

## LM-79-08 Test Report

For

### Antec Lighting Inc

(Brand Name: )

Quality, Honesty, Service and Innovation

Uniy C, 3979 E Guasti Road, Ontario, CA 91761

### Architectural Flood and Spot Luminaires

Model name(s): AOK-960WoF-NV-L5-XX-XX70-30-P

Remark: Where the first “XX” can be “00” represents non-dimming & without sensor, “DV” represents dimming & without sensor. The second “XX” can be any number represents for color temperature.

Representative (Tested) Model:

AOK-960WoF-NV-L5-00-3070-30-C

AOK-960WoF-NV-L5-00-5770-30-C

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

Test & Report By:

*Leo Wang*

Engineer: Leo Wang

Date: Jan.16,2020

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 A2LA, or any agency of the Federal Government.

**1.1 Product Information:**

Organization Name	Antec Lighting Inc	
Brand Name	 Quality, Honesty, Service and Innovation	
Model Number	AOK-960WoF-NV-L5-XX-XX70-30-P	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Architectural Flood and Spot Luminaires	
Rated Voltage / Frequency	100-277Vac, 50/60Hz	
Nominal Power	960W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,4000K,5000K,5700K	
LED Manufacturer	LUMILEDS	
LED Model	LUXEON 5050	
Sample Number	JAE191234-D1(3000K),D2(5700K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s
<b>Photo</b>		
<div style="display: flex; justify-content: space-around;">   </div>		

## 1.2 Test Specifications:

Date of Receipt	Dec.29,2019
Date of Test	Dec.31,2019
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>

## 1.3 Test Methods

### 1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , 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  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  horizontal intervals.

### 2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . 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.

### 3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . 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.

**2.1 Electrical, Photometric and Chromaticity Measurements**

Test date	2019-12-31	Test Ambient:	25±1 °C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	AOK-960WoF-NV-L5-00-3070 -30-C	Total Operating Time (min)	90

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE191234-D1	120.0	60	8.527	1023	0.9995	2.44
	277.0	60	3.597	953.9	0.9842	8.38
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

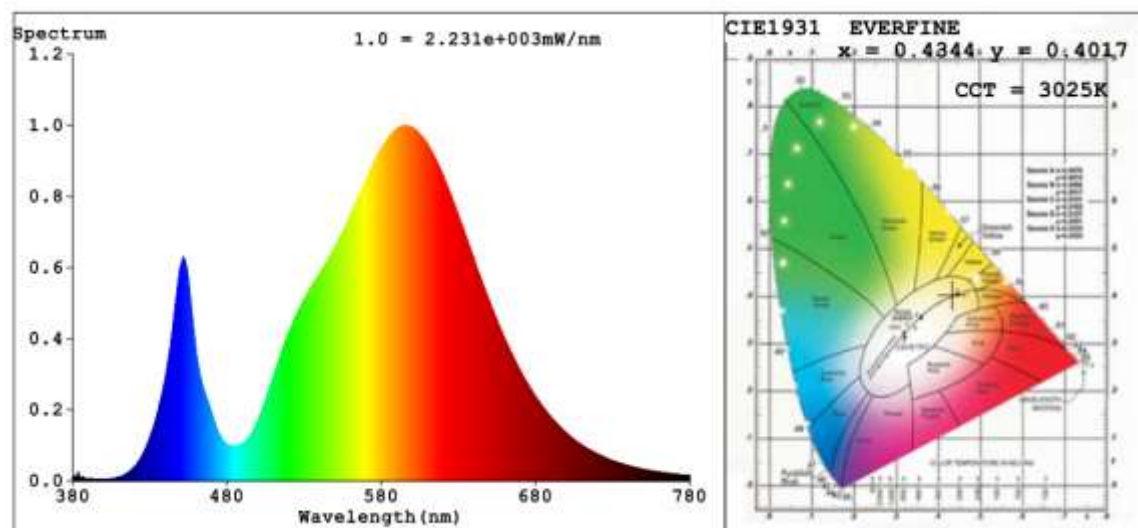
**Chromaticity Measurement - Sphere-Spectroradiometer**
**Method(Self-absorption:1.1215):**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	70	R9	0
Frequency (Hz)	60	R2	83	R10	59
CCT (K)	3025	R3	92	R11	63
Duv	-0.0006	R4	69	R12	48
Chromaticity (x, y)	x=0.4344 y=0.4017	R5	69	R13	73
Chromaticity (u', v')	u'=0.2499 v'=0.5201	R6	75	R14	95
Color Rendering Index (CRI)	73.3	R7	80	R15	64
R9	0	R8	48	--	--

