Certificate#4810.01

LM-79-08 Test Report

For

ATG Electronics Corp

(Brand Name: ATG)

10700 7th Street Rancho Cucamonga, CA

2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces

Model name(s): FPBL22-30W-XX

Remark: XX represents for CCT, can be 27=2700K, 30=3000K, 35=3500K, 40=4000K, 45=4500K, 50=5000K.

This is a multiple list report, the original report No. is BLC1809001E-A.

Representative (Tested) Model: FPBL22-30W-27, FPBL22-30W-50

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

Test & Report By:

Grace Li

Engineer: Grace Li

Date: Sept 03, 2018

Review By:

Tommy Liang

Manager: Tommy Liang

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1.1 Product Information:

Organization Name	ATG Electronics Corp	
Brand Name	ATG	
Model Number	FPBL22-30W-XX	
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, 50/60 Hz	
Nominal Power	30W	
Rated Initial Lamp Lumen	--	
Declared CCT	2700K,3000K,3500K,4000K,4500K,5000K	
LED Manufacturer	EBRIGHT SHENZHEN OPTO-ELECTRONIC CO.,LTD	
LED Model	ETRC-3030WB-MASD	
Sample Number	BLC1809001E-A1(2700K),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	Sept 03, 2018
Date of Test	Sept 03, 2018
Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	BL-QP-033

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° 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.
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 25º C ± 1º 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 25º C ± 1º 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.

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2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2018-09-03	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	FPBL22-30W-27		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC180900 1E-A1	120.0	60	0.2455	29.23	0.992	11.63
	277.0	60	0.1170	29.27	0.903	9.15
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

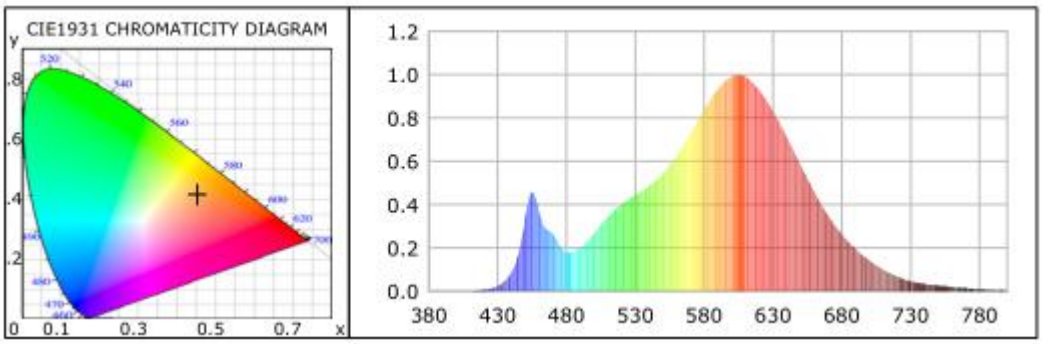
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	2785
Duv	0.00069
Chromaticity (x, y)	x=0.4542 y=0.4111
Chromaticity (u', v')	u(u')=0.2586 v'=0.5267
Color Rendering Index (CRI)	81.2
R9	2

Special Color Rendering Indices			
R1	80	R9	2
R2	92	R10	82
R3	94	R11	77
R4	78	R12	71
R5	80	R13	83
R6	91	R14	98
R7	79	R15	71
R8	55	--	--

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)	3697.3	3681.29	≥2000 (-10%)
Luminous Efficacy (lm/W)	126.49	125.77	Premium: >= 125(-3%)
Most worst Luminous/Highest Watts	125.77		
SC: 0-180^0	1.26		0.9-2.1
SC: 90-270^0	1.26		0.9-2.1
Zonal lumens in the 0-60° zone (%)	78	--	>=75(-3)
Beam Angle (°)	113.8	--	--
Center Beam Candle Power (cd)	1274	--	--

