

## LM-79-08 Test Report

For

### RAB Lighting Inc.

(Brand Name: RAB Lighting)

Room 6A33, No.1388, Wuzhong road, Shanghai ,China.  
Xiao Xiang, 15921313292, Gary.Xiao@rabweb.com

### Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires

Model name(s): WP1XFU29(01)

Representative (Tested) Model: WP1XFU29(01)

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

Test & Report By:



Engineer: Winny Wu

Date: 2023-12-29

Review By:



Manager: Jason Luo

### 1.1 Product Information:

Organization Name	RAB Lighting Inc.	
Brand Name	RAB Lighting	
Model Number	WP1XFU29(01)	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires	
Rated Voltage / Frequency	120-277Vac, 50/60 Hz	
Nominal Power	29W (wattage adjustable)	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,4000K,5000K(Color tunable)	
LED Manufacturer	Lumileds Holding B.V.	
LED Model	L128-3080RC35003P1 L128-5080RC35003P1	
Sample Number	UTC2312013E-A1	
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	2023-12-13
Date of Test	2023-12-15
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-79-2017 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	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  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , 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. Goniophotometer far field detector  $f1' = 1.42\%$ , Test distance: 14.14m

### 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.

Self-absorption:

### 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 BL-QP-033)

<b>Test date</b>	2023-12-15	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	WP1XFU29(01) @29W 3000K		

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
UTC231201	120.0	60	0.238	28.25	0.989	11.93
3E-A1	277.0	60	0.111	28.41	0.921	11.63
<b>DLC Pass Criteria</b>					$\geq 0.9(-3\%)$	$\leq 20(+5)$

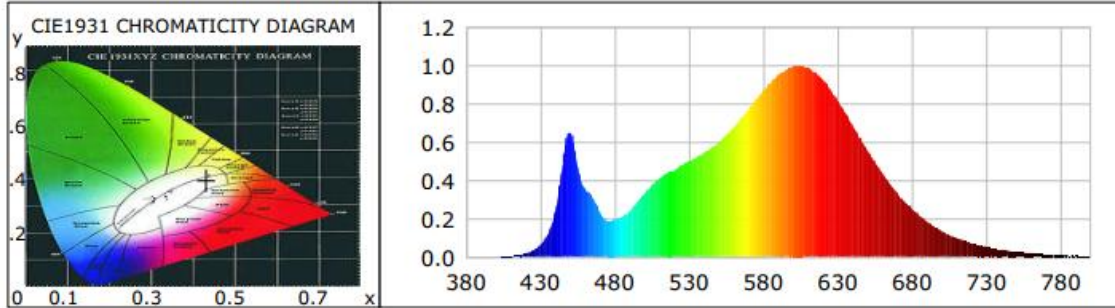
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	3040	R3	96	R11	80
Duv	-0.0016	R4	81	R12	72
Chromaticity (x, y)	x=0.4318 y=0.3984	R5	82	R13	83
Chromaticity (u', v')	u(u')=0.2497 v'=0.5183	R6	90	R14	98
Color Rendering Index (CRI)	82	R7	81	R15	73
R9	5	R8	58	--	--
Rf	84	--	--	--	--
Rg	96	--	--	--	--
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)	3939.8	3972.4	$\geq 300$ (0-90° zone)*** (-10%)
0-90° Total Luminous (lm)	3511.0	3538.0	
Luminous Efficacy (lm/W)	139.46	139.82	Premium: $\geq 120(-3\%)$
0-90° Luminous Efficacy (lm/W)	124.28	124.53	
Most worst Luminous/Highest	138.68		
Zonal lumens in the 80-90°/0-90°zone (%)	7.7	--	$\leq 10(+3)$
Beam Angle (°)	91.0	--	--
Center Beam Candle Power (cd)	3362	--	--

**Spectral Power Distribution & Chromaticity Diagram**



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0001	0.0095	535	0.4793	42.1588	690	0.3319	29.1947
385	0.0008	0.0697	540	0.5018	44.1413	695	0.2879	25.3261
390	0.0005	0.0472	545	0.5210	45.8266	700	0.2491	21.9078
395	0.0006	0.0551	550	0.5453	47.9671	705	0.2148	18.8961
400	0.0006	0.0498	555	0.5703	50.1606	710	0.1845	16.2248
405	0.0020	0.1793	560	0.6005	52.8209	715	0.1571	13.8213
410	0.0035	0.3117	565	0.6385	56.1661	720	0.1361	11.9673
415	0.0085	0.7476	570	0.6796	59.7813	725	0.1138	10.0132
420	0.0178	1.5653	575	0.7253	63.7952	730	0.0981	8.6330
425	0.0338	2.9758	580	0.7743	68.1098	735	0.0827	7.2705
430	0.0629	5.5326	585	0.8241	72.4915	740	0.0707	6.2150
435	0.1175	10.3340	590	0.8712	76.6324	745	0.0601	5.2854
440	0.2352	20.6897	595	0.9144	80.4297	750	0.0505	4.4440
445	0.4906	43.1563	600	0.9539	83.9035	755	0.0427	3.7565
450	0.6541	57.5376	605	0.9808	86.2727	760	0.0374	3.2914
455	0.4751	41.7937	610	0.9984	87.8166	765	0.0326	2.8684
460	0.3540	31.1355	615	0.9996	87.9287	770	0.0266	2.3403
465	0.3133	27.5548	620	0.9874	86.8491	775	0.0235	2.0639
470	0.2323	20.4329	625	0.9634	84.7411	780	0.0187	1.6445
475	0.1889	16.6134	630	0.9231	81.1948	785	0.0157	1.3853
480	0.1927	16.9509	635	0.8740	76.8794	790	0.0135	1.1834
485	0.2087	18.3556	640	0.8155	71.7322	795	0.0133	1.1679
490	0.2393	21.0496	645	0.7544	66.3551	800	0.0091	0.7979
495	0.2854	25.1005	650	0.6875	60.4739			
500	0.3317	29.1806	655	0.6213	54.6464			
505	0.3746	32.9481	660	0.5548	48.8024			
510	0.4095	36.0220	665	0.4927	43.3351			
515	0.4370	38.4384	670	0.4371	38.4489			
520	0.4531	39.8507	675	0.3809	33.5078			
525	0.4793	42.1588	680	0.3319	29.1947			
530	0.5018	44.1413	685	0.2879	25.3261			

