



Report No.: GZE160710-A

NVLAP LAB CODE 201011-0

## LM-79-08 Test Report

For

### AOK LED Light Company Limited (Brand Name:AOK)

Building 1, St George's Science and Technology Industrial Park, Shajin Street,  
Shenzhen, Guangdong Province, China Zip 518104

### High-bay Luminaires for Commercial and Industrial Buildings

Model name(s): AOK-100WiU-X

Representative (Tested) Model: AOK-100WiU-X (3000K)  
AOK-100WiU-X (5700K)

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

Test & Report By:

*Jamie Lin*

Engineer: Jamie Lin

Date: Jul.26,2016

Review By:

*Tommy Liang*

Manager: Tommy Liang

Note: 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

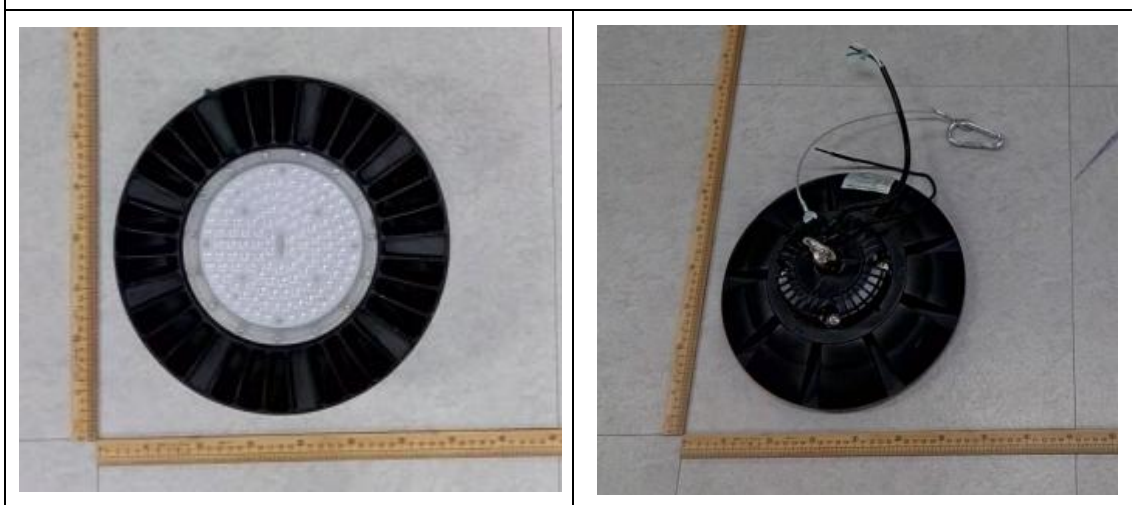
Report Format Number STD/QR4909-A/2

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	AOK LED Light Company Limited	
Brand Name	AOK	
Model Number	AOK-100WiU-X	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	High-bay Luminaires for Commercial and Industrial Buildings	
Rated Voltage / Frequency	100-277Vac,50/ 60 Hz	
Nominal Power	100W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,4500K,5000K,5700K	
LED Manufacturer	Nichia Corporation	
LED Model	NF2L757DR	
Sample Number	GZE160710-A1(3000K), A2(5700K)	
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	Jul.19,2016
Date of Test	Jul.21,2016
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

#### 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

(Refer to Work Instruction QD25)

Test date	2016-07-21	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	AOK-100WiU-X(3000K)		

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160710-	120.0	60	0.8147	97.52	0.9975	6.85
A1	277.0	60	0.3609	95.34	0.9537	10.03
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

