Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

5150

Accredited to ISO/IEC 17025:2017

TÜV SÜD Limited (Trading as TÜV SÜD)

Issue No: 001 **Issue date:** 17 March 2025

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL

Contact: Mrs Sandra Kitson-Wilms
Tel: +44 (0) 1489 558100
Fax: +44 (0)1489 558101
E-Mail: Sandra.Kitson-Wilms@tuvsud.com
Website: www.tuvsud.com/uk

Calibration performed at the above address only

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
TEMPERATURE			
Temperature controlled ovens, environmental chambers, fridges/refrigerators, freezers (inclusive of associated indicators, controllers and recorders, all with sensors, within the specified parameters and ranges).	-65 °C to +120 °C	1.1 °C	Multipoint time dependent temperature profiling, also referred to as spatial temperature surveying or mapping.
HUMIDITY			
Humidity controlled environmental chambers (inclusive of associated indicators, controllers and recorders, all with sensors, within the specified parameters and ranges)	5 °C to 70 °C 15 %rh to 97 %rh 85 °C performed at 85 %rh	6.7 %rh 6.7%rh	Multipoint time dependent humidity profiling, also referred to as spatial humidity surveying or mapping, using humidity and temperature measurements.
PRESSURE	4 kPa to 100 kPa	55 Pa	TBA Aug altitude chambers
ELECTRICAL CALIBRATIONS, RF AND MICROWAVE			
RF Impedance	*30 kHz to 1.3 GHz* 0 Ω to 5 Ω 5 Ω to 10 Ω 10 Ω to 20 Ω 20 Ω to 50 Ω 50 Ω to 75 Ω 75 Ω to 100 Ω 100 Ω to 150 Ω 150 Ω to 200 Ω 200 Ω to 250 Ω *1.3 GHz to 3 GHz* 0 Ω to 5 Ω 5 Ω to 10 Ω 10 Ω to 20 Ω 20 Ω to 50 Ω 50 Ω to 75 Ω 75 Ω to 100 Ω 100 Ω to 150 Ω 150 Ω to 200 Ω 200 Ω to 250 Ω	 0.43 Ω 0.41 Ω 0.38 Ω 0.51 Ω 0.89 Ω 1.5 Ω 3.5 Ω 6.4 Ω 10 Ω 0.8 Ω 0.8 Ω 0.7 Ω 0.7 Ω 1.4 Ω 2.6 Ω 6.4 Ω 12 Ω 19 Ω	Using impedance analyser.

