

## **LM-79-08 Test Report**

For

# **Beyond LED Technology**

**(Brand Name: Beyond LED Technology)**

4F Building 1, Changfang Industrial Park, No.1 Xingyuan East Road, Dongjiang High-tech Industrial Park , Zhongkai High-tech Zone, Huizhou,Guangdong, China

## **2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces**

Model name(s): DYU-TRO26640-DN-T50-A

Representative (Tested) Model:

DYU-TRO26640-DN-T50-A(0%,3500K)  
DYU-TRO26640-DN-T50-A(50%,4000K)  
DYU-TRO26640-DN-T50-A(100%,5000K)

Model Different: N/A

Test & Report By:

*Ferrum Li*

Engineer: Ferrum Li

Date: Jun.13,2022

Review By:

*Garman Mo*

Manager: Garman Mo

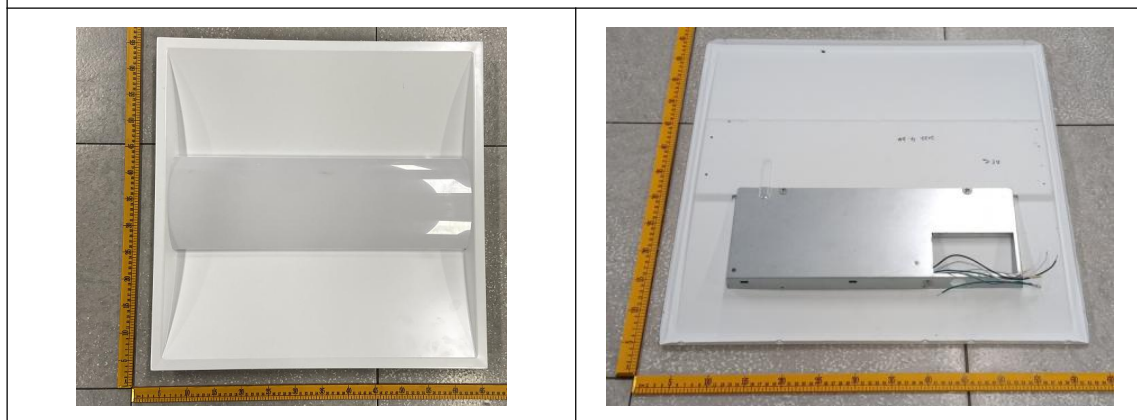
Note: 1.The results contained in this report pertain only to the tested samples.

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

**1.1 Product Information:**

Organization Name	Beyond LED Technology	
Brand Name	Beyond LED Technology	
Model Number	DYU-TRO26640-DN-T50-A	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	120-277Vac, 50/60Hz	
Nominal Power	20W/30W/40W	
Rated Initial Lamp Lumen	--	
Declared CCT	3500K,4000K,5000K	
LED Manufacturer	DONGGUAN SINOWIN OPTO-ELECTRONIC CO.,LTD	
LED Model	ZT2835WOM1	
Integral Controls Availability	Yes	
Dimming	Continuous	
Sample Number	JAE220502-C1	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

**Photo**



**1.2 Test Specifications:**

Date of Receipt	May.13,2022
Date of Test	May.14,2022
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 C78.377-2017 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> </ol>

**1.3 Test Methods**

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b> 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.</p>
<p><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b> 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.</p>
<p><b>3) Electrical Measurements:</b> 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.</p>

**2.1 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2022-05-14	<b>Test Ambient:</b>	25±1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	DYU-TRO26640-DN-T50-A	<b>Total Operating Time (min)</b>	75

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE220502-	120.1	60	0.3257	38.87	0.9933	9.84
C1	277.3	60	0.1394	37.47	0.9693	12.23
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Photometric Measurement – Goniophotometer Method(Test Distance: 26.000m):**

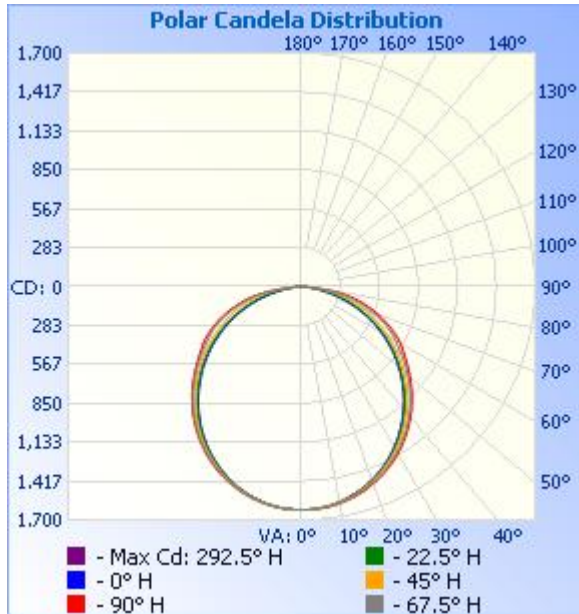
Parameter	Result		DLC V5.1 Pass Criteria	
Test Voltage (V)	120	277	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4808.7	4675.7	>=2000 (-10%)	
Luminous Efficacy (lm/W)	123.72	124.79	Standard: >= 110(-3%)	Premium: >= 125(-3%)
Zonal lumens in the 0-60° zone (%)	76.7	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.28	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.24	--	1.0-2.0(±0.1)	
Beam Angle (°)	115.7	--	--	
Center Beam Candle Power (cd)	1626	--	--	

