

## **LM-79-08 Test Report**

For

# **Revolution Lighting Technologies, Inc.**

**(Brand Name: Revolution Lighting Technologies)**

2280 Ward Ave. Simi Valley CA. 93065

## **2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces**

Model name(s): 153051-101  
153051-102  
153051-103  
153051-105

Remark: This is a multiple list report, the original report NO. is  
GZE170237-B.

Representative (Tested) Model: 153051-101  
153051-105

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

Test & Report By:

*Jack Luo*

Engineer: Jack Luo

Date: Feb.28,2017

Review By:

*Tommy Liang*

Manager: Tommy Liang

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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

Report Format Number STD/QR4909-A/2

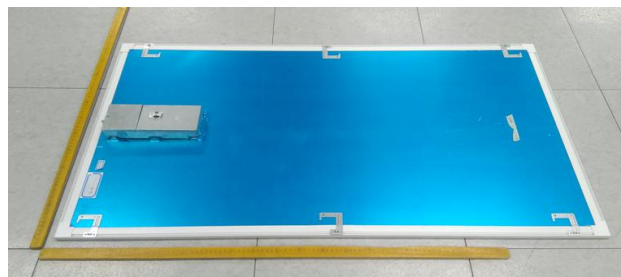
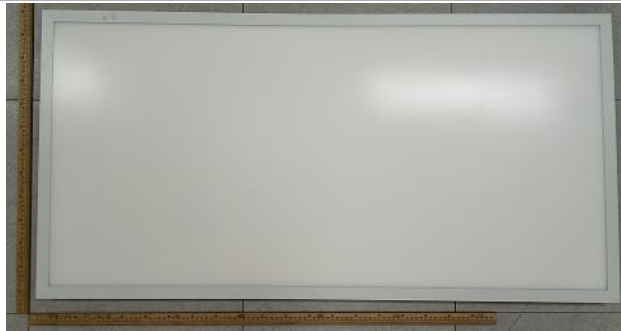
Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

**1.1 Product Information:**

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	153051-101 153051-102 153051-103 153051-105	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	36W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series (3000K)	
Sample Number	GZE170237-B1(3000K), B2(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	Feb.24,2017
Date of Test	Feb.25,2017
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>                  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>                  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>                  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>	2017-02-25	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	153051-101		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170237-	120.0	60	0.2987	35.36	0.9866	11.94
B1	277.0	60	0.1427	35.00	0.8855	16.44
<b>DLC Pass Criteria</b>					<b>&gt;= 0.9(-3%)</b>	<b>&lt;= 20(+5)</b>

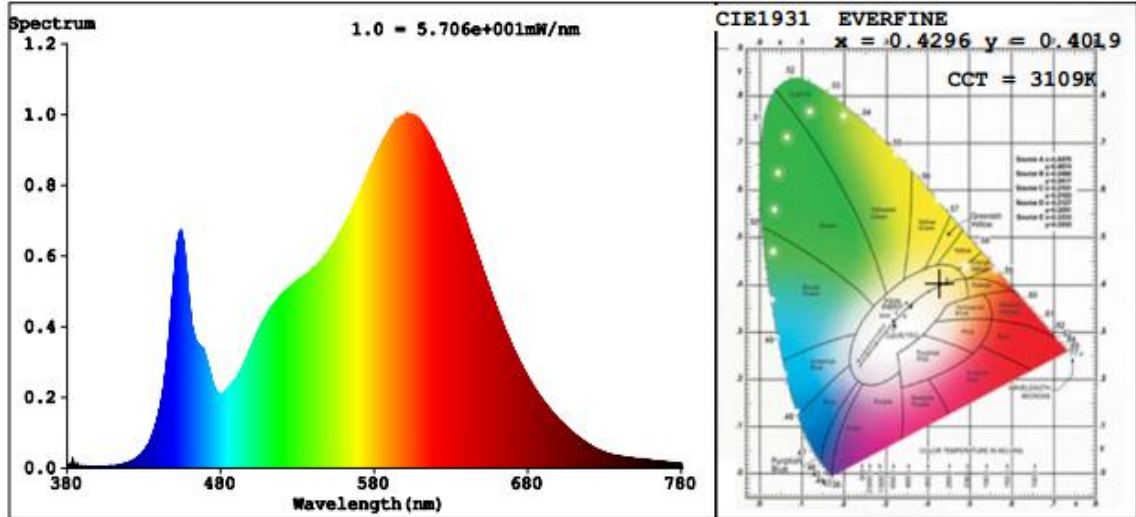
**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	9
Frequency (Hz)	60	R2	92	R10	83
CCT (K)	3109	R3	96	R11	81
Duv	0.0002	R4	81	R12	70
Chromaticity (x, y)	x=0.4296 y=0.4019	R5	83	R13	85
Chromaticity (u', v')	u'=0.2468 v'=0.5194	R6	91	R14	98
Color Rendering Index (CRI)	83.4	R7	83	R15	74
R9	9	R8	60	--	--

