

LM-79-08 Test Report

For

Revolution Lighting Technologies, Inc

(Brand Name:  Revolution)
Lighting

2280 Ward Ave. Simi Valley, CA. 93065

Outdoor Pole/Arm-Mounted Area and Roadway Luminaires

Model name(s): 113XS4-3LT

Remark: 113 represents Area Light Type, X represents Standard Housing Color. S represents Sensor Options, can be 1=N/A; 2=photocell& motion sensor. 4 represents 220W(AC100-277V). L represents Lens Type, can be 3=TYPEIII, 5=TYPEV. T represents CCT, can be 2=4000K, 4=5000K. This is a multiple list report, the original report NO. is GZE1708002-D-R.

Representative (Tested) Model: 113024-332 [113014-332]
113024-334 [113014-334]

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

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: Aug.11,2017

Update: Nov.13,2017(Updating model numbers)

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

Review By:

Tommy Liang

Manager: Tommy Liang

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

Report Format Number STD/QR4909-A/2


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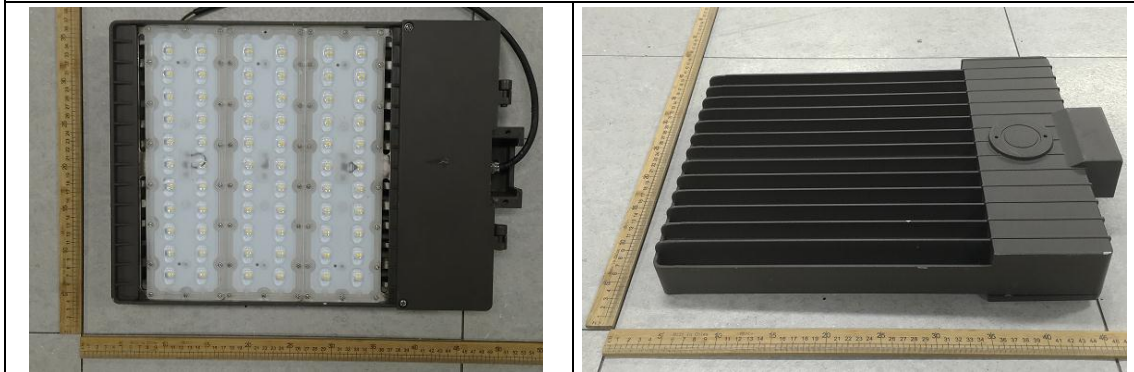
Fax: 8620-32290422

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

1.1 Product Information:

Organization Name	Revolution Lighting Technologies, Inc	
Brand Name		
Model Number	113XS4-3LT	
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	100-277 Vac, 50/60 Hz	
Nominal Power	220W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,5000K	
LED Manufacturer	Lumileds	
LED Model	L130-3080003000W2C	
Sample Number	GZE1708002-D1(4000K),D2(5000K)	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	Aug.04,2017
Date of Test	Aug.05,2017
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	2017-08-05	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	113024-332 [113014-332]		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170800	120.0	60	1.839	219.5	0.9949	5.21
2-D1	277.0	60	0.8472	217.2	0.9255	11.41
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