**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,262.7	26.3%
0-40	2,070.4	43.1%
0-60	3,686.8	76.7%
60-90	1,114.0	23.2%
70-100	492.3	10.2%
90-120	3.0	0.1%
0-90	4,800.8	99.8%
90-180	7.4	0.2%
0-180	4,808.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	153.8	3.2%	90-100	0.8	0%
10-20	440.6	9.2%	100-110	1.0	0%
20-30	668.3	13.9%	110-120	1.2	0%
30-40	807.6	16.8%	120-130	1.4	0%
40-50	842.5	17.5%	130-140	1.3	0%
50-60	773.9	16.1%	140-150	0.9	0%
60-70	622.4	12.9%	150-160	0.5	0%
70-80	392.8	8.2%	160-170	0.3	0%
80-90	98.8	2.1%	170-180	0.1	0%

## Photometric Data



### Illuminance at a Distance

Distance	Center Beam fc	Beam Width	Beam Width
4.0ft	101.6 fc	11.4 ft	14.3 ft
8.0ft	25.4 fc	22.8 ft	28.6 ft
12.0ft	11.3 fc	34.2 ft	43.0 ft
16.0ft	6.4 fc	45.6 ft	57.3 ft
20.0ft	4.1 fc	57.0 ft	71.6 ft

■ Vert. Spread: 109.9°  
■ Horiz. Spread: 121.6°

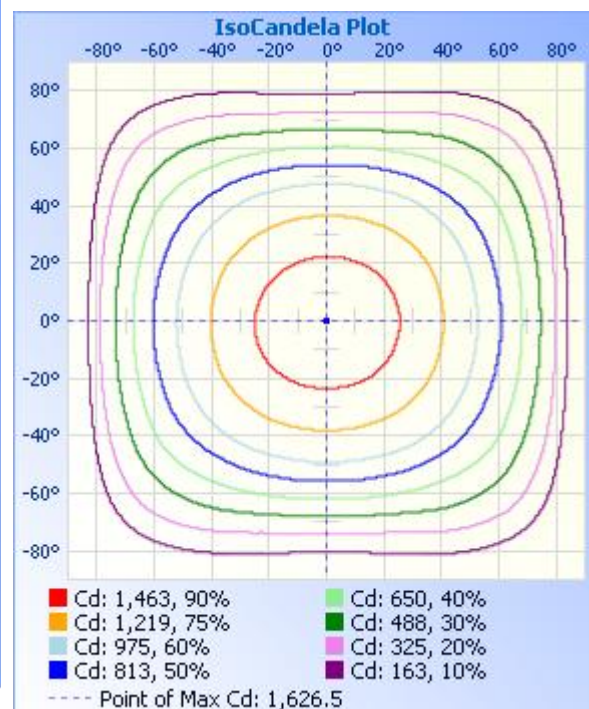
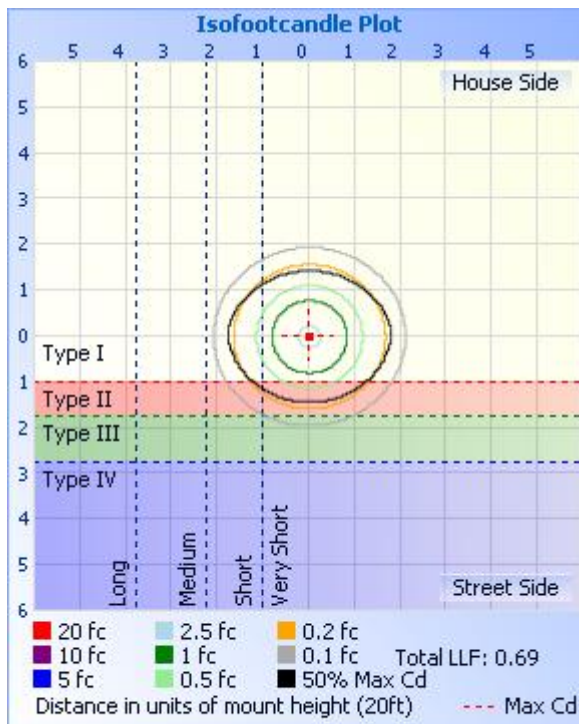


