



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

TRADEPORT ELECTRONICS CALIBRATION LABORATORY
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CALIBRATION

Valid To: October 31, 2024

Certificate Number: 2450.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 6}:

I. Electrical – DC / Low Frequency

| Parameter/Equipment | Range | CMC ^{2, 5} (±) | Comments |
|------------------------------------|-------------------|-------------------------|-----------------|
| DC Voltage ³ – Generate | (0 to 330) mV | 16 µV/V + 1.6 µV | Fluke 5520A |
| | 330 mV to 3.3 V | 8.5 µV/V + 9.6 µV | |
| | (3.3 to 33) V | 9.3 µV/V + 180 µV | |
| | (33 to 330) V | 14 µV/V + 1 mV | |
| | (330 to 1000) V | 14 µV/V + 3.4 mV | |
| | (0 to 220) mV | 8.0 µV/V + 0.68 µV | Fluke 5700A |
| | 220 mV to 2.2 V | 7.0 µV/V + 1.4 µV | |
| | (2.2 to 11) V | 7.0 µV/V + 6.5 µV | |
| | (11 to 22) V | 7.0 µV/V + 12 µV | |
| | (22 to 220) V | 8.0 µV/V + 140 µV | |
| | (220 to 1100) V | 9.0 µV/V + 1.5 mV | |
| | (0 to 0.202) V | 15 µV/V + 2.7 µV | Transmille 4010 |
| | (0.202 to 2.02) V | 9.0 µV/V + 2.6 µV | |
| | (2.02 to 20.2) V | 8.0 µV/V + 0.16 mV | |
| | (20.2 to 220) V | 12 µV/V + 0.31 mV | |
| | (200 to 1025) V | 12 µV/V + 9.0 mV | |
| (> 1 to 10) kV | 0.58 % + 25 V | Pintek HVC-801 | |
| (10 to 20) kV | 0.58 % + 26 V | | |
| (20 to 30) kV | 0.58 % + 27 V | | |
| (30 to 40) kV | 0.58 % + 30 V | | |

| Parameter/Equipment | Range | CMC ^{2, 4, 5} (±) | Comments |
|------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------|
| DC Voltage ³ – Measure | (0 to 100) mV (0 to 1) V (0 to 10) V (0 to 100) V (0 to 1000) V | 11 μV/V + 1.0 μV 10 μV/V + 1.0 μV 10 μV/V + 2.1 μV 12 μV/V + 34 μV 24 μV/V + 0.13 mV | Agilent 3458A |
| | 100 V to 15 kV | 3.9 % | Tektronix P6015A with 1 MΩ impedance oscilloscope |
| | (0.5 to 6) kV (> 6 to 10) kV | 0.035 % + 0.58 V 0.035 % + 5.8 V | Vitrek 4700 |
| | (> 10 to 40) kV (40 to 70) kV (70 to 100) kV | 0.058 % + 5.8 V 0.058 % + 58 V 0.058 % + 0.12 kV | Vitrek 4700 & Vitrek HVL-100 probe |
| DC Current ³ – Generate | (0 to 330) μA 330 μA to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A | 120 μA/A + 16 nA 78 μA/A + 52 nA 78 μA/A + 0.37 μA 78 μA/A + 7.0 μA 0.016 % + 52 μA | Fluke 5520A |
| | (1.1 to 3) A (3 to 11) A (11 to 20.5) A | 0.029 % + 0.19 mA 0.039 % + 0.74 mA 0.078 % + 2.4 mA | |
| | (> 20 to 50) A (50 to 100) A (100 to 500) A (500 to 1000) A | 0.19 % + 0.20 A 0.20 % + 0.40 A 0.20 % + 1.0 A 0.21 % + 1.8 A | Fluke 5520A & Fluke 5500A/COIL |
| | (> 20 to 120) A | 0.01 % + 0.13 A | APM SPS40VDC1000W |
| | (0 to 220) μA 220 μA to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A | 50 μA/A + 10 nA 50 μA/A + 22 nA 50 μA/A + 0.25 μA 60 μA/A + 1.8 μA 80 μA/A + 59 μA | Fluke 5700A |
| | | | |
| | | | |

| Parameter/Equipment | Range | CMC ^{2, 5} (±) | Comments |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| DC Current ³ – Generate (cont) | (0 to 202) μ A (0.2 to 2.02) mA (2 to 20.2) mA (20 to 202) mA (0.2 to 2.02) A (2 to 20.2) A (20.2 to 30) A (> 20 to 50) A (50 to 100) A (100 to 500) A (500 to 1000) A | 0.01 % + 12 nA 0.050 % + 79 nA 0.050 % + 0.37 μ A 0.05% + 3.7 μ A 0.013 % + 60 μ A 0.030 % + 1.4 mA 0.050 % + 1.5 mA 0.25 % + 0.20 A 0.25 % + 0.40 A 0.25 % + 1.0 A 0.25 % + 1.8 A | Transmille 4010 Transmille 4010 & Fluke 5500A/COIL |
| DC Current ³ – Measure | (0 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 3) A (3 to 10) A (10 to 20) A | 25 μ A/A + 2.1 nA 25 μ A/A + 17 nA 25 μ A/A + 0.17 μ A 40 μ A/A + 2.4 μ A 120 μ A/A + 50 μ A 0.016 % + 4.4 mA 0.039 % + 4.4 mA 0.21 % + 9.7 mA | Agilent 3458A Fluke 8846A Agilent 3458A & 50 A/50 mV current shunt |
| Resistance ³ – Generate | (0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 k Ω to 1.1 M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω 330 M Ω to 1.1 G Ω | 31 $\mu\Omega/\Omega$ + 0.79 m Ω 23 $\mu\Omega/\Omega$ + 1.2 m Ω 22 $\mu\Omega/\Omega$ + 1.5 m Ω 22 $\mu\Omega/\Omega$ + 0.024 Ω 22 $\mu\Omega/\Omega$ + 0.0059 Ω 22 $\mu\Omega/\Omega$ + 0.030 Ω 22 $\mu\Omega/\Omega$ + 0.083 Ω 22 $\mu\Omega/\Omega$ + 0.30 Ω 22 $\mu\Omega/\Omega$ + 0.90 Ω 25 $\mu\Omega/\Omega$ + 2.7 Ω 25 $\mu\Omega/\Omega$ + 8.4 Ω 47 $\mu\Omega/\Omega$ + 48 Ω 0.010 % + 200 Ω 0.019 % + 2.7 k Ω 0.039 % + 9.4 k Ω 0.23 % + 110 k Ω 1.2 % + 1.3 M Ω | Fluke 5520A |

