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Test Report Number: TRN-15327
Test Item: TI-11549

Report Number	TRN-15327
Customer	Claire Humphries
Contact	Messagemaker Displays Ltd
Product Type	LED Warning Sign (SLS-20W-600 x 600)
Test Purpose	UMS Energy Performance Test
Sales Order Ref	Q-LUX15-20133
Works Order Number	WO-5671
Test Item Reference	TI-11549
LAB Test Method Reference	TES-20012
Test Standards	LM-79-08 and Elexon UMS Charge Code process V4.0
Lab Location Reference	CF35 5AQ - UMS
Tested By	Huw Rees
Date of Test	07/08/2015
Analysed by	Steve Hunt
Number of products tested	5

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Signed:

Date: 07/08/2015

ROAD TRAFFIC EQUIPMENT VARIABLE MESSAGE DISPLAY LED (LED Warning Light - Messagemaker)

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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 +15º to Base Down
H45 - Horizontal to -45º only
VBU - Vertical Base Up ±15º
VBD - Vertical Base Down ±15º
HBU - Base Up +/- 90º (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 +/- 75º (bulb should not be operated within 15º of vertical)
U - Universal Burn (burn can be operated in any position)

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

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Test Item: TI-11549

Product Name	ROAD TRAFFIC EQUIPMENT VARIABLE MESSAGE DISPLAY LED (LED Warning Light - Messagemaker)
Part/Serial Number	See (Identifier) below
Type of Product	LED Warning Sign (SLS-20W-600 x 600)
Manufacturer	Messagemaker Displays Ltd
Date of Manufacturer	2015
Base Type	N/A
Driver Type	Mains
Driver Model	RS-75-5 Meanwell
Light Engine Model	PCB TE15-093
Operating Orientation	Base Up
Test Orientation	Base Up
Ambient Temperature	23.6°C
Humidity	<65% RH
Thermal Management	Passive
Dimmable	Yes
Product Summary	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

