

<b>Report Number</b>	TRN-15343
<b>Customer</b>	Claire Humphries
<b>Contact</b>	Messagemaker Displays Ltd
<b>Product Type</b>	LED Warning Sign (SLS-20W-600 x 600)
<b>Test Purpose</b>	UMS Energy Performance Test
<b>Sales Order Ref</b>	Q-LUX15-20149
<b>Works Order Number</b>	WO-5687
<b>Test Item Reference</b>	TI-11549
<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>	CF35 5AQ - UMS
<b>Tested By</b>	Huw Rees
<b>Date of Test</b>	07/08/2015
<b>Analysed by</b>	Steve Hunt
<b>Number of products tested</b>	5

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ROAD TRAFFIC EQUIPMENT VARIABLE MESSAGE  
DISPLAY LED ( School Warning Light -  
Messagemaker 100% Dimming level)

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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>	ROAD TRAFFIC EQUIPMENT VARIABLE MESSAGE DISPLAY LED ( School Warning Light - Messagemaker 100% Dimming level)
<b>Part/Serial Number</b>	See (Identifier) below
<b>Type of Product</b>	LED Warning Sign (SLS-20W-600 x 600)
<b>Manufacturer</b>	Messagemaker Displays Ltd
<b>Date of Manufacturer</b>	2015
<b>Base Type</b>	N/A
<b>Driver Type</b>	Mains
<b>Driver Model</b>	RS-75-5 Mean well
<b>Light Engine Model</b>	PCB TE15-093
<b>Operating Orientation</b>	Base Up
<b>Test Orientation</b>	Base Up
<b>Ambient Temperature</b>	24.9°C
<b>Humidity</b>	<65% RH
<b>Thermal Management</b>	Passive
<b>Dimmable</b>	Yes
<b>Product Summary</b>	The product is an LED Warning sign, constructed of metal in the form of a cabinet design. The enclosure incorporates all the electronics and power supplies whilst the front panel locates the LED's in the form of a speed limit.

Dimension	Sample	Luminous Opening
Diameter/Width	600 mm	480 mm
Length	600 mm	480 mm
Height/Depth	152 mm	0 mm

Test Item	Identifier
11549A	18015070154
11549B	18015070173
11549C	18015070170
11549D	18015070171
11549E	18015070155

### Test Conditions

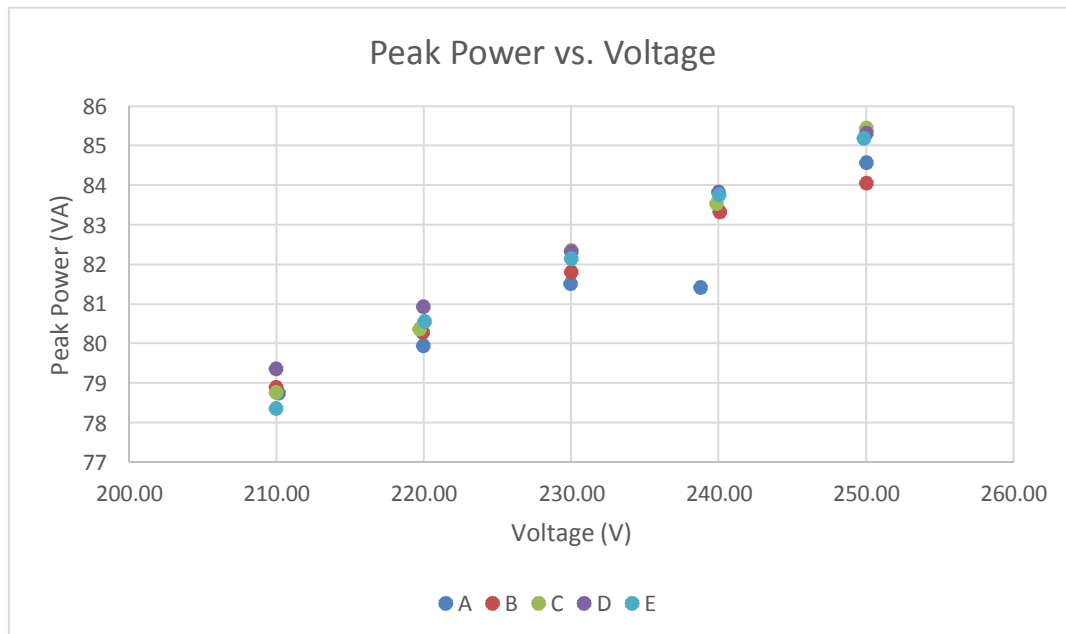
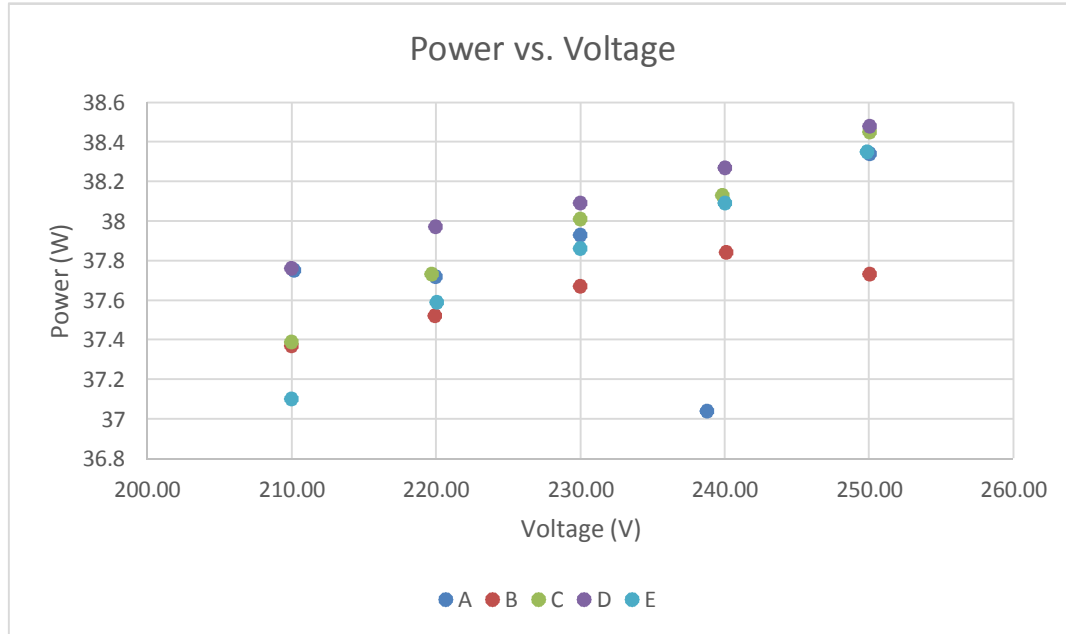
	Before Test	After Test
AC Supply Voltage (V)	249.9V	250.01V
AC Supply Frequency (Hz)	49.99Hz	50Hz
Voltage RMS Summation of the Harmonic Components (THD)	0.18%	0.2%