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, RF AND MICROWAVE (continued)			
RF Impedance (continued)	*3 GHz to 6 GHz*		Using network analyser.
	0 Ω to 5 Ω	1.4 Ω	
	5 Ω to 10 Ω	1.3 Ω	
	10 Ω to 20 Ω	1.2 Ω	
	20 Ω to 50 Ω	1.4 Ω	
	50 Ω to 75 Ω	2.6 Ω	
	75 Ω to 100 Ω	4.6 Ω	
	100 Ω to 150 Ω	11 Ω	
	150 Ω to 200 Ω	20 Ω	
	200 Ω to 250 Ω	33 Ω	
Voltage reflection coefficient (VRC)	*30 kHz to 1.3 GHz*		Using network analyser. The uncertainties are for a one port device fitted with an N-Type, APC-7 or 3.5 mm connector in good condition.
	0 to 0.1	0.005	
	0.1 to 0.5	0.009	
	0.5 to 1.0	0.019	
	1.3 GHz to 3 GHz		
	0 to 0.1	0.007	
	0.1 to 0.5	0.016	
	0.5 to 1.0	0.036	
	3 GHz to 6 GHz		
	0 to 0.1	0.015	
	0.1 to 0.5	0.027	
	0.5 to 1.0	0.06	
	6 GHz to 18 GHz		
	0 to 0.1	0.03	
	0.1 to 0.5	0.058	
	0.5 to 1.0	0.11	
Voltage Standing Wave Ratio (VSWR)	*10 Hz to 20 Hz*		Using network analyser. The Uncertainties are for a one port device fitted with a BNC or Type-N connector which is in good condition.
	1.0 to 1.3	0.01	
	1.3 to 1.6	0.012	
	1.6 to 2.0	0.015	
	2.0 to 4.0	0.034	
	4.0 to 6.0	0.052	
	6.0 to 7.0	0.062	
	7.0 to 8.0	0.072	
	8.0 to 9.0	0.082	
	9.0 to 10.0	0.093	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, RF AND MICROWAVE (continued)			
Voltage Standing Wave Ratio (VSWR) (continued)	*20 Hz to 50 Hz*		Using network analyser. The Uncertainties are for a one port device fitted with a BNC or Type-N connector which is in good condition.
	1.0 to 1.3	0.006	
	1.3 to 1.6	0.007	
	1.6 to 2.0	0.009	
	2.0 to 4.0	0.021	
	4.0 to 6.0	0.033	
	6.0 to 7.0	0.039	
	7.0 to 8.0	0.046	
	8.0 to 9.0	0.052	
	9.0 to 10.0	0.059	
	50 Hz to 1 MHz		
	1.0 to 1.3	0.003	
	1.3 to 1.6	0.004	
	1.6 to 2.0	0.004	
	2.0 to 4.0	0.011	
	4.0 to 6.0	0.017	
	6.0 to 7.0	0.021	
	7.0 to 8.0	0.025	
	8.0 to 9.0	0.028	
	9.0 to 10.0	0.033	
	30 kHz to 1.3 GHz		
	1.0 to 1.1	0.01	
	1.1 to 1.2	0.011	
	1.2 to 1.5	0.013	
	1.5 to 2	0.018	
	2 to 2.5	0.03	
	2.5 to 3	0.048	
	3 to 4	0.07	
	4 to 5	0.13	
	5 to 6	0.20	
	6 to 7	0.3	
	7 to 8	0.41	
	8 to 9	0.55	
	9 to 10	0.70	
	1.3 GHz to 3 GHz		
	1.0 to 1.1	0.013	
	1.1 to 1.2	0.015	
	1.2 to 1.5	0.017	
	1.5 to 2	0.027	
	2 to 2.5	0.052	
	2.5 to 3	0.086	
	3 to 4	0.13	
	4 to 5	0.24	
	5 to 6	0.39	
	6 to 7	0.57	
	7 to 8	0.79	
	8 to 9	1.0	
	9 to 10	1.3	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, RF AND MICROWAVE (continued)			
Voltage Standing Wave Ratio (VSWR) (continued)	*3 GHz to 6 GHz*		Using network analyser. The Uncertainties are for a one port device fitted with a BNC or Type-N connector which is in good condition.
	1.0 to 1.1	0.029	
	1.1 to 1.2	0.032	
	1.2 to 1.5	0.036	
	1.5 to 2	0.052	
	2 to 2.5	0.093	
	2.5 to 3	0.15	
	3 to 4	0.22	
	4 to 5	0.41	
	5 to 6	0.65	
	6 to 7	0.96	
	7 to 8	1.3	
	8 to 9	1.8	
	9 to 10	2.2	
	500 MHz to 18 GHz		
	1.0 to 1.1	0.057	
	1.1 to 1.2	0.062	
	1.2 to 1.5	0.069	
	1.5 to 2	0.089	
	2 to 2.5	0.13	
	2.5 to 3	0.18	
	3 to 4	0.24	
	4 to 5	0.41	
	5 to 6	0.62	
	6 to 7	0.88	
	7 to 8	1.2	
	8 to 9	1.5	
	9 to 10	2.0	
RF Attenuation	*30 kHz to 1.3 GHz*		Using vector network analyser. The uncertainties are for a two port device fitted with either Type-N, APC-7 or APC-3.5 connectors which are in good condition. These uncertainties apply to devices having an input and output VRC not greater than 0.05. The uncertainty will Increase for devices having a higher VRC.
