

<b>Report Number</b>	TRN-15551
<b>Customer</b>	LED Evolution
<b>Contact</b>	Robin Day
<b>Product Type</b>	Street Light
<b>Test Purpose</b>	UMS Energy Performance Test
<b>Sales Order Ref</b>	Q-LUX15-20173
<b>Works Order Number</b>	WO-6182
<b>Test Item Reference</b>	TI-10395
<b>LAB Test Method Reference</b>	TES-20012
<b>Test Standards</b>	LM-79-08 and Elexon UMS Charge Code process V4.0
<b>Lab Location Reference</b>	Performance
<b>Tested By</b>	Huw Rees
<b>Date of Test</b>	22/09/2015
<b>Analysed by</b>	Steve Hunt
<b>Number of products tested</b>	5

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Signed:




Roadway Single - 80W - 100% - LED  
Evolution

Date: 28/09/2015

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### Nomenclature

Lamp Orientation described below relates to the position in which a lamp is designed to operate for maximum performance and safety, these include:

BD - Base Down (bulb is vertically positioned with the metal base at the bottom, glass up)

BU - Base Up (bulb is vertically positioned with the metal base at the top, glass hanging down)

HBD - Horizontal  $+15^\circ$  to Base Down

H45 - Horizontal to  $-45^\circ$  only

VBU - Vertical Base Up  $\pm 15^\circ$

VBD - Vertical Base Down  $\pm 15^\circ$

HBU - Base Up  $\pm 90^\circ$  (bulb can be operated in a base up or horizontal position)

HOR - Horizontal Burn (bulb is positioned with the metal base parallel to the ground)

H75 - Horizontal  $\pm 75^\circ$  (bulb should not be operated within  $15^\circ$  of vertical)

U - Universal Burn (burn can be operated in any position)

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### Test Equipment and Description

Yokogawa WT210 Power Analyser. Kikusui PCR2000M Stable AC Power Supply with PC control and data recording



The products under test are connected to the UMS Test system which has full data control and recording using Labview software. This allows full integration of the test equipment used - Kikusui AC Stable Power Supply, Yokogawa Power Analyser, Pico Temperature Logger and a LUX-TSI distribution control panel

<b>Product Name</b>	Roadway Single - 80W - 100% - LED Evolution
<b>Part/Serial Number</b>	See (Identifier) below
<b>Type of Product</b>	Street Light
<b>Manufacturer</b>	LED Evolution
<b>Date of Manufacturer</b>	2015
<b>Base Type</b>	N/A
<b>Driver Type</b>	Mains
<b>Driver Model</b>	LUMOTECH L05175
<b>Light Engine Model</b>	E304660
<b>Operating Orientation</b>	Base Up
<b>Test Orientation</b>	Base Up
<b>Ambient Temperature</b>	27.3°C
<b>Humidity</b>	<65% RH
<b>Thermal Management</b>	Passive
<b>Dimmable</b>	Yes
<b>Product Summary</b>	The product is of a street lantern design with a Metal enclosure. The driver is situated within the enclosure and the Light engine fitted on underside of the product

Dimension	Sample	Luminous Opening
Diameter/Width	200 mm	150 mm
Length	710 mm	230 mm
Height/Depth	95 mm	10 mm

