



ShenZhen Xin An Biao Technology Service Co. Ltd Testing Center

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Energy Star Test Report

For

L-TECH CORPORATION

(Brand Name:N/A)

Shaogangtou District, Qiaotou Town, Dongguan City

Model name(s):
ULD16-5CT

Report Type: Testing and Report According to ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2

Type of Luminaire: Inseparable Other SSL Luminaire

Report Date: 2021-04-20

Test & Report By:

Garman Mo

Engineer: Garman Mo

Review By:

Johnson Sun

Manager: Johnson Sun

Note: 1.The results contained in this report pertain only to the tested samples.

2.This report does not imply product certification, approval, or endorsement by A2LA or any agency of the Federal Government.

3.This report contains data that are not covered by the A2LA accreditation.

Project No.:JCE210313 Report No.:JCE210313-H

Report Format Number STP-QP019-103-A/1

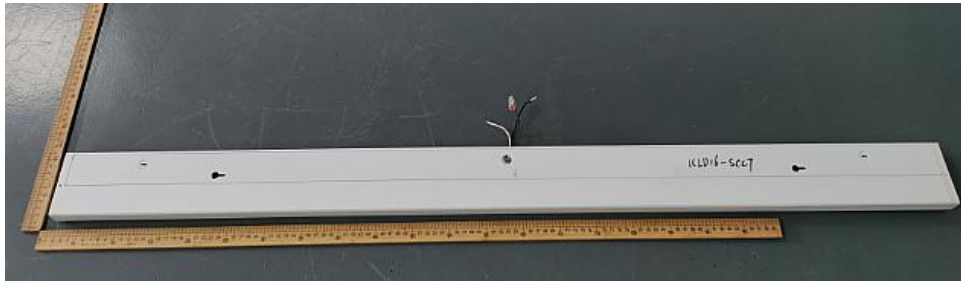
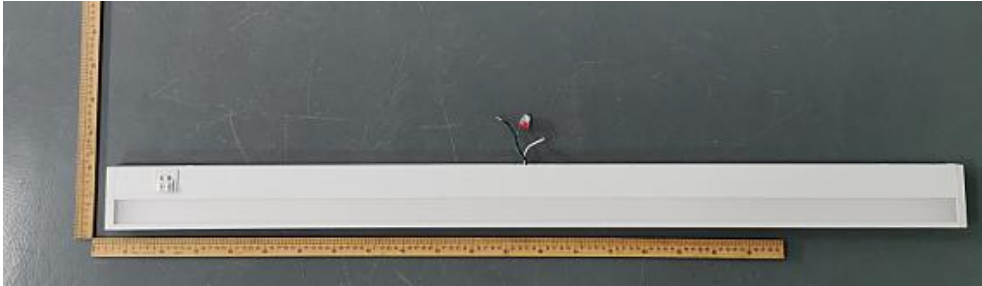
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1.1 Product Information:		
Model Number	ULD16-5CT	
Remark	According to the test data, 2700K is the most consumptive mode.	
Representative (Tested) Model	ULD16-5CT(Mode:2700K) ULD16-5CT(Mode:3000K) ULD16-5CT(Mode:3500K) ULD16-5CT(Mode:4000K) ULD16-5CT(Mode:5000K)	
Model Difference	N/A	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Inseparable Other SSL Luminaire	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series	
Dimming	10%-100%	
Sample Number	JCE210313-H1	
Date of Receipt	2021-04-05	
Luminaire Aperture (for Downlight retrofits)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

1.2 Rated Values:	
Rated Voltage / Frequency	120V,50/60Hz
Nominal Power	21W
Rated Initial Lamp Lumen	--
Declared CCT	2700K,3000K,3500K,4000K,5000K

1.3 Product Photos



1.4 Test Specifications:

Test item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters 8. Color Angular Uniformity 9. Dimming 10. Flicker 11. Operating Frequency 12. Starting Time 13. Transient Protection Test 14. In-Situ Temperature Measurement Test 15. Standby Power Consumption
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2015 Specifications for the Chromaticity of Solid State Lighting Products 3. C82.77-10:2014 American National Standard for Lighting Equipment-Harmonic Emission Limits-Related Power Quality Requirements 4. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 5. CIE 15-2004 Technical Report Colorimetry 6. UL1993 4th Edition, Self-Ballasted Lamps and Lamp Adapters 7. ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) – Version 2.2 8. ANSI/IEEE C62.41.2:2002 IEEE Recommended Practice on Characterization of Surges in Low-Voltage(1000V and Less) AC Power Circuits 9. IEC 62301:2011 Household electrical appliances - Measurement of standby power 10. NEMA 77-2017 Standard for Temporal Light Artifacts: Test Methods and Guidance for Acceptance Criteria
Remark	<p>Below test and data are not covered by A2LA accreditation:</p> <ul style="list-style-type: none"> - Operating Frequency - Noise

1.5 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

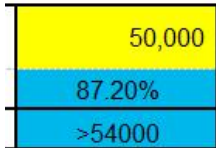
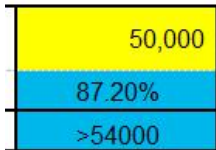
2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Summary of Test Result

