



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-COT-LR-01-XX-XX-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..... : C02A210702181L01005

Test Date..... : JUL. 15, 2021 – JUL. 21, 2021

Report Date..... : JUL. 22, 2021

Tested by:

Tim Qian

Tim Qian/ Test Engineer

Checked by:

Luke Lei

Luke Lei/ Project Engineer

Approved by:

Jessie Li

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-COT-LR-01-XX-XX-3W . The sample was received on 2021-07-15 ,is undamaged condition.

Model Tested:	SP-COT-LR-01-XX-XX-3W
Manufacturer:	Blackjack Lighting LLC
Manufacturer address:	1547 Barclay Blvd Buffalo Grove, IL 60089
Product Type:	Cone Tall
Rated Voltage/Frequency:	120-277V
Rated Power:	4.5W
Rated luminous flux:	200LM
Nominal CCT:	3000K
LED Manufacturer:	N/A
LED Model No:	N/A

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 Spectroradio Meter	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	2022/05/18

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)
120.14	60.08	0.03995	4.219	0.8791	204.31	48.43

CCT (K)	Ra	R9	x	y	u'	v'
3021	93.1	61	0.4364	0.4056	0.2496	0.5219

5.2 Color Rendering Index

<div>Ra</div> <div>93.1</div>				
<div>R1</div> <div>93</div>	<div>R2</div> <div>96</div>	<div>R3</div> <div>98</div>	<div>R4</div> <div>93</div>	<div>R5</div> <div>93</div>
<div>R6</div> <div>96</div>	<div>R7</div> <div>93</div>	<div>R8</div> <div>83</div>	<div>R9</div> <div>61</div>	<div>R10</div> <div>91</div>
<div>R11</div> <div>94</div>	<div>R12</div> <div>80</div>	<div>R13</div> <div>94</div>	<div>R14</div> <div>99</div>	<div>R15</div> <div>89</div>



