SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: September 30, 2022 Certificate Number: 2357.30

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1, 5]:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
DC Voltage – Generate[3]	(0.01 to 0.22) V (0.22 to 2.2) V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1100) V	8 µV/V + 2 µV 5 µV/V + 2 µV 4 µV/V + 8 µV 4 µV/V + 5 µV 7 µV/V + 60 µV 8 µV/V + 0.7 mV	Fluke 57X0A
DC Voltage[3] – Generate	(0 to 330) mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (100 to 1020) V	11 µV/V + 1.0 µV 5.9 µV/V + 5.7 µV 6.8 µV/V + 47 µV 11 µV/V + 410 µV 11 µV/V + 1.3 mV	Fluke 5522A 90 day specifications
DC Voltage – Measure[3]	(0.01 to 0.1) V (> 0.1 to 1) V (> 1 to 10) V (> 10 to 100) V (> 100 to 1100) V	7.1 µV/V + 93 nV 5.3 µV/V + 0.39 µV 3.6 µV/V + 3.9 µV 5.8 µV/V + 39 µV 5.5 µV/V + 0.49 mV	Fluke 85X8A
DC Current[3] – Generate	10 µA to 220 µA > 220 µA to < 2.2 mA (> 2.2 to 22) mA (> 22 to 220) mA > 0.22 to 2.2 A (> 2.2 to 10) A	80 µA/A 50 µA/A 50 µA/A 60 µA/A + 1 µA 80 µA/A + 25 µA 400 µA/A + 0.48 mA	Fluke 57X0A

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
DC Current[3] Generate	(0 to 330 µA (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1.1) A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	93 µA/A + 16 nA 62 µA/A + 39 nA 56 µA/A + 260 nA 61 µA/A + 2.3 µA 0.012 % + 39 µA 0.023 % + 33 µA 0.029 % + 440 µA 0.062 % + 590 µA	Fluke 5522A 90 day specifications
DC Current[3] **–** Measure	(0 to 200) µA (> 0.2 to 2) mA (> 2 to 20) mA (> 20 to 200) mA (> 0.2 to 2) A (> 2 to 20) A	14 µA/A + 0.31 nA 14 µA/A + 3.1 nA 15 µA/A + 31 nA 47 µA/A + 0.62 µA 0.17 mA/A + 12 µA 0.4 mA/A + 0.31 mA	Fluke 85X8A
DC Resistance[3] **–** Generate	(1, 1.9) Ω (10, 19) Ω (100, 190) Ω (1, 1.9) kΩ (10, 19) kΩ (100, 190) kΩ 1 MΩ, 1.9 MΩ 10 MΩ, 19 MΩ 100 MΩ	85 µΩ/Ω 25 µΩ/Ω 20 µΩ/Ω 11 µΩ/Ω 12 µΩ/Ω 15 µΩ/Ω 20 µΩ/Ω 70 µΩ/Ω 0.12 mΩ/Ω	Fluke 57X0A

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
DC Resistance[3] Generate	(0 to 11) Ω	27 μΩ/Ω + 0.78 mΩ	Fluke 5522A 90 day specifications
	(11 to 33) Ω	19 μΩ/Ω + 1.2 mΩ	
	(33 to 110) Ω	17 μΩ/Ω + 1.1 mΩ	
	(110 to 330) Ω 330 Ω to 1.1 kΩ	17 μΩ/Ω + 1.6 mΩ	
	(1.1 to 3.3) kΩ (3.3 to 11) kΩ	17 μΩ/Ω + 16 mΩ	
	(11 to 33) kΩ (33 to 110) kΩ	17 μΩ/Ω + 0.16 Ω	
	(110 to 330) kΩ	19 μΩ/Ω + 1.6 Ω	
	330 kΩ to 1.1 MΩ	19 μΩ/Ω + 1.7 Ω	
	(1.1 to 3.3) MΩ	31 μΩ/Ω + 24 Ω	
	(3.3 to 11) MΩ	80 μΩ/Ω + 0.12 kΩ	
	(11 to 33) MΩ	0.016 % + 2 kΩ	
	(33 to 110) MΩ	0.024 % + 15 kΩ	
	(110 to 330) MΩ	0.19 % + 78 kΩ	
	(330 to 1100) MΩ	0.93 % + 0.42 MΩ	
DC Resistance[3] **–** Measure	(0 to 2) Ω	20 μΩ/Ω + 4.0 μΩ	Fluke 85X8A
	(> 2 to 20) Ω	11 μΩ/Ω + 14 μΩ	
	(> 20 to 200) Ω	10 μΩ/Ω + 50 μΩ	
	(> 0.2 to 2) kΩ	8 μΩ/Ω + 0.50 mΩ	
	(> 2 to 20) kΩ	8 μΩ/Ω + 5.0 mΩ	
	(> 2 to 200) kΩ	8.2 μΩ/Ω + 50 mΩ	
	(> 0.2 to 2) MΩ	9 μΩ/Ω + 1.0 Ω	
	(2 to 20) MΩ	18 μΩ/Ω + 10 Ω	
	(> 20 to 200) MΩ	110 μΩ/Ω + 1.0 kΩ	
	(> 0.2 to 2) GΩ	0.18 mΩ/Ω + 100 kΩ	
	(> 2 to 20) GΩ	1.9 mΩ/Ω + 10 MΩ	

