



# LM-79-08 Test Report

For

## IKIO LED LIGHTING

(Brand Name: IKIO)

### Internal Driver/Line Voltage (UL Type B)Lamps

8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250

Model name(s): IK-GT804-0009-XXKB-SF

Remark: xxK represents for different CCT can be  
30K=3000K,35K=3500K,40K=4000K,41K=4100K,45K=4500K,50K=5000K,  
57K=5700K,65K=6500K

Representative (Tested) Model:

IK-GT804-0009-30KB-SF

IK-GT804-0009-65KB-SF

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

Test & Report By:

*Peter Zhou*

Engineer: Peter Zhou

Date: Jul.06, 2021

Review By:

*Ryan Liang*

Manager: Ryan Liang

**1.1 Product Information:**

Organization Name	XIAMEN PVTECH CO.,LTD	
Brand Name	PVTECH	
Model Number	IK-GT804-0009-XXKB-SF	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Internal Driver/Line Voltage (UL Type B) Lamps	
Rated Voltage / Frequency	120-277Vac, 50/60 Hz	
Nominal Power	9W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,4100K,4500K,5000K, 5700K,6500K	
LED Manufacturer	Lumileds Holding B.V.	
LED Model	L128-AA80RA35003Q1	
Sample Number	RHL21070101-901 (3000K) RHL21070101-904(6500K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

**Photo**



## 1.2 Test Specifications:

Date of Receipt	Jul. 01, 2021
Date of Test	Jul. 05, 2021
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 and IES-LM-79-2019 OPTICAL AND ELECTRICAL 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	HL-WI-EE-001, HL-WI-EE-002

## 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 HL-WI-EE-001, HL-WI-EE-002)*

<b>Test date</b>	2021-07-05	<b>Test Ambient:</b>	25.1 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	IK-GT804-0009-30KB-SF		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
RHL2107	120.0	60	0.075	8.802	0.978	10.30
0101-901	277.0	60	0.071	9.05	0.883	12.60

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

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	1
Frequency (Hz)	60	R2	92	R10	82
CCT (K)	3031	R3	94	R11	76
Duv	0.0006	R4	77	R12	70
Chromaticity (x, y)	x = 0.4356 y = 0.4050	R5	80	R13	83
Chromaticity (u', v')	u' = 0.2493 v' = 0.5215	R6	90	R14	97
Color Rendering Index (CRI)	81.0	R7	81	R15	72
R9	1	R8	56	--	--
Rf	83	--	--	--	--
Rg	92	--	--	--	--
Rcs,h1(%)	-12	--	--	--	--

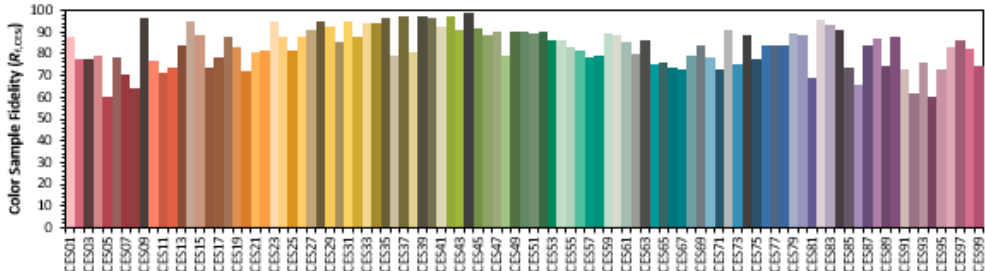
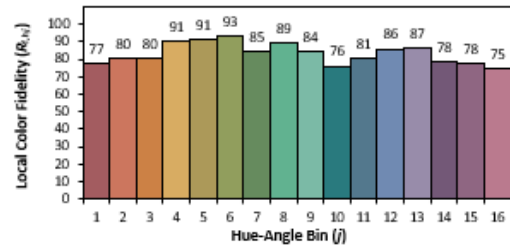
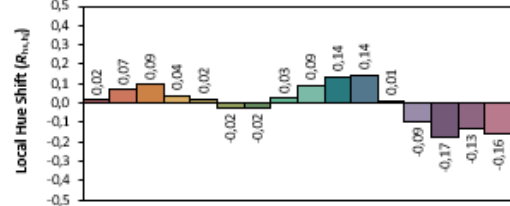
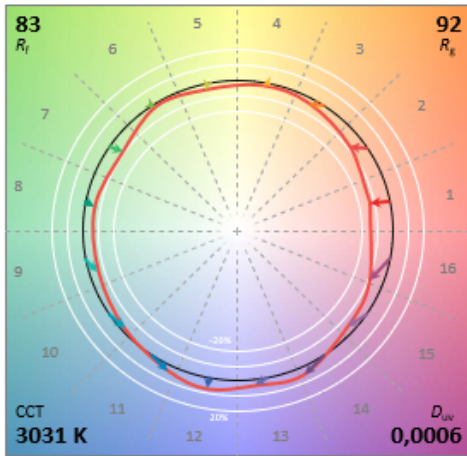
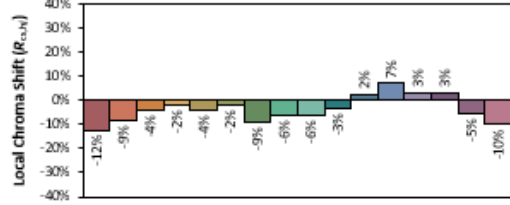
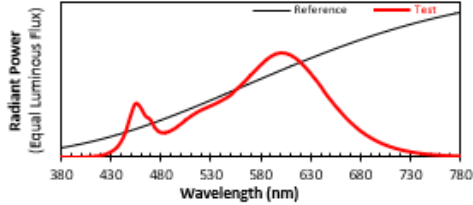
**Photometric Measurement – Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	1503.9	1522.3	Bare Lamp: $\geq 1600(-10\%)$
Luminous Efficacy (lm/W)	170.86	168.21	Bare lamp: $\geq 120(-3\%)$
Most worst Luminous/Highest Watts	166.18		



Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	0,0023	485	0,2369	590	0,9625	695	0,1609
385	0,0026	490	0,2532	595	0,9881	700	0,1377
390	0,0023	495	0,2798	600	0,9987	705	0,1177
395	0,0020	500	0,3160	605	0,9946	710	0,1007
400	0,0026	505	0,3552	610	0,9776	715	0,0856
405	0,0038	510	0,3911	615	0,9475	720	0,0729
410	0,0061	515	0,4219	620	0,9081	725	0,0620
415	0,0099	520	0,4494	625	0,8585	730	0,0528
420	0,0172	525	0,4707	630	0,8023	735	0,0449
425	0,0290	530	0,4915	635	0,7432	740	0,0383
430	0,0494	535	0,5131	640	0,6817	745	0,0328
435	0,0821	540	0,5376	645	0,6089	750	0,0278
440	0,1378	545	0,5642	650	0,5478	755	0,0240
445	0,2355	550	0,5946	655	0,4895	760	0,0205
450	0,3877	555	0,6429	660	0,4335	765	0,0174
455	0,5129	560	0,6857	665	0,3813	770	0,0151
460	0,4808	565	0,7326	670	0,3338	775	0,0129
465	0,3981	570	0,7843	675	0,2901	780	0,0119
470	0,3602	575	0,8337	680	0,2514		
475	0,2780	580	0,8823	685	0,2175		
480	0,2396	585	0,9264	690	0,1880		

**TM-30**



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

$x$  0,4356  
 $y$  0,4050  
 $u'$  0,2493  
 $v'$  0,5215

CIE 13.3-1995 (CRI)  
 $R_a$  81  
 $R_9$  1

**2.2 Electrical, Photometric and Chromaticity Measurements***(Refer to Work Instruction HL-WI-EE-001, HL-WI-EE-002)*

<b>Test date</b>	2021-07-05	<b>Test Ambient:</b>	25.1 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	IK-GT804-0009-30KB-SF		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
RHL2107	120.0	60	0.075	8.87	0.978	10.25
0101-901	277.0	60	0.036	9.05	0.902	13.08

**Photometric Measurement – Goniophotometer Method:**

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	1495.2	1512.7	Bare Lamp: $\geq 1600(-10\%)$
Luminous Efficacy (lm/W)	168.57	167.15	Bare lamp: $\geq 120(-3\%)$
Most worst Luminous/Highest Watts	165.22		
Beam Angle (°)	154.8		140° (-5°)
Center Beam Candle Power (cd)	280		--



## Zonal Lumen Tabulation

### Zonal Lumen Summary

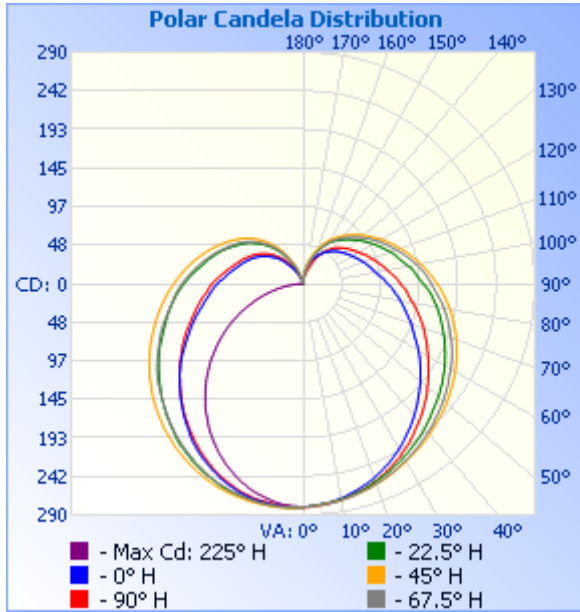
Zone	Lumens	% Lamp	% Luminaire
0-30	221.3	14.8%	14.8%
0-40	368.7	24.7%	24.7%
0-60	696.2	46.6%	46.6%
60-90	413.8	27.7%	27.7%
70-100	360.0	24.1%	24.1%
90-120	257.8	17.2%	17.2%
0-90	1,110.0	74.2%	74.2%
90-180	385.2	25.8%	25.8%
0-180	1,495.2	100%	100%

### Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	26.5	1.8%	90-100	101.9	6.8%
10-20	76.6	5.1%	100-110	85.9	5.7%
20-30	118.2	7.9%	110-120	70.0	4.7%
30-40	147.4	9.9%	120-130	53.8	3.6%
40-50	162.7	10.9%	130-140	37.6	2.5%
50-60	164.8	11.0%	140-150	22.5	1.5%
60-70	155.7	10.4%	150-160	10.2	0.7%
70-80	138.8	9.3%	160-170	3.0	0.2%
80-90	119.3	8.0%	170-180	0.4	0%



