



National Voluntary Laboratory Accreditation Program



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Equipment Management Technology

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CALIBRATION LABORATORIES

NVLAP LAB CODE 200865-0

NVLAP Code: 20/A01

ANSI/NCSL Z540-1-1994; Part 1

Compliant

DC/LF ELECTROMAGNETICS

NVLAP Code: 20/E02

AC Current Source

<i>Current Range</i>	<i>Frequency Range</i>	<i>Best Uncertainty (\pm)^{note 1} (in % + floor in μA)</i>	<i>Remarks</i>
0 μ A to 220 μ A	10 Hz to 20 Hz	0.095 + 0.025	Fluke 5700A/5725A
0 μ A to 220 μ A	20 Hz to 40 Hz	0.055 + 0.02	Fluke 5700A/5725A
0 μ A to 220 μ A	40 Hz to 1 kHz	0.03 + 0.016	Fluke 5700A/5725A
0 μ A to 220 μ A	1 kHz to 5 kHz	0.1 + 0.04	Fluke 5700A/5725A
0 μ A to 220 μ A	5 kHz to 10 kHz	0.24 + 0.08	Fluke 5700A/5725A
220 μ A to 2.2 mA	10 Hz to 20 Hz	0.074 + 0.04	Fluke 5700A/5725A
220 μ A to 2.2 mA	20 Hz to 40 Hz	0.038 + 0.035	Fluke 5700A/5725A
220 μ A to 2.2 mA	40 Hz to 1 kHz	0.017 + 0.035	Fluke 5700A/5725A
220 μ A to 2.2 mA	1 kHz to 5 kHz	0.1 + 0.4	Fluke 5700A/5725A
220 μ A to 2.2 mA	5 kHz to 10 kHz	0.24 + 0.8	Fluke 5700A/5725A
2.2 mA to 22 mA	10 Hz to 20 Hz	0.074 + 0.4	Fluke 5700A/5725A
2.2 mA to 22 mA	20 Hz to 40 Hz	0.038 + 0.35	Fluke 5700A/5725A
2.2 mA to 22 mA	40 Hz to 1 kHz	0.017 + 0.35	Fluke 5700A/5725A
2.2 mA to 22 mA	1 kHz to 5 kHz	0.1 + 4	Fluke 5700A/5725A
2.2 mA to 22 mA	5 kHz to 10 kHz	0.24 + 8	Fluke 5700A/5725A
22 mA to 220 mA	10 Hz to 20 Hz	0.074 + 4	Fluke 5700A/5725A

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22 mA to 220 mA	20 Hz to 40 Hz	0.038 + 3.5	Fluke 5700A/5725A
22 mA to 220 mA	40 Hz to 1 kHz	0.017 + 3.5	Fluke 5700A/5725A
22 mA to 220 mA	1 kHz to 5 kHz	0.1 + 40	Fluke 5700A/5725A
22 mA to 220 mA	5 kHz to 10 kHz	0.24 + 80	Fluke 5700A/5725A
220 mA to 2.2 A	20 Hz to 1 kHz	0.068 + 35	Fluke 5700A/5725A
220 mA to 2.2 A	1 kHz to 5 kHz	0.083 + 80	Fluke 5700A/5725A
220 mA to 2.2 A	5 kHz to 10 kHz	0.87 + 160	Fluke 5700A/5725A

