



Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 8/22/2005 10:38:24 PM

**Body\_PCS Ch661\_Keypad Up With 1.5cm Gap \_20050822**

**DUT: 580502; Type: PDA; Serial: 352023000735643**

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4

Medium: MSL\_1900 Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 53.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature : 20.7 °C; Liquid Temperature : 21.2 °C

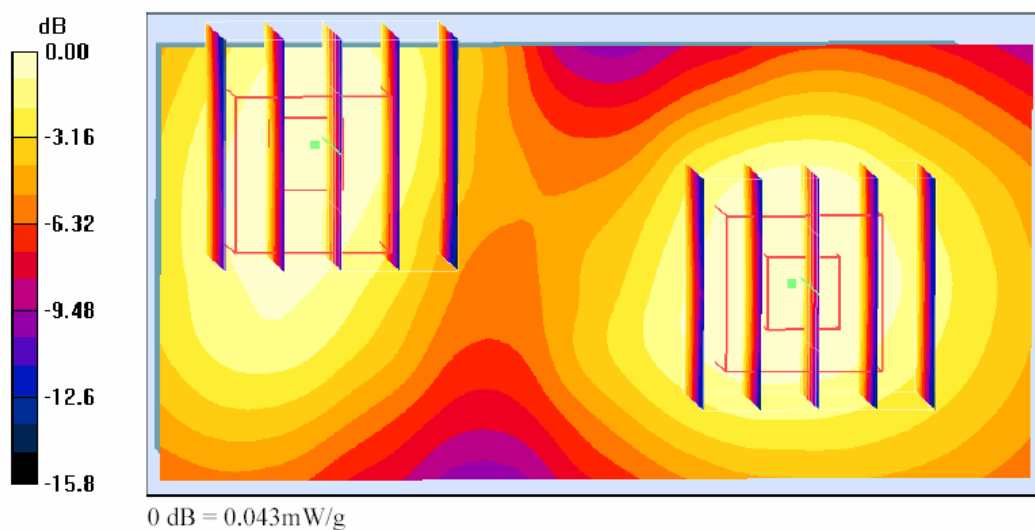
DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.56, 4.56, 4.56); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Ch661/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.044 mW/g

**Ch661/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 5.23 V/m; Power Drift = 0.067 dB  
Peak SAR (extrapolated) = 0.064 W/kg  
**SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.026 mW/g**  
Maximum value of SAR (measured) = 0.044 mW/g

**Ch661/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 5.23 V/m; Power Drift = 0.067 dB  
Peak SAR (extrapolated) = 0.056 W/kg  
**SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.025 mW/g**  
Maximum value of SAR (measured) = 0.043 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 8/22/2005 11:33:20 PM

**Body\_PCS Ch810\_Keypad Down With 1.5cm Gap \_20050822****DUT: 580502; Type: PDA; Serial: 352023000735643**

Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4

Medium: MSL\_1900 Medium parameters used :  $f = 1909.8$  MHz;  $\sigma = 1.54$  mho/m;  $\epsilon_r = 52.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature : 20.9 °C; Liquid Temperature : 21.3 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.56, 4.56, 4.56); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Ch810/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.442 mW/g

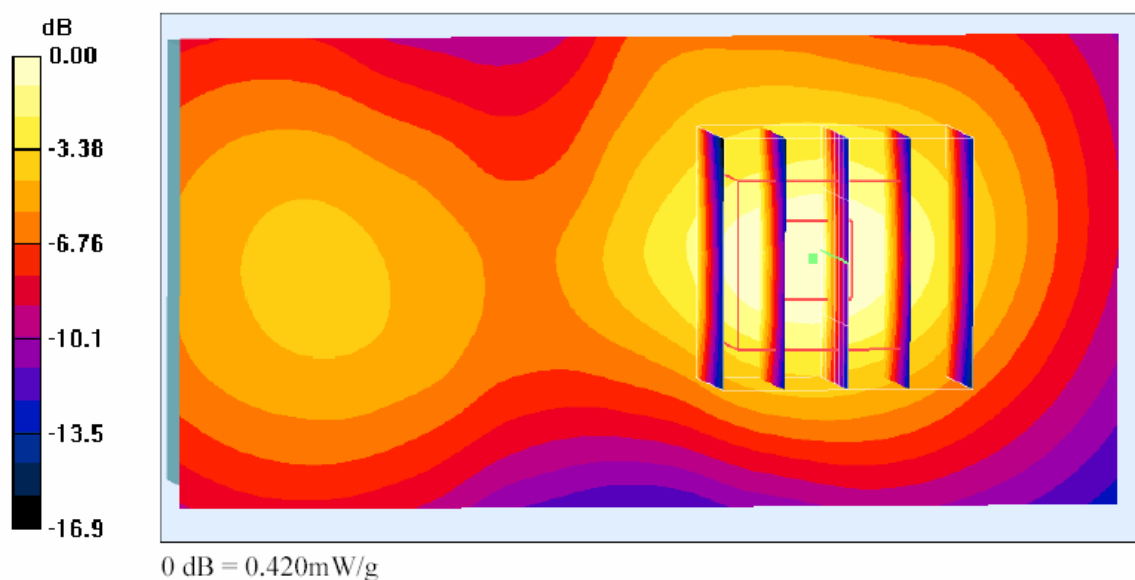
**Ch810/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.1 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.617 W/kg

