Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

20765

Accredited to ISO/IEC 17025:2017

The Equipment Calibration Business Ltd

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Calibration performed by the Organisation at the locations specified

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details		Activity	Location code
Address The Equipment Calibration Business The Annex W-17 Howbery Business Park Wallingford OX10 8BA United Kingdom	**Local contact** Mr Richard Harper Tel: +44 (0)01491 822691 E-Mail: Richard-harper@equipment-calibration.com Website: www.equipment-calibration.com	**Electrical calibration:** Calibration of EMC-related test and measurement equipment.	P

Site activities performed away from the locations listed above:

Location details		Activity	Location code
Address The customer's site or premises must be suitable for the nature of the particular calibrations undertaken and will be the subject of contract review arrangements between the laboratory and the customer.	**Local contact** Mr Richard Harper Tel: +44 (0)01491 822691 Mobile: +44 (07380 950803 E-Mail: Richard-harper@equipment-calibration.com Website: www.equipment-calibration.com	**Electrical calibration:** Calibration of EMC-related test and measurement equipment.	S

NOTE: Where EN Standards have exact equivalents in IEC, or BS EN Standards, these are also included in the accreditation.

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATION				
All electrical measurements are carried out using the method of direct comparison or transfer to laboratory reference standards unless otherwise determined in the remark's column. The measurement and generation headings in the first column declare the laboratory's ability to either measure outputs of submitted test items or to generate values as a stimulus for test items which measure.				
DC RESISTANCE Measurement	0 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ	 0.014 Ω 0.11 Ω 1.1 Ω 11 Ω 110 Ω 2.2 kΩ 0.83 MΩ		P and S
DC VOLTAGE Measurement	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	 8.7 µV 48 µV 410 µV 5.2 mV 56 mV		P and S
DC CURRENT Measurement	0 µA to 100 µA 100 µA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 3 A 3 A to 10 A	 0.077 µA 0.57 µA 7.1 µA 56 µA 1.1 mA 6.7 mA 13 mA		P and S
AC VOLTAGE Measurement	1 mV to 100 mV *10 Hz to 20 kHz* *20 kHz to 50 kHz* *50 kHz to 100 kHz* 100 mV to 1 V *10 Hz to 20 kHz* *20 kHz to 50 kHz* *50 kHz to 100 kHz* 1 V to 10 V *10 Hz to 20 kHz* *20 kHz to 50 kHz* *50 kHz to 100 kHz* 10 V to 100 V *10 Hz to 20 kHz* *20 kHz to 50 kHz* *50 kHz to 100 kHz*	 92 µV 170 mV 690 mV 920 µV 1.7 mV 7.0 mV 9.2 µV 17 mV 70 mV 92 mV 170 mV 700 mV		P and S P and S P and S P and S

