



## LM-79-08 Test Report

for

**MLS CO., LTD**

NO.1 MULINSEN RD XIAOLAN TOWNSHIP ZHONGSHAN City, GUANGDONG

**Linear Ambient Luminaires**

**Model: MT5Z02-9**

**Laboratory: Leading Testing Laboratories**

**NVLAP CODE: 200960-0**

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Report No.: HZ14090028f

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Review by:

Engineer: April Zou  
Nov. 17, 2014

Approved by:



Manager: Jim Zhang  
Nov. 17, 2014

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

## Test Summary

<b>Model</b>	<b>MT5Z02-9</b>
<b>Luminous Efficacy (Lumens /Watt)</b>	100.4
<b>Total Luminous Flux (Lumens)</b>	1431.0
<b>Power (Watts)</b>	14.26
<b>Power Factor</b>	0.9857
<b>CCT (K)</b>	4988
<b>CRI</b>	83.3
<b>Stabilization Time (Light &amp; Power)</b>	60 mins
<b>Note</b>	5000K, frosted lens

Table 1: Executive Data Summary

### Test specifications:

<b>Date of Receipt</b>	: Sep. 28, 2014
<b>Date of Test</b>	: Nov. 11, 2014
<b>Test item</b>	: Total Luminous Flux, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
<b>Reference Standard</b>	: IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

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### Sample Photo



Sample view

### Equipment Under Test (EUT)

<b>Name</b>	: Linear Ambient Luminaires
<b>Model</b>	: MT5Z02-9
<b>Electrical Ratings</b>	: AC100-277V, 50-60Hz, 14W
<b>Product Description</b>	: 5000K, frosted lens, 3 foot tube Model of LED light source: E2835UZ28-R80 Manufacturer of light source: MLS Quantity of LED light source: 96pcs
<b>Manufacturer</b>	: MLS CO., LTD
<b>Address</b>	: NO.1 MULINSEN RD XIAOLAN TOWNSHIP ZHONGSHAN City, GUANGDONG

## TEST RESULTS

Test ambient temperature was 25.0°C.

Test orientation was Light down. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 65 minutes.

### Sphere-Spectroradiometer Method

Parameter	Result			Special Color Rendering Indices	
Test Voltage (V)	120.0	100.0	277.0	R1	80.4
Voltage frequency (Hz)	60	60	60	R2	87.4
Test Current (A)	0.121	0.145	0.060	R3	93.5
Power Factor	0.9857	0.9911	0.8759	R4	82.7
Test Power (W)	14.26	14.40	14.58	R5	81.2
THD A%	6.93	5.84	17.27	R6	83.1
Luminous Efficacy (lm/W)	100.4			R7	88.8
Total Luminous Flux (lm)	1431.0			R8	68.9
Color Rendering Index (CRI)	83.3			R9	10.4
R9	10.4			R10	71
Correlated Color Temperature (CCT)(K)	4988			R11	81.5
Chromaticity Chroma x	0.3464			R12	63.4
Chromaticity Chroma y	0.3630			R13	81.9
Chromaticity Chroma u	0.2079			R14	96.6
Chromaticity Chroma v	0.3269				
Duv	0.0051				
Chromaticity Chroma u'	0.2079				
Chromaticity Chroma v'	0.4903				

Table 2: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u',v') diagram,  $u' = u = 4x/(-2x+12y+3)$ ,  $v' = 3v/2 = 9y/(-2x+12y+3)$ .

