SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: June 30, 2025 Certificate Number: 2296.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1, 10]:

I. Acoustical Quantities

Parameter/Equipment[5]	Frequency	CMC[2] (±)	Comments[6]
Microphone[3]	250 Hz	0.40 dB	Microphone

II. Electrical DC & Low Frequency

Parameter/Equipment	Range	CMC[2, 4, 11] (±)	Comments[6]
DC Voltage[3] – Generate	(0 to 32.9999) mV (33.000 to 77.999) mV (78.000 to 119.999) mV (120.000 to 329.999) mV (330.00 to 779.99) mV (0.780 00 to 1.199 99) V (1.200 00 to 3.299 99) V	61 µV 0.27 mV/V 0.14 mV/V 0.17 mV/V 87 µV/V 60 µV/V 0.12 mV/V	Fluke 5520A

Parameter/Equipment	Range	CMC[2, 4, 11, 12, 13, 14] (±)	Comments[6]
DC Voltage[3] – Generate (cont)	(3.3000 to 7.7999) V (7.8000 to 11.9999) V (12.0000 to 32.9999) V (33.000 to 77.999) V (78.000 to 119.999) V (120.000 to 329.999) V	65 µV/V 49 µV/V 0.15 mV/V 84 µV/V 63 µV/V 0.2 mV/V	Fluke 5520A
DC Voltage[3] – Measure PQT[3] Output Voltage	Up to 260 V	3.9 % + *R*	IEC/EN 61000-4-11, oscilloscope
Inrush Current	(0.001 to 1) kA	6.9 %	
EFT/Burst Generator[3] (50, 1000) Ω Load	(0.1 to 5) kV	5.3 %	IEC/EN 61000-4-4, oscilloscope
Surge Generator[3] Open & Short Circuit Voltage	(0.001 to 8) kV	4.3 %	IEC/EN 61000-4-5, IEC/EN 61000-4-5 (2005), oscilloscope
Current	(0.001 to 4) kA	4.3 %	
Transient Immunity[3] Surge Pulse & Load Dump Pulse Peak Amplitude & Burst Pulse Peak Amplitude	(1 to 1000) V	4.0 %	ISO 7637-2, ISO 7637-2 (2004), ISO 16750-2, oscilloscope
Resistance[3] – Measure	5 mΩ to 100 kΩ	0.018 % of reading + 0.005 % of range	DMM (2-wire measurement)

Parameter/Range	Frequency	CMC[2, 4, 11, 12, 14] (±)	Comments[6]
AC Voltage[3] – Generate			
(48.000 to 77.999) mV	1 kHz	0.19 %	Fluke 5520A
(78.000 to 119.999) mV	1 kHz	0.14 %	
(120.00 to 189.99) mV	1 kHz	0.37 %	
(190.00 to 329.00) mV	1 kHz	0.26 %	
(330.00 to 479.99) mV	1 kHz	0.18 %	
(480.00 to 779.99) mV	1 kHz	0.14 %	
(0.780 00 to 1.199 99) V	1 kHz	0.11 %	
(1.2000 to 1.8999) V	1 kHz	0.36 %	
(1.9000 to 3.2999) V	1 kHz	0.25 %	
(3.3000 to 4.7999) V	1 kHz	0.18 %	
(4.8000 to 7.7999) V	1 kHz	0.14 %	
(7.8000 to 11.9999) V	1 kHz	0.11 %	
(12.000 to 18.999) V	1 kHz	0.38 %	
(19.000 to 32.999) V	1 kHz	0.26 %	
(33.000 to 77.999) V	1 kHz	0.18 %	
(78.000 to 119.999) V	1 kHz	0.11 %	
(120.00 to 329.99) V	1 kHz	0.31 %	
AC Voltage – Measure[3, 7]			
Series Voltage Drop LISN, AN, AMN	(100, 200, 230) V 50/60 Hz	0.25 %	CISPR16-1-2 using: power analyzer
PQT[3] Output Voltage	Up to 260 V (50 to 60) Hz	3.9 %	IEC/EN 61000-4-11, oscilloscope