Criteria Item	The Type of Luminaires	Requirement (ES for Luminaires V2.2)	Measured Value	Status
Input Wattage	All	\leq Rated Wattage	19.72W	Pass
Luminous Efficacy	Inseparable Other SSL Luminaire	≥ 70 lm/W	84.64lm/W	Pass
Luminaire Minimum Light Output	Inseparable Other SSL Luminaire	≥ 200 lumens	1668.8lm	Pass
Correlated Color Temperature (CCT)	Inseparable Other SSL Luminaire	Shall be capable of providing at least one of the following nominal correlated color temperatures (CCTs): • 2700 Kelvin • 3000 Kelvin • 3500 Kelvin • 4000 Kelvin • 5000 Kelvin	2731K Duv=-0.0011	Pass
Color Rendering Index (CRI)	Inseparable Other SSL Luminaire	$R_a \geq 80$ $R_9 > 0$	$R_a = 93.7$ $R_9 = 61$	Pass
Lumen Maintenance	Solid State Option 1:	L70 lumen maintenance: $\geq 25,000$ hours for indoor $\geq 35,000$ hours for outdoor $\geq 50,000$ hours for inseparable luminaires		Pass
Light Source Life	Solid State	L70 lumen maintenance: $\geq 25,000$ hours for indoor $\geq 35,000$ hours for outdoor $\geq 50,000$ hours for inseparable luminaires		Pass
Color Maintenance	Inseparable Other SSL Luminaire	$\Delta u'v' \leq 0.007$	Max. 0.00687 in LM-80 report*	Pass
Source Start Time	Inseparable Other SSL Luminaire	< 750 ms	42.0ms	Pass

Power Factor	Solid State	Total luminaire input power ≤ 5 watts: PF ≥ 0.5 Total luminaire input power > 5 watts: PF ≥ 0.7	0.9765	Pass
Transient Protection	Solid State	The line transient shall consist of seven strikes of a 100 kHz ring wave, 2.5 kV level, for both common mode and differential mode.	Survival	Pass
Standby Power Consumption	All Luminaires	Luminaires shall not draw power in the off state.	0 W	Pass
Operating Frequency	Solid State	Frequency ≥ 120 Hz	120.000Hz	Pass
Maximum Measured Driver Case Temperature	Solid State	shall not exceed the driver manufacturer's maximum recommended temperature during in situ operation. ≤ 105 °C	37.6°C	Pass
Maximum In-Situ Source Temperature	Solid State	Maximum permitted Ts temperature for L70 \geq 50,000 hrs ≤ 105 °C	39.9°C	Pass
Dimming	Solid State	The luminaire and its components shall provide continuous dimming from 100% to 20% of total light output. Luminaire shall not emit noise above 24dBA at 1 meter or less at the minimum output.	Validated	Pass
CCT	Solid State	Packaging shall clearly describe the nominal color designation in units of Kelvin (e.g. 2700K, 3000K).	2700K,3000K, 3500K,4000K, 5000K	Pass

Note: The information or data with an “*” are provided by the manufacturer.

Our laboratory has no responsibility for the decision of compliance with specification that based on the data or information with the “*”.

2.2.1 Electrical, Photometric and Chromaticity Measurements	IES LM-79 2008
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Test date	2021-04-09	Test Ambient:	25 ± 1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ULD16-5CT(Mode:2700K)	Total Operating Time (min)	75

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
JCE210313-H1	120.1	60	0.1681	19.72	0.9765

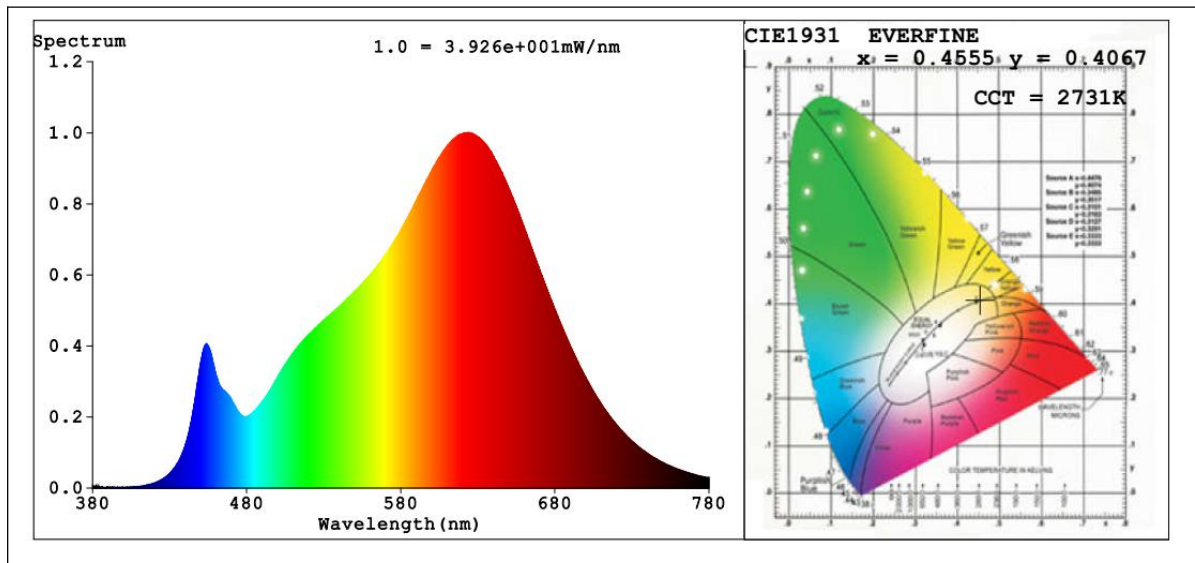
Sphere-Spectroradiometer Method(Self-absorption:1.1206):

