

<b>Report Number</b>	TRN-15145
<b>Customer</b>	ASD Lighting plc
<b>Contact</b>	Paul Gledhill
<b>Product Type</b>	Street Light
<b>Test Purpose</b>	UMS Energy Performance Test
<b>Sales Order Ref</b>	Q-LUX2014-2520
<b>Works Order Number</b>	WO-5489
<b>Test Item Reference</b>	TI-4554
<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>	24/06/2015
<b>Analysed by</b>	Steve Hunt
<b>Number of products tested</b>	5

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Signed:




36 LED - 350mA - 50% Output

Date: 25/06/2015

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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

VBV - 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 Conditions

Measurements were made with an ambient temperature of  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . 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>	36 LED - 350mA - 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 90/220-240/700 3DIMLT+E
<b>Light Engine Model</b>	PCB058 CREE XPG LED
<b>Operating Orientation</b>	Base Up
<b>Test Orientation</b>	Base Up
<b>Ambient Temperature</b>	22.4°C
<b>Manufacturer</b>	ASD Lighting plc
<b>Date of Manufacturer</b>	2015
<b>Thermal Management</b>	Passive
<b>Dimmable</b>	Yes
<b>Humidity</b>	<65% RH

Dimension	Sample	Luminous Opening
Diameter/Width	594 mm	275 mm
Length	232 mm	220 mm
Height/Depth	120 mm	0 mm

Test Item	Identifier
TI-4554A	1
TI-4554B	2
TI-4554C	3
TI-4554D	4
TI-4554E	5

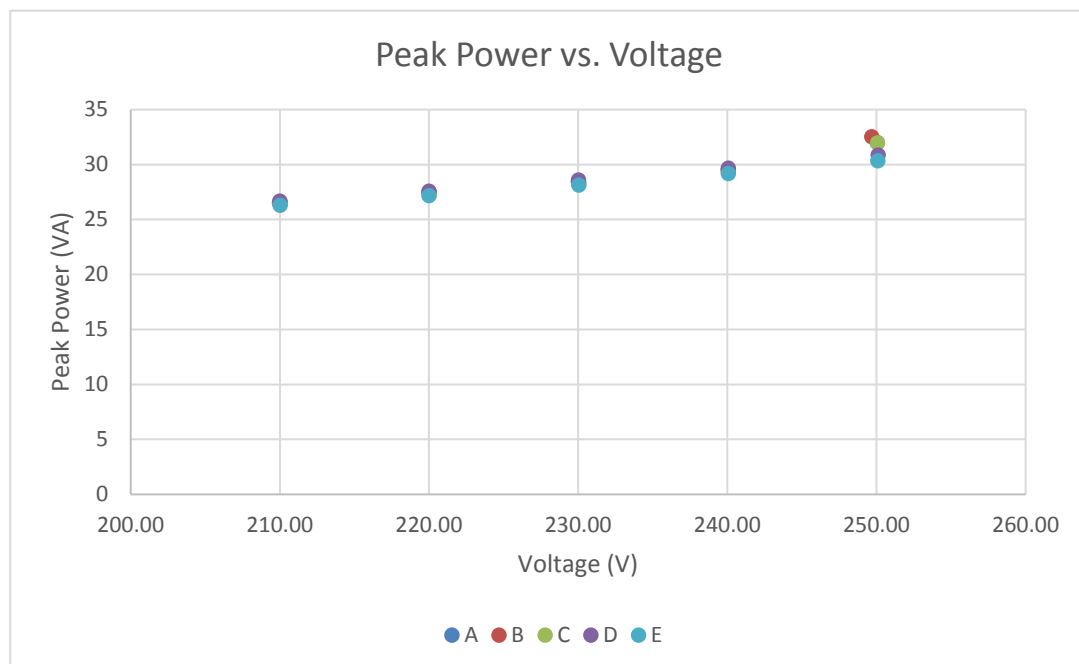
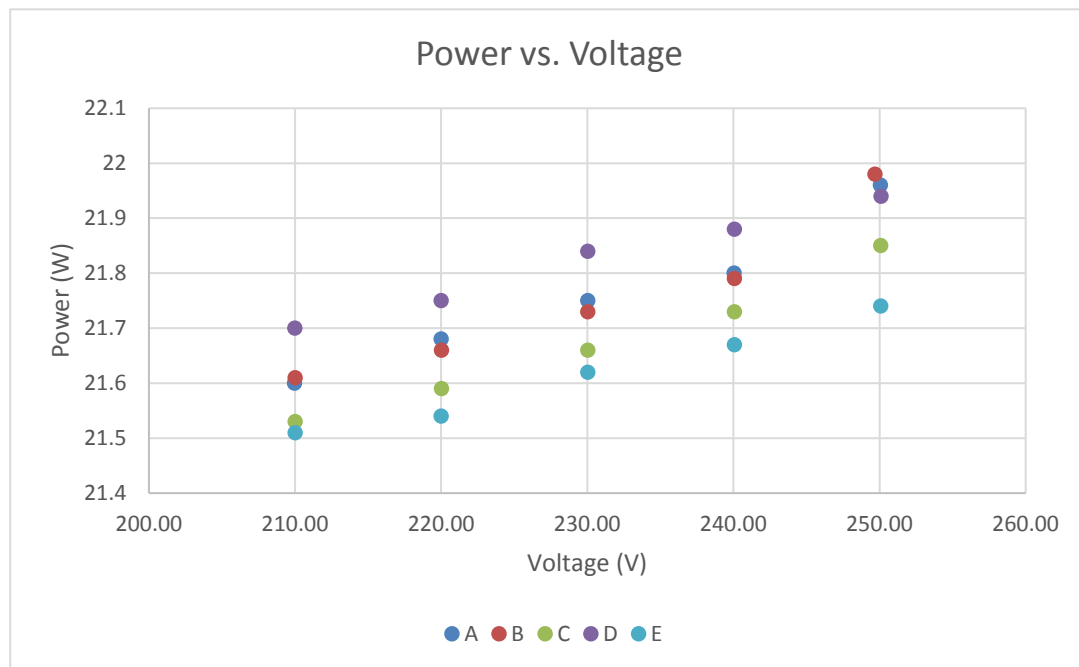
### Test Conditions