III. Electrical – RF/Microwave Device Specific Parameters

Parameter/Range[5]	Frequency	CMC[2, 12] (±)	Comments[6]
E-Field Probe[3] —			
Frequency Response, Linearity	100 kHz to 80 MHz 80 MHz to 1 GHz (1 to 3.2) GHz (3.2 to 6) GHz	0.98 dB 0.96 dB 0.97 dB 0.95 dB	IEEE Std 1309 using GTEM cell, reference E-field probe
Isotropic Response	10 kHz to 6 GHz	0.31dB	
Displayed Frequency Accuracy[3]	9 kHz to 30 MHz 30 MHz to 1 GHz (1 to 10) GHz (10 to 40) GHz	10 Hz 30 Hz 300 Hz 300 Hz	Signal generator, frequency standard
Span Readout Accuracy[3]	9 kHz to 40 GHz	0.7 %	Signal generator, frequency standard
Intercept Point Accuracy[3] –			
3rd Order (IP3)	9 kHz to 3 GHz (3 to 8) GHz (8 to 40) GHz	1.8 dB 3.1 dB 3.9 dB	Signal generator, frequency standard
2nd Order (IP2)	9 kHz to 1 GHz (1 to 8) GHz (8 to 13) GHz	1.7 dB 2.9 dB 3.6 dB	
Absolute Amplitude Accuracy[3] –			
Calibration of Measurement Function (-70 to +20) dBm	9 kHz to 1 GHz (1 to 18) GHz (18 to 40) GHz	0.23 dB 0.40 dB 0.50 dB	Signal generator, frequency standard, power meter, power sensor, attenuator
Calibration of Signal Source (-70 to +20) dBm	9 kHz to 6 GHz 10 MHz to 18 GHz (18 to 40) GHz	0.17 dB 0.24 dB 0.21 dB	Assuming "0" reflection coefficient at input of device under test
Power Meter Ref. Out	50 MHz, 0 dBm	0.04 dB	

Parameter/Range[5]	Frequency	CMC[2, 12] (±)	Comments[6]
Amplitude Modulation[3] –			
Carrier Frequency	(0.15 to 10) MHz	2.1 %	Modulation analyzer Spectrum analyzer
Modulation Frequency: 400 Hz to 3 kHz	(10 to 1300) MHz	1.3 %	
Modulation Index: (30 to 95) %	(1 to 18) GHz	2.5 %	
Frequency Modulation[3] –			
Carrier Frequency (Modulation Frequency: (0.3 to 10) kHz; FM Deviation: (1 to 200) kHz)	(0.25 to 10) MHz (10 to 1300) MHz	2.5 % 1.3 %	Modulation analyzer
Pulse Modulation[3] –			
Carrier Frequency: 150 kHz to 6 GHz			
Rise & Fall Time	(0 to 90) %	6 % + 70 ps	Oscilloscope
Pulse Width	(1 to 3) µs (3 to 10) µs 10 µs to 1 ms (1 to 3) ms (3 to 10) ms (10 to 30) ms	1.5 % 0.5 % 0.2 % 0.01 % 0.02 % 0.01 %	
Reference Level[3] (-80 to +10) dBm	9 kHz to 1 GHz (1 to 18) GHz	0.17 dB 0.48 dB	Signal generator, frequency standard, attenuator

Parameter/Range[5]	Frequency	CMC[2, 14] (±)	Comments[6]
Attenuator Check[3] – Calibration of Attenuation Measurement Function			
(0 to 110) dB	9 kHz to 1 GHz (1 to 8) GHz (8 to 18) GHz	0.25 dB 0.35 dB 0.63 dB	Signal generator, frequency standard, attenuator
Attenuation – Measure			
(0 to 110) dB	9 kHz to 1 MHz 1 MHz to 12 GHz (12 to 30) GHz (30 to 40) GHz	0.36 dB 0.25 dB 0.32 dB 0.52 dB	Spectrum analyzer
Marker Amplitude Readout Accuracy[3]	9 kHz to 1 GHz (1 to 18) GHz (18 to 40) GHz	0.23 dB 0.40 dB 0.50 dB	Signal generator, frequency standard, power meter, power sensor, attenuator Assuming "0" reflection coefficient at input of device under test.
Log Fidelity[3] –			
(1 to 49) dB (50 to 70) dB (71 to 80) dB (81 to 90) dB	9 kHz to 1 GHz	0.18 dB 0.19 dB 0.21 dB 0.22 dB	Signal generator, frequency standard, attenuator
(91 to 100) dB	1 MHz to 1 GHz	0.25 dB	
(101 to 110) dB (111 to 120) dB	5 MHz to 1 GHz	0.24 dB 0.31 dB	
(1 to 80) dB (81 to 90) dB (91 to 100) dB (101 to 110) dB (111 to 120) dB	(1 to 8) GHz	0.28 dB 0.35 dB 0.35 dB 0.50 dB 0.70 dB	
(1 to 80) dB (81 to 90) dB (91 to 100) dB (101 to 110) dB (111 to 120) dB	(8 to 18) GHz	0.53 dB 0.58 dB 0.58 dB 0.70 dB 0.87 dB	

