



# Energy Star Test Report

For

## L-TECH CORPORATION

(Brand Name: N/A)

Shaogangtou District, Qiaotou Town, Dongguan City

**Model name(s):**  
**LRKT560W-EN-3CT**  
**LRKT563W-EN-3CT**

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

**Type of Luminaire:** Downlights

**Report Date:** 2019-11-28

Ningbo TengLi Testing Co., Ltd

**Prepared By:** 2nd floor, Block B, Ningbo Testing and Certification Base, No. 66 Qingyi Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang

Test & Report By:

*Xeon Ren*

Engineer: Xeon Ren

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.



<b>1.1 Product Information:</b>		
Model Number	LRKT560W-EN-3CT LRKT563W-EN-3CT	
Remark	N/A	
Representative (Tested) Model	LRKT560W-EN-3CT(mode:2700K) LRKT560W-EN-3CT(mode:3000K) LRKT560W-EN-3CT(mode:3500K) LRKT563W-EN-3CT(mode:3000K)	
Model Difference	All construction and rating are the same, except CCT	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Downlights	
LED Manufacturer	Seoul Semiconductor Co., LTD	
LED Model	SAWxA32E-xx	
Dimming	Dimmable	
Sample Number	JCE191010-B1(LRKT560W),B4(LRKT563W)	
Date of Receipt	Nov.10,2019	
Luminaire Aperture (for Inseparable SSL Luminaire)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

<b>1.2 Rated Values:</b>	
Rated Voltage / Frequency	120Vac, 60Hz
Nominal Power	13W
Rated Initial Lamp Lumen	800lm
Declared CCT	2700K,3000K,3500K

### 1.3 Product Photos

**LRKT560W-EN-3CT**



**LRKT563W-EN-3CT**





**1.4 Test Specifications:**

Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> <li>7. UL1993 4<sup>th</sup> Edition, Self-Ballasted Lamps and Lamp Adapters</li> <li>8. ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) – Version 2.2</li> </ol>
Reference Work Instruction	QD25
Remark	<p>Below test and data are not covered by A2LA accreditation:</p> <ul style="list-style-type: none"> <li>- Operating Frequency</li> </ul>



## 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  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ , 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  $1\text{ }^{\circ}$  vertical intervals and  $22.5\text{ }^{\circ}$  horizontal intervals.

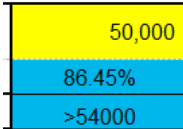
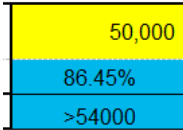
### 2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . 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  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . 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	12.63W	Pass
Luminous Efficacy	Downlights	$\geq 55$ lm/W	72.04lm/W	Pass
Luminaire Minimum Light Output	Downlights	$\leq 4.5''$ aperture: 345 lumens $> 4.5''$ aperture: 575 lumens	909.81lm	Pass
Luminaire Zonal Lumen Density Requirement	Downlights	$\geq 75\%$ of total initial lumens within the 0-60 °zone	84	Pass
Correlated Color Temperature (CCT)	Solid State	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	2726K Duv=0.0012	Pass
Color Rendering Index (CRI)	Solid State	$R_a \geq 80$ $R_9 > 0$	$R_a = 92.3$ $R_9 = 59$	Pass
Color Angular Uniform	Directional Solid State Indoor Luminaires	The variation of chromaticity shall be within 0.006 from the weighted average point on the CIE 1976(u',v') diagram	0.0006	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		Pass



		inseparable luminaires		
Color Maintenance	Solid State Indoor Luminaires	$\Delta u'v' \leq 0.007$	Max.0.0035in LM-80 report	Pass
Source Start Time	Solid State	<750 ms	36.0ms	Pass
Power Factor	Solid State	Total luminaire input power $\leq 5$ watts: PF $\geq 0.5$ Total luminaire input power $> 5$ watts: PF $\geq 0.7$	0.9472	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.	0W	Pass
Operating Frequency	Solid State	Frequency $\geq 120$ Hz	120.09Hz	Pass
Light Source Replaceability	Solid State	LED light engines or retrofit kits shall make use of electrical interconnects that allow for consumer replacement of the engine or kit without the cutting of wires or the use of solder.	N/A	N/A
Driver Replaceability	Solid State: Directional	Drivers shall be accessible and removable by an electrician without the cutting of wires and without damage to the luminaire housing, trim, decorative elements or the carpentry (e.g., ceilingdrywall) to which the luminaire is attached.	N/A	N/A



Maximum Measured Driver Case Temperature	Solid State	shall not exceed the driver manufacturer's maximum recommended temperature during in situ operation. ≤ 105 °C	44.2 °C	Pass
Maximum In-Situ Source Temperature	Solid State	Maximum permitted Ts temperature for L70≥50,000 hrs ≤ 105 °C	57.1 °C	Pass
Electronic Driver Safety	Solid State: Directional	Demonstrate compliance with ANSI/UL 1310-2010, ANSI/UL 2108-2004, ANSI/UL 8750-2009, as applicable.	Driver safety report has been verified	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.	Pass	Pass
Warranty Requirements	Solid State	incorporating replaceable drivers: ≥ 3 years incorporating non-replaceable drivers: ≥ 5 years	5 years	Pass
Lighting Toxics Reduction Requirements	Solid State	Luminaires and lamps shall not exceed: 1000 ppm: Mercury, Lead, Hexavalent Chromium, PBB and PBDE 100 ppm: Cadmium	RoHS report has been verified	Pass
CCT	Solid State	Packaging shall clearly describe the nominal color designation in units of Kelvin (e.g. 2700K, 3000K).	2700K,3000K, 3500K	Pass





<b>2.2.1 Electrical, Photometric and Chromaticity Measurements</b> (Refer to Work Instruction QD25)	<b>IES LM-79 2008</b>
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<b>Test date</b>	2019-11-11	<b>Test Ambient:</b>	25.0 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	LRKT560W-EN-3CT(mod e:2700K)		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JCE191010-B1	120.0	60	0.1111	12.63	0.9472

