

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 <p>0013</p> <p>Accredited to ISO/IEC 17025:2017</p>	<h3>Trescal Limited</h3> <p>Issue No: 122 Issue date: 07 October 2022</p>	
	<p>Saxony Way Blackbushe Business Park Yateley Hampshire GU46 6GT</p>	<p>Contact: Mr Matt Gypps Tel: +44 (0)1438 212500 Fax: +44 (0)1438 212555 E-Mail: ukcal@trescal.com Website: www.trescal.com</p>
<p>Calibration performed by the Organisation at the locations specified below</p>		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
<p>Address Saxony Way Blackbushe Business Park Yateley Hampshire GU46 6GT</p> <p>Local contact Mr Jeremy Struthers Tel: +44 (0)1252 533 300 Fax: +44 (0)1252 533 333 Email: calibration.yateley@trescal.com</p>	<p><u>Electrical dc & If</u> <u>Electrical rf</u> <u>Photometric</u> <u>Pressure</u> <u>Flow</u> <u>Temperature</u> <u>Humidity</u></p>	Yateley
<p>Park Gate Close Bredbury Park Way Bredbury Stockport SK6 2SL</p> <p>Mr Pedro Mendes Tel: +44 (0)161 406 7878 Fax: +44 (0)161 406 7979 E-Mail: calibration.manchester@trescal.com</p>	<p><u>Electrical dc & If</u> <u>High Voltage</u> <u>Accelerometry</u> <u>Acoustics</u> <u>Mass</u> <u>Force</u> <u>Torque</u> <u>Dimensional</u> <u>Pressure</u></p>	Manchester
<p>Ramsey Building Muirton Way Dunfermline Scotland KY11 9FZ</p> <p>Mr Mark Ramage Tel: +44 (0)1383 646464 Fax: +44 (0)1383 646468 E-Mail: calibration.scotland@trescal.com</p>	<p><u>Dimensional</u> <u>Electrical dc & If</u> <u>Electrical rf</u> <u>High Voltage</u> <u>Torque</u> <u>Pressure</u> <u>Temperature</u> <u>Volume</u></p>	Donbristle



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Locations covered by the organisation and their relevant activities

Laboratory locations (continued):

Location details	Activity	Location code
<p>Address Unit 14 Gunnels Wood Park Gunnels Wood road Stevenage SG1 2BH</p> <p>Local contact Mr James Sherlock Tel: +44 (0)1438 212541 Fax: +44 (0) 1438 772203 E-Mail: calibration.stevenage@trescal.com</p>	<p><u>Electrical dc and lf</u> <u>Electrical rf</u> <u>Dimensional</u> <u>Torque</u></p>	Stevenage
<p>Address Unit K2 M7 Business Park Newhall Naas County Kildare Ireland</p> <p>Mr P Kinsella Tel. +353 (0) 45 896660 Fax. +353 (0) 45 896713 Email : info@classictechnology.ie</p>	<p><u>Pressure calibration</u> <u>Temperature calibration</u> <u>Humidity calibration</u> <u>Mass calibration</u> <u>Electrical calibration</u></p>	Ireland
<p>Activities at more than one of the above locations</p>	<p><u>Electrical dc & lf</u></p>	As specified overleaf



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Site activities performed away from the locations listed above:

Location details	Activity	Location code
<p>Customers' sites or premises</p> <p>The customers' 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.</p>	<p><u>Dimensional</u></p>	<p>Based at Manchester</p>
	<p><u>DC & LF Electrical</u> <u>Pressure</u> <u>Temperature</u> <u>Humidity</u> <u>Torque</u> <u>Volume</u></p>	<p>On site</p>
	<p><u>Electrical DC & LF (including 17th edition equipment) and RF</u> <u>Humidity</u> <u>Temperature</u> <u>Pressure</u> <u>Mass - weighing machines (non-automatic)</u></p>	<p>Mobile facility</p>



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Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
Gauge blocks		Class (See Footnotes)	NOTES	Manchester
Inch (Steel and tungsten carbide)	BS 4311-1:2007 0 to 0.4 in 0.4 to 1 in 2 in 3 in 4 in	C D 3.0 µin 4.0 µin 4.0 µin 5.0 µin 5.0 µin 7.0 µin 6.0 µin 8.0 µin 7.0 µin 10.0 µin	1 In addition to the items listed above, other similar items, including parts of measuring instruments and machines, may be calibrated to the uncertainties stated. Where the item or part calibrated is of lower quality due to wear, errors in geometry or form, or poor surface texture, or where any other factor adversely affects the measurement capability, greater uncertainties must be quoted.	
Millimetre (Steel and tungsten carbide)	BS EN ISO 3650:1999 0 to 10 10 to 25 30, 40, 50 60, 70, 75 80, 90, 100	C D 0.080 0.10 0.10 0.13 0.12 0.17 0.15 0.21 0.18 0.25	2 The uncertainty quoted if for the departure from flatness, straightness, or squareness, ie the distance separating the two parallel planes which just enclose the surface under consideration.	
Long Series gauge blocks	BS EN ISO 3650:1999 100 to 1500	0.26 + (2.14 x length in m)	3 Single start, symmetrical thread forms only.	
Length bars Inspection, workshop and Grades 1 and 2	As BS 1790:1961 and BS 5317:1976 100 to 1500	0.26 + (2.14 x length in m)	4 Includes use of check plugs for screw rings from 1 mm to 14 mm diameter	
Class C uncertainties apply to the measurement of length of steel and tungsten carbide gauges by comparison with grade K standards of length of a similar material. Class C uncertainties apply to new and used grade 0, 1 and 2 gauges to BS 4311:2007 and BS EN ISO 3650:1999. Class D uncertainties represent the best capability for the measurement of length of gauges by comparison with grade K standards of length of a dissimilar material.			5 Functional test for size using setting plugs calibrated with a CMC of 3.0 µm	
Gauge block accessories	BS 4311:Part 2:2009 0.1 to 12.5	0.30	6 Simple height gauges - vernier, dial and digital instruments designed only for measuring distances parallel to the beam.	
Gauge block comparators	0 to 100 (see note 8)	0.050 + (0.50 x L in m)	7 Conformance statements cannot be made against specifications whose magnitudes are smaller than the specified CMC values.	
Length bar accessories	BS 1790:1961 and BS5317:1976	0.30		
Precision scales (linear)	0 to 400 (see note 9)	1.0 + (3.0 x L in m)		
Stage Micrometers	0 to 10 (see note 9)	0.50		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
Thread measuring cylinders	BS 3777:1964, BS 5590:1978, BS ISO 16239:2013 and specials 0.1 to 5	0.50	8. By comparison with end standards.	Manchester
Plain plug gauges (parallel) cylindrical setting standards and rollers	Diameter: 1 to 50 50 to 100 100 to 150 150 to 200 200 to 300 (see note 10)	0.80 1.0 1.5 2.0 3.0	9. Using a laser interferometer system.	
Plain plug gauges (taper)			10. Using a horizontal measuring machine and end standards.	
Parallel to 1 in 8 on diameter	3 to 50 50 to 100 (see note 10)	3.0 4.0	11. Using a horizontal measuring machine and reference ring gauges.	
1 in 8 to 1 in 3 on diameter	3 to 50 50 to 100 (see note 10)	5.0 6.0	12. Using a horizontal measuring machine, reference ring gauges and end standards.	
Plain ring gauges (parallel) and setting standards	Diameter: 1.5 to 10 10 to 25 25 to 50 50 to 100 100 to 150 150 to 400 (see note 11)	1.0 0.80 1.0 1.5 2.0 3.0	13. Using a horizontal measuring machine and/or end standards. 14. Using horizontal measuring machine and thread wires or contact scanning.	
Plain ring gauges (taper)	Diameter:		15. Using horizontal measuring machine and thread wires.	
Parallel to 1 in 8 on diameter	3 to 50 50 to 100 100 to 200 (see note 12)	4.0 5.0 6.0	16. Using horizontal measuring machine and balls or contact scanning.	
1 in 8 to 1 in 3 on diameter	3 to 50 50 to 100 100 to 200 (see note 12)	6.0 7.0 8.0	17. Using horizontal measuring machine and balls.	



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Length Gauges, flat and spherical ended	0 to 1200 1200 to 2000 (see note 10)	1.0 + (5.0 × L in m) 1.0 + (8.0 × L in m)	18. Using horizontal measuring machine.	
Plain Gap Gauges (parallel)	2 to 50 50 to 100 100 to 200 200 to 300 300 to 600 (see note 13)	3.0 5.0 8.0 12 15	19. Using profile projector. 20. By 1 st principles measurements and/or CMM.	
Screw plug gauges (parallel) including check and setting plugs	Diameter: 1 to 100 100 to 150 150 to 300 (see note 14)	CMC on pitch diameter 3.0 4.0 6.0	21. By comparison with reference angle standards. 22. By comparison with end standards and angle standards.	
Screw plug gauges (taper) including check plugs	5 to 100 100 to 150 (see note 15)	5.0 8.0	23. Using small angle generator or rotary table.	
Screw ring gauges (parallel)	1 to 6 6 to 100 100 to 150 150 to 300 300 to 600 (see note 16)	See note 4 5.0 6.0 8.0 12	24. By comparison with a reference optical flat and end standards where applicable. 25. By comparison with ring gauges or bore fixture.	
Screw ring gauges (taper)	6 to 150 (see note 17)	7.0		
Screw pitch	0.2 to 8 (see note 18)	1.5		
Screw flank angle	0° to 52° (see note 19)	5.0 minutes of arc		
Screw thread adjustable calliper gauges (parallel)	3 to 50 diameter	See note 5		



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DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
Parallels	As BS 906:Parts 1&2:1972 5 to 50 x 100 x 400	1.5 to 5.0		Manchester
Vee blocks	BS 3731:1987 20 to 200	2.5 to 5.0		
Receiver, position and profile gauges, jigs, fixtures.	Maximum dimensions Up to 750 x 750 x 750 (see note 20)	Dependant on size and 3.0 + (10 x L in m)		
Steel rules	BS 4372:1968 0 to 1000	5 + (10 x L in m)		
	DIN 866:1983 0 to 5000	5 + (10 x L in m)		
Tapes, measuring (pocket, precision and pi)	0 m to 5 m	20 + (3.0 x L in m)		
	5 m to 50 m (see note 9)	300 + (10 x L in m)		
ANGLE				
Angle gauges - NPL type	0° to 90° (see note 21)	4.0 seconds of arc		
Squares Blade type	BS 939:2007 0 to 300 300 to 600 600 to 1000	CMC on Squareness		
		3.0		
		5.0		
Cylindrical	BS 939:2007 0 to 600 600 to 1000	2.0		
		8.0		
Block	BS 939:2007 0 to 300 300 to 600 600 to 1000	3.0		
		5.0		
		8.0		



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DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
ANGLE (continued)				Manchester
Right angle and box angle plates	BS 5535:1978 50 to 600	Squareness: 3.0 + (1.0 per 100 mm) Parallelism: 1.0 + (1.0 per 100 mm) See Note 2		
Sine bars and tables	BS 3064:1978 0 to 500 length	Linear dimensions: 1.0 + (10 x L in m) Overall performance: 5.0 seconds of arc.		
Sine centres	0 to 500 length or between centres (see note 22)	Linear dimensions: 1.0 + (10 x L in m)		
Compound sine tables	With tables of equivalent up to 500 length (see note 22)	Overall performance 5.0 seconds of arc.		
Spirit levels	BS 958:1968 5 seconds of arc to 60 minutes of arc nominal sensitivity	Mean sensitivity: 10% of nominal Minimum 0.50 seconds of arc.		
Electronic indicating levels	0 to 20 minutes of arc (see note 23)	1.0 % of range (minimum 0.30 seconds of arc).		
Clinometers	0° to 360° (see note 23)	10 seconds of arc or greater dependent on sensitivity. Optical Instruments 2.0 seconds of arc.		
FORM				
Optical flats	10 to 75 diameter (see note 24)	0.13 flatness		
Optical parallels	10 to 30 diameter 10 to 100 length (see note 24)	0.13 flatness 0.20 parallelism 0.60 length		
Toolmakers Flats See Note1	BS 869:1978	0.50		



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FORM (continued)				Manchester
Surface plates				
Granite and cast iron	BS 817:2008 160 x 100 to 9 000 x 9 000	1.5 + (0.80 x L in m)		
Roundness	BS 3730 Part2 :1982			
External	0 to 350 diameter	0.050 on radius		
Internal	3 to 350 diameter	0.050 on radius		
Surface texture	BS 1134	7.0 % of measured value	In support of other measurements.	
Straightedges				
Cast Iron, Steel and Granite	BS 5204:Part 1:1975 and BS 5204:Part 2:1977 0 to 6000	1.0 + (2.0 x L in m)		
Precision Balls	1 to 25 diameter 25 to 50 diameter (see note 10)	0.50 on diameter 0.80 on diameter		
MEASURING INSTRUMENTS AND MACHINES				
Micrometers				
External	BS 870:2008 0 to 600	Heads: 2.0		
Internal	BS 959:2008 0 to 900	Setting and extension rods		
Depth	BS 6468:2008 0 to 300	1.0 + (8.0 x L in m)		
Micrometer heads	BS 1734:1951 0 to 50	1.0		
Bench micrometer	0 to 100 (see note 8)	Overall performance 2.0		



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DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
MEASURING INSTRUMENTS AND MACHINES (continued)				
Height setting micrometers	0 to 300 (see note 8)	Heads: 1.5 between any two points Stepped column 2.5 Overall performance: 3.0		Manchester
Riser blocks for above	150 300 (see note 8)	2.5 5.0		
3 point Bore micrometers and bore gauges	2 to 100 100 to 150 150 to 300 (see note 25)	3.0 3.6 5.0		
Height gauges - (Simple) including vernier, dial and digital types (See note 6 and note 7)	As BS EN ISO 13225:2012 (0 to 1000)	Length measurement error (E): $10 + (30 \times L \text{ in m})$		
Vernier gauges Calliper Height Depth	BS 887:2008 0 to 1000 BS 1643:2008 0 to 1000 BS 6365:2008 0 to 600	Overall performance: $10 + (30 \times L \text{ in m})$		
Bevel protractors	BS 1685:2008 0° to 360°	6.0 minutes of arc		
Combination Sets	0 to 600 (see note 22)	1.0 vernier division		
Dial gauges and dial test indicators	BS 907:2008 (and above) and BS 2795:1981 0 to 50 50 to 100	2.0 3.3		
Comparators (external)	BS1054:1975 250 to 10 000 magnifications	1.0 % of range Minimum 2.0		
Horizontal Comparator				
Horizontal Measuring	0 to 100 length of scale (see note 8)	Minimum 0.30		
Optical Dividing Heads	(see note 22)			
Rotary tables	0 to 1000 Capacity	Linear dimensions $1.0 + (10 \times L \text{ in m})$		
Inclinable tables	0 to 1000 Capacity	Overall angular performance		
Inclinable rotary tables	0 to 1000 Capacity	3.0 seconds of arc		



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MEASURING INSTRUMENTS AND MACHINES (continued)				
Bench Centres	0 to 1000 between centres (see note 8)	Linear dimensions $1.0 + (10 \times L \text{ in m})$		
Thread diameter measuring	NPL schedules MOY/SCMI/9 and MOY/SCMI/12 0 to 300	1.5 overall performance		
Taper diameter measuring machines	MOY/SCMI/48 0 to 100 0 to 100 magnifications	Linear 5.0 Angular 3.0 mins of arc		
Microscopes toolmakers	MOY/SCMI/02 0 to (150 x 150)	2.0 + 2.5/m with eye piece		
Linear scales associated with height and length measuring instruments using a laser interferometer	0 to 3000	$0.15 + (1.5 \times L \text{ in m})$		
Feeler gauges and shims	BS 957:2008 0.025 to 1	1.5		
Electronic Height Gauges With microprocessor control	0 to 1000 (see note 8)	$1.0 + (5.0 \times L \text{ in m})$		
Profile projectors	10 to 100 magnification Linearity Angle (see note 22)	130 at the screen 4.0 2.0 minutes of arc		
Cube moulds for concrete	BS EN 12390-1 2012 100 x 100 x 100 BS EN 196-1 2005 160 x 40 x 40	15		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
FORCE				Manchester
Push pull force measuring devices in tension and compression	0.1 N to 2500 N	0.10 %		
Gram Gauges	10 grams force to 5000 grams force	1.0 %		
Load cells (excluding proving devices)	0.2 kN to 100 kN	0.40 %		
TORQUE				
Hand torque tools	As BS EN ISO 6789 :2017 0.1 N-m to 2500 N-m	1.0 % of reading	The uncertainty quoted is for both the application of the calibration torque and the characteristics of the device being calibrated.	
Hand torque tools	As BS EN ISO 6789:2003 (withdrawn and superseded) 0.1 N-m to 2500 N-m	1.0 % of reading	Calibrations may also be given in lbf.in and lbf.ft.	
Torque measuring devices	As BS 7882:2017 0.05 N.m to 2.5 N.m 0.5 N.m to 1500 N.m 1000 N.m to 3000 N.m	0.060 % 0.051 % 0.250 %	Calibration of electrical indicators not accredited.	
MASS				
Nominal values	(g) 25 000 20 000 10 000 5 000 2 000 1 000 500 200 100 50 20 10 5 2 1 0.5 0.2 0.1 0.05 0.02 0.01 0.005 0.002 0.001	(mg) 250 20 10 5.0 1.0 0.50 0.25 0.10 0.053 0.033 0.027 0.020 0.017 0.013 0.010 0.0083 0.0067 0.0053 0.0040 0.0033 0.0027 0.0020 0.0020 0.0020	Intermediate values can be calibrated with an uncertainty interpolated from the next higher and lower values in the table above. Borda's Substitution Method.	



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ACCELEROMETRY ACCELERATION TRANSDUCERS				Manchester
Working or non-precision grades Piezo electric type	Frequency test 1 Hz to 2 Hz 2 Hz to 5 Hz 5 Hz to 10 Hz	2.0 % 2.0 % 2.0 %	Ambient 20 °C calibration of voltage sensitivity by comparison with a reference (precision grade) transducer at ambient temperature. System calibration comprising of transducer (tx), signal conditioner and power amplifier can be undertaken within the quoted uncertainties Nominal peak acceleration 1 Hz to 10 Hz : 0.1 g to 1 g (1 m/s ² to 10 m/s ²) System Sensitivity >1 mV/m/s ² (system) >0.03 pC/m/s ² (tx)	
	Frequency test 10 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	2.0 % 2.0 % 3.0 %	Nominal peak acceleration 10 Hz to 10 kHz : 1 g to 10 g (10 m/s ² to 100 m/s ²) System Sensitivity >0.1 mV/m/s ² (system) >0.003 pC/m/s ² (tx)	
Working or non-precision grades Piezoresistive or strain gauge types	Frequency test 1 Hz to 2 Hz 2 Hz to 5 Hz 5 Hz to 10 Hz	2.0 % 2.0 % 2.0 %	Nominal peak acceleration 1 Hz to 10 Hz : 0.1 g to 1 g (1 m/s ² to 10 m/s ²) System Sensitivity >1 mV/m/s ² (system) > 0.03 pC/m/s ² (tx)	
	Frequency test 10 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	2.0 % 2.0 % 3.0 %	Nominal peak acceleration 10 Hz to 10 kHz : 1 g to 10 g (10 m/s ² to 100 m/s ²) System Sensitivity >0.1 mV/m/s ² (system) >0.003 pC/m/s ² (tx)	
All Working grade or non precision grades. Temperature sensitivity	Frequency Test 20 Hz to 630 Hz Temperature -50 to +190 °C	3.0 %	Nominal peak acceleration 20 Hz to 630 Hz : 0.3 g to 2 g (3 m/s ² to 20 m/s ²) System sensitivity >3.0 mV/m/s ² >30 mV/C/g	



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CHARGE AMPLIFIERS Calibration of voltage output per picocoulomb or millivolt input. Minimum input 1 pC or 10 mV.	<i>1 Hz to 10 Hz</i> <i>10 Hz to 30 kHz</i> <i>30 kHz to 100 kHz</i> <i>100 kHz to 500 kHz</i>	0.80 % 0.29 % 0.32 % 1.5 %		Manchester
ACOUSTICS PISTONPHONES AND SOUND CALIBRATORS Sound pressure level	84 dB to 125 dB (ref : 20 μ Pa) <i>250 Hz</i> <i>1000 Hz</i>	 0.10 dB 0.10 dB	By a comparison method: For pistonphones using laboratory standard microphones (B&K type 4160 or type 4180), or working standard microphones (B&K type 4144, type 4134 or type 4136) as appropriate.	
Frequency	250 Hz 1000 Hz	0.20 Hz 0.20 Hz	For sound calibrators using laboratory standard microphones (B&K type 4160 or type 4180), or working standard microphones (B&K type 4144 or type 4134) as appropriate.	
SOUND LEVEL METERS Verification to BS 7580:Part 1:1997	BS7580: Part 1:1997	See Remarks	Verification of Type 1 and Type 2 sound level meters originally manufactured according to BS EN 60651:1994 or BS EN 60804:1994 where the required corrections factors are known	
ELECTRICAL CALIBRATION DC Resistance Measurement	0 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 2 k Ω 2 k Ω to 20 k Ω 20 k Ω to 200 k Ω 200 k Ω to 2 M Ω 2 M Ω to 20 M Ω 20 M Ω to 100 M Ω	32 $\mu\Omega/\Omega + 0.030$ m Ω 21 $\mu\Omega/\Omega + 0.070$ m Ω 16 $\mu\Omega/\Omega + 0.70$ m Ω 16 $\mu\Omega/\Omega + 7.0$ m Ω 17 $\mu\Omega/\Omega + 70$ m Ω 27 $\mu\Omega/\Omega + 2.0$ Ω 51 $\mu\Omega/\Omega + 93$ m Ω 370 $\mu\Omega/\Omega + 11$ k Ω		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC HIGH VOLTAGE				Manchester
Measurement and Generation	1 kV to 25 kV 25 kV to 60 kV 60 kV to 100 kV 100 kV to 150 kV	40 μ V/V 50 μ V/V 150 μ V/V 180 μ V/V		
AC HIGH VOLTAGE	1 kV to 50 kV 50 Hz	580 μ V/V		
AC CURRENT				
Generation	10 A to 1000 A 50 Hz	0.13 %		
Measurement	1 mA to 100 A 50 Hz to 1 kHz	0.11 %		
INDUCTANCE	At 1 kHz 1 μ H to 3 μ H 3 μ H to 5 μ H 5 μ H to 10 μ H 10 μ H to 100 μ H 100 μ H to 1 mH 1 mH to 10 mH 10 mH to 100 mH 100 mH to 1 H 1 H to 10 H	7.0 % 2.2 % 1.2 % 0.15 % + 50 nH 0.040 % + 60 nH 0.030 % + 1.0 μ H 0.030 % + 10 μ H 0.030 % + 100 μ H 0.030 % + 1.0 mH		
CAPACITANCE				
Measurement	At 1 kHz 1 pF to 1 nF 1 nF to 10 nF 10 nF to 100 nF 100 nF to 1 μ F	20 μ F/F 40 μ F/F 50 μ F/F 90 μ F/F		
Generation	1 pF 10 pF and 100 pF 1 nF 10 nF 100 nF 1 μ F	45 μ F/F 25 μ F/F 35 μ F/F 50 μ F/F 60 μ F/F 95 μ F/F		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
FREQUENCY				Mnchester
Measurement	0.01 Hz to 3 GHz	1.3 in 10^9		
Generation	0.01 Hz to 1 GHz	1.2 in 10^{10}		
Rise Time	0 ns to 100 ns	3.0 % + 1.5 ns		
Elapsed time	10 ms to 8 hrs	15 in 10^{10} + 500 ns		
DC CURRENT				
Generation	1 pA to 10 pA 10 pA to 100 pA 100 pA to 10 nA 10 nA to 100 nA 100 nA to 10 μ A 10 μ A to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 50 A 50 A to 100 A 100 A to 200 A	0.080 pA 4.0 % 0.80 % 0.40 % 0.040 % 40 μ A/A 40 μ A/A 80 μ A/A 80 μ A/A 80 μ A/A 120 μ A/A		
Measurement	0.1 pA to 2 pA 2 pA to 20 pA 20 pA to 200 pA 200 pA to 2 nA 2 nA to 20 nA 20 nA to 100 nA 100 nA to 10 μ A 10 μ A to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 50 A 50 A to 100 A 100 A to 200 A	0.080 pA 4.0 % 4.0 % 0.80 % 0.80 % 0.60 % 0.040 % 40 μ A/A 40 μ A/A 80 μ A/A 80 μ A/A 80 μ A/A 120 μ A/A		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
<p>PRESSURE</p> <p>Gas Pressure (Gauge)</p> <p>Calibration of pressure indicating instruments and gauges.</p> <p>Gas Pressure (Absolute)</p> <p>Calibration of pressure indicating instruments and gauges</p> <p>Hydraulic Pressure (Gauge)</p> <p>Calibration of pressure indicating instruments and gauges. "Pressure equivalent" calibration of Dead Weight Testers (pressure balance supplied with an associated mass set).</p> <p>Hydraulic Pressure (Absolute)</p> <p>Calibration of pressure indicating instruments and gauges.</p>	<p>-100 kPa to -3.5 kPa 3.5 kPa to 7 MPa</p> <p>1 kPa to 80 kPa 80 kPa to 115 kPa 115 kPa to 7.1 MPa</p> <p>500 kPa to 6 MPa 6 MPa to 120 MPa</p> <p>600 kPa to 6.1 MPa 6.1 MPa to 120.1 MPa</p>	<p>0.010 % 0.0070 %</p> <p>0.010 % + 24 Pa 24 Pa 0.0080 % + 24 Pa</p> <p>0.010 % 0.010 %</p> <p>0.010 % + 24 Pa 0.010 % + 24 Pa</p>	<p>Methods consistent with EURAMET CG17</p> <p>Calibrations of devices with an electrical output may be undertaken</p> <p>Methods consistent with EURAMET CG3 and CG17</p>	Manchester



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
TEMPERATURE			By comparison with reference Platinum Resistance Thermometers	Yateley
Temperature in air	-40 °C to +90 °C	0.20 °C		
Liquid-in-glass thermometers	-80 °C to -40 °C -40 °C to 0 °C 0 °C 0 °C to 100 °C 100 °C to 260 °C 260 °C to 450 °C	0.10 °C 0.050 °C 0.010 °C 0.050 °C 0.10 °C 0.20 °C	Unless otherwise stated calibration in a fluid bath	
Platinum thermocouples	0 °C to 260 °C 260 °C to 1100 °C 1100 °C to 1500 °C	1.2 °C 1.0 °C 3.0 °C		
Other thermocouples	-80 °C to +260 °C 260 °C to 500 °C 500 °C to 1500 °C	0.25 °C 1.0 °C 3.0 °C		
Resistance thermometers	-80 °C to -40 °C -40 °C to 260 °C 260 °C to 450 °C 450 °C to 600 °C	0.030 °C 0.010 °C 0.040 °C 0.10 °C		
Calibration at Fixed Points				
TP Mercury	-38.8344 °C	5.2 mK		
TP Water	0.01 °C	2.0 mK		
Melting point of Galium	29.7646 °C	2.0 mK		
FP Indium	156.5985 °C	4.6 mK		
FP Tin	231.928 °C	5.0 mK		
FP Zinc	419.527 °C	3.4 mK		
Electronic thermometers with sensors Analogue Digital	Range as for sensor	As for sensor - plus: Resolution of instrument One least significant digit		
Block calibrators	-40 °C to +260 °C 260 °C to 600 °C	0.10 °C 0.20 °C	Calibrated with Platinum Resistance Thermometer only.	
	260 °C to 1100 °C 1100 °C to 1300 °C	1.0 °C 3.0 °C	Calibrated with suitable Thermocouple	
Radiation thermometers (pyrometers)	-15 °C to +1 °C 1 °C to 120 °C 120 °C to 500 °C	1.4 °C 1.0 °C 2.0 °C	By comparison with a reference instrument. Only thermometers operating at the wavelength of 8 µm to 14 µm and an emissivity setting of 0.95 can be calibrated.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
HUMIDITY				Yateley
DEW-POINT	-15 °C to +60 °C 60 °C to 82 °C	0.12 °C 0.16 °C	By comparison with dew-point hygrometer and Platinum Resistance Thermometers	
Relative humidity	7 %rh to 83 %rh	1.3 %rh		
Temperature range	83 %rh to 95 %rh 15 °C to 20 °C	1.5 %rh 0.20 °C		
	7 %rh to 83 %rh 83 %rh to 95 %rh 20 °C to 60 °C	1.3 %rh 1.5 %rh 0.20 °C		
SALT CAPSULES	7 %rh to 88.8 %rh 60 °C to 85 °C	1.3 %rh 0.20 °C		
Nominal Values	7 %rh to 80 %rh	1.5 %rh 0.20 °C	By reference with reference hygrometer	
Within the temperature range of 15 °C to 40 °C	80 %rh to 83 %rh	1.6 %rh 0.20 °C		
FLOW				
Flow-rate – gas, and Quantity passed – gas	0.5 l/min to 6 l/min 6 l/min to 700 l/min	0.59 % 0.67 %	Dry air normally used. Any non-corrosive gas may be used. Bell prover methods	
PRESSURE			Methods consistent with EURAMET CG17	
Gas Pressure (absolute)				
Calibration of pressure indicating instruments and gauges	3.5 kPa to 175 kPa 175 kPa to 7 MPa	Q[0.0050 %, 1.9 Pa] Q[0.0050 %, 1.9 Pa]	Calibration of instruments with an electrical output may be undertaken	
Gas Pressure (gauge)				
Calibration of pressure indicating instruments and gauges	-95 kPa to -15 kPa -15 kPa to -4.9 kPa -4.9 kPa to -2.5 kPa -2.5 kPa to -490 Pa -490 Pa to +490 Pa 490 Pa to 2.5 kPa 2.5 kPa to 3.5 kPa 3.5 kPa to 175 kPa 175 kPa to 7 MPa	Q[0.0050 %, 24 Pa] 4.8 Pa 1.4 Pa 0.81 Pa 0.47 Pa 0.81 Pa 1.4 Pa 0.0050 % 0.0050 %		
Hydraulic Pressure (gauge)				
Calibration of pressure indicating instruments and gauges	0 Pa to 20 MPa 20 MPa to 70 MPa	2.3 kPa 7.5 kPa		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code	
PHOTOMETRIC			Calibration by comparison to reference.	Yateley	
Illuminance	0.5 lux to 20000 lux	1.5 %	All measurements carried out at approximately 2856 K.		
Luminous Intensity	4.0 cd to 7200 cd	1.3 %			
Correlated Colour Temperature	2856 kelvin	25 K			
Luminance	0.2 cdm ⁻² to 6000 cdm ⁻²	2.0 %			
Luminance factor	50 % to 100 %	1.5 %			
Chromaticity x y	0 to 1 0 to 1	0.0020 0.0010			White light sources only.
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT					For the calibration of surge generators as specified in BS EN 61000-4-5:2006 and 2014.
Surge discharge characteristics					
Open circuit voltage	10 V to 20 kV	1.1 %			
Voltage Waveform Undershoot	0 % to 60 %	1.48 %			
Voltage front / Rise time	0.1 µs to 3 µs 3 µs to 20 µs	13.3 ns 59.4 ns			
Pulse duration	2 µs to 20 µs 20 µs to 200 µs 200 µs to 1 ms	68.7 ns 0.68 µs 3.45 µs			
Short circuit current pulse	1 A to 5 kA	2.28 %			
Current Waveform Undershoot	0 % to 60 %	2.49 %			
Current front / Rise time	0.1 µs to 3 µs 3 µs to 20 µs	23.4 ns 62.5 ns			
Current duration	2 µs to 50 µs 50 µs to 500 µs	0.17 µs 1.7 µs			
Phase angle (Surge on AC line)	0° to 360°	0.70°			
Output impedance	0.1 Ω to 500 Ω	2.5 %			



