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Test report of
IES LM-79-08
Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Applicant:
Beyond LED Technology

Address:
2725 Mountain Industrial Blvd. Suite A-5 Tucker, GA 30084

For Product:
LED Refrigerated Case Luminaires

Model No.:
101311

Test laboratory: Shenzhen Belling Efficiency Testing Lab., 1/F., Building 1, 1F, No.1 building, Meibaohe industrial park, Dalang street, Shenzhen, Guangdong Prov.518101, China.

Sam Chen Jasonzhou

Complied by: Sam Chen **Review by: Jason zhou**

Project Engineer **Technical Manager**

Note: This test report is perpared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Shenzhen Belling Efficiency Testing Lab. This report must not be used by the customer to claim product certification, approval, or endorsement By NVLAP, NIST, or any agency of the Federal Government.

1 General

1.1 Product Information

Manufacturer	Beyond LED Technology
Manufacturer Address	2725 Mountain Industrial Blvd. Suite A-5 Tucker, GA 30084
Brand Name	Beyond
Luminaire Type	LED Refrigerated Case Luminaires
Model Number	101311
Rated Inputs	AC100-277V 50/60Hz
Rated Power	22W
Nominal CCT	6500K
Date of Receipt Samples	2016-06-14

1.2 Standards or methods

- ANSI C78.377-2011:Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits-Related Power Quality Requirements for Lighting Equipment
- CIE Publication No.13.3-1995:Method of Measuring and Specifying Color Rendering of Light Sources
- IESNA LM-79-08 Approved Method: Electric & Photometric Measurement of Solid-state Lighting Products

1.3 Equipment list

Device	Manufacture	Model No.	Serial No.	Calibration due date
Goniophotometeric System	SENSING	GMS-3000	N.A	2016-09-22
AC Power Source	ALL POWER	APW-110N	992257	2016-08-28
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S13100234	2016-09-16
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2016-08-30
Integral Sphere	SENSING	SPR-600M	N.A	2016-08-28
Integral Sphere (2M)	SENSING	SD-20	N.A	2016-08-28
Digital Power Meter	YOKOGAWA	WT210	91L929742	2016-08-30
Optical Color and Electrical Measurement System	SENSING	SPR-3000	N.A	2016-08-28
Temperature/humidity/clock	VICTOR	VC230	57636	2016-09-14
Digital Anemometer	TECMAN	TD8901	026141	2016-09-14

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab attests that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).

2 Test conducted and method

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at 25°C ±1°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 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.

2.5 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 method according to IESNA LM-79-08 following chapter.

3 Test Result Summary

3.1 Integrating Sphere System (Bare Lamp)

3.1.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
101311	120.15	60	0.174	20.712	0.991

3.1.2 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
101311	2436.27	117.626	6606	83.1	5

3.1.3 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
101311	0.0048	0.3099	0.3355	0.1935	0.4713

3.2 Goniophotometer System

3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)
101311	120.1	60	0.1721	20.46

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	S/MH (C0/180)	S/MH (C90/270)	Zonal Lumen in 0-60°(%lm)
2447.24	119.62	1.54	1.80	52.025

4 Test Data

Report of Spectroradiometric & Electric Analysis for Light Source

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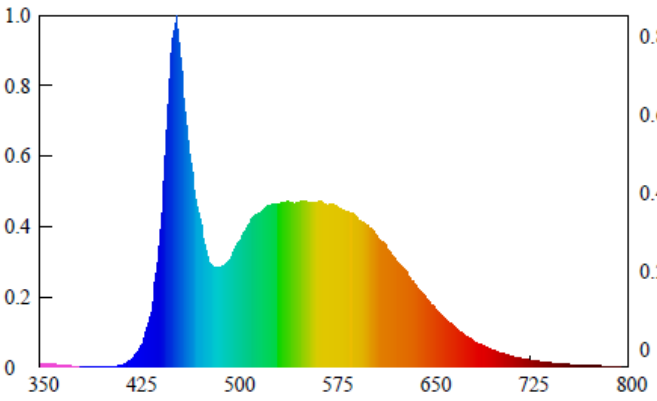
Model No.: Application NO.:
Sample SN: Applicant:
Manufacturer: Date:
Tested By: Sam Reviewed By:
Description:

