

**CEC Title 24 (CEC-400-2018-021-CMF 2019**  
**REFERENCE APPENDICES JA8 and JA10) Test Report**  
For  
**LEDVANCE LLC**  
**(Brand Name: LEDVANCE, SYLVANIA)**

200 BALLARDVALE STREET WILMINGTON, MA 01887

**Model name(s):**  
**LEDLD2A900ST930WH**

**Type of  
Luminaire:** Downlights

**Report Date:** 2022-02-16  
Ningbo TengLi Testing Co., Ltd

**Prepared By:** 2nd floor, Block B, Ningbo Testing and Certification Base,  
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Ningbo, Zhejiang

Test & Report By:

*Nick Song*

Engineer: Nick Song

Review By:

*Garman Mo*

Manager: Garman Mo

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 any agency of the  
Federal Government.

1.1 Product Information:	
Model Number	LEDLD2A900ST930WH
Remark	N/A
Representative (Tested) Model	LEDLD2A900ST930WH
Model Difference	N/A
SKU (if available)	N/A
Type of Lamp	Downlights
LED Manufacturer	Bridgelux, Inc
LED Model	BXFN-27G-13H-98
Dimming	Dimmable
Sample Number	STD211233NB-A1-A3

1.2 Rated Values:		
Rated Voltage / Frequency	120Vac, 60Hz	
Nominal Power	15W	
Rated Initial Lamp Lumen	--	
Dimming range	10%-100%	
Target Replacement Wattage	--	
Declared CCT	2700K/3000K/3500K/4000K/5000K	
Luminaire Aperture (for Downlight)	8	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

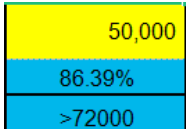
Product Photo



### 1.3 Test Specifications:

Date of Receipt	Feb.09,2022
Date of Test	Feb.10,2022
1.Test Method according to 10 CFR 430 Appendix BB to Subpart B, Uniform Test Method for Measuring the Input Power, Lumen Output, Lamp Efficacy, Correlated Color Temperature (CCT), Color Rendering Index (CRI), Power Factor, Time to Failure, and Standby Mode Power of Integrated Light-Emitting Diode (LED) Lamps	
2.Standards used: IES LM-84-14 Approved Method for Measuring Luminous Flux and Color Maintenance of LED Downlight Retrofits, Light Engines, and Luminaires	
3.The ambient temperature during maintenance test of the DUT between photometric measurements shall be maintained at 25°C ± 5°C. Humidity: < 65 RH. Airflow shall be minimized.	
4. Supply rated input voltage (e.g. 120V) and frequency (60Hz) to the samples. Branch circuit input voltage shall be regulated to within ≤ 2% of the rated rms value. The input voltage to each DUT or driver shall be verified periodically.	
5. Conduct minimum 6000 hours life test, conduct LM-79 test measurement in 1000-hour interval.	
6. At each measurement interval, the DUT shall be taken off the test racks and measured per IES LM-79-08 for electrical, photometric, and colorimetric characteristics. After measurement, the DUT shall be placed back on the test rack for the next cycle if required.	
7. 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.	
8. 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.	
9. Off state power measurement – accordance to IEC 62301	

## 2.1 Summary of Test Result

Criteria Item	Requirement	Measured Value	Status
Light Source Type	LED, OLED, Fluorescent, HID, Incandescent, Other	LED	Pass
Product type	Omnidirectional lamp, Directional lamp, Decorative lamp, LED light engine, inseparable SSL luminaire, T20 lamp, other	Downlights	Pass
Luminous Efficacy	$\geq 45$ lumens/Watt	72.56lm/W	Pass
Power Factor	$\geq 0.90$	0.9108	Pass
Start time	$\leq 0.5$ sec	100ms	Pass
Correlated Color Temperature (CCT)	For inseparable SSL luminaires, LED light engines and GU24 LED lamps, $\leq 4000$ Kelvin. For all other sources, $\leq 3000$ Kelvin.	3109K	Pass
Duv	--	0.0043	Pass
Color Rendering Index (CRI)	$\geq 90$	91.0	Pass
Color Rendering R9 (red)	$\geq 50$	74	Pass
LM-80 and TM-21 Projected Time to L70	$\geq 25,000$ hours, or N/A for light sources providing 6,000 hour lumen maintenance testing		Pass
Rated life	$\geq 15,000$ hours	50000	Pass
Standby Power Consumption	Luminaires shall not draw power in the off state.	See the data sheet	Pass
Minimum dimming level	$\leq 10\%$	See Below Test Data	Pass
Audible Noise	$\leq 24$ dBA	See Below Test Data	Pass

