

**LM-79-08 Test Report**

For

**Shenzhen OKT Lighting Co.,LTD**  
**(Brand Name: OKT Lighting)**

NO.2076 Jincheng Rd,Shajing Town, Bao'an District, Shenzhen, China.

**2X2 Luminaires for Ambient Lighting of Interior  
Commercial Spaces**

Model name(s): TT22-DM-XXE

Remark: "XX" in the model name refers to CCT as bellow:  
35=3500K, 40=4000K, 50=5000K,Representative (Tested) Model: TT22-DM-35E  
TT22-DM-50E

Model Different: All construction and rating are the same, except CCT.

Test &amp; Report By:

*Pan Xiao*

Engineer: Pan Xiao

Date: Aug.29,2018

Review By:

*Univ Xie*

Manager: Univ Xie

Note: 1. The results contained in this report pertain only to the tested samples.

2. This report does not imply product certification, approval, or endorsement by NVLAP, NIST,  
or any agency of the Federal Government.**Laboratory: Standard-Tech Co., Ltd. Testing Center**  
**NVLAP CODE: 201011-0**

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

**1.1 Product Information:**

Organization Name	Shenzhen OKT Lighting Co.,LTD	
Brand Name	OKT Lighting	
Model Number	TT22-DM-XXE	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	100-277Vac, 50/60Hz	
Nominal Power	40W	
Rated Initial Lamp Lumen	--	
Declared CCT	3500K, 4000K, 5000K	
LED Manufacturer	Guangdong Elite Optoelectronic Technology Co.,Ltd	
LED Model	JL-W2835LSD479-4K, JL-W2835MSD481-6K	
Sample Number	JAE180809-A1(3500K), A2(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

**Photo**



**1.2 Test Specifications:**

Date of Receipt	Aug.27,2018
Date of Test	Aug.29,2018
Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>
Reference Work Instruction	QD25

**1.3 Test Methods**

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b>                  Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.</p>
<p><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b>                  Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C ± 1° C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.</p>
<p><b>3) Electrical Measurements:</b>                  Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25° C ± 1° C. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.</p>

**2.1 Electrical, Photometric and Chromaticity Measurements**  
*(Refer to Work Instruction QD25)*

<b>Test date</b>	2018-08-29	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	TT22-DM-35E		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180809-	120.0	60	0.3394	40.31	0.9898	11.23
A1	277.0	60	0.1551	38.79	0.9026	12.05
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

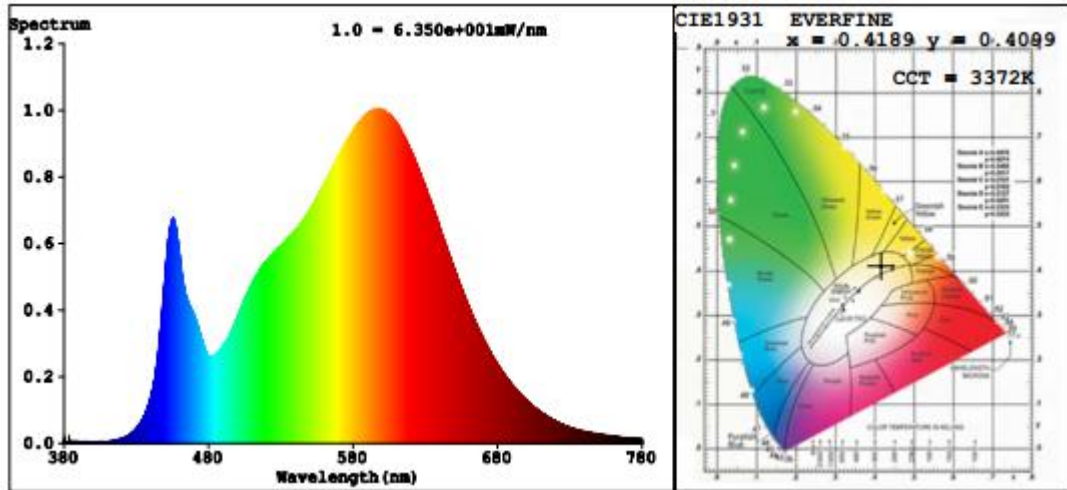
**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	78	R9	0
Frequency (Hz)	60	R2	89	R10	76
CCT (K)	3372	R3	97	R11	75
Duv	0.0053	R4	77	R12	60
Chromaticity (x, y)	x=0.4189 y=0.4099	R5	78	R13	81
Chromaticity (u', v')	u'=0.2367 v'=0.5210	R6	86	R14	98
Color Rendering Index (CRI)	80.7	R7	83	R15	70
R9	0	R8	57	--	--

