	146767	4/4/2022	4/4/2023
17	Omega thermometer	USB TC08	EQAH002615	4/5/2022	4/5/2023
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

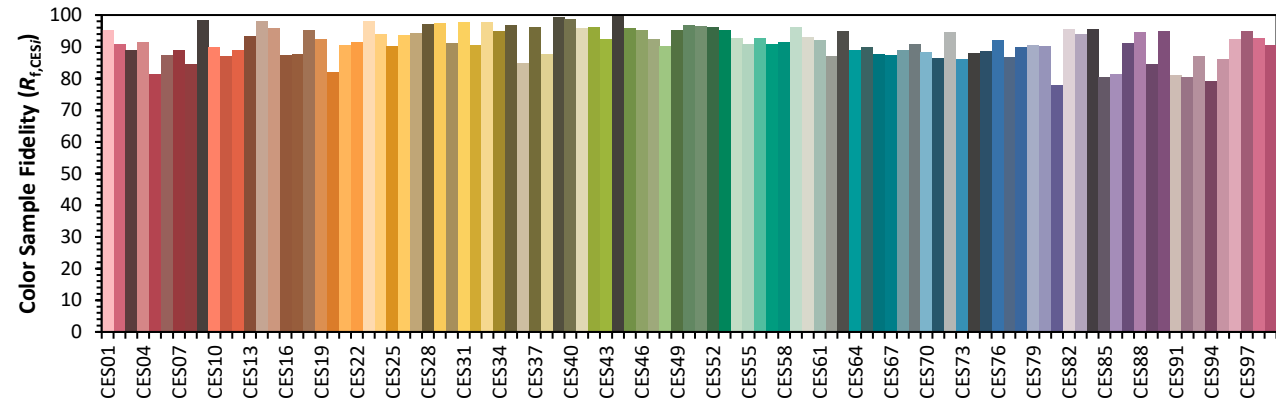
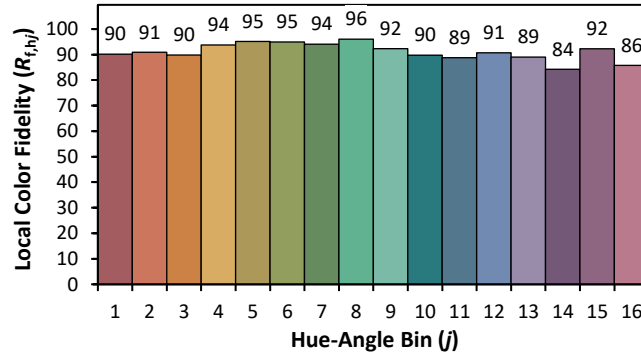
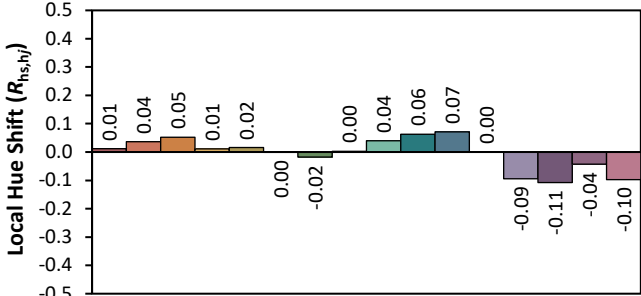
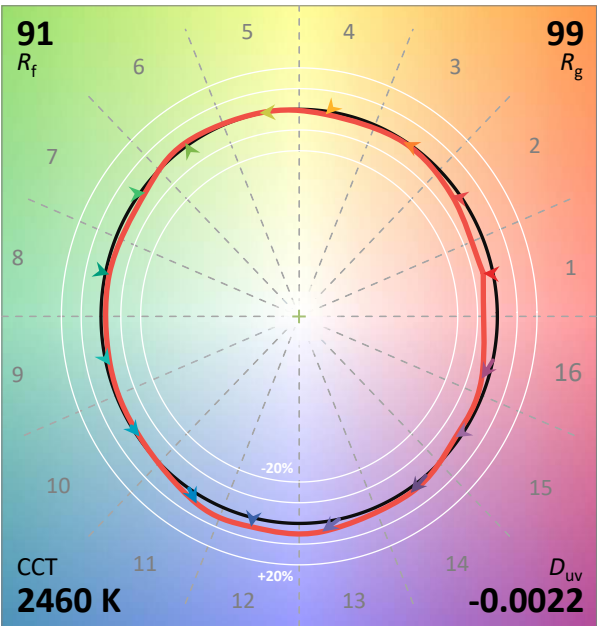
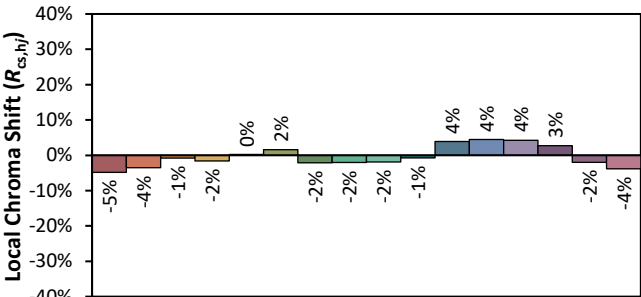
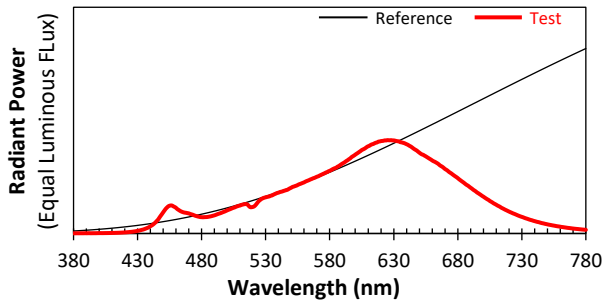
**REVISION HISTORY**

#	Revision Date	Updated By	Reviewed By	Description of Change
---	None	---	---	---
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Test Configuration	Tested Model No.	Pass/Fail/NA
1	700FMHLO16NB-LED927	NA

ANSI/IES TM-30-18 Color Rendition Report

Source:	User SPD	Manufacturer:	VISUAL COMFORT AND COMPANY
Date:	5/9/2022	Model:	700FMHLO16NB-LED927



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

x 0.4764  
y 0.4074  
u' 0.2748  
v' 0.5286