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code	
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)					
Electrical fast transient characteristics					
Peak voltage into 50 Ω	1 V to 8 kV	1.1 %	For the calibration of EFT/burst generators as specified in BS EN 61000-4-4	Yateley	
Peak voltage into 1 k Ω	1 V to 8 kV	3.2 %			
Rise time	2 ns to 10 ns	0.125 ns			
Pulse width	10 ns to 75 ns 75 ns to 200 ns	0.33 ns 0.71 ns			
Burst duration	200 ns to 1 ms 1 ms to 20 ms	0.12 μ s 2.8 μ s			
Burst period	50 ms to 500 ms	2.0 μ s/s			
Repetition rate	1 kHz to 1.5 MHz	2.0 μ s/s			
Impulse Magnetic Field Immunity			For the calibration of impulse Magnetic Field Immunity Generators and Loops as specified in BS EN 61000-4-9		
Peak Short Circuit Current	1 A to 5 kA	2.28 %			
Current Front./ Rise time	3 μ s to 20 μ s	62.5 ns			
Current Duration	2 μ s to 50 μ s	0.17 μ s			
Ring Wave Characteristics					
Peak voltage	10 V to 7 kV	1.35 %	For the calibration of Ring Wave Generators as specified in BS EN 61000-4-12		
Voltage rise time	0.1 μ s to 2 μ s	15.4 ns			
Decaying voltage	Pk 2 0 to 2x Pk V Pk 3 0 to 2 x Pk V Pk 4 0 to 2 x Pk V	1.39 % 1.45 % 1.66 %			
Oscillation frequency	10 kHz to 200 kHz	23 μ Hz/Hz			
Peak current	1 A to 600 A	2.4 %			
Current rise time	100 ns to 3 μ s	27.9 ns			
Phase angle	0 to 360 degrees	0.70°			
Output impedance	1 Ω to 100 Ω	2.8 %			



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ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				
Voltage dips and interrupts characteristics			For the calibration of voltage dips and interrupts simulators as specified in 61000-4-11	Yateley
AC Voltage dip	0 V to 500 V 50 Hz to 400 Hz	0.51 %		
Overshoot / undershoot	0 to 20 %	0.87 %		
Rise/Fall time	0.1 μ s to 1.5 μ s	45 ns		
Dip timing	10 μ s to 5 s	11.7 μ Hz/Hz		
Load regulation	0 V to 500 V	0.56 %		
Phase accuracy	0° to 360°	0.70°		
Inrush current	To 1000 A Peak	4.1 %		
Slow Damped Oscillatory Wave Characteristics			For the calibration of Slow Damped Oscillatory Wave Generators as specified in 61000-4-18	
Peak Voltage	10 V to 7 kV	1.36 %		
Voltage Rise Time	20 ns to 200 ns	5.2 ns		
Decaying Voltage				
Peak 5	0 to 2 * Pk V	1.41 %		
Peak 10	0 to 2 * Pk V	1.41 %		
Oscillation Frequency	10 kHz to 2 MHz	0.10 %		
Peak Current	500 mA to 50 A	2.41 %		
Burst Duration	0 s to 3 s	0.010 s		
Repetition Rate	30 Hz to 60 Hz 300 Hz to 600 Hz	0.50 % 0.050 %		
Output Impedance	50 Ω to 500 Ω	2.77 %		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				
Electrostatic Discharge				
ESD Generators				
DC Voltage	0.1 kV to 40 kV	0.39 %	For the calibration of ESD Generators to IEC61000-4-2:2009 and ISO 10605:2008.	Yateley
Peak Current	0.35 A to 150 A	2.3 %		
Rise Time (ps)	300 400 500 600 700 800 900 1000 1100	53.8 ps or 17.9 % 48.7 ps or 12.2 % 46.3 ps or 9.3 % 45.2 ps or 7.5 % 44.8 ps or 6.4 % 44.9 ps or 5.6 % 45.4 ps or 5.0 % 46.1 ps or 4.6 % 47.1 ps or 4.3 %	Uncertainty calculations in accordance with examples in standard.	
Decay points Depending on coupling networks	30 ns and 60 ns 65 ns and 130 ns	2.7 % 2.7 %		
150 pF/330 Ω 330 pF/330 Ω	180 ns 400 ns	4.2 % 4.2 %		
150 pF/2000 Ω 330 pF/2000 Ω	360 ns 800 ns	10.5 % 10.5 %		
LF and RF Impedance	Magnitude 1 Ω to 100 Ω		For the measurement of Line Impedance Stabilisation Networks (LISNs)	
	10 Hz to 1 MHz	0.20 Ω		
	1 MHz to 108 MHz	1.0 Ω		
	108 MHz to 200 MHz	2.0 Ω		
	200 MHz to 300 MHz	4.0 Ω		
	300 MHz to 500 MHz	5.0 Ω		
	Phase 0° to 180° 9 kHz to 108 MHz	1.0°	LISNs, CDNs and ISNs	
	Magnitude 80 Ω to 250 Ω 150 kHz to 30 MHz 30 MHz to 230 MHz	1.0 % 2.0 %	For the measurement of Coupling/Decoupling Networks (CDNs & ISNs)	



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ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)					
Longitudinal Conversion Loss (LCL)	30 dB to 81 dB		For the Calibration of ISNs	Yateley	
	Cat 3 Cat 5 Cat 6	0.19 dB 0.32 dB 0.57 dB			
	82 to 90 dB	0.61 dB to 1.36 dB			
DISCONTINUOUS INTERFERENCE ANALYSERS					
Pulse Amplitude	-2.5 dBm to +25 dBm	0.20 dB	Tests in accordance with BS55016-1-2007		
Pulse Duration	0.11 ms to 1.33 ms	10 μ s/s			
Pulse Separation	0.1 ms to 200 ms Initial 13 s of F.1-11/12 All other pulses/tests	0.10 % 10 μ s/s			
RECEIVERS AND ANALYSERS TO CP1106					
Amplitude Accuracy	-40 dBm to +10 dBm 10 Hz to 4 GHz	0.080 dB	N Type connectors		
	4 GHz to 12 GHz 12 GHz to 18 GHz	0.14 dB 0.19 dB			
	-40 dBm to +10 dBm 10 Hz to 4 GHz	0.080 dB	K Type connectors		
	4 GHz to 13 GHz	0.13 dB			
	13 GHz to 19 GHz	0.18 dB			
	19 GHz to 26 GHz	0.20 dB			
	26 GHz to 30 GHz	0.31 dB			
	30 GHz to 39 GHz	0.33 dB			
	39 GHz to 40 GHz	0.36 dB			



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ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				
RECEIVERS AND ANALYSERS TO CP1106 (continued)				
Calibration Signal	-40 dBm to 0 dBm 10 MHz to 500 MHz	0.070 dB		Yateley
Frequency Accuracy	10 MHz to 500 MHz	5.8×10^{-10}		
IF Bandwidth Nominal 0 dBm	10 MHz to 500 MHz Gaussian 3/6 dB Gaussian 60 dB	0.11 % of Bandwidth 1.0 % of Bandwidth		
	Non-Gaussian 3/6 dB Non-Gaussian 60 dB	0.20 % of Bandwidth 1.0 % of Bandwidth		
Bandwidth level switching Nominal 0 dBm	10 MHz to 500 MHz	0.070 dB		
Voltage Reflection Coefficient	100 kHz to 3 GHz 0 to 0.2 0.2 to 0.4 0.4 to 0.6	0.015 0.031 0.065	N Type connectors	
	3 GHz to 18 GHz 0 to 0.2 0.2 to 0.4 0.4 to 0.6	0.028 0.042 0.078		
	10 MHz to 26 GHz 0 to 0.2 0.2 to 0.4 0.4 to 0.6	0.036 0.037 0.041	K Type connectors	
	26 GHz to 40 GHz 0 to 0.2 0.2 to 0.4 0.4 to 0.6	0.053 0.055 0.063		



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ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				
RECEIVERS AND ANALYSERS TO CP1106 (continued)				
Amplitude Linearity Reference to a nominal 0 dBm	<i>10 MHz to 500 MHz</i> 0 dB to -40 dB 0 dB to -80 dB 0 dB to -90 dB 0 dB to -95 dB	0.070 dB 0.080 dB 0.12 dB 0.17 dB		Yateley
Reference Level Switching	<i>10 MHz to 500 MHz</i> Nominal amplitude 0 dBm	0.030 dB		
Attenuator	<i>10.1 MHz and 50.1 MHz</i> 0 dB to 70 dB	0.060 dB		
Tracking Generator Amplitude Accuracy	-30 dBm to +10 dBm <i>100 kHz to 4 GHz</i> <i>4 GHz to 12 GHz</i> <i>12 GHz to 18 GHz</i>	0.11 dB 0.12 dB 0.13 dB		
Tracking Generator Attenuator Accuracy	<i>10 MHz to 500 MHz</i> 0 dB to 60 dB 0 dB to 90 dB 0 dB to 100 dB	0.11 dB 0.21 dB 0.32 dB		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				
Pulse Accuracy and Detector Response				Yateley
Sine wave accuracy	60 dB μ V 10 Hz to 1 GHz	0.14 dB	The uncertainties apply to a receiver with a source VRC not greater than 0.02. The uncertainties may increase for receivers with higher VRC.	
QP Pulse level accuracy	20 dB μ V to 70 dB μ V emf (Bands A/B) (Bands C/D)	0.15 dB 0.23 dB		
Pulse repetition Frequency response	1000 Hz to 0.1 Hz	0.10 dB		
PRF Frequency Accuracy	0 Hz to 1 kHz 1 kHz to 5 kHz	50 mHz 1.2 Hz		
HARMONIC CONTENT	Carrier Frequency 1 MHz to 1.2 GHz Harmonic Frequency 2 MHz to 2.4 GHz	1.5 dB		
	20 Hz to 2.2 GHz 0 dBc to -70 dBc -70 dBc to -95 dBc -95 dBc to -120 dBc	0.80 dB 1.6 dB 2.3 dB		
	2.2 GHz to 7 GHz 0 dBc to -70 dBc -70 dBc to -95 dBc -95 dBc to -120 dBc	1.3 dB 1.8 dB 2.5 dB		
	7 GHz to 18 GHz 0 dBc to -70 dBc -70 dBc to -95 dBc -95 dBc to -120 dBc	2.3 dB 2.5 dB 3.1 dB		
	18 GHz to 26.5 GHz 0 dBc to -70 dBc -70 dBc to -95 dBc -95 dBc to -120 dBc	2.7 dB 3.0 dB 3.5 dB		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				
SPURIOUS RESPONSES	CW/spurious Response Frequency 1 MHz to 2.4 GHz	1.5 dB	Maximum CW amplitude +30 dBm; minimum spurious response level -90 dBc	Yateley
CALIBRATION OF ABSORBING CLAMPS				
Clamp Factor Nominal: 14 dB to 30 dB	30 MHz to 40 MHz 40 MHz to 200 MHz 200 MHz to 700 MHz 700 MHz to 1 GHz	1.5 dB 0.90 dB 0.70 dB 0.60 dB	The uncertainties are for a procedure according to BS EN 55016-1-3:2006. The customer's output attenuator and cable are required, if not supplied uncertainties may increase.	
Decoupling Factor DF Nominal: 20 dB to 60 dB	30 MHz to 100 MHz 100 MHz to 400 MHz 400 MHz to 1 GHz	0.70 dB 1.5 dB 2.0 dB		
Decoupling Factor DR Nominal: 20 dB to 60 dB	30 MHz to 200 MHz 200 MHz to 500 MHz 500 MHz to 1 GHz	0.60 dB 1.0 dB 2.0 dB		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC AND LF ELECTRICAL STANDARDS				Yateley
DC RESISTANCE				
Specific Values	100 $\mu\Omega$ 1 m Ω 10 m Ω	4.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 0.60 $\mu\Omega/\Omega$	The stated uncertainties refer to negligible power dissipation; resistors having significant power dissipation can be measured at voltages (up to 1 kV) and currents (up to 1000 A) with uncertainties in the range 10 $\mu\Omega/\Omega$ to 500 $\mu\Omega/\Omega$.	
	100 m Ω 1 Ω 10 Ω	0.12 $\mu\Omega/\Omega$ 0.090 $\mu\Omega/\Omega$ 0.090 $\mu\Omega/\Omega$		
	100 Ω 1 k Ω 10 k Ω	0.070 $\mu\Omega/\Omega$ 0.090 $\mu\Omega/\Omega$ 0.070 $\mu\Omega/\Omega$		
	100 k Ω 1 M Ω 10 M Ω	0.30 $\mu\Omega/\Omega$ 0.50 $\mu\Omega/\Omega$ 0.80 $\mu\Omega/\Omega$	Resistors of modest dimensions suitable for oil immersion can be measured at temperatures in the range 15 °C to 25 °C. Resistors which are not oil immersible can be measured over the temperature range 20 °C to 30 °C.	
	100 M Ω <i>Applied voltage 10 V</i>	1.5 $\mu\Omega/\Omega$		
Other Values	0 Ω to 1 m Ω 1 m Ω to 10 m Ω 10 m Ω to 100 m Ω	6.0 n Ω 6.0 $\mu\Omega/\Omega$ 0.40 $\mu\Omega/\Omega$	Uncertainties at high values also depend on applied voltage.	
	100 m Ω to 1 Ω 1 Ω to 10 Ω 10 Ω to 100 Ω	0.20 $\mu\Omega/\Omega$ 0.20 $\mu\Omega/\Omega$ 0.20 $\mu\Omega/\Omega$	The applied voltages are 100 V for values from 100 M Ω to 100 G Ω and 500 V for higher values.	
	100 Ω to 1 k Ω 1 k Ω to 10 k Ω 10 k Ω to 100 k Ω	0.20 $\mu\Omega/\Omega$ 0.20 $\mu\Omega/\Omega$ 0.30 $\mu\Omega/\Omega$		
	100 k Ω to 1 M Ω 1 M Ω to 10 M Ω 10 M Ω to 100 M Ω	0.50 $\mu\Omega/\Omega$ 0.80 $\mu\Omega/\Omega$ 1.50 $\mu\Omega/\Omega$		
High Resistance system	100 M Ω to 1 G Ω 1 G Ω to 10 G Ω 10 G Ω to 100 G Ω	30 $\mu\Omega/\Omega$ 45 $\mu\Omega/\Omega$ 55 $\mu\Omega/\Omega$		
	100 G Ω to 1 T Ω 1 T Ω to 10 T Ω 10 T Ω to 100 T Ω	100 $\mu\Omega/\Omega$ 250 $\mu\Omega/\Omega$ 250 $\mu\Omega/\Omega$		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC RESISTANCE				Yateley
Specific Values				
Generation	1 Ω 70 Hz 1 kHz 1592 Hz 2 kHz 5 kHz	5.0 $\mu\Omega/\Omega$ 5.0 $\mu\Omega/\Omega$ 5.0 $\mu\Omega/\Omega$ 6.0 $\mu\Omega/\Omega$ 15 $\mu\Omega/\Omega$		
	10 Ω , 100 Ω , 1 k Ω and 10 k Ω 70 Hz 1 kHz 1592 Hz 2 kHz 5 kHz 10 kHz 20 kHz	5.0 $\mu\Omega/\Omega$ 5.0 $\mu\Omega/\Omega$ 5.0 $\mu\Omega/\Omega$ 5.0 $\mu\Omega/\Omega$ 10 $\mu\Omega/\Omega$ 15 $\mu\Omega/\Omega$ 30 $\mu\Omega/\Omega$		
	25 Ω 75 Hz, 1 kHz & 5 kHz 10 kHz	3.0 $\mu\Omega/\Omega$ 10 $\mu\Omega/\Omega$		
Measurement	1 Ω , 10 Ω , 100 Ω , 1 k Ω and 10 k Ω 75 Hz	5.0 $\mu\Omega/\Omega$		
	1 Ω , 10 Ω , 100 Ω , 1 k Ω and 10 k Ω 70 Hz, 1 kHz, 1592 Hz, 2 kHz, 5 kHz	35 $\mu\Omega/\Omega$		
	10 Ω , 100 Ω , 1 k Ω and 10 k Ω 10 kHz	35 $\mu\Omega/\Omega$		
	10 Ω , 100 Ω , 1 k Ω and 10 k Ω 20 kHz	45 $\mu\Omega/\Omega$		
Other values	1 Ω to 10 k Ω 100 Hz to 1 kHz	520 $\mu\Omega/\Omega$		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC VOLTAGE				Yateley
Standard cell value	1.018 V nominal	0.15 μ V/V	The stated uncertainties can be realised with cells only if they are suitable for oil-immersion at 20 °C or have their own temperature-controlled enclosure of appropriate thermal stability. Standard cells and DC voltage standards of a moderate size can be measured over a temperature range of 15°C to 25°C and on a fully automated system.	
Zener References	1.0 V 10 V	0.15 μ V/V 0.12 μ V/V		
Other values	0 V to 1 mV 1.0 mV to 10 mV 10 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 1000 V	120 nV 120 nV 120 nV 230 nV 0.25 μ V/V 0.60 μ V/V		
	1 kV to 2 kV 2 kV to 10 kV	0.15 % + 100 mV 0.15 % + 600 mV	Measurement only.	
DC CURRENT	0 A to 2 pA 2 pA to 20 pA 20 pA to 200 pA 200 pA to 2 nA	0.50 % + 10 fA 0.40 % + 10 fA 0.30 % + 30 fA 0.090 % + 100 fA		
	2 nA to 20 nA 20 nA to 200 nA 200 nA to 1 μ A	0.080 % + 1.0 pA 0.080 % + 10 pA 8.0 μ A/A		
	1 μ A to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 100 A 100 A to 600 A	4.0 μ A/A 8.0 μ A/A 20 μ A/A 30 μ A/A 100 μ A/A		
	20 A to 2500 A	0.55 %	For the calibration of current clamps and similar devices, using 25 turn coil.	
	2500 A to 6000 A	0.55 %	For the calibration of current clamps and similar devices, using 50 turn coil.	



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Measured Quantity Instrument or Gauge	Range		Expanded Measurement Uncertainty ($k = 2$)		Remarks		Location Code							
AC/DC TRANSFER VOLTAGE (Specific Values)								Yateley						
AC/DC transfer difference in $\mu\text{V/V}$ at Specific Values, expressed as an expanded uncertainty ($k = 2$).														
Voltage	Frequency (Hz)													
	10	20	40	60	1 k	10 k	20 k		50 k	100 k	300 k	500 k	700 k	1M
1 mV	211	212	239	234	207	210	208		226	239	293	354	529	835
2 mV	140	139	138	139	139	143	145		144	150	234	282	401	624
10 mV	67	67	67	67	66	67	66		80	85	160	199	308	452
20 mV	113	47	44	44	44	44	44		55	69	119	184	261	434
100 mV	22	24	21	21	20	19	21		28	52	63	75	97	125
200 mV	21	23	19	19	19	19	20		20	25	43	63	86	122
300 mV	25	22	19	19	19	20	19		20	25	39	54	75	107
500 mV	19	19	19	21	22	19	19		21	26	32	46	60	83
1 V	19	19	18	18	19	18	18		19	23	28	34	44	56
2 V	18	18	18	19	19	19	18		19	23	25	27	34	44
3 V	20	19	19	19	19	19	19		20	22	25	29	34	63
5 V	19	19	19	19	19	19	19		19	22	24	26	31	38
10 V	19	18	18	18	19	19	19		19	22	24	27	31	39
20 V	27	23	19	19	22	19	18		19	22	25	30	42	44
30 V	20	23	20	20	20	22	21		21	23				
50 V	20	19	19	19	20	19	19		19	24				
100 V	19	20	19	19	20	19	19		19	24				
200 V	20	25	19	19	20	22	21		22	35				
300 V	21	22	21	20	20	20	20		23	31				
500 V	25	21	21	20	21	27	26		33	49				
1 kV	26	22	23	21	20	22	29		38	69				



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code									
AC/DC TRANSFER VOLTAGE (Other values)													
For intermediate values the uncertainty will be obtained using interpolation techniques													
AC/DC transfer difference in $\mu V/V$ for other values expressed as an expanded uncertainty ($k = 2$)													
Voltage	Frequency (Hz)												
	10	20	40	60	1 k	10 k	20 k	50 k	100 k	300 k	500 k	700 k	1 M
1 mV	213	214	241	236	209	212	210	228	240	295	355	530	835
2 mV	143	142	141	142	142	146	148	147	153	235	283	401	625
10 mV	73	73	73	73	73	73	72	85	89	162	201	309	453
20 mV	116	55	53	53	53	52	53	62	74	122	186	263	435
100 mV	36	38	36	36	35	35	36	40	58	68	80	100	128
200 mV	36	37	35	35	35	35	35	35	37	50	68	90	125
300 mV	38	37	35	35	35	35	35	35	37	47	60	80	110
500 mV	35	35	35	36	37	35	35	36	37	42	53	66	88
1 V	35	35	34	34	35	34	34	35	35	38	43	51	62
2 V	34	34	34	35	34	35	34	34	35	36	38	44	51
3 V	35	35	35	35	35	35	35	35	35	37	39	43	69
5 V	35	35	34	34	35	35	35	35	35	36	37	40	46
10 V	35	34	34	34	35	35	35	35	34	36	38	41	47
20 V	40	37	34	34	36	35	34	35	35	36	40	50	51
30 V	35	37	35	35	35	37	36	36	35				
50 V	35	35	35	35	35	35	35	35	36				
100 V	35	35	35	35	35	35	35	35	36				
200 V	35	38	35	35	35	36	36	36	44				
300 V	36	36	36	36	35	35	35	37	41				
500 V	38	36	36	35	36	40	39	44	56				
1 kV	39	36	37	36	35	36	41	48	74				

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Measured Quantity Instrument or Gauge	Range		Expanded Measurement Uncertainty ($k = 2$)		Remarks		Location Code							
AC VOLTAGE (Specific Values)								Yateley						
AC Voltage CMCs in $\mu\text{V/V}$ at Specific Values, expressed as an expanded uncertainty ($k = 2$)														
Voltage	Frequency (Hz)													
	10	20	40	60	1 k	10 k	20 k		50 k	100 k	300 k	500 k	700 k	1 M
1 mV	618	618	628	626	616	617	616		623	627	650	680	785	1017
2 mV	324	323	323	323	323	325	326		325	328	374	406	496	689
10 mV	90	90	90	91	90	91	90		100	104	171	208	314	456
20 mV	117	57	54	54	54	54	55		64	76	123	187	263	435
100 mV	24	26	23	22	22	21	23		29	53	63	76	97	125
200 mV	22	24	20	20	20	20	20		20	26	43	63	86	122
300 mV	26	24	20	21	21	21	20		21	26	39	54	76	107
500 mV	20	20	20	22	23	20	20		21	27	33	46	61	84
1 V	20	19	19	19	19	19	19		20	24	28	34	44	56
2 V	19	19	19	19	19	19	19		19	24	25	28	35	44
3 V	20	19	20	19	19	20	19		20	23	25	29	34	64
5 V	19	20	19	19	19	19	19		20	22	24	27	31	38
10 V	19	19	19	19	19	19	19		19	22	24	27	31	39
20 V	27	23	19	19	22	19	19		19	22	25	30	42	44
30 V	21	24	21	21	21	23	22		22	24				
50 V	20	20	20	20	20	20	20		20	24				
100 V	20	21	20	19	20	20	20		19	24				
200 V	21	25	20	20	20	22	21		22	35				
300 V	22	23	22	21	20	21	21		23	32				
500 V	25	21	22	20	21	28	26		33	49				
1 kV	26	22	23	22	20	22	29	38	69					



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code									
AC VOLTAGE (Other Values)													
For intermediate values the uncertainty will be obtained using interpolation techniques													
AC Voltage CMCs in $\mu\text{V/V}$ at other values, expressed as an expanded uncertainty ($k = 2$)													
Voltage	Frequency (Hz)												
	10	20	40	60	1 k	10 k	20 k	50 k	100 k	300 k	500 k	700 k	1 M
1 mV	618	619	628	626	617	618	617	624	628	651	680	786	1017
2 mV	325	324	324	325	325	326	327	327	329	375	407	496	690
10 mV	95	95	95	95	95	95	94	104	108	173	210	315	457
20 mV	121	64	61	61	61	61	62	70	80	126	189	265	436
100 mV	38	39	37	37	36	36	37	41	59	69	80	101	128
200 mV	36	38	35	35	35	35	36	36	37	51	68	90	125
300 mV	39	37	35	36	36	36	35	36	38	47	60	80	111
500 mV	35	35	35	36	37	35	35	36	38	42	54	66	88
1 V	35	35	35	35	35	35	35	35	36	39	43	51	62
2 V	35	35	35	35	35	35	35	35	36	37	38	44	51
3 V	35	35	35	35	35	35	35	35	35	37	39	43	69
5 V	35	35	35	35	35	35	35	35	35	36	38	41	46
10 V	35	34	34	34	35	35	35	35	34	36	38	41	47
20 V	40	37	35	35	36	35	34	35	35	37	40	50	51
30 V	36	37	36	36	36	37	36	36	36				
50 V	35	35	35	35	35	35	35	35	36				
100 V	35	36	35	35	35	35	35	35	36				
200 V	36	38	35	35	35	36	36	36	44				
300 V	36	37	36	36	35	36	36	37	41				
500 V	38	36	36	36	36	40	39	44	56				
1 kV	39	36	37	36	35	37	41	48	74				

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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code				
AC VOLTAGE RATIO	0.000 000 01 to unity <i>400 Hz to 1 kHz</i>	0.13 x 10 ⁻⁶ of input	By comparison with standard inductive voltage divider.	Yateley				
Synchro Resolver Standards	0° to 360°	2.0 second of arc						
Synchro Resolver Bridges	0° to 360°	2.0 second of arc						
Synchro Resolver simulators	0° to 360°	2.0 second of arc						
Synchro Resolver indicators	0° to 360°	2.0 second of arc						
AC/DC TRANSFER CURRENT (Specific Values)								
AC/DC transfer difference in $\mu\text{A/A}$ at Specific Values, expressed as an expanded uncertainty ($k = 2$).								
Current	Frequency							
	10 Hz	40 Hz	60 Hz	1 kHz	10 kHz	20 kHz	50 kHz	100 kHz
1 mA	83	57	49	52	57	51	75	80
10 mA	64	25	24	25	26	30	53	55
20 mA	62	21	21	21	23	26	52	55
30 mA	74	46	46	45	50	46	65	70
50 mA	66	32	31	31	32	34	56	63
100 mA	64	24	24	25	25	29	55	67
200 mA	66	25	25	24	25	28	57	95
300 mA	79	48	46	47	46	54	77	117
500 mA	73	34	34	36	34	45	70	127
1 A	73	29	28	30	28	52	81	156
2 A	77	28	28	29	29	67	101	199
3 A	91	49	49	50	52	92	144	338
5 A	85	38	38	41	39	83	132	316
10 A	89	33	34	34	46	104	161	433
15 A	95	37	35	36	39	114	170	379
20 A	95	35	34	34	36	113	169	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code				
AC/DC TRANSFER CURRENT (Other values)								
For intermediate values the uncertainty will be obtained using interpolation techniques								
AC/DC transfer difference in $\mu\text{A/A}$ for other values expressed as an expanded uncertainty ($k = 2$)								
Current	Frequency							
	10 Hz	40 Hz	60 Hz	1 kHz	10 kHz	20 kHz	50 kHz	100 kHz
1 mA	101	66	60	63	67	77	138	244
10 mA	86	43	42	43	43	65	127	237
20 mA	85	41	41	41	42	63	127	237
30 mA	94	58	58	57	61	74	133	241
50 mA	88	47	47	47	47	67	128	239
100 mA	86	42	42	43	43	64	128	241
200 mA	87	43	43	42	43	64	129	250
300 mA	98	59	58	58	58	79	139	259
500 mA	93	49	48	50	49	73	135	264
1 A	93	45	45	46	45	78	141	278
2 A	96	44	45	45	45	89	153	305
3 A	108	60	60	61	62	109	185	410
5 A	103	52	52	54	52	101	176	391
10 A	106	67	67	67	74	155	282	555
15 A	111	69	68	68	70	162	287	514
20 A	111	68	67	67	68	161	286	
AC CURRENT (Specific Values)								
AC Current CMCs in $\mu\text{A/A}$ at Specific Values, expressed as an expanded uncertainty ($k = 2$)								
Current	Frequency							
	10 Hz	40 Hz	60 Hz	1 kHz	10 kHz	20 kHz	50 kHz	100 kHz
1 mA	83	57	49	52	57	51	76	80
10 mA	64	25	24	25	26	30	53	55
20 mA	62	22	22	22	24	26	52	55
30 mA	74	46	46	45	50	47	65	70
50 mA	67	32	31	31	32	34	56	63
100 mA	64	24	24	26	25	29	55	67
200 mA	66	25	25	25	25	28	57	95
300 mA	79	48	46	47	47	54	77	117
500 mA	73	35	34	36	34	45	70	127
1 A	73	29	29	30	28	52	81	156
2 A	78	29	30	30	30	68	101	199
3 A	91	50	50	51	53	93	145	339
5 A	86	39	39	42	40	84	133	316
10 A	89	35	35	35	47	104	161	434
15 A	95	39	36	37	40	115	170	379
20 A	97	41	40	40	42	115	170	

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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code				
AC CURRENT (Other Values)								
For intermediate values the uncertainty will be obtained using interpolation techniques								
AC Current CMCs in $\mu\text{A/A}$ at Specific Values, expressed as an expanded uncertainty ($k = 2$)								
Current	Frequency							
	10 Hz	40 Hz	60 Hz	1 kHz	10 kHz	20 kHz	50 kHz	100 kHz
1 mA	101	66	60	63	67	77	138	244
10 mA	86	43	42	43	43	65	127	237
20 mA	85	41	41	41	42	63	127	237
30 mA	94	58	58	57	61	74	133	241
50 mA	88	47	47	47	47	67	129	239
100 mA	86	42	42	43	43	64	128	241
200 mA	87	43	43	43	43	64	129	250
300 mA	98	59	58	58	58	79	139	259
500 mA	93	49	48	50	49	73	135	264
1 A	93	45	45	46	45	78	141	278
2 A	97	45	46	46	46	89	154	305
3 A	108	61	60	61	63	109	185	410
5 A	104	52	52	55	53	102	176	392
10 A	106	67	67	67	75	156	282	555
15 A	111	69	68	69	70	163	287	514
20 A	113	71	70	70	71	163	287	
AC CURRENT Other values	40 Hz to 10 kHz 10 μA to 1 mA 20 A to 3000 A 10 Hz to 65 Hz 65 Hz to 300 Hz 3000 A to 6000 A 10 Hz to 65 Hz 65 Hz to 300 Hz	55 $\mu\text{A/A}$ 0.55 % 0.55 % 0.55 % 0.55 %	For the calibration of current clamps and similar devices, using 25 turn coil. For the calibration of current clamps and similar devices, using 50 turn coil.	Yateley				