AC Current Measure

0 µA to 100 µA	10 Hz to 20 Hz	0.5 + 0.03	Agilent 3458A Opt 002
0 µA to 100 µA	20 Hz to 45 Hz	0.2 + 0.03	Agilent 3458A Opt 002
0 µA to 100 µA	45 Hz to 100 Hz	0.1 + 0.03	Agilent 3458A Opt 002
0 µA to 100 µA	100 Hz to 5 kHz	0.1 + 0.03	Agilent 3458A Opt 002
100 µA to 1 mA	10 Hz to 20 Hz	0.48 + 0.2	Agilent 3458A Opt 002
100 µA to 1 mA	20 Hz to 45 Hz	0.19 + 0.2	Agilent 3458A Opt 002
100 µA to 1 mA	45 Hz to 100 Hz	0.09 + 0.2	Agilent 3458A Opt 002
100 µA to 1 mA	100 Hz to 5 kHz	0.057 + 0.2	Agilent 3458A Opt 002
1 mA to 10 mA	10 Hz to 20 Hz	0.48 + 2	Agilent 3458A Opt 002
1 mA to 10 mA	20 Hz to 45 Hz	0.19 + 2	Agilent 3458A Opt 002
1 mA to 10 mA	45 Hz to 100 Hz	0.09 + 2	Agilent 3458A Opt 002
1 mA to 10 mA	100 Hz to 5 kHz	0.057 + 2	Agilent 3458A Opt 002
10 mA to 100 mA	10 Hz to 20 Hz	0.48 + 20	Agilent 3458A Opt 002
10 mA to 100 mA	20 Hz to 45 Hz	0.19 + 20	Agilent 3458A Opt 002
10 mA to 100 mA	45 Hz to 100 Hz	0.09 + 20	Agilent 3458A Opt 002
10 mA to 100 mA	100 Hz to 5 kHz	0.057 + 20	Agilent 3458A Opt 002
100 mA to 1 A	10 Hz to 20 Hz	0.48 + 200	Agilent 3458A Opt 002
100 mA to 1 A	20 Hz to 45 Hz	0.21 + 200	Agilent 3458A Opt 002
100 mA to 1 A	45 Hz to 100 Hz	0.1 + 200	Agilent 3458A Opt 002
100 mA to 1 A	100 Hz to 5 kHz	0.14 + 200	Agilent 3458A Opt 002

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NVLAP Code: 20/E05
DC Resistance Source

<i>Fixed Point Resistance</i>	<i>Best Uncertainty (±) in $\mu\Omega$ ^{note 1}</i>	<i>Remarks</i>
0 Ω	50	Fluke 5700A
1 Ω	95	Fluke 5700A
1.9 Ω	95	Fluke 5700A
10 Ω	28	Fluke 5700A
19 Ω	27	Fluke 5700A
100 Ω	17	Fluke 5700A
190 Ω	17	Fluke 5700A
1 k Ω	13	Fluke 5700A
1.9 k Ω	13	Fluke 5700A
10 k Ω	12	Fluke 5700A
19 k Ω	12	Fluke 5700A
100 k Ω	14	Fluke 5700A
190 k Ω	14	Fluke 5700A
1 M Ω	20	Fluke 5700A
1.9 M Ω	21	Fluke 5700A
10 M Ω	40	Fluke 5700A
19 M Ω	47	Fluke 5700A
100 M Ω	110	Fluke 5700A

Resistance Measure

<i>Resistance Range</i>	<i>Best Uncertainty (±) ^{note 1}</i>	<i>Remarks</i>
10 m Ω to 10 Ω	17 $\mu\Omega/\Omega$ + 0.05 m Ω	Agilent 3458A Opt 002
10 Ω to 100 Ω	13.9 $\mu\Omega/\Omega$ + 0.5 m Ω	Agilent 3458A Opt 002
100 Ω to 1 k Ω	11.6 $\mu\Omega/\Omega$ + 0.5 m Ω	Agilent 3458A Opt 002
1 k Ω to 10 k Ω	11.6 $\mu\Omega/\Omega$ + 5 m Ω	Agilent 3458A Opt 002
10 k Ω to 100 k Ω	15 $\mu\Omega/\Omega$ + 50 m Ω	Agilent 3458A Opt 002
100 k Ω to 1 M Ω	20.8 $\mu\Omega/\Omega$ + 2 Ω	Agilent 3458A Opt 002

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DC Current Source

Current Range	Best Uncertainty (\pm) in $\mu A/A$ ^{note 1}	Remarks
0.01 μA to 220 μA	130	Fluke 5700A/5725A
0.22 mA to 2.2 mA	58	Fluke 5700A/5725A
2.2 mA to 22 mA	58	Fluke 5700A/5725A
22 mA to 220 mA	68	Fluke 5700A/5725A
0.22 A to 2.2 A	105	Fluke 5700A/5725A

