



Guangdong Meide Testing Technology Co., Ltd.



TEST REPORT OF ANSI/IES LM-79-19

APPROVED METHOD FOR OPTICAL AND ELECTRICAL MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS

Client..... : Blackjack Lighting LLC

Address..... : 1547 Barclay Blvd Buffalo Grove, IL 60089

Test Model..... : SP-GGL-WH-05-BL-30K-3W

Brand Name..... : Blackjack Lighting

Testing Laboratory..... : Guangdong Meide Testing Technology Co., Ltd.

Address..... : 1st floor, B Area, Jinbaisheng Industrial Park, Headquarters 2 Road, Songshan Lake
Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

Testing location..... : As above

Report No..... : C02A21010685L02001

Test Date..... : Feb. 03, 2021

Report Date..... : Feb. 04, 2021

Tested by:

Tim

Tim Qian/ Test Engineer

Checked by:

Luke lei

Luke Lei/ Project Engineer

Approved by:

Jessie

Jessie Li/ Technical Manager



Note 1: 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 Guangdong Meide Testing Technology 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 Federal Government.

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



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1. Product Description for Equipment under Test(EUT)

The client submitted 1 sample of model SP-GGL-WH-05-BL-30K-3W. Sample was numbered C02A21010685L02001-S01. The sample was received on 2021-02-02, is undamaged condition.

Model Tested:	SP-GGL-WH-05-BL-30K-3W
Manufacturer:	Blackjack Lighting LLC
Product Type:	5" White Globe Pendant
Rated Voltage/Frequency:	120-277V AC, 50/60Hz
Rated Power:	4.2W
Rated luminous flux:	230lm
Nominal CCT:	3000K

2. Standards Used

- ANSI/IES LM-79-19: APPROVED METHOD: OPTICAL AND ELECTRICAL MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS
- IES TM-30-18 IES Method for Evaluating Light Source Color Rendition (This Method is not in Nvlap accreditation scope)

3. Test equipment list

Test Equipment	Serial No	Model No	Calibration due date
Full-field Speed Goniophotometer	MD-E028	GO-R5000	2021/09/29
Digital Power Meter	MD-E001	PF2010	2021/09/29
AC Testing Power Source	MD-E002	DPS1060	2021/09/29
Total Spectral Radiant Flux Standard Lamp	MD-E007	D908S	2021/09/29
Integrating Sphere System	MD-E029	2M	2021/09/29
High Accuracy Array Spectroradiometer	MD-E011	HAAS-3000	2021/09/29
Digital Power Meter	MD-E008	PF310	2021/09/29
AC Testing Power Source	MD-E010	DPS1010	2021/09/29
Standard Lamp	MD-E012	D204	2021/06/09

Statement of Traceability: Guangdong Meide Testing Technology Co., Ltd. attested that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit(SI).



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4. Test Method

Requirements of Ambient Condition

Product was tested with no seasoning. All stabilization and measurements were made in compliance with ANSI/IES LM-79-19. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ during measurement. And relative humidity between 10% and 65%.

Goniophotometer System

The sample was tested according to the ANSI/IES LM-79-19.

Photometric parameters were measured using a type C goniophotometer and software. The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, Luminous efficacy, zonal flux were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the Largest dimension of the test SSL product.

Integrating Sphere System

The sample was tested according to the ANSI/IES LM-79-19.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Fidelity Index (R_i) and Gamut Index (R_g) Calculation

The R_i , R_g was calculated according to IES TM-30-18 by using calculation tools. The calculation was based on the measured SPD from 380nm to 780nm with 1nm intervals. All the colors in this report is for reference only.