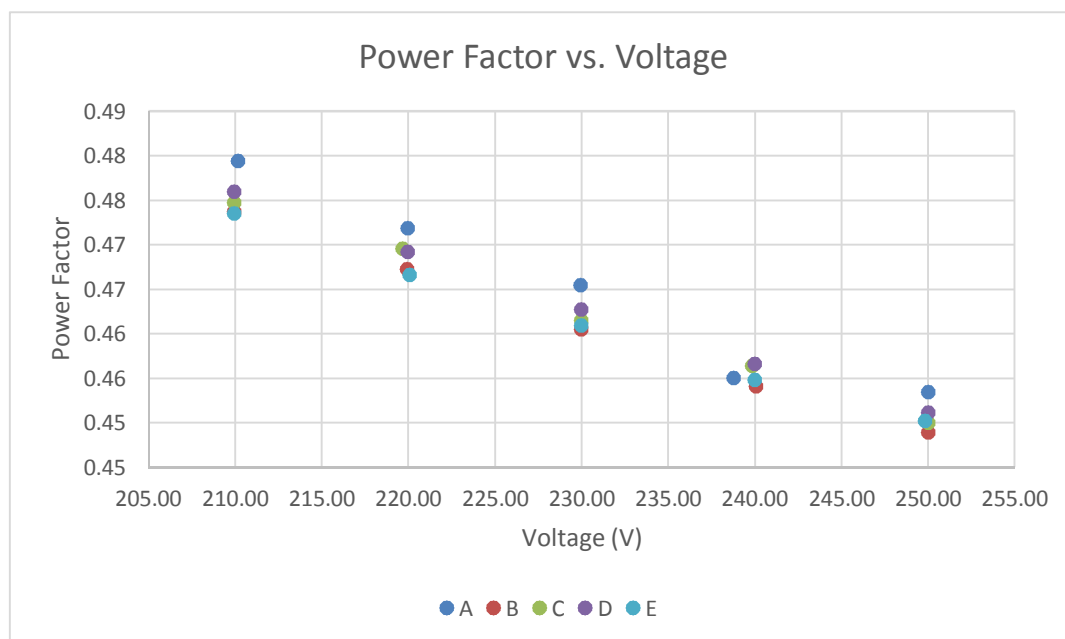
The test items were stabilised according to the electrical power stability of LM79-08. Stabilization is achieved when the difference in electrical power measurement is less than 0.5%. Each test item was stabilised at 250V.

Measurements were made with an ambient temperature of 23°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 Leading phase angle and therefore the driver has capacitive properties.

#### Measurement Uncertainty

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

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.

