

## 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-RHLED200-14C-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-C

Representative (Tested) Model: KT-RHLED200-14C-840-VDIM-P  
KT-RHLED200-14C-850-VDIM-P

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

Test & Report By:

*Garman Mo*

Engineer:Garman Mo

Date: Oct.26,2018

Review By:

*John Li*

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	Keystone Technologies	
Brand Name	Keystone	
Model Number	KT-RHLED200-14C-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	200W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K, 5000K.	
LED Manufacturer	Samsung Electronics Co., LTD.	
LED Model	4000K: SPMWH1228FD5WATOSG 5000K: SPMWH1228FD5WAROSG	
Sample Number	JAE180630-C1(4000K), C2(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"> <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>  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><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b>  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><b>3) Electrical Measurements:</b>  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)*

<b>Test date</b>	2018-06-29	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	KT-RHLED200-14C-840-VDIM-P		

**Electrical Measurement :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180630	120.0	60	1.6531	197.1	0.9936	8.68
-C1	277.0	60	0.7197	189.1	0.9485	8.41
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

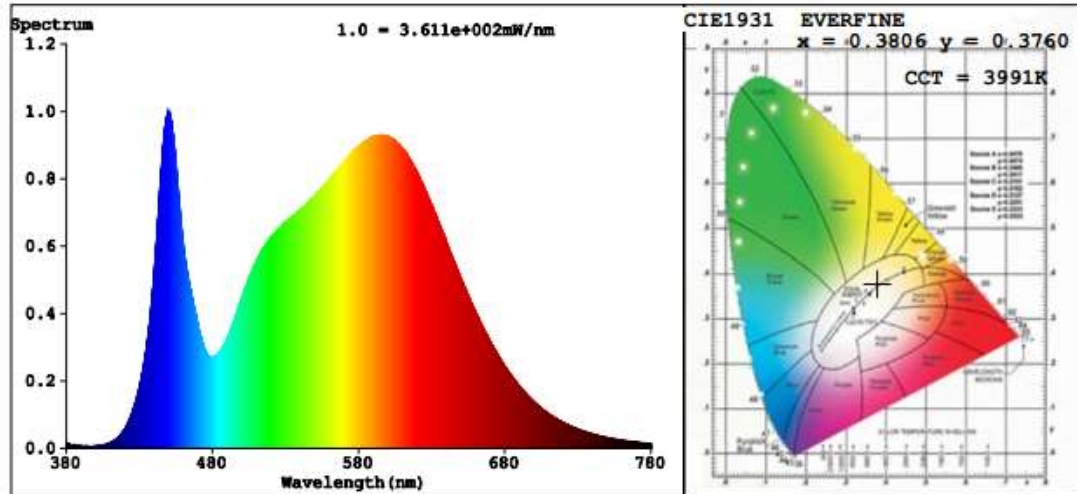
**Chromaticity Measurement -Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	15
Frequency (Hz)	60	R2	89	R10	75
CCT (K)	3991	R3	94	R11	82
Duv	-0.0004	R4	83	R12	64
Chromaticity (x, y)	x=0.3806 y=0.3760	R5	83	R13	84
Chromaticity (u', v')	u'=0.2255 v'=0.5013	R6	85	R14	97
Color Rendering Index (CRI)	83.9	R7	87	R15	77
R9	15	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)	26588	25642	≥10000	
Luminous Efficacy (lm/W)	134.90	135.60	Standard: ≥105(-3%)	Premium: ≥130(-3%)
Most Worst Luminous/Highest Watts	130.10			
Zonal lumens in the 20-50 ° zone (%)	52.4	--	≥30(-10)	
Beam Angle ( ° )	113.5	--	--	
Center Beam Candle Power (cd)	9436	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