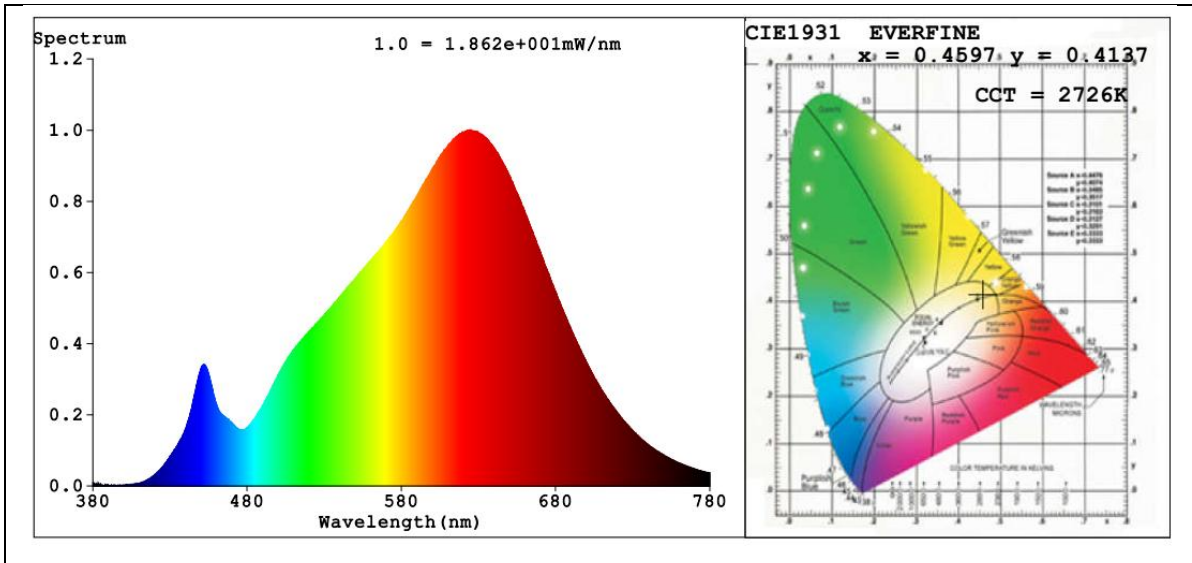
**Sphere-Spectroradiometer Method:**

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	92.3
R9	59
CCT (K)	2726
Duv	0.0012

**Goniophotometer Method:**

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	909.81
Luminous Efficacy (lm/W)	72.04
Beam Angle °	107.0
Center Beam Candle Power (cd)	353

**Spectral Power Distribution and Chromaticity Diagram**



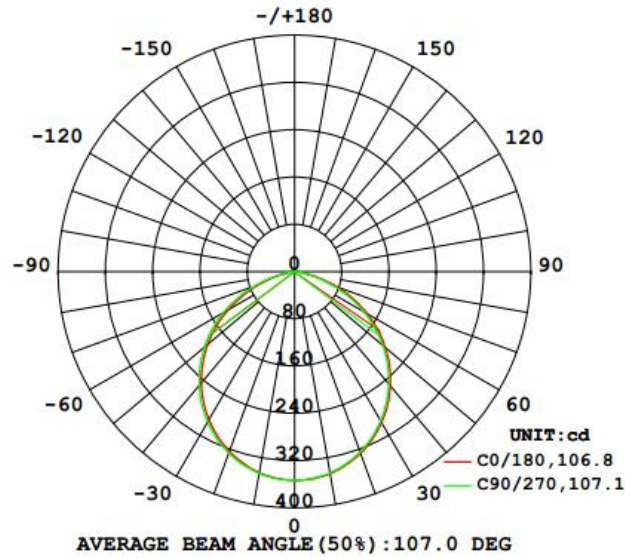
**Colorimetric Parameters**

**Colorimetric Parameters**

Chromaticity Coordinate:  $x=0.4597$   $y=0.4137$   $u'=0.2610$   $v'=0.5285$   
 CCT=2726K (Duv=0.0012) Dominant WL:Ld =583.7nm Purity=62.2%  
 Peak WL:Lp=624.8nm FWHM=149.9nm  
 Render Index: Ra=92.3 CRI=89.5

R1 =92	R2 =95	R3 =97	R4 =93	R5 =92	R6 =95	R7 =93	
R8 =82	R9 =59	R10=88	R11=94	R12=84	R13=93	R14=98	R15=88

**Zonal Lumen Tabulation**



Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	271.6	29.9%
0-40	441.7	48.6%
0-60	764.0	84%
60-90	145.6	16%
70-100	43.4	4.8%
90-120	0.0	0%
0-90	909.6	100%
90-180	0.1	0%
0-180	909.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	33.4	3.7%	90-100	0.0	0%
10-20	95.2	10.5%	100-110	0.0	0%
20-30	143.0	15.7%	110-120	0.0	0%
30-40	170.1	18.7%	120-130	0.0	0%
40-50	172.8	19.0%	130-140	0.0	0%
50-60	149.5	16.4%	140-150	0.0	0%
60-70	102.3	11.2%	150-160	0.0	0%
70-80	39.8	4.4%	160-170	0.0	0%
80-90	3.6	0.4%	170-180	0.0	0%



