

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

ESSF0606D482509W3018WW1

PROJECT NUMBER

G104349704

REPORT NUMBER

104349704CHI-076

ISSUE DATE

4/14/2021

REVISED DATE

None

TEST DATES

04/13/2021.

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104349704CHI-076

MODEL NUMBER

ESSF0606D482509W3018WW1

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-01080748-3.

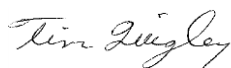
TEST STANDARDS

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

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

In Charge of Testing:



Tim Quigley
Project Engineer
Lighting Division

Reviewer:



Jeff Davis
N.A. Technical Lead
Lighting Division

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SAMPLE INFORMATION**REPORT NO. 104349704CHI-076****ITEMS RECEIVED**

Item No.	Control No.	Model No.	Description	Type	Received
1	AH04082021114642-004	ESSF0606D482509W301 8WW1	WARM DIM 350LM/FT 0606 WHITE	Production	4/8/2021

TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	ESSF0606D482509W3018WW1	1

SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	ESSF0606D482509W3018WW1
Product Description:	WARM DIM 350LM/FT 0606 WHITE
LED Model No.:	U series
Driver Model No.:	NA
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	789.0	813.4
Input Power (W) @ 24 (Vdc)	14.79	14.76
Lumen Efficacy (lm/W)	53.3	55.1
Input Power Factor (I) @ 24 (Vdc)	--	--

Criteria	Results
Input ATHD (%) @ 24 (Vdc)	--
Correlated Color Temperature (K)	2969
Color Rendering Index - Ra (I)	98.3
Color Rendering Index - R9 (I)	97.4
Duv (I)	0.0009
Chromaticity Coordinate (x)	0.438
Chromaticity Coordinate (y)	0.403
Chromaticity Coordinate (u')	0.252
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

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Test Configuration	Tested Model No.	Pass/Fail/NA
1	ESSF0606D482509W3018WW1	NA

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

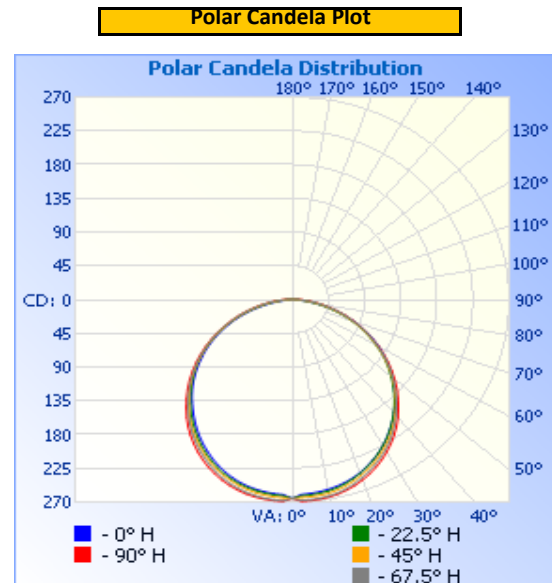
Base Orientation	Input Voltage (Vdc)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	24.00	616.0	14.79	--