| Parameter/Equipment | Range | CMC ^{2, 5} (±) | Comments |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Resistance ³ – Measure (2-Wire and 4-Wire) | (0 to 10) Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ | 18 μΩ/Ω + 0.11 mΩ 15 μΩ/Ω + 1.0 mΩ 13 μΩ/Ω + 7.5 mΩ 13 μΩ/Ω + 75 mΩ 13 μΩ/Ω + 0.75 Ω 18 μΩ/Ω + 8.3 Ω 53 μΩ/Ω + 0.20 kΩ 0.050 % + 0.24 kΩ 0.50 % + 0.24 MΩ | Agilent 3458A |

| Parameter/Range | Frequency | CMC ^{2, 5} (±) | Comments |
|------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------|
| AC Voltage ³ – Generate | | | |
| (1 to 33) mV | (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 | 0.062 % + 5.0 μV 0.012 % + 5.0 μV 0.016 % + 5.6 μV 0.078 % + 7.7 μV 0.27 % + 12 μV 0.62 % + 45 μV | Fluke 5520A |
| (33 to 330) mV | (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 | 0.023 % + 25 μV 0.011 % + 11 μV 0.012 % + 11 μV 0.027 % + 33 μV 0.062 % + 35 μV 0.16 % + 93 μV | |
| 330 mV to 3.3 V | (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 | 0.023 % + 150 μV 0.012 % + 100 μV 0.015 % + 100 μV 0.023 % + 120 μV 0.054 % + 220 μV 0.19 % + 1.0 mV | |
| (3.3 to 33) V | (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz | 0.023 % + 3.4 mV 0.012 % + 1.0 mV 0.019 % + 1.1 mV 0.027 % + 1.5 mV 0.070 % + 2.6 mV | |

| Parameter/Range | Frequency | CMC ^{2, 5} (±) | Comments |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| AC Voltage ³ – Generate (cont) | | | |
| (33 to 330) V | 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz | 0.015 % + 12 mV 0.016 % + 13 mV 0.019 % + 14 mV 0.023 % + 31 mV 0.16 % + 49 mV | Fluke 5520A |
| (330 to 1020) V | 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.023 % + 54 mV 0.019 % + 32 mV 0.023 % + 35 mV | |
| (1 to 2.2) mV | (10 to 20) Hz (20 to 40) Hz 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 | 0.055 % + 4.5 μV 0.021 % + 4.5 μV 0.011 % + 4.5 μV 0.037 % + 4.5 μV 0.085 % + 7.0 μV 0.11 % + 13 μV 0.17 % + 25 μV 0.34 % + 25 μV | Fluke 5700A |
| (2.2 to 22) mV | (10 to 20) Hz (20 to 40) Hz 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 | 0.055 % + 5.1 μV 0.021 % + 5.2 μV 0.011 % + 4.2 μV 0.037 % + 5.1 μV 0.085 % + 7.0 μV 0.11 % + 12 μV 0.17 % + 25 μV 0.34 % + 25 μV | |
| (22 to 220) mV | (10 to 20) Hz (20 to 40) Hz 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 | 0.055 % + 13 μV 0.021 % + 8.0 μV 0.011 % + 8.0 μV 0.037 % + 8.0 μV 0.085 % + 25 μV 0.11 % + 25 μV 0.17 % + 35 μV 0.34 % + 80 μV | |
| (0.22 to 2.2) V | (10 to 20) Hz (20 to 40) Hz 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 | 0.050 % + 130 μV 0.016 % + 55 μV 0.0080 % + 41 μV 0.012 % + 83 μV 0.025 % + 140 μV 0.043 % + 280 μV 0.11 % + 530 μV 0.22 % + 1.6 mV | |

| Parameter/Range | Frequency | CMC ^{2, 5} (±) | Comments |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| AC Voltage ³ – Generate (cont) | | | |
| (2.2 to 22) V | (10 to 20) Hz (20 to 40) Hz 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 | 0.050 % + 1.3 mV 0.016 % + 560 μV 0.008 % + 440 μV 0.012 % + 860 μV 0.025 % + 1.3 mV 0.050 % + 3.3 mV 0.13 % + 7.5 mV 0.27 % + 20 mV | Fluke 5700A |
| (22 to 220) V | (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz | 0.050 % + 13 mV 0.016 % + 5.8 mV 0.0080 % + 5.1 mV 0.022 % + 12 mV 0.050 % + 17 mV | |
| (220 to 1100) V | (15 to 50) Hz 50 Hz to 1 kHz | 0.040 % + 95 mV 0.0080 % + 94 mV | |
| (0 to 202) mV | (10 to 45) Hz 45 Hz to 1 kHz (1 to 20) kHz (20 to 100) kHz (100 to 500) kHz | 0.080 % + 31 μV 0.016 % + 31 μV 0.020 % + 44 μV 0.10 % + 0.15 mV 0.40 % + 0.17 mV | Transmille 4010 |
| (0.2 to 2.02) V | (10 to 45) Hz 45 Hz to 1 kHz (1 to 20) kHz (20 to 100) kHz 100 kHz to 1 MHz | 0.050 % + 0.28 mV 0.016 % + 0.25 mV 0.021 % + 0.45 mV 0.065 % + 1.3 mV 0.30 % + 3.3 mV | |
| (2 to 20.2) V | (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 100) kHz | 0.050 % + 2.6 mV 0.016 % + 2.2 mV 0.021 % + 2.2 mV 0.060 % + 7.2 mV | |
| (20 to 202) V | (30 Hz to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 40) kHz (40 to 100) kHz | 0.050 % + 28 mV 0.015 % + 23 mV 0.020 % + 80 mV 0.030 % + 0.14 V 0.20 % + 0.15 V | |
| (200 to 1020) V | 30 Hz to 45 Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz | 0.055 % + 0.23 V 0.020 % + 0.13 V 0.025 % + 0.17 V 0.030 % + 0.25 V | |