**TM30**

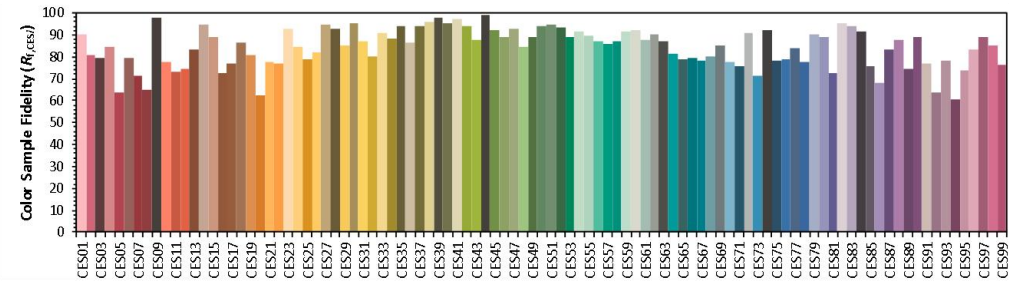
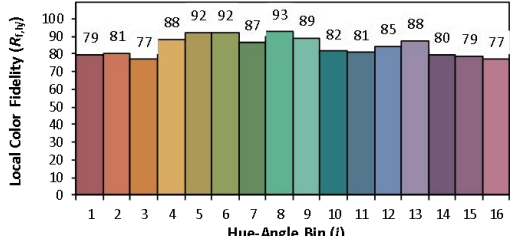
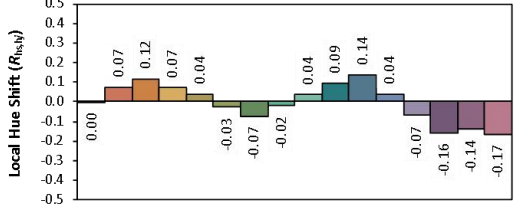
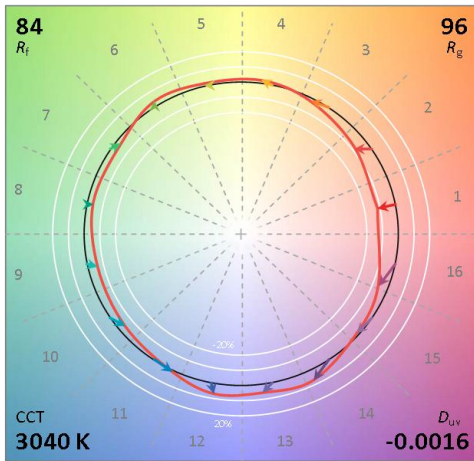
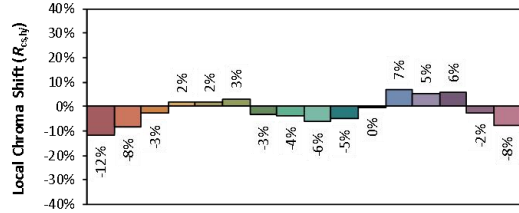
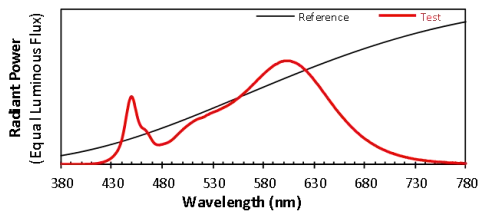
**ANSI/IES TM-30-18 Color Rendition Report**

Source: L128-3080RC35003P1

Date: 2023/12/15

Manufacturer: ASmart LIGHT CO., LTD

Model: AST-SWP11S-29HBSGDA1-abcW30



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

$x$  0.4319  
 $y$  0.3983  
 $u'$  0.2498  
 $v'$  0.5183

CIE 13.3-1995 (CRI)  
 $R_a$  82  
 $R_g$  5

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

<b>Zonal Lumen Tabulation</b>
-------------------------------

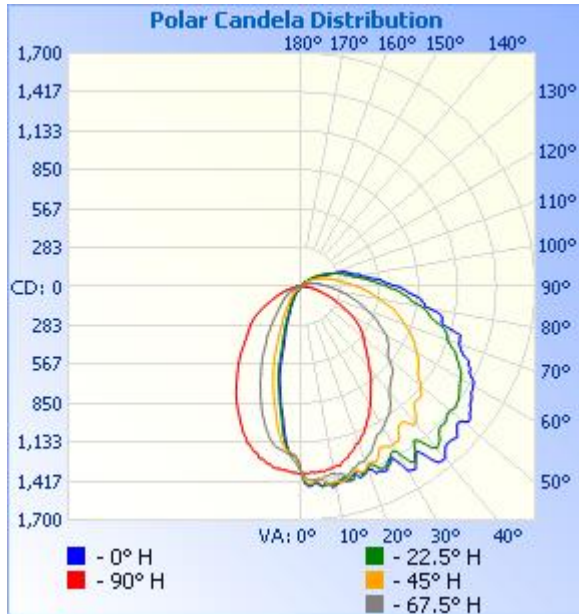
**Zonal Lumen Summary**

Zone	Lumens	% Lamp	% Luminaire
0-30	862.4	21.9%	21.9%
0-40	1,352.0	34.3%	34.3%
0-60	2,390.9	60.7%	60.7%
60-90	1,120.0	28.4%	28.4%
70-100	829.8	21.1%	21.1%
90-120	364.3	9.2%	9.2%
0-90	3,511.0	89.1%	89.1%
90-180	428.6	10.9%	10.9%
0-180	3,939.6	100%	100%

**Lumens Per Zone**

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	123.5	3.1%	90-100	178.7	4.5%
10-20	316.3	8.0%	100-110	115.6	2.9%
20-30	422.6	10.7%	110-120	70.0	1.8%
30-40	489.6	12.4%	120-130	36.7	0.9%
40-50	520.7	13.2%	130-140	16.2	0.4%
50-60	518.2	13.2%	140-150	6.7	0.2%
60-70	468.9	11.9%	150-160	2.9	0.1%
70-80	378.5	9.6%	160-170	1.3	0%
80-90	272.7	6.9%	170-180	0.4	0%

