

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): 281203-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-D

Representative (Tested) Model: 281203-S43
281203-S46

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

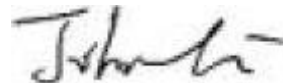
Test & Report By:



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

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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	281203-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	80W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,4500K,5000K,5700K	
LED Manufacturer	Seoul Semiconductor Co., LTD	
LED Model	SAWxC22B-xx	
Sample Number	GZE1712011-D1(4000K), D2(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"> 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	<ol style="list-style-type: none"> 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	QD25

1.3 Test Methods

<p>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.</p>
<p>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 °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>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 °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)

Test date	2017-12-12	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	281203-S43		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171201	120.0	60	0.6751	80.71	0.9962	4.55
1-D1	277.0	60	0.3044	79.27	0.9400	11.91
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

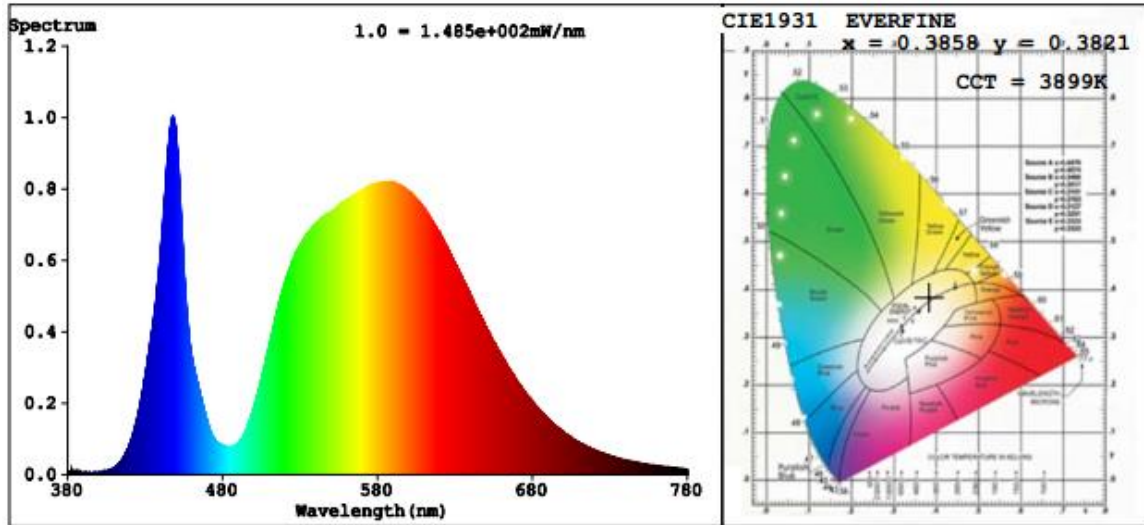
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	72	R9	0
Frequency (Hz)	60	R2	78	R10	46
CCT (K)	3899	R3	81	R11	69
Duv	0.0010	R4	74	R12	39
Chromaticity (x, y)	x=0.3858 y=0.3821	R5	70	R13	72
Chromaticity (u', v')	u'=0.2265 v'=0.5047	R6	68	R14	89
Color Rendering Index (CRI)	72.9	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)	9907.5	9846.6	>=5000(-10%)	
Luminous Efficacy (lm/W)	122.75	124.22	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	122.00		95(-3%)	115(-3%)
Zonal lumens in the 0-90 °zone (%)	99.7	--	>= 100(-3)	
Zonal lumens in the 80-90 °zone (%)	2.9	--	<=10(+3)	
Beam Angle (°)	126.8	--	--	
Center Beam Candle Power (cd)	2866	--	--	

Spectral Power Distribution & Chromaticity Diagram

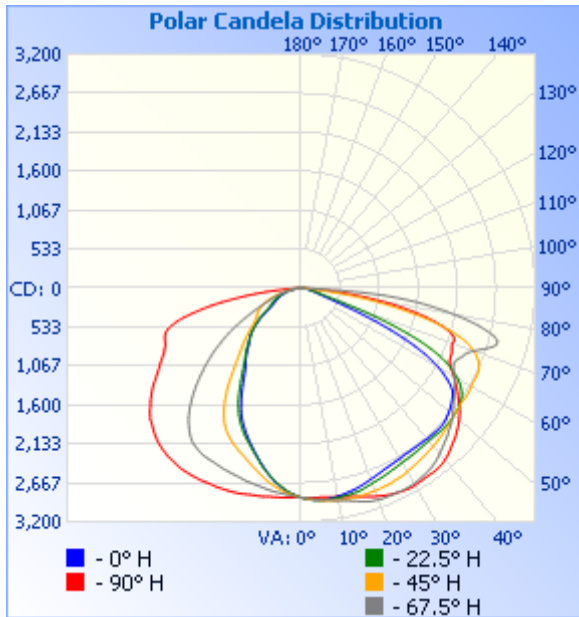


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	2,273.6	23%
0-40	3,798.4	38.3%
0-60	7,134.6	72%
60-90	2,742.4	27.7%
70-100	1,310.9	13.2%
90-120	11.1	0.1%
0-90	9,877.0	99.7%
90-180	27.9	0.3%
0-180	9,905.0	100%

