

Accredited entity according to ČSN EN ISO/IEC 17025:2018:

Element Metech s.r.o.
Calibration Laboratory
Toužimská 767, Letňany, 199 00 Praha 9

CMC for the field of measured quantity: Length

Ord. number	Calibrated quantity / Subject of calibration	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work-place
		min	max					
1	Slide gauges	0 mm	to 300 mm		(30L+ 30) μm	Direct measurement using parallel gauge blocks	LIII-D001	
2	Micrometers	0 mm	to 100 mm		(10L+ 3) μm	Direct measurement using parallel gauge blocks	LIII-D002	

¹⁾ Asterisk at the ordinal number identifies the calibrations, which the Laboratory is qualified to carry out outside the permanent laboratory premises.

²⁾ The expanded measurement uncertainty is in accordance with ILAC-P14 and EA-4/02 M, part of CMC, and it is the lowest value of the respective uncertainty. If not stated otherwise, its coverage probability is approx. 95 %. If not stated otherwise, the uncertainty values stated without a unit are relative to the value measured. If the calibration is carried out outside the laboratory premises, the measurement uncertainty may be affected.

³⁾ If the document identifying the calibration procedure is dated, only these specific procedures are used. If the document identifying the calibration procedure is not dated, the latest edition of the specified procedure is used (including any changes).

L [m] - characteristic dimension



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CMC for the field of measured quantity: Electrical quantities

Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
		min unit	max unit					
1*	DC voltage / DC voltage meters	0 mV	to 220 mV		0.00075 % + 0.4 μV 0.00048 % + 0.7 μV 0.00044 % 0.00037 % 0.00065 % 0.00081 %	Direct generation by a voltage calibrator	LIII-001	
		220 mV	to 2.2 V					
		2.2 V	to 11 V					
		11 V	to 22 V					
		22 V	to 220 V					
220 V	to 1,000 V							
2*	DC voltage / DC voltage sources	10 mV	to 120 mV		0.00075 % + 1.0 μV 0.00055 % + 1.0 μV 0.00055 % 0.00087 % 0.0016 %	Direct measurement by a standard multimeter	LIII-001	
		120 mV	to 1.2 V					
		1.2 V	to 12 V					
		12 V	to 120 V					
		120 V	to 1 kV					
3*	AC voltage / AC voltage meters	0.22 mV	to 2.2 mV	10 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 10 Hz to 20 Hz 20 Hz to 40 Hz	0.079 % + 4 μV 0.044 % + 4 μV 0.085 % + 4 μV 0.13 % + 5 μV 0.26 % + 10 μV 0.28 % + 20 μV 0.44 % + 20 μV 0.038 % + 4 μV 0.022 % + 4 μV	Direct generation by a voltage calibrator	LIII-005	
		2.2 mV	to 22 mV					
		22 mV	to 220 mV					
		220 mV	to 2.2 V					
		2.2 V	to 22 V					



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	min unit	max unit	min unit	max unit					
					40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	0.014 % + 4 μ V 0.029 % + 4 μ V 0.056 % + 5 μ V 0.13 % + 10 μ V 0.16 % + 20 μ V 0.32 % + 20 μ V			
			22 mV to	220 mV	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	0.085 % 0.042 % 0.038 % 0.050 % 0.12 % 0.18 % 0.25 % 0.49 %			
			220 mV to	2.2 V	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	0.050 % 0.018 % 0.0085 % 0.013 % 0.015 % 0.078 % 0.19 % 0.32 %			
			2.2 V to	22 V	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz	0.049 % 0.018 % 0.0075 %			



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		min unit	max unit					
4*	AC voltage / AC voltage sources	22 V to 220 V		20 kHz to 50 kHz	0.013 %	Direct measurement by a standard multimeter	L.III-005	
				50 kHz to 100 kHz	0.022 %			
				100 kHz to 300 kHz	0.060 %			
				300 kHz to 500 kHz	0.19 %			
				500 kHz to 1 MHz	0.33 %			
		10 Hz to 20 Hz		10 Hz to 20 Hz	0.049 %			
				20 Hz to 40 Hz	0.018 %			
				40 Hz to 20 kHz	0.0085 %			
		20 to 50 kHz		20 to 50 kHz	0.015 %			
				50 kHz to 100 kHz	0.028 %			
		220 V to 1,000 V		50 Hz to 1 kHz	0.023 %			
				1 kHz	4.5 μV			
		1 mV to 12 mV		1 kHz	11 μV			
				12 mV to 120 mV				
		120 mV to 12 V		40 Hz to 1 kHz	0.027 %			
				1 kHz to 20 kHz	0.030 %			
				20 kHz to 50 kHz	0.043 %			
		12 V to 120 V		50 kHz to 100 kHz	0.096 %			
				40 Hz to 20 kHz	0.035 %			
		120 V to 700 V		20 kHz to 50 kHz	0.048 %			
				50 kHz to 100 kHz	0.14 %			
						40 Hz to 20 kHz	0.075 %	



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		min unit	max unit						
5*	DC current / DC current meters	0 μ A	to 220 μ A		0.0040 % + 6 nA 0.0032 % + 7 nA 0.0050 % 0.0069 % 0.013 %	Direct generation by a current calibrator	LIII-004		
		220 μ A	to 2.2 mA						
		2.2 mA	to 22 mA						
		22 mA	to 220 mA						
		220 mA	to 2.2 A						
6*	DC current / DC current sources	100 nA	to 1 μ A		0.47 nA 0.30 nA 0.0097 % 0.0064 % 0.0064 % 0.0077 % 0.021 %	Direct measurement by a standard multimeter	LIII-004		
		1 μ A	to 10 μ A						
		10 μ A	to 100 μ A						
		100 μ A	to 1 mA						
		1 mA	to 10 mA						
		10 mA	to 100 mA						
		100 mA	to 1 A						
		1 A	to 10 A						Indirect measurement of voltage drop on a standard shunt
		10 A	to 20 A						
		20 A	to 30 A						
30 A	to 40 A								
		40 A	to 50 A		0.038 %				



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		min unit	max unit					
7*	AC current / AC current meters	9 μ A	220 μ A	10 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 20 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.041 % + 18 nA 0.036 % + 8 nA 0.047 % + 12 nA 0.11 % + 65 nA 0.059 % 0.049 % 0.095 % 0.39 % 0.045 % 0.031 % 0.057 % 0.32 % 0.045 % 0.028 % 0.046 % 0.15 % 0.046 % 0.083 % 0.70 %	Direct generation by a current calibrator	LIII-002	
		200 μ A	2.2 mA					
		2.2 mA	22 mA					
		22 mA	220 mA					
		220 mA	2.2 A					



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		min unit	max unit					
8*	AC current / AC current sources	10 μ A 120 μ A 1.2 mA 12 mA 120 mA	to to to to to	45 Hz to 1 kHz 45 Hz to 5 kHz 45 Hz to 5 kHz 45 Hz to 5 kHz 45 Hz to 5 kHz	82 nA 0.49 μ A 0.26 % 0.26 % 0.28 %	Direct measurement by a standard multimeter	LIII-002	
9*	DC resistance / DC resistance standards	0 Ω 0.1 Ω 1 Ω 10 Ω 100 Ω 1 k Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω 1 M Ω 10 M Ω 100 M Ω	to to to to to to to to to to to to		68 $\mu\Omega$ 0.0020 % 0.0020 % 0.0060 % 0.0014 % 0.0014 % 0.0014 % 0.0032 % 0.015 % 0.083 % 0.87 %	Direct measurement by a standard multimeter	LIII-006	
10*	DC resistance / DC resistance meters	1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω				Direct generation by a resistance calibrator	LIII-006	



