



Shenzhen Belling Efficiency Testing Lab Co., Ltd



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Test report of

IES LM-79-08

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

Applicant:

AFX Inc.

Address:

2345N.Ernie Krueger Circle Waukegan, IL 60087 ,USA

For Product:

LED Downlight

Model No.:

SLMF06L30D1WH

Test laboratory: Shenzhen Belling Efficiency Testing Lab Co., Ltd, 1Floor, No.1 Building, Meibaohe Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong Prov.518101 China.

Complied by: Jarvis zhang

Review by: Jason zhou

Project Engineer

Technical Manager

Note: The test data was only valid for the test sample(s). This test report is prepared 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 Co., Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement By NVLAP, NIST, or any agency of the U.S. Government.



1 General

1.1 Product Information

Manufacturer	AFX Inc.
Manufacturer Address	2345N.Ernie Krueger Circle Waukegan, IL 60087 ,USA
Brand Name	AFX
Luminaire Type	LED Downlight
Model Number	SLMF06L30D1WH
Rated Inputs	AC 120V 60Hz
Rated Power	15 W
Nominal CCT	3000K
Date of Receipt Samples	2020-05-08
Date of test	2020-05-08 to 2020-05-11
Burning Time Before Test	0hour(For New Products)

1.2 Standards or methods

- ANSI C78.377-2017:Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-10:2014:Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment - Solid State
- 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
Goniophotometric System	SENSING	GMS-3000	N.A	2021-04-02
AC Power Source	ALL POWER	APW-110N	992257	2021-04-02
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S1510065	2021-04-08
Total Spectral Radiant Flux Standard Lamp	SENSING	12V/20W	LSD12201731	2021-04-08
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2021-04-02
Thermostatic stabilized photometric sphere	SENSING	SPR-600M	N.A	2021-04-02
Digital Power Meter	YOKOGAWA	WT210	91L929742	2021-04-02
Spectral radiometer	SENSING	SPR-3000	S1101108	2021-04-02
Environment Measurer	XUYAO	HS-1	N/A	2021-04-08
Environment Measurer	XUYAO	HS-1	N/A	2021-04-08
Stop watch	KISLO	K610	N/A	2020-05-12
Digital Anemometer	TECMAN	TD8901	026141	2020-09-10

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab Co., Ltd 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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 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.

Integrating Sphere Uncertainty: The uncertainty of the light output (luminous flux) measurements is $U=1.8\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=20\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=1.8$ ($K=2$), at the 95% confidence level. The uncertainty of power meter AC current $U=0.18\%$ of rdg, AC Voltage $U=0.16\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level.



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.

Goniophotometer Uncertainty :The uncertainty of the luminous intensity is $U=1.6\%$ ($K=2$), at the 95% confidence level.



3 Test Result Summary

3.1 Integrating Sphere System (Total operating time for integrating sphere test: 1.0 hour)

3.1.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
SLMF06L30D1WH	120.01	60	0.125	14.94	0.996

3.1.2 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
SLMF06L30D1WH	1068.45	71.5	3067	93.5	59

3.1.3 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
SLMF06L30D1WH	+0.00309	0.4366	0.4118	0.2471	0.5243

3.2 Goniophotometer System (Total operating time for luminous intensity distribution: 1.0 hour)

3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
SLMF06L30D1WH	120.03	60	0.1250	14.95	0.9959

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-60°(%lm)
1064.50	71.21	74.47



