


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 0183 Accredited to ISO/IEC 17025:2005	Fluke Precision Measurement Ltd	
	Issue No: 053	Issue date: 18 April 2019
	52 Hurricane Way Norwich Airport Norwich Norfolk NR6 6JB	Contact: Mr P Bunyan Tel: +44 (0)1603-256600 Fax: +44 (0)1603-256777 E-Mail: service.uk@fluke.com Website: www.fluke.com
Calibration performed by the Organisations at the locations specified below		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Address 52 Hurricane Way Norwich Airport Norwich Norfolk NR6 6JB	Electrical	

Site activities performed away from the locations listed above:

Location details	Activity	Location code
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.	Electrical	Site capabilities are listed at the end of the schedule, click on link



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DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
DC RESISTANCE			
Specific values	20 m Ω 0.1 Ω 1 Ω 10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω 10 M Ω 100 M Ω 1 G Ω 10 G Ω	3.6 ppm 3.1 ppm 0.69 ppm 0.57 ppm 0.32 ppm 0.43 ppm 0.39 ppm 1.2 ppm 3.9 ppm 4.6 ppm 10 ppm 18 ppm 68 ppm	
Other values	0 Ω to 49 m Ω 50 m Ω to 0.2 Ω 0.2 Ω to 2.0 Ω 2.0 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 2.0 k Ω 2.0 k Ω to 20 k Ω 20 k Ω to 200 k Ω 200 k Ω to 2.0 M Ω 2.0 M Ω to 20 M Ω 20 M Ω to 200 M Ω 200 M Ω to 2 G Ω 2 G Ω to 20 G Ω	38 n Ω 3.3 ppm 1.5 ppm 1.4 ppm 0.62 ppm 0.68 ppm 0.66 ppm 1.3 ppm 4.2 ppm 7.5 ppm 11 ppm 28 ppm 90 ppm	
Earth Bonding Resistance 50Hz to 60 Hz	1 m Ω to 20 m Ω 20 m Ω to 100 m Ω 100 m Ω to 1 Ω 1 Ω to 100 Ω 100 Ω to 2 k Ω	2.4 % 0.83 % 0.32 % 0.44 % 0.090 %	
DC VOLTAGE			
Specific Values	100 mV 1 V 1.018 V 10 V 100 V 1000 V 1 V to 10 V in 1 V increments 10 V to 100 V in 10 V increments 100 V to 1 kV in 100 V increments	1.8 ppm 0.46 ppm 0.46 ppm 0.27 ppm 0.55 ppm 0.60 ppm 0.75 ppm 0.75 ppm 0.75 ppm	



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DC VOLTAGE (continued)			
Other Values	0 V to 10 mV 10 mV to 20 mV 20 mV to 100 mV 100 mV to 200 mV 200 mV to 20 V 20 V to 200 V 200 V to 1050 V	80 nV 9.0 ppm 5.7 ppm 5.0 ppm 2.6 ppm 3.8 ppm 4.8 ppm	
DC Voltage Linearity			
2 V range	0 V to 0.5 V 0.5 V to 1 V At 1 V 1 V to 1.5 V 1.5 V to 2 V	0.26 uV 0.31 uV 0.25 uV 0.37 uV 0.45 uV	
20 V range	0 V to 5 V 5 V to 10 V At 10 V 10 V to 15 V 15 V to 20 V	2.6 uV 3.0 uV 0.75 uV 3.7 uV 4.4 uV	
200 V range	At 100 V	7.5 uV	
1 kV range	At 500 V	75 uV	
	1 kV to 10 kV 10 kV to 40 kV	220 ppm 500 ppm	For the calibration of high voltage sources, meters and dividers.
DC CURRENT			
	0 A to 10 μ A 10 μ A to 200 μ A 200 μ A to 20 mA 20 mA to 200 mA	240 pA 2.4 ppm 1.6 ppm 1.9 ppm	
	200 mA to 1 A 1 A to 20 A 20 A to 10 A 50 A to 100 A	6.5 ppm 7.8 ppm 27 ppm 27 ppm	
AC VOLTAGE			
	1 mV to 1 V 20 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.012 % 0.020 % 0.040 %	For the calibration of voltage measuring instruments.
	<i>50 Hz and 60 Hz:</i>		
	1 kV to 10 kV	0.25 %	For the calibration of high voltage meters and sources.
	10 kV to 30 kV	0.36 %	
	1 kV to 10 kV	0.27 %	For the calibration of high voltage dividers.
	10 kV to 30 kV	0.37 %	



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Measured Quantity Instrument or Gauge	Range		Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)										Remarks				
AC CURRENT																	
Absolute current measurement (ppm)																	
Frequcey kHz	2 µA	10 µA	100 µA	1 mA	10 mA	20 mA	50 mA	100 mA	200 mA	500 mA	1 A	2 A	5 A	10 A	20 A	50 A	100 A
0.01	670	260	55	42	25	25	31	31	32	30	30	30	40	40	40	50	50
0.02	670	260	52	42	24	24	27	27	28	27	28	27	31	34	38	45	52
0.04	670	220	50	41	24	24	24	24	25	25	26	25	30	33	37	44	52
1	670	200	50	41	22	22	23	23	24	23	25	24	29	33	36	43	51
10	670	200	50	41	23	23	24	23	24	23	25	24	29	33	36	43	51
30	670	200	54	41	24	24	24	24	25	24	25	25	30	41	42	62	88
70	670	200	55	43	29	28	25	25	26	24	26	29	38	68	79	110	140
100	670	210	58	47	34	31	27	25	26	25	28	33	41	83	100	140	170
TEMPERATURE SIMULATION																	
Fluke 9100, 5500 and 525B series calibrators	Internal reference junction		0.078 °C										Product specific; calibration of calibrator internal reference junction				
Temperature simulators, calibration by electrical simulation													Including reference junction compensation				
Base metal thermocouples																	
Type E			-250 °C to -100 °C -100 °C to 1000 °C														
Type J			-210 °C to -100 °C -100 °C to 1200 °C														
Type K			-200 °C to -100 °C -100 °C to 1200 °C														
Type N			-200 °C to -100 °C -100 °C to 1372 °C														
Type T			-250 °C to -150 °C -150 °C to 400 °C														
Noble metal thermocouples																	
Type R			-50 °C to 100 °C 100 °C to 1000 °C 1000 °C to 1760 °C														
Type S			0 °C to 1400 °C 1400 °C to 1750 °C														



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
Temperature indicators, calibration by electrical simulation			Including reference junction compensation
Base metal thermocouples			
Type E	-250 °C to -100 °C -100 °C to 1000 °C	0.140 °C 0.080 °C	
Type J	-210 °C to -100 °C -100 °C to 1200 °C	0.096 °C 0.081 °C	
Type K	-200 °C to -100 °C -100 °C to 1200 °C	0.110 °C 0.087 °C	
Type N	-200 °C to -100 °C -100 °C to 1372 °C	0.140 °C 0.097 °C	
Type T	-250 °C to -150 °C -150 °C to 400 °C	0.200 °C 0.110 °C	
Noble metal thermocouples			
Type R	-50 °C to 100 °C 100 °C to 1000 °C 1000 °C to 1760 °C	0.30 °C 0.18 °C 0.29 °C	
Type S	0 °C to 1400 °C 1400 °C to 1750 °C	0.22 °C 0.26 °C	
CAPACITANCE	At effective frequencies from 0.08 Hz to 6 Hz		
	0.2 nF to 2 nF 2 nF to 20 nF 20 nF to 200 nF 0.2 µF to 2 µF 2 µF to 20 µF 20 µF to 200 mF	380 ppm 200 ppm 180 ppm 72 ppm 160 ppm 250 ppm	



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CAPACITANCE (continued)	<p><i>At 100 Hz:</i> 0.33 μF 1.09 μF 1.2 μF 3 μF 3.3 μF 10.9 μF</p> <p><i>At 1 kHz:</i> 350 pF 480 pF 600 pF 1 nF 1.2 nF 3 nF 3.3 nF 10.9 nF 12 nF</p> <p><i>At 1 kHz:</i> 30 nF 33 nF 109 nF 120 nF 300 nF</p>	<p>0.070 % 0.12 % 0.14 % 0.17 % 0.13 % 0.13 %</p> <p>1.7 % 1.3 % 0.80 % 0.43 % 0.39 % 0.15 % 0.15 % 0.080 % 0.17 %</p> <p>0.090 % 0.080 % 0.070 % 0.070 % 0.060 %</p>	<p>Measurement of ground-isolated capacitors and capacitance calibrators.</p> <p>Measurement of ground-isolated capacitors and capacitance calibrators</p>
FREQUENCY Measurement	<p>10 MHz</p> <p>10 Hz to 100 Hz 100 Hz to 1 kHz 1 kHz to 100 kHz 100 kHz to 1 MHz 1 MHz to 10 MHz 10 MHz to 30 MHz 30 MHz to 40 GHz</p>	<p>6.2 parts in 10^{12}</p> <p>2.5 parts in 10^7 3.1 parts in 10^8 3.3 parts in 10^9 1.8 parts in 10^{10} 1.4 parts in 10^{11} 7.2 parts in 10^{12} 6.6 parts in 10^{12}</p>	
Wideband Voltage	<p>1 V and 3 V into 50 Ω 1 MHz and 10 MHz 20 MHz 30 MHz 40 MHz 50 MHz</p>	<p>0.15 % 0.25 % 0.30 % 0.45 % 0.50 %</p>	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
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Fluke 5790A AC Measurement Standard Calibration - AC/DC Voltage Difference

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the measured AC/DC voltage difference of these instruments.

