



SCS Directory

Accreditation number: SCS 0108

International standard: ISO/IEC 17025:2005
Swiss standard: SN EN ISO/IEC 17025:2005

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Initial accreditation: 17.09.2004
Current accreditation: 17.09.2014 to 16.09.2019
Scope of accreditation see: www.sas.admin.ch
(Accredited bodies)

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Scope of accreditation as of 29.03.2018

Calibration laboratory for Specific Electric and Magnetic RF Fields and SAR measurements

Calibration and Measurement Capability (CMC)

Measured Quantity / Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty CMC at (22 ± 3) °C (1)	Remarks
Electric field				
Calibration of E-field probes	0.8 V/m ... 800 V/m	10 MHz ... 3 GHz	4,6 %	e.g. ER3DV6x, EF3DVx, EU2DVx, EE3DVx
Calibration of E-field probes	10 V/m ... 105 V/m	6 GHz ... 110 GHz	0,98 dB	e.g. EUmmWVx



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Magnetic field				
Calibration of H-field probes	2 mA/m ... 2 A/m	10 MHz ... 3 GHz	4,6 %	e.g. H2DVx, H3DVx
Calibration of sensitivity for magnetic field probes in the audio range	0,001 ... 0,1 V/(A/m)	1 kHz 0,1 ... 1 A/m	2,2 %	e.g. AM1DVx
Calibration of magnetic field simulator	-30 ... +40 dB A/m	1 kHz	4,1 %	e.g. TMFS (Telephone Magnetic Field Simulator)
Specific absorption rate (SAR)				e.g. ET3DVx, ES3DVx, EX3DVx, ET1DVx, EU2DVx
	E* field (typical ²))			
Calibration of dosimetric E-field probes	0,5 V/m ... 500 V/m	4 MHz ... 450 MHz	6,7 % (13,3 % for SAR)	Temperature transfer calibration *) As example, the indicated range corresponds to 0,2 mW/kg ... 200 W/kg for head tissue simulating liquid and f = 450 MHz
	E* field (typical ²))			e.g. ET3DVx, ES3DVx, EX3DVx, ET1DVx, EU2DVx
Calibration of dosimetric E-field probes	0,45 V/m ... 450 V/m	750 MHz ... 3 GHz	5,5 % (11 % for SAR)	Waveguide analytical calibration *) As example, the indicated range corresponds to 0,2 mW/kg ... 200 W/kg for head tissue simulating liquid and f = 1800 MHz
	E* field (typical ²))			e.g. EX3DVx, ET1DVx
	0,4 V/m ... 450 V/m	3 GHz ... 6 GHz	6,5 % (13,1 % for SAR)	Waveguide analytical calibration *) As example, the indicated range corresponds to 0,2 mW/kg ... 200 W/kg for head tissue simulating liquid and f = 5200 MHz



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Calibration of temperature SAR probes	0 °C ... + 60 °C	Tissue simulating Liquids	0,15 K (5 % temperature gradient for SAR)	As example, the temperature gradient of T1Vx and T1V3LAB probes can be determined to 5 %, which is also contribution to SAR accuracy. (Noise is dominating the lower SAR threshold to typically 0,2 W/kg)	
Calibration of test system validation sources	SAR* 1 g and 10 g per 1 W input power	4 MHz ... 290 MHz	18,4 % for SAR 1 g 18,0 % for SAR 10 g	e.g. CLA-6, CLA-13, CLA-30, CLA-64, CLA-128, CLA-150, CLA-220	
		300 MHz ... 450 MHz	18,1 % for SAR 1 g 17,6 % for SAR 10 g	e.g. D835V2 ... D3000V2 according to IEEE 1528, IEC 62209-1/2, for 1 g and 10 g SAR	
		750 MHz ... 3 GHz	17,0 % for SAR 1 g 16,5 % for SAR 10 g	*) SAR given (as example) for head tissue simulating liquid	
Near-Field Calibration of dipoles in air	E* field per 0,1 W input power 30 V/m ... 300 V/m	3 GHz ... 6 GHz	19,9 % for SAR 1 g 19,5 % for SAR 10 g	e.g. D3500V2 ... D5GHzV2 according to IEC 62209-2, for 1 g and 10 g SAR *) SAR given (as example) for head tissue simulating liquid	
		700 MHz ... 3 GHz	12,8 % for E field	e.g. CD835V3 ... CD2450V3 according to ANSI C 63.19, for E field and H field	
Calibration of Golden Validation Device	SAR* 1 g and 10 g per GVD input power	H* field per 0,1 W input power 0,07 A/m ... 0,7 A/m	385 MHz – 3 GHz	8,3 % for H field	e.g. AdxxxV5 according to ANSI 14117 for H-field
			900 MHz	15,0 % for SAR 1 g 15,1 % for SAR 10 g	e.g. GVD – SR 004001 AA
DC Voltage	Calibration of readout units for field and SAR probes	2 mV 200 mV	1,5 %	e.g. DAE3Vx, DAE4Vx, DAEasyVx	
			1 %		