4 Test Data

SLMF06L30D1WH

Test Condition

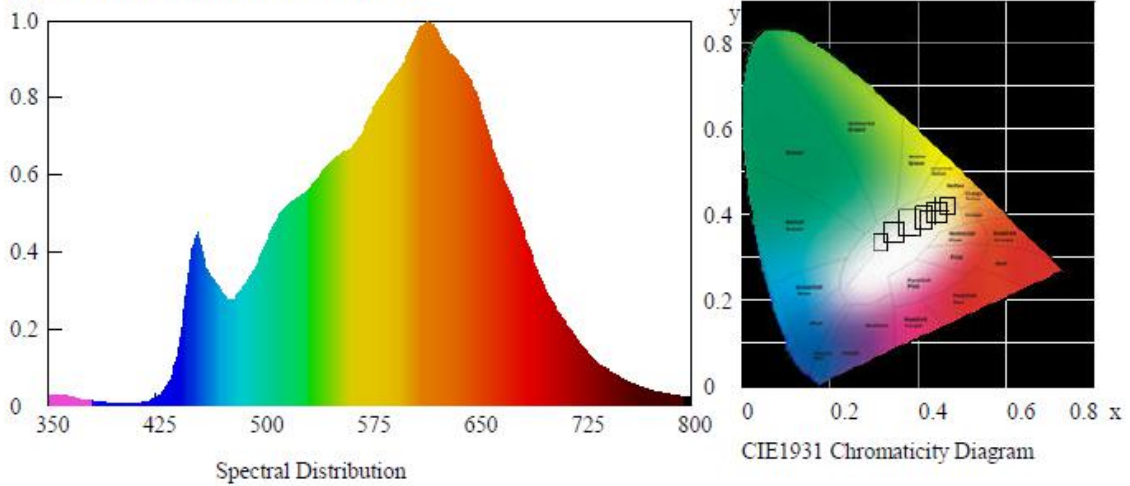
Temperature: °C

RH: %

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric Parameters

Chromaticity Coordinates: $x=0.4366$ $y=0.4118$ $u'=0.2471$ $v'=0.5243$

Correlated Color Temperature: 3067 K

Dominant Wavelength: 580.0 nm(E)