**SAR(1 g) = 0.386 mW/g; SAR(10 g) = 0.223 mW/g**

Maximum value of SAR (measured) = 0.420 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 8/16/2005 9:59:04 PM

**Left Cheek\_GSM850 Ch251\_20050816****DUT: 580502; Type: PDA; Serial: 352023000735643**

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium: HSL\_850 Medium parameters used :  $f = 848.8$  MHz;  $\sigma = 0.906$  mho/m;  $\epsilon_r = 40.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature : 21.6 °C; Liquid Temperature : 21.3 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.74, 6.74, 6.74); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Ch251/Area Scan (51x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.141 mW/g

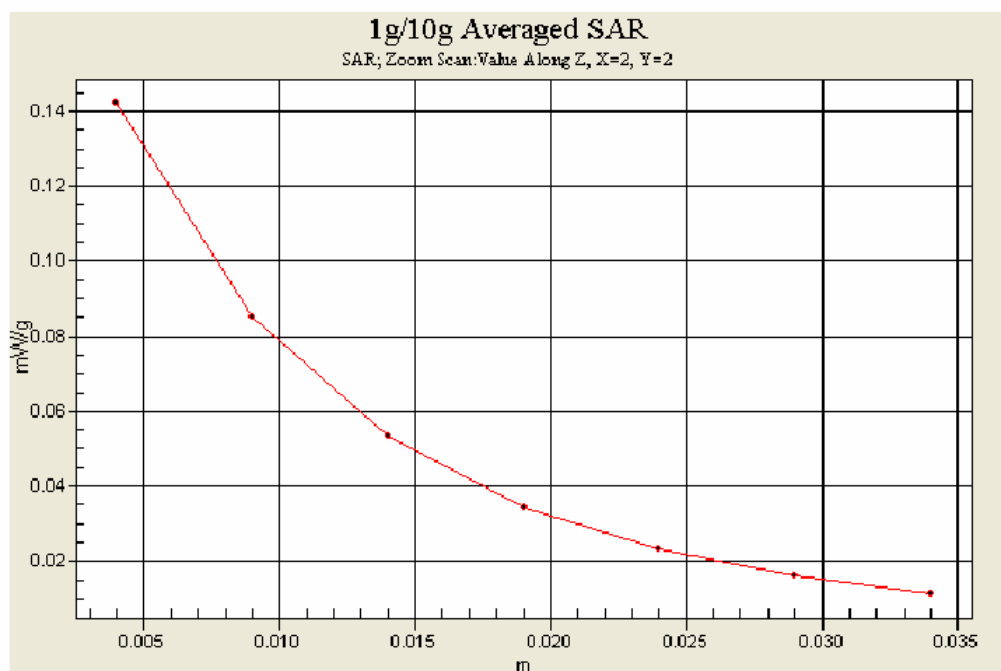
**Ch251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.53 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 0.230 W/kg

**SAR(1 g) = 0.131 mW/g; SAR(10 g) = 0.079 mW/g**

Maximum value of SAR (measured) = 0.142 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 8/19/2005 11:50:34 AM

**Left Tilted\_PCS Ch661\_20050819****DUT: 580502; Type: PDA; Serial: 352023000735643**

Communication System: PCS; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: HSL\_1900 Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 39.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature : 21.8 °C; Liquid Temperature : 21.5 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.16, 5.16, 5.16); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Ch661/Area Scan (51x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.124 mW/g

