

LM-79-08 Test Report

For

Revolution Lighting Technologies, Inc.
(Brand Name: Revolution Lighting Technologies)

2280 Ward Ave. Simi Valley CA. 93065

**2x2 Luminaires for Ambient Lighting of Interior
Commercial Spaces**Model name(s): 151053-101
151053-102
151053-103
151053-105Remark: This is a multiple list report, the original report NO. is
GZE1704041-I.Representative (Tested) Model: 151053-101
151053-105

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

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Apr.25,2017

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

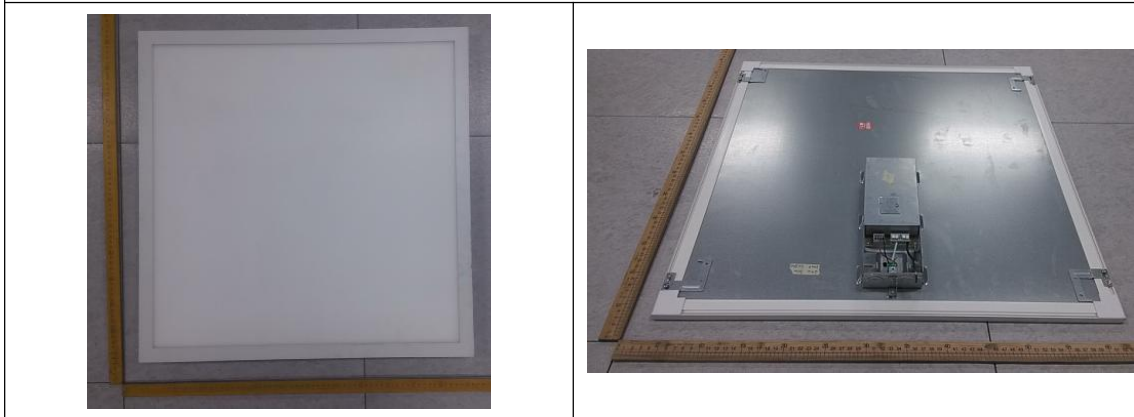
Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

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	151053-101 151053-102 151053-103 151053-105	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	30W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series (3000K)	
Sample Number	GZE1704041-I1(3000K),I2(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	Apr.24,2017
Date of Test	Apr.25,2017
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	2017-04-25	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	151053-101		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170404	120.0	60	0.2351	27.72	0.9824	10.77
1-11	277.0	60	0.1081	27.71	0.9252	14.26
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

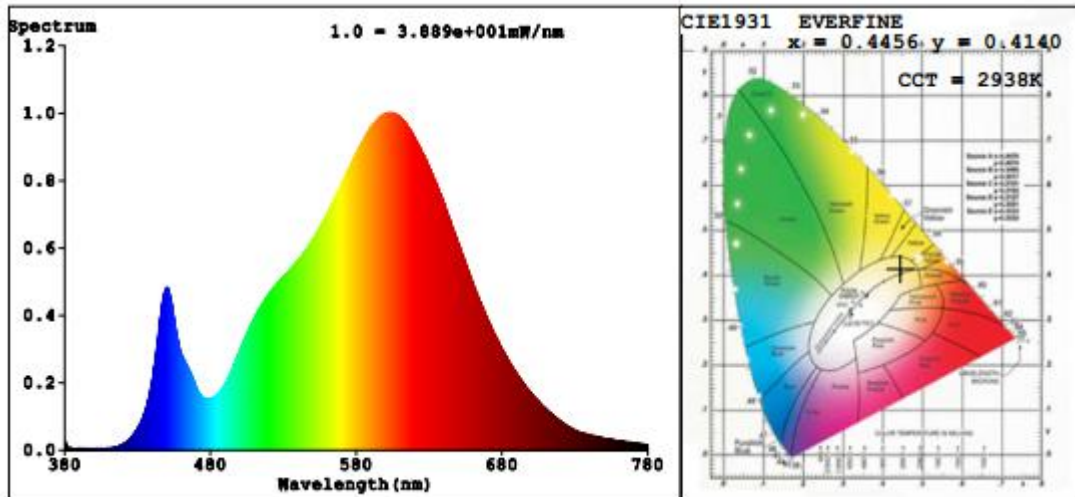
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	79	R9	5
Frequency (Hz)	60	R2	89	R10	74
CCT (K)	2938	R3	97	R11	78
Duv	0.0027	R4	80	R12	65
Chromaticity (x, y)	x=0.4456 y=0.4140	R5	79	R13	81
Chromaticity (u', v')	u'=0.2519 v'=0.5265	R6	85	R14	98
Color Rendering Index (CRI)	81.4	R7	84	R15	72
R9	5	R8	59	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.1 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	3558.8	3551.0	≥2000(-10%)	
Luminous Efficacy (lm/W)	128.38	128.15	Standard: ≥100(-3%)	Premium: ≥125(-3%)
Zonal lumens in the 0-60° zone (%)	77.9	--	≥75(-3)	
SC: 0-180° (if applicable)	1.26	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.24	--	1.0-2.0(±0.1)	
Beam Angle (°)	112.2	--	--	
Center Beam Candle Power (cd)	1237	--	--	

