

LM-79-08 Test Report

For

**Revolution Lighting Technologies, Inc.
(Brand Name: Revolution Lighting Technologies)**

2280 Ward Ave, Simi Valley, CA 93065

**2-lamp External Driver Lamp-Style Retrofit Kits
(UL Type C)**

Model name(s): 202421-21X

Remark: The "X" stands for different CCT as bellow: 1=3000K,
2=3500K, 3=4000K, 5=5000K.Representative (Tested) Model: 202421-211
202421-215

Model Difference: All construction and rating are the same, except CCT

Test & Report By:

Clint Chen

Engineer: Clint Chen

Date: Jul.09,2018

Review By:

John Li

Manager: John Li

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 NVLAP, NIST,
or any agency of the Federal Government.**Laboratory: Standard-Tech Co., Ltd Testing Center
NVLAP CODE: 201011-0**

Report Format Number STD/QR4909-A/2

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Tel: 8620-3229 0320

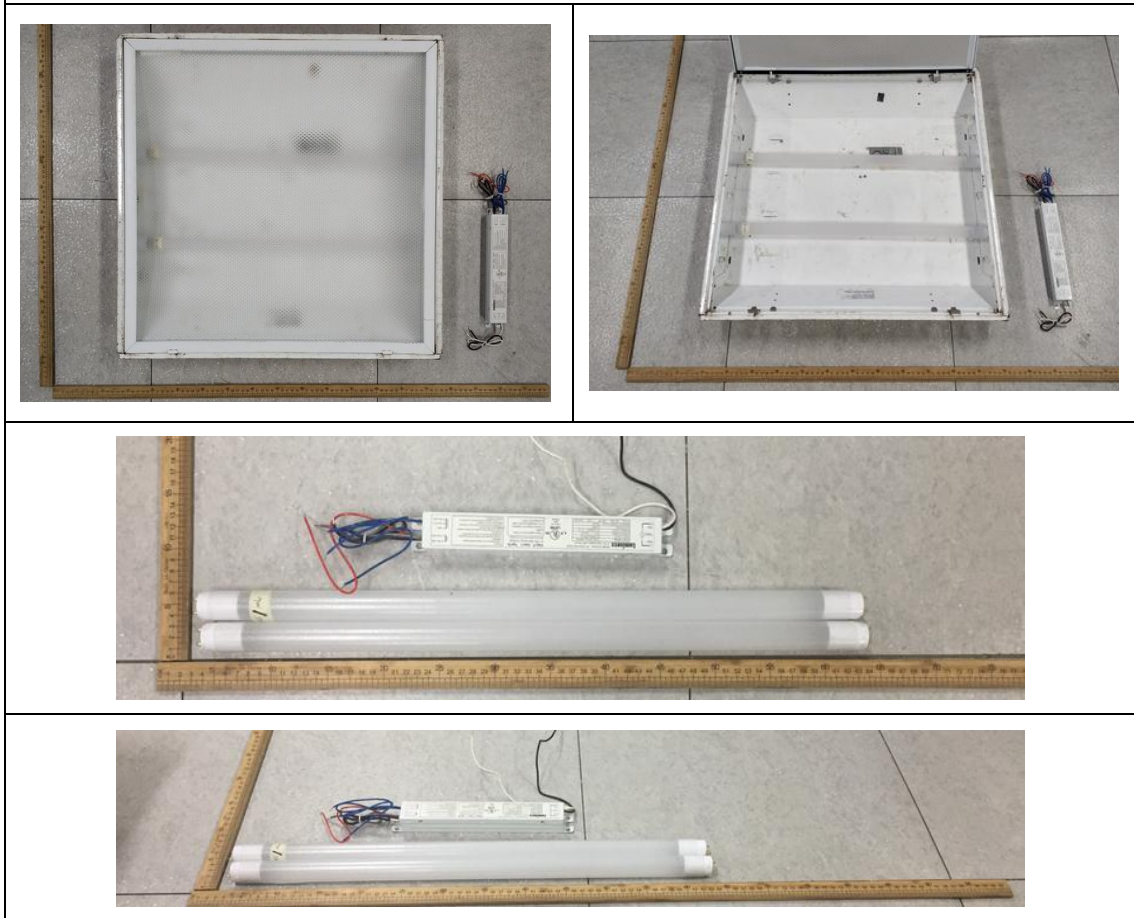
Fax: 8620-32290422

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1.1 Product Information:

