astro

PHOTOMETRIC TEST REPORT

Report Number	GNC-20243
Customer	Astro Lighting Limited
Contact	Ross Dickson
Product Type	LED Up & Down light
Test Purpose	Generation of photometric data
Quote Reference	Q-LUX17-21659
Works Order Number	WO-10890
Test Item Reference	TI-14347
LAB Test Method Reference	TES-102000
Test Standards	LM-79-08; (BS) EN 13032-4:2015; CIE S025:2015
Lab Location Reference	LUX-TSI
Tested by	Mike Sewell
Date of Test	02/11/2017
Reviewed by	Menno Schakel
Number of products tested	1

Address: LUX-TSI Ltd.,
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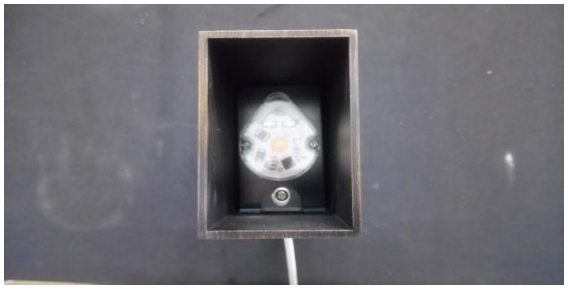
Telephone: +44 (0) 1656 864618
Authorised by: Gareth Jones
Email: gjones@lux-tsi.com
Signed:

Date: 02/11/2017



8174 - Kinzo 300 - Bronze

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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 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. Thermal stabilisation according to LM-79-08 was achieved before measurements are measured and reported.

Calibrations

The far field Type C Goniophotometer is calibrated using an intensity lamp calibrated by a NVLAP accredited calibration laboratory.

Test Equipment

UL LSI Custom Far-Field Type C Moving Mirror Goniophotometer measures intensity as a function of angle. On-axis spectral measurements taken using spectrometer, for which these measurements and outputs are not accredited.

Data Formats

IES (15 deg azimuth and 2.5 deg inclination) and LDT (15 deg C planes and 2.5 deg gamma angles)

Spectral Data file from which the calculation of chromaticity and CRI etc. have been performed and the derived results from the LightMtrX software are provided as a text file format.

All photometric data for LED products will be provided in ABSOLUTE photometric format and all non-LED data will be in relative photometric format with lamp lumens measured separately, where possible, for LOR estimation.

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Product Name	Kinzo 300 LED
Part/Serial Number	1398009
Type of Product	LED Up & Down light
Base Type	Not Applicable - Luminaire
Driver Type	Internal
Test Time	30 mins
Operating Orientation	Base Up & Down
Test Orientation	Base Up & Down
Ambient Temperature	24.3°C
Manufacturer	Astro Lighting Limited
Date of Manufacture	Not Available
Thermal Management	Passive
Dimmable	No
Pre-Burning Time	0 hours
Stabilisation Time	45 mins
Humidity	34.1% RH
Averaging Applied	NONE

Driver Details		
Manufacturer		N/A
Model		N/A
Part/Serial #		N/A
Rated Voltage		N/A
Output	Current	N/A
	Voltage	N/A

Photometric Measurements	
Luminous Flux	186 lm
Luminous Efficacy	16 lm/W

Dimension	**Sample**	**Luminous Opening**
Diameter/Width	55 mm	50 mm
Length	80 mm	75 mm
Height/Depth	300 mm	0 mm

Electrical Measurements	
Frequency	50 Hz
Voltage	230.0 V
Current	0.051 A
Power	11.7 W
Power Factor	0.994
Apparent Power	11.7 VA