**Spectral Power Distribution - Sphere Spectroradiometer Method**

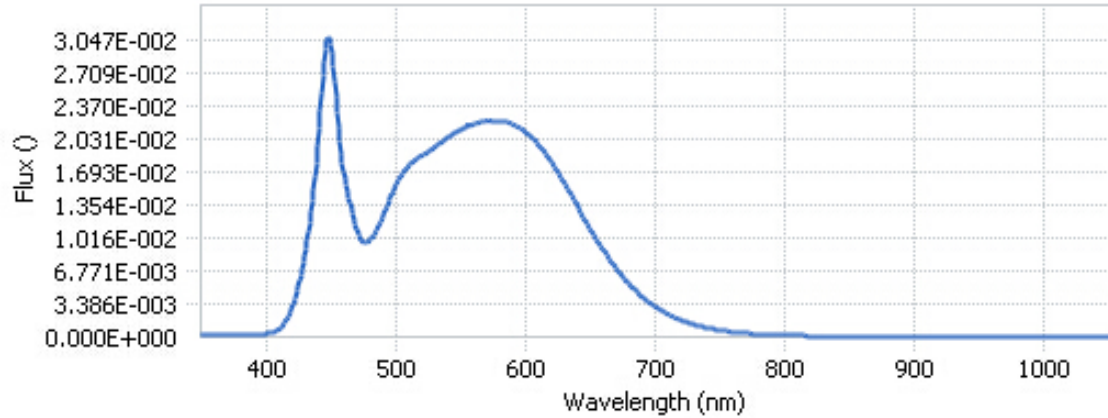
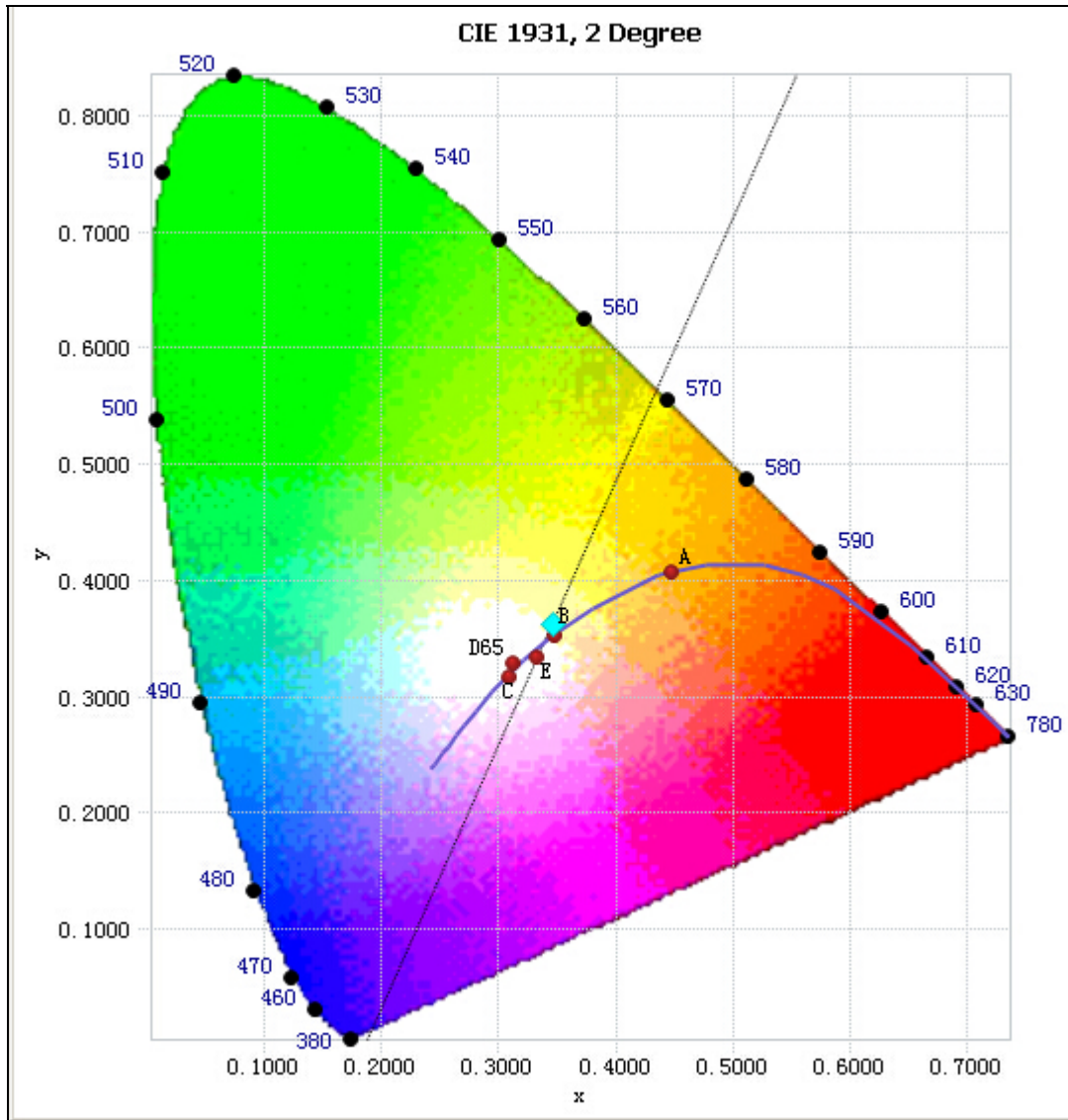


