

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)

Calibration or Measurement Services			Measurand Level or Range			Measurement Conditions/Independent variables		Expanded Uncertainty							Comments	NMI Service Identifier
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Uncertainty matrix			
DC voltage sources: single values	Standard cell, solid state voltage standard	Difference measurement	1	10	V	Fixed voltage	1.018 V, 1 V, 10 V	0.45 to 10	μV	2	95%	No	DC voltage 1	Approved on 06 August 2013	1	
DC voltage sources: low values	DC voltage source, multifunction calibrators	Direct measurement	0.01	10	V			38 to 1.2	$\mu\text{V/V}$	2	95%	Yes	DC voltage 2	Approved on 06 August 2013	3	
DC voltage sources: intermediate values	DC voltage source, multifunction calibrators	Direct measurement	10	1000	V			6.4 to 3.2	$\mu\text{V/V}$	2	95%	Yes	DC voltage 2	Approved on 06 August 2013	6	
DC voltage meters: intermediate values	DC voltmeter, multimeter, MTS	Direct measurement	0.01	1000	V			38 to 3.2	$\mu\text{V/V}$	2	95%	Yes	DC voltage 2	Approved on 06 August 2013	8	
DC current sources: low values	Current generator, multifunction calibrator	Voltage drop across standard resistor	0.1	0.1	mA	Power dissipation of standard resistor	0.1 mW	1.3	nA	2	95 %	No		Approved on 06 August 2013	78	
DC current sources: intermediate values	Current generator, multifunction calibrator	Voltage drop across standard resistor	0.0001	20	A	Power dissipation of standard resistor	up to 100 mW	0.0013 to 4800	μA	2	95%	No	DC current	Approved on 06 August 2013	79	
DC current sources: high values	Current generator	Voltage drop across standard resistor	20	30	A	Power dissipation of standard resistor	up to 100 mW	4.8 to 6	mA	2	95%	No		Approved on 06 August 2013	88	
DC current meters: low values	Ammeter, multimeter	Voltage drop across standard resistor	0.1	0.1	mA	Power dissipation of standard resistor	0.1 mW	1.3	nA	2	95 %	No		Approved on 06 August 2013	89	
DC current meters: intermediate values	Ammeter, multimeter	Voltage drop across standard resistor	0.0001	20	A	Power dissipation of standard resistor	up to 100 mW	0.0013 to 4800	μA	2	95%	No	DC current	Approved on 06 August 2013	90	
DC current meters: high values	Ammeter, multimeter	Voltage drop across standard resistor	20	30	A	Power dissipation of standard resistor	up to 100 mW	4.8 to 6	mA	2	95%	No		Approved on 06 August 2013	99	
DC resistance standards and sources: low values	Fixed resistor, resistance box	Comparison by means of a direct current comparator bridge	0.0001	1	Ω	Power	100 mW, 10 mW for 1 Ω	20 to 0.2	$\mu\Omega/\Omega$	2	95%	Yes	Resistance 1	In air bath and in oil bath, temperature: 23 °C Approved on 06 January 2015	13	

