Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0013

Accredited to ISO/IEC 17025:2017

Trescal Limited

Issue No: 115 **Issue date:** 19 January 2021

Saxony Way
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Calibration performed by the Organisation at the locations specified below

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details		Activity	Location code
Address Saxony Way Blackbushe Business Park Yateley Hampshire GU46 6GT	**Local contact** Mr James Luff Tel: +44 (0)1252 533 300 Fax: +44 (0)1252 533 333 Email: jim.luff@trescal.com Mr Jeremy Struthers Tel: +44 (0)1252 533 300 Fax: +44 (0)1252 533 333 Email: jeremy.struthers@trescal.com	Electrical dc & lf Electrical rf Photometric Pressure Flow Temperature Humidity	Yateley
Park Gate Close Bredbury Park Way Bredbury Stockport SK6 2SL	Mr Dave Gresty Tel: +44 (0)161 406 7878 Fax: +44 (0)161 406 7979 E-Mail: calibration.manchester@trescal.com	Electrical dc & lf High Voltage Accelerometry Acoustics Mass Force Torque Dimensional Pressure	Manchester
Ramsey Building Muirton Way Dunfermline Scotland KY11 9FZ	Mr Ken Baxter Tel: +44 (0)1383 646464 Fax: +44 (0)1383 646468 E-Mail: calibration.scotland@trescal.com	Dimensional Electrical dc & lf Electrical rf High Voltage Torque Pressure Temperature Volume	Donibristle

Locations covered by the organisation and their relevant activities

Laboratory locations (continued):

Location details		Activity	Location code
Sanders Building Gunnels Wood Road Stevenage SG1 2AU	Mr Stephen Crook Tel: +44 (0)1438 212541 Fax: +44 (0) 1438 772203 E-Mail: calibration.stevenage@trescal.com	Electrical dc and lf Electrical rf Dimensional Torque	Stevenage
Activities at more than one of the above locations		Electrical dc & lf	As specified overleaf

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Site activities performed away from the locations listed above:

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

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 (next paragraph should be attached to this paragraph). 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		
Long Series gauge blocks	BS EN ISO 3650:1999 100 to 1500	0.26 + (2.14 x length in m)	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.	
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)		
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.			3 Single start, symmetrical thread forms only. 4 Includes use of check plugs for screw rings from 1 mm to 14 mm diameter	
Gauge block accessories	BS 4311:Part 2:2009 0.1 to 12.5	0.30	5 Functional test for size using setting plugs calibrated with a CMC of 3.0 µm	
Gauge block comparators	0 to 100	0.050 + (0.50 × L in m)	6 Simple height gauges - vernier, dial and digital instruments designed only for measuring distances parallel to the beam.	
Length bar accessories	BS 1790:1961 and BS5317:1976	0.30		
Precision scales (linear)	0 to 400	1.0 + (3.0 x L in m)	7 Conformance statements cannot be made against specifications whose magnitudes are smaller than the specified CMC values	
Stage Micrometers	0 to 10	0.50		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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		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	 0.80 1.0 1.5 2.0 3.0		
Plain plug gauges (taper)				
Parallel to1 in 8 on diameter	3 to 50 50 to100	3.0 4.0		
1 in 8 to 1 in 3 on diameter	3 to 50 50 to 100	5.0 6.0		
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	 1.0 0.80 1.0 1.5 2.0 3.0	on diameter	
Plain ring gauges (taper)	Diameter:			
Parallel to 1 in 8 on diameter	3 to 50 50 to 100 100 to 200	4.0 5.0 6.0		
1 in 8 to 1 in 3 on diameter	3 to 50 50 to 100 100 to 200	6.0 7.0 8.0		
Length Gauges, flat and spherical ended	0 to 1200 1200 to 2000	1.0 + (5.0 × L in m) 1.0 + (8.0 × L in m)		
Plain Gap Gauges (parallel)	2 to 50 50 to 100 100 to 200 200 to 300 300 to 600	3.0 5.0 8.0 12 15		

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DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
Screw plug gauges (parallel) including check and setting plugs	Diameter: 1 to 100 100 to 150 150 to 300	CMC on pitch diameter 3.0 4.0 6.0		Manchester
Screw plug gauges (taper) including check plugs	5 to 100 100 to 150	5.0 8.0		
Screw ring gauges (parallel)	1 to 6 6 to 100 100 to 150 150 to 300 300 to 600	See note 4 5.0 6.0 8.0 12		
Screw ring gauges (taper)	6 to 150	7.0		
Screw pitch	0.2 to 8	1.5		
Screw flank angle	0° to 52°	5.0 minutes of arc		
Screw thread adjustable Calliper gauges (parallel)	3 to 50 diameter	See note 5		
Parallels	As BS 906:Parts 1&2:1972 5 to 50 x 100 x 400	 1.5 to 5.0		
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	Dependant on size and 3.0 + (10 x L in m)		
Steel rules	BS 4372:1968 0 to 1000 DIN 866:1983 0 to 5000	 5 + (10 x L in m) 5 + (10 x L in m)		
Tapes, measuring (pocket, precision and pi)	0 m to 5 m 5 m to 50 m	20 + (3.0 x L in m) 300 + (10 x L in m)		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
ANGLE				Manchester
Angle gauges - NPL type	0° to 90°	4.0 seconds of arc		
Squares Blade type	BS 939:2007 0 to 300 300 to 600 600 to1000	CMC on Squareness 3.0 5.0 8.0		
Cylindrical	BS 939:2007 0 to 600 600 to1000	 2.0 8.0		
Block	BS 939:2007 0 to 300 300 to 600 600 to 1000	 3.0 5.0 8.0		
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	Linear dimensions: 1.0 + (10 x L in m)		
Compound sine tables	With tables of equivalent up to 500 length	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	1.0 % of range (min 0.30 seconds of arc)		
Clinometers	0° to 360°	10 seconds of arc or greater dependent on sensitivity Optical Instruments 2.0 seconds of arc		