Frequency	2.2 mV range		7 mV range		22 mV range		70 mV range	
	2 mV	6 mV	10 mV	20 mV	20 mV	60 mV		
10 Hz	560	230	98	84	75	45		
20 Hz	550	230	85	73	62	31		
30 Hz	550	230	85	73	62	28		
40 Hz	550	180	85	73	62	28		
55 Hz	550	180	85	66	53	28		
60 Hz	550	180	77	66	53	31		
120 Hz	550	170	77	67	54	31		
300 Hz	550	170	79	66	53	31		
400 Hz	550	170	74	64	50	28		
500 Hz	550	170	82	64	50	28		
1 kHz	550	170	82	65	51	28		
10 kHz	550	170	82	66	54	30		
20 kHz	550	170	82	64	50	28		
30 kHz	550	170	82	64	50	34		
50 kHz	550	170	82	66	53	31		
70 kHz	550	170	82	66	53	31		
100 kHz	550	170	87	71	60	31		
200 kHz	550	250	93	76	66	40		
300 kHz	550	250	93	78	68	41		
500 kHz	560	250	110	96	89	59		
700 kHz	570	270	130	120	110	81		
800 kHz	570	270	130	120	120	88		
1 MHz	580	280	150	150	150	110		

Frequency	220 mV range			700 mV range						2.2 V range		
	60 mV	100 mV	200 mV	200 mV	300 mV	400 mV	500 mV	600 mV	700 mV	600 mV	1 V	2 V
10 Hz	45	23	22	19	19	19	17	18	18	16	12	8.2
20 Hz	31	19	19	16	16	16	15	15	15	15	12	7.2
30 Hz	28	18	15	18	17	17	15	15	15	15	11	6.3
40 Hz	28	14	14	14	13	13	13	13	13	13	6.3	6.3
55 Hz	28	15	14	14	13	13	13	13	13	12	6.3	6.3
60 Hz	31	14	13	13	13	13	13	13	13	12	6.3	6.3
120 Hz	31	15	13	13	13	13	13	13	13	12	6.1	6.1
300 Hz	31	14	13	13	13	13	13	13	13	12	6.1	6.1
400 Hz	28	11	9.2	8.4	8.7	8.7	7.5	7.5	7.5	7.3	6.0	6.0
500 Hz	28	12	9.2	8.4	8.3	8.7	7.5	7.5	7.5	7.3	6.0	6.0
1 kHz	28	12	9.2	9.3	9.2	9.2	7.5	7.5	7.5	7.3	6.0	6.0
10 kHz	30	12	9.2	8.4	10	9.2	7.5	7.5	7.5	11	7.5	7.5
20 kHz	28	12	9.5	8.8	9.1	9.5	7.9	7.9	7.9	12	7.5	7.5
30 kHz	34	12	9.5	8.8	9.6	9.5	7.9	7.9	7.9	12	7.5	7.5
50 kHz	31	12	9.5	8.8	9.1	9.5	7.9	7.9	7.9	12	7.5	7.5
70 kHz	31	13	11	9.3	9.6	10	8.4	8.4	8.4	12	7.7	7.7
100 kHz	31	12	13	12	12	12	9.8	9.8	9.8	13	8.1	8.1
200 kHz	40	25	27	22	20	20	20	21	21	24	14	11
300 kHz	41	26	27	26	20	20	25	24	24	27	16	14
500 kHz	59	47	42	41	36	33	39	39	39	35	25	25
700 kHz	81	61	61	54	50	50	53	53	53	44	25	25
800 kHz	88	70	71	57	53	53	56	56	56	45	27	26
1 MHz	110	85	91	71	68	68	70	70	70	48	29	27



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
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Fluke 5790A AC Measurement Standard Calibration (continued) - AC/DC Voltage Difference

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the measured AC/DC voltage difference of these instruments.

Frequency	7 V range						22 V range			
	2 V	3 V	4 V	5 V	6 V	7 V	6 V	8 V	10 V	20 V
10 Hz	12	9.3	11	13	11	9.5	13	13	13	14
20 Hz	12	8.8	9.5	8.2	8.2	8.2	12	12	12	13
30 Hz	11	8.7	9.4	8.3	8.3	8.3	6.3	6.3	7.2	8.5
40 Hz	8.9	6.8	7.8	5.8	5.8	6.3	6.3	6.3	7.2	8.5
55 Hz	8.9	6.8	7.8	5.8	5.8	6.3	6.3	6.2	7.2	8.5
60 Hz	8.9	6.8	7.6	5.7	5.7	6.2	6.3	6.2	6.5	8.5
120 Hz	8.0	6.8	6.2	5.7	5.7	6.2	6.3	6.2	6.5	7.9
300 Hz	8.0	6.8	5.7	5.7	5.7	6.2	6.3	6.2	6.5	7.9
400 Hz	8.0	6.8	5.7	5.7	5.7	6.2	6.3	6.2	6.5	7.9
500 Hz	8.0	6.8	5.7	5.7	5.7	6.2	7.7	7.6	8.0	9.1
1 kHz	8.0	6.8	5.7	5.7	5.7	5.7	6.4	6.3	6.5	7.9
10 kHz	8.0	6.8	5.7	5.7	5.7	5.7	6.3	6.2	6.5	7.9
20 kHz	8.0	6.8	5.7	5.7	5.7	5.7	6.3	6.2	6.5	7.9
30 kHz	8.0	6.8	5.7	5.7	5.7	5.7	6.3	6.3	6.5	7.9
50 kHz	8.0	6.8	5.7	6.8	6.8	5.7	6.3	6.3	6.5	7.9
70 kHz	8.2	7.8	5.9	9.7	9.7	5.9	6.5	6.5	6.6	7.9
100 kHz	9.4	8.3	7.3	11	11	6.9	7.4	7.4	7.4	8.9
200 kHz	10	9.4	12	13	13	8.7	12	13	13	15
300 kHz	16	13	13	15	15	9.5	13	13	13	16
500 kHz	83	83	83	82	68	69	69	67	55	24
700 kHz	81	80	80	80	67	69	68	68	54	28
800 kHz	81	81	81	80	81	82	68	68	67	32
1 MHz	82	80	80	80	80	80	67	67	67	38

Frequency	70 V range						220 V range		
	20 V	30 V	40 V	50 V	60 V	70 V	60 V	100 V	200 V
10 Hz	11	12	10	10	10	10	11	15	16
20 Hz	11	12	8.5	8.5	8.5	8.5	9.2	13	14
30 Hz	8.9	8.3	8.5	8.5	8.5	8.5	9.2	13	13
40 Hz	8.0	8.3	8.5	8.5	8.5	8.5	9.2	13	13
55 Hz	10	11	8.5	8.5	8.5	8.5	9.2	13	13
60 Hz	8.5	8.8	8.5	8.5	8.5	8.5	9.2	13	13
120 Hz	8.5	8.5	8.5	8.5	8.5	8.5	9.2	13	13
300 Hz	8.5	8.5	8.5	8.5	8.5	8.5	9.2	13	13
400 Hz	8.5	8.5	8.5	8.5	8.5	8.5	9.6	13	13
500 Hz	8.5	8.5	8.5	8.5	8.5	8.5	9.6	13	13
1 kHz	8.5	8.5	8.5	8.5	8.5	8.5	9.2	13	13
10 kHz	8.5	8.5	8.5	8.5	8.5	8.5	9.2	13	13
20 kHz	8.5	8.5	8.5	8.5	8.5	8.5	11	13	13
30 kHz	8.5	8.5	8.5	8.5	8.5	8.5	11	13	13
50 kHz	8.5	8.5	8.5	8.5	8.5	8.5	11	13	13
70 kHz	8.5	8.5	14	14	14	14	12	17	19
100 kHz	9.5	9.8	16	16	16	16	24	28	28
200 kHz	17	17							
300 kHz	19	21							
500 kHz	22	24							
700 kHz	27	32							
800 kHz	30								
1 MHz	35								



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Fluke 5790A AC Measurement Standard Calibration (continued) - AC/DC Voltage Difference

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the measured AC/DC voltage difference of these instruments.

Frequency	700 V range				1000 V range		
	200 V	300 V	500 V	600 V	600 V	800 V	1000 V
10 Hz	24	22	21	20	20	21	25
20 Hz	14	13	13	13	13	13	14
30 Hz	14	12	12	13	13	13	13
40 Hz	14	12	12	13	13	13	13
55 Hz	14	12	12	13	13	13	13
60 Hz	14	12	12	13	13	13	13
120 Hz	14	13	13	13	13	13	13
300 Hz	14	13	13	13	13	13	13
400 Hz	14	13	13	13	13	13	13
500 Hz	14	13	13	13	13	13	13
1 kHz	14	13	13	13	13	13	13
10 kHz	14	13	13	13	13	13	13
20 kHz	15	14	13	14	14	13	13
30 kHz	14	14	13	14	14	13	14
50 kHz	15	16	15	15	15	14	15
70 kHz	19	20	19	26	26	26	26
100 kHz	28	28	29	34	34	35	35

Fluke 5790A AC Measurement Standard Calibration - AC Voltage

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the AC voltage function of these instruments.

Frequency	2.2 mV range	7 mV range	22 mV range		70 mV range	
	2 mV	6 mV	10 mV	20 mV	20 mV	60 mV
10 Hz	610	240	120	89	81	46
20 Hz	610	240	110	79	69	32
30 Hz	610	240	110	79	69	30
40 Hz	610	200	110	79	69	30
55 Hz	610	190	110	72	61	30
60 Hz	610	190	100	72	61	33
120 Hz	610	190	100	73	62	33
300 Hz	610	190	100	72	61	33
400 Hz	610	180	100	70	58	30
500 Hz	610	180	110	70	58	30
1 kHz	610	180	110	71	59	30
10 kHz	610	180	110	72	61	31
20 kHz	610	180	100	70	58	30
30 kHz	610	180	100	70	58	35
50 kHz	610	180	100	72	61	33
70 kHz	610	180	100	72	61	33
100 kHz	610	190	110	77	67	33
200 kHz	610	260	110	81	72	41
300 kHz	610	260	110	83	75	42
500 kHz	610	260	130	100	100	60
700 kHz	640	280	140	130	120	82
800 kHz	640	280	150	130	120	88
1 MHz	650	290	160	160	150	110



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Fluke 5790A AC Measurement Standard Calibration (continued) - AC Voltage

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the AC voltage function of these instruments.