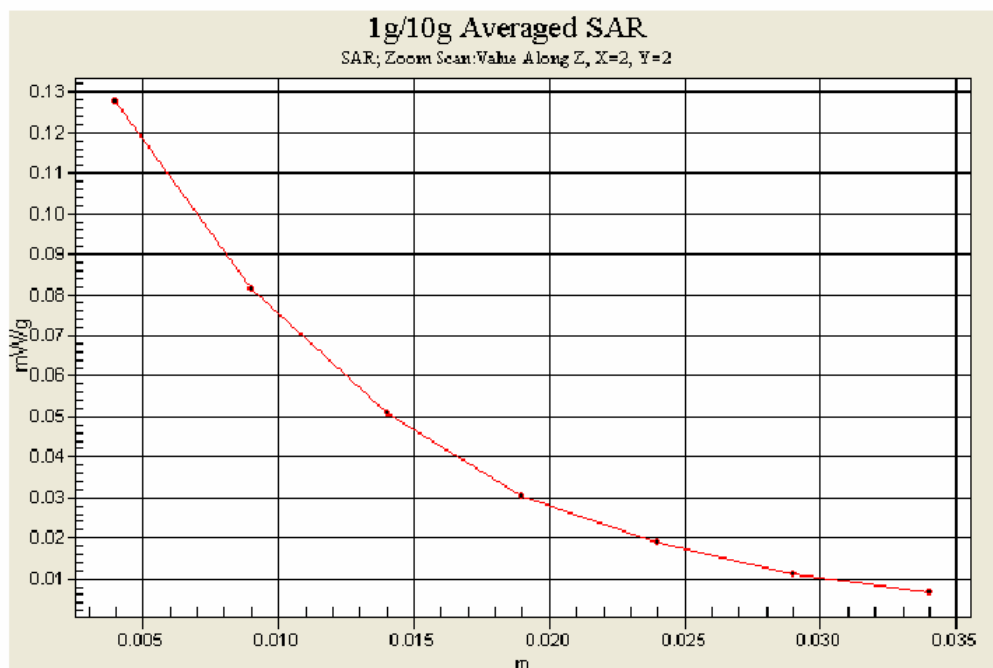
**Ch661/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.71 V/m; Power Drift = -0.049 dB

Peak SAR (extrapolated) = 0.201 W/kg

**SAR(1 g) = 0.117 mW/g; SAR(10 g) = 0.067 mW/g**

Maximum value of SAR (measured) = 0.128 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 8/16/2005 11:40:06 AM

**Body\_GSM850 Ch251\_Keypad Down With 1.5cm Gap \_20050816****DUT: 580502; Type: PDA; Serial: 352023000735643**

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:4

Medium: MSL\_850 Medium parameters used :  $f = 848.8$  MHz;  $\sigma = 1$  mho/m;  $\epsilon_r = 54.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature : 20.7 °C ; Liquid Temperature : 21.2 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.53, 6.53, 6.53); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Ch251/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.574 mW/g

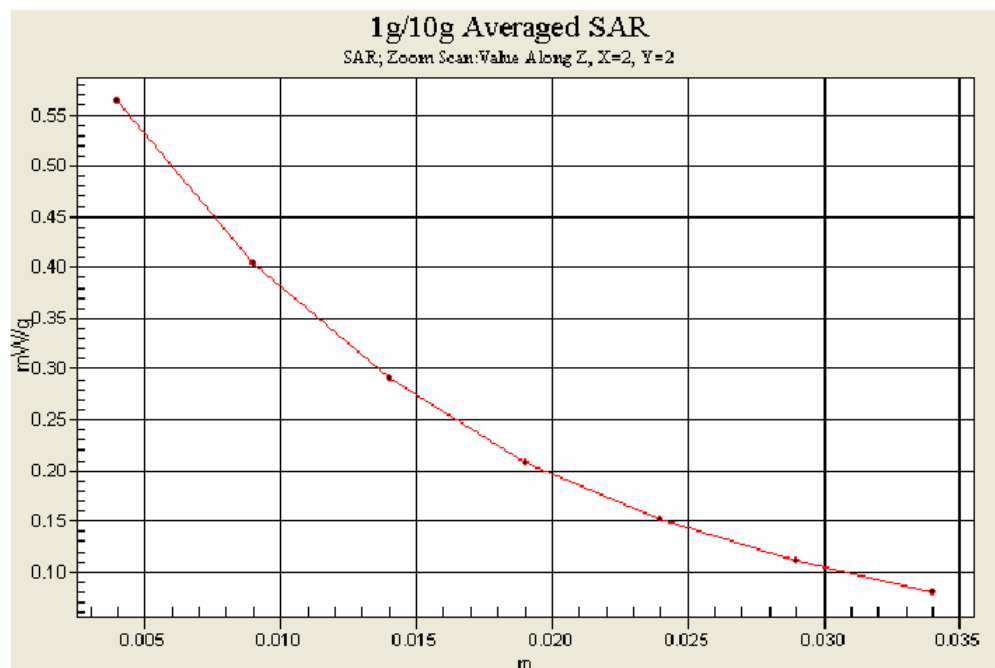
**Ch251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.81 V/m; Power Drift = 0.039 dB