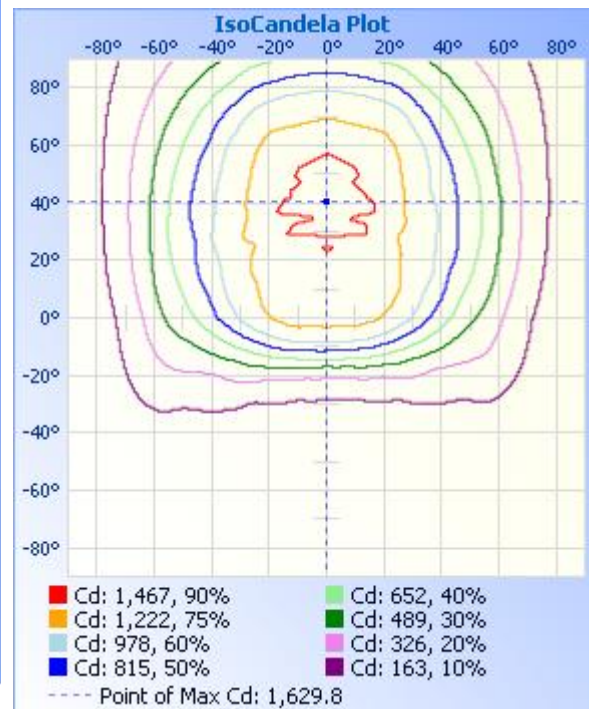
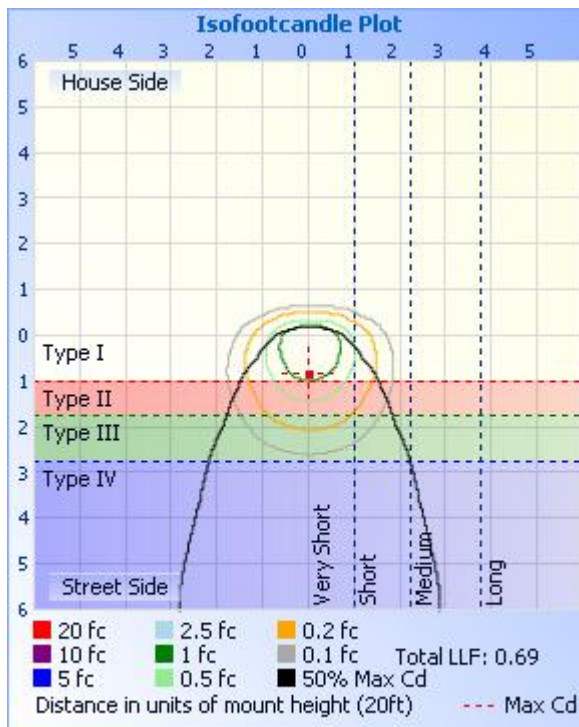
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	4.71 fc	38.3 ft	36.0 ft
34.0ft	1.18 fc	76.6 ft	72.0 ft
51.0ft	0.52 fc	114.9 ft	107.9 ft
68.0ft	0.29 fc	153.1 ft	143.9 ft
85.0ft	0.19 fc	191.4 ft	179.9 ft
102.0ft	0.13 fc	229.7 ft	215.9 ft

■ Vert. Spread: 96.8°  
■ Horiz. Spread: 93.2°



**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	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362
1	1431	1426	1410	1382	1358	1322	1294	1276	1277	1284	1293	1316	1364	1400	1418	1432	1431
2	1455	1445	1432	1407	1362	1296	1260	1239	1240	1240	1246	1281	1354	1416	1444	1458	1455
3	1452	1440	1437	1412	1352	1266	1236	1217	1229	1218	1225	1257	1355	1436	1456	1454	1452
4	1430	1415	1421	1408	1359	1248	1215	1214	1216	1216	1207	1230	1347	1443	1452	1433	1430
5	1446	1440	1394	1417	1356	1239	1210	1188	1179	1189	1197	1218	1341	1445	1438	1451	1446
6	1464	1461	1415	1411	1350	1220	1196	1144	1118	1144	1179	1205	1342	1448	1439	1453	1464
7	1437	1456	1441	1393	1357	1211	1168	1082	1048	1089	1151	1197	1334	1446	1447	1458	1437
8	1457	1444	1462	1391	1344	1202	1129	1012	971	1016	1110	1190	1338	1445	1453	1439	1457
9	1479	1458	1441	1378	1343	1187	1083	953	917	949	1068	1183	1330	1447	1457	1462	1479
10	1463	1463	1439	1384	1338	1178	1038	905	871	897	1019	1169	1315	1433	1428	1481	1463
11	1451	1436	1451	1394	1326	1160	986	858	805	844	964	1145	1313	1440	1439	1461	1451
12	1446	1428	1456	1391	1335	1145	934	802	754	786	914	1124	1296	1442	1469	1459	1446
13	1452	1429	1445	1409	1312	1121	894	752	712	744	879	1094	1287	1409	1469	1464	1452
14	1458	1448	1433	1413	1300	1102	851	710	661	702	836	1068	1284	1399	1453	1461	1458
15	1419	1460	1413	1390	1291	1069	812	663	587	656	792	1036	1253	1403	1443	1445	1419
16	1417	1411	1386	1372	1268	1042	774	603	513	595	749	1000	1253	1370	1444	1415	1417
17	1453	1404	1404	1371	1256	1009	730	537	442	522	709	976	1235	1348	1436	1408	1453
18	1451	1436	1419	1349	1239	971	689	476	401	460	668	939	1213	1349	1412	1433	1451
19	1427	1438	1419	1352	1214	943	653	422	368	415	629	899	1208	1335	1394	1457	1427
20	1416	1413	1392	1351	1211	909	611	386	342	381	587	869	1178	1334	1372	1438	1416
21	1428	1386	1374	1327	1191	874	571	355	313	351	549	830	1159	1330	1348	1419	1428
22	1464	1400	1378	1318	1171	852	532	328	279	321	500	800	1143	1318	1347	1432	1464
23	1457	1436	1389	1301	1159	817	490	300	245	293	458	772	1110	1317	1361	1428	1457
24	1472	1452	1367	1274	1132	785	445	273	219	266	419	737	1091	1301	1381	1440	1472
25	1475	1443	1331	1256	1116	758	410	245	201	240	386	701	1065	1281	1360	1438	1475
26	1429	1452	1300	1231	1090	723	375	222	187	216	355	673	1038	1254	1324	1451	1429
27	1407	1436	1312	1211	1067	686	350	203	175	199	329	645	1022	1239	1325	1456	1407
28	1418	1382	1314	1207	1052	662	328	189	162	184	304	614	994	1218	1319	1418	1418
29	1467	1368	1334	1200	1018	631	306	175	148	171	283	589	975	1203	1291	1392	1467