Frequency	220 mV range			700 mV range						2.2 V range		
	60 mV	100 mV	200 mV	200 mV	300 mV	400 mV	500 mV	600 mV	700 mV	600 mV	1 V	2 V
10 Hz	46	24	23	20	19	19	17	18	18	16	12	8.2
20 Hz	32	20	19	17	16	16	15	15	15	15	12	7.2
30 Hz	30	19	16	18	17	17	15	15	15	15	11	6.4
40 Hz	30	16	14	15	14	13	13	13	13	13	6.5	6.4
55 Hz	30	16	14	15	14	13	13	13	13	13	6.5	6.4
60 Hz	33	16	14	14	14	13	13	13	13	13	6.5	6.4
120 Hz	33	17	14	14	14	13	13	13	13	13	6.2	6.1
300 Hz	33	16	14	14	14	13	13	13	13	13	6.2	6.1
400 Hz	30	13	10	10	10	9.0	7.8	7.7	7.6	7.7	6.2	6.1
500 Hz	30	13	10	10	9.0	9.0	7.8	7.7	7.6	7.7	6.2	6.1
1 kHz	30	13	10	11	10	10	7.8	7.7	7.6	7.7	6.2	6.1
10 kHz	31	13	10	10	11	10	7.8	7.7	7.6	12	7.7	7.6
20 kHz	30	14	11	10	10	10	8.2	8.1	8.1	12	7.7	7.6
30 kHz	35	14	11	10	11	10	8.2	8.1	8.1	12	7.7	7.6
50 kHz	33	14	11	10	10	10	8.2	8.1	8.1	12	7.7	7.6
70 kHz	33	14	11	11	11	11	8.7	8.6	8.6	12	7.9	7.8
100 kHz	33	14	13	13	13	13	10	10	10	13	8.2	8.1
200 kHz	41	26	27	22	20	20	20	21	21	24	14	11
300 kHz	42	27	27	26	20	20	25	24	24	27	16	14
500 kHz	60	47	42	42	36	33	39	39	39	35	25	25
700 kHz	82	61	61	54	50	50	53	53	53	44	25	25
800 kHz	88	70	71	57	54	54	56	56	56	45	27	26
1 MHz	110	86	91	71	68	68	70	70	70	48	29	28

Frequency	7 V range						22 V range				
	2 V	3 V	4 V	5 V	6 V	7 V	6 V	8 V	10 V	20 V	
10 Hz	12	10	11	13	11	10	14	13	13	14	
20 Hz	12	10	10	8.4	8.3	8.3	13	12	12	13	
30 Hz	11	9	10	8.3	8.2	8.2	6.6	6.4	7.3	8.5	
40 Hz	10	7.1	8.0	6.0	6.0	6.4	6.6	6.4	7.3	8.5	
55 Hz	10	7.1	8.0	6.0	6.0	6.4	6.6	6.4	7.3	8.5	
60 Hz	10	7.1	7.8	5.9	5.8	6.2	6.6	6.4	6.7	8.5	
120 Hz	8.7	7.1	6.4	5.9	5.8	6.2	6.6	6.4	6.7	7.9	
300 Hz	8.7	7.1	5.9	5.9	5.8	6.2	6.6	6.4	6.7	7.9	
400 Hz	8.7	7.1	5.9	5.9	5.8	6.2	6.6	6.4	6.7	7.9	
500 Hz	8.7	7.1	5.9	5.9	5.8	6.2	8.0	7.8	8.1	10	
1 kHz	8.7	7.1	5.9	5.9	5.8	5.8	6.8	6.5	6.7	8.0	
10 kHz	8.7	7.1	5.9	5.9	5.8	5.8	6.6	6.4	6.7	8.0	
20 kHz	8.7	7.1	5.9	5.9	5.8	5.8	6.6	6.4	6.7	8.0	
30 kHz	8.7	7.1	5.9	5.9	5.8	5.8	6.6	6.4	6.7	8.0	
50 kHz	8.7	7.1	5.9	7.0	6.9	5.8	6.6	6.4	6.7	8.0	
70 kHz	8.9	8.1	6.1	10	10	6.0	6.8	6.6	6.8	8.0	
100 kHz	10	8.6	7.5	11	11	6.9	7.7	7.6	7.5	9.0	
200 kHz	11	10	12	13	13	8.7	13	13	13	15	
300 kHz	17	14	13	15	15	10	13	13	13	16	
500 kHz	84	83	83	82	68	69	69	67	55	24	
700 kHz	81	80	80	80	67	69	68	68	54	28	
800 kHz	81	81	81	80	81	82	68	69	67	32	
1 MHz	82	80	80	80	80	80	67	67	67	38	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
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Fluke 5790A AC Measurement Standard Calibration (continued) - AC Voltage

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the AC voltage function of these instruments.

Frequency	70 V range						220 V range		
	20 V	30 V	40 V	50 V	60 V	70 V	60 V	100 V	200 V
10 Hz	12	12	11	11	11	11	11	15	16
20 Hz	12	12	8.8	8.7	8.6	8.6	10	13	14
30 Hz	11	9.0	8.8	8.7	8.6	8.6	10	13	13
40 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
55 Hz	12	11	8.8	8.7	8.6	8.6	10	13	13
60 Hz	10	10	8.8	8.7	8.6	8.6	10	13	13
120 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
300 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
400 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
500 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
1 kHz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
10 kHz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
20 kHz	10	9.0	8.8	8.7	8.6	8.6	11	13	13
30 kHz	10	10	8.8	8.7	8.6	8.6	11	13	13
50 kHz	10	10	8.8	8.7	8.6	8.6	11	13	13
70 kHz	10	10	14	14	14	14	12	17	19
100 kHz	11	11	17	17	16	16	24	28	28
200 kHz	17	17							
300 kHz	20	21							
500 kHz	23	24							
700 kHz	27	32							
800 kHz	31								
1 MHz	35								

Frequency	700 V range				1000 V range		
	200 V	300 V	500 V	600 V	600 V	800 V	1000 V
10 Hz	24	22	22	20	20	21	25
20 Hz	14	13	13	13	13	13	14
30 Hz	14	13	12	13	13	13	13
40 Hz	14	13	12	13	13	13	13
55 Hz	14	13	12	13	13	13	13
60 Hz	14	13	12	13	13	13	13
120 Hz	14	13	13	13	13	13	13
300 Hz	14	13	13	13	13	13	13
400 Hz	14	13	13	13	13	13	13
500 Hz	14	14	13	13	13	13	13
1 kHz	14	14	13	13	13	13	13
10 kHz	14	14	13	13	13	13	13
20 kHz	15	14	13	14	14	13	13
30 kHz	14	14	13	14	14	13	14
50 kHz	15	16	15	15	15	14	15
70 kHz	19	20	19	26	26	26	26
100 kHz	28	28	29	34	34	35	35



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MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 792A AC/DC TRANSFER STANDARDS

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 792A AC/DC transfer standards.

The CMCs are in ppm of the nominal voltage and relate to the measured AC/DC voltage difference of these instruments.

Frequency	22 mV range				220 mV range			700 mV range					2.2 V range		7 V range							
	2 mV	6 mV	10 mV	20 mV	60 mV	100 mV	200 mV	200 mV	300 mV	400 mV	500 mV	600 mV	700 mV	600 mV	1 V	2 V	2 V	3 V	4 V	5 V	6 V	7 V
10 Hz	280	130	90	73	44	22	21	17	17	17	15	16	16	13	7.4	7.0	9.2	6.4	8.7	11	7.9	6.9
20 Hz	270	120	75	60	29	17	17	14	13	13	13	12	12	12	5.7	5.7	9.2	5.5	6.8	4.0	4.0	4.0
30 Hz	270	120	75	60	27	16	12	16	15	14	12	12	12	12	4.5	4.5	8.1	5.2	6.5	3.6	3.6	3.7
40 Hz	260	120	75	60	27	13	12	14	12	12	12	12	12	12	4.5	4.5	8.1	5.2	6.5	3.6	3.6	4.5
55 Hz	260	100	75	50	27	14	12	13	12	12	12	12	12	12	4.5	4.5	8.1	5.2	6.5	3.6	3.6	4.5
60 Hz	260	100	65	50	31	13	12	13	12	12	12	12	12	12	4.5	4.5	8.1	5.2	6.4	3.2	3.2	4.2
120 Hz	260	79	65	51	31	14	12	13	12	12	12	12	12	12	4.1	4.1	7.1	5.2	4.2	3.2	3.2	4.2
300 Hz	260	79	67	50	31	13	12	13	12	12	12	12	12	12	4.1	4.1	7.1	5.2	3.3	3.2	3.2	4.2
400 Hz	260	76	61	46	27	8.5	6.3	7.4	7.8	7.6	6.1	6.1	6.1	5.9	4.0	4.0	7.1	5.2	3.3	3.2	3.2	4.2
500 Hz	260	76	72	46	28	9.2	6.3	7.4	7.3	7.6	6.1	6.1	6.1	5.9	4.0	4.0	7.1	5.2	3.3	3.2	3.2	4.2
1 kHz	260	76	72	48	27	9.2	6.3	8.4	8.3	8.2	6.1	6.1	6.1	5.9	4.0	4.0	7.1	5.2	3.3	3.2	3.2	3.3
10 kHz	260	76	72	50	29	9.2	6.3	7.4	9.2	8.2	6.1	6.1	6.1	11	6.2	6.2	7.1	5.2	3.3	3.2	3.2	3.3
20 kHz	260	72	71	46	27	10	6.8	7.9	8.2	8.6	6.7	6.7	6.7	11	6.2	6.2	7.1	5.2	3.3	3.2	3.2	3.3
30 kHz	260	72	71	46	33	10	6.8	7.9	8.8	8.6	6.7	6.7	6.7	11	6.2	6.2	7.1	5.2	3.3	3.2	3.2	3.3
50 kHz	270	72	71	50	31	10	6.8	7.9	8.2	8.6	6.7	6.7	6.7	11	6.2	6.2	7.1	5.2	3.3	5.2	5.2	3.3
70 kHz	270	74	71	50	31	11	7.9	8.4	8.7	9.2	7.3	7.3	7.3	11	6.4	6.4	7.3	6.6	3.7	8.8	8.8	3.7
100 kHz	270	96	77	57	31	11	10	11	12	12	8.8	8.8	8.8	12	6.8	6.8	8.6	7.3	5.9	9.5	9.5	5.3
200 kHz	270	110	84	63	40	24	26	21	20	20	20	21	21	21	8.0	8.0	9.0	8.2	11	11	11	7.3
300 kHz	270	110	84	66	40	26	26	25	20	20	25	24	24	24	8.6	8.6	15	12	14	14	14	7.9
500 kHz	280	130	98	87	59	46	41	41	35	32	38	38	38	31	18	19	18	18	17	15	19	12
700 kHz	340	170	120	110	81	60	60	53	49	49	52	52	52	41	19	19	23	20	21	21	22	15
800 kHz	340	170	130	120	87	69	71	57	53	53	56	56	56	41	19	19	23	21	21	21	23	15
1 MHz	360	190	150	150	110	85	91	71	68	68	70	70	70	44	21	21	24	27	27	27	27	27