### 2.2.1 Initial Electrical and Light Output Measurement

(Refer to Work Instruction QD25)

[ ✓ ] IES LM-79 (2008)

[ ✓ ] ANSI C82.2:2002

Test date	2022-02-10	Test Ambient:	25.0 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LEDLD2A900ST930WH		

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
STD211233NB-A1	120.0	60	0.1364	14.91	0.9108

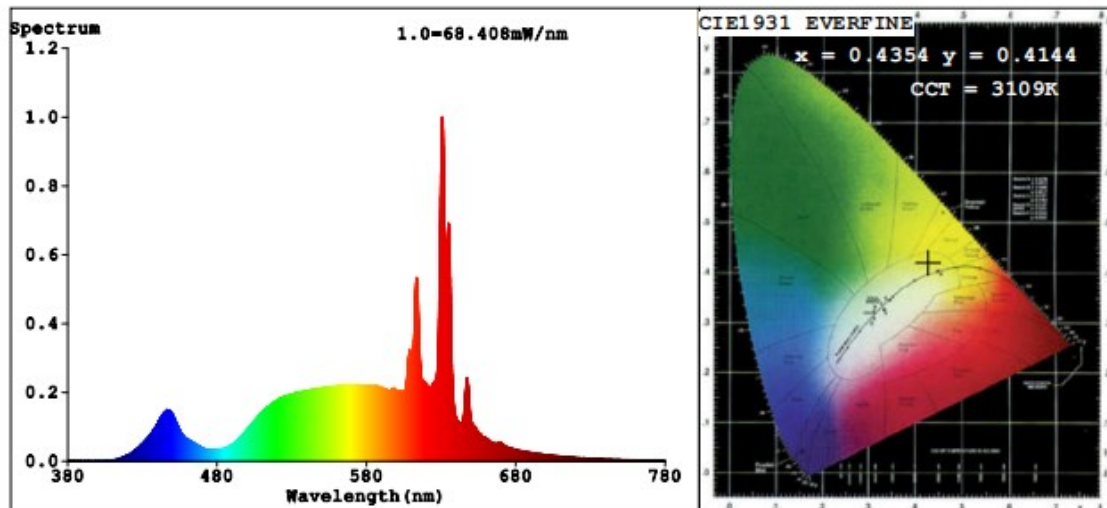
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3109
Duv	0.0043
Chromaticity (x, y)	x=0.4354 y=0.4144
Chromaticity (u', v')	u'=0.2452 v'=0.5251
Color Rendering Index (CRI)	91.0
R9	74

### Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1081.8
Luminous Efficacy (lm/W)	72.56
Beam Angle (°)	108.1
Center Beam Candle Power (cd)	379