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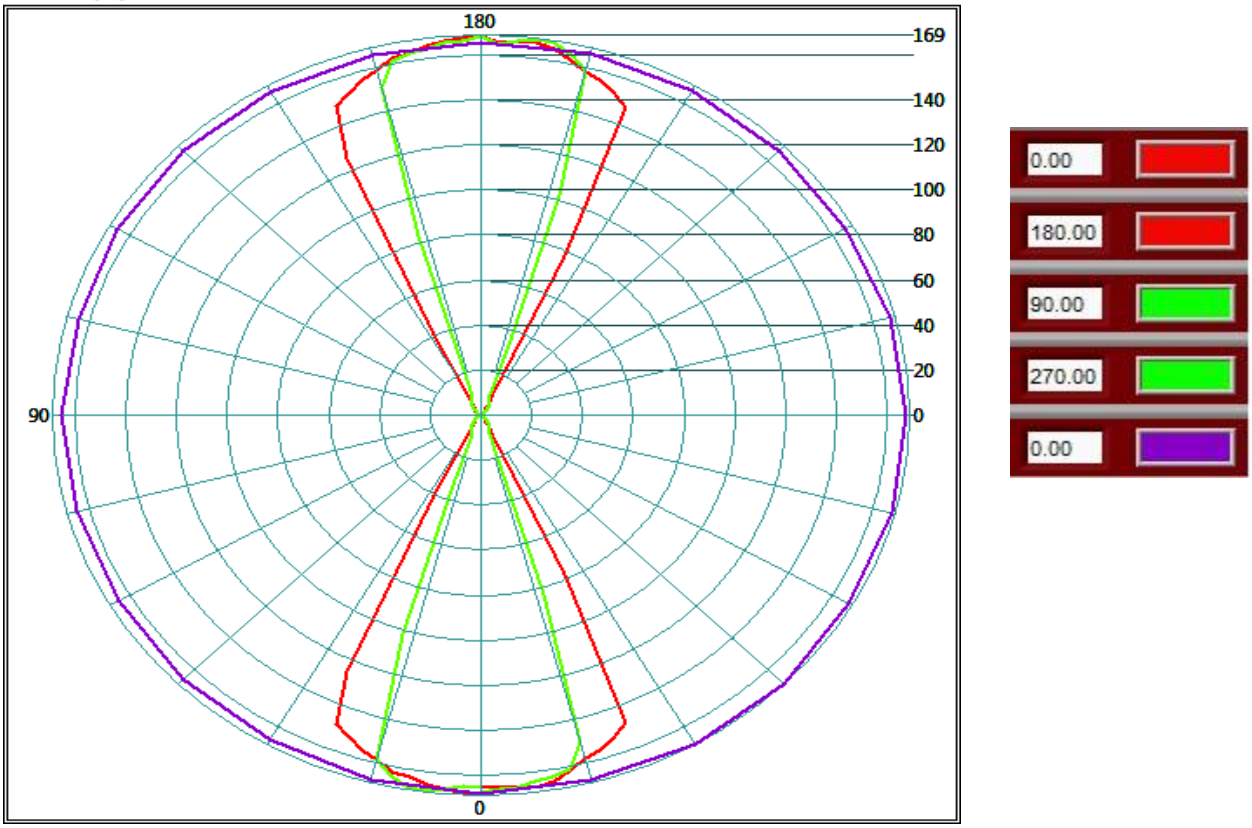
Goniophotometric Measurements		
Beam Angle	Horizontal	36º
	Vertical	51º
On-axis Intensity		168 cd
Peak Intensity		169 cd
Peak Direction	Horizontal	315º
	Vertical	0º

Polar Plot (cd)