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

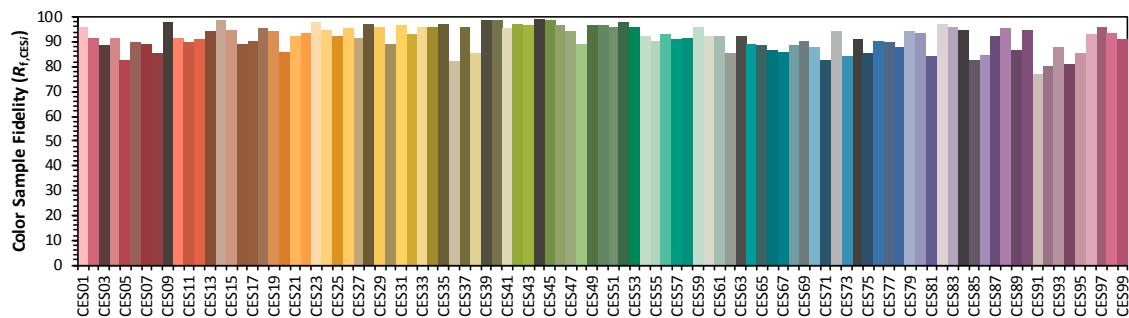
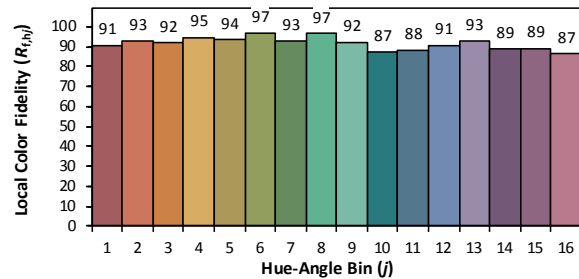
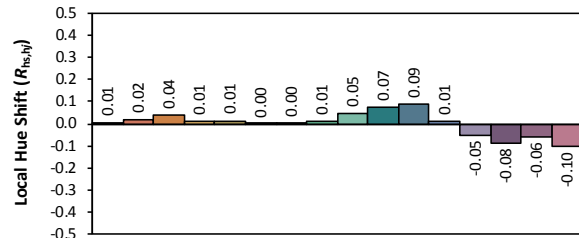
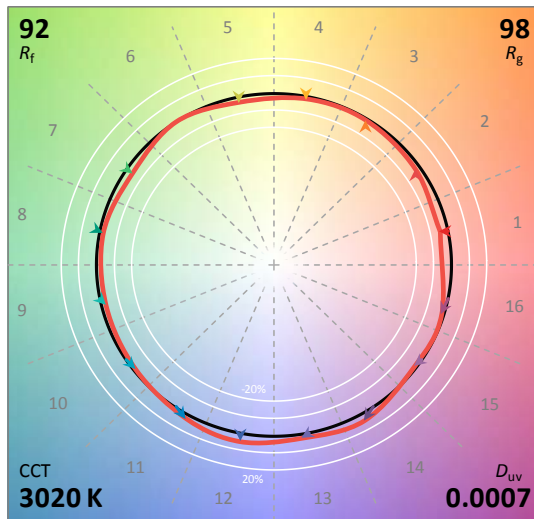
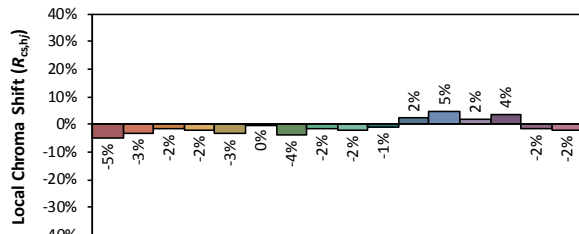
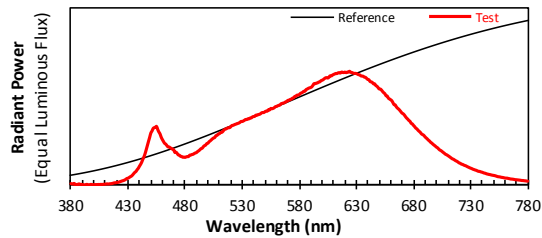
ANSI/IES TM-30-18 Color Rendition Report

Source: N/A

Manufacturer: Blackjack Lighting LLC

Date: 2021/7/21

Model: SP-COT-LR-01-XX-XX-3W



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

x 0.4364
 y 0.4055
 u' 0.2496
 v' 0.5219

CIE 13.3-1995
(CRI)

R_a 93
 R_g 61

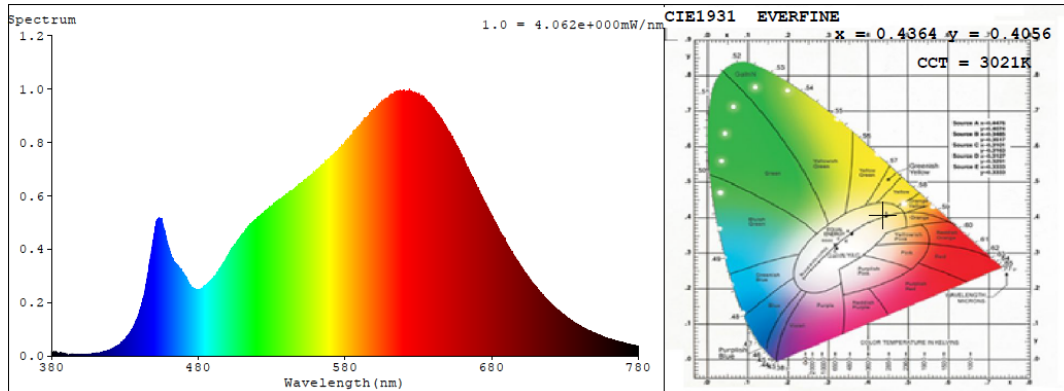
Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



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5.4 Relative Spectral Power Distribution