Table--1

UNIT: cd

C (DEG) γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5		
0	353	353	353	353	353	353	353	353	353	353	353	353	353	353	353	353		
5	352	352	352	351	351	351	351	351	351	351	351	352	352	352	352	352		
10	347	347	347	346	346	345	345	345	345	346	346	346	347	347	348	347		
15	339	338	338	337	337	336	336	335	336	336	337	338	338	339	339	339		
20	327	327	326	326	325	324	323	323	324	324	325	326	327	327	328	328		
25	312	312	311	310	310	309	308	307	308	308	309	311	312	313	314	313		
30	295	294	293	293	292	290	289	289	290	290	291	293	294	296	296	296		
35	275	274	273	272	271	270	268	268	269	270	271	272	274	276	276	276		
40	252	251	251	250	248	246	245	244	246	246	248	249	251	253	254	254		
45	228	227	226	225	223	221	219	218	220	221	222	224	226	229	230	229		
50	201	200	199	197	195	193	191	190	192	193	195	197	199	202	203	203		
55	172	171	170	168	166	163	161	160	162	164	165	168	170	173	174	174		
60	141	141	139	137	134	132	129	128	130	132	134	136	139	142	143	144		
65	109	109	107	105	102	98.5	96.2	94.9	97.0	98.3	101	103	106	109	111	111		
70	76.5	75.7	73.9	71.5	68.4	65.3	62.9	61.6	63.1	64.5	66.8	69.6	72.6	75.2	77.1	78.0		
75	43.2	42.2	40.3	37.7	34.9	32.2	30.1	28.9	30.1	31.3	33.3	36.0	38.9	41.6	43.5	44.5		
80	13.7	12.8	11.3	9.70	8.28	8.39	7.13	6.69	6.32	6.64	7.43	8.78	10.5	12.3	14.9	15.4		
85	3.39	3.28	3.07	2.83	2.57	2.35	2.18	2.07	2.18	2.28	2.45	2.68	2.94	3.19	3.39	3.51		
90	0.44	0.36	0.18	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.26	0.45	0.54		
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
105	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00		
110	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
115	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
120	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01		
125	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02		
130	0.02	0.03	0.03	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02		
135	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.03		
140	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03		
145	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03		
150	0.04	0.04	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03		
155	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03		
160	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02		
165	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.02		
170	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02		
175	0.02	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.01	0.02	0.01	0.02	0.02	0.01		
180	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		



<b>2.2.2 Electrical, Photometric and Integrating Sphere Measurements</b> (Refer to Work Instruction QD25)	<b>IES LM-79 2008</b>
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<b>Test date</b>	2019-11-11	<b>Test Ambient:</b>	25.0 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	LRKT560W-EN-3CT(mod e:3000K)		

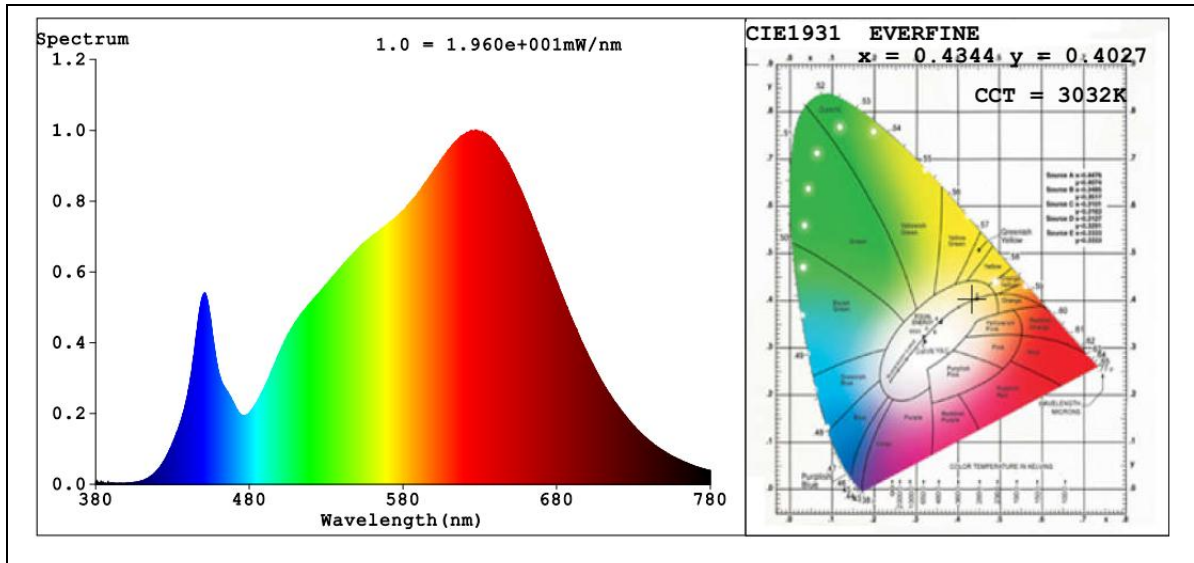
**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JCE191010-B1	120.0	60	0.1071	12.25	0.9535

**Sphere-Spectroradiometer Method:**

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	93.7
R9	71
CCT (K)	3032
Duv	-0.0002
Total Luminous (lm)	1032
Luminous Efficacy (lm/W)	84.22

**Spectral Power Distribution and Chromaticity Diagram**



**Colorimetric Parameters**

**Colorimetric Parameters**

Chromaticity Coordinate:  $x=0.4344$   $y=0.4027$  /  $u'=0.2495$   $v'=0.5205$

CCT=3032K (Duv=-0.0002) Dominant WL:Ld =582.8nm Purity=51.3%

Peak WL:Lp=628.0nm FWHM=169.5nm

Render Index: Ra=93.7 CRI=91.2

R1 =94	R2 =96	R3 =95	R4 =95	R5 =94	R6 =94	R7 =95	
R8 =88	R9 =71	R10=88	R11=95	R12=82	R13=95	R14=96	R15=92



<b>2.2.3 Electrical, Photometric and Integrating Sphere Measurements</b> (Refer to Work Instruction QD25)	<b>IES LM-79 2008</b>
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<b>Test date</b>	2019-11-11	<b>Test Ambient:</b>	25.0 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	LRKT560W-EN-3CT(mod e:3500K)		