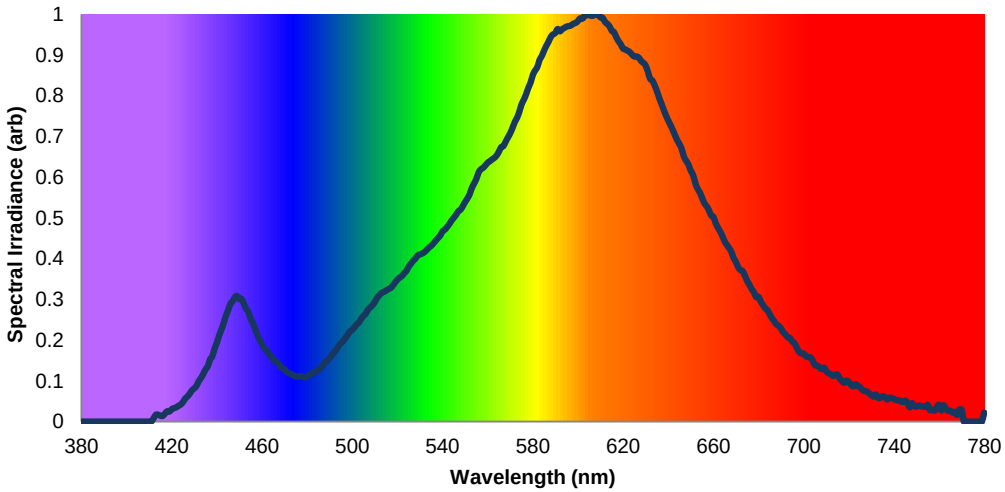
Mounting Height (m)	Beam Width (m) C0-C180 plane	Beam Width (m) C90-270 plane	Projected Illuminance (lux)
0.5	0.3	0.5	671
1	0.6	1.0	168
2	1.3	1.9	42
3	1.9	2.9	19
4	2.6	3.9	10
5	3.2	4.8	7
7.5	4.8	7.2	3
10	6.4	9.6	2
20	12.8	19.3	0

Appendices

On-axis Spectral Measurement

The following data was determined from an on-axis spectral measurement using a SP1000 