Light Output (lm)	Lumen Efficacy (lm/W)
789.0	53.3

INTENSITY SUMMARY - CANDELA

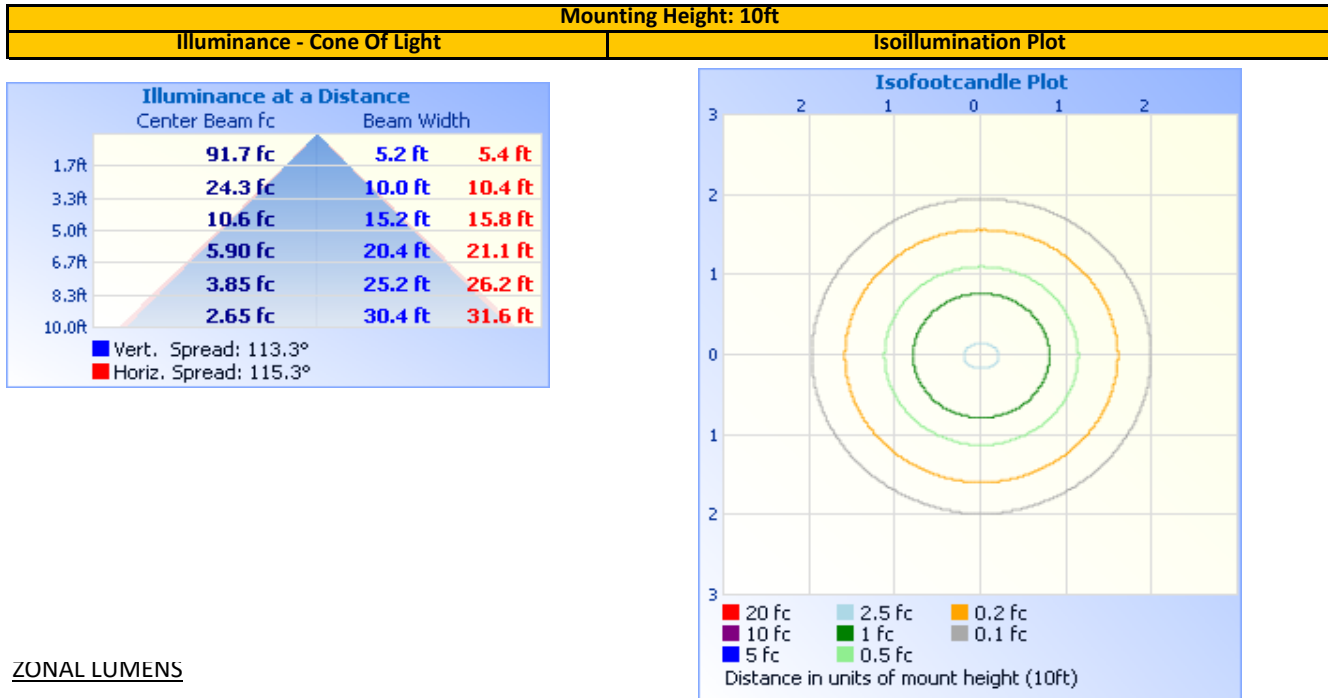
Angle	0	22.5	45	67.5	90
0	265	265	265	265	265
5	259	261	264	268	269
10	257	259	262	266	267
15	253	254	257	261	263
20	246	246	250	253	256
25	236	237	240	243	246
30	225	225	228	232	235
35	212	212	215	217	221
40	197	196	199	201	204
45	180	179	182	183	186
50	163	161	162	164	167
55	143	142	142	144	146
60	123	120	121	122	124
65	102	98	99	100	102
70	78	76	77	79	80
75	55	53	55	57	58
80	33	31	34	37	38
85	13	13	17	20	21
90	1	2	6	9	10
95	0	0	1	2	3
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	208.5	26.4%	90-100	2.0	0.3%
0-40	342.7	43.4%	100-110	0.0	0.0%
0-60	610.3	77.4%	110-120	0.0	0.0%
60-90	176.7	22.4%	120-130	0.0	0.0%
70-100	80.0	10.1%	130-140	0.0	0.0%
90-120	2.0	0.3%	140-150	0.0	0.0%
0-90	787.0	99.7%	150-160	0.0	0.0%
90-180	2.0	0.3%	160-170	0.0	0.0%
0-180	789.0	100.0%	170-180	0.0	0.0%