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DC resistance standards and sources: intermediate values	Fixed resistor, resistance box	Comparison by means of a direct current comparator bridge, comparison by means of a binary voltage divider bridge	10	1E+06	Ω	Power	10 mW up to 10 k Ω	0.24 to 6.5	$\mu\Omega/\Omega$	2	95%	Yes	Resistance 1	Fixed resistor in oil bath, temperature: 23 °C Approved on 06 January 2015	18
						Voltage	18.18 V for 100 k Ω , 45.5 V for 1 M Ω								
DC resistance standards and sources: high values	Fixed resistor, resistance box	Comparison by means of a binary voltage divider bridge	1E+07	1E+09	Ω	Voltage	90.9 V	60 to 5000	$\mu\Omega/\Omega$	2	95%	Yes	Resistance 1	Fixed resistor in oil or air bath, temperature: 23 °C Approved on 06 January 2015	121
DC resistance standards and sources: multiple ranges	Multifunction calibrator	Direct method of measurement	1	1E+09	Ω			3.76E-05 to 2.9E+06	Ω	2	95%	No	Resistance 2	Temperature: (23 \pm 1) °C Approved on 06 August 2013	22
DC resistance meters: low values	Multimeter, resistance bridge	Direct method of measurement	0.0001	1	Ω			20 to 0.2	$\mu\Omega/\Omega$	2	95%	Yes	Resistance 1	Temperature: 23 °C Approved on 06 January 2015	31
DC resistance meters: intermediate values	Ohmmeter, multimeter, resistance bridge	Direct method of measurement	0.01	1E+06	k Ω			0.24 to 5000	$\mu\Omega/\Omega$	2	95%	Yes	Resistance 1	Temperature: 23 °C Approved on 06 January 2015	36
Capacitance: dielectric capacitors	Fixed capacitor, switched capacitor, capacitance box	LCR meter	0.01	10000	nF	Frequency	20 Hz to 2 MHz	0.59 to 8.07	mF/F	2	95%	Yes	Cap 1	Approved on 06 August 2013	109
Capacitance: meters	Capacitance bridge, LCR meter	Direct measurement	1	1000	pF	Frequency	100 Hz to 1 MHz	0.005 to 0.26	mF/F	2	95%	Yes	Cap 2	Approved on 06 August 2013	110
Inductance: meters	Inductance bridge, LCR meter	Direct measurement	0.1	10000	mH	Frequency	100 Hz, 1 kHz	0.2 to 0.5	mH/H	2	95%	Yes	Induct 1	Approved on 06 August 2013	111
AC voltage: AC-DC transfer difference at low voltages	AC-DC transfer standard, thermal converters	Comparison	10	500	mV	Frequency	10 Hz to 1 MHz	17 to 240	$\mu V/V$	2	95%	Yes	matrix AC-DC transfer standard	Approved on 06 August 2013	45

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Calibration or Measurement Services			Measurand Level or Range			Measurement Conditions/Independent variables		Expanded Uncertainty							
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Uncertainty matrix	Comments	NMI Service Identifier
AC voltage: AC-DC transfer difference at medium voltages	AC-DC transfer standard, thermal converters	Comparison	0.5	5	V	Frequency	10 Hz to 1 MHz	10 to 56	μV/V	2	95%	Yes	matrix AC-DC transfer standard	Approved on 06 August 2013	46
AC voltage: AC-DC transfer difference at higher voltages	AC-DC transfer standard, thermal converters	Comparison	5	1000	V	Frequency	10 Hz to 1 MHz	13 to 73	μV/V	2	95%	Yes	matrix AC-DC transfer standard	Approved on 06 August 2013	47
AC voltage up to 1000 V: sources	Multifunction calibrator	Direct measurement	0.01	1000	V	Frequency	10 Hz to 1 MHz	0.03 to 3.9	mV/V	2	95%	Yes	AC voltage	Approved on 06 August 2013	52
AC voltage up to 1000 V: meters	AC voltmeter, multimeter	Comparison	0.01	1000	V	Frequency	10 Hz to 1 MHz	0.03 to 3.9	mV/V	2	95%	Yes	AC voltage	Approved on 06 August 2013	57
AC current up to 100 A: sources	Multifunction calibrator, transconductance amplifier	Voltage drop across current shunt	0.001	2	A	Frequency	10 Hz to 10 kHz	0.00042 to 2.34	mA	2	95%	No	AC current 1_new	Approved on 06 January 2015	100
AC current up to 100 A: meters	AC ammeter, multimeter, current transducers	Direct comparison	1E-04	100	A	Frequency	45 Hz to 5 kHz	0.08 to 0.58	mA/A	2	95%	Yes	AC current 2	Approved on 06 August 2013	101
AC power and energy: single phase (f <= 400 Hz)	Power meter, power convertor, wattmeter	Direct comparison or sampling method	0	48000	W	Voltage	4 V to 700 V	30 to 129	μW/VA	2	95 %	Yes	Power 1	The expanded uncertainties are referred to the apparent power of the range of the watt-convertor. Uncertainties are minimum and maximum values Approved on 06 August 2013	75
						Current	0.05 A to 100 A								
						Power factor	1 to 0, inductive or capacitive								
						Frequency	16 Hz to 400 Hz								
AC power and energy: single phase (f <= 400 Hz)	Power meter, power convertor	Direct comparison or sampling method	0	48000	var	Voltage	4 V to 700 V	37 to 129	μvar/VA	2	95 %	Yes	Power 2	Uncertainties are minimum and maximum values Approved on 06 August 2013	115
						Current	0.05 A to 100 A								

