

**LM-79-08 Test Report**

For

**P.Q.L., Inc.**

**(Brand Name: Superior Life<sup>®</sup>)**

2285 Ward Avenue / Simi Valley, CA 93065

**Outdoor Pole/Arm-Mounted Area and Roadway  
Luminaires**

Model name(s): 83940, 83941

Representative (Tested) Model: 83940 (3000K) 83941 (5000K)

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

Test & Report By:

*Garman Mo*

Engineer: Garman Mo

Date: Jan.04,2017

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

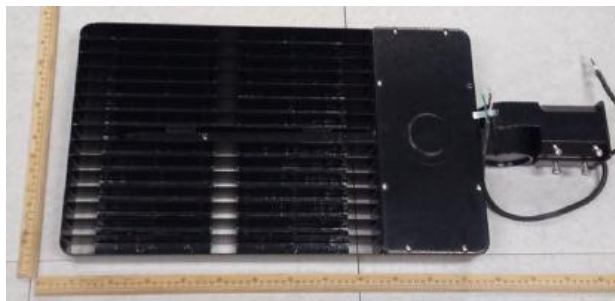
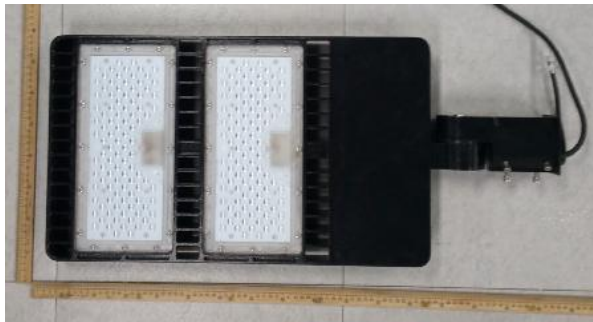
Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

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

**1.1 Product Information:**

Organization Name	P.Q.L., Inc.	
Brand Name	Superior Life®	
Model Number	83940, 83941	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Outdoor Pole/Arm-Mounted Area and Roadway Luminaires	
Rated Voltage / Frequency	180-528 Vac, 50/60 Hz	
Nominal Power	300W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,4500K,5000K	
LED Manufacturer	SAMSUNG	
LED Model	LH351B series	
Sample Number	GZE1612102-K1(3000K);K2(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	Dec.29,2016
Date of Test	Jan.01,2017
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 277 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 277 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 277 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>	2017-01-01	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	83940 (3000K)		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161210	277.0	60	1.058	290.7	0.9920	6.79
2-K1	480.0	60	0.6141	285.7	0.9692	10.78
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

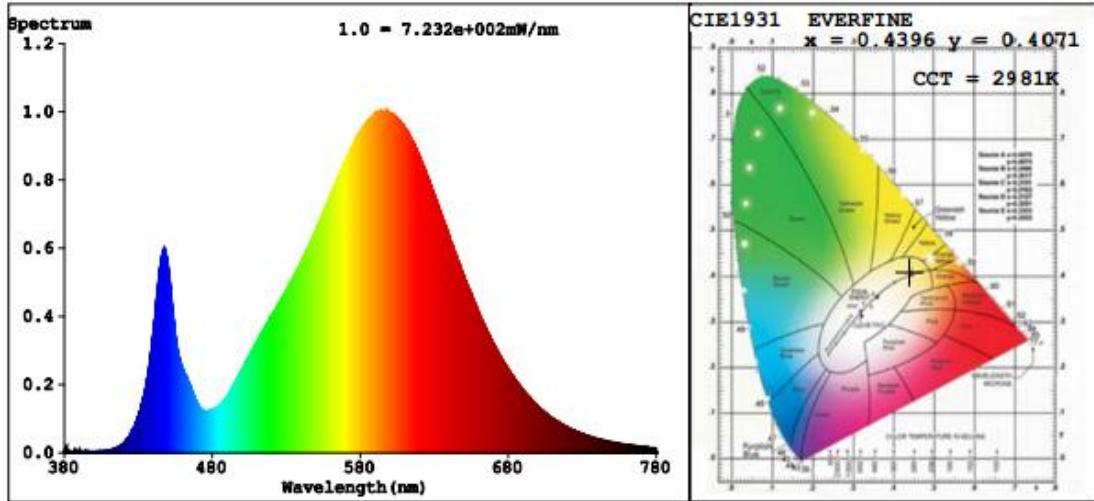
**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	277.0	R1	70	R9	0
Frequency (Hz)	60	R2	83	R10	61
CCT (K)	2981	R3	94	R11	65
Duv	0.0008	R4	70	R12	53
Chromaticity (x, y)	x=0.4396 y=0.4071	R5	69	R13	72
Chromaticity (u', v')	u'=0.2510 v'=0.5230	R6	77	R14	97
Color Rendering Index (CRI)	73.8	R7	79	R15	63
R9	0	R8	48	--	--