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)		Remarks	Location Code		
AC POWER				Sinusoidal waveforms	Yateley		
AC Power CMCs in $\mu\text{W/W}$, expressed as an expanded uncertainty ($k = 2$) Power Factor 1.0 to 0.75 Frequency 16 Hz to 69 Hz							
Current A	Voltage (V)						
	6.4 to 16	13.2 to 33	31 to 78	67 to 168		134 to 336	330 to 1008
0.1 to 2	350	330	280	280		280	330
2.1 to 5	350	330	280	280		280	330
5.1 to 10	380	330	300	300		300	350
10 to 21	400	380	330	330		330	380
20.1 to 80	480	480	430	430		430	480
AC Power CMCs in $\mu\text{W/W}$, expressed as an expanded uncertainty ($k = 2$) Power Factor 0.75 to 0.5 Frequency 16 Hz to 69 Hz							
Current A	Voltage (V)						
	6.4 to 16	13.2 to 33	31 to 78	67 to 168		134 to 336	330 to 1008
0.1 to 2	380	350	300	300		300	350
2.1 to 5	350	330	280	280		280	350
5.1 to 10	400	380	330	330		330	380
10 to 21	430	400	350	350		350	400
20.1 to 80	500	500	450	450		450	500
AC Power CMCs in $\mu\text{W/W}$, expressed as an expanded uncertainty ($k = 2$) Power Factor 0.5 to 0.25 Frequency 16 Hz to 69 Hz							
Current A	Voltage (V)						
	6.4 to 16	13.2 to 33	31 to 78	67 to 168	134 to 336	330 to 1008	
0.1 to 2	430	400	380	380	380	430	
2.1 to 5	430	400	380	380	380	400	
5.1 to 10	500	480	450	450	450	480	
10 to 21	500	500	450	480	480	500	
20.1 to 80	580	580	550	550	550	580	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code			
AC POWER (continued)			Sinusoidal waveforms	Yateley			
AC Power CMCs in $\mu\text{W/W}$, expressed as an expanded uncertainty (k = 2) Power Factor 1.0 to 0.75 Frequency 69 Hz to 180 Hz							
Current A	Voltage (V)						
	6.4 to 16	13.2 to 33	31 to 78		67 to 168	134 to 336	330 to 1008
0.1 to 2	375	350	300		300	300	350
2.1 to 5	350	330	280		280	280	330
5.1 to 10	400	380	330		330	330	380
10 to 21	425	400	350		350	350	400
20.1 to 80	500	500	450		450	450	500
AC Power CMCs in $\mu\text{W/W}$, expressed as an expanded uncertainty (k = 2) Power Factor 0.75 to 0.5 Frequency 69 Hz to 180 Hz							
Current A	Voltage (V)						
	6.4 to 16	13.2 to 33	31 to 78		67 to 168	134 to 336	330 to 1008
0.1 to 2	400	400	350		350	350	380
2.1 to 5	400	380	330		330	330	380
5.1 to 10	450	430	400		400	400	430
10 to 21	480	450	430		430	430	450
20.1 to 80	580	550	530		530	530	550
AC Power CMCs in $\mu\text{W/W}$, expressed as an expanded uncertainty (k = 2) Power Factor 0.5 to 0.25 Frequency 69 Hz to 180 Hz							
Current A	Voltage (V)						
	6.4 to 16	13.2 to 33	31 to 78	67 to 168	134 to 336	330 to 1008	
0.1 to 2	580	550	550	550	550	580	
2.1 to 5	580	550	530	530	530	580	
5.1 to 10	700	700	630	680	680	700	
10 to 21	730	700	680	680	680	700	
20.1 to 80	830	830	800	800	800	830	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code			
AC POWER (continued)			Sinusoidal waveforms	Yateley			
AC Power CMCs in $\mu\text{W/W}$, expressed as an expanded uncertainty (k = 2) Power Factor 1.0 to 0.75 Frequency 180 Hz to 450 Hz							
Current A	Voltage (V)						
	6.4 to 16	13.2 to 33	31 to 78		67 to 168	134 to 336	330 to 1008
0.1 to 2	450	430	400		400	400	430
2.1 to 5	450	430	400		400	400	430
5.1 to 10	530	500	480		480	480	500
10 to 21	550	530	500		500	500	530
20.1 to 80	680	650	630		630	630	650
AC Power CMCs in $\mu\text{W/W}$, expressed as an expanded uncertainty (k = 2) Power Factor 0.75 to 0.5 Frequency 180 Hz to 450 Hz							
Current A	Voltage (V)						
	6.4 to 16	13.2 to 33	31 to 78		67 to 168	134 to 336	330 to 1008
0.1 to 2	650	650	630		630	630	650
2.1 to 5	650	650	630		630	630	650
5.1 to 10	830	800	800		800	800	800
10 to 21	830	830	800		800	800	830
20.1 to 80	1000	1000	1000		1000	1000	1000
AC Power CMCs in $\mu\text{W/W}$, expressed as an expanded uncertainty (k = 2) Power Factor 0.5 to 0.25 Frequency 180 Hz to 450 Hz							
Current A	Voltage (V)						
	6.4 to 16	13.2 to 33	31 to 78	67 to 168	134 to 336	330 to 1008	
0.1 to 2	1300	1300	1300	1300	1300	1300	
2.1 to 5	1300	1300	1300	1300	1300	1300	
5.1 to 10	1700	1700	1700	1700	1700	1700	
10 to 21	1700	1700	1700	1700	1700	1700	
20.1 to 80	2100	2100	2100	2100	2100	2100	



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DC Voltage and AC Voltage harmonics				Yateley
DC	0.7 mV to 8 V	160 μ V/V + 7.0 mV		
	8 V to 16.5 V	160 μ V/V + 13 mV		
	16.5 V to 39 V	160 μ V/V + 30 mV		
	39 V to 84 V	160 μ V/V + 60 mV		
	84 V to 168 V	160 μ V/V + 130 mV		
	168 V to 504 V	230 μ V/V + 400 mV		
AC	1.5 mV to 4.8 V	160 μ V/V + 1.5 mV		
	16 Hz to 450 Hz	220 μ V/V + 1.5 mV		
	451 Hz to 850 Hz	630 μ V/V + 1.5 mV		
	851 Hz to 6 kHz			
	4.8 V to 9.9 V	160 μ V/V + 2.5 mV		
	16 Hz to 450 Hz	220 μ V/V + 2.5 mV		
	451 Hz to 850 Hz	630 μ V/V + 2.5 mV		
	851 Hz to 6 kHz			
	9.9 V to 23 V	160 μ V/V + 2.5 mV		
	16 Hz to 450 Hz	220 μ V/V + 2.5 mV		
	451 Hz to 850 Hz	630 μ V/V + 2.5 mV		
	851 Hz to 6 kHz			
	23 V to 50 V	160 μ V/V + 5.5 mV		
	16 Hz to 450 Hz	220 μ V/V + 5.5 mV		
	451 Hz to 850 Hz	630 μ V/V + 5.5 mV		
	851 Hz to 6 kHz			
	50 V to 100 V	160 μ V/V + 15 mV		
	16 Hz to 450 Hz	220 μ V/V + 15 mV		
	451 Hz to 850 Hz	680 μ V/V + 15 mV		
	851 Hz to 6 kHz			
	100 V to 302 V	230 μ V/V + 40 mV		
	16 Hz to 450 Hz	270 μ V/V + 40 mV		
	451 Hz to 850 Hz	680 μ V/V + 40 mV		
	851 Hz to 6 kHz			



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
DC Current and AC Current harmonics				Yateley
DC	0 A to 125 mA	180 μ A/A + 90 μ A		
	125 mA to 250 mA	180 μ A/A + 180 μ A		
	250 mA to 500 mA	180 μ A/A + 350 μ A		
	500 mA to 1.0 A	180 μ A/A + 700 μ A		
	1 A to 2.5 A	180 μ A/A + 1.8 mA		
	2.5 A to 5.0 A	250 μ A/A + 3.5 mA		
	5 A to 10 A	280 μ A/A + 7.0 mA		
AC	8 μ A to 75 mA			
	16 Hz to 450 Hz	180 μ A/A + 8.0 μ A		
	451 Hz to 850 Hz	240 μ A/A + 8.0 μ A		
	851 Hz to 6 kHz	630 μ A/A + 8.0 μ A		
	75 mA to 150 mA			
	16 Hz to 450 Hz	180 μ A/A + 15 μ A		
	451 Hz to 850 Hz	240 μ A/A + 15 μ A		
	851 Hz to 6 kHz	630 μ A/A + 15 μ A		
	150 mA to 300 mA			
	16 Hz to 450 Hz	180 μ A/A + 30 μ A		
	451 Hz to 850 Hz	240 μ A/A + 30 μ A		
	851 Hz to 6 kHz	630 μ A/A + 30 μ A		
	300 mA to 600 mA			
	16 Hz to 450 Hz	180 μ A/A + 60 μ A		
	451 Hz to 850 Hz	240 μ A/A + 60 μ A		
	851 Hz to 6 kHz	630 μ A/A + 60 μ A		
	600 mA to 1.5 A			
	16 Hz to 450 Hz	180 μ A/A + 150 μ A		
	451 Hz to 850 Hz	240 μ A/A + 150 μ A		
	851 Hz to 6 kHz	625 μ A/A + 150 μ A		
	1.5 A to 3.0 A			
	16 Hz to 450 Hz	240 μ A/A + 300 μ A		
	451 Hz to 850 Hz	330 μ A/A + 300 μ A		
	851 Hz to 6 kHz	650 μ A/A + 300 μ A		
	3 A to 6 A			
	16 Hz to 450 Hz	280 μ A/A + 900 μ A		
	451 Hz to 850 Hz	350 μ A/A + 900 μ A		
	851 Hz to 6 kHz	800 μ A/A + 900 μ A		
	6 A to 24 A			
	16 Hz to 450 Hz	350 μ A/A + 3.5 mA		
	451 Hz to 850 Hz	400 μ A/A + 3.5 mA		
	851 Hz to 6 kHz	850 μ A/A + 3.5 mA		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Harmonic values for non-sinusoidal waveforms				Yateley
50 Hz fundamental; current harmonics up to 3 kHz	RMS Values 1 A to 10 A	850 µA/A		
Flicker (Pst)	Modulated 230 V 50 Hz sine wave	0.42 %		
AC Power at unity power factor	37.5 W to 6 kW 50 Hz to 60 Hz	0.050 %	Maximum voltage 300 V Maximum current 20 A	
	75 mW to 50 kW 50 Hz to 400 Hz	0.10 %	Maximum voltage 1 k V Maximum current 50 A	
Voltage:Current Phase			The results and uncertainties may also be reported in terms of power factor.	
	0° to 360°		250 mA to 5 A 16 V to 1008 V	
	16 Hz to 69 Hz	0.0040°		
	70 Hz to 180 Hz	0.0070°		
	181 Hz to 450 Hz	0.020°		
	451 Hz to 850 Hz	0.040°		
	851 Hz to 3 kHz	0.20°		
	3 kHz to 6 kHz	0.35°		
	0° to 360°		5 A to 21 A 16 V to 1008 V	
	16 Hz to 69 Hz	0.0050°		
	70 Hz to 180 Hz	0.0090°		
	181 Hz to 450 Hz	0.025°		
	451 Hz to 850 Hz	0.050°		
	851 Hz to 3 kHz	0.25°		
	3 kHz to 6 kHz	0.50°		
INDUCTANCE				
Specific Values	At 1 kHz			
	1 µH	5.0 nH		
	10 µH	5.0 nH		
	100 µH	120 µH/H		
	500 µH	120 µH/H		
	1 mH	120 µH/H		
	5 mH	120 µH/H		
	10 mH	120 µH/H		
	50 mH	120 µH/H		
	100 mH	120 µH/H		
	500 mH	120 µH/H		
	1 H	120 µH/H		
	5 H	120 µH/H		
	10 H	120 µH/H		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
INDUCTANCE (continued) Specific Values (continued)	<i>At nominal 50 Hz</i> 1 H 5 H 10 H <i>At 200 Hz</i> 10 H <i>At 400 Hz</i> 1 H 10 H <i>At 10 kHz</i> 1 mH 10 mH 100 mH 1 H	200 µH/H 200 µH/H 200 µH/H 200 µH/H 200 µH/H 200 µH/H 200 µH/H 250 µH/H 250 µH/H 500 µH/H		Yateley
Other Values	<i>At 1 kHz</i> 5 nH to 100 µH 100 µH to 100 mH 100 mH to 1 H 1 H to 10 H	0.030 % + 10 nH 200 µH/H 200 µH/H 200 µH/H		
CAPACITANCE				
<p align="center">This facility is mainly for the measurement of 2-Terminal, 3-Terminal or 4-Terminal capacitance standards. 2-terminal capacitance standards usually incur larger uncertainties than 3-terminal or 4-terminal capacitors. A number of known reference capacitors are also available, mainly decade values from 0.001 pF to 1 µF, for calibration of bridges and capacitance meters.</p>				
Specific Values	<i>At 1 kHz:</i> 0.001 pF 0.01 pF 0.1 pF 1 pF 10 pF 100 pF 1000 pF 10 nF 100 nF 1 µF	0.0050 fF 0.0050 fF 0.0050 fF 5.0 µF/F 1.5 µF/F 1.5 µF/F 2.0 µF/F 10 µF/F 25 µF/F 35 µF/F		
Other Values	<i>At 1 kHz:</i> 0.01 fF to 0.01 pF 0.01 pF to 0.1 pF 0.1 pF to 1 pF	0.010 fF 0.010 fF 0.010 fF		



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CAPACITANCE (continued)	<i>At 1 kHz:</i> 1 pF to 10 pF 10 pF to 100 pF 100 pF to 1000 pF 1 nF to 10 nF 10 nF to 100 nF 100 nF to 1000 nF 1 μ F to 10 μ F <i>From 20 Hz to 10 kHz:</i> 1 pF to 1 nF <i>At 100 Hz:</i> 1 μ F to 100 μ F 100 μ F to 10 mF 1 nF 100 kHz 200 kHz to 900 kHz 1 MHz	10 μ F/F 5.0 μ F/F 5.0 μ F/F 20 μ F/F 50 μ F/F 60 μ F/F 600 μ F/F 22 μ F/F 0.35 % 0.40 % 300 μ F/F 600 μ F/F 700 μ F/F			Yateley
CAPACITANCE LOSS (Dissipation factor, $\tan \delta$)	10^{-4} to 1 50 Hz to 10 kHz	0.000050	Uncertainty range stated is for capacitance values ≤ 100 nF at 1 kHz		
PHASE ANGLE Generation	0° to 360° 10 Hz to 1 kHz 1 kHz to 6.25 kHz 6.26 kHz to 50 kHz 50 kHz to 100 kHz	(0.010 + 0.000050 R)° (0.010 + 0.00010 R)° (0.025 + 0.00025 R)° (0.050 + 0.00050 R)°	R is the ratio between the output voltages and may have any value between 1 and 100.		
Measurement	0° to 360° 10 Hz to 30 Hz 30 Hz to 6 kHz 6 kHz to 30 kHz 30 kHz to 50 kHz 50 kHz to 100 kHz	0.050° 0.025° 0.040° 0.050° 0.15°			
AC VOLTAGE Other values	40 Hz to 200 Hz 1 kV to 1.9 kV 1.9 kV to 7 kV	1.8 % + 500 mV 1.8 % + 5.0 V	Measurement only		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE (Wideband to 30 MHz) Generation	10 µV to 1.1 mV 10 Hz to 30 Hz	0.85 % + 1.6 µV		Yateley
	30 Hz to 120 Hz	0.70 % + 1.6 µV		
	120 Hz to 2 MHz	0.80 % + 4.0 µV		
	2 MHz to 10 MHz	0.95 % + 4.0 µV		
	10 MHz to 20 MHz	1.1 % + 4.0 µV		
	20 MHz to 30 MHz	1.8 % + 14 µV		
	1.1 mV to 3 mV 10 Hz to 30 Hz	0.80 % + 2.5 µV		
	30 Hz to 120 Hz	0.65 % + 2.4 µV		
	120 Hz to 2 MHz	0.65 % + 5.2 µV		
	2 MHz to 10 MHz	0.80 % + 5.0 µV		
	10 MHz to 20 MHz	0.95 % + 5.0 µV		
	20 MHz to 30 MHz	1.7 % + 5.0 µV		
	3 mV to 11 mV 10 Hz to 30 Hz	0.80 % + 6.5 µV		
	30 Hz to 120 Hz	0.65 % + 6.5 µV		
	120 Hz to 2 MHz	0.65 % + 8.5 µV		
	2 MHz to 10 MHz	0.80 % + 8.5 µV		
	10 MHz to 20 MHz	0.95 % + 8.5 µV		
	20 MHz to 30 MHz	1.7 % + 8.5 µV		
	11 mV to 33 mV 10 Hz to 30 Hz	0.70 % + 13 µV		
	30 Hz to 120 Hz	0.55 % + 13 µV		
	120 Hz to 2 MHz	0.55 % + 15 µV		
	2 MHz to 10 MHz	0.65 % + 15 µV		
	10 MHz to 20 MHz	0.80 % + 15 µV		
	20 MHz to 30 MHz	1.3 % + 15 µV		
33 mV to 110 mV 10 Hz to 30 Hz	0.70 % + 31 µV			
30 Hz to 120 Hz	0.55 % + 31 µV			
120 Hz to 2 MHz	0.55 % + 35 µV			
2 MHz to 10 MHz	0.65 % + 35 µV			
10 MHz to 20 MHz	0.80 % + 35 µV			
20 MHz to 30 MHz	1.3 % + 35 µV			
110 mV to 330 mV 10 Hz to 30 Hz	0.62 % + 80 µV			
30 Hz to 120 Hz	0.50 % + 80 µV			
120 Hz to 2 MHz	0.50 % + 80 µV			
2 MHz to 10 MHz	0.55 % + 80 µV			
10 MHz to 20 MHz	0.70 % + 80 µV			
20 MHz to 30 MHz	1.2 % + 80 µV			
330 mV to 1.1 V 10 Hz to 30 Hz	0.65 % + 310 µV			
30 Hz to 120 Hz	0.50 % + 310 µV			
120 Hz to 2 MHz	0.50 % + 310 µV			
2 MHz to 10 MHz	0.55 % + 310 µV			
10 MHz to 20 MHz	0.70 % + 310 µV			
20 MHz to 30 MHz	1.2 % + 310 µV			



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AC VOLTAGE (Wideband to 30 MHz) Generation (continued)	1.1 V to 3.5 V 10 Hz to 30 Hz 30 Hz to 120 Hz 120 Hz to 2 MHz 2 MHz to 10 MHz 10 MHz to 20 MHz 20 MHz to 30 MHz	0.55 % + 400 µV 0.40 % + 400 µV 0.40 % + 400 µV 0.50 % + 400 µV 0.65 % + 400 µV 1.1 % + 400 µV		Yateley
RF AND MICROWAVE ELECTRICAL MEASUREMENTS				
FREQUENCY Specific Values	100 kHz, 1 MHz, 5 MHz and 10 MHz	1.0 in 10 ¹²	1000 s minimum measuring period.	Yateley
Other Values	5 Hz to 50 Hz 50 Hz to 500 Hz 500 Hz to 5 kHz 5 kHz to 50 kHz 50 kHz to 500 kHz 500 kHz to 40 GHz 1 GHz to 18 GHz	2.0 in 10 ⁸ 2.0 in 10 ⁹ 2.1 in 10 ¹⁰ 1.9 in 10 ¹¹ 1.0 in 10 ¹¹ 4.0 in 10 ¹² 1 in 10 ¹²	For the calibration of signal sources and frequency meters/counters. For frequency generation.	
RF AND MICROWAVE MEASUREMENTS: Standards				
VSWR	1.0 to 1.05 <i>250 MHz to 8.25 GHz in 250 MHz steps</i> 1.0 to 1.5 <i>500 MHz to 8.25 GHz</i> 1.5 to 10 <i>500 MHz to 8.25 GHz</i> 1.0 to 1.5 <i>1.8 GHz to 18 GHz</i> 1.5 to 10 <i>1.8 GHz to 18 GHz</i> 1.0 to 1.2 <i>2 GHz to 18 GHz</i> <i>2 GHz to 18 GHz</i> <i>2 GHz to 26.5 GHz</i>	0.0030 to 0.0050 0.0090 to 0.019 0.012 to 0.21 0.017 to 0.020 0.018 to 0.20 (0.0080 + 0.00080 f _{GHz}) (0.0080 + 0.0010 f _{GHz}) (0.016 + 0.0015 f _{GHz})	14 mm GPC. Other connectors invoke slightly larger uncertainties. 14 mm GPC. Other connectors invoke slightly larger uncertainties. 14 mm GPC. Other connectors invoke slightly larger uncertainties. APC-7 connector. APC-7 connectors. APC 7 connectors. Precision Type N. APC 3.5 (uncertainty may increase for other 3.5 mm versions).	Yateley



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DIRECTIVITY (of VSWR bridges)	20 dB to 56 dB 2 GHz to 18 GHz	$(0.0050 + 0.00040 f_{GHz})$	APC 7 connectors.	Yateley
	2 GHz to 18 GHz	$(0.0050 + 0.0010 f_{GHz})$	Precision Type N.	
	2 GHz to 26.5 GHz	$(0.0060 + 0.0015 f_{GHz})$	APC 3.5 (uncertainty may increase for other 3.5 mm versions).	
VSWR (waveguide)	1.0 to 1.05 2.6 GHz, 2.8 GHz, 3.0 GHz, 3.2 GHz, 3.4 GHz, 3.6 GHz, 3.8 GHz and 3.95 GHz	0.0030 to 0.0040	Waveguide No 10 (WR 284, RG 48/U).	
	1.0 to 1.5 2.6 GHz to 3.95 GHz	0.0080 to 0.020		
	1.5 to 10 2.6 GHz to 3.95 GHz	0.020 to 0.20		
	1.0 to 1.05 3.95 GHz, 4.0 GHz, 4.5 GHz, 5.0 GHz, 5.5 GHz and 5.9 GHz	0.0030 to 0.0040	Waveguide No 12 (WR 187, RG 49/U) fitted with circular clamped flanges.	
	1.05 to 1.5 3.9 GHz to 5.9 GHz	0.0080 to 0.20		
	1.5 to 10 3.95 GHz to 5.85 GHz	0.011 to 0.20		
	1.0 to 1.05 6.2 GHz, 6.8 GHz, 7.5 GHz and 8.0 GHz	0.0030	Waveguide No 14 (WR 137, RG 50/U).	
	1.0 to 1.5 5.85 GHz to 8.2 GHz	0.0080 to 0.020		
	1.5 to 10 5.85 GHz to 8.2 GHz	0.011 to 0.20		
	1.0 to 1.05 7.5 GHz, 8.5 GHz and 9.5 GHz	0.0040 to 0.0060	Waveguide No 15 (WR 112, RG 51/U, R 84).	
	1.05 to 1.5 7 GHz to 10 GHz	0.012 to 0.020		
	1.5 to 10 7 GHz to 10 GHz	0.014 to 0.20		



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VSWR (waveguide) (continued)	1.0 to 1.05 8.25 GHz, 8.50 GHz, 9.30 GHz, 10.0 GHz, 10.5 GHz, 11.0 GHz, 11.5 GHz, 12.0 GHz and 12.4 GHz	0.0040 to 0.0060	Waveguide No 16 (WR 90, RG 52/U) fitted with square bolted flanges or circular clamped flanges.	Yateley
	1.0 to 1.5 8.2 GHz to 12.5 GHz	0.016 to 0.020	Waveguide No 16 (WR 90, RG 52/U).	
	1.5 to 10 8.2 GHz to 12.5 GHz	0.017 to 0.020		
	1.0 to 1.05 12.5 GHz, 14.5 GHz, 15.5 GHz, 16.5 GHz and 17.5 GHz	0.0040	Waveguide No 18 (WR 62, RG 91/U).	
	1.0 to 1.5 11.9 GHz to 18 GHz	0.016 to 0.020		
	1.5 to 10 11.9 GHz to 18 GHz	0.017 to 0.020		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
VSWR (of precision airlines)	1.0 to 1.05 2 GHz to 18 GHz*	$(0.0090 + 0.00080 f_{GHz})$	APC 7 connectors.	Yateley
	2 GHz to 18 GHz*	$(0.0090 + 0.0010 f_{GHz})$	Precision Type N.	
	2 GHz to 26 GHz* *in steps of 1 GHz	$(0.016 + 0.0015 f_{GHz})$	APC 3.5 (Uncertainty may increase for other 3.5 mm versions).	
VOLTAGE REFLECTION COEFFICIENT				
Modulus	0.82 to 0.997 500 MHz to 8.25 GHz	0.0060	14 mm 50 Ω GPC.	
Magnitude	0 to 1.0 50 GHz to 75 GHz 75 GHz to 110 GHz	0.018 0.024	Waveguide No 25. Waveguide No 27.	
Phase	-180° to +180° 50 GHz to 75 GHz	$180 \left(\frac{Unc \Gamma }{\pi \Gamma } \right)^0$	Waveguide No 25.	
	75 GHz to 110 GHz	$180 \left(\frac{Unc \Gamma }{\pi \Gamma } \right)^0$	Waveguide No 27.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
RF ATTENUATION	100 kHz to 3 GHz		The uncertainties are for incremental attenuation using VM7 system.	Yateley
	0 dB to 20 dB	0.0020 dB to 0.0050 dB		
	20 dB to 50 dB	0.0050 dB to 0.015 dB		
	50 dB to 90 dB	0.010 dB to 0.015 dB		
	90 dB to 100 dB	0.014 dB to 0.020 dB		
	100 dB to 110 dB	0.015 dB to 0.020 dB		
	110 dB to 120 dB	0.020 dB to 0.040 dB		
	3 GHz to 18 GHz			
	0 dB to 20 dB	0.0020 dB to 0.0060 dB		
	20 dB to 50 dB	0.005 dB to 0.016 dB		
	50 dB to 90 dB	0.010 dB to 0.016 dB		
	90 dB to 100 dB	0.014 dB to 0.023 dB		
100 dB to 110 dB	0.015 dB to 0.058 dB			
18 GHz to 26.5 GHz				
0 dB to 50 dB	0.012 dB to 0.025 dB			
20 dB to 50 dB	0.013 dB to 0.025 dB			
50 dB to 90 dB	0.020 dB to 0.028 dB			
90 dB to 100 dB	0.025 dB to 0.033 dB			
26.5 GHz to 40 GHz (waveguide)				
0 dB to 50 dB	0.011 dB to 0.036 dB			
20 dB to 50 dB	0.012 dB to 0.036 dB			
50 dB to 90 dB	0.019 dB to 0.054 dB			
90 dB to 100 dB	0.033 dB to 0.109 dB			
RF VOLTAGE	100 kHz to 1 MHz:		Supplies above 3 V are not necessarily available over the full frequency range.	Yateley
	50 μ V to 200 mV	0.60 %		
	200 mV to 3 V	0.060 %		
	1 MHz to 10 MHz:			
	50 μ V to 200 mV	0.60 %		
	200 mV to 3 V	0.070 %		
	10 MHz to 50 MHz:			
	50 μ V to 200 mV	0.62 %		
	200 mV to 3 V	0.15 %		
	50 MHz to 100 MHz:			
	50 μ V to 200 mV	0.62 %		
	200 mV to 3 V	0.15 %		
100 MHz to 200 MHz:				
50 μ V to 200 mV	0.62 %			
200 mV to 3 V	0.24 %			
200 MHz to 1000 MHz:				
50 μ V to 200 mV	0.63 %			
200 mV to 3 V	0.25 %			



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code							
Calibration of thermal voltage converters (TVCs)											
Frequency MHz	CMCs stated as % of RF - DC Difference for the following TVC nominal ratings <i>TVCs are normally calibrated at 90 % to 95 % of their nominal voltage rating, to a maximum of 50 V</i>										
	0.5 V	1 V	2 V	3 V	5 V	10 V	20 V	30 V	50 V	60 V	100 V
0.1 to 1	0.068	0.068	0.068	0.068	0.068	0.074	0.074	0.079	0.079	0.084	0.084
1 to 10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12
10 to 50	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.19	0.19
50 to 100	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
100 to 200	0.38	0.38	0.38	0.38	0.38	0.40	0.40	0.41	0.41	0.42	0.42
200 to 1000	0.55	0.55	0.55	0.55	0.55	0.57	0.57	0.59	0.59	0.61	0.61
RF Calibration Factor (coaxial line)	10 µW to 100 µW 100 kHz to 5 GHz 5 GHz to 8 GHz		0.60% to 1.0 % 1.0 % to 1.3 %		For the calibration of 50 Ω coaxial power sensors.						
	100 µW to 10 mW 100 kHz to 500 MHz 500 MHz to 2 GHz 2 GHz to 5 GHz 5 GHz to 7 GHz 7 GHz to 8 GHz		0.42 % 0.52 % to 0.63 % 0.63 % to 0.73 % 0.75 % 0.78 %								
	1 mW to 10 mW 8.2 GHz to 12.4 GHz 12.4 GHz to 18 GHz 18.0 GHz to 26.5 GHz 26.5 GHz to 40 GHz		0.98 % 0.98 % 1.5 % 2.4 %								
(Waveguide)	1 mW to 10 mW 2.6 GHz to 3.95 GHz		1.1 %		Waveguide No 10 (WR 284, RG 48/U, R32).						
	3.95 GHz to 5.85 GHz		1.1 %		Waveguide No 12 (WR 187, RG 49/U, R48).						
	5.85 GHz to 8.2 GHz		1.1 %		Waveguide No 14 (WR 137, RG 50/U, R70).						
	8.2 GHz to 12.4 GHz		0.88 %		Waveguide No 16 (WR 90, RG 52/U, R100).						
	12.4 GHz to 18.0 GHz		0.88 %		Waveguide No 18 (WR 62, RG 91/U, R140).						
	10 mW to 10 W 2.6 GHz to 18 GHz		1.1 % to 1.5 %		Waveguide sizes 10 to 18.						

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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
RF POWER (continued) (Waveguide)	1 mW to 1 W 18 GHz to 26.5 GHz	1.3 %	Waveguide No 20 (WR 42, RG 53/U, R220). Waveguide No 22 (WR 28, RG 96/U, R320).	Yateley
	26.5 GHz to 40 GHz	1.5 %		
	10 µW 3.95 GHz to 5.85 GHz	1.3 %	Waveguide No 12	
	5.85 GHz to 8.2 GHz	1.3 %	Waveguide No 14	
	8.2 GHz to 12.4 GHz	1.3 %	Waveguide No 16	
	12.4 GHz to 18 GHz	1.4 %	Waveguide No 18	
	18 GHz to 26.5 GHz	2.0 %	Waveguide No 20	
	26.5 GHz to 40 GHz	2.5 %	Waveguide No 22	
Calibration Factor 75 Ω sensors	100 kHz to 200 kHz	1.3 %	Nominal level 0 dBm to +10 dBm.	
	200 kHz to 1 MHz	0.81 %		
	1 MHz to 50 MHz	0.81 %		
	50 MHz to 100 MHz	0.81 %		
	100 MHz to 500 MHz	0.93 %		
	500 MHz to 1 GHz	0.92 %		
	1 GHz to 2 GHz	1.4 %		
	2 GHz to 3 GHz	1.6 %		
RF POWER (millimetric system)				
Effective Efficiency and Calibration Factor	1 mW to 10 mW 60 GHz, 62 GHz and 64 GHz	2.1 % (effective efficiency) 2.2 % (calibration factor)		
	75 GHz, 77 GHz, 80 GHz, 83 GHz, 85 GHz, 87 GHz, 90 GHz, 92 GHz, 94 GHz, 97 GHz, 100 GHz, 103 GHz, 108 GHz and 110 GHz	3.7 % (effective efficiency) 3.8 % (calibration factor)		
DC POWER	1 mW to 10 W	0.050 %	In support of RF power measurements.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
NOISE TEMPERATURE Excess Noise Ratio (ENR) of a noise source over that of a source at 290 K.	13 dB to 17 dB 10 MHz to 30 MHz 30 MHz to 4 GHz 4 GHz to 10 GHz 10 GHz to 15 GHz 15 GHz to 18 GHz 18 GHz to 26.5 GHz	0.12 dB 0.10 dB 0.12 dB 0.15 dB 0.16 dB 0.12 dB	APC7, Type N and APC3.5 connectors (APC7 only above 18 GHz) Other connectors (including those to waveguide systems) can be accommodated but with increased uncertainty. ENR values larger or smaller can be accommodated but with increased uncertainty. The uncertainty applies to the measurement of a noise source with a source VRC not greater than 0.01, the uncertainty may increase for noise sources of higher VRC.	Yateley



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
RF COMMUNICATIONS AREA				
WATTMETER CALIBRATION SYSTEM	3 MHz to 25 MHz 1 W to 1000 W	3.5 %		Yateley
	50 MHz to 60 MHz 0.1 W to 100 W	3.5 %		
	70 MHz to 1000 MHz 0.1 W to 100 W	3.0 %		
FREQUENCY MODULATION	FM deviation 50 Hz to 1 MHz	0.50 %	For carrier frequencies between 50 kHz and 1 GHz and modulation frequencies between 50 Hz and 200 kHz.	
	FM deviation 50 Hz to 1 MHz	1.0 %	For carrier frequencies between 1 GHz and 18 GHz and modulation frequencies between 50 Hz and 200 kHz.	
AMPLITUDE MODULATION	Modulation index 0.01 to 0.15 0.15 to 0.50 0.50 to 0.995	3.0 % 1.0 % 0.50 %	For carrier frequencies between 10 kHz and 1250 MHz and modulation frequencies between 50 Hz and 1 MHz.	
CALIBRATION OF SIGNAL SOURCES			System input VSWR < 1.09:1 up to 1.5 GHz and < 1.2:1 from 1.5 GHz to 18 GHz.	
RF POWER	3.16 μ W to 100 mW 100 kHz to 300 kHz 300 kHz to 1 MHz 1 MHz to 2 GHz 2 GHz to 18 GHz	0.27 dB 0.17 dB 0.13 dB 0.27 dB	For 50 Ω Type N connectors. If other types are used the uncertainty may be increased.	
FREQUENCY	0.01 Hz to 10 Hz 10 Hz to 10 MHz 10 MHz to 100 MHz 100 MHz to 1 GHz 1 GHz to 26.5 GHz	1.0 in $10^8 + 10 \mu$ Hz 1.0 Hz 1.0 in $10^9 + 15 \mu$ Hz 10 mHz 100 mHz	Frequency measurement and generation capability.	
	100 kHz to 1 MHz 1 MHz to 10 MHz At 10 MHz	5.0 in 10^9 5.0 in 10^{10} 5.0 in 10^{11}	Frequency measurement capability only.	