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		min unit	max unit					
11*	AC resistance / AC resistance meters	1 Ω	190 Ω	20 Hz 60 Hz 100 Hz 1 kHz 10 kHz 100 kHz	0.0011 %	Direct generation using an AC resistance standard	LIII-070	
			1 kΩ		0.00080 %			
			1.9 kΩ		0.00086 %			
			10 kΩ		0.00078 %			
			19 kΩ		0.00079 %			
			100 kΩ		0.0011 %			
			190 kΩ		0.0011 %			
			1 MΩ		0.0019 %			
			1.9 MΩ		0.0021 %			
			10 MΩ		0.0039 %			
			19 MΩ		0.0047 %			
100 MΩ	0.012 %							
		1 Ω	20 Hz	20 Hz 60 Hz 100 Hz 1 kHz 10 kHz 100 kHz	0.08 %			
			60 Hz		0.08 %			
			100 Hz		0.06 %			
			1 kHz		0.06 %			
			10 kHz		0.15 %			
			100 kHz		1.1 %			
		1 Ω	20 Hz	20 Hz 60 Hz 100 Hz 1 kHz 10 kHz 100 kHz	0.02 %			
			60 Hz		0.02 %			
			100 Hz		0.02 %			
			1 kHz		0.02 %			
			10 kHz		0.02 %			
			100 kHz		0.11 %			



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	min unit	max unit	min unit	max unit					
			10 Ω		20 Hz 60 Hz 100 Hz 1 kHz 10 kHz 100 kHz	0.02 % 0.02 % 0.02 % 0.02 % 0.02 % 0.05 %			
			100 Ω		20 Hz 60 Hz 100 Hz 1 kHz 10 kHz 100 kHz	0.02 % 0.02 % 0.02 % 0.02 % 0.02 % 0.05 %			
			1 kΩ		20 Hz 60 Hz 100 Hz 1 kHz 10 kHz 100 kHz	0.02 % 0.02 % 0.02 % 0.02 % 0.02 % 0.05 %			
			10 kΩ		20 Hz 60 Hz 100 Hz 1 kHz 10 kHz 100 kHz	0.02 % 0.02 % 0.02 % 0.02 % 0.02 % 0.05 %			



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12*	AC resistance / AC resistance standards	100 mΩ to 1 Ω	± 5 %	20 Hz to 100 Hz	0.02 %	Direct measurement by a standard LCR meter	LIII-071	
				100 Hz to 10 kHz	0.02 %			
				10 kHz to 100 kHz	0.02 %			
				20 Hz to 100 Hz	0.02 %			
				100 Hz to 10 kHz	0.02 %			
				10 kHz to 100 kHz	0.02 %			
		10 MΩ		20 Hz	0.04 %			
				60 Hz	0.02 %			
				100 Hz	0.02 %			
				1 kHz	0.02 %			
				10 kHz	0.07 %			
				100 kHz	0.61 %			
100 kΩ		20 Hz	0.11 %					
		60 Hz	0.07 %					
		100 Hz	0.05 %					
		1 kHz	0.05 %					
		10 kHz	0.05 %					
		100 kHz	0.81 %					



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		min unit	max unit					
		1 Ω	± 5 %	20 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.12 % 0.11 % 0.11 %			
		1 Ω to 10 Ω		20 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.12 % 0.12 % 0.12 %			
		10 Ω	± 5 %	20 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.10 % 0.08 % 0.09 %			
		10 Ω to 100 Ω		20 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.11 % 0.09 % 0.10 %			
		100 Ω	± 5 %	20 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.05 % 0.05 % 0.06 %			
		100 Ω to 1 kΩ		20 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.06 % 0.06 % 0.06 %			
		1 kΩ	± 5 %	20 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.06 % 0.05 % 0.05 %			
		1 kΩ to 10 kΩ		20 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.06 % 0.06 % 0.06 %			



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		min unit	max unit					
		10 k Ω	$\pm 5\%$	20 Hz to 100 Hz	0.05 %	Direct measurement using a standard modulation analyzer	LIII-050	
				100 Hz to 10 kHz	0.05 %			
				10 kHz to 100 kHz	0.05 %			
		10 k Ω	to 100 k Ω	20 Hz to 100 Hz	0.06 %			
				100 Hz to 10 kHz	0.06 %			
				10 kHz to 100 kHz	0.21 %			
		100 k Ω	$\pm 5\%$	20 Hz to 100 Hz	0.05 %			
				100 Hz to 10 kHz	0.05 %			
				10 kHz to 100 kHz	0.21 %			
		100 k Ω	to 1 M Ω	20 Hz to 100 Hz	0.08 %			
				100 Hz to 10 kHz	0.07 %			
				10 kHz to 100 kHz	0.61 %			
1 M Ω	$\pm 5\%$	20 Hz to 100 Hz	0.08 %					
		100 Hz to 10 kHz	0.07 %					
		10 kHz to 100 kHz	0.61 %					
1 M Ω	to 10 M Ω	20 Hz to 100 Hz	0.18 %					
		100 Hz to 10 kHz	0.81 %					
10 M Ω	$\pm 5\%$	20 Hz to 100 Hz	0.17 %					
		100 Hz to 10 kHz	0.81 %					
13*	Amplitude modulation depth / signal sources	10 %	to 90 %	Carrier frequency 150 kHz to 100 kHz Modulation frequency 50 Hz to 50 Hz	2.7 % 3.8 % 1.6 % 3.8 %			



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14*	Modulation swing of frequency modulation / signal sources	50 Hz	40 kHz	Carrier frequency 250 kHz to 10 MHz 50 Hz to 10 kHz 10 MHz to 1.3 GHz 50 Hz to 100 kHz 10 MHz to 1.3 GHz 100 kHz to 200 kHz	2.6 % 1.5 % 6.1 %	Measurement by a frequency swing analyzer	LIII-051	
		50 Hz	400 kHz					
		0.001 %	0.1 %					
15*	Signal distortion (THD) / signal sources (50 mV to 300 V)	0.1 %	3 %	Fundamental harmonic frequency 20 Hz to 20 kHz 20 kHz to 100 kHz 20 Hz to 20 kHz 80 kHz 20 kHz to 100 kHz 500 kHz 20 Hz to 20 kHz 80 kHz 20 kHz to 100 kHz 500 kHz 20 Hz to 20 kHz 80 kHz 20 kHz to 100 kHz 500 kHz	0.04 % (abs.) 0.11 % (abs.) 0.15 % (abs.) 0.32 % (abs.) 0.42 % (abs.) 0.90 % (abs.) 4.2 % (abs.) 9.0 % (abs.)	Direct measurement using a standard distortion analyzer	LIII-056	
		3 %	30 %					
		30 %	100 %					
		0	0.02					
		30 kHz	50 MHz					
		50 MHz	2 GHz					
		2 GHz	5 GHz					
5 GHz	6 GHz							
6 GHz	13 GHz							
13 GHz	18 GHz							
16*	Reflection factor / Instruments and circuit elements with coaxial connection (N connector, 50 Ω)	0	0.02		0.010 (abs.) 0.006 (abs.) 0.009 (abs.) 0.011 (abs.) 0.029 (abs.) 0.030 (abs.)	Measurement by a circuit analyzer	LIII-055	