Peak SAR (extrapolated) = 0.726 W/kg

**SAR(1 g) = 0.528 mW/g; SAR(10 g) = 0.372 mW/g**

Maximum value of SAR (measured) = 0.564 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 8/22/2005 11:33:20 PM

**Body\_PCS Ch810\_Keypad Down With 1.5cm Gap \_20050822****DUT: 580502; Type: PDA; Serial: 352023000735643**

Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4

Medium: MSL\_1900 Medium parameters used :  $f = 1909.8$  MHz;  $\sigma = 1.54$  mho/m;  $\epsilon_r = 52.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature : 20.9 °C; Liquid Temperature : 21.3 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.56, 4.56, 4.56); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Ch810/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.442 mW/g

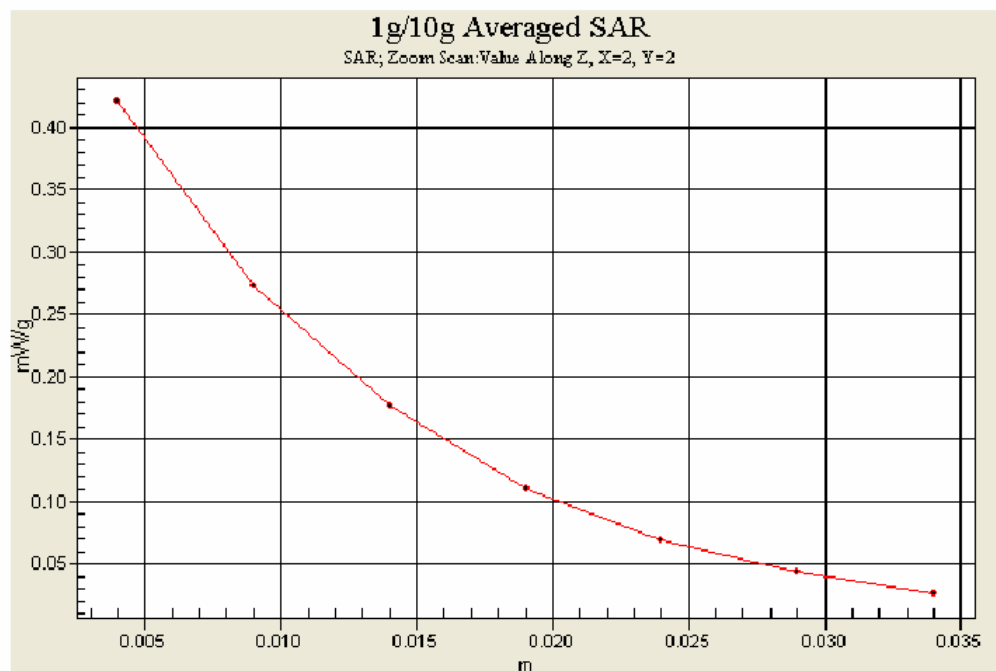
**Ch810/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.1 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.617 W/kg

**SAR(1 g) = 0.386 mW/g; SAR(10 g) = 0.223 mW/g**

Maximum value of SAR (measured) = 0.420 mW/g







## Appendix C – Calibration Data

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

Client **Sproton Int. (Auden)**

### CALIBRATION CERTIFICATE

Object(s) **D835V2 - SN:499**

Calibration procedure(s) **QA CAL-05 v2  
Calibration procedure for dipole validation kits**

Calibration date: **February 12, 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	Function	Signature
	Judith Mueller	Technician	

Approved by:	Name	Function
	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.



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Schmid & Partner Engineering AG

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**DASY**

**Dipole Validation Kit**

**Type: D835V2**

**Serial: 499**

Manufactured: July 10, 2003  
Calibrated: February 12, 2004





## **1. Measurement Conditions**

The measurements were performed in the flat section of the SAM twin phantom filled with **head simulating solution** of the following electrical parameters at 835 MHz:

Relative Dielectricity	<b>42.1</b>	$\pm 5\%$
Conductivity	<b>0.89 mho/m</b>	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.3 at 835 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was 250 mW  $\pm 3\%$ . The results are normalized to 1W input power.