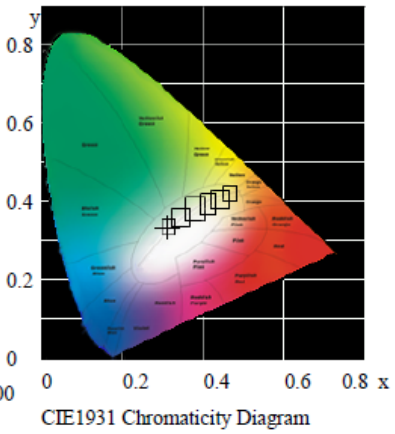
Test Condition

Temperature: 25°C RH: 58%
Spectrum Range: 350-800 nm Scan Step: 5 nm

Spectroradiometric Parameters



Spectral Distribution



CIE1931 Chromaticity Diagram

Chromaticity Coordinates: x=0.3099 y=0.3355 u'=0.1935 v'=0.4713
Correlated Color Temperature: 6606 K Dominant Wavelength: 492.0 nm(E)
Luminous Flux: 2436.270 lm Purity: 0.0791
Chromaticity Difference: 0.0048Duv Peak Wavelength: 447.6 nm
Color Ratio: Kr=29.4% Kg=56.8% Kb=13.8%
Bandwidth: 335.8nm Radiant Flux: 7.178 W
Rendering Index: Ra=83.1