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

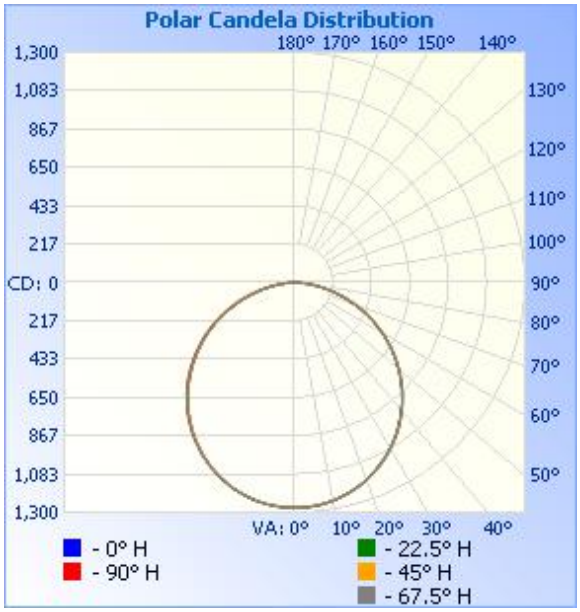
Zonal Lumen Summary

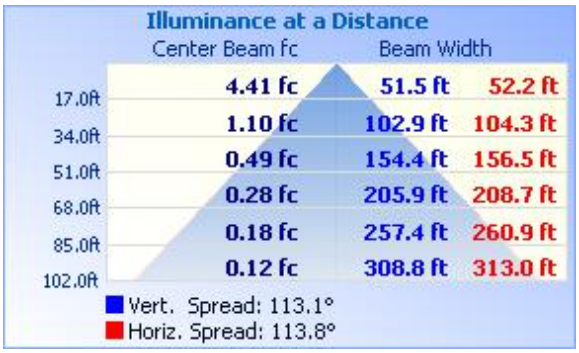
Zone	Lumens	% Lamp	% Luminaire
0-30	990.7	26.8%	26.8%
0-40	1,625.0	43.9%	44%
0-60	2,884.5	78%	78%
60-90	799.3	21.6%	21.6%
70-100	341.8	9.2%	9.2%
90-120	5.8	0.2%	0.2%
0-90	3,683.8	99.6%	99.6%
90-180	13.2	0.4%	0.4%
0-180	3,697.0	100%	100%

