

IES LM-79-08

MEASUREMENT AND TEST REPORT For

Beyond LED Technology 1939 Parker Ct Stone Mountain, GA 30087

Test Model: 100149

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, Power Factor, THD, Off-state Power
Test Engineer:	Daniel Duan <i>Daniel Duan</i>
Report Number:	RSZ140715506-10
Test Date:	2014-07-23 to 2014-07-30
Report Date:	2014-08-01
Reviewed By:	Jeanne Han/Safety Manager <i>Jeanne Han</i>
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Test Facility:	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
Accreditation:	The NVLAP Lab Code is 200707-0.

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1. Product Description

General Information:

One sample was received on 2014-07-21 and used for testing. Sample No.: RSZ140715506-S01 Model: 100149

Model Tested: 100149

Manufacturer: Beyond LED Technology

Brand Name: BEYOND LED

Product Designation: Linear Ambient Luminaires: Direct

Burning Time Before Test: 0 hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 100-277VAC 50/60Hz

Rated Power: 22W

Nominal CCT: 5000K

Length: 1.2M

2. Standards Used

- IESNA LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	N/A	2013-12-26	2014-12-26
Plus UV-VIS-Near IR Spectrophoto Colorimeter	EVERFINE	PMS-50(380nm-800nm)	506006	380nm~800nm	2014-03-08	2015-03-08
Digital CC&CV DC Power Supply	EVERFINE	WY305	1101047	30V/5A	2014-03-12	2015-03-12
Temperature/humidity/clock	Victor	VC230	EE209	0~40℃0~90%	2013-04-01	2016-03-31
Standard Light Source	EVERFINE	D204	201311	N/A	2013-09-26	2014-09-26
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010	1011001T	N/A	2014-03-12	2015-03-12
AC Power Supply	EVERFINE	VPS1060 PWM	1101006	0-150V, 0-300V	2014-03-12	2015-03-12
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2014-03-12	2015-03-12
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2014-03-12	2015-03-12
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2014-03-04	2015-03-04
Thermal Meter	Victor	VC230	EE091	0~40℃0~90%	2013-04-01	2016-03-31
Standard Light Source	EVERFINE	D908	1012001	N/A	2014-05-06	2015-05-06
Digital Power Meter	EVERFINE	PF9811	507047	0~35V DC	2013-11-12	2014-11-12
AC POWER SUPPLY	SZHPC	HPA 1103	0003394	3KVA	2014-03-12	2015-03-12

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.15\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level. This calibration results traceable to the NATIONAL INSTITUTE OF METROLOGY (NIM).

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the luminous intensity is $U=2.82\%$ ($K=2$), at the 95% confidence level.

Additional Test

The Additional Test item may not be covered by IESNA LM-79-2008. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$. Test voltage for THD and power factor test would be equal to rated voltage or, in case of a voltage range, maximum value of that range.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.15\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hours**

Test orientation: **Downward**

Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60.0	0.1779	21.1	0.988

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
2546.3	7.814	120.63	5176	3.13E-03

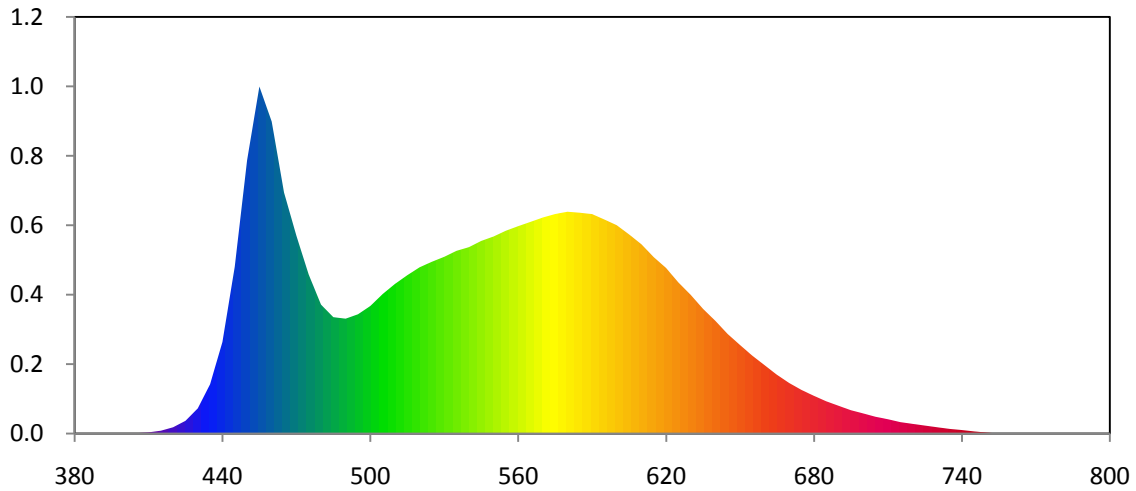
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3408	0.3543	0.2074	0.3236	0.2074	0.4854

