



Accredited measurement capabilities

quantity	calibration range	frequency range	best measurement capability	method	accreditation
Cf - thermist. mounts	(0.7 ÷ 1.0) / 7 mW	(0.01 ÷ 1) GHz	0.0098	N (coaxial)	CIPM MRA
Cf - thermist. mounts	(0.7 ÷ 1.0) / 7 mW	(0.01 ÷ 10) GHz	0.0065	N (coaxial)	CIPM MRA
Cf - thermist. mounts	(0.7 ÷ 1.0) / 7 mW	(10 ÷ 18) GHz	0.015	N (coaxial)	CIPM MRA
Cf - other mounts	(0.7 ÷ 1.0) / 7 mW	(0.01 ÷ 18) GHz	0.02	N (coaxial)	CIPM MRA
Cf - other mounts	(0.7 ÷ 1.0) / 7 mW	(0.001 ÷ 1) GHz	0.015	N 75 Ω (coaxial)	CIPM MRA
Cf - thermist. mounts	(0.7 ÷ 1.0) / 7 mW	(18 ÷ 26.5) GHz	0.02	PC-3.5 (coaxial) R220 (waveguide)	CAI
Cf - thermist. mounts	(0.5 ÷ 1.1) / 7 mW	(26.5 ÷ 40) GHz	0.02	R320 (waveguide)	CAI
attenuation	< 55 dB	(0.0001 ÷ 26.5) GHz	(0.015+0.0005×MV) dB	direct measurement	CAI
attenuation	(55 ÷ 75) dB	(0.0001 ÷ 26.5) GHz	(0.046+0.0005×MV) dB	substitution	CAI
attenuation	(75 ÷ 90) dB	(0.0001 ÷ 18) GHz	[0.12+0.0047(MV-75)] dB	substitution	CAI
attenuation	(75 ÷ 90) dB	(18 ÷ 26.5) GHz	[0.12+0.019(MV-75)] dB	substitution	CAI
attenuation	(90 ÷ 100) dB	(0.0001 ÷ 13.2) GHz	[0.12 + 0.012(MV-90)] dB	substitution	CAI
attenuation	(0 ÷ 40) dB	(26.5 ÷ 40) GHz	0.1 dB	substitution	CAI
s-parameters (reflection coeff.)	passive circuits	(0.0001 ÷ 18) GHz	0.008 ÷ 0.03	N (coaxial)	CIPM MRA
		(0.0001 ÷ 18) GHz	0.002 ÷ 0.01	PC-7 (coaxial)	CIPM MRA
		(0.0001 ÷ 26.5) GHz	0.004 ÷ 0.008	PC-3.5 (coaxial)	CIPM MRA
s-parameters (transmission coeff.)	passive circuits	(0.0001 ÷ 18) GHz	0.00003 ÷ 0.001	N (coaxial)	CIPM MRA
		(0.0001 ÷ 18) GHz	0.00003 ÷ 0.001	PC-7 (coaxial)	CIPM MRA
		(0.0001 ÷ 26.5) GHz	0.00003 ÷ 0.001	PC-3.5 (coaxial)	CIPM MRA
s-parameters (eff. source match)	passive circuits	(0.0001 ÷ 18) GHz	0.008 ÷ 0.03	N (coaxial)	CIPM MRA
RF voltage	(0.01 ÷ 10) V	(0.0001 ÷ 2) GHz	1.5 %	N (coaxial)	CAI
rise time	≥300 ps		12 ps		CAI
frequency		0.01 Hz ÷ 3 GHz	1×10 ⁻¹¹		CAI
frequency		(3 ÷ 18) GHz	1/f (Hz)		CAI
frequency		(18 ÷ 46) GHz	3/f (Hz)		CAI
electric field strength	(0.01 ÷ 140) V/m	(0.05 ÷ 250) MHz	0.5 ÷ 1 dB	TEM cell	CIPM MRA
electric field strength	(0.01 ÷ 50) V/m	(0.25 ÷ 2.5) GHz	1 dB	tapered TEM cell	CIPM MRA
electric field strength	(0.1 ÷ 200) V/m	(1 ÷ 2.5) GHz	0.6 dB	waveguide R14	CIPM MRA
power flux density	(0.1 ÷ 10) mW/cm ²	2.45 GHz	1 dB	waveguide R22	CIPM MRA
RF power	(-100 ÷ -50) dBm	(0.0001 ÷ 4.2) GHz	[0.19-0.0012(MV+50)] dB	N (coaxial)	CAI
RF power	(-50 ÷ 20) dBm	(0.0001 ÷ 4.2) GHz	0.1 dB	N (coaxial)	CAI
RF power	(-100 ÷ -45) dBm	(4.2 ÷ 18) GHz	[0.27-0.005(MV+45)] dB	N (coaxial)	CAI
RF power	(-40 ÷ 20) dBm	(4.2 ÷ 18) GHz	0.15 dB	N (coaxial)	CAI
RF power	(-90 ÷ -26) dBm	(18 ÷ 26.5) GHz	[0.38-0.0027(MV+26)] dB	PC-3.5 (coaxial)	CAI
RF power	(-26 ÷ 20) dBm	(18 ÷ 40) GHz	0.15 dB	PC-3.5 (coaxial) PC-2.4 (coaxial)	CAI
coupling/artificial network impedance	(3 ÷ 200) Ω	(0.009 ÷ 30) MHz	magnitude 6 % MH phase 4 °	according to the ČSN EN standard	ČIA
Pulse generators, ESD simulators current	(1 ÷ 80) A		4 % MV	ČSN EN 61000-4-2	ČIA
Pulse generators (τ _r > 0.2 μs)	(1 ÷ 3) kA peak value		4 % MV	according to the ČSN EN standard	ČIA



