

<b>Report Number</b>	TRN-14521
<b>Customer</b>	ASD Lighting plc
<b>Contact</b>	John Ryder
<b>Product Type</b>	Street Light
<b>Test Purpose</b>	UMS Energy Performance Test
<b>Sales Order Ref</b>	Q-LUX2014-2286
<b>Works Order Number</b>	WO-4744
<b>Test Item Reference</b>	TI-4098
<b>LAB Test Method Reference</b>	TES-2012
<b>Test Standards</b>	LM-79-08 and UMS charge code process v4.0
<b>Lab Location Reference</b>	UMS
<b>Tested by</b>	Steve Hunt
<b>Date of Test</b>	09/12/2014
<b>Analysed by</b>	Steve Hunt
<b>Number of products tested</b>	5

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24 LED - HIGHWAY CRYSTAL 500mA - 50%  
OUTPUT

Date: 11/12/2014

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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° to Base Down

H45 - Horizontal to -45° only

VBV - Vertical Base Up ±15°

VBD - Vertical Base Down ±15°

HBU - Base Up +/- 90° (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 +/- 75° (bulb should not be operated within 15° of vertical)

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

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### Test Conditions

Measurements were made with an ambient temperature of 25°C +/- 1°C. Measurements were taken only after sufficient time for thermal stabilisation has been allowed.

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### Test Equipment

Yokogawa WT210 Power Analyzer. Kikusui PCR2000M Stable AC Power Supply

with PC control and data recording



Full data control and recording  
using Labview software and full  
integration of the AC Stable Power  
Supply and Power Analyser

<b>Product Name</b>	24 LED - HIGHWAY CRYSTAL 500mA - 50% OUTPUT
<b>Part/Serial Number</b>	See (Identifier) below
<b>Type of Product</b>	Street Light
<b>Base Type</b>	N/A
<b>Driver Type</b>	Mains
<b>Driver Model</b>	OPTOTRONIC OT 50/220-240/700 3DIMLT+E
<b>Light Engine Model</b>	PG-02-14 Rev.1. PCB049
<b>Operating Orientation</b>	Base Up
<b>Test Orientation</b>	Base Up
<b>Ambient Temperature</b>	24.0°C
<b>Manufacturer</b>	ASD Lighting plc
<b>Date of Manufacturer</b>	2014
<b>Thermal Management</b>	Passive
<b>Dimmable</b>	Yes
<b>Humidity</b>	<65% RH

Dimension	Sample	Luminous Opening
Diameter/Width	386 mm	298 mm
Length	730 mm	356 mm
Height/Depth	100 mm	18 mm

