



Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:

Beyond Signs Inc dba Beyond LED Technology
1939 Parker Ct Suite C, Stone Mountain, Georgia, 30087, USA

For products:

2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces

Models No.:

BLT-GL22-F40-30

Test Date: Nov. 27, 2020

Test Lab.: **LCTECH Guangdong Testing Services Co., Ltd.**

2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China

Tel: +86-760-22833366 Fax: +86-760-22833399

E-mail: Service@lccert.com <http://www.lccert.com>

Test Sites: 1/F., Building I, Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China

Template No.: LC-RT-PL-045 Rev.1.3

Test Note:

Complied by:

Pengkang Liang

Nov. 30, 2020

Reviewed by:

Lin Qiu

Nov. 30, 2020

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1. General

1.1 Product Information

Brand Name	Beyond
Category	Indoor
General Application	Troffer
Primary Use	2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces
Model Number	BLT-GL22-F40-30
Rated Inputs	AC120-277V, 50/60Hz
Rated Power	40W
Rated Light output	4400lm
Declared CCT	3000K
Power Supply	ZS-FT60-600
LED Package, Array or Module	HL-AS-2835DW-3C-S1-08-PCT-HR3(R9) , Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Dimming	Continuous Dimming
Integral Controls	No
Controls Controllability	No
Receipt Samples	1 unit
Sample Code of lab.	201125102001
Date of Receipt Samples	Nov. 25, 2020
Note	-

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377- 2017	Specifications for the Chromaticity of Solid State Lighting Products
ANSI/IES TM-30-18*	IES Method for Evaluating Light Source Color Rendition
ANSI C82.77-2002	Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

Note:

*For reference only and not in the scope of NVLAP.

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-987	APW-120N	2020-01-06	2021-01-05
AC Power supply	LC-I-989	APW-120N	2020-01-06	2021-01-05
Power analyzer	LC-I-928	WT210	2019-12-29	2020-12-28
Power analyzer	LC-I-954	WT210	2019-12-26	2020-12-25
Multimeter	LC-I-972	Fluke	2020-07-20	2021-07-19
Photometric colorimetric electric system** (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp***	LC-PL-I-011	D204C	2020-07-14	2021-07-13
Luminous Flux Standard Lamp****	LC-PL-I-003	24V/100W	2020-07-14	2021-07-13
Goniophotometer(with mirror)	LC-I-902	GMS2000	2020-04-23	2021-04-22
Wireless temperature transmitter	LC-I-PL-009	DWLR-DLR	2020-01-03	2021-01-02
Wireless temperature transmitter	LC-I-PL-008	DWLR-DLR	2020-01-03	2021-01-02

Note:

** Bandwidth of spectroradiometer is 1 nm.

*** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

**** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

2. Test conducted and method

The luminaire was operated at least 2 hours to reach stabilization and temperature equilibrium before test.

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$; the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within ± 0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Electrical Instrumentation

The calibration uncertainties of the instruments for AC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC power meter was less than 0.5 percent (95 % confidence interval, $k=2$).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured by both sphere-spectroradiometer system and type C goniophotometer system.

Light intensity distribution was measured by a type C goniophotometer (with mirror) which can keep the sample in burn position when the tests conduct, and the total luminous flux was calculated from the intensity data by software automatically.

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the total luminous flux was calculated from these by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	120.07 V~60Hz	120.04 V~60Hz
Input Current(A)	0.336	0.336
Total Power(W)	40.02	40.00
Power Factor	0.992	0.992
I-THD	8.0%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	4513.36*	4516.67
Luminaire Efficacy(lm/W)	112.78	112.92
Correlated Color Temperature (CCT)(K)	3043	-
Color Rendering Index (CRI)	83	-
R9	7	-
R _f	85	-
R _g	95	-
R _{cs,h1}	-11%	-
Chromaticity Coordinate (x,y)	x = 0.4358 y = 0.4071	-
Chromaticity Coordinate (u',v')	u' = 0.2486 v' = 0.5224	-
Duv	0.0014	-
Zone Lumens between 0-60°	-	92.37 %

3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
81	91	97	81	81	89	83	59
R9	R10	R11	R12	R13	R14	R15	-
7	79	81	70	83	99	73	-

