

EX3DV4 Sn:3708 (1/7)

Calibration Laboratory of Schmid & Partner Engineering AG  
Zugstrasse 43, 8004 Zurich, Switzerland

Accredited by the Swiss Accreditation Service (SAS)  
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client: **SRTC (Auden)** Certificate No: **EX3-3708\_Oct18**

Accreditation No.: **SCS 0108**

**CALIBRATION CERTIFICATE**

Object: **EX3DV4 - SN:3708**

Calibration procedure(s): **QA CAL-01-v9, QA CAL-12-v9, QA CAL-14-v4, QA CAL-25-v5, QA CAL-25-v6  
Calibration procedure for dosimetric E-field probes**

Calibration date: **October 22, 2018**

This calibration certificate documents the traceability to national standards, which include the physical units of measurement (SI). The measurements and the uncertainties with confidence intervals are given on the following pages and are part of the certificate.

All calibrations have been conducted in the stated laboratory facility, environment temperature (20 ± 0.2°C) and humidity (40%).

Calibration Equipment used (MFR) unless for calibration:

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter 100	SN: 104779	04-Apr-18 (No. P17-08875)	Apr-19
Power meter 100P-201	SN: 102249	04-Apr-18 (No. P17-08875)	Apr-19
Power meter 100P-201	SN: 103245	04-Apr-18 (No. P17-08875)	Apr-19
Reference 20 dB Attenuator	SN: 93077 (D76)	04-Apr-18 (No. P17-08875)	Apr-19
Reference Probe ERK70	SN: 2013	30-Dec-17 (No. 1054-3013_04e17)	Dec-18
Coax	SN: 488	21-Dec-17 (No. 1064-488_04e17)	Dec-18

Secondary Standards	ID	Check Date (if listed)	Schedule Check
Power meter 544108	SN: 08810202014	08-Apr-18 (in house check Jun-18)	30-Nov-18 (Jun-20)
Power meter 644104	SN: 0714889302	08-Apr-18 (in house check Jun-18)	30-Nov-18 (Jun-20)
Power meter 644104	SN: 085102020	08-Apr-18 (in house check Jun-18)	30-Nov-18 (Jun-20)
RF generator HP 8440C	SN: 10500401010	08-Apr-18 (in house check Jun-18)	30-Nov-18 (Jun-20)
Network Analyzer 85050A	SN: 1061080007	31-May-14 (in house check Oct-16)	30-Nov-18 (Oct-18)

Calibrated by: **Quasdo Luder** (Function: Laboratory Technician)

Approved by: **Kjetil Pihonen** (Function: Technical Manager)

Issue Date: **October 22, 2018**

Certificate No: **EX3-3708\_Oct18** Page 1 of 39

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Certificate No: **EX3-3708\_Oct18** Page 7 of 39

EX3DV4 - SN:3708 October 22, 2018

**Probe EX3DV4**

**SN:3708**

Manufactured: **July 24, 2009**  
Calibrated: **October 22, 2018**

Calibrated for DASY/EASY Systems  
(please, non-compatible with DASY2 system)

Certificate No: **EX3-3708\_Oct18** Page 3 of 39

EX3DV4 - SN:3708 October 22, 2018

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708**

**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc. (k=2)
Norm. $U_{E-field} [V/m]$	0.20	0.35	0.42	± 10.1 %
DCP [mV]	95.4	103.6	100.4	

**Modulation Calibration Parameters**

Mod	Communication System name	A	B	C	D	VR	Unc. (k=2)
1.0	CDT	0.0	0.0	0.0	1.0	0.00	± 0.1 %
1.0	CDT	0.0	0.0	0.0	1.0	0.00	± 0.1 %
1.0	CDT	0.0	0.0	0.0	1.0	0.00	± 0.1 %

Note: For details on LRD parameters see Appendix.

**Sensor Model Parameters**

	C1	C2	a	T1	T2	T3	T4	T5	T6
X	33.84	275.1	40.37	9.383	1.302	0.002	0.000	0.762	1.008
Y	40.04	291.1	34.58	11.47	0.801	0.012	1.768	0.756	1.000
Z	38.34	262.2	35.37	11.65	0.833	0.011	0.000	0.909	1.008

The reported 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%.