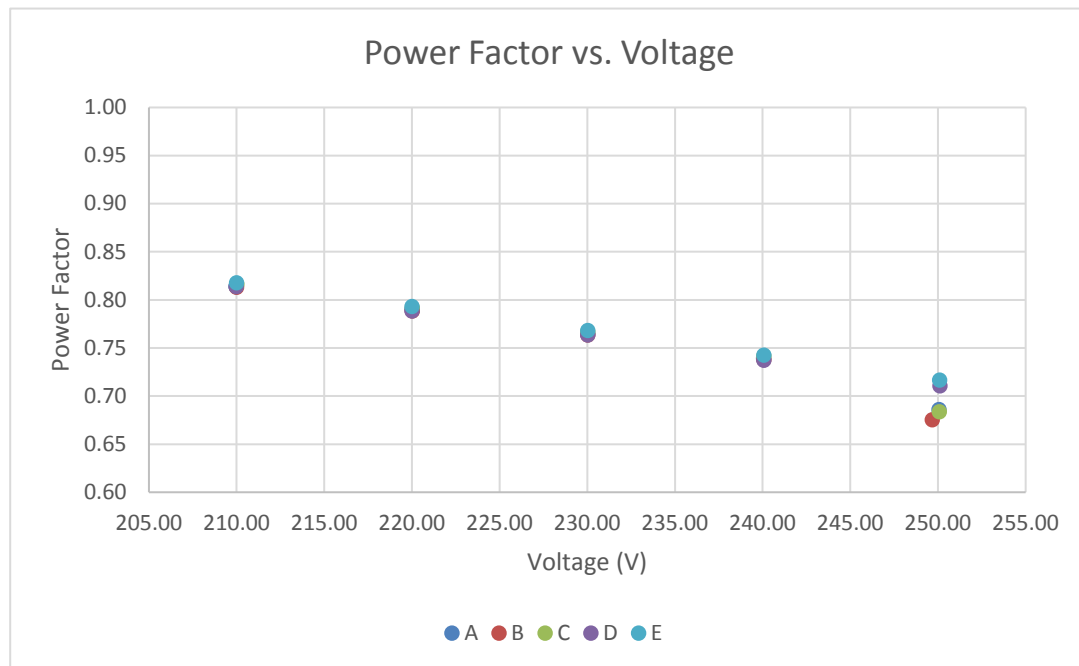
	Before Test	After Test
AC Supply Voltage (V)	250.87V	250.81V
AC Supply Frequency (Hz)	49.99Hz	50Hz
Voltage RMS Summation of the Harmonic Components (THD)	0.09%	0.08%