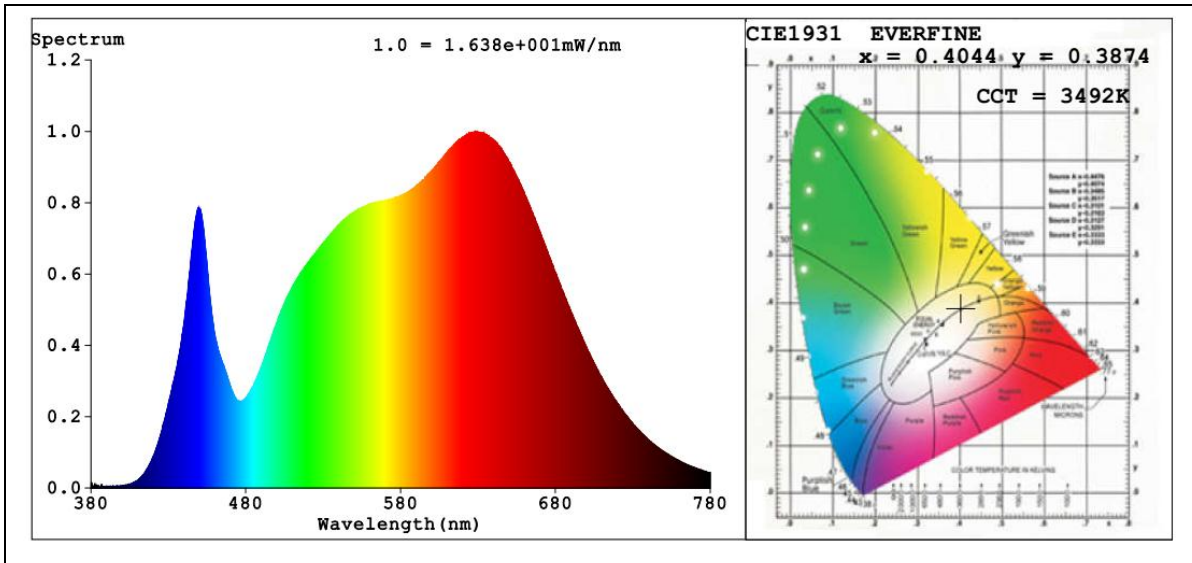
**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JCE191010-B1	120.0	60	0.1099	12.62	0.9570

**Sphere-Spectroradiometer Method:**

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	93.6
R9	81
CCT (K)	3492
Duv	-0.0013
Total Luminous (lm)	953.7
Luminous Efficacy (lm/W)	75.57

**Spectral Power Distribution and Chromaticity Diagram**



**Colorimetric Parameters**

**Colorimetric Parameters**

Chromaticity Coordinate:  $x=0.4044$   $y=0.3874$  /  $u'=0.2365$   $v'=0.5097$   
 CCT=3492K (Duv=-0.0013) Dominant WL:Ld =581.5nm Purity=37.6%  
 Peak WL:Lp=628.4nm FWHM=186.8nm  
 Render Index: Ra=93.6 CRI=91.4

R1 =96	R2 =95	R3 =91	R4 =94	R5 =94	R6 =92	R7 =95	
R8 =93	R9 =81	R10=86	R11=94	R12=80	R13=95	R14=94	R15=95





<b>2.2.4 Electrical, Photometric and Integrating Sphere Measurements</b> (Refer to Work Instruction QD25)	<b>IES LM-79 2008</b>
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<b>Test date</b>	2019-11-11	<b>Test Ambient:</b>	25.0 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	LRKT563W-EN-3CT(mod e:3000K)		

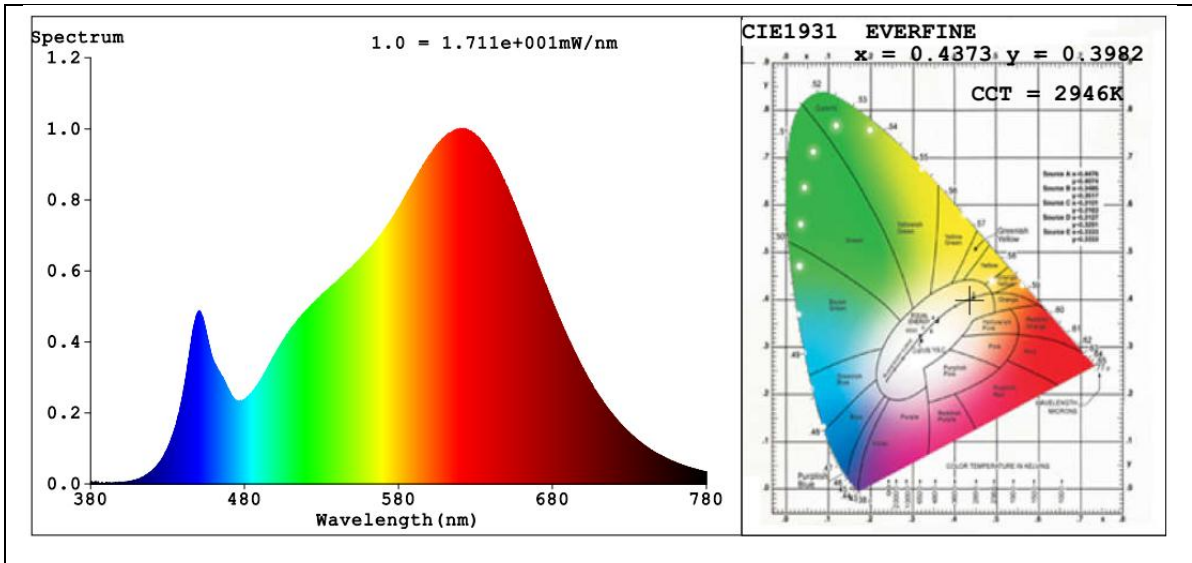
**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JCE191010-B4	120.0	60	0.1095	12.55	0.9551

