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EMC COMPLIANCE REPORT

In accordance with:

EN 61326-1: 2013 (RCM Emissions Requirements Only)

A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd

CAL3k-S

Bomb Calorimeter

REPORT: E2111-1479
DATE: March, 2022

WORLD RECOGNISED ACCREDITATION

Accreditation Number: 18553
Accredited for compliance with ISO/IEC 17025 - Testing

Certificate of Compliance

EMC Bayswater Test Report: E2111-1479
Issue Date: March, 2022

Product(s):	Bomb Calorimeter
Model No:	CAL3k-S
Serial No:	0-05/ 10-21/026
Variant:	Cal 3k U, Cal 3K S & Cal 3kF

The above listed variant (CAL3k-S) was tested by EMC Bayswater Pty Ltd as a representative model and the results and conclusions within this report do not necessarily reflect compliance for other models. Please refer to section 5 of this report for variant information and the customer variant declaration.

Manufacturer: Digital Data Systems Pty Ltd, South Africa

Client Details:
Mr. Peter Barras
A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd
PO Box 3229
Bangor, NSW, 2234, Australia

Phone No: 02 9543 7377 Fax No: 02 9543 7366
e-mail: peter@alpe.net.au

Test Specification(s): EN 61326-1: 2013 (RCM Emissions Requirements Only)
Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements. Part 1: General requirements

Results Summary:

Electromagnetic Radiation Disturbance	(CISPR 11)	***Complied (Group 1, Class A)***
Mains Terminal Disturbance Voltage	(CISPR 11)	***Complied (Group 1, Class A)***
Electrostatic Discharge (ESD)	(EN 61000-4-2)	***Not tested****
Electromagnetic Field	(EN 61000-4-3)	***Not tested****
Burst	(EN 61000-4-4)	***Not tested****
Surges	(EN 61000-4-5)	***Not tested****
Conducted RF	(EN 61000-4-6)	***Not tested****
Power Frequency Magnetic Field	(EN 61000-4-8)	***Not tested****
Voltage Dips and Interruptions	(EN 61000-4-11)	***Not tested****
Harmonic Current Emissions	(EN 61000-3-2)	***Not tested****
Voltage Change, Fluctuation & Flicker	(EN 61000-3-3)	***Not tested****

**The customer requested EMC Emissions testing only for RCM. No EMC Immunity testing was performed.*

Test Date(s): 8th to the 25th of November, 2021

Test House (Issued By)
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The A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd, CAL3k-S, Bomb Calorimeter, complied with the group 1, class A emissions requirements of EN 61326-1: 2013 (RCM Emissions Requirements Only).

Tested & prepared by:	Approved by:	
		03/03/2022 12:14
Fabio D'Amico (EMC Test Engineer)	Neville Liyanapatabendige (Manager)	Date

EMC Compliance Report
for
A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd

Contents

1. Introduction

Electromagnetic Compatibility (EMC) tests were performed on a A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd, CAL3k-S Bomb Calorimeter in accordance with EN 61326-1: 2013 (RCM Emissions Requirements Only).

2. Test Report Revision History

None

3. Report Information

EMC Bayswater Pty Ltd reports apply only to the specific samples tested under the stated test conditions. All samples tested were in good operating condition throughout the entire test program unless otherwise stated. EMC Bayswater Pty Ltd does not in any way guarantee the later performance of the product/equipment. It is the manufacturer's responsibility to ensure that additional production units of the tested model are manufactured with identical electrical and mechanical components. EMC Bayswater Pty Ltd shall have no liability for any deductions, inference or generalisations drawn by the clients or others from EMC Bayswater Pty Ltd issued reports. This report shall not be used to claim, constitute or imply product endorsement by EMC Bayswater Pty Ltd. This report shall not be reproduced except in full (with the exception of the certificate on page 2) without the written approval of EMC Bayswater Pty Ltd. This document may be altered or revised by EMC Bayswater Pty Ltd personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by EMC Bayswater Pty Ltd will constitute fraud and shall nullify the document.

4. Summary of Results

The EUT complied with the applicable group 1, class A emission requirements of EN 61326-1: 2013 (RCM Emissions Requirements Only). Worst-case emissions are tabled as follows:

Test	Class / Limit(s)	Result
Electromagnetic Radiation Disturbance (Horizontal antenna polarisation)	CISPR 11 Group 1, Class A	Complied with quasi-peak limit by 4.1dB+
Electromagnetic Radiation Disturbance (Vertical antenna polarisation)		Complied with quasi-peak limit by 6.5dB
Mains Terminal Disturbance Voltage (Active line)	CISPR 11 Group 1, Class A	Complied with quasi-peak limit by 39.4dB
		Complied with average limit by 31.8dB
Mains Terminal Disturbance Voltage (Neutral line)		Complied with quasi-peak limit by 40.3dB
		Complied with average limit by 35.5dB

+Refer to measurement uncertainty statement

Table 1: Summary of test results

5. Product Sample, Configuration & Modifications

5.1. Product Sample Details

The EUT (Equipment Under Test), as supplied by the client, is described as follows:

Product:	Bomb Calorimeter	
Model No:	CAL3k-S	
Variant:	Cal 3k U, Cal 3K S & Cal 3kF	
	**The customer (A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd) declared testing of one variant as a worst case representative sample and declared that to be the "CAL3k-S " (refer to Appendix D within this report for the customer declaration of worst case variant used for testing). Please note other than the unit(s) listed as a) "Product" and b) "Model", no other products/models or variant(s) were tested.*	
Serial No:	0-05/ 10-21/026	
Manufacturer:	Digital Data Systems Pty Ltd, South Africa	
Firmware:	Not stated	
Software:	Not stated	
Power Specifications:	12VDC via external AC/DC power adapter	
	Description:	External AC/DC plug-pack power adapter
	Manufacturer:	Ktec®
	Model:	KSA-18W-120150VA
	Serial:	Not stated
	Input:	100-240VAC, 50-60Hz, 0.5A
	Output:	12VDC, 1.5A
	Comment:	Used for testing purposes only, not marketed with EUT
Dimensions:	350mm x 280mm x 240mm	
Weight:	12 kg	
EUT Type:	Table-top i.e. not floor standing, wall mounted or suspended.	
Orientation:	The EUT is typically used in one orientation only	

(Customer supplied product information)

(Refer to photographs in Appendix B for views of the EUT)

5.2. Product description

Bomb Calorimeter.