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0146	414	0.0132	448	0.3869	482	0.2515	516	0.4948
381	0.0127	415	0.014	449	0.4218	483	0.2521	517	0.5008
382	0.0128	416	0.0157	450	0.4586	484	0.2639	518	0.5046
383	0.016	417	0.0185	451	0.4754	485	0.2651	519	0.5055
384	0	418	0.0214	452	0.4981	486	0.2698	520	0.5137
385	0.0073	419	0.0222	453	0.505	487	0.2719	521	0.5237
386	0.0069	420	0.024	454	0.5094	488	0.2784	522	0.5256
387	0.0124	421	0.0255	455	0.5158	489	0.2835	523	0.5303
388	0.0084	422	0.0283	456	0.4897	490	0.2873	524	0.5346
389	0.0076	423	0.0319	457	0.4675	491	0.2965	525	0.5379
390	0.0071	424	0.0352	458	0.451	492	0.3031	526	0.542
391	0.0038	425	0.0388	459	0.423	493	0.3121	527	0.5453
392	0.0033	426	0.0417	460	0.4025	494	0.3215	528	0.5513
393	0.0055	427	0.046	461	0.385	495	0.3253	529	0.5594
394	0.008	428	0.052	462	0.3685	496	0.3386	530	0.5594
395	0.0046	429	0.0595	463	0.3613	497	0.3474	531	0.5638
396	0.0017	430	0.0622	464	0.3486	498	0.3527	532	0.5701
397	0.007	431	0.0684	465	0.3369	499	0.3658	533	0.5768
398	0.007	432	0.0751	466	0.3361	500	0.3691	534	0.576
399	0.0047	433	0.0807	467	0.3284	501	0.3817	535	0.5832
400	0.0055	434	0.0905	468	0.323	502	0.3895	536	0.5823
401	0.0052	435	0.1026	469	0.3162	503	0.3987	537	0.5901
402	0.0061	436	0.1137	470	0.3112	504	0.4078	538	0.5907
403	0.006	437	0.1218	471	0.2884	505	0.415	539	0.5996
404	0.007	438	0.1369	472	0.2902	506	0.4192	540	0.6028
405	0.0065	439	0.1492	473	0.2799	507	0.435	541	0.6046
406	0.0077	440	0.1671	474	0.2666	508	0.4378	542	0.6152
407	0.0073	441	0.1833	475	0.2638	509	0.4495	543	0.6139
408	0.0077	442	0.203	476	0.2539	510	0.4519	544	0.6197
409	0.0093	443	0.2284	477	0.2524	511	0.462	545	0.6218
410	0.0094	444	0.2503	478	0.2458	512	0.4639	546	0.6268
411	0.0119	445	0.2793	479	0.2472	513	0.4715	547	0.6351
412	0.0122	446	0.3143	480	0.2446	514	0.4844	548	0.6378
413	0.011	447	0.3506	481	0.2494	515	0.4916	549	0.638