Table--1 UNIT: cd

C (DEG) □ (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	1626	1626	1626	1626	1626	1626	1626	1626	1626	1626	1626	1626	1626	1626	1626	1626			
5	1619	1620	1618	1617	1618	1617	1617	1617	1620	1620	1620	1618	1618	1619	1620	1617			
10	1600	1599	1594	1593	1591	1593	1595	1598	1601	1602	1598	1596	1596	1595	1598	1599			
15	1567	1566	1559	1555	1552	1552	1558	1564	1571	1569	1563	1558	1557	1558	1563	1565			
20	1524	1519	1510	1500	1498	1500	1508	1518	1526	1524	1516	1508	1504	1505	1514	1519			
25	1467	1461	1448	1435	1430	1434	1445	1459	1470	1467	1454	1443	1437	1441	1452	1461			
30	1397	1390	1374	1357	1349	1355	1370	1389	1402	1399	1381	1366	1360	1364	1378	1390			
35	1317	1308	1289	1268	1257	1264	1285	1308	1323	1318	1296	1279	1269	1276	1294	1310			
40	1227	1218	1193	1168	1155	1164	1189	1218	1235	1227	1204	1180	1168	1177	1200	1219			
45	1129	1117	1090	1060	1045	1056	1083	1117	1137	1127	1099	1073	1059	1071	1096	1119			
50	1025	1013	979	945	928	939	971	1009	1032	1020	988	958	943	956	985	1013			
55	919	902	861	824	803	817	852	897	927	911	870	836	819	834	868	903			
60	827	797	741	696	673	688	729	791	832	808	748	709	690	708	747	795			
65	720	697	624	565	539	556	608	684	719	700	631	577	556	576	626	698			
70	596	573	514	433	401	422	494	557	592	573	516	443	418	442	517	576			
75	466	441	384	303	264	290	364	425	461	440	384	313	281	311	390	445			
80	306	289	248	183	137	169	232	276	300	290	251	192	153	190	256	299			
85	92.9	86.4	82.8	63.5	38.5	57.9	79.3	82.8	89.8	92.5	92.1	73.0	49.3	73.1	101	101			
90	0.98	0.87	0.52	0.09	0.00	0.80	2.79	3.26	2.18	2.54	1.74	0.20	0.04	0.00	0.00	0.00			
95	0.79	0.70	0.35	0.09	0.00	0.70	1.75	2.19	1.49	1.31	1.13	0.09	0.00	0.00	0.00	0.00			
100	0.79	0.70	0.26	0.09	0.00	1.22	1.75	2.28	1.75	1.49	1.13	0.09	0.00	0.00	0.00	0.00			
105	1.14	0.70	0.70	0.44	0.62	1.39	2.53	2.89	1.93	1.66	1.13	0.35	0.00	0.00	0.00	0.09			
110	1.14	1.14	1.22	1.13	1.31	1.57	2.62	2.89	1.66	1.49	1.05	0.43	0.00	0.00	0.00	0.44			
115	1.49	1.31	1.40	1.30	1.92	1.66	2.62	2.98	1.49	1.58	1.05	0.52	0.35	0.00	0.09	0.44			
120	1.58	1.49	1.57	1.05	1.92	1.91	2.79	2.98	1.49	1.40	1.05	0.61	0.53	0.17	0.09	0.44			
125	1.84	1.58	1.66	2.61	2.97	2.53	2.71	3.07	1.58	1.40	0.87	0.70	0.70	0.61	0.09	0.44			
130	1.93	1.58	1.66	2.61	3.05	2.61	2.71	3.07	1.40	1.40	0.87	1.22	1.05	0.79	0.09	0.44			
135	1.93	1.58	1.57	2.61	3.23	2.61	2.27	3.07	1.40	1.40	0.78	1.22	1.31	1.13	0.09	0.44			
140	1.93	1.58	0.87	2.61	3.23	2.61	1.48	2.89	1.40	1.40	0.78	1.31	1.31	1.05	0.17	0.44			
145	1.93	1.66	0.00	2.18	2.44	2.09	1.22	2.54	1.40	1.23	0.78	0.87	1.22	1.48	0.35	0.44			
150	1.76	1.40	0.00	1.39	2.53	1.66	0.70	2.36	1.40	1.23	0.78	0.26	1.22	1.39	0.44	0.44			
155	1.66	1.23	0.00	1.31	2.53	1.66	0.70	2.10	1.31	1.14	0.78	0.26	1.22	1.57	0.44	0.44			
160	1.23	1.05	0.00	1.22	2.36	1.66	0.17	1.49	1.40	1.05	0.87	0.43	1.22	1.57	0.96	0.44			
165	1.23	0.79	0.00	1.13	2.09	1.39	0.09	0.61	0.79	0.96	0.70	0.61	1.22	1.57	1.05	0.53			
170	1.23	0.79	0.00	1.05	1.48	1.48	0.52	1.14	1.49	1.23	1.05	0.61	1.22	2.26	1.49	0.53			
175	1.23	0.79	0.00	1.13	2.27	1.39	0.52	1.31	1.49	1.23	0.87	0.26	1.22	2.26	1.40	0.53			
180	1.23	0.79	0.09	1.13	2.27	1.39	0.52	1.31	1.49	1.23	0.78	0.09	1.13	2.26	1.40	0.53			