**Photometric Measurement– Goniophotometer Method:**

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4305.1	4294.4	>=3000(-10%)	
Luminous Efficacy (lm/W)	121.75	122.70	Standard: >= 100(-3%)	Premium: >= 125(-3%)
Zonal lumens in the 0-60° zone (%)	79.3	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.35	--	--	
SC: 90-270° (if applicable)	1.25	--	--	
Beam Angle (°)	115.4	--	--	
Center Beam Candle Power (cd)	1452	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

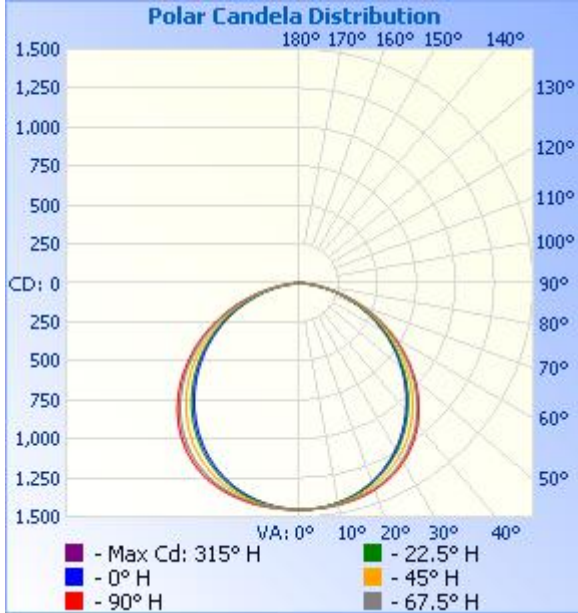


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,155.9	26.9%
0-40	1,912.6	44.4%
0-60	3,414.5	79.3%
60-90	890.2	20.7%
70-100	356.3	8.3%
90-120	0.0	0%
0-90	4,304.7	100%
90-180	0.0	0%
0-180	4,304.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	137.9	3.2%	90-100	0.0	0%
10-20	400.1	9.3%	100-110	0.0	0%
20-30	617.8	14.4%	110-120	0.0	0%
30-40	756.7	17.6%	120-130	0	0%
40-50	790.4	18.4%	130-140	0	0%
50-60	711.6	16.5%	140-150	0	0%
60-70	533.9	12.4%	150-160	0.0	0%
70-80	291.5	6.8%	160-170	0.0	0%
80-90	64.8	1.5%	170-180	0.0	0%