The highest internal clock frequency of the device declared by the customer was not declared by the customer.

The customer stated that the EUT was to be tested in accordance with the following:

Emissions testing
Class A equipment limits for emission.

Class A equipment is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

The EUT has been identified as Class A equipment by the customer. The following or similar warning shall be included in the instructions for use:

Warning: Class A equipment is intended for use in an industrial environment. In the documentation for the user, a statement shall be included drawing attention to the fact that there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

Immunity testing
No immunity testing was performed.

(Refer to photographs in Appendix B for views of the EUT)

5.3. Support Equipment

Support Equipment: 1	Description:	Keyboard
	Manufacturer:	Premium
	Model:	Not stated
	Serial number:	FUF04766

5.4. Product operating modes

The customer described the products normal operation modes as the following:

Standard mode.

(Customer supplied product operating mode information)

5.5. Product operating mode for testing

Standard mode.

5.6. EUT Configuration

The EUT was configured by the customer prior to testing. The EUT was connected to and powered by 230VAC, 50Hz via a customer supplied external AC/DC plug-pack power adapter for all testing.

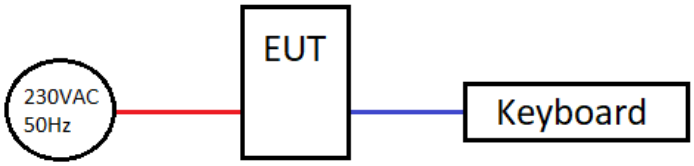

Table 2: Block diagram of EUT test configuration

Port	Cable type	Shielded cable	Length (m)	Cable Brand	Cable Model	Termination
DC power input	2-core	No	1.8	Ktec®	Not Stated	AC mains via external AC/DC adpater
Balance – RS232	No cable connected					Un-terminated
Computer – RS232	No cable connected					Un-terminated
Keyboard – PS2	Multi-core	No	1.5	Premium	Not Stated	Keyboard

Table 3: List of ports, loads and cable lengths used for testing

5.7. Modifications

The following modifications were made to the EUT to comply with Radiated Disturbance testing:

❶ 2 x Würth ferrites (part number 742 711 12 S) were placed on the DC input cable with 2 passes. One ferrite was placed as close as possible to the EUT DC input port and the other ferrite was placed as close as possible to the AC/DC power adapter.

(Refer to photograph 22 in Appendix B for a view of the modification)

Test	Modification
	❶
Electromagnetic Radiation Disturbance	✓
Mains Terminal Disturbance Voltage	×

✓ = Modification fitted, × = Modification not fitted

Table 4: Summary of fitted modifications per test

EMC Bayswater takes no responsibility for any modifications made to the EUT specifically to achieve EMC compliance and hence these modifications may only be satisfactory for that purpose under the stated EUT test conditions. The customer must check that the proposed modifications meet all the product design, functional, safety or other compliance requirements. The customer elected not to re-test any of the previously completed tests (unless otherwise indicated in the table). EMC Bayswater takes no responsibility for any adverse EMC performance of the unrepeated tests that may occur due to the modifications fitted.

5.8. Monitoring

N/A. No Immunity testing was performed.

6. Test Facility & Equipment

6.1. Test Facility

Electromagnetic Radiation Disturbance Measurements were taken at the indoor Open Area Test Site (iOATS) facility at EMC Bayswater Pty Ltd, located at 18/88 Merrindale Drive, Croydon South, Victoria, 3136, Australia.

All other tests were performed inside an anechoic chamber or a standard shielded enclosure, where applicable, at EMC Bayswater Pty Ltd, located at 18/88 Merrindale Drive, Croydon South, Victoria, 3136, Australia.

6.2. Test Equipment

Refer to Appendix A for the measurement instrument list.

7. Referenced Standards

EN 61326-1: 2013 (RCM Emissions Requirements Only)
Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements. Part 1: General requirements.

CISPR 16-1: 2010
Specification for radio disturbance and immunity measuring apparatus and methods – Part 1: Radio disturbance and immunity measuring apparatus.

CISPR 16-2: 2006
Specification for radio disturbance and immunity measuring apparatus and methods – Part 2: Methods of measurement of disturbances and immunity.

CISPR 11: 2009 + A1: 2010
Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement

CISPR 16-1-4: 2012
Specification for radio disturbance and immunity measuring apparatus and methods Part 1.4: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Radiated disturbances.

8. Referenced Documents

None.

9. Electromagnetic Radiation Disturbance (CISPR 11)

9.1. Test Procedure

Radiated Emissions were measured 3 metres away from the EUT in the iOATS (indoor Open Area Test Site) facility, which is a CISPR 16-1-4 compliant semi-anechoic chamber with ground plane. The EUT was placed on a non-conductive table, at a height of 0.8m above the ground plane.

In the frequency range of 30MHz to 1GHz, a Biconilog antenna was used. For both horizontal and vertical antenna polarizations, the peak detector was set to MAX-HOLD and the range selected continuously scanned. The measuring antenna was positioned at 4 different fixed height positions and the turntable slowly rotated. The peak preview measurements were performed with a resolution bandwidth of 120kHz and a video bandwidth of 300kHz. Peak emissions that exceeded the limit or were close to the applicable limit were investigated further. The frequency of each emissions was then accurately determined. Each emission of interest was than in-turn maximised by using the turntable to rotate the EUT through 360 degrees and varying the height of the antenna between 1 and 4 metres to find the worst-case emission arrangement. Quasi peak measurements were then performed using a measuring time of no less than 15 seconds. The final quasi-peak measurements were performed using a receiver bandwidth of 6dB and a resolution bandwidth of 120kHz.