**2.2 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2022-05-14	<b>Test Ambient:</b>	25±1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	DYU-TRO26640-DN-T50-A	<b>Total Operating Time (min)</b>	61

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE220502-	120.0	60	0.3285	39.07	0.9911	10.05
C1	277.0	60	0.1406	37.67	0.9671	12.44
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement - Sphere-Spectroradiometer**

**Method(Self-absorption:1.1328)(4π geometry):**

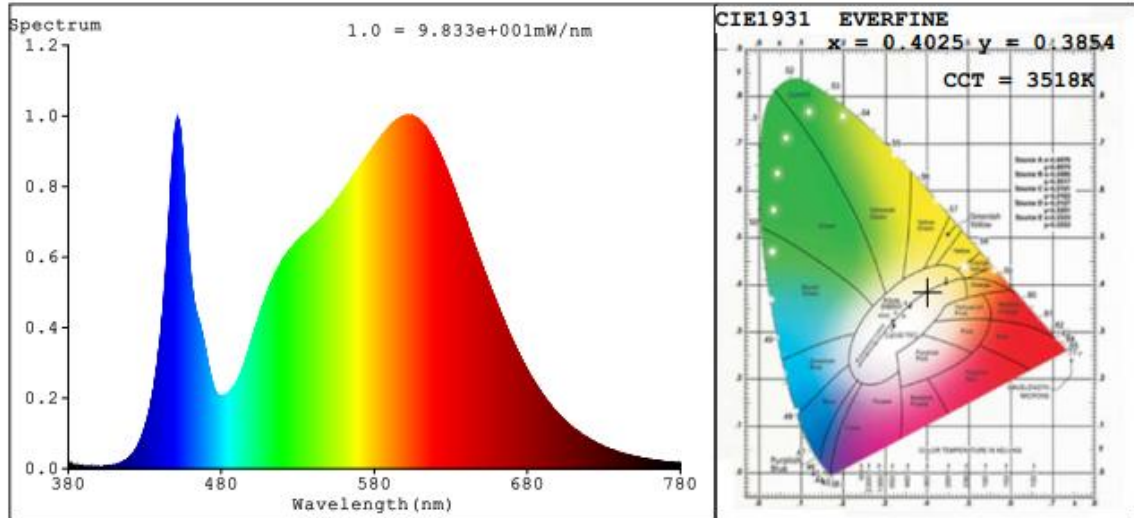
Parameter	Result	Parameter	Result
Test Voltage (V)	120	Color Rendering Index (CRI)	83.9
Frequency (Hz)	60	R9	17
CCT (K)	3518	Rg	98
Duv	-0.0017	Rf	84
Chromaticity (x, y)	x=0.4025 y=0.3854	Rcs,h1(%)	-11
Chromaticity (u', v')	u'=0.2361 v'=0.5086		

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V5.1 Pass Criteria	
Test Voltage (V)	120	277	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4839	4706	>=2000 (-10%)	
Luminous Efficacy (lm/W)	123.85	124.93	Standard: >= 110(-3%)	Premium: >= 125(-3%)