spectrometer at a distance of 1000mm, for which these measurements and outputs are not accredited.

Spectral Irradiance versus Wavelength



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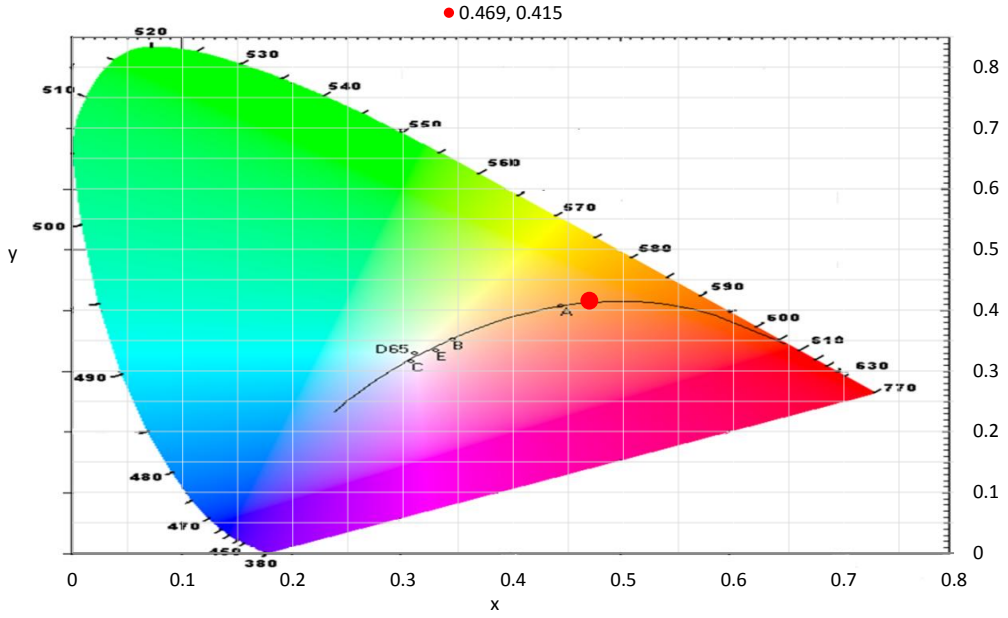
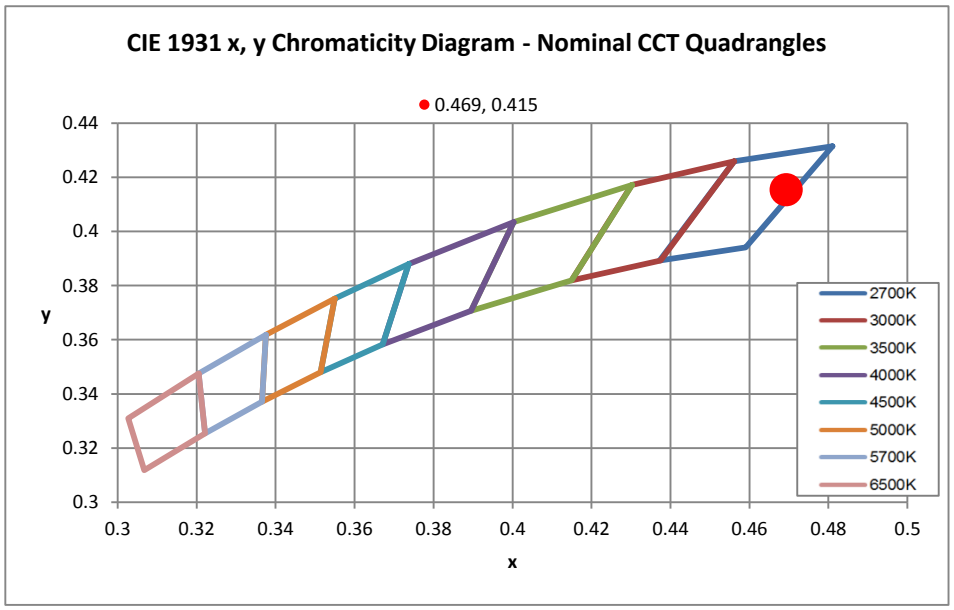
Colour Rendering Index Detail			
R1	76	R8	52
R2	88	R9	-4
R3	97	R10	73
R4	75	R11	73
R5	75	R12	68
R6	85	R13	78
R7	80	R14	99