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5. Integrating Sphere Test Results

5.1 Test Data

Test Ambient Temperature	25.1℃	Test orientation	Downward
Operate time(Min.)	60	stabilization time(Min.)	45

Optical and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.03011	4.073	0.9068	237.98	58.43

CCT (K)	Ra	R9	x	y	u'	v'
2946	91.5	53	0.4411	0.4059	0.2524	0.5227

Color Rendering Index

<div>Ra</div> <div>91.5</div>				
<div>R1</div> <div>91</div>	<div>R2</div> <div>97</div>	<div>R3</div> <div>98</div>	<div>R4</div> <div>90</div>	<div>R5</div> <div>91</div>
<div>R6</div> <div>96</div>	<div>R7</div> <div>90</div>	<div>R8</div> <div>78</div>	<div>R9</div> <div>53</div>	<div>R10</div> <div>91</div>
<div>R11</div> <div>90</div>	<div>R12</div> <div>80</div>	<div>R13</div> <div>93</div>	<div>R14</div> <div>100</div>	<div>R15</div> <div>87</div>



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ANSI/IES TM-30-18 Color Rendition Report

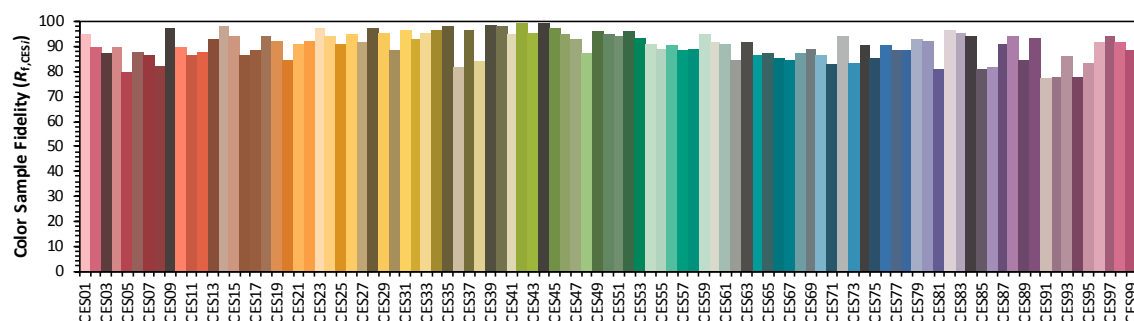
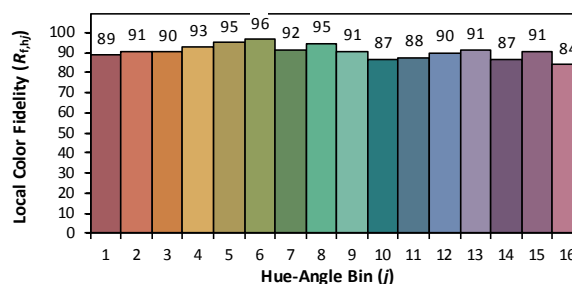
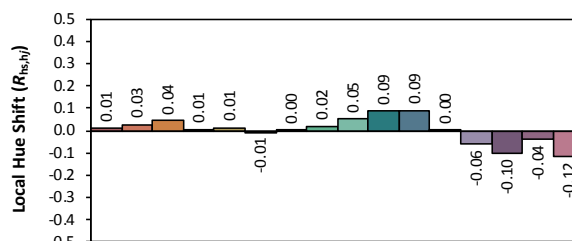
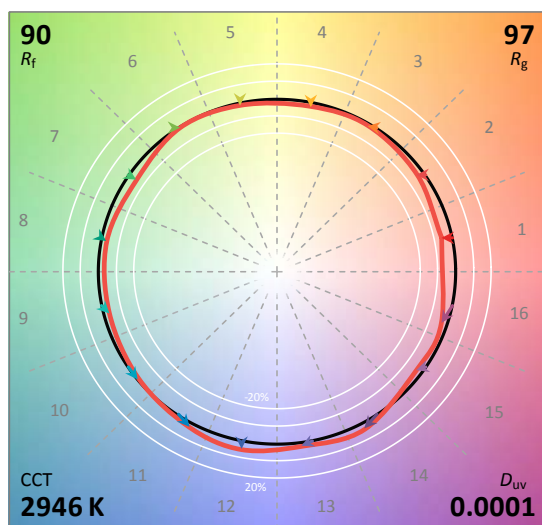
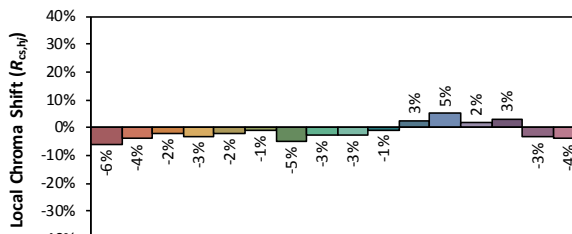
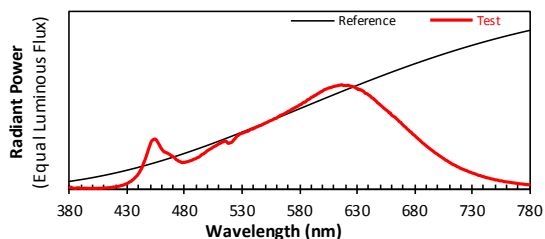
ANSI/IES TM-30-18 Color Rendition Report