**Photometric Measurement – Goniophotometer Method:**

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	277.0	480.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	34137	34358	>=1000 (±10%)	
Luminous Efficacy (lm/W)	117.43	120.26	Standard: >= 100(-3%)	Premium: >= 120(-3%)
Zonal lumens in the 0-90° zone (%)	99.8	--	>=100(-1)	
Zonal lumens in the 80-90° zone (%)	0.5	--	<=10(+3)	
Beam Angle (°)	94.3	--	--	
Center Beam Candle Power (cd)	6642	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

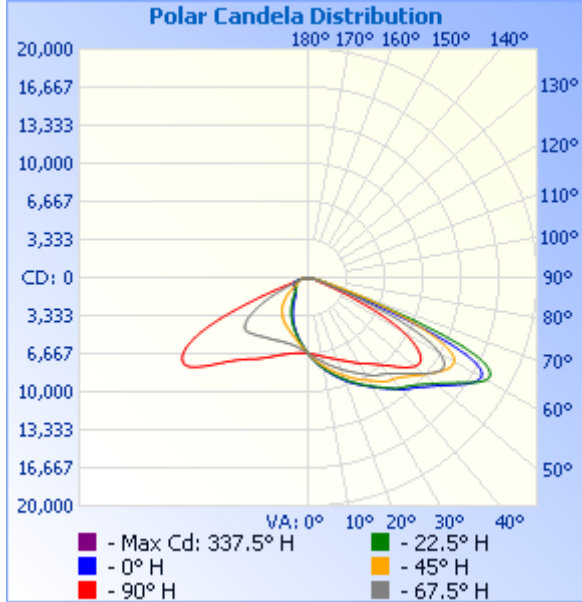


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	5,975.3	17.5%
0-40	10,875.5	31.9%
0-60	25,835.2	75.7%
60-90	8,222.2	24.1%
70-100	1,447.8	4.2%
90-120	28.9	0.1%
0-90	34,057.5	99.8%
90-180	76.0	0.2%
0-180	34,133.5	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	639.6	1.9%	90-100	3.7	0%
10-20	1,960.1	5.7%	100-110	10.3	0%
20-30	3,375.7	9.9%	110-120	14.9	0%
30-40	4,900.2	14.4%	120-130	15.2	0%
40-50	6,568.5	19.2%	130-140	12.3	0%
50-60	8,391.2	24.6%	140-150	8.6	0%
60-70	6,778.1	19.9%	150-160	6.0	0%
70-80	1,260.8	3.7%	160-170	3.5	0%
80-90	183.3	0.5%	170-180	1.4	0%