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	202421-21X	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	2-lamp External Driver Lamp-Style Retrofit Kits (UL Type C)	
Rated Voltage / Frequency	120-277 Vac, 50/60 Hz	
Nominal Power	10.5W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K, 3500K, 4000K, 5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S/KK5C-H3030N4P02430Z6/2T(HN), 67-21S/KK5C-H5050N42PA2430Z6/2T(HN)	
Sample Number	JBE180607-A1, A2(3000K), A3(5000K),	
Lamp Length	600	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



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1.2 Test Specifications:

Date of Receipt	Jul.07,2018
Date of Test	Jul.09,2018
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
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 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 °C ± 1 °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 °C ± 1 °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 °C ± 1 °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 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2018-07-09	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	202421-211		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.0844	10.04	0.9912	4.05
A1	277.0	60	0.0425	10.48	0.8901	9.21
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

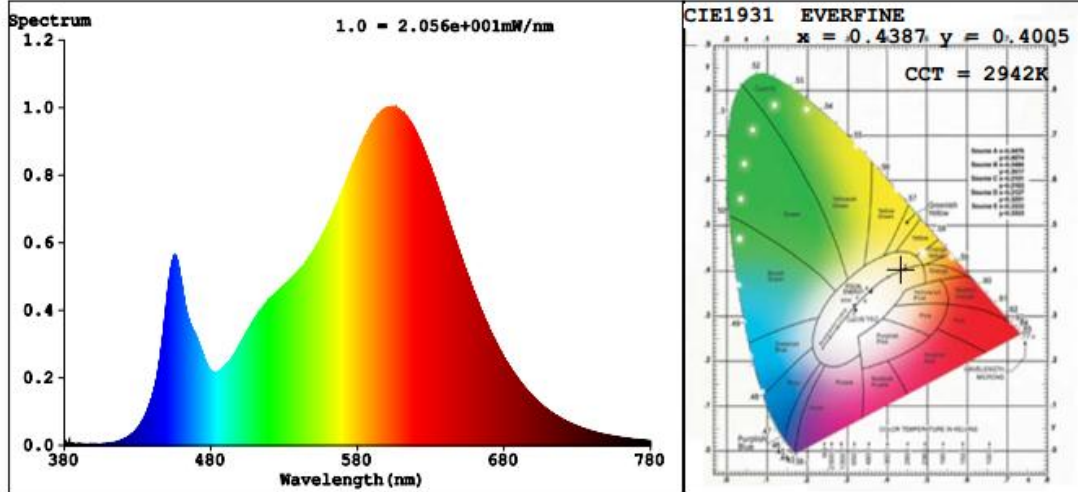
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	93	R10	84
CCT (K)	2942	R3	93	R11	78
Duv	-0.0016	R4	79	R12	73
Chromaticity (x, y)	x=0.4387 y=0.4005	R5	82	R13	84
Chromaticity (u', v')	u'=0.2532 v'=0.5202	R6	92	R14	97
Color Rendering Index (CRI)	82.1	R7	80	R15	74
R9	5	R8	57	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	1340	1380	Bare Lamp: 800(±10%)
Luminous Efficacy (lm/W)	133.47	131.68	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	127.86		

Spectral Power Distribution & Chromaticity Diagram



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2.2 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2018-07-09	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	202421-211		

Electrical Measurement for 2-lamp in Lithonia 2GT8 lensed 2x2:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.1689	20.05	0.9893	4.46
A1,A2	277.0	60	0.0858	20.93	0.8805	9.85
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement for 2-lamp in Lithonia 2GT8 lensed 2x2 -
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	6
Frequency (Hz)	60	R2	93	R10	84
CCT (K)	2932	R3	93	R11	78
Duv	-0.0018	R4	79	R12	74
Chromaticity (x, y)	x=0.4392 y=0.4004	R5	82	R13	85
Chromaticity (u', v')	u'=0.2536 v'=0.5203	R6	92	R14	97
Color Rendering Index (CRI)	82.3	R7	80	R15	74
R9	6	R8	57	--	--

