



LM-79-08 Test Report

For

Beyond LED Technology

(Brand Name: Beyond LED Technology)

1939 Parker Ct, Stone Mountain, GA 30087, USA

Model name(s): BLT-FL2*4-55-CC

Report Type: Testing and Report According to IES LM-79-2008
Type of Luminaire: 2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces
Report Date: 2019-04-03
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.



Certificate#4703.02

1.1 Product Information:		
Model Number	ZS-FL2*4-55-CC	
Remark	“CC” can be any number, represents color temperature, 30=3000K,35=3500K,40=4000K.45=4500K,50=5000K	
Representative (Tested) Model	ZS-FL2*4-55-30 ZS-FL2*4-55-50	
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)	2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces	
LED Manufacturer	DONGGUAN SINOWIN OPTO-ELECTRONIC CO.,LTD	
LED Model	ZT2835WOM1	
Dimming	Dimmable	
Sample Number	JBE190304-B1(3000K),B2(5000K)	
Date of Receipt	Apr.01,2019	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

1.2 Rated Values:	
Rated Voltage / Frequency	100-277Vac, 50/60Hz
Nominal Power	55W
Rated Initial Lamp Lumen	--
Declared CCT	3000K,3500K,4000K, 4500K,5000K

1.3 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
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. 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

1.4 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	Measured Value		Compliance	Requirement (DLC V4.4)	
Power (W)	3000K	120V	55.55	N/A	N/A
		277V	58.08		
	5000K	120V	54.50		
		277V	56.98		
Power Factor	3000K	120V	0.9930	Pass	≥ 0.9(-3%)
		277V	0.9030		
	5000K	120V	0.9936		
		277V	0.9035		
THD %	3000K	120V	6.08	Pass	≤ 20(+5)
		277V	15.01		
	5000K	120V	6.02		
		277V	14.94		
CRI	3000K	80.3		Pass	≥ 80(-2)
	5000K	80.8			
CCT (K)	3000K	2931		Pass	≤ 5000K
	5000K	4996			
Luminous Intensity Distribution	SC: 0-180°		1.28	Pass	1.0-2.0(±0.1)
	SC: 90-270°		1.37	Pass	1.0-2.0(±0.1)
	Zonal lumens in the 0-60°:		76.4	Pass	≥ 75(-3)
Total Luminous	3000K	120V	7897.0	Pass	≥ 3000(-10%)
		277V	8137.3		
	5000K	120V	8446		
		277V	8703		
Luminous Efficacy	3000K	120V	142.15	Pass	Standard: ≥ 100(-3%) Premium: ≥ 125(-3%)
		277V	140.10		
	5000K	120V	154.97		
		277V	152.74		



2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2019-04-02	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	ZS-FL2*4-55-30		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE190304-	120.0	60	0.4662	55.55	0.9930	6.08
B1	277.1	60	0.2321	58.08	0.9030	15.01