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Voltage – Generate[3]			
(60 to 220) mV	(10 to 20) Hz > 20 Hz to 40 kHz > 40 Hz to 20 kHz (> 20 to 50) kHz (> 50 to 100) kHz (> 100 to 300) kHz (> 300 to 500) kHz > 500 kHz to 1 MHz	0.84 mV/V 0.38 mV/V 0.27 mV/V 0.48 mV/V 1.4 mV/V 1.7 mV/V 2.5 mV/V 5.2 mV/V	Fluke 57X0A
(> 220 to 2.2) V	(10 to 20) Hz > 20 Hz to 40 kHz > 40 Hz to 20 kHz (> 20 to 50) kHz (> 50 to 100) kHz (> 100 to 300) kHz (> 300 to 500) kHz > 500 kHz to 1 MHz	0.95 mV/V 0.3 mV/V 0.11 mV/V 0.22 mV/V 0.62 mV/V 1.2 mV/V 3 mV/V 6.7 mV/V	
(> 2.2 to 22) V	(10 to 20) Hz > 20 Hz to 40 kHz > 40 Hz to 20 kHz (> 20 to 50) kHz (> 50 to 100) kHz (> 100 to 300) kHz (> 300 to 500) kHz > 500 kHz to 1 MHz	0.95 mV/V 0.3 mV/V 0.11 mV/V 0.22 mV/V 0.43 mV/V 1.4 mV/V 3.6 mV/V 7.4 mV/V	
(> 22 to 220) V	(10 to 20) Hz > 20 Hz to 40 kHz > 40 Hz to 20 kHz (> 20 to 50) kHz (> 50 to 100) kHz	0.95 mV/V 0.3 mV/V 0.13 mV/V 0.41 mV/V 0.95 mV/V	
(> 220 to 1100) V	(10 to 50) Hz > 50 Hz to 1 kHz (> 1 to 20) kHz (> 20 to 30) kHz	0.5 mV/V 0.15 mV/V 0.20 mV/V 0.50 mV/V	
(> 220 to 750) V	(30 to 50) kHz (> 50 to 100) kHz	0.5 mV/V 1.8 mV/V	