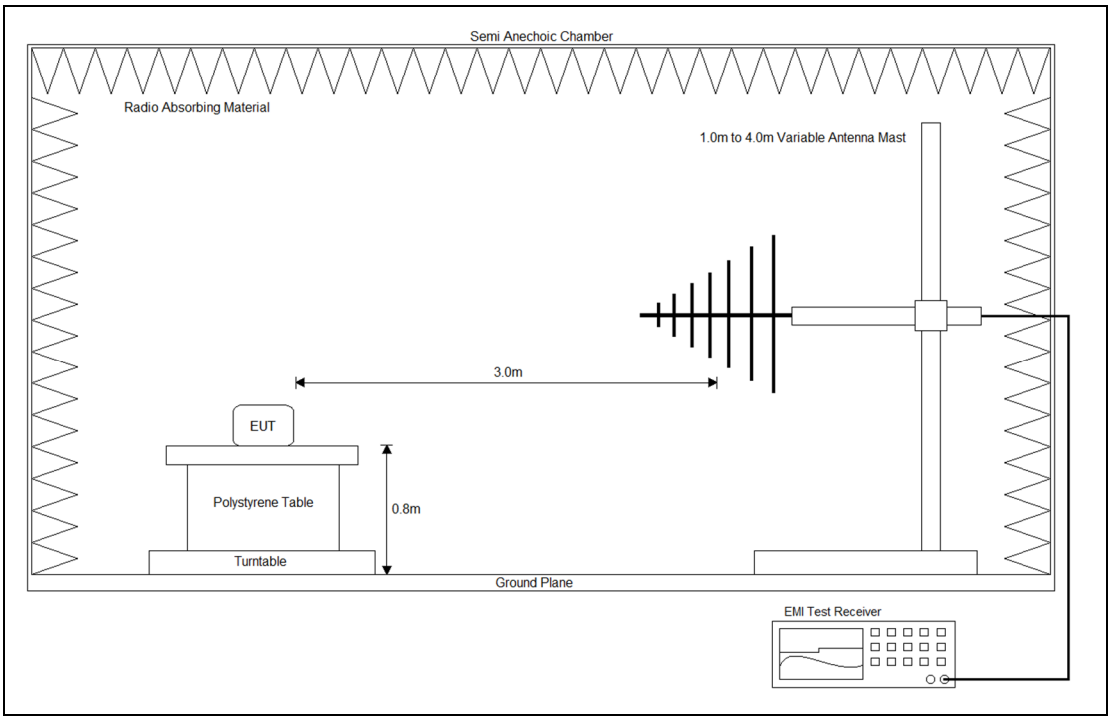

Figure 1: Test setup – 30MHz to 1GHz

Plots of the accumulated measurement data for both horizontal and vertical antenna polarizations, including all transducer and other measuring system correction factors were produced using commercially available compliant software (as listed in the test equipment list of this report).

(Refer to photograph 1 in Appendix B for a view of the test configuration)

9.2. Limits

The EUT shall meet the limits in the following table.

Frequency Range (MHz)	Limits (dBµV/m)
	Quasi-Peak
30 to 230	50
230 to 1000	57
NOTE The lower limit shall apply at the transition frequency.	

Table 5: Limits for Electromagnetic Radiation Disturbance of CISPR 11, Class A ISM Equipment at a measuring distance of 3 m.

9.3. Test Results

The Radiated Disturbance measurements are tabulated below.

(Refer to graphs 1 & 2 in Appendix C)

Frequency (MHz)	Result Quasi-peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Delta limit (dB)
41.737	22.3	50.0	-27.7
111.092	40.1	50.0	-9.9
134.954	27.3	50.0	-22.7
222.303	45.9	50.0	**-4.1*+**
333.465	44.7	57.0	-12.3
444.578	41.8	57.0	-15.2

**Worst-case emissions, +Refer to measurement uncertainty statement*

Table 6: Electromagnetic Radiation Disturbance – Horizontal antenna polarisation

Frequency (MHz)	Result Quasi-peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Delta limit (dB)
30.631	37.7	50.0	-12.3
31.698	35.8	50.0	-14.2
42.950	36.9	50.0	-13.1
110.995	41.9	50.0	-8.1
222.448	43.5	50.0	**-6.5***
333.562	46.7	57.0	-10.3

**Worst-case emissions*

Table 7: Electromagnetic Radiation Disturbance – Vertical antenna polarisation

The measurement uncertainty was calculated as follows:

Measurement frequency range	Calculated measurement uncertainty
30MHz to 1GHz	±4.65dB

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of *k=2* which gives a level of confidence of approximately 95%.

Climatic Conditions	
Temperature:	20°C
Humidity:	55 to 57%
Atmospheric pressure:	1013.1 to 1013.5hpa

Table 8: Climatic Conditions

Calculation: The above results are based upon the following calculation:

$$E = V_{QP/PK/AV} + AF - G_{Amp} + L_C$$

Where:

E	=	E-field in dBμV/m
$V_{QP/PK/AV}$	=	Measured Voltage (Quasi Peak, Peak or Average) in dBμV
AF	=	Antenna Factor in dB(/m)
L_C	=	Cable and attenuator Loss in dB
G_{Amp}	=	Pre Amplifier Voltage Gain in dB

Example calculation:

$E = V_{QP} + AF - G_{Amp} + L_C$
$E = 30dB\mu V + 12dB/m - 0dB + 2.3dB$
$E = 44.3\ dB\mu V/m$

Notes: Electromagnetic Radiation Disturbance measurements were below the specified Group 1, Class A limit for quasi-peak measurements

Assessment: The EUT complied with the specified CISPR 11, Group 1, Class A Electromagnetic Radiation Disturbance requirements of EN 61326-1: 2013 (RCM Emissions Requirements Only).

10. Mains Terminals Disturbance Voltage (CISPR 11)

10.1. Test Procedure

The EUT was positioned 0.4m from the vertical ground reference plane (chamber wall) and 0.8m above a horizontal ground reference plane (chamber floor) with the mains cable connected to the power port of an AMN located 0.8m away. The measuring port of the AMN was connected to the measuring receiver. In order to avoid unwanted ambient signals, power to the AMN was supplied via power line filters fitted to the shielded enclosure wall.

The mains flexible cord provided by the manufacturer is required to be 1m long for these measurements. If the manufacturer supplies a non-removable power lead, in excess of 1m, the cable in excess of 1m is folded at the centre into a bundle no longer than 0.4m in length.