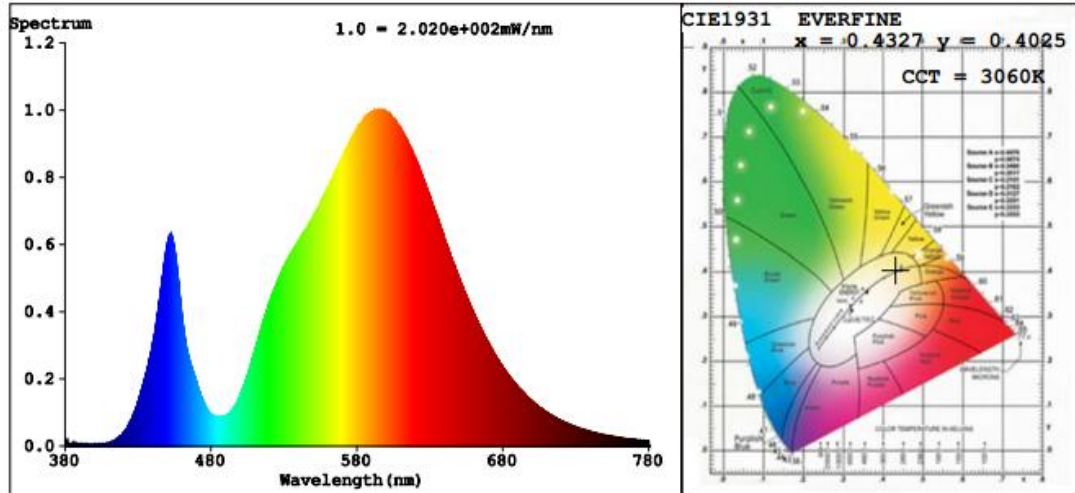
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	69	R9	0
Frequency (Hz)	60	R2	81	R10	55
CCT (K)	3060	R3	91	R11	62
Duv	0.0001	R4	69	R12	44
Chromaticity (x, y)	x=0.4327 y=0.4025	R5	68	R13	71
Chromaticity (u', v')	u'=0.2485 v'=0.5201	R6	73	R14	94
Color Rendering Index (CRI)	72.3	R7	80	R15	63
R9	0	R8	48	--	--

### Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	12866	12668	>=10000(-10%)	
Luminous Efficacy (lm/W)	131.93	132.87	Standard: >= 105(-3%)	Premium: >= 130(-3%)
Zonal lumens in the 20-50° zone (%)	69.9	--	>= 30(-10)	
Beam Angle (°)	104.1	--	--	
Center Beam Candle Power (cd)	3556	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

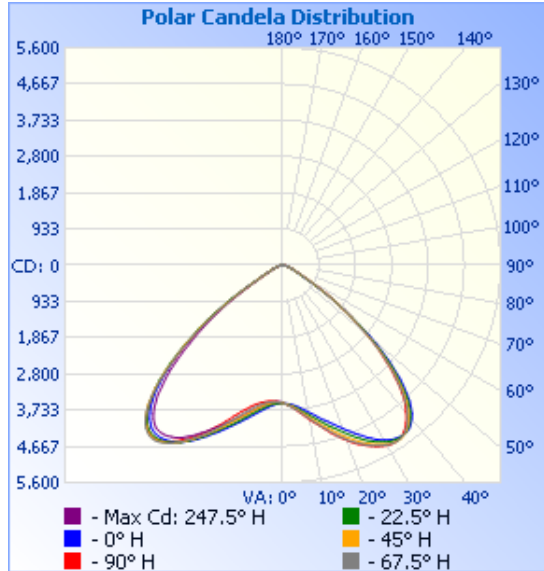


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	3,820.8	29.7%
0-40	7,180.7	55.8%
0-60	12,209.6	94.9%
60-90	643.6	5%
70-100	225.2	1.8%
90-120	3.1	0%
0-90	12,853.2	99.9%
90-180	11.7	0.1%
0-180	12,864.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	352.8	2.7%	90-100	1.1	0%
10-20	1,189.1	9.2%	100-110	0.9	0%
20-30	2,278.8	17.7%	110-120	1.1	0%
30-40	3,359.9	26.1%	120-130	1.6	0%
40-50	3,355.0	26.1%	130-140	2.0	0%
50-60	1,673.9	13.0%	140-150	2.0	0%
60-70	419.5	3.3%	150-160	1.6	0%
70-80	181.6	1.4%	160-170	0.9	0%
80-90	42.4	0.3%	170-180	0.3	0%