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nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.6455	599	0.9168	648	0.8683	697	0.3608	746	0.0955
551	0.65	600	0.9207	649	0.8568	698	0.3525	747	0.0939
552	0.6497	601	0.9266	650	0.8443	699	0.345	748	0.091
553	0.6627	602	0.9349	651	0.8437	700	0.3355	749	0.0887
554	0.6603	603	0.9416	652	0.8346	701	0.3293	750	0.0869
555	0.6735	604	0.9435	653	0.8218	702	0.3193	751	0.0851
556	0.6712	605	0.9401	654	0.8111	703	0.3099	752	0.0823
557	0.6741	606	0.9479	655	0.8024	704	0.3045	753	0.0787
558	0.6795	607	0.9601	656	0.785	705	0.2969	754	0.0756
559	0.6884	608	0.9582	657	0.7823	706	0.2886	755	0.0745
560	0.6914	609	0.9657	658	0.7643	707	0.2812	756	0.0727
561	0.6962	610	0.9712	659	0.7569	708	0.2725	757	0.07
562	0.7008	611	0.9756	660	0.7499	709	0.2678	758	0.0687
563	0.7034	612	0.98	661	0.7416	710	0.2613	759	0.0666
564	0.7141	613	0.9794	662	0.7251	711	0.2546	760	0.0641
565	0.7175	614	0.9854	663	0.7073	712	0.2473	761	0.0627
566	0.7209	615	0.9865	664	0.7047	713	0.2397	762	0.0626
567	0.7236	616	0.9835	665	0.6881	714	0.2324	763	0.06
568	0.7312	617	0.9924	666	0.6765	715	0.2283	764	0.0581
569	0.7347	618	0.9898	667	0.6682	716	0.2218	765	0.0554
570	0.7444	619	0.9881	668	0.6573	717	0.2152	766	0.0545
571	0.7452	620	0.9925	669	0.6448	718	0.2105	767	0.0534
572	0.7524	621	0.9867	670	0.6328	719	0.2038	768	0.0517
573	0.755	622	0.9921	671	0.6268	720	0.1964	769	0.0495
574	0.7633	623	0.9915	672	0.6162	721	0.1926	770	0.0488
575	0.767	624	0.9995	673	0.6021	722	0.1856	771	0.0476
576	0.7784	625	0.99	674	0.5895	723	0.1831	772	0.0464
577	0.7807	626	0.9888	675	0.5799	724	0.1777	773	0.0452
578	0.79	627	0.9843	676	0.5682	725	0.1735	774	0.0436
579	0.7907	628	0.9811	677	0.5604	726	0.1701	775	0.0419
580	0.7955	629	0.9812	678	0.5435	727	0.1642	776	0.0417
581	0.8054	630	0.9793	679	0.538	728	0.1597	777	0.0399
582	0.8099	631	0.9741	680	0.5254	729	0.1548	778	0.0391
583	0.8159	632	0.9695	681	0.5148	730	0.1503	779	0.0374
584	0.8245	633	0.9674	682	0.5017	731	0.1467	780	0.0362
585	0.8248	634	0.959	683	0.4944	732	0.1414		
586	0.8391	635	0.9574	684	0.4825	733	0.138		
587	0.8438	636	0.9555	685	0.4731	734	0.1341		
588	0.8502	637	0.9481	686	0.4642	735	0.1312		
589	0.854	638	0.946	687	0.4511	736	0.1264		
590	0.8573	639	0.9367	688	0.4446	737	0.1224		
591	0.8637	640	0.9279	689	0.4383	738	0.1215		
592	0.8772	641	0.9249	690	0.4264	739	0.1174		
593	0.8921	642	0.91	691	0.4162	740	0.1149		
594	0.8903	643	0.9062	692	0.4076	741	0.111		
595	0.896	644	0.9014	693	0.3967	742	0.1072		
596	0.8976	645	0.8893	694	0.3887	743	0.105		
597	0.9051	646	0.8893	695	0.3775	744	0.1006		
598	0.9068	647	0.8748	696	0.3702	745	0.0982		



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6. Goniophotometer Test results

6.1 Test Data

Test Ambient Temperature	25.0℃	Test orientation	Downward
Operate time(Min.)	90	stabilization time(Min.)	60

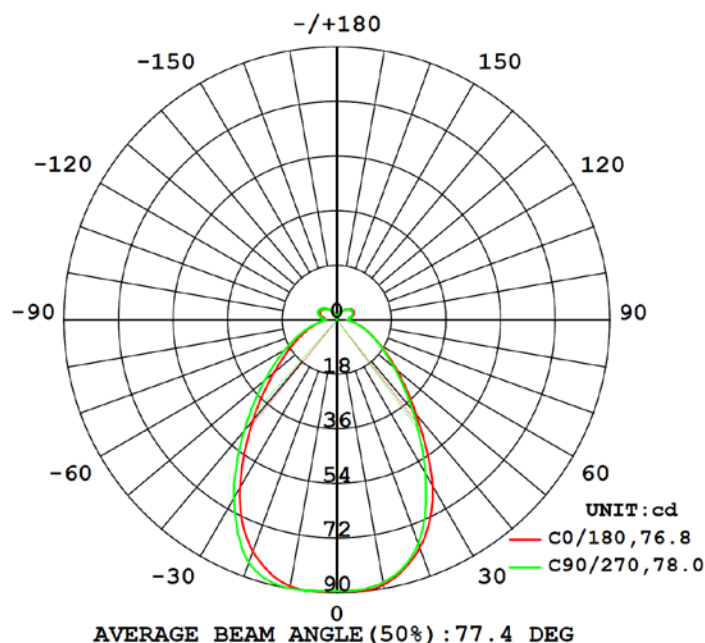
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120.1	60.01	0.039	0.9055	4.24