Frequency	22 V range				70 V range						220 V range			1 kV range						
	6 V	8 V	10 V	20 V	20 V	30 V	40 V	50 V	60 V	70 V	60 V	100 V	200 V	200 V	300 V	500 V	600 V	800 V	1000 V	
10 Hz	9.6	9.0	8.9	9.9	10	11	9.1	9.1	9.1	9.1	9.3	15	16	21	19	19	17	18	23	
20 Hz	7.8	6.8	7.1	8.1	10	11	7.4	7.3	7.3	7.3	8.4	12	13	14	12	12	12	13	13	
30 Hz	4.5	4.5	5.8	7.3	8.0	7.2	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
40 Hz	4.5	4.5	5.8	7.3	6.8	7.2	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
55 Hz	4.5	4.2	5.8	7.3	9.2	9.4	7.4	7.3	7.3	7.3	8.4	12	13	14	12	12	12	12	12	
60 Hz	4.5	4.2	4.8	7.3	7.5	7.8	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
120 Hz	4.5	4.2	4.8	6.6	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
300 Hz	4.5	4.2	4.8	6.6	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
400 Hz	4.5	4.2	4.8	6.6	7.5	7.4	7.4	7.3	7.3	7.3	8.8	12	12	14	12	12	12	12	12	
500 Hz	6.5	6.4	6.8	8.1	7.5	7.4	7.4	7.3	7.3	7.3	8.8	12	12	14	13	12	12	12	12	
1 kHz	4.8	4.5	4.8	6.7	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	13	12	13	12	12	
10 kHz	4.5	4.2	4.8	6.7	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	13	12	13	12	12	
20 kHz	4.5	4.2	4.8	6.7	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	14	13	13	12	12	
30 kHz	4.5	4.5	4.8	6.7	7.5	7.4	7.4	7.3	7.3	7.3	8.6	12	12	14	14	13	13	12	13	
50 kHz	4.5	4.5	4.8	6.7	7.5	7.4	7.4	7.4	7.3	7.3	8.6	12	13	14	15	13	13	13	14	
70 kHz	4.8	4.8	5.2	6.7	7.5	7.4	14	14	14	14	9.2	17	18	18	19	18	25	25	25	
100 kHz	6.1	6.1	6.2	7.9	8.6	8.9	16	16	16	16	15	27	28	27	28	29	34	34	34	
200 kHz	11	12	12	14	12	13														
300 kHz	12	12	12	15	16	17														
500 kHz	12	16	17	23	19	21														
700 kHz	20	21	22	27	24	30														
800 kHz	20	21	22	27	24															
1 MHz	23	23	23	33	30															



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AC VOLTAGE MEASUREMENTS USING FLUKE 792A AC/DC TRANSFER STANDARD

The CMCs shown relate to voltages and frequencies that lie within $\pm 10\%$ of the specified values. For intermediate frequencies the CMC is that of the greater of the two adjacent frequencies.

Voltage	Calibration and Measurement Capability in ppm of voltage expressed as an Expanded Uncertainty ($k = 2$)																	
	Hz				kHz						MHz							
	10	20	40	55	0.3	0.5	1	10	20	30	50	70	100	0.2	0.3	0.5	0.7	1.0
2 mV	480	470	470	470	470	470	470	470	470	470	470	470	470	470	470	480	520	780
6 mV	280	270	270	260	260	260	260	260	250	250	250	260	260	270	270	280	300	640
10 mV	130	100	100	100	100	100	100	100	100	100	100	100	110	110	110	120	140	170
20 mV	110	70	70	70	70	70	70	70	70	70	70	70	75	80	90	100	130	170
60 mV	62	36	35	35	38	35	35	36	35	40	38	38	38	46	50	70	90	120
100 mV	33	24	22	22	22	28	20	20	20	20	20	21	21	30	39	54	70	100
200 mV	35	28	20	20	20	20	17	17	17	17	17	17	19	31	35	47	69	120
400 mV	23	17	16	16	16	13	13	13	14	14	14	14	16	23	25	35	51	70
600 mV	25	16	16	16	16	12	12	12	12	12	12	12	13	24	28	41	54	73
1 V	24	15	11	11	11	11	11	12	12	12	12	12	13	16	21	28	33	46
2 V	23	14	10	10	10	10	10	11	11	11	11	11	12	16	16	25	29	35
4 V	25	16	13	13	14	12	12	12	12	12	12	12	13	16	17	27	30	39
6 V	23	13	8.9	8.9	8.7	8.7	8.7	8.7	8.7	8.7	9.7	12	13	14	20	25	31	39
10 V	24	16	12	12	11	12	11	11	11	11	11	12	12	16	18	22	28	28
20 V	25	16	13	13	12	13	12	12	12	12	12	12	13	18	29	34	38	42
40 V	26	18	15	15	15	15	15	15	15	16	16	20	22					
60 V	25	18	15	15	15	15	15	15	15	16	16	20	21					
100 V	30	22	20	20	20	20	20	20	20	22	22	27	38					
200 V	29	21	18	19	18	18	18	18	18	21	21	26	38					
600 V	31	23	21	21	21	21	21	21	21	21	23	32	43					
1 kV	39	30	28	28	28	28	28	28	28	28	30	37	47					



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AC VOLTAGE MEASUREMENTS USING FLUKE 5790A AC MEASUREMENT STANDARD.

The CMCs shown relate to voltages and frequencies that lie within $\pm 10\%$ of the specified values. For intermediate frequencies the CMC will be increased. The CMCs are for the calibration of AC Voltage Sources and for AC Voltage measuring instruments simultaneously connected to the AC Voltage Source.

Range Amplitude	2.2 mV	7 mV	22 mV		70 mV	220 mV		700 mV
	2 mV	6 mV	10 mV	20 mV	60 mV	100 mV	200 mV	600 mV
10 Hz	1500	430	170	150	60	40	40	30
20 Hz	1500	430	170	150	49	26	25	22
40 Hz	1500	410	170	150	48	23	22	21
500 Hz	1500	400	170	140	48	21	19	18
1 kHz	1500	400	170	140	48	21	19	18
10 kHz	1500	400	170	140	49	21	19	20
20 kHz	1500	400	160	140	48	22	20	20
50 kHz	1500	400	160	140	130	22	20	20
100 kHz	1500	400	170	140	130	22	22	22
200 kHz	1500	440	170	150	130	33	34	31
500 kHz	1500	450	190	170	140	80	80	50
1 MHz	1500	480	230	230	600	260	160	140

Range Amplitude	2.2 V		7 V	22 V		70 V	220 V		700 V	1 kV
	1 V	2 V	6 V	10 V	20 V	60 V	100 V	200 V	600 V	1 kV
10 Hz	20	30	30	30	30	30	40	40	40	70
20 Hz	20	18	27	29	29	27	29	29	29	29
40 Hz	18	18	27	27	27	27	29	29	29	29
500 Hz	17	17	27	27	28	27	29	29	29	29
1 kHz	17	17	27	27	27	27	29	29	29	29
10 kHz	18	18	27	27	27	27	29	29	29	29
20 kHz	18	18	27	27	27	27	29	29	29	29
50 kHz	18	18	27	27	27	27	29	29	30	30
100 kHz	19	19	29	28	28	31	39	39	60	60
200 kHz	24	23	34	34	35					
500 kHz	50	50	90	70	50					
1 MHz	140	140	260	160	150					



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AC/DC TRANSFER CURRENT DIFFERENCE

Calibrations may be performed at intermediate frequencies with the larger of the adjacent uncertainties

Frequency kHz	AC/DC Current Transfer Difference (ppm) for A40B shunts without detector																	
	1 mA	5 mA	10 mA	20 mA	30 mA	50 mA	100 mA	200 mA	300 mA	500 mA	1 A	2 A	3 A	5 A	10 A	20 A	50 A	100 A
0.01	22	28	9	10	19	10	11	12	22	10	10	10	24	18	22	32	42	52
1	22	28	9	10	19	10	11	12	22	10	10	10	24	18	23	32	42	52
10	22	29	11	11	19	12	11	12	22	10	10	10	24	19	23	42	52	72
30	22	29	11	12	19	12	13	14	22	11	15	19	32	29	52	63	73	83
70	34	39	16	18	19	12	13	14	23	15	15	28	46	44	63	85	95	130
100	37	41	19	20	21	16	13	14	23	15	19	42	65	64	84	110	140	160

Frequency kHz	AC/DC Current Transfer Difference (ppm) for shunts with their own detector (Fluke 792A, 5790A or thermal converter)																	
	1 mA	5 mA	10 mA	20 mA	30 mA	50 mA	100 mA	200 mA	300 mA	500 mA	1 A	2 A	3 A	5 A	10 A	20 A	50 A	100 A
0.01	26	31	18	18	22	18	19	19	24	18	18	18	28	24	27	36	44	54
1	23	29	13	13	19	13	14	14	22	13	13	13	25	20	24	33	43	53
10	24	30	16	16	21	16	16	17	23	15	16	15	27	22	26	44	53	73
30	25	31	17	18	22	18	19	19	24	18	20	23	35	32	54	64	74	84
70	37	41	21	22	22	18	19	19	25	20	20	31	47	46	64	86	96	130
100	39	43	23	24	24	21	19	19	25	20	23	44	67	65	85	110	140	160

Frequency	Resistance at full rated current (ppm)													
	1 mA	10 mA	20 mA	50 mA	100 mA	200 mA	500 mA	1 A	2 A	5 A	10 A	20 A	50 A	100 A
DC	6.0	6.0	5.7	7.1	7.2	7.5	7.8	9.7	7.8	9.5	11	8.7	15	17

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Issue No: 053 Issue date: 18 April 2019