DC Current Measure

Current Range	Best Uncertainty (\pm) ^{note 1} (in $\mu A/A$ + floor in nA)	Remarks
0 A to 100 μA	26 + 8	Agilent 3458A Opt 002
0.1 mA to 1 mA	26 + 5	Agilent 3458A Opt 002
1 mA to 10 mA	26 + 50	Agilent 3458A Opt 002
10 mA to 100 mA	46 + 500	Agilent 3458A Opt 002

NVLAP Code: 20/E06

DC Voltage Source

Voltage Range	Best Uncertainty (\pm) in $\mu V/V$ ^{note 1}	Remarks
0.001 mV to 220 mV	14	Fluke 5700A/5725A
0.22 V to 2.2 V	8.1	Fluke 5700A/5725A
2.2 V to 11 V	7.5	Fluke 5700A/5725A
11 V to 22 V	7.5	Fluke 5700A/5725A
22 V to 220 V	8.9	Fluke 5700A/5725A
220 V to 1100 V	9.6	Fluke 5700A/5725A

DC Voltage Measure

Voltage Range	Best Uncertainty (\pm) ^{note 1} (in $\mu V/V$ + floor in μV)	Remarks
0 V to 100 mV	8.2 + 0.5	Agilent 3458A Opt 002
0.1 V to 10 V	7.0 + 0.5	Agilent 3458A Opt 002
10 V to 100 V	7.0 + 30	Agilent 3458A Opt 002

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100 V to 500 V	12 + 100	Agilent 3458A Opt 002
500 V to 800 V	18 + 100	Agilent 3458A Opt 002
800 V to 1000 V	23 + 100	Agilent 3458A Opt 002

NVLAP Code: 20/E09
AC Voltage Source

Voltage Range	Frequency Range	Best Uncertainty (\pm)^{note 1} (in % + floor in μV)	Remarks
0 mV to 2.2 mV	10 Hz to 20 Hz	0.5 + 4.5	Fluke 5700A / 5725A
0 mV to 2.2 mV	20 Hz to 40 Hz	0.47 + 4.5	Fluke 5700A / 5725A
0 mV to 2.2 mV	40 Hz to 20 kHz	0.46 + 4.5	Fluke 5700A / 5725A
0 mV to 2.2 mV	20 kHz to 50 kHz	0.49 + 4.5	Fluke 5700A / 5725A
0 mV to 2.2 mV	50 kHz to 100 kHz	0.78 + 7	Fluke 5700A / 5725A
0 mV to 2.2 mV	100 kHz to 300 kHz	1.4 + 13	Fluke 5700A / 5725A
0 mV to 2.2 mV	300 kHz to 500 kHz	2.6 + 25	Fluke 5700A / 5725A
0 mV to 2.2 mV	500 kHz to 1 MHz	2.8 + 25	Fluke 5700A / 5725A
2.2 mV to 22 mV	10 Hz to 20 Hz	0.1 + 5	Fluke 5700A / 5725A
2.2 mV to 22 mV	20 Hz to 40 Hz	0.071 + 5	Fluke 5700A / 5725A
2.2 mV to 22 mV	40 Hz to 20 kHz	0.06 + 5	Fluke 5700A / 5725A
2.2 mV to 22 mV	20 kHz to 50 kHz	0.081 + 5	Fluke 5700A / 5725A
2.2 mV to 22 mV	50 kHz to 100 kHz	0.15 + 7	Fluke 5700A / 5725A
2.2 mV to 22 mV	100 kHz to 300 kHz	0.23 + 12	Fluke 5700A / 5725A
2.2 mV to 22 mV	300 kHz to 500 kHz	0.42 + 25	Fluke 5700A / 5725A
2.2 mV to 22 mV	500 kHz to 1 MHz	0.59 + 25	Fluke 5700A / 5725A
22 mV to 220 mV	10 Hz to 20 Hz	0.068 + 13	Fluke 5700A / 5725A
22 mV to 220 mV	20 Hz to 40 Hz	0.029 + 8	Fluke 5700A / 5725A
22 mV to 220 mV	40 Hz to 20 kHz	0.018 + 8	Fluke 5700A / 5725A
22 mV to 220 mV	20 kHz to 50 kHz	0.04 + 8	Fluke 5700A / 5725A
22 mV to 220 mV	50 kHz to 100 kHz	0.11 + 25	Fluke 5700A / 5725A
22 mV to 220 mV	100 kHz to 300 kHz	0.13 + 25	Fluke 5700A / 5725A
22 mV to 220 mV	300 kHz to 500 kHz	0.2 + 35	Fluke 5700A / 5725A
22 mV to 220 mV	500 kHz to 1 MHz	0.35 + 80	Fluke 5700A / 5725A
220 mV to 2.2 V	10 Hz to 20 Hz	0.058 + 80	Fluke 5700A / 5725A
220 mV to 2.2 V	20 Hz to 40 Hz	0.018 + 25	Fluke 5700A / 5725A