Colour Fidelity Index: $R_f=89$ Gamut Index: $R_g=95$

Luminous Flux: 1068.45 lm

Purity: 0.5481

Chromaticity Difference: +0.00309Duv

Peak Wavelength: 615.0 nm

Color Ratio: $K_r=43.3\%$ $K_g=47.9\%$ $K_b=8.8\%$

Bandwidth: 163.4nm

Radiant Flux: 3.976 W

Rendering Index: $R_a=93.5$

R1=94 R2=97 R3=99 R4=93 R5=93 R6=97 R7=92 R8=82

R9=59 R10=93 R11=95 R12=81 R13=95 R14=99 R15=89 $R_e=91$

Electric Parameters

Voltage: 120.01 V

Current: 0.125 A

Power Factor: 0.996

Power: 14.94 W

Luminous Efficacy: 71.5 lm/W



Zonal Flux Diagram

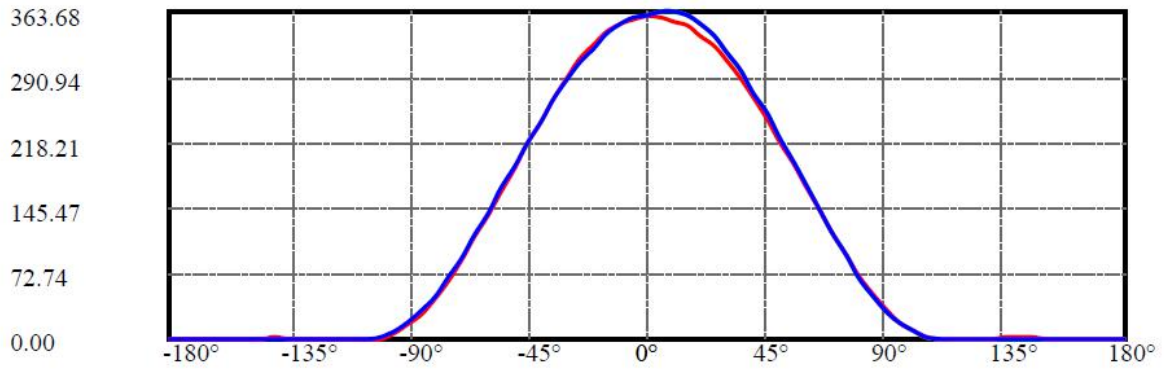
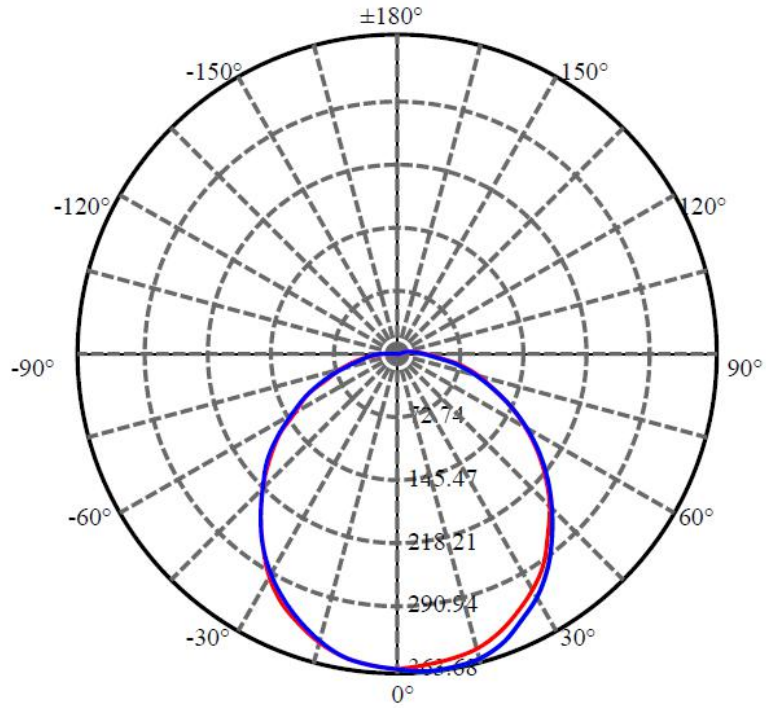
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	358.082	0.000	0	0.00%	0.00%
5.0	357.286	8.552	8.552	0.80%	0.80%
10.0	353.066	25.412	33.964	2.39%	3.19%
15.0	345.228	41.422	75.386	3.89%	7.08%
20.0	333.965	55.975	131.361	5.26%	12.34%
25.0	318.989	68.483	199.844	6.44%	18.77%
30.0	300.805	78.436	278.279	7.37%	26.14%
35.0	279.269	85.420	363.699	8.03%	34.17%
40.0	256.214	89.341	453.041	8.40%	42.56%
45.0	231.663	90.334	543.375	8.49%	51.05%
50.0	205.835	88.403	631.778	8.31%	59.35%
55.0	179.909	83.874	715.651	7.88%	67.23%
60.0	153.550	77.078	792.73	7.24%	74.47%
65.0	127.601	68.348	861.078	6.42%	80.89%
70.0	102.061	58.152	919.23	5.47%	86.35%
75.0	78.596	47.221	966.45	4.44%	90.79%
80.0	57.036	36.291	1002.741	3.41%	94.20%
85.0	38.490	25.957	1028.698	2.44%	96.64%
90.0	23.634	17.010	1045.708	1.60%	98.23%
95.0	12.734	9.958	1055.666	0.94%	99.17%
100.0	5.065	4.836	1060.502	0.45%	99.62%
105.0	1.013	1.626	1062.128	0.15%	99.78%
110.0	0.169	0.309	1062.437	0.03%	99.81%
115.0	0.217	0.098	1062.535	0.01%	99.82%
120.0	0.362	0.141	1062.675	0.01%	99.83%
125.0	0.555	0.212	1062.887	0.02%	99.85%
130.0	0.748	0.283	1063.171	0.03%	99.88%
135.0	0.676	0.288	1063.458	0.03%	99.90%
140.0	0.627	0.241	1063.699	0.02%	99.92%
145.0	0.844	0.246	1063.945	0.02%	99.95%
150.0	0.627	0.217	1064.162	0.02%	99.97%
155.0	0.434	0.134	1064.296	0.01%	99.98%
160.0	0.483	0.096	1064.392	0.01%	99.99%
165.0	0.314	0.066	1064.458	0.01%	100.00%
170.0	0.121	0.026	1064.483	0.00%	100.00%
175.0	0.169	0.010	1064.494	0.00%	100.00%
180.0	0.214	0.005	1064.498	0.00%	100.00%




Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]



C90(Max): 

C0/C180: 

C90/C270: 