## Spectral Power Distribution & Chromaticity Diagram



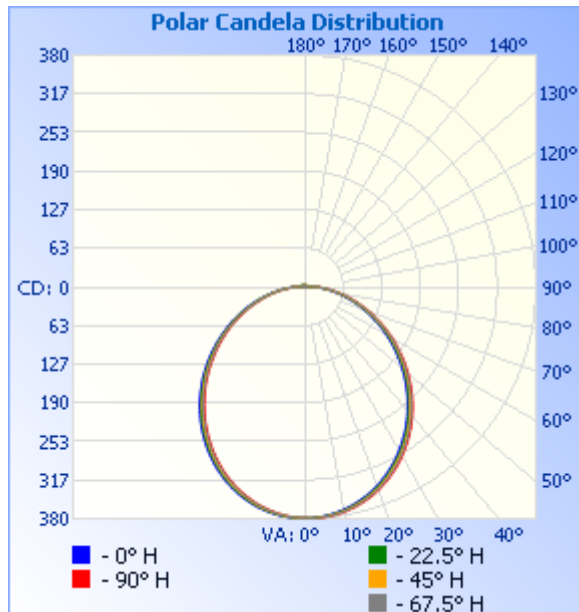
R1 =95    R2 =91    R3 =84    R4 =92    R5 =92    R6 =89    R7 =93  
R8 =92    R9 =74    R10=76    R11=93    R12=71    R13=93    R14=89    R15=93

## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	%Luminaire
0-30	290.5	26.9%
0-40	471.6	43.6%
0-60	821.2	75.9%
60-90	247.8	22.9%
70-100	126.9	11.7%
90-120	8.3	0.8%
0-90	1,069.0	98.8%
90-180	12.8	1.2%
0-180	1,081.7	100%

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	35.8	3.3%	90-100	6.7	0.6%
10-20	101.9	9.4%	100-110	0.8	0.1%
20-30	152.7	14.1%	110-120	0.8	0.1%
30-40	181.2	16.7%	120-130	1.0	0.1%
40-50	184.6	17.1%	130-140	1.3	0.1%
50-60	164.9	15.2%	140-150	1.0	0.1%
60-70	127.6	11.8%	150-160	0.7	0.1%
70-80	81.5	7.5%	160-170	0.5	0%
80-90	38.8	3.6%	170-180	0.1	0%

## Photometric Data



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	1.31 fc	46.9 ft	46.9 ft
34.0ft	0.33 fc	93.8 ft	93.9 ft
51.0ft	0.15 fc	140.7 ft	140.8 ft
68.0ft	0.08 fc	187.6 ft	187.7 ft
85.0ft	0.05 fc	234.5 ft	234.6 ft
102.0ft	0.04 fc	281.4 ft	281.6 ft

■ Vert. Spread: 108.1°  
■ Horiz. Spread: 108.1°

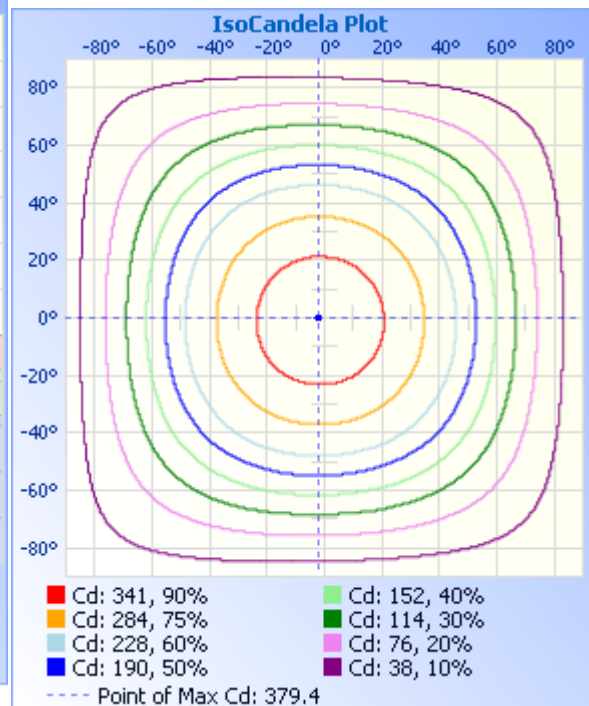
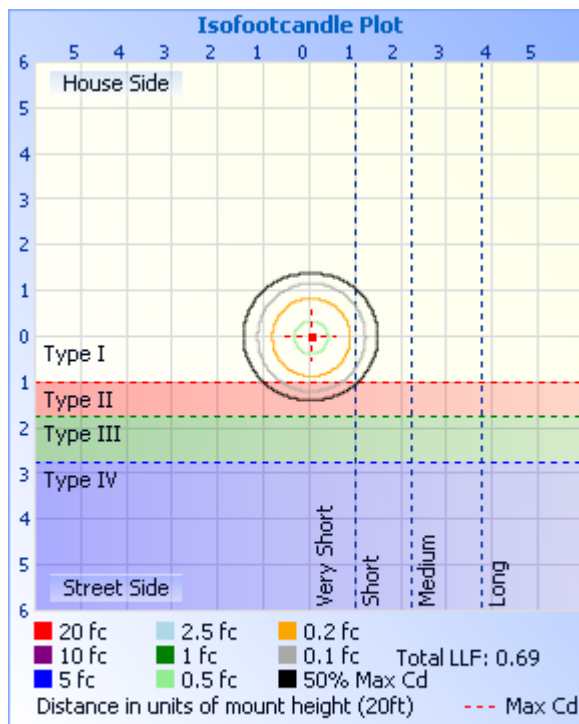