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Calibration of SAR for planar array systems	SAR* peak at 4 mm depth per 1 W input power	650 MHz ... 3 GHz	25,8 % for iSAR Flat 29,3 % for iSAR Head	e.g. iSAR Flat, iSAR Head
	SAR* peak at 3 mm depth per 1 W input power	650 MHz ... 3 GHz	22,4 % for cSAR3D Flat 25,9 % for cSAR3D Left/Right Head	e.g., cSAR3D Flat, cSAR3D Left Head, cSAR3D Right Head
	SAR* peak at 3 mm depth per 1 W input power	3 GHz ... 6 GHz	25,1 % for cSAR3D Flat 28,3 % for cSAR3D Left/Right Head	e.g., cSAR3D Flat, cSAR3D Left Head, cSAR3D Right Head also possible in the Subsidiary
Calibration of antenna sources for transfer calibration of planar array systems	SAR* peak per 1 W input power	650 MHz ... 3 GHz	17,7 % for SAR peak	e.g., SA AAE 083B, SA AAE 190 A, etc.
	SAR* peak per 1 W input power	3 GHz ... 6 GHz	19,9 % for SAR peak	
Calibration of thermometers	0 °C ... + 60 °C		0.1K	
Calibration of dielectric parameter probe	Permittivity, Conductivity or Loss Tangent from 10 MHz ... 20 GHz	homogeneous isotropic material		Open-ended coaxial probes, e.g. DAK-3.5, DAK-1.2, DAK-12
		Permittivity		
	1...15	10 MHz ... 20 MHz 20 MHz ... 200 MHz 200 MHz ... 3 GHz 3 GHz ... 6 GHz 6 GHz ... 20 GHz	24,3 % 11,2 % 2,0 % 2,0 % 2,1 %	Loss tangent < 0,1
	10...40	10 MHz ... 20 MHz 20 MHz ... 200 MHz 200 MHz ... 3 GHz 3 GHz ... 6 GHz 6 GHz ... 20 GHz	3,8 % 2,3 % 1,8 % 2,3 % 3,4 %	Conductivity < 0,1 S/m Conductivity < 0,1 S/m Conductivity: 1 – 10 S/m Conductivity: 1 – 10 S/m Conductivity: > 10 S/m
	35...100	10 MHz ... 20 MHz 20 MHz ... 200 MHz 200 MHz ... 3 GHz 3 GHz ... 6 GHz 6 GHz ... 20 GHz	2,9 % 2,1 % 1,7 % 1,9 % 2,4 %	Conductivity: 0,1 – 1 S/m Conductivity: 0,1 – 1 S/m Conductivity: 1 – 10 S/m Conductivity: 1 – 10 S/m Conductivity: > 10 S/m



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Conductivity	1 ... 10 S/m	10 MHz ... 20 MHz	2,5 %	Permittivity: 35 – 100 Permittivity: 35 – 100 Permittivity:35 – 100 Permittivity:35 – 100 Permittivity:10 – 40
		20 MHz ... 200 MHz	2,4 %	
		200 MHz ... 3 GHz	2,7 %	
		3 GHz ... 6 GHz	3,0 %	
		6 GHz ... 20 GHz	3,0 %	
Loss Tangent	0 ... 0,1	10 MHz ... 20 MHz	0,46	Permittivity: 1 – 15
		20 MHz ... 200 MHz	0,28	
		200 MHz ... 3 GHz	0,03	
		3 GHz ... 6 GHz	0,03	
		6 GHz ... 20 GHz	0,03	
Calibration of dielectric parameters of liquids and gels	Permittivity and Conductivity from 10 MHz ... 50 GHz	homogeneous isotropic material		using open-ended coaxial probes, e.g. DAK-3.5, DAK-1.2, DAK-12
Permittivity	1...100	10 MHz ... 20 MHz	11,2 %	static conductivity < 0,1 S/m
		20 MHz ... 30 MHz	5,0 %	
		30 MHz ... 50 MHz	3,5 %	
		50 MHz ... 5 GHz	3,1 %	
		5 GHz ... 20 GHz	3,9 %	
	1...100	20 GHz ... 50 GHz	6,6 %	static conductivity 0,1 – 10 S/m
		10 MHz ... 20 MHz	3,2 %	
		20 MHz ... 30 MHz	3,3 %	
		30 MHz ... 50 MHz	3,3 %	
		50 MHz ... 5 GHz	3,1 %	
5 GHz ... 20 GHz	20 GHz ... 50 GHz	6,6 %		
	5 GHz ... 20 GHz	3,9 %		
	20 GHz ... 50 GHz	6,6 %		
	5 GHz ... 20 GHz	3,9 %		
	20 GHz ... 50 GHz	6,6 %		
Conductivity	0.01 ... 0,1 S/m	300 MHz ... 500 MHz	6,5 %	Permittivity: 1 – 100
		500 MHz ... 20 GHz	5,2 %	
		20 GHz ... 50 GHz	7,9 %	
Conductivity	0,1 – 10 S/m	10 MHz ... 20 MHz	2,7 %	Permittivity: 1 – 100
		20 MHz ... 30 MHz	3,4 %	
		30 MHz ... 300 MHz	3,4 %	
		300 MHz ... 500 MHz	4,3 %	
		500 MHz ... 20 GHz	4,8 %	
		20 GHz ... 50 GHz	4,8 %	



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Calibration of active electro-optical E&H-field probes optimized for close near-field evaluations in air	15 mV/m ... 75 V/m	50 MHz ... 6000 MHz	3,3 dB	for antenna factor (E-field)
	42 µA/m ... 0.5 A/m	50 MHz ... 6000 MHz	3,3 dB	for antenna factor (H-field)
Calibration of active electro-optical RF over fiber systems	Gain: -55 ... 15dB	10 MHz ... 10 GHz	2,0 dB	For transfer function (gain)
Calibration of stabilized RF power sources	- 5 dBm ... + 17 dBm	600 MHz ... 6 GHz	0,43 dB	e.g. Powersource1

(2) Slightly depending on the frequency and probe type

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