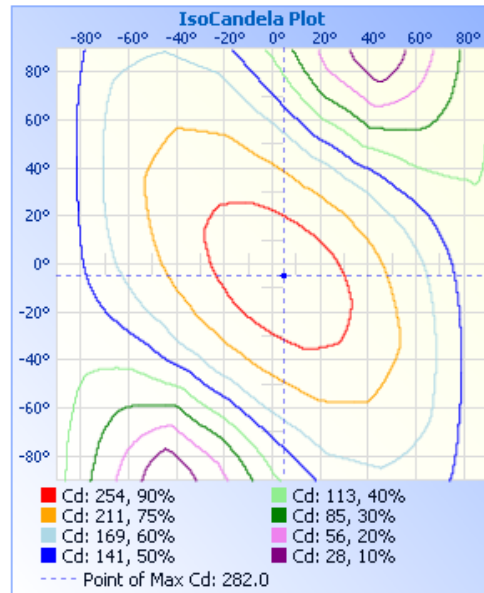
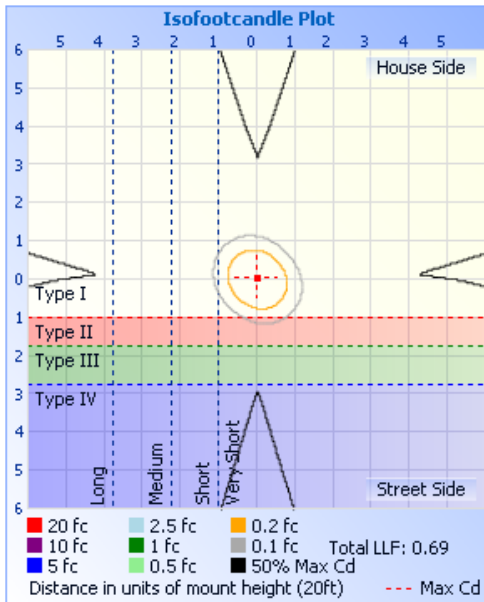
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	0.97 fc	98.9 ft	145.5 ft
34.0ft	0.24 fc	197.8 ft	290.9 ft
51.0ft	0.11 fc	296.8 ft	436.4 ft
68.0ft	0.06 fc	395.7 ft	581.9 ft
85.0ft	0.04 fc	494.6 ft	727.4 ft
102.0ft	0.03 fc	593.5 ft	872.8 ft

■ Vert. Spread: 142.1°  
■ Horiz. Spread: 153.7°





**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	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
1	279	280	280	279	280	280	280	280	280	280	280	280	280	280	279	280	279
2	279	279	279	279	280	280	280	280	280	281	281	280	280	280	279	280	279
3	278	279	279	279	279	280	280	280	281	281	281	280	280	279	279	279	278
4	278	278	278	279	279	279	280	280	281	281	281	280	279	279	278	278	278
5	277	277	278	279	278	279	280	280	280	281	282	281	279	279	278	277	277
6	277	277	278	278	278	278	279	280	280	281	282	281	280	278	277	276	277
7	276	276	277	277	277	277	278	279	280	281	282	280	279	277	276	275	276
8	275	276	276	277	277	277	277	278	279	281	282	280	278	276	275	274	275
9	274	275	276	276	276	276	276	278	279	281	281	280	278	275	274	273	274
10	273	274	275	276	275	275	276	277	279	281	281	280	277	275	272	272	273
11	272	274	275	275	274	273	274	276	278	280	281	280	277	273	271	270	272
12	270	273	274	274	273	272	273	275	278	280	281	279	276	272	270	268	270
13	269	272	273	273	272	271	271	274	277	279	281	278	276	271	268	267	269
14	268	271	272	273	271	270	270	273	276	279	280	278	274	269	267	266	268
15	267	270	272	271	270	268	269	271	275	278	280	278	273	268	265	264	267
16	265	269	271	271	269	266	267	270	274	278	280	277	273	266	262	262	265
17	264	267	270	270	268	265	266	268	273	277	279	276	271	265	261	260	264
18	262	266	270	269	267	263	264	267	272	277	279	276	270	263	258	258	262
19	261	265	268	268	265	261	262	265	270	276	278	275	268	260	256	256	261
20	259	264	267	267	264	259	259	263	269	275	278	274	267	258	254	253	259
21	257	263	266	266	262	257	257	261	268	275	277	273	266	256	251	251	257
22	255	262	266	265	260	255	255	258	266	274	277	272	264	254	249	248	255
23	254	260	265	264	259	253	252	256	265	272	276	272	263	252	246	246	254
24	252	259	264	263	257	251	250	254	263	271	275	270	261	250	244	244	252
25	250	258	263	262	256	248	247	252	261	270	274	269	259	247	240	241	250
26	248	257	262	261	254	246	245	250	259	269	273	268	258	244	238	238	248
27	246	255	261	260	252	244	242	247	257	268	273	267	255	242	235	236	246
28	244	254	260	258	250	241	239	244	256	267	271	265	253	239	232	232	244
29	242	253	258	257	249	238	236	242	254	265	270	264	251	236	229	230	242
30	239	251	258	256	246	236	233	238	252	264	269	263	249	234	226	226	239

**Laboratory: Hopestar Test Lab Limited, NVLAP Code: 600245-0**  
**Add: Room 212, 24 Building, 7 Qingyi Road, Hi-Tech Zone, Ningbo, China**  
**www.hopestartest.com**