	0 dB to 5 dB	0.082 dB	
	5 dB to 10 dB	0.083 dB	
	10 dB to 20 dB	0.085 dB	
	20 dB to 30 dB	0.085 dB	
	30 dB to 40 dB	0.085 dB	
	40 dB to 50 dB	0.094 dB	
	50 dB to 60 dB	0.13 dB	
	1.3 GHz to 3 GHz		
	0 dB to 5 dB	0.083 dB	
	5 dB to 10 dB	0.087 dB	
	10 dB to 20 dB	0.095 dB	
	20 dB to 30 dB	0.095 dB	
	30 dB to 40 dB	0.095 dB	
	40 dB to 50 dB	0.11 dB	
	50 dB to 60 dB	0.14 dB	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, RF AND MICROWAVE (continued)			
RF Attenuation (continued)	*3 GHz to 6 GHz*		Using vector network analyser. The uncertainties are for a two port device fitted with either Type-N, APC-7 or APC-3.5 connectors which are in good condition. These uncertainties apply to devices having an input and output VRC not greater than 0.05. The uncertainty will Increase for devices having a higher VRC.
	0 dB to 5 dB	0.11 dB	
	5 dB to 10 dB	0.12 dB	
	10 dB to 20 dB	0.12 dB	
	20 dB to 30 dB	0.12 dB	
	30 dB to 40 dB	0.12 dB	
	40 dB to 50 dB	0.13 dB	
	50 dB to 60 dB	0.24 dB	
	500 MHz to 18 GHz		
	0 dB to 10 dB	0.043 dB	
	10 dB to 20 dB	0.051 dB	
	20 dB to 30 dB	0.064 dB	
	30 dB to 40 dB	0.096 dB	
	40 dB to 50 dB	0.15 dB	
	50 dB to 60 dB	0.41 dB	
Frequency (Measurement)	1 Hz to 100 kHz	0.0001 Hz	Using frequency counter phase locked to GPS receiver.
	100 kHz to 1 MHz	0.00014 Hz	
	1 MHz to 5 MHz	0.00051 Hz	
	5 MHz to 10 MHz	0.001 Hz	
	10 MHz to 100 MHz	0.01 Hz	
	100 MHz to 4 GHz	1.2 Hz	
	4 GHz to 20 GHz	2.3 Hz	
	20 GHz to 26.5 GHz	2.9 Hz	
Antenna factor and gain	20 MHz to 200 MHz	2.6 dB	Using three antenna method.
	200 MHz to 1 GHz	2.6 dB	
	1 GHz to 18 GHz	2.8 dB	
Amplitude Modulation	5 % to 99 %		Using modulation analyser. For the calibration of sources and modulation meters.
	f_c 150 kHz to 10 MHz		
	f_{mod} 20 Hz to 10 kHz	3.8 % of reading	
	f_c 10 MHz to 1.3 GHz		
	f_{mod} 50 Hz to 50 kHz	1.7 % of reading	
	f_c 1.3 GHz to 18 GHz		
	f_{mod} 50 Hz to 50 kHz	2.4 % of reading	
	f_c 10 MHz to 18 GHz		
	f_{mod} 20 Hz to 100 kHz	3.9 % of reading	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, RF AND MICROWAVE (continued)			
Frequency Modulation	*f_c 250 kHz to 10 MHz* *f_{mod} 20 Hz to 10 kHz* Deviation 1 kHz to 40 kHz peak	2.6 % of reading + 24 Hz	Using modulation analyser. For the calibration of sources and modulation meters.
	f_c 10 MHz to 18 GHz *f_{mod} 50 Hz to 100 kHz* Deviation 1 kHz to 400 kHz peak	1.5 % of reading + 24 Hz	
	f_c 10 MHz to 18 GHz *f_{mod} 20 Hz to 200 kHz* Deviation 1 kHz to 400 kHz peak	5.9 % of reading + 24 Hz	
RF Power	0 dBm (1 mW), *50 MHz*	0.037 dB	The uncertainties are for the calibration of 50 Ω coaxial power measuring instruments having a worse case VSWR of 1.5. The uncertainties will increase for devices having a higher VSWR.
	+10dBm to +20dBm		
	100 kHz	0.90 dB	
	300 kHz to 3 GHz	0.24 dB	
	3 GHz to 18 GHz	0.30 dB	
	18 GHz to 26.5 GHz	0.27 dB	
	26.5 GHz to 40 GHz	0.53 dB	
	-20 dBm to +10 dBm		
	100 kHz	0.40 dB	
	300 kHz to 3 GHz	0.15 dB	
	3 GHz to 18 GHz	0.22 dB	
	18 GHz to 26.5 GHz	0.20 dB	
	26.5 GHz to 40 GHz	0.50 dB	
	-30 dBm to -20 dBm		
	100 kHz	0.80 dB	
	300 kHz to 3 GHz	0.16 dB	