INTEGRATING SPHERE TESTING

REPORT NO. 104349704CHI-076

Test Configuration	Tested Model No.	Pass/Fail/NA
1	ESSF0606D482509W3018WW1	NA

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

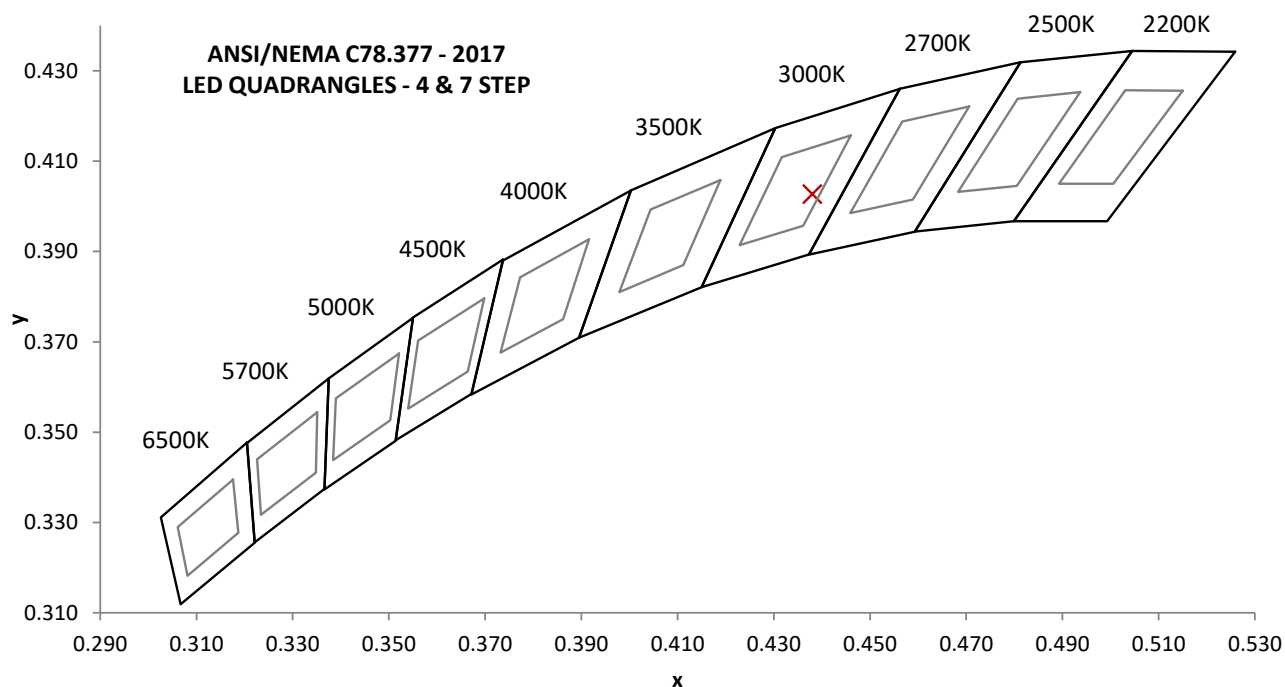
Base Orientation
Up

Input Voltage (Vdc)	Input Current (mA)	Input Power (W)	Input Power Factor ()	Input ATHD (%)
24.00	614.9	14.76	--	--

Measured at 24(Vdc)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra ()	CRI - R9 ()
813.4	55.1	2969	98.3	97.4

Duv ()	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
0.0009	0.438	0.403	0.252	0.521