| Parameter/Range | Frequency | CMC ^{2,5} (±) | Comments |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| AC Voltage ³ – Measure | | | |
| (1 to 10) mV | (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz | 0.30 μV/V + 4.1 μV 0.20 μV/V + 3.0 μV 0.30 μV/V + 3.1 μV 1.0 μV/V + 3.1 μV 5.0 μV/V + 9.1 μV 40 μV/V + 66 μV 40 μV/V + 66 μV | Agilent 3458A |
| (10 to 100) mV | (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (2 to 4) MHz (4 to 6) MHz (6 to 8) MHz (8 to 10) MHz | 72 nV/V + 7.0 μV 72 nV/V + 6.1 μV 0.14 μV/V + 8.1 μV 0.30 μV/V + 8.1 μV 0.80 μV/V + 37 μV 3.0 μV/V + 70 μV 10 μV/V + 70 μV 15 μV/V + 91 μV 40 μV/V + 0.72 mV 40 μV/V + 0.77 mV 40 μV/V + 0.77 mV 0.015 % + 2.3 mV | |
| 100 mV to 1V | (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (2 to 4) MHz (4 to 6) MHz (6 to 8) MHz (8 to 10) MHz | 72 nV/V + 64 μV 72 nV/V + 54 μV 0.014 % + 72 μV 0.030 % + 0.13 mV 0.080 % + 0.21 mV 0.30 % + 0.61 mV 1.0 % + 1.7 mV 1.5 % + 1.8 mV 4.0 % + 7.2 mV 4.0 % + 7.7 mV 4.0 % + 7.7 mV 15 % + 25 mV | |
| (1 to 10) V | (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz | 72 μV/V + 0.71 mV 72 μV/V + 0.54 mV 0.014 % + 0.71 mV 0.030 % + 1.3 mV 0.080 % + 1.6 mV 0.30 % + 5.2 mV 1.0 % + 16 mV | |
| (10 to 100) V | (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz | 0.020 % + 9.3 mV 0.020 % + 8.6 mV 0.020 % + 12 mV 0.035 % + 14 mV 0.12 % + 34 mV | |

| Parameter/Range | Frequency | CMC ^{2, 4, 5} (±) | Comments |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| AC Voltage ³ – Measure (cont) | | | |
| (10 to 100) V | (100 to 300) kHz 300 kHz to 1 MHz | 0.40 % + 35 mV 1.5 % + 35 mV | Agilent 3458A |
| (100 to 700) V | (1 to 50) Hz 50 Hz to 1 kHz (1 to 10) kHz | 0.040 % + 87 mV 0.040 % + 80 mV 0.060 % + 80 mV | |
| 100 V to 15 kV | 60 Hz | 3.9 % | Tektronix P6015A with 1MΩ impedance oscilloscope |
| (0.5 to 5) kV (> 5 to 10) kV | 60 Hz | 0.14 % + 0.60 V 0.14 % + 29 V | Vitrek 4700 |
| (> 10 to 20) kV (20 to 50) kV (50 to 70) kV | 60 Hz | 0.14 % + 29 V 0.14 % + 58 V 0.14 % + 0.12 kV | Vitrek 4700 + Vitrek HVL-100 Probe |
| 100 V to 1 kV | 400 Hz | 0.46 % + 0.13 V | Vitrek 4700 |
| AC Current ³ – Generate | | | |
| (29 to 330) μA | (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz | 0.16 % + 0.11 μA 0.12 % + 0.10 μA 0.097 % + 0.11 μA 0.23 % + 0.16 μA 0.62 % + 0.22 μA 1.2 % + 0.41 μA | Fluke 5520A |
| (0.33 to 3.3) mA | (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz | 0.16 % + 0.49 μA 0.097 % + 0.42 μA 0.078 % + 0.41 μA 0.16 % + 0.51 μA 0.39 % + 0.93 μA 0.78 % + 2.8 μA | |

| Parameter/Range | Frequency | CMC ^{2, 5} (±) | Comments | |
|----------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------|
| AC Current ³ – Generate (cont) | (3.3 to 33) mA | (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz | 0.14 % + 4.5 μA 0.070 % + 4.3 μA 0.031 % + 4.1 μA 0.062 % + 5.0 μA 0.16 % + 9.0 μA 0.31 % + 21 μA | Fluke 5520A |
| | (0 to 220) μA | (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.070 % + 28 nA 0.035 % + 24 nA 0.014 % + 21 nA 0.060 % + 42 nA 0.16 % + 82 nA | Fluke 5700A |
| | 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 | 0.070 % + 140 nA 0.035 % + 170 nA 0.014 % + 140 nA 0.060 % + 420 nA 0.16 % + 810 nA | |
| | (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 | 0.070 % + 1.5 μA 0.035 % + 1.4 μA 0.014 % + 1.4 μA 0.060 % + 4.3 μA 0.16 % + 8.1 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 | 0.070 % + 1.4 μA 0.035 % + 1.4 μA 0.014 % + 1.4 μA 0.060 % + 42 μA 0.16 % + 81 μA | |
| | 220 mA to 2.2 A | 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.065 % + 140 μA 0.075 % + 160 μA 0.85 % + 210 μA | |
| | (33 to 330) mA | (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz | 0.14 % + 47 μA 0.070 % + 45 μA 0.031 % + 42 μA 0.078 % + 62 μA 0.16 % + 120 μA 0.31 % + 310 μA | Fluke 5520A |
| | (0.33 to 1.1) A | (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.14 % + 0.14 mA 0.039 % + 0.13 mA 0.47 % + 0.80 mA 2.0 % + 3.9 mA | |