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	271.1	2.7%	90-100	3.5	0%
10-20	781.7	7.9%	100-110	3.6	0%
20-30	1,220.8	12.3%	110-120	4.0	0%
30-40	1,524.8	15.4%	120-130	4.2	0%
40-50	1,675.0	16.9%	130-140	3.9	0%
50-60	1,661.3	16.8%	140-150	3.5	0%
60-70	1,435.1	14.5%	150-160	2.7	0%
70-80	1,016.0	10.3%	160-170	1.8	0%
80-90	291.4	2.9%	170-180	0.7	0%

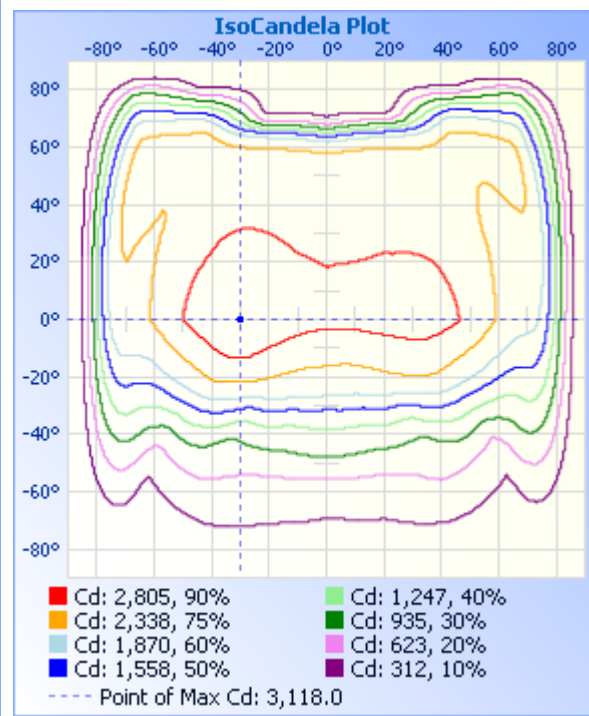
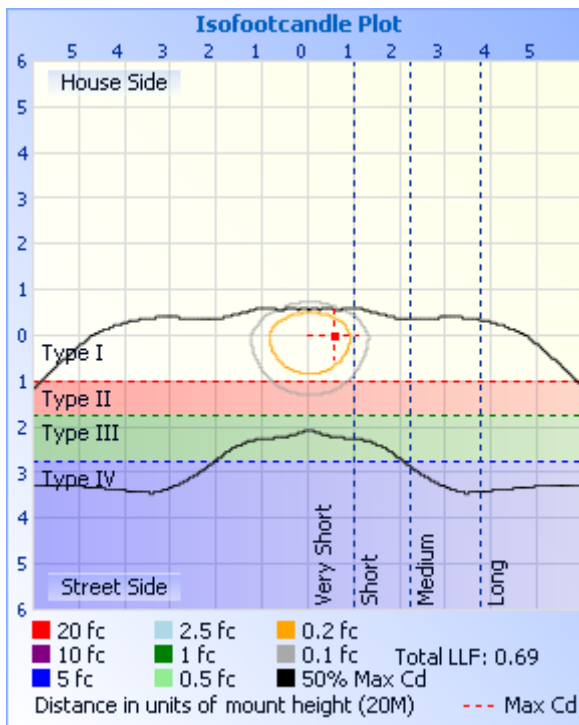
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
3.33M	23.9 fc	7.58 M	29.88 M
6.67M	5.99 fc	15.16 M	59.73 M
10.00M	2.66 fc	22.74 M	89.62 M
13.33M	1.50 fc	30.32 M	119.47 M
16.67M	0.96 fc	37.90 M	149.35 M
20.00M	0.67 fc	45.48 M	179.23 M