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	93.7
R9	61
CCT (K)	2731
Duv	-0.0011

Goniophotometer Method(Test Distance:26.000m):

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1668.8
Luminous Efficacy (lm/W)	84.64
Beam Angle°	99.1
Center Beam Candle Power (cd)	675

Spectral Power Distribution and Chromaticity Diagram



Colorimetric Parameters

Colorimetric Parameters

Chromaticity Coordinate: $x=0.4555$ $y=0.4067$ / $u'=0.2614$ $v'=0.5252$ $Du, Dv: 0.0003, -0.0010$

CCT=2731K ($Duv=-0.0011$) Dominant WL: $\lambda_d = 584.4 \text{ nm}$ Purity=58.8%

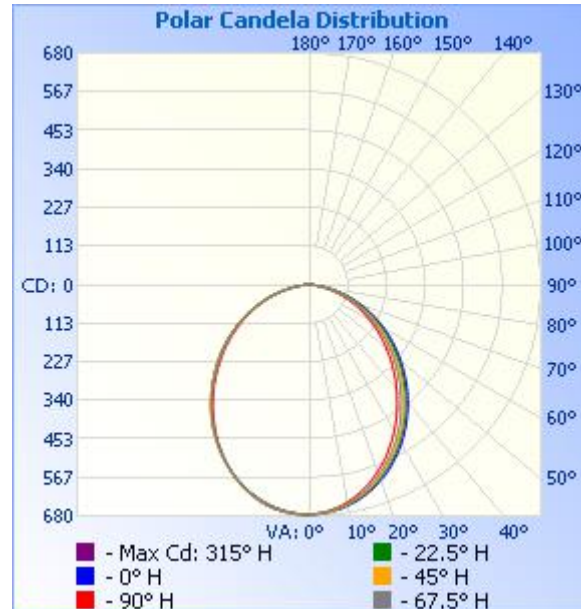
Peak WL: $\lambda_p = 623.9 \text{ nm}$ FWHM=143.0nm

Render Index: $R_a = 93.7$ Render Index: AvgR =91.5

R1 =95 R2 =98 R3 =98 R4 =94 R5 =95 R6 =97 R7 =91

R8 =82 R9 =61 R10=95 R11=96 R12=86 R13=96 R14=100 R15=90

Zonal Lumen Tabulation



Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	505.7	30.3%
0-40	808.8	48.5%
0-60	1,362.5	81.7%
60-90	306.1	18.3%
70-100	121.2	7.3%
90-120	0.0	0%
0-90	1,668.6	100%
90-180	0.0	0%
0-180	1,668.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	63.6	3.8%	90-100	0.0	0%
10-20	179.2	10.7%	100-110	0	0%
20-30	262.9	15.8%	110-120	0	0%
30-40	303.1	18.2%	120-130	0	0%
40-50	298.1	17.9%	130-140	0.0	0%
50-60	255.6	15.3%	140-150	0.0	0%
60-70	184.9	11.1%	150-160	0.0	0%
70-80	98.9	5.9%	160-170	0.0	0%
80-90	22.3	1.3%	170-180	0.0	0%



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	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
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Certificate #4703.03

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95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Project No.:JCE210313 Report No.:JCE210313-H

Report Format Number STP-QP019-103-A/1

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180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.2 Electrical, Photometric and Chromaticity Measurements	IES LM-79 2008
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Test date	2021-04-09	Test Ambient:	25 ± 1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ULD16-5CT(Mode:3000K)	Total Operating Time (min)	61