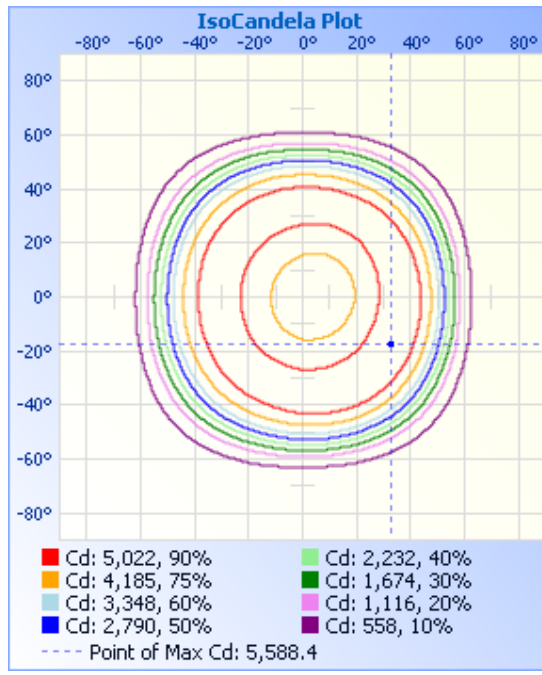
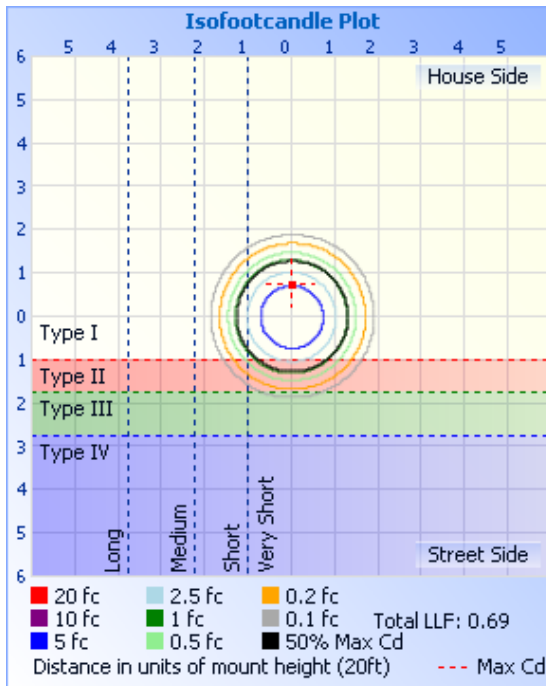
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	12.30 fc	31.8 ft	39.3 ft
34.0ft	3.08 fc	63.5 ft	78.6 ft
51.0ft	1.37 fc	95.3 ft	118.0 ft
68.0ft	0.77 fc	127.0 ft	157.3 ft
85.0ft	0.49 fc	158.8 ft	196.6 ft
102.0ft	0.34 fc	190.6 ft	235.9 ft