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220 mV to 2.2 V	40 Hz to 20 kHz	0.008 + 6	Fluke 5700A / 5725A
220 mV to 2.2 V	20 kHz to 50 kHz	0.014 + 16	Fluke 5700A / 5725A
220 mV to 2.2 V	50 kHz to 100 kHz	0.032 + 70	Fluke 5700A / 5725A
220 mV to 2.2 V	100 kHz to 300 kHz	0.056 + 130	Fluke 5700A / 5725A
220 mV to 2.2 V	300 kHz to 500 kHz	0.14 + 350	Fluke 5700A / 5725A
220 mV to 2.2 V	500 kHz to 1 MHz	0.31 + 850	Fluke 5700A / 5725A
2.2 V to 22 V	10 Hz to 20 Hz	0.058 + 800	Fluke 5700A / 5725A
2.2 V to 22 V	20 Hz to 40 Hz	0.018 + 250	Fluke 5700A / 5725A
2.2 V to 22 V	40 Hz to 20 kHz	0.009 + 60	Fluke 5700A / 5725A
2.2 V to 22 V	20 kHz to 50 kHz	0.014 + 160	Fluke 5700A / 5725A
2.2 V to 22 V	50 kHz to 100 kHz	0.029 + 350	Fluke 5700A / 5725A
2.2 V to 22 V	100 kHz to 300 kHz	0.066 + 1500	Fluke 5700A / 5725A
2.2 V to 22 V	300 kHz to 500 kHz	0.17 + 4300	Fluke 5700A / 5725A
2.2 V to 22 V	500 kHz to 1 MHz	0.36 + 8500	Fluke 5700A / 5725A
22 V to 220 V	10 Hz to 20 Hz	0.058 + 8000	Fluke 5700A / 5725A
22 V to 220 V	20 Hz to 40 Hz	0.018 + 2500	Fluke 5700A / 5725A
22 V to 220 V	40 Hz to 20 kHz	0.009 + 800	Fluke 5700A / 5725A
22 V to 220 V	20 kHz to 50 kHz	0.025 + 350	Fluke 5700A / 5725A
22 V to 220 V	50 kHz to 100 kHz	0.058 + 8000	Fluke 5700A / 5725A
22 V to 220 V	100 kHz to 300 kHz	0.24 + 90 000	Fluke 5700A / 5725A
220 V to 1100 V	40 Hz to 1 kHz	0.0095 + 4000	Fluke 5700A / 5725A
220 V to 1100 V	1 kHz to 20 kHz	0.017 + 6000	Fluke 5700A / 5725A
220 V to 1100 V	20 kHz to 30 kHz	0.61 + 11 000	Fluke 5700A / 5725A
220 V to 750 V	30 kHz to 50 kHz	0.061 + 11 000	Fluke 5700A / 5725A
220 V to 750 V	50 kHz to 100 kHz	0.23 + 45 000	Fluke 5700A / 5725A

AC Voltage Measure

0 mV to 10 mV	1 Hz to 40 Hz	0.07 + 3	Agilent 3458A opt 002
0 mV to 10 mV	0.04 kHz to 1 kHz	0.05 + 1	Agilent 3458A opt 002
0 mV to 10 mV	1 kHz to 20 kHz	0.05 + 1	Agilent 3458A opt 002
0 mV to 10 mV	20 kHz to 50 kHz	0.14 + 1	Agilent 3458A opt 002
0 mV to 10 mV	50 kHz to 100 kHz	0.7 + 1	Agilent 3458A opt 002
0 mV to 10 mV	100 kHz to 300 kHz	4.6 + 2	Agilent 3458A opt 002
10 mV to 100 mV	1 Hz to 40 Hz	0.013 + 4	Agilent 3458A opt 002