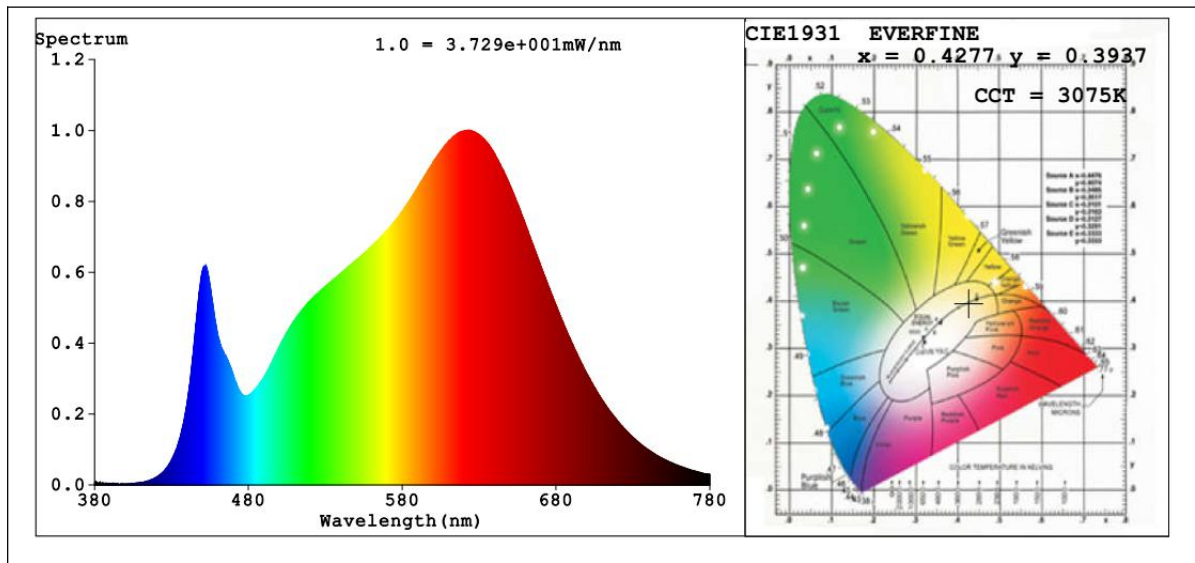
Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
JCE210313-H1	120.0	60	0.1696	19.79	0.9724

Sphere-Spectroradiometer Method(Self-absorption:1.1206):

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	95.0
R9	70
CCT (K)	3075
Duv	-0.0029
Total Luminous (lm)	1782
Luminous Efficacy (lm/W)	90.05

Spectral Power Distribution and Chromaticity Diagram



Colorimetric Parameters

Colorimetric Parameters

Chromaticity Coordinate: $x=0.4277, y=0.3937, u'=0.2491, v'=0.5158$ $Du, Dv: 0.0011, -0.0027$

$\text{CCT}=3075\text{K} (\text{Duv}=-0.0029)$ Dominant WL: $\lambda_d = 583.6\text{nm}$ Purity=46.5%

Peak WL: $\lambda_p = 623.4\text{nm}$ FWHM=164.5nm

Render Index: $R_a = 95.0$ Render Index: AvgR = 92.9

R1 = 96 R2 = 98 R3 = 98 R4 = 95 R5 = 96 R6 = 96 R7 = 93

R8 = 86 R9 = 70 R10 = 95 R11 = 96 R12 = 84 R13 = 97 R14 = 99 R15 = 93

2.2.3 Electrical, Photometric and Chromaticity Measurements	IES LM-79 2008
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Test date	2021-04-09	Test Ambient:	25 ± 1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ULD16-5CT(Mode:3500K)	Total Operating Time (min)	61

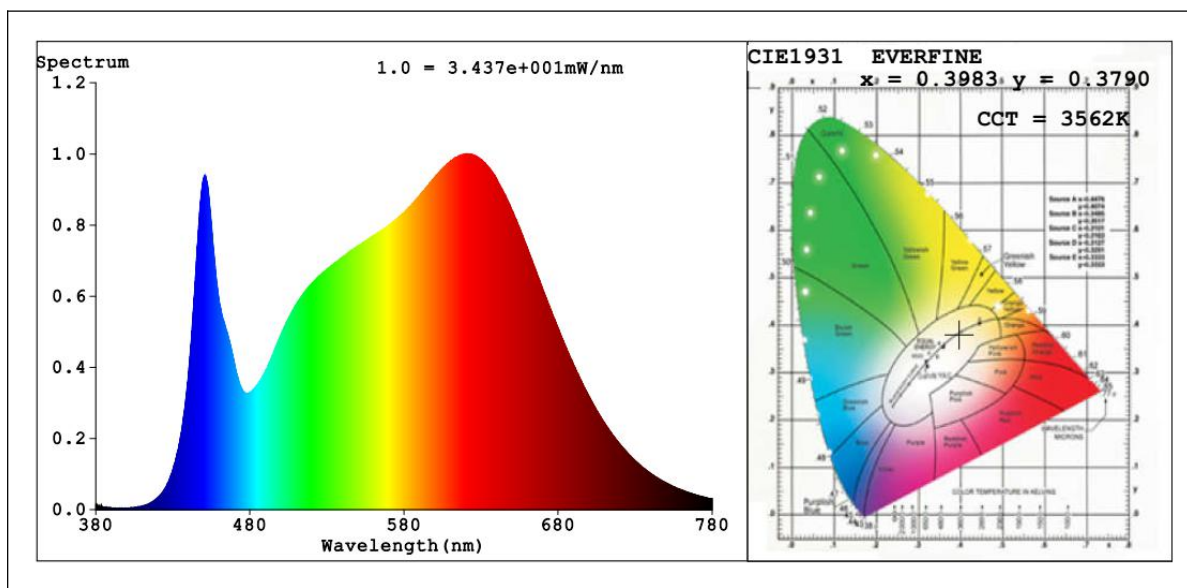
Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
JCE210313-H1	120.0	60	0.1693	19.76	0.9724