30	1547	1387	1330	1185	1001	606	284	162	136	160	265	556	949	1180	1282	1421	1547
31	1560	1454	1326	1174	975	582	263	151	124	149	250	520	925	1156	1276	1457	1560
32	1565	1510	1328	1156	949	559	246	141	114	137	233	493	900	1131	1278	1501	1565
33	1526	1512	1306	1138	927	528	234	130	104	127	211	470	872	1105	1286	1497	1526
34	1471	1495	1257	1133	902	496	221	121	96	117	195	449	851	1080	1283	1491	1471
35	1463	1439	1238	1120	878	472	200	112	88	109	182	433	820	1058	1246	1485	1463
36	1508	1389	1230	1094	861	454	183	104	81	100	170	403	800	1048	1206	1427	1508
37	1580	1401	1229	1079	840	434	170	96	75	92	159	379	775	1041	1194	1410	1580
38	1624	1449	1265	1049	819	416	160	89	69	86	150	361	752	1037	1202	1451	1624
39	1628	1509	1298	1016	787	393	152	82	63	79	142	341	734	1024	1209	1484	1628
40	1630	1534	1294	998	768	373	143	75	59	73	135	318	707	998	1205	1510	1630
41	1592	1520	1269	978	742	354	136	69	54	67	128	298	687	974	1203	1500	1592
42	1567	1505	1244	964	724	337	128	64	50	61	121	282	666	945	1197	1496	1567
43	1559	1468	1202	950	707	317	122	59	46	56	114	266	641	924	1187	1485	1559
44	1560	1443	1180	939	686	299	116	54	42	52	107	252	616	905	1166	1457	1560
45	1567	1436	1176	926	668	284	108	49	39	48	100	238	593	884	1140	1433	1567
46	1575	1441	1179	920	650	269	101	46	35	44	93	228	576	875	1131	1429	1575
47	1549	1436	1180	910	634	254	95	41	33	40	87	217	554	858	1129	1425	1549
48	1521	1424	1174	890	614	242	89	38	30	37	81	207	535	851	1120	1413	1521
49	1510	1410	1151	862	602	232	83	34	27	33	76	198	521	837	1104	1407	1510
50	1524	1408	1135	836	591	221	77	30	23	30	70	189	507	817	1087	1403	1524
51	1565	1420	1112	813	580	211	72	27	21	26	65	181	492	802	1068	1413	1565
52	1558	1425	1082	796	567	202	67	24	18	23	61	174	478	785	1044	1424	1558
53	1534	1414	1060	788	550	193	62	21	15	20	56	168	466	771	1023	1414	1534
54	1525	1410	1046	779	536	186	58	18	12	17	52	161	454	757	1002	1403	1525
55	1497	1401	1039	773	520	178	53	15	9	15	48	155	439	736	981	1395	1497
56	1490	1384	1026	766	502	171	49	12	6	11	44	149	424	725	967	1384	1490
57	1478	1373	1016	752	483	164	46	10	4	9	40	143	405	714	960	1370	1478
58	1455	1357	1003	737	464	157	42	6	2	6	36	137	387	701	946	1358	1455
59	1454	1346	987	726	445	151	38	3	2	4	34	131	368	685	931	1358	1454
60	1442	1339	967	713	424	145	34	2	2	3	30	124	345	666	919	1342	1442
61	1436	1329	953	695	402	138	32	2	2	3	27	118	324	646	911	1327	1436

62	1400	1315	937	671	377	131	28	2	2	3	24	112	304	629	897	1315	1400
63	1371	1289	926	648	353	124	26	2	2	2	22	106	283	613	881	1290	1371
64	1369	1274	911	628	330	117	23	2	2	3	19	98	265	596	867	1267	1369
65	1338	1249	894	614	309	111	21	2	2	3	17	92	249	582	855	1245	1338
66	1335	1231	879	597	290	103	18	2	2	3	15	86	234	563	833	1223	1335
67	1283	1217	859	574	271	97	17	2	2	3	14	81	220	543	809	1213	1283
68	1256	1179	838	554	253	90	16	2	3	2	14	75	207	523	791	1181	1256
69	1238	1153	820	532	237	84	15	1	2	2	13	70	192	497	776	1148	1238
70	1221	1130	797	513	220	77	14	2	2	2	12	66	179	471	757	1122	1221
71	1219	1123	780	492	204	72	14	2	2	3	12	62	166	453	735	1118	1219
72	1212	1110	767	474	187	67	13	2	2	2	11	56	154	433	714	1108	1212
73	1212	1095	746	458	172	62	13	2	3	2	10	52	144	417	697	1093	1212
74	1135	1070	724	441	159	57	12	2	2	3	10	49	133	402	680	1059	1135
75	1064	1024	707	420	146	53	11	2	2	3	10	45	123	384	662	1021	1064
76	1051	986	694	403	135	49	11	2	2	3	9	43	113	365	647	980	1051
77	1050	958	671	387	124	45	10	2	3	3	9	40	104	350	626	954	1050
78	1044	947	641	367	114	43	10	1	2	2	9	38	95	334	602	933	1044
79	1022	926	618	351	105	40	9	2	3	3	8	36	87	317	581	918	1022
80	967	901	597	336	95	38	8	2	3	3	8	35	79	302	558	889	967
81	907	873	578	318	86	36	8	2	3	3	8	32	71	287	540	865	907
82	905	828	559	303	78	34	8	2	3	2	8	31	64	271	522	831	905
83	883	800	535	288	70	33	8	2	3	4	7	30	58	258	501	793	883
84	876	787	517	272	63	32	8	2	3	3	7	28	53	244	478	781	876
85	848	763	502	261	57	30	8	2	3	3	7	27	48	233	467	755	848
86	805	733	481	248	51	29	7	2	3	3	6	26	44	221	446	722	805
87	774	718	458	233	46	27	7	2	3	3	6	24	40	210	425	708	774
88	758	692	442	222	41	26	7	3	3	3	6	24	38	198	409	683	758
89	732	651	427	210	38	25	6	2	3	3	6	23	36	188	393	642	732
90	710	626	407	199	35	24	6	3	3	3	6	22	35	178	374	620	710
91	661	614	392	189	33	23	6	3	3	2	5	21	33	169	358	602	661
92	636	574	372	179	32	22	6	3	3	4	5	21	32	160	343	571	636
93	608	550	353	171	30	21	5	2	3	3	5	20	31	151	326	543	608