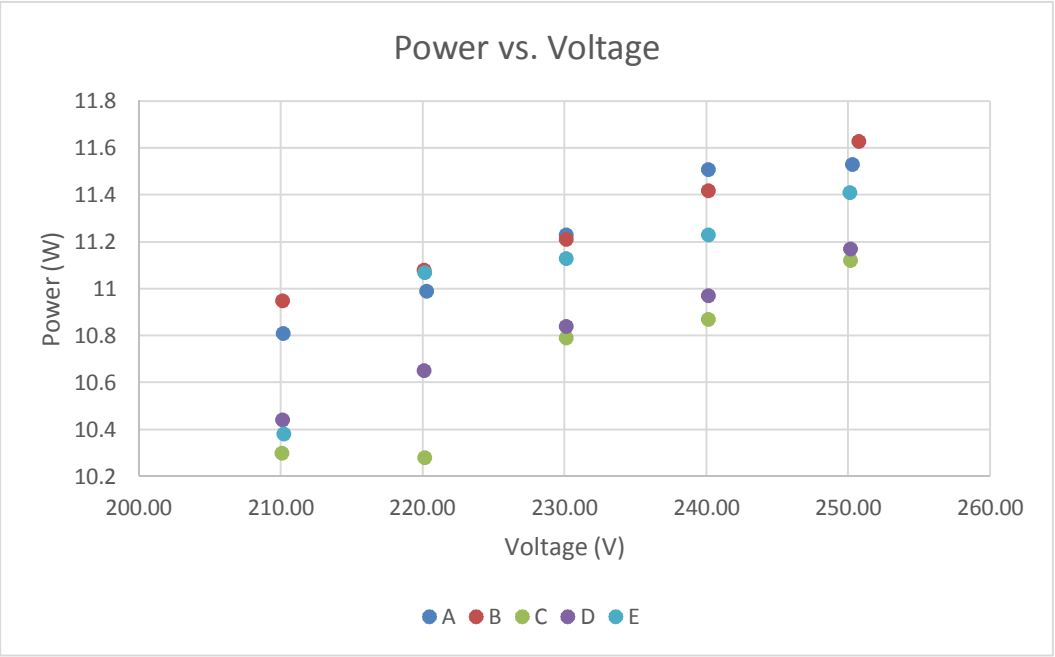
Test Conditions

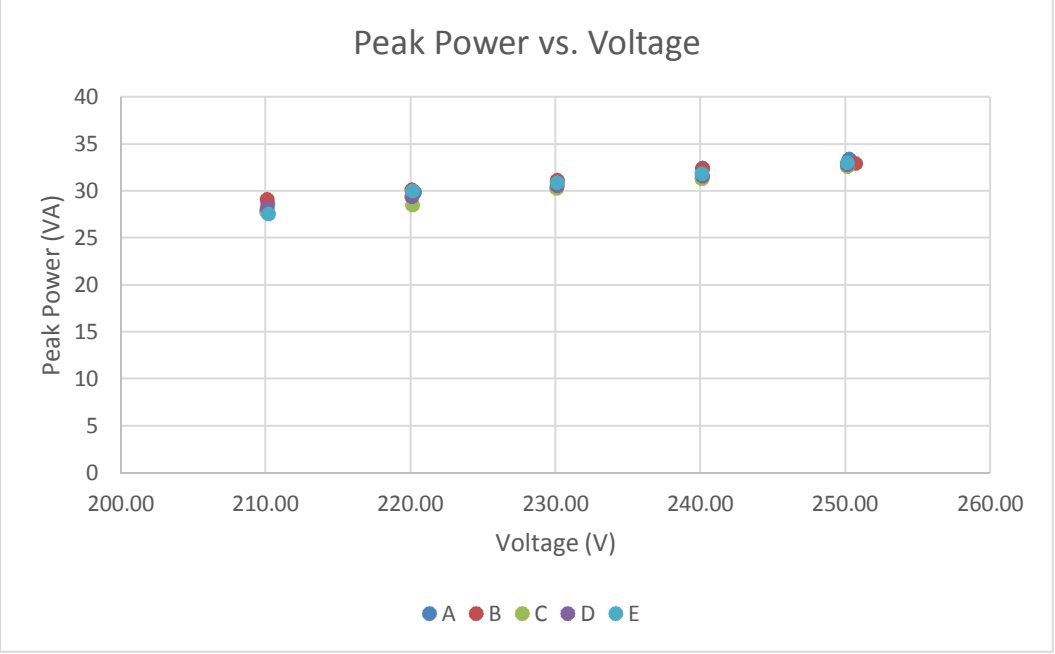
	Before Test	After Test
AC Supply Voltage (V)	249.48V	250.85V
AC Supply Frequency (Hz)	50Hz	50Hz
Voltage RMS Summation of the Harmonic Components (THD	0.09%	0.11%