Test Item	Identifier
10395A	1
10395B	2
10395C	3
10395D	4
10395E	5

### Test Conditions

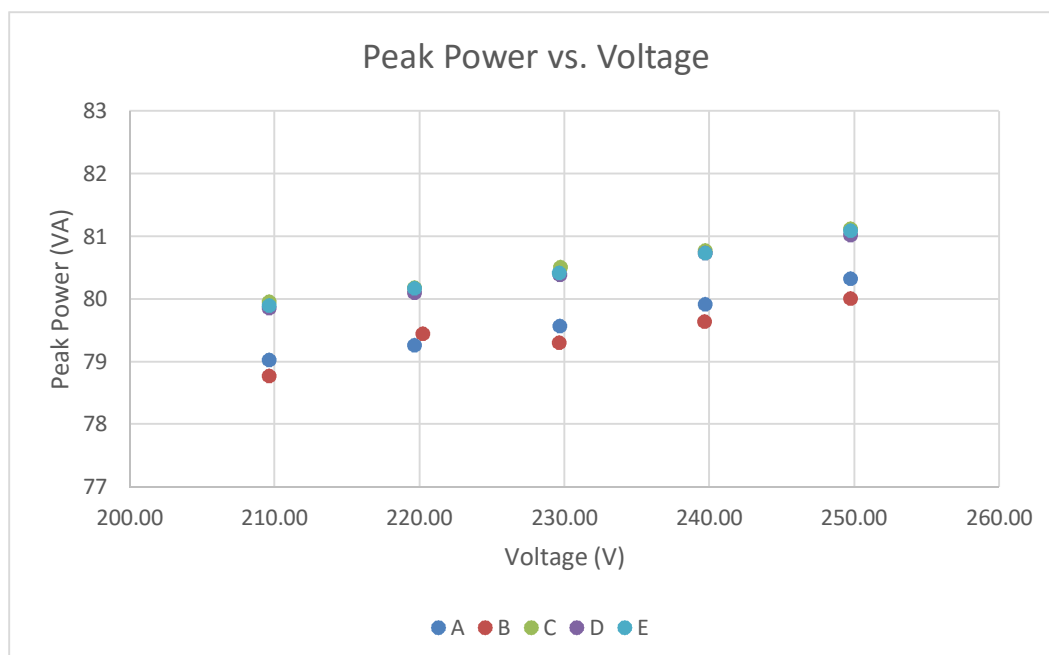
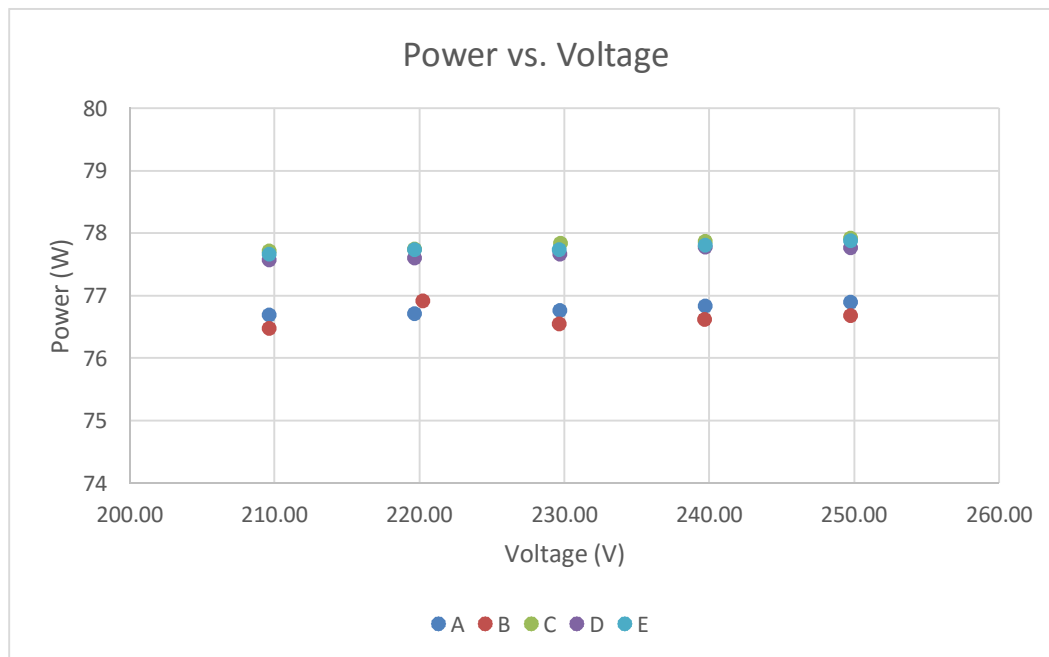
	Before Test	After Test
AC Supply Voltage (V)	249.73V	249.78V
AC Supply Frequency (Hz)	50Hz	50Hz
Voltage RMS Summation of the Harmonic Components (THC)	0.09%	0.08%