94	591	528	337	163	30	21	5	2	3	3	5	20	30	143	308	517	591
95	576	504	324	155	29	20	5	3	4	4	4	19	30	136	296	494	576
96	542	487	310	147	28	19	5	2	3	3	5	18	29	130	284	473	542
97	506	469	297	140	28	18	5	2	3	3	5	18	28	124	273	460	506
98	494	442	284	133	27	18	5	3	4	3	5	17	27	117	260	433	494
99	467	426	273	127	27	18	4	3	4	3	5	16	27	111	249	416	467
100	437	405	265	121	26	17	5	3	3	3	4	15	27	106	240	399	437
101	436	381	254	115	26	16	5	3	4	4	4	15	26	101	234	373	436
102	431	380	243	110	26	16	4	3	4	3	4	14	25	96	224	369	431
103	403	371	233	105	25	16	4	3	4	4	4	14	25	92	214	367	403
104	380	350	224	100	24	15	4	3	3	4	4	13	25	87	205	349	380
105	373	334	215	95	24	15	4	3	4	4	4	13	25	83	196	328	373
106	368	326	210	91	24	14	4	3	3	4	4	13	25	79	190	321	368
107	351	316	202	86	23	14	4	3	4	3	4	12	24	74	185	312	351
108	341	304	192	82	23	13	4	3	4	4	4	11	24	71	177	300	341
109	332	292	185	78	22	13	4	3	4	4	4	11	24	68	168	289	332
110	321	284	178	74	21	12	3	3	4	3	4	11	23	64	162	279	321
111	294	273	171	70	21	11	3	3	4	4	3	10	22	61	156	268	294
112	266	261	163	66	21	11	3	3	3	3	2	10	22	58	149	256	266
113	241	249	157	63	20	10	4	3	3	4	4	10	21	54	143	245	241
114	224	239	149	60	19	10	3	2	3	4	4	9	20	52	136	235	224
115	209	229	143	57	18	9	3	3	4	4	4	9	19	49	129	225	209
116	194	220	135	53	18	9	3	3	4	3	3	9	18	46	123	215	194
117	181	208	128	50	17	8	3	3	4	4	4	8	18	44	116	205	181
118	173	198	121	47	16	8	3	3	4	4	3	8	16	41	110	194	173
119	165	188	115	44	15	7	3	3	3	3	4	8	16	38	104	183	165
120	157	178	109	42	15	6	3	3	4	4	3	8	15	37	99	175	157
121	149	170	104	40	14	7	3	3	3	4	3	7	14	34	93	165	149
122	141	160	98	37	13	6	3	3	3	3	4	7	13	33	88	157	141
123	133	151	92	35	13	6	3	3	4	4	3	7	12	31	83	148	133
124	126	142	86	33	12	6	3	4	3	4	3	6	12	28	77	139	126
125	119	133	81	31	11	5	3	3	4	4	3	6	11	27	73	131	119

126	112	125	76	29	10	6	3	3	3	3	3	7	11	25	68	123	112
127	105	117	71	27	9	5	3	3	4	3	3	6	10	24	63	115	105
128	98	110	66	26	9	4	3	3	4	4	3	6	9	22	60	107	98
129	91	101	62	24	8	5	3	3	4	4	4	5	9	20	55	99	91
130	84	94	58	22	8	4	2	3	3	4	4	6	9	19	52	92	84
131	76	87	54	21	7	4	3	2	4	4	4	5	8	17	48	85	76
132	71	81	50	19	7	4	3	3	4	4	3	4	8	16	45	78	71
133	65	75	46	18	7	4	3	3	4	4	4	5	7	16	43	72	65
134	60	69	43	17	6	4	2	3	4	5	3	6	7	14	40	65	60
135	54	64	40	16	6	4	3	4	5	4	3	4	7	13	37	60	54
136	50	59	38	15	5	3	3	4	3	4	4	5	6	13	34	55	50
137	46	54	35	14	5	4	3	3	4	5	4	5	6	11	33	50	46
138	43	50	33	13	5	3	3	4	4	4	4	5	6	11	31	46	43
139	39	45	31	12	4	3	3	4	4	4	4	5	6	10	29	42	39
140	36	42	29	12	5	3	4	3	4	4	4	4	4	10	26	38	36
141	33	39	26	11	4	3	4	3	4	5	4	5	5	9	25	35	33
142	31	35	24	10	3	3	3	4	5	4	4	5	4	9	23	32	31
143	29	32	23	10	4	2	4	3	4	4	4	4	5	8	22	29	29
144	27	30	21	9	3	2	4	4	4	5	5	3	4	4	8	20	27
145	24	28	19	8	3	3	3	5	4	5	5	4	4	7	19	24	24
146	23	25	18	8	3	2	4	4	5	5	4	4	4	7	17	22	23
147	22	23	17	7	3	3	4	4	5	5	4	5	4	7	16	20	22
148	20	21	15	7	3	3	4	5	5	4	5	4	4	7	16	18	20
149	19	19	14	5	3	3	3	4	5	5	5	4	3	6	15	17	19
150	17	18	13	6	2	3	4	5	5	5	5	5	4	6	13	16	17
151	16	16	12	6	2	3	4	5	5	5	5	5	3	5	13	15	16
152	14	16	11	5	3	3	4	4	5	5	5	5	3	5	12	14	14
153	14	14	10	5	2	3	5	4	5	5	5	4	3	5	11	13	14
154	13	13	9	5	2	3	4	5	5	5	5	4	3	4	10	12	13
155	12	12	8	5	2	3	4	5	5	5	6	5	3	3	9	11	12
156	11	11	8	5	2	3	3	4	5	6	5	4	3	4	9	10	11
157	10	10	7	5	2	3	4	4	5	6	4	5	3	4	8	10	10

158	10	9	7	4	2	3	5	4	4	5	5	5	3	4	8	9	10
159	9	8	7	4	2	3	5	4	5	5	4	5	3	4	7	8	9
160	9	8	6	4	3	4	4	5	5	6	5	6	3	4	6	8	9
161	8	7	6	4	3	3	4	5	5	5	5	5	3	4	6	7	8
162	8	7	6	5	2	4	5	5	5	6	5	5	2	3	6	6	8
163	6	6	5	4	2	3	5	5	4	3	5	5	3	3	6	6	6
164	6	6	4	4	3	4	5	5	4	5	5	5	2	3	5	6	6
165	6	6	5	5	3	3	5	6	6	6	5	5	3	3	5	5	6
166	6	5	4	4	3	4	5	5	5	5	5	6	3	3	5	6	6
167	5	4	5	5	3	4	5	5	5	6	5	5	4	3	5	5	5
168	4	4	4	5	3	3	5	5	6	5	6	6	4	3	4	5	4
169	5	4	5	4	3	3	5	5	5	6	6	6	3	2	4	5	5
170	4	5	5	4	3	4	5	5	5	4	6	5	3	4	4	4	4
171	5	4	5	5	3	4	5	5	5	5	5	6	4	4	4	4	5
172	4	4	5	5	3	4	4	5	3	5	4	5	3	4	4	4	4
173	3	4	5	5	3	4	4	4	6	5	5	5	3	4	4	4	3
174	4	4	5	5	3	3	4	4	5	5	5	5	3	4	4	4	4
175	4	4	5	5	3	4	4	4	5	4	5	5	3	4	4	4	4
176	4	5	5	5	3	4	4	4	5	4	5	5	3	3	4	4	4
177	5	5	5	4	3	3	5	5	5	4	5	5	4	5	5	4	5
178	4	5	5	5	3	4	4	5	5	4	5	5	4	4	3	4	4
179	5	5	5	4	3	4	2	5	5	5	4	5	4	4	5	4	5
180	5	4	5	5	3	4	4	5	4	5	4	5	4	4	5	5	5