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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
PHASE ANGLE Zero crossing phase meter Voltage/voltage 3 V : 1 V Voltage/current 33 V : 300 mA 33 V : 2 A 33 V : 5 A	0 °, 60 ° and 90 ° 60 Hz 400 Hz 1 kHz 5 kHz 10 kHz 0 ° 65 Hz 0 ° 65 Hz 0 ° 65 Hz 400 Hz	0.11 ° 0.11 ° 0.13 ° 0.33 ° 0.59 ° 0.090 ° 0.12 ° 0.23 ° 0.36 °	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF OSCILLOSCOPE CALIBRATORS			
Voltage Amplitude	DC Voltage, 0 V to 120 V	0.010 % or 100 μ V, whichever is greater	These voltages can be measured into either 50 Ω or 1 M Ω up to 3 V, but into 1 M Ω only at 3 V and above.
	AC Squarewave 10 mV to 120 V pk-pk at 1 kHz	0.12 % to 0.050 %	
	AC Sinewave		Measurement of incident Voltage into Z_0
	Peak to peak value 10 mV to 5.5 V 10 Hz to 100 kHz	0.17%	
	100 kHz to 500 MHz 500 MHz to 1.1 GHz 1.1 GHz to 3.2 GHz	1.5% 1.8% 2.1%	Into 50 Ω , BNC Into 50 Ω , BNC Into 50 Ω , BNC
	10 mV to 5.5 V 100 kHz to 1.1 GHz 1.1 GHz to 3.0 GHz 3.0 GHz to 6.4 GHz	1.0% 1.4% 1.7%	Into 50 Ω , PC3.5mm Into 50 Ω , PC3.5mm Into 50 Ω , PC3.5mm
	AC Squarewave 10 Hz to 1 kHz 5 mV to 25 mV 25 mV to 130 mV 130 mV to 200 V	0.11 % (0.12 %) 0.050 % (0.060 %) 0.020 % (0.030 %)	The uncertainties in brackets apply if a 50 Ω termination is used, the capability being limited to a maximum of 5 V.
	1 kHz to 10 kHz 5 mV to 25 mV 25 mV to 130 mV 130 mV to 200 V	0.12 % (0.12 %) 0.060 % (0.070 %) 0.040 % (0.050 %)	
	10 kHz to 30 kHz 5 mV to 25 mV 25 mV to 130 mV 130 mV to 200 V	0.15 % (0.15 %) 0.11 % (0.11 %) 0.10 % (0.10 %)	
	Voltage Amplitude	30 kHz to 100 kHz 5 mV to 25 mV 25 mV to 200 V	0.36 % (0.36 %) 0.32 % (0.32 %)



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
Risetime	1 ns or greater, 25 mV <i>pk-pk</i> to 1 V <i>pk-pk</i> 100 Hz to 10 MHz	22 ps	Into 50 Ω
	25 ps nom 500 mV	3.0 ps	Into 50 Ω
	70 ps 60 mV to 2 V	10 ps	Into 50 Ω
	150 ps or greater, 5 mV to 3 V 10 kHz to 2 MHz	11 ps	Into 50 Ω
	500 ps or greater, 5 mV to 3 V 10 kHz to 2 MHz 5 mV to 50 mV 50 mV to 3 V	22 ps 18 ps	Into 50 Ω Into 50 Ω
Frequency and Markers	50 mV to 1 V: 0.02 Hz to 10 Hz 10 Hz to 1 MHz 1 MHz to 2 GHz	0.060 ppm 0.030 ppm 0.010 ppm	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks							
MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE ELECTRICAL POWER STANDARDS										
Voltage Amplitude	<i>Calibration and Measurement Capability</i> in ppm expressed as an Expanded Uncertainty ($k = 2$), from 10 % to 100 % of the stated voltage range. CMCs for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points. The 2.4 V range is only accessible to drive the Fluke 52120A Transconductance Amplifier									
Voltage range:	0.8 V	1.5 V	2.4 V	10 V	23 V	45 V	90 V	180 V	360 V	1008 V
Frequency										
DC	33	32	32	32	32	31	31	31	32	32
16 Hz	25	24	24	21	21	19	21	22	24	24
40 Hz	25	24	24	21	21	19	21	22	24	24
50 Hz	25	24	24	21	21	19	21	22	24	24
60 Hz	25	24	24	21	21	19	21	22	24	24
120 Hz	25	24	24	21	21	19	21	22	24	24
180 Hz	25	24	24	21	21	19	21	22	24	24
450 Hz	25	24	24	21	21	19	21	22	24	24
850 Hz	25	25	26	24	24	23	24	25	26	26
1.2 kHz	34	34	35	33	34	32	34	34	35	35
1.8 kHz	34	34	35	33	34	32	34	34	35	35
2.4 kHz	34	34	35	33	34	32	34	34	35	35
3.0 kHz	34	34	35	33	34	32	34	34	35	35
3.6 kHz	34	34	35	33	34	32	34	34	35	35
4.2 kHz	34	34	35	33	34	32	34	34	35	35
4.8 kHz	34	34	35	33	34	32	34	34	35	35
5.4 kHz	34	34	35	33	34	32	34	34	35	35
6.0 kHz	34	34	35	33	34	32	34	34	35	35



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
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**Voltage
Phase**

Calibration and Measurement Capability in millidegrees expressed as an Expanded Uncertainty ($k = 2$), from 10 % to 100 % of the stated voltage range The CMCs apply to the phase difference between the voltage channel and the master timing signal. Uncertainties for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points. The 2.4 V range is only accessible to drive the Fluke 52120A Transconductance Amplifier.

Voltage range:	0.8 V	1.5 V	2.4 V	10 V	16 V	33 V	78 V	168 V	336 V	1008 V
Frequency										
16 Hz	0.80	1.0	0.7	1.4	1.4	1.4	1.4	1.4	1.4	1.5
40 Hz	1.8	1.9	0.7	2.2	2.1	2.2	2.2	2.1	2.2	2.2
50 Hz	2.3	2.3	0.8	2.6	2.5	2.5	2.5	2.5	2.6	2.6
60 Hz	2.7	2.8	1.1	3.0	2.9	2.9	2.9	2.9	3.0	3.0
120 Hz	5.4	5.4	1.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
180 Hz	8.0	8.2	2.1	8.3	8.3	8.3	8.3	8.3	8.3	8.3
450 Hz	20	20	3.6	21	21	21	21	21	21	21
850 Hz	38	38	6.4	39	38	38	38	38	39	39
1.2 kHz	54	54	9.2	55	54	54	54	54	55	55
1.8 kHz	80	80	14	82	81	81	81	81	82	81
2.4 kHz	110	110	18	110	110	110	110	110	110	110
3.0 kHz	140	140	22	140	140	140	140	140	140	140
3.6 kHz	160	160	26	170	170	170	170	170	170	170
4.2 kHz	190	190	31	190	190	190	190	190	190	190
4.8 kHz	220	220	35	220	220	220	220	220	220	220
5.4 kHz	240	240	40	250	250	250	250	250	250	250
6.0 kHz	270	270	44	280	270	270	270	270	270	270

**Current
Amplitude**

Calibration and Measurement Capability in ppm expressed as an Expanded Uncertainty ($k = 2$), from 10 % to 100 % of the stated current range. CMCs for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points.

Current range:	0.1 A	0.5 A	1 A	2 A	5 A	10 A	20 A	50 A	100 A
Frequency									
DC	26	27	27	26	28	28	28	27	33
16 Hz	26	26	26	26	31	33	34	33	37
40 Hz	26	26	26	26	31	33	34	33	37
50 Hz	26	26	26	26	31	33	34	33	37
60 Hz	26	26	26	26	31	33	34	33	37
120 Hz	26	26	26	26	31	35	41	49	61
180 Hz	26	26	26	26	31	35	41	49	61
450 Hz	26	26	26	26	31	35	41	49	61
850 Hz	27	27	27	27	32	35	41	50	61
1.2 kHz	27	27	27	27	33	35	41	50	61
1.8 kHz	27	27	27	27	33	35	50	58	79
2.4 kHz	27	27	27	27	33	35	50	58	79
3.0 kHz	27	27	27	27	33	35	50	58	79
3.6 kHz	27	27	27	27	33	35	50	58	79
4.2 kHz	27	27	27	27	33	35	50	58	79
4.8 kHz	27	27	27	27	33	35	50	58	79
5.4 kHz	27	27	27	27	33	35	50	58	79
6.0 kHz	27	27	27	27	33	35	50	58	79



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
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Current Phase	<i>Calibration and Measurement Capability</i> in millidegrees expressed as an Expanded Uncertainty ($k = 2$), from 10 % to 100 % of the stated current range. The CMCs apply to the phase difference between the current channel and the master timing signal. CMCs for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points.								
Current range:	0.1 A	0.5 A	1 A	2 A	5 A	10 A	20 A	50 A	100 A
Frequency									
16 Hz	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
40 Hz	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
50 Hz	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
60 Hz	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
120 Hz	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.5
180 Hz	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
450 Hz	21	21	21	21	21	21	21	21	21
850 Hz	38	38	38	38	38	38	38	38	39
1.2 kHz	54	54	54	54	54	54	54	54	54
1.8 kHz	81	81	81	81	81	81	81	81	81
2.4 kHz	110	110	110	110	110	110	110	110	110
3.0 kHz	140	140	140	140	140	140	140	140	140
3.6 kHz	170	160	160	160	170	170	170	170	170
4.2 kHz	190	190	190	190	190	190	190	190	190
4.8 kHz	220	220	220	220	220	220	220	220	220
5.4 kHz	250	240	240	240	240	250	250	250	250
6.0 kHz	270	270	270	270	270	270	270	270	270

Channel to channel phase difference	<i>Calibration and Measurement Capability</i> in millidegrees expressed as an Expanded Uncertainty ($k = 2$), from 10 % to 100 % of the stated range. CMCs for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points.		
Frequency	Voltage Channel Relative to any other Voltage Channel	Voltage Channel Relative to any Current Channel	Voltage Channel to Voltage Channel using the same Measurement System Range
16 Hz	1.3	1.1	1.3
40 Hz	1.4	1.2	1.3
50 Hz	1.4	1.2	1.3
60 Hz	1.4	1.2	1.3
120 Hz	1.9	1.7	1.3
180 Hz	2.8	2.3	1.7
450 Hz	5.7	4.9	1.7
850 Hz	11	8.9	1.7
1.2 kHz	16	14	5.1
1.8 kHz	23	20	5.1
2.4 kHz	30	26	5.1
3.0 kHz	37	32	5.1
3.6 kHz	45	38	5.1
4.2 kHz	52	44	6.5
4.8 kHz	60	50	9.4
5.4 kHz	67	57	9.4
6.0 kHz	74	63	9.4



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
DC and AC POWER (simulated)	<i>DC and 16 Hz to 6 kHz:</i> 0 W to 100.8 kW	The RSS combination of the voltage, current and phase (expressed in terms of power factor) uncertainties as stated in calibration of Fluke Electrical Power Standards. At power factors approaching zero, the uncertainties will be stated in absolute terms.	Limiting voltage 1008 V Limiting current 120 A Power factor zero to unity, capacitive and inductive, single phase only.

MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 52120A TRANSCONDUCTANCE AMPLIFIERS

Calibration and Measurement Capability expressed as an Expanded Uncertainty ($k = 2$) in stand-alone mode for both voltage inputs (V_{IN}) and current inputs (I_{IN}), expressed as ppm of output current.