Color Rendering Index

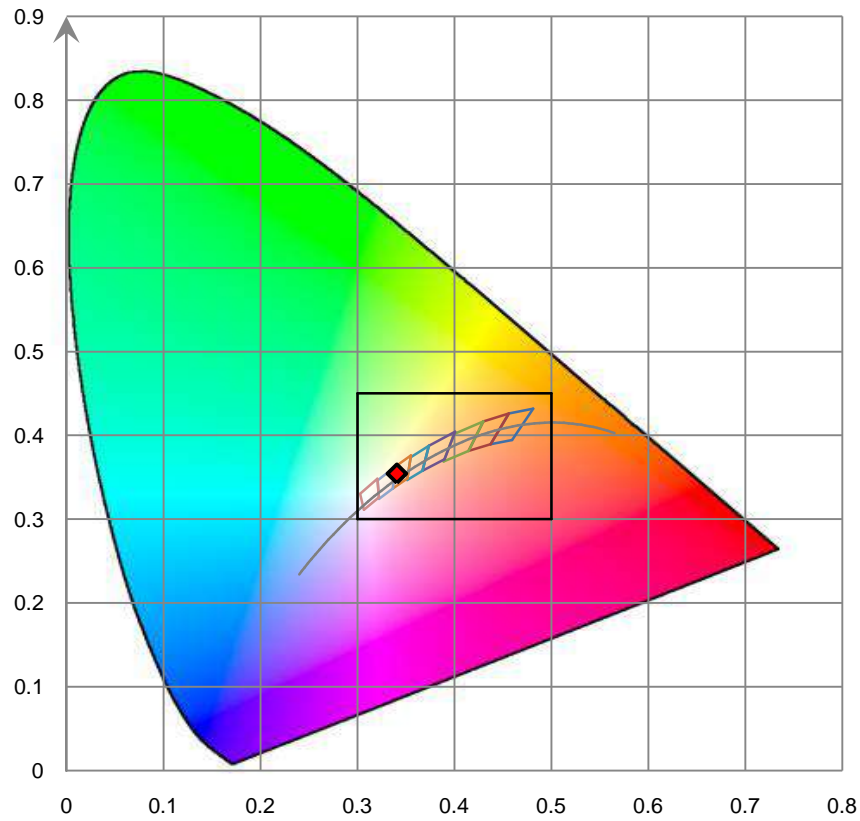
Ra			
81.8			
R1 80	R2 92	R3 94	R4 77
R5 80	R6 87	R7 83	R8 61
R9 0	R10 79	R11 76	R12 60
R13 84	R14 97	R15 74	