| Parameter/Range | Frequency | CMC ^{2,5} (±) | Comments |
|----------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------|
| AC Current ³ – Generate (cont) | | | |
| (1.1 to 3) A | (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.14 % + 1.1 mA 0.046 % + 1.0 mA 0.47 % + 1.5 mA 2.0 % + 4.4 mA | Fluke 5520A |
| (3 to 11) A | (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz | 0.047 % + 3.1 mA 0.078 % + 3.1 mA 0.23 % + 4.0 mA | |
| (11 to 20.5) A | (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz | 0.093 % + 6.3 mA 0.12 % + 6.1 mA 0.23 % + 7.5 mA | |
| (> 20 to 50) A | (50 to 100) Hz (100 to 400) Hz | 0.23 % + 0.12 A 0.62 % + 0.12 A | Fluke 5520A & Fluke 5500A/coil |
| (50 to 100) A | (50 to 100) Hz (100 to 400) Hz | 0.23 % + 0.21 A 0.62 % + 0.21 A | |
| (100 to 500) A | (50 to 100) Hz (100 to 400) Hz | 0.23 % + 1.1 A 0.62 % + 1.1 A | |
| (500 to 1000) A | (50 to 100) Hz (100 to 400) Hz | 0.24 % + 2.1 A 0.63 % + 1.9 A | |
| (20 to 202) µA | (10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz | 0.20 % + 0.30 µA 0.070 % + 0.23 µA 0.80 % + 0.77 µA 1.6 % + 0.83 µA | Transmille 4010 |
| (0.2 to 2.02) mA | (10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz | 0.20 % + 0.63 µA 0.060 % + 0.62 µA 0.50 % + 3.3 µA 1.0 % + 6.6 µA | |
| (2 to 20.2) mA | (10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz | 0.20 % + 4.0 µA 0.040 % + 3.4 µA 0.25 % + 4.2 µA 0.50 % + 5.0 µA | |
| (20 to 202) mA | (10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz | 0.20 % + 58 µA 0.040 % + 54 µA 0.50 % + 70 µA 0.70 % + 0.22 mA | |

| Parameter/Range | Frequency | CMC ^{2, 5} (±) | Comments |
|----------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------|
| AC Current ³ – Generate (cont) | | | |
| (0.2 to 2.02) A | (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 30) kHz | 0.20 % + 0.41 mA 0.060 % + 0.49 mA 0.50 % + 0.60 mA 0.60 % + 1.1 mA | Transmille 4010 |
| (2 to 30.0) A | (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.080 % + 5.6 mA 0.30 % + 6.6 mA 0.60 % + 6.6 mA 3.0 % + 6.8 mA | |
| (> 20 to 50) A | (50 to 100) Hz (100 to 400) Hz | 0.29 % + 0.11 A 0.79 % + 0.11 A | Transmille 4010 & Fluke 5500A/coil |
| (50 to 100) A | (50 to 100) Hz (100 to 400) Hz | 0.29 % + 0.20 A 0.79 % + 0.20 A | |
| (100 to 500) A | (50 to 100) Hz (100 to 400) Hz | 0.30 % + 1.0 A 0.80 % + 1.0 A | |
| (500 to 1000) A | (50 to 100) Hz (100 to 400) Hz | 0.41 % + 2.0 A 0.85 % + 1.8 A | |

| Parameter/Range | Frequency | CMC ^{2,5} (±) | Comments |
|-----------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------|
| AC Current ³ – Measure | | | |
| (10 to 100) μA | (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 10) kHz | 0.40 % + 44 nA 0.15 % + 44 nA 0.061 % + 44 nA 0.061 % + 44 nA 0.061 % + 44 nA | Agilent 3458A |
| 100 μA to 1 mA | (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 10) kHz | 0.40 % + 0.23 μA 0.15 % + 0.23 μA 0.061 % + 0.23 μA 0.031 % + 0.23 μA 0.061 % + 0.23 μA | |
| (1 to 10) mA | (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 10) kHz | 0.40 % + 2.8 μA 0.15 % + 2.8 μA 0.061 % + 2.8 μA 0.031 % + 2.8 μA 0.061 % + 2.8 μA | |
| (10 to 100) mA | (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 10) kHz | 0.40 % + 28 μA 0.15 % + 28 μA 0.061 % + 28 μA 0.031 % + 28 μA 0.061 % + 28 μA | |
| 100 mA to 1 A | (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 10) kHz | 0.40 % + 0.29 mA 0.18 % + 0.29 mA 0.081 % + 0.29 mA 0.11 % + 0.29 mA 0.31 % + 0.29 mA | |
| (1 to 3) A | 10 Hz to 1 kHz (1 to 5) kHz | 0.14 % + 3.8 mA 2.3 % + 4.5 mA | Fluke 8846A |
| (3 to 10) A | 10 Hz to 1 kHz (1 to 5) kHz | 0.14 % + 9.4 mA 2.3 % + 9.7 mA | |
| (10 to 20) A | 10 Hz to 400 Hz 400 Hz to 1 kHz | 0.23 % + 18 mA 0.23 % + 38 mA | Agilent 3458A & 50A/50mV current shunt |