**Spectral Power Distribution & Chromaticity Diagram**



**Special Color Rendering Indices**

R1 =83	R2 =90	R3 =94	R4 =83	R5 =83	R6 =86	R7 =86		
R8 =66	R9 =17	R10=75	R11=82	R12=63	R13=85	R14=97	R15=78	

**TM30**

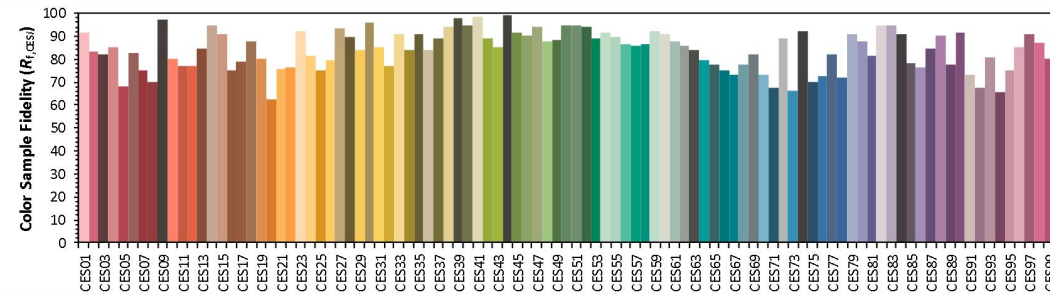
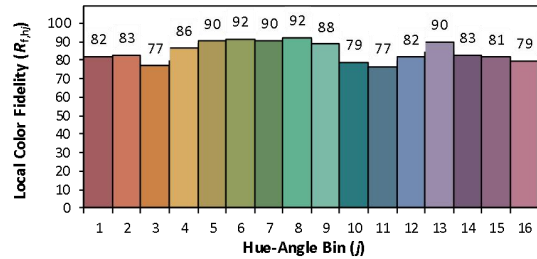
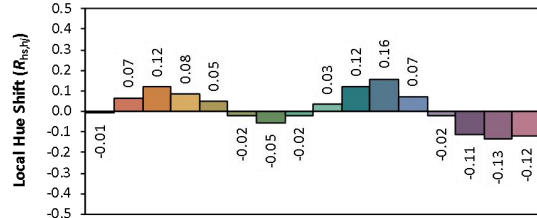
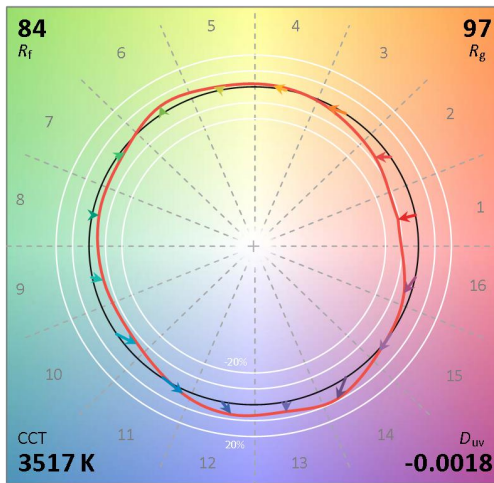
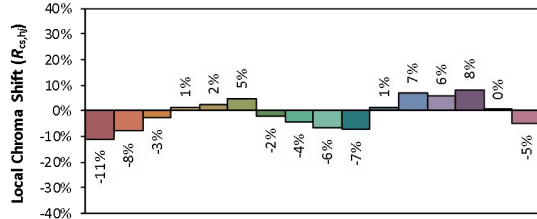
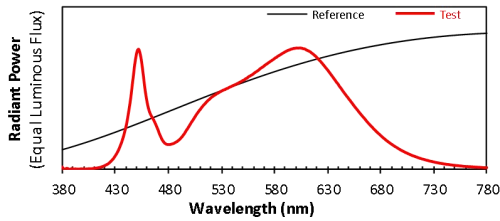
**ANSI/IES TM-30-18 Color Rendition Report**

Source: ZT2835WOM1

Manufacturer: Beyond Led Technology

Date: 2022-05-14

Model: DYU-TRO26640-DN-T50-A



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$  0.4025  
 $y$  0.3852  
 $u'$  0.2361  
 $v'$  0.5085

CIE 13.3-1995 (CRI)	
$R_a$	84
$R_9$	17

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

**2.3 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2022-05-14	<b>Test Ambient:</b>	25±1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	DYU-TRO26640-DN-T50-A	<b>Total Operating Time (min)</b>	61

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE220502-	120.0	60	0.3220	38.24	0.9895	10.23
C1	277.0	60	0.1378	36.86	0.9655	12.62
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement - Sphere-Spectroradiometer**