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Calibration or Measurement Services			Measurand Level or Range			Measurement Conditions/Independent variables		Expanded Uncertainty							
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Uncertainty matrix	Comments	NMI Service Identifier
						Power factor	1 to 0, inductive or capacitive								
						Frequency	16 Hz to 400 Hz								
AC power and energy: single phase ($f \leq 400$ Hz), apparent power	Power meter, power convertor, wattmeter	Sampling method	6	1200	VA	Voltage	12 V to 240 V	43 to 62	$\mu\text{VA}/\text{VA}$	2	95 %	Yes		The expanded uncertainties are referred to the apparent power measured. Uncertainties are minimum and maximum values. Approved on 06 August 2013	77
						Current	0.05 A to 5 A								
						Power factor	1 to 0, inductive or capacitive								
						Frequency	45 Hz to 65 Hz								
AC power and energy: single phase ($f \leq 400$ Hz)	Energy meter	Direct comparison	0.4	4800000	Ws (vars)	Voltage	30 V to 480 V	116 to 129	$\mu\text{Wh}/\text{VAh}$ ($\mu\text{varh}/\text{VAh}$)	2	95%	Yes		Uncertainties are minimum and maximum values. Approved on 06 August 2013	104
						Current	0.05 A to 100 A								
						Power factor (Reactive power factor)	1 to 0.25, inductive or capacitive								
						Frequency	50 Hz to 60 Hz								
						Measurement time	1 s to 100 s								
AC power and energy: three phase	Energy meter	Direct comparison	0.4	4800000	Ws (vars)	Voltage	30 V to 480 V	116 to 129	$\mu\text{Wh}/\text{VAh}$ ($\mu\text{varh}/\text{VAh}$)	2	95%	Yes		Range values per phase. Uncertainties are minimum and maximum values. Approved on 06 August 2013	106
						Current	0.05 A to 100 A								
						Power factor (Reactive power factor)	1 to 0.25, inductive or capacitive								
						Frequency	50 Hz to 60 Hz								

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Calibration or Measurement Services			Measurand Level or Range			Measurement Conditions/Independent variables		Expanded Uncertainty							
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Uncertainty matrix	Comments	NMI Service Identifier
						Measurement time	1 s to 100 s								
AC high voltage: ratio error	Voltage transformer	Direct comparison	0	2	%	Primary voltage	100/ $\sqrt{3}$ V to 120/ $\sqrt{3}$ kV	0.01 to 0.02	%	2	95%	No	VT ratio error	Uncertainties are minimum and maximum values Approved on 06 August 2013	116
						Secondary voltage	100/ $\sqrt{3}$ V, 110/ $\sqrt{3}$ V, 100 V, 110 V, 120 V								
						Frequency	50 Hz								
AC high voltage: phase displacement	Voltage transformer	Direct comparison	0	30	mrad	Primary voltage	100/ $\sqrt{3}$ V to 120/ $\sqrt{3}$ kV	0.10 to 0.15	mrad	2	95%	No	VT phase displacement	Uncertainties are minimum and maximum values Approved on 06 August 2013	117
						Secondary voltage	100/ $\sqrt{3}$ V, 110/ $\sqrt{3}$ V, 100 V, 110 V, 120 V								
						Frequency	50 Hz								
High AC current: ratio error	Current transformer	Direct comparison	0	2	%	Primary current	1 A to 3000 A	0.004 to 0.015	%	2	95%	No	CT ratio error	Uncertainties are minimum and maximum values Approved on 06 August 2013	118
						Secondary current	1A, 5A								
						Frequency	50 Hz								
High AC current: phase displacement	Current transformer	Direct comparison	0	30	mrad	Primary current	1 A to 3000 A	0.03 to 0.13	mrad	2	95%	No	CT phase displacement	Uncertainties are minimum and maximum values Approved on 06 August 2013	119
						Secondary current	1A, 5A								
						Frequency	50 Hz								