3.4 Electrical data on 277V

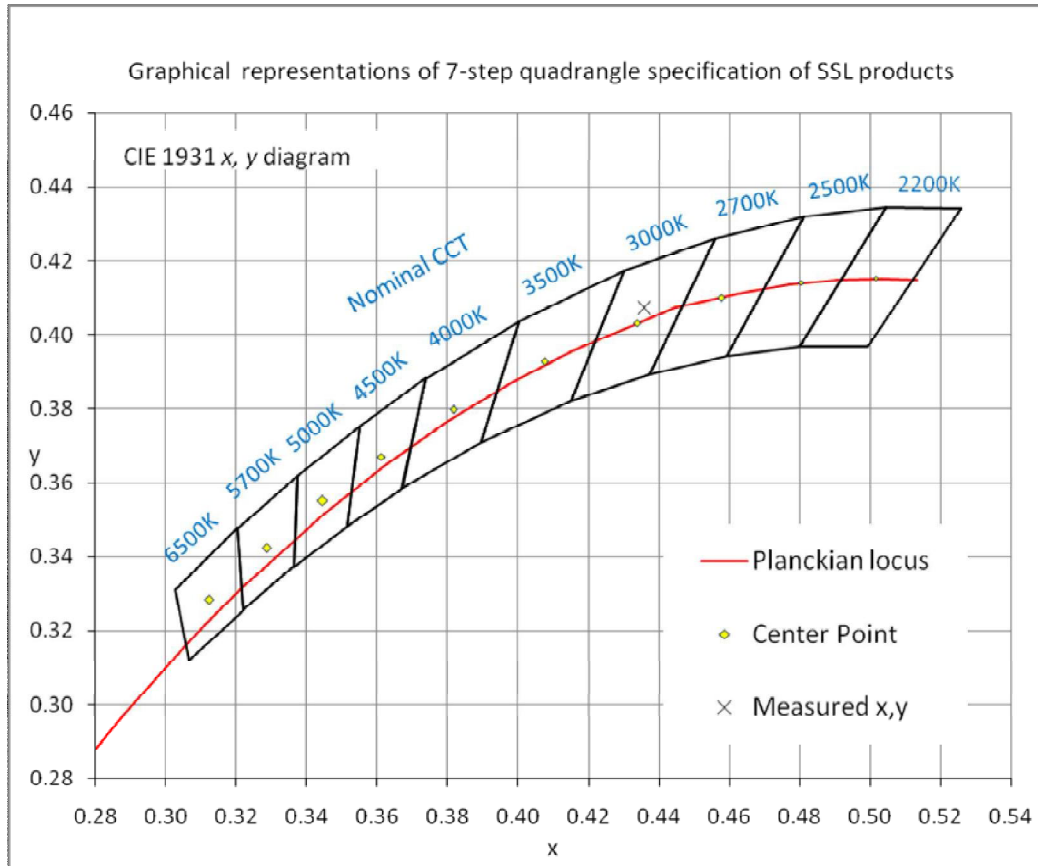
Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.02 V~60Hz	-
Power Factor	0.929	-
I-THD	15.7 %	-

Note:

* Self-absorption is 1.09.

4. Test Data

4.1 ANSI Chromaticity Quadrangles Diagram

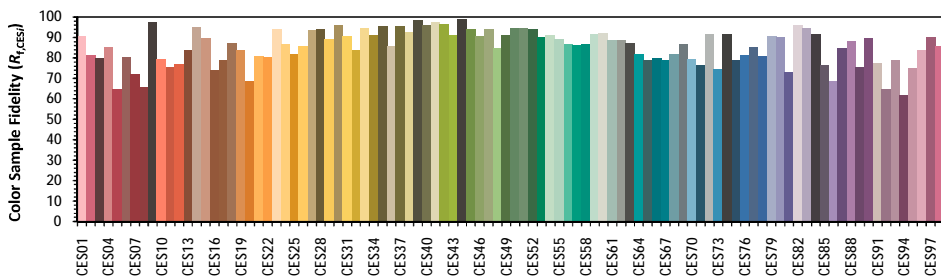
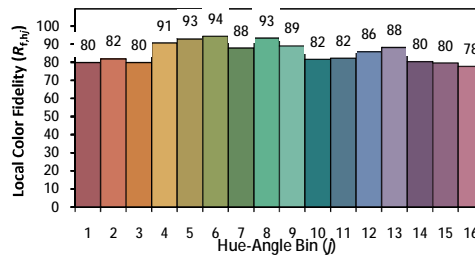
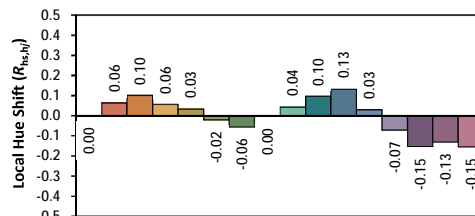
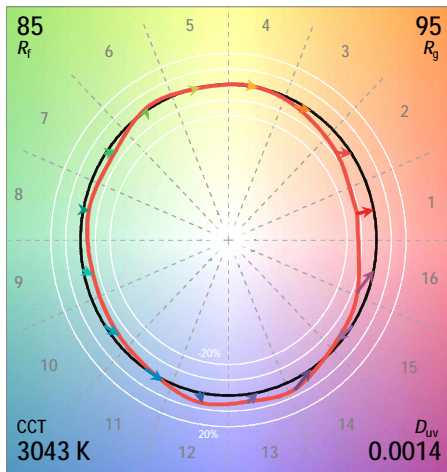
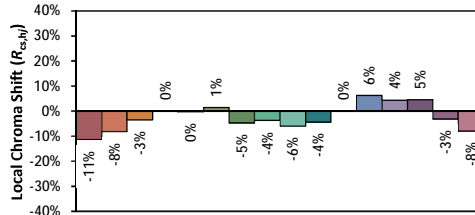
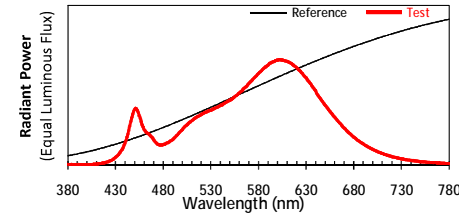