| Parameter/Range | Frequency | CMC ^{2, 5} (±) | Comments |
|-------------------------------------|-----------------|-------------------------|-----------------|
| Capacitance ³ – Generate | | | |
| (0.19 to 0.4) nF | 10 Hz to 10 kHz | 0.39 % + 0.0079 nF | Fluke 5520A |
| (0.4 to 1.1) nF | 10 Hz to 10 kHz | 0.39 % + 0.0080 nF | |
| (1.1 to 3.3) nF | 10 Hz to 3 kHz | 0.39 % + 0.0085 nF | |
| (3.3 to 11) nF | 10 Hz to 1 kHz | 0.19 % + 0.012 nF | |
| (11 to 33) nF | 10 Hz to 1 kHz | 0.19 % + 0.080 nF | |
| (33 to 110) nF | 10 Hz to 1 kHz | 0.19 % + 0.10 nF | |
| (110 to 330) nF | 10 Hz to 1 kHz | 0.19 % + 0.32 nF | |
| (0.33 to 1.1) μF | (10 to 600) Hz | 0.19 % + 1.1 nF | |
| (1.1 to 3.3) μF | (10 to 300) Hz | 0.19 % + 3.0 nF | |
| (3.3 to 11) μF | (10 to 150) Hz | 0.19 % + 12 nF | |
| (11 to 33) μF | (10 to 120) Hz | 0.31 % + 23 nF | |
| (33 to 110) μF | (10 to 80) Hz | 0.35 % + 150 nF | |
| (110 to 330) μF | Up to 50 Hz | 0.35 % + 420 nF | |
| (0.33 to 1.1) mF | Up to 20 Hz | 0.35 % + 1.1 μF | |
| (1.1 to 3.3) mF | Up to 6 Hz | 0.35 % + 2.5 μF | |
| (3.3 to 11) mF | Up to 2 Hz | 0.35 % + 9.5 μF | |
| (11 to 33) mF | Up to 0.6 Hz | 0.58 % + 25 μF | |
| (33 to 110) mF | Up to 0.2 Hz | 0.85 % + 81 μF | |
| (0.95 to 9.5) μF | 1 kHz | 0.70 % + 1.0 nF | Transmille 4010 |
| (9.5 to 95) μF | | 0.70 % + 6.0 nF | |
| 95 μF to 0.95mF | | 0.70 % + 5.3 nF | |
| (0.95 to 9.5) mF | | 0.70 % + 6.0 μF | |
| (9.5 to 100) mF | | 0.70 % + 24 μF | |
| Fixed Points Capacitance | | | |
| 1 nF | 1 kHz | 0.25 % + 0.61 pF | |
| 2 nF | | 0.25 % + 42 pF | |
| 5 nF | | 0.25 % + 32 pF | |
| 10 nF | | 0.25 % + 6.0 pF | |
| 100nF | | 0.25 % + 60 pF | |
| 1 μF | | 0.40 % + 0.60 μF | |
| 10 μF | | 0.60 % + 0.60 μF | |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------|
| Electrical Simulation of Thermocouple Indicating Systems ³ – | | | |
| Type B | (600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C | 0.34 °C 0.27 °C 0.24 °C 0.26 °C | Fluke 5520A |
| Type C | (0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C | 0.23 °C 0.20 °C 0.24 °C 0.39 °C 0.65 °C | |
| Type E | (-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C | 0.39 °C 0.13 °C 0.11 °C 0.14 °C 0.17 °C | |
| Type J | (-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C | 0.21 °C 0.13 °C 0.11 °C 0.13 °C 0.18 °C | |
| Type K | (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C | 0.26 °C 0.14 °C 0.13 °C 0.20 °C 0.31 °C | |
| Type L | (-200 to -100) °C (-100 to 800) °C (800 to 900) °C | 0.29 °C 0.20 °C 0.14 °C | |
| Type N | (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C | 0.31 °C 0.17 °C 0.15 °C 0.14 °C 0.21 °C | |
| Type R | (0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C | 0.44 °C 0.27 °C 0.26 °C 0.31 °C | |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------|
| Electrical Simulation of Thermocouple Indicating Systems ³ – (cont) | | | |
| Type S | (0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C | 0.36 °C 0.28 °C 0.29 °C 0.36 °C | Fluke 5520A |
| Type T | (-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C | 0.49 °C 0.19 °C 0.13 °C 0.11 °C | |
| Type U | (-200 to 0) °C (0 to 600) °C | 0.43 °C 0.21 °C | |
| Type B | (600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C | 0.44 °C 0.34 °C 0.30 °C 0.33 °C | Transmille 4010 |
| Type C | (0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C | 0.30 °C 0.26 °C 0.31 °C 0.50 °C 0.84 °C | |
| Type E | (-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C | 0.50 °C 0.16 °C 0.14 °C 0.16 °C 0.21 °C | |
| Type J | (-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C | 0.27 °C 0.16 °C 0.17 °C 0.17 °C 0.23 °C | |
| Type K | (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1370) °C | 0.33 °C 0.18 °C 0.16 °C 0.26 °C 0.40 °C | |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------|
| Electrical Simulation of Thermocouple Indicating Systems ³ – (cont) | | | |
| Type L | (-200 to -100) °C (-100 to 800) °C (800 to 900) °C | 0.37 °C 0.26 °C 0.17 °C | Transmille 4010 |
| Type N | (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C | 0.40 °C 0.22 °C 0.19 °C 0.18 °C 0.27 °C | |
| Type R | (0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C | 0.57 °C 0.35 °C 0.33 °C 0.40 °C | |
| Type S | (0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C | 0.47 °C 0.36 °C 0.37 °C 0.46 °C | |
| Type T | (-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C | 0.63 °C 0.24 °C 0.16 °C 0.14 °C | |
| Type U | (-200 to 0) °C (0 to 600) °C | 0.56 °C 0.27 °C | |
| Electrical Simulation of RTD Indicators & Indicating Systems ³ – | | | |
| Pt 385, 100 Ω | (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C (400 to 630) °C | 0.040 °C 0.040 °C 0.050 °C 0.070 °C 0.080 °C 0.090 °C 0.18 °C 0.090 °C | Fluke 5520A |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------|
| Electrical Simulation of RTD Indicators & Indicating Systems ³ – (cont) | | | |
| Pt 3926, 100 Ω | (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C | 0.040 °C 0.040 °C 0.060 °C 0.070 °C 0.080 °C | Fluke 5520A |
| Pt 3916, 100 Ω | (-200 to -190) °C (-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C | 0.19 °C 0.030 °C 0.040 °C 0.050 °C 0.050 °C 0.060 °C 0.070 °C 0.080 °C 0.18 °C | |
| Pt 385, 200 Ω | (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C | 0.030 °C 0.030 °C 0.030 °C 0.040 °C 0.090 °C 0.10 °C 0.11 °C 0.12 °C | |
| Pt 385, 500 Ω | (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C | 0.030 °C 0.040 °C 0.040 °C 0.050 °C 0.060 °C 0.060 °C 0.070 °C 0.090 °C | |
| Pt 385, 1000 Ω | (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C | 0.020 °C 0.020 °C 0.030 °C 0.040 °C 0.050 °C 0.050 °C 0.050 °C 0.18 °C | |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------|
| Electrical Simulation of RTD Indicators & Indicating Systems ³ - (cont) | | | |
| PtNi 385, 120 Ω | (-80 to 0) °C (0 to 100) °C (100 to 260) °C | 0.060 °C 0.060 °C 0.11 °C | Fluke 5520A |
| Cu 427, 10 Ω | (-100 to 260) °C | 0.23 °C | |
| Pt 25, 25 Ω | (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C | 0.50 °C 0.50 °C 0.60 °C 0.60 °C 0.60 °C 0.60 °C 0.60 °C | Transmille 4010 |
| Pt 100, 100 Ω | (-200 to -80) °C (80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C | 0.13 °C 0.13 °C 0.55 °C 0.55 °C 0.55 °C 0.55 °C 0.55 °C | |
| Pt 250, 250 Ω | (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 800) °C | 0.25 °C 0.25 °C 0.30 °C 0.30 °C 0.30 °C 0.30 °C 0.30 °C | |
| Pt 25, 500 Ω | (-200 to -80) °C (80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C | 0.10 °C 0.10 °C 0.90 °C 0.90 °C 0.90 °C 0.90 °C 0.90 °C | |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------|
| Electrical Simulation of RTD Indicators & Indicating Systems ³ – (cont) | | | |
| Pt 100, 1000 Ω | (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 800) °C | 0.080 °C 0.080 °C 0.45 °C 0.45 °C 0.45 °C 0.45 °C 0.45 °C | Transmille 4010 |
| Fixed Point Temperature (4 Wire) | | | |
| (-100 to 800) °C | -100 °C 0 °C 30 °C 60 °C 100 °C 200 °C 400 °C 800 °C | 0.011 °C 0.002 °C 0.004 °C 0.008 °C 0.011 °C 0.022 °C 0.041 °C 0.08 °C | |