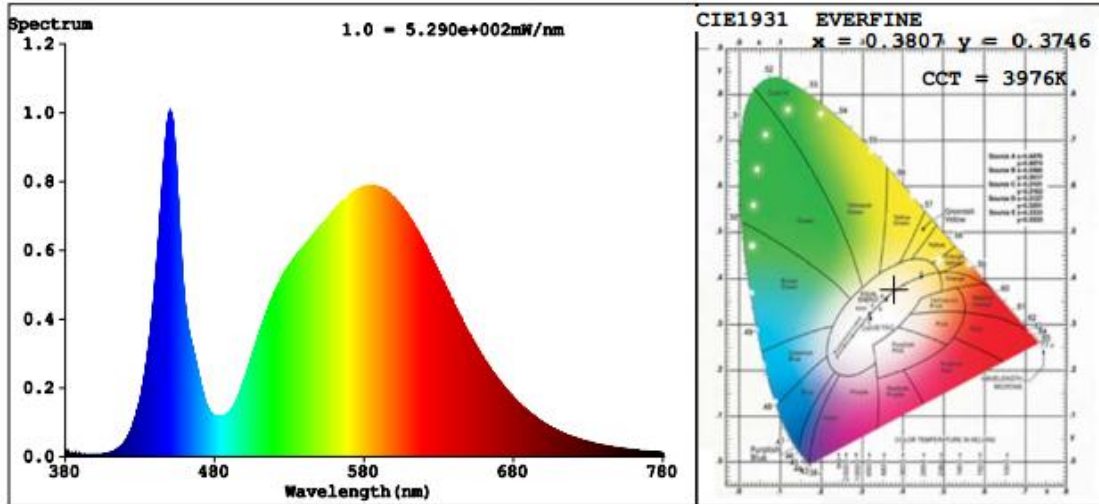
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	72	R9	0
Frequency (Hz)	60	R2	81	R10	54
CCT (K)	3976	R3	87	R11	69
Duv	-0.0011	R4	73	R12	44
Chromaticity (x, y)	x=0.3807 y=0.3746	R5	71	R13	74
Chromaticity (u', v')	u'=0.2262 v'=0.5007	R6	72	R14	92
Color Rendering Index (CRI)	74.5	R7	82	R15	67
R9	0	R8	57	--	--

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)	26750	26585	≥1000 (-10%)	
Luminous Efficacy (lm/W)	121.87	122.40	Standard: ≥100(-3%)	Premium: ≥120(-3%)
Most Worst Luminous/Highest Watts	121.12			
Zonal lumens in the 0-90 °zone (%)	99.8	--	≥ 100(-1)	
Zonal lumens in the 80-90 °zone (%)	1.4	--	≤ 10(+3)	
Beam Angle (°)	130.0	--	--	
Center Beam Candle Power (cd)	5968	--	--	

Spectral Power Distribution & Chromaticity Diagram

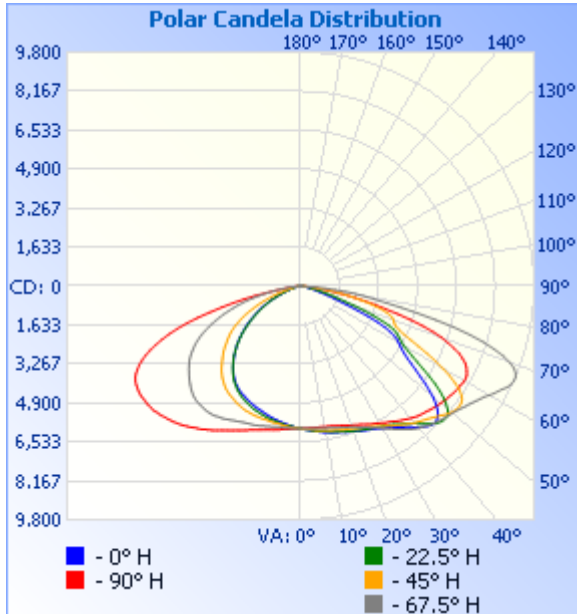


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	5,160.4	19.3%
0-40	9,210.1	34.4%
0-60	19,560.4	73.1%
60-90	7,117.8	26.6%
70-100	2,698.2	10.1%
90-120	26.1	0.1%
0-90	26,678.3	99.8%
90-180	65.7	0.2%
0-180	26,743.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	571.5	2.1%	90-100	6.0	0%
10-20	1,716.9	6.4%	100-110	8.8	0%
20-30	2,872.0	10.7%	110-120	11.3	0%
30-40	4,049.7	15.1%	120-130	11.8	0%
40-50	5,077.7	19.0%	130-140	10.1	0%
50-60	5,272.6	19.7%	140-150	7.6	0%
60-70	4,425.6	16.5%	150-160	5.5	0%
70-80	2,318.2	8.7%	160-170	3.3	0%
80-90	374.0	1.4%	170-180	1.3	0%