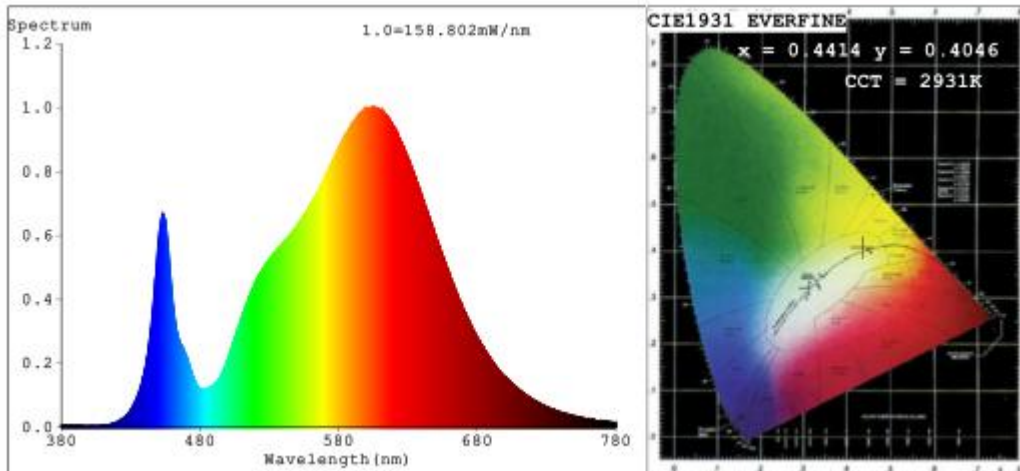
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	79	R9	4
Frequency (Hz)	60	R2	88	R10	71
CCT (K)	2931	R3	95	R11	75
Duv	-0.0004	R4	78	R12	58
Chromaticity (x, y)	x=0.4414 y=0.4046	R5	77	R13	81
Chromaticity (u', v')	u'=0.2532 v'=0.5223	R6	84	R14	97
Color Rendering Index (CRI)	80.3	R7	83	R15	72
R9	4	R8	58	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.1
Frequency (Hz)	60	60
Total Luminous (lm)	7897.0	8137.3
Luminous Efficacy (lm/W)	142.15	140.10
SC: 0-180° (if applicable)	1.28	--
SC: 90-270° (if applicable)	1.37	--
Zonal lumens in the 0-60°:	76.4	--
Beam Angle (°)	112.6	--
Center Beam Candle Power (cd)	2576	--

Spectral Power Distribution & Chromaticity Diagram

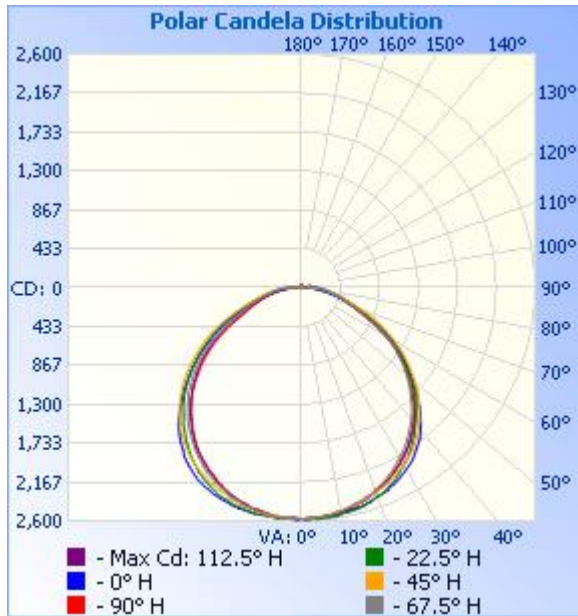


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	2,048.2	25.9%
0-40	3,392.3	43%
0-60	6,034.8	76.4%
60-90	1,675.3	21.2%
70-100	868.4	11%
90-120	144.1	1.8%
0-90	7,710.0	97.6%
90-180	186.2	2.4%
0-180	7,896.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	244.4	3.1%	90-100	83.8	1.1%
10-20	708.8	9.0%	100-110	39.3	0.5%
20-30	1,095.0	13.9%	110-120	21.0	0.3%
30-40	1,344.1	17.0%	120-130	11.8	0.1%
40-50	1,400.1	17.7%	130-140	9.9	0.1%
50-60	1,242.3	15.7%	140-150	8.4	0.1%
60-70	890.6	11.3%	150-160	6.1	0.1%
70-80	521.4	6.6%	160-170	4.2	0.1%
80-90	263.2	3.3%	170-180	1.7	0%