Relative Spectral Power Distribution

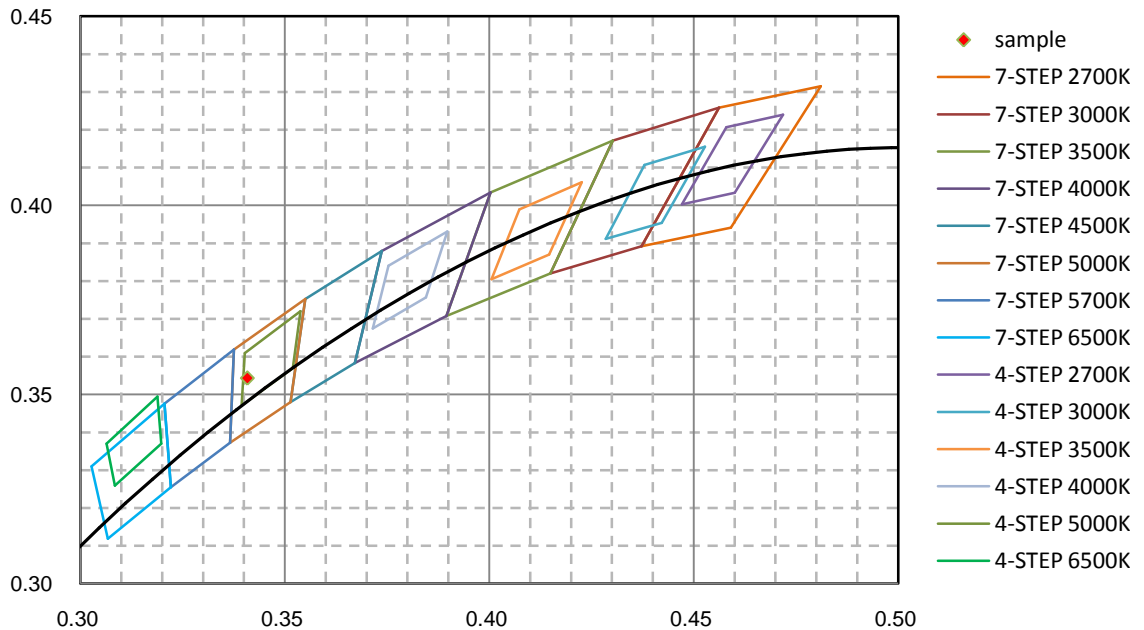


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.000E+00	465	4.528E+01	550	3.701E+01	635	2.342E+01	720	1.822E+00
385	0.000E+00	470	3.718E+01	555	3.810E+01	640	2.117E+01	725	1.502E+00
390	0.000E+00	475	2.988E+01	560	3.896E+01	645	1.870E+01	730	1.185E+00
395	8.530E-04	480	2.422E+01	565	3.976E+01	650	1.663E+01	735	8.796E-01
400	2.367E-02	485	2.186E+01	570	4.058E+01	655	1.463E+01	740	6.665E-01
405	7.925E-02	490	2.158E+01	575	4.124E+01	660	1.283E+01	745	4.047E-01
410	2.203E-01	495	2.240E+01	580	4.167E+01	665	1.104E+01	750	1.970E-01
415	5.369E-01	500	2.396E+01	585	4.148E+01	670	9.481E+00	755	0.000E+00
420	1.187E+00	505	2.620E+01	590	4.122E+01	675	8.182E+00	760	0.000E+00
425	2.390E+00	510	2.811E+01	595	4.020E+01	680	7.086E+00	765	0.000E+00
430	4.729E+00	515	2.974E+01	600	3.913E+01	685	6.058E+00	770	0.000E+00
435	9.271E+00	520	3.123E+01	605	3.741E+01	690	5.218E+00	775	0.000E+00
440	1.720E+01	525	3.227E+01	610	3.555E+01	695	4.387E+00	780	0.000E+00
445	3.133E+01	530	3.320E+01	615	3.314E+01	700	3.781E+00	785	0.000E+00
450	5.130E+01	535	3.433E+01	620	3.110E+01	705	3.153E+00	790	0.000E+00
455	6.519E+01	540	3.501E+01	625	2.838E+01	710	2.694E+00	795	0.000E+00
460	5.860E+01	545	3.618E+01	630	2.605E+01	715	2.154E+00	800	0.000E+00