**Sphere-Spectroradiometer Method:**

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	93.6
R9	62
CCT (K)	2946
Duv	-0.0024
Total Luminous (lm)	906.2
Luminous Efficacy (lm/W)	72.21

**Spectral Power Distribution and Chromaticity Diagram**



**Colorimetric Parameters**

**Colorimetric Parameters**

Chromaticity Coordinate:  $x=0.4373$   $y=0.3982$   $u'=0.2534$   $v'=0.5191$

CCT=2946K (Duv=-0.0024) Dominant WL:Ld =583.9nm Purity=50.8%

Peak WL:Lp=620.9nm FWHM=158.3nm

Render Index: Ra=93.6 CRI=91.5

R1 =94 R2 =97 R3 =98 R4 =94 R5 =95 R6 =96 R7 =91

R8 =82 R9 =62 R10=93 R11=95 R12=88 R13=95 R14=99 R15=90



<b>2.3 Color Spatial Uniformity</b>	<b>IES LM-79 2008</b> <b>ENERGY STAR® Program Requirements</b> <b>Product Specification for Luminaires (Light Fixtures) - Version 2.2</b>
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**Test Data:**

Test date	2019-11-11	Test Ambient	25.1 °C
Sample No.	Maximum $\Delta u'v'$		
JCE191010-B1	0.0006		

Gamma\C	CIE u'	CIE v'	$\Delta u'v'$	CIE u'	CIE v'	$\Delta u'v'$
-54	0.2601	0.5283	0.0005	0.2602	0.5283	0.0005
-53	0.2601	0.5283	0.0005	0.2602	0.5283	0.0005
-52	0.2601	0.5283	0.0005	0.2602	0.5283	0.0005
-51	0.2601	0.5283	0.0005	0.2604	0.5283	0.0005
-50	0.26	0.5283	0.0006	0.2604	0.5283	0.0005
-49	0.26	0.5283	0.0006	0.2604	0.5284	0.0006
-48	0.2602	0.5283	0.0005	0.2603	0.5284	0.0006
-47	0.2601	0.5283	0.0005	0.2604	0.5284	0.0006
-46	0.2601	0.5283	0.0005	0.2603	0.5283	0.0005
-45	0.2601	0.5283	0.0005	0.2603	0.5283	0.0005
-44	0.2601	0.5283	0.0005	0.2603	0.5283	0.0005
-43	0.2602	0.5283	0.0005	0.2604	0.5283	0.0005
-42	0.2602	0.5283	0.0005	0.2605	0.5283	0.0005
-41	0.2602	0.5282	0.0004	0.2604	0.5283	0.0005
-40	0.2602	0.5282	0.0004	0.2604	0.5283	0.0005
-39	0.2602	0.5282	0.0004	0.2604	0.5283	0.0005
-38	0.2603	0.5282	0.0004	0.2604	0.5283	0.0005
-37	0.2602	0.5282	0.0004	0.2604	0.5282	0.0004
-36	0.2602	0.5282	0.0004	0.2603	0.5282	0.0004
-35	0.2602	0.5282	0.0004	0.2604	0.5282	0.0004
-34	0.2602	0.5282	0.0004	0.2603	0.5282	0.0004
-33	0.2602	0.5281	0.0003	0.2605	0.5282	0.0004
-32	0.2602	0.5281	0.0003	0.2605	0.5282	0.0004
-31	0.2601	0.5281	0.0004	0.2604	0.5282	0.0004
-30	0.2603	0.5281	0.0003	0.2604	0.5282	0.0004
-29	0.2602	0.5281	0.0003	0.2604	0.5281	0.0003
-28	0.2602	0.5281	0.0003	0.2604	0.5281	0.0003
-27	0.2602	0.5281	0.0003	0.2604	0.5281	0.0003
-26	0.2602	0.528	0.0002	0.2604	0.5281	0.0003



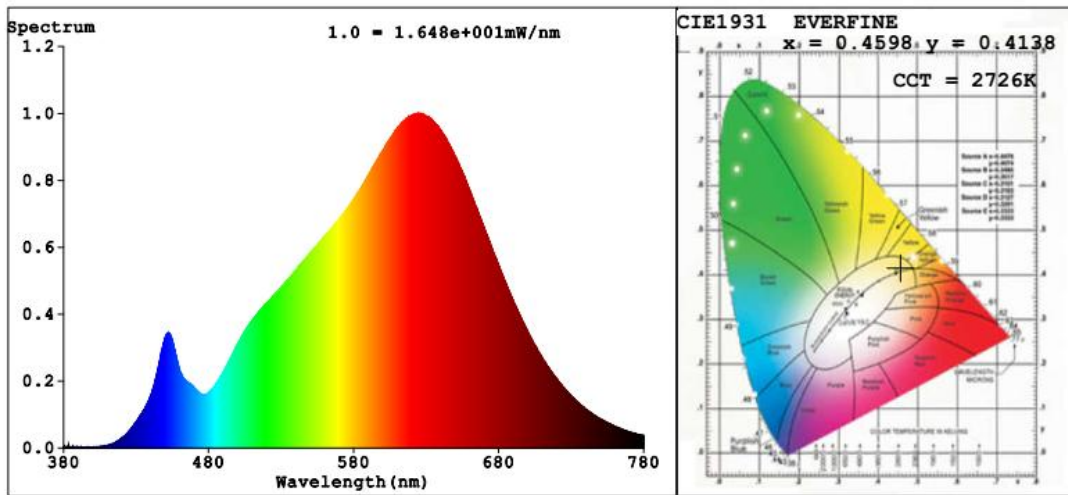
-25	0.2602	0.528	0.0002	0.2603	0.528	0.0002
-24	0.2601	0.528	0.0003	0.2603	0.528	0.0002
-23	0.2601	0.528	0.0003	0.2603	0.528	0.0002
-22	0.2601	0.528	0.0003	0.2603	0.528	0.0002
-21	0.2601	0.5279	0.0002	0.2603	0.528	0.0002
-20	0.2602	0.5279	0.0001	0.2603	0.528	0.0002
-19	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
-18	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
-17	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
-16	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
-15	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
-14	0.2602	0.5278	0.0001	0.2602	0.5279	0.0001
-13	0.2601	0.5278	0.0002	0.2602	0.5278	0.0001
-12	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
-11	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
-10	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
-9	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
-8	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
-7	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
-6	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
-5	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
-4	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
-3	0.2601	0.5278	0.0002	0.2601	0.5277	0.0002
-2	0.2601	0.5278	0.0002	0.2601	0.5277	0.0002
-1	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
0	0.2603	0.5278	0	0.2603	0.5278	0
1	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
2	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
3	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
4	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
5	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
6	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
7	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
8	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
9	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
10	0.2601	0.5278	0.0002	0.2601	0.5278	0.0002
11	0.2602	0.5278	0.0001	0.2602	0.5278	0.0001
12	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
13	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
14	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
15	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001