4.2 ANSI/IES TM-30-18 Color Rendition

ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD
Date: 2020/11/30

Manufacturer: Beyond Signs Inc dba Beyond
Model: BLT-GL22-F40-30



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information, Created with the IES TM-30-18 Calculator Version 2.00.

x 0.4358
y 0.4071
u' 0.2486
v' 0.5224

CIE 13.3-1995 (CRI)
R_a 83
R_g 7

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.



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4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular
Spacing Criteria (0-180)	1.28	Luminous Length	0.55 m
Spacing Criteria (90-270)	1.30	Luminous Width	0.55 m
Spacing Criteria (Diagonal)	1.42	Luminous Height	0.00 m
Test Distance	30.13 m		

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	721.18	16.00	16.00
0-30	1545.49	34.20	34.20
0-40	2543.00	56.30	56.30
0-60	4171.99	92.40	92.40
0-80	4469.8	99.00	99.00
0-90	4502.06	99.70	99.70
10-90	4316.66	95.60	95.60
20-40	1821.82	40.30	40.30
20-50	2817.85	62.40	62.40
40-70	1834.39	40.60	40.60
60-80	297.81	6.60	6.60
70-80	92.40	2.00	2.00
80-90	32.26	0.70	0.70
90-110	2.82	0.10	0.10
90-120	4.11	0.10	0.10
90-130	5.68	0.10	0.10
90-150	9.58	0.20	0.20
90-180	14.62	0.30	0.30
110-180	11.80	0.30	0.30
0-180	4516.67	100.00	100.00