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE Measurement (continued)				
	100 V to 750 V		AC Voltage measurement in this range is limited to a maximum 8 x 10^7 Volt-Hertz.	
	10 Hz to 20 kHz	680 mV		
	20 kHz to 50 kHz	1.3 V		
	50 kHz to 100 kHz	5.2 V		
AC CURRENT Measurement				P and S
	0 µA to 100 µA			
	10Hz to 5 kHz	140 nA		
	100 µA to 1 mA			
	10 Hz to 5 kHz	1.4 µA		
	1 mA to 10 mA			
	10 Hz to 5 kHz	15 µA		
	10 mA to 100 mA			
	10 Hz to 5 kHz	140 µA		
	100 mA to 1 A			
	10 Hz to 5 kHz	1.4 mA		
	1 A to 3 A			
	10 Hz to 5 kHz	8.2 mA		
	3 A to 10 A			
	10 Hz to 5 kHz	19 mA		
CAPACITANCE Measurement				P and S
	0 nF to 1 nF	1.0 pF		
	1 nF to 10 nF	5.1 pF		
	10 nF to 100 nF	51 pF		
	100 nF to 1 µF	510 pF		
	1 µF to 10 µF	5.1 nF		
	10 µF to 100 µF	51 nF		
FREQUENCY Measurement				P and S
	10 Hz to 100 Hz	0.031 % of reading		
	100 Hz to 300 Hz	0.010 % of reading		
FREQUENCY Measurement			Using a digital sampling oscilloscope	P and S
	10 mHz to 20 kHz	15 µHz/Hz		
	20 kHz to 200 kHz	30 µHz/Hz		
	200 kHz to 1 MHz	120 µHz/Hz		
	1 MHz to 10 MHz	0.12 %		
	10 MHz to 100 MHz	1.2 %		
	100 MHz to 120 MHz	1.8 %		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
TRANSIENT GENERATORS				
PULSE VOLTAGE	±1 V to ±15 kV	1.6 % of measured Voltage		P and S
PULSE ABERRATIONS Peak voltage, overshoot and undershoot	±10 V to ±15 kV	1.6 % of measured Voltage		
PULSE CURRENT	±1 A to ±5 kA	1.7 % of measured Current	Using a Digital Sampling Oscilloscope with Voltage or Current Probes as appropriate, with due consideration to EN 60469:2013.	
PULSE ABERRATIONS Peak current, overshoot and undershoot	±1 A to ±5 kA	1.7 % of measured Current		
PULSE RISETIME			For the calibration of Transient Generators with due consideration to EN 60469:2013 using a Digital Sampling Oscilloscope with Voltage or Current Probes as appropriate and in accordance with their respective Operators Manuals.	
Voltage	1 ns to 1 µs 1 µs to 20 µs 20 µs to 100 s	0.12 ns 0.26 ns 13 µs/s		
Current	25 ns to 100 ns 100 ns to 500 ns 500 ns to 10 µs 10 µs to 20 µs 20 µs to 100 s	6.7 ns to 3.2 ns 3.2 ns to 0.66 ns 0.66 ns to 0.17 ns 0.17 ns to 0.26 ns 13 µs/s		
PULSE DURATION Voltage and current	1 ns to 1 µs 1 µs to 20 µs 20 µs to 100 s	0.12 ns 0.26 ns 13 µs/s		
PHASE ANGLE	0° to 360°	0.8°	Relative to power line and using a Digital Sampling Oscilloscope and a HV probe.	
ESD GENERATORS			For the calibration of ESD generators to EN 61000-4-2:2009, ISO 10605:2008 +A1:2014, & ISO 10605:2023, including instruments designed to comply with earlier versions of these standards.	P and S
DC Voltage	1 kV to 32 kV	0.5 % of measured Voltage		
Voltage Hold Time	1 s to 100 s	14 ms		
Transition Time	300 ps to 800 ps	28 ps		
	800 ps to 1500 ps	28 ps		
Peak Current	0.1 A to 150 A	2.6%	The maximum uncertainty permitted by the standard is 15 % at the standardized value of 800 ps.	
Current at 30 ns	0.1 A to 150 A	3.7 %		
Current at 60 ns	0.1 A to 150 A	3.7 %		
Current at 65 ns	0.1 A to 150 A	3.7 %		
Current at 130 ns	0.1 A to 150 A	3.7 %		
Current at 180 ns	0.1 A to 150 A	3.7 %		
Current at 400 ns	0.1 A to 150 A	4.4 %		
Current at 360 ns	0.1 A to 150 A	4.4 %		
Current at 800 ns	0.1 A to 150 A	6.0 %		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
EFTB GENERATORS				P and S
Peak Voltage into 50 Ω	±1 V to ±7.2 kV	2.2 % of measured Voltage		
Peak Voltage into 1 kΩ	±1 V to ±7.2 kV	3.3 % of measured Voltage	For the calibration of EFTB Generators to EN 61000-4-4:2012 ISO 7637-2:2011 including instruments designed to comply with earlier versions of these standards.	
Rise Time	1 ns to 10 ns	0.12 ns		
Pulse Width	10 ns to 50 µs	0.59 ns		
Burst Duration	50 µs to 50 ms	0.58 µs		
Burst Period	50 ms to 500 ms	6.1 µs		
Repetition Rate	1 Hz to 150 kHz	0.040 % of the measured frequency		
SURGE GENERATORS				P and S
Open Circuit Voltage	±1 V to ±25 kV	1.6 % of measured Voltage		
Voltage Undershoot	0 to 60 %	1.6 % of measured Voltage		
Voltage Front Time	100 ns to 20 µs	2.5 ns	For the calibration of Surge Generators to EN 61000-4-5:2014/A1, ISO 7637-2:2011 ISO 16750-2:2012 and earlier versions of these standards.	
Voltage Duration	1 µs to 1 ms	365 ns		
S/C Current Peak	±1 A to ±5 kA	1.7 % of measured Current		
Current Undershoot	0 % to 60 %	1.7 % of measured Current		
Current Front Time	100 ns to 20 µs	35 ns		
Current Duration	1 µs to 500 µs	89 ns		
Phase Angle	0° to 360°	0.8°		
Output Impedance	0.1 Ω to 500 Ω	2.3 %		
VOLTAGE DIPS AND INTERRUPTS (AC / DC)				P and S
AC Voltage *50 Hz* / DC Voltage	100 mV to 750 V	0.26 % of measured Voltage		
AC Frequency	10 Hz to 100 Hz	0.040 %	For the calibration of Voltage Dips and Interrupt Generators to EN 61000-4-11:2020, EN 61000-4-34:2007 +A1:2009 EN 61000-4-29:2001 and earlier versions of these standards.	
Dip Levels	0 % to 100 %	0.27 % of measured Voltage		
Rise and Fall Times	500 ns to 10 µs	0.20 ns		
Dip Durations	1 ms to 10 s	12 µs/S		
Over / Undershoot	0 % to 100 %	2.1 % of measured Voltage		
Phase Angle	0° to 360°	0.20°		
Inrush Current	1 A to 1000 A	3.4 % of measured inrush current		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
POWER FREQUENCY MAGNETIC FIELDS				P and S
AC Voltage *50 Hz*	100 mV to 750 V	0.27 %		
AC Frequency	50 Hz	0.12 Hz		
Loop Current	1 A to 3.45 A 3.45 A to 45.5 A 45.5 A to 400 A 400 A to 1 kA 1 kA to 2 kA	0.15 A 0.15 A to 0.55 A 0.55 A to 4.8 A 8.2 A to 18 A 18 A to 35 A	For the calibration of Power Frequency Magnetic fields test Systems to EN 61000-4-8:2010 and earlier versions of these standards.	
Total Harmonic Distortion (THD)	0 % to 100 %	0.26 % of measured THD		
Magnetic Field	50 A/m to 150 A/m	2.4 %		
Coil Factor	0 to 1	2.7 % of the measured coil factor		
IMPULSE MAGNETIC FIELDS				P and S
S/C Current Peak	±1.0 A to ±2500 A	2.1 % of the measured current		
Current Undershoot	0 % to 60 %	2.1 % of the measured current	For the calibration of Impulse Magnetic Fields Test system to EN 61000-4-9:2016 and earlier versions of these standards	
Current Front Time	100 ns to 20 µs	0.40 ns		
Current Duration	1 µs to 500 µs	5.8 ns		
Phase Angle	0° to 360°	0.20°		
RING WAVE				P and S
Open Circuit Voltage	±10 V to ±7.2 kV	2.1 %		
Voltage Rise Time	100 ns to 20 µs	0.30 ns		
Oscillation Frequency	50 kHz to 150 kHz	21 µHz/Hz	For the calibration of Ring Wave Immunity Test Generators to EN 61000-4-12:2017 and earlier versions of these standards.	
Voltage Decay Ratio	0.1 to 1.5	0.50 %		
S/C Current Peak	±1.0 A to ±1000 A	2.1 %		
Current Rise Time	100 ns to 20 µs	2.0 ns		
Phase Angle	0° to 360°	0.20°		
Impedance	1 Ω to 100 Ω	3.0 %		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
LINE IMPEDANCE STABILISATION NETWORKS & COUPLING / DECOUPLING NETWORKS				
IMPEDANCE MAGNITUDE				P and S
1 kHz to 400 MHz	0 Ω to 10 Ω	9.8 %	For the calibration of Line Impedance Stabilizing Networks (LISN's) and Coupling / Decoupling Networks (CDN's) Where the CMC is expressed as a "%" this indicates that the uncertainty in expressed as a percentage of the measured value.	
	10 Ω to 20 Ω	9.8 % to 5.3 %		
	20 Ω to 30 Ω	5.3 % to 3.4 %		
	30 Ω to 50 Ω	3.4 % to 2.7 %		
	50 Ω to 70 Ω	2.7 %		
	70 Ω to 100 Ω	2.7 % to 3.5 %		
	100 Ω to 150 Ω	3.5 % to 5.7 %		
	150 Ω to 200 Ω	5.7 % to 7.1 %		
INSERTION LOSS/VOLTAGE DIVISION FACTOR			This Insertion Loss capability applies to all insertion loss measurements within the stated frequency range.	
1 kHz to 400 MHz	0 dB to 40 dB	0.43 dB		P and S
	40 dB to 60 dB	0.47 dB		
	60 dB to 70 dB	0.55 dB		
IMPEDANCE PHASE				
1 kHz to 400 MHz	+50 to – 50 degrees	1.9 degrees		P and S
ISOLATION/DECOUPLING LOSS				
1 kHz to 400 MHz	0 dB to 90 dB	2.9 dB		P and S
END				

