

## **5. SAR Measurement with DASY4 System**

Standard SAR-measurements were performed according to the measurement conditions described in section 4. The results (see figure supplied) have been normalized to a dipole input power of 1 W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over  $1 \text{ cm}^3$  (1 g) of tissue:  **$10.3 \text{ mW/g} \pm 16.8 \% (k=2)^2$**

averaged over  $10 \text{ cm}^3$  (10 g) of tissue:  **$6.76 \text{ mW/g} \pm 16.2 \% (k=2)^2$**

## **6. Dipole Impedance and Return Loss**

The dipole was positioned at the flat phantom sections according to section 4 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 835 MHz:  **$\text{Re}\{Z\} = 46.7 \Omega$**

**$\text{Im}\{Z\} = -4.5 \Omega$**

Return Loss at 835 MHz  **$-24.7 \text{ dB}$**

## **7. Handling**

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

## **8. Design**

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

## **9. Power Test**



Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN499**

Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1

Medium: HSL 835 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.89 \text{ mho/m}$ ;  $\epsilon_r = 42.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.3, 6.3, 6.3); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn411; Calibrated: 11/6/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.2 Build 25; Postprocessing SW: SEMCAD, V1.8 Build 98

**Pin = 250 mW; d = 15 mm/Area Scan (81x81x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Reference Value = 56.5 V/m

