

## LM-79-08 Test Report

For

# Revolution Lighting Technologies, Inc.

(Brand Name: Revolution Lighting Technologies)

2280 Ward Ave. Simi Valley, CA. 93065

## Outdoor Full-Cutoff Wall-Mounted Area Luminaires

Model name(s): 281201-S4X

Remark: S = Sensor Option (Can be any number);

X = CCT (3 = 4000K, 4 = 4500K, 5 = 5000K, 6 = 5700K).

This is multiple listed report, the Project Number of the original report is  
GZE1712011-A

Representative (Tested) Model: 281201-S43  
281201-S46

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

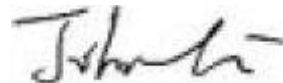
Test &amp; Report By:



Engineer: Garman Mo

Date: Dec.12,2018

Review By:



Manager: John-Li

Note: 1.The results contained in this report pertain only to the tested samples.

2.This report does not imply product certification, approval, or endorsement by 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

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<http://www.standard-tech.com>

**1.1 Product Information:**

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	281201-S4X	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Outdoor Full-Cutoff Wall-Mounted Area Luminaires	
Rated Voltage / Frequency	100-277Vac, 50/60Hz	
Nominal Power	40W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,4500K,5000K,5700K	
LED Manufacturer	Seoul Semiconductor Co., LTD	
LED Model	SAWxC22B-xx	
Sample Number	GZE1712011-A1(4000K), 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	Dec.05,2017
Date of Test	Dec.12,2017
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**

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b></p> <p>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.</p>
<p><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b></p> <p>Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °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.</p>
<p><b>3) Electrical Measurements:</b></p> <p>Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25 °C ± 1 °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.</p>

**2.1 Electrical, Photometric and Chromaticity Measurements**

(Refer to Work Instruction QD25)

<b>Test date</b>	2017-12-12	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	281201-S43		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171201	120.0	60	0.3395	40.41	0.9918	9.73
1-A1	277.0	60	0.1535	40.19	0.9455	10.16
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

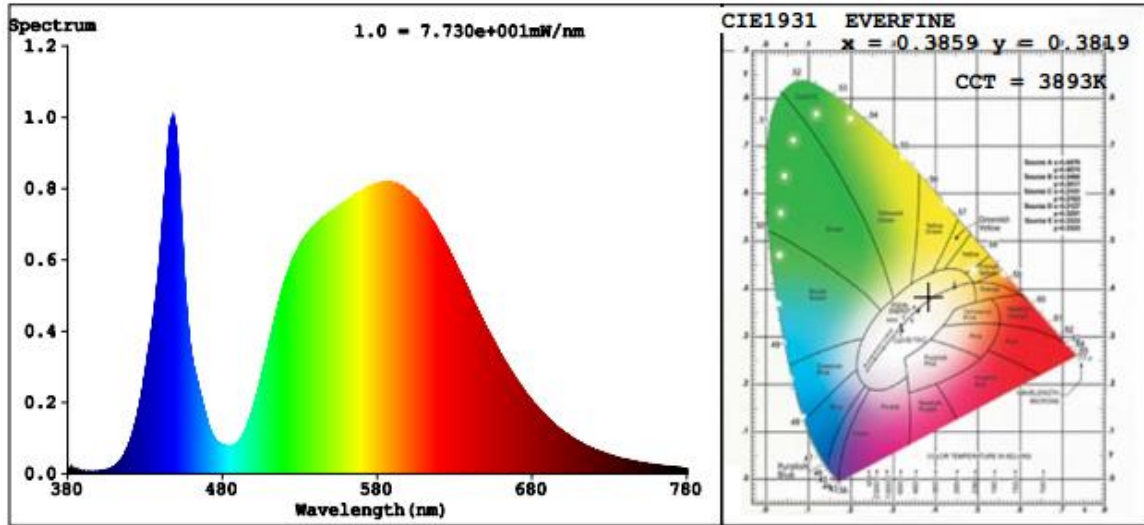
**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	72	R9	0
Frequency (Hz)	60	R2	78	R10	46
CCT (K)	3893	R3	81	R11	70
Duv	0.0008	R4	74	R12	40
Chromaticity (x, y)	x=0.3859 y=0.3819	R5	70	R13	72
Chromaticity (u', v')	u'=0.2266 v'=0.5046	R6	68	R14	89
Color Rendering Index (CRI)	73.1	R7	82	R15	67
R9	0	R8	59	--	--