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0 hours**

Test orientation: **Downward**

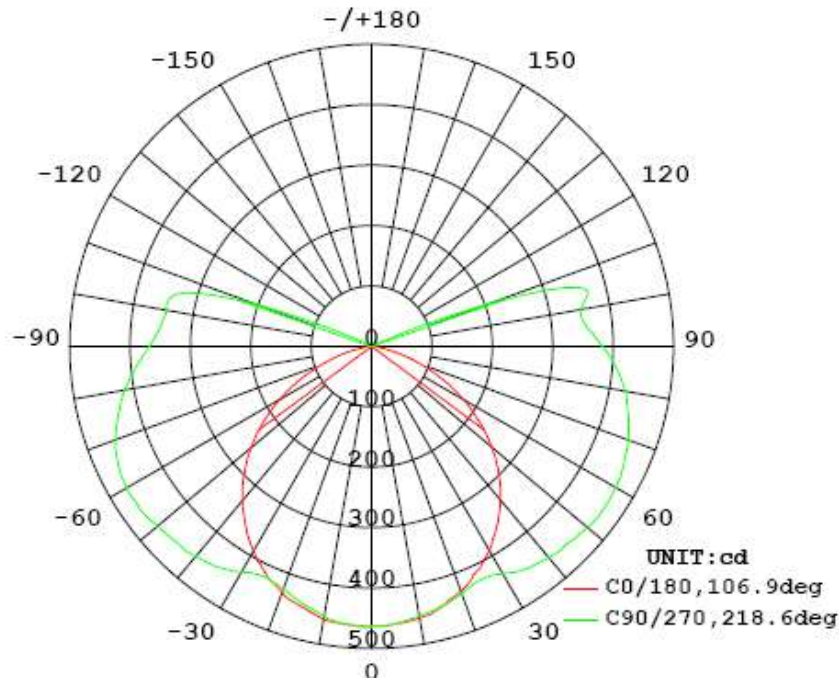
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60.0	0.1765	20.93	0.9879

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
2526.18	120.70	463	1.25	1.49

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	106.9	202.2	218.6	203.4	182.78
Field Angle (10% I _{max}):	151.0	211.5	228.1	212.2	200.70

Luminous Intensity (cd) Distribution Data

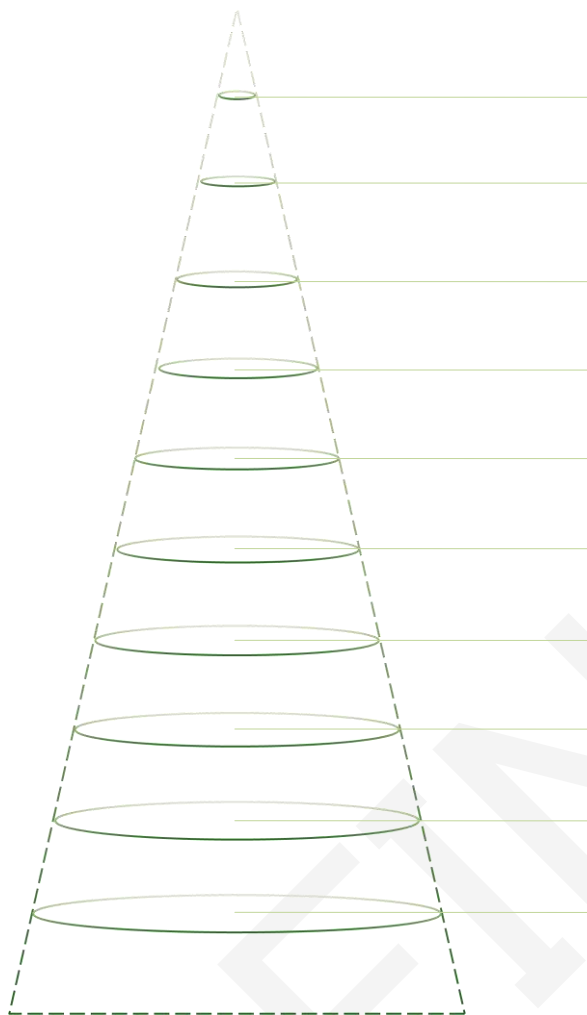
C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	463	463	463	463	463	463	463	463
5.0°	462	462	461	461	461	462	462	461
10.0°	459	455	456	457	454	456	456	457
15.0°	446	447	444	443	441	443	445	446
20.0°	434	433	427	428	427	429	429	431
25.0°	415	413	411	417	421	419	411	413
30.0°	391	390	395	415	431	419	396	387
35.0°	363	364	383	428	446	433	385	364
40.0°	333	336	384	434	454	438	388	338
45.0°	299	309	384	439	458	443	390	313
50.0°	260	282	379	439	463	443	387	290
55.0°	220	262	369	443	469	448	380	273
60.0°	177	245	363	444	468	448	375	257
65.0°	132	224	356	439	463	445	371	237
70.0°	88	200	347	427	451	434	362	214
75.0°	50	182	327	412	434	416	343	198
80.0°	22	161	301	390	415	396	317	176
85.0°	6	127	272	365	392	372	289	141
90.0°	0	92	242	337	368	341	257	105
95.0°	0	93	234	327	352	328	249	123
100.0°	0	5	243	323	346	327	259	6
105.0°	0	3	82	300	336	304	104	4
110.0°	0	3	6	121	202	130	7	3
115.0°	0	2	4	10	36	12	4	2
120.0°	0	1	3	4	5	4	3	2
125.0°	0	1	2	3	3	3	3	1
130.0°	0	0	2	2	2	2	2	1
135.0°	0	0	1	2	2	2	2	1
140.0°	0	0	1	1	1	1	1	1
145.0°	1	0	1	1	1	1	1	1
150.0°	1	0	0	1	1	1	1	1
155.0°	1	0	0	1	1	0	0	1
160.0°	1	0	0	0	0	0	0	1
165.0°	1	0	0	0	0	0	1	1
170.0°	1	1	1	1	0	1	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	1	1	1	1	1	1	1	1