**BUG**

**Lum. Classification System (LCS)**

<b>LCS Zone</b>	<b>Lumens</b>	<b>%Lamp</b>	<b>%Lum</b>
FL (0-30)	572.3	14.5	14.5
FM (30-60)	1306.5	33.2	33.2
FH (60-80)	796.6	20.2	20.2
FVH (80-90)	263.4	6.7	6.7
BL (0-30)	290.2	7.4	7.4
BM (30-60)	222.3	5.6	5.6
BH (60-80)	50.7	1.3	1.3
BVH (80-90)	9.2	0.2	0.2
UL (90-100)	178.7	4.5	4.5
UH (100-180)	249.9	6.3	6.3
<b>Total</b>	<b>3939.8</b>	<b>99.9</b>	<b>100.0</b>
<b>BUG Rating</b>	<b>B1-U3-G3</b>		

## 2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

<b>Test date</b>	2023-12-15	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	WP1XFU29(01) @29W 4000K		

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
UTC231106	120.0	60	0.230	27.32	0.989	11.91
2E-A1	277.0	60	0.107	27.25	0.922	11.58
<b>DLC Pass Criteria</b>					<b>&gt;= 0.9(-3%)</b>	<b>&lt;= 20(+5)</b>

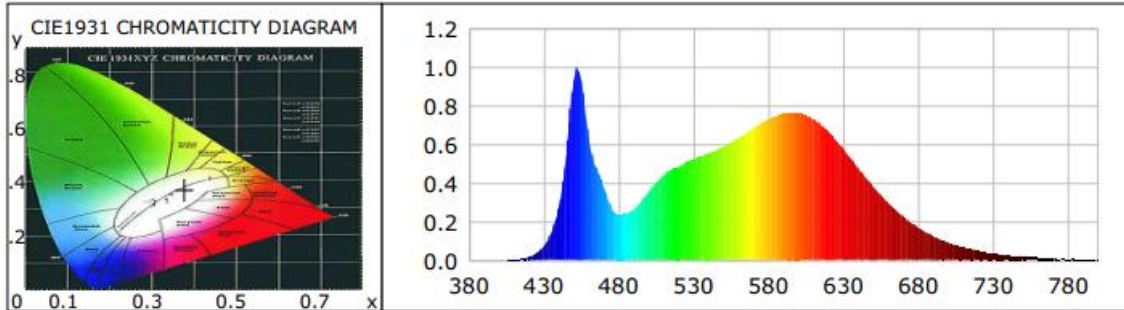
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	12
Frequency (Hz)	60	R2	92	R10	79
CCT (K)	4028	R3	95	R11	81
Duv	-0.0025	R4	82	R12	62
Chromaticity (x, y)	x=0.3775 y=0.3696	R5	83	R13	86
Chromaticity (u', v')	u(u')=0.2260 v'(v')=0.4980	R6	88	R14	98
Color Rendering Index (CRI)	84	R7	84	R15	78
R9	12	R8	65	--	--
Rf	84	--	--	--	--
Rg	95	--	--	--	--
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)	4146.1	4146.4	5000-10000(-10%)
Luminous Efficacy (lm/W)	151.76	152.16	Premium: >= 120(-3%)
Most worst Luminous/Highest	151.76		

**Spectral Power Distribution & Chromaticity Diagram**



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0002	0.0200	535	0.5095	52.9750	690	0.2240	23.2968
385	0.0007	0.0700	540	0.5250	54.5925	695	0.1943	20.2002
390	0.0003	0.0349	545	0.5389	56.0377	700	0.1678	17.4519
395	0.0006	0.0645	550	0.5553	57.7455	705	0.1451	15.0845
400	0.0007	0.0767	555	0.5704	59.3114	710	0.1243	12.9253
405	0.0014	0.1441	560	0.5902	61.3744	715	0.1067	11.0944
410	0.0029	0.3021	565	0.6115	63.5858	720	0.0904	9.3995
415	0.0075	0.7786	570	0.6360	66.1305	725	0.0779	8.0983
420	0.0170	1.7720	575	0.6616	68.7903	730	0.0653	6.7908
425	0.0365	3.7940	580	0.6870	71.4368	735	0.0557	5.7967
430	0.0729	7.5844	585	0.7122	74.0552	740	0.0471	4.8984
435	0.1437	14.9467	590	0.7326	76.1782	745	0.0405	4.2108
440	0.2739	28.4840	595	0.7499	77.9795	750	0.0340	3.5386
445	0.5568	57.8952	600	0.7617	79.2079	755	0.0274	2.8461
450	0.9347	97.1921	605	0.7672	79.7803	760	0.0250	2.6011
455	0.9296	96.6607	610	0.7654	79.5911	765	0.0221	2.2934
460	0.6292	65.4288	615	0.7534	78.3444	770	0.0173	1.7999
465	0.4807	49.9807	620	0.7319	76.1082	775	0.0157	1.6323
470	0.3762	39.1217	625	0.7033	73.1352	780	0.0134	1.3911
475	0.2732	28.4109	630	0.6643	69.0777	785	0.0105	1.0962
480	0.2357	24.5097	635	0.6214	64.6163	790	0.0100	1.0394
485	0.2425	25.2176	640	0.5744	59.7298	795	0.0076	0.7882
490	0.2638	27.4316	645	0.5268	54.7794	800	0.0051	0.5302
495	0.3054	31.7609	650	0.4766	49.5595			
500	0.3564	37.0603	655	0.4277	44.4737			
505	0.4025	41.8485	660	0.3793	39.4448			
510	0.4422	45.9783	665	0.3364	34.9795			
515	0.4713	49.0115	670	0.2952	30.6999			
520	0.4848	50.4060	675	0.2588	26.9131			
525	0.5095	52.9750	680	0.2240	23.2968			
530	0.5250	54.5925	685	0.1943	20.2002			