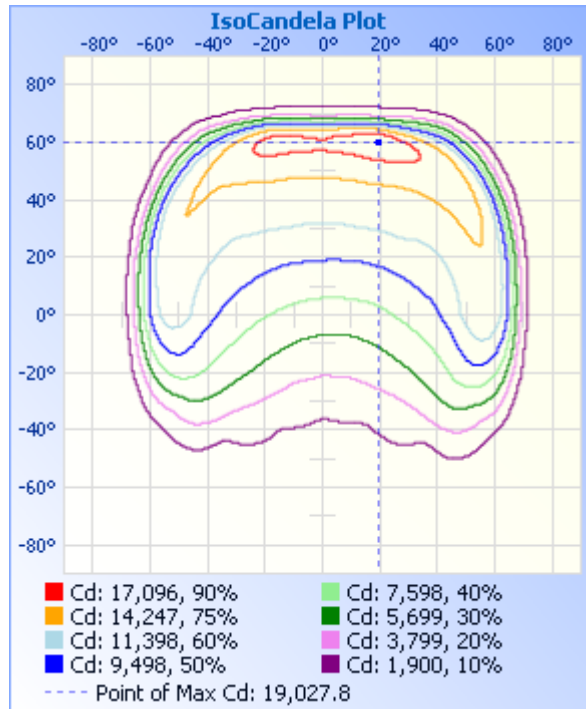
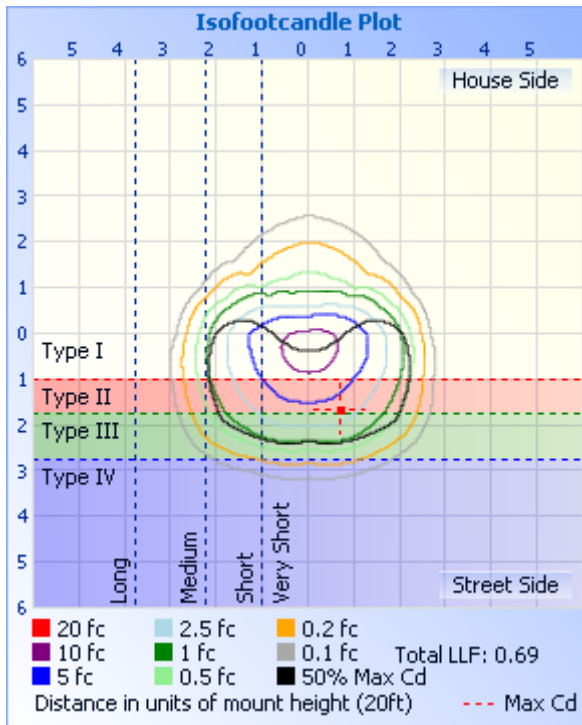
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width
17.0ft	23.0 fc	15.8 ft 30.6 ft
34.0ft	5.75 fc	31.5 ft 61.2 ft
51.0ft	2.55 fc	47.3 ft 91.9 ft
68.0ft	1.44 fc	63.0 ft 122.5 ft
85.0ft	0.92 fc	78.8 ft 153.1 ft
102.0ft	0.64 fc	94.5 ft 183.7 ft