Preview scan measurements were performed using a peak and an average detector of the EMI receiver with a resolution bandwidth of 9kHz. The scan measurements frequency step size of the EMI receiver was set to less than half of the resolution bandwidth. The final quasi-peak and CISPR average measurements were performed at spot frequencies where the preview peak or average emission was close to, or exceeded the applicable limit line with a receiver bandwidth of 6dB and a resolution bandwidth of 9kHz. The final measurements were performed using a measuring time of no less than 15 seconds.

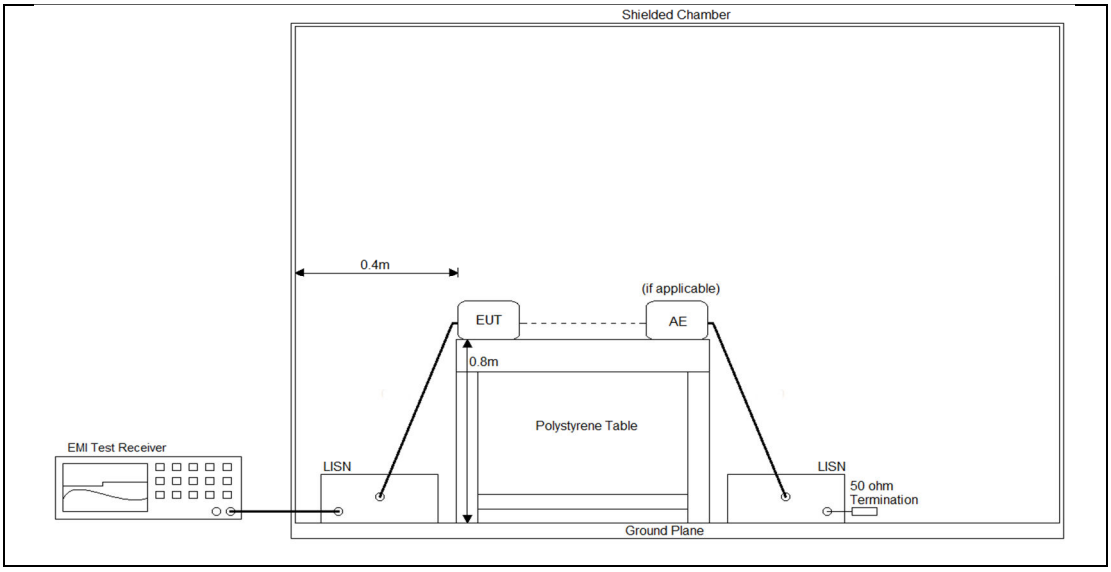

Figure 2: Conducted emissions test setup

Both the active and neutral Ports were measured, in turn.

Plots of the accumulated measurement data for both active and neutral Ports, including all transducer and other measuring system correction factors were produced using commercially available compliant software (as listed in the test equipment list of this report).

(Refer to photograph 2 in Appendix B for a view of the test configuration)

10.2. Limits

The EUT shall meet the limits in the following table. This includes the average limit and the quasi-peak limit when using an average detector and quasi-peak detector, respectively.

Frequency Range (MHz)	Limits (dBµV)	
	Quasi-Peak	Average
0.15 to 0.50	79	66
0.5 to 30	73	60
NOTE 1 The lower limit shall apply at the transition frequencies.		

Table 9: Limits for Mains Terminal Disturbance Voltage for CISPR 11, Class A ISM equipment.

10.3. Test Results

The Mains Terminal Disturbance Voltage measurements are tabulated below. Quasi-peak or CISPR Average measurements were performed at spot frequencies where the peak or average emission was close to, or exceeded the applicable limit line.

(Refer to graphs 3 & 4 in Appendix C)

Quasi – Peak Measurements				Average Measurements			
Frequency (MHz)	Result (dBµV)	Limit (dBµV)	Delta Limit (dB)	Frequency (MHz)	Result (dBµV)	Limit (dBµV)	Delta Limit (dB)
0.430	38.8	79.0	-40.2	0.430	29.7	66.0	-36.3
0.450	38.2	79.0	-40.8	0.485	27.7	66.0	-38.3
15.566	26.8	73.0	-46.2	16.626	23.9	60.0	-36.1
17.542	25.1	73.0	-47.9	18.706	24.4	60.0	-35.6
18.106	28.4	73.0	-44.6	27.018	25.0	60.0	-35.0
29.098	33.6	73.0	**-39.4***	29.098	28.2	60.0	**-31.8***

**Worst-case emissions*

Table 10: for Mains Terminal Disturbance Voltage measurements – Active Line

Quasi – Peak Measurements				Average Measurements			
Frequency (MHz)	Result (dBµV)	Limit (dBµV)	Delta Limit (dB)	Frequency (MHz)	Result (dBµV)	Limit (dBµV)	Delta Limit (dB)
0.426	30.5	79.0	-48.5	0.426	24.4	66.0	-41.6
15.618	24.0	73.0	-49.0	16.626	19.6	60.0	-40.4
17.322	23.5	73.0	-49.5	18.286	19.3	60.0	-40.7
17.886	29.0	73.0	-44.0	18.702	23.5	60.0	-36.5
18.066	29.9	73.0	-43.1	27.014	20.5	60.0	-39.5
29.094	32.7	73.0	**-40.3***	29.094	24.5	60.0	**-35.5***

**Worst-case emissions*

Table 11: for Mains Terminal Disturbance Voltage measurements – Neutral Line

The measurement uncertainty was calculated as follows:

Measurement frequency range	Calculated measurement uncertainty
0.15MHz to 30MHz	±2.88dB

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of *k=2* which gives a level of confidence of approximately 95%.

Climatic Conditions	
Temperature:	23 to 24°C
Humidity:	51 to 53%
Atmospheric pressure:	1013.5 to 1013.6hpa

Table 12: Climatic Conditions

Calculation: The above results are based upon the following calculation:

$$V = V_{QP/AV} + VAMN + L_C + L_T$$

Where:

V = Corrected Voltage Amplitude in dBµV
$V_{QP/AV}$ = Measured Voltage (Quasi Peak or Average) in dBµV
$VAMN$ = Artificial Mains Network Factor in dB
L_C = Cable/attenuator Loss in dB
L_T = Transient Protection Network Loss in dB

Example calculation:

$V = V_{QP} + VAMN + L_C + L_T$
V = 15 dBµV + 10.1dB + 11.5dB + 10.1dB
V = 46.7 dBµV

Notes: Mains Terminal Disturbance Voltage measurements were below the specified Group 1, Class A limits for both quasi-peak and average measurements.