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RF ATTENUATION	2.5 MHz to 1.3 GHz: 6 dBm to ≥ -34 dBm 6 dBm to (< -34 dBm, ≥ -54 dBm) 6 dBm to (< -54 dBm, ≥ -104 dBm) 6 dBm to (< -104 dBm, ≥ -120 dBm)	0.060 dB 0.080 dB 0.12 dB 0.15 dB		Yateley
AMPLITUDE MODULATION	150 kHz to 1.3 GHz, 0 % to 5 % 150 kHz to 10 MHz, 5 % to 40 % 10 MHz to 1.3 GHz, 5 % to 40 % 150 kHz to 10 MHz, 40 % to 99 % 10 MHz to 1.3 GHz, 40 % to 99 % 1.3 GHz to 26.5 GHz, 5 % to 40 % 1.3 GHz to 26.5 GHz, 5 % to 40 %	3.0 % + 0.010 % AM 2.0 % + 0.010 % AM 1.0 % + 0.010 % AM 2.0 % + 0.10 % AM 1.0 % + 0.10 % AM 1.5 % + 0.010 % AM 1.5 % + 0.10 % AM	Modulation frequency between 50 Hz and 50 kHz.	
Modulation index	0.001 to 0.95	5.0 %	For carrier frequencies between 1 MHz and 1 GHz and modulation frequencies between 50 Hz and 20 kHz.	
FREQUENCY MODULATION	250 kHz to 10 MHz, 0 Hz to 4 kHz 10 MHz to 1.3 GHz, 0 Hz to 4 kHz 250 kHz to 10 MHz, 4 kHz to 40 kHz 10 MHz to 1.3 GHz, 4 kHz to 40 kHz 10 MHz to 1.3 GHz, 40 kHz to 400 kHz 1.3 GHz to 26.5 GHz, 0 Hz to 4 kHz 1.3 GHz to 26.5 GHz, 4 kHz to 40 kHz 1.3 GHz to 26.5 GHz, 40 kHz to 400 kHz	2.0 % + 0.0010 kHz 1.0 % + 0.0010 kHz 2.0 % + 0.010 kHz 1.0 % + 0.010 kHz 1.0 % + 0.10 kHz 1.0 % + 0.0010 kHz 1.0 % + 1.010 kHz 1.0 % + 0.10 kHz	Modulation frequency between 50 Hz and 50 kHz.	
Frequency deviation	50 Hz to 400 kHz	2.0 %	For carrier frequencies between 1 MHz and 1 GHz and modulation frequencies between 50 Hz and 20 kHz.	
AC VOLTAGE	0.1 V to 30 V 50 Hz to 20 kHz	0.20 %		
SINAD (Signal to Noise And Distortion)	Fundamentals in the range of 100 Hz to 100 kHz, up to 7 V RMS	2.2 % or 0.19 dB		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code	
AUTOMATIC NETWORK ANALYSER SYSTEMS					
VOLTAGE TRANSMISSION COEFFICIENT MAGNITUDE					
The uncertainties are for 50Ω Systems fitted with GR900, Type N, TNC, 7 mm, 3.5 mm, SMA, 2.92 mm, Type K or 2.4 mm connectors over their defined frequency ranges. The uncertainties apply to devices with input and output VRC not exceeding 0.01, the uncertainty quoted on certificates may be increased for devices with larger input or output matches. The uncertainties below for the 8753 and 8510 ANAs represent the minimum and maximum values obtained from two separate systems in each case.					
8751 ANA	0dB to 25dB	25dB to 45dB	45dB to 65dB	65dB to 85dB	85dB to 100dB
0.1 to 0.3 MHz	0.024 to 0.041	0.041 to 0.064	0.064 to 0.11	0.11 to 0.69	0.57 to 3.38
0.3 to 50 MHz	0.024 to 0.041	0.041 to 0.064	0.064 to 0.11	0.11 to 0.79	0.57 to 3.36
50 to 500 MHz	0.024 to 0.041	0.041 to 0.064	0.064 to 0.11	0.11 to 0.79	0.57 to 3.36
8753 ANA	0dB to 25dB	25dB to 45dB	45dB to 65dB	65dB to 85dB	85dB to 100dB
0.3 to 1 GHz	0.024 to 0.025	0.025 to 0.028	0.027 to 0.110	0.064 to 0.60	0.56 to 2.96
1 to 2 GHz	0.024 to 0.027	0.025 to 0.030	0.027 to 0.122	0.065 to 0.63	0.57 to 2.99
2 to 3 GHz	0.024 to 0.029	0.026 to 0.031	0.029 to 0.201	0.068 to 0.66	0.57 to 3.27
8510 ANA	0dB to 25dB	25dB to 45dB	45dB to 65dB	65dB to 85dB	85dB to 90dB
0.05 to 2 GHz	0.024 to 0.028	0.027 to 0.035	0.035 to 0.075	0.057 to 0.59	0.37 to 1.06
2 to 10 GHz	0.024 to 0.028	0.028 to 0.037	0.035 to 0.110	0.070 to 0.98	0.50 to 1.68
10 to 18 GHz	0.036 to 0.040	0.038 to 0.046	0.045 to 0.122	0.120 to 1.07	0.87 to 1.84
18 to 20 GHz	0.037 to 0.040	0.039 to 0.049	0.046 to 0.201	0.130 to 1.50	1.09 to 2.75
20 to 26.5 GHz	0.038 to 0.041	0.040 to 0.059	0.055 to 0.360	0.330 to 3.00	2.84 to 5.01
26.5 to 40 GHz	0.049 to 0.057	0.051 to 0.085	0.068 to 0.490	0.410 to 4.34	3.43 to 7.32
Reflection for waveguide systems					
8510C ANA	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0
WG10 (2.6 GHz to 3.95 GHz)	0.013 to 0.015	0.013 to 0.015	0.013 to 0.015	0.014 to 0.019	0.019 to 0.029
WG12 (3.95 GHz to 5.85 GHz)	0.010	0.010	0.010	0.01 to 0.013	0.013 to 0.02
WG14 (5.8 GHz to 8.2 GHz)	0.010	0.010	0.01	0.010	0.01 to 0.012
WG15 (7.0 GHz to 10.0 GHz)	0.010	0.010	0.010	0.010	0.01 to 0.012
WG16 (8.2 GHz to 12.4 GHz)	0.012	0.012	0.012	0.012 to 0.018	0.015 to 0.022
WG18 (12.4 GHz to 18 GHz)	0.012	0.012	0.012 to 0.013	0.013 to 0.019	0.019 to 0.029
WG20 (18 GHz to 26.5 GHz)	0.010	0.010	0.01 to 0.014	0.014 to 0.023	0.023 to 0.036
WG22 (26.5 GHz to 40 GHz)	0.010	0.010	0.010	0.010	0.01 to 0.015
Transmission for Waveguide Systems					
8510C ANA	0 dB to 25 dB	25 dB to 45 dB	45 dB to 65 dB	65 dB to 85 dB	85 dB to 90 dB
WG10 (2.6 GHz to 3.95 GHz)	0.020 to 0.030	0.030 to 0.040	0.040 to 0.090	0.090 to 0.72	0.69 to 1.25
WG12 (3.95 GHz to 5.85 GHz)	0.020 to 0.030	0.030 to 0.040	0.040 to 0.090	0.090 to 0.72	0.69 to 1.25
WG14 (5.8 GHz to 8.2 GHz)	0.020 to 0.030	0.030 to 0.040	0.040 to 0.090	0.090 to 0.72	0.69 to 1.25
WG15 (7.0 GHz to 10.0 GHz)	0.020 to 0.030	0.030 to 0.040	0.040 to 0.090	0.090 to 0.72	0.69 to 1.25
WG16 (8.2 GHz to 10.0 GHz)	0.020 to 0.030	0.030 to 0.040	0.030 to 0.090	0.090 to 0.72	0.72 to 1.25
WG16 (10 GHz to 12.4 GHz)	0.020 to 0.030	0.030 to 0.040	0.040 to 0.090	0.090 to 0.85	0.85 to 1.44
WG18 (12.4 GHz to 18 GHz)	0.020 to 0.040	0.030 to 0.040	0.040 to 0.10	0.090 to 0.85	0.85 to 1.44
WG20 (18 GHz to 26.5 GHz)	0.030	0.030 to 0.050	0.060 to 0.40	0.40 to 3.44	3.44 to 5.51
WG22 (26.5 GHz to 40 GHz)	0.030 to 0.040	0.030 to 0.070	0.060 to 0.49	0.47 to 4.34	4.34 to 7.32

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Transmission Phase (-180° to +180°)	0.1 MHz to 8 GHz <i>0 dB to 50 dB</i>	0.50°	For coaxial 50Ω systems fitted with: GR900 connectors.	Yateley
	0.1 MHz to 18 GHz <i>0 dB to 50 dB</i>	0.50°	7 mm connectors.	
	0.1 MHz to 18 GHz <i>0 dB to 20 dB</i> <i>20 dB to 50 dB</i>	0.50° 1.0°	Type N connectors.	
	8 GHz to 18 GHz <i>20 dB to 50 dB</i>	2.0°		
	0.1 MHz to 26.5 GHz <i>0 dB to 20 dB</i>	0.50°	3.5 mm connectors.	
	0.1 MHz to 8 GHz <i>20 dB to 40 dB</i> <i>40 dB to 50 dB</i>	0.50° 1.0°		
	8 GHz to 26.5 GHz <i>40 dB to 50 dB</i>	2.0°		



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AUTOMATIC NETWORK ANALYSER SYSTEMS (continued)						
Transmission Phase (-180° to +180°) (continued)	0.1 MHz to 40 GHz 0 dB to 20 dB 20 dB to 40 dB 40 dB to 50 dB	1.0° 2.0° 10°	For coaxial 50Ω systems fitted with: 2.92 mm, Type K and 2.4 mm connectors.	Yateley		
VOLTAGE REFLECTION COEFFICIENT (Real, imaginary and magnitude) The uncertainties are for one port devices and may be higher for multi-port devices. 50Ω connectors other than those specified below can be measured but the uncertainties may be increased. The CMCs below represent the maximum and minimum values obtained from both S_{12} and S_{21} measurements and in the case of the 8753 and 8510 ANAs from two separate systems in each case. The ranges and uncertainties are shown in VRC terms.						
8751 ANA	For 50 Ω coaxial systems fitted with GR900 (14 mm) or 7 mm connectors.					
	0 to 0.2	0.2 to 0.4	0.4 to 0.6		0.6 to 0.8	0.8 to 1.0
0.1 to 500 MHz	0.005	0.006	0.006 to 0.008		0.008 to 0.012	0.012 to 0.016
8751 ANA	For 50 Ω coaxial systems fitted with Type N, 3.5 mm, 2.92 mm or 2.4 mm connectors					
	0 to 0.2	0.2 to 0.4	0.4 to 0.6		0.6 to 0.8	0.8 to 1.0
0.1 to 500 MHz	0.007	0.007 to 0.009	0.009 to 0.012		0.012 to 0.019	0.019 to 0.027
8753 ANA	For 50 Ω coaxial systems fitted with GR900 (14 mm) connectors					
	0 to 0.2	0.2 to 0.4	0.4 to 0.6		0.6 to 0.8	0.8 to 1.0
0.3 to 500 MHz	0.005 to 0.006	0.006	0.006 to 0.007	0.006 to 0.008	0.006 to 0.010	
0.5 to 1.5 GHz	0.004 to 0.010	0.005 to 0.010	0.006 to 0.010	0.006 to 0.015	0.006 to 0.022	
1.5 to 2.0 GHz	0.006 to 0.010	0.006 to 0.010	0.007 to 0.013	0.008 to 0.019	0.011 to 0.029	
2.0 to 3.0 GHz	0.006 to 0.011	0.006 to 0.011	0.007 to 0.015	0.008 to 0.024	0.011 to 0.036	
8753 ANA	For 50Ω coaxial systems fitted with 7 mm and Type N connectors					
	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0	
0.3 to 3.0 GHz	0.005 to 0.007	0.006 to 0.008	0.006 to 0.009	0.006 to 0.010	0.008 to 0.012	



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AUTOMATIC NETWORK ANALYSER SYSTEMS (continued)					
VOLTAGE REFLECTION COEFFICIENT (continued) (Real, imaginary and magnitude)					
8753 ANA	For 50 Ω coaxial systems fitted with 3.5 mm connectors				
	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0
0.3 to 400 MHz	0.007	0.007 to 0.008	0.008 to 0.009	0.009 to 0.011	0.011 to 0.013
0.4 to 2.6 GHz	0.007 to 0.008	0.007 to 0.008	0.008 to 0.009	0.008 to 0.011	0.010 to 0.013
2.6 to 3.0 GHz	0.008	0.008	0.008 to 0.009	0.008 to 0.010	0.010 to 0.013
8753 ANA	For 50 Ω coaxial systems fitted with 2.92 mm and 2.4 mm connectors				
	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0
0.3 to 3000 MHz	0.014 to 0.015	0.015	0.015 to 0.018	0.017 to 0.021	0.021 to 0.027
8510 ANA	For 50 Ω coaxial systems fitted with GR900 (14 mm) connectors				
	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0
0.05 to 0.5 GHz	0.007	0.007	0.007	0.007 to 0.008	0.008 to 0.009
0.5 to 2 GHz	0.007 to 0.013	0.007 to 0.011	0.007 to 0.017	0.007 to 0.028	0.008 to 0.043
2 to 5.5 GHz	0.009 to 0.024	0.009 to 0.021	0.008 to 0.037	0.008 to 0.064	0.008 to 0.100
5.5 to 8 GHz	0.015 to 0.024	0.015 to 0.024	0.016 to 0.039	0.016 to 0.064	0.020 to 0.100
8510 ANA	For 50 Ω coaxial systems fitted with 7 mm connectors				
	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0
0.05 to 0.5 GHz	0.007	0.007	0.007	0.007 to 0.008	0.008 to 0.010
0.5 to 2.5 GHz	0.005 to 0.008	0.005 to 0.007	0.005 to 0.007	0.005 to 0.010	0.006 to 0.015
2.5 to 4 GHz	0.006 to 0.007	0.005 to 0.006	0.005 to 0.006	0.005 to 0.010	0.006 to 0.015
4 to 8 GHz	0.005 to 0.009	0.005 to 0.006	0.005 to 0.006	0.005 to 0.014	0.007 to 0.022
8 to 10.5 GHz	0.006 to 0.010	0.006 to 0.007	0.006 to 0.008	0.007 to 0.024	0.007 to 0.037
10.5 to 14.5 GHz	0.008 to 0.013	0.007 to 0.008	0.008	0.010 to 0.028	0.014 to 0.043
14.5 to 18 GHz	0.008 to 0.013	0.008	0.008	0.010 to 0.037	0.014 to 0.057

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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code	
AUTOMATIC NETWORK ANALYSER SYSTEMS (continued)					
VOLTAGE REFLECTION COEFFICIENT (continued) (Real, imaginary and magnitude)					
8510 ANA	For 50 Ω coaxial systems fitted with Type N connectors				
	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0
0.05 to 0.1 GHz	0.007	0.007	0.007	0.006 to 0.009	0.007 to 0.011
0.1 to 3.0 GHz	0.005 to 0.007	0.005 to 0.007	0.005 to 0.008	0.005 to 0.009	0.006 to 0.011
3.0 to 8.5 GHz	0.006 to 0.010	0.005 to 0.010	0.005 to 0.009	0.005 to 0.011	0.006 to 0.015
8.5 to 11.5 GHz	0.007 to 0.010	0.007 to 0.010	0.007 to 0.010	0.007 to 0.015	0.007 to 0.022
11.5 to 15.5 GHz	0.009 to 0.014	0.008 to 0.014	0.008 to 0.016	0.008 to 0.024	0.010 to 0.036
15.5 to 18.0 GHz	0.009 to 0.014	0.009 to 0.014	0.009 to 0.016	0.010 to 0.024	0.014 to 0.036
8510 ANA	For 50 Ω coaxial systems fitted with 3.5 mm connectors				
	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0
0.05 to 0.5 GHz	0.007	0.007	0.007	0.007 to 0.008	0.008 to 0.009
0.5 to 2.5 GHz	0.007 to 0.009	0.007 to 0.009	0.007 to 0.008	0.007 to 0.008	0.007 to 0.009
2.5 to 4.5 GHz	0.009 to 0.010	0.008 to 0.010	0.007 to 0.009	0.007 to 0.008	0.007 to 0.010
4.5 to 7.0 GHz	0.008 to 0.010	0.008 to 0.009	0.007 to 0.009	0.006 to 0.008	0.007 to 0.010
7.0 to 8.0 GHz	0.009 to 0.011	0.008 to 0.011	0.007 to 0.010	0.007 to 0.008	0.007 to 0.011
8.0 to 11.0 GHz	0.010 to 0.018	0.009 to 0.018	0.008 to 0.016	0.007 to 0.014	0.007 to 0.018
11 to 17.0 GHz	0.011 to 0.019	0.010 to 0.018	0.009 to 0.016	0.008 to 0.014	0.008 to 0.019
17 to 21.0 GHz	0.012 to 0.032	0.011 to 0.031	0.010 to 0.028	0.009 to 0.024	0.009 to 0.032
21 to 26.5 GHz	0.021 to 0.041	0.019 to 0.039	0.016 to 0.035	0.016 to 0.030	0.016 to 0.041
8510 ANA	For 50 Ω coaxial systems fitted with 2.92 mm connectors				
	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0
0.05 to 1.5 GHz	0.015	0.015 to 0.019	0.016 to 0.030	0.018 to 0.048	0.024 to 0.073
1.5 to 12 GHz	0.015 to 0.030	0.015 to 0.029	0.016 to 0.033	0.016 to 0.048	0.020 to 0.073
12 to 20 GHz	0.019 to 0.031	0.018 to 0.030	0.017 to 0.033	0.017 to 0.048	0.021 to 0.072
20 to 32 GHz	0.020 to 0.035	0.018 to 0.034	0.017 to 0.035	0.017 to 0.048	0.021 to 0.072
32 to 37 GHz	0.026 to 0.036	0.023 to 0.035	0.021 to 0.035	0.021 to 0.048	0.022 to 0.072
37 to 40 GHz	0.026 to 0.036	0.023 to 0.035	0.021 to 0.035	0.021 to 0.048	0.023 to 0.072

Location
Code

Yateley



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code	
AUTOMATIC NETWORK ANALYSER SYSTEMS (continued)					
VOLTAGE REFLECTION COEFFICIENT (continued) (Real, imaginary and magnitude)					
8510 ANA	For 50 Ω coaxial systems fitted with 2.4 mm connectors				
	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1.0
0.05 to 1.5 GHz	0.008	0.008 to 0.009	0.009 to 0.010	0.010 to 0.012	0.012 to 0.017
1.5 to 5 GHz	0.008 to 0.013	0.008 to 0.013	0.009 to 0.012	0.010 to 0.013	0.012 to 0.018
5.0 to 10 GHz	0.013 to 0.015	0.012 to 0.015	0.011 to 0.013	0.011 to 0.014	0.013 to 0.019
10 to 16 GHz	0.013 to 0.016	0.012 to 0.016	0.011 to 0.015	0.011 to 0.021	0.013 to 0.031
16 to 29 GHz	0.016 to 0.033	0.015 to 0.032	0.015 to 0.029	0.015 to 0.025	0.021 to 0.033
29 to 40 GHz	0.019 to 0.041	0.018 to 0.039	0.017 to 0.035	0.018 to 0.029	0.023 to 0.035
Voltage Reflection Coefficient (Phase)	-180° to +180° 0.1 MHz to 40 GHz	$(0.5^2 + (0.05 \times f_{\text{GHz}})^2 + (3 \times U(\text{rp}))^2)^{0.5}$ $(0.5^2 + (0.05 \times f_{\text{GHz}})^2 + (U(\text{rp}))^2)^{0.5}$ where: $U(\text{rp}) = \frac{\sin^{-1}(U(\text{vrc}))}{\text{VRC}(\text{Mag})}$ If VRC(real) or VRC(imag) < U(vrc), then U(reflection phase) = 180°	For coaxial 50Ω systems fitted with Type N connectors. For coaxial 50Ω systems fitted with 7 mm, 3.5 mm, 2.92 mm, Type K and 2.4 mm connectors. U(vrc) is the CMC for the corresponding values of reflection coefficient magnitude presented in the previous tables.	Yateley	
RF POWER (Generation)	-50 dBm to -20 dBm 10 MHz to 50 MHz 50 MHz to 1 GHz 1 GHz to 5 GHz 5 GHz to 10 GHz 10 GHz to 15 GHz 15 GHz to 18 GHz -20 dBm to +16 dBm 10 MHz to 50 MHz 50 MHz to 1 GHz 1 GHz to 5 GHz 5 GHz to 10 GHz 10 GHz to 15 GHz 15 GHz to 18 GHz	1.1 % 1.0 % 1.5 % 1.8 % 2.1 % 2.2 % 1.1 % 1.0 % 1.4 % 1.6 % 1.7 % 1.8 %	These uncertainties are for devices fitted with Type N connectors with a VSWR not exceeding 1.02. The uncertainty will be increased if the device under test has a higher VSWR or is fitted with a different connector type.		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
CALIBRATION FACTOR				Yateley
Nominal power level 0 dBm	10 MHz to 50 MHz 50 MHz to 1 GHz 1 GHz to 5 GHz 5 GHz to 10 GHz 10 GHz to 15 GHz 15 GHz to 18 GHz	0.70 % 0.60 % 1.2 % 1.4 % 1.5 % 1.6 %	These CMCs are for power sensors fitted with Type N connectors in good condition and with a VSWR not exceeding 1.02. The uncertainty will be increased for sensors with a higher VSWR or which is fitted with a different connector type.	
Nominal power level -30 dBm	10 MHz to 50 MHz 50 MHz to 1 GHz 1 GHz to 5 GHz 5 GHz to 10 GHz 10 GHz to 15 GHz 15 GHz to 18 GHz	0.80 % 0.60 % 1.3 % 1.6 % 2.0 % 2.2 %		
AMPLITUDE MODULATION			The uncertainties apply to modulating sinewaves with less than 2% distortion. The uncertainty will be increased for greater levels of distortion.	
(Modulation Factor)	0.05 to 0.50 Carrier 10.7 MHz Modulation 1 kHz	0.0070		
	0.50 to 0.95 Carrier 10.7 MHz Modulation 1 kHz 5 kHz to 40 kHz Carrier 10.7 MHz, 21.4 MHz and 42.8 MHz Modulation 1 kHz	0.013 0.70		
FREQUENCY MODULATION				
(Carrier Deviation)	40 kHz to 500 kHz Carrier 10.7 MHz, 21.4 MHz and 42.8 MHz Modulation 1 kHz	2.5 %		
SPECTRUM ANALYSER CALIBRATION				
Frequency response	500 Hz to 3 GHz 3 GHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 26.5 GHz 26.5 GHz to 40 GHz	0.14 dB 0.31 dB 0.40 dB 0.50 dB 0.86 dB		
Scale linearity	500 Hz to 40 GHz	0.15 dB		



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SPECTRUM ANALYSER CALIBRATION (continued)					
Input level IF Gain and Attenuator accuracy	<i>500 Hz to 40 GHz fundamental</i> 0 dBm to -30 dBm -30 dBm to -80 dBm -80 dBm to -100 dBm -00 dBm to -110 dBm -110 dBm to -120 dBm	0.060 dB 0.10 dB 0.15 dB 0.25 dB 0.60 dB		Yateley	
Displayed average noise level	500 Hz to 18 GHz 500 Hz to 40 GHz	0.30 dB 0.30 dB	Type N VSWR < 1.25 Type K VSWR < 2.0		
Resolution Bandwidth	50 MHz to 300 MHz	0.59 %			
Reference output	<i>50 MHz to 300 MHz</i> -20 dBm	0.050 dB			
OSCILLOSCOPE CALIBRATION SYSTEM					
Vertical Deflection Accuracy	6 mV to 60 mV 60 mV to 200 V	1.0 % 0.50 %	Calibration of vertical deflection coefficients using 1 kHz chopped DC.		
DC Levels	60 mV to 30 mV 30 mV to 200 V	1.0 % 0.50 %	Calibration of vertical deflection coefficients using DC levels.		
Cursor Accuracies	6 mV to 60 mV 60 mV to 600 mV 600 mV to 12 V 12 V to 200 V	1.0 % 0.5 % 0.15 % 0.10 %	Calibration of vertical deflection coefficients using 1 kHz chopped DC based on a 12 bit resolution.		
DC Levels	6 mV to 12 mV 12 mV to 30 mV 30 mV to 60 mV 60 mV to 120 mV 120 mV to 200 V	1.0 % 0.50 % 0.20 % 0.15 % 0.10 %	Calibration of vertical deflection coefficients using DC levels based on a 12 bit resolution.		
DC Resistance Measurement	10 Ω to 100 Ω 100 Ω to 150 Ω 50 k Ω to 800 k Ω 800 k Ω to 1.2 M Ω 1.2 M Ω to 12 M Ω	0.050 % 0.60 % 0.60 % 0.20 % 0.60 %	Input resistance measurement.		