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	I _{max} (cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
203.088	47.9	90.02	1.10	1.15

6.2 Luminous Intensity Distribution





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6.3 Zonal Flux Diagram

y	C0	C45	C90	C135	C180	C225	C270	C315	y	Φ zone	Φ total	%lum, lamp
10	88.75	87.84	87.88	88.70	89.29	89.63	89.93	89.53	0- 10	8.536	8.536	4.2,4.2
20	79.90	78.12	78.46	78.87	81.16	83.84	85.08	82.66	10- 20	24.18	32.72	16.1,16.1
30	63.15	58.36	58.40	60.48	64.11	66.98	68.07	66.87	20- 30	33.47	66.19	32.6,32.6
40	40.66	39.42	38.73	39.16	43.07	46.61	47.79	45.10	30- 40	32.83	99.02	48.8,48.8
50	25.81	25.41	24.80	24.81	27.34	30.38	31.31	28.26	40- 50	26.51	125.5	61.8,61.8
60	16.46	16.28	15.96	15.98	17.22	19.18	19.92	17.52	50- 60	19.58	145.1	71.5,71.5
70	10.56	10.51	10.28	10.29	10.91	12.03	12.20	10.95	60- 70	13.79	158.9	78.2,78.2
80	6.161	6.174	5.943	5.927	6.246	6.835	6.683	6.197	70- 80	8.998	167.9	82.7,82.7
90	3.594	3.623	3.411	3.485	3.710	4.203	3.983	3.621	80- 90	4.959	172.9	85.1,85.1
100	4.836	4.724	4.493	4.609	4.920	5.496	5.430	5.034	90-100	4.686	177.5	87.4,87.4
110	5.872	5.674	5.489	5.671	6.022	6.603	6.591	6.193	100-110	5.841	183.4	90.3,90.3
120	6.165	5.941	5.800	6.011	6.334	6.770	6.761	6.468	110-120	6.185	189.6	93.3,93.3
130	5.539	5.386	5.273	5.462	5.693	5.939	5.909	5.713	120-130	5.392	195.0	96,96
140	4.467	4.396	4.357	4.486	4.612	4.701	4.669	4.551	130-140	3.958	198.9	97.9,97.9
150	3.193	3.212	3.229	3.324	3.373	3.330	3.270	3.206	140-150	2.471	201.4	99.2,99.2
160	1.894	1.988	2.064	2.137	2.131	2.038	1.918	1.846	150-160	1.235	202.6	99.8,99.8
170	0.7165	0.5946	0.9783	1.025	0.9965	0.9080	0.7599	0.6609	160-170	0.4189	203.0	100,100
180	0.0826	0.0822	0.0839	0.0826	0.0809	0.0822	0.0817	0.0822	170-180	0.0410	203.1	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



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6.4 Luminous Distribution Intensity (cd) Data