**Photometric Measurement – Goniophotometer Method:**

Parameter	Result		DLC V4.2 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4861.2	4808.2	300-5000(-10%)	
Luminous Efficacy (lm/W)	120.30	119.64	Standard: >= 90(-3%)	Premium: >= 110(-3%)
Most Worst Luminous/Highest Watts	118.99			
Zonal lumens in the 0-90 °zone (%)	99.7	--	>= 100(-3)	
Zonal lumens in the 80-90 °zone (%)	3.7	--	<=10(+3)	
Beam Angle (°)	122.3	--	--	
Center Beam Candle Power (cd)	1421	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

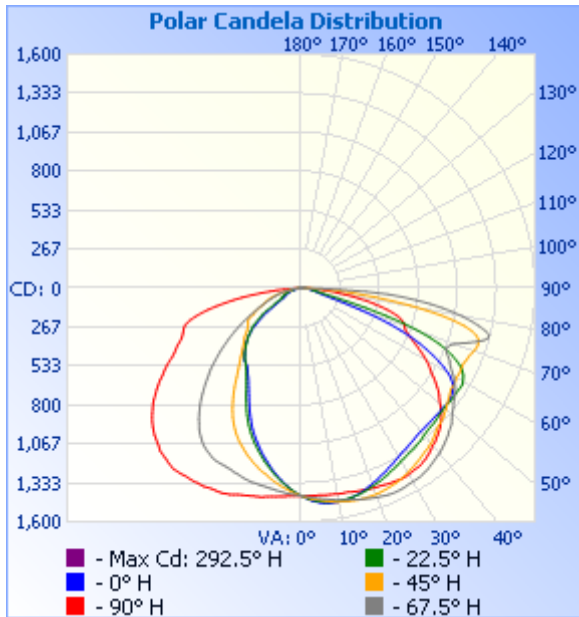


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,114.0	22.9%
0-40	1,846.4	38%
0-60	3,448.9	71%
60-90	1,395.1	28.7%
70-100	695.5	14.3%
90-120	6.6	0.1%
0-90	4,844.0	99.7%
90-180	16.4	0.3%
0-180	4,860.4	100%

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	134.5	2.8%	90-100	2.4	0%
10-20	386.8	8.0%	100-110	2.0	0%
20-30	592.7	12.2%	110-120	2.2	0%
30-40	732.4	15.1%	120-130	2.3	0%
40-50	804.4	16.5%	130-140	2.2	0%
50-60	798.1	16.4%	140-150	2.1	0%
60-70	701.9	14.4%	150-160	1.7	0%
70-80	513.4	10.6%	160-170	1.1	0%
80-90	179.8	3.7%	170-180	0.5	0%