Sphere-Spectroradiometer Method(Self-absorption:1.1206):

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	95.4
R9	76
CCT (K)	3562
Duv	-0.0037
Total Luminous (lm)	1831
Luminous Efficacy (lm/W)	92.66

Spectral Power Distribution and Chromaticity Diagram



Colorimetric Parameters

Colorimetric Parameters

Chromaticity Coordinate: $x=0.3983, y=0.3790, u'=0.2360, v'=0.5052$ $Du, Dv: 0.0018, -0.0032$

$\text{CCT}=3562\text{K} (\text{Duv}=-0.0037)$ Dominant WL: $\text{Ld} = 582.5\text{nm}$ Purity=33.3%

Peak WL: $\text{Lp}=620.8\text{nm}$ FWHM=180.1nm

Render Index: $\text{Ra}=95.4$ Render Index: $\text{AvgR} = 93.3$

R1 =97 R2 =98 R3 =97 R4 =96 R5 =96 R6 =95 R7 =95

R8 =90 R9 =76 R10=94 R11=96 R12=80 R13=98 R14=98 R15=95

2.2.4 Electrical, Photometric and Chromaticity Measurements	IES LM-79 2008
--	-----------------------

Test date	2021-04-09	Test Ambient:	25 ± 1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ULD16-5CT(Mode:4000K)	Total Operating Time (min)	61

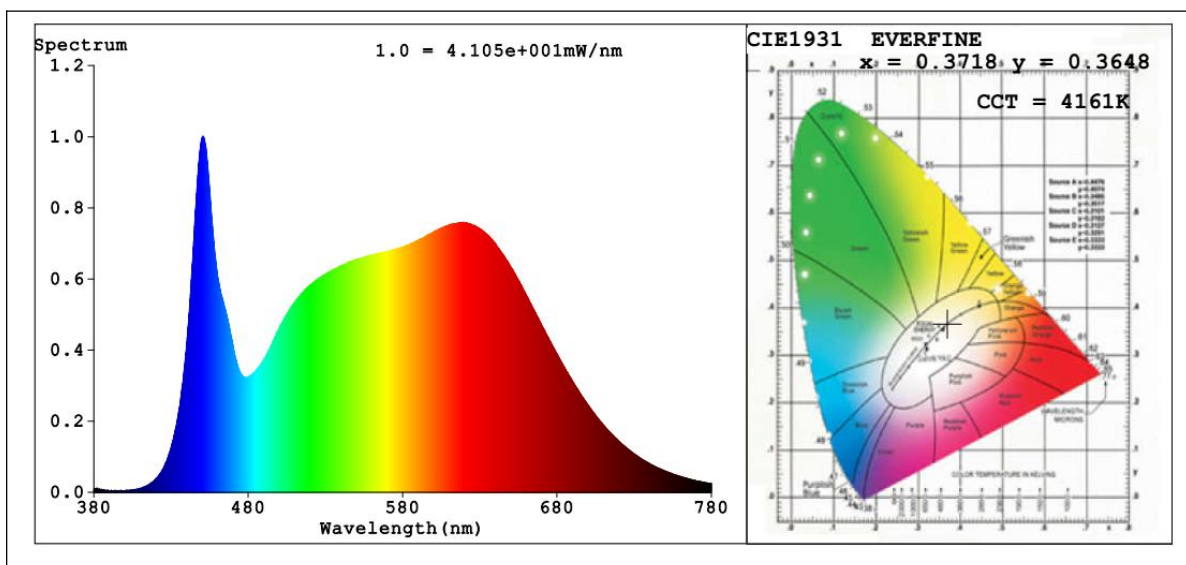
Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
JCE210313-H1	120.0	60	0.1687	19.69	0.9726

Sphere-Spectroradiometer Method(Self-absorption:1.1206):

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	95.1
R9	79
CCT (K)	4161
Duv	-0.0031
Total Luminous (lm)	1870
Luminous Efficacy (lm/W)	94.97

Spectral Power Distribution and Chromaticity Diagram



Colorimetric Parameters

Colorimetric Parameters

Chromaticity Coordinate: $x=0.3718$ $y=0.3648$ $u'=0.2242$ $v'=0.4949$ $Du, Dv: 0.0018, -0.0025$

CCT=4161K ($Duv=-0.0031$) Dominant WL: $\lambda_d = 580.5\text{nm}$ Purity=21.0%

Peak WL: $\lambda_p = 450.5\text{nm}$ FWHM=24.3nm

Render Index: $R_a = 95.1$ Render Index: AvgR = 92.7

R1 = 96 R2 = 97 R3 = 95 R4 = 96 R5 = 95 R6 = 93 R7 = 96

R8 = 92 R9 = 79 R10 = 91 R11 = 95 R12 = 75 R13 = 97 R14 = 97 R15 = 96

2.2.5 Electrical, Photometric and Chromaticity Measurements	IES LM-79 2008
--	-----------------------

Test date	2021-04-09	Test Ambient:	25 ± 1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ULD16-5CT(Mode:5000K)	Total Operating Time (min)	61