Field angle(10%Imax):C0/180Left:82.7 Right:88.8

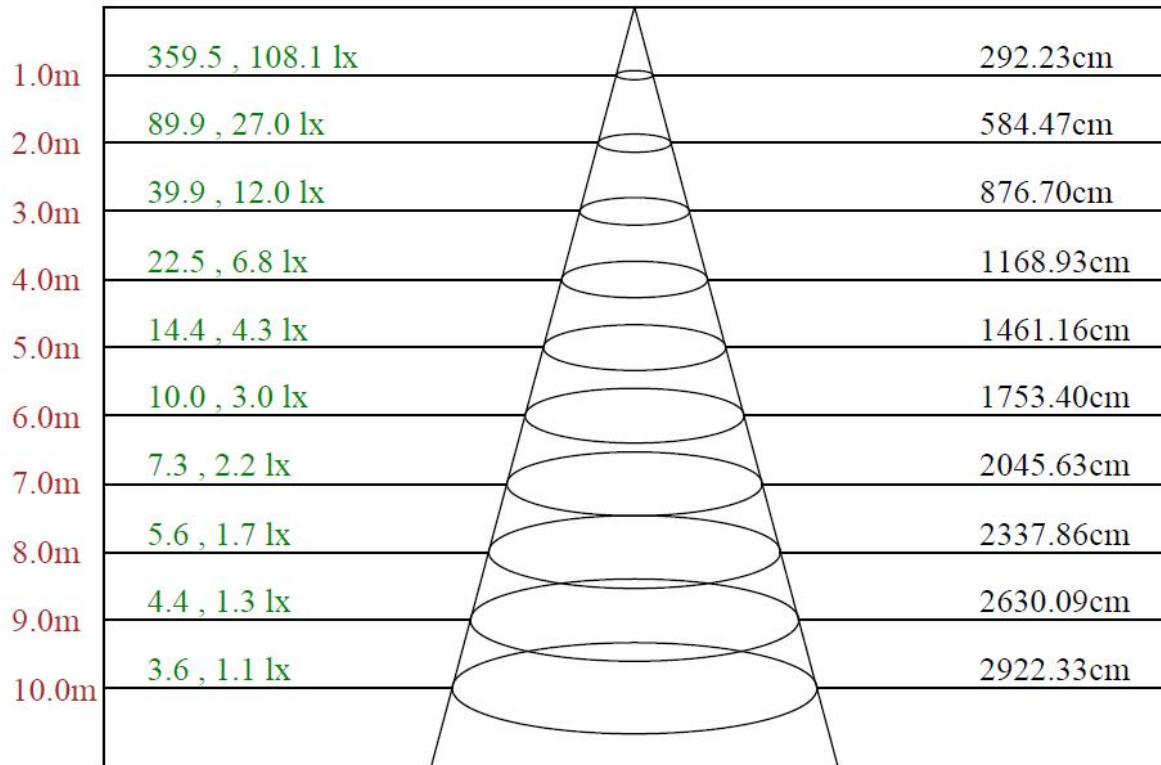
:C90/270Left:83.4 Right:88.2

Beam Angle(50%Imax):C0/180Left:52.1 Right:58.1

:C90/270Left:52.0 Right:57.8



Lux distance Curve



Max , Ave

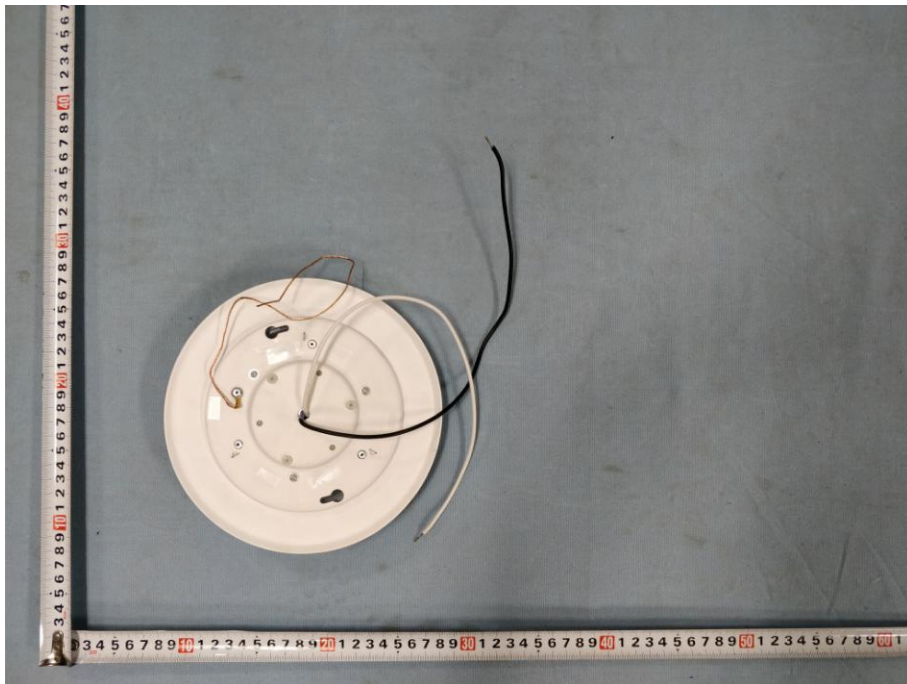
Beam angle of C90 plane 111.23

**Luminous Intensity Distribution Data**

$C/\gamma(^{\circ})$	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	358.08	356.54	353.26	347.66	337.63	324.90	308.50	289.98	267.98
45.0	358.08	356.35	352.87	346.31	336.86	323.55	307.34	288.63	266.63
90.0	358.08	363.68	363.29	358.66	349.01	335.90	319.11	297.12	274.35
135.0	358.08	358.28	355.00	348.05	336.86	321.04	301.75	279.37	255.83
180.0	358.08	355.38	349.79	341.10	327.79	310.62	290.36	267.21	242.13
225.0	358.08	354.61	349.40	339.75	328.18	311.01	290.36	266.44	242.71
270.0	358.08	356.73	349.40	337.82	323.74	307.73	288.24	266.63	242.71
315.0	358.08	356.73	351.52	342.45	331.65	317.18	300.78	278.79	257.37
360.0	358.08	356.54	353.26	347.66	337.63	324.90	308.50	289.98	267.98
$C/\gamma(^{\circ})$	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	244.25	219.75	195.25	168.82	142.58	116.34	92.61	69.46	48.81
45.0	243.67	219.17	193.70	167.85	141.61	115.57	91.06	68.49	47.85
90.0	249.85	223.03	196.60	170.55	143.35	116.92	91.84	68.11	47.65
135.0	230.17	203.16	176.73	150.49	124.06	98.40	74.67	52.86	34.54
180.0	217.43	190.42	163.41	137.18	111.90	87.21	63.86	44.76	27.98
225.0	216.86	190.04	164.19	137.75	112.29	87.21	65.21	44.76	28.36