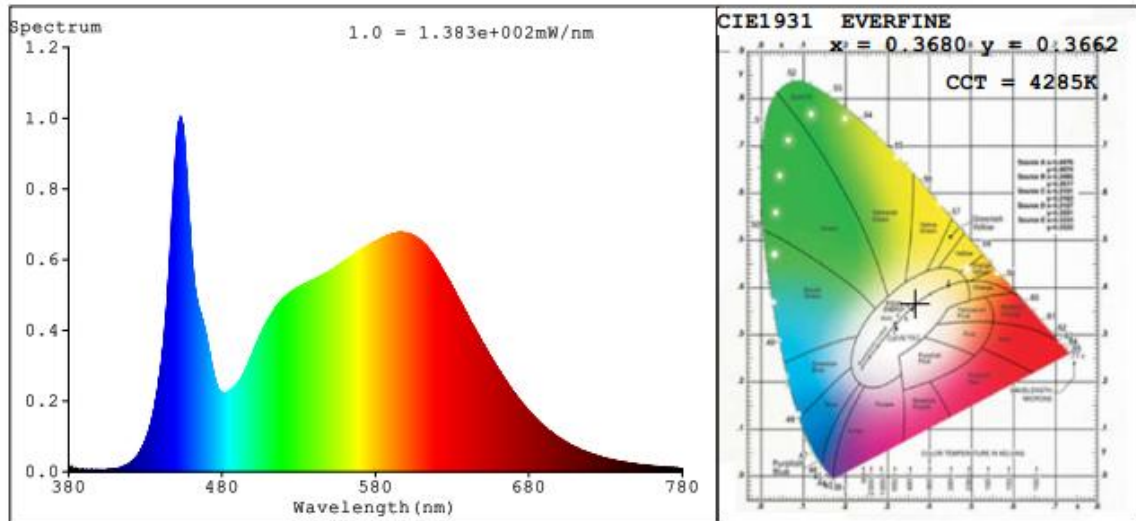
**Method(Self-absorption:1.1328)(4π geometry):**

Parameter	Result	Parameter	Result
Test Voltage (V)	120	Color Rendering Index (CRI)	85.5
Frequency (Hz)	60	R9	22
CCT (K)	4285	Rg	96
Duv	-0.0012	Rf	85
Chromaticity (x, y)	x=0.3680 y=0.3662	Rcs,h1(%)	-11
Chromaticity (u', v')	u'=0.2211 v'=0.4950		

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V5.1 Pass Criteria	
Test Voltage (V)	120	277	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	5172	5028	>=2000 (-10%)	
Luminous Efficacy (lm/W)	135.25	136.41	Standard: >= 110(-3%)	Premium: >= 125(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



**Special Color Rendering Indices**

R1 =85	R2 =91	R3 =95	R4 =84	R5 =84	R6 =87	R7 =88		
R8 =70	R9 =22	R10=78	R11=83	R12=60	R13=87	R14=97	R15=80	

**TM30**

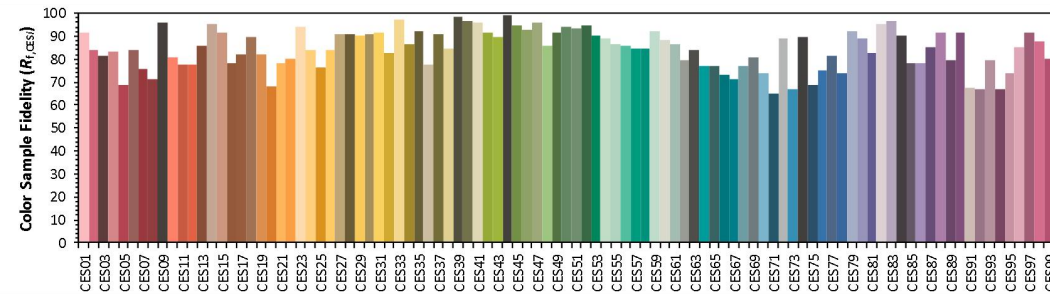
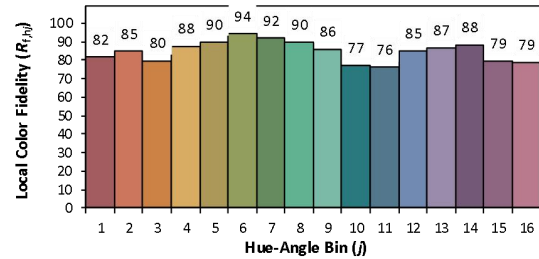
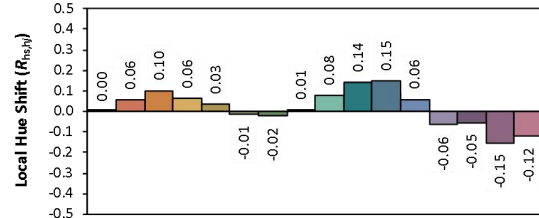
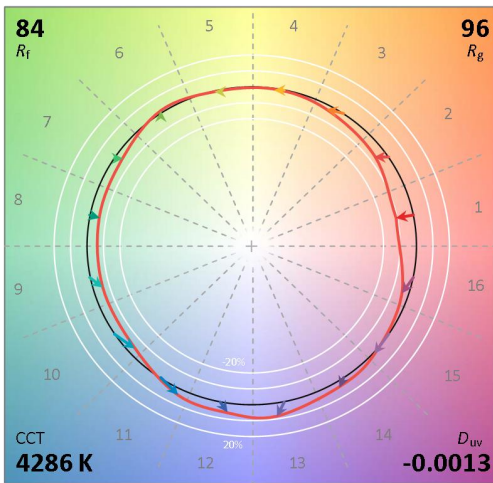
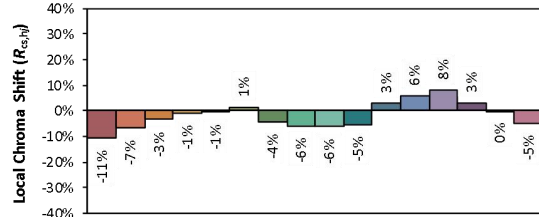
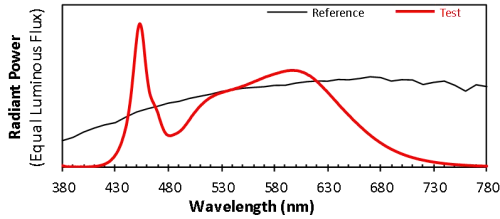
**ANSI/IES TM-30-18 Color Rendition Report**