R1=81	R2=90	R3=94	R4=79	R5=80	R6=85	R7=88	R8=68
R9=5	R10=75	R11=78	R12=55	R13=85	R14=97	R15=75	

Electric Parameters

Voltage: 120.15 V Current: 0.174 A
Power Factor: 0.991 Power: 20.712 W

Luminous Efficacy: 117.626 lm/W

SENSING Instruments Co.,Ltd

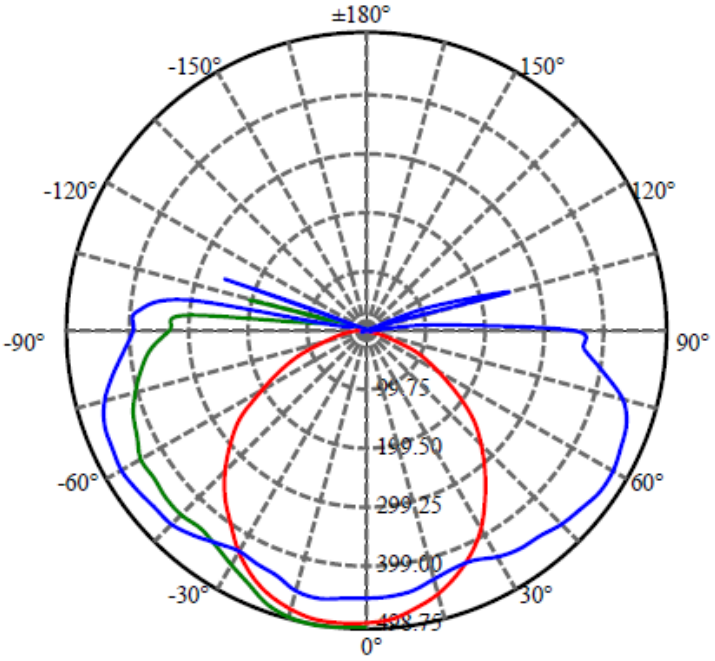
Zonal Flux Diagram

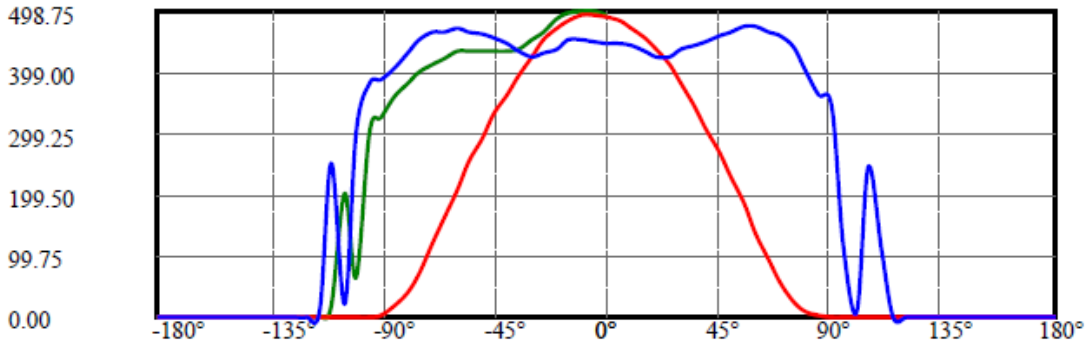
Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	477.403	.000	.000	.000%	.000%
5.0	477.403	11.414	11.414	.466%	.466%
10.0	472.956	33.997	45.412	1.389%	1.856%
15.0	465.397	55.662	101.074	2.275%	4.130%
20.0	452.205	75.623	176.698	3.090%	7.220%
25.0	437.827	93.348	270.046	3.814%	11.035%
30.0	423.746	109.033	379.078	4.455%	15.490%
35.0	412.481	123.140	502.218	5.032%	20.522%
40.0	401.067	135.734	637.953	5.546%	26.068%
45.0	391.433	146.738	784.690	5.996%	32.064%
50.0	381.205	156.123	940.813	6.380%	38.444%
55.0	371.274	163.614	1104.427	6.686%	45.130%
60.0	358.823	168.760	1273.187	6.896%	52.025%
65.0	343.704	170.786	1443.973	6.979%	59.004%
70.0	326.955	169.815	1613.788	6.939%	65.943%
75.0	306.500	165.575	1779.363	6.766%	72.709%
80.0	281.746	157.398	1936.761	6.432%	79.141%
85.0	247.951	143.931	2080.692	5.881%	85.022%
90.0	223.301	129.032	2209.725	5.273%	90.295%
95.0	137.834	98.882	2308.606	4.041%	94.335%
100.0	68.673	56.113	2364.719	2.293%	96.628%
105.0	69.369	36.936	2401.656	1.509%	98.137%
110.0	51.894	31.696	2433.352	1.295%	99.433%
115.0	1.512	13.523	2446.875	.553%	99.985%
120.0	.000	.368	2447.242	.015%	100.000%
125.0	.000	.000	2447.242	.000%	100.000%
130.0	.000	.000	2447.242	.000%	100.000%
135.0	.000	.000	2447.242	.000%	100.000%
140.0	.000	.000	2447.242	.000%	100.000%
145.0	.000	.000	2447.242	.000%	100.000%
150.0	.000	.000	2447.242	.000%	100.000%
155.0	.000	.000	2447.242	.000%	100.000%
160.0	.000	.000	2447.242	.000%	100.000%
165.0	.000	.000	2447.242	.000%	100.000%
170.0	.000	.000	2447.242	.000%	100.000%
175.0	.000	.000	2447.242	.000%	100.000%
180.0	.000	.000	2447.242	.000%	100.000%

Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





C225(Max):

C0/C180:

C90/C270:

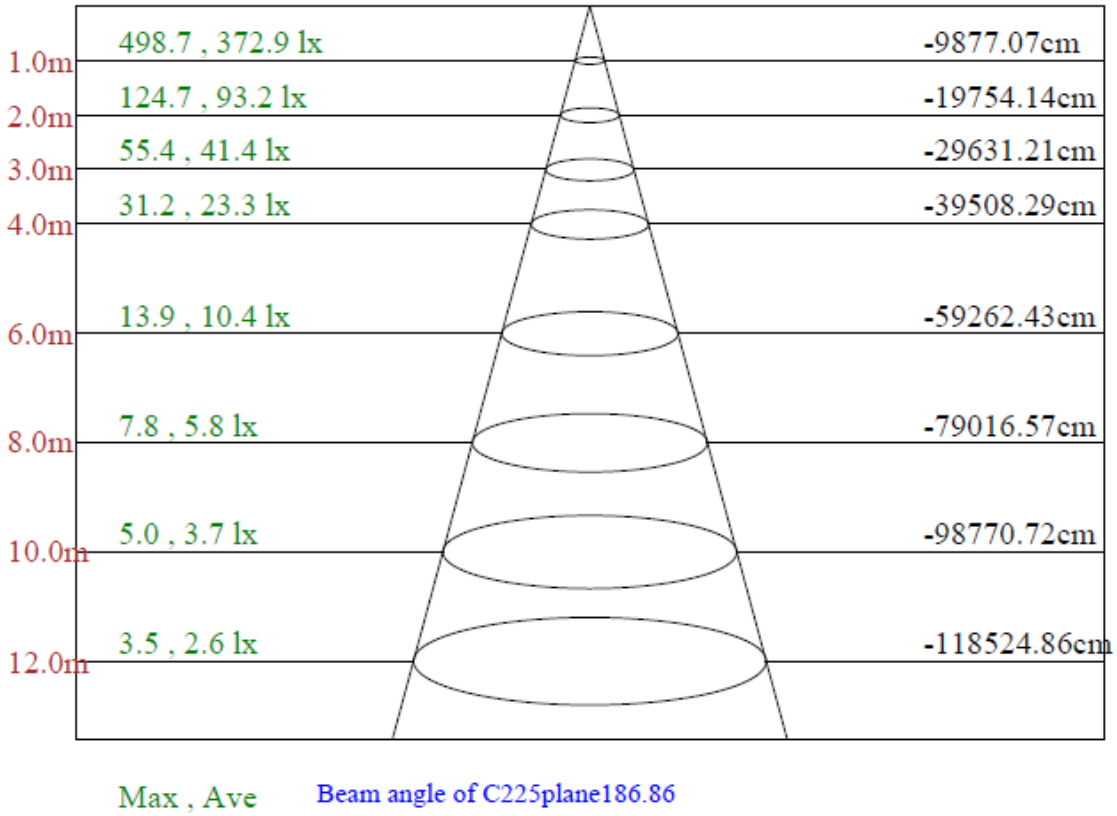
Field angle(10%Imax):C0/180Left:73.7 Right:76.0

:C90/270Left:174.3 Right:52.8

Beam Angle(50%Imax):C0/180Left:50.9 Right:53.0

:C90/270Left:170.3 Right:45.3

Lux distance Curve



Luminous Intensity Distribution Data

C/γ(°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	489.26	484.52	470.29	456.06	437.09	411.00	380.17	344.59	306.65
22.5	486.89	475.03	470.29	458.43	441.83	422.86	399.14	370.68	346.97
45.0	494.00	484.52	477.40	465.55	456.06	439.46	434.71	439.46	437.09
67.5	448.94	453.69	446.57	441.83	425.23	427.60	434.71	446.57	448.94
90.0	446.57	446.57	441.83	432.34	422.86	422.86	437.09	444.20	448.94
112.5	475.03	475.03	467.92	458.43	444.20	434.71	437.09	446.57	446.57
135.0	491.63	484.52	479.78	467.92	451.32	432.34	408.63	394.40	384.91
157.5	486.89	479.78	470.29	456.06	439.46	415.74	384.91	354.08	318.51
180.0	489.26	491.63	491.63	484.52	470.29	451.32	425.23	394.40	363.57
202.5	486.89	491.63	486.89	484.52	475.03	458.43	437.09	408.63	384.91
225.0	494.00	498.75	498.75	496.38	486.89	465.55	451.32	437.09	432.34
247.5	448.94	463.17	463.17	460.80	446.57	441.83	427.60	434.71	446.57
270.0	446.57	448.94	453.69	451.32	437.09	429.97	425.23	434.71	446.57
292.5	475.03	477.40	475.03	477.40	465.55	451.32	437.09	437.09	444.20
315.0	491.63	494.00	489.26	484.52	472.66	456.06	434.71	413.37	392.03
337.5	486.89	489.26	484.52	470.29	463.17	444.20	425.23	399.14	368.31
360.0	489.26	484.52	470.29	456.06	437.09	411.00	380.17	344.59	306.65