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short-circuit current					
Pulse generators ($t_r > 0.2 \mu\text{s}$) open-circuit voltage	(0.2 ÷ 8) kV peak value		3,5 % MV	according to the ČSN EN standard	ČIA
Pulse generators EFT/burst voltage into 50 Ω load	(0.1 ÷ 2.5) kV peak value		3 % MV	ČSN EN 61000-4-4	ČIA
Pulse generators EFT/burst voltage into 1 k Ω load	(0.2 ÷ 6) kV peak value		4 % MV	ČSN EN 61000-4-4	ČIA
antenna factor	(-60 ÷ 90) dB	10 Hz ÷ 30 MHz	(0.14 ÷ 1) dB	Active or passive loop antenna, ref. value for unit: S m ⁻¹	CIPM MRA
antenna gain	(0 ÷ 28) dB	(1 ÷ 18) GHz	0.25 dB	horn antennas	CIPM MRA

Legend:

Cf calibration factor
 CAI Czech accreditation institute, see <http://www.cai.cz/>
 CIPM MRA international mutual recognition arrangement, see <http://www.bipm.org/en/cipm-mra/>
 MV measured value

Other measurement capabilities and services

quantity / service	range / note	frequency range	best measurement capability	method
rise time	> 25 ps		8 ps	
calibration of EMC generators	up to 15 kV	up to 1 GHz	depends on quantity	ČSN EN 61000-4-2 ČSN EN 61000-4-4 ČSN EN 61000-4-5 ČSN EN 61000-4-6 ČSN EN 61000-4-11 ČSN EN 61000-4-12 ČSN EN 61000-4-18
calibration of other EMC auxiliary devices	up to 4 kV (cou- pling/decoupling networks, ...)	up to 1 GHz	depends on quantity	ČSN EN 61000-4-4 ČSN EN 61000-4-5 ČSN EN 61000-4-6
calibration of measuring receivers	QP, PK, AV detectors	(0.009 ÷ 40) GHz	depends on quantity	CISPR 16-1
calibration and service of Aeroflex GSM testers	type 6103, 6104, 6113 - accredited			
digital and analog oscilloscopes	accredited up to 1.1 GHz	up to 18 GHz	depends on quantity	



Calibration of other devices or quantities upon request. The laboratory is able to fulfil many non-standard calibration requests (development, self-made devices, special equipment).

The laboratory also offers consultancy and metrology staff training. The laboratory develops metrologically traceable methods of measurement of error parameters in communications systems (such as EVM) and undertakes traceable measurement of scattering parameters.