Source: N/A

Manufacturer: Blackjack Lighting LLC

Date: 2021/2/4

Model: SP-GGL-WH-05-BL-30K-3W



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

x 0.4411
 y 0.4058
 u' 0.2525
 v' 0.5227

CIE 13.3-1995
(CRI)

R_a 91
 R_g 53

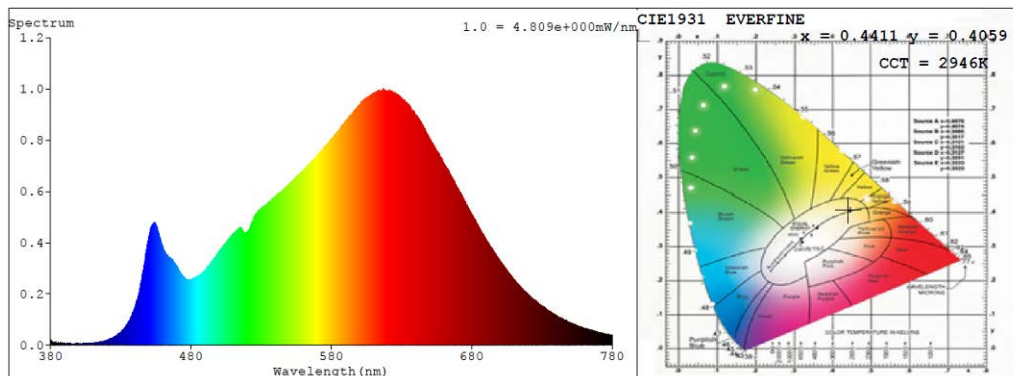
Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



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Relative Spectral Power Distribution