**Photometric Measurement 2-lamp in Lithonia 2GT8 lensed 2x2 –
 Goniophotometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2188.5	2253.1	In luminaire (2 lamps): 1350(±10%)
Luminous Efficacy (lm/W)	109.15	107.65	In luminaire: >= 100(-3%)
Most worst Luminous/Highest Watts	104.56		
Zonal lumens in the 0-60 ° zone (%)	85	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.29	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.14	--	1.0-2.0(±0.1)
Beam Angle (°)	96.0	--	--
Center Beam Candle Power (cd)	942	--	--

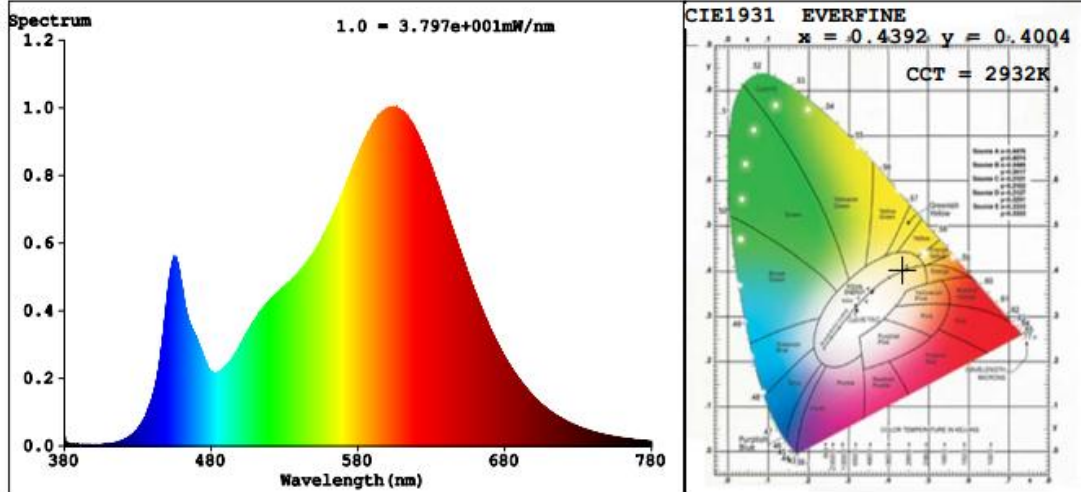
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Spectral Power Distribution & Chromaticity Diagram

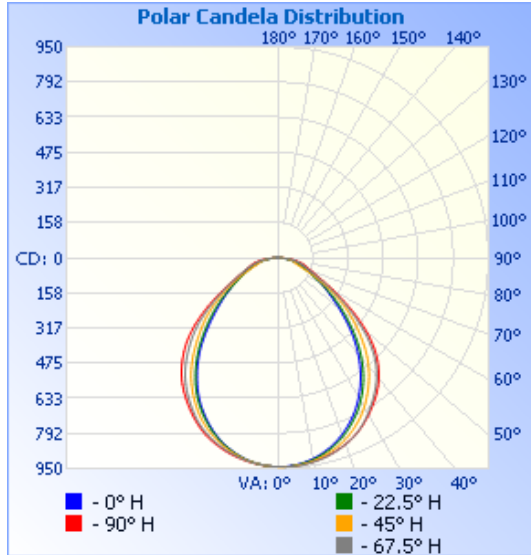


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	718.8	32.8%
0-40	1,153.0	52.7%
0-60	1,860.5	85%
60-90	317.2	14.5%
70-100	141.8	6.5%
90-120	4.8	0.2%
0-90	2,177.7	99.5%
90-180	10.6	0.5%
0-180	2,188.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	88.9	4.1%	90-100	1.1	0%
10-20	253.1	11.6%	100-110	1.7	0.1%
20-30	376.7	17.2%	110-120	2.0	0.1%
30-40	434.3	19.8%	120-130	1.9	0.1%
40-50	407.6	18.6%	130-140	1.5	0.1%
50-60	299.9	13.7%	140-150	1.1	0%
60-70	176.5	8.1%	150-160	0.7	0%
70-80	103.6	4.7%	160-170	0.4	0%
80-90	37.1	1.7%	170-180	0.1	0%