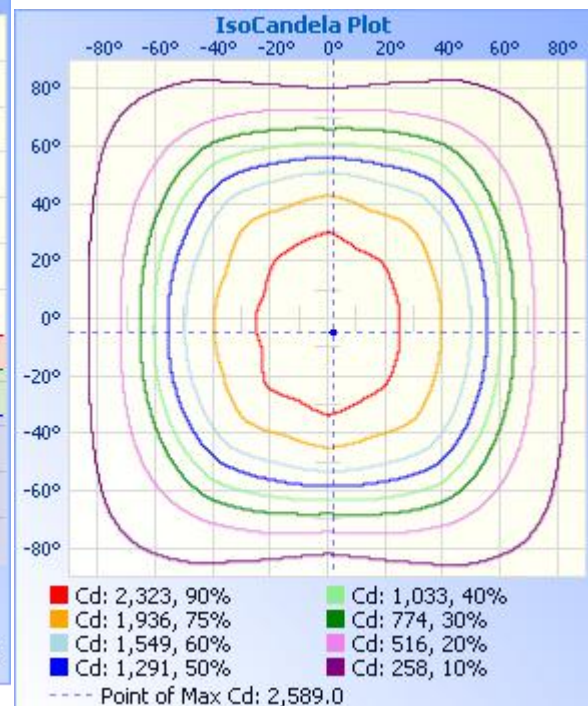
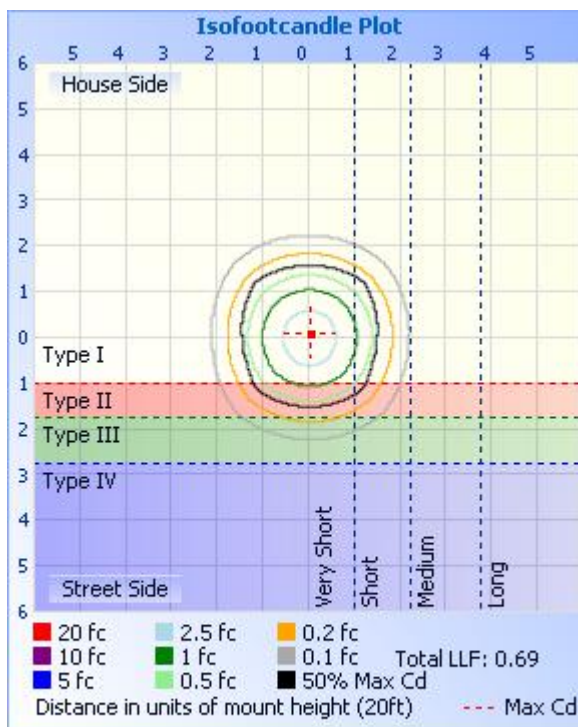
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
3.3ft	237 fc	10.2 ft	9.6 ft
6.7ft	57.4 fc	20.7 ft	19.5 ft
10.0ft	25.8 fc	30.9 ft	29.1 ft
13.3ft	14.6 fc	41.1 ft	38.7 ft
16.7ft	9.23 fc	51.7 ft	48.6 ft
20.0ft	6.44 fc	61.9 ft	58.2 ft

