



## SCS Directory

Accreditation number: SCS 0173

International standard: ISO/IEC 17025:2017  
Swiss standard: SN EN ISO/IEC 17025:2018

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Initial accreditation: 21.09.2023  
Current accreditation: 21.09.2023 to 20.09.2028  
Scope of accreditation see: [www.sas.admin.ch](http://www.sas.admin.ch)  
(Accredited bodies)

### Scope of accreditation as of 21.09.2023

#### Calibration laboratory for electrical measurands

Measured Quantity / Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty $\pm$ <sup>1)</sup>	Remarks
Scattering parameters (complex): <b>Reflection coefficient in coaxial line (S11)</b>	0,01 ... 1	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	0,0246 0,0119 0,0171 0,0276 0,0353	Z <sub>ref</sub> = 50 Ω, N-connector, real and imaginary quantity  Including additional uncertainty for connector and cable movement according EURAMET Calibration Guide No. 12, Version 3.0
	0,0001 ... 1	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	0,0293 0,0263 0,0287 0,0401 0,0497	



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Measured Quantity / Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty $\pm$ <sup>1)</sup>	Remarks
Scattering parameters (complex): <b>Transmission coefficient in coaxial line (S21)</b>	0.01 ... 1 (40 dB)	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	0,0247 (0,212 dB) 0,0121 (0,104 dB) 0,0193 (0,166 dB) 0,0276 (0,236 dB) 0,0355 (0,303 dB)	$Z_{ref} = 50 \Omega$ , N-connector, real and imaginary quantity  Including additional uncertainty for connector and cable movement according EURAMET Calibration Guide No. 12, Version 3.0
	0.0001 ... 1 (80 dB)	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	0,0294 (0,252 dB) 0,0264 (0,227 dB) 0,0287 (0,246 dB) 0,0401 (0,342 dB) 0,0498 (0,422 dB)	
Scattering parameters (derived quantity): <b>RF Impedance</b>	2 ... < 15 $\Omega$	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	$(-1,8E-2 \cdot Z + 3,8E-1) \cdot Z$ $(-8,5E-3 \cdot Z + 1,8E-1) \cdot Z$ $(-1,2E-2 \cdot Z + 2,6E-1) \cdot Z$ $(-2,0E-2 \cdot Z + 4,3E-1) \cdot Z$ $(-2,5E-2 \cdot Z + 5,5E-1) \cdot Z$	$Z =$ measured RF Impedance, $Z_{ref} = 50 \Omega$ , N-connector  Including additional uncertainty for connector and cable movement according EURAMET Calibration Guide No. 12, Version 3.0
	15 ... < 100 $\Omega$	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	$6,1E-2 \cdot Z$ $2,9E-2 \cdot Z$ $4,2E-2 \cdot Z$ $6,9E-2 \cdot Z$ $8,8E-2 \cdot Z$	
	100 $\Omega$ ... 1 k $\Omega$	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	$(3,2E-4 \cdot Z + 2,5E-2) \cdot Z$ $(1,3E-4 \cdot Z + 1,4E-2) \cdot Z$ $(2,0E-4 \cdot Z + 1,9E-2) \cdot Z$ $(3,7E-4 \cdot Z + 2,7E-2) \cdot Z$ $(5,2E-4 \cdot Z + 3,0E-2) \cdot Z$	
Scattering parameters (derived quantity): <b>RF Admittance</b>	1 mS ... < 10 mS	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	$(-2,0E+1 \cdot Y + 2,4E-1) \cdot Y$ $(-9,6E+0 \cdot Y + 1,2E-1) \cdot Y$ $(-1,4E+1 \cdot Y + 1,7E-1) \cdot Y$ $(-2,2E+1 \cdot Y + 2,7E-1) \cdot Y$ $(-2,9E+1 \cdot Y + 3,5E-1) \cdot Y$	$Y =$ measured RF Admittance, $Y_{ref} = 20$ mS, N-connector  Including additional uncertainty for connector and cable movement according EURAMET Calibration Guide No. 12, Version 3.0
	10 mS ... < 50 mS	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	$6,3E-2 \cdot Y$ $3,0E-2 \cdot Y$ $4,3E-2 \cdot Y$ $7,1E-2 \cdot Y$ $9,2E-2 \cdot Y$	
	50 mS ... 0.5 S	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	$(9,8E-1 \cdot Y + 1,7E-2) \cdot Y$ $(3,6E-1 \cdot Y + 1,2E-2) \cdot Y$ $(5,8E-1 \cdot Y + 1,5E-2) \cdot Y$ $(1,2E+0 \cdot Y + 1,6E-2) \cdot Y$ $(1,9E+0 \cdot Y + 1,1E-2) \cdot Y$	