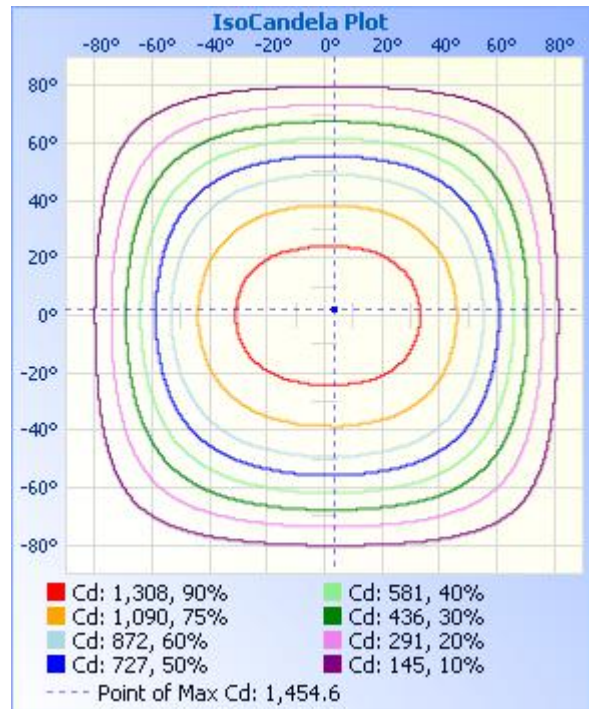
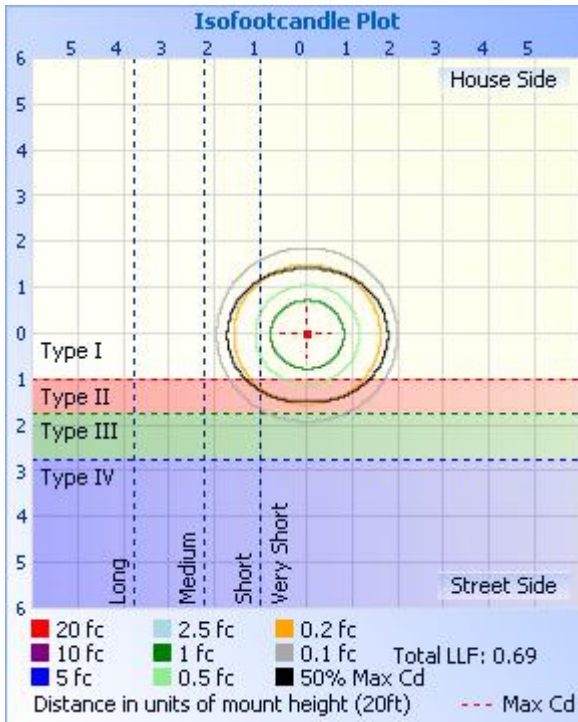
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	5.03 fc	49.6 ft	58.5 ft
34.0ft	1.26 fc	99.2 ft	117.0 ft
51.0ft	0.56 fc	148.8 ft	175.5 ft
68.0ft	0.31 fc	198.4 ft	234.0 ft
85.0ft	0.20 fc	248.0 ft	292.5 ft
102.0ft	0.14 fc	297.6 ft	351.0 ft

■ Vert. Spread: 111.1°  
■ Horiz. Spread: 119.7°



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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	1452	1452	1452	1452	1452	1452	1452	1452	1452	1452	1452	1452	1452	1452	1452	1452
5	1452	1453	1451	1449	1448	1448	1449	1450	1450	1448	1446	1445	1446	1447	1449	1450
10	1448	1447	1441	1434	1430	1431	1437	1442	1443	1440	1433	1427	1426	1430	1438	1444
15	1439	1435	1422	1408	1401	1404	1416	1427	1431	1424	1410	1398	1395	1402	1417	1432
20	1421	1414	1391	1368	1358	1364	1384	1403	1410	1398	1376	1356	1350	1361	1386	1409
25	1391	1380	1348	1317	1302	1312	1340	1366	1376	1361	1329	1302	1294	1308	1342	1375
30	1346	1332	1292	1252	1234	1246	1282	1315	1327	1309	1270	1235	1224	1242	1286	1326
35	1284	1267	1221	1175	1155	1169	1210	1248	1262	1240	1195	1156	1143	1164	1214	1262
40	1205	1186	1136	1086	1064	1079	1123	1165	1180	1156	1108	1066	1052	1075	1129	1181
45	1109	1089	1038	988	966	980	1024	1066	1081	1056	1007	965	952	976	1030	1084
50	998	979	928	880	859	872	914	954	968	943	896	856	844	868	921	973
55	874	857	810	766	746	757	795	831	843	819	777	741	731	752	802	851
60	740	725	685	646	628	637	669	699	709	688	651	620	613	632	677	720
65	598	587	554	522	507	513	538	561	568	551	520	496	491	508	545	582
70	453	445	420	396	383	387	405	420	424	411	388	372	369	382	412	440
75	309	302	286	271	261	262	273	280	283	274	260	250	249	260	280	300
80	171	169	162	153	147	146	150	151	153	148	141	138	139	146	158	168
85	58.2	59.1	57.8	55.0	51.8	49.6	48.6	46.9	46.4	45.3	44.8	45.4	47.2	50.7	54.8	58.3
90	0.13	0.14	0.15	0.57	0.51	0.43	0.12	0.06	0.00	0.00	0.00	0.00	0.05	0.25	0.20	0.24
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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**2.2 Electrical, Photometric and Chromaticity Measurements**

