



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
 16.06.11
Address :
Edition : 21.06.2011 SCS108/J

Specific Absorption Rate (SAR)
Temperature
DC Voltage

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument	Range	Condition of measurement	Best Measurement Capability 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
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)



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Measured Quantity Instrument	Range	Condition of measurement	Best Measurement Capability CMC at (22 ± 3) °C (1)	Remarks
Specific absorption rate (SAR) Calibration of dosimetric E-field probes	E* field (typical ²) 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 ²) 0,45 V/m ... 450 V/m	750 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 ²) 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 (1)	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
	SAR* 1 g and 10 g per 1 W input power	750 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	
Calibration of Golden Validation Device	SAR* 1 g and 10 g per GVD input power	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		1,5 %	e.g. DAE3Vx, DAE4Vx, DAEasyVx
	200 mV		1 %	
Calibration of iSAR	SAR* peak per 1 W input power	650 MHz ... 3 GHz	23,6 % for iSAR - Flat 27,3 % for iSAR - Head	e.g. iSAR-Flat, iSAR-Head
	SAR* peak per 1 W input power	3 GHz ... 6 GHz	31,7 % for iSAR - Flat 34,6 % for iSAR - Head	



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Measured Quantity Instrument	Range	Condition of measurement	Best Measurement Capability CMC at (22 ± 3) °C (1)	Remarks
Calibration of iSAR dipole antenna	SAR* peak per 1 W input power	650 MHz ... 3 GHz	17,7 % for SAR peak	e.g., SA AAE 083BA, SA AAE 190 AA, etc.
	SAR* peak per 1 W input power	3 GHz ... 6 GHz	19,9 % for SAR peak	
Calibration of dielectric probe	Permittivity, Conductivity or Loss Tangent from 20 MHz ... 6 GHz	homogeneous material		Open-ended coaxial probes
Permittivity	3...120	300 MHz ... 6 GHz 20 MHz 30 MHz ... 6 GHz 65 MHz ... 6 GHz 100 MHz	3,0 % 4,5 % 3,2 % 3,6 % 5,0 %	Liquids Polar liquids, e.g. Ethanol, Methanol, Ethanediol Planar low loss substrate Tissue simulating liquids
Conductivity	0,1 ... 17 S/m	e'' < 1000 20 MHz 30 MHz ... 3 GHz 3 GHz ... 6 GHz 20 MHz ... 1 GHz 1 GHz ... 6 GHz 1 GHz ... 6 GHz	4,8 % 3,7 % 6,7 % 7,4 % 2,3 % 8,7 %	Head and Body tissue simulating liquids Aqueous NaCl solutions with e'' < 1000 Moderate Loss polar liquids, e.g. Ethanol, Methanol, Ethanediol Liquids
Loss Tangent	0 ... 1,2	20 MHz ... 65 MHz 65 MHz ... 300 MHz 300 MHz ... 1 GHz 300 MHz ... 6 GHz	0,07 0,02 0,05 0,015	Polar liquids Liquids Planar low loss substrate, e.g. permittivity = 10

(1) 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.

(2) Slightly depending on the frequency and probe type