**Photometric Measurement – Goniophotometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4083.3	4003.2	>=2000(-10%)	
Luminous Efficacy (lm/W)	101.30	103.20	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	99.31		100(-3%)	125(-3%)
Zonal lumens in the 0-60° zone (%)	72.3	--	>=75%(-3%)	
SC: 0-180° (if applicable)	1.55	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.37	--	1.0-2.0(±0.1)	
Beam Angle (°)	137.5	--	--	
Center Beam Candle Power (cd)	1042	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

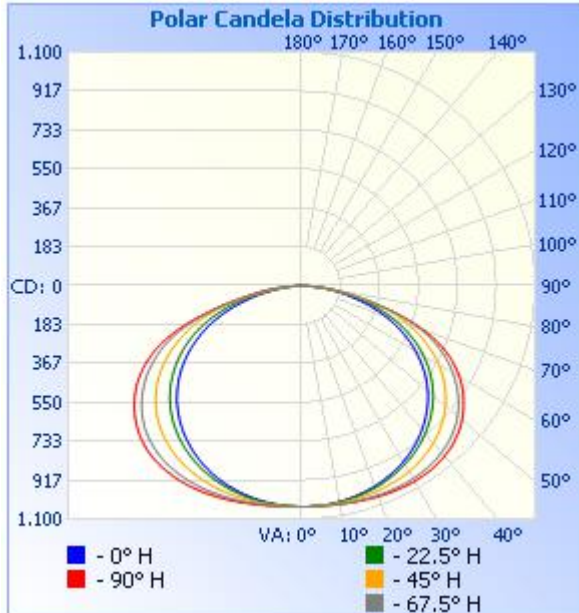


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	868.2	21.3%
0-40	1,492.8	36.6%
0-60	2,951.1	72.3%
60-90	1,122.5	27.5%
70-100	485.2	11.9%
90-120	4.8	0.1%
0-90	4,073.6	99.8%
90-180	9.3	0.2%
0-180	4,082.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	99.4	2.4%	90-100	1.5	0%
10-20	294.1	7.2%	100-110	1.6	0%
20-30	474.6	11.6%	110-120	1.7	0%
30-40	624.7	15.3%	120-130	1.6	0%
40-50	721.7	17.7%	130-140	1.2	0%
50-60	736.5	18.0%	140-150	0.8	0%
60-70	638.8	15.6%	150-160	0.5	0%
70-80	390.6	9.6%	160-170	0.3	0%
80-90	93.1	2.3%	170-180	0.1	0%