Parameter/Equipment[5]	Frequency	CMC[2, 12, 14] (±)	Comments[6]
Bandwidth Accuracy[3, 7]	9 kHz to 1 GHz (1 to 18) GHz	2 % 3.5 %	Signal generator, frequency standard, attenuator
Bandwidth Switching Accuracy[3]	9 kHz to 1 GHz (1 to 18) GHz	0.1 dB 0.1 dB	Signal generator, frequency standard, attenuator
Harmonic Measurements[3]	9 kHz to 18 GHz	1.8 dB	Signal generator, frequency standard, power meter, power sensor, spectrum analyzer Assuming "0" reflection coefficient at input of device under test
Displayed Average Noise Level[3]	9 kHz to 3.6 GHz (3.6 to 8) GHz (8 to 40) GHz	1.2 dB 2.0 dB 2.7 dB	50 Ω termination
Frequency Response[3] – Measuring Equipment	9 kHz to 1 GHz (1 to 18) GHz (18 to 40) GHz	0.23 dB 0.40 dB 0.50 dB	Signal generator, frequency standard, power meter, power sensor, attenuator Assuming "0" reflection coefficient at input of device under test
Frequency Response[3] – Generator	9 kHz to 6 GHz 10 MHz to 18 GHz (18 to 40) GHz	0.17 dB 0.24 dB 0.21 dB	Power meter, power sensor Assuming "0" reflection coefficient at input of device under test

Parameter/Range[5]	Frequency	CMC[2] (±)	Comments[6]
CISPR Amplitude Calibration[3, 7 –]			
Pulse Repetitions	Bands A/B/C/D/E	0.65 dB	CISPR pulse generator, signal generator, power meter, power sensor, function generator
Relative Amplitude		0.77 dB	
Amplitude Relationship		0.66 dB	
Response To Intermittent, Unsteady & Drifting Narrowband Disturbances		0.65 dB	
Impedance[3, 7] – Measure			VNA with calibration kit
LISN, AN, AMN	9 kHz to 200 MHz	0.6 Ω	CISPR16-1-2, ANSI C63.4
CDNs	(0.1 to 230) MHz	4.7 Ω	IEC/EN 61000-4-6
Terminator	9 kHz to 500 MHz 45 MHz to 18 GHz	0.6 Ω 1.4 Ω	
Impedance Phase Angle[3, 7]			VNA with calibration kit
LISN, AN, AMN	9 kHz to 110 MHz	6.3 deg (Reflection Coefficient > 0.01(lin))	CISPR16-1-2(2006), CISPR16-1-2 ANSI C63.4 (2003/2009)
	(110 to 200) MHz	6.4 deg (Reflection Coefficient > 0.01(lin))	ANSI C63.4

ParameterRange[5]	Frequency	CMC[2, 12] (±)	Comments[6]
Insertion Loss[3, 7, 8] –			VNA with calibration kit
LISN, AN, AMN (Voltage Division Factor, Isolation)	9 kHz to 30 MHz (30 to 200) MHz	0.34 dB 0.45 dB	CISPR16-1-2, ANSI C63.4
CDNs, (50 to 150) Ω Adapters	9 kHz to 230 MHz	0.18 dB	IEC/EN 61000-4-6
Current Injection /Monitor Probes (Transfer Impedance) Calibration Fixture	(10 to 300) kHz 300 kHz to 200 MHz (200 to 400) MHz (400 to 1000) MHz	0.23 dB 0.31 dB 0.44 dB 0.86 dB	CISPR16-1-2, IEC/EN 61000-4-6 ISO 11452-4
Amplifiers (Gain), Attenuators, Directional Couplers (Coupling Factor, Isolation), RF Cables & Filters	9 kHz to 10 MHz 10 MHz to 2 GHz (2 to 8) GHz (8 to 18) GHz (18 to 26.5) GHz (26.5 to 40) GHz	0.06 dB 0.07 dB 0.08 dB 0.14 dB 0.17 dB 0.18 dB	
Calibration Factor[3] –			
Power Sensor	9 kHz to 6 GHz 10 MHz to 18 GHz 10 MHz to 26.5 GHz 10 MHz to 40 GHz	2.0 % 3.2 % 3.9 % 4.6 %	Signal generator, power meter, power sensor, power splitter
Pulse Area[3, 7] –			
CISPR Pulse Generator	9 kHz to 1 GHz	5.3 %	CISPR16-1-1 using oscilloscope
Spectrum Flatness[3, 7] –			
CISPR Pulse Generator	9 kHz to 1 GHz	0.35 dB	Power meter, power sensor, signal generator, EMI test receiver