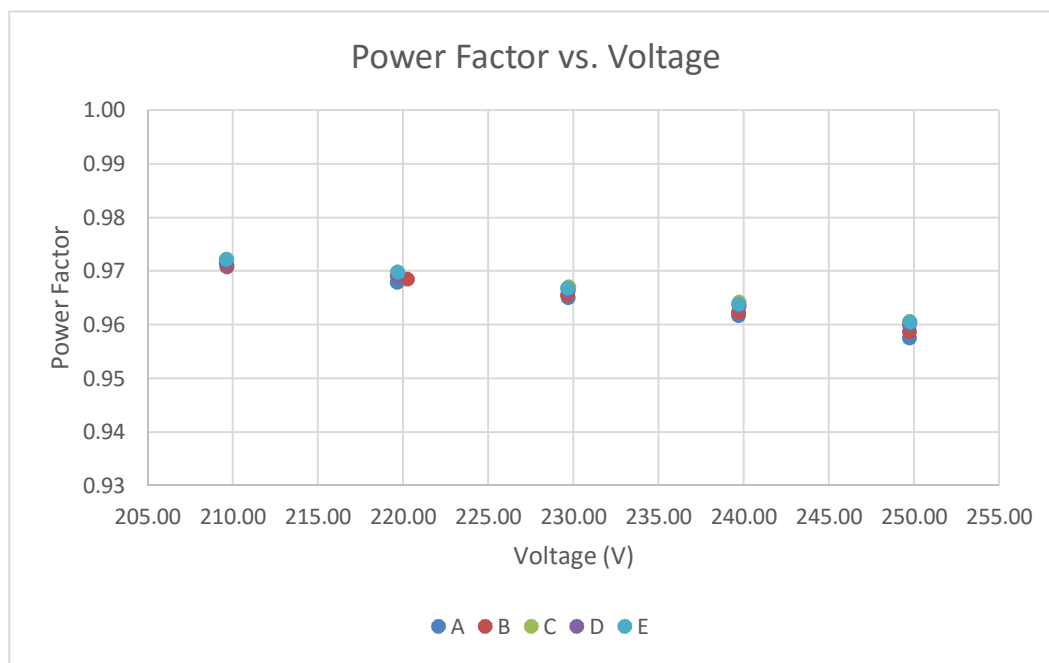
The test items were stabilised according to the electrical power stability of LM79-08. Stabilization is achieved when the difference in electrical power measurement is less than 0.5%. Each test item was stabilised at 250V.

Measurements were made with an ambient temperature of 25°C +/- 2°C. Measurements were taken only after sufficient time for thermal stabilisation has been allowed.

### Test Results Summary

These are the summary graphs of the test results for all products tested. The raw results are on page 6 of this test report.





Power factors measured have a Lagging phase angle and therefore the driver has inductive properties.

### Measurement Uncertainty

Parameter	Uncertainty
Voltage (300 V, 50/60 Hz)	$\pm 0.061 \text{ V}_{\text{rms}}$
Current (200 mA, 50/60Hz)	$\pm 0.07 \text{ mA}_{\text{rms}}$
Current (0.5 A, 50/60Hz)	$\pm 0.16 \text{ mA}_{\text{rms}}$
Current (5 A, 50/60Hz)	$\pm 0.0016 \text{ A}_{\text{rms}}$
Power (300 V, 200 mA, 50/60 Hz)	$\pm 0.032 \text{ W}_{\text{rms}}$
Power (300 V, 0.5 A, 50/60 Hz)	$\pm 0.09 \text{ W}_{\text{rms}}$
Power (300 V, 5 A, 50/60 Hz)	$\pm 0.0009 \text{ kW}_{\text{rms}}$
Frequency (50/60 Hz)	$\pm 0.001 \text{ Hz}$
Power Factor	$\pm 0.0006 \text{ PF}$

Measurements of power of 0.50W or greater are made with an uncertainty of less than or equal to 2% at the 95% confidence level. Measurements of power less than 0.50W are made with an uncertainty of less than or equal to 0.01W at the 95% confidence level.