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0124	414	0.0106	448	0.3601	482	0.2591	516	0.4574
381	0.0162	415	0.0113	449	0.3946	483	0.2628	517	0.4457
382	0.01	416	0.0132	450	0.4241	484	0.2657	518	0.4356
383	0.0062	417	0.0134	451	0.454	485	0.2692	519	0.4388
384	0.0049	418	0.0181	452	0.4658	486	0.2724	520	0.4429
385	0.0036	419	0.0167	453	0.4739	487	0.2779	521	0.4468
386	0.0082	420	0.0182	454	0.4769	488	0.2845	522	0.4589
387	0.0094	421	0.02	455	0.4723	489	0.2862	523	0.4721
388	0.01	422	0.0232	456	0.4581	490	0.292	524	0.4827
389	0.0045	423	0.0258	457	0.4393	491	0.2984	525	0.4985
390	0.0049	424	0.0281	458	0.4207	492	0.3019	526	0.5103
391	0.0046	425	0.0329	459	0.3987	493	0.3095	527	0.5139
392	0.0042	426	0.0332	460	0.3818	494	0.3189	528	0.526
393	0.0065	427	0.0382	461	0.3678	495	0.3284	529	0.5297
394	0.0049	428	0.0423	462	0.3551	496	0.3331	530	0.5337
395	0.0052	429	0.0473	463	0.3528	497	0.3404	531	0.5366
396	0.0041	430	0.0504	464	0.3455	498	0.3486	532	0.5417
397	0.0026	431	0.0578	465	0.3435	499	0.358	533	0.5461
398	0.004	432	0.0656	466	0.3351	500	0.367	534	0.5493
399	0.0047	433	0.0695	467	0.3305	501	0.3732	535	0.5522
400	0.0057	434	0.0786	468	0.3202	502	0.3804	536	0.558
401	0.005	435	0.0872	469	0.3158	503	0.3858	537	0.5667
402	0.0036	436	0.0966	470	0.3066	504	0.3931	538	0.5723
403	0.004	437	0.1089	471	0.3018	505	0.402	539	0.5724
404	0.0055	438	0.1192	472	0.2883	506	0.407	540	0.5789
405	0.0062	439	0.1318	473	0.277	507	0.4123	541	0.582
406	0.0059	440	0.1474	474	0.2729	508	0.4188	542	0.591
407	0.0036	441	0.1652	475	0.2638	509	0.4258	543	0.5933
408	0.0063	442	0.1851	476	0.2606	510	0.4341	544	0.5981
409	0.006	443	0.2041	477	0.255	511	0.436	545	0.6046
410	0.0068	444	0.2382	478	0.2501	512	0.4449	546	0.6072
411	0.0091	445	0.2646	479	0.2554	513	0.4478	547	0.6107
412	0.008	446	0.2929	480	0.2534	514	0.4539	548	0.6188
413	0.0101	447	0.3257	481	0.2568	515	0.4566	549	0.6217