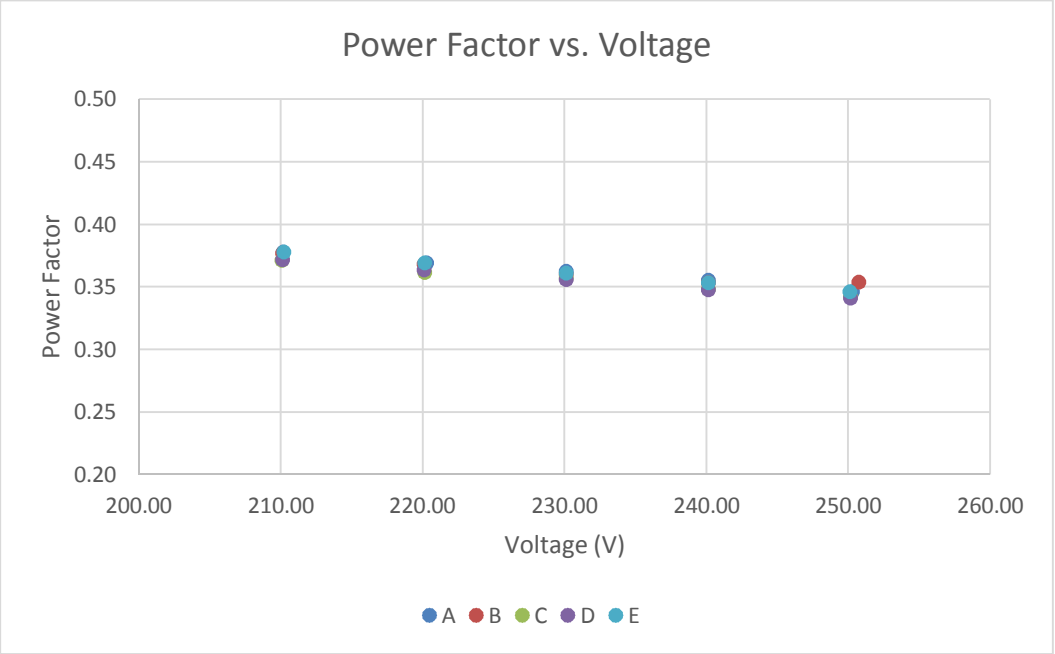
The test items were stabilised according to the electrical power stability of LM79-08. Stabilization is achieved when the difference in electrical power measurement is less than 0.5%. Each test item was stabilised at 250V.
Measurements were made with an ambient temperature of 23°C +/- 2°C. Measurements 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)	± 0.061 V_{rms}
Current (200 mA, 50/60Hz)	± 0.07 mA_{rms}
Current (0.5 A, 50/60Hz)	± 0.16 mA_{rms}
Current (5 A, 50/60Hz)	± 0.0016 A_{rms}
Power (300 V, 200 mA, 50/60 Hz)	± 0.032 W_{rms}
Power (300 V, 0.5 A, 50/60 Hz)	± 0.09 W_{rms}
Power (300 V, 5 A, 50/60 Hz)	± 0.0009 kW_{rms}
Frequency (50/60 Hz)	± 0.001 Hz
Power Factor	± 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.

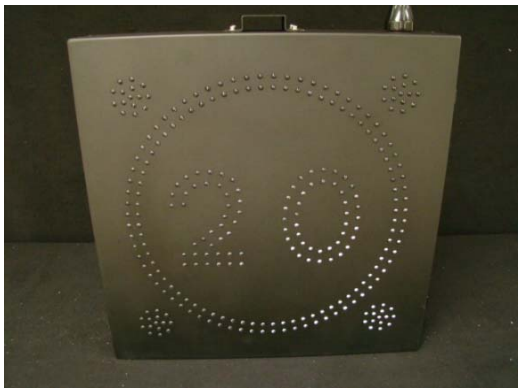
Full Test Results

Test Item	Voltage (V)	Current (mA)	Electrical Power (W)	Ambient Temp (°C)	Peak Power (VA)	Power Factor	Leading / Lagging
A	250.30	133.23	11.53	23.65	33.35	0.346	Leading
B	250.76	131.12	11.63	23.78	32.88	0.354	Leading
C	250.17	130.09	11.12	23.85	32.55	0.342	Leading
D	250.17	131.12	11.17	23.92	32.80	0.340	Leading
E	250.16	131.90	11.41	23.91	33.00	0.346	Leading
A	240.18	135.09	11.51	23.88	32.44	0.355	Leading
B	240.17	134.78	11.42	23.81	32.37	0.353	Leading
C	240.15	130.10	10.87	23.89	31.24	0.348	Leading
D	240.17	131.37	10.97	23.60	31.55	0.347	Leading
E	240.15	132.57	11.23	23.78	31.84	0.353	Leading
A	230.14	134.83	11.23	23.46	31.03	0.362	Leading
B	230.17	135.34	11.21	23.63	31.15	0.360	Leading
C	230.13	131.47	10.79	23.37	30.26	0.357	Leading
D	230.14	132.57	10.84	23.49	30.51	0.355	Leading
E	230.15	134.08	11.13	23.49	30.86	0.361	Leading
A	220.31	135.33	10.99	23.52	29.81	0.369	Leading
B	220.14	136.81	11.08	23.60	30.12	0.368	Leading
C	220.16	129.23	10.28	23.23	28.45	0.361	Leading
D	220.14	133.23	10.65	23.33	29.33	0.363	Leading
E	220.19	136.27	11.07	23.28	30.00	0.369	Leading
A	210.20	136.22	10.81	23.89	28.64	0.377	Leading
B	210.14	138.38	10.95	23.68	29.08	0.377	Leading
C	210.11	132.16	10.30	23.60	27.77	0.371	Leading
D	210.14	133.81	10.44	23.66	28.12	0.371	Leading
E	210.25	130.82	10.38	23.67	27.51	0.377	Leading