Colorimetric Details	
CCT	2607K
CRI (Ra)	79

Chromaticity Coordinates		
CIE 1931	x	0.4693
	y	0.4154
CIE 1960	u	0.2664
	v	0.3537
CIE 1976	u'	0.2664
	v'	0.5306
Duv		0.0009

CIE 1931 Colour Chart





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Spectral Power Distribution

λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units
380	0.00E+00	430	8.16E-02	480	1.10E-01	530	4.11E-01
381	0.00E+00	431	8.77E-02	481	1.15E-01	531	4.13E-01
382	0.00E+00	432	9.92E-02	482	1.18E-01	532	4.16E-01
383	0.00E+00	433	1.07E-01	483	1.19E-01	533	4.22E-01
384	0.00E+00	434	1.17E-01	484	1.24E-01	534	4.27E-01
385	0.00E+00	435	1.28E-01	485	1.28E-01	535	4.32E-01
386	0.00E+00	436	1.36E-01	486	1.31E-01	536	4.38E-01
387	0.00E+00	437	1.53E-01	487	1.38E-01	537	4.44E-01
388	0.00E+00	438	1.60E-01	488	1.46E-01	538	4.51E-01
389	0.00E+00	439	1.79E-01	489	1.50E-01	539	4.57E-01
390	0.00E+00	440	1.93E-01	490	1.56E-01	540	4.67E-01
391	0.00E+00	441	2.11E-01	491	1.63E-01	541	4.71E-01
392	0.00E+00	442	2.26E-01	492	1.71E-01	542	4.78E-01
393	0.00E+00	443	2.41E-01	493	1.77E-01	543	4.85E-01
394	0.00E+00	444	2.59E-01	494	1.86E-01	544	4.94E-01
395	0.00E+00	445	2.73E-01	495	1.93E-01	545	5.01E-01
396	0.00E+00	446	2.89E-01	496	1.98E-01	546	5.08E-01
397	0.00E+00	447	2.95E-01	497	2.06E-01	547	5.17E-01
398	0.00E+00	448	3.05E-01	498	2.13E-01	548	5.21E-01
399	0.00E+00	449	3.08E-01	499	2.21E-01	549	5.29E-01
400	0.00E+00	450	3.00E-01	500	2.26E-01	550	5.39E-01
401	0.00E+00	451	3.01E-01	501	2.32E-01	551	5.48E-01
402	0.00E+00	452	2.89E-01	502	2.39E-01	552	5.58E-01
403	0.00E+00	453	2.77E-01	503	2.44E-01	553	5.74E-01
404	0.00E+00	454	2.69E-01	504	2.53E-01	554	5.85E-01
405	0.00E+00	455	2.52E-01	505	2.60E-01	555	5.96E-01
406	0.00E+00	456	2.42E-01	506	2.65E-01	556	6.12E-01
407	0.00E+00	457	2.27E-01	507	2.75E-01	557	6.19E-01
408	0.00E+00	458	2.13E-01	508	2.81E-01	558	6.23E-01
409	0.00E+00	459	2.01E-01	509	2.86E-01	559	6.29E-01
410	0.00E+00	460	1.91E-01	510	2.94E-01	560	6.36E-01
411	0.00E+00	461	1.81E-01	511	3.04E-01	561	6.40E-01
412	8.42E-03	462	1.75E-01	512	3.10E-01	562	6.44E-01
413	1.69E-02	463	1.67E-01	513	3.16E-01	563	6.48E-01
414	1.68E-02	464	1.61E-01	514	3.19E-01	564	6.54E-01
415	1.45E-02	465	1.51E-01	515	3.22E-01	565	6.63E-01
416	1.37E-02	466	1.49E-01	516	3.25E-01	566	6.74E-01
417	1.94E-02	467	1.45E-01	517	3.28E-01	567	6.77E-01
418	2.55E-02	468	1.36E-01	518	3.34E-01	568	6.88E-01
419	2.45E-02	469	1.32E-01	519	3.42E-01	569	6.98E-01
420	3.04E-02	470	1.29E-01	520	3.48E-01	570	7.08E-01
421	3.29E-02	471	1.22E-01	521	3.54E-01	571	7.21E-01
422	3.49E-02	472	1.19E-01	522	3.57E-01	572	7.35E-01
423	3.87E-02	473	1.17E-01	523	3.64E-01	573	7.46E-01
424	4.18E-02	474	1.14E-01	524	3.70E-01	574	7.60E-01
425	4.79E-02	475	1.11E-01	525	3.81E-01	575	7.79E-01
426	5.65E-02	476	1.10E-01	526	3.88E-01	576	7.90E-01
427	6.18E-02	477	1.12E-01	527	3.95E-01	577	8.03E-01
428	6.84E-02	478	1.11E-01	528	4.00E-01	578	8.19E-01
429	7.70E-02	479	1.08E-01	529	4.08E-01	579	8.32E-01
						580	8.51E-01