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nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.6303	599	0.9324	648	0.8237	697	0.3541	746	0.0978
551	0.6325	600	0.9377	649	0.8172	698	0.3451	747	0.095
552	0.6379	601	0.9458	650	0.8067	699	0.3383	748	0.0934
553	0.6449	602	0.9527	651	0.7967	700	0.3311	749	0.0913
554	0.6514	603	0.9559	652	0.788	701	0.3223	750	0.0858
555	0.6548	604	0.9598	653	0.7773	702	0.3157	751	0.0855
556	0.659	605	0.9653	654	0.7682	703	0.308	752	0.0837
557	0.6654	606	0.9688	655	0.7592	704	0.2996	753	0.0815
558	0.6724	607	0.9717	656	0.7509	705	0.293	754	0.0767
559	0.6737	608	0.9735	657	0.7421	706	0.285	755	0.0762
560	0.6781	609	0.9792	658	0.7283	707	0.2763	756	0.0761
561	0.6884	610	0.9817	659	0.7273	708	0.2714	757	0.0726
562	0.6936	611	0.9844	660	0.708	709	0.2652	758	0.0691
563	0.7016	612	0.9871	661	0.7003	710	0.2562	759	0.0677
564	0.7079	613	0.9884	662	0.6925	711	0.2508	760	0.0667
565	0.7105	614	0.9931	663	0.6883	712	0.2432	761	0.0651
566	0.7159	615	0.9929	664	0.6753	713	0.2358	762	0.064
567	0.7204	616	0.996	665	0.6659	714	0.2311	763	0.0628
568	0.7285	617	0.9984	666	0.6548	715	0.2266	764	0.0601
569	0.7337	618	0.9909	667	0.6428	716	0.2212	765	0.0587
570	0.7424	619	0.9905	668	0.637	717	0.2134	766	0.0563
571	0.7462	620	0.9903	669	0.6226	718	0.2089	767	0.0558
572	0.7517	621	0.9907	670	0.6127	719	0.2042	768	0.0537
573	0.7602	622	0.9926	671	0.6007	720	0.1968	769	0.0522
574	0.7667	623	0.9915	672	0.5933	721	0.1927	770	0.05
575	0.772	624	0.9851	673	0.5819	722	0.188	771	0.0494
576	0.7778	625	0.9839	674	0.5698	723	0.1839	772	0.0471
577	0.7846	626	0.9806	675	0.5624	724	0.1787	773	0.0476
578	0.7888	627	0.9782	676	0.5488	725	0.1756	774	0.0457
579	0.7958	628	0.9748	677	0.5438	726	0.1713	775	0.0444
580	0.8045	629	0.9656	678	0.5308	727	0.165	776	0.0423
581	0.8082	630	0.9641	679	0.5203	728	0.1603	777	0.0419
582	0.8153	631	0.9515	680	0.5126	729	0.1581	778	0.0403
583	0.8253	632	0.9549	681	0.5019	730	0.1529	779	0.0396
584	0.8293	633	0.9466	682	0.4909	731	0.1489	780	0.0375
585	0.8329	634	0.947	683	0.4816	732	0.1462		
586	0.8438	635	0.9391	684	0.4716	733	0.1417		
587	0.8542	636	0.9314	685	0.4627	734	0.1374		
588	0.8571	637	0.9173	686	0.4514	735	0.1326		
589	0.8646	638	0.914	687	0.441	736	0.1284		
590	0.8732	639	0.9102	688	0.4329	737	0.1275		
591	0.8816	640	0.8993	689	0.4238	738	0.1236		
592	0.8842	641	0.8938	690	0.4143	739	0.1184		
593	0.8946	642	0.8842	691	0.4053	740	0.1182		
594	0.8979	643	0.8717	692	0.3968	741	0.1119		
595	0.9063	644	0.868	693	0.3877	742	0.1096		
596	0.9134	645	0.8571	694	0.3789	743	0.1064		
597	0.9189	646	0.8474	695	0.3708	744	0.1042		
598	0.9262	647	0.8373	696	0.3632	745	0.1018		



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6. Goniophotometer Test results

6.1 Test Data

Test Ambient Temperature	25.1℃	Test orientation	Downward
Operate time(Min.)	90	stabilization time(Min.)	60

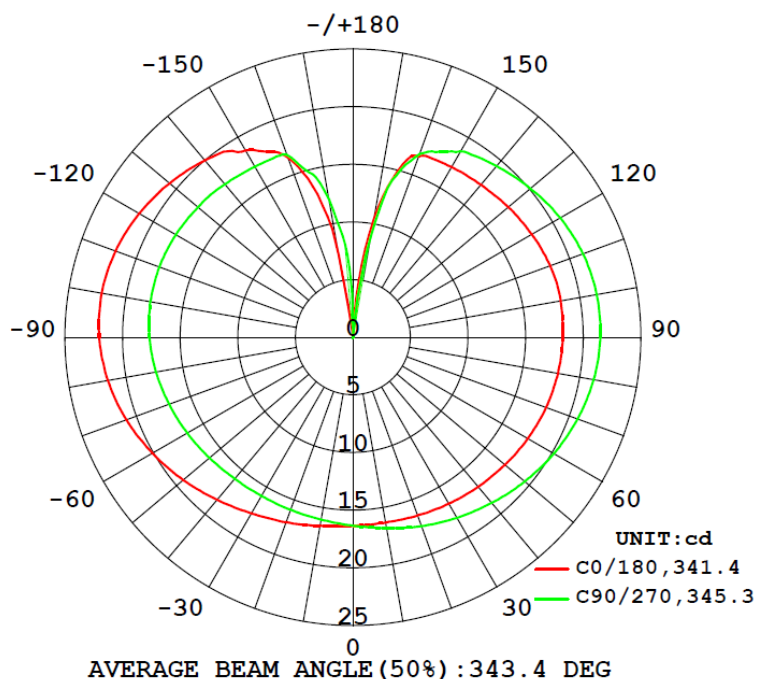
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120.0	60	0.0373	0.9124	4.080