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	min unit	max unit	min unit	max unit					
	0.02	to 0.1	30 kHz to 50 MHz		30 kHz to 50 MHz	0.011 (abs.)			
			50 MHz to 2 GHz		50 MHz to 2 GHz	0.006 (abs.)			
			2 GHz to 5 GHz		2 GHz to 5 GHz	0.009 (abs.)			
			5 GHz to 6 GHz		5 GHz to 6 GHz	0.011 (abs.)			
			6 GHz to 13 GHz		6 GHz to 13 GHz	0.029 (abs.)			
			13 GHz to 18 GHz		13 GHz to 18 GHz	0.030 (abs.)			
	0.1	to 0.2	30 kHz to 50 MHz		30 kHz to 50 MHz	0.011 (abs.)			
			50 MHz to 1 GHz		50 MHz to 1 GHz	0.006 (abs.)			
			1 GHz to 2 GHz		1 GHz to 2 GHz	0.007 (abs.)			
			2 GHz to 4 GHz		2 GHz to 4 GHz	0.009 (abs.)			
			4 GHz to 5 GHz		4 GHz to 5 GHz	0.010 (abs.)			
			5 GHz to 6 GHz		5 GHz to 6 GHz	0.011 (abs.)			
			6 GHz to 11 GHz		6 GHz to 11 GHz	0.029 (abs.)			
			11 GHz to 18 GHz		11 GHz to 18 GHz	0.030 (abs.)			
	0.2	to 0.3	30 kHz to 300 kHz		30 kHz to 300 kHz	0.016 (abs.)			
			300 kHz to 50 MHz		300 kHz to 50 MHz	0.017 (abs.)			
			50 MHz to 200 MHz		50 MHz to 200 MHz	0.007 (abs.)			
			200 MHz to 2 GHz		200 MHz to 2 GHz	0.008 (abs.)			
			2 GHz to 4 GHz		2 GHz to 4 GHz	0.010 (abs.)			
			4 GHz to 5 GHz		4 GHz to 5 GHz	0.011 (abs.)			
			5 GHz to 6 GHz		5 GHz to 6 GHz	0.012 (abs.)			
			6 GHz to 11 GHz		6 GHz to 11 GHz	0.029 (abs.)			
			11 GHz to 13 GHz		11 GHz to 13 GHz	0.030 (abs.)			
			13 GHz to 18 GHz		13 GHz to 18 GHz	0.031 (abs.)			



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	min unit	max unit	min unit	max unit					
	0.3	to 0.4	30 kHz to 300 kHz 300 kHz to 50 MHz 50 MHz to 200 MHz 200 MHz to 2 GHz 2 GHz to 5 GHz 5 GHz to 6 GHz 6 GHz to 13 GHz 13 GHz to 18 GHz			0.016 (abs.) 0.017 (abs.) 0.010 (abs.) 0.011 (abs.) 0.013 (abs.) 0.014 (abs.) 0.031 (abs.) 0.032 (abs.)			
	0.4	to 0.5	30 kHz to 300 kHz 300 kHz to 50 MHz 50 MHz to 1 GHz 1 GHz to 2 GHz 2 GHz to 4 GHz 4 GHz to 6 GHz 6 GHz to 13 GHz 13 GHz to 18 GHz			0.020 (abs.) 0.023 (abs.) 0.015 (abs.) 0.016 (abs.) 0.017 (abs.) 0.018 (abs.) 0.033 (abs.) 0.034 (abs.)			
	0.5	to 0.6	30 kHz to 300 kHz 300 kHz to 50 MHz 50 MHz to 1 GHz 1 GHz to 2 GHz 2 GHz to 5 GHz 5 GHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 18 GHz			0.020 (abs.) 0.023 (abs.) 0.021 (abs.) 0.022 (abs.) 0.023 (abs.) 0.024 (abs.) 0.036 (abs.) 0.037 (abs.)			



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		min unit	max unit						
		0.6	to 0.7	30 kHz to 300 kHz 300 kHz to 50 MHz 50 MHz to 1 GHz 1 GHz to 3 GHz 3 GHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 18 GHz	0.026 (abs.) 0.030 (abs.) 0.028 (abs.) 0.030 (abs.) 0.031 (abs.) 0.041 (abs.) 0.042 (abs.)				
		0.7	to 0.8	30 kHz to 300 kHz 300 kHz to 1.3 GHz 1.3 GHz to 4 GHz 4 GHz to 6 GHz 6 GHz to 13 GHz 13 GHz to 18 GHz	0.026 (abs.) 0.030 (abs.) 0.039 (abs.) 0.040 (abs.) 0.048 (abs.) 0.049 (abs.)				
		0.8	to 0.9	30 kHz to 300 kHz 300 kHz to 1.3 GHz 1.3 GHz to 4 GHz 4 GHz to 6 GHz 6 GHz to 18 GHz	0.032 (abs.) 0.039 (abs.) 0.049 (abs.) 0.050 (abs.) 0.057 (abs.)				
		0.9	to 1.0	30 kHz to 300 kHz 300 kHz to 1.3 GHz 1.3 GHz to 2 GHz 2 GHz to 6 GHz 6 GHz to 18 GHz	0.032 (abs.) 0.039 (abs.) 0.060 (abs.) 0.061 (abs.) 0.067 (abs.)				



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		min unit	max unit						
	Reflection factor / Instruments and circuit elements with coaxial connection (3.5mm connector, 50 Ω)	0	to 0.2	50 MHz to 250 MHz	0.007 (abs.)				
250 MHz to 500 MHz				0.008 (abs.)					
500 MHz to 1 GHz				0.009 (abs.)					
1 GHz to 2 GHz				0.012 (abs.)					
2 GHz to 3 GHz				0.013 (abs.)					
3 GHz to 4 GHz				0.014 (abs.)					
4 GHz to 5 GHz				0.017 (abs.)					
5 GHz to 6 GHz				0.018 (abs.)					
6 GHz to 26.5 GHz		0.045 (abs.)							
0.2		to 0.3	50 MHz to 500 MHz	0.010 (abs.)					
			500 MHz to 1 GHz	0.011 (abs.)					
			1 GHz to 2 GHz	0.014 (abs.)					
			2 GHz to 3 GHz	0.015 (abs.)					
			3 GHz to 4 GHz	0.016 (abs.)					
			4 GHz to 5 GHz	0.018 (abs.)					
			5 GHz to 6 GHz	0.019 (abs.)					
	6 GHz to 26.5 GHz		0.046 (abs.)						
0.3	to 0.4	50 MHz to 250 MHz	0.014 (abs.)						
		250 MHz to 500 MHz	0.015 (abs.)						
		500 MHz to 1 GHz	0.016 (abs.)						



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Toužimská 767, Letňany, 199 00 Praha 9

Ord. number ¹	Calibrated quantity / Subject of calibration		Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
	min unit	max unit	min unit	max unit					
					1 GHz to 2 GHz 2 GHz to 4 GHz 4 GHz to 5 GHz 5 GHz to 6 GHz 6 GHz to 19 GHz 19 GHz to 26.5 GHz	0.018 (abs.) 0.019 (abs.) 0.021 (abs.) 0.022 (abs.) 0.047 (abs.) 0.048 (abs.)			
	0.4	to	0.5		50 MHz to 500 MHz 500 MHz to 1 GHz 1 GHz to 3 GHz 3 GHz to 4 GHz 4 GHz to 5 GHz 5 GHz to 6 GHz 6 GHz to 10 GHz 10 GHz to 20 GHz 20 GHz to 26.5 GHz	0.021 (abs.) 0.022 (abs.) 0.024 (abs.) 0.025 (abs.) 0.026 (abs.) 0.027 (abs.) 0.049 (abs.) 0.050 (abs.) 0.051 (abs.)			
	0.5	to	0.6		50 MHz to 250 MHz 250 MHz to 1 GHz 1 GHz to 3 GHz 3 GHz to 4 GHz 4 GHz to 5 GHz 5 GHz to 6 GHz 6 GHz to 20 GHz	0.029 (abs.) 0.030 (abs.) 0.032 (abs.) 0.033 (abs.) 0.034 (abs.) 0.035 (abs.) 0.054 (abs.)			