■ Vert. Spread: 114.2°
■ Horiz. Spread: 111.0°





Certificate#4703.02

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Table--1

UNIT: cd

C (DEG) y (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	2576	2576	2576	2576	2576	2576	2576	2576	2576	2576	2576	2576	2576	2576	2576	2576			
5	2565	2571	2551	2575	2567	2571	2561	2556	2571	2567	2559	2581	2576	2587	2572	2574			
10	2531	2541	2523	2548	2540	2561	2524	2525	2530	2541	2556	2569	2567	2571	2550	2543			
15	2484	2489	2493	2509	2524	2537	2482	2470	2482	2484	2531	2536	2555	2543	2511	2503			
20	2413	2423	2441	2447	2472	2478	2425	2394	2407	2426	2488	2495	2524	2505	2454	2429			
25	2308	2324	2355	2352	2422	2394	2357	2306	2332	2332	2435	2423	2474	2431	2403	2350			
30	2205	2210	2263	2242	2334	2283	2276	2186	2218	2223	2353	2323	2399	2328	2320	2237			
35	2070	2081	2152	2109	2217	2139	2173	2050	2092	2100	2232	2181	2285	2192	2213	2106			
40	1904	1920	2012	1942	2059	1977	2024	1897	1938	1954	2093	2024	2121	2037	2086	1968			
45	1730	1742	1839	1756	1855	1799	1852	1720	1751	1792	1911	1852	1915	1866	1924	1793			
50	1513	1540	1637	1557	1618	1591	1651	1530	1545	1601	1710	1646	1685	1664	1734	1597			
55	1285	1323	1415	1341	1363	1366	1434	1326	1330	1397	1489	1427	1440	1452	1522	1381			
60	1014	1071	1187	1107	1094	1123	1201	1099	1082	1173	1256	1195	1181	1219	1282	1138			
65	744	802	945	873	837	884	966	838	799	887	1023	953	914	975	1036	864			
70	558	599	681	660	621	667	708	616	598	648	753	722	672	740	770	642			
75	423	451	496	481	430	485	503	463	449	494	538	532	476	545	554	488			
80	310	340	369	326	271	324	372	342	332	362	398	358	306	372	411	364			
85	220	241	264	220	144	213	268	252	237	265	287	240	169	248	299	266			
90	98.0	97.7	101	78.3	46.5	75.2	102	98.1	102	144	171	139	85.1	145	187	163			
95	109	110	86.0	42.7	45.5	44.7	96.5	126	97.6	115	99.2	69.4	59.8	67.4	91.4	107			
100	88.2	75.8	44.4	29.9	21.9	29.4	53.6	96.2	107	100	66.0	32.2	23.6	31.7	55.3	88.7			
105	40.4	40.6	35.7	21.0	17.7	21.8	37.6	41.6	54.2	43.1	37.9	25.5	13.4	24.7	37.0	42.5			
110	33.5	33.1	28.3	17.1	12.4	17.0	29.9	34.1	38.2	35.2	28.9	18.9	17.3	19.0	29.5	34.1			
115	28.2	27.5	11.3	10.8	9.42	15.0	12.5	29.6	32.4	29.8	14.9	12.9	15.1	14.9	16.8	28.3			
120	24.4	20.9	15.9	11.7	14.0	14.5	16.2	15.4	28.3	24.9	18.8	14.1	15.6	13.3	17.1	23.4			
125	4.24	14.5	14.8	9.99	13.6	13.1	10.3	18.2	4.98	13.3	17.0	13.1	11.4	13.1	15.9	9.36			
130	18.1	16.0	6.37	10.9	11.8	13.5	10.2	16.3	17.3	16.8	9.71	13.8	15.1	14.6	8.26	16.2			
135	17.1	14.3	11.8	12.0	15.3	10.4	15.2	7.90	14.9	8.11	16.0	13.8	15.1	14.6	14.7	14.3			
140	8.24	12.0	11.7	7.73	13.5	8.85	15.1	15.1	8.32	15.6	15.5	9.08	14.1	10.00	14.1	11.7			
145	17.5	14.2	10.1	7.62	12.7	13.1	12.8	15.7	17.5	17.9	15.1	8.65	12.7	12.2	12.3	14.8			
150	17.5	13.6	10.9	11.4	12.3	11.9	12.6	14.9	17.5	18.2	15.0	11.6	12.0	12.7	13.0	14.3			
155	18.4	13.0	8.09	12.2	11.8	11.2	8.65	14.4	17.3	17.4	14.5	12.2	12.7	13.6	9.85	14.1			
160	14.9	11.3	10.9	12.8	12.8	13.4	13.4	9.25	12.6	12.4	12.1	13.8	14.7	15.4	16.9	10.2			
165	17.7	16.7	15.5	13.4	13.3	14.4	14.4	14.1	12.0	12.3	16.3	14.5	15.3	15.9	17.5	16.5			
170	21.9	18.7	17.7	14.4	14.5	15.4	16.3	16.0	19.6	19.4	18.1	16.3	16.1	16.5	17.5	17.6			
175	21.6	19.5	18.5	15.6	15.5	16.1	16.9	17.2	20.3	20.1	19.1	16.6	16.6	16.9	18.4	17.7			
180	20.6	19.9	18.0	16.6	15.9	16.3	16.6	18.0	20.5	20.4	19.1	16.3	16.3	16.6	18.2	17.1			