Source: ZT2835WOM1

Manufacturer: Beyond LED Technology

Date: 2022-05-14

Model: DYU-TRO26640-DN-T50-A



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$  0.3680  
 $y$  0.3660  
 $u'$  0.2211  
 $v'$  0.4949

CIE 13.3-1995 (CRI)	
$R_a$	85
$R_9$	22

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

**2.4 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2022-05-14	<b>Test Ambient:</b>	25±1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	DYU-TRO26640-DN-T50-A	<b>Total Operating Time (min)</b>	61

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE220502-	120.0	60	0.3277	38.95	0.9905	10.09
C1	277.0	60	0.1403	37.55	0.9665	12.48
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement - Sphere-Spectroradiometer**

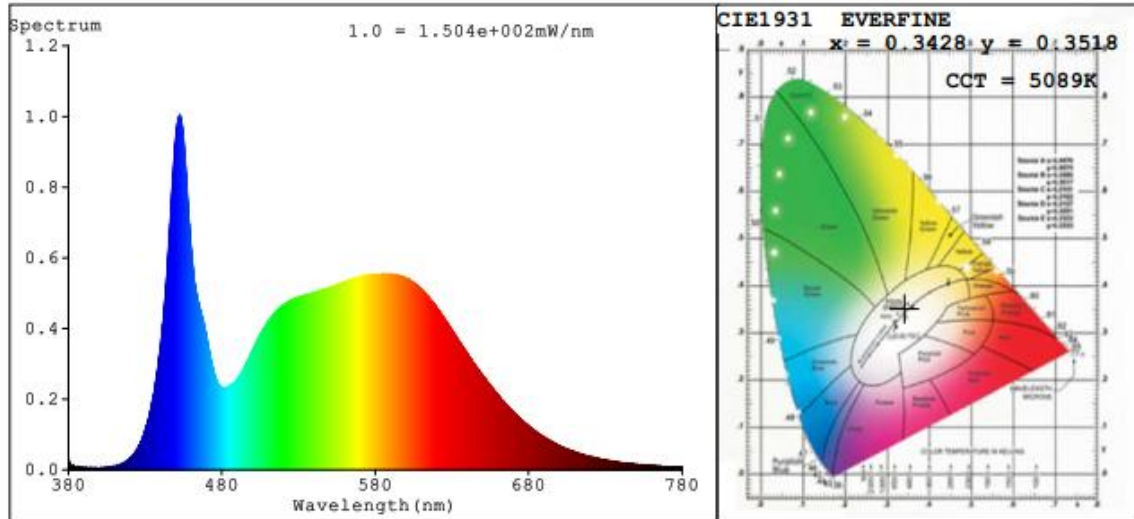
**Method(Self-absorption:1.1328)(4π geometry):**

Parameter	Result	Parameter	Result
Test Voltage (V)	120	Color Rendering Index (CRI)	84.7
Frequency (Hz)	60	R9	15
CCT (K)	5089	Rg	96
Duv	0.0010	Rf	84
Chromaticity (x, y)	x=0.3428 y=0.3518	Rcs,h1(%)	-12
Chromaticity (u', v')	u'=0.2098 v'=0.4844		

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V5.1 Pass Criteria	
Test Voltage (V)	120	277	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	5022	4883	>=2000 (-10%)	
Luminous Efficacy (lm/W)	128.93	130.04	Standard: >= 110(-3%)	Premium: >= 125(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