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OSCILLOSCOPE CALIBRATION SYSTEM (continued)				
RF Voltage	0.3 V to 3 V peak to peak 100 MHz to 100 MHz 100 MHz to 550 MHz 500 MHz to 1.1 GHz	3.5 % 4.5 % 5.5 %	Uncertainties are for RF voltage developed across a perfectly matched 50 Ω coaxial line system relative to a reference voltage level at 50 kHz in the same system. Uncertainties include those associated with the visual display of voltage levels.	Yateley
Bandwidth	100 MHz to 100 MHz 100 MHz to 550 MHz 500 MHz to 1.1 GHz	level: 3.5 % level: 4.5 % level: 5.5 %	The uncertainty quoted on a calibration certificate will be in terms of frequency, based on the relationship between level and frequency at the -3 dB point for the system under calibration.	
Risetime Measurement	150 ps to 300 ps 300 ps to 600 ps >600 ps	+15 ps, -12 ps 7.5 % 2.0 %	Measurement of fast risetime square waves.	
Risetime Generation	21 ps to 35 ps 35 ps to 150 ps 150 ps to 300 ps 300 ps to 600 ps >600 ps	+7.0 ps, -11 ps +7.0 ps, -7 ps +14 ps, -14 ps 7.5 % 2.0 %	Generation of fast risetime square waves for calibration of amplifiers or mainframes.	
Timebase Sweep Rate	0.4 ns to 1 ns 1 ns to 50 s	0.50 % 0.25 %	Calibration of timebase sweep rates.	
DC Voltage Measurement	1 mV 2 mV 5 mV 10 mV 20 mV 50 mV 100 mV to 200 V	2.5 % 1.5 % 0.50 % 0.30 % 0.15 % 0.070 % 0.050 %	Calibration of DC voltage reference. Includes uncertainty of measurement for stability and reset ability checks.	
Period Measurement	1 ns to 50 ms 0.1 s to 5 s	0.10 μ s/s + 0.10 ps 0.010 %	Calibration of time mark generators. The following additional characteristics can be measured:	
			Delay between channels (s) Comparator voltage (V) Horizontal amplifier sensitivity (V/Div) Delay time multiplier (Ratio : 1) Trigger sensitivity Internal (Div) External (V) Common mode rejection (Ratio :1)	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
OSCILLOSCOPE CALIBRATION SYSTEM (continued)				Manchester, Yateley, Donibristle and Stevenage
Automated and 9500 System				
Square Wave	35 μ V to 1mV 1 mV to 21 mV 21 mV to 0.556 V 0.556 V to 210 V	1.0 % + 10 μ V 0.10 % + 15 μ V 0.10 % + 1.0 μ V 0.05 % + 1.0 μ V	Applicable mainly to analogue oscilloscopes.	
DC Levels	888 μ V to 220 V	0.025 % + 25 μ V	Applicable mainly to digital oscilloscopes for the calibration of the following functions given in typical oscilloscope manuals.	
Cursor Accuracy Reported as absolute or Relative DC values	6 mV to 60 mV 60 mV to 600 mV 600 mV to 12 V 12 V to 200V	1.0 % 0.50 % 0.15 % 0.10 %	DC Balance Accuracy, Voltage Gain Accuracy, DC Offset Accuracy, Voltage Measurement Accuracy, Vertical Position Accuracy, Ground Line Accuracy	
DC Resistance	10 Ω to 150 Ω 40 Ω to 90 Ω 50 k Ω to 12 M Ω 800 k Ω to 1.2 M Ω	0.50 % 0.10 % 0.50 % 0.10 %	Input Resistance Measurement.	
Capacitance	1 pF to 35 pF 35 pF to 95 pF	2.0 % + 0.25 pF 3.0 % + 0.25 pF		
Sine Wave Voltage Peak to Peak	4 mV to 5 V 50 kHz to 10 MHz 100 MHz to 550 MHz 550 MHz to 1.1 GHz 1.1 GHz to 3.2 GHz	1.5 % 3.0 % 4.0 % 5.2 %	Uncertainties are for oscilloscope input VSWR not exceeding 1.6:1 in a 50 Ω system, relative to a reference voltage level at 50 kHz in the same system.	
Rise / Fall Time	200 ps to 220 ps 220 ps to 250 ps 250 ps to 300 ps 300 ps to 400 ps 400 ps to 500 ps 500 ps to 700 ps 700 ps to 1000 ps	+25 ps, -36 ps +21 ps, -28 ps +17 ps, -22 ps +14 ps, -17 ps +10 ps, -12 ps +8.0 ps, -9.0 ps +5.0 ps, -6.0 ps		
Time Marker Period	450 ps to 55 s	10 μ s/s		
Probe Compensation	100 mV to 5 V	0.30 %		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL				Manchester, Yateley
Temperature indicators and simulators: Calibration by electrical simulation			Including cold junction compensation	
Type K	-200 °C to -100 °C -100 °C to -25 °C -25 °C to +120 °C 120 °C to 1000 °C 1000 °C to 1372 °C	0.41 °C 0.25 °C 0.21 °C 0.32 °C 0.50 °C		
Type J	-210 °C to -100 °C -100 °C to -30 °C -30 °C to +150 °C 150 °C to 760 °C 760 °C to 1200 °C	0.33 °C 0.21 °C 0.19 °C 0.22 °C 0.28 °C		
Type T	-250 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C	0.73 °C 0.30 °C 0.21 °C 0.19 °C		
Type R	0 °C to 250 °C 250 °C to 400 °C 400 °C to 1000 °C 1000 °C to 1767 °C	0.70 °C 0.42 °C 0.40 °C 0.54 °C		
Type N	-200 °C to -100 °C -100 °C to -25 °C -25 °C to +120 °C 120 °C to 410 °C 1000 °C to 1300 °C	0.47 °C 0.27 °C 0.24 °C 0.23 °C 0.33 °C		
Type E	-250 °C to -100 °C -100 °C to -25 °C -25 °C to +350 °C 350 °C to 650 °C 659 °C to 1000 °C	0.59 °C 0.21 °C 0.19 °C 0.21 °C 0.26 °C		
Type B	600 °C to 800 °C 800 °C to 1000 °C 1000 °C to 1550 °C 1550 °C to 1820 °C	0.52 °C 0.41 °C 0.36 °C 0.40 °C		
Type C	0 °C to 150 °C 150 °C to 650 °C 650 °C to 1000 °C 1000 °C to 1800 °C 1800 °C to 2316 °C	0.36 °C 0.32 °C 0.59 °C 0.59 °C 1.0 °C		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL (continued)				Manchester, Yateley
Temperature indicators and simulators: Calibration by electrical simulation (continued)				
PRT	-200 °C to -80 °C -80 °C to 0 °C 0 °C to 100 °C 100 °C to 300 °C 300 °C to 400 °C 400 °C to 630 °C 630 °C to 800°C	0.060 °C 0.060 °C 0.11 °C 0.11 °C 0.12 °C 0.14 °C 0.27 °C		Manchester, Yateley, Donibristle and Stevenage
Calibration of 17th Edition Test Equipment				
Continuity	0 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 5 kΩ 5 kΩ to 50 kΩ	0.25 % + 12 mΩ 0.25 % + 120 mΩ 0.25 % + 120 mΩ 0.25 % + 1.2 Ω 0.25 % + 12 Ω		
Continuity Current	0 A to 320 mA	1.3 % + 100 μA		
Insulation	10 kΩ to 5 MΩ 5 MΩ to 100 MΩ 100 MΩ to 2 GΩ 2 GΩ to 10 GΩ	0.10 % + 5.8 kΩ 1.0 % + 5.8 kΩ 1.0 % + 12 kΩ 5.0 % + 12 kΩ		
Insulation test voltage	0 V to 1.1 kV	1.0 % + 810 mV		
Insulation test current	0 A to 2 mA	1.0 % + 8.0 μA		
Voltage 50 Hz	90 V to 420 V	0.20 % + 120 mV		
Loop Impedance	50 Hz 50 mΩ to 1 kΩ	0.50 % + 22 mΩ		
RCD testers				
Current	50 Hz 2 mA to 3 A	1.2 % + 61 μA		
Timing	20 ms to 5 s	730 μs		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
PAT TESTERS				Manchester, Yateley, Donibristle and Stevenage
Earth Bond Resistance	50 mΩ to 10 Ω 10 Ω to 1 kΩ	0.50 % + 4.7 mΩ 0.50 % + 4.6 mΩ		
Earth Bond Current	50 Hz 10 mA to 500 mA 500 mA to 30 A	1.5 % + 6.1 mA 1.5 % + 60 mA		
Load Test	0.13 kVA (nominal 440 Ω)	5.0 %		
Leakage Current	2 mA to 8 mA	1.5 % + 8.4 μA		
Line Voltage	200 V to 260 V	0.80 % + 620 mV		
Flash Voltage	1 kV to 1.8 kV (Class 1) 2 kV to 3.6 kV (Class 2)	4.0 % + 10 V 4.0 % + 10 V		
Flash Current	0 mA to 3 mA	5.0 % + 880 μA		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC/LF AUTOMATED AND MANUAL SYSTEMS FOR GENERATION			Using multifunction calibrator	Donibristle
DC RESISTANCE Generation	1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 k Ω 1.9 k Ω 10 k Ω 1 k Ω 1.9 k Ω 10 k Ω 19 k Ω 100 k Ω 190 k Ω 1 M Ω 1.9 M Ω 10 M Ω 19 M Ω 100 M Ω	95 $\mu\Omega/\Omega$ 95 $\mu\Omega/\Omega$ 23 $\mu\Omega/\Omega$ 23 $\mu\Omega/\Omega$ 11 $\mu\Omega/\Omega$ 11 $\mu\Omega/\Omega$ 8.6 $\mu\Omega/\Omega$ 8.6 $\mu\Omega/\Omega$ 8.6 $\mu\Omega/\Omega$ 8.6 $\mu\Omega/\Omega$ 8.6 $\mu\Omega/\Omega$ 8.6 $\mu\Omega/\Omega$ 8.6 $\mu\Omega/\Omega$ 11 $\mu\Omega/\Omega$ 11 $\mu\Omega/\Omega$ 20 $\mu\Omega/\Omega$ 21 $\mu\Omega/\Omega$ 40 $\mu\Omega/\Omega$ 47 $\mu\Omega/\Omega$ 100 $\mu\Omega/\Omega$		
DC VOLTAGE Generation	0 V to 220 mV 220 mV to 2.2 V 2.2 V to 11 V 11 V to 22 V 22 V to 220 V 220 V to 1100 V	7.6 $\mu\text{V}/\text{V} + 0.46 \mu\text{V}$ 5.1 $\mu\text{V}/\text{V} + 0.70 \mu\text{V}$ 3.6 $\mu\text{V}/\text{V} + 2.5 \mu\text{V}$ 3.6 $\mu\text{V}/\text{V} + 4.0 \mu\text{V}$ 5.1 $\mu\text{V}/\text{V} + 40 \mu\text{V}$ 6.6 $\mu\text{V}/\text{V} + 400 \mu\text{V}$		
DC CURRENT Generation	0 A to 220 μA 220 μA to 2.2 mA 2.2 mA to 22 mA 22 mA to 220 mA 220 mA to 2.2 A 2.2 A to 11 A	41 $\mu\text{A}/\text{A} + 6.0 \text{nA}$ 36 $\mu\text{A}/\text{A} + 7.0 \text{nA}$ 36 $\mu\text{A}/\text{A} + 40 \text{nA}$ 46 $\mu\text{A}/\text{A} + 700 \text{nA}$ 81 $\mu\text{A}/\text{A} + 12 \mu\text{A}$ 280 $\mu\text{A}/\text{A} + 380 \mu\text{A}$		
Simulation	11 A to 550 A	0.30 % + 600 mA	For the calibration of current clamps and similar devices, using a multi-turn coil.	



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AC VOLTAGE Generation	0.1 mV to 2.2 mV			Doniristie
	10 Hz to 20 Hz	750 μ V/V + 4.0 μ V		
	20 Hz to 40 Hz	720 μ V/V + 4.0 μ V		
	40 Hz to 20 kHz	720 μ V/V + 4.0 μ V		
	20 kHz to 50 kHz	750 μ V/V + 4.0 μ V		
	50 kHz to 100 kHz	850 μ V/V + 5.0 μ V		
	100 kHz to 300 kHz	0.13 % + 10 μ V		
	300 kHz to 500 kHz	0.16 % + 20 μ V		
	500 kHz to 1 MHz	0.30 % + 20 μ V		
	2.2 mV to 22 mV			
	10 Hz to 20 Hz	270 μ V/V + 4.0 μ V		
	20 Hz to 40 Hz	140 μ V/V + 4.0 μ V		
	40 Hz to 20 kHz	130 μ V/V + 4.0 μ V		
	20 kHz to 50 kHz	230 μ V/V + 4.0 μ V		
	50 kHz to 100 kHz	520 μ V/V + 5.0 μ V		
	100 kHz to 300 kHz	0.11 % + 10 μ V		
	300 kHz to 500 kHz	0.14 % + 20 μ V		
	500 kHz to 1 MHz	0.28 % + 20 μ V		
	22 mV to 220 mV			
	10 Hz to 20 Hz	250 μ V/V + 12 μ V		
20 Hz to 40 Hz	100 μ V/V + 7.0 μ V			
40 Hz to 20 kHz	90 μ V/V + 7.0 μ V			
20 kHz to 50 kHz	210 μ V/V + 7.0 μ V			
50 kHz to 100 kHz	470 μ V/V + 17 μ V			
100 kHz to 300 kHz	910 μ V/V + 20 μ V			
300 kHz to 500 kHz	0.14 % + 25 μ V			
500 kHz to 1 MHz	0.27 % + 45 μ V			
220 mV to 2.2 V				
10 Hz to 20 Hz	250 μ V/V + 40 μ V			
20 Hz to 40 Hz	100 μ V/V + 15 μ V			
40 Hz to 20 kHz	60 μ V/V + 8.0 μ V			
20 kHz to 50 kHz	85 μ V/V + 10 μ V			
50 kHz to 100 kHz	120 μ V/V + 30 μ V			
100 kHz to 300 kHz	430 μ V/V + 80 μ V			
300 kHz to 500 kHz	0.10 % + 200 μ V			
500 kHz to 1 MHz	0.17 % + 300 μ V			
2.2 V to 22 V				
10 Hz to 20 Hz	250 μ V/V + 400 μ V			
20 Hz to 40 Hz	100 μ V/V + 150 μ V			
40 Hz to 20 kHz	60 μ V/V + 50 μ V			
20 kHz to 50 kHz	85 μ V/V + 100 μ V			
50 kHz to 100 kHz	110 μ V/V + 200 μ V			
100 kHz to 300 kHz	280 μ V/V + 600 μ V			
300 kHz to 500 kHz	0.10 % + 2.0 mV			
500 kHz to 1 MHz	0.15 % + 3.2 mV			



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC VOLTAGE Generation	(continued) 22 V to 220 V 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	250 μ V/V + 4.0 mV 100 μ V/V + 1.5 mV 65 μ V/V + 600 μ V 90 μ V/V + 1.0 mV 160 μ V/V + 2.5 mV		Donbristle
	220 V to 1100 V 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 30 kHz	80 μ V/V + 3.5 mV 140 μ V/V + 5.0 mV 470 μ V/V + 8.5 mV		
AC CURRENT Generation	220 V to 750 V 30 kHz to 50 kHz 50 kHz to 100 kHz	470 μ V/V + 9.0 mV 0.18 % + 35 mV		
	100 nA to 220 μ A 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	130 μ A/A + 8.0 nA 290 μ A/A + 12 nA 0.11 % + 65 nA		
	220 μ A to 2.2 mA 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	140 μ A/A + 35 nA 220 μ A/A + 110 nA 0.11 % + 650 nA		
	2.2 mA to 22 mA 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	130 μ A/A + 350 nA 210 μ A/A + 550 nA 0.11 % + 5.0 μ A		
	22 mA to 220 mA 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	130 μ A/A + 2.5 μ A 210 μ A/A + 3.5 μ A 0.11 % + 10 μ A		
	220 mA to 2.2 A 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	270 μ A/A + 35 μ A 460 μ A/A + 80 μ A 0.55 % + 130 μ A		
	2.2 A to 11 A 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	370 μ A/A + 140 μ A 740 μ A/A + 300 μ A 0.28 % + 590 μ A		
Simulation	11 A to 550 A 45 Hz to 65 Hz	0.30 % + 600 mA	For the calibration of current clamps and similar devices, using a multi-turn coil.	



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DC/LF AUTOMATED AND MANUAL SYSTEMS FOR GENERATION (5700A)				
DC RESISTANCE				Manchester, Yateley, Stevenage
Generation	1 Ω	86 $\mu\Omega/\Omega$		
	1.9 Ω	86 $\mu\Omega/\Omega$		
	10 Ω	26 $\mu\Omega/\Omega$		
	19 Ω	25 $\mu\Omega/\Omega$		
	100 Ω	16 $\mu\Omega/\Omega$		
	190 Ω	16 $\mu\Omega/\Omega$		
	1 k Ω	12 $\mu\Omega/\Omega$		
	1.9 k Ω	12 $\mu\Omega/\Omega$		
	10 k Ω	11 $\mu\Omega/\Omega$		
	19 k Ω	11 $\mu\Omega/\Omega$		
	100 k Ω	13 $\mu\Omega/\Omega$		
	190 k Ω	13 $\mu\Omega/\Omega$		
	1 M Ω	19 $\mu\Omega/\Omega$		
	1.9 M Ω	19 $\mu\Omega/\Omega$		
	10 M Ω	36 $\mu\Omega/\Omega$		
	19 M Ω	43 $\mu\Omega/\Omega$		
	100 M Ω	110 $\mu\Omega/\Omega$		
DC VOLTAGE				
Generation	0 V to 220 mV	7.1 $\mu\text{V}/\text{V} + 0.67 \mu\text{V}$		
	220 mV to 2.2 V	6.3 $\mu\text{V}/\text{V} + 0.93 \mu\text{V}$		
	2.2 V to 11 V	6.3 $\mu\text{V}/\text{V} + 3.1 \mu\text{V}$		
	11 V to 22 V	6.3 $\mu\text{V}/\text{V} + 6.2 \mu\text{V}$		
	22 V to 220 V	7.0 $\mu\text{V}/\text{V} + 78 \mu\text{V}$		
	220 V to 1100 V	8.6 $\mu\text{V}/\text{V} + 470 \mu\text{V}$		
DC CURRENT				
Generation	0 A to 220 μA	47 $\mu\text{A}/\text{A} + 8.0 \text{ nA}$		
	220 μA to 2.2 mA	47 $\mu\text{A}/\text{A} + 8.0 \text{ nA}$		
	2.2 mA to 22 mA	47 $\mu\text{A}/\text{A} + 80 \text{ nA}$		
	22 mA to 220 mA	55 $\mu\text{A}/\text{A} + 800 \text{ nA}$		
	220 mA to 2.2 A	75 $\mu\text{A}/\text{A} + 24 \mu\text{A}$		
	2.2 A to 11 A	280 $\mu\text{A}/\text{A} + 380 \mu\text{A}$		
Simulation	11 A to 550 A	0.30 % + 600 mA	For the calibration of current clamps and similar devices, using a multi-turn coil.	



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AC VOLTAGE Generation	0.1 mV to 2.2 mV 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 2.2 mV to 22 mV 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 22 mV to 220 mV 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 220 mV to 2.2 V 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	850 $\mu\text{V/V} + 4.0 \mu\text{V}$ 730 $\mu\text{V/V} + 4.0 \mu\text{V}$ 710 $\mu\text{V/V} + 4.0 \mu\text{V}$ 770 $\mu\text{V/V} + 4.0 \mu\text{V}$ 0.10 % + 7.0 μV 0.13 % + 12 μV 0.16 % + 25 μV 0.30 % + 25 μV 480 $\mu\text{V/V} + 5.0 \mu\text{V}$ 220 $\mu\text{V/V} + 5.0 \mu\text{V}$ 140 $\mu\text{V/V} + 5.0 \mu\text{V}$ 340 $\mu\text{V/V} + 5.0 \mu\text{V}$ 750 $\mu\text{V/V} + 6.5 \mu\text{V}$ 0.11 % + 12 μV 0.15 % + 25 μV 0.29 % + 25 μV 470 $\mu\text{V/V} + 13 \mu\text{V}$ 190 $\mu\text{V/V} + 8.0 \mu\text{V}$ 95 $\mu\text{V/V} + 8.0 \mu\text{V}$ 290 $\mu\text{V/V} + 8.0 \mu\text{V}$ 700 $\mu\text{V/V} + 25 \mu\text{V}$ 860 $\mu\text{V/V} + 25 \mu\text{V}$ 0.14 % + 31 μV 0.28 % + 80 μV 470 $\mu\text{V/V} + 80 \mu\text{V}$ 150 $\mu\text{V/V} + 25 \mu\text{V}$ 75 $\mu\text{V/V} + 6.0 \mu\text{V}$ 120 $\mu\text{V/V} + 16 \mu\text{V}$ 220 $\mu\text{V/V} + 65 \mu\text{V}$ 380 $\mu\text{V/V} + 120 \mu\text{V}$ 940 $\mu\text{V/V} + 310 \mu\text{V}$ 0.19 % + 800 μV		Manchester, Yateley, Stevenage



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code	
AC VOLTAGE (continued) Generation (continued)	2.2 V to 22 V 10 Hz to 20 Hz 20Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 22 V to 220 V 10 Hz to 20 Hz 20Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 220 V to 1100 V 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 30 kHz 220 V to 750 V 30 kHz to 50 kHz 50 kHz to 100 kHz	470 μ V/V + 800 μ V 150 μ V/V + 240 μ V 75 μ V/V + 55 μ V 120 μ V/V + 160 μ V 220 μ V/V + 310 μ V 470 μ V/V + 1.3 mV 0.11 % + 4.0 mV 0.24 % + 7.0mV 470 μ V/V + 8.0 mV 150 μ V/V + 2.5 mV 80 μ V/V + 800 μ V 200 μ V/V + 3.2 mV 470 μ V/V + 8.0 mV 80 μ V/V + 3.2 mV 140 μ V/V + 5.0 mV 470 μ V/V + 8.6 mV 470 μ V/V + 9.0 mV 0.18 % + 35 mV			Manchester, Yateley, Stevenage



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC CURRENT				Manchester, Yateley
Generation	100 nA to 220 μ A 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	140 μ A/A + 16 nA 550 μ A/A + 40 nA 0.14 % + 80 nA		
	220 μ A to 2.2 mA 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	150 μ A/A + 32 nA 550 μ A/A + 400 nA 0.14 % + 800 nA		
	2.2 mA to 22 mA 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	140 μ A/A + 400 nA 550 μ A/A + 3.9 μ A 0.14 % + 7.8 μ A		
Generation	22 mA to 220 mA 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	150 μ A/A + 3.1 μ A 550 μ A/A + 39 μ A 0.14 % + 78 μ A		
	220 mA to 2.2 A 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	590 μ A/A + 31 μ A 670 μ A/A + 78 μ A 0.78 % + 150 μ A		
	2.2 A to 11 A 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	370 μ A/A + 140 μ A 740 μ A/A + 300 μ A 0.28 % + 590 μ A		
Simulation	11 A to 550 A 45 Hz to 65 Hz	0.30 % + 600 mA	For the calibration of current clamps and similar devices, using a multi-turn coil.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code	
DC/LF AUTOMATED AND MANUAL SYSTEMS FOR MEASUREMENT					
ZERO CHECKS					
DC Resistance	0 Ω	10 $\mu\Omega$	4-terminal short circuit	Manchester, Yateley	
DC Voltage	0 V	100 nV	4-terminal short circuit		
DC Current	0 A	200 nA	Open Circuit input		
DC RESISTANCE					
Measurement	0 Ω to 12 Ω	45 $\mu\Omega/\Omega$ + 0.10 m Ω			
	12 Ω to 120 Ω	30 $\mu\Omega/\Omega$ + 1.0 m Ω			
	120 Ω to 1.2 k Ω	22 $\mu\Omega/\Omega$ + 1.0 m Ω			
	1.2 k Ω to 12 k Ω	21 $\mu\Omega/\Omega$ + 10 m Ω			
	12 k Ω to 120 k Ω	23 $\mu\Omega/\Omega$ + 100 m Ω			
	120 k Ω to 1.2 M Ω	35 $\mu\Omega/\Omega$ + 3.0 Ω			
	1.2 M Ω to 12 M Ω	80 $\mu\Omega/\Omega$ + 140 Ω			
	12 M Ω to 120 M Ω	600 $\mu\Omega/\Omega$ + 2.1 k Ω			
	120 M Ω to 1.2 G Ω	0.65 % + 160 k Ω			
DC VOLTAGE					
Measurement	0 V to 120 mV	13 $\mu\text{V}/\text{V}$ + 1.8 μV			
	120 mV to 1.2 V	12 $\mu\text{V}/\text{V}$ + 2.0 μV			
	1.2 V to 12 V	12 $\mu\text{V}/\text{V}$ + 6.5 μV			
	12 V to 120 V	13 $\mu\text{V}/\text{V}$ + 130 μV			
	120 V to 1050 V	19 $\mu\text{V}/\text{V}$ + 750 μV			
DC CURRENT					
Measurement	0 A to 1.2 μA	210 $\mu\text{A}/\text{A}$ + 85 pA			
	1.2 μA to 12 μA	110 $\mu\text{A}/\text{A}$ + 210 pA			
	12 μA to 120 μA	75 $\mu\text{A}/\text{A}$ + 1.7 nA			
	120 μA to 1.2 mA	75 $\mu\text{A}/\text{A}$ + 11 nA			
	1.2 mA to 12 mA	75 $\mu\text{A}/\text{A}$ + 75 nA			
	12 mA to 120 mA	95 $\mu\text{A}/\text{A}$ + 1.1 μA			
	120 mA to 1.05 A	170 $\mu\text{A}/\text{A}$ + 18 μA			
AC VOLTAGE					
Measurement	10 μV to 12 mV	800 $\mu\text{V}/\text{V}$ + 9.0 μV			
	10 Hz to 40 Hz	300 $\mu\text{V}/\text{V}$ + 8.0 μV			
	40 Hz to 1 kHz	400 $\mu\text{V}/\text{V}$ + 8.0 μV			
	1 kHz to 20 kHz	400 $\mu\text{V}/\text{V}$ + 8.0 μV			
	20 kHz to 50 kHz	0.13 % + 8.0 μV			
	50 kHz to 100 kHz	0.60 % + 11 μV			
	100 kHz to 300 kHz	4.7 % + 21 μV			



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code	
AC VOLTAGE (continued) Measurement (continued)	12 mV to 120 mV 10 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz 1 MHz to 2 MHz 120 mV to 1.2 V 10 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz 1 MHz to 2 MHz 1.2 V to 12 V 10 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz 1 MHz to 2 MHz 12 V to 120 V 10 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 120 V to 700 V 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 30 kHz At 700 V 30 kHz to 50 kHz 50 kHz to 100 kHz 220 V to 1.1 kV 40 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz	800 μ V/V + 21 μ V 180 μ V/V + 13 μ V 230 μ V/V + 13 μ V 400 μ V/V + 13 μ V 0.15 % + 40 μ V 0.40 % + 40 μ V 1.3 % + 40 μ V 1.8 % + 40 μ V 800 μ V/V + 140 μ V 140 μ V/V + 30 μ V 200 μ V/V + 30 μ V 400 μ V/V + 40 μ V 0.10 % + 110 μ V 0.36 % + 230 μ V 1.2 % + 1.1 mV 1.8 % + 1.2 mV 750 μ V/V + 1.3 mV 140 μ V/V + 300 μ V 200 μ V/V + 300 μ V 400 μ V/V + 400 μ V 0.10 % + 600 μ V 0.36 % + 2.5 mV 1.3 % + 12 mV 1.8 % + 12 mV 750 μ V/V + 14 mV 280 μ V/V + 3.5 mV 280 μ V/V + 3.5 mV 510 μ V/V + 6.0 mV 0.16 % + 13 mV 500 μ V/V + 20 mV 750 μ V/V + 20 mV 0.16 % + 25 mV 0.20 % + 25 mV 0.45 % + 25 mV 210 μ V/V + 25 mV 760 μ V/V + 60 mV 0.65 % + 250 mV			Manchester, Yateley, Donibristle



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC CURRENT Measurement	100 nA to 120 μ A 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 1 kHz	0.18 % + 40 nA 0.080 % + 40 nA 0.11 % + 70 nA		Manchester, Yateley, Donibristle
	120 μ A to 1.2 mA 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz 5 kHz to 10 kHz	0.18 % + 300 nA 0.080 % + 300 nA 0.090 % + 700 nA 0.25 % + 1.3 μ A		
	1.2 mA to 12 mA 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz 5 kHz to 10 kHz	0.18 % + 3.0 μ A 0.080 % + 3.0 μ A 0.090 % + 7.0 μ A 0.25 % + 13 μ A		
	12 mA to 120 mA 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz 5 kHz to 10 kHz	0.18 % + 30 μ A 0.080 % + 30 μ A 0.090 % + 70 μ A 0.25 % + 130 μ A		
	120 mA to 1.05 A 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz 5 kHz to 10 kHz	0.21 % + 250 μ A 0.13 % + 250 μ A 0.16 % + 550 μ A 1.3 % + 1.0 mA		
DISTORTION Distortion Factor	20 Hz to 100 kHz			
	0.1 % to 0.25 % 0.2 V to 0.5 V 0.5 V to 2 V 2 V to 300 V	0.083 % absolute 0.043 % absolute 0.023 % absolute		
	0.25 % to 0.4 % 0.2 V to 0.5 V 0.5 V to 2 V 2 V to 300 V	0.068 % absolute 0.068 % absolute 0.032 % absolute		
	0.4 % to 1 % 0.2 V to 0.5 V 0.5 V to 2 V 2 V to 300 V	0.17 % absolute 0.090 % absolute 0.080 % absolute		
	1.0 % to 100 % 0.2 V to 0.5 V 0.5 V to 2 V 2 V to 300 V	0.90 % absolute 0.80 % absolute 0.80 % absolute		