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	I _{max} (cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
234.083	57.37	22.79	1.70	1.50

6.2 Luminous Intensity Distribution





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6.3 Zonal Flux Diagram

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	16.30	16.59	16.80	16.80	16.60	16.27	16.05	16.07	0- 10	1.564	1.564	0.67,0.67
20	16.44	16.99	17.42	17.47	17.07	16.39	15.92	15.95	10- 20	4.698	6.263	2.68,2.68
30	16.66	17.44	18.06	18.20	17.64	16.59	15.90	15.96	20- 30	7.814	14.08	6.01,6.01
40	16.91	17.89	18.74	19.07	18.39	17.00	16.01	16.04	30- 40	10.85	24.93	10.7,10.7
50	17.21	18.35	19.46	20.00	19.25	17.52	16.28	16.24	40- 50	13.76	38.70	16.5,16.5
60	17.54	18.80	20.14	20.91	20.11	18.11	16.62	16.51	50- 60	16.44	55.13	23.6,23.6
70	17.83	19.18	20.74	21.72	20.94	18.70	17.00	16.78	60- 70	18.72	73.85	31.5,31.5
80	18.06	19.48	21.20	22.36	21.61	19.23	17.38	17.05	70- 80	20.46	94.31	40.3,40.3
90	18.22	19.66	21.47	22.73	22.04	19.61	17.67	17.26	80- 90	21.49	115.8	49.5,49.5
100	18.32	19.69	21.48	22.76	22.16	19.77	17.87	17.38	90-100	21.71	137.5	58.7,58.7
110	18.21	19.62	21.24	22.45	21.95	19.73	17.90	17.39	100-110	21.04	158.5	67.7,67.7
120	17.91	19.24	20.76	21.84	21.45	19.45	17.79	17.28	110-120	19.51	178.1	76.1,76.1
130	17.59	18.73	20.10	21.07	20.81	19.14	17.59	17.08	120-130	17.27	195.3	83.4,83.4
140	17.29	18.25	19.41	20.21	20.05	18.76	17.35	16.91	130-140	14.54	209.9	89.7,89.7
150	17.07	17.82	18.63	19.15	18.72	18.36	17.09	16.82	140-150	11.49	221.4	94.6,94.6
160	16.75	16.70	16.93	16.81	16.61	16.30	16.85	16.64	150-160	8.099	229.5	98,98
170	10.33	8.991	8.779	9.566	7.232	8.942	12.11	13.07	160-170	4.112	233.6	99.8,99.8
180	0.7908	0.7908	0	0	0	0	0.7908	0.7908	170-180	0.5164	234.1	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



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6.4 Luminous Distribution Intensity (cd) Data