*(Refer to Work Instruction QD25)*

<b>Test date</b>	2017-02-25	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	153051-105		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170237-	120.0	60	0.3026	35.79	0.9855	11.78
B2	277.0	60	0.1444	35.46	0.8867	15.97
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

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

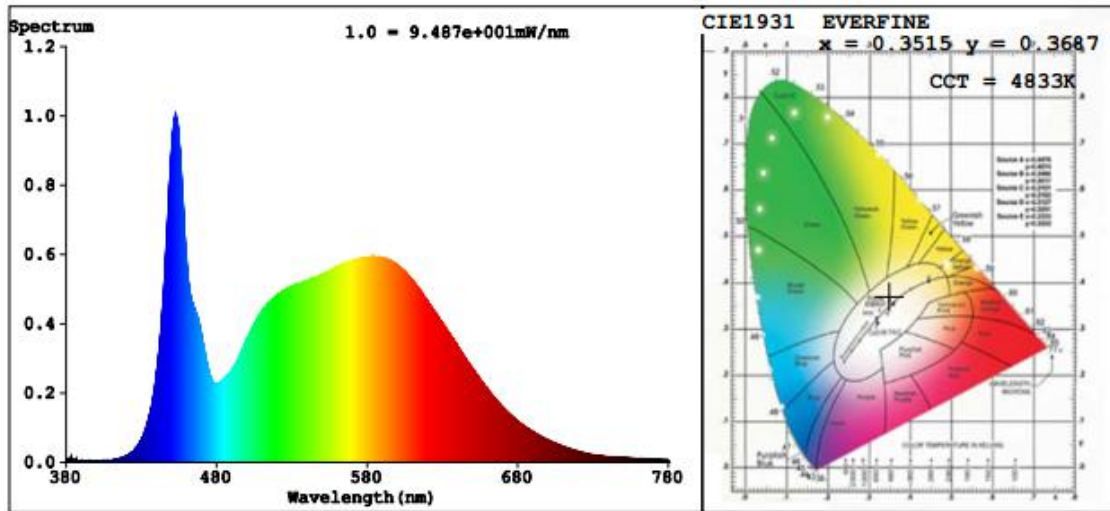
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	79	R9	0
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	4833	R3	95	R11	78
Duv	0.0059	R4	79	R12	52
Chromaticity (x, y)	x=0.3515 y=0.3687	R5	79	R13	81
Chromaticity (u', v')	u'=0.2092 v'=0.4937	R6	83	R14	97
Color Rendering Index (CRI)	81.6	R7	87	R15	72
R9	0	R8	64	--	--

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

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4415	4415	>=3000(-10%)	
Luminous Efficacy (lm/W)	123.36	124.51	Standard: >= 100(-3%)	Premium: >= 125(-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)
153051-101	3000K	4305.1	35.36	121.75
153051-102	3500K	4342* <sup>1</sup>	35.58* <sup>2</sup>	122.04* <sup>3</sup>
153051-103	4000K	4378* <sup>1</sup>	35.58* <sup>2</sup>	123.07* <sup>3</sup>
153051-105	5000K	4415	35.79	123.36

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

$$4342=(4415-4305.1)/3+4305.1$$

$$4378=(4415-4305.1)/3+4342$$

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

$$35.58=(35.79+35.36)/2$$

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

$$122.04=4342/35.58$$

$$123.07=4378/35.58$$

**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-327	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-12	2017-07-11
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
GO-R5000	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-12	2017-07-11
PF210	Power Meter for Goniophotometer	2016-07-07	2017-07-06

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 \*\*\*\*\***

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