■ Vert. Spread: 97.3°
■ Horiz. Spread: 154.8°



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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	2866	2866	2866	2866	2866	2866	2866	2866	2866	2866	2866	2866	2866	2866	2866	2866	
5	2875	2884	2902	2917	2913	2912	2913	2903	2874	2844	2802	2774	2758	2754	2790	2826	
10	2896	2922	2913	2917	2894	2912	2948	2953	2897	2835	2708	2617	2582	2583	2676	2787	
15	2920	2954	2911	2877	2849	2894	2959	3020	2957	2835	2581	2428	2365	2378	2535	2750	
20	2948	2979	2889	2825	2786	2843	2952	3083	3032	2835	2471	2247	2157	2188	2403	2712	
25	2956	2990	2853	2764	2727	2800	2937	3091	3092	2830	2370	2052	1929	1989	2284	2678	
30	2968	2969	2821	2732	2695	2759	2903	3089	3117	2816	2210	1751	1616	1709	2105	2654	
35	2959	2905	2773	2711	2682	2738	2858	3047	3101	2757	1893	1409	1332	1396	1798	2585	
40	2914	2845	2704	2692	2687	2723	2817	2953	3066	2599	1506	1185	1158	1182	1426	2396	
45	2831	2739	2661	2700	2692	2734	2772	2840	2953	2309	1200	1002	1005	995	1152	2103	
50	2699	2608	2613	2694	2639	2721	2727	2714	2822	1952	963	854	846	844	934	1756	
55	2498	2469	2586	2656	2534	2673	2696	2561	2624	1565	759	676	620	656	765	1398	
60	2258	2340	2569	2484	2174	2471	2689	2413	2415	1171	674	523	447	489	692	1018	
65	2068	2242	2559	2018	1349	1959	2680	2338	2252	789	600	445	367	405	605	668	
70	1987	2402	2462	951	359	822	2520	2512	2204	489	510	352	294	321	481	427	
75	1760	2644	2113	233	185	225	1988	2783	1993	278	351	257	224	240	328	285	
80	1100	2087	1195	131	108	132	1021	2175	1253	164	180	153	112	144	177	169	
85	338	1117	216	68.0	53.3	70.7	176	1136	366	73.2	77.0	68.3	54.1	64.4	72.0	71.7	
90	7.50	10.5	6.28	2.01	1.24	1.38	4.60	11.5	6.74	4.91	3.35	1.07	0.82	1.02	3.28	5.25	
95	5.58	4.12	3.00	1.13	0.77	0.76	2.08	4.35	4.46	4.96	3.97	1.33	0.82	1.22	3.69	5.46	
100	5.62	2.89	1.98	0.97	0.77	0.71	1.46	2.68	4.57	5.32	4.62	2.26	1.29	2.04	4.55	6.06	
105	6.37	2.63	1.68	0.97	0.82	0.76	1.31	2.48	5.27	6.53	5.03	3.23	2.16	3.10	5.30	6.77	
110	7.17	3.29	1.57	0.97	0.92	0.81	1.36	2.63	5.62	6.53	5.33	4.10	3.50	3.92	5.30	6.87	
115	7.62	4.15	1.67	1.07	1.08	0.97	1.47	3.43	5.57	6.53	5.64	4.30	4.38	4.12	5.50	6.66	
120	7.88	4.76	2.18	1.58	1.59	1.22	1.82	4.24	5.52	6.58	6.14	5.12	4.99	4.98	5.45	6.06	
125	7.88	5.57	2.44	2.10	1.96	1.78	2.37	4.85	5.57	6.28	5.59	5.99	6.13	5.75	5.40	5.76	
130	7.88	5.87	2.74	2.46	2.32	2.24	2.63	5.10	5.57	6.08	5.69	6.30	6.48	6.41	5.61	5.76	
135	7.88	5.92	3.30	3.07	2.62	2.54	3.18	5.30	5.97	6.08	5.54	6.45	6.48	6.30	5.55	5.86	
140	7.63	6.08	4.01	3.38	3.09	3.09	3.48	5.55	5.87	6.53	5.43	6.45	6.48	6.30	5.51	6.11	
145	7.47	5.72	4.36	4.10	3.34	3.76	3.84	5.55	5.87	6.48	5.69	6.60	6.54	6.36	6.16	6.11	
150	7.13	5.57	5.33	4.60	4.32	4.22	4.80	5.71	5.87	6.58	6.40	6.60	6.59	6.41	7.22	6.06	
155	6.53	5.67	6.09	5.22	4.99	4.83	5.50	6.11	5.27	6.43	6.30	6.55	6.48	6.15	6.56	6.01	
160	5.62	5.87	6.40	5.78	5.61	5.44	5.86	6.26	5.47	5.72	6.20	6.50	6.43	6.31	6.31	5.96	
165	5.82	5.97	6.60	5.94	5.87	5.64	5.91	6.21	5.82	5.68	6.25	6.60	6.49	6.51	6.31	6.16	
170	6.27	6.58	7.72	7.01	6.79	6.81	7.22	6.41	6.37	6.38	7.46	8.29	8.34	8.04	7.47	7.88	
175	6.37	7.24	8.12	7.47	8.13	7.27	7.73	6.87	6.27	6.33	7.41	8.39	8.34	8.44	7.47	8.03	
180	5.82	7.34	8.28	7.78	8.29	7.53	7.98	6.97	5.82	5.98	7.41	8.20	7.82	8.19	7.47	7.88	