	3 GHz to 18 GHz	0.23 dB	
	18 GHz to 26.5 GHz	0.21 dB	
	26.5 GHz to 40 GHz	0.50 dB	
	-60 dBm to -30 dBm		
	100 kHz	0.40 dB	
	200 kHz	0.24 dB	
	300 kHz to 10 GHz	0.25 dB	
	10 GHz to 18 GHz	0.28 dB	
	-70 dBm to -60 dBm		
	100 kHz	0.41 dB	
	300 kHz to 10 GHz	0.28 dB	
	10 GHz to 18 GHz	0.31 dB	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, RF AND MICROWAVE (continued)			
RF Power (Tuned RF Level)	*2.5 MHz to 20 MHz*		For the calibration of RF sources. The uncertainties are for instruments having a worse case VSWR of 1.5:1 in a 50 Ω coaxial system. The uncertainties will increase for devices having a higher VSWR.
	0 dBm to -10 dBm	0.09 dB	
	-10 dBm to -20 dBm	0.11 dB	
	-20 dBm to -30 dBm	0.13 dB	
	-30 dBm to -42 dBm	0.16 dB	
	-42 dBm to -50 dBm	0.17 dB	
	-50 dBm to -60 dBm	0.19 dB	
	-60 dBm to -70 dBm	0.22 dB	
	-70 dBm to -82 dBm	0.25 dB	
	-82 dBm to -90 dBm	0.27 dB	
	-90 dBm to -100 dBm	0.30 dB	
	-100 dBm to -110 dBm	0.33 dB	
	-110 dBm to -120 dBm	0.35 dB	
	50 MHz to 1 GHz		
	0 dBm to -10 dBm	0.11 dB	
	-10 dBm to -20 dBm	0.12 dB	
	-20 dBm to -30 dBm	0.14 dB	
	-30 dBm to -42 dBm	0.17 dB	
	-42 dBm to -50 dBm	0.18 dB	
	-50 dBm to -60 dBm	0.20 dB	
	-60 dBm to -70 dBm	0.23 dB	
	-70 dBm to -82 dBm	0.25 dB	
	-82 dBm to -90 dBm	0.26 dB	
	-90 dBm to -100 dBm	0.28 dB	
	-100 dBm to -110 dBm	0.31 dB	
	-110 dBm to -120 dBm	0.34 dB	
	1 GHz to 2 GHz		
	0 dBm to -10 dBm	0.18 dB	
	-10 dBm to -20 dBm	0.19 dB	
	-20 dBm to -30 dBm	0.21 dB	
	-30 dBm to -42 dBm	0.23 dB	
	-42 dBm to -50 dBm	0.23 dB	
	-50 dBm to -60 dBm	0.25 dB	
	-60 dBm to -70 dBm	0.27 dB	
	-70 dBm to -82 dBm	0.30 dB	
	-82 dBm to -90 dBm	0.30 dB	
	-90 dBm to -100 dBm	0.32 dB	
	-100 dBm to -110 dBm	0.34 dB	
	-110 dBm to -120 dBm	0.37 dB	
	2 GHz to 10 GHz		
	0 dBm to -10 dBm	0.31dB	
	-10 dBm to -20 dBm	0.17dB	
	-20 dBm to -30 dBm	0.18dB	
	-30 dBm to -42 dBm	0.20dB	
	-42 dBm to -50 dBm	0.21dB	
	-50 dBm to -60 dBm	0.23dB	
	-60 dBm to -70 dBm	0.25dB	
	-70 dBm to -82 dBm	0.28dB	
	-82 dBm to -90 dBm	0.30dB	
	-90 dBm to -100 dBm	0.32dB	
	-100 dBm to -110 dBm	0.35dB	
	-110 dBm to -120 dBm	0.38dB	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, RF AND MICROWAVE (continued)			
RF Power (Tuned RF Level) (continued)	*10 GHz to 18 GHz*		For the calibration of RF sources. The uncertainties are for instruments having a worse case VSWR of 1.5:1 in a 50 Ω coaxial system. The uncertainties will increase for devices having a higher VSWR.
	0 dBm to -10 dBm	0.22 dB	
	-10 dBm to -20 dBm	0.23 dB	
	-20 dBm to -30 dBm	0.24 dB	
	-30 dBm to -42 dBm	0.26 dB	
	-42 dBm to -50 dBm	0.26 dB	
	-50 dBm to -60 dBm	0.28 dB	
	-60 dBm to -70 dBm	0.30 dB	
	-70 dBm to -82 dBm	0.32 dB	
	-82 dBm to -90 dBm	0.34 dB	
	-90 dBm to -100 dBm	0.36 dB	
	-100 dBm to -110 dBm	0.38 dB	
	-110 dBm to -120 dBm	0.41 dB	
	2.5 MHz to 20 MHz		For the calibration of analysers, receivers, etc. The uncertainties are for a coaxial power measuring instrument having a worse case VSWR of 1.5:1. The uncertainties will increase for devices having a higher VSWR.
	0 dBm to -10 dBm	0.15 dB	
	-10 dBm to -20 dBm	0.16 dB	
	-20 dBm to -30 dBm	0.18 dB	
	-30 dBm to -42 dBm	0.20 dB	
	-42 dBm to -50 dBm	0.21 dB	
	-50 dBm to -60 dBm	0.23 dB	
	-60 dBm to -70 dBm	0.25 dB	