**TM30**

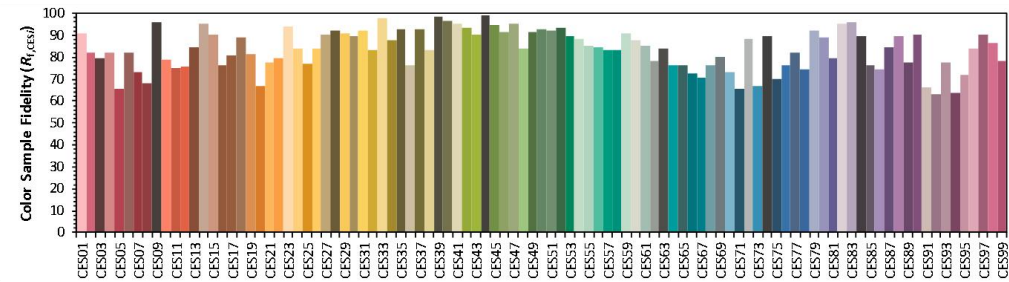
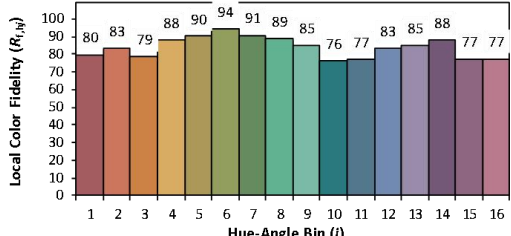
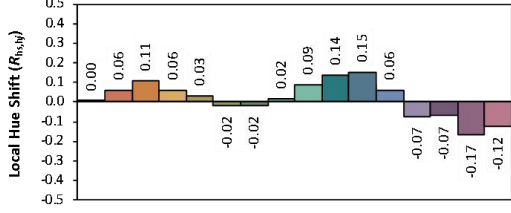
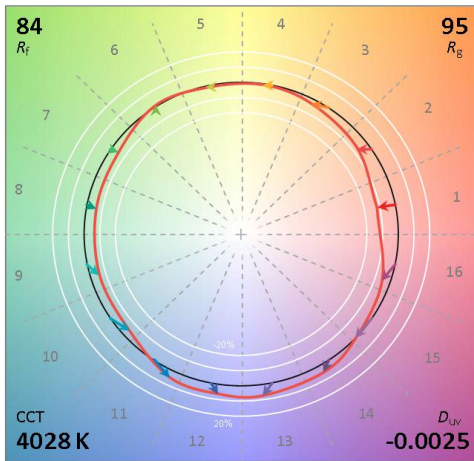
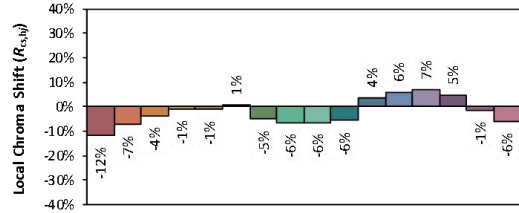
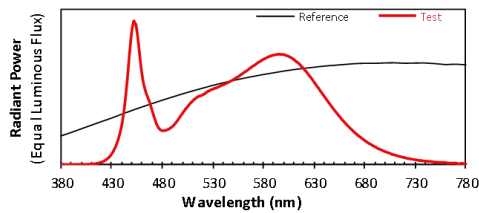
ANSI/IES TM-30-18 Color Rendition Report

Source: L128-3080RC35003P1  
L128-5080RC35003P1

Date: 2023/12/15

Manufacturer: ASmart LIGHT CO., LTD

Model: AST-SWP11S-29HBSGDA1-abcW40



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

$x$  0.3775  
 $y$  0.3696  
 $u'$  0.2260  
 $v'$  0.4980

CIE 13.3-1995 (CRI)  
 $R_a$  84  
 $R_g$  12

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

### 2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

<b>Test date</b>	2023-12-05	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	WP1XFU29(01) @29W 5000K		

#### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
UTC231106	120.0	60	0.241	28.53	0.988	12.03
2E-A1	277.0	60	0.112	28.71	0.922	11.54
<b>DLC Pass Criteria</b>					$\geq 0.9(-3\%)$	$\leq 20(+5)$

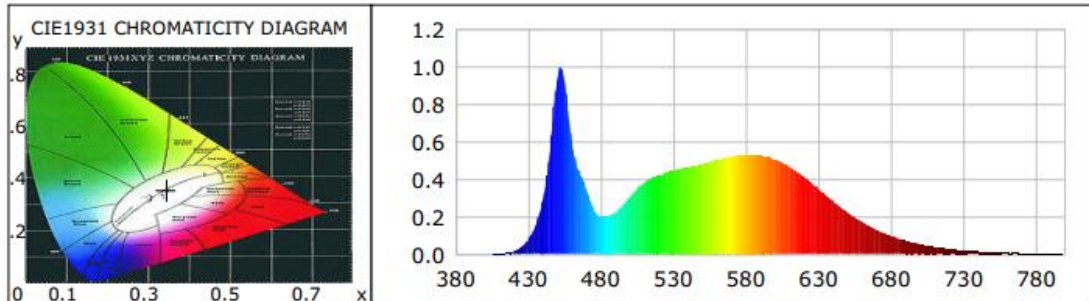
#### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	1
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	5125	R3	93	R11	80
Duv	0.0014	R4	81	R12	58
Chromaticity (x, y)	x=0.3419 y=0.3518	R5	81	R13	83
Chromaticity (u', v')	u(u')=0.2092 v'(v')=0.4843	R6	83	R14	96
Color Rendering Index (CRI)	82	R7	85	R15	75
R9	1	R8	65	--	--
Rf	82	--	--	--	--
Rg	95	--	--	--	--
Rcs,h1(%)	-14	--	--	--	--

#### 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)	4275.5	4319.4	5000-10000(-10%)
Luminous Efficacy (lm/W)	149.86	150.45	Premium: $\geq 120(-3\%)$
Most worst Luminous/Highest	148.92		