Power Drift = -0.0 dB

Maximum value of SAR = 2.68 mW/g

**Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

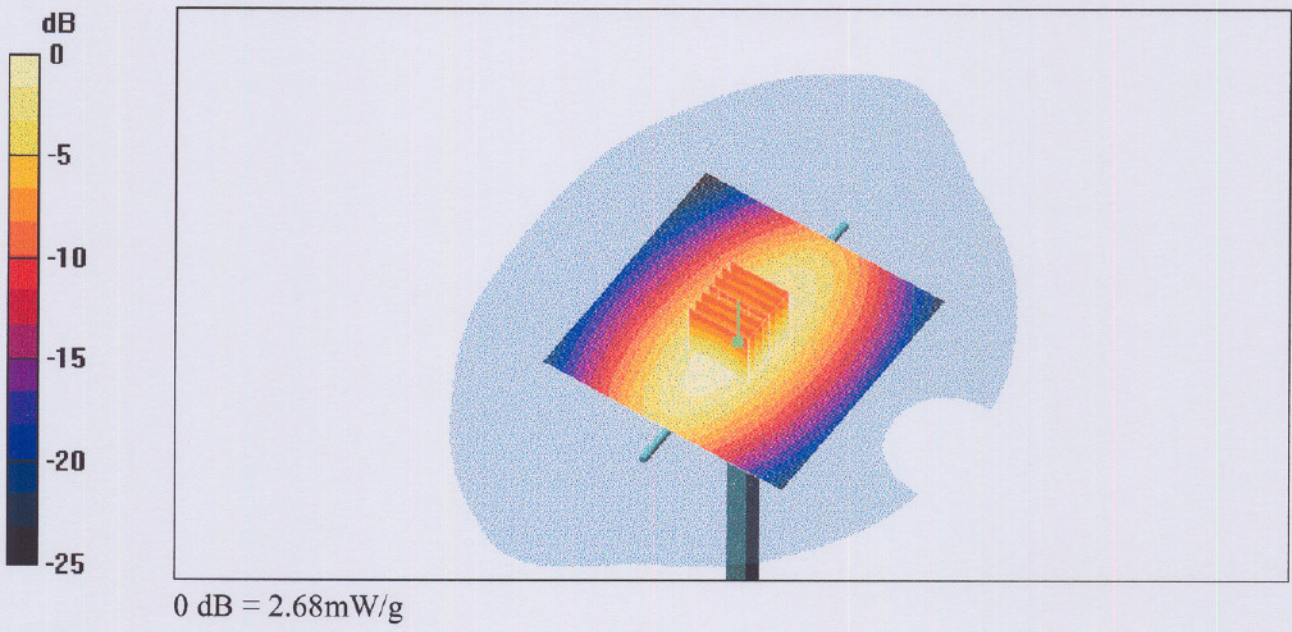
Peak SAR (extrapolated) = 3.81 W/kg

**SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.62 mW/g**

Reference Value = 56.5 V/m

Power Drift = -0.0 dB

Maximum value of SAR = 2.68 mW/g



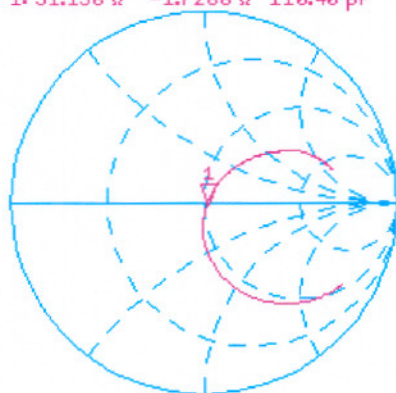
12 Feb 2004 10:45:43  
CH1 S11 1 U FS 1: 51.156  $\Omega$  -1.7266  $\Omega$  110.40 pF 835.000 000 MHz

Del

Cor

Avg  
16

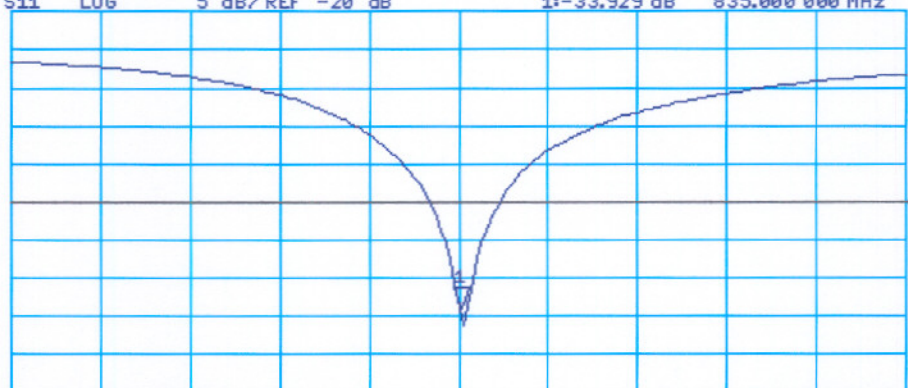
↑



CH2 S11 LOG 5 dB/REF -20 dB 1: -33.929 dB 835.000 000 MHz

Cor

↑



CENTER 835.000 000 MHz

SPAN 400.000 000 MHz



Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN499**

Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Muscle 835 MHz;

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.99$  mho/m;  $\epsilon_r = 55.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.13, 6.13, 6.13); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 11/6/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006;
- Measurement SW: DASY4, V4.2 Build 25; Postprocessing SW: SEMCAD, V1.8 Build 101