### Full Test Results

Test Item	Voltage (V)	Current (mA)	Electrical Power (W)	Ambient Temp (°C)	Peak Power (VA)	Power Factor	Leading / Lagging
A	249.76	321.60	76.90	27.32	80.32	0.957	Lagging
B	249.76	320.30	76.69	27.49	80.00	0.959	Leading
C	249.77	324.80	77.93	27.58	81.12	0.961	Leading
D	249.77	324.40	77.77	27.59	81.02	0.960	Leading
E	249.78	324.60	77.88	27.58	81.09	0.960	Leading
A	239.73	333.30	76.84	27.29	79.91	0.962	Lagging
B	239.72	332.20	76.62	27.47	79.63	0.962	Leading
C	239.75	336.90	77.87	27.63	80.77	0.964	Leading
D	239.76	336.70	77.78	27.65	80.73	0.963	Leading
E	239.73	336.80	77.81	27.63	80.73	0.964	Leading
A	229.70	346.40	76.77	27.53	79.56	0.965	Lagging
B	229.69	345.20	76.55	27.45	79.30	0.965	Leading
C	229.74	350.40	77.84	27.61	80.50	0.967	Leading
D	229.70	350.00	77.67	27.58	80.38	0.966	Leading
E	229.69	350.10	77.74	27.80	80.41	0.967	Leading
A	219.67	360.80	76.72	27.94	79.26	0.968	Lagging
B	220.27	360.60	76.92	27.63	79.44	0.968	Leading
C	219.67	365.00	77.75	27.84	80.18	0.970	Leading
D	219.67	364.60	77.61	27.66	80.09	0.969	Leading
E	219.71	364.90	77.74	27.70	80.17	0.970	Leading
A	209.67	376.90	76.70	27.80	79.02	0.971	Lagging
B	209.67	375.70	76.48	27.86	78.77	0.971	Leading
C	209.66	381.30	77.72	27.72	79.95	0.972	Leading
D	209.65	380.90	77.58	27.55	79.85	0.972	Leading
E	209.65	381.10	77.67	27.64	79.89	0.972	Leading

### Test Item Photographs

#### TI-10395

Images of Product(s) under test includes (where possible) labelling, Driver and Light engine details



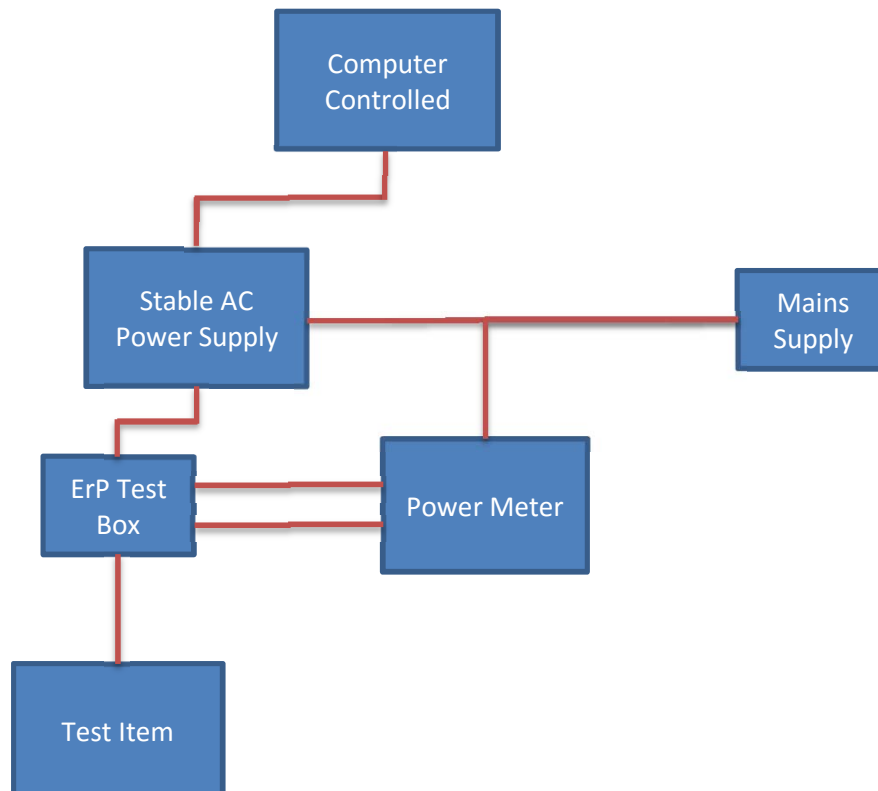


Driver in Situ



Light Engine

## Appendix 1: Test item set-up



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