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BUG Rating: B3-U2-G2

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	1221.4	12.3
FM - Front-Medium(30-60)	3102.7	31.3
FH - Front-High(60-80)	1813.4	18.3
FVH - Front-Very High(80-90)	227.22	2.3
Total Forward Light	6376.1	64.4

BL - Back-Low(0-30)	1052.3	10.6
BM - Back-Medium(30-60)	1760.2	17.8
BH - Back-High(60-80)	638.24	6.4
BVH - Back-Very High(80-90)	64.199	0.6
Total Back Light	3531.4	35.6

UL - Uplight-Low(90-100)	3.5339	0.0
UH - Uplight-High(100-180)	24.419	0.2
Total Up Light	27.953	0.3

BUG(Back,Up,Glare) Rating	B3-U2-G2
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Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	3514.9	16.5	3531.4
Street Side	6364.7	11.454	6376.1

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

Test date	2017-12-12	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	281203-S46		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171201	120.0	60	0.6649	79.59	0.9975	4.29
1-D2	277.0	60	0.3000	78.41	0.9436	11.32
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

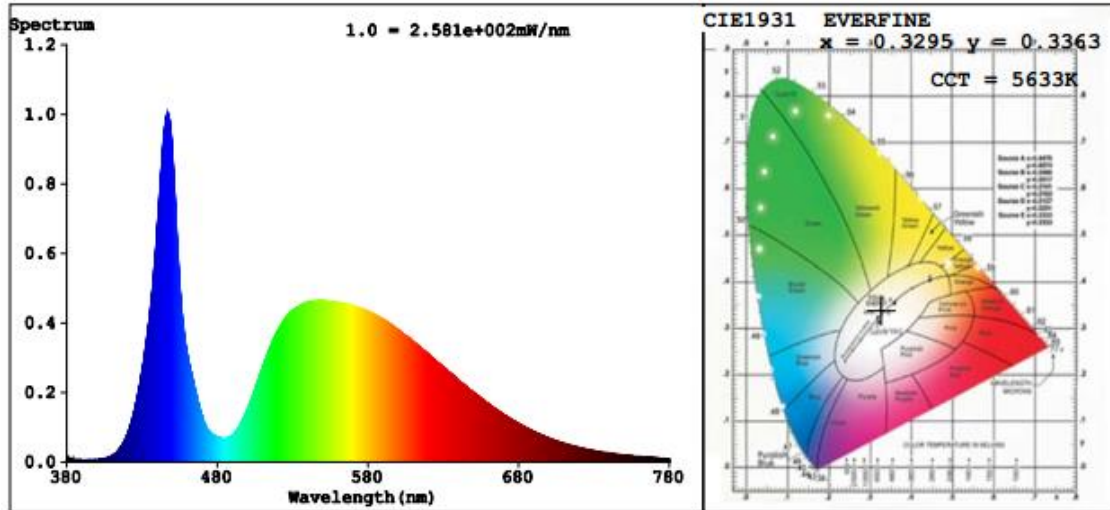
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	75	R9	0
Frequency (Hz)	60	R2	75	R10	40
CCT (K)	5633	R3	73	R11	75
Duv	-0.0011	R4	76	R12	43
Chromaticity (x, y)	x=0.3295 y=0.3363	R5	75	R13	73
Chromaticity (u', v')	u'=0.2067 v'=0.4746	R6	66	R14	85
Color Rendering Index (CRI)	73.4	R7	80	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)	10007	9909	>=5000(-10%)	
Luminous Efficacy (lm/W)	125.73	126.37	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	124.50		95(-3%)	115(-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)
281203-S43	4000K	9907.5	80.71	122.75
281203-S44	4500K	9941 ^{*1}	80.15 ^{*2}	124.03 ^{*3}
281203-S45	5000K	9974 ^{*1}	80.15 ^{*2}	124.44 ^{*3}
281203-S46	5700K	10007	79.59	125.73

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

$$9941=(10007-9907.5)/3+9907.5$$

$$9974=(10007-9907.5)/3+9941$$

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

$$80.15=(80.71+79.59)/2$$

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

$$124.03=9941/80.15$$

$$124.44=9974/80.15$$

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 *******

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