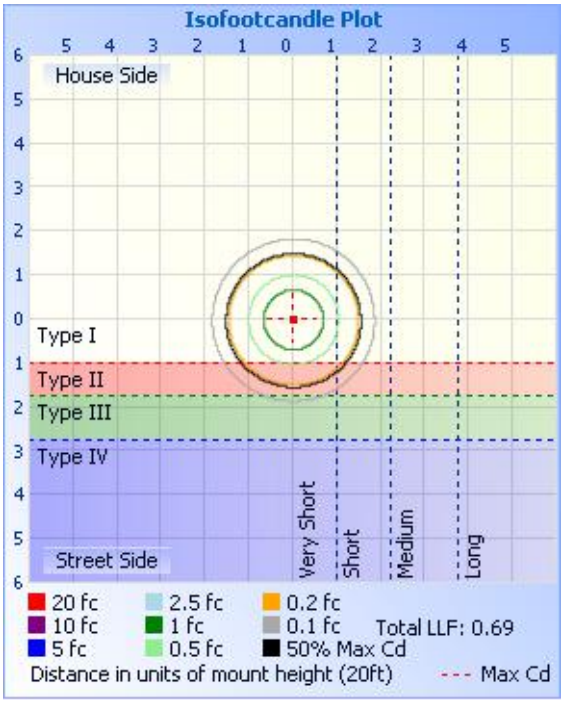
Lumens Per Zone

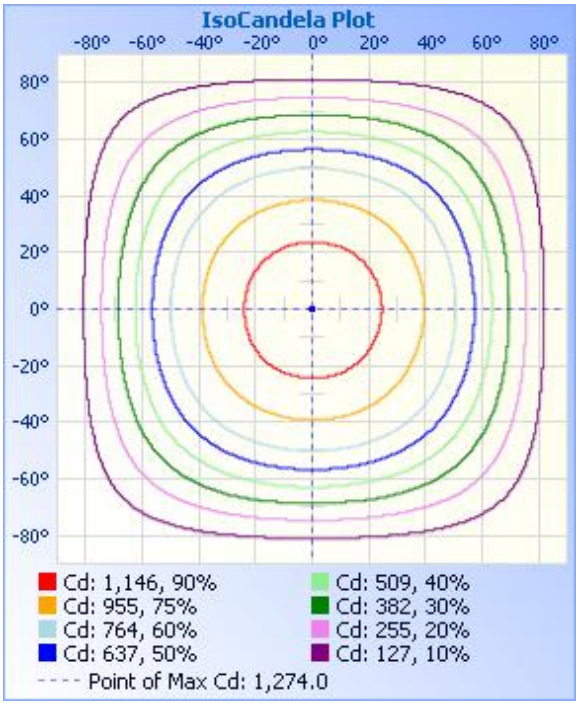
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	120.5	3.3%	90-100	2.3	0.1%
10-20	345.5	9.3%	100-110	1.8	0%
20-30	524.6	14.2%	110-120	1.7	0%
30-40	634.3	17.2%	120-130	1.7	0%
40-50	660.3	17.9%	130-140	1.7	0%
50-60	599.3	16.2%	140-150	1.6	0%
60-70	459.8	12.4%	150-160	1.3	0%
70-80	266.7	7.2%	160-170	0.8	0%
80-90	72.9	2.0%	170-180	0.3	0%

Photometric Data









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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	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273
1	1273	1273	1273	1272	1273	**1274**	1273	1273	1272	1273	1272	1273	1273	**1274**	1273	1273	1273
2	1273	**1274**	1272	1272	1272	1273	1273	1273	1272	1272	1271	1272	1273	1273	1273	1272	1273
3	1272	1273	1271	1270	1271	1272	1272	1272	1270	1271	1270	1271	1272	1272	1273	1272	1272
4	1270	1271	1270	1269	1269	1271	1271	1271	1268	1271	1269	1269	1270	1270	1271	1270	1270
5	1267	1268	1268	1268	1267	1269	1269	1270	1267	1269	1267	1267	1269	1269	1270	1268	1267
6	1264	1267	1264	1266	1265	1265	1267	1267	1265	1266	1265	1265	1266	1267	1267	1266	1264
7	1261	1264	1262	1264	1264	1263	1263	1265	1262	1263	1261	1262	1263	1263	1264	1263	1261
8	1258	1259	1259	1261	1260	1259	1261	1259	1259	1259	1257	1258	1260	1259	1261	1260	1258
9	1254	1255	1255	1257	1257	1256	1257	1256	1255	1255	1254	1255	1257	1256	1255	1256	1254
10	1251	1251	1251	1253	1253	1252	1254	1252	1251	1252	1249	1250	1252	1252	1251	1252	1251
11	1246	1247	1246	1249	1248	1249	1249	1247	1247	1247	1245	1245	1248	1247	1246	1247	1246
12	1241	1242	1243	1244	1242	1243	1244	1242	1241	1242	1240	1240	1241	1244	1242	1242	1241
13	1236	1237	1238	1237	1236	1238	1236	1237	1236	1237	1235	1235	1236	1238	1236	1237	1236
14	1230	1231	1232	1231	1231	1232	1231	1231	1230	1229	1229	1230	1230	1232	1231	1228	1230
15	1224	1224	1226	1225	1224	1226	1224	1225	1224	1224	1223	1223	1224	1226	1225	1222	1224
16	1217	1218	1219	1219	1218	1218	1218	1218	1218	1216	1216	1217	1218	1219	1218	1216	1217
17	1209	1210	1212	1212	1211	1210	1211	1211	1210	1209	1207	1210	1210	1212	1211	1208	1209
18	1202	1203	1203	1205	1204	1203	1204	1204	1201	1201	1199	1202	1204	1205	1203	1201	1202
19	1193	1194	1195	1197	1196	1196	1197	1196	1193	1193	1191	1194	1196	1195	1196	1193	1193
20	1186	1186	1187	1188	1188	1187	1189	1187	1184	1186	1183	1183	1188	1187	1186	1185	1186
21	1177	1178	1178	1180	1179	1179	1180	1177	1175	1177	1174	1177	1179	1178	1179	1177	1177
22	1166	1169	1169	1171	1170	1170	1170	1168	1166	1168	1165	1166	1171	1169	1169	1168	1166
23	1157	1160	1159	1162	1159	1160	1161	1159	1157	1158	1156	1156	1159	1160	1160	1158	1157
24	1147	1150	1149	1151	1150	1151	1152	1149	1147	1148	1146	1146	1149	1150	1149	1148	1147
25	1137	1139	1139	1141	1140	1140	1139	1137	1137	1138	1135	1136	1139	1140	1139	1138	1137
26	1126	1126	1129	1131	1130	1129	1129	1127	1126	1125	1123	1126	1129	1129	1129	1126	1126
27	1116	1115	1118	1120	1117	1118	1118	1115	1116	1114	1112	1115	1118	1118	1116	1114	1116
28	1104	1104	1106	1109	1106	1107	1107	1104	1104	1102	1101	1104	1107	1106	1105	1103	1104
29	1092	1093	1095	1097	1094	1095	1095	1092	1092	1090	1089	1092	1094	1095	1093	1091	1092