Assessment: The EUT complied with the specified CISPR 11, Group 1, Class A Mains Terminal Disturbance Voltage requirements of EN 61326-1: 2013 (RCM Emissions Requirements Only).

11. Conclusion

The A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd, CAL3k-S Bomb Calorimeter complied with the group 1, class A emission requirements of EN 61326-1: 2013 (RCM Emissions Requirements Only).

Appendix A – Test Equipment

Inv	Equipment	Make	Model No.	Serial No.	Calibration	
					Due	Type
Electromagnetic Radiation Disturbance						
1217	Analyser, EMI Receiver	Rohde & Schwarz	ESU40	100182	May-22	E
0932	Controller, Position	Sunol Sciences	SC104V-3	081006-1	-	V
0933	Turntable	Sunol Sciences	SM46C	081006-2	-	V
0934	Mast, Antenna	Sunol Sciences	TLT2	081006-5	-	V
0935	Antenna, Biconilog	Sunol Sciences	JB5	A071106	Feb-23	E
0718	Attenuator, 6dB	JFW	50FPE-006	-	Jan-22	I
1143	Cable, Coax, Sucoflex 104PA	Huber + Suhner	84287041	SN MY058/4PA	Jan-22	I
1145	Cable, Coax, Sucoflex 104PA	Huber + Suhner	84279564	SN MY056/4PA	Jan-22	I
1248	Hygrometer, Temp, Humidity	Thomas Scientific	6066N53	181037404	Feb-22	I
0666	Enclosure, Semi-Anechoic, #1	RFI Industries	S800 iOATS	1229	Jan-22	I
SW007	EMC Measurement Software	Rohde & Schwarz	EMC 32	Version 8.53.0	N/A	N/A
Mains Terminal Disturbance Voltage						
0954	Analyser, EMI Receiver	Rohde+Schwarz	ESCI 3	100196	Aug-22	E
0044	Limiter, Transient, 9k-200M	Hewlett Packard	11947A	2820A00132	May-23	I
1244	LISN, Single Phase, 50uH/50Ω	Teseq	NNB 51	47414	Mar-22	I
1148	Cable, Coax, Sucoflex 104PA	Huber + Suhner	84287047	SN MY059/4PA	Jan-22	I
1149	Cable, Coax, Sucoflex 104PA	Huber + Suhner	84287049	SN MY053/4PA	Dec-21	I
1154	Hygrometer, Temp, Humidity	DigiTech	QM7312	-	Jul-23	I
0441	Enclosure, Shielded, No 5	RFI Industries	TC800-20	933	-	V
SW007	EMC Measurement Software	Rohde & Schwarz	EMC 32	Version 8.53.0	N/A	N/A

V: Verification of operation against an internal reference
I: Internal calibration against a traceable standard
E: External calibration by a NATA or MRA equivalent endorsed facility
N/A: Not Applicable

Appendix B – Photographs

Number	Photograph Description
1	Electromagnetic Radiation Disturbance – Test configuration
2	Mains Terminal Disturbance Voltage
3	EUT – External views
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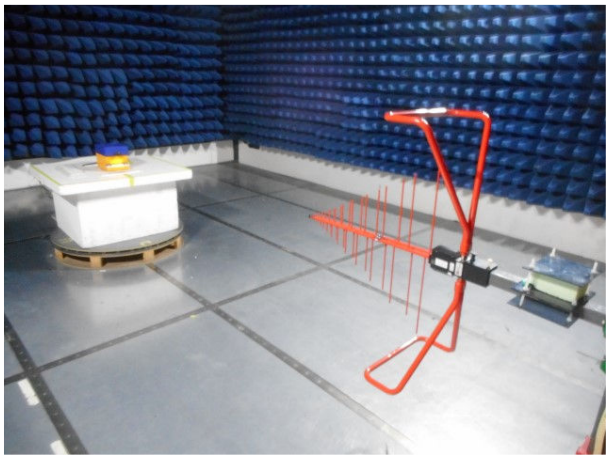
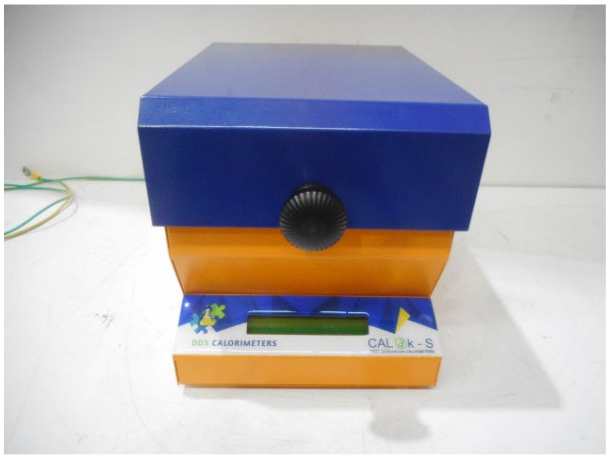
14	EUT – Internal views
15	
16	
17	
18	
19	
20	EUT – External AC/DC power adapter
21	
22	EUT – Modification
23	Support equipment – Keyboard
24	