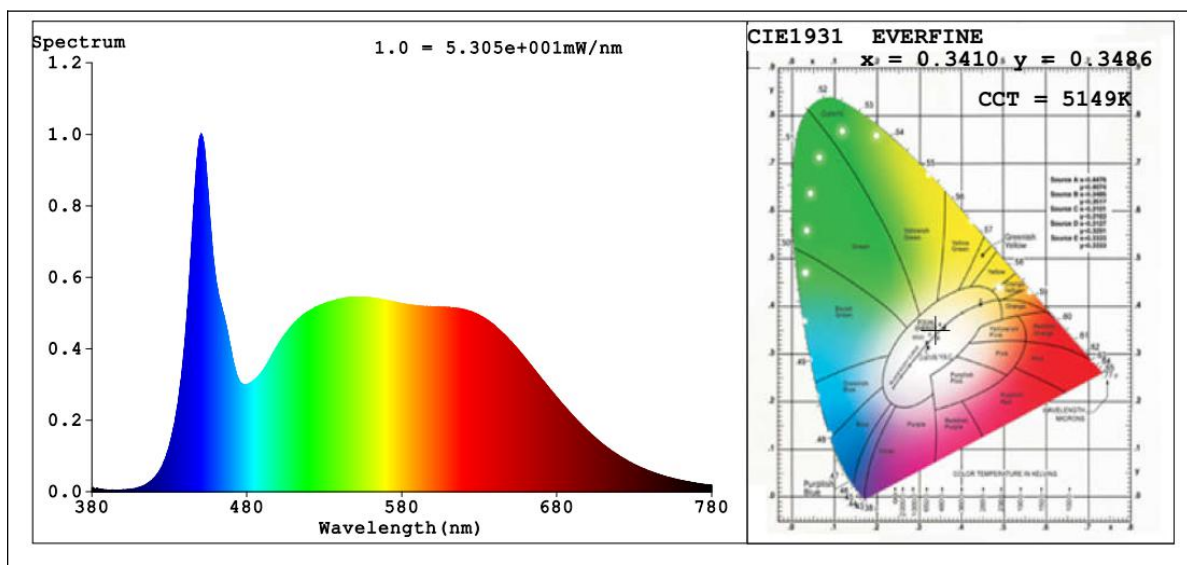
Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
JCE210313-H1	120.0	60	0.1684	19.65	0.9725

Sphere-Spectroradiometer Method(Self-absorption:1.1206):

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	93.1
R9	72
CCT (K)	5149
Duv	0.0001
Total Luminous (lm)	1911
Luminous Efficacy (lm/W)	97.25

Spectral Power Distribution and Chromaticity Diagram



Colorimetric Parameters

Colorimetric Parameters

Chromaticity Coordinate: $x=0.3410$ $y=0.3486$ $u'=0.2098$ $v'=0.4826$ $Du, Dv: -0.0001, 0.0001$

CCT=5149K (Duv=0.0001) Dominant WL:Ld =570.1nm Purity=6.9%

Peak WL:Lp=450.5nm FWHM=23.4nm

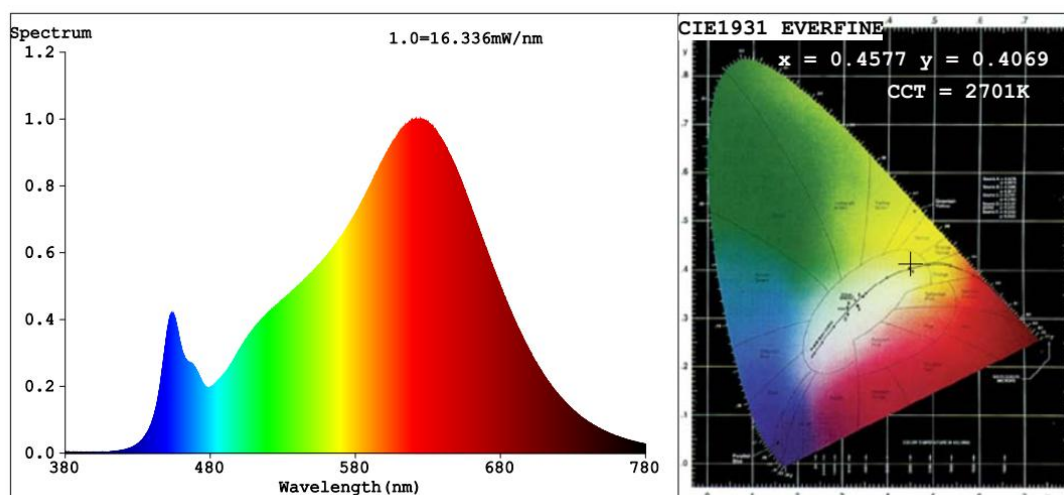
Render Index:Ra=93.1 Render Index:AvgR =90.1