31	237	250	256	255	244	233	230	235	250	263	268	262	247	231	222	224	237
32	235	248	255	254	242	230	227	233	248	262	267	259	245	228	220	220	235
33	233	247	254	253	241	227	224	230	245	260	266	258	242	225	216	218	233
34	230	245	253	251	239	224	220	227	243	258	265	256	240	222	213	214	230
35	228	244	252	250	236	221	216	223	241	257	263	255	238	219	209	211	228
36	226	242	251	249	234	218	213	221	238	255	262	254	236	216	205	208	226
37	223	241	250	247	231	215	210	217	236	254	261	252	233	212	202	205	223
38	221	240	249	246	229	212	206	214	233	252	260	250	231	209	198	202	221
39	218	238	248	244	227	209	202	210	230	251	258	249	229	206	195	197	218
40	216	236	247	243	225	206	198	207	228	249	257	247	226	203	190	195	216
41	213	235	245	242	223	202	195	204	225	246	255	246	224	200	187	191	213
42	211	233	243	240	221	199	191	201	223	245	254	244	221	196	183	188	211
43	209	232	243	239	219	196	187	197	220	243	252	242	219	193	179	184	209
44	206	230	241	237	217	193	183	193	217	241	251	240	216	190	175	181	206
45	203	228	240	236	214	189	179	190	215	239	249	238	214	186	171	177	203
46	201	226	239	234	212	185	175	186	212	237	247	237	211	183	167	174	201
47	199	225	237	233	210	182	171	182	209	235	246	235	209	179	163	170	199
48	196	224	237	232	208	179	166	179	207	233	244	233	206	175	159	167	196
49	194	222	235	230	206	176	162	175	204	231	242	231	204	172	155	163	194
50	191	221	234	229	203	172	158	171	201	229	241	229	201	169	151	159	191
51	189	219	232	227	201	168	154	167	199	227	239	227	198	165	147	156	189
52	186	218	231	226	198	165	149	163	196	225	237	226	196	162	142	152	186
53	184	216	230	224	196	162	145	159	193	223	235	224	194	158	138	149	184
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56	176	211	225	219	189	152	132	148	185	217	229	219	186	148	126	138	176
57	174	209	224	217	187	149	128	144	183	215	228	217	184	145	121	134	174
58	172	208	222	216	185	146	123	140	180	212	226	215	181	142	117	131	172
59	169	206	221	215	183	143	118	137	177	211	224	213	178	138	113	127	169
60	166	205	220	214	180	139	114	132	174	209	222	211	176	135	109	124	166
61	164	203	218	212	178	136	110	129	171	207	220	209	173	132	104	120	164
62	161	201	217	211	176	132	105	125	168	205	218	207	171	128	100	116	161
63	158	199	215	209	174	129	101	121	165	203	216	204	169	125	96	113	158

Laboratory: Hopenstar Test Lab Limited, NVLAP Code: 600245-0  
 Add: Room 212, 24 Building, 7 Qingyi Road, Hi-Tech Zone, Ningbo, China  
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64	156	198	213	207	172	126	96	118	162	201	214	202	166	121	91	110	156
65	154	196	212	205	170	122	91	114	160	199	212	200	164	118	87	106	154
66	151	194	211	204	168	119	87	110	157	196	210	198	162	115	83	103	151
67	150	192	209	202	166	116	83	107	154	194	208	196	159	111	78	100	150
68	148	191	207	200	164	113	78	103	152	191	206	194	157	108	74	96	148
69	146	189	206	199	162	110	74	100	150	189	204	192	154	105	70	93	146
70	144	187	204	197	160	107	69	96	147	187	202	190	152	102	66	90	144
71	141	185	202	195	158	104	65	93	145	185	200	188	149	99	62	87	141
72	139	184	200	193	156	101	61	89	142	183	198	186	147	96	58	84	139
73	137	182	199	191	154	98	57	86	140	181	196	184	145	93	54	81	137
74	135	180	197	189	152	95	52	83	138	179	194	182	143	90	50	78	135
75	133	178	195	188	150	92	48	80	135	178	192	179	141	88	46	75	133
76	131	177	194	186	148	90	45	77	133	176	190	177	139	85	42	72	131
77	129	175	192	184	146	87	41	74	130	174	188	175	137	83	38	69	129
78	127	173	190	183	144	84	36	71	128	172	186	173	135	80	34	67	127
79	125	172	188	181	142	82	33	68	126	170	184	171	133	78	31	64	125
80	124	170	187	179	139	80	29	65	124	168	182	169	131	75	27	62	124
81	122	168	185	177	137	77	25	63	122	166	180	167	129	73	24	60	122
82	120	166	183	175	135	75	22	61	120	165	178	165	128	71	20	57	120
83	118	165	181	173	134	73	18	58	119	163	176	164	126	69	17	55	118
84	116	163	179	171	132	71	15	56	117	161	174	162	123	67	14	54	116
85	114	161	177	169	131	69	12	55	116	159	172	160	121	65	11	52	114
86	113	159	175	167	129	67	9	53	114	157	169	159	119	64	9	50	113
87	111	157	173	165	128	66	7	51	112	155	168	157	118	62	7	49	111
88	110	155	172	164	125	65	5	50	111	153	166	155	117	60	5	48	110
89	108	153	170	162	123	63	4	48	109	151	164	153	116	59	4	47	108
90	106	150	168	161	122	61	3	46	107	149	162	152	114	58	3	45	106
91	104	148	166	159	120	60	2	45	106	147	160	150	112	56	3	44	104
92	103	146	164	157	119	59	2	44	104	145	158	148	110	55	2	42	103
93	101	144	162	156	118	58	2	43	101	143	156	146	108	54	2	41	101
94	100	143	160	154	116	57	2	42	99	141	154	144	107	52	2	40	100
95	98	141	158	152	114	56	3	41	98	139	152	142	105	51	2	40	98
96	96	140	156	151	112	55	3	40	97	137	150	140	103	50	2	39	96