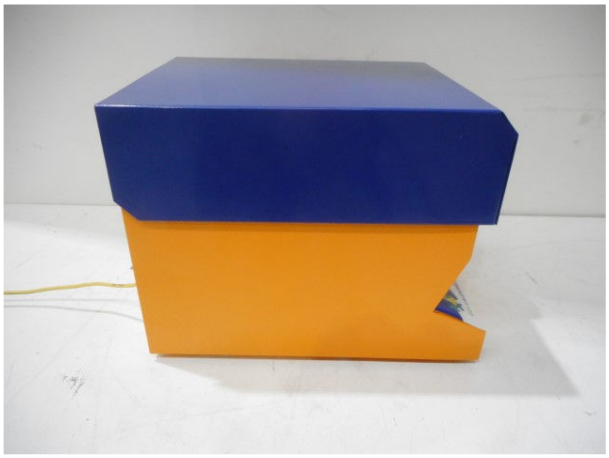


Photograph 1

Photograph 2

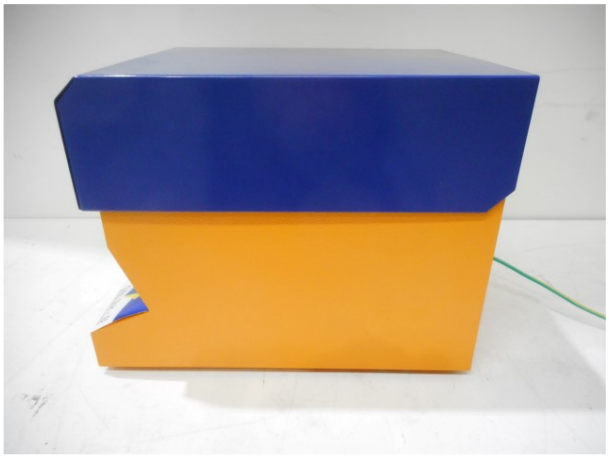


Photograph 3

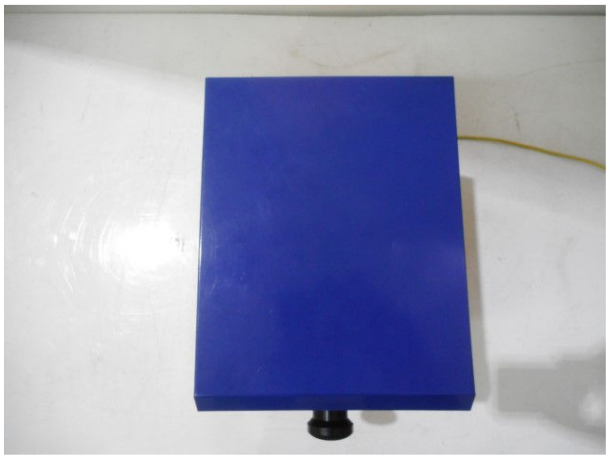


Photograph 4

Photograph 5

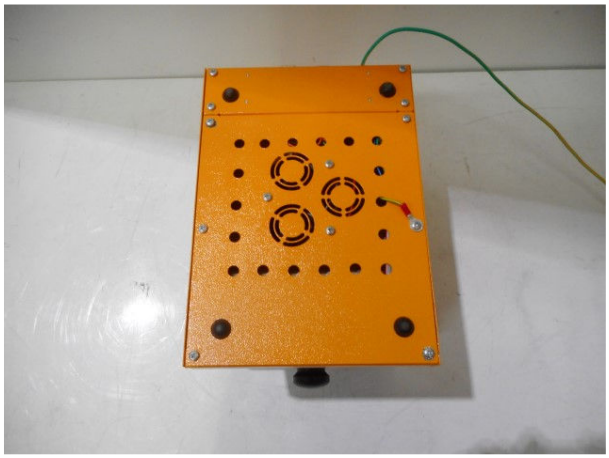


Photograph 6



Photograph 7

Photograph 8



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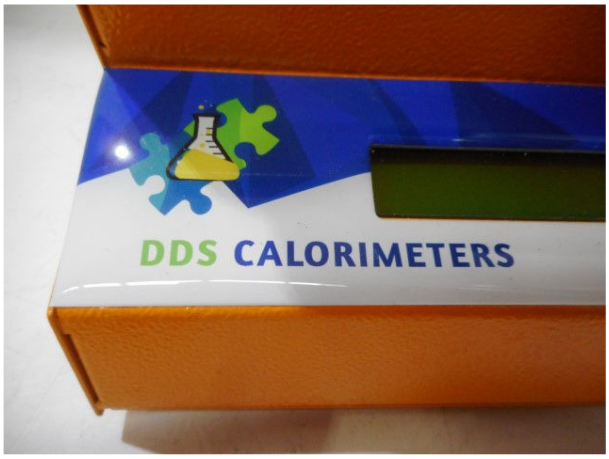
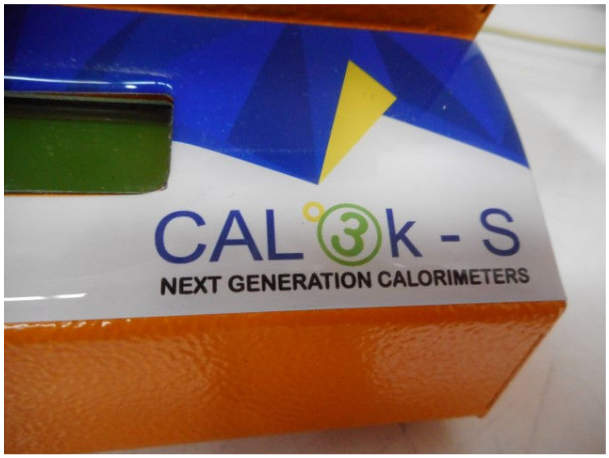
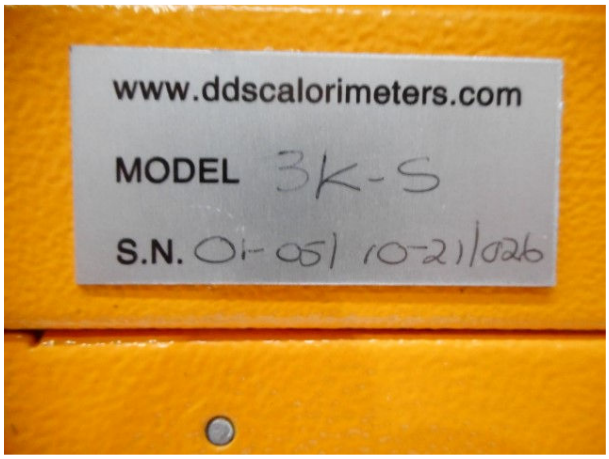