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DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				
FORM				Manchester
Optical flats	10 to 75 diameter	0.13 flatness		
Optical parallels	10 to 30 diameter 10 to 100 length	0.13 flatness 0.20 parallelism 0.60 length		
Toolmakers Flats See Note1	BS 869:1978	0.50		
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 External Internal	BS 3730 Part2 :1982 0 to 350 diameter 3 to 350 diameter	 0.050 on radius 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	0.50 on diameter 0.80 on diameter		
MEASURIING 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	Overall performance 2.0		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				Manchester
MEASURIING INSTRUMENTS AND MACHINES (continued)				
Height setting micrometers	0 to 300	Heads: 1.5 between any two points stepped column 2.5 Overall performance: 3.0		
Riser blocks for above	150 300	2.5 5.0		
3 point Bore micrometers and bore gauges	0 to 300	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 x L 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 x L in m)		
Bevel protractors	BS 1685:2008 0° to 360°	6.0 minutes of arc		
Combination Sets	0 to 600	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	Minimum 0.30		
NPL type level comparator	MOY/SCMI/42 0 to 1000	0.050 + (0.50 × L in m)		
Optical Dividing Heads				
Rotary tables	0 to 1000 Capacity	Linear dimensions 1.0 + (10 × L in m)		
Inclinable tables	0 to 1000 Capacity	Overall angular performance		
Inclinable rotary tables	0 to 1000 Capacity	3.0 seconds of arc		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				Manchester
MEASURIING INSTRUMENTS AND MACHINES (continued)				
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 x L in m) µm		
	As BS EN ISO 10360-5:2010 10 mm to 50 mm (single stylus probing test only)	0.90 µm		
Bench Centres	0 to 1000 between centres	Linear dimensions 1.0 + (10 × L in m)		
Thread diameter measuring	NPL schedules MOY/SCMI/9 and MOY/SCMI/12 0 to 300	1.5 overall performance		
Measuring machines plain	MOY/SMCI 16,19 and 78	Magnification 125		
Taper diameter	0 to 100 0 to 100 magnifications	Linear 5.0 Angular 3.0 mins of arc		
Microscopes toolmakers	MOY/SCMI/02 0 to (150 × 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 x L in m)		
Feeler gauges and shims	BS 957:2008 0.025 to 1	1.5		
Electronic Height Gauges With microprocessor control	0 to 1000	1.0 + (5.0 x L in m)		
Profile projectors	10 to 100 magnification Linearity Angle	130 at the screen 4.0 2.0 minutes of arc		
Cube moulds for concrete	BS EN 12390-1 2012 100 × 100 × 100 BS EN 196-1 2005 160 × 40 × 40	15		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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		.Calibration of electrical indicators not accredited	
	0.05 N.m to 2.5 N.m 0.5 N.m to 1500 N.m	0.060 % 0.051 %		
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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ACCELEROMETRY				Manchester
ACCELERATION TRANSDUCERS			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	
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 %	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-precison 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 precison 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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
CHARGE AMPLIFIERS				Manchester
Calibration of voltage output per picocoulomb or millivolt input. Minimum input 1 pC or 10 mV.	*1 Hz to 10 Hz* *10 Hz to 30 kHz* *30 kHz to 100 kHz* *100 kHz to 500 kHz*	0.80 % 0.29 % 0.32 % 1.5 %		
ACOUSTICS				
PISTONPHONES AND SOUND CALIBRATORS			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.	
Sound pressure level	84 dB to 125 dB (ref : 20 µPa)			
	250 Hz *1000 Hz*	0.10 dB 0.10 dB		
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	
DC Resistance				
Measurement	0 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 2 kΩ 2 kΩ to 20 kΩ 20 kΩ to 200 kΩ 200 kΩ to 2 MΩ 2 MΩ to 20 MΩ 20 MΩ to 100 MΩ	32 ppm + 0.030 mΩ 21 ppm + 0.070 mΩ 16 ppm + 0.70 mΩ 16 ppm + 7.0 mΩ 17 ppm + 70 mΩ 27 ppm + 2.0 Ω 51 ppm + 93 mΩ 370 ppm + 11 kΩ		
DC HIGH VOLTAGE				
Measurement and Generation	1 kV to 25 kV 25 kV to 60 kV 60 kV to 100 kV 100 kV to 150 kV	40 ppm 50 ppm 150 ppm 180 ppm		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC HIGH VOLTAGE	1 kV to 50 kV *50 Hz*	580 ppm		Manchester
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 μH to 3 μH	7.0 %		
	3 μH to 5 μH	2.2 %		
	5 μH to 10 μH	1.2 %		
	10 μH to 100 μH	0.15 % + 50 nH		
	100 μH to 1 mH	0.040 % + 60 nH		
	1 mH to 10 mH	0.030 % + 1.0 μH		
	10 mH to 100 mH	0.030 % + 10 μH		
	100 mH to 1 H	0.030 % + 100 μH		
	1 H to 10 H	0.030 % + 1.0 mH		
CAPACITANCE				
Measurement	*At 1 kHz*			
	1 pF to 1 nF	20 ppm		
	1 nF to 10 nF	40 ppm		
	10 nF to 100 nF	50 ppm		
	100 nF to 1 μF	90 ppm		
Generation	1 pF	45 ppm		
	10 pF and 100 pF	25 ppm		
	1 nF	35 ppm		
	10 nF	50 ppm		
	100 nF	60 ppm		
	1 μF	95 ppm		
FREQUENCY				
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		
Elasped time	10 ms to 8 hrs	15 in 10^{10} + 500 ns		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC CURRENT				Mnachester
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 µA 10 µA 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 ppm 40 ppm 80 ppm 80 ppm 80 ppm 120 ppm		
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 µA 10 µA 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 ppm 40 ppm 80 ppm 80 ppm 80 ppm 120 ppm		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
PRESSURE			Methods consistent with EURAMET CG3	Manchester
Gas Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges.	-100 kPa to -3.5 kPa -3.5 kPa to -1.5 kPa 1.5 kPa to 3.5 kPa 3.5 kPa to 7 MPa	0.010 % 0.024 % 0.023 % 0.0070 %	Calibrations of devices with an electrical output may be undertaken	
Gas Pressure (Absolute)				
Calibration of pressure indicating instruments and gauges	1.0 kPa to 80 kPa 80 kPa to 115 kPa 115 kPa to 7.1 MPa	0.010 % + 24 Pa 24 Pa 0.0080 % + 24 Pa		
Hydraulic Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges. "Pressure equivalent" calibration of Dead Weight Testers (pressure balance supplied with an associated mass set).	600 kPa to 6 MPa 6 MPa to 120 MPa	0.010 % 0.010 %	Methods consistent with EURAMET CG3 and CG17	
Hydraulic Pressure (Absolute)				
Calibration of pressure indicating instruments and gauges.	700 kPa to 6.1 MPa 6.1 MPa to 120.1 MPa	0.010 % + 24 Pa 0.010 % + 24 Pa		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 1ºC to 120 ºC 120 ºC to 500 ºC	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.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
HUMIDITY			By comparison with dew-point hygrometer and Platinum Resistance Thermometers	Yateley
DEW-POINT	-15 °C to +60 °C 60 °C to 70 °C 70 °C to 82 °C	0.12 °C 0.13 °C 0.16 °C		
Relative humidity Temperature range	7 %rh to 83 %rh 83 %rh to 95 %rh 15 °C to 20 °C	1.3 %rh 1.5 %rh 0.20 °C		
	7 %rh to 83 %rh 83 %rh to 95 %rh 20 °C to 70 °C	1.3 %rh 1.5 %rh 0.20 °C		
	7 %rh to 88.8 %rh 70 °C to 85 °C	1.3 %rh 0.20 °C		
SALT CAPSULES 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 CG3	
Gas Pressure (absolute)				
Calibration of pressure indicating instruments and gauges	3.5 kPa to 175 kPa 175 kPa to 7 MPa	0.0055 % + 1.9 Pa 0.0055 % + 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	0.0055 % + 24 Pa 4.8 Pa 1.4 Pa 0.81 Pa 0.47 Pa 0.81 Pa 1.4 Pa 0.0055 % 0.0055 %		
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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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				
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	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 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				Yateley
Electrical fast transient characteristics			For the calibration of EFT/burst generators as specified in BS EN 61000-4-4	
Peak voltage into 50 Ω	1 V to 8 kV	1.1 %		
Peak voltage into 1 kΩ	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 μs 2.8 μs		
Burst period	50 ms to 500 ms	2 ppm		
Repetition rate	1 kHz to 1.5 MHz	2 ppm		
Impulse Magnetic Filed 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 μs to 20 μs	62.5 ns		
Current Duration	2 μs to 50 μs	0.17 μs		
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 μs to 2 μs	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 ppm		
Peak current	1 A to 600 A	2.4 %		
Current rise time	100 ns to 3 μs	27.9 ns		
Phase angle	0 to 360 degrees	0.70°		
Output impedance	1 Ω to 100 Ω	2.8 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
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	
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 µs to 1 5µs	45 ns		
Dip timing	10 µs to 5 s	11.7 ppm		
Load regulation Phase accuracy	0 V to 500 V 0° to 360°	0.56 % 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	Yateley
Peak Voltage	10 V to 7 kV	1.36 %		
Voltage Rise Time	20 ns to 200 ns	5.2 ns		
Decaying Voltage Peak 5 Peak 10	 0 to 2 * Pk V 0 to 2 * Pk V	 1.41 % 1.41 %		
Oscillation Frequency	10 kHz to 2 MHz	0.10 %		
Peak Current	500 mA to 50 A	2.41 %		
Burst Duration	Up to 3 s	0.01 s		
Repetition Rate	30 / s to 60 / s 300 / s to 600 / s	0.50 % 0.05 %		
Output Impedance	50 Ω to 500 Ω	2.77 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				Yateley
ElectroStatic Discharge				
ESD Generators			For the calibration of ESD Generators to IEC61000-4-2:2009 and ISO 10605:2008.	
DC Voltage	0.1 kV to 40 kV	0.39 %,		
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 150 pF/330 Ω 330 pF/330 Ω 150 pF/2000 Ω 330 pF/2000 Ω 150 pF/2000 Ω 330 pF/2000 Ω	 30 ns and 60 ns 65 ns and 130 ns 180 ns 400 ns 360 ns 800 ns	 2.7 % 2.7 % 4.2 % 4.2 % 10.5 % 10.5 %		
LF and RF Impedance *10 Hz to 1 MHz* *1 MHz to 108 MHz* *108 MHz to 200 MHz* *200 MHz to 300 MHz* *300 MHz to 500 MHz* Phase 0° to 180° *9 kHz to 108 MHz* Magnitude 80 Ω to 250 Ω *150 kHz to 30 MHz* *30 MHz to 230 MHz*	Magnitude 1 Ω to 100 Ω	 0.20 Ω 1.0 Ω 2.0 Ω 4.0 Ω 5.0 Ω 1.0° 1.0 % 2.0 %	For the measurement of Line Impedance Stabilisation Networks (LISNs) LISNs, CDNs and ISNs For the measurement of Coupling/Decoupling Networks (CDNs & ISNs)	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				Yateley
Longitudinal Conversion Loss (LCL)	30 dB to 81 dB		For the Calibration of ISNs	
	Cat 3	0.19 dB		
	Cat 5	0.32 dB		
	Cat 6	0.57 dB		
	82 to 90 dB	0.61 dB to 1.36 dB		
DISCONTINUOUS INTERFERENCE ANALYSERS			Tests in accordance with BS55016-1-2007	
Pulse Amplitude	-2.5 dBm to +25 dBm	0.20 dB		
Pulse Duration	0.11 ms to 1.33 ms	10 ppm		
Pulse Separation	0.1 ms to 200 ms			
	Initial 13 s of F.1-11/12	0.10 %		
	All other pulses/tests	10 ppm		
RECEIVERS AND ANALYSERS TO CP1106				
Amplitude Accuracy				
	-40 dBm to +10 dBm		N Type connectors	
	10 Hz to 4 GHz	0.080 dB		
	4 GHz to 12 GHz	0.14 dB		
	12 GHz to 18 GHz	0.19 dB		
	-40 dBm to +10 dBm		K Type connectors	
	10 Hz to 4 GHz	0.080 dB		
	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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				Yateley
RECEIVERS AND ANALYSERS TO CP1106 (continued)				
Calibration Signal				
	-40 dBm to 0 dBm			
	10 MHz to 500 MHz	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	0.11 % of Bandwidth		
	Gaussian 60 dB	1.0 % of Bandwidth		
	Non-Gaussian 3/6 dB	0.20 % of Bandwidth		
	Non-Gaussian 60 dB	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		N Type connectors	
	0 to 0.2	0.015		
	0.2 to 0.4	0.031		
	0.4 to 0.6	0.065		
	3 GHz to 18 GHz			
	0 to 0.2	0.028		
	0.2 to 0.4	0.042		
	0.4 to 0.6	0.078		
	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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				Yateley
RECEIVERS AND ANALYSERS TO CP1106 (continued)				
Amplitude Linearity Reference to a nominal 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	0.11 dB		
	4 GHz to 12 GHz	0.12 dB		
	12 GHz to 18 GHz	0.13 dB		
Tracking Generator Attenuator Accuracy				
	10 MHz to 500 MHz			
	0 dB to 60 dB	0.11 dB		
	0 dB to 90 dB	0.21 dB		
	0 dB to 100 dB	0.32 dB		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				Yateley
Pulse Accuracy and Detector Response				
Sine wave accuracy	60 dBµV *10 Hz to 1 GHz*	 0.14 dB		
QP Pulse level accuracy	20 dBµV to 70 dBµV emf (Bands A/B) (Bands C/D)	 0.15 dB 0.23 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.	
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	Maximum CW amplitude +15 dBm; minimum harmonic level -80 dBc	
	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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATIONS IN SUPPORT OF EMC TESTING EQUIPMENT (continued)				Yateley
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	
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	0.6 dB 1.0 dB 2.0 dB		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC AND LF ELECTRICAL STANDARDS				Yateley
DC RESISTANCE				
Specific Values	100 µΩ 1 mΩ 10 mΩ	4.0 ppm 3.0 ppm 0.60 ppm	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 ppm to 500 ppm Specific values are those, which fall within ± 0.1% of the stated values at or below 100 TΩ. 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 mΩ 1 Ω 10 Ω	0.12 ppm 0.090 ppm 0.090 ppm		
	100 Ω 1 kΩ 10 kΩ	0.070 ppm 0.090 ppm 0.070 ppm		
	100 kΩ 1 MΩ 10 MΩ	0.30 ppm 0.50 ppm 0.80 ppm		
	100 MΩ *Applied voltage 10 V*	1.5 ppm		
Other Values	0 Ω to 1 mΩ 1 mΩ to 10 mΩ 10 mΩ to 100 mΩ	6.0 nΩ 6.0 ppm 0.40 ppm	Uncertainties at high values also depend on applied voltage The applied voltages are 100 V for values from 100 MΩ to 100 GΩ and 500 V for higher values.	
	100 mΩ to 1 Ω 1 Ω to 10 Ω 10 Ω to 100 Ω	0.20 ppm 0.20 ppm 0.20 ppm		
	100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ	0.20 ppm 0.20 ppm 0.30 ppm		
	100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ	0.50 ppm 0.80 ppm 1.50 ppm		
High Resistance system	100 MΩ to 1 GΩ 1 GΩ to 10 GΩ 10 GΩ to 100 GΩ	30 ppm 45 ppm 55 ppm		
	100 GΩ to 1 TΩ 1 TΩ to 10 TΩ 10 TΩ to 100 TΩ	100 ppm 250 ppm 250 ppm		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC RESISTANCE				Yateley
Specific Values				
Generation	1 Ω			
	70 Hz	5.0 ppm		
	1 kHz	5.0 ppm		
	1592 Hz	5.0 ppm		
	2 kHz	6.0 ppm		
	5 kHz	15 ppm		
	10 Ω, 100 Ω, 1 kΩ and 10 kΩ			
	70 Hz	5.0 ppm		
	1 kHz	5.0 ppm		
	1592 Hz	5.0 ppm		
	2 kHz	5.0 ppm		
	5 kHz	10 ppm		
	10 kHz	15 ppm		
	20 kHz	30 ppm		
	25 Ω			
	75 Hz, 1 kHz & 5 kHz	3.0 ppm		
	10 kHz	10 ppm		
Measurement	1 Ω, 10 Ω, 100 Ω, 1 kΩ and 10 kΩ			
	75 Hz	5.0 ppm		
	1 Ω, 10 Ω, 100 Ω, 1 kΩ and 10 kΩ			
	70 Hz, 1 kHz, 1592 Hz, 2 kHz, 5 kHz	35 ppm		
	10 Ω, 100 Ω, 1 kΩ and 10 kΩ			
	10 kHz	35 ppm		
	10 Ω, 100 Ω, 1 kΩ and 10 kΩ			
	20 kHz	45 ppm		
Other values	1 Ω to 10 kΩ			
	100 Hz to 1 kHz	520 ppm		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC VOLTAGE				Yateley
Standard cell value	1.018 V nominal	0.15 ppm	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 ppm 0.12 ppm		
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 ppm 0.60 ppm		
	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 μA	0.080 % + 1.0 pA 0.080 % + 10 pA 8.0 ppm		
	1 μA 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 ppm 8.0 ppm 20 ppm 30 ppm 100 ppm		
	20 A to 2500 A	0.55 %	For the calibration of current clamps and similar devices, using 25 turn coil.	
	2500 A to 5000 A	0.55 %	For the calibration of current clamps and similar devices, using 50 turn coil.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC/DC TRANSFER VOLTAGE (Specific Values)				Yateley
AC/DC transfer difference in ppm 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				

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 ppm 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				

Yateley

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code

AC VOLTAGE (Specific Values)