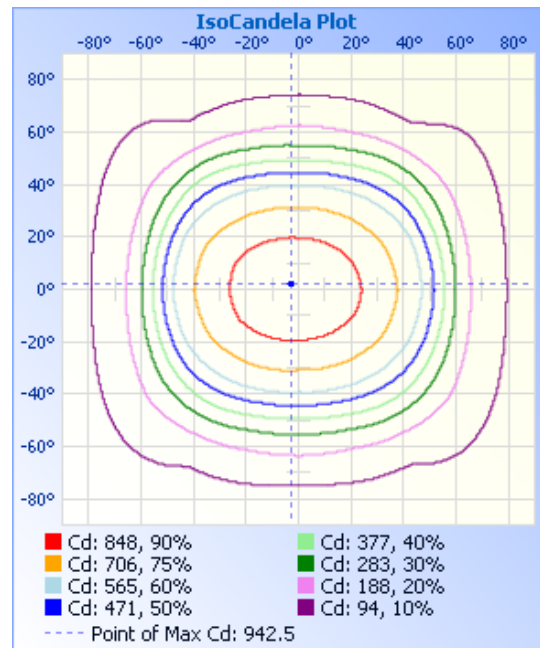
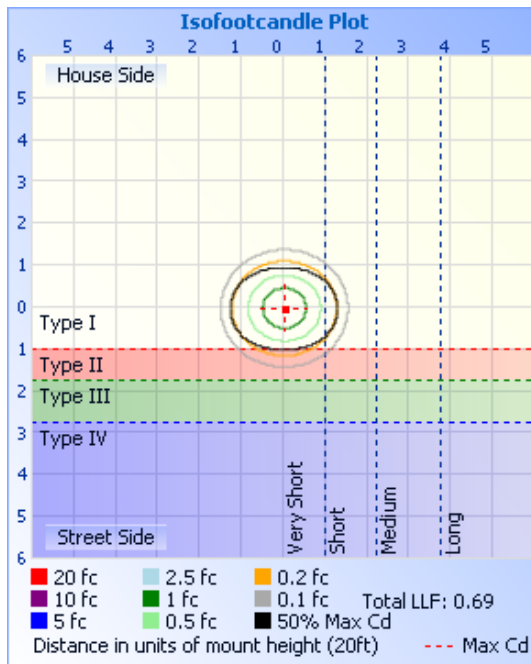
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	3.26 fc	33.2 ft	42.9 ft
34.0ft	0.81 fc	66.5 ft	85.9 ft
51.0ft	0.36 fc	99.7 ft	128.8 ft
68.0ft	0.20 fc	133.0 ft	171.7 ft
85.0ft	0.13 fc	166.2 ft	214.7 ft
102.0ft	0.09 fc	199.5 ft	257.6 ft