Certificate No: **EX3-3708\_Oct18** Page 4 of 39

EX3DV4 Sn:3708 (2/7)

SRTC2019-9004(F)-19042601(H) October 22, 2019

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz)	Relative Permittivity <sup>a</sup>	Conductivity (S/m) <sup>b</sup>	Const X	Const Y	Const Z	Alpha <sup>c</sup>	Depth <sup>d</sup> (mm)	Unc. (k=2)
450	52.5	0.37	9.79	9.79	9.79	0.16	1.20	± 13.3 %
750	41.9	0.80	9.59	9.59	9.59	0.54	0.80	± 12.0 %
1050	41.5	0.90	9.15	9.15	9.15	0.51	0.92	± 12.0 %
1450	40.5	1.20	8.50	8.50	8.50	0.53	0.80	± 12.0 %
1750	40.1	1.37	8.20	8.20	8.20	0.55	0.84	± 12.0 %
1950	40.0	1.40	7.89	7.89	7.89	0.55	0.80	± 12.0 %
2250	40.0	1.40	7.50	7.50	7.50	0.54	0.80	± 12.0 %
2300	39.5	1.87	7.51	7.51	7.51	0.22	0.80	± 12.0 %
2450	39.2	1.80	7.13	7.13	7.13	0.58	0.86	± 12.0 %
2600	38.0	1.90	7.01	7.01	7.01	0.57	0.87	± 12.0 %
4500	36.0	4.68	5.48	5.48	5.48	1.00	1.00	± 13.1 %
5200	35.0	4.78	5.22	5.22	5.22	0.40	1.00	± 13.1 %
6600	34.0	5.07	4.84	4.84	4.84	0.40	1.00	± 13.1 %
8000	33.0	5.27	5.00	5.00	5.00	0.40	1.00	± 13.1 %

<sup>a</sup> Frequency values above 300 MHz of a 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to a 10 MHz. The uncertainty is the 10% of the Const<sup>a</sup> uncertainty of calibration frequency and the uncertainty for the indicated frequency band. Frequency values below 300 MHz is a 10, 30, 40, 50 and 70 MHz for Const<sup>a</sup> assessments at 30, 64, 128, 192 and 220 MHz respectively. Above 3 GHz frequency values can be extended to a 100 MHz.  
<sup>b</sup> As frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to a 10% if liquid comparison formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to 5%. The uncertainty is the 10% of the Const<sup>a</sup> uncertainty for indicated target tissue parameters.  
<sup>c</sup> AlphaDepth are determined during calibration. SPTAC warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe for distance from the boundary.

Certificate No: EX3-3708\_0418 Page 5 of 39

SRTC2019-9004(F)-19042601(H) October 22, 2019

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Calibration Parameter Determined in Body Tissue Simulating Media

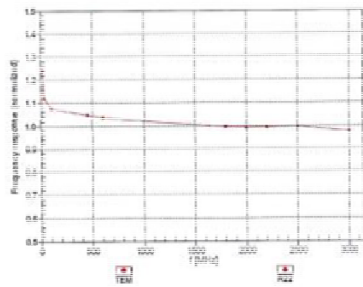
f (MHz)	Relative Permittivity <sup>a</sup>	Conductivity (S/m) <sup>b</sup>	Const X	Const Y	Const Z	Alpha <sup>c</sup>	Depth <sup>d</sup> (mm)	Unc. (k=2)
450	52.7	0.34	10.30	10.30	10.30	0.08	1.20	± 13.3 %
750	46.9	0.98	9.51	9.51	9.51	0.50	0.85	± 12.0 %
1050	45.8	0.97	9.33	9.33	9.33	0.47	0.84	± 12.0 %
1450	44.0	1.30	7.84	7.84	7.84	0.30	0.80	± 12.0 %
1750	43.4	1.69	7.60	7.60	7.60	0.37	0.85	± 12.0 %
1900	43.3	1.82	7.56	7.56	7.56	0.46	0.84	± 12.0 %
2200	43.3	1.82	7.53	7.53	7.53	0.41	0.84	± 12.0 %
2300	42.9	1.81	7.34	7.34	7.34	0.39	0.80	± 12.0 %
2450	42.7	1.58	7.10	7.10	7.10	0.53	0.85	± 12.0 %
2600	42.5	2.19	7.14	7.14	7.14	0.32	0.85	± 12.0 %
4500	34.0	4.50	4.83	4.83	4.83	0.60	1.00	± 13.1 %
5200	33.0	4.42	4.41	4.41	4.41	0.50	1.00	± 13.1 %
6600	32.0	4.77	3.98	3.98	3.98	0.50	1.00	± 13.1 %
8000	31.0	5.00	4.21	4.21	4.21	0.50	1.00	± 13.1 %