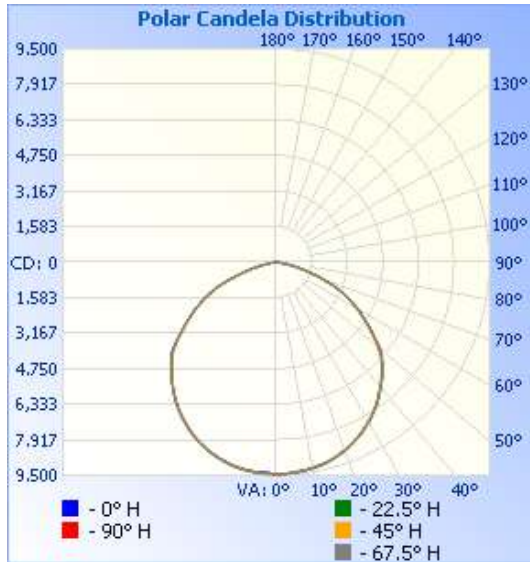


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	7,436.2	28%
0-40	12,277.3	46.2%
0-60	21,905.8	82.4%
60-90	4,594.2	17.3%
70-100	1,401.9	5.3%
90-120	26.1	0.1%
0-90	26,500.0	99.7%
90-180	85.4	0.3%
0-180	26,585.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	894.4	3.4%	90-100	4.6	0%
10-20	2,582.8	9.7%	100-110	8.5	0%
20-30	3,959.0	14.9%	110-120	13.0	0%
30-40	4,841.0	18.2%	120-130	13.9	0.1%
40-50	5,120.1	19.3%	130-140	14.2	0.1%
50-60	4,508.5	17.0%	140-150	12.7	0%
60-70	3,196.9	12.0%	150-160	9.9	0%
70-80	1,272.9	4.8%	160-170	6.2	0%
80-90	124.4	0.5%	170-180	2.4	0%

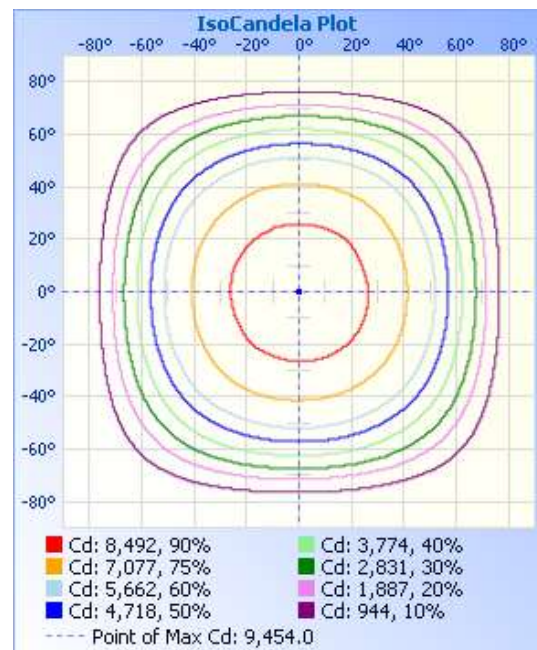
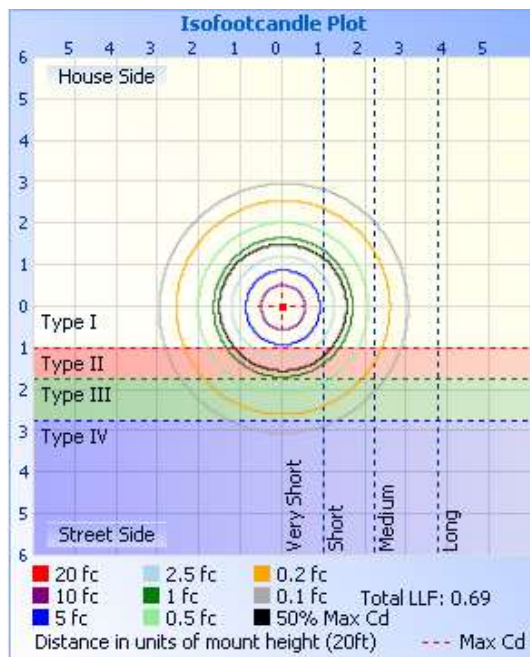
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	32.7 fc	52.0 ft	51.9 ft
34.0ft	8.2 fc	103.9 ft	103.8 ft
51.0ft	3.6 fc	155.9 ft	155.7 ft
68.0ft	2.0 fc	207.8 ft	207.6 ft
85.0ft	1.3 fc	259.8 ft	259.5 ft
102.0ft	0.9 fc	311.8 ft	311.4 ft