16	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
17	0.2602	0.5279	0.0001	0.2602	0.5279	0.0001
18	0.2602	0.5279	0.0001	0.2601	0.5279	0.0002
19	0.2603	0.528	0.0002	0.2601	0.5279	0.0002
20	0.2603	0.528	0.0002	0.2601	0.528	0.0003
21	0.2603	0.528	0.0002	0.2601	0.528	0.0003
22	0.2603	0.528	0.0002	0.2602	0.528	0.0002
23	0.2603	0.528	0.0002	0.2602	0.528	0.0002
24	0.2603	0.5281	0.0003	0.2602	0.528	0.0002
25	0.2603	0.5281	0.0003	0.2602	0.5281	0.0003
26	0.2604	0.5281	0.0003	0.2602	0.5281	0.0003
27	0.2604	0.5281	0.0003	0.2602	0.5281	0.0003
28	0.2604	0.5281	0.0003	0.2603	0.5281	0.0003
29	0.2604	0.5282	0.0004	0.2601	0.5281	0.0004
30	0.2604	0.5282	0.0004	0.2602	0.5281	0.0003
31	0.2604	0.5282	0.0004	0.2602	0.5281	0.0003
32	0.2603	0.5282	0.0004	0.2602	0.5282	0.0004
33	0.2603	0.5282	0.0004	0.2603	0.5282	0.0004
34	0.2603	0.5282	0.0004	0.2603	0.5282	0.0004
35	0.2603	0.5283	0.0005	0.2603	0.5282	0.0004
36	0.2604	0.5283	0.0005	0.2602	0.5282	0.0004
37	0.2604	0.5283	0.0005	0.2602	0.5282	0.0004
38	0.2604	0.5283	0.0005	0.2602	0.5283	0.0005
39	0.2604	0.5283	0.0005	0.2602	0.5283	0.0005
40	0.2604	0.5283	0.0005	0.2603	0.5283	0.0005
41	0.2604	0.5283	0.0005	0.2603	0.5283	0.0005
42	0.2602	0.5283	0.0005	0.2601	0.5283	0.0005
43	0.2603	0.5283	0.0005	0.2602	0.5283	0.0005
44	0.2603	0.5283	0.0005	0.2602	0.5283	0.0005
45	0.2603	0.5283	0.0005	0.2602	0.5283	0.0005
46	0.2603	0.5283	0.0005	0.2601	0.5283	0.0005
47	0.2603	0.5283	0.0005	0.2601	0.5283	0.0005
48	0.2603	0.5283	0.0005	0.2601	0.5283	0.0005
49	0.2603	0.5283	0.0005	0.2601	0.5283	0.0005
50	0.2601	0.5283	0.0005	0.26	0.5283	0.0006
51	0.2602	0.5283	0.0005	0.26	0.5283	0.0006
52	0.2602	0.5283	0.0005	0.26	0.5283	0.0006
53	0.2602	0.5283	0.0005	0.26	0.5283	0.0006
54	0.2602	0.5283	0.0005	0.2599	0.5282	0.0006
55	0.2599	0.5282	0.0006	0.2599	0.5282	0.0006

<b>2.4 Electrical and Photometric Measurements, with dimming</b>	<b>IES LM-79 2008 ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2</b>
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<b>Test date</b>	2019-11-11		<b>Test Ambient:</b>	25.1 °C
<b>Dimmer Technology</b>			Forward phase-cut	
<b>Sample No.</b>			<b>Maximum Level</b>	<b>Minimum Level</b>
JCE191010-B1	Input: 120.0 V / 60 Hz	Light outout(Lumen)	877.8	60.40
		Percentage	96.48%	6.88%



**Colorimetric Parameters**

Chromaticity Coordinate:  $x=0.4598$   $y=0.4138$   $u'=0.2610$   $v'=0.5286$   
 CCT=2726K (Duv=0.0012) Dominant WL:  $\lambda_d = 583.7\text{nm}$  Purity=62.3%  
 Peak WL:  $\lambda_p = 624.4\text{nm}$  FWHM=150.4nm  
 Render Index:  $R_a=92.4$  CRI=89.6  
 R1 =92 R2 =95 R3 =97 R4 =93 R5 =92 R6 =95 R7 =93  
 R8 =82 R9 =59 R10=88 R11=94 R12=83 R13=93 R14=98 R15=88

The luminaires [can] ~~[can 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	21.9	Dimmer adjusted to lowest light output	< 1 m