Frequency	2 A range				20 A range				120 A range			
	V_{IN}			I_{IN}	V_{IN}			I_{IN}	V_{IN}			I_{IN}
	0.4 A	1.0 A	2.0 A	2.0 A	4 A	10 A	20 A	20 A	20 A	60 A	120 A	120 A
DC	49	31	24	26	72	72	72	72	34	34	34	35
10 Hz	69	43	28	30	56	56	46	47	71	71	71	64
20 Hz	69	43	28	30	54	54	43	45	71	71	71	64
40 Hz	69	43	28	30	54	54	43	45	71	71	71	64
50 Hz	69	43	28	30	54	54	43	45	71	71	71	64
60 Hz	69	43	28	30	54	54	43	45	71	71	71	64
120 Hz	69	43	28	30	54	54	43	45	71	71	71	64
180 Hz	69	43	28	30	54	54	43	45	71	71	71	64
450 Hz	69	43	28	30	54	54	43	45	71	71	71	64
850 Hz	69	43	28	30	54	54	43	45	71	71	71	64
1.0 kHz	69	43	28	30	54	54	43	45	71	71	71	64
1.2 kHz	69	43	28	30	61	61	51	53	88	88	88	82
1.8 kHz	69	43	28	30	61	61	51	53	88	88	88	82
2.4 kHz	69	43	28	30	61	61	51	53	88	88	88	82
3.0 kHz	69	43	28	30	61	61	51	53	88	88	88	82
3.6 kHz	69	43	28	30	61	61	51	53	88	88	88	82
4.2 kHz	69	43	28	30	61	61	51	53	88	88	88	82
4.8 kHz	69	43	28	30	61	61	51	53	88	88	88	82
5.4 kHz	69	43	28	30	61	61	51	53	88	88	88	82
6.0 kHz	69	43	28	30	61	61	51	53	88	88	88	82
8.0 kHz	73	49	37	39	65	65	56	57	88	88	88	82
10.0 kHz	73	49	37	39	65	65	56	57	88	88	88	82



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
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MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 52120A TRANSCONDUCTANCE AMPLIFIERS (continued)

Calibration and Measurement Capability expressed as an Expanded Uncertainty ($k = 2$) when under 6105A control, expressed as ppm of output current.

Frequency	2 A range			20 A range			120 A range		
	0.4 A	1 A	2 A	4 A	10 A	20 A	20 A	60 A	120 A
DC	59	47	43	78	78	78	49	50	49
16 Hz	75	53	41	62	62	52	77	75	70
40 Hz	75	53	41	62	62	52	77	75	70
50 Hz	75	53	41	62	62	52	77	75	70
60 Hz	75	53	41	62	62	52	77	75	70
120 Hz	75	53	41	62	62	52	77	75	70
180 Hz	75	53	41	62	62	52	77	75	70
450 Hz	75	53	41	62	62	52	77	75	70
850 Hz	75	53	42	62	62	53	77	75	70
1.0 kHz	75	53	42	62	62	53	77	75	70
1.2 kHz	75	53	42	68	68	60	93	91	87
1.8 kHz	75	53	42	68	68	60	93	91	87
2.4 kHz	75	53	42	68	68	60	93	91	87
3.0 kHz	75	53	42	68	68	60	93	91	87
3.6 kHz	78	57	47	72	72	64	96	94	90
4.2 kHz	78	57	47	72	72	64	96	94	90
4.8 kHz	78	57	47	72	72	64	96	94	90
5.4 kHz	78	57	47	72	72	64	96	94	90
6.0 kHz	78	57	47	72	72	64	96	94	90

Phase angle when under 6105A control

0° to 360°
16 Hz
40 Hz
50 Hz
60 Hz
120 Hz
180 Hz
450 Hz
850 Hz
1 000 Hz
1 200 Hz
1 800 Hz
2 400 Hz
3 000 Hz
3 600 Hz
4 200 Hz
4 800 Hz
5 400 Hz

1.3 m°
1.8 m°
2.1 m°
2.5 m°
4.3 m°
6.4 m°
16 m°
30 m°
34 m°
57 m°
120 m°
130 m°
130 m°
150 m°
180 m°
220 m°
210 m°

All ranges: 2 A, 20 A and 120 A



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
CALIBRATION OF CURRENT COILS			
Effective current transfer ratio	50 Hz to 400 Hz 25 turn coils	0.085 % of ratio	1000 A maximum simulated current
	50 turn coils	0.28 % of ratio	6000 A maximum simulated current
RF MEASUREMENTS			
RF POWER Calibration Factor 50 Ω Sensors	1 mW to 10 mW 10 MHz to 100 MHz 100 MHz to 1 GHz 1 GHz to 3 GHz 3 GHz to 8 GHz 8 GHz to 12 GHz 12 GHz to 18 GHz 18 GHz to 22 GHz 22 GHz to 26.5 GHz 26.5 GHz to 40 GHz 10 MHz to 100 MHz 100 MHz to 1 GHz 1 GHz to 3 GHz 3 GHz to 8 GHz 8 GHz to 12 GHz 12 GHz to 18 GHz	0.72 % 0.99 % 1.1 % 1.2 % 1.3 % 1.9 % 1.7 % 2.0 % 3.0 % 0.44 % 0.55 % 0.75 % 0.82 % 1.1 % 1.7 %	For power sensors with PC2.92 or PC3.5 connectors in good condition with a VSWR not exceeding 1.2. Larger VSWRs can be accommodated but at larger uncertainties. PC3.5 connectors are limited to 26.5 GHz. For power sensors with Type N connector in good condition with a VSWR not exceeding 1.2
VSWR	10 MHz to 100 MHz 100 MHz to 1 GHz 1 GHz to 3 GHz 3 GHz to 8 GHz 8 GHz to 12 GHz 12 GHz to 18 GHz 18 GHz to 22 GHz 22 GHz to 26.5 GHz 26.5 GHz to 40 GHz	0.015 0.021 0.025 0.026 0.033 0.032 0.041 0.044 0.055	For power sensors with PC2.92 or PC3.5 connectors in good condition with a VSWR not exceeding 1.2. Larger VSWRs can be accommodated but at larger uncertainties. PC3.5 connectors are limited to 26.5 GHz.



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks
VSWR (continued)	10 MHz to 100 MHz 100 MHz to 1 GHz 1 GHz to 3 GHz 3 GHz to 8 GHz 8 GHz to 12 GHz 12 GHz to 18 GHz	0.014 0.015 0.018 0.018 0.022 0.024	For power sensors with Type N connectors in good condition with a VSWR not exceeding 1.2

MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 9600 SERIES RF REFERENCE SOURCES

Levelled sine wave output accuracy - 50 Ω system

Calibration and Measurement Capability in dB expressed as an Expanded Uncertainty (k = 2). For frequencies between those in the table the greater of the adjacent CMCs applies.

Frequency MHz	Level (dBm)																
	+ 24 to + 20	+ 20 to 0	0 to - 10	- 10 to - 20	- 20 to - 30	- 30 to - 40	- 40 to - 48	- 48 to - 58	- 58 to - 68	- 68 to - 78	- 78 to - 88	- 88 to - 98	- 98 to - 108	- 108 to - 118	- 118 to - 128		
0.001	0.0020	0.0020	0.0020	0.0020	0.0030	0.0040	0.0040										
0.020	0.0020	0.0020	0.0020	0.0020	0.0030	0.0040	0.0040	0.024									
0.075	0.0020	0.0020	0.0020	0.0020	0.0030	0.0040	0.0040	0.024									
0.1	0.0020	0.0020	0.0020	0.0020	0.0030	0.0050	0.0060	0.030	0.042	0.045	0.10	0.14	0.20	0.19	0.46		
0.3	0.017	0.011	0.024	0.024	0.022	0.022	0.024	0.030	0.042	0.038	0.10	0.10	0.13	0.19	0.46		
1	0.017	0.011	0.023	0.023	0.021	0.021	0.023	0.030	0.042	0.038	0.10	0.076	0.13	0.19	0.46		
10	0.018	0.012	0.023	0.023	0.021	0.021	0.023	0.030	0.035	0.038	0.092	0.061	0.11	0.17	0.21		
20	0.023	0.019	0.030	0.030	0.028	0.028	0.029	0.034	0.040	0.042	0.064	0.063	0.10	0.16	0.21		
100	0.030	0.027	0.029	0.029	0.027	0.028	0.029	0.034	0.039	0.041	0.064	0.063	0.099	0.16	0.21		
125	0.030	0.027	0.034	0.034	0.032	0.033	0.034	0.038	0.043	0.045	0.067	0.065	0.10	0.16	0.25		
300		0.027	0.034	0.034	0.033	0.033	0.034	0.038	0.043	0.045	0.067	0.065	0.20	0.39	0.47		
750		0.040	0.046	0.046	0.045	0.045	0.046	0.049	0.064	0.065	0.077	0.086	0.20	0.40	0.47		
1 000		0.040	0.046	0.046	0.045	0.045	0.046	0.050	0.078	0.080	0.10	0.10	0.21	0.41	0.47		
1 400		0.058	0.065	0.065	0.062	0.062	0.063	0.066	0.11	0.11	0.13	0.13	0.22	0.42	0.48		
2 000		0.058	0.065	0.065	0.062	0.062	0.063	0.066	0.13	0.13	0.15	0.14	0.24	0.43	0.48		
2 500		0.066	0.072	0.072	0.070	0.070	0.070	0.078	0.14	0.14	0.18	0.17	0.25	0.43	0.49		
3 000		0.067	0.072	0.072	0.070	0.070	0.070	0.078	0.17	0.17	0.18	0.18	0.19	0.25	0.49		
3 500		0.11	0.087	0.087	0.085	0.085	0.086	0.092	0.18	0.18	0.18	0.19	0.28	0.49	0.55		
4 000		0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.19	0.20	0.20	0.21					



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Fluke Precision Measurement Ltd
Issue No: 053 Issue date: 18 April 2019

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 9600 SERIES RF REFERENCE SOURCES <i>(continued)</i>			
Output VSWR Fluke 9600 Series			
Results and uncertainties may also be reported in terms of VRC and return loss			
50Ω Type N connector	1.0 to 1.4		
	300 kHz to 0.99 MHz	0.057	
	1 MHz to 10 MHz	0.037	
	10 MHz to 1 GHz	0.028	
	1 GHz to 1.7 GHz	0.037	
	1.7 GHz to 2 GHz	0.047	
	2 GHz to 2.5 GHz	0.064	
	2.5 GHz to 3 GHz	0.102	
	3 GHz to 3.6 GHz	0.180	
	3.6 GHz to 4 GHz	0.210	
75Ω Type N connector	1.0 to 1.4		
	300 kHz to 0.99 MHz	0.061	
	1 MHz to 50 MHz	0.043	
	50 MHz to 1 GHz	0.036	
	1 GHz to 1.3 GHz	0.041	
	1.3 GHz to 2.0 GHz	0.067	
Type K connector	2 GHz to 3 GHz	0.110	
	1.0 to 1.4		
	2.5 GHz to 5 GHz	0.260	
	5 GHz to 11 GHz	0.420	
	11 GHz to 20 GHz	0.420	
	20 GHz to 27 GHz	0.650	
	1.4 to 2.4		
	2.5 GHz to 5 GHz	0.280	
	5 GHz to 11 GHz	0.450	
	11 GHz to 20 GHz	0.520	
20 GHz to 27 GHz	0.760		



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
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Levelled sine wave output accuracy

75 Ω system

Calibration and Measurement Capability in dB expressed as an Expanded Uncertainty ($k = 2$). For frequencies between those in the table the greater of the adjacent CMCs applies.