R1 =94 R2 =95 R3 =93 R4 =94 R5 =93 R6 =91 R7 =95

R8 =90 R9 =72 R10=86 R11=93 R12=73 R13=94 R14=96 R15=93

2.3 Electrical and Photometric Measurements, with dimming	IES LM-79 2008 ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2
Noted: The noise test and data are not covered by A2LA accreditation	

Test date	2021-04-09		Test Ambient:	25±1° C
Dimmer Technology			Forward phase-cut	
Sample No.			Maximum Level	Minimum Level
JCE210313-H1	Input:	Light outout(Lumen)	1533	45.25
	120.0V / 60Hz	Percentage	91.86%	2.95%



Color Parameters:

Chromaticity Coordinate: $x=0.4577$ $y=0.4069$ $u'=0.2628$ $v'=0.5256$
CCT=2701K (Duv=-0.0012) Dominant WL:Ld =584.6nm WL:Lc = --nm Purity=59.5%
Ratio:R=26.8% G=70.6% B=2.7% Peak WL:Lp=621.7nm FWHM=139.2nm
Render Index:Ra=93.7 AvgR=91.6 TM30:Rf=92 Rg=100

R1 =95 R2 =99 R3 =98 R4 =94 R5 =95 R6 =97 R7 =91
R8 =81 R9 =62 R10=96 R11=96 R12=85 R13=96 R14=100 R15=90

The luminaires [can] ~~lean not~~ provide less than 20% of total light output with continuous dimmer.

Dimmer	Peak Noise Reading (dBA)	Test Condition	Distance between the microphone and the UUT
LUTRON MACL-153M	14.7	Dimmer adjusted to lowest light output	< 1 m



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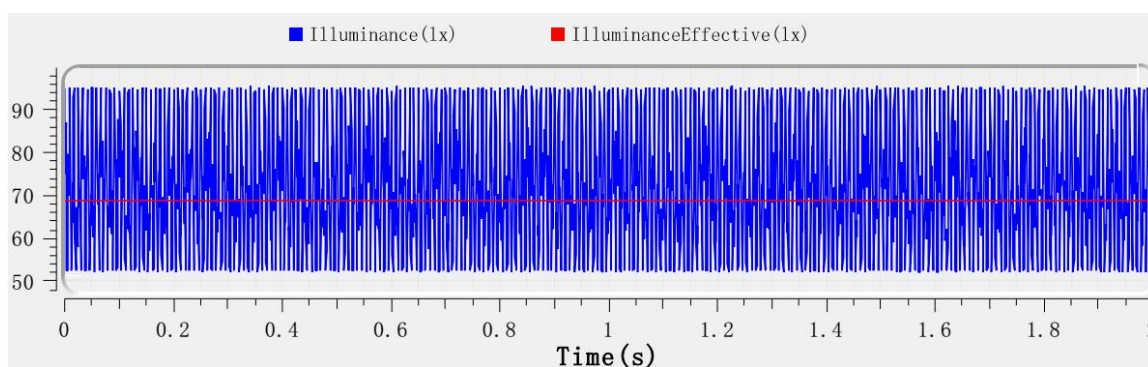
2.4 Flicker	NEMA 77-2017 ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2
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Dimming Technology	Forward phase-cut
Dimmer	LUTRON MACL-153M

Item	Short Term Flicker Indicator (Pst)	Stroboscopic Visibility Measure (SVM)
Maximum conduction	0.170	0.846
Intermediate conduction	0.228	1.150
Minimum conduction	0.549	0.322

2.5 Operating Frequency	ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2
Noted: This test and data are not covered by A2LA accreditation	

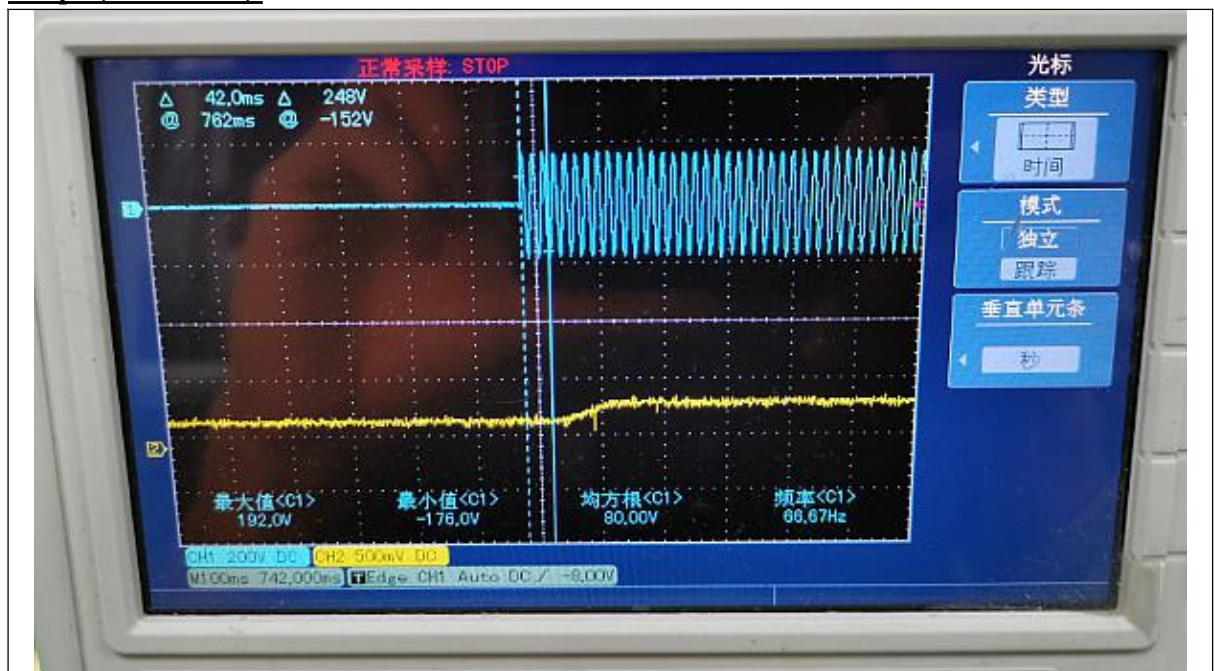
Test date	2021-04-09	Test Ambient:	25±1° C
Sample No.	Operating Frequency (Hz)		
JCE210313-H1	120.000		