AC Voltage Generate **(±) CMC**[2, 7, 8]						
AC Voltage[3]	**Frequency**					
	(10 to 45) Hz	45 Hz to 10 kHz	(10 to 20) kHz	(20 to 50) kHz	(50 to 100) kHz	(100 to 500) kHz
(1 to 33) mV	0.044 % + 6.0 µV	93 µV/V + 4.7 µV	0.012 % + 4.7 µV	0.062 % + 4.7 µV	0.23 % + 9.3 µV	0.47 % + 39 µV
(33 to 330) mV	0.019 % + 6.9 µV	0.011 % + 6.2 µV	0.012 % + 6.2 µV	0.023 % + 6.2 µV	0.047 % + 25 µV	0.12 % + 54 µV
(0.33 to 3.3) V	0.019 % + 45 µV	0.011 % + 47 µV	0.012 % + 47 µV	0.019 % + 39 µV	0.043 % + 97 µV	0.16 % + 470 µV
(3.3 to 33) V	0.019 % + 580 µV	97 µV/V + 470 µV	0.017 % + 470 µV	0.023 % + 470 µV	0.058 % + 1.2 mV	
AC Voltage[3]	**Frequency**					
	(45 to 1000) Hz	(1 to 5) kHz	(5 to 10) kHz	(10 to 20) kHz	(20 to 50) kHz	(50 to 100) kHz
(33 to 333) V	0.012 % + 2.1 mV	0.012 % + 5.0 mV	0.012 % + 5.0 mV	0.017 % + 4.9 mV	0.019 % + 4.9 mV	0.12 % + 39 mV
(330 to 1020) V	0.019 % + 8.0 mV	0.016 % + 8.0 mV	0.019 % + 8.0 mV			
Comments	Fluke 5522A, 90 day specifications					

Parameter/Range	**Frequency**	**CMC**[2, 4] **(±)**	**Comments**
AC Voltage – Measure[3]			
Up to 199.99 mV	(1 to 10) Hz	0.17 mV/V + 16 µV	Fluke 85X8A
	(10 to 40) Hz	0.12 mV/V + 5.0 µV	
	(40 to 100) Hz	0.1 mV/V + 5.0 µV	
	(0.1 to 2) kHz	0.1 mV/V + 2.0 µV	
	(2 to 10) kHz	0.13 mV/V + 5.0 µV	
	(10 to 30) kHz	0.31 mV/V + 10 µV	
	(30 to 100) kHz	0.66 mV/V + 24 µV	
(0.2 to 1.9999) V	(1 to 10) Hz	0.93 mV/V + 0.14 mV	
	(10 to 40) Hz	0.12 mV/V + 24 µV	
	(40 to 100) Hz	0.14 mV/V + 24 µV	
	(0.1 to 2) kHz	74 µV/V + 24 µV	
	(2 to 10) kHz	0.11 mV/V + 24 µV	
	(10 to 30) kHz	0.2 mV/V + 50 µV	
	(30 to 100) kHz	0.53 mV/V + 0.24 mV	
	(100 to 300) kHz	2.4 mV/V + 2.4 mV	
	(0.3 to 1) MHz	7.8 mV/V + 24 mV	

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Voltage – Measure[3] (cont)			
(2 to 19.999) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) khz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	6.4 mV/V + 1.4 mV 0.84 mV/V + 0.20 mV 250 µV/V + 0.20 mV 250 µV/V + 0.20 mV 0.27 mV/V + 0.20 mV 0.36 mV/V + 0.50 mV 0.84 mV/V + 2.4 mV 4 mV/V + 24 mV 13 mV/V + 0.24 V	Fluke 85X8A
(20 to 199.9) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	78 mV/V + 14 mV 5.9 mV/V + 2.4 mV 3.3 mV/V +2.4 mV 2500 µV/V + 2.4 mV 2.6 mV/V + 2.4 mV 3.5 mV/V + 5.0 mV 6.9 mV/V + 24 mV 8.7 mV/V + 0.24 mV 13 mV/V + 2.4 mV	
(100 to 1050) V	(1 to 10) Hz (10 to 40) Hz 40 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	22 mV/V + 80 mV 6.4 mV/V + 25 mV 41 mV/V + 25 mV 110 mV/V + 50 mV 110 mV/V + 0.25 V	