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DC HIGH VOLTAGE	1.1 kV to 50 kV 1.1 kV to 70 kV	0.20 % + 1.0 V 0.20 % + 10 V	Source. Measurement.	Donbristle
AC HIGH VOLTAGE	1.1 kV to 4 kV 50 Hz 4.1 kV to 30 kV 50 Hz	0.35 % + 1.0 V 0.45 % + 2.0 V	Measurement. Measurement.	
DC CURRENT				
Generation	1 μ A to 10 μ A 10 μ A to 500 mA 500 mA to 10 A 10 A to 100 A	40 μ A/A 30 μ A/A 40 μ A/A 250 μ A/A	Current up to 2000 A can be simulated at increased uncertainties, using a multi turn coil, for clamp meter calibration.	
AC CURRENT	50 Hz to 1 kHz 1 mA to 10 A 10 A to 100 A	0.050 % 0.12 %	Current up to 2000 A can be simulated at increased uncertainties, using a multi turn coil, for clamp meter calibration.	
AC RESISTANCE	50 Hz to 1 kHz 1 Ω , 10 Ω , 100 Ω , 1 k Ω and 10 k Ω	10 $\mu\Omega/\Omega$		
LF CAPACITANCE	1 kHz 100 pF 1 pF to 11.1 μ F 11.1 μ F to 100 μ F	20 μ F/F 90 μ F/F 250 μ F/F	The uncertainty quoted is for measurement of 3-terminal capacitance. 2-terminal capacitance measurements can also be undertaken but there will be an additional uncertainty of 0.5 pF.	
INDUCTANCE Generation only	1 kHz 1 mH 10 mH 100 mH 1 H	0.030 % 0.020 % 0.020 % 0.020 %		
FREQUENCY	1 mHz to 1.3 GHz	3.0 in 10^{10}		
Optical Tachometers	60 rpm to 18 000 rpm	0.013 %		
Mechanical Tachometers	300 rpm to 1500 rpm 600 rpm to 3000 rpm 1200 rpm to 6000 rpm	1.5 rpm 2.5 rpm 6.5 rpm		
AC POWER	1 W to 10 kW 30 Hz to 1 kHz	0.40 %	Based on AC voltage and AC current measurements at unity power factor	
RCD Testers (current)	10 mA to 1 A 50 Hz	1.6 %		
RCD Testers (trip time)	10 ms, 35 ms, 100 ms, 300 ms 500 ms, 750 ms and 1 s	1.2 %		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
CAPACITANCE				Donbristle
Measurement	0.1 μ F to 10 μ F at 1 kHz 10 pF to 1 μ F at 10 kHz	0.060 % + 0.020 pF 0.25% + 1.0 fF	Using a Wayne Kerr B905A Bridge	
PORTABLE APPLIANCE TESTER CALIBRATION				
AC Resistance at 50 Hz	0.1 Ω to 2 Ω 0.1 Ω to 1 Ω 2 Ω	0.020 Ω 0.020 Ω 0.030 Ω	Test current 8 amperes Test current 25 amperes Test current 25 amperes	
AC Current at 50 Hz	8 A to 30 A	2.0 A		
FREQUENCY				
Generation	1 MHz, 5 MHz and 10 MHz	8.0 in 10^{11}		
Measurement	1 MHz, 5 MHz and 10 MHz 10 Hz to 100 Hz 100 Hz to 1 kHz 1 kHz to 100 MHz 100 MHz to 26.5 GHz	1.0 in 10^{10} 1.2 in 10^6 to 6.0 in 10^8 6.0 in 10^8 to 3.7 in 10^9 3.7 in 10^9 to 1.2 in 10^9 1.0 in 10^9		
VOLTAGE REFLECTION COEFFICIENT				
	0.3 MHz to 8 GHz 0 to 0.2 0.2 to 0.6 0.6 to 0.8	0.010 0.015 0.020	7 mm 50 Ω coaxial line fitted with GPC 7 or Type N connectors. The measurement uncertainty may increase if the device requires the use of a test port cable.	
	8 GHz to 18 GHz 0 to 0.2 0.2 to 0.6 0.6 to 0.8	0.020 0.020 0.025		
	0.5 GHz to 8 GHz 0 to 0.2 0.2 to 0.6 0.6 to 0.8	0.030 0.035 0.040	3.5 mm 50 Ω coaxial line fitted with GPC 3.5 connectors. The measurement uncertainty may increase if the device requires the use of a test port cable.	
	8 GHz to 18 GHz 0 to 0.2 0.2 to 0.6 0.6 to 0.8	0.060 0.060 0.065		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
RF ATTENUATION	<i>0.3 MHz to 3 GHz</i> 0 dB to 40 dB 40 dB to 62 dB 62 dB to 80 dB <i>0.5 GHz to 8 GHz</i> 0 dB to 50 dB 50 dB to 62 dB <i>8 GHz to 18 GHz</i> 0 dB to 40 dB 40 dB to 50 dB 50 dB to 62 dB <i>0.5 GHz to 8 GHz</i> 0 dB to 62 dB <i>8 GHz to 18 GHz</i> 0 dB to 62 dB	0.050 dB 0.090 dB 0.90 dB 0.050 dB 0.070 dB 0.060 dB 0.070 dB 0.090 dB 0.14 dB 0.23 dB	7 mm 50 Ω coaxial line fitted with GPC 7 or Type N connectors. The uncertainty is for devices with input and output VRC not exceeding 0.2. 3.5 mm 50 Ω coaxial line fitted with GPC 3.5 connectors. The uncertainty is for devices with input and output VRC not exceeding 0.2.	Donibristle
RF POWER	0.8 mW to 1.2 mW 50 MHz	0.50 %	For the calibration of 50 Ω power meter reference sources with output VSWR not exceeding 1.05:1	
Calibration Factor			The uncertainties shown for calibration factor are based on a device with a VSWR of 1.03:1 or less. If the measured reflection coefficient is significantly greater than this, the calibration factor uncertainties will be increased accordingly.	
50 Ω coaxial power sensors	Nominal level 1 mW <i>0.1 MHz to 0.3 MHz</i> <i>0.3 MHz to 0.1 GHz</i> <i>0.1 GHz to 2 GHz</i> <i>2 GHz to 8 GHz</i> <i>8 GHz to 18 GHz</i>	1.3 % 1.1 % 1.0 % 1.3 % 1.7 %	Connector type: 7 mm Type N	
50 Ω coaxial power sensors	Nominal level 1 μW <i>0.1 GHz to 2 GHz</i> <i>2 GHz to 8 GHz</i> <i>8 GHz to 18 GHz</i>	1.9 % 2.1 % 2.4 %	Connector type: 7 mm Type N	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
50 Ω coaxial thermistor mounts	Nominal level 1 mW <i>0.05 GHz to 2 GHz</i> <i>2 GHz to 8 GHz</i> <i>8 GHz to 18 GHz</i>	1.7 % 1.9 % 2.1 %	Connector type: 7 mm Type N.	Donbristle
RF Power Measurement	+20 dBm to -25 dBm <i>100 kHz to 300 kHz</i> <i>300 kHz to 1 MHz</i> <i>1 MHz to 50 MHz</i> <i>50 MHz to 2 GHz</i> <i>2 GHz to 12 GHz</i> <i>12 GHz to 18 GHz</i> <i>18 GHz to 26.5 GHz</i>	0.55 dB 0.26 dB 0.18 dB 0.18 dB 0.25 dB 0.34 dB 0.31 dB	50 Ω coaxial line systems fitted with Type N connectors. The uncertainty is for devices with output VRC not exceeding 0.2.	
	-25 dBm to -50 dBm <i>50 MHz to 2 GHz</i> <i>2 GHz to 12 GHz</i> <i>12 GHz to 18 GHz</i>	0.22 dB 0.37 dB 0.40 dB		
	-50 dBm to -60 dBm <i>50 MHz to 2 GHz</i> <i>2 GHz to 12 GHz</i> <i>12 GHz to 18 GHz</i>	0.24 dB 0.38 dB 0.41 dB		
	-60 dBm to -65 dBm <i>50 MHz to 2 GHz</i> <i>2 GHz to 12 GHz</i> <i>12 GHz to 18 GHz</i>	0.38 dB 0.48 dB 0.50 dB		
RF Power Generation	0 dBm to -67 dBm <i>100 kHz to 4.2 GHz</i> <i>4.2 GHz to 18 GHz</i>	0.15 dB 0.22 dB	50 Ω coaxial line systems fitted with precision Type N connectors. Devices fitted with non-precision Type N connectors can be calibrated but with increased uncertainties. The CMCs stated are for a load VRC <0.05. The stated uncertainty may be increased if the VRC exceeds this value.	
	-67 dBm to -127 dBm <i>100 kHz to 4.2 GHz</i> <i>4.2 GHz to 18 GHz</i>	0.24 dB 0.37 dB		
TRANSFER IMPEDANCE (RF current probe calibration)	<i>20 Hz to 9 kHz</i> <i>10 kHz to 500 MHz</i> <i>500 MHz to 1 GHz</i>	0.65 dB 0.37 dB 0.74 dB		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
SPECTRAL INTENSITY	0.1 MHz to 1 GHz 80 dB μ V/MHz to 100 dB μ V/MHz	0.90 dB		Donbristle
AMPLITUDE MODULATION	Carrier 100 kHz to 10 MHz Modulation 20 Hz to 50 Hz	5 % to 50 % 3.0 % 50 % to 95 % 3.1 %	The uncertainties for amplitude modulation are presented in terms of modulation depth.	
	Carrier 150 kHz to 10 MHz Modulation 50 Hz to 10 kHz	5 % to 50 % 2.0 % 50 % to 95 % 2.1 %		
	Carrier 10 MHz to 1.3 GHz Modulation 50 Hz to 90 Hz	5 % to 50 % 1.1 % 50 % to 95 % 1.3 %		
	Carrier 10 MHz to 1.3 GHz Modulation 90 Hz to 10 kHz	5 % to 20 % 1.1 % 20 % to 50 % 0.53 % 50 % to 80 % 0.85 %		
	Carrier 10 MHz to 1.3 GHz Modulation 10 kHz to 50 kHz	5 % to 50 % 1.1 % 50 % to 95 % 1.3 %		
	Carrier 10 MHz to 1.3 GHz Modulation 50 kHz to 100 kHz	5 % to 50 % 3.0 % 50 % to 95 % 3.1 %		
	Carrier 10 MHz to 1.3 GHz Modulation 90 Hz to 10 kHz	80 % to 95 % 1.3 %		
	Carrier 10 MHz to 1.3 GHz Modulation 20 Hz to 50 Hz	5 % to 20 % 3.0 %		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Temperature indicators, calibration by electrical simulation				Donibristle
Thermocouple type			including reference junction compensation	
K	-200 °C to 0 °C 0 °C to 1372 °C	0.28 °C 0.27 °C		
J	-210 °C to 0 °C 0 °C to 1200 °C	0.29 °C 0.27 °C		
T	-200 °C to 0 °C 0 °C to 400 °C	0.34 °C 0.27 °C		
R	0 °C to 200 °C 200 °C to 1767 °C	0.40 °C 0.30 °C		
S	0 °C to 300 °C 300 °C to 1400 °C	0.40 °C 0.30 °C		
N	-250 °C to 0 °C 0 °C to 1000 °C	0.30 °C 0.27 °C		
E	-200 °C to 0 °C 0 °C to 400 °C	0.29 °C 0.26 °C		
B	600 °C to 800 °C 800 °C to 1820 °C	0.36 °C 0.30 °C		
K	-200 °C to 0 °C 0 °C to 1372 °C	0.27 °C 0.25 °C	Excluding reference junction compensation	
J	-210 °C to 0 °C 0 °C to 1200 °C	0.28 °C 0.25 °C		
T	-200 °C to 0 °C 0 °C to 400 °C	0.33 °C 0.25 °C		
R	0 °C to 200 °C 200 °C to 1767 °C	0.39 °C 0.29 °C		
S	0 °C to 300 °C 300 °C to 1400 °C	0.39 °C 0.29 °C		
N	-250 °C to 0 °C 0 °C to 1000 °C	0.29 °C 0.26 °C		
E	-200 °C to 0 °C 0 °C to 400 °C	0.28 °C 0.25 °C		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Temperature indicators, calibration by electrical simulation (continued)				Donbristle
Thermocouple type (continued)				
B	600 °C to 800 °C 800 °C to 1820 °C	0.35 °C 0.29 °C		
Resistance thermometer (Pt 100)	-200 °C to +800 °C	0.030 °C		
TORQUE				
Torque measuring devices	As BS 7882:2017 0.05 Nm to 1000 Nm	0.10 % of reading	Calibration of electrical indicators is not accredited.	
Hand torque tools	As BS EN ISO 6789 :2017 0.1 N·m to 1500 N·m	1.0 % of reading	The uncertainty quoted is for both the application of the calibration torque and the characteristics of the device being calibrated.	
Hand torque tools	As BS EN ISO 6789 :2003 (withdrawn and superseded) 0.2 Nm to 1500 Nm	1.0 % of reading	Calibrations may also be given in lbf.in and lbf.ft.	
PRESSURE			Methods consistent with EURAMET CG3 and CG17.	
Gas Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges.	-95 kPa to 0 Pa 0 Pa to 3.5 kPa 3.5 kPa to 10 MPa	31 Pa 5.0 Pa 0.0075 %	Calibration of devices with an electrical output may be undertaken.	
"Pressure equivalent" calibration of dead-weight testers	3.5 kPa to 10 MPa	0.0075 %		
Gas Pressure (Absolute)				
Calibration of pressure indicating instruments and gauges	2 kPa to 75 kPa 75 kPa to 115 kPa 115 kPa to 10 MPa	36 Pa 7.0 Pa 0.0075 % + 16 Pa		
Hydraulic Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges.	0 Pa to 550 kPa 550 kPa to 140 MPa 140 MPa to 400 MPa	15 kPa 0.0075 % 0.035 %		
"Pressure equivalent" calibration of dead-weight testers	550 kPa to 60 MPa	0.0075 %		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
TEMPERATURE				Donbristle
4-wire platinum resistance thermometers	0.01 °C (Triple point of water) -80 °C to +10 °C 10 °C to 250 °C 250 °C to 550 °C	0.0035 °C 0.050 °C 0.050 °C 0.35 °C	Calibration with liquid and metal media.	
Base metal thermocouples	-80 °C to 250 °C 250 °C to 550 °C	0.40 °C 0.80 °C	Calibration with liquid and metal media.	
Dial type and electronic thermometers with sensors:				
Resistance sensors	-80 °C to +250 °C 250 °C to 550 °C	0.040 °C 0.35 °C	Calibration with liquid and metal media.	
Thermocouple sensors	-80 °C to +250 °C 250 °C to 550 °C	0.40 °C 0.80 °C	Calibration with liquid and metal media.	
Thermistors	-80 °C to +250 °C 250 °C to 600 °C	0.050 °C 0.35 °C	Calibration with liquid and metal media.	
Metal block calibrators and portable liquid baths	-30 °C to +150 °C 150 °C to 550 °C	0.090 °C 0.25 °C	Calibration performed with respect to EURAMET CG 13.	
Liquid in glass thermometers	-80 °C to 250 °C	0.025 °C + 1/4 of a scale division	Calibration with liquid media.	
Air temperature: data loggers.	-50 °C to 50 °C	0.35 °C	Within a temperature controlled chamber.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
VOLUME OF LIQUIDS (SEE NOTE 1)				Donibristle
Single channel instruments	0.1 μ l to 10 μ l 10 μ l to 20 μ l 20 μ l to 100 μ l 100 μ l to 200 μ l 200 μ l to 500 μ l 0.5 ml to 2 ml 2 ml to 5 ml 5 ml to 10 ml 10 ml to 20 ml	0.060 μ l 0.071 μ l 0.20 μ l 0.40 μ l 0.70 μ l 0.002 ml 0.010 ml 0.015 ml 0.030 ml	Note 1. For water delivered from piston and/or plunger operated volumetric apparatus (POVA) using in-house gravimetric Procedures. 1 volume (fixed volume pipettes) 4 volumes (variable volume pipettes) 10 readings (as specified in ISO 8655).	
Multi channel instruments up to 12 channels Simultaneously calibrated	1.0 μ l to 20 μ l 20 μ l to 50 μ l 50 μ l to 100 μ l 100 μ l to 200 μ l 200 μ l to 300 μ l 300 μ l to 600 μ l 600 μ l to 1200 μ l	0.10 μ l 0.20 μ l 0.30 μ l 0.50 μ l 0.80 μ l 1.10 μ l 3.00 μ l	From minimum of 1 volume and minimum of 5 readings up to 4 volumes and up to 10 readings (by agreement with the customer).	
DIMENSIONAL				
DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
MEASURING INSTRUMENTS AND MACHINES				
Micrometers External (including digital and electronic) - Excluding thread micrometers	As BS 870:2008 0 to 1000	Heads: 2.0 between any two points. Setting and extension rods: $1.0 + (8.0 \times L \text{ in m})$		
Vernier gauges Caliper	As BS 887:2008 0 to 1000	Overall performance $10 + (30 \times L \text{ in m})$	The uncertainty quoted is for the departure from flatness, straightness, parallelism or squareness, i.e. the distance separating the two parallel planes which just enclose the surface under consideration. All linear calibrations may be given in Inch units.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL CALIBRATION			NOTE: Certain quantities in this section are applicable for calibration of digital multimeters. In some cases, these calibrations are conducted under computer control using a bespoke robot arm with video scanning and decoding of the multimeter display.	Stevenage
ZERO CHECKS	The uncertainty will be determined by the resolution and stability of the unit under test when applying external shorts and open circuits			
RESISTANCE				
Specific Values	0.1 Ω 1 Ω 10 Ω 100 Ω 1 k Ω 10 k Ω	8.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 2.4 $\mu\Omega/\Omega$ 2.4 $\mu\Omega/\Omega$ 2.4 $\mu\Omega/\Omega$ 2.5 $\mu\Omega/\Omega$	4 terminal resistors of modest dimensions suitable for oil immersion can be measured over the temperature range 14°C to 30°C.	
	20 k Ω to 100 k Ω (in 10 k Ω steps)	2.6 $\mu\Omega/\Omega$	Decade resistors measured via a build-up technique.	
	200 k Ω to 1 M Ω (in 100 k Ω steps) 2 M Ω to 10 M Ω (in 1 M Ω steps)	2.7 $\mu\Omega/\Omega$ 3.2 $\mu\Omega/\Omega$		
Other Values	0 Ω to 20 k Ω 20 k Ω to 20 M Ω 20 M Ω to 200 M Ω 200 M Ω to 2 G Ω 2 G Ω to 20 G Ω 20 G Ω to 200 G Ω 200 G to 1 T Ω	6.5 $\mu\Omega/\Omega$ + 10 $\mu\Omega$ 7.2 $\mu\Omega/\Omega$ + 100 m Ω 0.15 % + 8.5 k Ω 0.23 % + 69 k Ω 0.23 % + 570 k Ω 0.35 % + 8.7 M Ω 0.94 %		
Generation	10 Ω 100 Ω 1 k Ω 10 Ω 100 k Ω 1 M Ω 10 M Ω 100 M Ω	11 $\mu\Omega/\Omega$ 4.4 $\mu\Omega/\Omega$ 4.4 $\mu\Omega/\Omega$ 6.4 $\mu\Omega/\Omega$ 5.0 $\mu\Omega/\Omega$ 11 $\mu\Omega/\Omega$ 23 $\mu\Omega/\Omega$ 65 $\mu\Omega/\Omega$	DC automated and manual calibrations.	
DC Conductance	1 S to 50 μS 50 μS to 10 μS 10 μS to 100 nS 100 nS to 10 nS	7.0 $\mu\text{S/S}$ 3.0 $\mu\text{S/S}$ 4.0 $\mu\text{S/S}$ 60 $\mu\text{S/S}$		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC VOLTAGE				Stevenage
Measurement				
Specific Values	1.018 V 10 V	0.90 μ V/V 0.46 μ V/V		
Other Values	0 V to 20 V 20 V to 200 V 200 V to 1000 V	3.1 μ V/V + 230 nV 6.2 μ V/V + 1.2 μ V 6.2 μ V/V + 12 μ V		
Generation	0 mV to 200 mV 0.2 V to 2 V 2 V to 20 V 20V to 200V 200 V to 1000 V	2.7 μ V/V + 330 nV 1.6 μ V/V + 660 nV 0.87 μ V/V + 2.9 μ V 1.7 μ V/V + 42 μ V 2.4 μ V/V + 420 μ V	DC automated and manual calibrations.	
DC CURRENT				
Specific Values	100 μ A 1 mA 10 mA 100 mA 1 A 10 A	21 μ A/A 10 μ A/A 7.2 μ A/A 8.2 μ A/A 13 μ A/A 100 μ A/A		
Other Values	1 μ A to 100 μ A 100 μ A to 10 mA 10 mA to 100 mA 100 mA to 10 A 10 A to 50 A	13 μ A/A + 0.10 nA 13 μ A/A + 0.10 nA 20 μ A/A 75 μ A/A 100 μ A/A		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC POWER	1 μ W to 25 kW	The RSS summation of the relevant voltage and current uncertainties.	Upper limits of voltage and current are 1 kV and 25 A respectively. Laboratory supplies and loads are not normally available over the full range.	Stevenage
AC VOLTAGE				
Datron 4920 System				
Specific Values	1 V			
	40 Hz	27 μ V/V		
	1 kHz	27 μ V/V		
	30 kHz	28 μ V/V		
	50 kHz	31 μ V/V		
	100 kHz	34 μ V/V		
	200 kHz	67 μ V/V		
	500 kHz	240 μ V/V		
	1 MHz	520 μ V/V		
	10 V			
	40 Hz	26 μ V/V		
	1 kHz	26 μ V/V		
	30 kHz	27 μ V/V		
	50 kHz	29 μ V/V		
	100 kHz	29 μ V/V		
	200 kHz	65 μ V/V		
500 kHz	240 μ V/V			
1 MHz	430 μ V/V			
100 V				
40 Hz	43 μ V/V			
1 kHz	35 μ V/V			
30 kHz	35 μ V/V			
50 kHz	39 μ V/V			
100 kHz	40 μ V/V			
700 V				
50 kHz	170 μ V/V			
100 kHz	230 μ V/V			
1000 V				
45 Hz	87 μ V/V			
100 Hz	87 μ V/V			
1 kHz	86 μ V/V			
10 kHz	88 μ V/V			
20 kHz	88 μ V/V			
30 kHz	97 μ V/V			



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC VOLTAGE (continued)				Stevenage
Datron 4920 System (continued)				
Other values	0.9 mV to 2.7 mV 10 Hz to 100 Hz 100 Hz to 30 kHz 30 kHz to 200 kHz 200 kHz to 500 kHz 500 kHz to 1 MHz 2.7 mV to 9 mV 10 Hz to 100 Hz 100 Hz to 30 kHz 30 kHz to 200 kHz 200 kHz to 500 kHz 500 kHz to 1 MHz 9 mV to 27 mV 10 Hz to 100 Hz 100 Hz to 30 kHz 30 kHz to 200 kHz 200 kHz to 500 kHz 500 kHz to 1 MHz 27 mV to 90 mV 10 Hz to 30 kHz 30 kHz to 200 kHz 200 kHz to 500 kHz 500 kHz to 1 MHz 90 mV to 1.1 V 10 Hz to 30 kHz 30 kHz to 200 kHz 200 kHz to 500 kHz 500 kHz to 1 MHz 1.1 V to 3.4 V 10 Hz to 30 kHz 30 kHz to 200 kHz 200 kHz to 500 kHz 500 kHz to 1 MHz 3.4 V to 11 V 10 Hz to 30 kHz 30 kHz to 200 kHz 200 kHz to 500 kHz 500 kHz to 1 MHz	0.033 % + 0.30 μ V 0.020 % + 0.30 μ V 0.047 % + 0.30 μ V 0.13 % + 0.30 μ V 0.32 % + 0.30 μ V 0.026 % + 0.30 μ V 0.016 % + 0.20 μ V 0.033 % + 0.20 μ V 0.10 % + 0.20 μ V 0.24 % + 0.40 μ V 0.019 % + 0.30 μ V 0.0093 % + 0.20 μ V 0.018 % + 0.20 μ V 0.054 % + 0.30 μ V 0.14% + 0.40 μ V 42 μ V/V + 0.50 μ V 96 μ V/V + 0.60 μ V 280 μ V/V + 0.40 μ V 720 μ V/V + 0.50 μ V 36 μ V/V + 1.7 μ V 67 μ V/V + 2.0 μ V 260 μ V/V + 1.4 μ V 720 μ V/V + 1.5 μ V 36 μ V/V + 5.7 μ V 66 μ V/V + 6.7 μ V 260 μ V/V + 5.3 μ V 710 μ V/V + 6.7 μ V 36 μ V/V + 19 μ V 65 μ V/V + 22 μ V 260 μ V/V + 17 μ V 720 μ V/V + 22 μ V		



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AC VOLTAGE (continued)				Stevenage
Datron 4920 System (continued)				
Other values (continued)	11 V to 34 V 10 Hz to 30 kHz 30 kHz to 200 kHz 200 kHz to 500 kHz 500 kHz to 1 MHz 34 V to 110 V 10 Hz to 30 kHz 30 kHz to 200 kHz 110 V to 340 V 40 Hz to 20 kHz 20 kHz to 100 kHz 340 V to 1199.5 V 40 Hz to 20 kHz 20 kHz to 100 kHz	36 $\mu\text{V/V} + 57 \mu\text{V}$ 65 $\mu\text{V/V} + 67 \mu\text{V}$ 260 $\mu\text{V/V} + 53 \mu\text{V}$ 710 $\mu\text{V/V} + 67 \mu\text{V}$ 37 $\mu\text{V/V} + 130 \mu\text{V}$ 80 $\mu\text{V/V} + 120 \mu\text{V}$ 44 $\mu\text{V/V} + 1.4 \text{ mV}$ 160 $\mu\text{V/V} + 4.5 \text{ mV}$	The maximum Volt-Hertz product is 7.5×10^7 .	
Fluke 5790 System				
	1 mV to 2.2 mV 20 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 70 kHz 70 kHz to 100 kHz 100 kHz to 200 kHz 200 kHz to 300 kHz 300 kHz to 1 MHz 2.2 mV to 7 mV 20 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 70 kHz 70 kHz to 100 kHz 100 kHz to 200 kHz 200 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	650 $\mu\text{V/V} + 1.3 \mu\text{V}$ 650 $\mu\text{V/V} + 2.0 \mu\text{V}$ 650 $\mu\text{V/V} + 2.5 \mu\text{V}$ 800 $\mu\text{V/V} + 4.0 \mu\text{V}$ 800 $\mu\text{V/V} + 4.0 \mu\text{V}$ 0.16 % + 8.0 μV 0.55 % + 8.0 μV 220 $\mu\text{V/V} + 1.3 \mu\text{V}$ 220 $\mu\text{V/V} + 2.0 \mu\text{V}$ 220 $\mu\text{V/V} + 2.5 \mu\text{V}$ 320 $\mu\text{V/V} + 4.0 \mu\text{V}$ 350 $\mu\text{V/V} + 4.0 \mu\text{V}$ 900 $\mu\text{V/V} + 4.0 \mu\text{V}$ 0.40 % + 8.0 μV 0.40 % + 8.0 μV		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC VOLTAGE (continued)				Stevenage
Fluke 5790 System (continued)				
	7 mV to 22 mV 20 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 70 kHz 70 kHz to 100 kHz 100 kHz to 200 kHz 200 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	100 μ V/V + 1.3 μ V 100 μ V/V + 2.0 μ V 120 μ V/V + 2.5 μ V 210 μ V/V + 4.0 μ V 210 μ V/V + 4.0 μ V 750 μ V/V + 4.0 μ V 0.30 % + 8.0 μ V 0.30 % + 8.0 μ V		
	22 mV to 70 mV 20 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 70 kHz 70 kHz to 200 kHz 200 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	60 μ V/V + 1.5 μ V 60 μ V/V + 1.5 μ V 60 μ V/V + 2.0 μ V 80 μ V/V + 2.5 μ V 210 μ V/V + 4.0 μ V 380 μ V/V + 8.0 μ V 0.14 % + 8.0 μ V 0.14 % + 8.0 μ V		
	70 mV to 700 mV 20 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 70 kHz 70 kHz to 200 kHz 200 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	45 μ V/V + 1.5 μ V 40 μ V/V + 1.5 μ V 40 μ V/V + 2.0 μ V 70 μ V/V + 2.5 μ V 200 μ V/V + 4.0 μ V 360 μ V/V + 8.0 μ V 0.14 % + 8.0 μ V 0.14 % + 8.0 μ V		
	700 mV to 22 V 200 kHz to 300 kHz 300 kHz to 1 MHz	520 μ V/V 0.18 %		
	700 mV to 70 V 1 kHz to 20 kHz 20 kHz to 70 kHz 70 kHz to 200 kHz	50 μ V/V 100 μ V/V 210 μ V/V		
	700 mV to 1000 V 20 Hz to 40 Hz 40 Hz to 1 kHz	50 μ V/V 45 μ V/V		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC VOLTAGE (continued)				Stevenage
Fluke 5790 System (continued)				
AC Voltage Waveform Analysis	70 V to 220 V 1 kHz to 20 kHz 20 kHz to 70 kHz 70 kHz to 100 kHz 220 V to 1000 V 1 kHz to 20 kHz 20 kHz to 100 kHz 3 μ V to 300 V 20 Hz to 76 kHz	50 μ V/V 100 μ V/V 260 μ V/V 170 μ V/V 990 μ V/V 5.0 % of FSD	15 ranges of 30 μ V to 300 V FSD in a 3-10-30 sequence.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC CURRENT				Stevenage
Measurement	20 Hz to 5 kHz			
Specific Values	100 μ A 1 mA 10 mA 100 mA 1 A 10 A	0.026 % 0.015% 0.0090 % 0.0090 % 0.010 % 0.017 %		
Other Values	30 Hz to 20 kHz 200 mA to 25 A	0.070 %		
	30 Hz to 1 kHz 0.1 mA to 2 mA	150 μ A/A		
	20 Hz to 10 kHz 2 mA to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 20 A	80 μ A/A 100 μ A/A 120 μ A/A 200 μ A/A		
Generation	5 nA to 100 μ A 20 Hz to 1 kHz 1 kHz to 5 kHz	0.028 % + 5.0 nA 0.032 % + 6.0 nA		
	100 μ A to 1 mA 20 Hz to 1 kHz 1 kHz to 5 kHz	0.016 % + 47 nA 0.018 % + 47 nA		
	1 mA to 10 mA 20 Hz to 1 kHz 1 kHz to 5 kHz	0.010 % + 470 nA 0.013 % + 470 nA		
	10 mA to 100 mA 20 Hz to 1 kHz 1 kHz to 5 kHz	0.010 % + 470 nA 0.013 % + 470 nA		
	100 mA to 1 A 20 Hz to 1 kHz 1 kHz to 5 kHz	0.022 % + 47 μ A 0.033 % + 62 μ A		
	1 A to 10 A 20 Hz to 1 kHz 1 kHz to 5 kHz	0.029 % + 0.93 mA 0.061 % + 1.2 mA		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code			
AC POWER				Stevenage			
Calibration and Measurement Capability for AC Power in $\mu\text{W/W}$ over the frequency range 16 Hz to 69 Hz and for power factors between 1 and 0.75.							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78		78 to 168	168 to 330	330 to 1008
0.1 to 2	330	290	260		260	260	300
2 to 5	340	300	270		270	270	310
5 to 10	350	320	290		290	290	330
10 to 21	380	350	320		330	330	360
Calibration and Measurement Capability for AC Power in $\mu\text{W/W}$ over the frequency range 16 Hz to 69 Hz and for power factors between 0.75 and 0.5.							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78		78 to 168	168 to 330	330 to 1008
0.1 to 2	340	300	270		270	270	310
2 to 5	350	320	290		290	290	330
5 to 10	370	340	300		310	310	340
10 to 21	400	370	340		340	340	380
Calibration and Measurement Capability for AC Power in $\mu\text{W/W}$ over the frequency range 16 Hz to 69 Hz and for power factors between 0.5 and 0.25.							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78	78 to 168	168 to 330	330 to 1008	
0.1 to 2	380	350	320	330	330	360	
2 to 5	430	400	290	380	380	410	
5 to 10	440	410	380	390	390	420	
10 to 21	470	440	420	420	420	450	
Calibration and Measurement Capability for AC Power in $\mu\text{W/W}$ over the frequency range 69 Hz to 180 Hz and for power factors between 1 and 0.75.							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78	78 to 168	168 to 330	330 to 1008	
0.1 to 2	330	300	260	260	260	310	
2 to 5	350	320	280	280	280	330	
5 to 10	360	330	300	300	300	340	
10 to 21	390	370	340	340	340	370	



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Measured Quantity Instrument or Gauge	Range		Expanded Measurement Uncertainty ($k = 2$)		Remarks	Location Code	
AC POWER (continued)						Stevenage	
<i>Calibration and Measurement Capability for AC Power in μW/W over the frequency range 69 Hz to 180 Hz and for power factors between 0.75 and 0.5.</i>							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78	78 to 168	168 to 330		330 to 1008
0.1 to 2	360	330	290	300	300		330
2 to 5	390	370	340	340	340		370
5 to 10	410	380	350	350	350		390
10 to 21	430	410	380	380	380		410
<i>Calibration and Measurement Capability for AC Power in μW/W over the frequency range 69 Hz to 180 Hz and for power factors between 0.5 and 0.25.</i>							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78	78 to 168	168 to 330		330 to 1008
0.1 to 2	470	450	420	420	420		450
2 to 5	580	560	540	540	540		570
5 to 10	590	570	550	550	550		570
10 to 21	610	590	570	570	570		590
<i>Calibration and Measurement Capability for AC Power in μW/W over the frequency range 180 Hz to 450 Hz and for power factors between 1 and 0.75.</i>							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78	78 to 168	168 to 330	330 to 1008	
0.1 to 2	400	370	340	340	340	380	
2 to 5	450	430	410	410	410	440	
5 to 10	460	440	420	420	420	450	
10 to 21	490	470	440	440	440	470	
<i>Calibration and Measurement Capability for AC Power in μW/W over the frequency range 180 Hz to 450 Hz and for power factors between 1 and 0.75.</i>							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78	78 to 168	168 to 330	330 to 1008	
0.1 to 2	400	370	340	340	340	380	
2 to 5	450	430	410	410	410	440	
5 to 10	460	440	420	420	420	450	
10 to 21	490	470	440	440	440	470	
<i>Calibration and Measurement Capability for AC Power in μW/W over the frequency range 180 Hz to 450 Hz and for power factors between 0.75 and 0.5.</i>							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78	78 to 168	168 to 330	330 to 1008	
0.1 to 2	560	540	520	520	520	540	
2 to 5	690	680	660	660	660	680	
5 to 10	700	680	670	670	670	690	
10 to 21	720	700	690	690	690	700	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code			
AC POWER (continued)				Stevenage			
<i>Calibration and Measurement Capability for AC Power in $\mu\text{W/W}$ over the frequency range 180 Hz to 450 Hz and for power factors between 0.5 and 0.25.</i>							
Current range A	Voltage range (V)						
	6.4 to 13.2	13.2 to 31	31 to 78		78 to 168	168 to 330	330 to 1008
0.1 to 2	1100	1100	1100		1100	1100	1100
2 to 5	1400	1400	1400		1400	1400	1400
5 to 10	1400	1400	1400	1400	1400	1400	
10 to 21	1400	1400	1400	1400	1400	1400	
AC POWER FACTOR	0 to unity 16 Hz to 69 Hz 69 Hz to 180 Hz	0.000050 0.000090	For applied voltages between 16 V and 1008 V and for applied currents between 0.25 A and 5 A.				
	180 Hz to 450 Hz 450 Hz to 850 Hz 850 Hz to 3 kHz 3 kHz to 6 kHz	0.00026 0.00053 0.0026 0.0052					
AC POWER FACTOR	0 to unity 16 Hz to 69 Hz 69 Hz to 180 Hz	0.000070 0.00012	For applied voltages between 16 V and 1008 V and for applied currents between 5 A and 21 A.				
	180 Hz to 450 Hz 450 Hz to 850 Hz 850 Hz to 3 kHz 3 kHz to 6 kHz	0.00035 0.00070 0.0035 0.0070					



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code	
INDUCTANCE			The ability to realise the stated uncertainties for inductance is particularly dependent on the electrical and physical characteristics of the inductor being calibrated	Stevenage	
Specific Values	<i>100 Hz:</i> 1 H 10 H <i>1 kHz and 10 kHz:</i> 1 μ H 10 μ H 100 μ H, 1 mH and 10 mH <i>1 kHz:</i> 100 mH and 1 H 10 H <i>10 kHz</i> 100 mH 1 H	0.015 % 0.010 % 0.35 % 0.15 % 0.015 % 0.015 % 0.025 % 0.025 % 0.60 %			
Other Values	<i>100 Hz, 1 kHz and 10 kHz:</i> 1 μ H to 10 μ H 10 μ H to 100 μ H 100 μ H to 100 mH <i>100 Hz and 1 kHz:</i> 100 mH to 10 H	0.40 % 0.20 % 0.10 % 0.10 %			
CAPACITANCE					
Specific Values	1 nF 1 kHz	8.0 μ F/F			
Other Values	10 pF to 100 pF <i>100 Hz to 10 kHz</i> 100 pF to 0.1 μ F <i>50 Hz to 10 kHz</i> 0.1 μ F to 1 μ F <i>50 Hz to 1 kHz</i> <i>1 kHz to 10 kHz</i>	0.010 % 0.010 % 0.010 % 0.030 %			Capacitance can be measured below 10 pF and from 1 μ F to 11 μ F, and also up to 100 kHz, with an increased uncertainty which varies in a complex manner with frequency and capacitance. Fixed capacitors within this range are available for the calibration of bridges, capacitance meters and similar instruments.
CAPACITANCE LOSS					
Dissipation factor ($\tan \delta$)	10^{-4} to unity 1 kHz	0.10 % + 2.0×10^{-5}			For capacitance values ≤ 50 nF. Measurements may be made for greater capacitance values and other frequencies within the range 50 Hz to 10 kHz but the uncertainties may be increased.