AC Voltage CMCs in ppm 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				

Yateley

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 ppm 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	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE RATIO	0.000 000 01 to unity *400 Hz to 1 kHz*	0.13 ppm of input		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 ppm 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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 ppm 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 ppm 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	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 ppm 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	55 ppm		Yateley
	20 A to 3000 A *10 Hz to 65 Hz* *65 Hz to 300 Hz*	 0.55 % 0.55 %	For the calibration of current clamps and similar devices, using 25 turn coil.	
	3000 A to 6000 A *10 Hz to 65 Hz* *65 Hz to 300 Hz*	 0.55 % 0.55 %	For the calibration of current clamps and similar devices, using 50 turn coil.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC POWER			Sinusoidal waveforms	Yateley

AC Power CMCs in ppm, 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 ppm, 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 ppm, 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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC POWER (continued)			Sinusoidal waveforms	Yateley

AC Power CMCs in ppm, 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 ppm, 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 ppm, 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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC POWER (continued)			Sinusoidal waveforms	Yateley

AC Power CMCs in ppm, 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 ppm, 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 ppm, 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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC Voltage and AC Voltage harmonics				Yateley
DC	0.7 mV to 8 V 8 V to 16.5 V 16.5 V to 39 V 39 V to 84 V 84 V to 168 V 168 V to 504 V	160 ppm + 7.0 mV 160 ppm + 13 mV 160 ppm + 30 mV 160 ppm + 60 mV 160 ppm + 130 mV 230 ppm + 400 mV		
AC	1.5 mV to 4.8 V *16 Hz to 450 Hz* *451 Hz to 850 Hz* *851 Hz to 6 kHz*	 160 ppm + 1.5 mV 220 ppm + 1.5 mV 630 ppm + 1.5 mV		
	4.8 V to 9.9 V *16 Hz to 450 Hz* *451 Hz to 850 Hz* *851 Hz to 6 kHz*	 160 ppm + 2.5 mV 220 ppm + 2.5 mV 630 ppm + 2.5 mV		
	9.9 V to 23 V *16 Hz to 450 Hz* *451 Hz to 850 Hz* *851 Hz to 6 kHz*	 160 ppm + 2.5 mV 220 ppm + 2.5 mV 630 ppm + 2.5 mV		
	23 V to 50 V *16 Hz to 450 Hz* *451 Hz to 850 Hz* *851 Hz to 6 kHz*	 160 ppm + 5.5 mV 220 ppm + 5.5 mV 630 ppm + 5.5 mV		
	50 V to 100 V *16 Hz to 450 Hz* *451 Hz to 850 Hz* *851 Hz to 6 kHz*	 160 ppm + 15 mV 220 ppm + 15 mV 680 ppm + 15 mV		
	100 V to 302 V *16 Hz to 450 Hz* *451 Hz to 850 Hz* *851 Hz to 6 kHz*	 230 ppm + 40 mV 270 ppm + 40 mV 680 ppm + 40 mV		

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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 ppm		
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 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 *70 Hz to 180 Hz* *181 Hz to 450 Hz* *451 Hz to 850 Hz* *851 Hz to 3 kHz* *3 kHz to 6 kHz*	0.0040° 0.0070° 0.020° 0.040° 0.20° 0.35°		
	0° to 360°		5 A to 21 A 16 V to 1008 V	
	16 Hz to 69 Hz *70 Hz to 180 Hz* *181 Hz to 450 Hz* *451 Hz to 850 Hz* *851 Hz to 3 kHz* *3 kHz to 6 kHz*	0.0050° 0.0090° 0.025° 0.050° 0.25° 0.50°		
INDUCTANCE				
Specific Values	*At 1 kHz*			
	1 μH	5.0 nH		
	10 μH	5.0 nH		
	100 μH	120 ppm		
	500 μH	120 ppm		
	1 mH	120 ppm		
	5 mH	120 ppm		
	10 mH	120 ppm		
	50 mH	120 ppm		
	100 mH	120 ppm		
	500 mH	120 ppm		
	1 H	120 ppm		
	5 H	120 ppm		
	10 H	120 ppm		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
INDUCTANCE (continued)				Yateley
Specific Values (continued)	*At nominal 50 Hz*			
	1 H	200 ppm		
	5 H	200 ppm		
	10 H	200 ppm		
	At 200 Hz			
	10 H	200 ppm		
	At 400 Hz			
	1 H	200 ppm		
	10 H	200 ppm		
	At 10 kHz			
	1 mH	200 ppm		
	10 mH	250 ppm		
	100 mH	250 ppm		
	1 H	500 ppm		
Other Values	*At 1 kHz*			
	5 nH to 100 μH	0.030 % + 10 nH		
	100 μH to 100 mH	200 ppm		
	100 mH to 1 H	200 ppm		
	1.0 H to 10 H	200 ppm		
CAPACITANCE				
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				
Specific Values	*At 1 kHz:*			
	0.001 pF	0. 005 fF		
	0.01 pF	0. 005 fF		
	0.1 pF	0. 005 fF		
	1 pF	5.0 ppm		
	10 pF	1.5 ppm		
	100 pF	1.5 ppm		
	1000 pF	2.0 ppm		
	10 nF	10 ppm		
	100 nF	25 ppm		
	1 μF	35 ppm		
Other Values	*At 1 kHz:*			
	0.01 fF to 0.01 pF	0. 010 fF		
	0.01 pF to 0.1 pF	0. 010 fF		
	0.1 pF to 1 pF	0. 010 fF		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
CAPACITANCE (continued)				Yateley
	At 1 kHz:			
	1 pF to 10 pF	10 ppm		
	10 pF to 100 pF	5.0 ppm		
	100 pF to 1000 pF	5.0 ppm		
	1 nF to 10 nF	20 ppm		
	10 nF to 100 nF	50 ppm		
	100 nF to 1000 nF	60 ppm		
	1 μF to 10 μF	600 ppm		
	From 20 Hz to 10 kHz:			
	1 pF to 1 nF	22 ppm		
	At 100 Hz:			
	1 μF to 100 μF	0.35 %		
	100 μF to 10 mF	0.40 %		
	1 nF			
	100 kHz	300 ppm		
	200 kHz to 900 kHz	600 ppm		
	1 MHz	700 ppm		
CAPACITANCE LOSS				
(Dissipation factor, tan δ)	10^{-4} to 1		Uncertainty range stated is for capacitance values ≤ 100nF at 1 kHz	
	50 Hz to 10 kHz	0.000050		
PHASE ANGLE				
Generation	0° to 360°		*R* is the ratio between the output voltages and may have any value between 1 and 100	
	10 Hz to 1 kHz	(0.010 + 0.000050*R*)°		
	1 kHz to 6.25 kHz	(0.010 + 0.00010*R*)°		
	6.26 kHz to 50 kHz	(0.025 + 0.00025 *R*)°		
	50 kHz to 100 kHz	(0.050 + 0.00050 *R*)°		
Measurement	0° to 360°			
	10 Hz to 30 Hz	0.050°		
	30 Hz to 6 kHz	0.025°		
	6 kHz to 30 kHz	0.040°		
	30 kHz to 50 kHz	0.050°		
	50 kHz to 100 kHz	0.15°		
AC VOLTAGE	*40 Hz to 200 Hz*			
Other values	1 kV to1.9 kV	1.8 % + 500 mV	Measurement only	
	1.9 kV to 7 kV	1.8 % + 5.0 V		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE (Wideband to 30 MHz) Generation	10 µV to 1.1 mV			Yateley
	10 Hz to 30 Hz	0.85 % + 1.6 µV		
	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		
Generation	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	0.7 % + 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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
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				Yateley
Specific Values	100 kHz, 1 MHz, 5 MHz and 10 MHz	1.0 in 10^{12}	1000 s minimum measuring period	
Other Values	5 Hz to 50 Hz 50 Hz to 500 Hz 500 Hz to 5 kHz	2.0 in 10^{8} 2.0 in 10^{9} 2.1 in 10^{10}	For the calibration of signal sources and frequency meters/ counters	
	5 kHz to 50 kHz 50 kHz to 500 kHz 500 kHz to 40 GHz	1.9 in 10^{11} 1.0 in 10^{11} 4.0 in 10^{12}		
	1 GHz to 18 GHz	1 in 10^{12}	For frequency generation	
RF AND MICROWAVE MEASUREMENTS: Standards				
VSWR	1.0 to 1.05 *250 MHz to 8.25 GHz* *in 250 MHz steps*	0.0030 to 0.0050	14 mm GPC. Other connectors invoke slightly larger uncertainties	Yateley
	1.0 to 1.5 *500 MHz to 8.25 GHz*	0.0090 to 0.019	14mm GPC. Other connectors invoke slightly larger uncertainties	
	1.5 to 10 *500 MHz to 8.25 GHz*	0.012 to 0.21	14mm GPC. Other connectors invoke slightly larger uncertainties	
	1.0 to 1.5 *1.8 GHz to 18 GHz*	0.017 to 0.020	APC-7 connector	
	1.5 to 10 *1.8 GHz to 18 GHz*	0.018 to 0.20	APC-7 connectors	
	1.0 to 1.2 *2 GHz to 18 GHz*	(0.0080 + 0.00080 f_{GHz})	APC 7 connectors	
	2 GHz to 18 GHz	(0.0080 + 0.0010 f_{GHz})	Precision Type N	
	2 GHz to 26.5 GHz	(0.016 + 0.0015 f_{GHz})	APC 3.5 (uncertainty may increase for other 3.5 mm versions)	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
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*	0.004 to 0.006	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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
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 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 0.20		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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*	$180\left(\frac{Unc\lvert\Gamma\rvert}{\pi\lvert\Gamma\rvert}\right)^{o}$	Waveguide No 25	
	75 GHz to 110 GHz	$180\left(\frac{Unc\lvert\Gamma\rvert}{\pi\lvert\Gamma\rvert}\right)^{o}$	Waveguide No 27	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RF ATTENUATION	*100 kHz to 3 GHz*			Yateley
	0 dB to 20 dB	0.002 dB to 0.005 dB		
	20 dB to 50 dB	0.005 dB to 0.015 dB	The uncertainties are for incremental attenuation using VM7 system	
	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	0.002 dB to 0.006 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)	0.011 dB to 0.036 dB		
	0 dB to 50 dB	0.012 dB to 0.036 dB		
	20 dB to 50 dB	0.019 dB to 0.054 dB		
	50 dB to 90 dB	0.033 dB to 0.109 dB		
	90 dB to 100 dB			
RF VOLTAGE	*100 kHz to 1 MHz:*		Supplies above 3 V are not necessarily available over the full frequency range	
	50 μV to 200 mV	0.60 %		
	200 mV to 3 V	0.060 %		
	1 MHz to 10 MHz:			
	50 μV to 200 mV	0.60 %		
	200 mV to 3 V	0.070 %		
	10 MHz to 50 MHz:			
	50 μV to 200 mV	0.62 %		
	200 mV to 3 V	0.15 %		
	50 MHz to 100 MHz:			
	50 μV to 200 mV	0.62 %		
	200 mV to 3 V	0.15 %		
	100 MHz to 200 MHz:			
	50 μV to 200 mV	0.62 %		
	200 mV to 3 V	0.24 %		
	200 MHz to 1000 MHz:			
	50 μV to 200 mV	0.63 %		
	200 mV to 3 V	0.25 %		

Calibration of thermal voltage converters (TVCs)

CMCs stated as % of RF – DC Difference for the following TVC nominal ratings
TVCs are normally calibrated at 90 % to 95 % of their nominal voltage rating, to a maximum of 50 V