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10 mV to 100 mV	0.04 kHz to 1 kHz	0.010 + 2	Agilent 3458A opt 002
10 mV to 100 mV	1 kHz to 20 kHz	0.018 + 2	Agilent 3458A opt 002
10 mV to 100 mV	20 kHz to 50 kHz	0.037 + 2	Agilent 3458A opt 002
10 mV to 100 mV	50 kHz to 100 kHz	0.095 + 2	Agilent 3458A opt 002
10 mV to 100 mV	100 kHz to 300 kHz	0.37 + 10	Agilent 3458A opt 002
10 mV to 100 mV	300 kHz to 1 M Hz	1.2 + 10	Agilent 3458A opt 002
100 mV to 1 V	1 Hz to 40 Hz	0.13 + 40	Agilent 3458A opt 002
100 mV to 1 V	0.04 kHz to 1 kHz	0.01 + 20	Agilent 3458A opt 002
100 mV to 1 V	1 kHz to 20 kHz	0.018 + 20	Agilent 3458A opt 002
100 mV to 1 V	20 kHz to 50 kHz	0.037 + 20	Agilent 3458A opt 002
100 mV to 1 V	50 kHz to 100 kHz	0.095 + 20	Agilent 3458A opt 002
100 mV to 1 V	100 kHz to 300 kHz	0.37 + 100	Agilent 3458A opt 002
100 mV to 1 V	300 kHz to 1 MHz	1.2 + 100	Agilent 3458A opt 002
1 V to 10 V	1 Hz to 40 Hz	0.013 + 400	Agilent 3458A opt 002
1 V to 10 V	0.04 kHz to 1 kHz	0.01 + 200	Agilent 3458A opt 002
1 V to 10 V	1 kHz to 20 kHz	0.018 + 200	Agilent 3458A opt 002
1 V to 10 V	20 kHz to 50 kHz	0.037 + 200	Agilent 3458A opt 002
1 V to 10 V	50 kHz to 100 kHz	0.095 + 200	Agilent 3458A opt 002
1 V to 10 V	100 kHz to 300 kHz	0.37 + 1000	Agilent 3458A opt 002
1 V to 10 V	300 kHz to 1 M Hz	1.2 + 1000	Agilent 3458A opt 002
10 V to 100 V	1 Hz to 40 Hz	0.028 + 4000	Agilent 3458A opt 002
10 V to 100 V	0.04 kHz to 1 kHz	0.025 + 2000	Agilent 3458A opt 002
10 V to 100 V	1 kHz to 20 kHz	0.025 + 2000	Agilent 3458A opt 002
10 V to 100 V	20 kHz to 50 kHz	0.043 + 2000	Agilent 3458A opt 002
10 V to 100 V	50 kHz to 100 kHz	0.14 + 2000	Agilent 3458A opt 002
10 V to 100 V	100 kHz to 300 kHz	0.47 + 10 000	Agilent 3458A opt 002
10 V to 100 V	300 kHz to 1 M Hz	1.7 + 10 000	Agilent 3458A opt 002
100 V to 700 V	1 Hz to 40 Hz	0.051 + 40 000	Agilent 3458A opt 002
100 V to 700 V	0.04 kHz to 1 kHz	0.048 + 20 000	Agilent 3458A opt 002
100 V to 700 V	1 kHz to 20 kHz	0.072 + 20 000	Agilent 3458A opt 002
100 V to 700 V	20 kHz to 50 kHz	0.14 + 20 000	Agilent 3458A opt 002
100 V to 700 V	50 kHz to 100 kHz	0.035 + 20 000	Agilent 3458A opt 002