2.3 Electrical, Photometric and Chromaticity Measurements

Test date	2019-04-02	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	ZS-FL2*4-55-50		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE190304-	120.0	60	0.4571	54.50	0.9936	6.02
B2	277.0	60	0.2277	56.98	0.9035	14.94

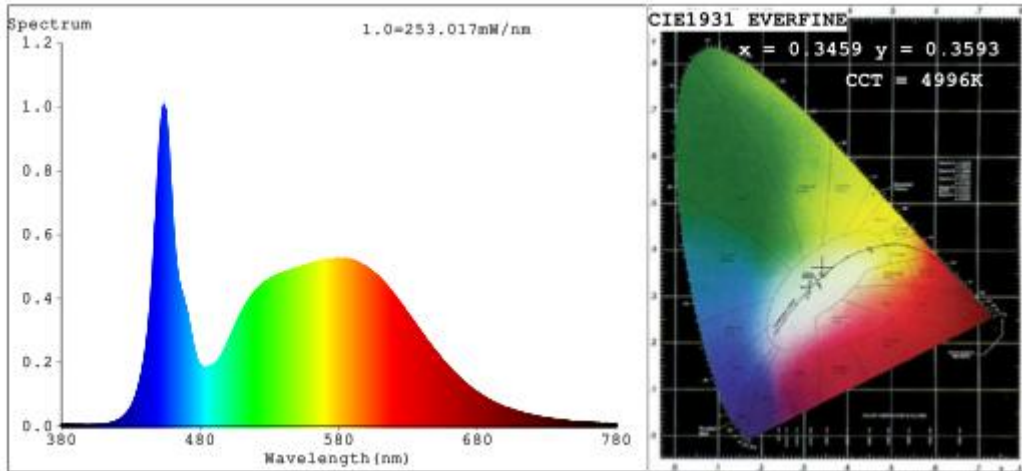
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	79	R9	1
Frequency (Hz)	60	R2	87	R10	68
CCT (K)	4996	R3	92	R11	75
Duv	0.0035	R4	78	R12	47
Chromaticity (x, y)	x=0.3459 y=0.3593	R5	78	R13	81
Chromaticity (u', v')	u'=0.2090 v'=0.4885	R6	81	R14	96
Color Rendering Index (CRI)	80.8	R7	87	R15	73
R9	1	R8	65	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	8446	8703
Luminous Efficacy (lm/W)	154.97	152.74

Spectral Power Distribution & Chromaticity Diagram





2.4 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
ZS-FL2*4-55-30	3000K	7897	55.55	142.16
ZS-FL2*4-55-35	3500K	8034 ^{*1}	55.03 ^{*2}	145.99 ^{*3}
ZS-FL2*4-55-40	4000K	8172 ^{*1}	55.03 ^{*2}	148.50 ^{*3}
ZS-FL2*4-55-45	4500K	8309 ^{*1}	55.03 ^{*2}	150.99 ^{*3}
ZS-FL2*4-55-50	5000K	8446 ^{*1}	54.50	154.97