<b>2.5 Flicker</b>	<b>NEMA 77-2017 ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2</b>
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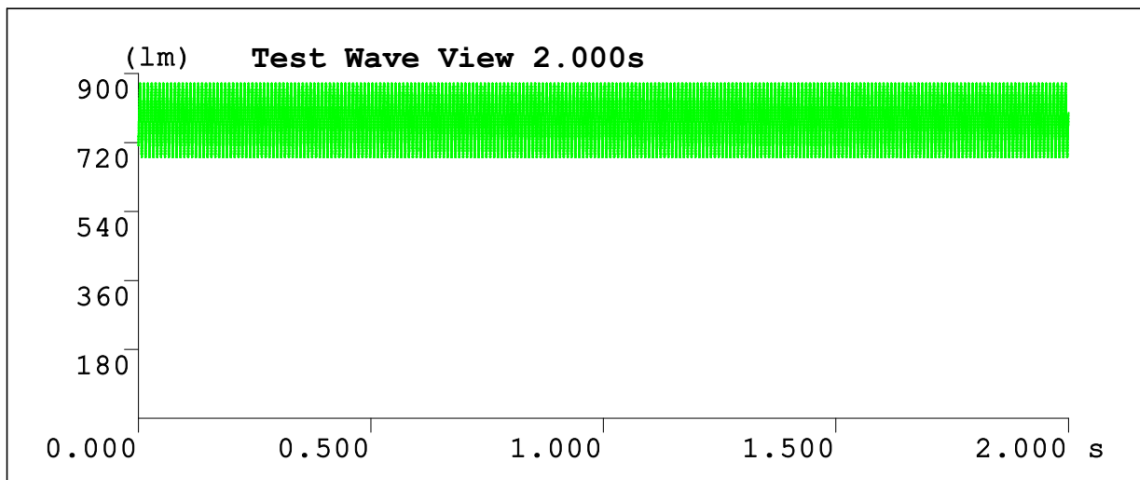
<b>Dimming Technology</b>	phase-cut
<b>Dimmer</b>	LUTRON MACL-153M

Item	Short Term Flicker Indicator (Pst)	Stroboscopic Visibility Measure (SVM)
<b>Maximum conduction</b>	0.095	0.595
<b>Intermediate conduction</b>	0.167	0.708
<b>Minimum conduction</b>	0.382	0.514



<b>2.6 Operating Frequency</b>	<b>ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2</b>
<b>Noted: This test and data are not covered by NVLAP accreditation</b>	

<b>Test date</b>	2019-11-11	<b>Test Ambient:</b>	25.1 °C
<b>Sample No.</b>	<b>Operating Frequency (Hz)</b>		
JCE191010-B1	120.09		

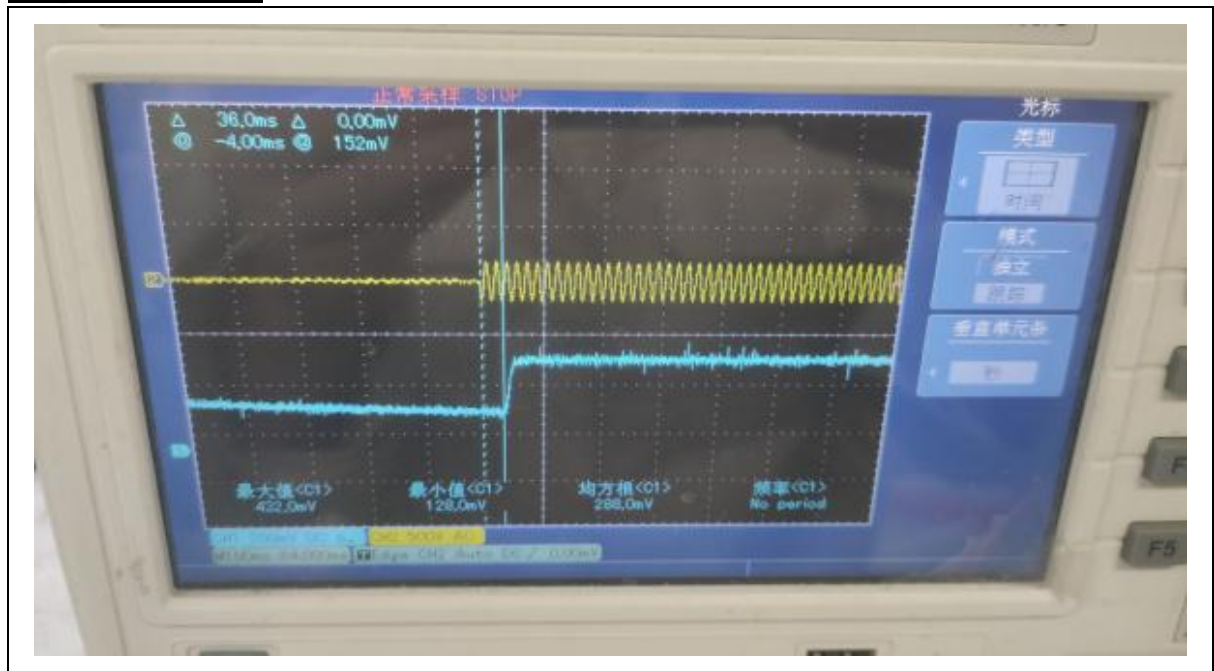




<b>2.7 Starting Time</b> <i>(Refer to Work Instruction QD28)</i>	<b>ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2</b>
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Test date	2019-11-11	Test Ambient:	25.1 °C
Sample No.	Start Time (ms)		
JCE191010-B1	36.0		