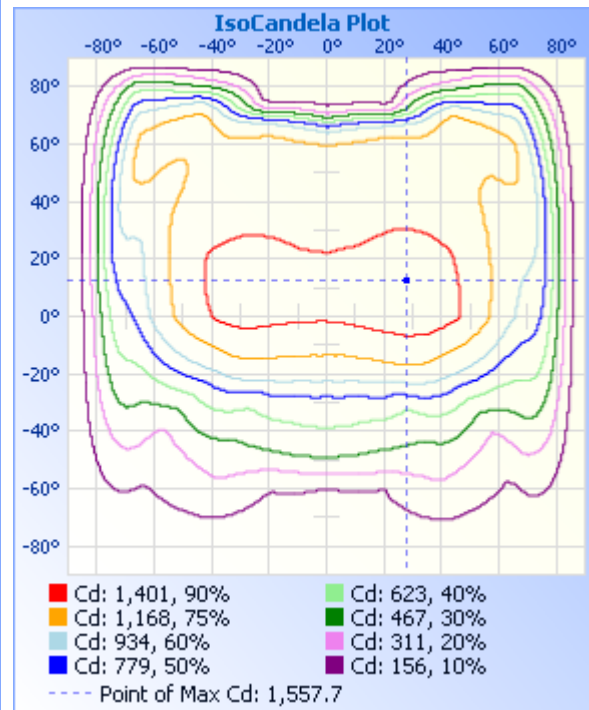
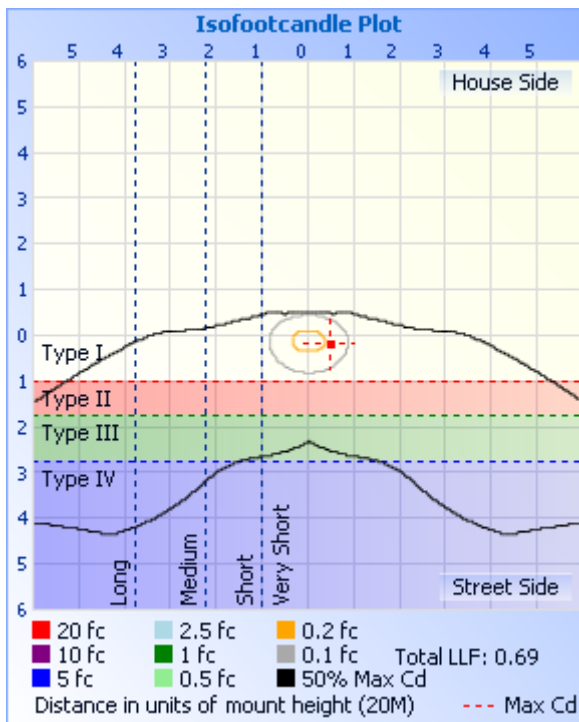
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
3.33M	11.9 fc	7.43 M	24.09 M
6.67M	2.97 fc	14.85 M	48.15 M
10.00M	1.32 fc	22.28 M	72.24 M
13.33M	0.74 fc	29.70 M	96.30 M
16.67M	0.48 fc	37.13 M	120.38 M
20.00M	0.33 fc	44.56 M	144.47 M