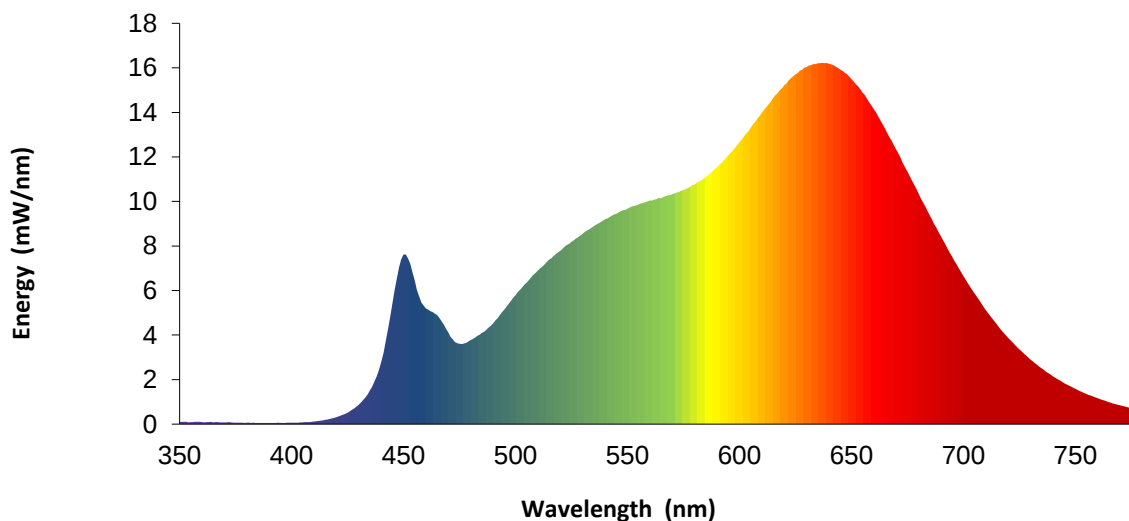


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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.1		460	5.2		570	10.3		680	10.4
355	0.1		465	4.9		575	10.5		685	9.4
360	0.1		470	4.1		580	10.8		690	8.4
365	0.1		475	3.6		585	11.1		695	7.5
370	0.1		480	3.8		590	11.5		700	6.7
375	0.1		485	4.1		595	12.1		705	5.9
380	0.1		490	4.5		600	12.7		710	5.1
385	0.1		495	5.1		605	13.3		715	4.5
390	0.1		500	5.8		610	14.0		720	3.9
395	0.1		505	6.4		615	14.6		725	3.4
400	0.1		510	6.9		620	15.2		730	2.9
405	0.1		515	7.4		625	15.7		735	2.5
410	0.1		520	7.8		630	16.0		740	2.2
415	0.2		525	8.2		635	16.2		745	1.8
420	0.3		530	8.5		640	16.2		750	1.6
425	0.5		535	8.9		645	15.9		755	1.4
430	0.9		540	9.2		650	15.5		760	1.2
435	1.5		545	9.4		655	14.9		765	1.0
440	2.8		550	9.7		660	14.1		770	0.8
445	5.4		555	9.9		665	13.3		775	0.7
450	7.6		560	10.0		670	12.3		780	0.6
455	6.4		565	10.1		675	11.4		---	---

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	7/1/2020	7/1/2021
2	Omega Thermometer	DPI8-C24	146920	10/1/2020	10/1/2021
3	LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU
4	Newport Thermohygrometer	iServer	146957	1/29/2021	1/29/2022
6	Sorenson DC Power Supply	XHR 150-7	146922	VBU	VBU
8	Newport Humidity Recorder	iServer	146961	9/3/2020	9/3/2021
21	Labsphere 2M Sphere & Spectroradiometer	CDS1100	146137	VBU	VBU
23	Sorenson DC Power Supply	XFR150-8	146847	VBU	VBU
24	Yokogawa Power Meter	WT1600	146767	10/2/2020	10/2/2021
25	Omega Thermometer	MDSi8	146873	7/1/2020	7/1/2021
26					
27					
28					
29					
30					