Parameter/Range	Frequency	CMC[2, 9, 14] (±)	Comments
Reflection S_{11}/S_{22}, Magnitude & Phase (VSWR) – Measure[3]			
(0 to 0.4) lin	9 kHz to 10 MHz	(0.004 to 0.008) lin	Network analyzer with calibration kit
(0.4 to 0.6) lin		(0.008 to 0.01) lin	
(0.6 to 0.8) lin		(0.01 to 0.014) lin	
(0.8 to 1) lin		(0.014 to 0.017) lin	
(0 to 0.2) lin		(1.6 to 180) º	
(0.2 to 0.4) lin		(1.1 to 1.6) º	
(0.4 to 1) lin		(1.0 to 1.1) º	
(0 to 0.4) lin	10 MHz to 2 GHz	(0.005 to 0.011) lin	
(0.4 to 0.6) lin		(0.011 to 0.015) lin	
(0.6 to 0.8) lin		(0.015 to 0.02) lin	
(0.8 to 1) lin		(0.02 to 0.027) lin	
(0 to 0.2) lin		(2.1 to 180) º	
(0.2 to 1) lin		(1.4 to 2.1) º	
(0 to 0.2) lin	(2 to 8) GHz	(0.009 to 0.011) lin	
(0.2 to 0.4) lin		(0.011 to 0.015) lin	
(0.4 to 0.6) lin		(0.015 to 0.021) lin	
(0.6 to 0.8) lin		(0.021 to 0.029) lin	
(0.8 to 1) lin		(0.029 to 0.028) lin	
(0 to 0.2) lin		(3.2 to 180) º	
(0.2 to 1) lin		(2.2 to 3.2) º	
(0 to 0.2) lin	(8 to 18) GHz	(0.009 to 0.011) lin	
(0.2 to 0.4) lin		(0.011 to 0.015) lin	
(0.4 to 0.6) lin		(0.015 to 0.021) lin	
(0.6 to 0.8) lin		(0.021 to 0.029) lin	
(0.8 to 1) lin		(0.029 to 0.038) lin	
(0 to 0.2) lin		(3.2 to 180) º	
(0.2 to 1) lin		(2.2 to 3.2) º	

Parameter/Range	Frequency	CMC[2, 9, 14] (±)	Comments
Reflection S_{11}/S_{22}, Magnitude & Phase (VSWR)– Measure[3] (cont)			
(0 to 0.2) lin	(18 to 26.5) GHz	(0.0074 to 0.0094) lin	Network analyzer with calibration kit
(0.2 to 0.4) lin		(0.094 to 0.014) lin	
(0.4 to 0.6) lin		(0.014 to 0.02) lin	
(0.6 to 0.8) lin		(0.02 to 0.03) lin	
(0.8 to 1) lin		(0.03 to 0.04) lin	
(0 to 0.2) lin		(2.7 to 180) º	
(0.2 to 1) lin		(2.3 to 2.7) º	
(0 to 0.2) lin	(26.5 to 40) GHz	(0.0017 to 0.02) lin	
(0.2 to 0.4) lin		(0.02 to 0.025) lin	
(0.4 to 0.6) lin		(0.025 to 0.031) lin	
(0.6 to 0.8) lin		(0.031 to 0.041) lin	
(0.8 to 1) lin		(0.041 to 0.052) lin	
(0 to 0.2) lin		(5.6 to 180) º	
(0.2 to 1) lin		(3.0 to 5.6) º	
Transmission S_{12}/S_{21}, Magnitude & Phase – Measure[3]			
(0 to -10) dB	9 kHz to 10 MHz	(0.045 to 0.056) dB (0.3 to 0.37) º	Network analyzer with calibration kit non-reflecting device
(-10 to -20) dB		(0.056 to 0.068) dB (0.37 to 0.45) º	
(-20 to -30) dB		(0.068 to 0.098) dB (0.45 to 0.65) º	
(-30 to -40) dB		(0.098 to 0.18) dB (0.65 to 1.1) º	
(-40 to -50) dB		(0.18 to 0.42) dB (1.1 to 2.8) º	
(-50 to -60) dB		(0.42 to 1.2) dB (2.8 to 8.4) º	