	-70 dBm to -82 dBm	0.28 dB	
	-82 dBm to -90 dBm	0.30 dB	
	-90 dBm to -100 dBm	0.32 dB	
	-100 dBm to -110 dBm	0.35 dB	
	-110 dBm to -120 dBm	0.37 dB	
	50 MHz to 1 GHz		
	0 dBm to -10 dBm	0.16 dB	
	-10 dBm to -20 dBm	0.17 dB	
	-20 dBm to -30 dBm	0.18 dB	
	-30 dBm to -42 dBm	0.20 dB	
	-42 dBm to -50 dBm	0.21 dB	
	-50 dBm to -60 dBm	0.23 dB	
	-60 dBm to -70 dBm	0.25 dB	
	-70 dBm to -82 dBm	0.28 dB	
	-82 dBm to -90 dBm	0.28 dB	
	-90 dBm to -100 dBm	0.31 dB	
	-100 dBm to -110 dBm	0.33 dB	
	-110 dBm to -120 dBm	0.36 dB	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, RF AND MICROWAVE (continued)			
RF Power (Tuned RF Level) (continued)	*1 GHz to 2 GHz*		For the calibration of analysers, receivers, etc. The uncertainties are for a coaxial power measuring instrument having a worse case VSWR of 1.5:1. The uncertainties will increase for devices having a higher VSWR.
	0 dBm to -10 dBm	0.15 dB	
	-10 dBm to -20 dBm	0.16 dB	
	-20 dBm to -30 dBm	0.18 dB	
	-30 dBm to -42 dBm	0.20 dB	
	-42 dBm to -50 dBm	0.21 dB	
	-50 dBm to -60 dBm	0.23 dB	
	-60 dBm to -70 dBm	0.25 dB	
	-70 dBm to -82 dBm	0.28 dB	
	-82 dBm to -90 dBm	0.28 dB	
	-90 dBm to -100 dBm	0.30 dB	
	-100 dBm to -110 dBm	0.33 dB	
	-110 dBm to -120 dBm	0.36 dB	
	2 GHz to 10 GHz		
	0 dBm to -10 dBm	0.19 dB	
	-10 dBm to -20 dBm	0.20 dB	
	-20 dBm to -30 dBm	0.21 dB	
	-30 dBm to -42 dBm	0.23 dB	
	-42 dBm to -50 dBm	0.24 dB	
	-50 dBm to -60 dBm	0.26 dB	
	-60 dBm to -70 dBm	0.28 dB	
	-70 dBm to -82 dBm	0.30 dB	
	-82 dBm to -90 dBm	0.32 dB	
	-90 dBm to -100 dBm	0.34 dB	
	-100 dBm to -110 dBm	0.37 dB	
	-110 dBm to -120 dBm	0.40 dB	
	10 GHz to 18 GHz		
	0 dBm to -10 dBm	0.20 dB	
	-10 dBm to -20 dBm	0.21 dB	
	-20 dBm to -30 dBm	0.22 dB	
	-30 dBm to -42 dBm	0.24 dB	
	-42 dBm to -50 dBm	0.25 dB	
	-50 dBm to -60 dBm	0.26 dB	
	-60 dBm to -70 dBm	0.28 dB	
	-70 dBm to -82 dBm	0.31 dB	
	-82 dBm to -90 dBm	0.33 dB	
	-90 dBm to -100 dBm	0.35 dB	
	-100 dBm to -110 dBm	0.37 dB	
	-110 dBm to -120 dBm	0.40 dB	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, DC AND LF			
DC Resistance			
Measurement	1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ	17 µΩ/Ω + 59 µΩ 35 µΩ/Ω + 6 mΩ 30 µΩ/Ω + 6 mΩ 30 µΩ/Ω + 6 mΩ 30 µΩ/Ω + 60 mΩ 36 µΩ/Ω + 2.5 Ω 150 µΩ/Ω + 120 Ω	Using digital multimeter.
Generation	1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ	2.3 mΩ 2.3 mΩ 2.9 mΩ 180 mΩ 140 mΩ 1.5 Ω 21 Ω 400 Ω 12 kΩ	Fixed resistance values for the calibration of resistance measuring instruments.
DC Voltage			
Measurement	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	9 µV/V + 2.0 µV 8 µV/V + 2 µV 15 µV/V + 15 µV 21 µV/V + 110 µV 21 µV/V + 1.1mV	Using digital multimeter.
Generation	0 mV 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	1.9 µV 16 µV 77 µV 150 µV 1.8 mV 10 mV	Using multi-function calibrator.
DC Current			
Measurement	0 µA to 1 µA 1 µA to 10 µA 10 µA to 100µA 100 µA to 1 mA 1 mA to 10 mA 10 mA to 100mA 100 mA to 1 A	60 µA/A + 60 pA 25 µA/A + 150 pA 25 µA/A + 1.5 nA 25 µA/A + 7.5 nA 25 µA/A + 75 nA 40 µA/A + 710 nA 130 µA/A + 20 µA	Using digital multimeter.
Generation	0 µA 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	14 nA 110 nA 1.1 µA 31 µA 220 µA	Using multi-function calibrator.