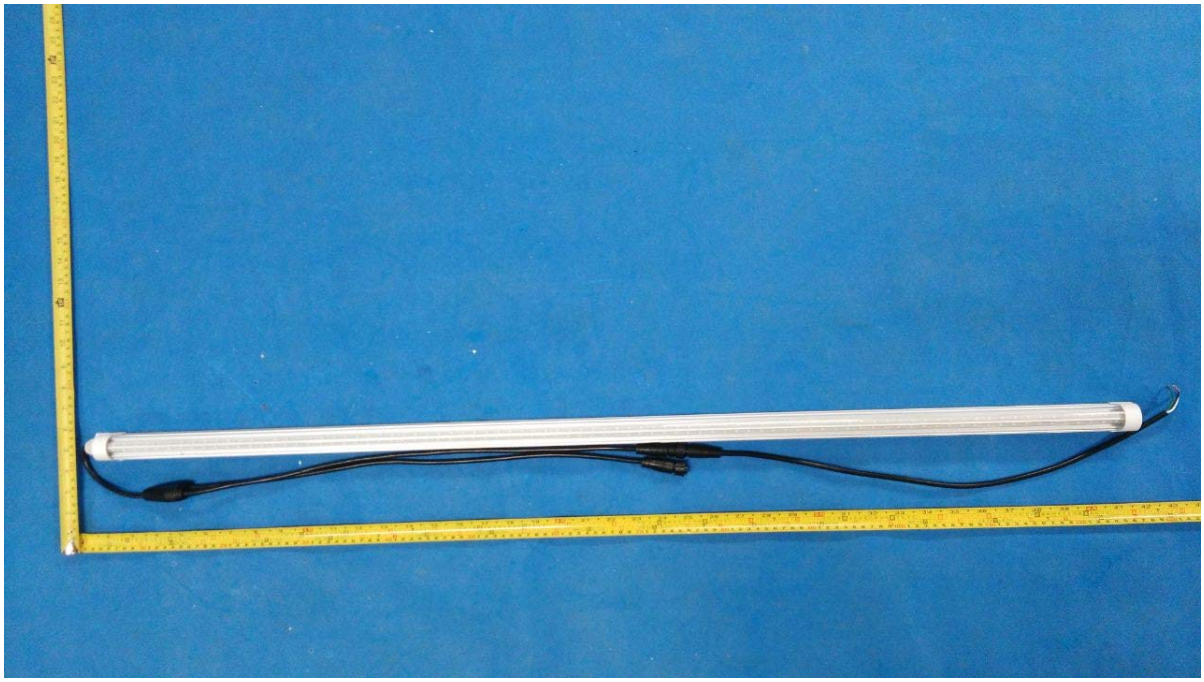
C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	268.70	230.76	185.70	135.89	93.20	55.26	24.43	10.20	3.08
22.5	327.99	313.76	299.53	278.19	271.07	261.59	240.24	207.04	138.26
45.0	432.34	429.97	434.71	434.71	422.86	406.26	384.91	349.34	294.79
67.5	458.43	467.92	472.66	472.66	465.55	453.69	434.71	401.51	361.20
90.0	458.43	465.55	472.66	472.66	465.55	458.43	439.46	401.51	363.57
112.5	448.94	458.43	465.55	460.80	453.69	441.83	418.11	387.28	337.48
135.0	380.17	365.94	356.45	356.45	349.34	332.74	311.39	282.93	223.64
157.5	285.30	249.73	216.53	190.44	166.72	138.26	119.29	105.06	57.63
180.0	330.36	292.42	254.47	207.04	161.98	119.29	71.86	41.03	17.31
202.5	358.82	337.48	320.88	309.02	292.42	273.45	254.47	230.76	211.78
225.0	434.71	434.71	432.34	432.34	420.49	411.00	399.14	380.17	358.82
247.5	456.06	458.43	465.55	463.17	456.06	451.32	441.83	432.34	413.37
270.0	456.06	460.80	465.55	470.29	465.55	463.17	451.32	429.97	406.26
292.5	453.69	460.80	463.17	465.55	458.43	451.32	441.83	425.23	399.14
315.0	382.54	375.42	365.94	361.20	354.08	337.48	320.88	301.91	282.93
337.5	330.36	297.16	268.70	230.76	202.30	176.21	150.12	121.66	97.95
360.0	268.70	230.76	185.70	135.89	93.20	55.26	24.43	10.20	3.08