**Photometric Measurement – Goniophotometer Method(Test Distance: 26.000m):**

Parameter	Result		DLC V4.4 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	140310	138153	>=10000 (-10%)	
Luminous Efficacy (lm/W)	137.16	144.83	Standard: >= 105(-3%)	Premium: >= 130(-3%)
Zonal lumens in the 0-90 °zone (%)	99.6	--	>= 85(-3)	
Beam Angle (°)	32.6	--	--	
Center Beam Candle Power (cd)	288575	--	--	

## Spectral Power Distribution &amp; Chromaticity Diagram



## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	100,810.1	71.9%
0-40	119,613.2	85.3%
0-60	134,780.2	96.1%
60-90	4,911.3	3.5%
70-100	1,705.8	1.2%
90-120	44.1	0%
0-90	139,691.5	99.6%
90-180	552.4	0.4%
0-180	140,243.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	24,340.0	17.4%	90-100	8.7	0%
10-20	44,036.2	31.4%	100-110	13.3	0%
20-30	32,433.9	23.1%	110-120	22.1	0%
30-40	18,803.1	13.4%	120-130	44.0	0%
40-50	9,683.2	6.9%	130-140	76.8	0.1%
50-60	5,483.8	3.9%	140-150	116.9	0.1%
60-70	3,214.2	2.3%	150-160	134.3	0.1%
70-80	1,489.9	1.1%	160-170	99.0	0.1%
80-90	207.2	0.1%	170-180	37.4	0%



## Photometric Data

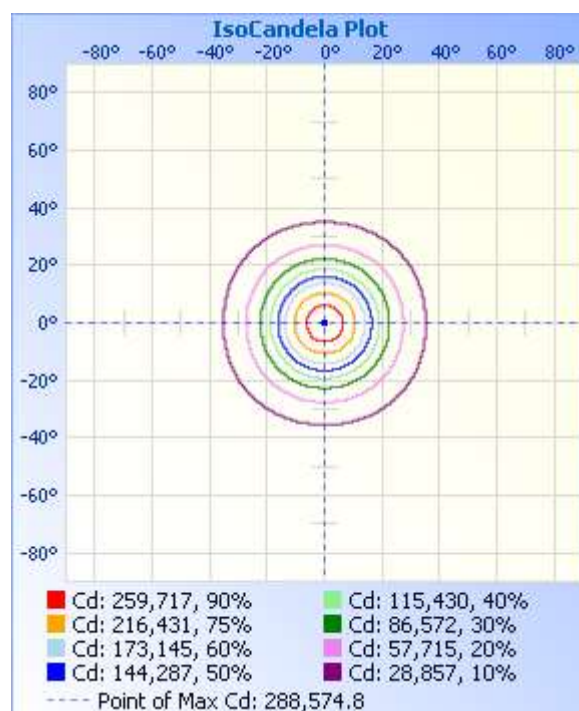
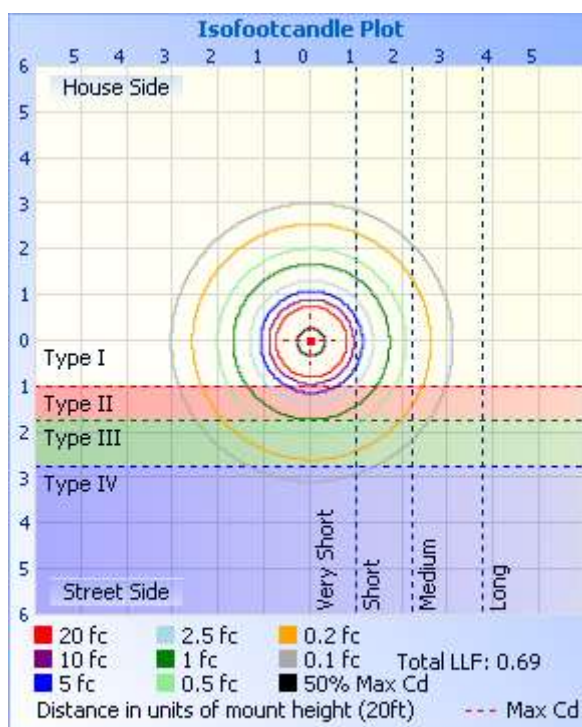
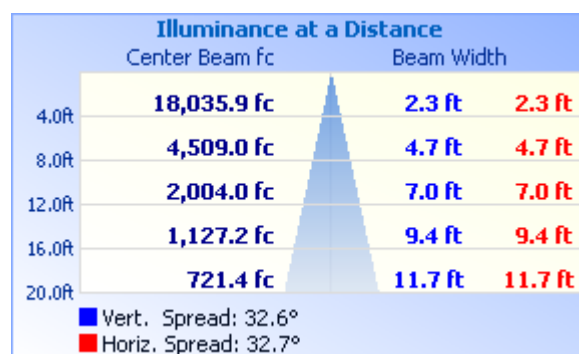
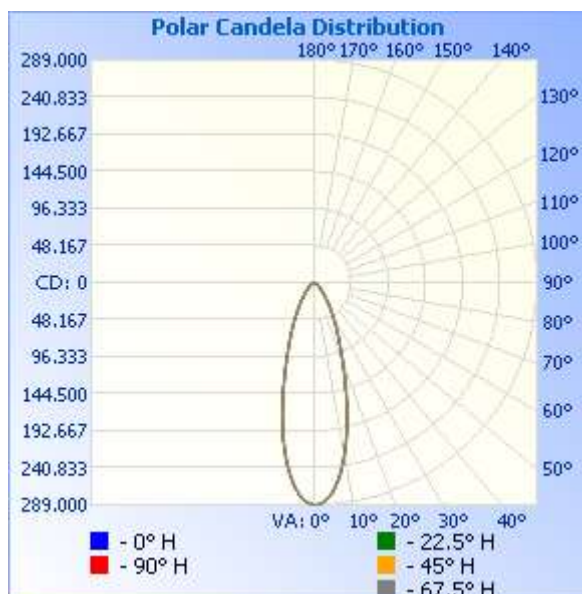