■ Vert. Spread: 113.6°  
 ■ Horiz. Spread: 113.5°



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Table--1

UNIT: cd

γ (DEG)	C (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	9436	9436	9436	9436	9436	9436	9436	9436	9436	9436	9436	9436	9436	9436	9436	9436
5	9391	9363	9395	9396	9391	9410	9395	9420	9398	9372	9425	9400	9390	9409	9392	9427
10	9297	9275	9292	9305	9304	9325	9305	9305	9308	9293	9328	9338	9310	9338	9316	9348
15	9136	9103	9148	9150	9166	9162	9121	9157	9146	9122	9154	9130	9135	9159	9145	9162
20	8905	8857	8915	8905	8911	8945	8910	8937	8895	8873	8912	8882	8902	8915	8905	8906
25	8582	8552	8603	8588	8582	8599	8593	8602	8603	8569	8601	8568	8573	8583	8587	8611
30	8172	8174	8222	8217	8209	8235	8190	8227	8213	8184	8223	8178	8178	8197	8190	8212
35	7722	7715	7762	7752	7756	7790	7742	7772	7756	7720	7763	7721	7713	7730	7727	7754
40	7189	7194	7232	7231	7233	7252	7220	7258	7211	7203	7252	7212	7168	7176	7180	7199
45	6586	6597	6665	6630	6661	6674	6648	6630	6619	6619	6672	6676	6618	6611	6563	6594
50	5968	5928	5974	5958	5963	5955	5915	5986	6049	5986	6006	5961	5995	5921	5923	5961
55	4984	5014	5052	5055	5054	5039	4984	5030	5056	5053	5099	5034	5039	4998	4983	5031
60	4111	4136	4199	4216	4206	4169	4136	4152	4199	4195	4231	4187	4164	4153	4113	4133
65	3264	3298	3350	3337	3321	3278	3290	3291	3268	3283	3345	3269	3233	3212	3194	3235
70	2140	2167	2188	2211	2227	2187	2136	2171	2216	2200	2216	2192	2157	2080	2073	2110
75	1135	1166	1197	1224	1204	1192	1176	1182	1172	1193	1197	1161	1116	1108	1095	1136
80	401	424	456	465	472	462	445	427	429	429	432	409	387	383	385	391
85	56.2	57.2	61.4	68.5	72.2	71.5	69.0	67.3	65.2	61.6	54.3	49.0	48.1	51.1	56.2	58.9
90	4.35	4.44	4.61	4.45	4.46	4.52	4.57	4.43	4.90	3.87	3.84	3.83	3.43	4.24	4.40	3.54
95	4.37	4.35	4.56	4.46	3.99	3.95	4.00	4.11	3.63	3.67	3.74	3.78	3.64	3.60	3.64	3.70
100	5.97	5.91	5.94	5.67	5.58	5.64	5.69	5.81	4.65	4.79	4.87	4.75	4.76	4.77	4.71	4.83
105	12.7	8.49	8.84	8.79	9.16	9.29	9.01	8.17	6.30	6.63	6.67	6.60	7.34	7.83	7.50	6.69
110	16.1	13.7	11.3	12.1	13.8	12.4	10.9	10.9	9.22	9.19	8.56	8.19	9.48	9.40	8.87	11.5
115	17.9	17.6	13.9	13.1	13.5	13.0	13.6	15.7	13.6	12.7	10.8	10.4	10.7	10.2	10.8	15.3
120	18.3	18.7	16.7	14.5	14.9	14.0	16.1	18.1	15.6	14.9	12.7	11.8	12.7	11.3	12.2	14.3
125	19.1	19.2	17.8	16.0	15.8	14.9	17.5	18.8	14.3	14.1	13.0	12.6	13.0	11.6	13.1	14.4
130	20.4	19.5	18.2	18.9	20.3	19.2	17.7	19.5	15.3	14.7	14.6	15.3	16.6	15.0	14.2	14.9
135	20.6	20.2	18.0	21.3	21.2	20.9	18.3	20.2	16.3	15.7	16.5	18.3	18.0	17.6	16.2	16.3
140	22.0	21.3	17.6	22.4	22.0	22.0	19.6	21.3	17.8	17.2	17.1	20.2	19.3	18.5	17.0	17.2
145	21.9	21.2	18.8	22.7	20.9	22.6	20.2	21.5	18.5	18.8	18.5	20.3	20.3	20.6	18.0	18.0
150	22.0	21.1	21.0	23.7	23.0	23.6	20.5	21.8	19.0	19.9	19.1	20.4	20.4	20.9	20.5	19.0
155	22.0	21.0	23.7	23.6	24.4	23.9	22.1	22.7	19.1	20.6	20.1	20.9	20.0	20.3	22.1	19.7
160	19.7	20.8	24.0	23.4	24.5	23.8	22.4	23.4	17.3	19.8	20.2	21.3	21.1	20.8	21.5	18.8
165	20.0	20.5	24.3	23.2	24.1	23.7	23.6	23.6	18.4	17.9	20.4	21.6	20.9	21.3	21.2	20.4
170	20.9	22.2	26.8	23.9	24.3	25.9	27.2	23.7	20.0	20.0	22.8	25.6	25.2	25.5	24.5	25.7
175	20.3	23.4	27.1	25.3	29.0	27.3	28.3	23.8	20.7	20.9	24.5	25.9	27.4	29.9	26.1	28.7
180	19.8	24.0	25.6	23.9	28.5	26.4	27.9	23.6	19.8	19.9	23.5	25.1	24.1	28.3	25.9	27.7