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TIME & FREQUENCY

NVLAP Code: 20/F01

Frequency Source

<i>Frequency Range</i>	<i>Best Uncertainty (\pm)^{note 1}</i>	<i>Remarks</i>
10 MHz	7 parts in 10^{12}	Agilent 5071A w/NIST FMAS
1 Hz to 20 MHz	8 parts in 10^{12}	3325A Locked to 5071A/FMAS
100 kHz to 2.5 GHz	8 parts in 10^{12}	8663A Locked to 5071A/FMAS
10 MHz to 50 GHz	8 parts in 10^{12}	83650B Locked to 5071A/FMAS

Frequency Measure

0.01 Hz to 500 MHz	3 parts in 10^{10}	Counters Locked to 5071A/FMAS
500 MHz to 46 GHz	1 part in 10^{10}	Counters Locked to 5071A/FMAS
46 GHz to 50 GHz	1 part in 10^{10}	E4448A Locked to 5071A/FMAS

RF/MICROWAVE ELECTROMAGNETICS

NVLAP Code: 20/R17

RF Power Source

<i>Power Range in dBm</i>	<i>Frequency Range</i>	<i>Best Uncertainty (\pm)^{note 1} (in dB)</i>	<i>Remarks</i>
-10 to +16	100 kHz to 2.56 GHz	0.10 dB	Agilent 8663A
> -70 to < -10	100 kHz to 2.56 GHz	0.40 dB	Agilent 8663A
> -120 to < -70	100 kHz to 2.56 GHz	0.78 dB	Agilent 8663A
-127 to < -120	100 kHz to 2.56 GHz	0.81 dB	Agilent 8663A
-20 to 20	50 MHz to 26.5 GHz	0.25 dB	Agilent 83650B w/opt 001
-20 to 20	26.5 GHz to 40 GHz	0.37 dB	Agilent 83650B w/opt 001
-70 to -20	26.5 GHz to 40 GHz	0.32 dB	Agilent 83650B w/opt 001
-20 to 20	40 GHz to 50 GHz	0.47 dB	Agilent 83650B w/opt 001
-70 to -20	40 GHz to 50 GHz	0.42 dB	Agilent 83650B w/opt 001

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RF Power Measure

Power Range in dBm	Frequency Range	Best Uncertainty (\pm) ^{note 1} (in %)	Remarks
-20 to 20	100 kHz to 300 kHz	4.7	Agilent E4419A w/8482A
-20 to 20	300 kHz to 1 MHz	2.0	Agilent E4419A w/8482A
-20 to 20	1 MHz to 2 GHz	1.3	Agilent E4419A w/8482A
-20 to 20	2 GHz to 12.4 GHz	2.4	Agilent E4419A w/8485A
-20 to 20	12.4 to 18 GHz	2.7	Agilent E4419A w/8485A
-20 to 20	18 GHz to 26.5 GHz	3.9	Agilent E4419A w/8485A
-20 to 20	26.5 GHz to 40 GHz	5.2	Agilent E4419A w/8487A
-20 to 20	40 GHz to 50 GHz	7.7	Agilent E4419A w/8487A
-30 to -20	10 MHz to 30 MHz	4.5	Agilent E4419A w/8481D
-30 to -20	30 MHz to 4 GHz	2.6	Agilent E4419A w/8481D
-30 to -20	4 GHz to 12 GHz	3.4	Agilent E4419A w/8485D
-30 to -20	12 GHz to 18 GHz	3.7	Agilent E4419A w/8485D
-30 to -20	18 GHz to 26.5 GHz	4.2	Agilent E4419A w/8485D
-30 to -20	26.5 GHz to 34 GHz	5.0	Agilent E4419A w/8487D
-30 to -20	34 GHz to 40 GHz	7.3	Agilent E4419A w/8487D
-30 to -20	40 GHz to 45 GHz	10.6	Agilent E4419A w/8487D
-30 to -20	45 GHz to 50 GHz	11.0	Agilent E4419A w/8487D
-20 to 30	100 kHz to 2.6 GHz	2.1	Agilent 8902A w/ 11722A
-20 to 30	2.6 GHz to 18 GHz	3.6	Agilent 8902A w/ 11792A, 11793A, 83650B
-20 to 30	18 GHz to 26.5 GHz	5.4	Agilent 8902A w/ 11792A, 11793A, 83650B

1. Represents an expanded uncertainty using a coverage factor, $k = 2$, at an approximate level of confidence of 95 %.

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