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Phase angle: sources	Phase source	Direct measurement	0	360	°	Frequency	1 Hz to 100 kHz	0.04 to 1.68	°	2	95 %	No	Phase angle	Approved on 06 August 2013	108
						Voltage	10 mV to 350 V								
Phase angle: meters	Phase meter	Direct measurement	0	360	°	Frequency	1 Hz to 100 kHz	0.04 to 1.68	°	2	95 %	No	Phase angle	Approved on 06 August 2013	120
						Voltage	10 mV to 350 V								
Current and voltage waveform: main frequency current harmonics	Main frequency harmonics analyser, flicker meter	Comparison	0.016	10	A	Harmonic number	1 to 50	0.4 to 2.9 (of fundamental)	mA/A	2	95%	Yes	matrix 1 harmonics	For IEC 61000-3-2, IEC 61000-3-3, current in A dependent on wave shape Approved on 06 August 2013	112
Current and voltage waveform: flicker severity (Pst), square or sine wave modulation	Flicker meter	Comparison	0.5	10		Voltage	120 V, 230 V	0.05		2	95%	No		For IEC 61000-3-2, IEC 61000-3-3 Approved on 06 August 2013	113
DC voltage sources: single values	Solid state voltage standard	Direct comparison with JVS	1.0	10	V	Fixed voltage	1.018 V, 1 V, 10 V	0.04 to 0.12	µV/V	2	95%	Yes	DC voltage 1	Approved on 07 April 2016	122

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**DC voltage 1**

	Expanded uncertainty / μV	Reference Stanard used in calibration
1.018 V	0.12	Josephson Voltage Standard
1 V	0.12	Josephson Voltage Standard
10 V	0.04	Josephson Voltage Standard
1.018 V	0.45	Group of standard cells and solid state voltage standards
1 V	1	Group of standard cells and solid state voltage standards
10 V	1	Group of standard cells and solid state voltage standards

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**DC voltage 2**

	Expanded uncertainty / ($\mu\text{V/V}$)
10 mV to 100 mV	38 to 6
0.1 V to 1 V	5 to 2
1 V to 10 V	1.5 to 1.2
10 V to 100 V	6.4 to 3.4
100 V to 1000 V	4.2 to 3.2

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**DC current**

	Power dissipation	Expanded uncertainty
0.1 mA to 1 mA	up to 10 mW	1.3 nA to 12 nA
1 mA to 3 mA	up to 10 mW	12 nA to 35 nA
3 mA to 10 mA	up to 10 mW	33 nA to 98 nA
10 mA to 30 mA	up to 10 mW	0.14 μ A to 0.33 μ A
30 mA to 100 mA	up to 10 mW	1.2 μ A to 1.4 μ A
0.1 A to 1 A	up to 100 mW	11 μ A to 16 μ A
1 A to 3 A	up to 100 mW	0.11 mA to 0.32 mA
3 A to 10 A	up to 100 mW	0.59 mA to 1.1 mA
10 A to 20 A	up to 100 mW	3.9 mA to 4.4 mA

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**Resistance 1**

	Expanded uncertainty
100 $\mu\Omega$	20
1 m Ω	10
10 m Ω	2.5
100 m Ω	1.5
1 Ω	0.2
10 Ω	0.33
100 Ω	0.39
1000 Ω	0.24
10000 Ω	0.29
100 k Ω	2.6
1 M Ω	6.5
10 M Ω	60
100 M Ω	500
1 G Ω	5000