■ Vert. Spread: 88.7°
 ■ Horiz. Spread: 103.2°



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Table--1

UNIT: cd

T (DEG) \ C (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	942	942	942	942	942	942	942	942	942	942	942	942	942	942	942	942	
5	935	934	936	936	937	939	940	942	940	940	938	936	934	934	934	934	
10	921	919	919	919	919	923	928	934	932	931	924	919	913	914	916	919	
15	901	897	894	890	889	896	907	918	916	914	900	889	881	882	889	897	
20	874	869	860	849	847	857	876	894	894	888	866	849	836	840	852	868	
25	836	829	814	799	794	807	833	861	862	854	823	796	780	786	806	828	
30	788	777	755	737	728	746	778	812	818	804	766	733	712	723	746	776	
35	735	720	689	662	651	672	712	757	768	746	698	656	632	645	677	716	
40	673	657	614	578	564	587	637	694	709	676	616	566	542	557	596	646	
45	595	577	526	485	467	490	546	611	630	588	523	470	443	463	505	560	
50	500	474	432	387	369	393	450	502	527	489	433	379	354	374	420	467	
55	383	362	339	299	286	303	350	381	401	375	335	292	281	287	326	359	
60	273	259	238	218	221	220	245	271	285	276	244	219	220	213	236	264	
65	192	182	155	158	169	159	158	191	200	202	170	167	170	162	164	195	
70	146	135	101	117	126	118	104	142	152	152	117	126	127	123	113	148	
75	118	106	78.1	88.9	92.9	88.8	80.7	112	123	112	87.4	94.0	91.6	91.1	84.7	110	
80	87.5	77.6	64.9	62.4	65.7	62.0	67.6	80.8	90.2	76.0	67.1	61.4	63.0	60.7	65.8	76.2	
85	43.8	42.6	35.0	30.8	31.0	31.3	36.3	44.6	44.5	39.9	31.3	27.8	27.6	28.3	31.4	40.3	
90	1.00	0.95	1.33	1.40	0.74	1.63	1.40	1.01	0.72	0.83	1.75	1.38	0.82	1.27	1.05	0.50	
95	0.53	0.61	0.88	0.77	0.61	0.88	1.11	0.63	0.61	0.94	1.48	1.05	1.12	0.83	0.88	0.72	
100	0.71	0.83	0.83	0.74	0.63	0.83	1.29	1.16	1.60	1.88	1.88	2.10	1.26	1.32	1.27	1.17	
105	0.94	0.99	0.85	0.77	0.65	1.16	1.81	2.16	2.87	2.98	2.97	2.40	1.48	1.44	1.60	1.55	
110	1.66	1.27	0.91	0.91	0.88	1.29	2.32	2.67	3.58	3.53	3.38	2.04	1.63	1.43	1.64	1.73	
115	1.68	1.36	1.08	1.05	0.88	1.23	2.63	3.22	3.65	3.55	3.47	2.04	1.78	1.53	1.67	1.70	
120	1.71	1.47	1.21	1.18	0.93	1.29	2.63	3.50	3.71	3.50	2.97	2.28	2.03	1.77	1.71	1.68	
125	1.71	1.76	1.21	1.27	1.21	1.81	2.54	3.49	3.58	3.47	2.42	2.60	1.94	1.92	1.74	1.74	
130	1.76	1.73	1.21	1.42	1.59	1.87	2.16	3.17	3.31	2.81	2.09	2.49	1.76	1.96	1.60	1.60	
135	1.81	1.76	1.21	1.59	1.63	1.93	1.83	2.61	2.54	2.43	1.78	2.70	2.47	1.85	1.47	1.33	
140	1.81	1.55	1.18	1.53	1.67	2.01	1.66	2.18	2.37	2.07	1.72	2.37	2.28	1.71	1.45	1.33	
145	1.80	1.38	1.10	1.48	1.72	1.92	1.54	1.89	2.21	2.05	1.68	2.10	2.01	1.82	1.43	1.33	
150	1.69	1.29	1.01	1.44	1.75	1.55	1.54	1.81	2.14	2.08	1.65	1.71	1.96	1.82	1.40	1.27	
155	1.54	1.16	0.94	1.41	1.76	1.38	1.56	1.68	2.08	2.05	1.65	1.39	1.81	1.76	1.38	1.25	
160	1.43	1.15	0.91	1.49	1.71	1.38	1.44	1.55	2.01	2.00	1.65	1.45	1.87	1.84	1.64	1.23	
165	1.41	1.13	0.92	1.38	1.65	1.42	1.00	1.42	1.76	1.60	1.46	1.55	1.92	2.01	1.78	1.23	
170	1.40	1.12	0.93	1.43	1.77	1.65	1.07	1.43	1.71	1.74	1.47	1.71	2.09	2.07	1.79	1.18	
175	1.38	1.11	0.93	1.71	1.87	1.74	1.14	1.52	1.71	1.77	1.43	1.49	2.04	2.10	1.77	1.17	
180	1.81	1.16	1.26	1.71	2.14	1.76	1.16	1.44	1.71	1.71	1.16	1.26	1.76	2.10	1.77	1.17	