Gamma\C	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	16.34	16.34	16.34	16.34	16.34	16.34	16.34	16.34
5.0°	16.31	16.35	16.43	16.5	16.54	16.55	16.54	16.5
10.0°	16.3	16.44	16.59	16.72	16.8	16.83	16.8	16.72
15.0°	16.36	16.57	16.78	16.96	17.1	17.17	17.12	17.01
20.0°	16.44	16.72	16.99	17.23	17.42	17.51	17.47	17.31
25.0°	16.54	16.88	17.21	17.51	17.74	17.86	17.82	17.64
30.0°	16.66	17.06	17.44	17.79	18.06	18.22	18.2	18
35.0°	16.78	17.23	17.66	18.06	18.39	18.6	18.62	18.41
40.0°	16.91	17.41	17.89	18.34	18.74	19.01	19.07	18.86
45.0°	17.06	17.59	18.12	18.63	19.1	19.44	19.53	19.33
50.0°	17.21	17.79	18.35	18.93	19.46	19.86	20	19.8
55.0°	17.37	17.98	18.58	19.21	19.81	20.28	20.47	20.27
60.0°	17.54	18.17	18.8	19.47	20.14	20.69	20.91	20.72
65.0°	17.69	18.34	19	19.72	20.46	21.06	21.33	21.16
70.0°	17.83	18.5	19.18	19.94	20.74	21.41	21.72	21.57
75.0°	17.95	18.64	19.35	20.13	20.99	21.71	22.07	21.93
80.0°	18.06	18.75	19.48	20.3	21.2	21.96	22.36	22.24
85.0°	18.15	18.85	19.59	20.44	21.36	22.15	22.58	22.47
90.0°	18.22	18.91	19.66	20.52	21.47	22.27	22.73	22.63
95.0°	18.26	18.98	19.69	20.56	21.5	22.32	22.78	22.71
100.0°	18.32	19.04	19.69	20.54	21.48	22.29	22.76	22.7
105.0°	18.3	18.98	19.7	20.48	21.4	22.19	22.64	22.6
110.0°	18.21	18.85	19.62	20.36	21.24	22.01	22.45	22.42
115.0°	18.08	18.68	19.45	20.19	21.03	21.75	22.18	22.17
120.0°	17.91	18.49	19.24	19.97	20.76	21.44	21.84	21.85
125.0°	17.76	18.31	19	19.74	20.45	21.08	21.47	21.5
130.0°	17.59	18.11	18.73	19.46	20.1	20.7	21.07	21.11
135.0°	17.42	17.9	18.48	19.17	19.76	20.31	20.64	20.68
140.0°	17.29	17.72	18.25	18.88	19.41	19.9	20.21	20.24
145.0°	17.17	17.56	18.03	18.58	19.05	19.49	19.77	19.73
150.0°	17.07	17.41	17.82	18.3	18.63	18.94	19.15	19.16
155.0°	17	17.29	17.5	17.56	17.77	18.23	18.44	18.33
160.0°	16.75	16.86	16.7	16.46	16.93	17	16.81	16.82
165.0°	14.89	14.49	14	13.97	14.51	14.87	14.33	14.05
170.0°	10.33	9.815	8.991	9.789	8.779	9.739	9.566	8.646
175.0°	3.435	3.549	3.263	3.467	0.141	0.837	0.062	0
180.0°	0.791	0.791	0.791	0.791	0	0	0	0