The expanded uncertainty given in this table are expressed in $\mu\Omega/\Omega$

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**Resistance 2**

	Expanded uncertainty	Units
1 Ω to 10 Ω	$(50 + 1.5E-05R)/\sqrt{3}$	$\mu\Omega$
10 Ω to 100 Ω	$(0.5 + 1.2E-05R)/\sqrt{3}$	m Ω
100 Ω to 1000 Ω	$(0.5 + 1E-05R)/\sqrt{3}$	m Ω
1 k Ω to 10 k Ω	$(5 + 1E-05R)/\sqrt{3}$	m Ω
10 k Ω to 100 k Ω	$(50 + 1E-05R)/\sqrt{3}$	m Ω
0.1 M Ω to 1 M Ω	$(2 + 1.5E-05R)/\sqrt{3}$	Ω
1 M Ω to 10 M Ω	$(100 + 5E-05R)/\sqrt{3}$	Ω
10 M Ω to 100 M Ω	$(1 + 5E-04R)/\sqrt{3}$	k Ω
0.1 G Ω to 1 G Ω	$(10 + 5E-03R)/\sqrt{3}$	k Ω

R is given in ohm

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**Cap_1**

	20 Hz	120 Hz	1 kHz	10 kHz	100 kHz	1 MHz	2 MHz
0.01 nF	-	-	-	-	0.81	0.72 to 0.81	0.84
0.1 nF	-	-	-	-	0.62	0.61 to 0.63	0.71
1 nF	-	-	0.71 to 1.31	-	-	0.59 to 0.69	0.60 to 0.78
100 nF	-	0.6	-	-	0.69	-	-
10000 nF	3.06	3.06	3.1	3.56	8.07	-	-

The expanded uncertainties given in this table are expressed in mF/F

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)

Cap_2

	1 kHz	100 Hz to 1 MHz
1 pF	0.01	0.03 to 0.26
10 pF	0.007	0.012 to 0.13
100 pF	0.007	0.012 to 0.09
1000 pF	0.005	0.01 to 0.014

The expanded uncertainties given in this table are expressed in mF/F

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)

Induct_1

	100 Hz	1 kHz
0.1 mH to 1000 mH	-	0.2
1 H to 10 H	0.5	0.2

The expanded uncertainties given in this table are expressed in mH/H

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**matrix AC-DC transfer standard**

	10 Hz	20 Hz	40 Hz	500 Hz	1 kHz	10 kHz	20 kHz	50 kHz	100 kHz	200 kHz	500 kHz	700 kHz	1 MHz
10 mV	230	220	210	220	210	220	220	220	230	220	230	230	240
20 mV	110	94	96	95	91	91	91	96	100	100	110	120	150
30 mV	81	64	64	60	60	60	59	64	68	73	81	100	110
60 mV	55	47	47	47	47	47	47	47	47	47	55	64	90
100 mV	37	37	37	37	37	37	37	33	37	33	37	46	60
200 mV	37	37	37	37	37	37	37	37	33	37	46	60	60
400 mV	24	24	24	17	17	17	18	18	20	28	37	47	52
600 mV	17	17	17	17	17	17	17	17	20	28	37	47	52
1 V	14	14	13	13	13	13	13	13	14	17	24	35	44
2 V	11	11	11	10	10	10	10	11	11	14	23	33	43
3 V	12	11	11	10	10	10	10	11	11	14	23	33	43
6 V	18	16	15	13	13	13	13	13	16	21	28	42	56
10 V	23	18	18	14	14	14	14	14	18	25	32	47	64
20 V	27	21	21	16	16	16	16	16	22	27	37	53	73
30 V	30	25	24	17	17	18	18	18	25	25	-	-	-
60 V	39	30	29	22	22	22	22	22	30	40	-	-	-
100 V	40	30	30	22	22	22	22	22	30	-	-	-	-
200 V	43	33	33	24	24	24	24	24	33	-	-	-	-
300 V	48	36	37	27	27	27	27	27	36	-	-	-	-
600 V	53	40	40	27	27	27	27	27	40	-	-	-	-
800 V	58	43	40	27	27	27	27	28	42	-	-	-	-
1000 V	57	43	40	27	27	27	27	28	42	-	-	-	-