Appendix - Calibration and Measurement Capabilities

Introduction

The definitive statement of the accreditation status of a calibration laboratory is the Accreditation Certificate and the associated Schedule of Accreditation. This Schedule of Accreditation is a critical document, as it defines the measurement capabilities, ranges and boundaries of the calibration activities for which the organisation holds accreditation.

Calibration and Measurement Capabilities (CMCs)

The capabilities provided by accredited calibration laboratories are described by the Calibration and Measurement Capability (CMC), which expresses the lowest measurement uncertainty that can be achieved during a calibration. If a particular device under calibration itself contributes significantly to the uncertainty (for example, if it has limited resolution or exhibits significant non-repeatability) then the uncertainty quoted on a calibration certificate will be increased to account for such factors.

The CMC is normally used to describe the uncertainty that appears in an accredited calibration laboratory's schedule of accreditation and is the uncertainty for which the laboratory has been accredited using the procedure that was the subject of assessment. The measurement uncertainty is calculated according to the procedures given in the GUM and is normally stated as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k = 2$. An accredited laboratory is not permitted to quote an uncertainty that is smaller than the published measurement uncertainty in certificates issued under its accreditation.

Expression of CMCs - symbols and units

It should be noted that the percentage symbol (%) represents the number 0.01. In cases where the measurement uncertainty is stated as a percentage, this is to be interpreted as meaning percentage of the measurand.
Thus, for example, a measurement uncertainty of 1.5 % means $1.5 \times 0.01 \times q$, where q is the quantity value.

The notation Q[a, b] stands for the root-sum-square of the terms between brackets: $Q[a, b] = [a^2 + b^2]^{1/2}$