Total Luminaire Efficiency = 100.00%

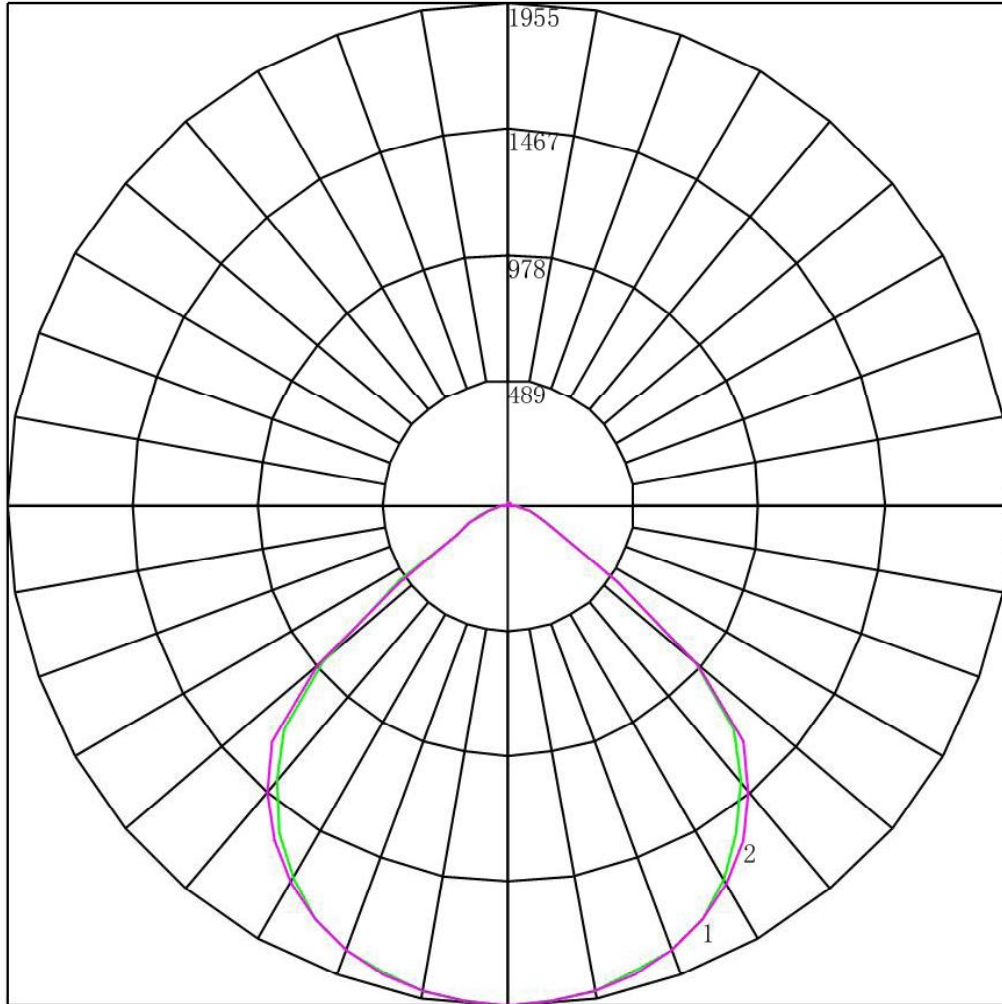
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	185.40
10-20	535.77
20-30	824.31
30-40	997.51
40-50	996.03
50-60	632.96
60-70	205.40
70-80	92.40
80-90	32.26
90-100	1.83
100-110	0.99
110-120	1.29
120-130	1.57
130-140	1.78
140-150	2.13
150-160	2.38
160-170	1.92
170-180	0.73