Frequency MHz	Level (dBm) 75 Ω														
	+ 18 to + 11	+ 11 to 0	0 to - 10	- 10 to - 20	- 20 to - 30	- 30 to - 40	- 40 to - 50	- 50 to - 55	- 55 to - 65	- 65 to - 75	- 75 to - 85	- 85 to - 95	- 95 to - 105	- 105 to - 115	- 115 to - 125
0.001	0.0020	0.0020	0.0020	0.0030	0.0030	0.0040	0.0040	0.0050							
0.020	0.0020	0.0020	0.0020	0.0030	0.0030	0.0040	0.0040	0.0050	0.045						
0.075	0.0020	0.0020	0.0020	0.0030	0.0030	0.0040	0.0040	0.0050	0.045						
0.1	0.0020	0.0020	0.0030	0.0030	0.0040	0.0050	0.0050	0.0050	0.045	0.046	0.067	0.070	0.13	0.25	0.25
0.3	0.023	0.020	0.020	0.021	0.019	0.019	0.019	0.047	0.047	0.049	0.069	0.072	0.13	0.25	0.25
1	0.023	0.020	0.020	0.021	0.019	0.019	0.019	0.047	0.047	0.049	0.069	0.072	0.13	0.25	0.25
10	0.023	0.020	0.020	0.021	0.019	0.019	0.019	0.047	0.047	0.049	0.069	0.072	0.13	0.25	0.25
20	0.029	0.027	0.027	0.027	0.026	0.026	0.026	0.050	0.050	0.052	0.071	0.074	0.13	0.25	0.25
100	0.029	0.027	0.027	0.027	0.026	0.026	0.026	0.050	0.050	0.052	0.071	0.074	0.13	0.25	0.25
125	0.029	0.027	0.027	0.027	0.026	0.026	0.026	0.050	0.050	0.052	0.071	0.074	0.13	0.25	0.25
300	0.031	0.029	0.029	0.029	0.028	0.028	0.028	0.052	0.052	0.053	0.072	0.075	0.21	0.44	0.44
750	0.045	0.044	0.044	0.044	0.043	0.043	0.043	0.061	0.061	0.063	0.079	0.082	0.22	0.44	0.44
1 000	0.045	0.044	0.044	0.044	0.043	0.043	0.043	0.061	0.061	0.063	0.079	0.082	0.22	0.44	0.44
1 400	0.066	0.064	0.064	0.065	0.062	0.062	0.062	0.089	0.089	0.090	0.12	0.13	0.22	0.45	0.45
2 000		0.068	0.068	0.068	0.067	0.067	0.067	0.090	0.090	0.091	0.12	0.13	0.22	0.45	0.45
2 500		0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.15	0.15	0.24	0.46	0.46
3 000		0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.15	0.15	0.24	0.46	0.46

50 Ω System - 2.92 mm Microwave Output

Level (dBm) 50 Ω

Frequency MHz	24 to 18	18 to 0	0 to -10	-10 to -20	-20 to -30	-30 to -40	-40 to -50	-50 to -60	-60 to -70	-70 to -80	-80 to -90
0.020	0.005	0.005	0.005	0.023	0.023	0.024	0.047				
0.075	0.005	0.005	0.005	0.023	0.023	0.024	0.047	0.112	0.133	0.156	0.158
0.1	0.005	0.005	0.005	0.024	0.024	0.024	0.047	0.080	0.082	0.156	0.158
0.3	0.094	0.087	0.094	0.095	0.096	0.097	0.108	0.110	0.120	0.130	0.130
1	0.094	0.087	0.094	0.095	0.096	0.097	0.108	0.110	0.120	0.130	0.130
10	0.094	0.087	0.094	0.095	0.096	0.097	0.108	0.110	0.120	0.130	0.130
20	0.094	0.087	0.094	0.095	0.096	0.097	0.108	0.110	0.120	0.130	0.130
100	0.094	0.087	0.094	0.095	0.096	0.097	0.108	0.110	0.120	0.130	0.130
125	0.099	0.092	0.098	0.099	0.101	0.102	0.120	0.120	0.120	0.130	0.130
300	0.099	0.092	0.098	0.099	0.101	0.102	0.120	0.120	0.120	0.130	0.130
750	0.110	0.095	0.110	0.110	0.110	0.110	0.120	0.120	0.120	0.130	0.130
1 000	0.110	0.095	0.110	0.110	0.110	0.110	0.120	0.120	0.120	0.130	0.140
1 400	0.110	0.096	0.110	0.110	0.110	0.110	0.120	0.120	0.120	0.130	0.140
2 000	0.120	0.107	0.120	0.120	0.120	0.120	0.130	0.130	0.130	0.140	0.140
2 500	0.120	0.107	0.120	0.120	0.120	0.120	0.130	0.130	0.130	0.140	0.150
3 000	0.120	0.107	0.120	0.120	0.120	0.120	0.130	0.130	0.130	0.140	0.150



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Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
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50 Ω System - 2.92 mm Microwave Output
Continued

Frequency MHz	Level (dBm) 50 Ω										
	24 to 18	18 to 0	0 to -10	-10 to -20	-20 to -30	-30 to -40	-40 to -50	-50 to -60	-60 to -70	-70 to -80	-80 to -90
3 500	0.120	0.107	0.120	0.120	0.120	0.120	0.130	0.130	0.130	0.140	0.150
4 000	0.120	0.107	0.120	0.120	0.120	0.120	0.130	0.130	0.130	0.140	0.150
5 000	0.120	0.108	0.120	0.120	0.120	0.120	0.130	0.130	0.130	0.140	0.150
6 000	0.120	0.108	0.120	0.120	0.120	0.130	0.150	0.150	0.140	0.150	0.150
7 000	0.140	0.122	0.140	0.140	0.140	0.140	0.160	0.160	0.160	0.200	0.190
8 000	0.140	0.122	0.140	0.140	0.140	0.140	0.160	0.160	0.160	0.200	0.200
9 000	0.140	0.124	0.140	0.140	0.140	0.140	0.160	0.170	0.170	0.200	0.200
10 000	0.140	0.124	0.140	0.150	0.150	0.150	0.170	0.170	0.170	0.200	0.200
11 000	0.140	0.125	0.140	0.150	0.150	0.150	0.210	0.210	0.170	0.200	0.200
12 000	0.140	0.125	0.140	0.160	0.160	0.160	0.210	0.210	0.180	0.200	0.200
13 000	0.190	0.175	0.200	0.210	0.210	0.210	0.250	0.250	0.220	0.240	0.200
14 000	0.190	0.175	0.200	0.210	0.210	0.210	0.250	0.250	0.280	0.240	0.240
15 000	0.190	0.175	0.200	0.210	0.210	0.210	0.250	0.280	0.280	0.240	0.240
16 000	0.200	0.177	0.200	0.220	0.220	0.220	0.280	0.280	0.300	0.270	0.270
17 000	0.200	0.177	0.200	0.220	0.220	0.220	0.280	0.280	0.300	0.270	0.270
18 000	0.200	0.177	0.210	0.220	0.220	0.220	0.460	0.320	0.300	0.300	0.300
19 000	0.200	0.182	0.210	0.220	0.230	0.230	0.460	0.320	0.310	0.310	0.300
20 000	0.200	0.184	0.210	0.230	0.230	0.230	0.460	0.330	0.540	0.370	0.370
21 000	0.200	0.184	0.210	0.250	0.250	0.250	0.460	0.330	0.540	0.370	0.370
22 000	0.200	0.184	0.210	0.250	0.250	0.250	0.460	0.330	0.540	0.370	0.370
23 000	0.210	0.188	0.220	0.260	0.260	0.260	0.460	0.330	0.540	0.370	0.370
24 000	0.210	0.188	0.220	0.270	0.270	0.270	0.460	0.440	0.620	0.540	0.540
25 000	0.210	0.193	0.230	0.280	0.280	0.280	0.730	0.490	0.620	0.540	0.540
26 000	0.220	0.202	0.240	0.280	0.280	0.280	0.730	0.490	0.700	0.910	0.910
26 500	0.220	0.202	0.240	0.280	0.280	0.280	0.730	0.620	0.700	0.910	0.910

50 Ω System - 2.92 mm Sensor / Splitter Levelled Output

Frequency	Level (dBm) 50 Ω		
	10 to 0	0 to -10	-10 to -20
1.00 kHz	0.005	0.005	0.023
20.00 kHz	0.005	0.005	0.023
100.00 kHz	0.005	0.005	0.024
300.00 kHz	0.031	0.033	0.044
1.00 MHz	0.031	0.033	0.044
10.0 MHz	0.031	0.033	0.044
20.0 MHz	0.031	0.033	0.044
100.0 MHz	0.031	0.033	0.044
125.0 MHz	0.033	0.034	0.045
300.0 MHz	0.033	0.034	0.045
750.0 MHz	0.033	0.035	0.046
1.00 GHz	0.033	0.035	0.046
1.40 GHz	0.036	0.037	0.047
2.00 GHz	0.038	0.040	0.049
2.50 GHz	0.038	0.040	0.049
3.00 GHz	0.038	0.040	0.049
3.50 GHz	0.038	0.040	0.049
4.00 GHz	0.039	0.040	0.049



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

50 Ω System - 2.92 mm Sensor / Splitter Levelled Output
(continued)

Frequency	Level (dBm) 50 Ω		
	10 to 0	0 to -10	-10 to -20
5.00 GHz	0.040	0.041	0.051
6.00 GHz	0.041	0.042	0.051
7.00 GHz	0.044	0.045	0.054
8.00 GHz	0.044	0.045	0.054
9.00 GHz	0.047	0.048	0.057
10.00 GHz	0.047	0.048	0.057
11.00 GHz	0.048	0.049	0.057
12.00 GHz	0.048	0.049	0.057
13.00 GHz	0.062	0.063	0.069
14.00 GHz	0.062	0.063	0.069
15.00 GHz	0.062	0.063	0.069
16.00 GHz	0.064	0.065	0.071
17.00 GHz	0.064	0.065	0.071
18.00 GHz	0.064	0.065	0.071
19.00 GHz	0.076	0.077	0.083
20.00 GHz	0.077	0.077	0.083
21.00 GHz	0.077	0.077	0.083
22.00 GHz	0.077	0.077	0.083
23.00 GHz	0.087	0.088	0.092
24.00 GHz	0.087	0.088	0.092
25.00 GHz	0.087	0.088	0.092
26.00 GHz	0.106	0.107	0.110
26.50 GHz	0.106	0.107	0.110

Note

The above uncertainties may also be reported for differences in level reported as Attenuation, the attenuation uncertainty will be the combined uncertainties of the reference level and the uncertainty at the final level.

MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF PHASOR MEASUREMENT UNIT CALIBRATORS

Total Vector Error (TVE)			
Steady State Tests	45 Hz to 65 Hz 16 V to 1008 V and 100 mA to 80 A	0.010 %	
Frequency Ramp Tests	16 V to 1008 V and 100 mA to 80 A 45 Hz to 55 Hz & 55 Hz to 65 Hz ± 0.1 Hz/s to ± 2 Hz/s	0.011 %	
Amplitude Modulation Tests	50 Hz & 60 Hz 16 V to 1008 V and 100 mA to 80 A Mod Factor 0.1 (10 %) Mod Freq: 0.1 Hz to 5 Hz	0.010 %	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF PHASOR MEASUREMENT UNIT CALIBRATORS			
(continued)			
Phase Modulation Tests	16 V to 1008 V and 100 mA to 80 A Mod Factor 0.1 radians Mod Freq: 0.1 Hz to 5 Hz	0.012 %	
Frequency Error (FE)			
Steady State Tests	45 Hz to 65 Hz 16 V to 1008 V and 100 mA to 80 A	1.8 μ Hz	
Frequency Ramp Tests	16 V to 1008 V and 100 mA to 80 A 45 Hz to 55 Hz & 55 Hz to 65 Hz ± 0.1 Hz/s to ± 2 Hz/s	5.2 μ Hz	
Amplitude Modulation Tests	16 V to 1008 V and 100 mA to 80 A Mod Factor 0.1 (10 %) Mod Freq: 0.1 Hz to 5 Hz	1.8 μ Hz	
Phase Modulation Tests	16 V to 1008 V and 100 mA to 80 A Mod Factor 0.1 radians Fundamental: 50 Hz Mod Freq: 0.1 Hz 0.5 Hz 1.0 Hz 2.0 Hz 5.0 Hz	5.2 μ Hz 16 μ Hz 30 μ Hz 62 μ Hz 140 μ Hz	
	Fundamental: 60 Hz Mod Freq: 0.1 Hz 0.5 Hz 1.0 Hz 2.0 Hz 5.0 Hz	5.7 μ Hz 16 μ Hz 33 μ Hz 73 μ Hz 170 μ Hz	
Rate of Change of Frequency Error (RFE)			
Steady State Tests	45 Hz to 65 Hz 16 V to 1008 V and 100 mA to 80 A	1.1 μ Hz	
Frequency Ramp Tests	16 V to 1008 V and 100 mA to 80 A 45 Hz to 55 Hz & 55 Hz to 65 Hz ± 0.1 Hz/s to ± 2 Hz/s	0.80 μ Hz	
Amplitude Modulation Tests	16 V to 1008 V and 100 mA to 80 A Mod Factor 0.1 (10 %) Mod Freq: 0.1 Hz to 5 Hz	1.0 μ Hz	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF PHASOR MEASUREMENT UNIT CALIBRATORS			
(continued)			
Rate of Change of Frequency Error (RFE) (continued) Phase Modulation Tests	16 V to 1008 V and 100 mA to 80 A Mod Factor 0.1 radians Fundamental: 50 Hz Mod Freq: 0.1 Hz 0.5 Hz 1.0 Hz 2.0 Hz 5.0 Hz Fundamental: 60 Hz Mod Freq: 0.1 Hz 0.5 Hz 1.0 Hz 2.0 Hz 5.0 Hz	2.7 μ Hz 57 μ Hz 160 μ Hz 770 μ Hz 4 500 μ Hz 2.8 μ Hz 58 μ Hz 210 μ Hz 930 μ Hz 5 600 μ Hz	
Amplitude & Phase Step Delay Time 10% or 0.1 radian Step Size	45 Hz to 65 Hz 16 V to 1008 V and 100 mA to 80 A	2.8 μ s	
MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF RF AND MICROWAVE SPECTRUM ANALYSERS, SIGNAL ANALYSERS AND OTHER INSTRUMENTS WITH EQUIVALENT FUNCTIONALITY.			
For calibrations performed at the main address and at customer premises. Calibrations may be performed in suitable areas within the customers' premises that must be appropriate for the nature of the particular calibrations undertaken, and will be the subject of contract review arrangements between the laboratory and the customer.			Depending on environmental conditions, increased uncertainties may apply to calibrations performed at customer premises.
FREQUENCY REFERENCE ACCURACY	Frequency 10 MHz 50 MHz 100 MHz	0.15 Hz 0.73 Hz 1.47 Hz	
FREQUENCY READOUT AND COUNTER ACCURACY	10 Hz to 40 GHz	1 mHz	
FREQUENCY SPAN ACCURACY	10 Hz to 40 GHz Frequency Span settings, at 10 Hz to 40 GHz	0.026 %	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
RESOLUTION BANDWIDTH (RBW) ACCURACY	1 Hz to 10 MHz RBW settings, at 50 MHz to 128 MHz.		
Bandwidth frequency accuracy	-3 dB BW response -60 dB BW response	0.29 % 0.30 %	
Level response accuracy at nominal BW frequency	-3 dB BW response -60 dB BW response	0.053 dB 0.10 dB	
POWER BANDWIDTH ACCURACY	1 Hz to 10 MHz RBW settings, at 50 MHz to 128 MHz.	0.0030 dB	
RESOLUTION BANDWIDTH (RBW) SWITCHING ACCURACY	1 Hz to 10 MHz RBW settings, at 50 MHz to 128 MHz.	0.049 dB	
ABSOLUTE LEVEL/AMPLITUDE ACCURACY	At 10 Hz to 128 MHz -80 dBm to -70dBm -70 dBm to -40 dBm -40 dBm to +10 dBm	0.51 dB 0.21 dB 0.053 dB	
FREQUENCY RESPONSE	-48 dBm to +24 dBm 10 Hz to 100 kHz 100 kHz to 128 MHz 128 MHz to 300 MHz 300 MHz to 1.4 GHz 1.4 GHz to 4 GHz	0.046 dB 0.062 dB 0.083 dB 0.022dB 0.035 dB	
	-35 dBm to+18 dBm 1 kHz to 100 MHz 100 MHz to 2.4 GHz 2.4 GHz to 8 GHz 8 GHz to 12.4 GHz 12.4 GHz to 18 GHz 18 GHz to 26.5 GHz	0.08 dB 0.12 dB 0.24 dB 0.35 dB 0.41 dB 0.42 dB	
	-35 dBm to 0 dBm 26.5 GHz to 33 GHz 33 GHz to 40 GHz	0.83 dB 0.84 dB	
INPUT ATTENUATOR ACCURACY AND REFERENCE LEVEL SWITCHING ACCURACY	At 10 Hz to 128 MHz, relative to +10 dBm 0 to 49 dB 49 to 59 dB 59 to 69 dB 69 to 94 dB	 0.025 dB 0.036 dB 0.060 dB 0.085 dB	



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United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

Fluke Precision Measurement Ltd
Issue No: 053 Issue date: 18 April 2019

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks
DISPLAY SCALE FIDELITY	At 10 Hz to 128 MHz, relative to +10 dBm 0 to 49 dB 49 to 59 dB 59 to 69 dB 69 to 94 dB	0.021 dB 0.031 dB 0.051 dB 0.071 dB	
NOISE FLOOR (DANL)		1.8 dB	
SECOND HARMONIC DISTORTION	At ≤ 1 GHz fundamental Harmonic level Down to -55 dBc -55 to -65 dBc -65 to -95 dBc At > 1 GHz fundamental Harmonic level Down to -55 dBc -55 to -95 dBc	0.72 dB 0.73 dB 1.2 dB 1.1 dB 1.5 dB	
NOISE SIDEBANDS (PHASE NOISE)	At 500 MHz to 1GHz Offset frequency 10 Hz 100 Hz 100 Hz to 1 MHz 1MHz to 10 MHz 10MHz to 100 MHz	2.3 dB 2.2 dB 2.9 dB 3.2 dB	
INPUT VSWR	N Type connectors (50 Ω) 10 MHz to 1 GHz 1 GHz to 8 GHz 8 GHz to 12 GHz 12 GHz to 18 GHz PC 3.5 connectors 10 MHz to 100 MHz 100 MHz to 8 GHz 8 GHz to 18 GHz 18 GHz to 26.5 GHz PC 2.92 connectors 10 MHz to 100 MHz 100 MHz to 8 GHz 8 GHz to 18 GHz 18 GHz to 26.5 GHz 26.5 GHz to 40 GHz	0.015 0.018 0.022 0.024 0.015 0.026 0.033 0.044 0.015 0.026 0.033 0.044 0.055	The listed uncertainties apply to UUTs with input connectors in good condition and VSWR not exceeding 1.2:1. Larger VSWRs can be accommodated, with increased uncertainties.
END			



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Appendix - Calibration and Measurement Capabilities

Introduction

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

Calibration and Measurement Capabilities (CMCs)

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

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 μ V

Over the range 100 mV to 1 V, the CMC is 0.0025 %·V + 5.0 μ V, 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 %· p + (0.12·10⁻⁶· p ·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 · 0.01 · i , where i is the instrument indication.