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Current – Generate[3]			
(10 to 220) µA	(10 to 20) Hz (> 20 to 40) Hz > 40 Hz to 1 kHz (> 1 to 5) kHz (> 5 to 10) kHz	0.7 mA/A 0.36 mA/A 0.14 mA/A 0.59 mA/A 1.7 mA/A	Fluke 57X0A
> 220 µA to 2.2 mA	(10 to 20) Hz (> 20 to 40) Hz > 40 Hz to 1 kHz (> 1 to 5) kHz (> 5 to 10) kHz	0.7 mA/A 0.36 mA/A 0.14 mA/A 0.59 mA/A + 1 µA 1.7 mA/A + 1 µA	
(> 2.2 to 22) mA	(10 to 20) Hz (> 20 to 40) Hz > 40 Hz to 1 kHz (> 1 to 5) kHz (> 5 to 10) kHz	0.7 mA/A + 1 µA 0.36 mA/A + 1 µA 0.14 mA/A + 1 µA 0.59 mA/A + 5 µA 1.7 mA/A + 10 µA	
(> 22 to 220) mA	(10 to 20) Hz (> 20 to 40) Hz > 40 Hz to 1 kHz (> 1 to 5) kHz (> 5 to 10) kHz	0.7 mA/A + 5 µA 0.36 mA/A + 5 µA 0.14 mA/A + 5 µA 0.59 mA/A + 50 µA 1.7 mA/A + 0. 1 mA	
AC Current – Generate[3] (cont)			
> 220 mA to 2.2 A	20 Hz to 1 kHz (> 1 to 5) kHz (> 5 to 10) kHz	0.64 mA A + 50 µA 0.76 mA/A + 0.1 mA 8.7 mA/A + 0.2 mA	Fluke 57X0A
(> 2.2 to 11) A	40 Hz to 1 kHz (> 1 to 5) kHz (> 5 to 10) kHz	0.47 mA A + 0.2 mA 1 mA/A + 0.5 mA 3.8 mA/A + 0.9 mA	

AC Current Generate **(±) CMC**[2, 7, 8]						
AC Current[3]	**Frequency**					
	(10 to 20) Hz	(20 to 45) Hz	(45 to 1000) Hz	(1 to 5) kHz	(5 to 10) kHz	(10 to 30) kHz
(29 to 330) µA	0.12 % + 78 nA	0.093 % + 78 nA	0.078 % + 78 nA	0.19 % + 120 nA	0.47 % + 160 nA	0.93 % + 310 nA
(0.33 to 3.3) mA	0.12 % + 120 nA	0.078 % + 120 nA	0.062 % + 120 nA	0.12 % + 160 nA	0.31 % + 230 nA	0.62 % + 470 nA
(3.3 to 33) mA	0.12 % + 1.6 µA	0.058 % + 1.60 µA	0.027 % + 1.6 µA	0.050 % + 1.6 µA	0.12 % + 2.3 µA	0.25 % + 3.1 µA
(33 to 330) mA	0.12 % + 16 µA	0.058 % + 16 µA	0.027 % + 16 µA	0.062 % + 39 µA	0.12 % + 78 µA	0.25 % + 160 µA
(0.33 to 1.1) A	0.12 % + 78 µA	0.12 % + 78 µA	0.028 % + 78 µA	0.39 % + 780 µA	1.6 % + 3.9 mA	
(1.1 to 3) A			0.039 % + 78 µA			

AC Current[3]	**Frequency**		
	(45 to 100) Hz	(100 to 1000) Hz	(1 to 5) kHz
(3 to 11) A	0.039 % + 1.6 mA	0.062 % + 1.6 mA	1.9 % + 1.6 mA
(11 to 20.5) A	0.078 % + 3.9 mA	0.10 % + 3.9 mA	1.9 % + 3.9 mA
Comments	Fluke 5522A, 90 day specifications		

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Current – Measure[3]			
(9 to 200) µA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.49 mA/A + 19 nA 0.5 mA/A + 19 mA 0.65 mA/A + 19 nA 3.1 mA/A + 19 nA	Fluke 85x8A
(0.2 to 2) mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.32 mA/A + 0.19 µA 0.3 mA/A + 0.19 µA 0.6 mA/A + 0.19 µA 3.1 mA/A + 0.19 µA	
(2 to 20) mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.32 mA/A + 1.9 µA 0.3 mA/A + 0.19 µA 0.65 mA/A + 1.9 µA 3.1. mA/A + 1.9 µA	
(20 to 200) mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz	0.32 mA/A + 19 µA 0.29 mA/A + 19 µA 0.6 mA/A + 19 µA	
(0.2 to 2) A	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz	0.55 mA/A + 0.19 mA 0.65 mA/A + 0.19 mA 2.4 mA/A + 0.19 mA	
(2 to 20) A	10 Hz to 2 kHz (2 to 10) kHz	0.75 mA/A + 1.9 mA 2.0 mA/A + 1.9 mA	