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Ord. number ¹	Calibrated quantity / Subject of calibration		Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
	min unit	max unit	min unit	max unit					
					20 GHz to 26.5 GHz	0.057 (abs.)			
	0.6	to 0.7			50 MHz to 250 MHz 250 MHz to 1 GHz 1 GHz to 3 GHz 3 GHz to 4 GHz 4 GHz to 6 GHz 6 GHz to 17 GHz 17 GHz to 20 GHz	0.039 (abs.) 0.040 (abs.) 0.042 (abs.) 0.043 (abs.) 0.044 (abs.) 0.060 (abs.) 0.061 (abs.)			
	0.7	to 0.8			20 GHz to 26.5 GHz 50 MHz to 500 MHz 500 MHz to 1 GHz 1 GHz to 4 GHz 4 GHz to 5 GHz 5 GHz to 6 GHz 6 GHz to 20 GHz	0.051 (abs.) 0.052 (abs.) 0.054 (abs.) 0.055 (abs.) 0.056 (abs.) 0.069 (abs.)			
	0.8	to 0.9			20 GHz to 26.5 GHz 50 MHz to 1 GHz 1 GHz to 4 GHz 4 GHz to 6 GHz 6 GHz to 17 GHz 17 GHz to 20 GHz	0.076 (abs.) 0.065 (abs.) 0.068 (abs.) 0.069 (abs.) 0.080 (abs.) 0.081 (abs.)			



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	min unit	max unit	min unit	max unit					
					20 GHz to 26.5 GHz	0.090 (abs.)			
			0.9 to 1.0		50 MHz to 1 GHz 1 GHz to 4 GHz 4 GHz to 6 GHz 6 GHz to 20 GHz 20 GHz to 26.5 GHz	0.080 (abs.) 0.083 (abs.) 0.084 (abs.) 0.94 (abs.) 0.11 (abs.)			
			0 to 0.1		50 MHz to 2 GHz 2 GHz to 3 GHz 3 GHz to 4 GHz 4 GHz to 12 GHz 12 GHz to 14 GHz 14 GHz to 20 GHz 20 GHz to 26 GHz 26 GHz to 30 GHz 30 GHz to 34 GHz 34 GHz to 36 GHz 36 GHz to 39 GHz 39 GHz to 40 GHz 40 GHz to 43 GHz 43 GHz to 44 GHz 44 GHz to 47 GHz	0.010 (abs.) 0.011 (abs.) 0.012 (abs.) 0.013 (abs.) 0.014 (abs.) 0.016 (abs.) 0.017 (abs.) 0.018 (abs.) 0.021 (abs.) 0.022 (abs.) 0.024 (abs.) 0.020 (abs.) 0.023 (abs.) 0.021 (abs.) 0.031 (abs.)			
		Reflection factor / Instruments and circuit elements with coaxial connection (2.4 mm connector, 50 Ω)							



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Ord. number ¹	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
	min unit	max unit					
	0.1	to 0.2	47 GHz to 50 GHz 50 MHz to 2 GHz 2 GHz to 3 GHz 3 GHz to 12 GHz 12 GHz to 14 GHz 14 GHz to 20 GHz 20 GHz to 26 GHz 26 GHz to 30 GHz 30 GHz to 34 GHz 34 GHz to 36 GHz 36 GHz to 39 GHz 39 GHz to 40 GHz 40 GHz to 43 GHz 43 GHz to 44 GHz 44 GHz to 47 GHz 47 GHz to 50 GHz	0.035 (abs.) 0.010 (abs.) 0.012 (abs.) 0.013 (abs.) 0.014 (abs.) 0.016 (abs.) 0.017 (abs.) 0.018 (abs.) 0.021 (abs.) 0.022 (abs.) 0.024 (abs.) 0.020 (abs.) 0.023 (abs.) 0.021 (abs.) 0.031 (abs.) 0.036 (abs.)			
	0.2	to 0.3	50 MHz to 2 GHz 2 GHz to 3 GHz 3 GHz to 12 GHz 12 GHz to 14 GHz 14 GHz to 20 GHz 20 GHz to 22 GHz 22 GHz to 26 GHz 26 GHz to 30 GHz 30 GHz to 34 GHz 34 GHz to 36 GHz	0.010 (abs.) 0.012 (abs.) 0.013 (abs.) 0.014 (abs.) 0.016 (abs.) 0.018 (abs.) 0.017 (abs.) 0.019 (abs.) 0.021 (abs.) 0.022 (abs.)			



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Ord. number ¹	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
	min unit	max unit					
			36 GHz to 39 GHz	0.024 (abs.)			
			39 GHz to 40 GHz	0.020 (abs.)			
			40 GHz to 43 GHz	0.023 (abs.)			
			43 GHz to 44 GHz	0.022 (abs.)			
			44 GHz to 47 GHz	0.032 (abs.)			
			47 GHz to 50 GHz	0.036 (abs.)			
	0.3	to 0.4	50 MHz to 2 GHz	0.011 (abs.)			
			2 GHz to 3 GHz	0.012 (abs.)			
			3 GHz to 12 GHz	0.013 (abs.)			
			12 GHz to 14 GHz	0.015 (abs.)			
			14 GHz to 18 GHz	0.016 (abs.)			
			18 GHz to 20 GHz	0.017 (abs.)			
			20 GHz to 26 GHz	0.019 (abs.)			
			26 GHz to 30 GHz	0.020 (abs.)			
			30 GHz to 36 GHz	0.023 (abs.)			
			36 GHz to 39 GHz	0.025 (abs.)			
			39 GHz to 40 GHz	0.022 (abs.)			
			40 GHz to 43 GHz	0.025 (abs.)			
			43 GHz to 44 GHz	0.024 (abs.)			
			44 GHz to 47 GHz	0.033 (abs.)			
			47 GHz to 50 GHz	0.037 (abs.)			
	0.4	to 0.5	50 MHz to 2 GHz	0.011 (abs.)			
			2 GHz to 3 GHz	0.013 (abs.)			
			3 GHz to 12 GHz	0.014 (abs.)			
			12 GHz to 14 GHz	0.015 (abs.)			
			14 GHz to 20 GHz	0.017 (abs.)			