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Electrical Simulation of Temperature (calibration of indicating devices and measurement of electrical temperature simulators).			Including cold junction compensation. Ambient temperature over the range 15 °C to 25 °C, with a CMC of 0.072 °C, may also be performed in support of cold junction characteristics.	Stevenage
Type K thermocouples	-200 °C to -100 °C -100 °C to -25 °C -25 °C to +120 °C	0.27 °C 0.16 °C 0.15 °C		
	120 °C to 1000 °C 1000 °C to 1372 °C	0.22 °C 0.32 °C		
Type J thermocouples	-210 °C to -100 °C -100 °C to -30 °C -30 °C to +150 °C 150 °C to 760 °C 760 °C to 1200 °C	0.23 °C 0.15 °C 0.13 °C 0.15 °C 0.19 °C		
Type T thermocouples	-250 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C	0.50 °C 0.20 °C 0.15 °C 0.13 °C		
Type R thermocouples	0 °C to 250 °C 250 °C to 400 °C 400 °C to 1000 °C 1000 °C to 1767 °C	0.46 °C 0.29 °C 0.27 °C 0.32 °C		
Type S thermocouples	0 °C to 250 °C 250 °C to 1000 °C 1000 °C to 1400 °C 1400 °C to 1767 °C	0.39 °C 0.30 °C 0.30 °C 0.37 °C		
Type N thermocouples	-200 °C to -100 °C -100 °C to -25 °C -25 °C to +120 °C 120 °C to 410 °C 410 °C to 1300 °C	0.32 °C 0.19 °C 0.17 °C 0.16 °C 0.22 °C		
Type E thermocouples	-250 °C to -100 °C -100 °C to -25 °C -25 °C to +350 °C 350 °C to 650 °C 650 °C to 1000 °C	0.40 °C 0.15 °C 0.13 °C 0.15 °C 0.18 °C		
Type B thermocouples	600 °C to 800 °C 800 °C to 1000 °C 1000 °C to 1550 °C 1550 °C to 1820 °C	0.37 °C 0.28 °C 0.25 °C 0.27 °C		
Type C thermocouples	0 °C to 150 °C 150 °C to 650 °C 650 °C to 1000 °C 1000 °C to 1800 °C 1800 °C to 2316 °C	0.25 °C 0.22 °C 0.25 °C 0.40 °C 0.66 °C		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
FREQUENCY				Stevenage
Specific Values	1 MHz to 10 MHz in 1 MHz intervals	4.5 in 10^{12}	For a comparison procedure over a 7 day period.	
Other Values	10 Hz to 120 MHz	1.2 in 10^6 to 1.7 in 10^9	For the calibration of signal sources and frequency meters.	
	100 MHz to 20 GHz	1.0 in 10^6 to 1.8 in 10^{11}		
	20 GHz to 26.5 GHz	2.0 in 10^9		
	1 mHz to 18 GHz	4.0 in 10^{11}	For frequency comparison using a synthesiser.	
	18 GHz to 40 GHz	1.0 in 10^5	For the calibration of resonant cavity wavemeters.	
TIME INTERVAL	50 ns to 1 s 1 s to 100 s 100 s to 1000 s 1000 s to 10^4 s 10^4 s to 10^5 s	5 ns 1.2 in 10^6 to 3.7 in 10^9 3.7 in 10^9 to 1.2 in 10^9 1.2 in 10^9 to 5.8 in 10^8 5.8 in 10^8 to 1.6 in 10^9	For the Calibration of Pulse, function Generators etc.	
RISE TIME	1 s to 1 ns 1000 ps to 100 ps 100 ps to 25 ps	0.10 % + 20 ps 15 ps 10 ps	For the calibration of Pulse, Function Generators, scope calibrators etc. (Calculated values) $CV = (MV^2 - ScopeRT^2)^{0.5}$	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL MEASUREMENTS - RF AND MICROWAVE				Stevenage
NOTE: Where critical, the pin and receptacle depth of precision coaxial connectors used on RF and microwave equipment can be measured and reported on calibration certificates. The quoted uncertainty will not be less than 0.001".				
VOLTAGE REFLECTION COEFFICIENT				
For calibrations using autotesters and bridges in 50 Ω coaxial line	100 Hz to 1 GHz 0.0 to 0.1 0.1 to 0.6 0.6 to 0.9	0.010 to 0.020 0.020 to 0.040 0.040 to 0.070	14 mm 50 Ω coaxial system.	
	10 MHz to 18 GHz 0.0 to 0.6 0.6 to 0.9	0.011 to 0.054 0.054 to 0.10	7 mm and Type N connectors.	
	0.0 to 0.6 10 MHz to 18 GHz 18 GHz to 26.5 GHz	0.015 to 0.043 0.017 to 0.060	3.5 mm WSMA and SMA connectors.	
	0.6 to 0.9 10 MHz to 18 GHz 18 GHz to 26.5 GHz	0.043 to 0.078 0.060 to 0.11	3.5 mm WSMA and SMA connectors.	
	0.0 to 0.6 10 MHz to 18 GHz 18 GHz to 26.5 GHz	0.018 to 0.047 0.025 to 0.060	3.5 mm PC-3.5 connectors.	
	0.6 to 0.9 10 MHz to 18 GHz 18 GHz to 26.5 GHz	0.047 to 0.081 0.060 to 0.11	3.5 mm PC-3.5 connectors.	
	0.0 to 0.6 10 MHz to 18 GHz 18 GHz to 26.5 GHz 26.5 GHz to 40 GHz	0.018 to 0.073 0.025 to 0.080 0.032 to 0.098	2.92 mm Type K connectors.	
For calibrations using a six-port reflection analyser	0.6 to 0.9 10 MHz to 18 GHz 18 GHz to 26.5 GHz 26.5 GHz to 40 GHz	0.073 to 0.14 0.080 to 0.14 0.098 to 0.18	2.92 mm Type K connectors	
	0.25 GHz to 18 GHz 0.0 to 0.2 0.2 to 1.0	0.0050 to 0.010 0.010 to 0.023	7 mm Type N and PC-7 connectors.	
	0.25 GHz to 26.5 GHz 0.0 to 0.2 0.2 to 1.0	0.013 0.013 to 0.080	3.5 mm PC-3.5 connectors.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
RF VOLTAGE				Stevenage
Specific Values	0.5 V, 1 V, 3 V, 5 V, 10 V, 20 V 1 MHz, 10 MHz and 20 MHz 30 MHz 40 MHz 50 MHz	0.090 % 0.070 % 0.070 % 0.15 %	Sources of RF voltage may not be available for all combinations of voltage and frequency.	
Other values	20 mV to 100 mV 10 kHz to 100 kHz 100 kHz to 1 MHz 1 MHz to 100 MHz 100 MHz to 1 GHz 100 MHz to 1.5 GHz	0.32 % 0.34 % 0.55 % 0.81 % 0.88 %	The measurements are of RF voltage developed across a perfectly matched 50 Ω coaxial line system. The uncertainties are for the measurement of the output of a signal generator or the calibration of an instrument for the measurement of RF voltage in such a coaxial line system. If the measurement of RF voltage is required at a specified plane in the coaxial line system, the uncertainties will be increased. The frequency response of the device can be given relative to any frequency between 10 kHz and 1 MHz. Sources of RF voltage may not be available for all combinations of voltage and frequency.	
	100 mV to 1 V 10 kHz to 100 kHz 100 kHz to 1 MHz 1 MHz to 100 MHz 100 MHz to 1.5 GHz	0.40 % 0.43 % 0.61 % 1.0 %		
	1 V to 10 V 10 kHz to 100 kHz 100 kHz to 1 MHz 1 MHz to 100 MHz 100 MHz to 1.5 GHz	0.46 % 0.50 % 0.65 % 1.0 %		
RF POWER	1 μW to 3 mW 0.3 GHz to 12.4 GHz	6.0 %	Mismatch uncertainty less than 1.5%.	
	10 μW to 3 mW 50 MHz to 200 MHz	(0.90 % to 0.70 %) + 0.10 μW	50 Ω Type N or GPC-7 coaxial system.	
	200 MHz to 1 GHz 1 GHz to 4 GHz	(1.1 % to 0.90 %) + 0.10 μW (1.4 % to 1.2 %) + 0.10 μW		
	10 mW to 300 mW 1 kHz to 50 MHz 50 MHz to 100 MHz 100 MHz to 2 GHz 2 GHz to 6 GHz	0.65 % 0.65 % 0.68 % 0.94 %	50 Ω 14 mm coaxial system.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
RF POWER (continued)	0.1 mW to 10 mW 8.2 GHz to 12.4 GHz 12.4 GHz to 17.0 GHz 18 GHz 9 kHz to 5 GHz +20 dBm to -50 dBm -50 dBm to -80 dBm -80 dBm to -127dBm 2 GHz to 18 GHz +10 dBm to -50 dBm -50 dBm to -80 dBm -80 dBm to -100 dBm	3.0 % 3.0 % 4.0 % 0.15 dB 0.20 dB 0.35 dB 0.15 dB 0.20 dB 0.30 dB	50 Ω Type N coaxial system For the calibration of Signal Sources, Spectrum Analysers. The uncertainties are for the measurements in 7 mm coaxial lines fitted with Type N connectors. If adaptors for other types of connector are used then these uncertainties will be increased. If the device being measured presents an imperfect match in 50 Ω coaxial line systems the uncertainties will be increased.	Stevenage



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)		Remarks	Location Code
CALIBRATION FACTOR (Power sensor calibration)	Calibration and Measurement Capability (CMC) in % calibration factor for the sensor types shown. The CMCs are for 50 Ω sensors with input voltage reflection coefficients not exceeding 0.02. Uncertainties will be increased for higher values of VRC. The reference calibration factor is obtained at 50 MHz.				Stevenage
Nominal level 1 mW <i>Other levels can be used but the uncertainties may be increased.</i>	30 kHz to 4.2 GHz system	10 MHz to 18 GHz system	10 MHz to 26.5 GHz system	10 MHz to 40 GHz system	
Frequency	Type N sensors	Type N and 7 mm sensors	3.5 mm sensors	2.92 mm sensors	
30 kHz	2.8				
50 kHz	1.9				
100 kHz	0.9				
300 kHz	0.59				
500 kHz	0.56				
1 MHz	0.55				
3 MHz	0.58				
5 MHz	0.62				
10 MHz	0.67	1.3	3.7	1.1	
30 MHz	0.67	0.69	1.6	0.87	
100 MHz	0.70	0.59	1.0	0.85	
300 MHz	0.78	0.67	1.0	0.93	
500 MHz	0.78	0.67	1.0	0.93	
1 GHz	0.81	0.69	1.0	0.94	
2 GHz	0.78	0.72	1.1	1.0	
3 GHz	0.93	0.91	1.2	1.0	
4 GHz	1.0	1.0	1.2	1.0	
4.2 GHz	1.1				
5 GHz		1.1	1.3	1.1	
6 GHz		1.4	1.5	1.2	
7 GHz		1.5	1.6	1.3	
8 GHz		1.5	1.6	1.3	
9 GHz		1.7	1.7	1.3	
10 GHz		1.7	1.7	1.3	
11 GHz		1.6	1.7	1.3	
12 GHz		1.5	1.8	1.3	
12.4 GHz		1.6			
13 GHz		1.6	1.8	1.5	
14 GHz		1.9	1.8	1.5	
15 GHz		2.0	1.8	1.5	
16 GHz		2.0	2.0	1.5	
17 GHz		1.8	2.1	1.5	
18 GHz		1.9	2.3	1.5	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
CALIBRATION FACTOR (Power sensor calibration) (continued)	Calibration and Measurement Capability (CMC) in % calibration factor for the sensor types shown. The CMCs are for 50 Ω sensors with input voltage reflection coefficients not exceeding 0.02. Uncertainties will be increased for higher values of VRC. The reference calibration factor is obtained at 50 MHz.			
Nominal level 1 mW <i>Other levels can be used but the uncertainties may be increased.</i>	30 kHz to 4.2 GHz system	10 MHz to 18 GHz system	10 MHz to 26.5 GHz system	10 MHz to 40 GHz system
Frequency	Type N sensors	Type N and 7 mm sensors	3.5 mm sensors	2.92 mm sensors
19 GHz			2.7	2.0
20 GHz			2.9	2.0
20.5 GHz			2.7	
21 GHz			2.6	2.0
21.5 GHz			2.5	
22 GHz			2.4	2.0
22.5 GHz			2.5	
23 GHz			2.6	2.0
23.5 GHz			2.5	
24 GHz			2.4	2.0
24.5 GHz			2.4	
25 GHz			2.4	2.0
25.5 GHz			2.4	
26 GHz			2.4	2.1
26.5 GHz			2.4	
27 GHz				2.3
28 GHz				2.6
29 GHz				2.6
30 GHz				2.6
31 GHz				2.6
32 GHz				2.6
33 GHz				2.7
34 GHz				2.7
35 GHz				2.6
36 GHz				2.6
37 GHz				2.7
38 GHz				2.7
39 GHz				2.6
40 GHz				2.6
Nominal level 1 μ W <i>Other levels can be used but the uncertainties may be increased.</i>	10 MHz to 18 GHz system	10 MHz to 26.5 GHz system	10 MHz to 40 GHz system	
Frequency	Type N sensors	3.5 mm sensors	2.92 mm sensors	
10 MHz	1.6	2.1	1.4	
30 MHz	1.0	1.1	1.1	
100 MHz	0.87	1.0	1.2	
300 MHz	0.87	0.94	1.2	
500 MHz	0.87	0.94	1.2	
1 GHz	1.0	0.94	1.2	

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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Nominal level 1 μ W <i>Other levels can be used but the uncertainties may be increased.</i>	10 MHz to 18 GHz system	10 MHz to 26.5 GHz system	10 MHz to 40 GHz system	Stevenage
Frequency	Type N sensors	3.5 mm sensors	2.92 mm sensors	
2 GHz	1.1	1.0	1.2	
3 GHz	1.1	1.1	1.2	
4 GHz	1.1	1.2	1.2	
5 GHz	1.2	1.3	1.4	
6 GHz	1.6	1.5	1.5	
7 GHz	1.8	1.5	1.5	
8 GHz	2.0	1.7	2.4	
9 GHz	2.2	1.9	2.4	
10 GHz	2.2	2.0	2.3	
11 GHz	2.2	2.2	2.5	
12 GHz	2.8	2.0	2.3	
12.4 GHz	2.8			
13 GHz	3.4	2.1	2.5	
14 GHz	3.7	2.3	2.6	
15 GHz	3.1	2.1	2.4	
16 GHz	3.3	2.3	2.5	
17 GHz	3.5	2.3	2.5	
18 GHz	3.1	2.3	2.7	
19 GHz		3.1	3.1	
20 GHz		3.6	3.0	
20.5 GHz		3.8		
21 GHz		3.7	3.1	
21.5 GHz		4.3		
22 GHz		4.5	3.2	
22.5 GHz		4.0		
23 GHz		4.0	3.1	
23.5 GHz		3.8		
24 GHz		3.6	3.0	
24.5 GHz		3.9		
25 GHz		3.8	3.1	
25.5 GHz		3.6		
26 GHz		3.4	3.4	
26.5 GHz		3.4		
27 GHz			4.4	
28 GHz			4.3	
29 GHz			4.2	
30 GHz			4.4	
31 GHz			4.3	
32 GHz			4.4	
33 GHz			4.6	
34 GHz			4.4	
35 GHz			4.4	
36 GHz			4.7	
37 GHz			4.7	
38 GHz			4.4	
39 GHz			4.2	
40 GHz			4.7	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AMPLITUDE MODULATION				
Modulation Factor	0.05 to 0.50	0.10 %	Modulation generation in discrete steps with 10.7 MHz carrier frequency and 1.045 kHz modulation frequency.	Stevenage
	0.50 to 0.70	0.20 %		
	0.70 to 0.95	0.30 %		
Modulation Factor	0.05 to 0.50	0.10 %	Modulation generation with 10 MHz to 13 MHz carrier frequency range and 20 Hz to 100 kHz modulation frequency range.	
	0.50 to 0.70	0.20 %		
	0.70 to 0.95	0.30 %		
Modulation Factor	0.20 to 0.80	0.40 %	Calibration of sources with 10 kHz to 1 GHz carrier frequency range and 30 Hz to 50 kHz modulation frequency range.	
	0 to 0.50	0.50 %		
	0.50 to 0.70	0.50 %		
	0.70 to 0.95	0.60 %		
Modulation Factor	0 to 0.95	2.5 %	Calibration of sources with 50 kHz to 5 MHz carrier frequency range and 30 Hz to 15 kHz modulation frequency range.	
	0 to 0.95	2.5 %		
FREQUENCY MODULATION				
Frequency Deviation	249.8 Hz to 1024 kHz	0.30 %	Modulation generation in discrete steps with carrier frequencies from 10.7 MHz to 85.6 MHz and modulation frequency of 1.007 kHz. The uncertainty will depend on the carrier frequency.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
FREQUENCY MODULATION (continued)				Stevenage
Frequency Deviation (continued)	0 to 500 kHz	0.15 %	Modulation generation with 80 kHz to 1050 MHz carrier frequency range and 20 Hz to 100 kHz modulation frequency range. The uncertainty will depend on the carrier frequency.	
	0 to 5 kHz 5 kHz to 50 kHz	0.50 % 0.40 %	Calibration of sources with 50 kHz to 5.5 MHz carrier frequency range and at 1 kHz modulation frequency. Measurements can be made at other modulation frequencies with increased uncertainties.	
SPECTRAL INTENSITY	9 kHz to 1 GHz	0.79 dB		
RF ATTENUATION	2.5 MHz to 1300 MHz 0 dB to 34 dB 34 dB to 54 dB 54 dB to 104 dB 104 dB to 120 dB	0.060 dB 0.080 dB 0.12 dB 0.15 dB	Measurement of attenuation in 50 Ω coaxial systems. HP 8902A System.	
TORQUE				
Hand torque tools	BS EN ISO 6789:2017 0.1 N·m to 1500 N·m	1.0 % of reading	The uncertainty quoted is for both the application of the calibration torque and the characteristics of the device being calibrated. Results and uncertainties may also be presented in terms of lbf.in and lbf.ft.	
Hand torque tools	BS EN ISO 6789:2003 (withdrawn and superseded) 0.1 N·m to 1500 N·m	1.0 % of reading		



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RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES, UNLESS OTHERWISE STATED				Stevenage
LENGTH				
Plain plug gauges (parallel)	0 to 100 diameter	0.80 on diameter	See note 10 – Manchester	
Plain ring gauges (parallel) and setting standards	2 to 50 diameter 50 to 100 diameter	1.1 on diameter 1.7 on diameter	See note 11 – Manchester	
Parallels	As BS 906:Parts 1 & 2:1972 5 to 50 x 100 x 450	Dependant on size and grade 1.5 to 5.0		
ANGLE				
Angle plates and box angle plates	As BS 5535:1978 50 to 600	<i>Squareness:</i> 3.0 + (1.0 per 100 mm) <i>Parallelism:</i> 1.0 + (1.0 per 100 mm)	The uncertainty quoted is for the departure from squareness, the distance separating the two parallel planes that just enclose the surface under consideration.	
MEASURING INSTRUMENTS				
Micrometers				
External Internal Depth	As BS 870:2008 0 to 600 As BS 959:2008 0 to 900 As BS 6468:2008 0 to 300	<i>Heads:</i> 2.0 between any two points. <i>Setting and Extension rods up to 300:</i> 1.0 + (5.0 x length in m)		
Vernier caliper, height and depth gauges	As BS 887:2008 0 to 1000 BS 1643:2008 0 to 1000 and BS 6365:2008 0 to 600	Overall performance: 10 + (30 x length in m)		
Dial gauges and Dial test indicators	As BS 907:1965 and BS 2795:1981 0 to 50	1.2		
Bore micrometers (three point)	0 to 150 diameter	5.0	See note 25 - Manchester	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
<p>PRESSURE CALIBRATION</p> <p>Gas pressure (absolute)</p> <p>Calibration of pressure measuring instruments and gauges</p> <p>Gas pressure (gauge)</p> <p>Calibration of pressure measuring instruments and gauges</p> <p>Gas pressure (differential)</p> <p>Calibrations of differential pressure devices with low and high pressure ports at a common mode pressure of 3.5 kPa</p> <p>Hydraulic pressure (gauge)</p> <p>Calibration of pressure measuring instruments and gauges</p> <p>Hydraulic pressure (absolute)</p> <p>Calibration of pressure measuring instruments and gauges</p>	<p>1.4 kPa to 710 kPa 710 kPa to 10.1 MPa</p> <p>-100 kPa to -1.4 kPa 1.4 kPa to 10 MPa</p> <p>6 Pa to 10 kPa (Line pressure 3.5 kPa)</p> <p>358 kPa to 3.5 MPa 3.5 MPa to 111.5 MPa</p> <p>458 kPa to 3.6 MPa 3.6 MPa to 111.6 MPa</p>	<p>0.0050 % + 2.0 Pa 0.0050 % + 20 Pa</p> <p>0.0050 % 0.0050 %</p> <p>0.010 % + 0.060 Pa</p> <p>0.0090 % + 30 Pa 0.0075 %</p> <p>0.0090 % + 50 Pa 0.0075 % + 20 Pa</p>	<p>Calibration of pressure measuring devices with an electrical output may be undertaken.</p> <p>Methods consistent with EURAMET CG17.</p>	Ireland



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
TEMPERATURE CALIBRATION				
Temperature indicators and recorders, with temperature sensor(s)	0.01 °C (Water Triple Point)	0.0030 °C	In a range of liquid and metal media baths.	Ireland
	-196 °C (LN2)	0.015 °C		
	-90 °C to -80 °C	0.025 °C		
	-80 °C to +300 °C	0.015 °C		
	300 °C to 450 °C	0.027 °C		
450 °C to 650 °C	0.094 °C			
Platinum Resistance Thermometers (4 wire)	0.01 °C (Water Triple Point)	0.0030 °C	In a range of liquid and metal media baths.	
	-196 °C (LN2)	0.015 °C		
	-90 °C to -80 °C	0.025 °C		
	-80 °C to +300 °C	0.015 °C		
	300 °C to 450 °C	0.027 °C		
450 °C to 650 °C	0.094 °C			
Metal Block Calibrators and portable liquid baths	-100 °C to +100 °C	0.030 °C	Method consistent with Euramet CG 13.	
	100 °C to 300 °C	0.038 °C		
	300 °C to 420 °C	0.15 °C	Suitable zero reference baths.	
	420 °C to 650 °C	0.16 °C		
	0 °C	0.020 °C		
HUMIDITY CALIBRATION				
Dew-point	-25 °C to +60 °C	0.17 °C	Calibrations undertaken in an air chamber.	
Temperature sensors in air	0 °C to 60 °C	0.10 °C		
Relative humidity	Example conditions	Corresponding to above dew-point and temperature uncertainties		
	At 0 °C: 10 %rh to 90 %rh	0.20 %rh to 1.1 %rh		
	At 23 °C: 5 %rh to 95 %rh	0.20 %rh to 1.1 %rh		
	At 60 °C: 5 %rh to 90 %rh	0.20 %rh to 0.80 %rh		



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MASS CALIBRATION	Nominal value (g)	(mg)		Ireland	
	20 000	10	Intermediate values can be calibrated with an uncertainty not less than that interpolated from the next higher and lower nominal value in the table.		
	10 000	5.3			
	5 000	2.3			
	2 000	1.0			
	1 000	0.53			
	500	0.27			
	200	0.10			
	100	0.053			
	50	0.033			
	20	0.027			
	10	0.020	Calibrations can be given in other units as required. Calibration by substitution.		
	5	0.017			
	2	0.013			
	1	0.010			
	0.5	0.0083			
	0.2	0.0067			
	0.1	0.0053			
	0.05	0.0040			
	0.02	0.0033			
	0.01	0.0027			
ELECTRICAL CALIBRATION					
DC VOLTAGE	0 mV to 200 mV	10 μ V/V + 1.5 μ V			
	200 mV to 2 V	10 μ V/V + 1.5 μ V			
	2 V to 20 V	10 μ V/V + 10 μ V			
	20 V to 200 V	10 μ V/V + 200 μ V			
	200 V to 1 kV	10 μ V/V + 2.0 mV			
DC CURRENT	0 μ A to 200 μ A	20 μ A/A + 1 nA	Using a suitable shunt. Shunt value used will be stated on the certificate.		
	200 μ A to 2 mA	20 μ A/A + 10 nA			
	2 mA to 20 mA	20 μ A/A + 75 nA			
	20 mA to 40 mA	50 μ A/A + 150 nA			
	40 mA to 200 mA	35 μ A/A + 700 nA			
	200 mA to 2 A	250 μ A/A + 30 μ A			
	2 A to 20 A	500 μ A/A + 1.0 mA			
	100 mA to 202 mA	130 μ A/A + 6.6 μ A		Calibration of measuring devices by comparison.	
	202 mA to 2.02 A	150 μ A/A + 180 μ A			
	2.02 A to 20 A	420 μ A/A + 1.5 mA			
	20 A to 1500 A	0.22 % + 100 mA	Simulation using a multi turn coil.		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC RESISTANCE	0 Ω to 2 Ω 2 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 2 k Ω 2 k Ω to 20 k Ω 20 k Ω to 200 k Ω 200 k Ω to 2 M Ω 2 M Ω to 20 M Ω 20 M Ω to 200 M Ω 200 M Ω to 1 G Ω	15 $\mu\Omega/\Omega$ + 20 $\mu\Omega$ 15 $\mu\Omega/\Omega$ + 20 $\mu\Omega$ 15 $\mu\Omega/\Omega$ + 150 $\mu\Omega$ 15 $\mu\Omega/\Omega$ + 1.0 m Ω 15 $\mu\Omega/\Omega$ + 15 m Ω 15 $\mu\Omega/\Omega$ + 100 m Ω 15 $\mu\Omega/\Omega$ + 1.5 Ω 20 $\mu\Omega/\Omega$ + 20 Ω 400 $\mu\Omega/\Omega$ + 500 Ω 0.35 % + 12 k Ω		Ireland
AC VOLTAGE	1 mV to 200 mV 20 Hz to 55 Hz 55 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz	150 $\mu\text{V}/\text{V}$ + 15 μV 120 $\mu\text{V}/\text{V}$ + 15 μV 350 $\mu\text{V}/\text{V}$ + 16 μV 600 $\mu\text{V}/\text{V}$ + 20 μV	AC Values can be sourced or measured by comparison up to 1 kHz, above that frequency is for measurement only.	
	200 mV to 2 V 20 Hz to 55 Hz 55 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 500 kHz	140 $\mu\text{V}/\text{V}$ + 40 μV 120 $\mu\text{V}/\text{V}$ + 40 μV 260 $\mu\text{V}/\text{V}$ + 40 μV 350 $\mu\text{V}/\text{V}$ + 100 μV 0.65 % + 15 mV		
	2 V to 20 V 20 Hz to 55 Hz 55 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 500 kHz	150 $\mu\text{V}/\text{V}$ + 260 μV 140 $\mu\text{V}/\text{V}$ + 260 μV 260 $\mu\text{V}/\text{V}$ + 330 μV 550 $\mu\text{V}/\text{V}$ + 1.2 mV 0.75 % + 120 mV		
	20 V to 200 V 20 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz	140 $\mu\text{V}/\text{V}$ + 7.0 mV 260 $\mu\text{V}/\text{V}$ + 7.0 mV 600 $\mu\text{V}/\text{V}$ + 15 mV		
	200 V to 1 kV 50 Hz to 10 kHz 10 kHz to 30 kHz	200 $\mu\text{V}/\text{V}$ + 25 mV 380 $\mu\text{V}/\text{V}$ + 30 mV		
AC CURRENT	10 μA to 200 μA 55 Hz to 5 kHz 5 kHz to 10 kHz	0.050 % + 50 nA 0.060 % + 50 nA	AC Values can be sourced or measured by comparison up to 1 kHz, above that frequency is for measurement only.	
	200 μA to 2 mA 55 Hz to 10 kHz	0.050 % + 500 nA		
	2 mA to 20 mA 55 Hz to 10 kHz	0.050 % + 5.0 μA		
	20 mA to 200 mA 55 Hz to 10 kHz	0.050 % + 50 μA		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC CURRENT (continued)	200 mA to 2 A 55 Hz to 10 kHz	0.085 % + 500 μ A	Calibration of measuring devices by comparison.	Ireland
	2 A to 20 A 55 Hz to 5 kHz	0.20 % + 5.0 mA		
	25 μ A to 202 μ A 40 Hz to 45 Hz 45 Hz to 999 Hz	0.28 % + 420 nA 0.099 % + 390 nA		
	202 μ A to 2.02 mA 40 Hz to 45 Hz 45 Hz to 999 Hz	0.22 % + 1.2 μ A 0.094 % + 0.80 μ A		
	2.02 mA to 20.2 mA 40 Hz to 45 Hz 45 Hz to 999 Hz	0.23 % + 12 μ A 0.094 % + 7.9 μ A		
	20.2 mA to 202 mA 40 Hz to 45 Hz 45 Hz to 999 Hz	0.22 % + 120 μ A 0.94 % + 90 μ A		
	202 mA to 2.02 A 40 Hz to 45 Hz 45 Hz to 999 Hz	0.25 % + 1.2 mA 0.11 % + 0.11 mA		
	2.02 A to 20 A 40 Hz to 45 Hz 45 Hz to 999 Hz	0.34 % + 13 mA 0.073 % + 4.4 mA		
	20 A to 100 A, 40 Hz to 60 Hz 100 A to 1500 A, 40 Hz to 60 Hz	0.25 % + 100 mA 0.25 % + 400 mA	Simulation using a multi turn coil.	
CAPACITANCE	1 nF	29 pF	Fixed nominal decade values appropriate for the calibration of multimeters with a capacitance function.	Ireland
	10 nF	58 pF		
	20 nF	92 pF		
	50 nF	190 pF		
	100 nF	360 pF		
	1 μ F	5.1 nF		
	10 μ F	74 nF		
	100 μ F	840 nF		
	1 mF	13 μ F		
	10 mF	130 μ F		