Table--1

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	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379			
5	375	375	376	376	377	377	378	378	379	379	378	378	377	377	376	376			
10	368	368	368	369	370	371	373	373	374	374	374	373	372	371	370	369			
15	357	357	357	358	360	362	363	365	366	366	366	364	363	361	359	358			
20	342	342	343	344	346	349	351	352	354	354	353	352	350	348	346	344			
25	325	324	325	327	329	332	335	337	339	339	338	336	334	331	329	327			
30	304	304	305	307	309	313	316	318	320	320	319	317	314	311	308	306			
35	281	281	282	284	287	291	294	296	299	299	298	295	292	289	286	284			
40	256	256	257	260	263	266	270	272	275	275	274	271	268	264	261	259			
45	230	230	231	233	237	241	244	246	249	249	248	245	242	238	235	233			
50	203	203	204	206	210	214	217	219	222	222	221	218	214	211	208	205			
55	175	175	176	179	182	186	189	192	194	194	193	190	186	183	180	178			
60	147	147	148	151	154	158	161	163	166	166	164	161	158	155	152	150			
65	120	120	121	124	127	130	133	135	138	138	136	133	130	127	125	122			
70	93.8	94.0	95.2	97.3	100	103	106	108	111	110	109	106	103	101	98.1	96.2			
75	69.6	69.8	70.9	72.8	75.4	78.3	80.7	82.4	84.2	83.7	82.4	80.1	77.6	75.2	73.1	71.5			
80	48.1	48.3	49.3	50.9	53.1	55.5	57.6	58.9	60.5	60.1	58.8	56.8	54.7	52.7	51.1	49.7			
85	30.1	30.3	31.0	32.3	34.2	36.0	37.8	38.7	39.7	39.5	38.5	36.8	35.1	33.6	32.4	31.4			
90	16.6	16.7	17.2	18.0	19.2	20.5	21.6	22.3	23.3	23.1	22.3	21.0	19.8	18.9	18.1	17.5			
95	3.08	2.79	0.02	8.32	2.10	9.06	0.03	1.97	1.56	0.08	0.00	2.18	0.39	2.23	0.00	0.00			
100	0.38	0.53	0.05	2.72	3.29	3.08	0.04	0.13	0.21	0.09	2.12	3.95	3.82	3.45	0.79	0.16			
105	1.08	0.94	0.21	0.08	0.04	0.06	0.25	1.68	1.98	1.18	0.16	0.05	0.40	0.05	0.17	1.01			
110	0.84	0.63	0.45	0.22	0.31	0.33	0.68	1.37	1.27	1.10	0.30	0.22	0.29	0.27	0.30	1.00			
115	0.90	0.67	0.61	0.46	0.18	0.63	1.20	1.42	1.36	1.02	0.79	0.33	0.03	0.41	0.92	1.17			
120	1.10	0.84	0.78	0.35	0.72	0.69	1.55	1.60	1.43	1.18	0.74	0.50	0.46	0.99	1.39	1.38			
125	1.33	1.01	0.96	0.27	0.88	0.62	1.77	1.62	1.31	1.07	0.84	0.15	0.61	0.39	1.84	1.69			
130	1.56	1.19	1.14	1.26	1.22	0.63	2.22	1.91	1.58	1.18	0.91	0.74	1.26	0.70	2.11	1.92			
135	2.02	1.35	0.63	1.57	1.55	4.39	2.40	2.14	1.81	1.51	0.58	1.21	1.66	4.12	1.84	2.21			
140	1.88	1.17	0.68	1.70	2.43	2.49	1.95	2.27	2.24	1.63	0.74	1.20	1.51	2.98	2.01	3.50			
145	1.29	0.96	0.89	1.83	1.64	2.49	0.31	2.11	1.60	1.25	0.35	1.52	0.46	2.10	0.54	1.74			
150	0.86	0.36	0.84	2.23	1.76	2.45	0.62	1.77	3.78	1.21	0.93	0.63	0.55	0.43	1.38	0.67			
155	0.95	0.94	1.00	1.05	3.63	4.03	2.02	0.51	0.71	0.76	1.57	1.99	0.69	0.43	2.41	1.88			
160	1.93	1.74	0.43	1.13	1.27	2.06	0.66	0.96	1.93	1.87	2.01	1.96	0.91	1.57	2.03	1.98			
165	1.34	1.81	0.50	0.79	0.67	0.49	0.71	0.96	2.01	2.13	2.66	1.83	1.27	1.49	4.26	3.21			
170	1.09	1.63	0.97	0.15	0.77	1.42	2.45	0.98	1.70	1.73	1.76	1.55	1.08	1.53	1.43	1.39			
175	0.99	0.85	0.44	0.72	0.87	1.12	0.83	0.49	0.71	0.73	0.92	0.95	0.61	1.01	1.12	1.00			
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			