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97	94	139	154	149	110	54	3	39	95	135	148	138	101	49	2	38	94
98	93	137	152	147	109	53	3	39	94	133	147	136	100	48	1	38	93
99	92	135	150	145	107	52	3	38	92	131	145	135	98	47	1	38	92
100	91	132	148	143	106	51	3	37	91	129	143	133	97	46	1	37	91
101	89	130	146	141	104	50	3	37	89	127	141	131	95	46	1	37	89
102	89	129	144	139	103	50	3	36	88	126	139	129	94	45	1	36	89
103	88	127	142	137	101	49	3	36	87	124	137	127	92	44	1	36	88
104	86	125	140	135	100	49	3	35	85	123	135	126	91	44	1	36	86
105	85	124	139	133	98	48	3	35	84	121	133	124	90	43	1	35	85
106	84	122	137	131	97	47	3	35	83	120	131	122	88	43	1	35	84
107	83	121	135	130	96	47	3	34	82	118	130	120	87	42	1	35	83
108	82	120	133	128	94	46	3	33	81	116	128	119	86	41	1	35	82
109	81	118	131	126	93	46	3	33	80	115	126	117	85	41	1	35	81
110	80	116	129	124	92	45	3	32	78	113	124	115	84	40	1	35	80
111	79	114	127	122	90	45	3	31	77	111	123	113	82	39	1	34	79
112	78	113	126	120	89	45	4	31	76	110	121	111	81	39	1	34	78
113	77	111	124	119	88	44	3	30	75	108	119	110	80	38	1	34	77
114	76	110	122	117	87	44	3	29	74	106	117	108	79	37	1	34	76
115	75	108	120	116	86	44	3	28	73	105	115	107	77	37	1	34	75
116	74	106	118	114	84	43	3	27	72	103	113	105	76	36	1	34	74
117	73	105	117	112	83	43	3	27	71	101	112	103	75	35	1	33	73
118	72	103	115	110	81	43	3	26	69	99	110	102	74	34	1	33	72
119	71	102	113	109	81	43	3	25	68	98	108	100	73	34	1	33	71
120	70	100	112	107	79	42	4	24	67	96	107	99	72	33	1	33	70
121	69	98	110	105	78	42	4	23	66	95	105	97	71	32	1	32	69
122	68	97	108	104	77	41	4	21	64	93	103	96	69	31	1	32	68
123	67	96	106	102	76	41	4	20	63	91	101	94	68	30	1	32	67
124	67	94	105	101	75	41	4	18	61	90	100	92	67	29	1	31	67
125	66	93	103	99	74	40	4	18	60	88	98	91	65	28	1	31	66
126	65	91	101	97	73	40	4	17	59	87	96	89	64	27	1	31	65
127	64	90	100	95	72	39	4	16	57	85	94	87	62	26	1	30	64
128	63	88	98	94	71	39	4	15	56	83	92	86	61	25	1	30	63
129	62	87	96	92	70	38	4	15	54	81	90	84	60	24	1	29	62

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130	62	85	95	90	69	38	4	14	52	79	89	82	58	23	1	29	62
131	61	84	93	89	68	37	4	13	51	77	86	80	57	22	1	29	61
132	60	82	91	87	67	37	4	12	49	75	84	78	55	21	1	28	60
133	59	81	90	86	66	36	4	11	48	73	82	75	53	20	1	28	59
134	58	80	88	84	65	35	4	11	46	71	80	74	52	19	1	27	58
135	58	78	87	82	64	35	4	10	45	69	78	72	50	17	1	27	58
136	57	77	85	81	63	34	4	9	43	67	76	70	48	16	1	26	57
137	56	76	83	79	61	33	4	8	41	65	74	67	47	15	1	26	56
138	55	74	82	78	60	32	4	7	39	63	71	65	45	14	1	25	55
139	54	73	80	76	59	32	4	6	37	61	69	63	43	13	1	24	54
140	53	72	79	74	57	31	4	6	35	58	67	61	41	12	1	24	53
141	52	70	77	73	56	30	4	5	33	56	64	58	40	11	1	23	52
142	51	69	75	71	55	29	4	4	30	54	62	56	38	10	1	23	51
143	50	67	74	69	53	28	4	4	28	52	59	54	35	9	1	22	50
144	49	66	72	68	52	27	3	4	27	49	57	52	33	8	1	22	49
145	48	65	70	66	50	26	3	3	25	47	54	50	31	8	1	21	48
146	47	63	68	64	48	25	3	3	24	45	52	47	29	7	1	21	47
147	46	62	67	62	47	24	3	3	22	42	50	45	27	6	1	20	46
148	45	60	65	61	45	23	3	2	21	39	47	42	26	5	1	19	45
149	44	59	63	59	43	22	3	2	19	36	44	39	24	4	1	19	44
150	43	57	62	57	42	20	2	2	17	33	41	36	22	4	1	18	43
151	42	55	60	55	40	19	2	2	16	31	38	33	21	3	1	16	42
152	41	54	58	53	38	17	2	2	14	29	35	31	19	3	1	15	41
153	39	52	56	50	36	16	2	2	12	27	32	29	17	3	1	14	39
154	38	50	54	48	35	15	2	1	10	25	30	27	15	2	1	13	38
155	37	48	52	46	32	14	1	1	9	23	28	25	14	2	1	12	37
156	36	46	50	44	30	13	1	1	7	20	26	23	12	2	1	11	36
157	35	45	47	42	28	12	1	1	5	18	23	20	10	2	1	10	35
158	33	43	45	39	25	11	1	1	4	16	21	18	9	1	1	10	33
159	32	41	43	37	23	10	1	1	3	14	18	16	7	1	1	10	32
160	31	39	40	35	21	9	1	1	2	12	16	14	6	1	1	10	31
161	29	37	38	32	20	9	1	1	2	9	14	11	5	1	1	9	29
162	28	35	36	30	19	8	1	1	2	7	11	10	4	1	1	8	28