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	min	max	unit	unit					
					20 GHz to 22 GHz	0.022 (abs.)			
					22 GHz to 26 GHz	0.021 (abs.)			
					26 GHz to 30 GHz	0.023 (abs.)			
					30 GHz to 34 GHz	0.025 (abs.)			
					34 GHz to 36 GHz	0.026 (abs.)			
					36 GHz to 39 GHz	0.028 (abs.)			
					39 GHz to 40 GHz	0.024 (abs.)			
					40 GHz to 43 GHz	0.029 (abs.)			
					43 GHz to 44 GHz	0.028 (abs.)			
					44 GHz to 47 GHz	0.036 (abs.)			
					47 GHz to 50 GHz	0.040 (abs.)			
			0.5	to 0.6	50 MHz to 2 GHz	0.011 (abs.)			
					2 GHz to 3 GHz	0.014 (abs.)			
					3 GHz to 12 GHz	0.015 (abs.)			
					12 GHz to 14 GHz	0.016 (abs.)			
					14 GHz to 20 GHz	0.018 (abs.)			
					20 GHz to 26 GHz	0.026 (abs.)			
					26 GHz to 30 GHz	0.027 (abs.)			
					30 GHz to 34 GHz	0.029 (abs.)			
					34 GHz to 35 GHz	0.030 (abs.)			
					35 GHz to 36 GHz	0.029 (abs.)			
					36 GHz to 39 GHz	0.031 (abs.)			
					39 GHz to 40 GHz	0.028 (abs.)			
					40 GHz to 43 GHz	0.035 (abs.)			



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		min unit	max unit					
				43 GHz to 44 GHz 44 GHz to 47 GHz 47 GHz to 50 GHz	0.034 (abs.) 0.041 (abs.) 0.045 (abs.)			
		0.6	to 0.7	50 MHz to 100 MHz 100 MHz to 2 GHz 2 GHz to 3 GHz 3 GHz to 8 GHz 8 GHz to 11 GHz 11 GHz to 12 GHz 12 GHz to 14 GHz 14 GHz to 16 GHz 16 GHz to 20 GHz 20 GHz to 22 GHz 22 GHz to 26 GHz 26 GHz to 30 GHz 30 GHz to 34 GHz 34 GHz to 36 GHz 36 GHz to 39 GHz 39 GHz to 40 GHz 40 GHz to 43 GHz 43 GHz to 44 GHz 44 GHz to 47 GHz 47 GHz to 50 GHz	0.011 (abs.) 0.012 (abs.) 0.016 (abs.) 0.017 (abs.) 0.018 (abs.) 0.017 (abs.) 0.018 (abs.) 0.019 (abs.) 0.020 (abs.) 0.032 (abs.) 0.031 (abs.) 0.032 (abs.) 0.034 (abs.) 0.035 (abs.) 0.036 (abs.) 0.034 (abs.) 0.043 (abs.) 0.042 (abs.) 0.048 (abs.) 0.051 (abs.)			



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Ord. number ¹	Calibrated quantity / Subject of calibration		Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place																															
	min unit	max unit	min unit	max unit																																				
	0.7	to 0.8	50 MHz to 100 MHz	100 MHz to 2 GHz	2 GHz to 3 GHz	3 GHz to 12 GHz	12 GHz to 14 GHz	14 GHz to 18 GHz	18 GHz to 19 GHz	19 GHz to 20 GHz	20 GHz to 29 GHz	26 GHz to 30 GHz	30 GHz to 34 GHz	34 GHz to 36 GHz	36 GHz to 39 GHz	39 GHz to 40 GHz	40 GHz to 43 GHz	43 GHz to 44 GHz	44 GHz to 47 GHz	47 GHz to 50 GHz	0.012 (abs.)	0.013 (abs.)	0.019 (abs.)	0.020 (abs.)	0.021 (abs.)	0.022 (abs.)	0.023 (abs.)	0.022 (abs.)	0.039 (abs.)	0.040 (abs.)	0.041 (abs.)	0.042 (abs.)	0.043 (abs.)	0.041 (abs.)	0.053 (abs.)	0.052 (abs.)	0.057 (abs.)	0.060 (abs.)		
	0.8	to 0.9	50 MHz to 100 MHz	100 MHz to 2 GHz	2 GHz to 3 GHz	3 GHz to 8 GHz	8 GHz to 11 GHz	11 GHz to 12 GHz														0.013 (abs.)	0.014 (abs.)	0.022 (abs.)	0.023 (abs.)	0.024 (abs.)	0.023 (abs.)													



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		min	max					
				12 GHz to 14 GHz 14 GHz to 18 GHz 18 GHz to 19 GHz 19 GHz to 20 GHz 20 GHz to 26 GHz 26 GHz to 30 GHz 30 GHz to 36 GHz 36 GHz to 37 GHz 37 GHz to 39 GHz 39 GHz to 40 GHz 40 GHz to 43 GHz 43 GHz to 44 GHz 44 GHz to 47 GHz 47 GHz to 50 GHz	0.024 (abs.) 0.025 (abs.) 0.026 (abs.) 0.025 (abs.) 0.047 (abs.) 0.048 (abs.) 0.050 (abs.) 0.052 (abs.) 0.051 (abs.) 0.049 (abs.) 0.064 (abs.) 0.063 (abs.) 0.068 (abs.) 0.070 (abs.)			
		0.8	to 0.9	50 MHz to 100 MHz 100 MHz to 2 GHz 2 GHz to 3 GHz 3 GHz to 8 GHz 8 GHz to 11 GHz 11 GHz to 14 GHz 14 GHz to 16 GHz 16 GHz to 18 GHz 18 GHz to 19 GHz 19 GHz to 20 GHz 20 GHz to 26 GHz	0.014 (abs.) 0.015 (abs.) 0.026 (abs.) 0.027 (abs.) 0.028 (abs.) 0.027 (abs.) 0.028 (abs.) 0.029 (abs.) 0.030 (abs.) 0.029 (abs.) 0.057 (abs.)			



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		min unit	max unit					
17*	HF power - calibration factor / HF power meters (N connector, 50 Ω, 1 mW)	0.5	to 1.5	26 GHz to 30 GHz	0.058 (abs.)	Comparison with a standard HF wattmeter	LIII-052	
				30 GHz to 36 GHz	0.060 (abs.)			
				36 GHz to 39 GHz	0.061 (abs.)			
				39 GHz to 40 GHz	0.059 (abs.)			
				40 GHz to 43 GHz	0.078 (abs.)			
				43 GHz to 44 GHz	0.077 (abs.)			
				44 GHz to 47 GHz	0.080 (abs.)			
				47 GHz to 50 GHz	0.083 (abs.)			
				10 MHz to 30 MHz	2.0 %			
				30 MHz to 100 MHz	1.6 %			
				100 MHz to 4 GHz	1.7 %			
				4 GHz to 7 GHz	2.1 %			
				7 GHz to 8 GHz	2.0 %			
				8 GHz to 9 GHz	2.2 %			
				9 GHz to 11 GHz	2.3 %			
				11 GHz to 12 GHz	2.5 %			
				12 GHz to 13 GHz	2.6 %			
13 GHz to 15 GHz	2.7 %							
15 GHz to 16 GHz	2.5 %							
16 GHz to 17 GHz	2.9 %							
17 GHz to 18 GHz	4.3 %							



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Ord. number	Calibrated quantity / Subject of calibration	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
		min unit	max unit					
	HF power - calibration factor / HF power meters (2.4mm connector, 50 Ω, 1 mW)	0.5	to 1.5	100 MHz to 300 MHz 300 MHz to 8 GHz 8 GHz to 20 GHz 20 GHz to 21 GHz 21 GHz to 23 GHz 23 GHz to 29 GHz 29 GHz to 31 GHz 31 GHz to 35 GHz 35 GHz to 37 GHz 37 GHz to 39 GHz 39 GHz to 41 GHz 41 GHz to 42 GHz 42 GHz to 45 GHz 45 GHz to 46 GHz 46 GHz to 47 GHz 47 GHz to 48 GHz 48 GHz to 50 GHz 50 GHz	2.4 % 2.5 % 2.6 % 2.8 % 2.9 % 2.9 % 3.6 % 3.0 % 3.0 % 3.1 % 3.2 % 3.3 % 3.7 % 3.6 % 3.6 % 3.7 % 5.8 % 4.8 %			
	HF power - calibration factor / HF power meters (2.4mm connector, 50 Ω, 1 μW)	0.5	to 1.5	100 MHz to 300 MHz 300 MHz to 8 GHz 8 GHz to 22 GHz 22 GHz to 26 GHz	2.5 % 2.6 % 2.7 % 2.8 %			



