

m e t a s
metrology and accreditation switzerland


Based on the Accreditation and Designation Ordinance dated 17 June 1996 (as of 9 December 2003) and on the advice of the Federal Accreditation Commission, the Swiss Accreditation Service (SAS) grants to

Schmid & Partner Engineering AG
Zeughausstrasse 43
CH-8004 Zürich

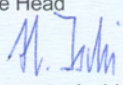
the accreditation as

Calibration Laboratory for Specific Electric and Magnetic RF Fields and SAR Measurements

in accordance with the Standard ISO/IEC 17025. The ranges and measurement uncertainties are listed in the Official SCS-Directory of the Accredited Calibration Laboratories.

Accreditation mark and number:  SCS 108
Date of accreditation: 17 September 2004
The accreditation is valid until: 16 September 2009

CH-3003 Berne-Wabern, 17 September 2004
Swiss Accreditation Service

The Head

Hanspeter Ischi

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Bundesamt für Metrologie und Akkreditierung	Eidg. Justiz- und Polizeidepartement
Office fédéral de métrologie et d'accréditation	Département fédéral de justice et police
Ufficio federale di metrologia e di accreditamento	Dipartimento federale di giustizia e polizia
Swiss Federal Office of Metrology and Accreditation	Swiss Federal Department of Justice and Police



Schweizerische Akkreditierungsstelle
Service d'accréditation suisse
Servizio di accreditamento svizzero
Swiss Accreditation Service

Accreditation number SCS 108

SCS Directory

page 1 of 3

Calibration Laboratory for Specific Electric and Magnetic RF Fields and SAR Measurements

Schmid & Partner
Engineering AG
Zeughausstrasse 43
8004 Zürich
Phone 044/ 245 97 00
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Head of laboratory : Dr. Katja Pokovic
Deputy of head of laboratory : Dr. Fin Bomholt
Responsible person for QA : Prof. Dr. Niels Kuster
First accreditation (d,m,y) : 17.09.2004
Last accreditation (d,m,y) : 17.09.2004

Measured Quantity:

Electric field
Magnetic field
Specific Absorption Rate (SAR)
Temperature
DC Voltage

Change:

Staff :
Scope extension : 01.10.2005
Address :
Edition : SCS108/D

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measured Quantity Instrument	Range	Conditions of measurements	Best Measurement Capability BMC at $(22 \pm 3) ^\circ\text{C}$	Remarks
Electric field Calibration of E-field probes	0,8 V/m ... 800 V/m	10 MHz ... 3 GHz	5,1 %	e.g. ER3DV6x, EF3DVx, EU2DVx, EE3DVx
Magnetic field Calibration of H-field probes	2 mA/m ... 2 A/m	10 MHz ... 3 GHz	5,1 %	e.g. H2DVx, H3DVx
Specific absorption rate (SAR) Calibration of dosimetric E-field probes	E* field (typical ¹⁾) 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



Schweizerische Akkreditierungsstelle
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SCS Directory

page 2 of 3

Calibration Laboratory for Specific Electric and Magnetic RF Fields and SAR Measurements

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measured Quantity Instrument	Range	Conditions of measurements	Best Measurement Capability BMC at $(22 \pm 3) ^\circ\text{C}$	Remarks
Specific absorption rate (SAR) Calibration of dosimetric E-field probes	E* field (typical ¹) 0,45 V/m ... 450 V/m	800 MHz ... 2 GHz	5,5% (11,0 % 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 ¹) 0,4 V/m ... 400 V/m	2,45 GHz	5,9 % (11,8 % 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 $f = 2450$ MHz
Specific absorption rate (SAR)	E* field (typical ¹) 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 probe 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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Accreditation number SCS 108

SCS Directory

page 3 of 3

Calibration Laboratory for Specific Electric and Magnetic RF Fields and SAR Measurements

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measured Quantity Instrument	Range	Conditions of measurements	Best Measurement Capability BMC at $(22 \pm 3) ^\circ\text{C}$	Remarks
Calibration of test system validation dipoles	SAR* 1 g and 10 g per 1 W input power	300 MHz ... 450 MHz 835 MHz ... 3 GHz	18,1 % for SAR 1 g 17,6 % for SAR 10 g 17,0 % for SAR 1 g 16,5 % 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
Calibration of test system validation dipoles	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 H* field per 0,1 W input power 0,07 A/m ... 0,7 A/m	800 MHz 3000 MHz	12,8 % for E field 8,2 % for H field	e.g. CD835V3 – CD2450V3 according to ANSI PC63.19- 2001, for E field and H field
DC Voltage Calibration of readout units for field and SAR probes	2 mV 200 mV		0,65 % 0,06 %	e.g. DAE3Vx, DAE4Vx, DAEasyVx

¹ Slightly depending on the frequency and probe type



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Confédération suisse
Confederazione Svizzera
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Federal Department of Economic Affairs DEA
State Secretariat for Economic Affairs SECO
Swiss Accreditation Service SAS

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

SCS Directory Registro SCS

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

page/pagina 1 of/di 3

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

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Head of laboratory : Dr. Katja Poković
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Responsible person for QA : Prof. Dr. Niels Kuster
First accreditation (d,m,y) : 17.09.2004
Last accreditation (d,m,y) : 17.09.2004
Actual version : <http://www.sas.ch/>

Measured Quantities:

Electric field
Magnetic field
Specific Absorption Rate (SAR)
Temperature
DC Voltage

Change:

Staff :
Scope extension : 01.10.05, 01.04.08
Address :
Edition : **SCS108/G**

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
Electric field Calibration of E-field probes	0.8 V/m ... 800 V/m	10 MHz ... 3 GHz	5,1 %	e.g. ER3DV6x, EF3DVx, EU2DVx, EE3DVx
Magnetic field Calibration of H-field probes	2 mA/m ... 2 A/m	10 MHz ... 3 GHz	5,1 %	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		e.g. TMFS (Telephone Magnetic Field Simulator)