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, DC AND LF (continued)			
AC Voltage			
Measurement	*1 Hz to 40 Hz*		Using digital multimeter.
	0 mV to 10 mV	0.040 % + 10 µV	
	110 mV to 100 mV	0.040 % + 7 µV	
	100 mV to 1 V	0.010 % + 65 µV	
	1 V to 10 V	0.010 % + 0.8 mV	
	10 V to 100 V	0.030 % + 7 mV	
	100 V to 700 V	0.050 % + 60mV	
	40 Hz to 1 kHz		
	0 mV to 10 mV	0.040 % + 10 µV	
	110 mV to 100 mV	0.010 % + 6 uV	
	100 mV to 1 V	0.010 % + 60 µV	
	1 V to 10 V	0.010 % + 0.65 mV	
	10 V to 100 V	0.025 % + 6.5 mV	
	100 V to 700 V	0.050 % + 60 mV	
	1 kHz to 20 kHz		
	0 mV to 10 mV	0.040 % + 10 µV	
	10 mV to 100 mV	0.020 % + 6 µV	
	100 mV to 1 V	0.020 % + 50 µV	
	1 V to 10 V	0.027 % + 0.5 mV	
	10 V to 100 V	0.025 % + 5 mV	
	100 V to 700 V	0.070 % + 40 mV	
	20 kHz to 50 kHz		
	0 mV to 10 mV	0.12 % + 10 µV	
	10 mV to 100 mV	0.050 % + 6 µV	
	100 mV to 1 V	0.040 % + 50 µV	
	1 V to 10 V	0.040 % + 0.5 mV	
	10 V to 100 V	0.050 % + 5 mV	
	50 kHz to 100 kHz		
	0 mV to 10 mV	0.60 % + 10 µV	
	10 mV to 100 mV	0.10 % + 5.5 µV	
	100 mV to 1 V	0.10 % + 50 µV	
	1 V to 10 V	0.10 % + 0.5 mV	
	10 V to 100 V	0.15 % + 5 mV	
Generation	*10 Hz to 20 Hz*		Using multi-function calibrator.
	0 mV to 2.2 mV	4.8 µV	
	2.2 mV to 22 mV	14 µV	
	22 mV to 220 mV	120 µV	
	220 mV to 2.2 V	1.1 mV	
	2.2 V to 22 V	11 mV	
	22 V to 220 V	110 mV	
	20 Hz 40 Hz		
	0 mV to 2.2 mV	4.6 µV	
	2.2 mV to 22 mV	7.3 µV	
	22 mV to 220 mV	47 µV	
	220 mV to 2.2 V	350 µV	
	2.2 V to 22 V	3.5 mV	
	22 V to 220 V	35 mV	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, DC AND LF (continued)			
AC Voltage (continued)			
Generation (continued)	*40 Hz to 20 kHz*		Using multi-function calibrator.
	0 mV to 2.2 mV	4.6 µV	
	2.2 mV to 22 mV	6.2 µV	
	22 mV to 220 mV	25 µV	
	220 mV to 2.2 V	170 µV	
	2.2 V to 22 V	1.7 mV	
	22 V to 220 V	18 mV	
	20 kHz to 50 kHz		
	0 mV to 2.2 mV	4.7 µV	
	2.2 mV to 22 mV	9.8 µV	
	22 mV to 220 mV	71 µV	
	220 mV to 2.2 V	260 µV	
	2.2 V to 22 V	2.6 mV	
	22 V to 220 V	49 mV	
	50 kHz to 100 kHz		
	0 mV to 2.2 mV	7.6 µV	
	2.2 mV to 22 mV	20 µV	
	22 mV to 220 mV	190 µV	
	220 mV to 2.2 V	550 µV	
	2.2 V to 22 V	5.5 mV	
	22 V to 220 V	110 mV	
	100 kHz to 300 kHz		
	0 mV to 2.2 mV	13 µV	
	2.2 mV to 22 mV	28 µV	
	22 mV to 220 mV	240 µV	
	220 mV to 2.2 V	960 µV	
	2.2 V to 22 V	11 mV	
	300 kHz to 500 kHz		
	0 mV to 2.2 mV	25 µV	
	2.2 mV to 22 mV	47 µV	
	22 mV to 220 mV	380 µV	
	220 mV to 2.2 V	2.4 mV	
	2.2 V to 22 V	28 mV	
	500 kHz to 1 MHz		
	0 mV to 2.2 mV	26 µV	
	2.2 mV to 22 mV	81 µV	
	22 mV to 220 mV	750 µV	