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

$$8034 = (8446 - 7897.0) / 4 * 1 + 7897.0$$

$$8172 = (8446 - 7897.0) / 4 * 2 + 7897.0$$

$$8309 = (8446 - 7897.0) / 4 * 3 + 7897.0$$

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

$$55.03 = (54.50 + 55.55) / 2$$

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

$$145.99 = 8034 / 55.03$$

$$148.50 = 8172 / 55.03$$

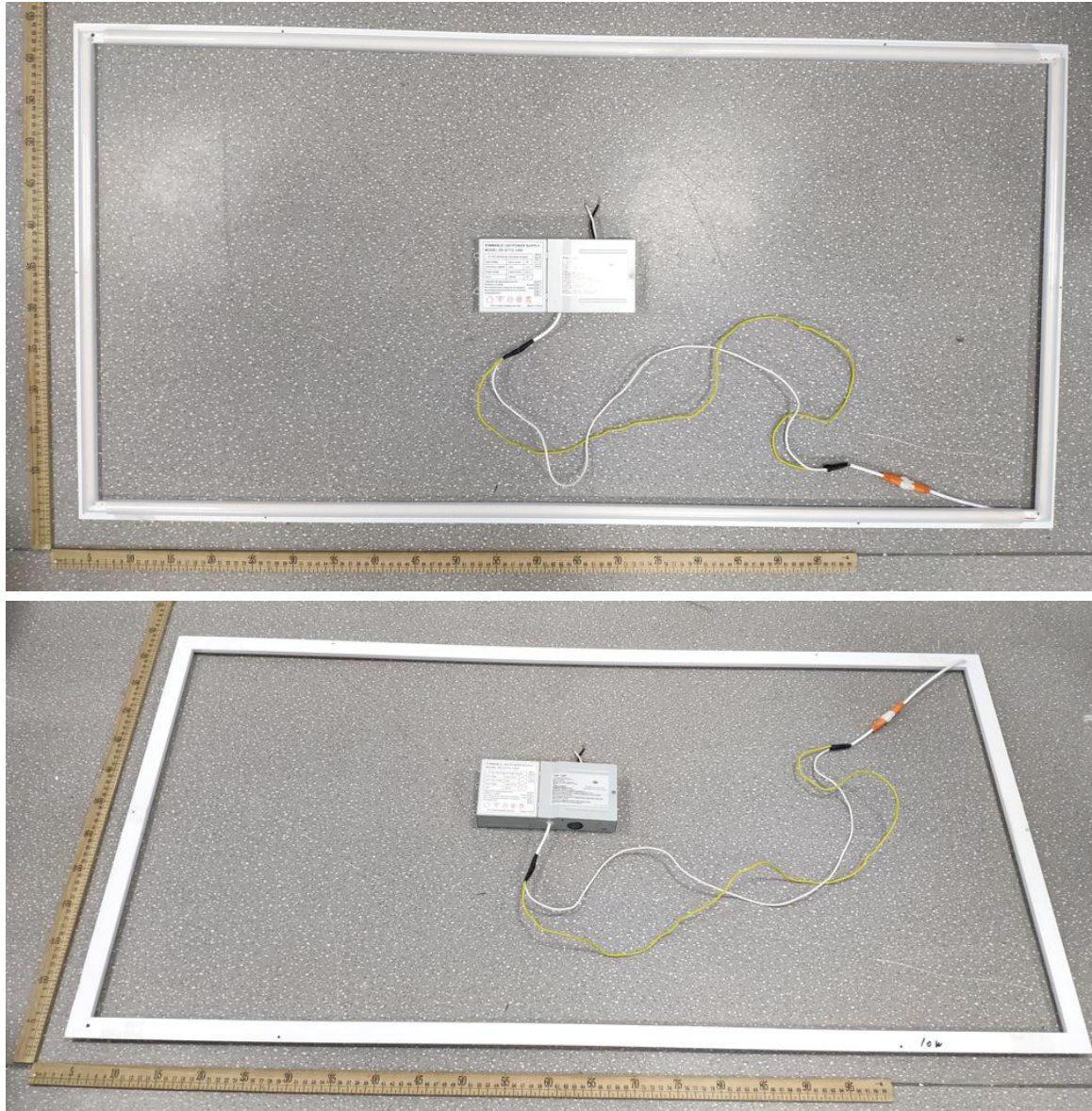
$$150.99 = 8309 / 55.03$$



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	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	Standard Lamp	2019-02-12	2020-02-11
ST-R-711	Power Meter for Goniophotometer	2019-01-06	2020-01-05
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

4. Product Photo



***** END OF REPORT *****