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Ord. number	Calibrated quantity / Subject of calibration		Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place				
	min	unit	max	unit									
18*	Power output / signal sources				26 GHz to 29 GHz	2.9 %	Direct measurement by a HF wattmeter	LIII-054					
					29 GHz to 32 GHz	2.9 %							
					32 GHz to 34 GHz	3.0 %							
					34 GHz to 37 GHz	2.9 %							
					37 GHz to 38 GHz	3.0 %							
					38 GHz to 40 GHz	3.1 %							
					40 GHz to 41 GHz	3.2 %							
					41 GHz to 43 GHz	3.3 %							
					43 GHz to 46 GHz	3.5 %							
					46 GHz to 48 GHz	3.6 %							
					48 GHz to 49 GHz	3.8 %							
					49 GHz to 50 GHz	4.1 %							
					400 MHz to 4 GHz	3.2 % + 0.10 mW				Measurement by a wattmeter	LIII-059		
					50 MHz	0.60 %							
					100 kHz to 12 GHz	0.12 dB						Direct measurement by a HF wattmeter	LIII-054
					12 GHz to 18 GHz	0.14 dB							
					18 GHz to 26.5 GHz	0.20 dB							
					26.5 GHz to 47 GHz	0.23 dB							
47 GHz to 50 GHz	0.29 dB												



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		min unit	max unit					
19*	HF attenuation / attenuation pads, lines (2 port, 50 Ω device with N connector)	-50 dBm to	-20 dBm	100 kHz to 4 GHz	0.13 dB	Measurement by a selective HF signal meter	LIII-057	
				4 GHz to 6 GHz	0.14 dB			
				6 GHz to 31 GHz	0.19 dB			
				31 GHz to 40 GHz	0.20 dB			
				40 GHz to 43 GHz	0.21 dB			
				43 GHz to 48 GHz	0.23 dB			
				48 GHz to 50 GHz	0.24 dB			
				2.5 MHz to 10 MHz	0.28 dB			
				10 MHz to 26.5 GHz	0.15 dB			
				2.5 MHz to 10 MHz	0.33 dB			
		10 MHz to 26.5 GHz	0.23 dB					
		-120 dBm to	-110 dBm	2.5 MHz to 1.3 GHz	0.41 dB			
		0 dB to	10 dB	2.5 MHz to 1.3 GHz	0.11 dB			
		10 dB to	20 dB					
		20 dB to	30 dB					
		30 dB to	40 dB					
		40 dB to	50 dB					
		50 dB to	60 dB					
		60 dB to	70 dB					
		70 dB to	80 dB					
		80 dB to	90 dB					



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		min unit	max unit					
		90 dB	to 100 dB		0.56 dB			
		100 dB	to 110 dB		0.65 dB			
	HF attenuation / attenuation pads, lines (2 port, 50 Ω device with N connector)	0 dB	to 3 dB	300 kHz to 2 GHz	0.03 dB	Measurement by a circuit analyzer		
				2 GHz to 6 GHz	0.04 dB			
				6 GHz to 11 GHz	0.13 dB			
				11 GHz to 18 GHz	0.14 dB			
			3 dB	to 6 dB	300 kHz to 50 MHz		0.05 dB	
					50 MHz to 3 GHz		0.04 dB	
					3 GHz to 6 GHz		0.05 dB	
					6 GHz to 11 GHz		0.13 dB	
					11 GHz to 18 GHz		0.14 dB	
			6 dB	to 10 dB	300 kHz to 50 MHz		0.07 dB	
					50 MHz to 3 GHz		0.04 dB	
				3 GHz to 6 GHz	0.07 dB			
				6 GHz to 11 GHz	0.13 dB			
				11 GHz to 18 GHz	0.14 dB			
		10 dB	to 20 dB	300 kHz to 50 MHz	0.12 dB			
				50 MHz to 3 GHz	0.06 dB			
				3 GHz to 6 GHz	0.12 dB			
				6 GHz to 11 GHz	0.14 dB			
				11 GHz to 18 GHz	0.15 dB			

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	min unit	max unit	min unit	max unit					
	20 dB	to 30 dB	300 kHz to 50 MHz			0.17 dB			
			50 MHz to 3 GHz			0.08 dB			
			3 GHz to 6 GHz			0.14 dB			
			6 GHz to 11 GHz			0.16 dB			
			11 GHz to 18 GHz			0.17 dB			
	30 dB	to 40 dB	300 kHz to 50 MHz			0.22 dB			
			50 MHz to 200 MHz			0.12 dB			
			200 MHz to 3 GHz			0.11 dB			
			3 GHz to 6 GHz			0.17 dB			
			6 GHz to 11 GHz			0.20 dB			
			11 GHz to 18 GHz			0.22 dB			
	40 dB	to 50 dB	300 kHz to 50 MHz			0.27 dB			
			50 MHz to 3 GHz			0.16 dB			
			3 GHz to 6 GHz			0.20 dB			
			6 GHz to 11 GHz			0.24 dB			
			11 GHz to 18 GHz			0.30 dB			
	50 dB	to 60 dB	300 kHz to 50 MHz			0.32 dB			
			50 MHz to 200 MHz			0.27 dB			
			200 MHz to 3 GHz			0.25 dB			
			3 GHz to 6 GHz			0.28 dB			
			6 GHz to 11 GHz			0.32 dB			
			11 GHz to 18 GHz			0.47 dB			



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	min unit	max unit	min unit	max unit					
			60 dB	to 70 dB	300 kHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 18 GHz	0.37 dB 0.50 dB 0.85 dB			
		HF attenuation / attenuation pads, lines (2 port, 50 Ω device with 3.5mm connector)	0 dB	to 10 dB	50 MHz to 3 GHz 3 GHz to 11 GHz 11 GHz to 20 GHz 20 GHz to 26.5 GHz	0.06 dB 0.14 dB 0.15 dB 0.43 dB			
			10 dB	to 20 dB	50 MHz to 3 GHz 3 GHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 20 GHz 20 GHz to 26.5 GHz	0.07 dB 0.14 dB 0.15 dB 0.16 dB 0.43 dB			
			20 dB	to 30 dB	50 MHz to 3 GHz 3 GHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 20 GHz 20 GHz to 26.5 GHz	0.09 dB 0.15 dB 0.17 dB 0.18 dB 0.44 dB			
			30 dB	to 40 dB	50 MHz to 200 MHz 200 MHz to 3 GHz 3 GHz to 5 GHz	0.13 dB 0.12 dB 0.17 dB			