Luminous Intensity (cd) Distribution Data (cont.)

C \ Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	463	463	463	463	463	463	463	463
5.0°	461	462	461	462	460	460	460	462
10.0°	457	454	452	451	453	451	453	454
15.0°	446	443	441	445	445	445	442	444
20.0°	432	427	430	434	435	435	431	428
25.0°	411	409	416	422	426	422	415	409
30.0°	390	390	399	420	435	422	400	388
35.0°	362	364	387	432	449	435	391	364
40.0°	331	339	385	439	457	442	391	339
45.0°	297	313	387	443	459	447	393	313
50.0°	259	285	380	444	467	449	388	289
55.0°	217	264	374	448	469	452	382	271
60.0°	175	248	368	443	467	449	377	255
65.0°	130	226	358	437	460	441	367	235
70.0°	87	204	343	424	452	430	353	213
75.0°	50	182	324	410	440	418	336	193
80.0°	22	155	303	396	426	401	315	165
85.0°	5	130	281	374	406	375	292	141
90.0°	0	100	259	356	382	353	263	107
95.0°	0	86	233	322	358	328	242	97
100.0°	0	5	263	324	351	331	275	5
105.0°	0	3	68	319	367	324	74	3
110.0°	0	3	6	107	207	111	6	3
115.0°	0	2	3	6	19	6	3	2
120.0°	0	2	3	4	5	4	3	2
125.0°	0	1	2	3	3	3	2	1
130.0°	0	0	2	2	2	2	2	0
135.0°	0	0	1	2	2	2	1	0
140.0°	0	0	1	1	1	1	1	0
145.0°	0	0	0	1	1	1	1	0
150.0°	0	0	0	0	1	1	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	1	0	0	0	0	0	0	0
170.0°	1	1	1	1	0	0	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	1	1	1	1	1	1	1	1

Average Area Illumination Figure

Angle: 90.00°. Flux out: 753.2 lm.



Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	100.0	959.0	1860.0
1.0	200.0	239.8	465.0
1.5	300.0	106.6	206.7
2.0	400.0	59.9	116.2
2.5	500.0	38.4	74.4
3.0	600.0	26.6	51.7
3.5	700.0	19.6	38.0
4.0	800.0	15.0	29.1
4.5	900.0	11.8	23.0
5.0	1000.0	9.6	18.6