Frequency MHz	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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RF Calibration Factor				Yateley
(coaxial line)	10 μW to 100 μW		For the calibration of 50 Ω coaxial power sensors	
	100 kHz to 5 GHz	0.60% to 1.0 %		
	5 GHz to 8 GHz	1.0 % to 1.3 %		
	100 μW to 10 mW			
	100 kHz to 500 MHz	0.42 %		
	500 MHz to 2 GHz	0.52 % to 0.63 %		
	2 GHz to 5 GHz	0.63 % to 0.73 %		
	5 GHz to 7 GHz	0.75 %		
	7 GHz to 8 GHz	0.78 %		
	1 mW to 10 mW			
	8.2 GHz to 12.4 GHz	0.98 %		
	12.4 GHz to 18 GHz	0.98 %		
	18.0 GHz to 26.5 GHz	1.5 %		
	26.5 GHz to 40 GHz	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.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RF POWER (continued) (Waveguide)	1 mW to 1 W			Yateley
	18.0 GHz to 26.5 GHz	1.3 %	Waveguide No 20 (WR 42, RG 53/U, R220)	
	26.5 GHz to 40.0 GHz	1.5 %	Waveguide No 22 (WR 28, RG 96/U, R320)	
	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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 µW 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 µHz 1.0 Hz 1.0 in 10^9 + 15 µHz 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.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
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			Modulation frequency between 50 Hz and 50 kHz	
	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 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			Modulation frequency between 50 Hz and 50 kHz	
	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		
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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 CMCs 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

Location Code: Yateley

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
Transmission Phase (-180° to +180°)			For coaxial 50Ω systems fitted with:	Yateley
	0.1 MHz to 8 GHz		GR900 connectors	
	0 dB to 50 dB	0.50°		
	0.1 MHz to 18 GHz		7 mm connectors	
	0 dB to 50 dB	0.50°		
	0.1 MHz to 18 GHz		Type N connectors	
	20 dB to 20 dB	0.50°		
	20 dB to 50 dB	1.0°		
	8 GHz to 18 GHz			
	20 dB to 50 dB	2.0°		
	0.1 MHz to 26.5 GHz			
	0 dB to 20 dB	0.50°	3.5 mm connectors	
	0.1 MHz to 8 GHz			
	20 dB to 40 dB	0.50°		
	40 dB to 50 dB	1.0°		
	8 GHz to 26.5 GHz			
	40 dB to 50 dB	2.0°		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AUTOMATIC NETWORK ANALYSER SYSTEMS (continued)				Yateley
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	

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 CMCs 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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AUTOMATIC NETWORK ANALYSER SYSTEMS (continued)				Yateley
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 50Ω 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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AUTOMATIC NETWORK ANALYSER SYSTEMS (continued)				Yateley
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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AUTOMATIC NETWORK ANALYSER SYSTEMS (continued)				Yateley
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 to1.5 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	$(0.5^2 + (0.05 \times f_{GHz})^2 + (3*U(rp))^2)^{0.5}$ $(0.5^2 + (0.05 \times f_{GHz})^2 + (U(rp))^2)^{0.5}$ where: $U(rp) = \frac{\sin^{-1}(U(vrc))}{VRC(Mag)}$ 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 7mm, 3.5mm, 2.92, Type K and 2.4mm connectors. U(vrc) is the CMC for the corresponding values of reflection coefficient magnitude presented in the previous tables.	
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.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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				
(Modulation Factor)	0.05 to 0.50 *Carrier 10.7 MHz* *Modulation 1 kHz*	0.0070	The uncertainties apply to modulating sinewaves with less than 2% distortion. The uncertainty will be increased for greater levels of distortion.	
	0.50 to 0.95 *Carrier 10.7 MHz* *Modulation 1 kHz*	0.013		
	5 kHz to 40 kHz *Carrier 10.7 MHz, 21.4 MHz and 42.8 MHz* *Modulation 1 kHz*	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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
SPECTRUM ANALYSER CALIBRATION (continued)				Yateley
Input level IF Gain and Attenuator accuracy	*500 Hz to 40 GHz fundamental* 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		
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	*50 MHz to 300 MHz* -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 1kHz 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 kΩ to 800 kΩ 800 kΩ to 1.2 MΩ 1.2 MΩ to 12 MΩ	0.050 % 0.60 % 0.60 % 0.20 % 0.60 %	Input resistance measurement	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
OSCILLOSCOPE CALIBRATION SYSTEM (continued)				Yateley
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	
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 ps, -11 ps +7 ps, - 7 ps +14 ps, -14 pss 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 ppm + 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)	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
OSCILLOSCOPE CALIBRATION SYSTEM (continued)				Manchester, Yateley, Donibristle and Stevenage
Automated and 9500 System				
Square Wave	35 µV to 1mV 1 mV to 21 mV 21 mV to 0.556 V 0.556 V to 210 V	1.0 % + 10 µV 0.10 % + 15 µV 0.10 % + 1.0 µV 0.05 % + 1.0 µV	Applicable mainly to analogue oscilloscopes	
DC Levels	888 µV to 220 V	0.025 % + 25 µV	Aplicable 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	60 mV to 30 mV 30 mV 200 V 6 mV to 60 mV 60 mV to 600 mV 600 mV to 12 V 12 V to 200V	1.0 % 0.50 % 1.0 % 0.50 % 0.15 % 0.10 %		
DC Resistance	10 Ω to 150 Ω 40 Ω to 90 Ω 50 kΩ to 12 MΩ 800 kΩ to 1.2 MΩ	0.50 % 0.10 % 0.50 % 0.10 %		
Capacitance	1 pF to 35 pF 35 pF to 95 pF	2.0 % + 0.29 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 ppm		
Probe Compensation	100 mV to 5 V	0.30 %		
DC Voltage	1 mV 1 mV to 50 mV 50 mV to 100 mV 100 mV to 1000 V	0.25 % 0.025 % 0.0050 % 0.0010 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL (continued)				Manchester, Yateley, Donibristle and Stevenage
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		
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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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)	4.0 % + 10 V		
	2 kV to 3.6 kV (Class 2)	4.0 % + 10 V		
Flash Current	0 mA to 3 mA	5.0 % + 880 µA		

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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE				Donibristle
Generation	0.1 mV to 2.2 mV			
	10 Hz to 20 Hz	750 ppm + 4.0 µV		
	20 Hz to 40 Hz	720 ppm + 4.0 µV		
	40 Hz to 20 kHz	720 ppm + 4.0 µV		
	20 kHz to 50 kHz	750 ppm + 4.0 µV		
	50 kHz to 100 kHz	850 ppm + 5.0 µV		
	100 kHz to 300 kHz	0.13 % + 10 µV		
	300 kHz to 500 kHz	0.16 % + 20 µV		
	500 kHz to 1 MHz	0.30 % + 20 µV		
	2.2 mV to 22 mV			
	10 Hz to 20 Hz	270 ppm + 4.0 µV		
	20 Hz to 40 Hz	140 ppm + 4.0 µV		
	40 Hz to 20 kHz	130 ppm + 4.0 µV		
	20 kHz to 50 kHz	230 ppm + 4.0 µV		
	50 kHz to 100 kHz	520 ppm + 5.0 µV		
	100 kHz to 300 kHz	0.11 % + 10 µV		
	300 kHz to 500 kHz	0.14 % + 20 µV		
	500 kHz to 1 MHz	0.28 % + 20 µV		
	22 mV to 220 mV			
	10 Hz to 20 Hz	250 ppm + 12 µV		
	20 Hz to 40 Hz	100 ppm + 7.0 µV		
	40 Hz to 20 kHz	90 ppm + 7.0 µV		
	20 kHz to 50 kHz	210 ppm + 7.0 µV		
	50 kHz to 100 kHz	470 ppm + 17 µV		
	100 kHz to 300 kHz	910 ppm + 20 µV		
	300 kHz to 500 kHz	0.14 % + 25 µV		
	500 kHz to 1 MHz	0.27 % + 45 µV		
	220 mV to 2.2 V			
	10 Hz to 20 Hz	250 ppm + 40 µV		
	20 Hz to 40 Hz	100 ppm + 15 µV		
	40 Hz to 20 kHz	60 ppm + 8.0 µV		
	20 kHz to 50 kHz	85 ppm + 10 µV		
	50 kHz to 100 kHz	120 ppm + 30 µV		
	100 kHz to 300 kHz	430 ppm + 80 µV		
	300 kHz to 500 kHz	0.10 % + 200 µV		
	500 kHz to 1 MHz	0.17 % + 300 µV		
	2.2 V to 22 V			
	10 Hz to 20 Hz	250 ppm + 400 µV		
	20 Hz to 40 Hz	100 ppm 150 µV		
	40 Hz to 20 kHz	60 ppm + 50 µV		
	20 kHz to 50 kHz	85 ppm + 100 µV		
	50 kHz to 100 kHz	110 ppm + 200 µV		
	100 kHz to 300 kHz	280 ppm + 600 µV		
	300 kHz to 500 kHz	0.10 % + 2.0 mV		
	500 kHz to 1 MHz	0.15 % + 3.2mV		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE Generation (continued)				Donibristle
	22 V to 220 V			
	10 Hz to 20 Hz	250 ppm + 4.0 mV		
	20 Hz to 40 Hz	100 ppm + 1.5 mV		
	40 Hz to 20 kHz	65 ppm + 600 µV		
	20 kHz to 50 kHz	90 ppm + 1.0 mV		
	50 kHz to 100 kHz	160 ppm + 2.5 mV		
	220 V to 1100 V			
	40 Hz to 1 kHz	80 ppm + 3.5 mV		
	1 kHz to 20 kHz	140 ppm + 5.0 mV		
	20 kHz to 30 kHz	470 ppm + 8.5 mV		
	220 V to 750 V			
	30 kHz to 50 kHz	470 ppm + 9.0 mV		
	50 kHz to 100 kHz	0.18 % + 35 mV		
AC CURRENT				
Generation	100 nA to 220 µA			
	40 Hz to 1 kHz	130 ppm + 8.0 nA		
	1 kHz to 5 kHz	290 ppm + 12 nA		
	5 kHz to 10 kHz	0.11 % + 65 nA		
	220 µA to 2.2 mA			
	40 Hz to 1 kHz	140 ppm + 35 nA		
	1 kHz to 5 kHz	220 ppm + 110 nA		
	5 kHz to 10 kHz	0.11 % + 650 nA		
	2.2 mA to 22 mA			
	40 Hz to 1 kHz	130 ppm + 350 nA		
	1 kHz to 5 kHz	210 ppm + 550 nA		
	5 kHz to 10 kHz	0.11 % + 5.0 µA		
	22 mA to 220 mA			
	40 Hz to 1 kHz	130 ppm + 2.5 µA		
	1 kHz to 5 kHz	210 ppm + 3.5 µA		
	5 kHz to 10 kHz	0.11 % + 10 µA		
	220 mA to 2.2 A			
	40 Hz to 1 kHz	270 ppm + 35 µA		
	1 kHz to 5 kHz	460 ppm + 80 µA		
	5 kHz to 10 kHz	0.55 % + 130 µA		
	2.2 A to 11 A			
	40 Hz to 1 kHz	370 ppm + 140 µA		
	1 kHz to 5 kHz	740 ppm + 300 µA		
	5 kHz to 10 kHz	0.28 % + 590 µA		
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.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC/LF AUTOMATED AND MANUAL SYSTEMS FOR GENERATION (5700A)				
DC RESISTANCE				Manchester, Yateley, Stevenage
Generation	1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 k Ω 1.9 kΩ 10 kΩ 19 k Ω 100 kΩ 190 kΩ 1 MΩ 1.9 MΩ 10 MΩ 19 MΩ 100 MΩ	86 ppm 86 ppm 26 ppm 25 ppm 16 ppm 16 ppm 12 ppm 12 ppm 11 ppm 11 ppm 13 ppm 13 ppm 19 ppm 19 ppm 36 ppm 43 ppm 110 ppm		
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	7.1 ppm + 0.67 μV 6.3 ppm + 0.93 μV 6.3 ppm + 3.1 μV 6.3 ppm + 6.2 μV 7.0 ppm + 78 μV 8.6 ppm + 470 μV		
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	47 ppm + 8.0 nA 47 ppm + 8.0 nA 47 ppm + 80 nA 55 ppm + 800 nA 75 ppm + 24 μA 280 ppm + 380 μA		
Simulation	11 A to 550 A	0.30 % + 600 mA	For the calibration of current clamps and similar devices, using a multi-turn coil.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE				Manchester, Yateley, Stevenage
Generation	0.1 mV to 2.2 mV			
	10 Hz to 20 Hz	850 ppm + 4.0 µV		
	20 Hz to 40 Hz	730 ppm + 4.0 µV		
	40 Hz to 20 kHz	710 ppm + 4.0 µV		
	20 kHz to 50 kHz	770 ppm + 4.0 µV		
	50 kHz to 100 kHz	0.10 % + 7.0 µV		
	100 kHz to 300 kHz	0.13 % + 12 µV		
	300 kHz to 500 kHz	0.16 % + 25 µV		
	500 kHz to 1 MHz	0.30 % + 25 µV		
	2.2 mV to 22 mV			
	10 Hz to 20 Hz	480 ppm + 5.0 µV		
	20 Hz to 40 Hz	220 ppm + 5.0 µV		
	40 Hz to 20 kHz	140 ppm + 5.0 µV		
	20 kHz to 50 kHz	340 ppm + 5.0 µV		
	50 kHz to 100 kHz	750 ppm + 6.5 µV		
	100 kHz to 300 kHz	0.11 % + 12 µV		
	300 kHz to 500 kHz	0.15 % + 25 µV		
	500 kHz to 1 MHz	0.29 % + 25 µV		
	22 mV to 220 mV			
	10 Hz to 20 Hz	470 ppm + 13 µV		
	20Hz to 40 Hz	190 ppm + 8.0 µV		
	40 Hz to 20 kHz	95 ppm + 8.0 µV		
	20 kHz to 50 kHz	290 ppm + 8.0 µV		
	50 kHz to 100 kHz	700 ppm + 25 µV		
	100 kHz to 300 kHz	860 ppm + 25 µV		
	300 kHz to 500 kHz	0.14 % + 31 µV		
	500 kHz to 1 MHz	0.28 % + 80 µV		
	220 mV to 2.2 V			
	10 Hz to 20 Hz	470 ppm + 80 µV		
	20 Hz to 40 Hz	150 ppm + 25 µV		
	40 Hz to 20 kHz	75 ppm + 6.0 µV		
	20 kHz to 50 kHz	120 ppm + 16 µV		
	50 kHz to 100 kHz	220 ppm + 65 µV		
	100 kHz to 300 kHz	380 ppm + 120 µV		
	300 kHz to 500 kHz	940 ppm + 310 µV		
	500 kHz to 1 MHz	0.19 % + 800 µV		