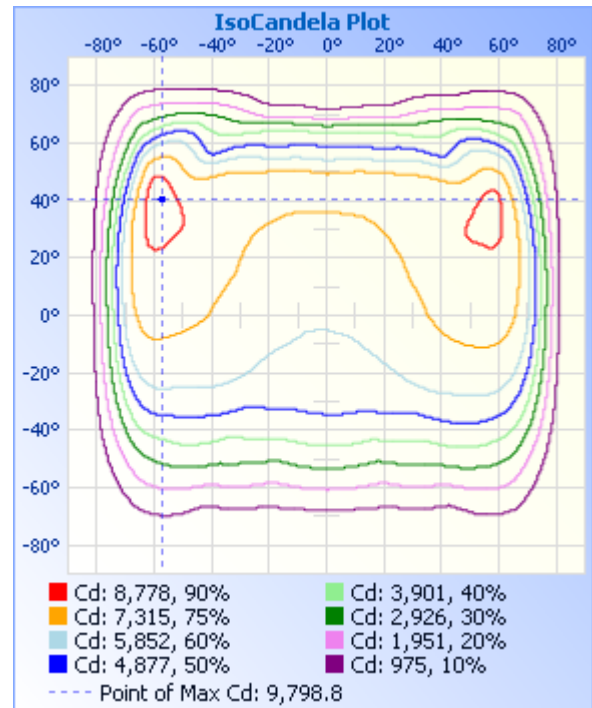
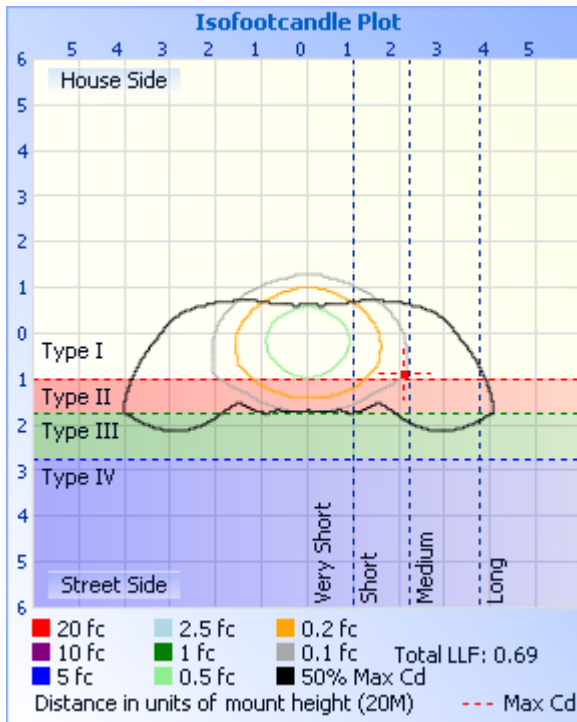
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
20.0M	1.39 fc	45.9 M	112.9 M
40.0M	0.35 fc	91.8 M	225.8 M
60.0M	0.15 fc	137.6 M	338.7 M
80.0M	0.09 fc	183.5 M	451.6 M
100.0M	0.06 fc	229.4 M	564.5 M