**Spectral Power Distribution & Chromaticity Diagram**



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0005	0.0631	535	0.4361	60.9605	690	0.1297	18.1308
385	0.0004	0.0614	540	0.4481	62.6432	695	0.1123	15.6915
390	0.0004	0.0557	545	0.4551	63.6153	700	0.0970	13.5549
395	0.0005	0.0654	550	0.4658	65.1081	705	0.0825	11.5301
400	0.0010	0.1351	555	0.4712	65.8615	710	0.0718	10.0343
405	0.0013	0.1827	560	0.4811	67.2496	715	0.0611	8.5430
410	0.0028	0.3876	565	0.4922	68.7959	720	0.0515	7.1945
415	0.0070	0.9738	570	0.5033	70.3553	725	0.0444	6.2065
420	0.0162	2.2706	575	0.5128	71.6771	730	0.0374	5.2304
425	0.0364	5.0838	580	0.5224	73.0263	735	0.0319	4.4616
430	0.0757	10.5756	585	0.5284	73.8601	740	0.0271	3.7878
435	0.1522	21.2705	590	0.5299	74.0647	745	0.0235	3.2836
440	0.2859	39.9593	595	0.5299	74.0720	750	0.0201	2.8033
445	0.5607	78.3721	600	0.5259	73.5045	755	0.0164	2.2940
450	0.9343	130.6008	605	0.5180	72.4071	760	0.0146	2.0423
455	0.9235	129.0870	610	0.5056	70.6739	765	0.0137	1.9214
460	0.5991	83.7375	615	0.4883	68.2549	770	0.0113	1.5731
465	0.4433	61.9598	620	0.4665	65.2027	775	0.0099	1.3852
470	0.3464	48.4144	625	0.4411	61.6556	780	0.0080	1.1222
475	0.2423	33.8670	630	0.4115	57.5173	785	0.0057	0.7990
480	0.2018	28.2031	635	0.3803	53.1642	790	0.0055	0.7718
485	0.2060	28.7903	640	0.3487	48.7353	795	0.0038	0.5358
490	0.2236	31.2552	645	0.3158	44.1464	800	0.0032	0.4451
495	0.2592	36.2317	650	0.2833	39.6056			
500	0.3055	42.7011	655	0.2525	35.2966			
505	0.3485	48.7122	660	0.2224	31.0943			
510	0.3821	53.4060	665	0.1960	27.4000			
515	0.4069	56.8840	670	0.1717	24.0007			
520	0.4177	58.3835	675	0.1492	20.8492			
525	0.4361	60.9605	680	0.1297	18.1308			
530	0.4481	62.6432	685	0.1123	15.6915			

**TM30**

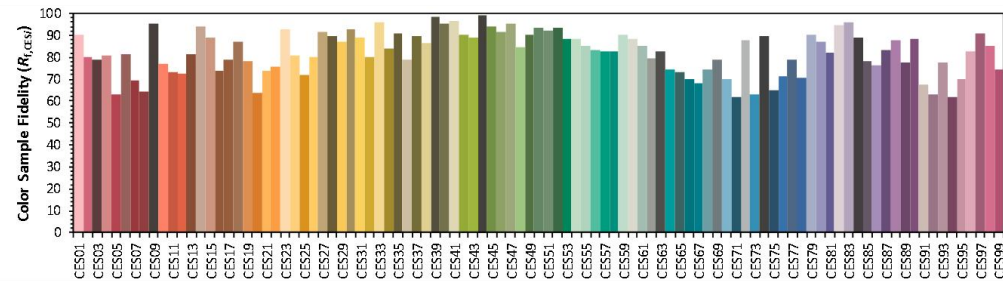
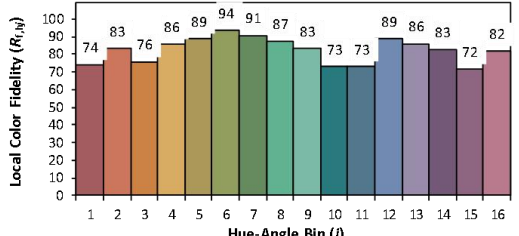
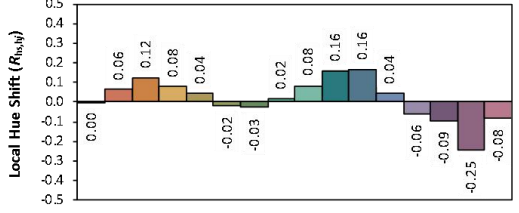
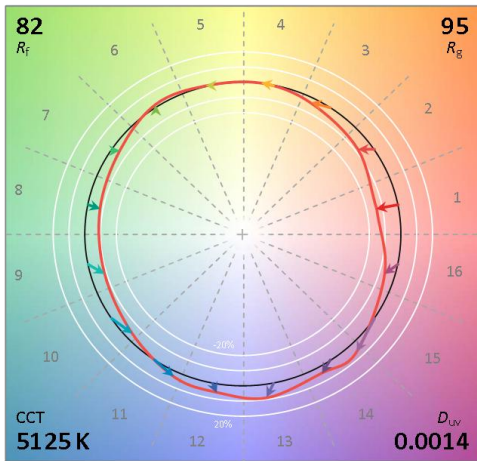
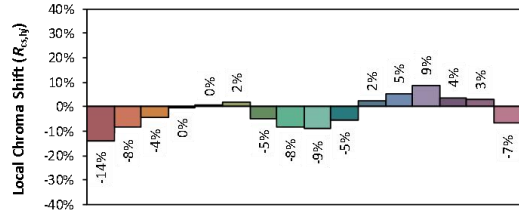
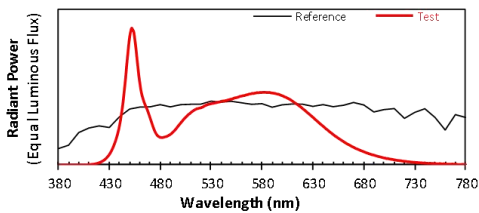
**ANSI/IES TM-30-18 Color Rendition Report**

Source: L128-5080RC35003P1

Manufacturer: ASmart LIGHT CO., LTD

Date: 2023/12/15

Model: AST-SWP11S-29HBSGDA1-abcW50



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

$x$  0.3419  
 $y$  0.3518  
 $u'$  0.2092  
 $v'$  0.4843

CIE 13.3-1995  
(CRI)  
 $R_a$  82  
 $R_g$  1

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

### 3. Test Equipment

Equipment Name	Model No.	Serial No.	Calibration Date
Goniophotometric System	GPM-3000	DYHXF120001	2023-01-17
AC Power Source	CHP-500C	DYBWD010159	2023-01-18
Total Luminous Flux Standard Lamp	24V/150W	DYJYR040040	2023-02-01
Digital Power Meter	WT500	DYDWQ20010	2023-01-18
Integral Sphere (2M)	2M	DYJCE120067	2023-01-17
Digital Power Meter	WT500	DYDWQ200006	2023-01-18
Optical Color and Electrical Measurement System	CMS-3000S	DYJCE120067	2023-01-17
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 \*\*\*\*\*