| Parameter/Equipment | Range | CMC ^{2, 5} (±) | Comments | |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------|
| Oscilloscope ³ – | | | | |
| Square Wave Amplitude: 50 Ω Load 1 MΩ Load | V _{p-p} 1 mV to 6.6 V V _{p-p} 1 mV to 130 V ≤ 1 kHz > 1 kHz | 0.19 % of output + 39 μV 0.08 % of output + 39 μV 0.08 % of output + 39 μV | Fluke 5520A with SC-1100 option | |
| DC Signal Output: 50 Ω Load 1 MΩ Load | V _{dc} (0 to 6.6) V V _{dc} (0 to 130) V | 0.19 % of output + 5.9 μV 0.040 % of output + 8.0 μV | | |
| Leveled Sine Wave Amplitude: 5 mV _{p-p} to 5.5 V _{p-p} | 50 kHz reference 50 KHz to 100 MHz (100 to 300) MHz | 1.6 % of output + 250 μV 2.8 % of output + 400 μV 3.1 % of output + 660 μV | | |
| 5 mV _{p-p} to 3.5 V _{p-p} | (300 to 600) MHz (600 to 1100) MHz | 4.7 % of output + 660 μV 5.5 % of output + 250 μV | | |
| Flatness: Relative to 50 kHz 5 mV _{p-p} to 5.5 V _{p-p} | 50 kHz reference 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz | 1.5 % of output + 240 μV 2.0 % of output + 240 μV 4.0 % of output + 240 μV 5.0 % of output + 240 μV | | |
| Time Marker: 50 Ω Load | 5 s to 50 ms (20 to 1.0) ms (50 to 20) ns 10 ns (5 to 1) ns | 8.1 μs/s 8.1 μs/s 8.1 μs/s 5.8 μs/s 5.8 μs/s | | |
| Edge-Rise Time | 1 kHz to 10 MHz | ≤ 300 ps | | |
| Square Wave Amplitude: 1 MΩ Load | V _{p-p} 1 mV to 300 V at 1 kHz | 0.25 % of output + 38 μV | | Transmille 4010 with SCP 600 option |
| DC Signal Output: 1 MΩ Load | V _{dc} (0 to 300) V | 0.01 % of output + 0.84 μV | | |