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	min	unit	max	unit					
					5 GHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 19 GHz 19 GHz to 20 GHz 20 GHz to 21 GHz 21 GHz to 26.5 GHz	0.18 dB 0.20 dB 0.22 dB 0.23 dB 0.46 dB 0.49 dB			
			40 dB	to 50 dB	50 MHz to 200 MHz 200 MHz to 3 GHz 3 GHz to 5 GHz 5 GHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 20 GHz 20 GHz to 21 GHz 21 GHz to 26.5 GHz	0.17 dB 0.16 dB 0.20 dB 0.21 dB 0.24 dB 0.30 dB 0.51 dB 0.56 dB			
			50 dB	to 60 dB	50 MHz to 200 MHz 200 MHz to 3 GHz 3 GHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 19 GHz 19 GHz to 20 GHz 20 GHz to 21 GHz	0.27 dB 0.25 dB 0.28 dB 0.32 dB 0.47 dB 0.48 dB 0.68 dB			



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	min unit	max unit					
			21 GHz to 26.5 GHz	0.75 dB			
	60 dB to	70 dB	50 MHz to 200 MHz 200 MHz to 3 GHz 3 GHz to 6 GHz 6 GHz to 11 GHz 11 GHz to 20 GHz 20 GHz to 21 GHz 21 GHz to 26.5 GHz	0.56 dB 0.45 dB 0.46 dB 0.50 dB 0.86 dB 1.3 dB 1.5 dB			
	0 dB to	10 dB	50 MHz to 4 GHz 4 GHz to 12 GHz 12 GHz to 40 GHz 40 GHz to 41 GHz 41 GHz to 47 GHz 47 GHz to 50 GHz	0.04 dB 0.13 dB 0.14 dB 0.19 dB 0.20 dB 0.21 dB			
	10 dB to	20 dB	50 MHz to 4 GHz 4 GHz to 7 GHz 7 GHz to 12 GHz 12 GHz to 29 GHz 29 GHz to 36 GHz 36 GHz to 37 GHz 37 GHz to 40 GHz	0.06 dB 0.13 dB 0.14 dB 0.15 dB 0.16 dB 0.17 dB 0.16 dB			
			HF attenuation / attenuation pads, lines (2 port, 50 Ω device with 2.4 mm connector)				



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Ord. number ¹	Calibrated quantity / Subject of calibration		Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
	min unit	max unit	min unit	max unit					
					40 GHz to 47 GHz 47 GHz to 50 GHz	0.21 dB 0.22 dB			
			20 dB	30 dB	50 MHz to 4 GHz 4 GHz to 7 GHz 7 GHz to 12 GHz 12 GHz to 29 GHz 29 GHz to 36 GHz 36 GHz to 37 GHz 37 GHz to 40 GHz 40 GHz to 47 GHz 47 GHz to 50 GHz	0.08 dB 0.14 dB 0.16 dB 0.17 dB 0.19 dB 0.20 dB 0.19 dB 0.24 dB 0.25 dB			
			30 dB	40 dB	50 MHz to 500 MHz 500 MHz to 4 GHz 4 GHz to 7 GHz 7 GHz to 12 GHz 12 GHz to 21 GHz 21 GHz to 29 GHz 29 GHz to 40 GHz 40 GHz to 47 GHz 47 GHz to 50 GHz	0.12 dB 0.11 dB 0.17 dB 0.20 dB 0.22 dB 0.28 dB 0.31 dB 0.41 dB 0.42 dB			
			40 dB	50 dB	50 MHz to 4 GHz 4 GHz to 7 GHz 7 GHz to 12 GHz 12 GHz to 20 GHz 20 GHz to 21 GHz	0.16 dB 0.20 dB 0.24 dB 0.30 dB 0.31 dB			



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	min unit	max unit	min unit	max unit					
					21 GHz to 29 GHz 29 GHz to 40 GHz 40 GHz to 47 GHz 47 GHz to 50 GHz	0.38 dB 0.41 dB 0.59 dB 0.60 dB			
			50 dB to 60 dB		50 MHz to 500 MHz 500 MHz to 4 GHz 4 GHz to 7 GHz 7 GHz to 12 GHz 12 GHz to 20 GHz 20 GHz to 21 GHz 21 GHz to 29 GHz 29 GHz to 40 GHz 40 GHz to 50 GHz	0.25 dB 0.25 dB 0.28 dB 0.32 dB 0.47 dB 0.55 dB 0.63 dB 0.65 dB 1.2 dB			
			60 dB to 70 dB		50 MHz to 500 MHz 500 MHz to 4 GHz 4 GHz to 7 GHz 7 GHz to 12 GHz 12 GHz to 20 GHz 20 GHz to 21 GHz 21 GHz to 40 GHz 40 GHz to 50 GHz	0.56 dB 0.44 dB 0.46 dB 0.50 dB 0.85 dB 1.3 dB 1.4 dB 3.5 dB			



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Ord. number	Calibrated quantity / Subject of calibration	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
		min unit	max unit					
20*	Capacity / Electrical capacity meters	10 pF	60 Hz	1.1 %	Direct generation using a capacity standard	L.III-070		
			100 Hz					0.18 %
			1 kHz					0.08 %
			10 kHz					0.05 %
			100 kHz					0.05 %
		100 pF	60 Hz	0.16 %				
			100 Hz	0.11 %				
			1 kHz	0.06 %				
			10 kHz	0.05 %				
			100 kHz	0.05 %				
		1 nF	60 Hz	0.05 %				
			100 Hz	0.05 %				
			1 kHz	0.05 %				
			10 kHz	0.05 %				
			100 kHz	0.05 %				
10 nF	60 Hz	0.05 %						
	100 Hz	0.05 %						
	1 kHz	0.05 %						
	10 kHz	0.05 %						
	100 kHz	0.06 %						
100 nF	60 Hz	0.05 %						
	100 Hz	0.05 %						
	1 kHz	0.04 %						



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Ord. number ¹	Calibrated quantity / Subject of calibration		Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place	
	min unit	max unit	min unit	max unit						
21*	Capacity / capacity standards		1 μF		20 Hz	0.05 %	Direct measurement using a standard RLC bridge	LIII-071		
					60 Hz					
					100 Hz					
					1 kHz					
					10 kHz					
					100 kHz					
			10 μF		20 Hz	0.08 %	60 Hz			
					100 Hz					
					1 kHz					
					10 kHz					
					100 μF		20 Hz	0.08 %	60 Hz	
							100 Hz			
1 kHz										
10 kHz										
± 5 %		60 Hz to 100 Hz	1.1 %	100 Hz to 10 kHz						
		10 kHz to 100 kHz								
		60 Hz to 100 Hz		0.18 %	100 Hz to 10 kHz					
		100 Hz to 10 kHz								
		10 kHz to 100 kHz			0.05 %	60 Hz to 100 Hz				
		100 Hz to 10 kHz								
10 kHz to 100 kHz	1.2 %	100 Hz to 10 kHz								
10 kHz to 100 kHz		0.20 %	100 Hz to 10 kHz							
10 kHz to 100 kHz			0.07 %	10 kHz to 100 kHz						
10 kHz to 100 kHz										
10 kHz to 100 kHz										
10 kHz to 100 kHz										



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Ord. number	Calibrated quantity / Subject of calibration	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
		min unit	max unit					
		100 pF	± 5 %	60 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.16 % 0.11 % 0.05 %			
		100 pF to 1 nF	1 nF	60 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.20 % 0.15 % 0.06 %			
		1 nF	± 5 %	60 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.06 % 0.06 % 0.05 %			
		1 nF to 10 nF	10 nF	60 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.07 % 0.06 % 0.06 %			
		10 nF	± 5 %	60 Hz to 100 Hz 100 Hz to 10 kHz 10 kHz to 100 kHz	0.06 % 0.06 % 0.06 %			
		10 nF to 100 nF	100 nF	60 Hz to 100 Hz 100 Hz to 10 kHz	0.07 % 0.09 %			
		100 nF	± 5 %	60 Hz to 100 Hz 100 Hz to 10 kHz	0.06 % 0.06 %			
		100 nF to 1 μF	1 μF	60 Hz to 100 Hz 100 Hz to 10 kHz	0.07 % 0.07 %			
		1 μF	± 5 %	60 Hz to 100 Hz 100 Hz to 10 kHz	0.06 % 0.06 %			
		1 μF to 10 μF	10 μF	60 Hz to 100 Hz 100 Hz to 10 kHz	0.09 % 0.10 %			