■ Vert. Spread: 97.8°
 ■ Horiz. Spread: 141.0°



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Table--1

UNIT: cd

C (DEG) γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	
0	5968	5968	5968	5968	5968	5968	5968	5968	5968	5968	5968	5968	5968	5968	5968	5968	
5	6017	6073	6089	6093	6083	6077	6045	5995	5960	5909	5874	5846	5844	5869	5911	5970	
10	6111	6199	6215	6230	6219	6189	6134	6047	5983	5899	5810	5716	5705	5769	5835	5983	
15	6233	6345	6355	6354	6329	6317	6245	6143	6055	5957	5762	5591	5563	5671	5782	6068	
20	6422	6532	6524	6502	6477	6454	6355	6283	6211	5988	5672	5457	5414	5537	5748	6154	
25	6673	6790	6749	6680	6651	6617	6521	6542	6403	6055	5558	5301	5257	5368	5675	6252	
30	6978	7228	7072	6869	6875	6785	6780	6881	6629	6159	5437	5093	5081	5159	5537	6419	
35	7312	7677	7417	7187	7208	7073	7102	7324	6921	6306	5210	4808	4819	4856	5370	6544	
40	7629	8116	7762	7678	7715	7513	7470	7756	7217	6312	4911	4400	4409	4430	5091	6531	
45	7876	8445	8068	8247	8021	8105	7802	8058	7444	6164	4543	3868	3896	3903	4683	6404	
50	8088	8593	8380	7979	7263	8069	8243	8299	7656	5856	4064	3261	3313	3283	4214	6095	
55	8124	8847	8089	6381	5663	6596	8280	8632	7824	5450	3551	2571	2674	2604	3679	5718	
60	8006	9189	6469	4890	4759	5018	6908	9138	7933	4979	2971	1901	1984	1923	3020	5196	
65	7351	9424	4571	4163	3561	4313	4802	9742	7619	4269	2203	1295	1309	1308	2192	4427	
70	5883	8213	4014	2186	1468	2392	4147	9349	6286	3364	1341	724	719	721	1316	3437	
75	3425	5543	2784	883	624	963	3271	6669	3681	2283	632	405	392	395	611	2313	
80	1157	2920	1199	392	307	432	1600	3159	1518	1154	285	206	195	206	271	1132	
85	235	967	263	110	79.9	120	351	1016	313	270	94.8	71.2	50.1	70.8	92.3	246	
90	11.0	12.6	5.48	1.64	1.00	1.75	5.81	13.3	10.4	9.29	3.38	0.89	1.80	1.20	4.96	10.9	
95	10.9	8.15	3.19	0.84	0.48	0.85	3.08	8.52	9.52	10.4	4.48	1.84	0.90	2.05	5.70	12.3	
100	13.8	7.90	3.13	0.94	0.74	1.15	3.07	8.31	11.4	12.8	6.56	3.72	2.54	3.99	6.99	14.5	
105	17.3	9.79	4.27	1.98	1.94	1.99	4.50	10.1	14.5	15.9	8.71	5.66	4.48	5.89	9.68	16.8	
110	19.7	12.1	5.56	3.07	3.38	3.28	6.09	12.4	16.7	16.9	11.2	8.19	7.26	8.03	12.1	18.5	
115	20.5	13.8	7.10	3.91	4.17	4.38	7.48	14.2	16.9	17.8	12.9	9.37	9.89	9.82	12.6	18.9	
120	20.5	14.4	8.50	5.68	5.30	5.46	9.07	15.2	16.7	18.0	14.1	11.9	11.0	12.1	13.1	17.5	
125	20.4	15.1	8.62	7.88	8.54	8.41	9.53	16.3	16.1	17.9	12.6	13.2	14.5	13.0	12.6	16.6	
130	19.4	14.7	8.70	9.07	9.38	9.57	10.2	15.5	16.3	15.4	13.0	14.5	15.0	14.2	13.1	14.9	
135	17.1	13.3	8.90	10.6	12.2	11.4	10.8	13.8	15.3	13.7	12.1	14.8	15.3	15.0	12.4	14.0	
140	16.1	12.7	9.12	11.2	12.4	11.7	9.83	13.6	14.7	13.9	10.1	14.5	14.0	13.9	9.87	14.1	
145	14.9	10.8	9.34	11.2	9.83	11.9	8.53	12.2	14.1	12.9	9.74	13.6	12.6	12.6	10.5	13.9	
150	14.0	10.5	11.0	11.6	12.5	12.5	10.01	11.9	13.4	12.7	10.7	13.0	13.0	12.4	12.6	12.8	
155	11.5	10.3	12.0	12.0	13.3	12.5	11.3	11.7	11.8	12.4	11.3	12.2	12.1	11.8	12.0	11.7	
160	11.5	9.59	12.1	12.1	12.4	12.3	11.5	11.4	11.0	11.9	10.9	11.4	11.5	11.3	11.1	11.6	
165	11.5	9.76	12.4	12.1	11.9	12.4	11.4	10.8	11.6	10.9	10.4	10.3	10.8	10.8	10.7	11.2	
170	12.7	10.8	13.4	13.8	13.0	13.8	12.8	11.4	13.3	13.2	11.7	13.4	14.7	14.3	13.6	13.3	
175	13.3	12.3	13.9	14.2	14.3	13.9	13.4	12.2	13.6	14.0	12.9	13.6	15.1	14.9	13.8	13.9	
180	12.6	12.1	13.0	13.9	14.0	12.9	13.2	11.7	12.7	12.7	11.9	12.7	13.8	13.9	13.0	13.2	