Examples of calibrated devices (not a full list)

Power sensors:

HP, Agilent	Rohde & Schwarz	Aeroflex/IFR/Marconi	Anritsu	Bird
8481A, B, D, H	NRV-Z1	6912	MA2422A	Bird 43
8482A	NRV-Z4	6919	MA2422D	4303A
8485D	NRV-Z5	6920	MA2472A	
8487A	NRV-Z15		MA248xD	
8478B	NRV-Z33		MA249xA	
8484°	NRV-Z51			
8498A	NRV-Z55			
R486A	NRP-Z91			
K486A	NRT-Z10			
ECP-E26A	NRT-Z11			
E4412A	NRT-Z43			
E9300A	NRT-Z44			
	NAP-Z4			
	NRS			

Passive devices:

HP, Agilent	Narda	Aeroflex/Weinschel	Wiltron	Huber+Suhner
8494H	376, 377, 378NM	1570	26N50, 26NF50	6603
8496H	752-3 to 752-30	1870A	60N50	6607
11667°, B, C	773-1 to 773-40	AW-32	28NF50-2	5906
86205A	779-1 to 779-50	AW-48		5930
K241C		AW-81		6550
11636A				6560

Frequency counters:

HP, Agilent	Racal Dana	Advantest	Marconi	Anritsu
53131A	1991	R5362	2440	MF1603A
53132A	1992	R5372P	2442	MF1604A
53181A	1994	TR5821		MF2413B
HP5361B	1995	TR5822		MF2414B
HP5361B	1996	TR5823		
HP5385A	1998			
HP5352B	1999			
HP8753E	9045			



Spectrum analyzers, measuring receivers (not fully accredited):

HP, Agilent	Rohde & Schwarz	Advantest	Anritsu	Narda	Promax
8590 series	ESVP	R3131	MS2651B	PMM8000	MC-944
8560 series	ESCS30	R3371A	MS2721B	PMM8010	MC-944B
E444x PSA series	ESIB7, 26, 40	R3261C	MS2719B	PMM9010	Prolink-3+
8960 testers	FSP3, 7, 13, 30, 40		MS2722C	PMM9030	Prolink-4C
N9020A	FSH3, FSH7		MS2711E		Prodig 5
	ESVN40				TV Explorer II+
	ESH2, ESH3				
	FSEB30				
	ESPI				

Scalar and vector network analyzers (not fully accredited):

HP, Agilent	Anritsu	Bird
HP8757D	S111	SA-2000A
HP8756A	S113	SA-2500A
8714C	S331A, B, D, E	AT-500
8720ES	S332A, B, C	AT-800
8510C	S251B	
E8364B PNA	S810C	
	MT8222B	
	37369C	
	S400	

RF generators (not fully accredited):

HP, Agilent	Rohde & schwarz	Wavetek	Fluke	Marconi	Tektronix
E4438C	SMY 01, SMY 02	9100	5500A	2022D	AFG 3252
HP8350B	SME 03	9500	5520A	2023	AWG7102
HP8657B	SMH	model 19			
HP81101A	SMT				
HP83732B	SMIQ 03B				
HP83712B	SMR 40				
HP8648B					
33120°					
33220A					
33250A					
E8257D					

EMC generators, artificial networks, other auxiliary EMC devices (not fully accredited):

EM Test	Schaffner/TESEQ	RFT	PMM	Rohde & Shwarz
UCS500, UCS200 (various models)	NSG 600	NNB11	PMM L3-32	ESH2-Z5
CNV500 (various models)	NSG 623	NNBM25	PMM L2-16	ESH3-25
CNI503	NSG 625			ESH3-Z6
MV2616	NSG 1025			
RWG500 (various models)	Best EMC			
PFS503	MN 2053D			
KW50, KW1000				
CWS500 (various models)				



Antennas, field probes (not fully accredited):

RFT	PMM	Wandel & Goltermann	VEB Funkmechanik	Narda	Frankonia	Holiday
FSA 101	PMM 8051	EMR-300 EMR-20 EFA-300	NFM1	8718B SMR 3000 ELT 400	BTA-M	1501 HI 4422 HI 4116

Electrostatic discharge generators (ESD):

EM Test	Schaffner/TESEQ	Keytek	Haefely	RAO	Noiseken	Inventfine
Dito ESD 30	NSG 432 NSG 435 NSG 437 NSG 438 NSG 439 Best ESD	MZEC4	PESD 3010 ONYX	SRG 02	ESS-S3011	ESD-2020G

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