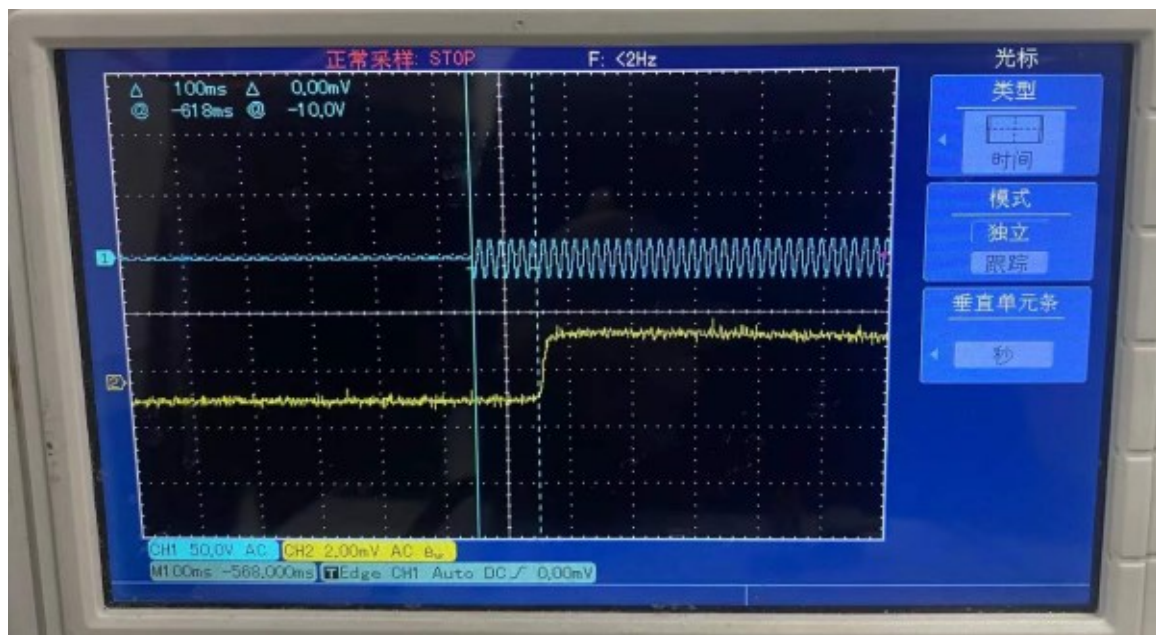
### 2.3 Start Time Test

Test date	2022-02-10	Test Ambient:	25±1 °C
Test Orientation	As intended	Stabilization Time (min)	45
Model Number	LEDLD2A900ST930WH		