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.

### 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 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.

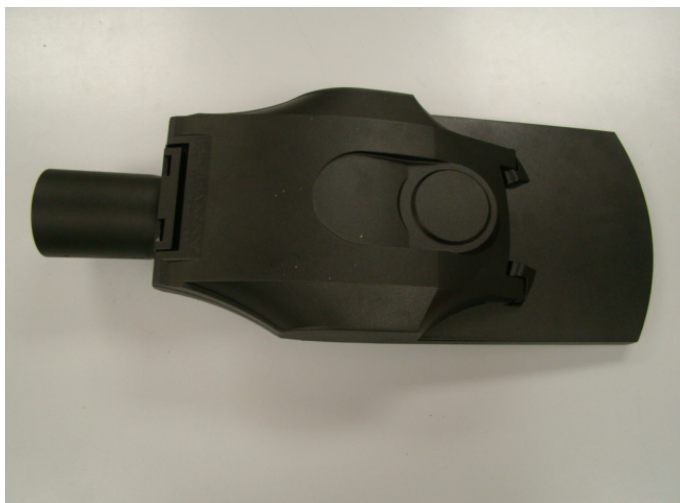
### Full Test Results

Test Item	Voltage (V)	Current (mA)	Electrical Power (W)	Ambient Temp (°C)	Peak Power (VA)	Power Factor	Leading / Lagging
A	250.05	128.00	21.96	22.43	32.01	0.686	Leading
B	249.67	130.29	21.98	22.43	32.53	0.676	Leading
C	250.07	127.82	21.85	22.41	31.96	0.684	Leading
D	250.10	123.43	21.94	22.40	30.87	0.711	Leading
E	250.08	121.32	21.74	22.46	30.34	0.717	Leading
A	240.05	122.87	21.80	22.42	29.49	0.739	Leading
B	240.07	123.02	21.79	22.46	29.53	0.738	Leading
C	240.06	122.07	21.73	22.49	29.30	0.742	Leading
D	240.07	123.59	21.88	22.40	29.67	0.738	Leading
E	240.07	121.51	21.67	22.39	29.17	0.743	Leading
A	230.02	123.57	21.75	22.48	28.42	0.765	Leading
B	230.02	123.75	21.73	22.34	28.46	0.763	Leading
C	230.03	122.77	21.66	22.33	28.24	0.767	Leading
D	230.02	124.32	21.84	22.35	28.60	0.764	Leading
E	230.03	122.33	21.62	22.40	28.14	0.768	Leading
A	220.00	124.75	21.68	22.42	27.45	0.790	Leading
B	220.01	124.86	21.66	22.45	27.47	0.789	Leading
C	220.01	123.94	21.59	22.50	27.27	0.792	Leading
D	220.00	125.39	21.75	22.42	27.58	0.789	Leading
E	220.00	123.45	21.54	22.39	27.16	0.793	Leading
A	209.96	126.33	21.60	22.46	26.52	0.814	Leading
B	210.00	126.51	21.61	22.44	26.57	0.813	Leading
C	210.01	125.60	21.53	22.31	26.38	0.816	Leading
D	209.98	127.02	21.70	22.35	26.67	0.814	Leading
E	210.00	125.22	21.51	22.39	26.30	0.818	Leading