**Pin = 250 mW; d = 15 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm

Reference Value = 54.7 V/m; Power Drift = 0.002 dB

Maximum value of SAR (interpolated) = 2.79 mW/g

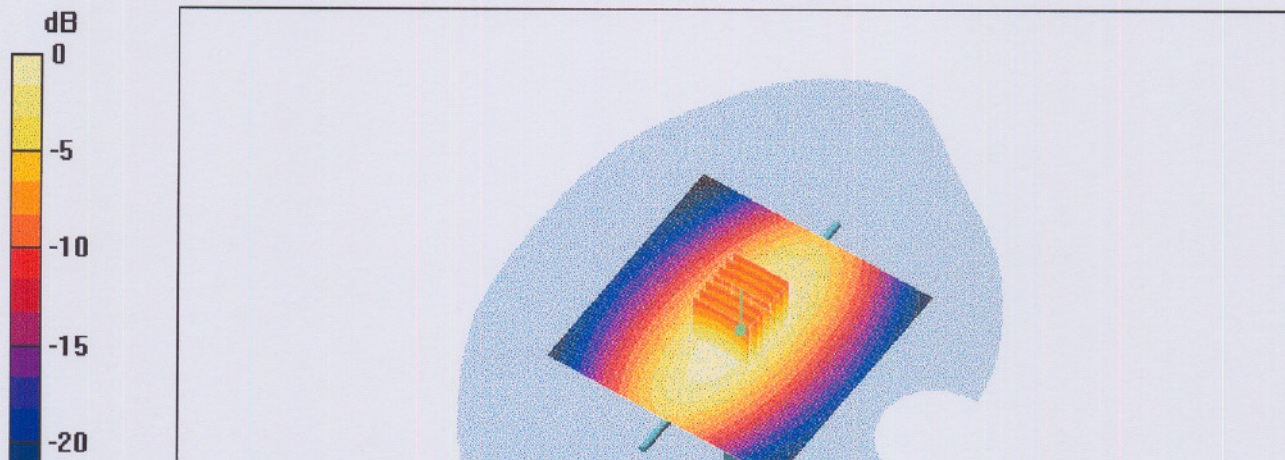
**Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.7 V/m; Power Drift = 0.002 dB

Maximum value of SAR (measured) = 2.79 mW/g

Peak SAR (extrapolated) = 3.82 W/kg

**SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.69 mW/g**



435  
Body

10 Feb 2004 10:59:22

CH1 S11 1 U FS

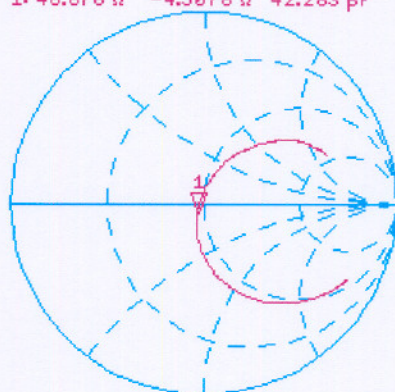
1: 46.676  $\Omega$  -4.5078  $\Omega$  42.283 pF 835.000 000 MHz

Del

Cor

Avg  
16

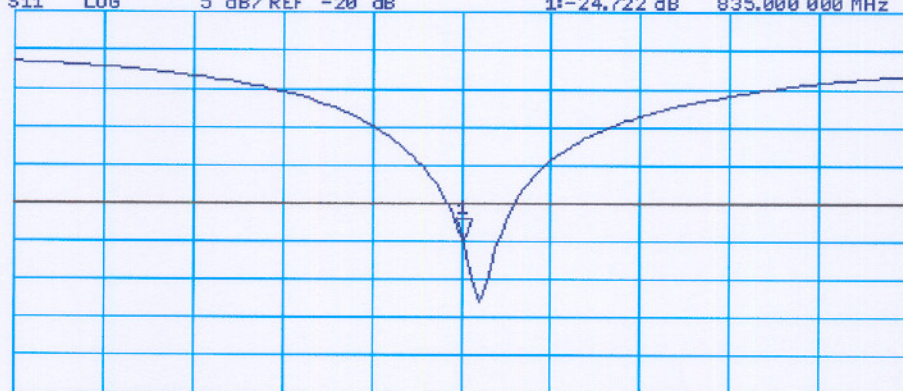
↑



CH2 S11 LOG 5 dB/REF -20 dB 1:-24.722 dB 835.000 000 MHz

Cor

↑



CENTER 835.000 000 MHz

SPAN 400.000 000 MHz



Client

Sproton Int. (Auden)

## CALIBRATION CERTIFICATE

Object(s)

D1900V2 - SN:5d041

Calibration procedure(s)

QA CAL-05.v2  
Calibration procedure for dipole validation kits

Calibration date:

February 17, 2004

Condition of the calibrated item

In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	US37292783	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Oct 05

Calibrated by:

Name  
Judith Mueller

Function  
Technician

Signature

Approved by:

Katja Pokovic

Laboratory Director

Date issued: February 18, 2004

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.



# DASY

## Dipole Validation Kit

Type: D1900V2

Serial: 5d041

Manufactured:	July 4, 2003
Calibrated:	February 17, 2004