■ Vert. Spread: 49.7°  
■ Horiz. Spread: 84.0°



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Table--1

UNIT: ×10ed

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
0	664	664	664	664	664	664	664	664	664	664	664	664	664	664	664	664
5	663	692	717	732	739	737	726	702	677	647	620	599	590	593	608	631
10	672	728	774	801	814	810	787	748	698	638	582	540	520	528	559	611
15	691	770	833	870	887	879	849	801	727	640	554	485	453	467	520	602
20	721	819	894	941	960	949	911	855	764	649	528	430	385	408	487	602
25	764	876	960	1014	1031	1022	976	912	808	664	503	373	317	350	459	610
30	814	939	1034	1093	1103	1096	1038	976	864	683	475	313	250	291	429	624
35	872	1014	1110	1178	1184	1176	1110	1044	919	698	441	251	192	231	393	640
40	939	1061	1186	1272	1280	1259	1159	1098	1000	715	391	200	163	183	354	666
45	1052	1145	1247	1353	1357	1329	1223	1189	1105	715	321	164	153	152	301	694
50	1210	1265	1360	1472	1471	1443	1320	1309	1210	680	233	142	148	135	235	713
55	1321	1410	1506	1653	1630	1604	1424	1415	1200	559	154	130	142	127	165	656
60	1235	1476	1639	1867	1746	1795	1475	1331	977	357	110	122	137	120	114	488
65	846	1228	1527	1756	1370	1629	1209	862	480	162	94.5	116	133	112	94.4	259
70	230	503	868	522	329	543	570	228	112	82.6	80.5	103	123	99.2	78.5	100
75	69.0	117	204	150	131	141	148	68.1	56.2	54.8	63.7	84.6	98.6	80.5	63.9	60.7
80	34.7	41.8	64.4	46.8	44.9	46.1	45.8	35.0	34.1	35.4	49.2	54.5	50.0	51.5	54.6	36.5
85	12.8	13.6	13.3	8.65	6.70	10.5	12.1	15.6	14.2	15.6	19.3	15.6	16.7	17.7	22.3	14.6
90	0.20	0.28	0.40	0.36	0.33	0.36	0.35	0.23	0.20	0.21	0.29	0.24	0.24	0.25	0.26	0.23
95	0.15	0.15	0.18	0.21	0.22	0.20	0.16	0.15	0.22	0.38	0.57	0.47	0.38	0.50	0.45	0.25
100	0.44	0.19	0.15	0.19	0.22	0.18	0.13	0.27	0.56	0.88	1.24	1.20	1.02	1.23	1.02	0.63
105	1.00	0.40	0.17	0.19	0.23	0.18	0.16	0.58	1.15	1.55	1.88	1.80	1.73	1.89	1.77	1.33
110	1.60	0.72	0.25	0.22	0.28	0.21	0.28	0.95	1.71	1.94	2.08	2.08	2.16	2.26	2.14	1.99
115	1.94	1.00	0.35	0.22	0.29	0.23	0.40	1.25	1.94	2.15	2.40	2.41	2.69	2.56	2.37	2.26
120	2.11	1.23	0.47	0.25	0.28	0.23	0.54	1.41	1.99	2.16	2.60	2.69	2.76	2.72	2.71	2.32
125	2.26	1.44	0.56	0.34	0.36	0.33	0.63	1.52	1.97	2.19	2.30	2.57	3.00	2.57	2.56	2.45
130	2.23	1.47	0.60	0.39	0.36	0.42	0.66	1.52	1.99	1.88	2.02	2.95	2.78	3.09	2.53	2.36
135	2.03	1.34	0.60	0.47	0.40	0.51	0.71	1.35	1.80	1.71	1.74	2.76	2.65	2.83	2.32	2.27
140	1.88	1.28	0.63	0.58	0.46	0.60	0.68	1.29	1.58	1.69	1.39	2.45	2.14	2.45	1.74	2.27
145	1.66	1.07	0.71	0.62	0.46	0.66	0.55	1.11	1.47	1.49	1.41	2.08	1.87	2.05	1.83	2.18
150	1.49	1.02	0.92	0.73	0.73	0.76	0.71	1.09	1.37	1.39	1.62	1.99	1.92	1.97	2.19	1.99
155	1.18	1.02	1.01	0.87	0.89	0.87	0.79	1.10	1.24	1.33	1.43	1.69	1.64	1.73	2.06	1.66
160	1.23	1.02	1.06	0.95	0.99	0.92	0.85	1.12	1.08	1.23	1.23	1.51	1.44	1.48	1.72	1.59
165	1.21	1.06	1.14	1.06	1.07	1.03	0.94	1.08	1.19	1.09	1.18	1.40	1.33	1.36	1.52	1.66
170	1.33	1.26	1.33	1.23	1.15	1.23	1.30	1.20	1.40	1.38	1.49	1.70	1.86	1.89	1.78	1.95
175	1.41	1.48	1.44	1.40	1.49	1.31	1.48	1.33	1.49	1.48	1.57	1.62	1.76	1.80	1.62	1.84
180	1.32	1.52	1.46	1.43	1.52	1.34	1.54	1.36	1.36	1.34	1.47	1.44	1.42	1.52	1.34	1.55