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FREQUENCY	0.01 Hz to 50 MHz	5.0 parts in 10^8	Frequency may also be expressed in terms of time; $1/f$, for repetitive signals or in other units such as revolutions per minute.	Ireland
RPM (Revolutions per minute)	2 rpm to 10 rpm 10 rpm to 100 rpm 100 rpm to 1000 rpm 1 000 rpm to 10 000 rpm 10 000 rpm to 100 000 rpm	0.0010 % + 0.0005 rpm 0.0010 % + 0.0020 rpm 0.0010 % + 0.020 rpm 0.0010 % + 0.20 rpm 0.0010 % + 2.0 rpm		
TIME INTERVAL	100 ms to 100 hrs 80 ns to 100 hrs	2.0 μ s/s + 20 ms 2.0 μ s/s + 80 ns	Manually triggered single events. Electronically triggered single events.	
RCD				
Trip current	2 mA to 3 A 20 ms to 190 ms	5.8 % + 240 μ A		
Trip time	2 mA to 3 A 190 ms to 5 s	1.4 % + 80 μ A		
AC resistance for Loop 50 Hz	20 ms to 400 ms 400 ms to 5 s	1.0 ms 10 ms	Laboratory loop 0.20 Ω	
Nominal Ranges	0.2 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω	0.60 % + 4.8 m Ω 0.60 % + 19 m Ω 0.60 % + 36 m Ω		
Earth Bond Resistance	0 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω	0.60 % + 4.8 m Ω 0.60 % + 19 m Ω 0.60 % + 36m Ω		
Earth bond current 50 Hz	10 mA to 500 mA 100 mA to 10 A 10 A to 30 A	1.8 % + 7.0 mA 1.8 % + 70 mA 1.8 % + 70 mA		
Load	0.13 kVA	6.0 %		
Leakage Current At nominal 240 V 50 Hz	2 mA to 8 mA	1.8 % + 11 μ A		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Insulation Test Voltage	50 V to 1000 V	1.2 % + 950 mV		Ireland
Insulation Resistance	10 k Ω to 100 k Ω 101 k Ω to 1 M Ω 1.01 M Ω to 10 M Ω 10.1 M Ω to 100 M Ω 101 M Ω to 1 G Ω 1.01 G Ω to 10 G Ω	0.12 % + 200 m Ω 0.12 % 1.2 % 1.2 % 1.4 % 7.0 %		
AC Voltage				
Nominal 50 Hz	100 V to 400 V	0.25 % + 160 mV		
Continuity Resistance	20 m Ω to 1000 Ω	0.30 % + 30 m Ω		
Continuity Current At a nominal 1 Ω	10 mA to 300 mA	1.6 % + 0.80 mA		
ELECTRICAL SIMULATION OF TEMPERATURE				
Thermocouple capabilities listed below are given for type T Base and Type C Noble, using EMF sensitivity values as listed in BS EN 60584-1:2013. Other thermocouple types can be calibrated, the uncertainties will correspond to the appropriate sensitivities listed. Calibrations which include the internal reference junction (CJC) are available for types: J, K, N, T, E, R, S, B and C.				
Base Metal Thermocouples	-200 $^{\circ}$ C to +1400 $^{\circ}$ C	0.10 $^{\circ}$ C	Excluding automatic CJC	
Noble Metal Thermocouples	0 $^{\circ}$ C to 2315 $^{\circ}$ C	0.10 $^{\circ}$ C		
Base Metal Thermocouples	-200 $^{\circ}$ C to +1400 $^{\circ}$ C	0.25 $^{\circ}$ C	Including automatic CJC	
Noble Metal Thermocouples	500 $^{\circ}$ C to 1800 $^{\circ}$ C	0.26 $^{\circ}$ C		
Cold Junction Compensation	0 $^{\circ}$ C to 30 $^{\circ}$ C	0.15 $^{\circ}$ C		
Resistance thermometers by simulation				
Values below are based upon a PT100. Other resistance thermometer types, including thermistors with a defined resistance scale can also be calibrated based on the resistance capabilities listed above.				
Resistance thermometer simulation	-200 $^{\circ}$ C to 840 $^{\circ}$ C	0.0050 $^{\circ}$ C		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL CALIBRATION				
DC RESISTANCE				
Measurement	0 Ω to 300 Ω 300 Ω to 3 k Ω 3 k Ω to 30 k Ω 30 k Ω to 300 k Ω 300 k Ω to 3 M Ω 3 M Ω to 30 M Ω	39 $\mu\Omega/\Omega$ + 1.8 m Ω 37 $\mu\Omega/\Omega$ + 14 m Ω 37 $\mu\Omega/\Omega$ + 140 m Ω 38 $\mu\Omega/\Omega$ + 1.4 Ω 85 $\mu\Omega/\Omega$ + 14 Ω 70 $\mu\Omega/\Omega$ + 350 Ω		Site Calibration
DC CURRENT	0 A to 200 μ A 200 μ A 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 1 A 1 A to 2 A	350 μ A/A + 10 nA 350 μ A/A + 50 nA 350 μ A/A + 480 nA 360 μ A/A + 10 μ A 0.11 % + 280 μ A		
DC VOLTAGE				
Measurement	0 V to 300 mV 300 mV to 3 V 3 V to 30 V 30 V to 300 V 300 V to 1000 V	40 μ V/V + 1.3 μ V 25 μ V/V + 8.0 μ V 25 μ V/V + 110 μ V 40 μ V/V + 1.5 mV 50 μ V/V + 13 mV		
AC VOLTAGE	10 mV to 200 mV 40 Hz to 10 kHz 10 kHz to 50 kHz 50 kHz to 100 kHz 200 mV to 2 V 40 Hz to 10 kHz 10 kHz to 50 kHz 50 kHz to 100 kHz 2 V to 20 V 40 Hz to 10 kHz 10 kHz to 50 kHz 50 kHz to 100 kHz 20 V to 200 V 40 Hz to 10 kHz 10 kHz to 50 kHz 50 kHz to 100 kHz	0.060 % + 120 μ V 1.2 % + 120 μ V 5.8 % + 500 μ V 0.060 % + 240 μ V 0.12 % + 470 μ V 0.58 % + 2.4 mV 0.060 % + 2.4 mV 0.12 % + 4.7 mV 0.58 % + 24 mV 0.060 % + 24 mV 0.12 % + 47 mV 0.58 % + 240 mV		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC VOLTAGE (continued)	200 V to 700 V 40 Hz to 10 kHz 10 kHz to 30 kHz	0.060 % + 85 mV 0.12 % + 170 mV		Site Calibration
AC CURRENT	40 Hz to 1 kHz 10 μ A to 200 μ A 200 μ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 1A 1 A to 2 A	950 μ A/A + 120 nA 950 μ A/A + 1.2 μ A 950 μ A/A + 12 μ A 950 μ A/A + 120 μ A 0.11 % + 280 μ A 0.29 % + 3.5 mA		
TIME INTERVAL	0 s to 8 hrs	2.0 ms		
TEMPERATURE SIMULATION				
Temperature simulators, Calibration by electrical simulation				
Base metal	-200 °C to +1370 °C	0.47 °C	Including cold junction compensation	
Noble metal	0 °C to +1760 °C	0.47 °C	including cold junction compensation	
Resistance thermometer (Pt 100)	-200 °C to +800 °C	0.15 °C		
Temperature indicators, calibration by electrical simulation				
Base metal	-200 °C to +1370 °C	0.47 °C	Including cold junction compensation	
Noble metal	0 °C to 1760 °C	0.47 °C	including cold junction compensation	
Resistance thermometer (Pt 100)	-200 °C to +800 °C	0.10 °C		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
<p>PRESSURE</p> <p>Gas Pressure (gauge)</p> <p>Calibration of pressure indicating instruments and gauges</p> <p>Gas Pressure (absolute)</p> <p>Calibration of pressure indicating instruments and gauges</p> <p>Hydraulic Pressure (gauge)</p> <p>Calibration of pressure indicating instruments and gauges</p> <p>Hydraulic Pressure (absolute)</p> <p>Calibration of pressure indicating instruments and gauges</p>	<p>-100 kPa to 0 Pa 0 Pa to 40 kPa 40 kPa to 350 kPa 350 kPa to 400 kPa 400 kPa to 2 MPa 2 MPa to 2.8 MPa</p> <p>1.5 kPa to 100 kPa 100 kPa to 140 kPa 140 kPa to 450 kPa 450 kPa to 500 kPa 500 kPa to 2.1 MPa 2.1 MPa to 2.9 MPa</p> <p>0 Pa to 41.4 MPa</p> <p>100 kPa to 41.5 MPa</p>	<p>230 Pa 100 Pa 180 Pa 400 Pa 1.0 kPa 1.3 kPa</p> <p>250 Pa 0.14 kPa 0.21 kPa 0.41 kPa 1.0 kPa 1.3 kPa</p> <p>31 kPa</p> <p>31 kPa</p>	<p>Methods consistent with EURAMET CG17</p> <p>Calibrations of devices with an electrical output may be undertaken</p>	Site Calibration



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code	
TEMPERATURE AND HUMIDITY					
Temperature controlled chambers, autoclaves, media preparators fridges/refrigerators, freezers and ovens, with associated indicators and recorders	-20 °C to +250 °C 250 °C to 1000 °C	0.34 °C 6.7 °C	Single and multipoint time dependent temperature profiling, also referred to as spatial temperature surveying or mapping	Site Calibration	
Humidity controlled chambers (inclusive of associated indicators, controllers and recorders, all with sensors within the specified parameters and ranges)	35 %rh to 95 %rh 20 °C to 70 °C	5.7 %rh			
Block Calibrators	-20 °C to +250 °C 250 °C to 1000 °C	0.91 °C 6.7 °C			
Temperature indicators and recorders with temperature sensors	-20 °C to +200 °C	0.43 °C			
Radiation thermometers (pyrometers)	20 °C to 150 °C 150 °C to 200 °C 200 °C to 250 °C 250 °C to 300 °C 300 °C to 350 °C 350 °C to 400 °C 400 °C to 450 °C 450 °C to 500 °C 500 °C to 550 °C	1.4 °C 1.5 °C 1.9 °C 2.1 °C 2.4 °C 3.0 °C 3.7 °C 4.4 °C 5.1 °C	+ 0.30 % of reading		
TORQUE					
Hand Torque Tools	As BS EN ISO 6789 :2017 0.1 N·m to 2500 N·m	1.0 % of reading	The uncertainty quoted is for both the application of the calibration Torque and the characteristics of the device being calibrated Calibrations may also be given in lbf.in and lbf.ft		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code	
ELECTRICAL CALIBRATION					
DC RESISTANCE	1 Ω to 10 Ω	5.0 m Ω		Mobile	
	10 Ω to 100 Ω	120 $\mu\Omega/\Omega$ + 5.0 m Ω			
	100 Ω to 1 k Ω	120 $\mu\Omega/\Omega$ + 13 m Ω			
	1 k Ω to 10 k Ω	120 $\mu\Omega/\Omega$ + 160 m Ω			
	10 k Ω to 100 k Ω	120 $\mu\Omega/\Omega$ + 1.6 Ω			
	100 k Ω to 1 M Ω	470 $\mu\Omega/\Omega$ + 120 Ω			
	1 M Ω to 100 M Ω	1.0 % + 12 k Ω			
	Generation				
	Specific values	30 M Ω 100 M Ω 190 M Ω 300 M Ω	0.10 % 0.62 % 0.61 % 0.61 %		
	Other values	100 M Ω to 400 M Ω	0.60 % + 40 k Ω		
DC VOLTAGE	0 V to 100 mV	69 $\mu V/V$ + 4.2 μV			
	100 mV to 1 V	52 $\mu V/V$ + 8.2 μV			
	1 V to 10 V	47 $\mu V/V$ + 58 μV			
	10 V to 100 V	59 $\mu V/V$ + 700 μV			
	100 V to 1 kV	59 $\mu V/V$ + 12 mV			
	1 kV to 20 kV	2.5 %			
AC VOLTAGE	10 mV to 100 mV 45 Hz to 100 Hz	730 $\mu V/V$ + 46 μV			
	100 mV to 1 V 45 Hz to 20 kHz 20 kHz to 50 kHz	0.14 % + 59 μV 0.69 % + 99 μV			
	1 V to 10 V 45 Hz to 20 kHz 20 kHz to 50 kHz	0.46 % + 680 μV 730 $\mu V/V$ + 490 μV			
	10 V to 100 V 45 Hz to 20 kHz 20 kHz to 50 kHz	0.14 % + 3.5 mV 0.14 % + 3.6 mV			
	100 V to 750 V 45 Hz to 1 kHz	0.46 % + 5.8 mV			
	750 V to 1 kV 40 Hz to 10 kHz	0.12 % + 50 mV	Generation only		
	1 kV to 20 kV 50 Hz	2.3%			



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC CURRENT	0 A to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 3 A 3 A to 20 A 20 A to 100 A 100 A to 500 A	600 μ A/A + 2.6 μ A 600 μ A/A + 26 μ A 600 μ A/A + 260 μ A 600 μ A/A + 1.2 mA 0.12 % + 12 mA 0.20 % + 10 mA 0.30 % + 700 mA		Mobile
AC CURRENT	1 mA to 30 mA 45 Hz to 1 kHz	0.74 % + 130 μ A		
	30 mA to 100 mA 4 Hz to 1 kHz	0.74 % + 130 μ A		
	100 mA to 10 A 45 Hz to 1 kHz	1.5 % + 130 mA		
	320 mA to 3.2 A 45 Hz to 1 kHz	0.20 % + 120 μ A	Generation only.	
	3.2 A to 20 A 45 Hz to 1 kHz	0.20 % + 1.2 mA		
FREQUENCY	10 Hz to 100 MHz	1.0 in 10^5 + 1.0 Hz	Measurement only.	
TIME INTERVAL	0 s to 1 hour 1 hour to 1 Day	100 ms 100 ms + 1.0 μ s/s	Mechanically triggered devices, e.g. stopwatches. 20 °C \pm 3 °C	
	0 s to 1 hour 1 hour to 1 Day	210 ms 210 ms + 20 ms/hr	Mechanically triggered devices e.g. stopwatches. 0 °C to 40 °C	
BANDWIDTH	1 MHz to 250 MHz 30 mV pp to 0.707 V pp	1.4 %	Bandwidth uncertainty will be expressed in terms of frequency relative to the -3 dB point.	
	250 MHz to 1 GHz 30 mV pp to 2 V pp	5.4 %		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
RECEIVERS AND ANALYSERS TO CP1106				Mobile
Amplitude Accuracy	-40 dBm to +10 dBm <i>10 Hz to 4 GHz</i> <i>4 GHz to 12 GHz</i> <i>12 GHz to 18 GHz</i>	0.080 dB 0.14 dB 0.19 dB	N Type connectors	
	-40 dBm to +10 dBm <i>10 Hz to 4 GHz</i> <i>4 GHz to 13 GHz</i> <i>13 GHz to 19 GHz</i> <i>19 GHz to 26 GHz</i> <i>26 GHz to 30 GHz</i> <i>30 GHz to 39 GHz</i> <i>39 GHz to 40 GHz</i>	0.080 dB 0.13 dB 0.18 dB 0.20 dB 0.31 dB 0.33 dB 0.36 dB	K Type connectors	
Calibration Signal	-40 dBm to 0 dBm <i>10 MHz to 500 MHz</i>	0.070 dB		
Frequency Accuracy	10 MHz to 500 MHz	5.8×10^{-10}		
IF Bandwidth Nominal 0 dBm	10 MHz to 500 MHz Gaussian 3/6 dB Gaussian 60 dB	0.11 % of Bandwidth 1.0 % of Bandwidth		
	Non-Gaussian 3/6 dB Non-Gaussian 60 dB	0.20 % of Bandwidth 1.0 % of Bandwidth		
Bandwidth level switching Nominal 0 dBm	10 MHz to 500 MHz	0.070 dB		
Voltage Reflection Coefficient	<i>100 kHz to 3 GHz</i> 0 to 0.2 0.2 to 0.4 0.4 to 0.6	0.015 0.031 0.065	N Type connectors	
	<i>3 GHz to 18 GHz</i> 0 to 0.2 0.2 to 0.4 0.4 to 0.6	0.028 0.042 0.078		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
RECEIVERS AND ANALYSERS TO CP1106 (continued)				Mobile
	10 MHz to 26 GHz		K Type connectors	
	0 to 0.2	0.036		
	0.2 to 0.4	0.037		
	0.4 to 0.6	0.041		
	26 GHz to 40 GHz			
	0 to 0.2	0.053		
	0.2 to 0.4	0.055		
	0.4 to 0.6	0.063		
Amplitude Linearity Referenced to a nominal level of 0 dBm	10 MHz to 500 MHz			
	0 dB to -40 dB	0.070 dB		
	0 dB to -80 dB	0.080 dB		
	0 dB to -90 dB	0.12 dB		
	0 dB to -95 dB	0.17 dB		
Reference Level Switching	10 MHz to 500 MHz Nominal amplitude 0 dBm	0.030 dB		
Attenuator	10.1 MHz and 50.1 MHz 0 dB to 70 dB	0.060 dB		
Tracking Generator Amplitude Accuracy	-30 dBm to +10 dBm 100 kHz to 4 GHz 4 GHz to 12 GHz 12 GHz to 18 GHz	0.11 dB 0.12 dB 0.13 dB		
Tracking Generator Attenuator Accuracy	10 MHz to 500 MHz 0 dB to 60 dB 0 dB to 90 dB 0 dB to 100 dB	0.11 dB 0.21 dB 0.32 dB		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
RECEIVERS AND ANALYSERS TO CP1106 (continued)				
Pulse Accuracy and Detector Response				Mobile
Sine wave accuracy	10 Hz to 1 GHz at 60 dB μ V	0.14 dB		
Pulse level accuracy	20 dB μ V to 70 dB μ V emf	0.84 dB		
Pulse repetition frequency	0 Hz to 1 kHz 1 kHz to 5 kHz	50 mHz 1.2 Hz		
Surge discharge characteristics			For the calibration of surge generators as specified in BS EN 61000-4-5:2006 and 2014	
Open circuit voltage	10 V to 20 kV	3.2 %		
Voltage waveform undershoot	0 % to 60 %	1.48 %		
Voltage front / Rise time	0.1 μ s to 3 μ s 3 μ s to 20 μ s	13.3 ns 59.4 ns		
Pulse duration	2 μ s to 20 μ s 20 μ s to 200 μ s 200 μ s to 1 ms	68.7 ns 0.68 μ s 3.45 μ s		
Short circuit current pulse	1 A to 5 kA	2.28 %		
Current waveform undershoot	0 % to 60 %	2.49 %		
Current front / rise time	0.1 μ s to 3 μ s 3 μ s to 20 μ s	23.4 ns 62.5 ns		
Current duration	2 μ s to 50 μ s 50 μ s to 500 μ s	0.17 μ s 1.7 μ s		
Phase angle (surge on AC line)	0° to 360°	0.70°		
Output impedance	0.1 Ω to 500 Ω	2.5 %		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Electrical fast transient characteristics			For the calibration of EFT/Burst generators as specified in BS EN 61000-4-4	Mobile
Peak voltage into 50 Ω	1 V to 8 kV	1.1 %		
Peak voltage into 1 k Ω	1 V to 8 kV	3.2 %		
Rise time	2 ns to 10 ns	0.125 ns		
Pulse width	10 ns to 75 ns	0.33 ns		
	75 ns to 200 ns	0.71 ns		
Burst duration	200 ns to 1 ms	0.12 μ s		
	1 ms to 20 ms	2.8 μ s		
Burst period	50 ms to 500 ms	2.0 μ s/s		
Repetition rate	1 kHz to 1.5 MHz	2.0 μ s/s		
Ring wave characteristics			For the calibration of Ring Wave Generators as specified in BS EN 61000-4-12	
Peak voltage	10 V to 7 kV	1.35 %		
Voltage rise time	0.1 μ s to 2 μ s	15.4 ns		
Decaying voltage	Pk 2 0 to 2x PkV	1.39 %		
	Pk 3 0 to 2x PkV	1.45 %		
	Pk 4 0 to 2x PkV	1.66 %		
Oscillation frequency	10 kHz to 200 kHz	23 μ Hz/Hz		
Peak current	1 A to 600 A	2.4 %		
Current rise time	100 ns to 3 μ s	27.9 ns		
Phase angle	0 to 360 degrees	0.7°		
Output impedance	1 Ω to 100 Ω	2.8 %		
Voltage dips and interrupts characteristics			For the calibration of voltage dips and interrupts simulators as specified in BS EN 61000-4-11	
AC Voltage dip	0 V to 500 V	0.51 %		
	50 Hz to 400 Hz			
Overshoot / undershoot	0 to 20 %	0.87 %		
Rise/Fall time	0.1 s to 15 μ s	45 ns		



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Measured Quantity Instrument Moor Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Dip timing	10 μ s to 5 s	11.7 μ s/s	For the calibration of Slow Damped Oscillatory Wave Generators as specified in IEC 61000-4-18	Mobile
Load regulation	0 V to 500 V	0.56 %		
Phase accuracy	0° to 360°	0.7°		
Inrush current	To 1000A peak	4.1 %		
Slow Damped Oscillatory Wave Characteristics				
Peak Voltage	10 V to 7 kV	1.36 %		
Voltage Rise Time	20 ns to 200 ns	5.2 ns		
Decaying Voltage Peak 5	0 to 2 * Pk V	1.41 %		
Peak 10	0 to 2 * Pk V	1.41 %		
Oscillation Frequency	10 kHz to 2 MHz	0.10 %		
Peak Current	500 mA to 50 A	2.41 %		
Burst Duration	0 s to 3 s	0.010 s		
Repetition Rate	30 Hz to 60 Hz 300 Hz to 600 Hz	0.50 % 0.050 %		
Output Impedance	50 Ω to 500 Ω	2.77 %		
Calibration of 17 th Edition Test Equipment				
Continuity	0 Ω to 10 Ω	0.25 % + 12 m Ω		
	10 Ω to 100 Ω	0.25 % + 120 m Ω		
	100 Ω to 1 k Ω	0.25 % + 120 m Ω		
	1 k Ω to 5 k Ω	0.25 % + 1.2 Ω		
	5 k Ω to 50 k Ω	0.25 % + 12 Ω		
Continuity Current	0 A to 320 mA	1.3 % + 100 μ A		
Insulation	10 k Ω to 5 M Ω	0.10 % + 5.8 k Ω		
	5 M Ω to 100 M Ω	1.0 % + 5.8 k Ω		
	100 M Ω to 2 G Ω	1.0 % + 12 k Ω		
	2 G Ω to 10 G Ω	5.0 % + 12 k Ω		
Insulation test voltage	0 V to 1.1 kV	1.0 % + 810 mV		
Insulation test current	0 A to 2 mA	1.0 % + 8.0 μ A		
Voltage 50 Hz	90 V to 420 V	0.20 % + 120 mV		



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Measured Quantity Instrument Moor Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Calibration of 17 th Edition Test Equipment (continued)				Mobile
Loop Impedance	50 Hz 50 mΩ to 1 kΩ	0.50 % + 22 mΩ		
RCD testers				
Current	50 Hz 2 mA to 3 A	1.2 % + 61 μA		
Timing	20 ms to 5 s	730 μs		
PAT TESTERS				
Earth Bond Resistance	50 mΩ to 10 Ω 10 Ω to 1 kΩ	0.50 % + 4.7 mΩ 0.50 % + 4.6 mΩ		
Earth Bond Current	50 Hz 10 mA to 500 mA 500 mA to 30 A	1.5 % + 6.1 mA 1.5 % + 60 mA		
Load Test	0.13 kVA (nominal 440 Ω)	5.0 %		
Leakage Current	2 mA to 8 mA	1.5 % + 8.4 μA		
Line Voltage	200 V to 260 V	0.80 % + 620 mV		
Flash Voltage	1 kV to 1.8 kV (Class 1) 2 kV to 3.6 kV (Class 2)	4.0 % + 10 V 4.0 % + 10 V		
Flash current	0 mA to 3 mA	5.0 % + 880 μA		



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Measured Quantity Instrument Moor Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Temperature simulators, calibration by electrical simulation				Mobile
Resistance thermometers (Pt 100)	-200 °C to +800 °C	0.10 °C		
Base metal thermocouples	-200 °C to -100 °C -100 °C to +1372 °C	1.7 °C 1.2 °C	Including cold junction compensation	
Noble metal thermocouples	0 °C to +100 °C 100 °C to 400 °C 400 °C to 1770 °C	4.0 °C 2.7 °C 2.0 °C	Including cold junction compensation	
Resistance thermometers (Pt 100)	-200 °C to +800 °C	0.15 °C		
Base metal thermocouples	-200 °C to -100 °C -100 °C to +1372 °C	1.7 °C 1.2 °C	Including cold junction compensation	
Noble metal thermocouples	0 °C to 100 °C 100 °C to 400 °C 400 °C to 1770 °C	4.0 °C 2.7 °C 2.0 °C	Including cold junction compensation	
HUMIDITY Calibration of rh probes:	15 °C to 20 °C 36 %rh to 90 %rh	1.7 %rh to 3.8 %rh	The accreditation covers other humidity units directly related to dew point, e.g. vapour pressure, ppm volume, g/kg, etc.	
	20 °C to 30 °C 26 %rh to 90 %rh	1.3 %rh to 3.7 %rh		
	30 °C to 50 °C 25 %rh to 75 %rh	1.2 %rh to 2.9 %rh		



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HUMIDITY (continued)				Mobile
Calibration of chambers: Dew-Point	0 °C to 82 °C	0.58 °C		
Relative Humidity	10 °C to 20 °C 50 %rh to 98 %rh	2.4 %rh to 4.2 %rh	Dew Point and Relative Humidity Instruments may be calibrated in accordance with the schedule measured quantities and range.	
	20 °C to 40 °C 30 %rh to 98 %rh	1.5 %rh to 3.9 %rh		
	40 °C to 60 °C 10 %rh to 98 %rh	1.5 %rh to 3.4 %rh		
	60 °C to 80 °C 10 %rh to 98 %rh	1.5 %rh to 3.0 %rh		
	85 °C and 85 %rh	3.5 %rh		
TEMPERATURE				
Temperature controlled chambers/ovens, fridges/refrigerators and freezers	-80 to +100 °C 100 °C to 260 °C	0.20 °C 0.40 °C	Temperature controlled baths calibrated using PRTs.	
Temperature controlled furnaces and fridges/refrigerators	0 °C to 1100 °C 1100 °C to 1300 °C	3.0 °C 5.0 °C	Calibrated using type R thermocouples.	
Temperature controlled ovens/chambers, fridges/refrigerators and freezers	-80 °C to +260 °C	1.0 °C	Calibrated using type T thermocouples.	
Temperature controlled ovens/chambers and fridges/refrigerators	0 °C to 1200 °C	5.0 °C	Calibrated using type N thermocouples. Single and multipoint time dependent temperature profiling, also referred to as spatial temperature surveying or mapping.	
Temperature Indicators	-80 °C to -25 °C -25 °C to +140 °C 140 °C to 1100 °C 1100 °C to 1300 °C	0.20 °C 0.50 °C 3.0 °C 5.0 °C		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
<p>PRESSURE</p> <p>Gas Pressure (gauge)</p> <p>Calibration of pressure indicating instruments and gauges</p> <p>Hydraulic Pressure (gauge)</p> <p>Calibration of pressure indicating instruments and gauges</p> <p>Gas Pressure (Absolute)</p> <p>Calibration of pressure indicating instruments and gauges</p> <p>MASS</p> <p>Weighing Machines (Non Automatic)</p>	<p>-95 kPa to 0 Pa 0 Pa to 1 MPa 1 MPa to 2 MPa 2 MPa to 10 MPa</p> <p>0 Pa to 70 MPa</p> <p>5 kPa to 80 kPa 80 kPa to 115 kPa 115 kPa to 200 kPa</p> <p>5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg</p> <p>1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg 50 kg 100 kg 200 kg 500 kg 750 kg 1000 kg 1250 kg 1750 kg</p>	<p>720 Pa 720 Pa 1.8 kPa 4.2 kPa</p> <p>100 kPa</p> <p>700 Pa 52 Pa 700 Pa</p> <p>0.0030 mg 0.0041 mg 0.0050 mg 0.0061 mg 0.0081 mg 0.0091 mg 0.012 mg</p> <p>0.015 mg 0.018 mg 0.024 mg 0.033 mg 0.045 mg 0.074 mg 0.14 mg 0.28 mg 0.69 mg 1.9 mg 3.8 mg 9.6 mg 19 mg 39 mg 2.9 g 5.9 g 12 g 29 g 44 g 66 g 89 g 136 g</p>	<p>Methods consistent with EURAMET CG17.</p> <p>Calibration of pressure devices with an electrical output may be undertaken.</p> <p>Calibration of pressure devices with an electrical output may be undertaken.</p> <p>Absolute pressure calibrations may be undertaken over the gauge pressure ranges with the addition of the barometric pressure and uncertainty of 52 Pa.</p> <p>Weights available in OIML Class: E2 from 1 mg to 2 kg, grouped load 7 kg. F1 up to 10 kg, group load 50 kg.</p> <p>M1 up to 10 kg, grouped load 750 kg. M2 up to 500 kg, grouped load 1750 kg. Other loads within the overall listed range may also be used.</p> <p>Methods consistent with EURAMET CG18.</p>	Mobile



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
VOLUME OF LIQUIDS (SEE NOTE 1)				
Single channel instruments	0.1 μ l to 10 μ l 10 μ l to 20 μ l 20 μ l to 100 μ l 100 μ l to 200 μ l 200 μ l to 500 μ l 0.5 ml to 2 ml	0.060 μ l 0.071 μ l 0.20 μ l 0.40 μ l 0.70 μ l 0.002 ml	Note 1. For water delivered from piston and/or plunger operated volumetric apparatus (POVA) using in-house gravimetric procedures.	Mobile
	2 ml to 5 ml 5 ml to 10 ml 10 ml to 20 ml	0.010 ml 0.015 ml 0.030 ml	1 volume (fixed volume pipettes) 4 volumes (variable volume pipettes). 10 readings (as specified in ISO 8655).	
Multi channel instruments up to 12 channels Simultaneously calibrated	1.0 μ l to 20 μ l 20 μ l to 50 μ l 50 μ l to 100 μ l 100 μ l to 200 μ l 200 μ l to 300 μ l 300 μ l to 600 μ l 600 μ l to 1200 μ l	0.10 μ l 0.20 μ l 0.30 μ l 0.50 μ l 0.80 μ l 1.10 μ l 3.00 μ l	From minimum of 1 volume and minimum of 5 readings up to 4 volumes and up to 10 readings (by agreement with the customer)	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
Electronic Height Gauges with microprocessor control	0 to 1000	$1.0 + (5.0 \times L \text{ in m})$	See note 8 – Manchester	Manchester (Site calibration)
Comparators - Horizontal (external)	BS1054:1975 250 to 10 000 magnifications	1.0% of range, minimum 2.0		
Horizontal measuring machines	0 to 1200	$0.30 + (4.0 \times L \text{ in m})$	See note 8 – Manchester	
NPL type level comparator	MOY/SCMI/42 0 to 1000 mm	$0.050 + (0.50 \times L \text{ in m})$		
Gauge block comparators	0 to 100 mm	$0.050 + (0.5 \times L \text{ in m})$	See note 8 - Manchester	
Optical dividing heads			See note 22 – Manchester	
Rotary tables		Linear dimensions		
Inclinable tables	0 to 1000 Capacity	$1 + (10 \times L \text{ in m})$ Overall angular performance 3 seconds of arc		
Inclinable rotary tables				
Profile projectors	10 to 100 magnification Linear Angle	125 at the screen 4.0 2 minutes of arc	See note 22 - Manchester	
Microscopes toolmakers	MOY/SCMI/02 0 to 150 x 150 mm	$2.0 + 2.5/m$ with eye piece		
Measuring machines plain taper diameter	MOY/SMCI 16,19 and 78 0 to 100 magnifications	1.5 (overall performance)		
Linear scales associated with height and length measuring instruments using a laser interferometer	0 to 3000	$0.15 + (1.5 \times L \text{ in m})$		
Performance verification of co-ordinate measuring machines	As BS EN ISO 10360-2:2009 0 mm to 1500 mm (longest diagonal using end standards)	0.70 $+ (0.70 \times L \text{ in m}) \mu\text{m}$		
	As BS EN ISO 10360-5:2010 10 mm to 50 mm	0.90 μm		



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Trescal Limited
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Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
FORM Surface Plates Granite Cast iron	As BS 817:2008	1.5 + (0.80 x diagonal in m)	The uncertainty quoted is for the departure from flatness, straightness or squareness; ie the distance separating the two parallel planes which just enclose the surface under consideration.	Manchester (Site calibration)
END				



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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 uncertainty of measurement 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 CIPM-ILAC definition of the CMC is as follows:

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 CMC is stated only as a percentage, this is to be interpreted as meaning percentage of the measurand.

Thus, for example, a measurement uncertainty of 1.5 % means $1.5 \cdot 0.01 \cdot q$, where q is the quantity value.

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