The expanded uncertainties given in this table are expressed in $\mu\text{V/V}$

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**AC voltage**

	10 Hz	20 Hz	40 Hz	500 Hz	1 kHz	10 kHz	20 kHz	50 kHz	100 kHz	200 kHz	500 kHz	700 kHz	1 MHz
10 mV	0.53	0.53	0.43	0.35	0.35	0.35	0.35	0.52	0.68	1.4	2.1	3.9	3.9
20 mV	0.42	0.42	0.31	0.22	0.22	0.22	0.22	0.37	0.51	1.2	1.6	3.5	3.5
30 mV	0.34	0.34	0.22	0.15	0.15	0.15	0.15	0.24	0.40	0.77	1.1	1.8	1.8
60 mV	0.31	0.31	0.18	0.12	0.12	0.12	0.12	0.19	0.35	0.69	0.94	1.7	1.7
100 mV	0.26	0.26	0.12	0.08	0.08	0.08	0.08	0.11	0.22	0.37	0.56	1.5	1.5
200 mV	0.25	0.25	0.11	0.07	0.07	0.07	0.07	0.10	0.20	0.35	0.51	1.4	1.4
400 mV	0.25	0.25	0.10	0.05	0.05	0.05	0.05	0.07	0.11	0.26	0.42	1.4	1.4
600 mV	0.25	0.25	0.09	0.05	0.05	0.05	0.05	0.07	0.10	0.25	0.41	1.4	1.4
1 V	0.23	0.23	0.08	0.03	0.03	0.03	0.03	0.06	0.09	0.23	0.36	1.4	1.4
2 V	0.23	0.23	0.08	0.03	0.03	0.03	0.03	0.06	0.09	0.23	0.36	1.4	1.4
3 V	0.23	0.23	0.08	0.03	0.03	0.03	0.03	0.06	0.10	0.25	0.54	1.7	1.7
6 V	0.23	0.23	0.08	0.03	0.03	0.03	0.03	0.06	0.10	0.25	0.54	1.7	1.7
10 V	0.23	0.23	0.08	0.04	0.04	0.04	0.04	0.06	0.10	0.26	0.54	1.7	1.7
20 V	0.23	0.23	0.08	0.04	0.04	0.04	0.04	0.06	0.10	0.26	0.54	1.7	1.7
30 V	0.23	0.23	0.09	0.05	0.05	0.05	0.05	0.07	0.13	0.26	-	-	-
60 V	0.23	0.23	0.09	0.05	0.05	0.05	0.05	0.08	0.13	0.26	-	-	-
100 V	0.23	0.23	0.09	0.05	0.05	0.05	0.05	0.09	0.13	-	-	-	-
200 V	0.23	0.23	0.09	0.05	0.05	0.05	0.05	0.09	0.13	-	-	-	-
300 V	0.24	0.23	0.13	0.06	0.06	0.06	0.06	0.18	0.98	-	-	-	-
600 V	0.24	0.23	0.13	0.06	0.06	0.06	0.06	0.18	0.98	-	-	-	-
800 V	0.24	0.23	0.13	0.06	0.06	0.06	0.06	0.18	0.98	-	-	-	-
1000 V	0.24	0.23	0.13	0.06	0.06	0.06	0.06	0.18	0.98	-	-	-	-

The expanded uncertainties given in this table are expressed in mV/V

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**AC current 1 _new**

	10 Hz	20 Hz	21 Hz to 45 Hz	46 Hz to 400 Hz	401 Hz to 1 kHz	1.1 kHz to 5 kHz	5.1 kHz to 10 kHz
1 mA	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00043
10 mA	0.012	0.0032	0.0020	0.0020	0.0020	0.0020	0.0020
100 mA	0.12	0.029	0.018	0.018	0.018	0.018	0.019
200 mA	0.23	0.059	0.037	0.037	0.037	0.037	0.037
500 mA	0.58	0.15	0.092	0.092	0.092	0.092	0.093
1 A	1.05	0.26	0.17	0.17	0.17	0.17	0.17
2 A	2.34	0.59	0.37	0.37	0.37	0.37	0.37

The expanded uncertainty given in this table are expressed in mA

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**AC current 2**

	45 Hz to 1 kHz	1.1 kHz to 5 kHz	50 Hz to 60 Hz
0.1 mA	0.25	0.43	-
1 mA	0.22	0.35	-
10 mA	0.22	0.30	-
100 mA	0.21	0.28	-
1000 mA	0.36	0.58	-
0.05 A to 100 A	-	-	0.08 to 0.11