Table--1

UNIT: ×100cd

C (DEG) θ (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	2886	2886	2886	2886	2886	2886	2886	2886	2886	2886	2886	2886	2886	2886	2886	2886	
5	2693	2701	2712	2721	2728	2733	2735	2733	2732	2726	2718	2707	2700	2694	2691	2693	
10	2203	2215	2230	2243	2256	2265	2271	2269	2271	2258	2243	2225	2212	2204	2200	2199	
15	1572	1587	1601	1616	1624	1638	1644	1639	1645	1632	1615	1596	1582	1574	1569	1573	
20	1030	1040	1047	1056	1064	1072	1077	1077	1078	1072	1059	1050	1041	1035	1031	1033	
25	683	691	696	701	706	711	716	716	716	711	704	698	691	689	686	689	
30	448	453	458	462	466	471	474	475	473	469	463	458	453	451	451	453	
35	286	290	293	297	300	304	306	307	305	302	296	292	289	287	287	289	
40	180	182	185	187	189	191	194	194	193	190	186	183	182	180	181	182	
45	118	119	121	122	124	125	127	127	126	124	121	119	119	117	118	119	
50	82.2	83.0	84.1	84.9	86.3	86.8	87.9	88.2	87.2	85.5	83.8	82.3	82.1	81.2	81.6	82.4	
55	58.2	59.4	60.5	60.3	60.9	61.9	63.3	63.0	61.8	61.5	60.7	58.9	58.0	58.0	58.6	58.8	
60	42.3	43.0	43.4	43.6	43.5	44.3	45.0	45.3	44.4	44.4	43.7	42.8	41.9	42.1	42.4	42.9	
65	31.9	32.1	32.0	32.2	32.4	32.6	33.0	33.7	33.3	33.2	32.4	31.8	31.5	31.2	31.4	32.0	
70	22.7	22.4	22.4	22.3	22.9	22.7	23.2	23.7	23.7	23.2	22.8	22.3	22.2	21.8	22.1	22.4	
75	13.7	13.6	13.6	13.6	13.9	13.9	14.4	14.9	14.7	14.4	14.1	13.7	13.6	13.3	13.6	13.8	
80	6.18	6.10	6.14	6.03	6.09	6.30	6.72	6.92	6.89	6.76	6.60	6.27	6.05	5.99	6.14	6.24	
85	1.11	1.11	0.99	1.17	1.24	1.38	1.19	1.40	1.52	1.38	1.19	1.19	1.01	1.04	1.06	1.10	
90	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	
95	0.08	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.08	0.07	0.08	0.08	
100	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.10	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	
105	0.14	0.14	0.13	0.11	0.11	0.12	0.13	0.13	0.11	0.11	0.12	0.11	0.11	0.11	0.13	0.14	
110	0.19	0.19	0.17	0.15	0.16	0.16	0.17	0.18	0.16	0.15	0.16	0.17	0.16	0.16	0.18	0.20	
115	0.26	0.25	0.22	0.18	0.20	0.18	0.23	0.24	0.22	0.21	0.22	0.20	0.21	0.17	0.26	0.27	
120	0.37	0.35	0.32	0.26	0.21	0.25	0.32	0.33	0.30	0.29	0.35	0.32	0.25	0.28	0.36	0.38	
125	0.53	0.52	0.45	0.45	0.45	0.45	0.42	0.49	0.42	0.45	0.51	0.56	0.52	0.47	0.55	0.57	
130	0.76	0.74	0.59	0.65	0.66	0.65	0.56	0.68	0.63	0.70	0.71	0.87	0.77	0.70	0.79	0.83	
135	1.09	1.05	0.77	0.96	0.96	0.94	0.75	0.95	0.94	1.01	0.96	1.26	1.05	1.02	1.01	1.18	
140	1.57	1.51	0.82	1.32	1.28	1.33	0.91	1.33	1.36	1.42	1.18	1.74	1.41	1.54	1.10	1.67	
145	2.18	2.04	1.23	1.83	1.42	1.82	1.33	1.84	1.93	1.95	1.51	2.40	1.61	2.22	2.01	2.21	
150	2.82	2.50	1.94	2.33	2.52	2.47	1.44	2.48	2.50	2.48	1.63	3.20	2.84	2.93	3.22	2.45	
155	3.34	2.91	2.50	2.75	3.12	2.99	2.10	3.16	2.96	2.98	1.88	3.91	3.15	3.16	3.78	2.05	
160	3.59	3.13	3.05	3.17	3.59	3.35	3.00	3.38	3.34	3.33	3.12	4.37	4.00	3.65	3.52	2.58	
165	3.75	3.35	3.37	2.85	3.22	2.83	3.55	3.50	3.58	3.50	3.47	4.16	3.49	3.41	3.56	3.61	
170	3.87	3.79	3.73	3.62	3.22	3.53	4.04	3.85	3.91	3.88	3.75	3.89	4.36	3.90	4.07	4.18	
175	3.93	4.02	3.80	3.75	3.86	3.52	4.11	3.95	3.96	3.99	3.97	3.89	4.26	4.03	3.63	4.21	
180	3.82	3.94	3.75	3.77	3.53	3.26	3.95	3.84	3.82	3.83	3.93	3.74	3.77	3.53	3.28	3.93	

## 2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2019-12-31	Test Ambient:	25±1 °C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	AOK-960WoF-NV-L5-00-5770 -30-C	Total Operating Time (min)	90

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE191234-D2	120.0	60	8.747	1030	0.9813	2.93
	277.0	60	3.556	960.4	0.9751	8.84
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