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163	27	33	34	27	17	7	1	1	2	5	9	7	3	1	1	8	27
164	25	31	31	24	16	7	1	1	2	4	7	6	3	1	1	7	25
165	24	29	29	22	14	7	1	1	2	3	5	4	2	1	1	7	24
166	22	27	27	19	13	6	1	1	1	2	4	4	2	1	2	6	22
167	21	25	25	17	12	6	1	1	1	1	3	3	2	1	2	6	21
168	19	23	23	15	12	5	1	1	1	1	3	2	1	1	2	6	19
169	18	21	21	14	11	5	1	1	1	1	2	2	1	1	2	6	18
170	16	19	18	13	10	5	1	1	1	1	2	1	1	1	2	5	16
171	15	17	15	13	9	5	1	1	1	1	1	1	1	1	2	5	15
172	13	15	13	11	8	4	1	1	1	1	1	1	1	1	2	5	13
173	11	13	11	10	7	4	1	1	1	1	1	1	1	1	2	5	11
174	9	12	10	9	7	4	1	1	1	1	1	1	1	1	2	5	9
175	8	10	8	8	6	4	2	1	1	1	1	1	1	1	2	4	8
176	7	8	7	7	5	4	2	2	1	1	1	1	1	1	3	4	7
177	6	6	6	6	5	4	2	2	1	1	1	1	1	1	3	4	6
178	5	5	5	5	4	3	2	2	2	1	1	1	1	2	3	4	5
179	4	2	4	4	4	3	3	3	3	2	2	2	2	2	3	3	4
180	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

**2.3 Electrical, Photometric and Chromaticity Measurements***(Refer to Work Instruction HL-WI-EE-001, HL-WI-EE-002)*

<b>Test date</b>	2021-07-05	<b>Test Ambient:</b>	25.1 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	IK-GT804-0009-50KB-SF		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
RHL210701	120.0	60	0.078	9.154	0.978	11.24
01-904	277.0	60	0.038	9.337	0.887	13.61
<b>DLC Pass Criteria</b>					$\geq 0.9(-3\%)$	$\leq 20(+5)$

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

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	12
Frequency (Hz)	60	R2	92	R10	80
CCT (K)	5043	R3	95	R11	81
Duv	0.0026	R4	82	R12	65
Chromaticity (x, y)	x = 0.3443 y = 0.3561	R5	83	R13	86
Chromaticity (u', v')	u' = 0.2092 v' = 0.4867	R6	88	R14	98
Color Rendering Index (CRI)	85	R7	86	R15	78
R9	12	R8	67	--	--
Rf	84				
Rg	94				
Rcs,h1(%)	-12				

**Photometric Measurement – Goniophotometer Method:**

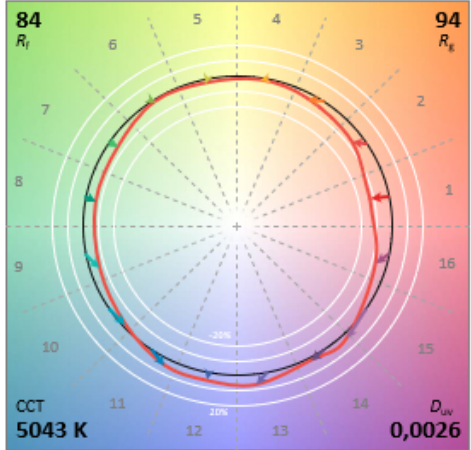
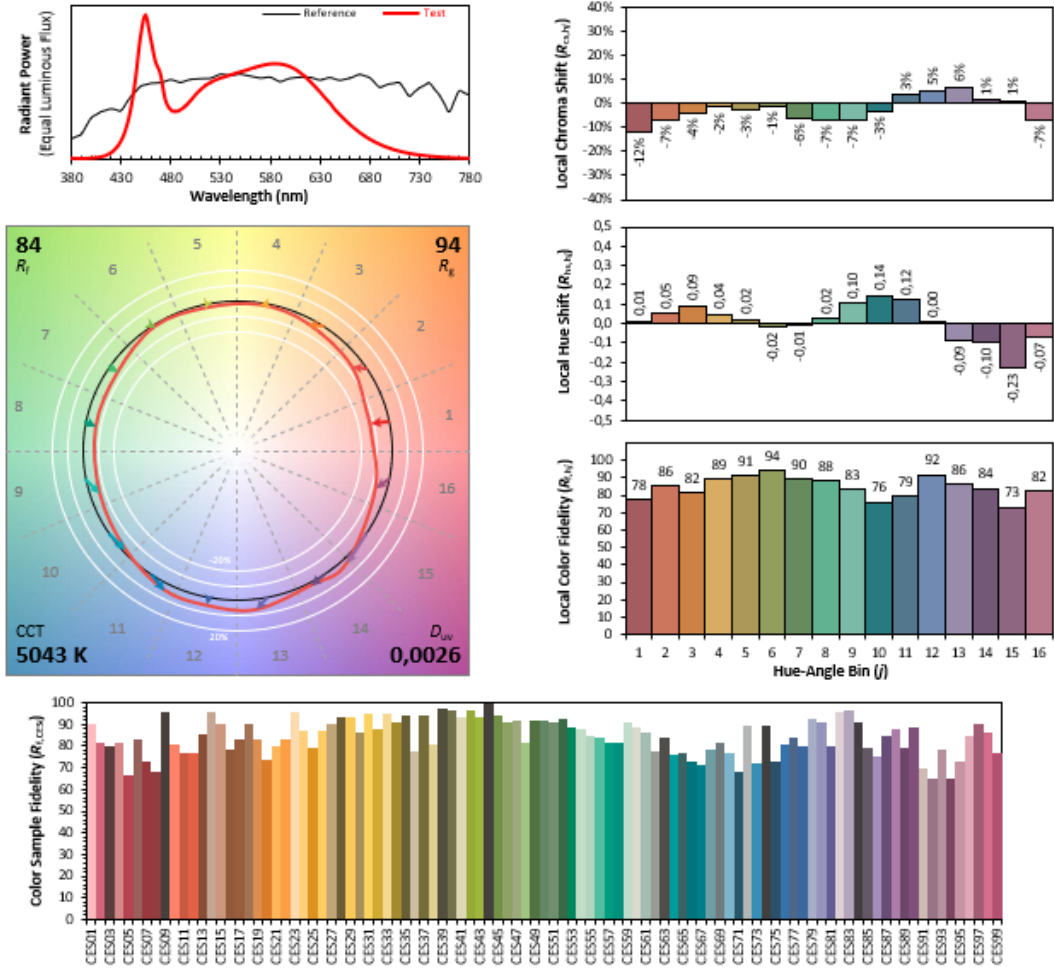
Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	1730.2	1731.9	Bare Lamp: $\geq 1600(-10\%)$
Luminous Efficacy (lm/W)	189.01	185.49	Bare lamp: $\geq 120(-3\%)$
Most worst Luminous/Highest Watts	185.31		





Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	0,0072	485	0,3310	590	0,6610	695	0,0880
385	0,0060	490	0,3419	595	0,6543	700	0,0754
390	0,0052	495	0,3670	600	0,6423	705	0,0645
395	0,0056	500	0,4049	605	0,6253	710	0,0550
400	0,0076	505	0,4458	610	0,6013	715	0,0469
405	0,0103	510	0,4818	615	0,5729	720	0,0400
410	0,0155	515	0,5106	620	0,5397	725	0,0340
415	0,0247	520	0,5326	625	0,5034	730	0,0293
420	0,0422	525	0,5496	630	0,4659	735	0,0249
425	0,0712	530	0,5627	635	0,4267	740	0,0213
430	0,1188	535	0,5734	640	0,3883	745	0,0182
435	0,1992	540	0,5841	645	0,3432	750	0,0156
440	0,3336	545	0,5952	650	0,3068	755	0,0133
445	0,5498	550	0,6062	655	0,2728	760	0,0115
450	0,8413	555	0,6151	660	0,2402	765	0,0098
455	0,9993	560	0,6272	665	0,2110	770	0,0083
460	0,8504	565	0,6384	670	0,1837	775	0,0072
465	0,6817	570	0,6472	675	0,1595	780	0,0070
470	0,5945	575	0,6557	680	0,1380		
475	0,4143	580	0,6616	685	0,1195		
480	0,3458	585	0,6629	690	0,1030		

**TM-30**



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

$x$	<b>0,3443</b>	CIE 13.3-1995 (CRI)  $R_2$ 85  $R_3$ 12
$y$	<b>0,3561</b>	
$x'$	<b>0,2092</b>	
$y'$	<b>0,4867</b>	

**2.4 Electrical, Photometric and Chromaticity Measurements***(Refer to Work Instruction HL-WI-EE-001, HL-WI-EE-002)*

<b>Test date</b>	2021-07-05	<b>Test Ambient:</b>	25.1 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	IK-GT804-0009-65KB-SF		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
RHL210701	120.0	60	0.077	9.037	0.978	11.20
01-904	277.0	60	0.038	9.294	0.883	13.60
<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	80	R9	8
Frequency (Hz)	60	R2	88	R10	70
CCT (K)	6586	R3	92	R11	81
Duv	0.0070	R4	82	R12	59
Chromaticity (x, y)	x = 0.3104 y = 0.3342	R5	81	R13	82
Chromaticity (u', v')	u' = 0.1943 v' = 0.4707	R6	83	R14	96
Color Rendering Index (CRI)	83.0	R7	89	R15	75
R9	8	R8	70	--	--
Rf	84				
Rg	93				
Rcs,h1(%)	-13				