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Ord. number	Calibrated quantity / Subject of calibration	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
		min unit	max unit					
22*	Inductance / Electric inductance meters	10 µF	± 5 %	60 Hz to 100 Hz	0.08 %	Direct generation using an inductance standard	L.III-070	
				100 Hz to 10 kHz	0.10 %			
				60 Hz to 100 Hz	0.13 %			
		10 µF to 100 µF		100 Hz to 10 kHz	0.76 %			
				60 Hz to 100 Hz	0.12 %			
				100 Hz to 10 kHz	0.69 %			
		10 µH		10 kHz	0.21 %			
				50 kHz	0.21 %			
				100 kHz	0.21 %			
		100 µH		1 kHz	0.21 %			
				10 kHz	0.11 %			
				50 kHz	0.11 %			
1 mH		100 kHz	0.11 %					
		1 kHz	0.11 %					
		10 kHz	0.11 %					
10 mH		50 kHz	0.11 %					
		100 kHz	0.11 %					
		100 Hz	0.15 %					
100 mH		1 kHz	0.08 %					
		10 kHz	0.08 %					
		100 Hz	0.08 %					
				100 Hz	0.08 %			
				1 kHz	0.05 %			
				10 kHz	0.06 %			



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Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work place
		min unit	max unit					
23*	Inductance / Inductance standards	1 H		100 Hz 1 kHz	0.06 % 0.06 %	Direct measurement using a standard RLC bridge	L.III-071	
		10 H		100 kHz 1 kHz	0.06 % 0.06 %			
		10 μH	± 5 %	10 kHz to 100 kHz	0.37 %			
		10 μH to 100 μH		10 kHz to 100 kHz	0.40 %			
		100 μH	± 5 %	1 kHz to 10 kHz	0.27 %			
		100 μH to 1 mH		10 kHz to 100 kHz	0.11 %			
		1 mH	± 5 %	1 kHz to 10 kHz	0.29 %			
		1 mH to 10 mH		10 kHz to 100 kHz	0.12 %			
		10 mH	± 5 %	1 kHz to 10 kHz	0.18 %			
		10 mH to 100 mH		10 kHz to 100 kHz	0.11 %			
		100 mH	± 5 %	1 kHz to 10 kHz	0.20 %			
		100 mH to 1 kHz		100 Hz to 1 kHz	0.15 %			
		1 kHz	± 5 %	1 kHz to 10 kHz	0.13 %			
		1 kHz to 10 kHz		100 Hz to 1 kHz	0.16 %			
		10 kHz	± 5 %	1 kHz to 10 kHz	0.14 %			
		100 Hz to 1 kHz		100 Hz to 1 kHz	0.09 %			
1 kHz to 10 kHz		1 kHz to 10 kHz	0.06 %					
100 Hz to 1 kHz		100 Hz to 1 kHz	0.14 %					
1 H	± 5 %	100 Hz to 1 kHz	0.13 %					
1 H to 10 H		100 Hz to 1 kHz	0.14 %					
10 H	± 5 %	100 Hz to 1 kHz	0.14 %					



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- 1) Asterisk at the ordinal number identifies the calibrations, which the Laboratory is qualified to carry out outside the permanent laboratory premises.
- 2) The expanded measurement uncertainty is in accordance with ILAC-P14 and EA-4/02 M, part of CMC, and it is the lowest value of the respective uncertainty. If not stated otherwise, its coverage probability is approx. 95 %. If not stated otherwise, the uncertainty values stated without a unit are relative to the value measured. If the calibration is carried out outside the laboratory premises, the measurement uncertainty may be affected.
- 3) If the document identifying the calibration procedure is dated, only these specific procedures are used. If the document identifying the calibration procedure is not dated, the latest edition of the specified procedure is used (including any changes).



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CMC for the field of measured quantity: Time and frequency quantities

Ord. number	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work-place
		min	unit	max	unit					
1*	Frequency / frequency meters	0.01 Hz		to	0.1 Hz		2.0 · 10 ⁻³	Direct measurement by a reference counter	LIII-053	
		0.1 Hz		to	1 Hz		2.0 · 10 ⁻⁴			
		1 Hz		to	10 Hz		2.0 · 10 ⁻⁵			
		10 Hz		to	100 Hz		2.0 · 10 ⁻⁶			
		100 Hz		to	1 kHz		2.0 · 10 ⁻⁷			
		1 kHz		to	10 kHz		2.0 · 10 ⁻⁸			
		10 kHz		to	100 kHz		2.0 · 10 ⁻⁹			
		100 kHz		to	1 MHz		7.0 · 10 ⁻¹⁰			
		1 MHz		to	10 MHz		5.0 · 10 ⁻¹⁰			
		10 MHz		to	1.3 GHz		5.0 · 10 ⁻¹⁰			
		1.3 GHz		to	10 GHz		2.0 · 10 ⁻⁹			
10 GHz		to	26.5 GHz		2.0 · 10 ⁻¹⁰					
2*	Frequency / signal sources				10 MHz		2.0 · 10 ⁻¹²	Generation by a GPS receiver Generation by a standard frequency generator	LIII-053	
		0.01 Hz		to	0.1 Hz		2.0 · 10 ⁻³			
		0.1 Hz		to	1 Hz		2.0 · 10 ⁻⁴			
		1 Hz		to	10 Hz		2.0 · 10 ⁻⁵			
		10 Hz		to	100 Hz		2.0 · 10 ⁻⁶			
		100 Hz		to	1 kHz		2.0 · 10 ⁻⁷			
		1 kHz		to	10 kHz		2.0 · 10 ⁻⁸			
		10 kHz		to	100 kHz		2.0 · 10 ⁻⁹			
		100 kHz		to	1 MHz		7.0 · 10 ⁻¹⁰			
							5.0 · 10 ⁻¹⁰			
							5.0 · 10 ⁻¹⁰			



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Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range		Parameter(s) of the meas. quantity	Lowest expanded measurement uncertainty specified ²	Calibration principle	Calibration procedure identification ³	Work-place
		min	max					
		1 MHz	to 10 MHz		$5.0 \cdot 10^{-10}$			
		10 MHz	to 1.3 GHz		$5.0 \cdot 10^{-10}$			
		1.3 GHz	to 10 GHz		$2.0 \cdot 10^{-9}$			
		10 GHz	to 26.5 GHz		$2.0 \cdot 10^{-10}$			
3*	Time interval / frequency meters, signal sources	10 ns	to 1,000 s		15 ns	Direct measurement by a reference counter	LIII-053	

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² The expanded measurement uncertainty is in accordance with ILAC-P14 and EA-4/02 M, part of CMC, and it is the lowest value of the respective uncertainty. If not stated otherwise, its coverage probability is approx. 95%. If not stated otherwise, the uncertainty values stated without a unit are relative to the value measured. If the calibration is carried out outside the laboratory premises, the measurement uncertainty may be affected.
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