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4.5 Polar Curves



Maximum Candela = 1955.362 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

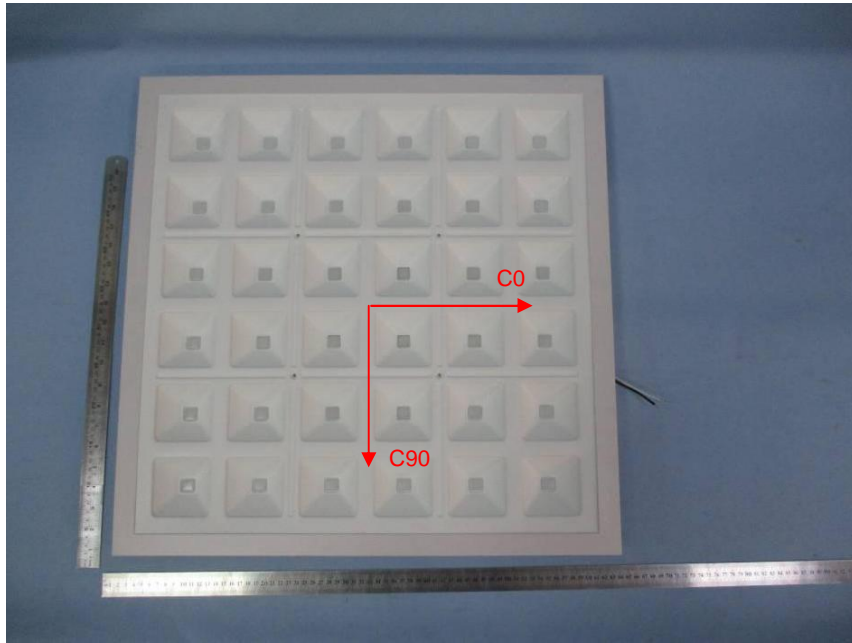
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	1955.362	1955.362	1955.362	1955.362	1955.362	1955.362	1955.362
5	1948.086	1949.904	1949.226	1948.335	1948.781	1949.240	1948.133
10	1926.259	1929.891	1929.909	1928.840	1929.938	1928.154	1928.706
15	1891.699	1896.007	1896.046	1895.291	1897.025	1896.413	1897.081
20	1848.499	1849.612	1851.276	1853.355	1855.486	1852.651	1851.901
25	1781.198	1781.614	1790.142	1795.550	1793.971	1787.124	1789.102
30	1679.792	1689.054	1704.692	1721.879	1728.172	1707.313	1704.165
35	1557.014	1569.660	1596.288	1622.140	1620.314	1600.972	1597.993
40	1404.677	1420.016	1462.203	1497.690	1499.321	1471.054	1462.003
45	1244.611	1261.730	1299.257	1370.080	1347.912	1314.828	1302.520
50	952.216	1015.661	1125.856	1170.587	1152.896	1025.728	966.838
55	515.670	582.650	796.780	962.263	790.361	594.946	524.984
60	235.553	251.527	437.934	546.300	390.623	260.071	231.318
65	165.978	170.111	179.537	202.883	180.010	170.051	164.001
70	119.141	122.125	126.585	126.942	125.758	120.170	116.563
75	84.126	89.606	87.496	86.593	85.124	83.212	79.967
80	55.023	56.400	57.497	56.671	55.842	53.736	51.504
85	30.013	30.247	30.680	30.149	29.509	29.249	28.463
90	6.366	2.957	2.954	2.947	3.179	3.176	1.807
95	0.909	0.910	1.364	1.360	1.362	1.360	1.355
100	0.909	0.910	0.909	1.360	0.908	0.907	0.904
105	0.909	0.910	0.909	0.907	0.908	0.907	0.904
110	0.909	0.910	1.136	0.907	0.908	0.907	0.904
115	1.364	1.365	1.364	1.360	1.362	1.360	1.355
120	1.364	1.365	1.591	1.813	1.362	1.587	1.807
125	1.819	1.819	1.818	1.813	1.816	1.814	1.807
130	1.819	1.819	1.818	1.813	1.816	1.814	1.807
135	2.274	2.274	2.273	2.267	2.270	2.267	2.259
140	3.183	2.729	3.182	2.947	2.724	2.721	2.711
145	3.638	3.184	3.409	3.174	3.404	3.174	3.163
150	4.093	4.094	4.318	4.080	4.312	4.081	4.066
155	5.457	5.458	5.000	5.440	5.220	5.215	5.422
160	5.912	5.913	5.909	5.894	5.902	6.122	6.325
165	6.821	6.823	6.818	6.800	6.810	6.802	6.777
170	7.731	7.732	7.954	7.707	7.944	7.936	8.132
175	8.185	8.187	8.181	8.161	8.172	8.389	8.584
180	4.538	4.538	4.538	4.538	4.538	4.538	4.538

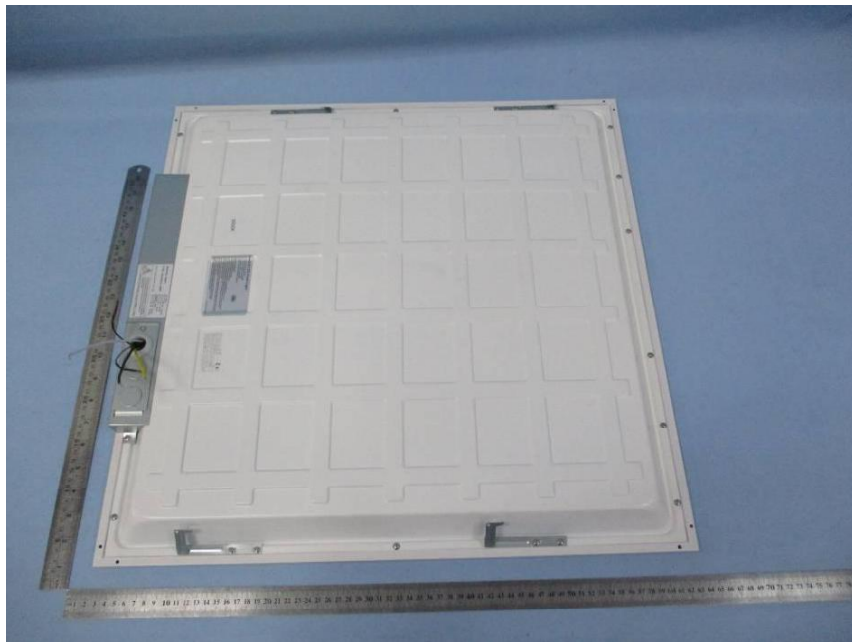


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Appendix A Product Photo



Picture 1



Picture 2

****End of test report****