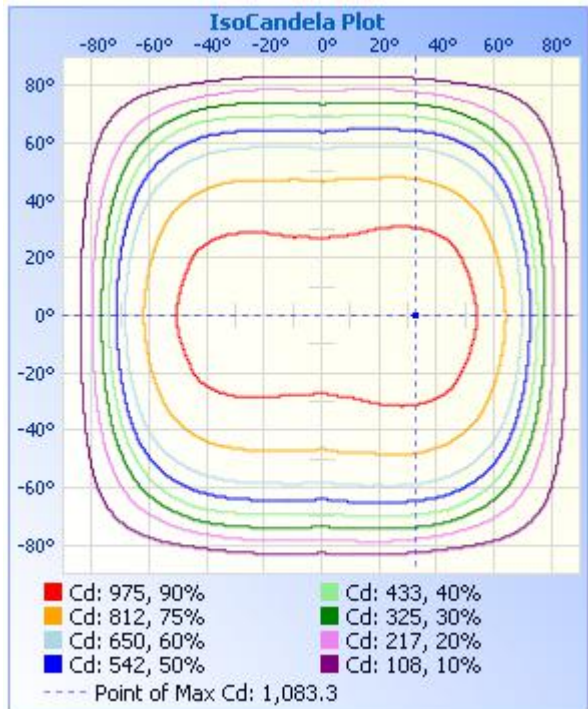
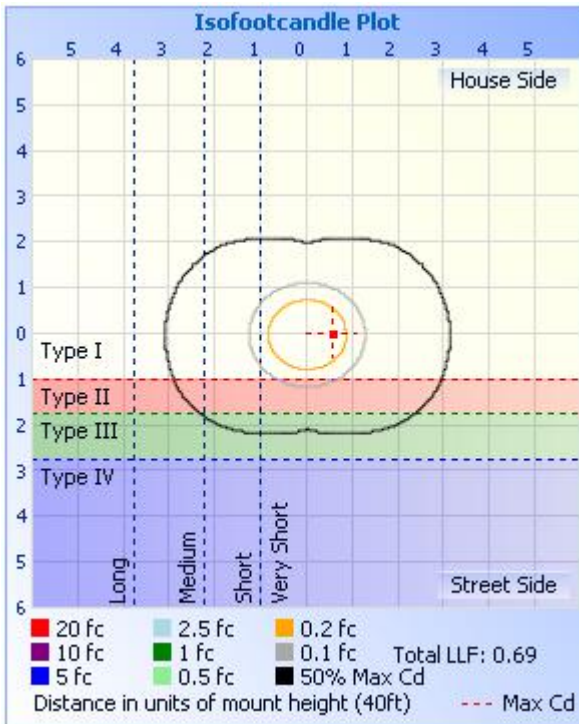
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
3.3ft	<b>95.7 fc</b>	<b>13.8 ft</b>	<b>20.4 ft</b>
6.6ft	<b>23.9 fc</b>	<b>27.6 ft</b>	<b>40.8 ft</b>
9.9ft	<b>10.6 fc</b>	<b>41.3 ft</b>	<b>61.2 ft</b>
13.2ft	<b>6.0 fc</b>	<b>55.1 ft</b>	<b>81.6 ft</b>
16.5ft	<b>3.8 fc</b>	<b>68.9 ft</b>	<b>102.0 ft</b>
19.8ft	<b>2.7 fc</b>	<b>82.7 ft</b>	<b>122.3 ft</b>