Photograph 10



Photograph 11

Photograph 12



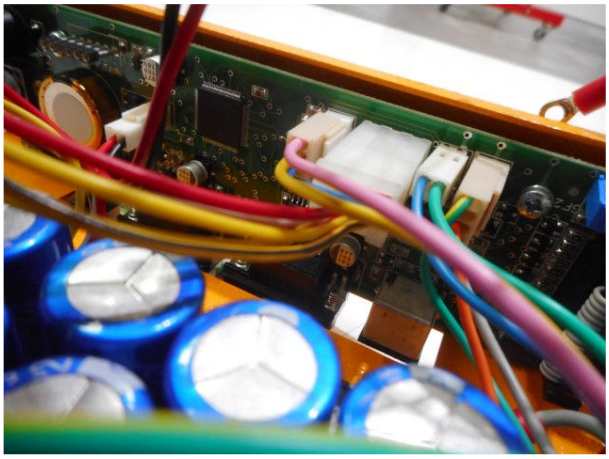
Photograph 13

Photograph 14

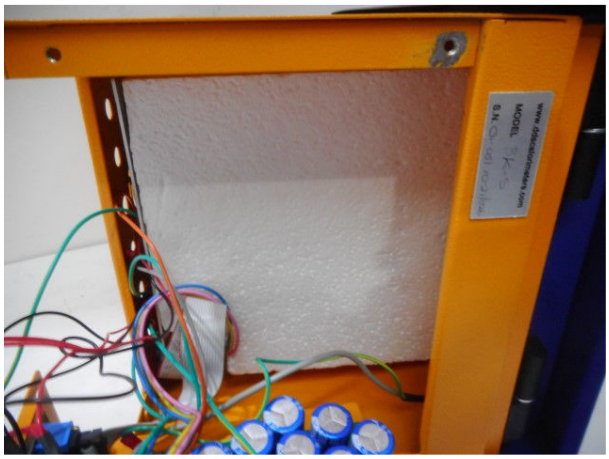
Photograph 15

Photograph 16

Photograph 17



Photograph 18



Photograph 19

Photograph 20

Photograph 21

Photograph 22

Photograph 23

Photograph 24

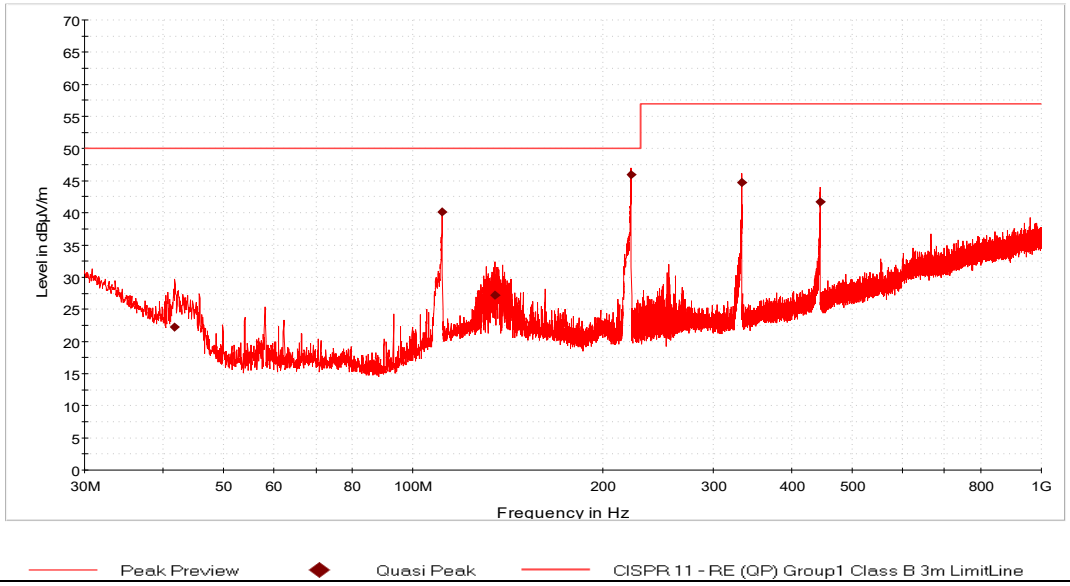
Appendix C – Measurement Graphs

No.	Test	Graph Description
1	Electromagnetic Radiation Disturbance	Horizontal Antenna Polarisation
2		Vertical Antenna Polarisation
3	Mains Terminal Disturbance Voltage	Active Line
4		Neutral Line

EMC Bayswater Pty. Ltd.

Electromagnetic Radiation Disturbance
A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd - CAL3k-S - Bomb Calorimeter
Horizontal Antenna Polarisation

Job Number: E2111-1479
Test Engineer: FD

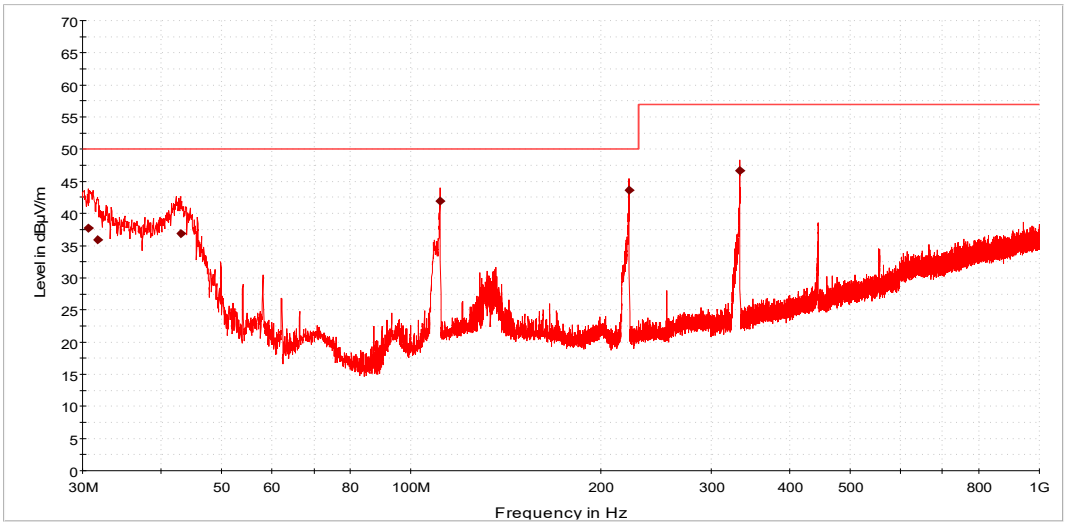


Graph 1

EMC Bayswater Pty. Ltd.