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30	1080	1081	1083	1086	1082	1083	1082	1079	1077	1078	1077	1080	1082	1082	1081	1079	1080
31	1068	1068	1070	1071	1070	1071	1070	1067	1065	1065	1065	1067	1070	1071	1069	1066	1068
32	1053	1056	1058	1058	1057	1056	1057	1054	1052	1053	1050	1054	1057	1058	1056	1053	1053
33	1040	1043	1042	1045	1044	1043	1044	1041	1039	1039	1037	1040	1044	1043	1043	1040	1040
34	1027	1030	1029	1032	1031	1030	1030	1028	1025	1026	1023	1027	1030	1029	1030	1026	1027
35	1013	1016	1015	1019	1016	1015	1015	1014	1010	1011	1009	1013	1017	1015	1017	1013	1013
36	999	1002	1001	1004	1003	1002	1002	997	996	996	995	998	1002	1001	1002	999	999
37	984	986	987	989	986	987	987	983	982	981	980	982	988	987	986	984	984
38	969	970	972	975	971	973	972	968	967	966	966	967	973	972	971	969	969
39	954	955	957	960	956	957	957	952	950	951	950	952	958	957	956	954	954
40	939	941	942	945	941	943	939	937	935	935	935	936	943	942	941	940	939
41	923	924	927	928	925	926	923	920	919	919	919	921	926	927	925	923	923
42	907	908	911	911	909	910	907	904	902	901	903	905	910	911	909	905	907
43	889	891	894	895	893	892	891	888	886	884	884	888	893	895	893	889	889
44	873	876	876	878	876	876	874	871	867	868	868	872	879	878	876	872	873
45	856	859	859	863	859	859	857	853	850	850	851	855	862	859	859	855	856
46	840	840	843	843	842	840	839	835	833	833	833	834	843	842	842	838	840
47	822	823	825	826	823	822	822	818	815	815	814	817	826	825	824	821	822
48	802	805	806	809	805	805	803	800	796	797	797	800	810	808	807	804	802
49	785	789	789	791	788	787	783	779	779	779	779	782	790	788	789	786	785
50	767	770	771	774	770	769	765	761	760	759	761	762	771	771	772	767	767
51	749	751	753	755	749	749	747	743	742	741	740	744	752	752	753	749	749
52	730	733	734	735	731	730	728	724	723	721	722	725	733	734	734	730	730
53	711	714	716	716	712	711	709	705	701	703	703	707	714	716	714	711	711
54	692	695	696	697	693	692	689	686	682	683	683	687	696	696	694	693	692
55	673	674	676	677	674	670	668	666	663	663	664	666	678	675	675	673	673
56	654	655	657	659	653	651	649	646	643	643	642	647	655	656	656	652	654
57	634	634	638	637	634	631	629	626	622	623	622	627	636	637	636	632	634
58	612	615	616	616	613	610	609	606	601	603	602	607	616	617	616	612	612
59	593	596	596	597	593	591	587	583	581	581	583	587	597	595	596	592	593
60	573	576	576	577	572	570	566	563	561	562	562	567	576	576	575	573	573
61	553	555	556	555	550	548	546	543	541	540	541	544	554	554	556	553	553