#### Electrical Measurement:

Sample No.	Start Time (ms)
STD211233NB-A1	100
STD211233NB-A2	98
STD211233NB-A3	96
Average	98

#### Graph (Start Time):



## 2.4 In-Situ Temperature Measurement Test (ISTMT)

Test date	2022-02-10	Test Ambient:	25.1 °C
Test Orientation	As intended	Stabilization Time (min)	45
Model Number	LEDLD2A900ST930WH		

### Electrical Measurement:

Input Vol./Frequency	120 V / 60 Hz		Output Current of Single LED(mA)	80.00mA	
Sample No.	LED Package Model	Maximum Measured LED Ts Point Temperature (°C)	Maximum LED Ts Point Temperature Limited (°C)	Maximum Measured LED Driver Td Point Temperature (°C)	Maximum LED Driver Td Point Temperature Limited (°C)
STD211233NB-A1	BXFN-27G-13H-98	72.5	105	92.7	105
STD211233NB-A2		72.1		92.5	
STD211233NB-A3		71.7		92.3	

## Results

Time (t) at which to estimate lumen maintenance (hours):	50,000
Lumen maintenance at time (t) (%):	86.39%
Reported L70 (hours):	>72000

## 2.5 Dimming, Reduced Flicker Operation and Audible Noise

Test date	2022-02-10	Test Ambient:	25±1 ° C
Test Orientation	As intended	Stabilization Time (min)	45
Model Number	LEDLD2A900ST930WH		

### Electrical Measurement:

Dimmer Model	LUTRON MACL-153M		
Sample No.	Input	Dimming (100%)	Dimming (<10%)
		Luminous flux (lm)	Luminous flux (lm)
STD211233NB-A1	120.0 V / 60 Hz	1062.9	11.21
STD211233NB-A2	120.0 V / 60 Hz	1063.2	11.52
STD211233NB-A3	120.0 V / 60 Hz	1064.5	11.89
		Dimming (100%)	Dimming (20%)
Sample No.	Input	Peak Noise Reading (dBA)	Peak Noise Reading (dBA)
STD211233NB-A1	120.0 V / 60 Hz	19.7	20.5
STD211233NB-A2	120.0 V / 60 Hz	19.6	20.1
STD211233NB-A3	120.0 V / 60 Hz	19.8	20.3

### Flicker Result:

Dimming Level	100% Dimming Level	20% Dimming Level	Nominal Dimming Level
Percent Flicker (Unfiltered)	10.261%	3.376%	7.869%
Percent Flicker (1000Hz cut-off)	9.391%	2.403%	6.466%
Percent Flicker (400Hz cut-off)	7.025%	1.916%	5.865%
Percent Flicker (200Hz cut-off)	4.934%	1.667%	5.387%
Percent Flicker (90Hz cut-off)	0.665%	1.476%	4.998%
Percent Flicker (40Hz cut-off)	0.643%	1.461%	4.979%

### 3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-702	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-701	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-703	Standard Lamp D204	2022-01-14	2023-01-13
ST-R-704	Power Meter for Integrating Sphere	2022-01-03	2023-01-02
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
ST-R-710	Standard Lamp D908S	2022-01-14	2023-01-13
ST-R-711	Power Meter for Goniophotometer	2022-01-03	2023-01-02
ST-R-725	LFA-3000	2022-01-03	2023-01-02
Uncertainty(K=2): Photometric Measurement (Sphere):3.94% Chromaticity Measurement(Sphere):48.2K Photometric Measurement(Goniophotometer):3.96%			

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