

LM-79-08 Test Report

For

Keystone Technologies

(Brand Name: Keystone)

1390 Welsh Rd North Wales, PA 19454

High Bay Luminaires for Commercial and Industrial Buildings

Model name(s): KT-RHLED100-10C-8xx-VDIM-P

Remark: The “xx” stands for different CCT as bellow: 40=4000K,
50=5000K.This is multiple listed report, the Project Number of the original report is
JAE180630-ARepresentative (Tested) Model: KT-RHLED100-10C-840-VDIM-P
KT-RHLED100-10C-850-VDIM-P

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

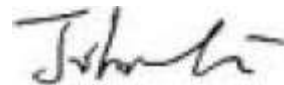
Test & Report By:



Engineer: Garman Mo

Date: Oct.26,2018

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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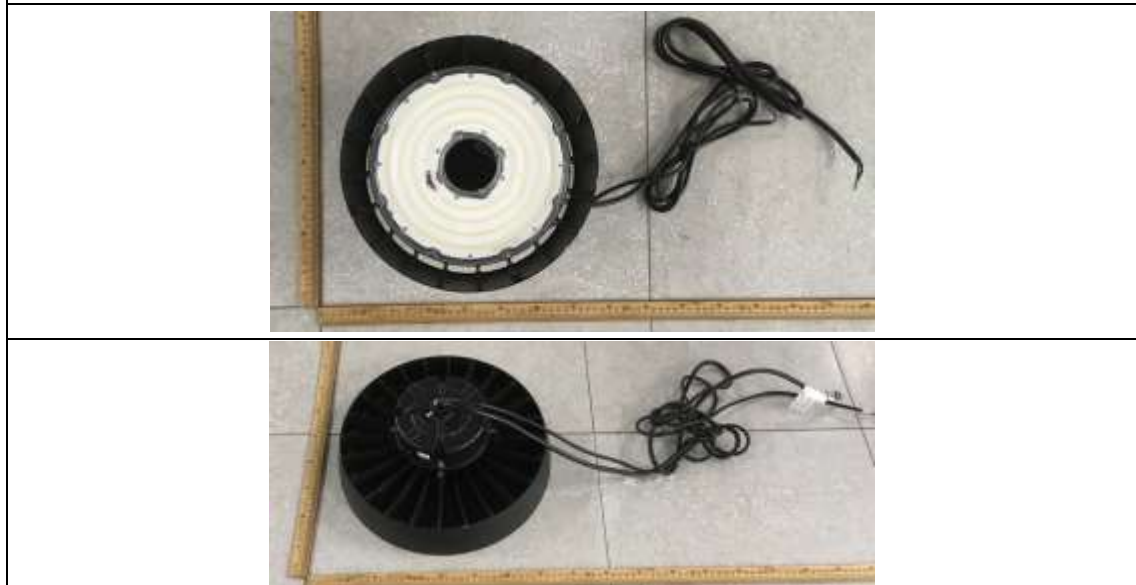
Fax: 8620-32290422

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

1.1 Product Information:

Organization Name	Keystone Technologies	
Brand Name	Keystone	
Model Number	KT-RHLED100-10C-8xx-VDIM-P	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	High Bay Luminaires for Commercial and Industrial Buildings	
Rated Voltage / Frequency	100-277V ac, 50/60 Hz	
Nominal Power	100W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K, 5000K.	
LED Manufacturer	Samsung Electronics Co., LTD.	
LED Model	4000K: SPMWH1228FD5WATOSG 5000K: SPMWH1228FD5WAROSG	
Sample Number	JAE180630-A1(4000K), A2(5000K)	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	Jun.29,2018
Date of Test	Jun.29,2018
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	2018-06-29	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	KT-RHLED100-10C-840-VDIM-P		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180630	120.0	60	0.8024	95.99	0.9969	4.03
-A1	277.0	60	0.3619	94.21	0.9399	11.55
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