62	532	535	536	534	530	528	523	522	518	519	520	524	533	536	534	531	532
63	511	513	514	513	509	507	502	500	497	496	500	502	512	514	513	510	511
64	489	492	493	493	488	486	482	479	476	475	479	483	491	492	492	489	489
65	469	470	472	471	465	462	461	458	456	454	455	460	471	473	471	468	469
66	448	450	452	451	444	441	439	436	434	432	434	439	451	451	450	447	448
67	427	428	431	429	423	420	417	415	410	412	414	418	429	430	429	428	427
68	405	407	410	409	402	399	396	392	389	389	392	397	407	408	407	407	405
69	383	387	386	388	379	376	375	371	368	368	370	374	385	387	386	384	383
70	363	365	366	365	358	355	353	349	346	347	349	353	365	365	365	362	363
71	341	342	346	345	337	335	330	328	324	327	328	332	344	344	343	341	341
72	320	322	324	323	315	313	309	304	302	305	307	311	322	322	324	320	320
73	298	301	304	303	292	290	288	283	282	282	287	288	302	303	302	298	298
74	278	279	283	280	271	270	267	262	261	261	264	267	279	280	282	278	278
75	257	259	262	260	251	250	245	242	238	241	244	248	258	259	260	258	257
76	236	239	240	239	230	229	223	221	218	221	223	227	238	239	238	237	236
77	217	218	220	220	211	209	204	199	198	201	203	208	217	219	218	217	217
78	197	198	199	199	189	187	184	179	178	179	184	185	198	199	198	196	197
79	176	177	180	179	169	167	164	161	159	160	162	166	177	179	179	178	176
80	156	158	159	159	150	148	144	142	138	141	144	148	158	159	158	156	156
81	137	139	140	140	130	128	125	122	121	122	126	128	139	141	139	138	137
82	119	120	121	122	112	110	107	104	103	104	106	110	121	120	121	120	119
83	103	104	104	104	94	92	90	87	86	87	90	93	103	104	102	102	103
84	85	85	86	86	78	76	73	71	69	70	73	76	85	86	87	86	85
85	69	69	69	70	61	60	55	55	52	55	56	60	67	68	70	69	69
86	53	54	53	52	46	44	40	39	38	39	42	43	51	52	53	54	53
87	39	38	39	37	31	29	27	26	24	25	26	29	36	37	38	39	39
88	24	25	25	24	17	16	14	13	12	13	14	16	22	23	24	25	24
89	12	14	12	11	6	6	6	6	4	5	6	6	11	12	12	14	12
90	4	4	4	3	2	3	3	3	2	3	2	3	3	4	4	5	4
91	3	3	3	3	1	2	2	2	2	2	2	2	2	3	3	3	3
92	2	3	3	2	1	2	2	2	2	2	2	3	2	2	2	3	2
93	2	2	3	2	1	2	2	2	2	2	2	2	1	2	2	3	2

94	2	2	3	2	1	2	2	2	2	2	2	2	2	2	2	2	2
95	2	2	3	2	1	2	2	2	2	2	2	2	1	1	2	3	2
96	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	3	2
97	2	2	3	2	1	1	1	2	2	2	2	2	2	2	2	2	2
98	2	2	3	2	1	1	1	2	2	2	2	2	1	2	2	2	2
99	2	2	2	3	1	1	2	2	2	2	2	2	2	2	2	2	2
100	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2
101	2	2	3	2	1	1	2	2	2	1	2	2	2	2	2	3	2
102	1	2	2	2	1	1	1	2	2	1	2	2	1	2	2	2	1
103	2	2	2	2	1	1	2	2	1	2	2	1	1	2	2	2	2
104	1	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	1
105	2	2	2	2	1	1	2	2	2	2	2	2	1	1	2	2	2
106	2	2	2	2	0	1	2	2	1	2	2	1	1	2	2	2	2
107	2	2	2	2	1	2	1	2	2	2	2	2	1	2	2	2	2
108	2	2	2	2	1	1	2	2	2	2	2	2	1	2	2	2	2
109	2	2	3	2	1	2	1	2	2	2	2	2	1	1	2	2	2
110	2	2	3	2	0	1	1	2	2	2	2	2	1	1	2	3	2
111	2	2	2	2	0	0	1	2	1	2	2	2	1	1	1	2	2
112	2	2	2	2	0	1	1	2	2	1	2	1	2	1	2	2	2
113	2	2	2	2	1	1	2	2	2	2	2	2	1	2	2	3	2
114	2	2	3	2	0	1	1	2	2	2	2	1	2	1	2	2	2
115	2	2	2	2	1	1	1	2	2	2	2	2	1	1	2	2	2
116	2	2	2	2	0	1	1	2	1	2	1	2	1	2	2	2	2
117	2	2	2	2	1	1	1	2	2	2	2	2	1	2	2	3	2
118	2	3	3	2	1	1	1	2	2	2	2	2	1	1	2	2	2
119	2	2	3	1	0	1	1	2	1	2	2	2	1	2	2	2	2
120	2	2	2	2	0	1	2	2	2	2	2	2	1	2	2	1	2
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124	2	2	2	2	1	2	2	2	2	2	2	2	1	2	1	2	2
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126	2	2	3	2	0	1	2	2	2	2	2	2	1	2	1	3	2
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179	3	3	3	3	2	3	3	3	2	3	3	3	2	3	3	3	3
180	3	3	4	3	2	3	3	3	0	3	3	3	3	3	3	3	3