**Graph (Start Time):**





<b>2.8 Transient Protection Test</b> <i>(Refer to Work Instruction QD34)</i>	<b>ANSI/IEEE C62.41</b> <b>ENERGY STAR® Program Requirements</b> <b>for Luminaires – Version 2.2</b>
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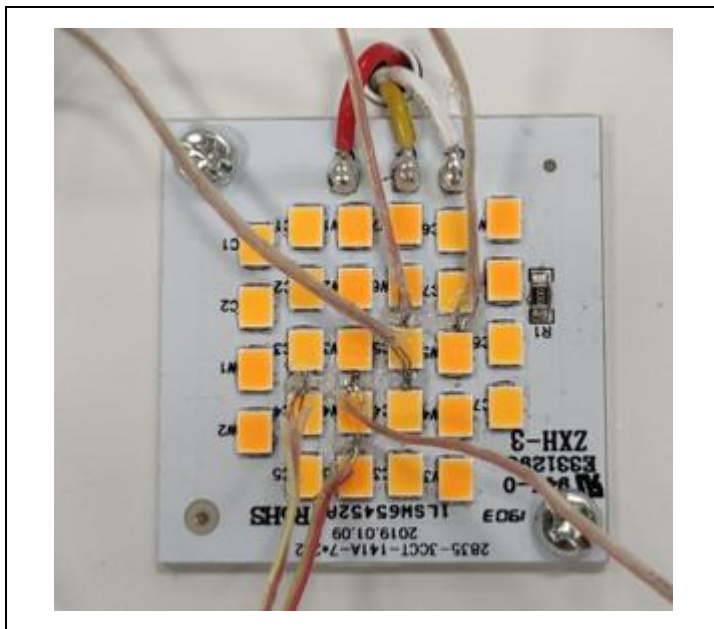
**Test voltage: 120V,60Hz**

Test date	2019-11-11	Test Ambient	25.1 °C
Sample No.		Transient Protection Test - Seven Strikes	
JCE191010-B1		Survival	

<b>2.9 In-Situ Temperature Measurement Test (ISTMT)</b>	<b>UL1598-2008, 3<sup>rd</sup> Edition</b>
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Test date	2019-11-11	Test Ambient	25.1 °C
Input Vol./Frequency	120 V / 60 Hz	Output Current of Single LED(mA)	92.5
Sample No.	LED Package Model	Maximum Measured LED Ts Point Temperature ( °C)	Maximum permitted Ts temperature for L70 ≥ 50,000 hrs ( °C)
JCE191010-B1	SAWxA32E-xx	57.1	105

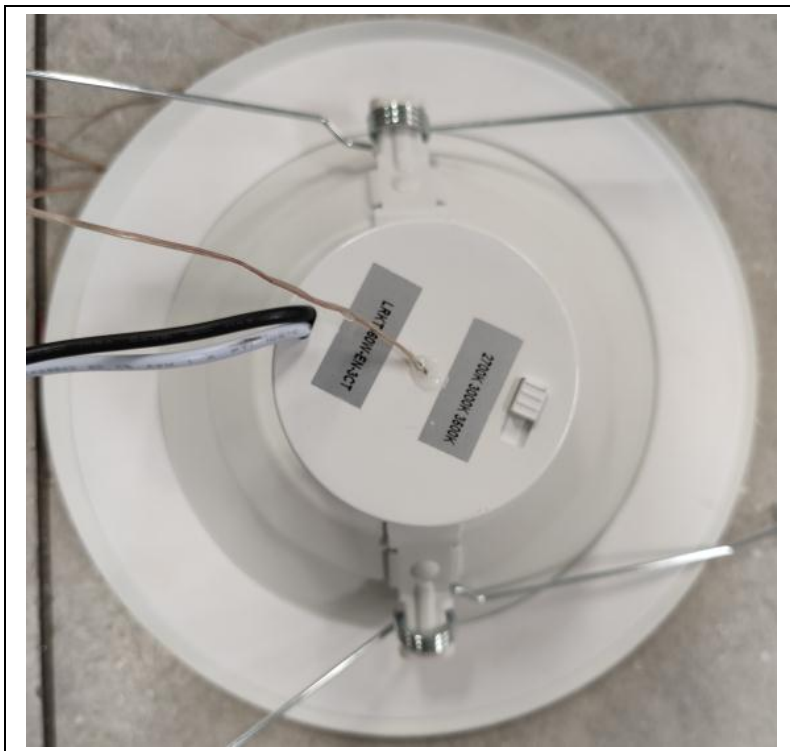
**In-Situ Picture - Ts:**



<b>2.10 Maximum Measured Ballast or Driver Case Temperature</b>	<b>UL1598-2008, 3<sup>rd</sup> Edition</b>
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<b>Test date</b>	2019-11-11	<b>Test Ambient</b>	25.1 °C
<b>Sample No.</b>	<b>Maximum Measured Driver Case Temperature ( °C)</b>	<b>Maximum Driver Case Temperature Limited ( °C)</b>	
JCE191010-B1	44.2	105	

**In-Situ Picture - Ts:**





<b>2.11 Off-State Power Consumption:</b>	<b>ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2</b>
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<b>Test date</b>	2019-11-11	<b>Test Ambient:</b>	25.0 °C
<b>Model Number</b>	LRKT560W-EN-3CT(mode:2 700K)	<b>Stabilization Time (min)</b>	90

**Electrical Measurement – when the luminaires turned off:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)
JCE191010-B1	120.0	60	0	0



**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-702	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-701	Spectral analysis system HAAS-2000	Verified by D204 standard lamp	
ST-R-705	D204 Standard Lamp	2019-02-07	2020-02-06
ST-R-704	Power Meter for Integrating Sphere	2019-01-06	2020-01-05
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
ST-R-710	D908S Standard Lamp	2019-02-12	2020-02-11
ST-R-711	Power Meter for Goniophotometer	2019-01-06	2020-01-05
ST-R-720	Digital Luxmeter	2019-01-06	2020-01-05
ST-R-622	Oscillograph	2019-01-06	2020-01-05
ST-R-721	EMS61000-12C	2019-01-06	2020-01-05
ST-R-725	LFA-3000	2019-01-06	2020-01-05
Uncertainty Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

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