■ Vert. Spread: 86.1°  
■ Horiz. Spread: 98.3°



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**Candela Table - Type C**

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	3556	3560	3550	3548	3544	3539	3530	3522	3556	3560	3550	3548	3544	3539	3530	3522	3556
1	3559	3568	3566	3574	3573	3562	3549	3537	3559	3554	3537	3535	3527	3519	3515	3518	3559
2	3570	3587	3587	3601	3601	3598	3574	3554	3569	3557	3533	3524	3512	3511	3509	3519	3570
3	3583	3607	3618	3639	3634	3629	3610	3583	3584	3568	3536	3522	3506	3506	3509	3526	3583
4	3605	3639	3648	3675	3683	3666	3643	3613	3612	3584	3545	3526	3506	3507	3515	3542	3605
5	3629	3670	3695	3728	3727	3718	3691	3656	3640	3606	3564	3535	3512	3512	3528	3560	3629
6	3665	3715	3738	3763	3788	3765	3734	3696	3684	3643	3585	3548	3521	3522	3544	3581	3665
7	3701	3757	3798	3827	3842	3832	3781	3741	3722	3677	3614	3573	3538	3536	3569	3616	3701
8	3751	3814	3850	3882	3911	3888	3847	3788	3765	3724	3647	3596	3557	3554	3594	3650	3751
9	3793	3862	3905	3955	3970	3960	3902	3853	3820	3765	3696	3634	3580	3582	3629	3696	3793
10	3848	3911	3980	4015	4046	4020	3978	3907	3865	3810	3738	3670	3615	3608	3664	3737	3848
11	3896	3977	4040	4093	4107	4081	4039	3978	3924	3867	3797	3721	3649	3641	3702	3792	3896
12	3947	4030	4117	4156	4174	4161	4102	4036	3975	3918	3846	3768	3689	3690	3756	3839	3947
13	4011	4101	4180	4239	4242	4228	4180	4110	4042	3986	3911	3833	3746	3734	3803	3891	4011
14	4077	4159	4261	4308	4330	4312	4244	4172	4097	4044	3968	3891	3810	3798	3867	3958	4077
15	4130	4232	4325	4378	4402	4381	4324	4250	4168	4118	4027	3952	3867	3854	3922	4015	4130
16	4187	4303	4391	4468	4492	4469	4404	4312	4227	4179	4107	4035	3929	3933	3980	4085	4187
17	4257	4364	4473	4539	4562	4557	4470	4392	4300	4258	4172	4104	4014	4000	4054	4143	4257
18	4317	4426	4539	4627	4633	4627	4535	4458	4362	4323	4257	4195	4086	4090	4118	4203	4317
19	4395	4508	4620	4694	4720	4694	4619	4523	4443	4389	4327	4270	4186	4164	4200	4280	4395
20	4459	4574	4701	4775	4788	4778	4686	4606	4508	4456	4417	4349	4270	4261	4268	4345	4459
21	4541	4661	4767	4852	4870	4844	4771	4676	4594	4542	4490	4451	4379	4340	4336	4429	4541
22	4610	4730	4850	4914	4948	4921	4839	4764	4663	4613	4585	4534	4465	4420	4425	4500	4610
23	4698	4816	4914	4974	5006	4983	4920	4856	4733	4705	4661	4640	4551	4521	4498	4571	4698
24	4769	4883	4993	5046	5063	5053	4984	4927	4822	4779	4759	4723	4662	4603	4596	4644	4769
25	4842	4964	5054	5099	5127	5109	5059	4995	4895	4874	4837	4825	4747	4705	4673	4736	4842
26	4931	5028	5112	5164	5177	5173	5116	5075	4983	4949	4916	4904	4852	4786	4769	4805	4931
27	4999	5086	5177	5212	5236	5223	5184	5135	5052	5025	5013	4983	4934	4867	4846	4897	4999
28	5079	5153	5225	5267	5280	5266	5234	5208	5132	5116	5089	5078	5034	4966	4924	4969	5079