Spectral Power Distribution & Chromaticity Diagram

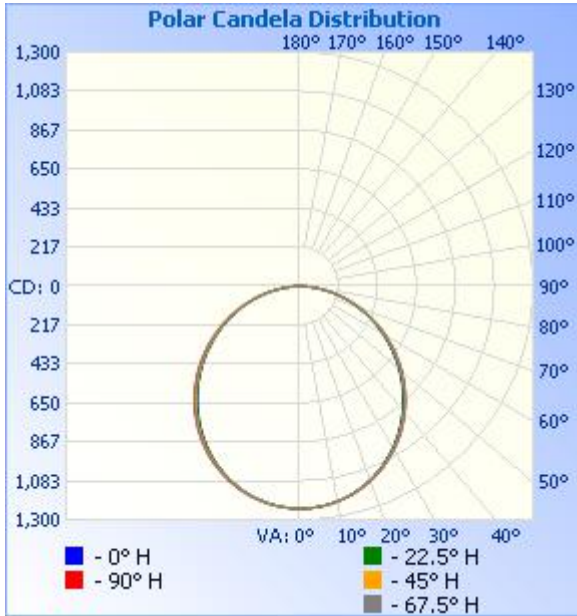


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	958.4	26.9%
0-40	1,567.9	44.1%
0-60	2,770.3	77.9%
60-90	787.9	22.1%
70-100	344.7	9.7%
90-120	0.0	0%
0-90	3,558.1	100%
90-180	0.3	0%
0-180	3,558.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	117.0	3.3%	90-100	0.0	0%
10-20	334.8	9.4%	100-110	0	0%
20-30	506.6	14.2%	110-120	0.0	0%
30-40	609.5	17.1%	120-130	0.1	0%
40-50	631.0	17.7%	130-140	0.1	0%
50-60	571.3	16.1%	140-150	0.1	0%
60-70	443.1	12.5%	150-160	0.0	0%
70-80	268.6	7.5%	160-170	0.0	0%
80-90	76.1	2.1%	170-180	0.0	0%

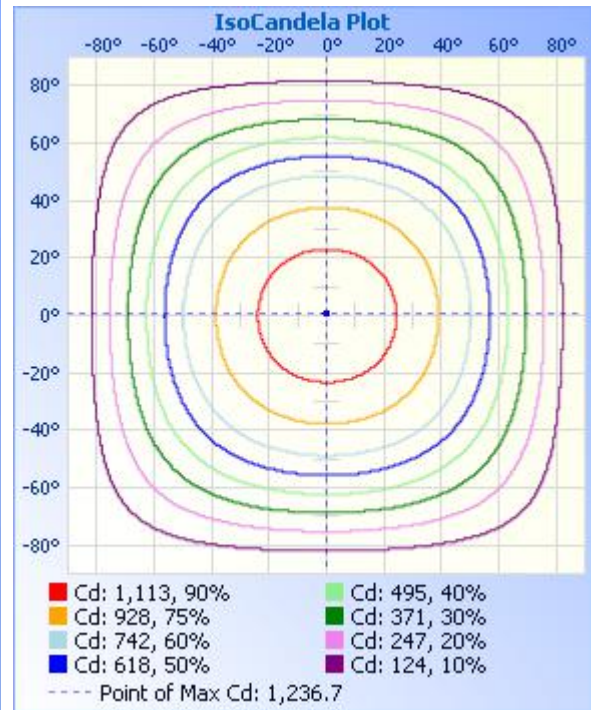
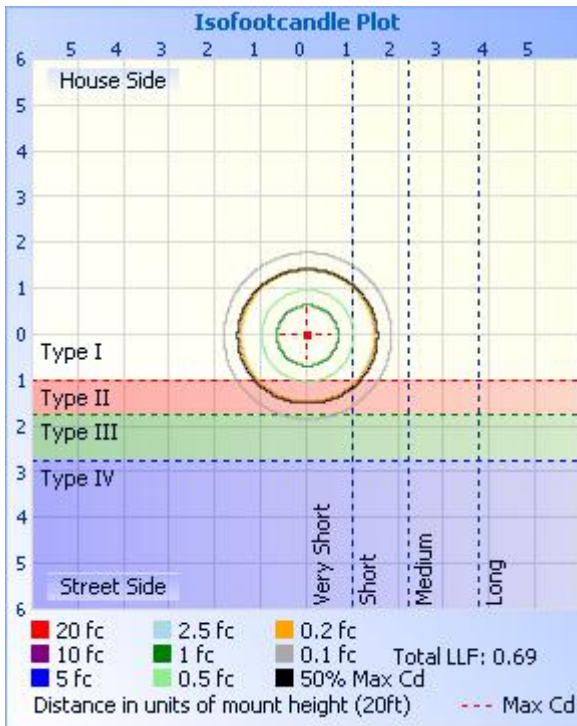
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	4.28 fc	49.6 ft	51.6 ft
34.0ft	1.07 fc	99.2 ft	103.2 ft
51.0ft	0.48 fc	148.8 ft	154.9 ft
68.0ft	0.27 fc	198.3 ft	206.5 ft
85.0ft	0.17 fc	247.9 ft	258.1 ft
102.0ft	0.12 fc	297.5 ft	309.7 ft