Test Item	Identifier
TI-4098A	1
TI-4098B	2
TI-4098C	3
TI-4098D	4
TI-4098E	5

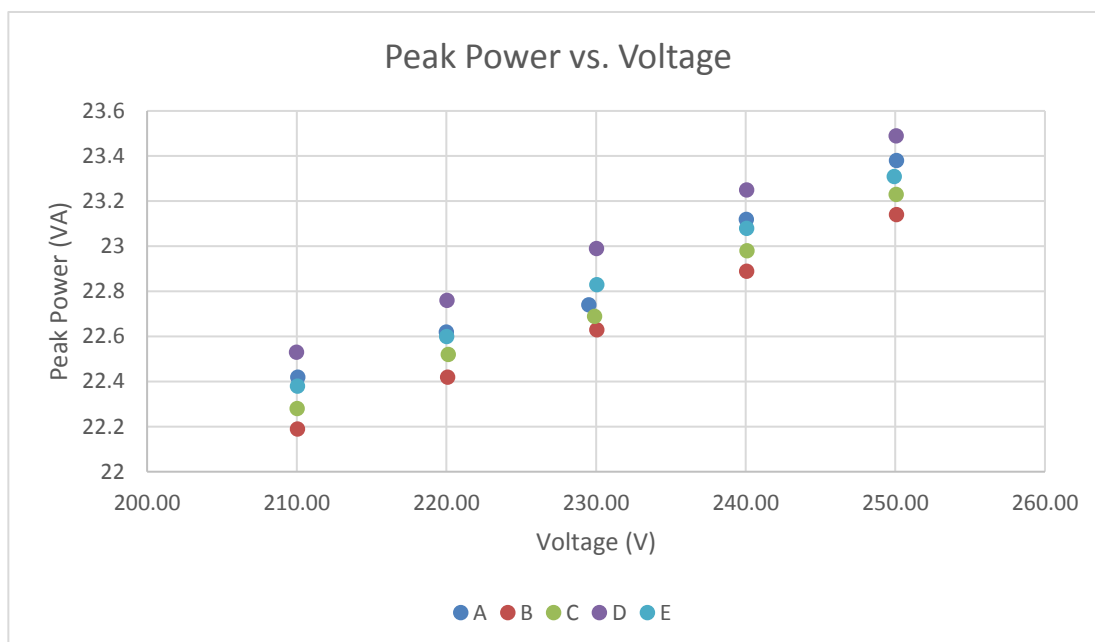
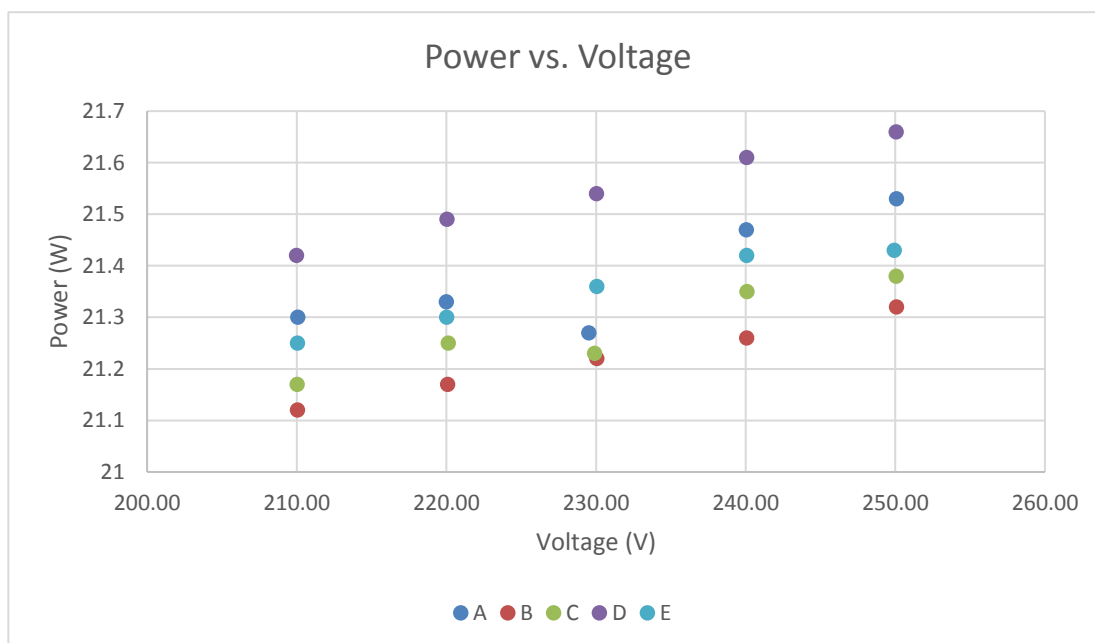
### Test Conditions

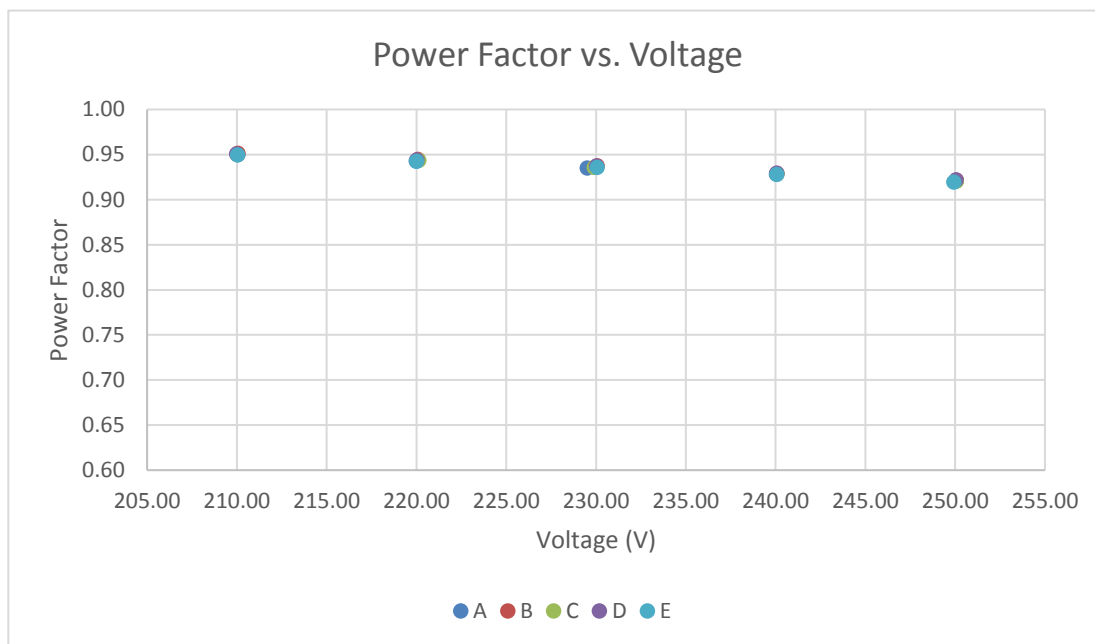
	Before Test	After Test
AC Supply Voltage (V)	249.99V	250.07V
AC Supply Frequency (Hz)	50Hz	50Hz
Voltage RMS Summation of the Harmonic Components (THD)	0.07%	0.07%

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.