| Parameter/Equipment | Range | CMC ^{2, 5} (±) | Comments |
|--------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------|
| Oscilloscope ³ – (cont) | | | |
| Leveled Sine Wave Amplitude: 600 mV _p | 50 kHz reference (> 5 to 600) MHz | 0.26 % of output + 69 μV 0.26 % of output + 69 μV | Transmille 4010 with SCP 600 option |
| Timebase: 50 Ω Load | (5 to 1) s (500 to 1) ms (500 to 100) μs (50 to 1) μs (500 to 2) ns | 0.010% + 0.58 ms 0.010 % + 58 μs 0.010% + 5.8 μs 0.010 % + 0.58 ns 0.010 % + 0.58 ps | |
| Edge-Rise Time | 1 kHz | ≤ 1.5 ns | |

| Parameter/Range | Frequency | CMC ^{2, 4, 5} (±) | Comments |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------|
| Phase – Measuring Equipment ³ | (10 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz | 0.093° 0.20° 0.39° 2.0° 3.9° 7.8° | Fluke 5520A |
| | (40 to 60) Hz (60 to 100) Hz (100 to 400) Hz | 0.11° 0.26° 0.50° | Transmille 4010 |
| DC Power ³ – | | | |
| | 33 mV to 1020 V | 330 μA to 330 mA > 330 mA to 3 A (> 3 to 20) A | 0.018 % 0.041 % 0.078 % |
| 200 mV to 1000 V | (0.2 to 20) mA > 20 mA to 2 A (> 2 to 30) A | 0.030 % 0.014 % 0.031 % | Transmille 4010 |

| Parameter/Range | Frequency | CMC ^{2, 4, 5} (±) | Comments |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------|-------------|
| AC Power ³ – PF = 1 33 mV to 1020 V | | | |
| (3 to 9) mA (> 9 to 33) mA (> 33 to 90) mA (> 90 to 330) mA > 330 mA to 0.9 A (> 0.9 to 2.2) A (> 2.2 to 4.5) A (> 4.5 to 20.5) A | (10 to 65) Hz | 0.062 % 0.041 % 0.063 % 0.042 % 0.047 % 0.066 % 0.11 % 0.10 % | Fluke 5520A |
| (3 to 9) mA (> 9 to 33) mA (> 33 to 90) mA (> 90 to 330) mA > 330 mA to 0.9 A (> 0.9 to 2.2) A (> 2.2 to 4.5) A (> 4.5 to 20.5) A | (65 to 500) Hz | 0.049 % 0.046 % 0.049 % 0.074 % 0.055 % 0.069 % 0.11 % 0.12 % | |
| (> 3 to 9) mA (> 9 to 33) mA (> 33 to 90) mA (> 90 to 330) mA > 330 mA to 0.9 A (> 0.9 to 2.2) A (> 2.2 to 4.5) A (> 4.5 to 20.5) A | 500 Hz to 1 kHz | 0.045 % 0.041 % 0.045 % 0.041 % 0.047 % 0.065 % 0.11 % 0.12 % | |
| (> 3 to 9) mA (> 9 to 33) mA (> 33 to 90) mA (> 90 to 330) mA > 330 mA to 0.9 A (> 0.9 to 2.2) A | (1 to 5) kHz | 0.10 % 0.068 % 0.10 % 0.084 % 0.47 % 0.47 % | |
| (> 3 to 9) mA (> 9 to 33) mA (> 33 to 90) mA (> 90 to 330) mA > 330 mA to 0.9 A (> 0.9 to 2.2) A | (5 to 10) kHz | 0.18 % 0.16 % 0.18 % 0.16 % 2.0 % 2.2 % | |

| Parameter/Range | Frequency | CMC ^{2, 4, 5} (±) | Comments |
|---------------------------------------------------|-------------------|------------------------------|-----------------|
| AC Power ³ – (cont) | | | |
| PF = 1 200 mV to 1000 V | | | |
| (0.2 to 20) mA > 20 mA to 2 A (> 2 to 30) A | (40 to 60) Hz | 0.21 % 0.21 % 0.20 % | Transmille 4010 |
| (0.2 to 20) mA > 20 mA to 2 A (> 2 to 30) A | (> 60 to 100) Hz | 0.079 % 0.088 % 0.10 % | |
| (0.2 to 20) mA > 20 mA to 2 A (> 2 to 30) A | (> 100 to 400) Hz | 0.079 % 0.088 % 0.31 % | |

II. Electrical – RF/Microwave

| Parameter/Range | Frequency | CMC ^{2, 5} (±) | Comments |
|-----------------------------|------------------|-------------------------|-------------------------------|
| RF Absolute Power – Measure | | | |
| (20 to 44) dBm | 10 MHz to 4 GHz | 0.73 dB | 30 dB attenuator with HP8482B |
| (-30 to 20) dBm | 0.1 MHz to 4 GHz | 0.16 dB | HP437B & HP 8482A |
| (-20 to -70) dBm | 10 MHz to 8 GHz | 0.11 dB | HP437B & HP8481D |
| | (> 8 to 10) GHz | 0.13 dB | HP437B & HP8481D |
| | (> 10 to 14) GHz | 0.14 dB | HP437B & HP8481D |
| | (> 14 to 18) GHz | 0.16 dB | HP437B & HP8481D |
| (10 to -10) dBm | 10 MHz to 8 GHz | 0.13 dB | HP437B & HP8481A |
| | (> 8 to 10) GHz | 0.17 dB | HP437B & HP8481A |
| | (> 10 to 14) GHz | 0.17 dB | HP437B & HP8481A |
| | (> 14 to 18) GHz | 0.21 dB | HP437B & HP8481A |