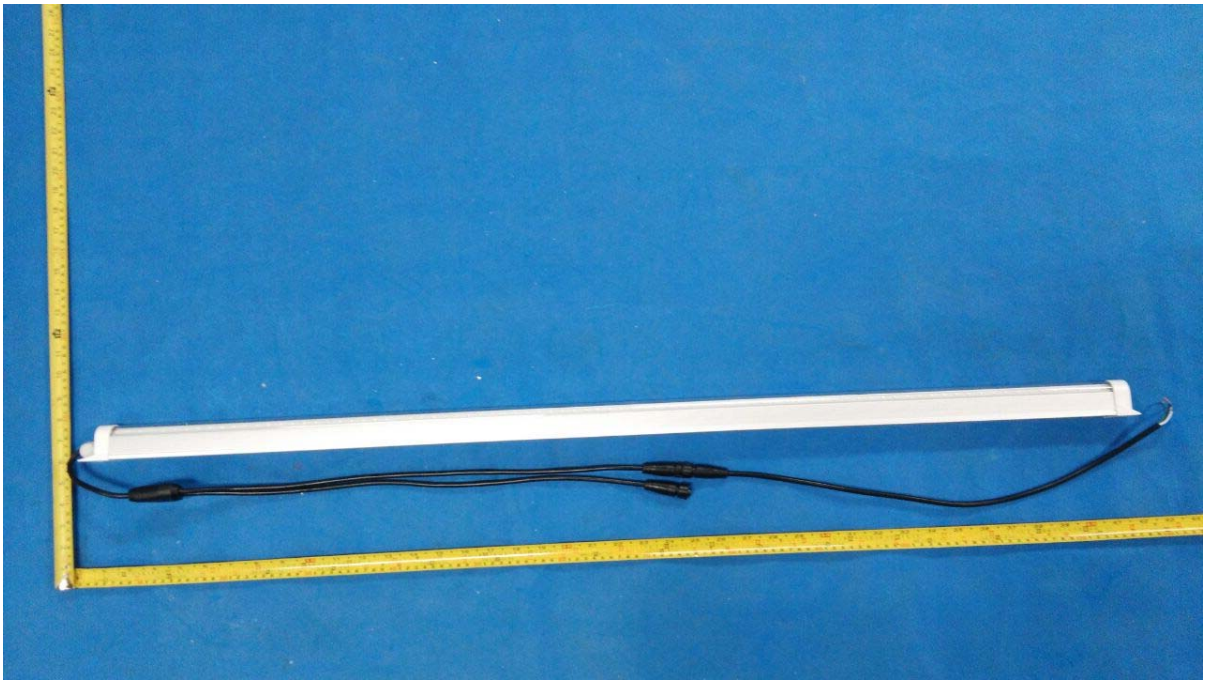
C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22.5	114.55	74.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45.0	271.07	45.77	195.18	78.97	0.00	0.00	0.00	0.00	0.00
67.5	339.85	48.14	26.80	233.13	71.86	0.00	0.00	0.00	0.00
90.0	342.22	114.55	10.20	244.99	107.43	0.00	0.00	0.00	0.00
112.5	311.39	31.54	31.54	173.84	3.08	0.00	0.00	0.00	0.00
135.0	195.18	31.54	109.81	0.00	0.00	0.00	0.00	0.00	0.00
157.5	22.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.0	3.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
202.5	180.95	161.98	67.12	0.71	0.00	0.00	0.00	0.00	0.00
225.0	325.62	299.53	64.75	199.93	17.31	0.71	0.00	0.00	0.00
247.5	387.28	356.45	159.61	7.83	211.78	5.46	0.00	0.00	0.00
270.0	387.28	382.54	299.53	22.06	249.73	12.57	0.00	0.00	0.00
292.5	363.57	358.82	81.35	52.89	169.10	5.46	0.00	0.00	0.00
315.0	249.73	235.50	52.89	95.58	0.00	0.00	0.00	0.00	0.00
337.5	78.97	64.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
202.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
225.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
247.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
270.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
292.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
315.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
337.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

C/γ(°)	180.0
0.0	0.00
22.5	0.00
45.0	0.00
67.5	0.00
90.0	0.00
112.5	0.00
135.0	0.00
157.5	0.00
180.0	0.00
202.5	0.00
225.0	0.00
247.5	0.00
270.0	0.00
292.5	0.00
315.0	0.00
337.5	0.00
360.0	0.00

Photo Document





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