**Special Color Rendering Indices**

R1 =84	R2 =90	R3 =93	R4 =85	R5 =84	R6 =85	R7 =88		
R8 =70	R9 =15	R10=75	R11=84	R12=63	R13=85	R14=96	R15=79	

**TM30**

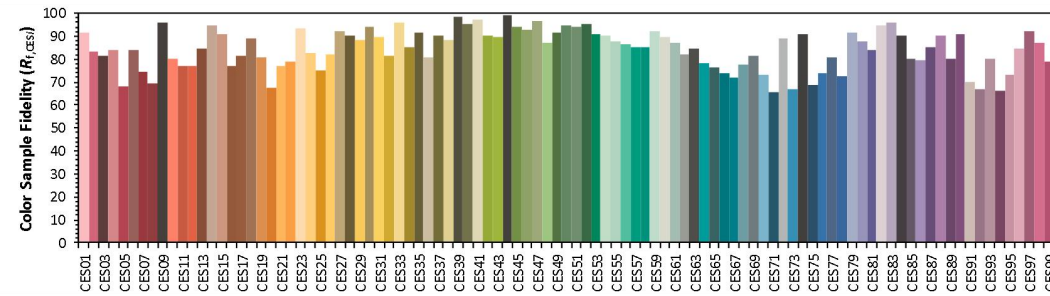
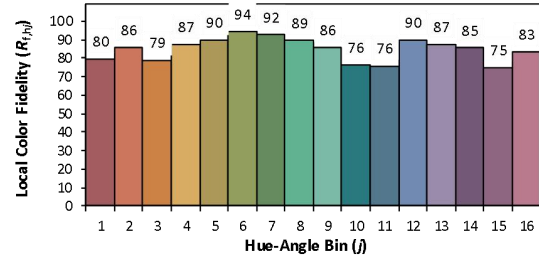
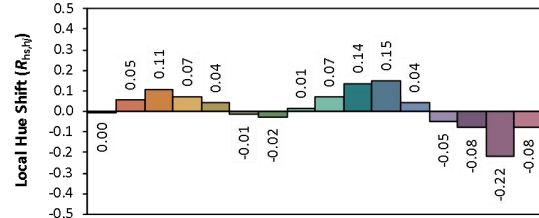
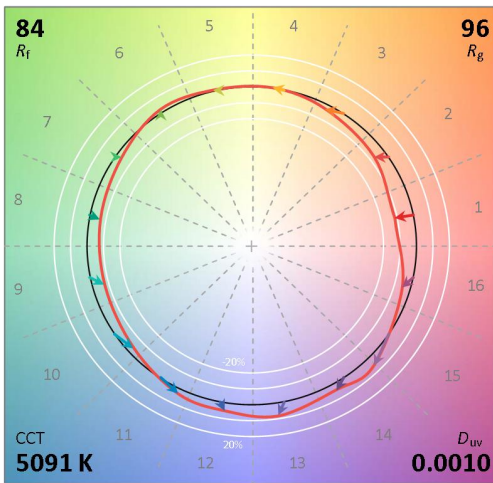
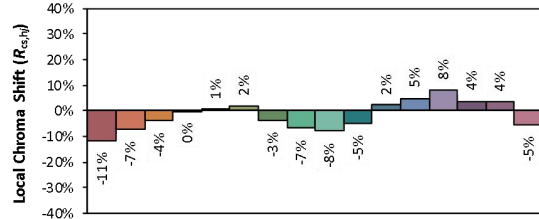
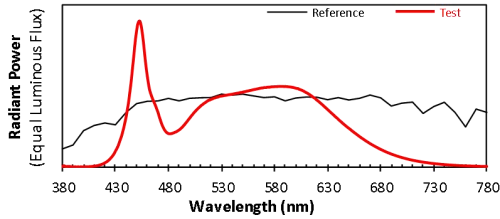
**ANSI/IES TM-30-18 Color Rendition Report**

Source: ZT2835WOM1

Manufacturer: Beyond LED Technology

Date: 2022-05-14

Model: DYU-TRO26640-DN-T50-A



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$  0.3428  
 $y$  0.3517  
 $u'$  0.2098  
 $v'$  0.4844

CIE 13.3-1995 (CRI)	
$R_a$	85
$R_9$	15

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0



**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-423	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-327	Spectral analysis system HAAS-2000	Verified by D204 standard lamp	
ST-R-332	Standard Lamp	2021-07-07	2022-07-06
ST-R-333	Power Meter for Integrating Sphere	2021-06-25	2022-06-24
ST-R-405	Temperature Probe for Integrating Sphere	2022-01-21	2023-01-20
ST-R-355	Goniophotometer system	Verified by D908S standard lamp	
ST-R-359	Standard Lamp	2021-07-07	2022-07-06
ST-R-358	Power Meter for Goniophotometer	2021-06-25	2022-06-24
ST-R-354	hygrothermograph for Goniophotometer	2021-06-26	2022-06-25

Expand Uncertainty:

Photometric Measurement (Sphere):3.06%, k=2

Chromaticity Measurement(Sphere):43.20K, k=2

Photometric Measurement(Goniophotometer):3.36%, k=2

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