	220 mV to 2.2 V	4.9 mV	
	2.2 V to 22 V	60 mV	
	220 V to 1100 V		
	15 Hz to 50 Hz	440 mV	
	50 Hz to 1 kHz	100 mV	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, DC AND LF (continued)			
AC Current			
Measurement	*20 Hz to 1 kHz*		Using digital multimeter.
	0 µA to 100 µA	0.20 % + 35 nA	
	100 µA to 1 mA	0.20 % + 0.3µA	
	1 mA to 10 mA	0.20 % + 3.0 µA	
	10 mA to 100 mA	0.20 % + 30 µA	
	100 mA to 1 A	0.19 % + 0.25 mA	
Generation	*10 Hz to 20 Hz*		Using multi-function calibrator.
	0 µA to 220 µA	0.16 µA	
	220 µA to 2.2 mA	1.5 µA	
	2.2 mA to 22 mA	15 µA	
	22 mA to 220 mA	150 µA	
	20 Hz to 40 Hz		
	0 µA to 220 µA	0.081 µA	
	220 µA to 2.2 mA	0.78 µA	
	2.2 mA to 22 mA	7.7 µA	
	22 mA to 220 mA	77 µA	
	40 Hz to 1 kHz		
	0 µA to 220 µA	0.038 µA	
	220 µA to 2.2 mA	0.33 µA	
	2.2 mA to 22 mA	3.1 µA	
	22 mA to 220 mA	31 µA	
	1 kHz to 5 kHz		
	0 µA to 220 µA	0.14 µA	
	220 µA to 2.2 mA	1.4 µA	
	2.2 mA to 22 mA	14 µA	
	22 mA to 220 mA	140 µA	
	5 kHz to 10 kHz		
	0 µA to 220 µA	0.37 µA	
	220 µA to 2.2 mA	3.6 µA	
	2.2 mA to 22 mA	36 µA	
	22 mA to 220 mA	360 µA	
	220 mA to 2.2 A		
	20 Hz to 1 kHz	1.4mA	
	1 kHz to 5 kHz	1.7 mA	
	5 kHz to 10 kHz	19 mA	
Capacitance (Measurement)	0 nF to 0.9 nF	0.53 %	Using digital multimeter (ΔV/Δt technique).
	0.9 nF to 9 nF	0.52 %	
	9 nF to 90 nF	1.7 %	
	90 nF to 900 nF	5.5 %	
	0.9 µF to 9 µF	5.6 %	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL CALIBRATIONS, DC AND LF (continued)			
LF Impedance	*10 Hz*		Using impedance analyser.
	0 Ω to 5 Ω	0.11 Ω	
	5 Ω to 10 Ω	0.15 Ω	
	10 Ω to 20 Ω	0.19 Ω	
	20 Ω to 50 Ω	0.40 Ω	
	50 Ω to 75 Ω	0.58 Ω	
	75 Ω to 100 Ω	0.76 Ω	
	100 Ω to 150 Ω	1.3 Ω	
	150 Ω to 200 Ω	1.7 Ω	
	200 Ω to 250 Ω	2.1 Ω	
	20 Hz		
	0 Ω to 5 Ω	0.096 Ω	
	5 Ω to 10 Ω	0.12 Ω	
	10 Ω to 20 Ω	0.13 Ω	
	20 Ω to 50 Ω	0.25 Ω	
	50 Ω to 75 Ω	0.35 Ω	
	75 Ω to 100 Ω	0.46 Ω	
	100 Ω to 150 Ω	0.81 Ω	
	150 Ω to 200 Ω	1.1 Ω	
	200 Ω to 250 Ω	1.4 Ω	
	50 Hz		
	0 Ω to 5 Ω	0.087 Ω	
	5 Ω to 10 Ω	0.10 Ω	
	10 Ω to 20 Ω	0.093 Ω	
	20 Ω to 50 Ω	0.16 Ω	
	50 Ω to 75 Ω	0.22 Ω	
	75 Ω to 100 Ω	0.28 Ω	
	100 Ω to 150 Ω	0.53 Ω	
	150 Ω to 200 Ω	0.70 Ω	
	200 Ω to 250 Ω	0.88 Ω	
	100 Hz		
	0 Ω to 5 Ω	0.084 Ω	
	5 Ω to 10 Ω	0.097 Ω	
	10 Ω to 20 Ω	0.082 Ω	
	20 Ω to 50 Ω	0.13 Ω	
	50 Ω to 75 Ω	0.17 Ω	
	75 Ω to 100 Ω	0.22 Ω	
	100 Ω to 150 Ω	0.44 Ω	
	150 Ω to 200 Ω	0.57 Ω	
	200 Ω to 250 Ω	0.72 Ω	
	200 Hz		
	0 Ω to 5 Ω	0.083 Ω	
	5 Ω to 10 Ω	0.094 Ω	
	10 Ω to 20 Ω	0.077 Ω	
	20 Ω to 50 Ω	0.12 Ω	
	50 Ω to 75 Ω	0.15 Ω	
	75 Ω to 100 Ω	0.19 Ω	
	100 Ω to 150 Ω	0.39 Ω	
	150 Ω to 200 Ω	0.51 Ω	