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2.3 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2018-07-09	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	202421-215		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.0872	10.32	0.9865	5.42
A3	277.0	60	0.0443	10.77	0.8786	10.63
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

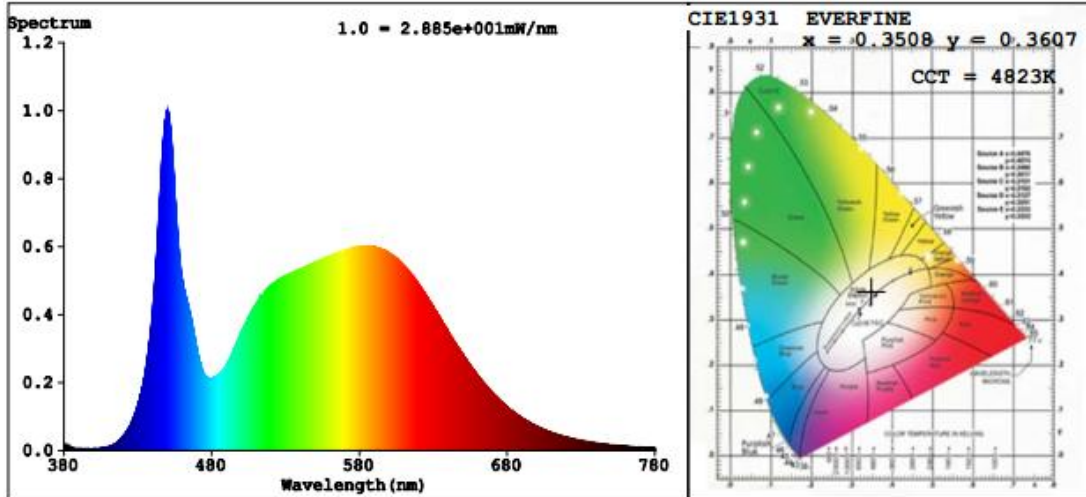
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	7
Frequency (Hz)	60	R2	87	R10	69
CCT (K)	4823	R3	92	R11	80
Duv	0.0023	R4	82	R12	56
Chromaticity (x, y)	x=0.3508 y=0.3607	R5	80	R13	82
Chromaticity (u', v')	u'=0.2118 v'=0.4899	R6	82	R14	96
Color Rendering Index (CRI)	82.3	R7	88	R15	75
R9	7	R8	67	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	1431	1473	Bare Lamp: 800(±10%)
Luminous Efficacy (lm/W)	138.66	136.77	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	132.87		

Spectral Power Distribution & Chromaticity Diagram



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2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
202421-211	3000K	1340	10.04	133.47
202421-212	3500K	1363 ^{*1}	10.18 ^{*2}	133.89 ^{*3}
202421-213	4000K	1386 ^{*1}	10.18 ^{*2}	136.15 ^{*3}
202421-215	5000K	1431	10.32	138.66

*1: This value is calculated and the calculation formula is as below:

$$1363 = (1431 - 1340) / 4 * 1 + 1340$$

$$1386 = (1431 - 1340) / 4 * 2 + 1340$$

*2: This value is calculated and the calculation formula is as below:

$$10.18 = (10.04 + 10.32) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$133.89 = 1363 / 10.18$$

$$136.15 = 1386 / 10.18$$

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2018-07-01	2019-06-30
ST-R-327	Spectral analysis system HAAS-2000	2018-07-01	2019-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2018-07-01	2019-06-30
GO-R5000	Goniophotometer system	2018-07-01	2019-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2018-07-07	2019-07-06

Expand Uncertainty:

Photometric Measurement (Sphere):2.04%, k=2

Chromaticity Measurement(Sphere):28.8K, k=2

Photometric Measurement(Goniophotometer):2.36%, k=2

******* END OF REPORT *********Laboratory: Standard-Tech Co., Ltd Testing Center****NVLAP CODE: 201011-0**

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