Table--1

UNIT: cd

C (DEG) γ (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	89.4	89.5	89.4	89.3	89.4	89.4	89.4	89.3	89.4	89.5	89.4	89.3	89.4	89.4	89.4	89.3			
5	89.7	89.5	89.4	89.3	89.3	89.5	89.7	89.8	89.8	89.8	89.7	89.7	89.6	89.7	89.9	89.9			
10	88.7	88.2	87.8	87.7	87.9	88.3	88.7	89.1	89.3	89.3	89.6	89.7	89.9	89.8	89.5	89.3			
15	85.2	84.5	84.3	84.2	84.6	84.8	85.1	85.7	86.2	87.0	87.9	88.8	88.8	87.9	87.1	86.3			
20	79.9	78.5	78.1	78.0	78.5	78.4	78.9	80.0	81.2	82.3	83.8	85.1	85.1	83.5	82.7	81.9			
25	72.7	70.3	68.9	68.6	69.1	69.6	70.7	72.5	73.9	75.2	76.6	78.0	77.5	76.9	76.0	75.4			
30	63.1	60.2	58.4	58.0	58.4	59.2	60.5	62.1	64.1	65.9	67.0	67.7	68.1	68.0	66.9	65.2			
35	51.2	49.7	48.5	47.9	47.9	48.7	49.3	50.7	53.2	55.7	56.4	57.4	57.7	58.0	55.6	52.6			
40	40.7	40.1	39.4	39.2	38.7	39.0	39.2	40.7	43.1	45.3	46.6	48.1	47.8	46.9	45.1	42.2			
45	32.4	32.0	31.7	31.5	31.1	31.0	31.1	32.4	34.5	36.3	38.0	39.2	38.8	37.4	36.0	33.9			
50	25.8	25.5	25.4	25.1	24.8	24.7	24.8	25.8	27.3	28.9	30.4	31.2	31.3	29.9	28.3	27.1			
55	20.6	20.5	20.3	20.0	19.8	19.8	19.9	20.5	21.6	23.0	24.1	25.1	25.0	23.8	22.2	21.4			
60	16.5	16.4	16.3	16.0	16.0	16.0	16.0	16.3	17.2	18.3	19.2	20.0	19.9	18.7	17.5	16.9			
65	13.2	13.3	13.2	12.9	12.9	13.0	12.9	13.2	13.8	14.6	15.2	15.7	15.7	14.8	13.8	13.4			
70	10.6	10.6	10.5	10.3	10.3	10.4	10.3	10.5	10.9	11.5	12.0	12.3	12.2	11.6	11.0	10.7			
75	8.24	8.31	8.22	8.02	7.99	8.04	7.98	8.10	8.43	8.90	9.26	9.36	9.24	8.81	8.43	8.27			
80	6.16	6.24	6.17	6.01	5.94	5.96	5.93	6.01	6.25	6.58	6.84	6.84	6.68	6.38	6.20	6.15			
85	4.31	4.39	4.36	4.24	4.15	4.15	4.14	4.21	4.36	4.58	4.75	4.70	4.51	4.28	4.23	4.28			
90	3.59	3.66	3.62	3.50	3.41	3.44	3.48	3.60	3.71	3.97	4.20	4.19	3.98	3.74	3.62	3.57			
95	4.17	4.19	4.13	4.00	3.90	3.93	3.99	4.13	4.27	4.55	4.81	4.85	4.67	4.44	4.29	4.19			
100	4.84	4.81	4.72	4.59	4.49	4.52	4.61	4.76	4.92	5.22	5.50	5.58	5.43	5.21	5.03	4.90			
105	5.42	5.36	5.26	5.13	5.05	5.09	5.19	5.35	5.53	5.84	6.13	6.23	6.10	5.88	5.69	5.52			
110	5.87	5.78	5.67	5.56	5.49	5.55	5.67	5.83	6.02	6.32	6.60	6.71	6.59	6.38	6.19	6.00			
115	6.13	6.03	5.92	5.81	5.76	5.83	5.96	6.12	6.31	6.58	6.83	6.92	6.83	6.65	6.47	6.27			
120	6.17	6.06	5.94	5.84	5.80	5.88	6.01	6.16	6.33	6.56	6.77	6.85	6.76	6.61	6.47	6.30			
125	5.94	5.85	5.75	5.65	5.62	5.69	5.82	5.95	6.10	6.29	6.44	6.49	6.41	6.29	6.17	6.05			
130	5.54	5.48	5.39	5.30	5.27	5.35	5.46	5.57	5.69	5.83	5.94	5.97	5.91	5.80	5.71	5.62			
135	5.04	5.00	4.93	4.87	4.85	4.91	5.01	5.09	5.18	5.27	5.35	5.37	5.32	5.23	5.17	5.11			
140	4.47	4.44	4.40	4.36	4.36	4.41	4.49	4.54	4.61	4.66	4.70	4.71	4.67	4.60	4.55	4.52			
145	3.85	3.84	3.82	3.80	3.81	3.86	3.92	3.95	4.00	4.01	4.02	4.01	3.98	3.92	3.89	3.88			
150	3.19	3.21	3.21	3.21	3.23	3.28	3.32	3.34	3.37	3.35	3.33	3.30	3.27	3.23	3.21	3.22			
155	2.54	2.57	2.59	2.61	2.64	2.69	2.72	2.73	2.75	2.72	2.66	2.62	2.57	2.54	2.52	2.54			
160	1.89	1.95	1.99	2.02	2.06	2.11	2.14	2.13	2.13	2.11	2.04	1.97	1.92	1.88	1.85	1.87			
165	1.28	1.34	1.40	1.46	1.50	1.54	1.56	1.56	1.55	1.53	1.45	1.37	1.31	1.26	1.22	1.22			
170	0.72	0.76	0.59	0.93	0.98	1.01	1.03	1.02	1.00	1.00	0.91	0.83	0.76	0.71	0.66	0.65			
175	0.22	0.24	0.25	0.10	0.07	0.07	0.07	0.07	0.30	0.31	0.25	0.09	0.27	0.23	0.15	0.19			
180	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08			



