



Accreditation number **SCS 108**  
Numero d'accreditamento

## SCS Directory Registro SCS

Accreditation Standard ISO/IEC 17025:2005  
Norma d'accreditamento ISO/IEC

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### Calibration Laboratory for Specific Electric and Magnetic RF Fields and SAR measurements

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First accreditation (d,m,y) : 17.09.2004  
Last accreditation (d,m,y) : 17.09.2009  
Actual version : <http://www.sas.ch/>

#### Measured Quantities:

Electric field  
Magnetic field

#### Change:

Staff :  
Scope extension : 01.10.05, 01.04.08,  
17.02.10

#### Specific Absorption Rate (SAR)

Temperature  
DC Voltage

Address :  
Edition : **SCS108/I**

The given extended measurement uncertainty is the standard uncertainty of the measurement multiplied by an extension factor  $k = 2$ , which corresponds to a confidence level of about 95% for a normal distribution.

Measured Quantity Instrument	Range	Condition of measurement	Best Measurement Capability CMC at (22 ± 3) °C	Remarks
<b>Electric field</b>  Calibration of E-field probes	0.8 V/m ... 800 V/m	10 MHz ... 3 GHz	4,6 %	e.g. ER3DV6x, EF3DVx, EU2DVx, EE3DVx
<b>Magnetic field</b>  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)



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Measured Quantity Instrument	Range	Condition of measurement	Best Measurement Capability CMC at (22 ± 3) °C	Remarks
<b>Specific absorption rate (SAR)</b>  Calibration of dosimetric E-field probes	E* field (typical <sup>1</sup> ) 0,5 V/m ... 500 V/m	300 MHz ... 450 MHz	6,7 % (13,3 % for SAR)	e.g. ET3DVx, ES3DVx, EX3DVx, ET1DVx, EU2DVx  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 <sup>1</sup> ) 0,45 V/m ... 450 V/m	800 MHz ... 3 GHz	5,5 % (11 % for SAR)	e.g. ET3DVx, ES3DVx, EX3DVx, ET1DVx, EU2DVx  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 <sup>1</sup> ) 0,4 V/m ... 450 V/m	3 GHz ... 6 GHz	6,5 % (13,1 % for SAR)	e.g. EX3DVx, ET1DVx 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
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)



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Measured Quantity Instrument	Range	Condition of measurement	Best Measurement Capability CMC at (22 ± 3) °C	Remarks
Calibration of test system validation dipoles	SAR* 1 g and 10 g per 1 W input power	300 MHz ... 450 MHz	18,1 % for SAR 1 g 17,6 % for SAR 10 g	e.g. D835V2 ... D3000V2 according to IEEE 1528-2003, for 1 g and 10 g SAR *) SAR given (as example) for head tissue simulating liquid
		835 MHz ... 3 GHz	17,0 % for SAR 1 g 16,5 % for SAR 10 g	
	SAR* 1 g and 10 g per 1 W input power	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
Calibration of dipoles in air	E* field per 0,1 W input power 30 V/m ... 300 V/m	700 MHz ... 3 GHz	12,8 % for E field	e.g. CD835V3 ... CD2450V3 according to ANSI C 63.19 - 2007, for E field and H field
	H* field per 0,1 W input power 0,07 A/m ... 0,7 A/m		8,2 % for H field	
<b>DC Voltage</b>				
Calibration of readout units for field and SAR probes	2 mV		1,5 %	e.g. DAE3Vx, DAE4Vx, DAEasyVx
	200 mV		1 %	
<b>Calibration of iSAR</b>	SAR* peak per 1 W input power	800 MHz ... 3 GHz	24,5 % for iSAR - Flat 28,1 % for iSAR - Head	e.g. iSAR-Flat, iSAR-Head
<b>Calibration of iSAR dipole antenna</b>	SAR* peak per 1 W input power	800 MHz ... 3 GHz	18,1 % for SAR peak	e.g., SA AAE 083BA, SA AAE 190 AA, etc.
<b>Calibration of dielectric probe</b>	Permittivity, Conductivity or Loss Tangent from 20 MHz ... 6 GHz	homogeneous material		Open-ended coaxial probes



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Measured Quantity Instrument	Range	Condition of measurement	Best Measurement Capability CMC at (22 ± 3) °C	Remarks
Permittivity (relative)	3...120	300 MHz ... 6 GHz	3,0 %	Liquids Polar liquids, e.g. Ethanol, Methanol, Ethanediol Planar low loss substrate Tissue simulating liquids
		20 MHz	4,5 %	
		30 MHz ... 6 GHz	3,2 %	
		65 MHz ... 6 GHz	3,6 %	
		100 MHz	5,0 %	
Conductivity	0,1 ... 17 S/m	e'' < 1000		Head and Body tissue simulating liquids  Aqueous NaCl solutions with e'' < 1000 Moderate Loss polar liquids, e.g. Ethanol, Methanol, Ethanediol Liquids
		20 MHz	4,8 %	
		30 MHz ... 3 GHz	3,7 %	
		3 GHz ... 6 GHz	6,7 %	
		20 MHz ... 1 GHz	7,4 %	
		1 GHz ... 6 GHz	2,3 %	
Loss Tangent	0 ... 1,2	20 MHz ... 65 MHz	0,07	Polar liquids  Liquids Planar low loss substrate, e.g. permittivity = 10
		65 MHz ... 300 MHz	0,02	
		300 MHz ... 1 GHz	0,05	
		300 MHz ... 6 GHz	0,015	

<sup>1</sup> Slightly depending on the frequency and probe type