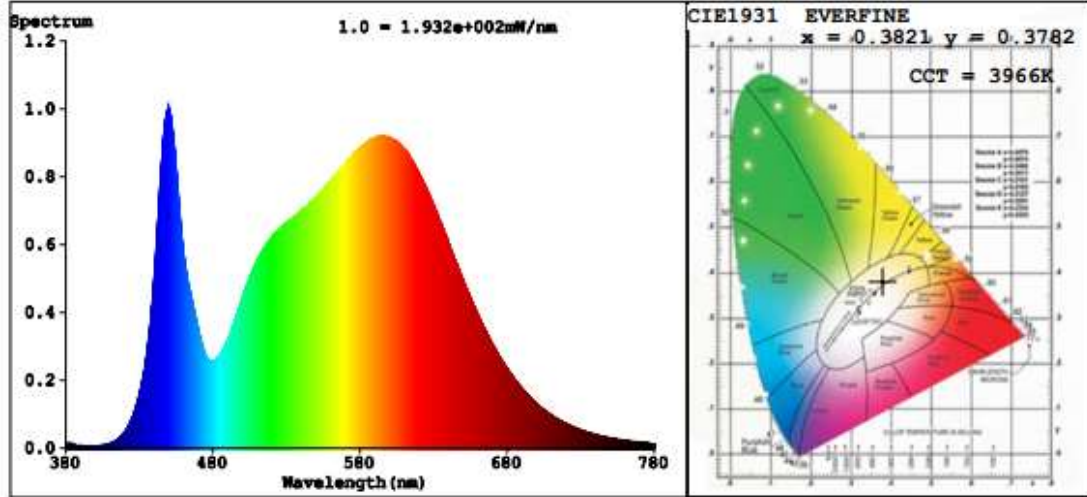
Chromaticity Measurement -Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	13
Frequency (Hz)	60	R2	89	R10	74
CCT (K)	3966	R3	94	R11	82
Duv	0.0002	R4	83	R12	64
Chromaticity (x, y)	x=0.3821 y=0.3782	R5	82	R13	84
Chromaticity (u', v')	u'=0.2256 v'=0.5025	R6	85	R14	97
Color Rendering Index (CRI)	83.7	R7	97	R15	77
R9	13	R8	67	--	--

Photometric Measurement –Goniophotometer Method:

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	12968	12785	≥10000	
Luminous Efficacy (lm/W)	135.10	135.71	Standard: ≥105(-3%)	Premium: ≥130(-3%)
Most Worst Luminous/Highest Watts	133.19			
Zonal lumens in the 20-50 ° zone (%)	54.3	--	≥30(-10)	
Beam Angle (°)	112.0	--	--	
Center Beam Candle Power (cd)	4776	--	--	