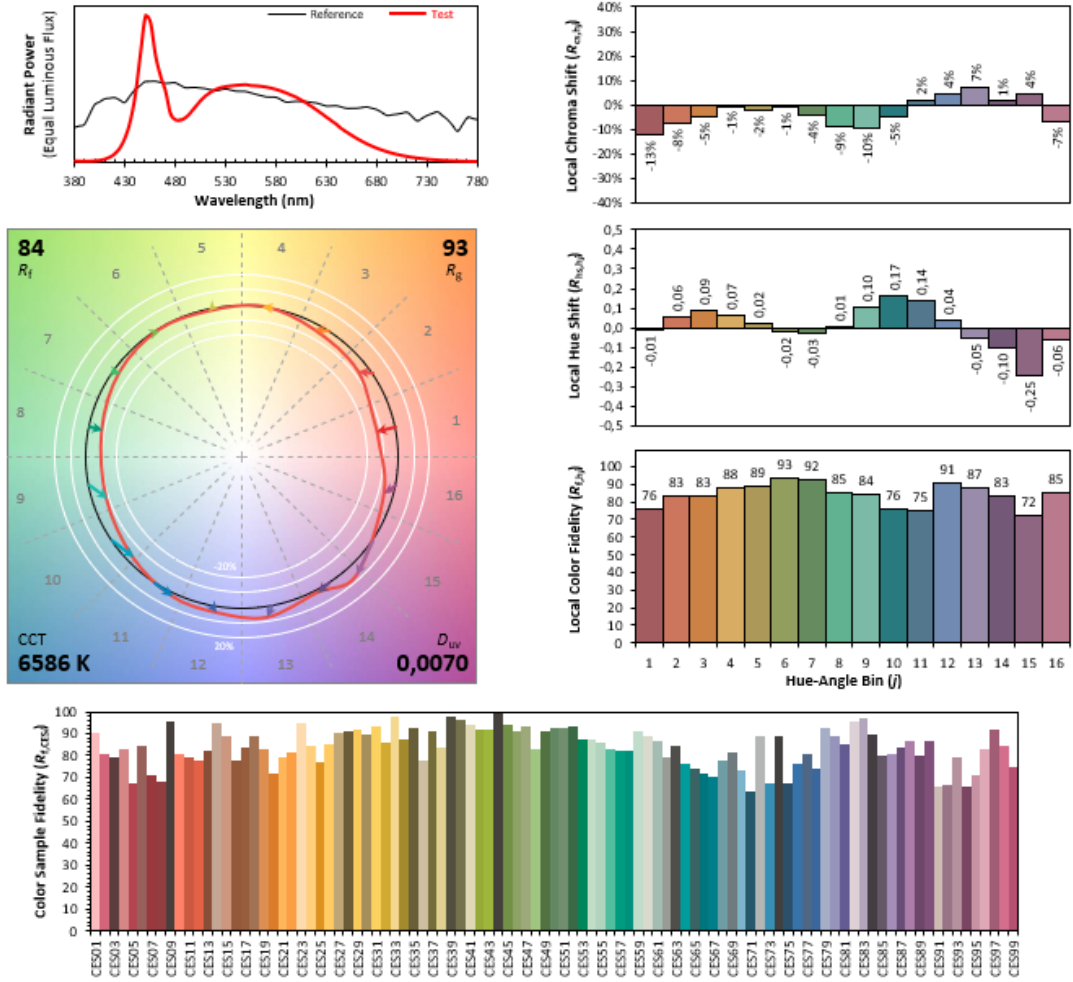
**Photometric Measurement – Goniophotometer Method:**

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	1709.7	1705.9	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	189.19	183.55	Bare lamp: >= 120(-3%)
Most worst Luminous/Highest Watts	183.55		



Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	0,0087	485	0,2804	590	0,4616	695	0,0616
385	0,0074	490	0,2975	595	0,4471	700	0,0531
390	0,0068	495	0,3302	600	0,4331	705	0,0458
395	0,0074	500	0,3719	605	0,4143	710	0,0392
400	0,0096	505	0,4104	610	0,3947	715	0,0336
405	0,0138	510	0,4425	615	0,3728	720	0,0288
410	0,0213	515	0,4671	620	0,3498	725	0,0248
415	0,0355	520	0,4848	625	0,3260	730	0,0212
420	0,0595	525	0,4965	630	0,3014	735	0,0181
425	0,0994	530	0,5037	635	0,2771	740	0,0157
430	0,1670	535	0,5079	640	0,2530	745	0,0135
435	0,2753	540	0,5119	645	0,2246	750	0,0115
440	0,4514	545	0,5147	650	0,2020	755	0,0099
445	0,7177	550	0,5166	655	0,1807	760	0,0085
450	0,9699	555	0,5102	660	0,1602	765	0,0073
455	0,9319	560	0,5087	665	0,1415	770	0,0063
460	0,7131	565	0,5055	670	0,1242	775	0,0056
465	0,5746	570	0,5006	675	0,1087	780	0,0052
470	0,4744	575	0,4933	680	0,0946		
475	0,3212	580	0,4847	685	0,0824		
480	0,2823	585	0,4740	690	0,0715		

**TM-30**



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

$x$  **0, 3104**  
 $y$  **0, 3342**  
 $u'$  **0, 1943**  
 $v'$  **0, 4707**

CIE 13.3-1995 (CRI)	
$R_a$	83
$R_9$	8



**2.4 Performance Assessment:**

Model Number	Luminous Flux (lm)	Power (W)	Efficacy (lm/W)
IK-GT804-0009-30KB-SF	1503.90	8.80	170.86
IK-GT804-0009-35KB-SF	1541.62	8.86	173.98
IK-GT804-0009-40KB-SF	1579.33	8.92	177.07
IK-GT804-0009-41KB-SF	1617.05	8.98	180.11
IK-GT804-0009-45KB-SF	1629.62	9.00	181.12
IK-GT804-0009-50KB-SF	1730.20	9.15	189.01
IK-GT804-0009-57KB-SF	1723.37	9.11	189.12
IK-GT804-0009-65KB-SF	1709.70	9.04	189.19

**3. Test Equipment**

Equipment Name	Model No.	Serial No.	Next Calibration Date
Goniophotometric System	GPM-3000	91N827816	2021-09-26
AC Power Source	CHP-1000	213630	2021-09-19
Total Luminous Flux Standard Lamp	24V150W	24V150W	2021-08-10
Digital Power Meter	WT500	TBS1012 C020506	2021-09-19
Integral Sphere (2M)	2m sphere	N.A	N/A
Digital Power Meter	PF310A	P609877CD1391157	2022-04-02
Optical Color and Electrical Measurement System	HAAS-2000	M108544CM5351115	2021-09-26
Expand Uncertainty: Photometric Measurement (Sphere): 2.08%, k=2 Chromaticity Measurement(Sphere):25.6K, k=2 Photometric Measurement(Goniophotometer):2.645%, k=2			

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