III. Mechanical

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|----------------------------------------------|----------------|----------------------|-------------------|
| Pressure ³ – Generate and Measure | Pneumatic | | |
| | (-14 to 0) PSI | 0.025 % + 0.73 PSI | Druck DPI610 |
| | (0 to 300) PSI | 0.025 % + 0.73 PSI | |
| | Hydraulic | (0 to 2000) PSI | 0.02 % + 0.34 PSI |
| (> 2000 to 10 000) PSI | | 0.1 % + 0.69 PSI | |

IV. Time & Frequency

| Parameter/Equipment | Range | CMC ^{2, 7} (±) | Comments |
|------------------------------------------|-----------------------|-------------------------|-------------------------------------------------------------|
| Frequency & Period – Measuring Equipment | 10 MHz | 0.035 mHz | Brandywine Communication GPS time/frequency system |
| | (0.01 to 119.99) Hz | 3.0 pHz/Hz + 5.8 mHz | Fluke 5520A |
| | (120.0 to 1199.9) Hz | 3.0 pHz/Hz + 58 mHz | (With 10 MHz GPS external clock) |
| | (1.200 to 11.999) kHz | 3.0 pHz/Hz + 0.58 Hz | |
| | (12.00 to 119.99) kHz | 3.0 pHz/Hz + 5.8 Hz | |
| | (120.0 to 1199.9) kHz | 3.0 pHz/Hz + 58 Hz | |
| | (1.200 to 2.000) MHz | 3.0 pHz/Hz + 0.58 kHz | |
| | (0.05 to 100) MHz | 3.0 pHz/Hz + 5.8 kHz | |
| | (100 to 300) MHz | 3.0 pHz/Hz + 5.8 kHz | |
| | (300 to 600) MHz | 3.0 pHz/Hz + 5.8 kHz | |
| (600 to 1100) MHz | 3.0 pHz/Hz + 58 kHz | | |

V. EMC

| Parameter/Equipment | Range | CMC ^{2,4} (±) | Comments |
|----------------------------------------------------------------------------|------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESD Simulators – | | | EN 61000-4-2 |
| Contact Voltage (Positive & Negative) | (2 to 8) kV ± 5 % (10 to 30) kV ± 5 % | 0.35 % 4.4 % | Tektronix DPO7254 with Noiseken Target 06- 00067A, Noiseken Attenuator 00-00010A, Tektronix attenuator 011- 0053-03, Tektronix probe P6015A, Brandenburg HV meter 139D |
| Rise/Fall Time | (0.6 to 1) ns | 1.2 % | |
| Peak Current | (7.5 to 30) A ± 15 % | 2.3 % | |
| 30 ns Current | (4 to 16) A ± 30 % | 2.2 % | |
| 60 ns Current | (2 to 8) A ± 30 % | 3.0 % | |
| EFT/Burst Generator ³ – 50 Ω / 1 kΩ Load; 100 kHz / 5 kHz | | | |
| Voltage (Positive & Negative) | (0.25 to 4.4) kV | 4.3 % | Tektronix DPO7254 with Noiseken attenuators AT- 810 & AT-811 |
| Rise/Fall Time | 5 ns ± 30 % | 3.6 % | |
| Burst Duration | 50 ns ± 30 % | 3.6 % | |
| Impulse Duration 5 kHz 100 kHz | 20 ms ± 20 % 1 ms ± 20 % | 3.7 % 3.7 % | |
| Burst Period (5/100) kHz | 300 ms ± 20 % | 3.7 % | |
| Repetition Cycle 5 kHz 100 kHz | 200 μs ± 20 % 10 μs ± 20 % | 3.7 % 3.7 % | |

| Parameter/Equipment | Range | CMC ^{2,4} (±) | Comments |
|-----------------------------------------------------|-------------------|------------------------|------------------------------------------------------------------------------------|
| Surge Generator ³ – | | | EN 61000-4-5 |
| Open Circuit – Voltage (Positive & Negative) | (0.5 to 4.4) kV | 2.6 % | Tektronix DPO7254 with Pintek DP-100, Pearson 110A, Tektronix 011-0060-02 |
| Rise/Fall Time | 1.2 μs | 2.7 % | |
| Duration | 50 μs | 2.6 % | |
| Short Circuit – Current (Positive & Negative) | (41.67 to 2200) A | 1.3 % | |
| Front Time | 8 μs | 1.3 % | |
| Duration | 20 μs | 1.3 % | |
| Ring Wave Generator ³ – | | | |
| Open Circuit – Voltage (Positive & Negative) | (0.5 to 4) kV | 5.9 % | Tektronix DPO7254 with Pintek DP-100, Pearson 110A, Tektronix 011-0060-02 |
| Rise/Fall Time | 1 μs | 6.0 % | |
| Duration | 10 μs | 6.0 % | |
| Short Circuit – Current (Positive * Negative) | (200 & 500) A | 5.8 % | |
| Rise/Fall Time | 8 μs | 6.0 % | |

| Parameter/Equipment | Range | CMC ^{2,4} (±) | Comments |
|------------------------------------------------------------------|---------------------------|------------------------|--------------------------------------|
| PQT ³ – Testing Voltage at 220 V With no Loading – | | | EN 61000-4-11 |
| Dip Voltage | (0 to 70) % | 2.7 % | Tektronix DPO7254 with Pintek DP-100 |
| Duration (1 to 100) cycles | 16.6 ms to 1.666 s | 2.6 % | |
| Phase Angle | (0 to 360) ^o | 2.7 % | |
| Rise/Fall Time | 2 cycles, 30 ^o | 2.7 % | |

¹ This laboratory offers commercial and field calibration services.

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. CMCs 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. 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 Unless otherwise noted, in the statement of CMC, percent refers to percent of reading.

⁵ The measurands stated are generated using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure the measurand in the ranges indicated. CMC are expressed as either a specific value that covers the full range or as a fraction/percent of the reading plus a fixed floor specification.

⁶ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁷ 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.