### Chromaticity Measurement - Sphere-Spectroradiometer

#### Method(Self-absorption:1.1210):

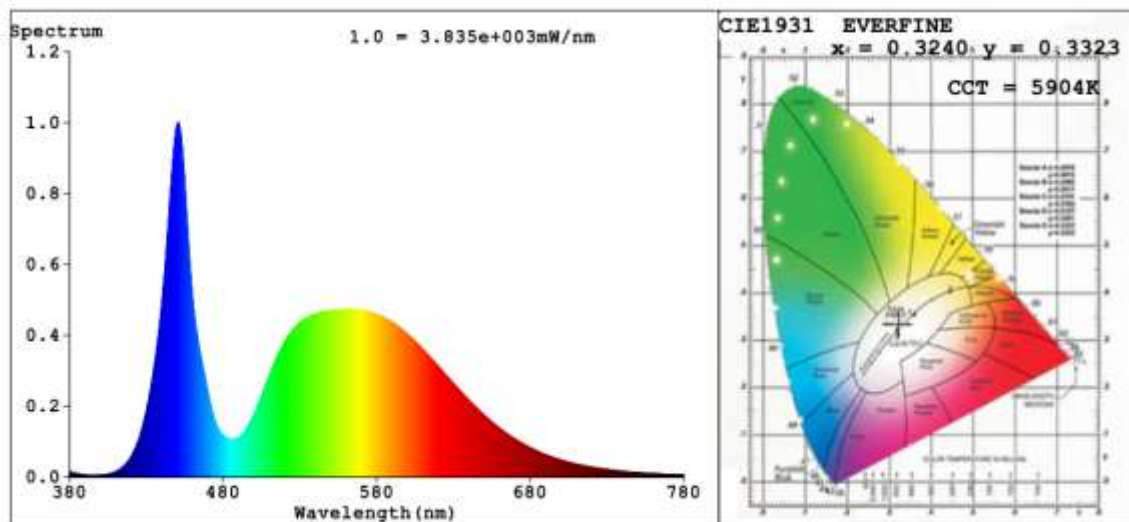
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	75	R9	0
Frequency (Hz)	60	R2	79	R10	49
CCT (K)	5904	R3	80	R11	74
Duv	-0.0006	R4	77	R12	45
Chromaticity (x, y)	x=0.3240 y=0.3323	R5	75	R13	75
Chromaticity (u', v')	u'=0.2044 v'=0.4718	R6	71	R14	88
Color Rendering Index (CRI)	75.8	R7	84	R15	72
R9	0	R8	65	--	--

### Photometric Measurement –Spectroradiometer Method:

Parameter	Result		DLC V4.4 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	152112	149773	>=10000 (-10%)	
Luminous Efficacy (lm/W)	147.68	155.95	Standard: >= 105(-3%)	Premium: >= 130(-3%)



**Spectral Power Distribution & Chromaticity Diagram**



**Laboratory: Standard-Tech Co., Ltd. Testing Center**

Report Format Number STD-QP019-409-B/0

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### 2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
AOK-960WoF-NV-L5-00-3070-30-C	3000K	140310	1023	137.16
AOK-960WoF-NV-L5-00-4070-30-C	4000K	145031 <sup>*1</sup>	1027 <sup>*2</sup>	141.22 <sup>*3</sup>
AOK-960WoF-NV-L5-00-5070-30-C	5000K	149752 <sup>*1</sup>	1027 <sup>*2</sup>	145.81 <sup>*3</sup>
AOK-960WoF-NV-L5-00-5770-30-C	5700K	152112	1030	147.68

\*1: This value is calculated and the calculation formula is as below:

$$145031 = (152112 - 140310) / 5 * 2 + 140310$$

$$149752 = (152112 - 140310) / 5 * 4 + 140310$$

\*2: This value is calculated and the calculation formula is as below:

$$1027 = (1023 + 1023) / 2$$

\*3: This value is calculated and the calculation formula is as below:

$$141.22 = 145031 / 1027$$

$$145.81 = 149752 / 1027$$

**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-423	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-327	Spectral analysis system HAAS-2000	Verified by D204 standard lamp	
ST-R-332	Standard Lamp	2019-07-09	2020-07-08
ST-R-333	Power Meter for Integrating Sphere	2019-06-27	2020-06-26
ST-R-405	Temperature Probe for Integrating Sphere	2019-01-24	2020-01-23
ST-R-355	Goniophotometer system	Verified by D908S standard lamp	
ST-R-359	Standard Lamp	2019-07-09	2020-07-08
ST-R-358	Power Meter for Goniophotometer	2019-06-27	2020-06-26
ST-R-354	hygrothermograph for Goniophotometer	2019-06-28	2020-06-27
Expand Uncertainty: Photometric Measurement (Sphere):3.06%, k=2 Chromaticity Measurement(Sphere):43.46K, k=2 Photometric Measurement(Goniophotometer):3.38%, k=2			

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