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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC CURRENT				Manchester, Yateley
Generation	100 nA to 220 μA *40 Hz to 1 kHz* *1 kHz to 5 kHz* 5 kHz to 10 kHz	 140 ppm + 16 nA 550 ppm + 40 nA 0.14 % + 80 nA		
	220 μA to 2.2 mA *40 Hz to 1 kHz* *1 kHz to 5 kHz* 5 kHz to 10 kHz	 150 ppm + 32 nA 550 ppm + 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 ppm + 400 nA 550 ppm + 3.9 μA 0.14 % + 7.8 μA		
Generation	22 mA to 220 mA *40 Hz to 1 kHz* *1 kHz to 5 kHz* *5 kHz to 10 kHz*	 150 ppm + 3.1 μA 550 ppm + 39 μA 0.14 % + 78 μA		
	220 mA to 2.2 A *40 Hz to 1 kHz* *1 kHz to 5 kHz* *5 kHz to 10 kHz*	 590 ppm + 31 μA 670 ppm + 78 μA 0.78 % + 150 μA		
	2.2 A to 11 A *40 Hz to 1 kHz* *1 kHz to 5 kHz* *5 kHz to 10 kHz*	 370 ppm + 140 μA 740 ppm + 300 μA 0.28 % + 590 μA		
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.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC/LF AUTOMATED AND MANUAL SYSTEMS FOR MEASUREMENT				
ZERO CHECKS				Manchester, Yateley
DC Resisitance	0 Ω	10 µΩ	4-terminal short circuit	
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 12 Ω to 120 Ω 120 Ω to 1.2 kΩ 1.2 kΩ to 12 kΩ 12 kΩ to 120 kΩ 120 kΩ to 1.2 MΩ 1.2 MΩ to 12 MΩ 12 MΩ to 120 MΩ 120 MΩ to 1.2 GΩ	45 ppm + 0.10 mΩ 30 ppm + 1.0 mΩ 22 ppm + 1.0 mΩ 21 ppm + 10 mΩ 23 ppm + 100 mΩ 35 ppm + 3.0 Ω 80 ppm + 140 Ω 600 ppm + 2.1 kΩ 0.65 % + 160 kΩ		
DC VOLTAGE				
Measurement	0 V to 120 mV 120 mV to 1.2 V 1.2 V to 12 V 12 V to 120 V 120 V to 1050 V	13 ppm + 1.8 µV 12 ppm + 2.0 µV 12 ppm + 6.5 µV 13 ppm + 130 µV 19 ppm + 750 µV		
DC CURRENT				
Measurement	0 A to 1.2 µA 1.2 µA to 12 µA 12 µA to 120 µA 120 µA to 1.2 mA 1.2 mA to 12 mA 12 mA to 120 mA 120 mA to 1.05 A	210 ppm + 85 pA 110 ppm + 210 pA 75 ppm + 1.7 nA 75 ppm + 11 nA 75 ppm + 75 nA 95 ppm + 1.1 µA 170 ppm + 18 µA		
AC VOLTAGE				
Measurement	10 µV to 12 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*	 800 ppm + 9.0 µV 300 ppm + 8.0 µV 400 ppm + 8.0 µV 0.13 % + 8.0 µV 0.60 % + 11 µV 4.7 % + 21 µV		