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29	5140	5201	5271	5305	5320	5314	5280	5257	5192	5185	5180	5155	5112	5046	5016	5045	5140
30	5194	5255	5322	5338	5358	5343	5327	5302	5259	5264	5252	5248	5187	5141	5089	5119	5194
31	5248	5293	5352	5371	5382	5370	5356	5349	5307	5322	5332	5319	5276	5211	5170	5177	5248
32	5292	5327	5383	5392	5396	5381	5380	5381	5348	5386	5391	5401	5342	5290	5227	5232	5292
33	5320	5347	5401	5403	5397	5382	5391	5405	5390	5428	5454	5458	5417	5348	5291	5267	5320
34	5341	5363	5400	5394	5383	5368	5389	5416	5417	5471	5496	5509	5466	5409	5333	5303	5341
35	5357	5364	5381	5369	5350	5334	5374	5415	5438	5496	5528	5556	5518	5447	5365	5322	5357
36	5356	5353	5350	5334	5293	5291	5351	5400	5443	5510	5553	5580	5543	5471	5389	5332	5356
37	5336	5317	5304	5267	5234	5219	5301	5368	5434	5511	5558	5588	5550	5476	5393	5326	5336
38	5301	5273	5227	5200	5140	5145	5231	5324	5412	5498	5542	5577	5529	5459	5372	5304	5301
39	5233	5185	5149	5094	5052	5036	5157	5246	5375	5462	5510	5533	5491	5412	5336	5248	5233
40	5159	5098	5028	4992	4925	4934	5065	5165	5304	5412	5448	5476	5421	5352	5260	5178	5159
41	5066	4996	4913	4871	4808	4822	4927	5038	5229	5323	5376	5398	5344	5250	5173	5074	5066
42	4923	4841	4781	4697	4676	4659	4800	4917	5109	5233	5282	5270	5222	5150	5063	4949	4923
43	4784	4705	4593	4539	4492	4515	4618	4780	4991	5089	5132	5143	5100	5027	4899	4781	4784
44	4579	4492	4420	4326	4324	4310	4454	4584	4817	4949	4987	4953	4912	4836	4742	4631	4579
45	4392	4272	4185	4140	4091	4126	4275	4408	4654	4739	4771	4777	4733	4654	4510	4389	4392
46	4186	4068	3981	3940	3890	3929	4040	4172	4425	4551	4575	4524	4531	4399	4302	4192	4186
47	3904	3849	3706	3674	3629	3673	3838	3969	4220	4342	4305	4298	4254	4178	4019	3961	3904
48	3672	3564	3477	3455	3419	3460	3570	3755	3950	4065	4070	3991	4010	3877	3779	3684	3672
49	3373	3326	3244	3172	3204	3191	3345	3477	3720	3828	3756	3731	3697	3628	3469	3427	3373
50	3123	3025	2948	2943	2931	2972	3121	3248	3480	3513	3493	3467	3438	3309	3214	3126	3123
51	2865	2748	2684	2635	2683	2725	2839	2955	3162	3250	3221	3128	3102	3045	2892	2870	2865
52	2511	2504	2392	2411	2413	2456	2586	2689	2901	2915	2876	2852	2815	2770	2680	2596	2511
53	2207	2211	2162	2140	2206	2249	2312	2399	2634	2699	2650	2556	2512	2480	2357	2350	2207
54	1966	1985	1887	1934	1956	1996	2103	2175	2385	2374	2311	2213	2240	2149	2107	2052	1966
55	1647	1700	1679	1687	1763	1796	1845	1904	2073	2114	2048	1951	1926	1898	1802	1823	1647
56	1406	1471	1432	1498	1518	1549	1643	1688	1756	1792	1739	1650	1685	1602	1567	1528	1406
57	1154	1215	1246	1270	1322	1308	1399	1425	1524	1555	1455	1422	1382	1370	1290	1252	1154
58	977	999	1030	1098	1099	1133	1212	1234	1270	1281	1239	1149	1088	1082	1091	1067	977
59	777	846	882	904	945	943	1005	1027	1076	1016	985	951	904	894	870	862	777

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60	660	682	726	774	786	813	866	876	835	838	822	769	741	733	706	719	660
61	571	600	636	646	677	671	719	716	709	701	688	668	656	634	626	605	571
62	506	516	542	562	574	585	625	623	613	623	604	574	562	553	527	536	506
63	433	458	470	482	511	512	533	532	526	527	525	485	497	469	462	463	433
64	386	401	406	428	438	452	459	473	477	465	448	429	425	416	402	414	386
65	342	363	358	376	397	396	412	411	412	400	398	376	382	369	366	367	342
66	314	323	327	344	353	360	364	374	370	363	353	344	344	340	329	330	314
67	285	296	295	309	323	322	334	337	331	327	325	311	310	308	305	305	285
68	262	270	274	285	291	296	301	312	305	298	295	289	288	282	280	280	262
69	246	253	252	261	271	271	280	285	279	278	272	266	265	264	259	263	246
70	227	234	237	241	249	254	258	267	257	257	256	246	249	244	243	244	227
71	214	217	220	227	231	235	242	247	241	241	237	232	230	230	226	225	214
72	197	203	207	210	218	218	224	229	223	223	223	215	213	212	212	212	197
73	184	187	191	198	202	206	208	216	210	207	206	202	199	196	196	195	184
74	168	175	176	182	190	190	196	200	193	194	190	186	183	183	180	182	168
75	153	159	164	170	174	178	180	187	178	178	177	170	171	167	167	166	153
76	141	147	149	156	160	163	168	171	165	162	162	158	155	155	151	150	141
77	125	132	137	141	148	149	153	156	150	150	150	143	140	140	139	137	125
78	113	117	122	129	133	137	141	144	138	135	134	130	128	124	123	122	113
79	99	106	108	115	121	122	126	128	123	123	122	115	112	111	107	109	99
80	84	92	96	104	107	110	111	116	108	108	107	100	100	96	95	94	84
81	73	80	82	89	93	96	99	101	96	93	91	88	85	84	79	79	73
82	58	66	71	74	81	84	84	89	82	82	79	72	70	68	63	66	58
83	47	51	56	62	67	69	72	73	70	67	64	56	57	52	51	51	47
84	32	39	41	48	55	54	57	58	55	54	51	44	42	40	36	36	32
85	21	25	30	36	40	42	42	46	40	39	35	29	30	26	25	24	21
86	9	15	17	23	28	28	31	31	29	25	20	19	17	16	12	12	9
87	2	5	8	11	15	17	17	20	16	15	9	8	7	6	4	5	2
88	1	1	2	4	6	7	9	9	7	5	4	3	3	2	2	2	1
89	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1
90	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1