Spectral Power Distribution & Chromaticity Diagram

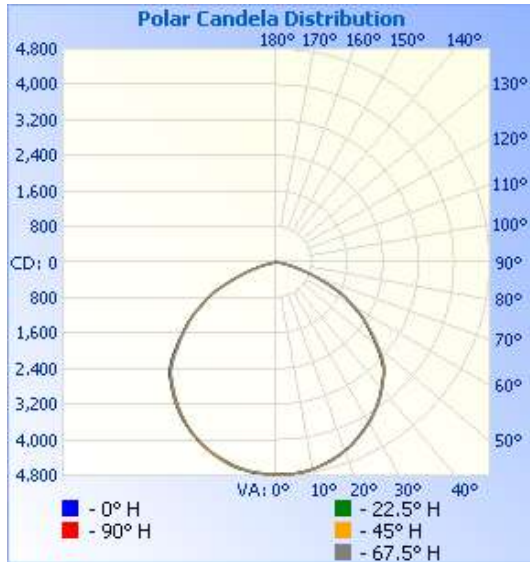


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	3,762.7	29%
0-40	6,217.2	47.9%
0-60	11,017.0	85%
60-90	1,914.3	14.8%
70-100	479.0	3.7%
90-120	7.5	0.1%
0-90	12,931.3	99.7%
90-180	35.3	0.3%
0-180	12,966.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	453.6	3.5%	90-100	0.8	0%
10-20	1,307.1	10.1%	100-110	2.2	0%
20-30	2,002.0	15.4%	110-120	4.5	0%
30-40	2,454.4	18.9%	120-130	5.9	0%
40-50	2,586.9	20.0%	130-140	6.2	0%
50-60	2,212.9	17.1%	140-150	5.9	0%
60-70	1,436.1	11.1%	150-160	5.0	0%
70-80	452.8	3.5%	160-170	3.3	0%
80-90	25.4	0.2%	170-180	1.4	0%

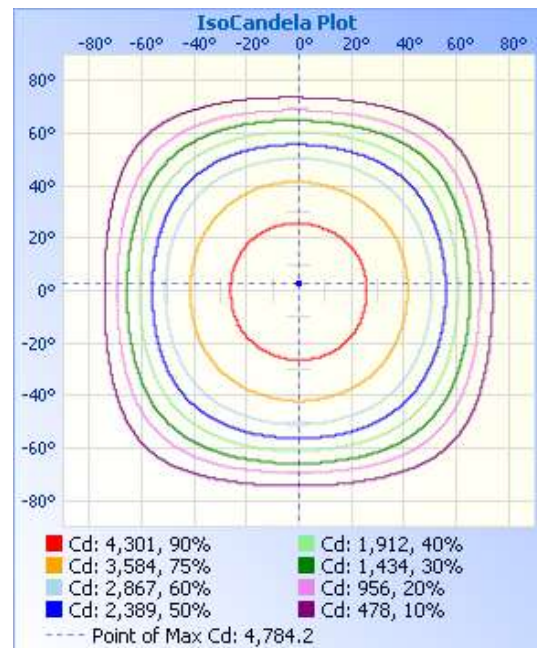
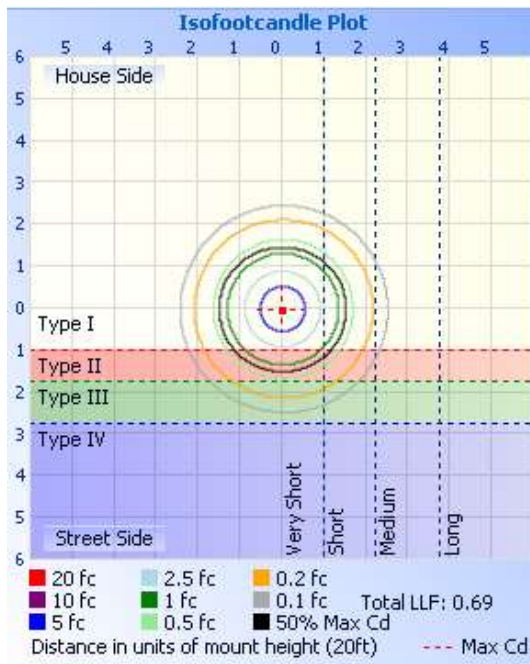
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	16.53 fc	50.4 ft	50.4 ft
34.0ft	4.13 fc	100.8 ft	100.8 ft
51.0ft	1.84 fc	151.3 ft	151.1 ft
68.0ft	1.03 fc	201.7 ft	201.5 ft
85.0ft	0.66 fc	252.1 ft	251.9 ft
102.0ft	0.46 fc	302.5 ft	302.3 ft