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

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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
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	Donibristle
AC HIGH VOLTAGE	1.1 kV to 4 kV *50 Hz* 4.1 kV to 30 kV *50 Hz*	0.35 % + 1 V 0.45 % + 2 V	Measurement Measurement	
DC CURRENT				
Generation	1 µA to 10 µA 10 µA to 500 mA 500 mA to 10 A 10 A to 100 A	40 ppm 30 ppm 40 ppm 250 ppm	Current up to 2000 A can be simulated at increased uncertainties, using a multi turn coil, for clamp meter calibration	
AC CURRENT	2.2 A to 10 A *50 Hz to 1 kHz* 1 mA to 10 A 10 A to 100 A	0.05 % 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 kΩ and 10 kΩ	 10 ppm		
LF CAPACITANCE	*1 kHz* 100 pF 1 pF to 11.1 µF 11.1 µF to 100 µF	 20 ppm 90 ppm 250 ppm	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 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
CAPACITANCE				Donibristle
Measurement	0.1 µF to 10 µF at *1 kHz* 10 pF to 1 µF *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	0.020Ω 0.020Ω 0.030Ω	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	0.010	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.	
	0.2 to 0.6	0.015		
	0.6 to 0.8	0.020		
	8 GHz to 18 GHz			
	0 to 0.2	0.020		
	0.2 to 0.6	0.020		
	0.6 to 0.8	0.025		
	0.5 GHz to 8 GHz			
	0 to 0.2	0.030	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.	
	0.2 to 0.6	0.035		
	0.6 to 0.8	0.040		
	8 GHz to 18 GHz			
	0 to 0.2	0.060		
	0.2 to 0.6	0.060		
	0.6 to 0.8	0.065		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RF ATTENUATION	*0.3 MHz to 3 GHz*		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.	Donibristle
	0 dB to 40 dB	0.050 dB		
	40 dB to 62 dB	0.090 dB		
	62 dB to 80 dB	0.90 dB		
	0.5 GHz to 8 GHz			
	0 dB to 50 dB	0.050 dB		
	50 dB to 62 dB	0.070 dB		
	8 GHz to 18 GHz			
	0 dB to 40 dB	0.060 dB		
	40 dB to 50 dB	0.070 dB		
	50 dB to 62 dB	0.090 dB		
	0.5 GHz to 8 GHz		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.	
	0 dB to 62 dB	0.14 dB		
	8 GHz to 18 GHz			
	0 dB to 62 dB	0.23 dB		
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			
	0.1 MHz to 0.3 MHz	1.3%	Connector type: 7 mm Type N	
	0.3 MHz to 0.1 GHz	1.1%		
	0.1 GHz to 2 GHz	1.0%		
	2 GHz to 8 GHz	1.3%		
	8 GHz to 18 GHz	1.7%		
50 Ω coaxial power sensors	Nominal level 1 μW			
	0.1 GHz to 2 GHz	1.9%	Connector type: 7 mm Type N	
	2 GHz to 8 GHz	2.1%		
	8 GHz to 18 GHz	2.4%		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
50 Ω coaxial thermistor mounts	Nominal level 1 mW			Donibristle
	0.05 GHz to 2 GHz	1.7%	Connector type: 7 mm Type N	
	2 GHz to 8 GHz	1.9%		
	8 GHz to 18 GHz	2.1%		
RF Power Measurement	+20 dBm to -25 dBm		50 Ω coaxial line systems fitted with Type N connectors. The uncertainty is for devices with output VRC not exceeding 0.2.	
	100 kHz to 300 kHz	0.55 dB		
	300 kHz to 1 MHz	0.26 dB		
	1 MHz to 50 MHz	0.18 dB		
	50 MHz to 2 GHz	0.18 dB		
	2 GHz to 12 GHz	0.25 dB		
	12 GHz to 18 GHz	0.34 dB		
	18 GHz to 26.5 GHz	0.31 dB		
	-25 dBm to -50 dBm			
	50 MHz to 2 GHz	0.22 dB		
	2 GHz to 12 GHz	0.37 dB		
	12 GHz to 18 GHz	0.40 dB		
	-50 dBm to -60 dBm			
	50 MHz to 2 GHz	0.24 dB		
	2 GHz to 12 GHz	0.38 dB		
	12 GHz to 18 GHz	0.41 dB		
	-60 dBm to -65 dBm			
	50 MHz to 2 GHz	0.38 dB		
	2 GHz to 12 GHz	0.48 dB		
	12 GHz to 18 GHz	0.50 dB		
RF Power Generation	0 dBm to -67 dBm		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	
	100 kHz to 4.2 GHz	0.15 dB		
	4.2 GHz to 18 GHz	0.22 dB		
	-67 dBm to -127 dBm			
	100 kHz to 4.2 GHz	0.24 dB		
	4.2 GHz to 18 GHz	0.37 dB		
TRANSFER IMPEDANCE (RF current probe calibration)	*20 Hz to 9 kHz*	0.65 dB		
	10 kHz to 500 MHz	0.37 dB		
	500 MHz to 1 GHz	0.74 dB		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
SPECTRAL INTENSITY	*0.1 MHz to 1 GHz* 80 dBµV/MHz to 100 dBµV/MHz	 0.90 dB		Donibristle
AMPLITUDE MODULATION	Carrier 100 kHz to 10 MHz Modulation 20 Hz to 50 Hz 5% to 50% 50% to 95%	 3.0% 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% 50% to 95%	 2.0% 2.1%		
	Carrier 10 MHz to 1.3 GHz Modulation 50 Hz to 90 Hz 5% to 50% 50% to 95%	 1.1% 1.3%		
	Carrier 10 MHz to 1.3 GHz Modulation 90 Hz to 10 kHz 5% to 20% 20% to 50% 50% to 80%	 1.1% 0.53% 0.85%		
	Carrier 10 MHz to 1.3 GHz Modulation 10 kHz to 50 kHz 5% to 50% 50% to 95%	 1.1% 1.3%		
	Carrier 10 MHz to 1.3 GHz Modulation 50 kHz to 100 kHz 5% to 50% 50% to 95%	 3.0% 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%		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
Temperature indicators, calibration by electrical simulation				Donibristle
Thermocouple type				
K	-200 °C to 0 °C 0 °C to 1372 °C	0.28 °C 0.27 °C	including reference junction compensation	
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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
Temperature indicators, calibration by electrical simulation (continued)				Donibristle
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	25 Pa 5.6 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	31 Pa 9.0 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	12 kPa 0.0075 % 0.035 %		
"Pressure equivalent" calibration of dead-weight testers	550 kPa to 60 MPa	0.0075 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
TEMPERATURE				Donibristle
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 600 °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 600 °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 600 °C	0.040 °C 0.35 °C	Calibration with liquid and metal media	
Thermocouple sensors	-80 °C to +250 °C 250 °C to 600 °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 600 °C	0.15 °C 0.25 °C	Calibration performed with respect to EURAMET CG 13	
Liquid in glass thermometers	-80 °C to 250 °C	0.025 °C + ¼ 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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
VOLUME OF LIQUIDS (SEE NOTE 1)				Donibristle
Single channel instruments	0.1 µl to 10 µl 10 µl to 20 µl 20 µl to 100 µl 100 µl to 200 µl 200 µl to 500 µl 0.5 ml to 2 ml 2 ml to 5 ml 5 ml to 10 ml 10 ml to 20 ml	0.060 µl 0.071 µl 0.20 µl 0.40 µl 0.70 µl 0.002 ml 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 µl to 20 µl 20 µl to 50 µl 50 µl to 100 µl 100 µl to 200 µl 200 µl to 300 µl 300 µl to 600 µl 600 µl to 1200 µl	0.10 µl 0.20 µl 0.30 µl 0.50 µl 0.80 µl 1.10 µl 3.00 µl	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 x L in m)		
Vernier gauges Caliper	As BS 887:2008 0 to 1000	Overall performance 10 + (30 x L 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.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATION			NOTE: Certain qualtities 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 kΩ 10 kΩ	8.0 ppm 3.0 ppm 2.4 ppm 2.4 ppm 2.4 ppm 2.5 ppm	4 terminal resistors of modest dimensions suitable for oil immersion can be measured over the temperature range 14°C to 30°C	
	20 kΩ to 100 kΩ (in 10 kΩ steps)	2.6 ppm	Decade resistors measured via a build-up technique	
	200 kΩ to 1 MΩ (in 100 kΩ steps) 2 MΩ to 10 MΩ (in 1 MΩ steps)	2.7 ppm 3.2 ppm		
Other Values	0 Ω to 20 kΩ 20 kΩ to 20 MΩ 20 MΩ to 200 MΩ 200 MΩ to 2 GΩ 2 GΩ to 20 GΩ 20 GΩ to 200 GΩ 200 G to 1 TΩ	6.5 ppm + 10 µΩ 7.2 ppm + 100 mΩ 0.15 % + 8.5 kΩ 0.23 % + 69 kΩ 0.23 % + 570 kΩ 0.35 % + 8.7 MΩ 0.94 %		
Generation			DC automated and manual calibrations	
	10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ	11 ppm 4.4 ppm 4.4 ppm 6.4 ppm 5.0 ppm 11 ppm 23 ppm 65 ppm		
DC Conductance	1 s to 50 µs 50 µs to 10 µs 10 µs to 100 ns 100 ns to 10 ns	7.0 ppm 3.0 ppm 4.0 ppm 60 ppm		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC VOLTAGE				Stevenage
Measurement				
Specific Values	1.018 V 10 V	0.90 ppm 0.46 ppm		
Other Values	0 V to 20 V 20 V to 200 V 200 V to 1000 V	3.1 ppm + 230 nV 6.2 ppm + 1.2 µV 6.2 ppm + 12 µV		
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 ppm + 330 nV 1.6 ppm + 660 nV 0.87 ppm + 2.9 µV 1.7 ppm + 42 µV 2.4 ppm + 420 µV	DC automated and manual calibrations	
DC CURRENT				
Specific Values	100 µA 1 mA 10 mA 100 mA 1 A 10 A	21 ppm 10 ppm 7.2 ppm 8.2 ppm 13 ppm 100 ppm		
Other Values	1 µA to 100 µA 100 µA to 10 mA 10 mA to 100 mA 100 mA to 10 A 10 A to 50 A	13 ppm + 0.10 nA 13 ppm + 0.10 nA 20 ppm 75 ppm 100 ppm		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC POWER AC VOLTAGE	1 µW 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
Datron 4920 System				
Specific Values	1 V *40 Hz* *1 kHz* *30 kHz* *50 kHz* *100 kHz* *200 kHz* *500 kHz* *1 MHz* 10 V *40 Hz* *1 kHz* *30 kHz* *50 kHz* *100 kHz* *200 kHz* *500 kHz* *1 MHz* 100 V *40 Hz* *1 kHz* *30 kHz* *50 kHz* *100 kHz* 700 V *50 kHz* *100 kHz* 1000 V *45 Hz* *100 Hz* *1 kHz* *10 kHz* *20 kHz* *30 kHz*	 27 ppm 27 ppm 28 ppm 31 ppm 34 ppm 67 ppm 240 ppm 520 ppm 26 ppm 26 ppm 27 ppm 29 ppm 29 ppm 65 ppm 240 ppm 430 ppm 43 ppm 35 ppm 35 ppm 39 ppm 40 ppm 170 ppm 230 ppm 87 ppm 87 ppm 86 ppm 88 ppm 88 ppm 97 ppm		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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	0.033% + 0.30µV		
	100 Hz to 30 kHz	0.020% + 0.30µV		
	30 kHz to 200 kHz	0.047% + 0.30µV		
	200 kHz to 500 kHz	0.13% + 0.30µV		
	500 kHz to 1 MHz	0.32% + 0.30µV		
	2.7 mV to 9 mV			
	10 Hz to 100 Hz	0.026% + 0.30µV		
	100 Hz to 30 kHz	0.016% + 0.20µV		
	30 kHz to 200 kHz	0.033% + 0.20µV		
	200 kHz to 500 kHz	0.10% + 0.20µV		
	500 kHz to 1 MHz	0.24% + 0.40µV		
	9 mV to 27 mV			
	10 Hz to 100 Hz	0.019% + 0.30µV		
	100 Hz to 30 kHz	0.0093% + 0.20µV		
	30 kHz to 200 kHz	0.018% + 0.20µV		
	200 kHz to 500 kHz	0.054% + 0.30µV		
	500 kHz to 1 MHz	0.14% + 0.40µV		
	27 mV to 90 mV			
	10 Hz to 30 kHz	42 ppm + 0.50µV		
	30 kHz to 200 kHz	96 ppm + 0.60µV		
	200 kHz to 500 kHz	280 ppm + 0.40µV		
	500 kHz to 1 MHz	720 ppm + 0.50µV		
	90 mV to 1.1 V			
	10 Hz to 30 kHz	36 ppm + 1.7 µV		
	30 kHz to 200 kHz	67 ppm + 2.0 µV		
	200 kHz to 500 kHz	260 ppm + 1.4 µV		
	500 kHz to 1 MHz	720 ppm + 1.5 µV		
	1.1 V to 3.4 V			
	10 Hz to 30 kHz	36 ppm + 5.7 µV		
	30 kHz to 200 kHz	66 ppm + 6.7 µV		
	200 kHz to 500 kHz	260 ppm + 5.3 µV		
	500 kHz to 1 MHz	710 ppm + 6.7 µV		
	3.4 V to 11 V			
	10 Hz to 30 kHz	36 ppm + 19 µV		
	30 kHz to 200 kHz	65 ppm + 22 µV		
	200 kHz to 500 kHz	260 ppm + 17 µV		
	500 kHz to 1 MHz	720 ppm + 22 µV		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
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 ppm + 57 µV 65 ppm + 67 µV 260 ppm + 53 µV 710 ppm + 67 µV 37 ppm + 130 µV 80 ppm + 120 µV 44 ppm + 1.4 mV 160 ppm + 4.5 mV 49 ppm + 4.4 mV 160 ppm + 15 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 ppm + 1.3 µV 650 ppm + 2.0 µV 650 ppm + 2.5 µV 800 ppm + 4.0 µV 800 ppm + 4.0 µV 0.16 % + 8.0 µV 0.55 % + 8.0 µV 220 ppm + 1.3 µV 220 ppm + 2.0 µV 220 ppm + 2.5 µV 320 ppm + 4.0 µV 350 ppm + 4.0 µV 900 ppm + 4.0 µV 0.40 % + 8.0 µV 0.40 % + 8.0 µV		

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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE (continued)				Stevenage
Fluke 5790 System (continued)				
	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*	 50 ppm 100 ppm 260 ppm 170 ppm 990 ppm		
AC Voltage Waveform Analysis	3 µV to 300 V *20 Hz to 76 kHz*	5.0 % of FSD	15 ranges of 30 µV to 300 V FSD in 3-10-30 sequence	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC CURRENT				Stevenage
Measurement	*20 Hz to 5 kHz*			
Specific Values	100 μA	0.026 %		
	1 mA	0.015%		
	10 mA	0.0090 %		
	100 mA	0.0090 %		
	1 A	0.010 %		
	10 A	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 ppm		
	20 Hz to 10 kHz			
	2 mA to 100 mA	80 ppm		
	100 mA to 1 A	100 ppm		
	1 A to 10 A	120 ppm		
	10 A to 20 A	200 ppm		
Generation	5 nA to 100 μA			
	20 Hz to 1 kHz	0.028 % + 5.0 nA		
	1kHz to 5 kHz	0.032 % + 6.0 nA		
	100 μA to 1 mA			
	20 Hz to 1 kHz	0.016 % + 47 nA		
	1kHz to 5 kHz	0.018 % + 47 nA		
	1 mA to 10 mA			
	20 Hz to 1 kHz	0.010 % + 470 nA		
	1kHz to 5 kHz	0.013 % + 470 nA		
	10 mA to 100 mA			
	20 Hz to 1 kHz	0.010 % + 470 nA		
	1kHz to 5 kHz	0.013 % + 470 nA		
	100 mA to 1 A			
	20 Hz to 1 kHz	0.022 % + 47 μA		
	1 kHz to 5 kHz	0.033 % + 62 μA		
	1 A to 10 A			
	20 Hz to 1 kHz	0.029 % + 0.93 mA		
	1 kHz to 5 kHz	0.061 % + 1.2 mA		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC POWER				Stevenage

Calibration and Measurement Capability for AC Power in ppm of reading 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 ppm of reading 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 ppm of reading 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 ppm of reading 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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC POWER (continued)				Stevenage

Calibration and Measurement Capability for AC Power in ppm of reading over the frequency range 69 Hz to 180 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	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

Calibration and Measurement Capability for AC Power in ppm of reading over the frequency range 69 Hz to 180 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	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

Calibration and Measurement Capability for AC Power in ppm of reading over the frequency range 180 Hz to 450 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	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

Calibration and Measurement Capability for AC Power in ppm of reading over the frequency range 180 Hz to 450 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	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