	200 Ω to 250 Ω	0.64 Ω	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
LF Impedance (continued)	*400 Hz*		Using impedance analyser.
	0 Ω to 5 Ω	0.082 Ω	
	5 Ω to 10 Ω	0.093 Ω	
	10 Ω to 20 Ω	0.074 Ω	
	20 Ω to 50 Ω	0.11 Ω	
	50 Ω to 75 Ω	0.14 Ω	
	75 Ω to 100 Ω	0.17 Ω	
	100 Ω to 150 Ω	0.37 Ω	
	150 Ω to 200 Ω	0.48 Ω	
	200 Ω to 250 Ω	0.60 Ω	
	1 MHz		
	0 Ω to 5 Ω	0.081 Ω	
	5 Ω to 10 Ω	0.091 Ω	
	10 Ω to 20 Ω	0.072 Ω	
	20 Ω to 50 Ω	0.10 Ω	
	50 Ω to 75 Ω	0.13 Ω	
	75 Ω to 100 Ω	0.15 Ω	
	100 Ω to 150 Ω	0.35 Ω	
	150 Ω to 200 Ω	0.45 Ω	
	200 Ω to 250 Ω	0.56 Ω	
LF Attenuation	*10 Hz to 20 Hz*		Using impedance analyser. The uncertainties are for a two port device fitted with either BNC or Type-N connectors which are in good condition.
	0 dB to 20 dB	0.049 dB	
	20 dB to 30 dB	0.086 dB	
	30 dB to 40 dB	0.18 dB	
	40 dB to 50 dB	0.42 dB	
	50 dB to 60 dB	1.3 dB	
	20 Hz to 50 Hz		
	0 dB to 20 dB	0.034 dB	
	20 dB to 30 dB	0.071 dB	
	30 dB to 40 dB	0.12 dB	
	40 dB to 50 dB	0.24 dB	
	50 dB to 60 dB	0.75 dB	
	50 Hz to 100 Hz		
	0 dB to 20 dB	0.026 dB	
	20 dB to 30 dB	0.063 dB	
	30 dB to 40 dB	0.085 dB	
	40 dB to 50 dB	0.13 dB	
	50 dB to 60 dB	0.36 dB	
	100 Hz to 10 kHz		
	0 dB to 20 dB	0.046 dB	
	20 dB to 30 dB	0.062 dB	
	30 dB to 40 dB	0.073 dB	
	40 dB to 50 dB	0.097 dB	
	50 dB to 60 dB	0.25 dB	
	10 kHz to 1 MHz		
	0 dB to 20 dB	0.086 dB	
	20 dB to 30 dB	0.11 dB	
	30 dB to 40 dB	0.15 dB	
	40 dB to 50 dB	0.17 dB	
	50 dB to 60 dB	0.25 dB	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
Electrical simulation of temperature Calibration of measurement displays with internal reference enabled.			
Type K thermocouple displays	-50 °C to +100 °C +100 °C to +1000 °C	0.33 °C 0.44 °C	
Type T thermocouple displays	-100 °C to +400 °C	0.36 °C	
ACCELEROMETRY			
Isotron and Piezoelectric types	Nominal peak acceleration 1gn up to 10 gn (9.81 up to 98 m/s-2) Charge Sensitivity >0.1 pCgn (0.01 pC/ms-2) <1000 pCgn (0.01 pC/ms-2) 2 Hz to 40 Hz 40 Hz to 3105 Hz	 3.5% 3.1%	Calibration of charge sensitivity by comparison with a reference (precision grade) transducer
END			

Appendix - Calibration and Measurement Capabilities

Introduction

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

Calibration and Measurement Capabilities (CMCs)

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

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

Expression of CMCs - symbols and units

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

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