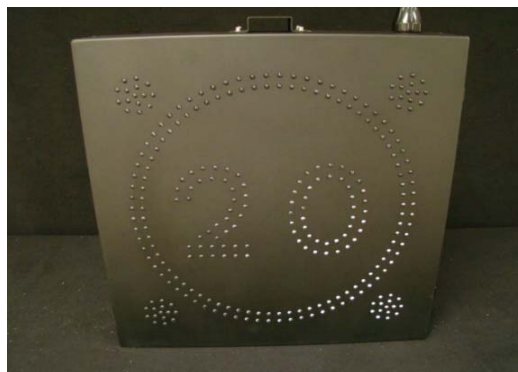
### Full Test Results

Test Item	Voltage (V)	Current (mA)	Electrical Power (W)	Ambient Temp (°C)	Peak Power (VA)	Power Factor	Leading / Lagging
A	250.01	338.20	38.34	24.94	84.57	0.453	Leading
B	250.01	336.20	37.73	24.83	84.05	0.449	Leading
C	250.01	341.80	38.45	24.99	85.45	0.450	Leading
D	250.01	341.20	38.48	24.66	85.31	0.451	Leading
E	249.83	341.00	38.35	24.74	85.18	0.450	Leading
A	238.78	340.90	37.04	24.79	81.41	0.455	Leading
B	240.08	347.10	37.84	24.85	83.32	0.454	Leading
C	239.84	348.30	38.13	24.79	83.53	0.456	Leading
D	240.00	349.30	38.27	24.66	83.83	0.457	Leading
E	240.01	349.00	38.09	24.78	83.76	0.455	Leading
A	229.96	354.40	37.93	24.65	81.51	0.465	Leading
B	229.98	355.70	37.67	24.77	81.80	0.461	Leading
C	229.97	358.10	38.01	24.81	82.36	0.461	Leading
D	229.98	358.00	38.09	24.75	82.32	0.463	Leading
E	229.98	357.20	37.86	24.86	82.15	0.461	Leading
A	219.96	363.50	37.72	25.02	79.94	0.472	Leading
B	219.91	365.10	37.52	24.96	80.29	0.467	Leading
C	219.68	365.80	37.73	24.98	80.36	0.470	Leading
D	219.97	367.90	37.97	24.77	80.93	0.469	Leading
E	220.06	366.10	37.59	24.85	80.55	0.467	Leading
A	210.15	374.70	37.75	24.82	78.75	0.479	Leading
B	209.95	375.70	37.37	24.97	78.89	0.474	Leading
C	209.95	375.10	37.39	24.69	78.76	0.475	Leading
D	209.96	378.00	37.76	24.75	79.36	0.476	Leading
E	209.96	373.10	37.10	24.81	78.35	0.474	Leading

### Test Item Photographs

#### TI-11549

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



Front and Back View of LED Warning Sign

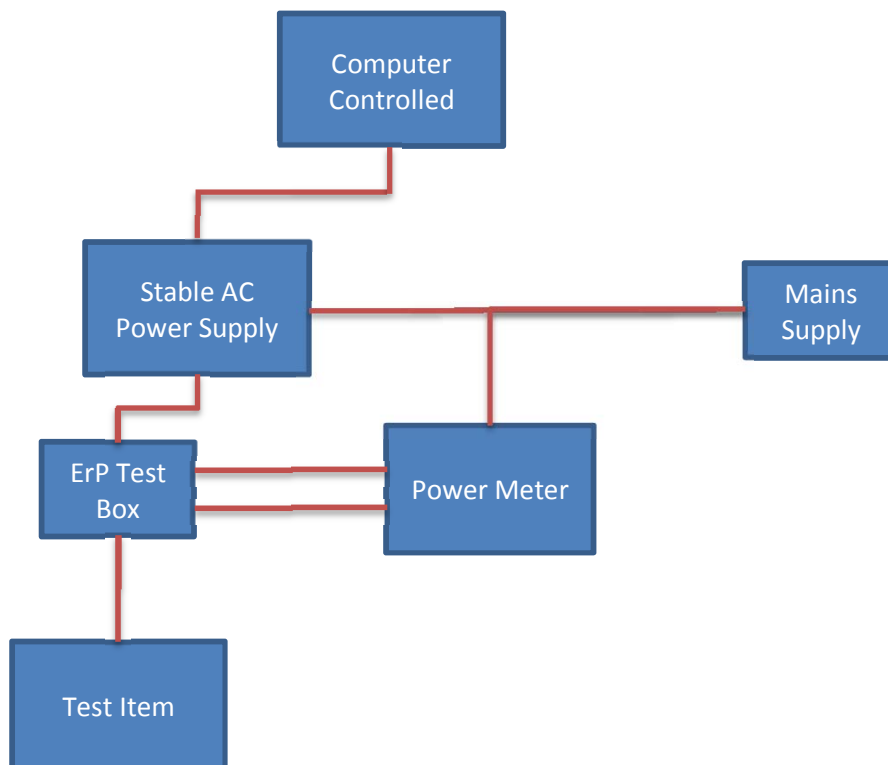




Representative images of label on Product, LED PCB and Driver



## Appendix 1: Test item set-up



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