Certificate#4810.01

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2018-09-03	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	FPBL22-30W-50		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC1809001E-A2	120.0	60	0.2474	29.46	0.9923	11.52
	277.0	60	0.1185	29.72	0.9052	9.03
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

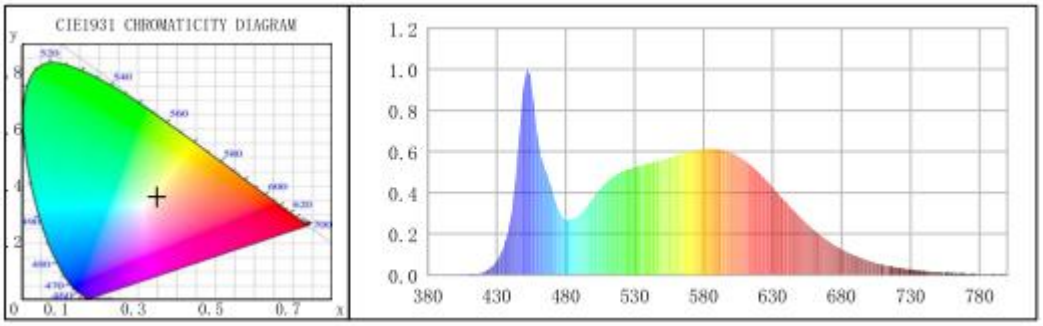
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	4909
Duv	0.00428
Chromaticity (x, y)	x=0.3487 y=0.3631
Chromaticity (u', v')	u(u')=0.2094 v'=0.4907
Color Rendering Index (CRI)	83.1
R9	6

Special Color Rendering Indices			
R1	81	R9	6
R2	90	R10	75
R3	95	R11	80
R4	80	R12	55
R5	81	R13	84
R6	85	R14	98
R7	87	R15	75
R8	66	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3933.5	3941.17	>=2000(-10%)
Luminous Efficacy (lm/W)	133.52	132.61	Premium: >= 125(-3%)
Most worst Luminous/Highest Watts	132.35		

Spectral Power Distribution & Chromaticity Diagram



Calculated Efficacy Data for family models (3000K,3500K,4000K and 4500K):

Model Number	Luminous Flux (lm)	Power (W)	Efficacy (lm/W)
FPBL22-30W-27	3697.30	29.23	126.49
FPBL22-30W-30	3736.67	29.35	127.31
FPBL22-30W-35	3776.03	29.35	128.68
FPBL22-30W-40	3815.40	29.35	130.02
FPBL22-30W-45	3854.77	29.35	131.36
FPBL22-30W-50	3933.50	29.46	133.52

3. Test Equipment

Equipment Name	Model No.	Serial No.	Next Calibration Date
Goniophotometeric System	GPM-3000	DYHXF120001	2019-01-15
AC Power Source	CHP-500C	N/A	2019-01-14
Total Luminous Flux Standard Lamp	24V/150W	DYJYR040040	2019-01-22
Digital Power Meter	WT500	DYDWQ200006	2019-01-14
Integral Sphere (2M)	2M	DYJCE120067	2019-01-15
Digital Power Meter	WT500	DYDWQ200006	2019-01-14
Optical Color and Electrical Measurement System	CMS-3000S	DYJCE120067	2019-01-15
Expand Uncertainty: Photometric Measurement (Sphere): 2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.7%, k=2			

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