Calibration and Measurement Capability for AC Power in ppm of reading over the frequency range 180 Hz to 450 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	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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC POWER (continued)				Stevenage
	Calibration and Measurement Capability for AC Power in ppm of reading over the frequency range 180 Hz to 450 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	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* *180 Hz to 450 Hz* *450 Hz to 850 Hz* *850 Hz to 3 kHz* *3 kHz to 6 kHz*	 0.00005 0.00009 0.00026 0.00053 0.0026 0.0052	For applied voltages between 16 V and 1008 V and for applied currents between 0.25 A and 5 A	
	0 to unity *16 Hz to 69 Hz* *69 Hz to 180 Hz* *180 Hz to 450 Hz* *450 Hz to 850 Hz* *850 Hz to 3 kHz* *3 kHz to 6 kHz*	 0.00007 0.00012 0.00035 0.00070 0.0035 0.0070	For applied voltages between 16 V and 1008 V and for applied currents between 5 A and 21 A	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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	*100 Hz:*			
	1 H	0.015 %		
	10 H	0.010 %		
	1 kHz and 10 kHz:			
	1 µH	0.35 %		
	10 µH	0.15 %		
	100 µH, 1 mH and 10 mH	0.015 %		
	1 kHz:			
	100 mH and 1 H	0.015 %		
	10 H	0.025 %		
	10 kHz			
	100 mH	0.025 %		
	1 H	0.60 %		
Other Values	*100 Hz, 1 kHz and 10 kHz:*			
	1 µH to 10 µH	0.40 %		
	10 µH to 100 µH	0.20 %		
	100 µH to 100 mH	0.10 %		
	100 Hz and 1 kHz:			
	100 mH to 10 H	0.10 %		
CAPACITANCE				
Specific Values	1 nF			
	1 kHz	8.0 ppm		
Other Values	10 pF to 100 pF		Capacitance can be measured below 10 pF and from 1 µF to 11 µF, and also up to 100 kHz, with an increased uncertainty which varies in a complex manner with frequency and capacitance.	
	100 Hz to 10 kHz	0.010 %		
	100 pF to 0.1 µF			
	50 Hz to 10 kHz	0.010 %		
	0.1 µF to 1 µF		Fixed capacitors within this range are available for the calibration of bridges, capacitance meters and similar instruments.	
	50 Hz to 1 kHz	0.010 %		
	1 kHz to 10 kHz	0.030 %		
CAPACITANCE LOSS				
Dissipation factor (tan δ)	10^{-4} to unity		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.	
	1 kHz	0.10 % + 2.0 x 10^{-5}		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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	0.27 °C		
	-100 °C to -25 °C	0.16 °C		
	-25 °C to 120 °C	0.15 °C		
	120 °C to 1000 °C	0.22 °C		
	1000 °C to 1372 °C	0.32 °C		
Type J thermocouples	-210 °C to -100 °C	0.23 °C		
	-100 °C to -30 °C	0.15 °C		
	-30 °C to 150 °C	0.13 °C		
	150 °C to 760 °C	0.15 °C		
	760 °C to 1200 °C	0.19 °C		
Type T thermocouples	-250 °C to -150 °C	0.50 °C		
	-150 °C to 0 °C	0.20 °C		
	0 °C to 120 °C	0.15 °C		
	120 °C to 400 °C	0.13 °C		
Type R thermocouples	0 °C to 250 °C	0.46 °C		
	250 °C to 400 °C	0.29 °C		
	400 °C to 1000 °C	0.27 °C		
	1000 °C to 1767 °C	0.32 °C		
Type S thermocouples	0 °C to 250 °C	0.39 °C		
	250 °C to 1000 °C	0.30 °C		
	1000 °C to 1400 °C	0.30 °C		
	1400 °C to 1767 °C	0.37 °C		
Type N thermocouples	-200 °C to -100 °C	0.32 °C		
	-100 °C to -25 °C	0.19 °C		
	-25 °C to 120 °C	0.17 °C		
	120 °C to 410 °C	0.16 °C		
	410 °C to 1300 °C	0.22 °C		
Type E thermocouples	-250 °C to -100 °C	0.40 °C		
	-100 °C to -25 °C	0.15 °C		
	-25 °C to 350 °C	0.13 °C		
	350 °C to 650 °C	0.15 °C		
	650 °C to 1000 °C	0.18 °C		
Type B thermocouples	600 °C to 800 °C	0.37 °C		
	800 °C to 1000 °C	0.28 °C		
	1000 °C to 1550 °C	0.25 °C		
	1550 °C to 1820 °C	0.27 °C		
Type C thermocouples	0 °C to 150 °C	0.25 °C		
	150 °C to 650 °C	0.22 °C		
	650 °C to 1000 °C	0.25 °C		
	1000 °C to 1800 °C	0.40 °C		
	1800 °C to 2316 °C	0.66 °C		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 100 MHz to 20 GHz 20 GHz to 26.5 GHz	1.2 in 10^6 to 1.7 in 10^9 1.0 in 10^6 to 1.8 in 10^{11} 2.0 in 10^9	For the calibration of signal sources and frequency meters	
	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 =SQRT(MV^2-$ScopeRT^2$)	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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	
	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	
For calibrations using a six-port reflection analyser	*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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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	0.090 %	Sources of RF voltage may not be available for all combinations of voltage and frequency	
	30 MHz	0.070 %		
	40 MHz	0.070 %		
	50 MHz	0.15 %		
Other values	20 mV to 100 mV		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	
	10 kHz to 100 kHz	0.32 %		
	100 kHz to 1 MHz	0.34 %		
	1 MHz to 100 MHz	0.55 %		
	100 MHz to 1 GHz	0.81 %		
	100 MHz to 1.5 GHz	0.88 %		
	100 mV to 1 V			
	10 kHz to 100 kHz	0.40 %		
	100 kHz to 1 MHz	0.43 %		
	1 MHz to 100 MHz	0.61 %		
	100 MHz to 1.5 GHz	1.0 %		
	1 V to 10 V			
	10 kHz to 100 kHz	0.46 %		
	100 kHz to 1 MHz	0.50 %		
	1 MHz to 100 MHz	0.65 %		
	100 MHz to 1.5 GHz	1.0 %		
RF POWER	1 µW to 3 mW		Mismatch uncertainty less than 1.5%.	
	0.3 GHz to 12.4 GHz	6.0 %		
	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	(1.1 % to 0.90 %) + 0.10 µW		
	1 GHz to 4 GHz	(1.4 % to 1.2 %) + 0.10 µW		
	10 mW to 300 mW		50 Ω 14 mm coaxial system	
	1 kHz to 50 MHz	0.65 %		
	50 MHz to 100 MHz	0.65 %		
	100 MHz to 2 GHz	0.68 %		
	2 GHz to 6 GHz	0.94 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RF POWER (continued)			50 Ω Type N coaxial system	Stevenage
	0.1 mW to 10 mW			
	8.2 GHz to 12.4 GHz	3.0 %		
	12.4 GHz to 17.0 GHz	3.0 %		
	18 GHz	4.0 %		
	9 kHz to 5 GHz		For the calibration of Signal Sources, Spectrum Analysers,	
	+20 dBm to -50 dBm	0.15 dB		
	-50 dBm to -80 dBm	0.20 dB	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.	
	-80 dBm to -127dBm	0.35 dB		
	2 GHz to 18 GHz			
	+10 dBm to -50 dBm	0.15 dB		
	-50 dBm to -80 dBm	0.20 dB		
	-80 dBm to-100 dBm	0.30 dB		
			If the device being measured presents an imperfect match in 50 Ω coaxial line systems the uncertainties will be increased.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 *Other levels can be used but the uncertainties may be increased.*	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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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.			Stevenage
Nominal level 1 mW *Other levels can be used but the uncertainties may be increased.*	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 µW *Other levels can be used but the uncertainties may be increased.*	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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
Nominal level 1 µW *Other levels can be used but the uncertainties may be increased.*	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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AMPLITUDE MODULATION				Stevenage
Modulation Factor	0.05 to 0.50 0.50 to 0.70 0.70 to 0.95	0.10 % 0.20 % 0.30 %	Modulation generation in discrete steps with 10.7 MHz carrier frequency and 1.045 kHz modulation frequency	
	0.05 to 0.50 0.50 to 0.70 0.70 to 0.95	0.10 % 0.20 % 0.30 %	Modulation generation with 10 MHz to 13 MHz carrier frequency range and 20 Hz to 100 kHz modulation frequency range	
	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	
Modulation Factor	0 to 0.50 0.50 to 0.70 0.70 to 0.95	0.50 % 0.50 % 0.60 %	Calibration of sources with 50 kHz to 2.32 GHz carrier frequency range and 1 kHz modulation frequency.	
	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 %	Calibration of sources with 5.5 MHz to 2.32 GHz carrier frequency range and 30 Hz to 50 kHz modulation frequency range.	
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.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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	 0.06 dB 0.08 dB 0.12 dB 0.15 dB	Measurement of attenuation in 50 Ω coaxial systems. HP 8902A System	
TORQUE			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 6789:2017 0.1 N·m to 1500 N·m	1.0 % of reading		
Hand torque tools	BS EN ISO 6789:2003 (withdrawn and superseded) 0.1 N·m to 1500 N·m	1.0 % of reading		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES, UNLESS OTHERWISE STATED				Stevenage
LENGTH				
Plain plug gauges (parallel)	0 to 100 diameter	0.80 on diameter		
Plain ring gauges (parallel) and setting standards	2 to 50 diameter 50 to 100 diameter	1.1 on diameter 1.7 on diameter		
Parallels	As BS 906:Parts 1 & 2:1972 5 to50 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	*Squareness:* 3.0 + (1.0 per 100 mm) *Parallelism:* 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	*Heads*: 2.0 between any two points. *Setting and Extension rods up to 300:* 1.0 + (5.0 x length in m)		
Micrometer Heads	As BS 1734:1951 0 to 100	1.0		
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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATION				Site Calibration
DC RESISTANCE				
Measurement	0 Ω to 300 Ω 300 Ω to 3 kΩ 3 kΩ to 30 kΩ 30 kΩ to 300 kΩ 300 kΩ to 3 MΩ 3 MΩ to 30 MΩ	39 ppm + 1.8 mΩ 37 ppm + 14 mΩ 37 ppm + 140 mΩ 38 ppm + 1.4 Ω 85 ppm + 14 Ω 70 ppm + 350 Ω		
DC CURRENT	0 A to 200 µA 200 µA 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 1 A 1 A to 2 A	350 ppm + 10 nA 350 ppm + 50 nA 350 ppm + 480 nA 360 ppm + 10 µA 0.11 % + 280 µA		
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 ppm + 1.3 µV 25 ppm + 8.0 µV 25 ppm + 110 µV 40 ppm + 1.5 mV 50 ppm + 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 µV 1.2 % + 120 µV 5.8 % + 500 µV 0.060 % + 240 µV 0.12 % + 470 µV 058 % + 2.4 mV 0.060 % + 2.4 mV 0.12 % + 4.7 mV 058 % + 24 mV 0.060 % + 24 mV 0.12 % + 47 mV 058 % + 240 mV		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE (continued)	200 V to 700 V			Site Calibration
	40 Hz to 10 kHz	0.060 % + 85 mV		
	10 kHz to 30 kHz	0.12 % + 170 mV		
AC CURRENT	*40 Hz to 1 kHz*			
	10 μA to 200 μA	950 ppm + 120 nA		
	200 μA to 2 mA	950 ppm + 1.2 μA		
	2 mA to 20 mA	950 ppm + 12 μA		
	20 mA to 200 mA	950 ppm + 120 μA		
	200 mA to 1A	0.11 % + 280 μA		
	1 A to 2 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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
PRESSURE				Site Calibration
Gas Pressure (gauge)				
Calibration of pressure indicating instruments and gauges	-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	230 Pa 100 Pa 180 Pa 400 Pa 1.0 kPa 1.3 kPa	Calibrations of devices with an electrical output may be undertaken	
Gas Pressure (absolute)				
Calibration of pressure indicating instruments and gauges	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	250 Pa 0.14 kPa 0.21 kPa 0.41 kPa 1.0 kPa 1.3 kPa		
Hydraulic Pressure (gauge)				
Calibration of pressure indicating instruments and gauges	0 Pa to 41.4 MPa	31 kPa		
Hydraulic Pressure (absolute)				
Calibration of pressure indicating instruments and gauges	100 kPa to 41.5 MPa	31 kPa		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
TEMPERATURE AND HUMIDITY				Site Calibration
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	
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	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATION				Mobile
DC RESISTANCE	1 Ω to 10 Ω	5.0 mΩ		
	10 Ω to 100 Ω	120 ppm + 5.0 mΩ		
	100 Ω to 1 kΩ	120 ppm + 13 mΩ		
	1 kΩ to 10 kΩ	120 ppm + 160 mΩ		
	10 kΩ to 100 kΩ	120 ppm + 1.6 Ω		
	100 kΩ to 1 MΩ	470 ppm + 120 Ω		
	1 MΩ to 100 MΩ	1.0 % + 12 kΩ		
Generation				
Specific values	30 MΩ	0.10 %		
	100 MΩ	0.62 %		
	190 MΩ	0.61 %		
	300 MΩ	0.61 %		
Other values	100 MΩ to 400 MΩ	0.60 % + 40 kΩ		
DC VOLTAGE	0 V to 100 mV	69 ppm + 4.2 μV		
	100 mV to 1 V	52 ppm + 8.2 μV		
	1 V to 10 V	47 ppm + 58 μV		
	10 V to 100 V	59 ppm + 700 μV		
	100 V to 1 kV	59 ppm + 12 mV		
	1 kV to 20 kV	2.5 %		
AC VOLTAGE	10 mV to 100 mV			
	45 Hz to 100 Hz	730 ppm + 46 μV		
	100 mV to 1 V			
	45 Hz to 20 kHz	0.14 % + 59 μV		
	20 kHz to 50 kHz	0.69 % + 99 μV		
	1 V to 10 V			
	45 Hz to 20 kHz	0.46 % + 680 μV		
	20 kHz to 50 kHz	730 ppm + 490 μV		
	10 V to 100 V			
	45 Hz to 20 kHz	0.14 % + 3.5 mV		
	20 kHz to 50 kHz	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%		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC CURRENT	0 A to 10 mA	600 ppm + 2.6 µA		Mobile
	10 mA to 100 mA	600 ppm + 26 µA		
	100 mA to 1 A	600 ppm + 260 µA		
	1 A to 3 A	600 ppm + 1.2 mA		
	3 A to 20 A	0.12 % + 12 mA		
	20 A to 100 A	0.20 % + 10 mA		
	100 A to 500 A	0.30 % + 700 mA		
AC CURRENT	1 mA to 30 mA *45 Hz to 1 kHz*	0.74 % + 130 µA		
	30 mA to 100 mA *4 Hz to 1 kHz*	0.74 % + 130 µA		
	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 µA	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	100 ms	Mechanically triggered devices, e.g. stopwatches 20 °C ± 3 °C	
	1 hour to 1 Day	100 ms + 1.0 ppm		
	0 s to 1 hour	210 ms	Mechanically triggered devices e.g. stopwatches 0 °C to 40 °C	
	1 hour to 1 Day	210 ms + 20 ms/hr		
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 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RECEIVERS AND ANALYSERS TO CP1106				Mobile
Amplitude Accuracy				
	-40 dBm to +10 dBm		N Type connectors	
	10 Hz to 4 GHz	0.080 dB		
	4 GHz to 12 GHz	0.14 dB		
	12 GHz to 18 GHz	0.19 dB		
	-40 dBm to +10 dBm		K Type connectors	
	10 Hz to 4 GHz	0.080 dB		
	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		
Calibration Signal				
	-40 dBm to 0 dBm			
	10 MHz to 500 MHz	0.070 dB		
Frequency Accuracy	10 MHz to 500 MHz	5.8 X 10^{-10}		
IF Bandwidth				
Nominal 0 dBm	10 MHz to 500 MHz			
	Gaussian 3/6 dB	0.11 % of Bandwidth		
	Gaussian 60 dB	1.0 % of Bandwidth		
	Non-Gaussian 3/6 dB	0.20 % of Bandwidth		
	Non-Gaussian 60 dB	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		N Type connectors	
	0 to 0.2	0.015		
	0.2 to 0.4	0.031		
	0.4 to 0.6	0.065		
	3 GHz to 18 GHz			
	0 to 0.2	0.028		
	0.2 to 0.4	0.042		
	0.4 to 0.6	0.078		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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	0.11 dB		
	4 GHz to 12 GHz	0.12 dB		
	12 GHz to 18 GHz	0.13 dB		
Tracking Generator Attenuator Accuracy				
	10 MHz to 500 MHz			
	0 dB to 60 dB	0.11 dB		
	0 dB to 90 dB	0.21 dB		
	0 dB to 100 dB	0.32 dB		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RECEIVERS AND ANALYSERS TO CP1106 (continued)				Mobile
Pulse Accuracy and Detector Response				
Sine wave accuracy	10 Hz to 1 GHz at 60 dBµV	0.14 dB		
Pulse level accuracy	20 dBµV to 70 dBµV 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 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 ˚	0.7 ˚		
Output impedance	0.1 Ω to 500 Ω	2.5 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 kΩ	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 μs 2.8 μs		
Burst period	50 ms to 500 ms	2 ppm		
Repetition rate	1 kHz to 1.5 MHz	2 ppm		
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 μs to 2 μs	15.4 ns		
Decaying voltage	Pk 2 0 to 2x PkV Pk 3 0 to 2x PkV Pk 4 0 to 2x PkV	1.39 % 1.45 % 1.66 %		
Oscillation frequency	10 kHz to 200 kHz	23 ppm		
Peak current	1 A to 600 A	2.4 %		
Current rise time	100 ns to 3 μs	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 50 Hz to 400 Hz	0.51 %		
Overshoot / undershoot	0 to 20 %	0.87 %		
Rise/Fall time	0.1 s to 15 μs	45 ns		