<sup>a</sup> Frequency values above 300 MHz of a 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to a 10 MHz. The uncertainty is the 10% of the Const<sup>a</sup> uncertainty of calibration frequency and the uncertainty for the indicated frequency band. Frequency values below 300 MHz is a 10, 30, 40, 50 and 70 MHz for Const<sup>a</sup> assessments at 30, 64, 128, 192 and 220 MHz respectively. Above 3 GHz frequency values can be extended to a 100 MHz.  
<sup>b</sup> As frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to a 10% if liquid comparison formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to 5%. The uncertainty is the 10% of the Const<sup>a</sup> uncertainty for indicated target tissue parameters.  
<sup>c</sup> AlphaDepth are determined during calibration. SPTAC warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe for distance from the boundary.

Certificate No: EX3-3708\_0418 Page 6 of 39

SRTC2019-9004(F)-19042601(H) October 22, 2019

Frequency Response of E-Field  
(TEM-Cell:R110 EXX, Waveguide: R22)

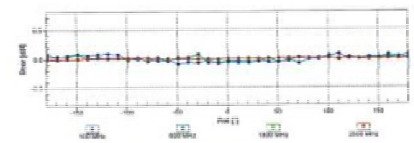
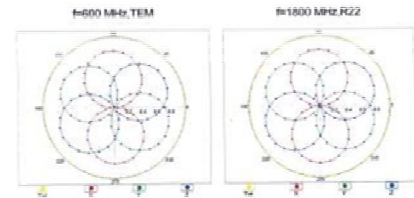


Uncertainty of Frequency Response of E-Field: ± 4.2% (k=2)

Certificate No: EX3-3708\_0418 Page 7 of 39

SRTC2019-9004(F)-19042601(H) October 22, 2019

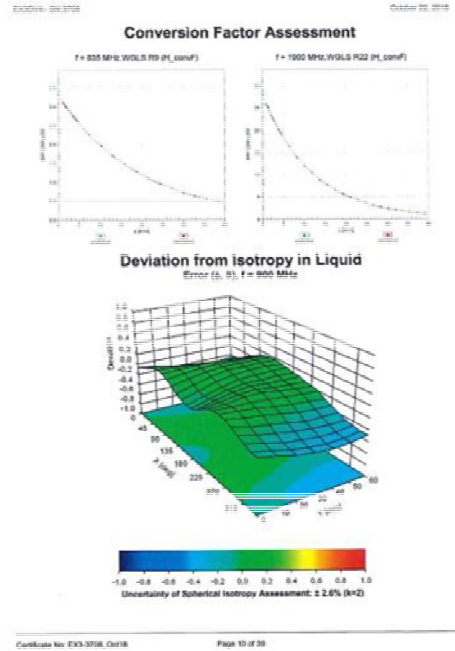
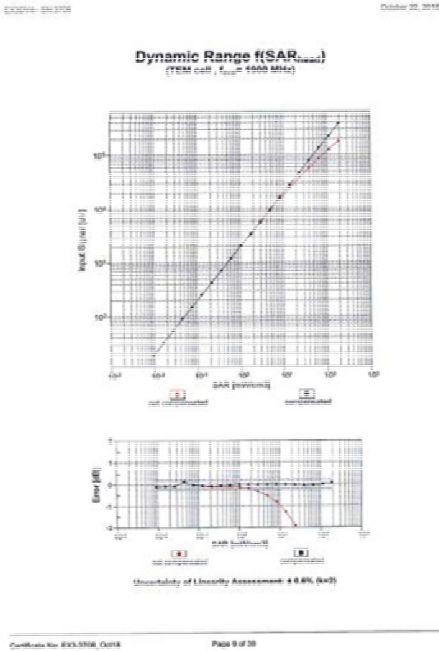
Receiving Pattern (ψ, θ = 0°)



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Certificate No: EX3-3708\_0418 Page 8 of 39

EX3DV4 Sn:3708 (3/7)



October 22, 2019

### DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Other Probe Parameters

Probe Arrangement	Triangular
Antenna Angle (°)	± 8°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Channel Length	307 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	4.4 mm

Certificate No: EX3-3708\_0018 Page 11 of 38