The expanded uncertainty given in this table are expressed in mA/A

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**Power 1**

	Voltage	Current	Frequency	Direct comparison	Sampling method
0 W to 1200 W	12 V to 240 V	0.05 A to 5 A	45 Hz to 65 Hz	30 $\mu\text{W}/\text{VA}$	-
0 W to 48000 W	30 V to 480 V	0.05 A to 100 A	50 Hz to 60 Hz	116 $\mu\text{W}/\text{VA}$ to 129 $\mu\text{W}/\text{VA}$	-
0 W to 14000 W	4 V to 700 V	0.05 A to 20 A	16 Hz to 400 Hz	-	37 $\mu\text{W}/\text{VA}$ to 50 $\mu\text{W}/\text{VA}$

Sampling method: only for power meter and convertor

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**Power 2**

	Voltage	Current	Frequency	Direct comparison	Sampling method
0 var to 14000 var	4 V to 700 V	0.05 A to 20 A	16 Hz to 400 Hz	-	37 μ var/VA to 50 μ var/VA
0 var to 48000 var	30 V to 480 V	0.05 A to 100 A	50 Hz to 60 Hz	116 μ var/VA to 129 μ var/VA	-

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)

VT ratio error

	Expanded uncertainty
100/ $\sqrt{3}$ V to 600/ $\sqrt{3}$ V	0.01
600 V to 4000 V	0.01
5000 V to 35000 V	0.01
40000/ $\sqrt{3}$ V to 120000/ $\sqrt{3}$ V	0.02

Frequency: 50 Hz

The expanded uncertainties given in this table are expressed in %

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)

VT phase displacement

	Expanded uncertainty
100/ $\sqrt{3}$ V to 600/ $\sqrt{3}$ V	0.10
600 V to 4000 V	0.10
5000 V to 35000 V	0.10
40000/ $\sqrt{3}$ V to 120000/ $\sqrt{3}$ V	0.15

Frequency: 50 Hz

The expanded uncertainties given in this table are expressed in mrad

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**CT ratio error**

	Frequency: 50 Hz	Expanded uncertainty
1 A to 500 A	0.20/ to 2.00/	0.004
1 A to 500 A	0.05/	0.005
1 A to 500 A	0.01/	0.009
750 A to 3000 A	0.20/ to 2.00/	0.005
750 A to 3000 A	0.05/	0.006
750 A to 3000 A	0.01/	0.015

I is the rated current

The expanded uncertainties given in this table are expressed in %

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**CT phase displacement**

	Frequency: 50 Hz	Expanded uncertainty
1 A to 500 A	0.20/ to 2.00/	0.03
1 A to 500 A	0.05/	0.06
1 A to 500 A	0.01/	0.12
750 A to 3000 A	0.20/ to 2.00/	0.04
750 A to 3000 A	0.05/	0.07
750 A to 3000 A	0.01/	0.13

I is the rated current

The expanded uncertainties given in this table are expressed in mrad

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)**Phase angle**

	$U_1 = U_2$	$U_2 / U_1 \leq 1000$
1 Hz to 50 Hz	0.06	0.08 to 0.22
50 Hz to 100 Hz	0.04	0.06 to 0.21
100 Hz to 1 kHz	0.08	0.18 to 0.48
1 kHz to 10 kHz	0.08 to 0.14	0.18 to 0.78
10 kHz to 100 kHz	0.14 to 0.83	0.29 to 1.68

U_1 and U_2 are the signals whose phase difference is measured

The expanded uncertainties given in this table are expressed in °

Electricity and Magnetism, Serbia, DMDM (Directorate of Measures and Precious Metals)

matrix I harmonics

	1	2 to 9	10 to 17	18 to 50
0.016 A to 10 A	0.4	-	-	-
(0.016 A to 10 A)/ <i>n</i>	-	1.4	1.7	2.9

n: number of harmonics

The expanded uncertainties given in this table are expressed in mA/A