■ Vert. Spread: 112.0°
 ■ Horiz. Spread: 112.0°



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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	4776	4776	4776	4776	4776	4776	4776	4776	4776	4776	4776	4776	4776	4776	4776	4776
5	4766	4772	4771	4769	4775	4773	4772	4768	4771	4769	4769	4768	4767	4763	4750	4748
10	4699	4714	4715	4720	4724	4730	4728	4725	4732	4736	4730	4732	4722	4721	4705	4701
15	4599	4610	4606	4620	4624	4642	4637	4636	4648	4650	4639	4633	4625	4631	4620	4611
20	4485	4494	4487	4495	4508	4519	4520	4520	4520	4522	4515	4509	4497	4497	4500	4483
25	4315	4327	4325	4328	4346	4355	4362	4367	4357	4360	4340	4348	4335	4339	4331	4325
30	4125	4135	4130	4139	4154	4168	4172	4180	4164	4171	4152	4147	4141	4145	4114	4114
35	3888	3898	3906	3915	3932	3947	3944	3964	3952	3951	3936	3920	3920	3923	3905	3886
40	3636	3628	3620	3642	3675	3695	3686	3698	3685	3689	3682	3673	3665	3650	3642	3621
45	3345	3363	3391	3390	3408	3416	3423	3424	3426	3428	3401	3392	3385	3372	3332	3339
50	2893	2885	2872	2932	2953	2957	2989	2997	3004	2990	2973	2949	2930	2889	2879	2860
55	2448	2458	2459	2458	2491	2516	2522	2538	2512	2528	2508	2482	2466	2455	2432	2417
60	1947	1944	1958	1970	2003	2034	2051	2068	2039	2040	2009	1994	1970	1940	1935	1925
65	1410	1425	1424	1414	1467	1519	1526	1550	1571	1558	1532	1516	1492	1466	1428	1393
70	812	828	840	845	879	905	927	947	945	943	911	888	862	841	830	801
75	347	349	350	370	395	426	432	452	453	443	420	398	387	368	349	346
80	90.0	86.1	94.3	110	125	131	136	138	138	130	124	121	114	104	94.3	91.2
85	3.36	3.53	3.64	4.12	4.85	6.32	7.06	7.77	7.68	6.90	5.95	5.20	4.36	3.87	3.36	2.97
90	0.86	0.81	0.76	0.81	0.87	1.03	1.12	1.07	0.65	1.08	0.55	0.55	0.73	0.66	0.67	0.67
95	0.84	0.76	0.65	0.79	0.73	0.76	0.84	0.82	0.71	0.77	0.60	0.56	0.61	0.56	0.71	0.71
100	1.11	1.06	1.05	1.00	1.00	0.96	1.05	1.05	1.01	0.96	0.91	0.86	1.01	1.07	1.21	1.12
105	2.26	2.22	2.11	1.86	1.91	1.82	1.92	1.96	1.87	1.77	1.72	1.57	1.67	1.77	2.03	2.07
110	4.28	3.48	3.73	4.03	3.88	3.79	3.43	3.18	3.89	2.88	2.97	3.68	3.69	3.64	2.92	3.04
115	5.64	5.59	4.18	4.24	4.79	4.21	4.14	5.40	4.94	4.95	3.53	3.52	4.69	3.49	3.79	4.80
120	6.85	6.46	5.59	5.43	5.24	5.15	5.40	6.76	5.95	6.21	4.99	4.74	4.59	4.50	5.00	5.96
125	7.76	7.41	6.40	6.95	7.67	7.02	6.87	7.92	6.95	6.70	5.69	6.05	6.92	6.22	5.60	6.31
130	8.16	7.87	6.90	7.96	8.38	7.88	7.17	8.10	7.38	6.86	6.15	7.16	7.93	7.59	6.47	6.51
135	8.37	8.16	7.55	9.12	8.88	8.79	8.02	8.13	7.91	7.37	7.31	8.27	8.68	8.70	7.05	7.42
140	8.72	8.83	8.11	9.57	9.59	9.55	8.37	9.03	8.42	8.68	7.61	8.87	9.39	9.28	7.58	8.94
145	9.68	8.89	8.96	10.3	9.98	10.4	8.83	9.49	9.12	9.08	8.16	9.42	9.89	9.76	9.20	9.44
150	9.76	9.52	10.8	10.9	12.0	11.3	11.0	10.5	9.27	10.0	9.43	9.92	10.1	10.4	11.0	9.49
155	9.34	9.82	12.2	11.7	12.4	11.9	12.2	11.6	9.02	10.5	9.72	10.9	10.2	10.4	11.3	9.74
160	8.77	10.3	12.3	12.1	12.7	12.3	12.9	11.6	9.42	9.64	10.3	11.5	10.4	10.7	11.2	10.1
165	10.1	10.8	12.7	12.0	12.8	12.9	13.2	11.5	10.1	10.1	10.9	11.8	10.6	11.5	11.2	11.1
170	11.4	12.3	15.2	14.3	14.4	15.0	15.5	12.3	11.4	11.7	13.3	15.5	15.5	15.4	14.6	15.5
175	11.9	13.5	16.0	15.2	16.9	15.6	16.4	13.4	11.9	12.0	13.8	16.1	16.3	16.8	14.8	16.6
180	11.8	14.1	15.7	15.7	16.9	15.1	16.7	13.5	11.4	11.8	13.8	15.5	15.7	16.8	15.1	16.4