2.6 Starting Time	ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2
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Test date	2021-04-09	Test Ambient:	25±1° C
Sample No.	Start Time (ms)		
JCE210313-H1	42.0		

Graph (Start Time):





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2.7 Transient Protection Test	ANSI/IEEE C62.41 ENERGY STAR® Program Requirements for Luminaires – Version 2.2
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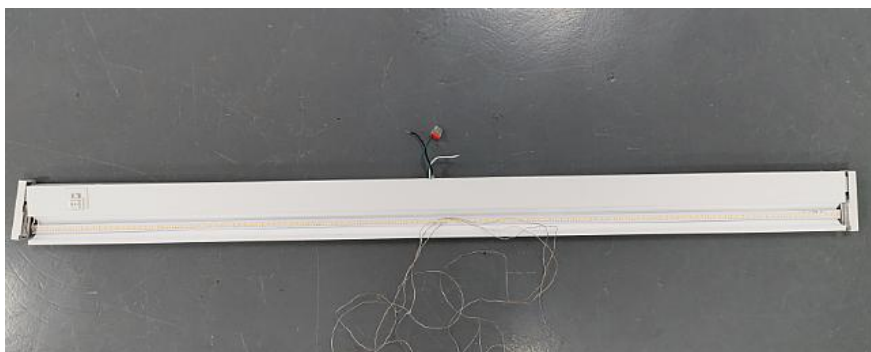
Test voltage: 120V,60Hz

Test date	2021-04-09	Test Ambient	25±1° C
Sample No.		Transient Protection Test - Seven Strikes	
JCE210313-H1		Survival	

2.8 In-Situ Temperature Measurement Test (ISTMT)	UL1598-2008, 3rd Edition
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Test date	2021-04-09	Test Ambient	25±5° C
Input Vol./Frequency	120.0V / 60Hz	Output Current of Single LED(mA)	43.46
Sample No.	LED Package Model	Maximum Measured LED Ts Point Temperature (°C)	Maximum permitted Ts temperature for L70≥50,000 hrs (°C)
JCE210313-H1	67-21S Series	39.9	105

In-Situ Picture - Ts:



2.9 Maximum Measured Ballast or Driver Case Temperature	UL1598-2008, 3rd Edition
--	--

Test date	2021-04-09	Test Ambient	25±5° C
Sample No.	Maximum Measured Driver Case Temperature (°C)	Maximum Driver Case Temperature Limited (°C)	
JCE210313-H1	37.6	105	

In-Situ Picture - Ts:





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2.10 Standby Power Consumption:	ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2
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Test date	2021-04-09	Test Ambient:	25±1° C
Model Number	ULD16-5CT(Mode:2700K)	Stabilization Time (min)	60

Electrical Measurement – when the luminaires turned off:

Sample No.	Standby Power Consumption(W):
JCE210313-H1	0



3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-S-451	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-S-455	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-S-452	Standard Lamp D204	2021-04-15	2022-04-14
ST-R-S-453	Power Meter for Integrating Sphere	2021-04-09	2022-04-06
ST-R-S-407	Goniophotometer system	Verified by S1530039 standard lamp	
ST-R-S-410	Standard Lamp S1530039	2021-04-15	2022-04-14
ST-R-S-408	Power Meter for Goniophotometer	2021-04-09	2022-04-06
ST-R-S-027	Digital Luxmeter	2021-04-09	2022-04-07
ST-R-S-016	Oscillograph	2021-04-09	2022-04-06
ST-R-S-017	Probe	2021-04-09	2022-04-07
ST-R-361	ZLB61012X	2020-08-19	2021-08-20
ST-R-414	LFA-3000	2020-12-18	2021-12-17
Uncertainty: Photometric Measurement (Sphere):2.72%, k=2 Chromaticity Measurement(Sphere):43.60K, k=2 Photometric Measurement(Goniophotometer): 3.44%, k=2			

***** END OF DATASHEET PACKAGE *****