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

Test date	2017-08-05	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	113024-334 [113014-334]		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170800	120.0	60	1.835	218.7	0.9932	5.69
2-D2	277.0	60	0.8428	215.8	0.9244	11.82
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

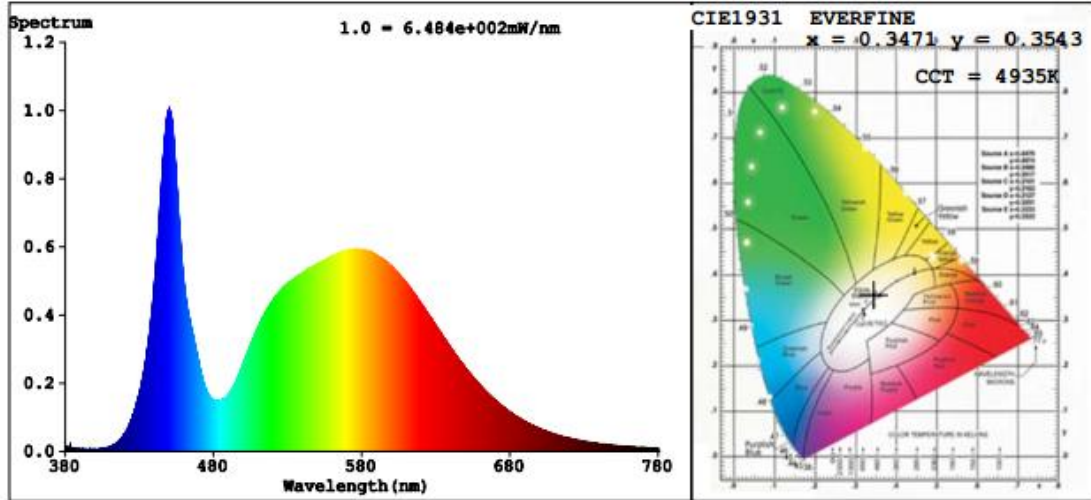
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	75	R9	0
Frequency (Hz)	60	R2	82	R10	57
CCT (K)	4935	R3	87	R11	73
Duv	0.0005	R4	76	R12	47
Chromaticity (x, y)	x=0.3471 y=0.3543	R5	75	R13	76
Chromaticity (u', v')	u'=0.2117 v'=0.4862	R6	74	R14	93
Color Rendering Index (CRI)	77.0	R7	85	R15	70
R9	0	R8	62	--	--

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)	27169	26925	≥1000 (-10%)	
Luminous Efficacy (lm/W)	124.23	124.77	Standard: ≥	Premium: ≥
Most Worst Luminous/Highest Watts	123.11		100(-3%)	120(-3%)

Spectral Power Distribution & Chromaticity Diagram



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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 *******