■ Vert. Spread: 111.1°
■ Horiz. Spread: 113.3°



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Table--1 UNIT: cd

C (DEG) \ γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
0	1237	1237	1237	1237	1237	1237	1237	1237	1237	1237	1237	1237	1237	1237	1237	1237
5	1231	1232	1231	1231	1231	1232	1232	1232	1232	1232	1231	1231	1230	1230	1230	1231
10	1215	1215	1214	1214	1214	1215	1215	1216	1216	1215	1214	1213	1212	1212	1213	1215
15	1188	1188	1187	1186	1186	1187	1188	1190	1190	1188	1186	1184	1182	1183	1185	1187
20	1151	1150	1148	1146	1147	1148	1150	1153	1154	1151	1148	1144	1142	1143	1146	1149
25	1104	1103	1100	1097	1097	1099	1103	1106	1107	1103	1099	1093	1091	1092	1096	1101
30	1047	1046	1042	1038	1038	1040	1045	1049	1051	1047	1040	1034	1031	1032	1038	1044
35	981	980	975	972	970	973	979	984	985	981	973	965	962	964	971	978
40	908	906	901	897	895	899	905	911	911	907	898	889	885	887	896	903
45	827	825	820	815	813	817	824	830	831	826	816	807	803	805	814	822
50	739	739	733	727	725	729	737	743	744	739	729	719	715	718	726	735
55	647	647	641	635	634	638	645	650	652	647	637	628	624	626	634	643
60	551	551	546	541	540	543	550	555	557	552	542	534	530	533	539	548
65	453	454	449	445	444	447	453	458	459	454	446	439	435	437	443	450
70	355	355	352	349	348	351	355	360	361	356	349	343	340	341	346	352
75	255	256	255	254	254	256	259	263	264	259	253	248	245	246	249	253
80	159	159	160	161	160	162	166	166	167	163	160	155	153	153	154	157
85	66.1	66.2	66.6	69.0	70.2	71.6	70.9	71.3	71.9	68.7	65.6	64.9	63.2	62.4	61.8	64.2
90	0.01	0.02	0.03	0.08	0.07	0.05	0.10	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00	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	0.10	0.05	0.00	0.00	0.10	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.15	0.00	0.05	0.15	0.00	0.00	0.00
125	0.00	0.00	0.00	0.05	0.25	0.00	0.00	0.20	0.15	0.15	0.00	0.10	0.36	0.10	0.00	0.00
130	0.05	0.00	0.00	0.00	0.30	0.00	0.00	0.15	0.25	0.15	0.00	0.10	0.46	0.10	0.00	0.00
135	0.10	0.00	0.00	0.05	0.41	0.00	0.00	0.15	0.25	0.15	0.00	0.10	0.46	0.10	0.00	0.00
140	0.10	0.00	0.00	0.05	0.41	0.00	0.00	0.15	0.25	0.20	0.00	0.05	0.20	0.10	0.00	0.00
145	0.15	0.00	0.00	0.05	0.25	0.00	0.00	0.05	0.36	0.10	0.00	0.00	0.25	0.15	0.00	0.00
150	0.20	0.00	0.00	0.05	0.25	0.00	0.00	0.00	0.35	0.10	0.00	0.00	0.51	0.25	0.00	0.00
155	0.05	0.00	0.00	0.05	0.25	0.00	0.00	0.00	0.10	0.10	0.00	0.00	0.46	0.25	0.00	0.00
160	0.00	0.00	0.00	0.05	0.25	0.00	0.00	0.00	0.20	0.10	0.00	0.00	0.46	0.30	0.00	0.00
165	0.00	0.00	0.00	0.05	0.25	0.00	0.00	0.00	0.15	0.25	0.05	0.00	0.20	0.25	0.00	0.00
170	0.05	0.00	0.00	0.20	0.25	0.00	0.00	0.00	0.36	0.30	0.30	0.00	0.41	0.46	0.20	0.00
175	0.10	0.00	0.00	0.41	0.41	0.00	0.00	0.00	0.41	0.15	0.00	0.00	0.35	0.46	0.00	0.00
180	0.10	0.00	0.00	0.30	0.41	0.00	0.00	0.00	0.15	0.10	0.00	0.00	0.31	0.41	0.00	0.00