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λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units
581	8.62E-01	631	8.59E-01	681	2.95E-01	731	6.17E-02
582	8.71E-01	632	8.42E-01	682	2.86E-01	732	6.65E-02
583	8.88E-01	633	8.37E-01	683	2.78E-01	733	5.82E-02
584	8.98E-01	634	8.26E-01	684	2.73E-01	734	5.84E-02
585	9.11E-01	635	8.11E-01	685	2.63E-01	735	6.25E-02
586	9.23E-01	636	7.95E-01	686	2.54E-01	736	6.02E-02
587	9.33E-01	637	7.81E-01	687	2.46E-01	737	5.43E-02
588	9.45E-01	638	7.66E-01	688	2.38E-01	738	5.87E-02
589	9.51E-01	639	7.52E-01	689	2.35E-01	739	5.80E-02
590	9.55E-01	640	7.40E-01	690	2.28E-01	740	5.57E-02
591	9.64E-01	641	7.28E-01	691	2.19E-01	741	5.28E-02
592	9.58E-01	642	7.17E-01	692	2.14E-01	742	5.26E-02
593	9.63E-01	643	7.03E-01	693	2.07E-01	743	4.98E-02
594	9.67E-01	644	6.91E-01	694	2.05E-01	744	4.82E-02
595	9.70E-01	645	6.81E-01	695	1.96E-01	745	5.13E-02
596	9.71E-01	646	6.69E-01	696	1.92E-01	746	4.65E-02
597	9.73E-01	647	6.50E-01	697	1.81E-01	747	3.49E-02
598	9.77E-01	648	6.40E-01	698	1.72E-01	748	4.52E-02
599	9.79E-01	649	6.31E-01	699	1.67E-01	749	3.89E-02
600	9.84E-01	650	6.16E-01	700	1.67E-01	750	3.68E-02
601	9.90E-01	651	6.06E-01	701	1.61E-01	751	3.93E-02
602	9.89E-01	652	5.86E-01	702	1.58E-01	752	3.81E-02
603	9.97E-01	653	5.72E-01	703	1.58E-01	753	3.68E-02
604	9.98E-01	654	5.63E-01	704	1.50E-01	754	3.65E-02
605	9.98E-01	655	5.50E-01	705	1.39E-01	755	4.11E-02
606	9.96E-01	656	5.37E-01	706	1.38E-01	756	2.81E-02
607	9.97E-01	657	5.29E-01	707	1.33E-01	757	2.95E-02
608	1.00E+00	658	5.20E-01	708	1.29E-01	758	2.68E-02
609	9.98E-01	659	5.06E-01	709	1.33E-01	759	3.50E-02
610	9.92E-01	660	5.03E-01	710	1.24E-01	760	4.14E-02
611	9.91E-01	661	4.88E-01	711	1.19E-01	761	2.73E-02
612	9.81E-01	662	4.77E-01	712	1.17E-01	762	4.02E-02
613	9.77E-01	663	4.67E-01	713	1.12E-01	763	3.19E-02
614	9.70E-01	664	4.56E-01	714	1.15E-01	764	2.61E-02
615	9.60E-01	665	4.43E-01	715	1.15E-01	765	2.67E-02
616	9.56E-01	666	4.34E-01	716	1.06E-01	766	2.24E-02
617	9.44E-01	667	4.26E-01	717	9.96E-02	767	2.37E-02
618	9.34E-01	668	4.17E-01	718	9.51E-02	768	1.65E-02
619	9.26E-01	669	4.02E-01	719	1.00E-01	769	2.95E-02
620	9.16E-01	670	3.92E-01	720	9.73E-02	770	2.89E-02
621	9.14E-01	671	3.79E-01	721	9.01E-02	771	0.00E+00
622	9.11E-01	672	3.72E-01	722	8.66E-02	772	0.00E+00
623	9.07E-01	673	3.69E-01	723	9.19E-02	773	0.00E+00
624	9.01E-01	674	3.58E-01	724	8.76E-02	774	0.00E+00
625	8.97E-01	675	3.45E-01	725	8.46E-02	775	0.00E+00
626	8.97E-01	676	3.36E-01	726	7.80E-02	776	0.00E+00
627	8.93E-01	677	3.25E-01	727	7.52E-02	777	0.00E+00
628	8.85E-01	678	3.17E-01	728	7.40E-02	778	0.00E+00
629	8.81E-01	679	3.06E-01	729	6.97E-02	779	0.00E+00
630	8.74E-01	680	3.07E-01	730	6.54E-02	780	2.23E-02

Measurement Uncertainty

The following is the reported expanded uncertainty of the UL 6440T Type C Mirror Goniophotometer.

Parameter	Uncertainty
Total Luminous Flux (%)	± 4.9
Luminous Intensity (%)	± 4.9
Temperature (°C)	± 1.0
Voltage DC TY720 (%)	± 0.017
Current DC TY720 (%)	± 0.10
Voltage AC WT210 (%)	± 0.059
Current AC WT210 (%)	± 0.025
Power AC WT210 (%)	± 0.23
Frequency (50/60 Hz) WT210 (%)	± 0.004
Power Factor WT210 (%)	± 0.06

The reported expanded uncertainty is based on the combined standard uncertainty multiplied by a coverage factor of k = 2. This value of k gives a coverage probability of approximately 95%, assuming a normal distribution. This determination of the measurement uncertainty has been done in accordance with international requirements including UKAS, BIPM Guide to the Expression of Uncertainty in Measurement and CIE 198:2011 and CIE S 025/E:2015.

Electrical measurement equipment used for the determination of results for this report, are compliant and meet the performance requirements of the measurement standards used.

---------- END OF REPORT ----------