Parameter/Range	Frequency	CMC[2, 9, 14] (±)	Comments
Transmission S_{12}/S_{21}, Magnitude & Phase – Measure[3] (cont)			
(0 to -10) dB	10 MHz to 2 GHz	(0.055 to 0.065) dB (0.37 to 0.43) º	Network analyzer with calibration kit non-reflecting device
(-10 to -20) dB		(0.065 to 0.076) dB (0.43 to 0.5) º	
(-20 to -30) dB		(0.076 to 0.097) dB (0.5 to 0.65) º	
(-30 to -40) dB		(0.097 to 0.13) dB (0.65 to 0.81) º	
(-40 to -50) dB		(0.13 to 0.16) dB (0.81 to 1.1) º	
(-50 to -60) dB		(0.16 to 0.24) dB (1.1 to 1.6) º	
(0 to -10) dB	(2 to 8) GHz	(0.076 to 0.081) dB (0.5 to 0.54) º	
(-10 to -20) dB		(0.081 to 0.086) dB (0.54 to 0.57) º	
(-20 to -30) dB		(0.086 to 0.09) dB (0.57 to 0.6) º	
(-30 to -40) dB		(0.09 to 0.096) dB (0.6 to 0.64) º	
(-40 to -50) dB		(0.096 to 0.11) dB (0.64 to 0.7) º	
(-50 to -60) dB		(0.11 to 0.15) dB (0.7 to 0.99) º	

Parameter/Range	Frequency	CMC[2, 9, 14] (±)	Comments
Transmission S_{12}/S_{21}, Magnitude & Phase – Measure[3] (cont)			
(0 to -10) dB	(8 to 18) GHz	(0.1 to 0.11) dB (0.66 to 0.7) º	Network analyzer with calibration kit non-reflecting device
(-10 to -20) dB		(0.11 to 0.11) dB (0.7 to 0.73) º	
(-20 to -30) dB		(0.11 to 0.12) dB (0.73 to 0.76) º	
(-30 to -40) dB		(0.12 to 0.12) dB (0.76 to 0.8) º	
(-40 to -50) dB		(0.12 to 0.13) dB (0.8 to 0.86) º	
(-50 to -60) dB		(0.13 to 0.17) dB (0.86 to 1.13) º	
(0 to -10) dB	(18 to 26.5) GHz	(0.11 to 0.12) dB (0.73 to 0.76) º	
(-10 to -20) dB		(0.12 to 0.12) dB (0.76 to 0.79) º	
(-20 to -30) dB		(0.12 to 0.13) dB (0.79 to 0.82) º	
(-30 to -40) dB		(0.13 to 0.13) dB (0.82 to 0.86) º	
(-40 to -50) dB		(0.13 to 0.14) dB (0.86 to 0.92) º	
(-50 to -60) dB		(0.14 to 0.18) dB (0.92 to 1.2) º	

Parameter/Range	Frequency	CMC[2, 9, 14] (±)	Comments
Transmission S_{12}/S_{21}, Magnitude & Phase – Measure[3] (cont)			
(0 to -10) dB	(26.5 to 40) GHz	(0.18 to 0.18) dB (1.2 to 1.2) º	Network analyzer with calibration kit non-reflecting device
(-10 to -20) dB		(0.18 to 0.19) dB (1.2 to 1.2) º	
(-20 to -30) dB		(0.19 to 0.19) dB (1.2 to 1.3) º	
(-30 to -40) dB		(0.19 to 0.2) dB (1.3 to 1.3) º	
(-40 to -50) dB		(0.2 to 0.22) dB (1.3 to 1.4) º	
(-50 to -60) dB		(0.22 to 0.33) dB (1.4 to 2.2) º	

IV. Mechanical

Parameter/Range[5]	Frequency	CMC[2, 12] (±)	Comments[6]
Accelerometers[3] –			
(0.98 to 100) m/s^2	(5 to 9) Hz (10 to 99) Hz 100 Hz (101 to 920) Hz (0.921 to 5) kHz (5 to 10) kHz (10 to 15) kHz (15 to 20) kHz	1.8 % 1.3 % 1.2 % 1.3 % 1.4 % 2.2 % 2.6 % 4.2 %	Reference PCB Accelerometer, data acquisition card & shaker
Shock Accelerometer[3]	(20 to 2000) g (2000 to 10 000) g	2.4 % 2.4 %	Data acquisition card, reference shock accelerometer, shock exciter