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	ESSF0606D482509W3018WW1	NA

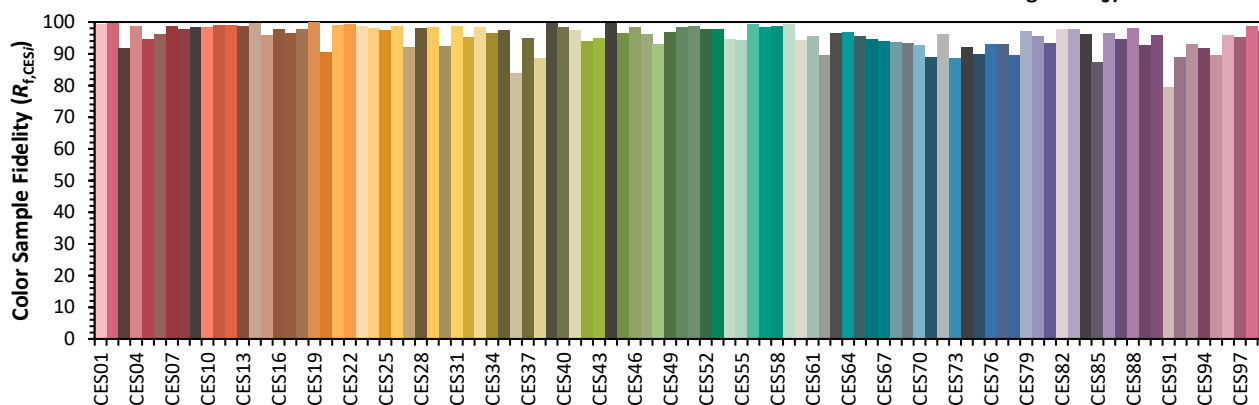
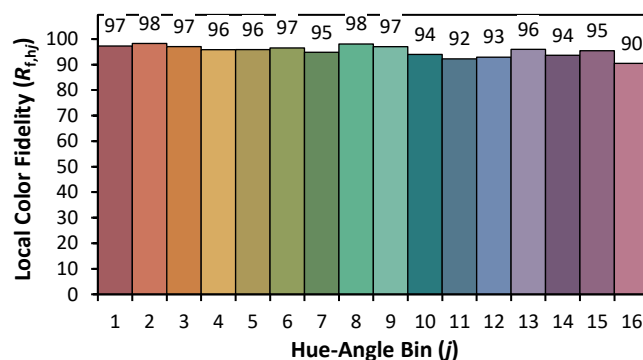
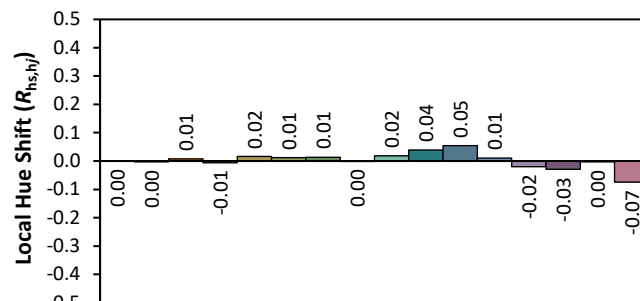
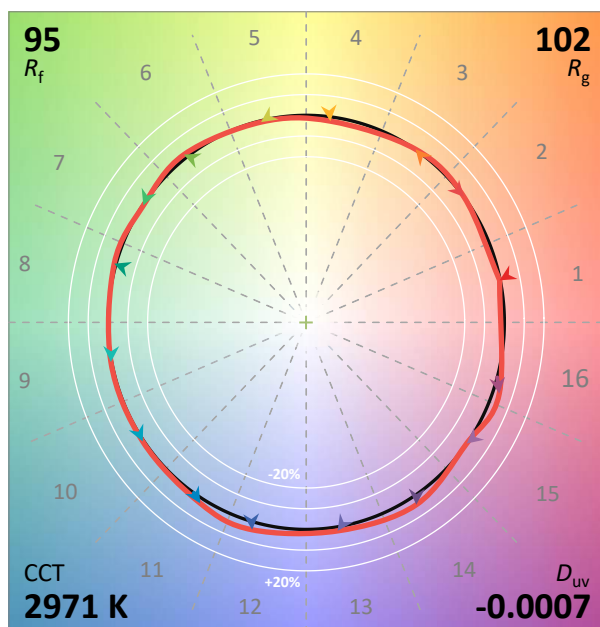
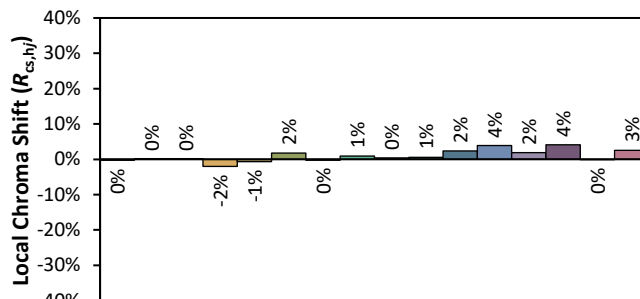
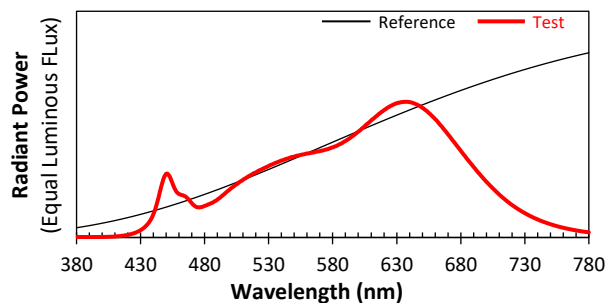
ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: VISUAL COMFORT AND COMPANY

Date: 4/13/2021

Model: ESSF0606D482509W3018WW1



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

x 0.4380

y 0.4027

u' 0.2518

v' 0.5210