### 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.





All power factors measured have a Leading phase angle and therefore the driver has capacitive 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	250.07	93.49	21.53	24.01	23.38	0.921	Leading
B	250.07	92.53	21.32	24.01	23.14	0.922	Leading
C	250.06	92.91	21.38	25.00	23.23	0.920	Leading
D	250.05	93.94	21.66	25.12	23.49	0.922	Leading
E	249.93	93.28	21.43	25.02	23.31	0.919	Leading
A	240.05	96.31	21.47	25.95	23.12	0.928	Leading
B	240.06	95.34	21.26	25.81	22.89	0.929	Leading
C	240.08	95.73	21.35	25.82	22.98	0.929	Leading
D	240.07	96.86	21.61	25.82	23.25	0.929	Leading
E	240.07	96.14	21.42	25.82	23.08	0.928	Leading
A	229.51	99.08	21.27	25.76	22.74	0.935	Leading
B	230.06	98.39	21.22	25.90	22.63	0.937	Leading
C	229.91	98.69	21.23	25.65	22.69	0.936	Leading
D	230.03	99.93	21.54	25.66	22.99	0.937	Leading
E	230.06	99.25	21.36	25.81	22.83	0.936	Leading
A	219.99	102.81	21.33	25.80	22.62	0.943	Leading
B	220.08	101.85	21.17	25.81	22.42	0.945	Leading
C	220.13	102.31	21.25	25.70	22.52	0.943	Leading
D	220.03	103.45	21.49	25.58	22.76	0.944	Leading
E	220.01	102.70	21.30	25.76	22.60	0.943	Leading
A	210.06	106.74	21.30	25.50	22.42	0.950	Leading
B	210.05	105.65	21.12	25.51	22.19	0.951	Leading
C	210.03	106.09	21.17	25.58	22.28	0.950	Leading
D	209.99	107.30	21.42	25.47	22.53	0.951	Leading
E	210.04	106.55	21.25	25.48	22.38	0.950	Leading

## Test Item Photographs

### Product Details



(Driver and LED Module)

### TI-4098A



### TI-4098B





**TI-4098C**



**TI-4098D**

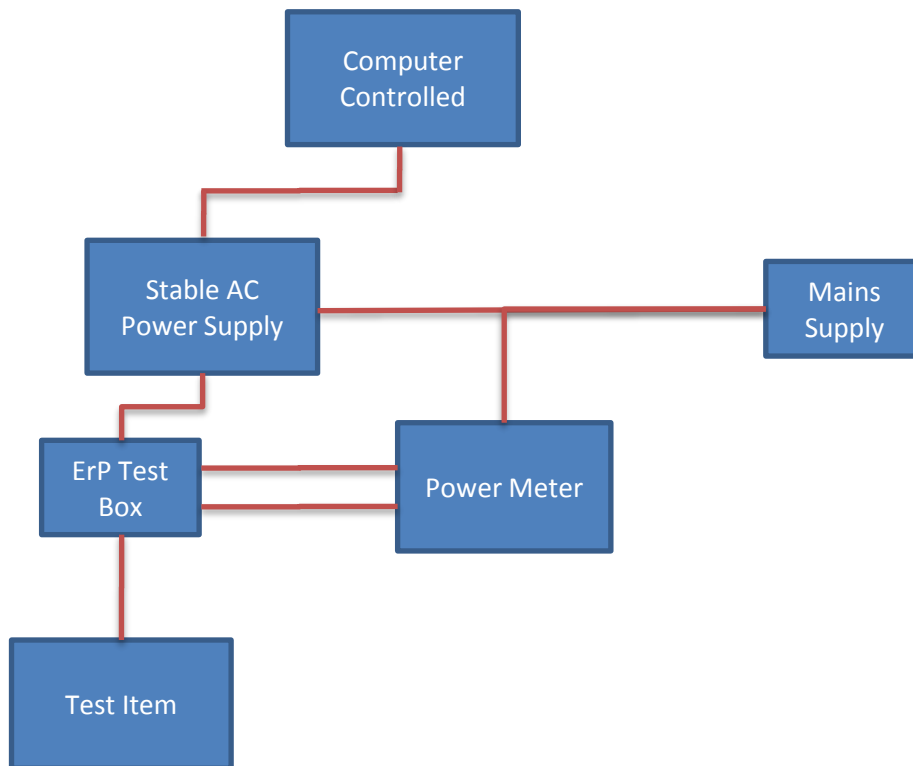


**TI-4098E**





### Appendix 1: Test item set-up



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