■ Vert. Spread: 128.8°  
 ■ Horiz. Spread: 144.1°



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Table--1 UNIT: cd

C (DEG) Y (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	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042
5	1044	1044	1043	1042	1040	1041	1041	1042	1042	1042	1039	1039	1039	1040	1042	1043
10	1051	1049	1043	1037	1034	1035	1039	1045	1046	1043	1037	1033	1032	1036	1041	1047
15	1059	1055	1042	1028	1022	1026	1036	1048	1051	1046	1034	1024	1021	1027	1040	1053
20	1068	1060	1039	1016	1006	1013	1032	1051	1057	1049	1029	1011	1005	1015	1038	1058
25	1077	1065	1032	999	985	996	1023	1052	1063	1049	1020	993	983	999	1031	1062
30	1082	1065	1021	977	958	972	1011	1050	1064	1047	1007	969	955	976	1021	1062
35	1082	1060	1004	949	924	943	992	1042	1061	1038	987	938	920	947	1004	1057
40	1074	1046	979	914	884	907	966	1026	1048	1021	958	899	877	911	978	1043
45	1054	1022	945	871	834	863	931	1000	1025	993	921	853	826	866	944	1018
50	1017	982	899	817	776	809	884	959	986	951	871	797	766	811	896	978
55	963	924	839	752	706	743	824	899	932	892	809	728	693	744	835	918
60	889	847	763	673	622	665	747	823	859	814	730	647	609	664	756	842
65	785	747	665	580	527	572	651	725	758	714	633	553	511	569	657	740
70	634	612	549	470	420	462	537	594	613	582	517	441	401	457	538	602
75	425	424	405	345	300	340	396	410	409	396	374	316	279	330	389	412
80	238	236	227	214	180	211	221	223	222	212	198	185	159	194	208	225
85	110	102	85.9	86.5	72.1	82.8	77.0	85.1	90.6	76.2	61.8	62.9	55.2	67.3	68.5	90.9
90	2.14	2.19	2.16	2.20	1.97	2.13	2.18	2.04	1.59	1.37	1.31	1.26	1.05	1.32	1.53	1.53
95	1.48	1.53	1.42	1.31	1.10	1.42	1.43	1.48	1.43	1.22	1.21	1.05	1.00	1.21	1.38	1.33
100	1.48	1.37	1.32	1.26	1.10	1.32	1.38	1.43	1.49	1.32	1.31	1.15	1.05	1.37	1.54	1.49
105	1.64	1.58	1.42	1.31	1.20	1.37	1.59	1.59	1.85	1.53	1.53	1.36	1.37	1.58	1.69	1.65
110	1.80	1.69	1.68	1.47	1.52	1.58	1.69	1.75	1.80	1.69	1.58	1.41	1.68	1.63	1.64	1.70
115	2.01	1.90	1.68	1.57	1.63	1.63	1.75	2.01	1.80	1.69	1.58	1.20	1.73	1.37	1.59	1.70
120	2.01	1.90	1.74	1.52	1.68	1.58	1.80	2.07	1.80	1.69	1.42	1.73	1.95	1.89	1.59	1.65
125	2.01	1.79	1.74	1.89	2.20	2.00	1.80	2.07	1.64	1.43	1.05	1.67	2.36	1.89	1.22	1.59
130	2.01	1.79	1.63	1.89	2.15	2.00	1.75	2.01	1.59	1.16	0.89	1.52	2.26	1.79	1.11	1.22
135	1.96	1.74	1.27	1.89	2.15	2.00	1.53	1.81	1.58	1.16	0.74	1.20	1.99	1.58	0.95	1.22
140	1.85	1.58	1.00	1.73	1.94	1.90	1.06	1.59	1.43	1.16	0.68	1.10	1.57	1.47	0.85	1.22
145	1.69	1.32	0.68	1.57	1.52	1.58	0.74	1.38	1.38	1.16	0.84	1.10	1.63	1.63	0.90	1.11
150	1.48	1.16	0.68	1.46	1.68	1.53	0.69	1.27	1.22	1.16	0.84	1.00	1.68	1.68	1.06	0.95
155	1.27	1.00	0.79	1.36	1.73	1.26	0.74	1.22	1.22	1.16	0.95	0.94	1.63	1.58	1.16	0.90
160	1.17	0.95	0.79	1.26	1.63	1.16	0.74	0.80	1.32	1.16	0.95	0.89	1.57	1.58	1.16	0.90
165	1.16	0.90	0.79	1.15	1.42	1.16	0.79	0.85	1.32	1.16	0.95	0.89	1.21	1.58	1.22	0.90
170	1.16	0.90	0.79	1.10	1.52	1.16	0.79	0.95	1.38	1.16	0.95	0.89	1.21	1.68	1.16	0.95
175	1.16	0.90	0.79	1.15	1.68	1.16	0.85	0.95	1.38	1.16	0.95	0.89	1.15	1.68	1.16	0.85
180	1.16	0.90	0.99	1.15	1.68	1.16	0.85	0.95	1.22	1.16	0.89	0.84	1.15	1.68	1.16	0.85

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**2.2 Electrical, Photometric and Chromaticity Measurements**

*(Refer to Work Instruction QD25)*

<b>Test date</b>	2018-08-29	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	TT22-DM-50E		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GJAE180809-	120.0	60	0.3403	40.51	0.9921	11.02
A2	277.0	60	0.1553	38.96	0.9057	11.68
<b>DLC Pass Criteria</b>					<b>&gt;= 0.9(-3%)</b>	<b>&lt;= 20(+5)</b>