Electromagnetic Radiation Disturbance
A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd - CAL3k-S - Bomb Calorimeter
Vertical Antenna Polarisation

Job Number: E2111-1479
Test Engineer: FD

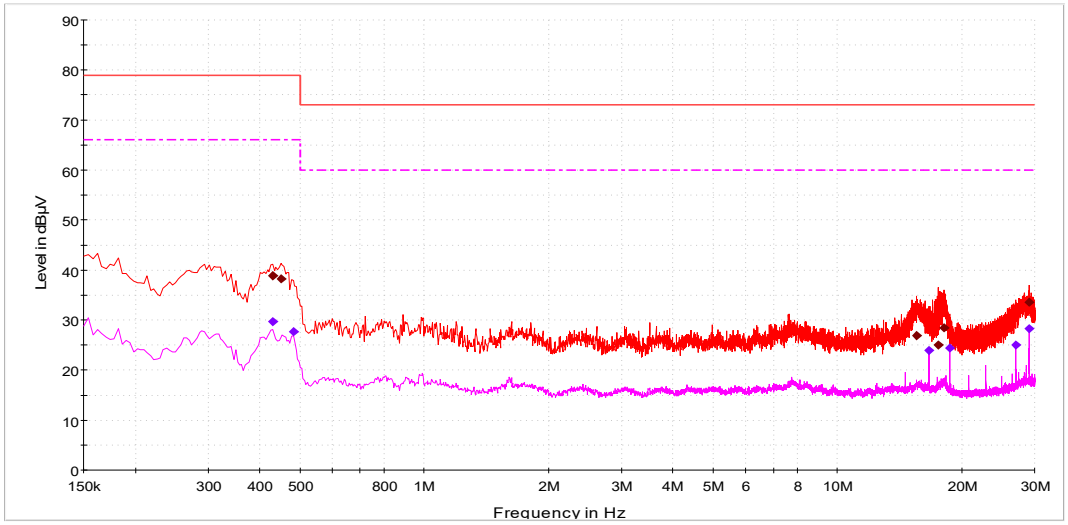


Graph 2

EMC Bayswater Pty. Ltd.

Mains Terminals Disturbance Voltage
A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd - CAL3k-S - Bomb Calorimeter
Active Line

Job Number: E2111-1479
Test Engineer: FD

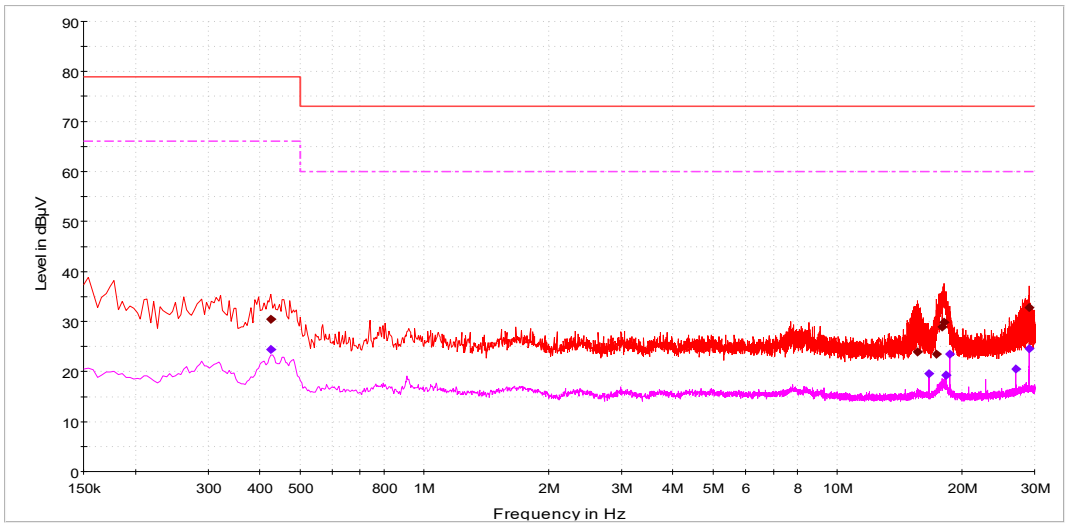


Graph 3

EMC Bayswater Pty. Ltd.

Mains Terminals Disturbance Voltage
A.L.P.E Pty Ltd t/a Scientific Solutions Australia Pty Ltd - CAL3k-S - Bomb Calorimeter
Neutral Line

Job Number: E2111-1479
Test Engineer: FD



Graph 4

Appendix D – Customer Declaration of Product Variant

A.L.P.E Pty Ltd trading as Scientific Solutions Australia
7 Mona Rd
Menai
NSW
2234
T +61 2 9543 7377
www.scisol.com.au
ABN: 39 103 953 715

Date: 9/12/2021

Declaration of Product Variations

The below was completed by the manufacturer of the goods

We Digital Data Systems Pty Ltd
of 22 Arbeid Avenue, Strydompark, Randburg, Johannesburg, South Africa

hereby declare that:

Equipment Oxygen Bomb Calorimeter System

Model number CAL3k-S

to be the worst-case variant used for EMC testing of a product range consisting of other variants along with the justification declared in the table below. Digital Data Systems Pty Ltd accepts all responsibility for any adverse effects with respect to the EMC performance of the variant products listed in the table with regards to the performance observed whilst testing the declared worst case model.

Model tested	Variants models	Variants	Justification (examples)
CAL3K-S	CAL3K-F and CAL3K-U	DISPLAY	Larger 40x4 character display Wider and longer internal ribbon cable
		SIZE	Larger in size by 15%
		BOARD POWER SUPPLY	Better Power Supply circuit and grounding layout
		LID LOCK	Electronic locking of the LID. Automatic Open and LID closed detection. DC operated
		RS232 PORTS	3 RS232 ports each with dedicated operation.
		USB PORT	USB communication
		FAN CONTROL	No FAN's inside the calorimeter and no FAN control

Signed by:
Name: Peter Barras
Position: General Manager
Date signed: 9/12/2021