Parameter/Equipment	Range	(±) CMC[2, 5, 8]	Comments
DC Current Clamp Meters[3]	(16.5 to 150) A (150 to 1025) A	3.9 mA/A + 0.11 mA 3.9 mA/A + 0.39 mA	Fluke 5522A, Fluke 5500A/COIL

AC Current Clamp Meters (±) CMC[2, 7, 8]			
Clamp Type: Toroidal			
AC Current[3]	**Frequency**		
	(45 to 65) Hz	(65 to 100) Hz	(100 to 440) Hz
(16.5 to 150) A	0.36 %	0.83 %	0.83 %
(150 to 1025) A	0.36 %	0.84 %	0.84 %
Clamp Type: Non-Toroidal			
AC Current[3]	**Frequency**		
	(45 to 65) Hz	(65 to 100) Hz	(100 to 440) Hz
(16.5 to 150) A	0.75 %	1.2 %	1.2 %
(150 to 1025) A	1.2 %	1.6 %	1.6 %
Comments	Fluke 5522A, Fluke 5500A/COIL		

Parameter/Equipment	Range	(±) CMC[2, 7, 8]	Comments
Capacitance[3, 9] – Generate	(220 to 399.9) pF	0.30 % + 7.8 pF	Fluke 5522A
10 Hz to 10 kHz	(0.4 to 1.1) nF	0.30 % + 7.8 pF	
10 Hz to 10 kHz	(1.1 to 3.3) nF	0.27 % + 9.4 pF	90 day Specification
10 Hz to 3 kHz	(3.3 to 11) nF	0.14 % + 9.6 pF	
(10 to 1000) Hz	(11 to 33) nF	0.13 % + 96 pF	
(10 to 1000) Hz	(33 to 110) nF	0.14 % + 93 pF	
(10 to 1000) Hz	(110 to 330) nF	0.10 % + 590 pF	
(10 to 1000) Hz	(0.33 to 1.1) µF	0.14 % + 930 pF	
(10 to 600) Hz	(1.1 to 3.3) µF	0.10 % + 5.9 nF	
(10 to 300) Hz	(3.3 to 11) µF	0.14 % + 9.3 nF	
(10 to 150) Hz	(11 to 33) µF	0.18 % + 56 nF	
(10 to 120) Hz	(33 to 110) µF	0.26 % + 90 nF	
(10 to 80) Hz	(110 to 330) µF	0.26 % + 0.24 µF	
Up to 50 Hz	(0.33 to 1.1) mF	0.26 % + 0.79 µF	
Up to 20 Hz	(1.1 to 3.3) mF	0.21 % + 5.5 µF	
Up to 6 Hz	(3.3 to 11) mF	0.26 % + 9.5 µF	
Up to 2 Hz	(11 to 33) mF	0.50 % + 46 µF	
Up to 0.6 Hz	(33 to 110) mF	0.77 % + 95 µF	
Up to 0.2 Hz			
Electrical Simulation of **Thermocouples**[3]	**Type J**		Fluke 5522A 90 day Specification
	(-210 to -100) ºC	0.16 ºC	
	(-100 to -30) ºC	0.093 ºC	
	(-30 to 150) ºC	0.078 ºC	
	(150 to 760) ºC	0.10 ºC	
	(760 to 1200) ºC	0.14 ºC	
	Type K		
	(-200 to -100) ºC	0.19 ºC	
	(-100 to -25) ºC	0.11 ºC	
	(-25 to 120) ºC	0.093 ºC	
	(120 to 1000) ºC	0.15 ºC	
	(1000 to 1372) ºC	0.23 ºC	
	Type T		
	(-250 to -150) ºC	0.37 ºC	
	(-150 to 0) ºC	0.14 ºC	
	(0 to 120) ºC	0.093 ºC	
	(120 to 400) ºC	0.078 ºC	