**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

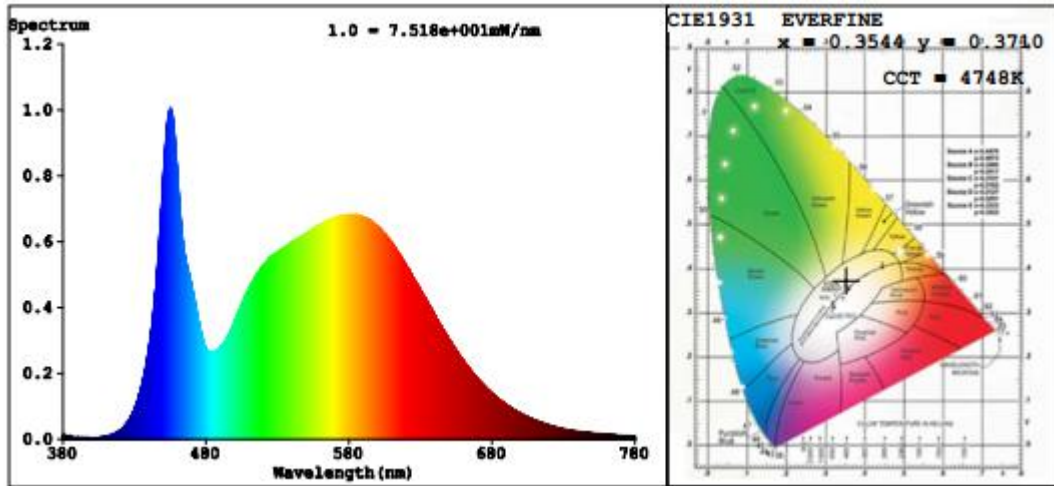
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	77	R9	0
Frequency (Hz)	60	R2	88	R10	70
CCT (K)	4748	R3	94	R11	74
Duv	0.0059	R4	76	R12	51
Chromaticity (x, y)	x=0.3544 y=0.3710	R5	77	R13	80
Chromaticity (u', v')	u'=0.2102 v'=0.4952	R6	82	R14	97
Color Rendering Index (CRI)	80.3	R7	86	R15	71
R9	0	R8	62	--	--

**Photometric Measurement – Goniophotometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4356	4268	>=2000(-10%)	
Luminous Efficacy (lm/W)	107.52	109.54	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	105.35		100(-3%)	125(-3%)



**Spectral Power Distribution & Chromaticity Diagram**



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**2.3 Performance Assessment:**

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
TT22-DM-35E	3500K	4083.3	40.31	101.30
TT22-DM-40E	4000K	4174.2 <sup>*1</sup>	40.41 <sup>*2</sup>	103.30 <sup>*3</sup>
TT22-DM-50E	5000K	4356	40.51	107.52

- \*1: This value is calculated and the calculation formula is as below:  
 $4174.2 = (4356 - 4083.3) / 3 * 1 + 4083.3$
- \*2: This value is calculated and the calculation formula is as below:  
 $40.41 = (40.31 + 40.51) / 2$
- \*3: This value is calculated and the calculation formula is as below:  
 $103.30 = 4174.2 / 40.41$

**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2018-07-02	2019-07-01
ST-R-327	Spectral analysis system HAAS-2000	2018-07-02	2019-07-01
ST-R-332	Standard Lamp	2018-07-04	2019-07-03
ST-R-333	Power Meter for Integrating Sphere	2018-06-28	2019-06-27
ST-R-355	Goniophotometer system	2018-07-01	2019-06-30
ST-R-359	Standard Lamp	2018-07-04	2019-07-03
ST-R-358	Power Meter for Goniophotometer	2018-06-28	2019-06-27

Expand Uncertainty:  
Photometric Measurement (Sphere):2.04%, k=2  
Chromaticity Measurement(Sphere):28.8K, k=2  
Photometric Measurement(Goniophotometer):2.36%, k=2

**\*\*\*\*\* END OF REPORT \*\*\*\*\***