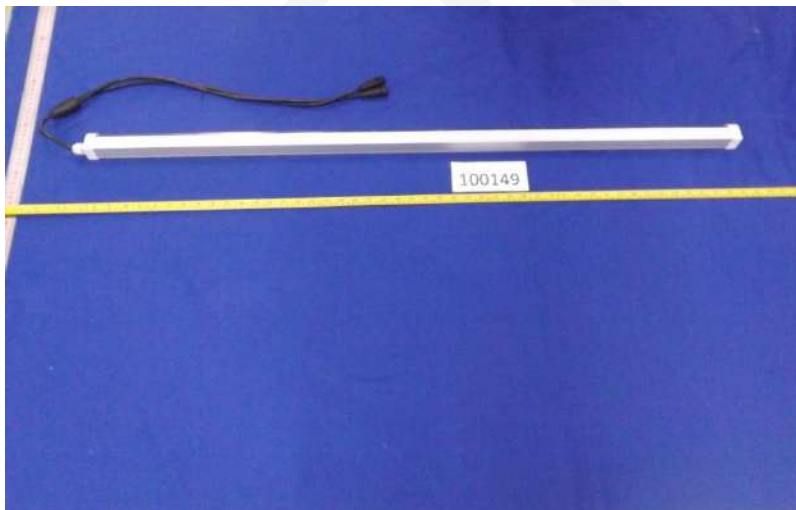
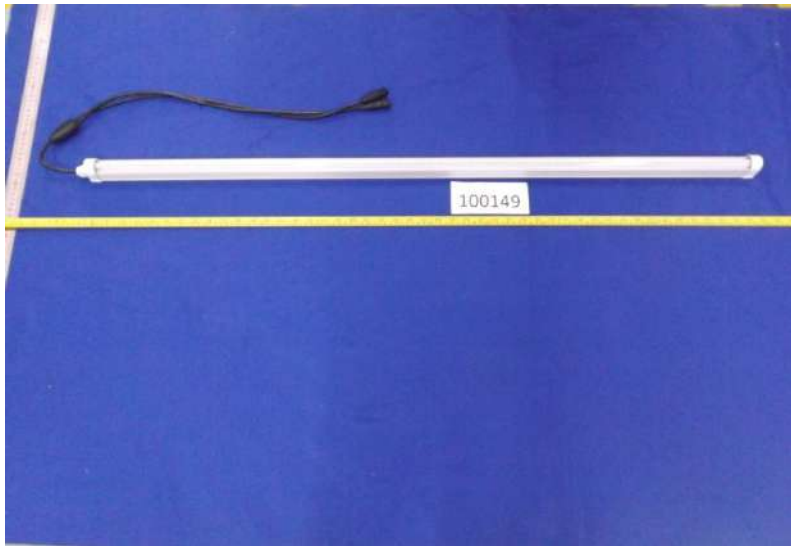
Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	11.1	0.44	0-5	11.1	0.44
5-10	32.8	1.29	0-10	43.8	1.73
10-15	53.3	2.12	0-15	97.2	3.85
15-20	72.1	2.85	0-20	169.2	6.70
20-25	88.7	3.51	0-25	257.9	10.21
25-30	103.6	4.10	0-30	361.5	14.31
30-35	117.9	4.67	0-35	479.4	18.98
35-40	131.2	5.19	0-40	610.6	24.17
40-45	142.6	5.65	0-45	753.2	29.82
45-50	151.4	5.99	0-50	904.6	35.81
50-55	158.3	6.26	0-55	1062.9	42.07
55-60	163.2	6.47	0-60	1226.1	48.54
60-65	165.4	6.55	0-65	1391.6	55.09
65-70	163.9	6.48	0-70	1555.5	61.57
70-75	159.2	6.31	0-75	1714.7	67.88
75-80	151.9	6.01	0-80	1866.6	73.89
80-85	141.5	5.60	0-85	2008.1	79.49
85-90	128.7	5.10	0-90	2136.8	84.59
90-95	119.1	4.71	0-95	2255.9	89.30
95-100	106.4	4.21	0-100	2362.3	93.51
100-105	92.9	3.68	0-105	2455.3	97.19
105-110	52.3	2.07	0-110	2507.6	99.26
110-115	13.3	0.53	0-115	2520.9	99.79
115-120	2.0	0.08	0-120	2522.8	99.87
120-125	1.1	0.04	0-125	2523.9	99.91
125-130	0.7	0.03	0-130	2524.6	99.94
130-135	0.5	0.02	0-135	2525.1	99.96
135-140	0.3	0.01	0-140	2525.4	99.97
140-145	0.2	0.01	0-145	2525.7	99.98
145-150	0.2	0.01	0-150	2525.8	99.99
150-155	0.1	0.00	0-155	2525.9	99.99
155-160	0.1	0.00	0-160	2526.0	99.99
160-165	0.1	0.00	0-165	2526.1	99.99
165-170	0.1	0.01	0-170	2526.1	100.00
170-175	0.0	0.00	0-175	2526.2	100.00
175-180	0.0	0.00	0-180	2526.2	100.00

[Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	277	60	0.931
Total Harmonic Distortion:	120	60	14.08%
Total Harmonic Distortion:	277	60	14.98%
Off State Power (W):	120	60	0.0

6. Product Photo



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