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Pulse Characterization – Risetime – Measure[3]	40 ps to 25 ns 50 mV to 50 V	0.04 (t_r) + 4 ps	Tektronix TDS8000 and 80E04 Periodic signals, pulse amplitudes t_r = actual rise time
Pulse Characterization – Risetime – Measure – Measuring devices and voltage probes[3]	40 ps to 1 ns (10 to 250) mV 500 ps to 3 ns 25 mV to 3 V 1.5 ns to 25 ns 25 V and 50 V	0.04 (t_r) + 8 ps 0.02 (t_r) + 65 ps 0.02 (t_r) + 120 ps	Tektronix TDS8000 and 80E04 t_r = actual rise time
Pulse Characterization – Risetime – Measure – Current Clamp[3]	(1.5 to 20) ns 0.5 A and 1 A (100 to 300) ns 5 A	0.03 (t_r) + 200 ps 0.03 (t_r)	Picoseconds Lab 2600 (Isoview Mod) t_r = actual rise time

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Oscilloscope Calibration[3]			
DC Voltage – Generate 50 Ω, 1 MΩ Load	0 V (1 to 100) mV > 100 mV to 1.0 V (>1.0 to 5.6) V	15 µV 0.05 % + 26 µV 0.022 % + 65 µV 0.026 % + 50 µV	Short Fluke 9500 + 9530, 9550 or 9560, Tektronix FCA3103
1 MΩ Load	(5.6 to 222.4) V	0.03 %	
Sinewave Flatness – 50 Ω Load, $\lvert\Gamma_{DUT}\rvert \leq 0.23$	50 kHz to 10 MHz 4.4 mV_{p-p} to 5.6 V_{p-p}	0.22 dB	
	(10 to 100) MHz 4.4 mV_{p-p} to 5.6 V_{p-p}	0.29 dB	
	(> 100 to 550) MHz 4.4 mV_{p-p} to 5.6 V_{p-p}	0.37 dB	
	(> 1.1 to 2.5) GHz 4.4 mV_{p-p} to 3.4 V_{p-p}	0.48 dB	
	(> 2.5 to 3.2) GHz 4.4 mV_{p-p} to 2.2 V_{p-p}	0.48 dB	
Input Resistance – Measure	50 Ω 75 Ω 1 MΩ	0.11 % 0.13 % 0.12 %	
DC Voltage	(0 to 5) V	230 µV	
Frequency Period	0.5 ns to 10 ns 1 µs to 50 s	0.27 µs/s 0.27 µs/s	

II. Time & Frequency

Parameter/Equipment	Range	CMC[2, 7, 8] (±)	Comments
Frequency[3] – Generate	(3 to 20) Hz (20 to 200) Hz (200 to 2000) Hz (2 to 20) kHz (20 to 200) kHz (200 to 2000) kHz	1.4 µHz/Hz + 22 µHz 1.7 µHz/Hz + 61 µHz 1.8 µHz/Hz + 0.34 mHz 1.8 µHz/Hz + 3.4 mHz 1.7 µHz/Hz + 51 mHz 1.8 µHz/Hz + 0.34 Hz	Fluke 5522A
Frequency[3] – Measure	0.001 Hz to 1 kHz (1 to 1000) kHz (1 to 225) MHz 225 MHz to 3 GHz	0.22 mHz/Hz 1.8 µHz/Hz 0.18 µHz/Hz 0.18 µHz/Hz	HP 53131A

[1] This laboratory offers commercial field calibration service.

[2] Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMC's represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

[3] Field calibration service is available for this calibration and this laboratory meets A2LA *R104 – General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

[4] The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMC's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.

[5] This scope meets A2LA's *P112 Flexible Scope Policy*.

[6] The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.

[7] The measurands stated are generated with the Fluke 552x and 57x0 series of instruments. This capability is suitable for the calibration of the devices intended to measure the stated measurand in the ranges

indicated. CMCs are expressed as either a specific value that covers the full range or as a fraction of the reading plus a fixed floor specification.

[8] The uncertainty quoted on an A2LA certificate will include that of the reference standard plus any uncertainties attributable to the device under test during calibration.

[9] The capacitance ranges applies to both DC charge / discharge meters and AC RCL meters.

Accredited Laboratory

A2LA has accredited

FLUKE EUROPE B.V. TEKTRONIX/FLUKE EMEA FIELD SERVICES

Eindhoven, NETHERLANDS

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets R205 – Specific Requirements: Calibration Laboratory Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 10th day of November 2020.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2357.30
Valid to September 30, 2022
Revised December 14, 2020

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.