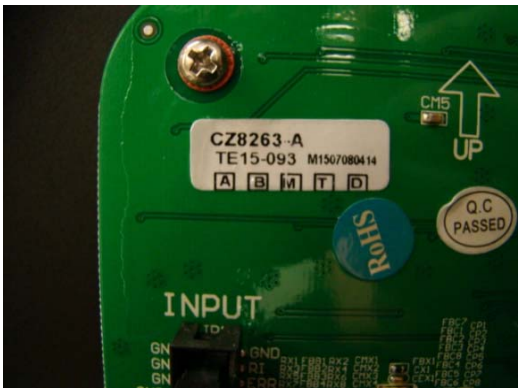
Test Item Photographs

TI-11549

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

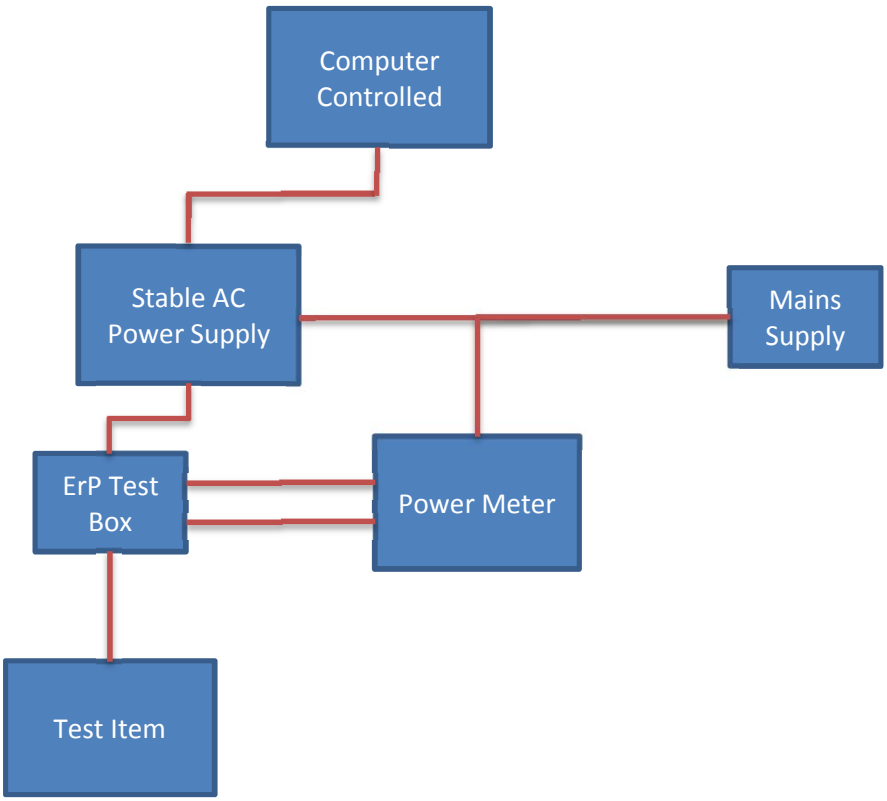


Front and Back View of LED Warning Sign



Representative images of label on Product, LED PCB and Driver

Appendix 1: Test item set-up



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