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.05E-04	485	1.09E-02	590	2.18E-02	695	3.58E-03
385	2.16E-04	490	1.23E-02	595	2.15E-02	700	3.11E-03
390	2.17E-04	495	1.39E-02	600	2.11E-02	705	2.67E-03
395	2.58E-04	500	1.55E-02	605	2.05E-02	710	2.31E-03
400	3.08E-04	505	1.67E-02	610	1.97E-02	715	1.99E-03
405	4.20E-04	510	1.75E-02	615	1.89E-02	720	1.72E-03
410	6.98E-04	515	1.82E-02	620	1.79E-02	725	1.48E-03
415	1.48E-03	520	1.87E-02	625	1.69E-02	730	1.26E-03
420	2.93E-03	525	1.90E-02	630	1.58E-02	735	1.08E-03
425	5.21E-03	530	1.95E-02	635	1.46E-02	740	9.30E-04
430	8.31E-03	535	1.99E-02	640	1.34E-02	745	7.93E-04
435	1.28E-02	540	2.04E-02	645	1.22E-02	750	6.75E-04
440	1.97E-02	545	2.09E-02	650	1.11E-02	755	5.88E-04
445	2.83E-02	550	2.13E-02	655	9.96E-03	760	5.02E-04
450	3.00E-02	555	2.16E-02	660	8.92E-03	765	4.31E-04
455	2.29E-02	560	2.19E-02	665	7.91E-03	770	3.71E-04
460	1.70E-02	565	2.21E-02	670	7.03E-03	775	3.20E-04
465	1.38E-02	570	2.22E-02	675	6.17E-03	780	2.73E-04
470	1.11E-02	575	2.22E-02	680	5.41E-03		
475	9.68E-03	580	2.22E-02	685	4.72E-03		
480	9.91E-03	585	2.20E-02	690	4.12E-03		

Table 3: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

**Chromaticity Diagram - Sphere Spectroradiometer Method**



Tristimulus values(x, y) : (0.3464, 0.3630)

Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

**Nominal CCT Quadrangles – Sphere Spectroradiometer Method**

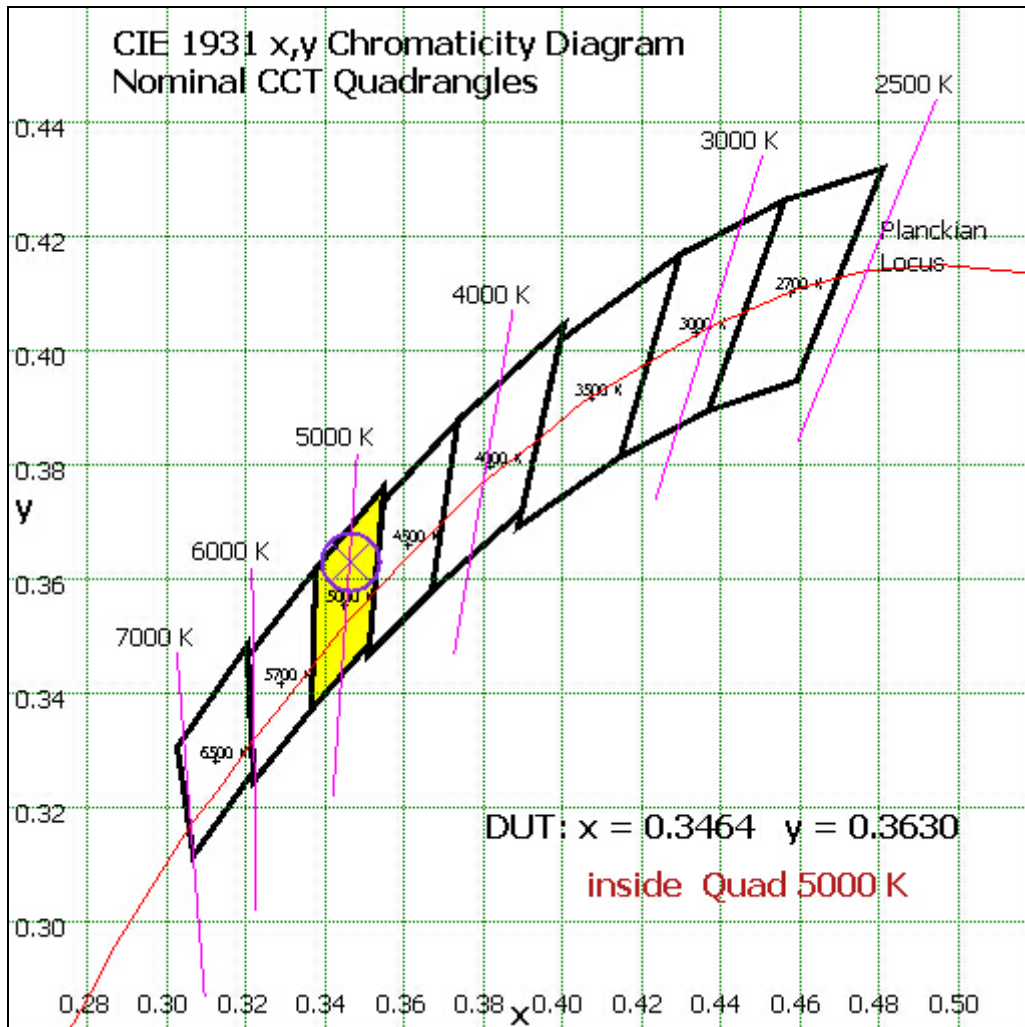


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram



## EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Integrate Sphere system	2M	HZTE015-01	Sep. 18, 2014	Sep. 17, 2015
Digital Power Meter	WT210	HZTE008-01	Sep. 18, 2014	Sep. 17, 2015
AC Power Supply	PCR 500L	HZTE001-07	Sep. 18, 2014	Sep. 17, 2015
DC Power Supply	6154	HZTE004-04	Sep. 18, 2014	Sep. 17, 2015
Temperature and humidity recorder	JR900	HZTE018-01	Sep. 18, 2014	Sep. 17, 2015
Standard source	SCL-1400	HZTE012-02	Sep. 18, 2014	Sep. 17, 2015

Table 4: Test Equipment List

## TEST METHODS

### Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning. Therefore, no seasoning was performed.

### Sphere-Spectroradiometer Method- Photometric and Electrical Measurements

A Labsphere Model CDS 2100 Spectroradiometer and Two Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit. The coating reflectance of each sphere is 98%. The measure geometry is  $4\pi$ . Self-absorption correction is conducted in testing. Bandwidth of spectroradiometer is 350nm-1050nm.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

The standard reference of the integrated sphere system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Standards and Technology.

The uncertainty of integrating sphere system reported in this document is expanded uncertainty is 1.06% with a coverage factor  $k=2$ .

\*\*\* End of Report \*\*\*

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