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

Test date	2018-06-29	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	KT-RHLED100-10C-850-VDIM-P		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180630	120.0	60	0.8118	96.85	0.9942	5.30
-A2	277.0	60	0.3585	94.21	0.9487	12.47
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

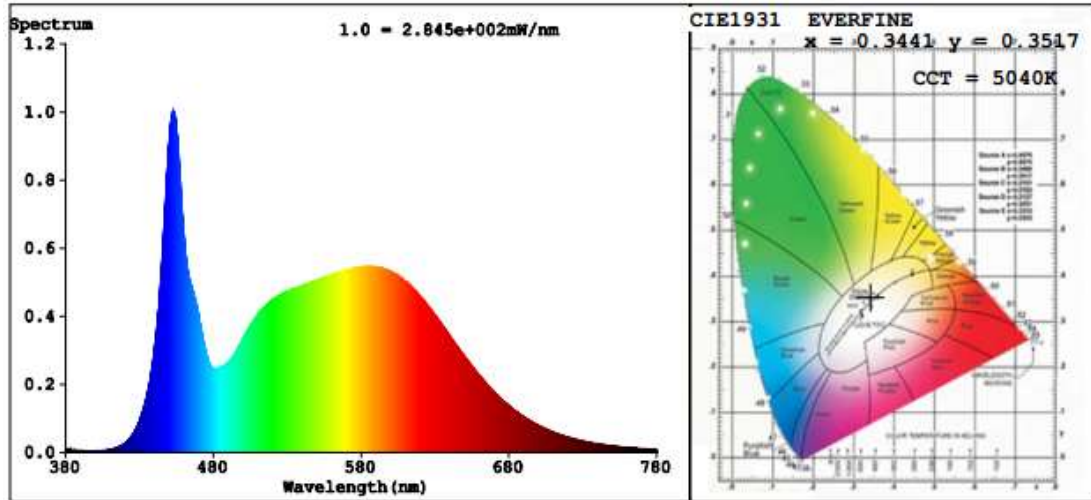
Chromaticity Measurement -Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	85	R9	22
Frequency (Hz)	60	R2	91	R10	78
CCT (K)	5040	R3	94	R11	84
Duv	0.0004	R4	85	R12	63
Chromaticity (x, y)	x=0.3441 y=0.3517	R5	85	R13	67
Chromaticity (u', v')	u'=0.2107 v'=0.4846	R6	87	R14	97
Color Rendering Index (CRI)	85.7	R7	88	R15	81
R9	22	R8	71	--	--

Photometric Measurement –Spectroradiometer Method:

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	13195	12901	>=10000(-10%)	
Luminous Efficacy (lm/W)	136.24	136.94	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	133.21		105(-3%)	130(-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 *******

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