V. Time & Frequency

Parameter/Equipment[5]	Range	CMC[2, 11, 12] (±)	Comments[6]
Time Interval & Frequency[3] –			
EFT/Burst Generator[3] (50, 1000) Ω Load:			
Rise Time	(2 to 7) ns	5.5 %	IEC/EN 61000-4-4, oscilloscope
Impulse Duration	(30 to 170) ns	4.0 %	
Burst Duration	(0.5 to 20) ms	3.3 %	
Burst Period	(200 to 400) ms	3.3 %	
Repetition Frequency	1 kHz to 1 MHz	3.3 %	
Surge Generator[3] Open & Short Circuit:			
Front Time, Rise Time	(0.3 to 13) µs	3.8 %	IEC/EN 61000-4-5, IEC/EN 61000-4-5 (2005), oscilloscope
Time to Half Value, Duration	(10 to 900) µs	3.6 %	
Open Circuit Phase Shifting	(0 to 20) ms	3.6 %	

Parameter/Equipment[5]	Range	CMC[2, 11, 12, 13] (±)	Comments[6]
Time Interval & Frequency[3] (cont) –			
Voltage Transient Emission[3]			
Switching Time	(200 to 400) ns	3.3 %	ISO 7637-2, ISO 7637-2 (2004), oscilloscope
Transient Immunity[3] Surge Pulse & Load Dump Pulse			
Rise Time	0.4 µs to 15 ms	4.4 %	ISO 7637-2, ISO 7637-2 (2004), ISO 16750-2, oscilloscope
Duration	0.1 µs to 700 ms	4.1 %	
Transient Immunity[3] Burst Pulse			
Rise Time	(3 to 7) ns	5.3 %	ISO 7637-2, ISO 7637-2 (2004), oscilloscope
Duration	(30 to 200) ns	5.3 %	
PQT3			
Phase Angle	(0 to 359) °	3.3 % + *R*	IEC/EN 61000-4-11, oscilloscope
Pulse Rise/Fall Time	(1 to 5) µs	5.3 %	
Voltage Dropout Time	20 µs to 200 ms	3.3 %	Oscilloscope
Repetition Time	1 ms to 5 s	3.3 %	
Frequency – Measure[3] (Generating Devices)	0.1 Hz to 9 kHz 9 kHz to 10 MHz (10 to 100) MHz	0.1 mHz 10 mHz 100 mHz	Frequency counter, frequency standard
	100 MHz to 15 GHz (15 to 40) GHz	1×10^{-9} Hz/Hz 1×10^{-9} Hz/Hz	After 72 h warm-up period for frequency standard

[1] This laboratory offers commercial calibration service and 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. 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] The measurands stated are generated with the Fluke 5520A 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.

[5] Some of the types of instruments calibrated under these parameters are EMI Receivers, EFT/Burst Generators, Surge Generators, Generators for Voltage Dips, Short Interrupts and Variations, Ring Wave Generators, Network Analyzers, Pulse Generators, Power Meters, Power Sensors, Signal Generators, Spectrum Analyzers, Attenuators, Terminations, Power Analyzer, CVCF power supply and Audio Analyzer.

[6] For standards or methods listed below without a revision date, laboratories are expected to be competent in the use of the current version within one year of the date of publication of the standard test method or upon the date specified by the standard test method originator when the originator has implementation authority. When a superseded standard or method is required for an accredited test, the scope will include the superseded date/version.

[7] Instruments are calibrated against standard's specifications. These calibrations may also, at customer request, be based on conformance to the calibration requirements of various standards such as ANSI C63.2, CISPR 16-1-1, CISPR 16-1-2, CISPR 25. Other standards may apply and the customer should contact the lab for further information.

[8] CMCs do not include mismatch error due to connections of the device to other devices in actual use. Mismatch CMCs, due to the reflection coefficient of the device to be calibrated, are to be included in the overall measurement uncertainty. The approach of determining expanded CMCs at approximately the 95% level of confidence, (using a coverage factor of k=2) is to be applied for this calculation as well.

[9] CMC for intermediate values of the measurand can be found by interpolation.

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

[11] The contributions from the best existing device are not included in the CMC claim.

[12] In the statement of CMC, the percentages are percentages of reading, unless otherwise noted.

[13] In the statement of CMC, R is the numerical value of the resolution of the unit under test.

Accredited Laboratory

A2LA has accredited

TOYO CORPORATION CALIBRATION LABORATORY

Tokyo, JAPAN

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 the requirements of 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 20th day of July 2023.

Mr. Trace McInturff Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2296.01
Valid to June 30, 2025

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