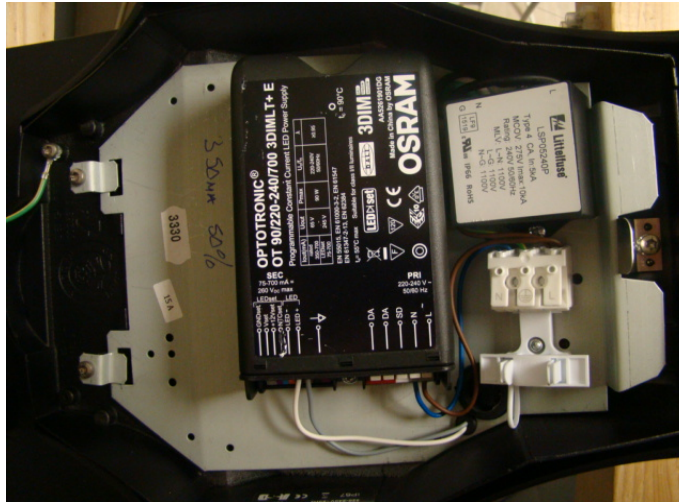
### Test Item Photographs

#### TI-4554

Images of Product(s) under test. Identification of each of the products can be found on page 3 of this report







Internal Circuitry including Rating Labels



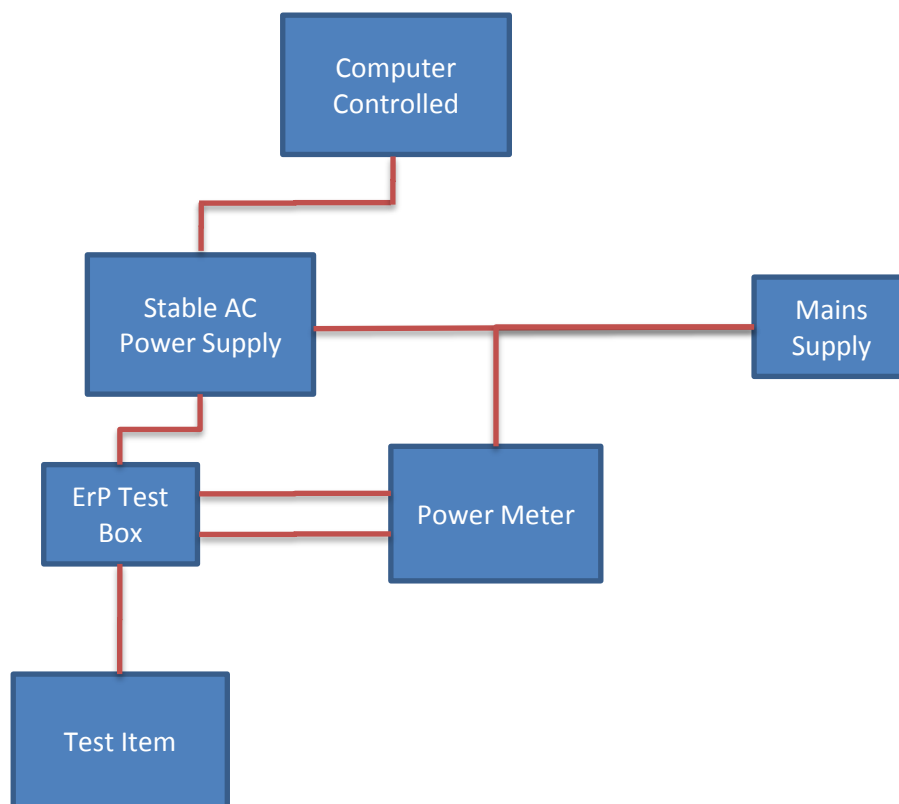
Driver in Situ



Light Engine



### Appendix 1: Test item set-up



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