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91	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	2	1
92	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1
93	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
94	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
95	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
96	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
98	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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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

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122	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2
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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>

153	4	3	3	3	4	3	3	3	4	3	3	3	4	3	3	4	4
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Laboratory: Standard-Tech Co. Ltd Testing Center  
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Report Format Number STD/QR4909-A/2

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## 2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-21	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	AOK-100WiU-X(5000K)		

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160710-	120.0	60	0.8207	98.20	0.9971	5.72
A2	277.0	60	0.3635	96.00	0.9533	9.78
<b>DLC Pass Criteria</b>					<b>&gt;= 0.9(-3%)</b>	<b>&lt;= 20(+5)</b>

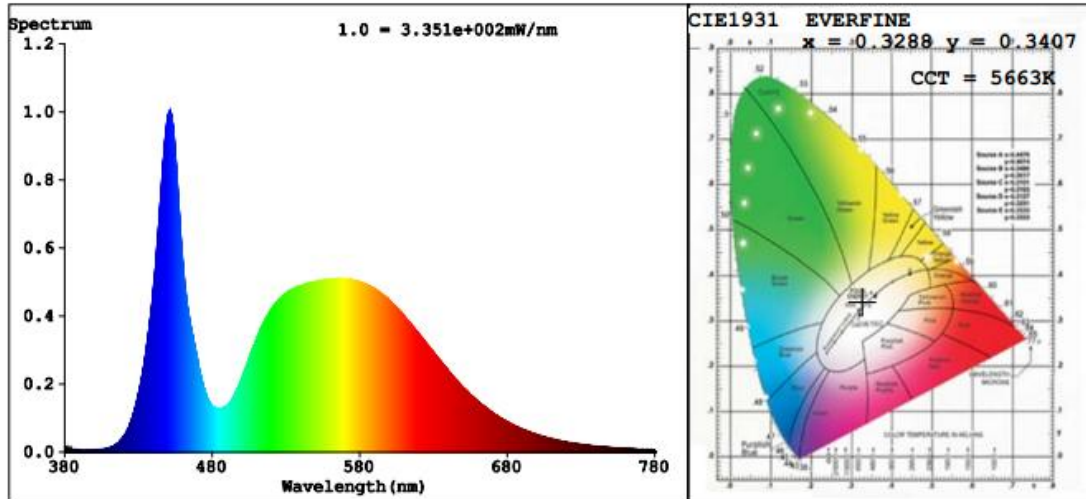
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	75	R9	0
Frequency (Hz)	60	R2	81	R10	52
CCT (K)	5663	R3	83	R11	75
Duv	0.0015	R4	77	R12	47
Chromaticity (x, y)	x=0.3288 y=0.3407	R5	75	R13	76
Chromaticity (u', v')	u'=0.2045 v'=0.4768	R6	73	R14	90
Color Rendering Index (CRI)	76.5	R7	84	R15	71
R9	0	R8	64	--	--

### Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	13471	13264	>=10000(-10%)	
Luminous Efficacy (lm/W)	137.18	138.17	Standard: >= 105(-3%)	Premium: >= 130(-3%)

Spectral Power Distribution & Chromaticity Diagram



Laboratory: Standard-Tech Co. Ltd Testing Center  
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

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### 3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

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

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**NVLAP CODE: 201011-0**

Report Format Number STD/QR4909-A/2

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