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

Test date	2017-04-25	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	151053-105		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170404	120.0	60	0.2428	28.51	0.9784	11.17
1-12	277.0	60	0.1117	28.50	0.9207	14.70
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

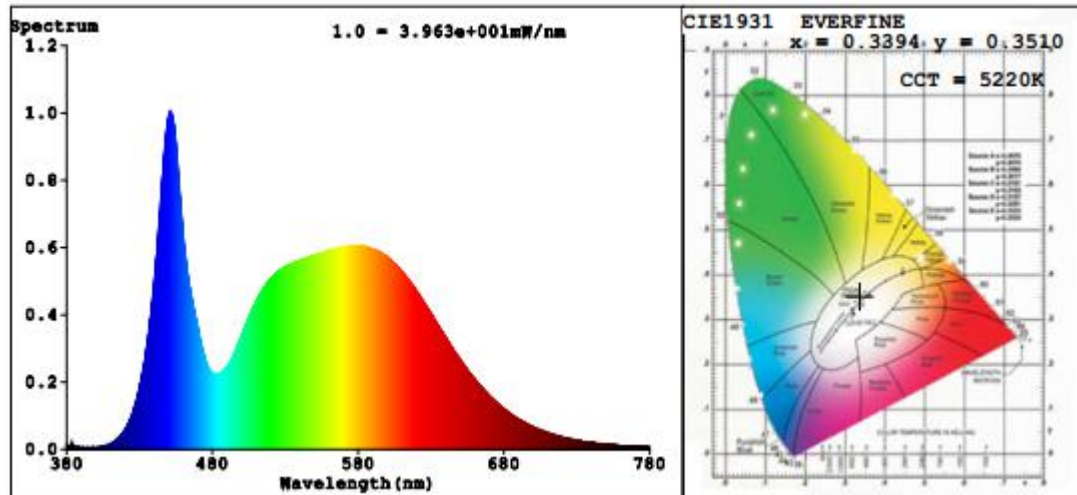
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	3
Frequency (Hz)	60	R2	86	R10	66
CCT (K)	5220	R3	90	R11	81
Duv	0.0020	R4	82	R12	59
Chromaticity (x, y)	x=0.3394 y=0.3510	R5	81	R13	81
Chromaticity (u', v')	u'=0.2078 v'=0.4835	R6	81	R14	94
Color Rendering Index (CRI)	81.6	R7	86	R15	75
R9	3	R8	67	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.1 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	3756	3748	>=2000(-10%)	
Luminous Efficacy (lm/W)	131.76	131.52	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)
151053-101	3000K	3558.8	27.72	128.38
151053-102	3500K	3608*1	28.12*2	128.31*3
151053-103	4000K	3657*1	28.12*2	130.05*3
151053-105	5000K	3756	28.51	131.76

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

$$3608 = (3756 - 3558.8) / 4 + 3558.8$$

$$3657 = (3756 - 3558.8) / 4 + 3608$$

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

$$28.12 = (27.72 + 28.51) / 2$$

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

$$128.31 = 3608 / 28.12$$

$$130.05 = 3657 / 28.12$$

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 *******