Vert. Spread: 96.2°  
Horiz. Spread: 149.0°



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Table--1

UNIT: cd

C (DEG) \ y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
0	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421	1421
5	1431	1449	1470	1467	1474	1464	1456	1446	1422	1399	1364	1345	1340	1344	1370	1403
10	1450	1474	1498	1487	1484	1479	1486	1472	1429	1368	1298	1253	1235	1249	1307	1381
15	1469	1499	1515	1479	1466	1468	1502	1499	1440	1335	1220	1147	1120	1146	1243	1367
20	1498	1530	1514	1449	1425	1441	1500	1523	1454	1301	1143	1033	991	1027	1164	1341
25	1506	1549	1489	1415	1378	1406	1486	1539	1468	1266	1052	886	844	888	1069	1321
30	1512	1557	1463	1379	1333	1367	1459	1530	1472	1222	916	753	721	750	939	1286
35	1516	1532	1439	1344	1300	1341	1422	1511	1453	1131	761	662	647	658	782	1210
40	1480	1490	1403	1318	1277	1310	1384	1475	1402	989	636	606	601	600	651	1081
45	1419	1440	1352	1310	1270	1294	1331	1422	1346	836	558	538	533	529	561	927
50	1330	1371	1325	1310	1271	1277	1293	1348	1243	693	492	452	438	447	498	767
55	1207	1302	1294	1307	1260	1281	1245	1284	1123	553	437	317	279	336	443	605
60	1063	1206	1285	1283	1162	1278	1226	1204	990	418	389	199	150	194	408	451
65	936	1126	1285	1140	891	1174	1225	1109	840	299	291	135	119	142	311	321
70	858	1148	1304	773	433	853	1257	1115	752	231	230	109	94.5	114	243	226
75	751	1268	1225	178	128	219	1238	1324	648	174	161	84.1	67.6	83.7	168	161
80	473	1070	736	87.7	75.9	90.0	868	1127	402	95.7	91.9	47.1	33.4	47.2	88.1	90.6
85	165	651	299	55.1	41.8	57.2	330	696	157	39.1	34.8	18.1	12.1	17.7	35.0	37.0
90	3.45	11.0	12.1	9.01	7.64	7.77	10.7	15.2	3.13	2.41	1.88	0.67	0.52	0.66	1.93	2.78
95	2.23	2.46	2.14	1.18	0.98	0.81	1.83	2.69	2.23	2.66	2.34	1.03	0.62	1.02	2.48	2.83
100	2.07	1.41	1.42	0.87	0.67	0.66	1.11	1.62	2.33	2.96	2.75	1.50	1.08	1.63	2.78	2.98
105	2.43	1.25	1.17	0.82	0.57	0.51	0.86	1.32	2.58	3.21	3.20	2.31	1.65	2.44	3.39	3.14
110	2.83	1.30	1.02	0.72	0.57	0.51	0.86	1.31	2.78	3.31	3.61	2.83	2.32	2.80	3.34	3.14
115	3.24	1.56	1.02	0.72	0.57	0.51	0.86	1.47	2.98	3.26	3.61	3.24	2.79	3.25	3.39	3.19
120	3.44	1.81	1.07	0.77	0.72	0.86	0.96	1.97	3.19	3.31	3.46	3.34	3.04	3.30	3.19	3.29
125	3.94	2.45	1.22	0.98	0.88	0.86	1.41	2.38	3.39	3.36	3.46	3.34	3.15	3.30	3.19	3.29
130	4.05	2.51	1.37	1.13	0.98	0.97	1.72	2.63	3.64	3.51	3.51	3.34	3.25	3.30	3.29	3.44
135	4.20	2.86	1.73	1.54	1.19	1.32	1.72	2.83	4.00	3.71	3.66	3.44	3.35	3.40	3.44	3.69
140	4.30	3.16	2.19	1.64	1.54	1.53	1.92	3.14	4.25	3.96	3.87	3.65	3.51	3.51	3.69	3.84
145	4.40	3.21	2.44	1.95	1.60	1.62	2.33	3.19	4.35	4.11	4.22	3.86	3.61	3.61	3.80	3.94
150	4.40	3.51	2.90	2.47	1.91	2.28	2.78	3.34	4.45	4.11	4.17	4.21	3.92	3.91	4.05	4.05
155	4.60	3.91	3.20	2.77	2.43	2.52	3.14	3.89	4.15	4.11	4.12	4.16	4.08	3.91	4.05	4.05
160	4.60	4.16	3.36	3.24	2.73	2.90	3.19	3.89	3.95	3.91	4.12	4.06	4.08	3.96	4.05	4.05
165	4.60	4.11	3.91	3.49	3.25	3.20	3.34	3.99	4.00	3.81	4.02	4.06	4.08	3.96	4.00	4.04
170	4.81	4.86	4.47	4.11	3.56	3.91	4.20	4.70	5.11	5.12	5.29	5.19	4.95	4.47	4.66	5.11
175	5.06	5.07	4.93	4.42	4.08	4.21	4.61	4.91	5.11	5.07	5.64	5.50	4.85	4.52	4.81	5.06
180	5.11	5.17	5.13	4.83	4.23	4.37	4.81	5.01	5.11	5.07	5.24	5.19	4.85	4.22	4.35	4.85

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**BUG Rating: B1-U2-G2**

**IESNA Luminaire Flux Distribution Table:**

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	620.34	12.8
FM - Front-Medium(30-60)	1539.9	31.7
FH - Front-High(60-80)	960.84	19.8
FVH - Front-Very High(80-90)	154.11	3.2
<b>Total Forward Light</b>	<b>3281.7</b>	<b>67.5</b>

BL - Back-Low(0-30)	493.77	10.2
BM - Back-Medium(30-60)	795.66	16.4
BH - Back-High(60-80)	254.5	5.2
BVH - Back-Very High(80-90)	25.885	0.5
<b>Total Back Light</b>	<b>1579.8</b>	<b>32.5</b>

UL - Uplight-Low(90-100)	2.4569	0.1
UH - Uplight-High(100-180)	14.082	0.3
<b>Total Up Light</b>	<b>16.539</b>	<b>0.3</b>