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**2.2 Electrical, Photometric and Chromaticity Measurements**

*(Refer to Work Instruction QD25)*

<b>Test date</b>	2018-06-29	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	KT-RHLED200-14C-850-VDIM-P		

**Electrical Measurement :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180630	120.0	60	1.6689	198.5	0.9912	9.54
-C2	277.0	60	0.7337	191.1	0.9403	9.37
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement -Spectroradiometer Method:**

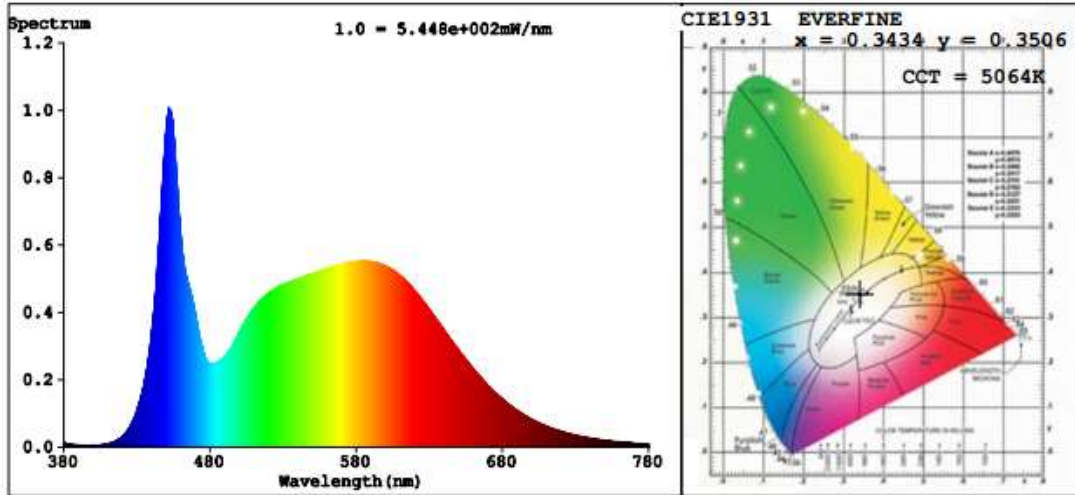
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	85	R9	23
Frequency (Hz)	60	R2	91	R10	78
CCT (K)	5064	R3	94	R11	85
Duv	0.0002	R4	85	R12	64
Chromaticity (x, y)	x=0.3434 y=0.3506	R5	85	R13	87
Chromaticity (u', v')	u'=0.2106 v'=0.4839	R6	86	R14	97
Color Rendering Index (CRI)	85.8	R7	88	R15	81
R9	23	R8	72	--	--

**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)	27038	26185	>=5000(-10%)	
Luminous Efficacy (lm/W)	136.21	137.02	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	131.91		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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