270.0	217.63	192.35	166.69	139.49	114.22	89.71	67.91	48.04	31.06
315.0	233.45	208.75	182.71	156.28	130.81	105.15	81.61	59.81	41.67
360.0	244.25	219.75	195.25	168.82	142.58	116.34	92.61	69.46	48.81
$C/\gamma(^{\circ})$	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	31.83	18.71	8.88	2.70	0.19	0.58	0.77	0.77	0.97
45.0	30.68	17.94	8.49	2.32	0.19	0.19	0.19	0.58	0.77
90.0	29.90	17.17	8.49	2.12	0.00	0.00	0.00	0.00	0.00
135.0	20.45	10.80	3.86	0.00	0.00	0.00	0.39	0.58	1.16
180.0	15.63	6.75	0.77	0.00	0.39	0.19	0.19	0.77	0.97
225.0	16.21	7.14	1.54	0.00	0.00	0.00	0.19	0.19	0.39
270.0	18.33	8.88	2.51	0.00	0.19	0.19	0.19	0.39	0.19
315.0	26.05	14.47	5.98	0.97	0.39	0.58	0.97	1.16	1.54
360.0	31.83	18.71	8.88	2.70	0.19	0.58	0.77	0.77	0.97
$C/\gamma(^{\circ})$	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	1.35	1.35	1.16	0.77	0.39	0.19	0.00	0.00	0.19
45.0	0.58	0.58	1.35	0.19	0.19	0.19	0.00	0.00	0.19
90.0	0.00	0.00	0.00	0.19	0.19	0.19	0.19	0.19	0.00
135.0	0.00	0.00	0.77	1.54	0.58	0.58	1.16	0.19	0.19
180.0	0.77	1.16	0.77	0.77	0.77	0.77	0.58	0.19	0.19
225.0	0.77	0.77	1.54	1.16	0.58	1.16	0.00	0.00	0.00
270.0	0.58	0.19	0.58	0.39	0.58	0.58	0.39	0.39	0.58
315.0	1.35	0.97	0.58	0.00	0.19	0.19	0.19	0.00	0.00
360.0	1.35	1.35	1.16	0.77	0.39	0.19	0.00	0.00	0.19
$C/\gamma(^{\circ})$	180.0								
0.0	0.21								
45.0	0.21								
90.0	0.21								
135.0	0.21								
180.0	0.21								
225.0	0.21								
270.0	0.21								
315.0	0.21								
360.0	0.21								



Photo Document



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