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**2.2 Electrical, Photometric and Chromaticity Measurements**

*(Refer to Work Instruction QD25)*

<b>Test date</b>	2017-01-01	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	83941 (5000K)		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161210	277.0	60	1.069	292.0	0.9857	7.19
2-K2	480.0	60	0.6212	287.0	0.9625	11.58
<b>DLC Pass Criteria</b>					<b>&gt;= 0.9(-3%)</b>	<b>&lt;= 20(+5)</b>

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

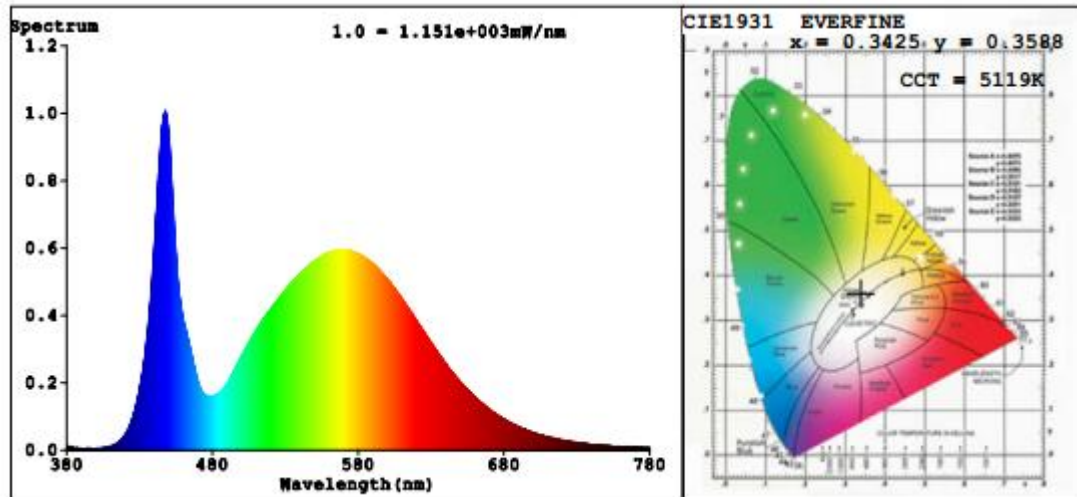
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	277.0	R1	69	R9	0
Frequency (Hz)	60	R2	78	R10	49
CCT (K)	5119	R3	86	R11	69
Duv	0.0046	R4	73	R12	48
Chromaticity (x, y)	x=0.3425 y=0.3588	R5	71	R13	70
Chromaticity (u', v')	u'=0.2069 v'=0.4878	R6	71	R14	92
Color Rendering Index (CRI)	72.9	R7	81	R15	63
R9	0	R8	55	--	--

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

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	277.0	480.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	35265	35499	>=1000 (±10%)	
Luminous Efficacy (lm/W)	120.77	123.69	Standard: >= 100(-3%)	Premium: >= 120(-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)
83940 (3000K)	3000K	34137	290.7	117.43
839XX (3500K)	3500K	34419 <sup>*1</sup>	291.4 <sup>*2</sup>	118.12 <sup>*3</sup>
839XX (4000K)	4000K	34701 <sup>*1</sup>	291.4 <sup>*2</sup>	119.08 <sup>*3</sup>
839XX (4500K)	4500K	34983 <sup>*1</sup>	291.4 <sup>*2</sup>	120.05 <sup>*3</sup>
83941 (5000K)	5000K	35265	292.0	120.77

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

$$34419 = (35265 - 34137) / 4 + 34137$$

$$34701 = (35265 - 34137) / 4 + 34419$$

$$34983 = (35265 - 34137) / 4 + 34701$$

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

$$291.4 = (290.7 + 292.0) / 2$$

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

$$118.12 = 34419 / 291.4$$

$$119.08 = 34701 / 291.4$$

$$120.05 = 34983 / 291.4$$

**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

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

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