<b>BUG(Back,Up,Glare) Rating</b>	<b>B1-U2-G2</b>
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Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	1569.8	10.023	1579.8
Street Side	3275.2	6.5164	3281.7



**2.2 Electrical, Photometric and Chromaticity Measurements**  
*(Refer to Work Instruction QD25)*

<b>Test date</b>	2017-12-12	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	281201-S46		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171201	120.0	60	0.3354	39.94	0.9923	9.61
1-A2	277.0	60	0.1510	39.62	0.9472	10.54
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

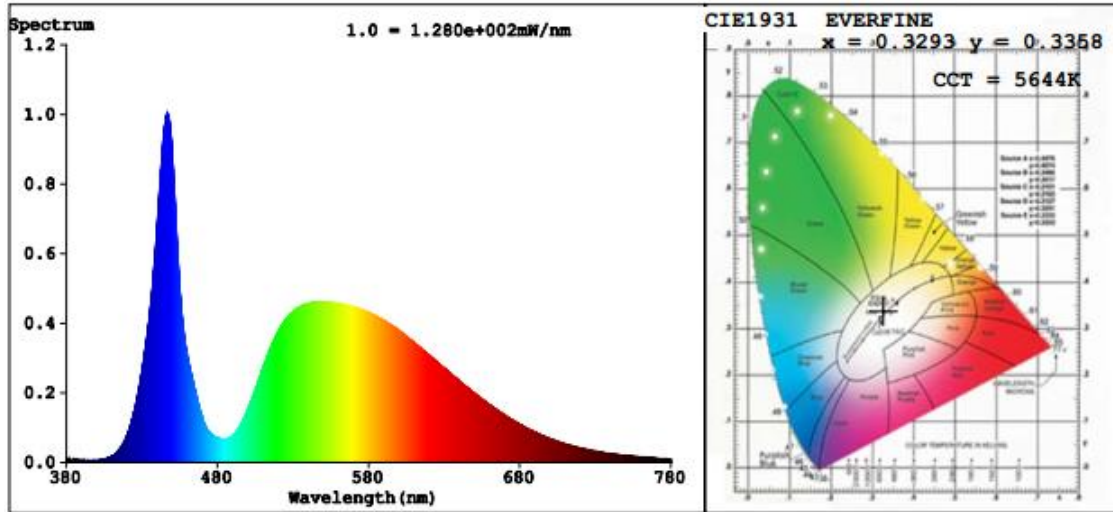
**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	75	R9	0
Frequency (Hz)	60	R2	75	R10	39
CCT (K)	5644	R3	73	R11	75
Duv	-0.0013	R4	76	R12	43
Chromaticity (x, y)	x=0.3293 y=0.3358	R5	75	R13	73
Chromaticity (u', v')	u'=0.2067 v'=0.4744	R6	66	R14	84
Color Rendering Index (CRI)	73.4	R7	79	R15	72
R9	0	R8	68	--	--

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

Parameter	Result		DLC V4.2 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4685	4619	300-5000(-10%)	
Luminous Efficacy (lm/W)	117.30	116.58	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	115.65		90(-3%)	110(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



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**2.3 Performance Assessment:**

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
281201-S43	4000K	4861.2	40.41	120.30
281201-S44	4500K	4802 <sup>*1</sup>	40.18 <sup>*2</sup>	119.51 <sup>*3</sup>
281201-S45	5000K	4743 <sup>*1</sup>	40.18 <sup>*2</sup>	118.04 <sup>*3</sup>
281201-S46	5700K	4685	39.94	117.30

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

$$4802=(4685-4861.2)/3+4861.2$$

$$4743=(4685-4861.2)/3+4802$$

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

$$40.18=(40.41+39.94)/2$$

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

$$119.51=4802/40.18$$

$$118.04=4743/40.18$$

**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2017-07-01	2018-06-30
ST-R-327	Spectral analysis system HAAS-2000	2017-07-01	2018-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2017-07-01	2018-06-30
GO-R5000	Goniophotometer system	2017-07-01	2018-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2017-07-07	2018-07-06
Expand Uncertainty: Photometric Measurement (Sphere):2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.36%, k=2			

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