Guangdong Meide Testing Technology Co., Ltd.



7. Photo of sample

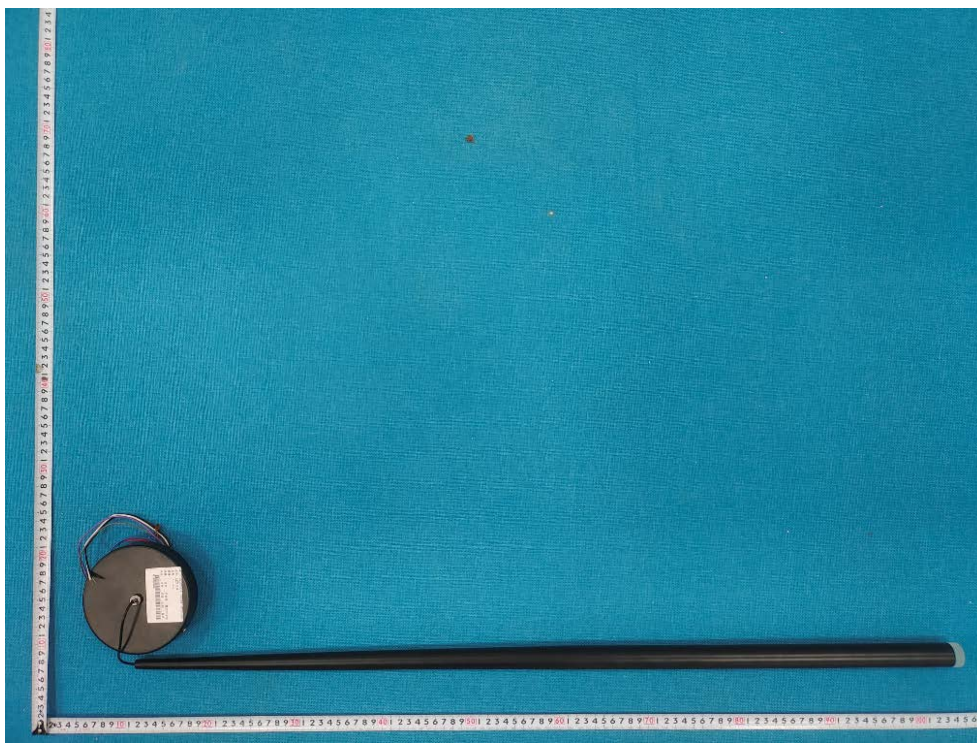


Figure 1

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