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Gamma/C	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	16.34	16.34	16.34	16.34	16.34	16.34	16.34	16.34
5.0°	16.45	16.37	16.28	16.21	16.17	16.16	16.18	16.23
10.0°	16.6	16.44	16.27	16.14	16.05	16.03	16.07	16.15
15.0°	16.82	16.57	16.32	16.1	15.97	15.94	16	16.13
20.0°	17.07	16.72	16.39	16.1	15.92	15.87	15.95	16.15
25.0°	17.33	16.89	16.47	16.12	15.9	15.84	15.95	16.19
30.0°	17.64	17.11	16.59	16.16	15.9	15.83	15.96	16.24
35.0°	17.99	17.39	16.77	16.26	15.93	15.84	15.99	16.31
40.0°	18.39	17.71	17	16.4	16.01	15.89	16.04	16.39
45.0°	18.81	18.05	17.25	16.58	16.13	15.98	16.12	16.49
50.0°	19.25	18.41	17.52	16.78	16.28	16.1	16.24	16.62
55.0°	19.68	18.78	17.82	16.99	16.44	16.24	16.37	16.76
60.0°	20.11	19.15	18.11	17.22	16.62	16.39	16.51	16.91
65.0°	20.54	19.51	18.4	17.45	16.81	16.55	16.65	17.05
70.0°	20.94	19.88	18.7	17.68	17	16.7	16.78	17.18
75.0°	21.31	20.21	18.99	17.92	17.19	16.87	16.92	17.3
80.0°	21.61	20.48	19.23	18.14	17.38	17.03	17.05	17.42
85.0°	21.85	20.72	19.43	18.32	17.54	17.17	17.17	17.52
90.0°	22.04	20.92	19.61	18.47	17.67	17.29	17.26	17.6
95.0°	22.14	21.04	19.73	18.59	17.79	17.38	17.33	17.65
100.0°	22.16	21.08	19.77	18.66	17.87	17.45	17.38	17.67
105.0°	22.09	21.08	19.78	18.67	17.9	17.48	17.39	17.67
110.0°	21.95	20.97	19.73	18.66	17.9	17.47	17.39	17.66
115.0°	21.72	20.75	19.62	18.6	17.86	17.44	17.35	17.64
120.0°	21.45	20.53	19.45	18.49	17.79	17.38	17.28	17.54
125.0°	21.15	20.31	19.3	18.37	17.68	17.29	17.19	17.41
130.0°	20.81	20.05	19.14	18.27	17.59	17.19	17.08	17.26
135.0°	20.44	19.77	18.94	18.13	17.49	17.12	16.98	17.12
140.0°	20.05	19.52	18.76	17.97	17.35	17.03	16.91	17
145.0°	19.65	19.28	18.59	17.82	17.19	16.93	16.86	16.91
150.0°	18.72	18.77	18.36	17.64	17.09	16.86	16.82	16.84
155.0°	17.79	17.95	17.76	17.36	17.04	16.71	16.72	16.82
160.0°	16.61	16.52	16.3	16.19	16.85	16.58	16.64	16.75
165.0°	13.56	13.78	13.86	13.99	14.8	15.66	16.02	15.82
170.0°	7.232	8.352	8.942	8.961	12.11	13.3	13.07	11.91
175.0°	0	0	0	0.138	8.055	8.902	7.871	5.826
180.0°	0	0	0	0	0.791	0.791	0.791	0.791



Guangdong Meide Testing Technology Co., Ltd.



7. Photo of Sample



Figure 1

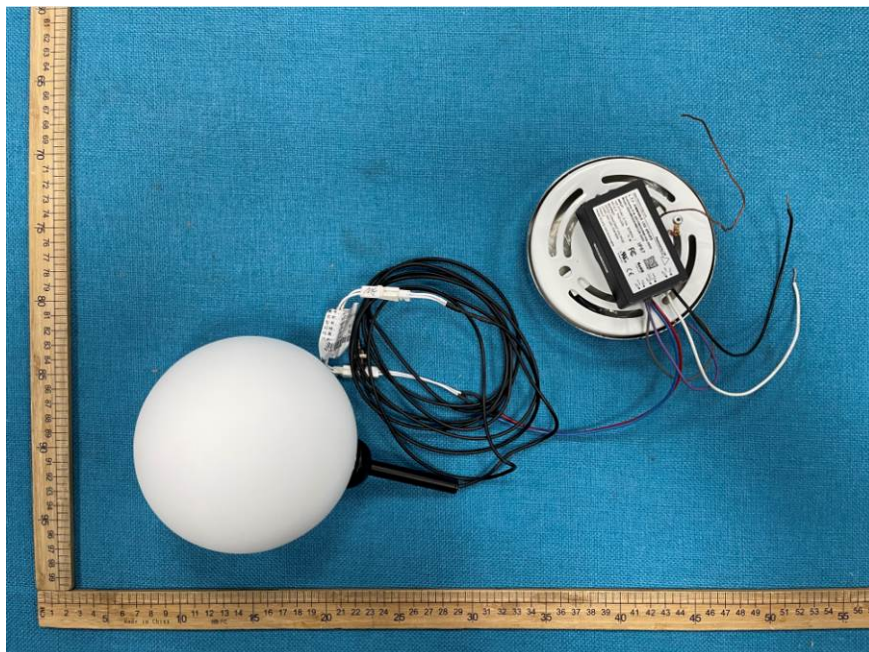


Figure 2

***** END OF THE TEST REPORT*****