Measured Quantity Instrument Moor Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
Dip timing	10 μs to 5 s	11.7 ppm		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			For the calibration of Slow Damped Oscillatory Wave Generators as specified in IEC 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 Peak 10	 0 to 2 * Pk V 0 to 2 * Pk V	 1.41 % 1.41 %		
Oscillation Frequency	10 kHz to 2 MHz	0.1 %		
Peak Current	500 mA to 50 A	2.41 %		
Burst Duration	Up to 3 s	0.01 s		
Repetition Rate	30 / s to 60 / s 300 / s to 600 / s	0.5 % 0.05 %		
Output Impedance	50 Ω to 500 Ω	2.77 %		
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		
Inculation test current	0 A to 2 mA	1.0 % + 8.0 μA		
Voltage 50 Hz	90 V to 420 V	0.20 % + 120 mV		

Measured Quantity Instrument Moor Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
Calibration of 17th 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 A to 3 mA	5.0 % + 880 µA		

Measured Quantity Instrument Moor Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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 ºC to 20 ºC 36 %rh to 90 %rh 20 ºC to 30 ºC 26 %rh to 90 %rh 30 ºC to 50 ºC 25 %rh to 75 %rh	 1.7 %rh to 3.8 %rh 1.3 %rh to 3.7 %rh 1.2 %rh to 2.9 %rh	The accreditation covers other humidity units directly related to dew point, e.g. vapour pressure, ppm volume, g/kg, etc.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
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		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
PRESSURE				Mobile
Gas Pressure (gauge)				
Calibration of pressure indicating instruments and gauges	-95 kPa to 0 Pa 0 Pa to 1 MPa 1 MPa to 2 MPa 2 MPa to 10 MPa	720 Pa 720 Pa 1.8 kPa 4.2 kPa	Calibration of pressure devices with an electrical output may be undertaken	
Hydraulic Pressure (gauge)				
Calibration of pressure indicating instruments and gauges	0 Pa to 70 MPa	100 kPa	Calibration of pressure devices with an electrical output may be undertaken	
Gas Pressure (Absolute)				
Calibration of pressure indicating instruments and gauges	5 kPa to 80 kPa 80 kPa to 115 kPa 115 kPa to 200 kPa	700 Pa 52 Pa 700 Pa	Absolute pressure calibrations may be undertaken over the gauge pressure ranges with the addition of the barometric pressure and uncertainty of 52 Pa	
MASS				
Weighing Machines (Non Automatic)	5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 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	0.0030 mg 0.0041 mg 0.0050 mg 0.0061 mg 0.0081 mg 0.0091 mg 0.012 mg 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	Weights available in OIML Class: E2 from 1 mg to 2 kg, grouped load 7 kg F1 up to 10 kg, group loaded 50 kg 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.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
VOLUME OF LIQUIDS (SEE NOTE 1)				Mobile
Single channel instruments	0.1 µl to 10 µl 10 µl to 20 µl 20 µl to 100 µl 100 µl to 200 µl 200 µl to 500 µl 0.5 ml to 2 ml 2 ml to 5 ml 5 ml to 10 ml 10 ml to 20 ml	0.060 µl 0.071 µl 0.20 µl 0.40 µl 0.70 µl 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 µl to 20 µl 20 µl to 50 µl 50 µl to 100 µl 100 µl to 200 µl 200 µl to 300 µl 300 µl to 600 µl 600 µl to 1200 µl	0.10 µl 0.20 µl 0.30 µl 0.50 µl 0.80 µl 1.10 µl 3.00 µl	From minimum of 1 volume and minimum of 5 readings up to 4 volumes and up to 10 readings (by agreement with the customer)	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DIMENSIONAL MEASUREMENTS: RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETERS UNLESS OTHERWISE STATED				Manchester (Site calibration)
Electronic Height Gauges with microprocessor control	0 to 1000	1.0 + (5.0 x L in m)		
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 x L in m)		
NPL type level comparator	MOY/SCMI/42 0 to 1000 mm	0.050 + (0.50 × L in m)		
Gauge block comparators	0 to 100 mm	0.050 + (0.5 x L in m)		
Optical dividing heads				
Rotary tables		Linear dimensions		
Inclinable tables	0 to 1000 Capacity	1 + (10 x L 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		
Microscopes toolmakers	MOY/SCMI/02 0 to 150 × 150 mm	2.0 + 2.5/m with eye piece		
Measuring machines plain taper diameter	MOY/SMCI 16,19 and 78 0 to100 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 x L 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 x L in m) µm		
	As BS EN ISO 10360-5:2010 10 mm to 50 mm	0.90 µm		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded 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				

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:

A CMC is a calibration and measurement capability available to customers under normal conditions:
(a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA; or
(b) as described in the laboratory's scope of accreditation granted by a signatory to the ILAC Arrangement.

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 CMC is calculated according to the procedures given in M3003 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 CMC in certificates issued under its accreditation.

The CMC may be described using various methods in the Schedule of Accreditation:

As a single value that is valid throughout the range.
As an explicit function of the measurand or of a parameter (see below).
As a range of values. The range is stated such that the customer can make a reasonable estimate of the likely uncertainty at any point within the range.
As a matrix or table where the CMCs depend on the values of the measurand and a further quantity.
In graphical form, providing there is sufficient resolution on each axis to obtain at least two significant figures for the CMC.

Expression of CMCs - symbols and units

In general, only units of the SI and those units recognised for use with the SI are used to express the values of quantities and of the associated CMCs. Nevertheless, other commonly used units may be used where considered appropriate for the intended audience. For example, the term "ppm" (part per million) is frequently used by manufacturers of test and measurement equipment to specify the performance of their products. Terms like this may be used in Schedules of Accreditation where they are in common use and understood by the users of such equipment, providing their use does not introduce any ambiguity in the capability that is being described.

When the CMC is expressed as an explicit function of the measurand or of a parameter, this often comprises a relative term (e.g., percentage) and an absolute term, i.e. one expressed in the same units as those of the measurand. This form of expression is used to describe the capability that can be achieved over a range of values. Some examples are shown below. It should be noted that these expressions are *not* mathematical formulae but are instead written in a commonly used shorthand for expressing uncertainties - therefore, for purposes of clarity, an indication of how they are to be interpreted is also provided below.

DC voltage, 100 mV to 1 V: 0.0025 % + 5.0 µV

Over the range 100 mV to 1 V, the CMC is 0.0025 %·V + 5.0 µV, where V is the measured voltage.

Hydraulic pressure, 0.5 MPa to 140 MPa: 0.0036 % + 0.12 ppm/MPa + 4.0 Pa

Over the range 0.5 MPa to 140 MPa, the CMC is $0.0036\ \%\cdot p + (0.12\cdot 10^{-6}\cdot p\cdot 10^{-6}) + 4.0$ Pa, where p is the measured pressure in Pa.

It should be noted that the percentage symbol (%) simply 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 measured value or indication.

Thus, for example, a CMC of 1.5 % means $1.5 \cdot 0.01 \cdot i$, where i is the instrument indication.