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Measured Quantity / Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty $\pm$ <sup>1)</sup>	Remarks
Scattering parameters (derived quantity): <b>Voltage Standing Wave Ratio (VSWR)</b>	1,06 ... 10	9 kHz ... < 100 kHz 100 kHz ... < 1 GHz 1 GHz ... < 6 GHz 6 GHz ... < 12 GHz 12 GHz ... 18 GHz	$(1,17E-2 \cdot V + 3,80E-2) \cdot V$ $(0,53E-2 \cdot V + 1,85E-2) \cdot V$ $(0,79E-2 \cdot V + 2,65E-2) \cdot V$ $(1,34E-2 \cdot V + 4,26E-2) \cdot V$ $(1,79E-2 \cdot V + 5,44E-2) \cdot V$	V = measured VSWR $Z_{ref} = 50 \Omega$ , N-connector  Including additional uncertainty for connector and cable movement according EURAMET Calibration Guide No. 12, Version 3.0  According IEC 61000-4-6
<b>CDN parameters:</b>				
Impedance, $Z_{CM}$ (common mode)	80 ... 220 $\Omega$	150 kHz ... < 80 MHz 80 MHz ... < 200 MHz 200 MHz ... 230 MHz	5,0 $\Omega$ 7,0 $\Omega$ 25,0 $\Omega$	CDN type Mx, Sx, Tx, AFx
Insertion loss (common mode)	8 ... 10.5 dB	150 kHz ... 230 MHz	0,4 dB	CDN adapter
<b>AMN parameters:</b>				
Impedance, $Z_{CM}$ (common mode)	1 ... 65 $\Omega$ (Magnitude)  -15° ... 90° (Phase)	9 kHz ... < 100 kHz 100 kHz ... 30 MHz  9 kHz ... 30 MHz	0,5 $\Omega$ 1,0 $\Omega$  3,0 °	According CISPR 16-1-2 for V-AN (V-AMN, LISN)
Coupling factor (VDF) (common mode)	0 ... 50 dB	9 kHz ... < 30 kHz 30 kHz ... 30 MHz	0,6 dB 0,5 dB	
Decoupling factor (Isolation, common mode)	20 ... < 50 dB 50 ... 75 dB	9 kHz ... 30 MHz 9 kHz ... 30 MHz	4,0 dB 11,8 dB	
<b>AAN parameters:</b>				
Impedance, $Z_{CM}$ (common mode)	5 ... 300 $\Omega$ (Magnitude)  -40 ... 40° (Phase)	150 kHz ... 30 MHz  150 kHz ... 30 MHz	5,0 $\Omega$  3,0°	According CISPR 16-1-2 for AAN (asymmetric artificial network, Y-network, unshielded symmetric signals) and AN (Artificial network for coaxial and other screened cables)
Coupling factor (VDF) (common mode)	0 ... 50 dB	150 kHz ... 30 MHz	0,5 dB	
Decoupling factor (Isolation, common mode)	20 ... < 50 dB 50 ... 75 dB	150 kHz ... 30 MHz 150 kHz ... 30 MHz	4,0 dB 11,8 dB	
<b>EM clamp parameters:</b>				
Impedance, $Z_{CM}$ (common mode)	20 ... 1000 $\Omega$	150 kHz ... < 80 MHz 80 kHz ... 230 MHz	20,0 $\Omega$ 40,0 $\Omega$	According IEC 61000-4-6, Annex A (ABCD transformation) for EM and decoupling clamps
Coupling factor (VDF) (common mode)	0 ... 20 dB	150 kHz ... 230 MHz	1,7 dB	
Decoupling factor (Isolation, common mode)	0 ... 30 dB	150 kHz ... 230 MHz	3,0 dB	



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<b>CMAD parameters:</b>				
Insertion loss S21 (common mode)	0.05 ... 0.5	30 MHz ... 300 MHz	1,44 dB	According CISPR16-1-4, Section 8.5 and CISPR TR 16-3, Section 4.9.3.4 for Common Mode Absorbing Devices (CMAD)
Impedance S11 (common mode)	0.3 ... 1.0	30 MHz ... 300 MHz	1,58 dB	
<b>SVSWR:</b> TD-SVSWR acc. ANSI C63.25.1				
Time Domain (TD), frequency stepping 1 MHz	2,0 ... 10,0 dB	1 GHz ... < 6 GHz	1,46 dB	Direct VNA measurement
	2,5 ... 10,0 dB	6 GHz ... 18 GHz	1,86 dB	
Moving Average (MA), frequency stepping 120 MHz	1,5 ... 10,0 dB	1 GHz ... < 6 GHz	1,04 dB	Moving Average (MA) and correlation according standard
	2,0 ... 10,0 dB	6 GHz ... 18 GHz	1,47 dB	
<b>Rod Antenna:</b> Antenna factor (ECSM):				
	-100 ... 0 dB	9 kHz ... 36 MHz	0,42 dB	According CISPR 16-1-6, Clause 5.1
<b>Current Probe parameters:</b>				
Insertion loss (common mode)	0,001 ... 10 $\Omega$ (Flat)	9 kHz ... 500 MHz	1,10 dB	According CISPR 16-1-2, RTCA DO-160, MIL-STD-461, IEC 61000-4-6, ISO 11452-4
	0,001 ... 10 $\Omega$ (Rise/Fall)	9 kHz ... 500 MHz	1,59 dB	
Transfer impedance (common mode)	0,001 ... 10 $\Omega$ (Flat)	9 kHz ... 500 MHz	1,10 dB	
	0,001 ... 10 $\Omega$ (Rise/Fall)	9 kHz ... 500 MHz	1,59 dB	
<b>AC Resistance:</b> (Complex Impedance)	10 $\Omega$ ... 10 k $\Omega$	3 Hz ... 150 kHz	2,5 %	According RF I-V measurement method
<b>AC Capacitance:</b> (Complex Impedance)	1 nF ... 100 $\mu$ F	3 Hz ... 150 kHz	2,5 %	According RF I-V measurement method
<b>AC Inductance:</b> (Complex Impedance)	10 $\mu$ H ... 1 H	3 Hz ... 150 kHz	2,5 %	According RF I-V measurement method

1) The dimensionless parts of the measurement uncertainty are relative values, related to the measured value.

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