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

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

averaged over 1 cm <sup>3</sup> (1 g) of tissue:	<b>9.96 mW/g <math>\pm 16.8\%</math> (k=2)<sup>1</sup></b>
averaged over 10 cm <sup>3</sup> (10 g) of tissue:	<b>6.48 mW/g <math>\pm 16.2\%</math> (k=2)<sup>1</sup></b>

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<sup>1</sup> validation uncertainty



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

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	<b>1.382 ns</b>	(one direction)
Transmission factor:	<b>0.985</b>	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 835 MHz:	$\text{Re}\{Z\} = 51.2 \Omega$
	$\text{Im}\{Z\} = -1.7 \Omega$
Return Loss at 835 MHz	<b>-33.9 dB</b>

### **4. Measurement Conditions**

The measurements were performed in the flat section of the SAM twin phantom filled with **body simulating solution** of the following electrical parameters at 835 MHz:

Relative Dielectricity	<b>55.5</b>	$\pm 5\%$
Conductivity	<b>0.99 mho/m</b>	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.13 at 835 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was 250 mW  $\pm 3\%$ . The results are normalized to 1W input power.



## **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 cm<sup>3</sup> (1 g) of tissue:      **10.3 mW/g ± 16.8 % (k=2)<sup>2</sup>**

averaged over 10 cm<sup>3</sup> (10 g) of tissue:      **6.76 mW/g ± 16.2 % (k=2)<sup>2</sup>**

## **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:      **Re{Z} = 46.7 Ω**

**Im {Z} = -4.5 Ω**

Return Loss at 835 MHz      **-24.7 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**

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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<sup>2</sup> validation uncertainty



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=15mm, dy=15mm

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=5mm, dy=5mm, dz=5mm

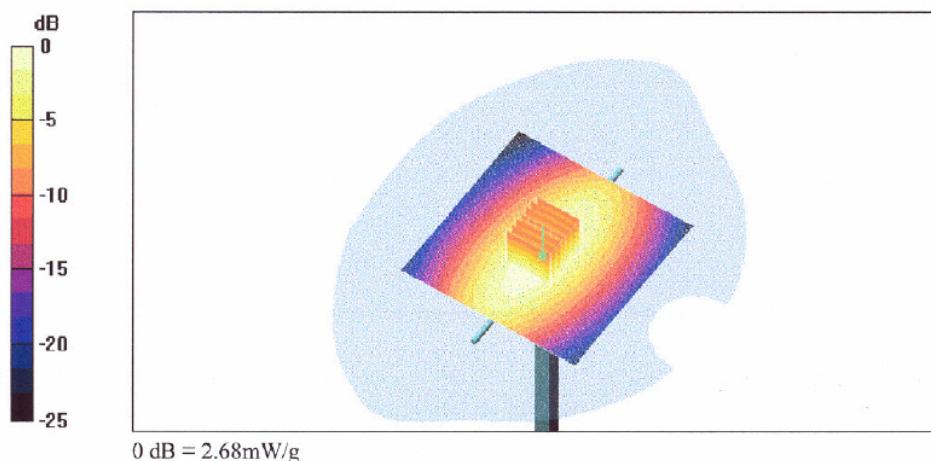
Peak SAR (extrapolated) = 3.81 W/kg

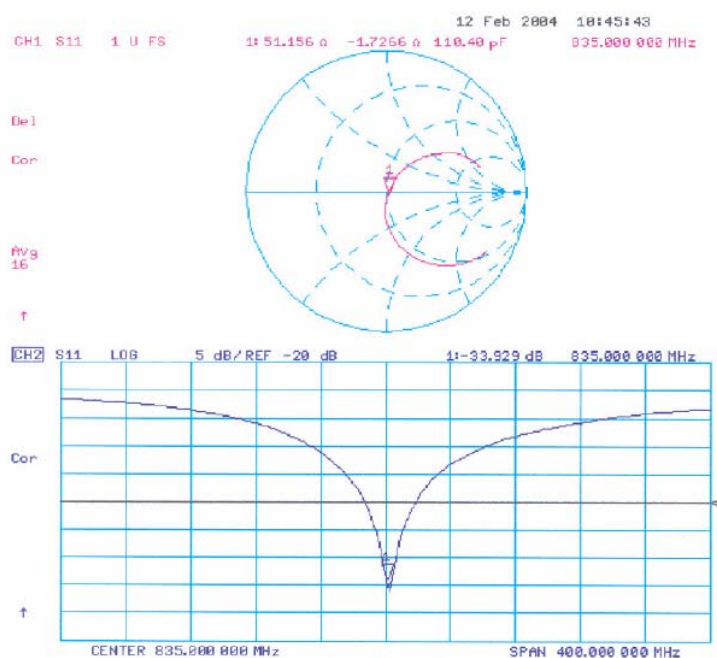
**SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.62 mW/g**

Reference Value = 56.5 V/m

Power Drift = -0.0 dB

Maximum value of SAR = 2.68 mW/g









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

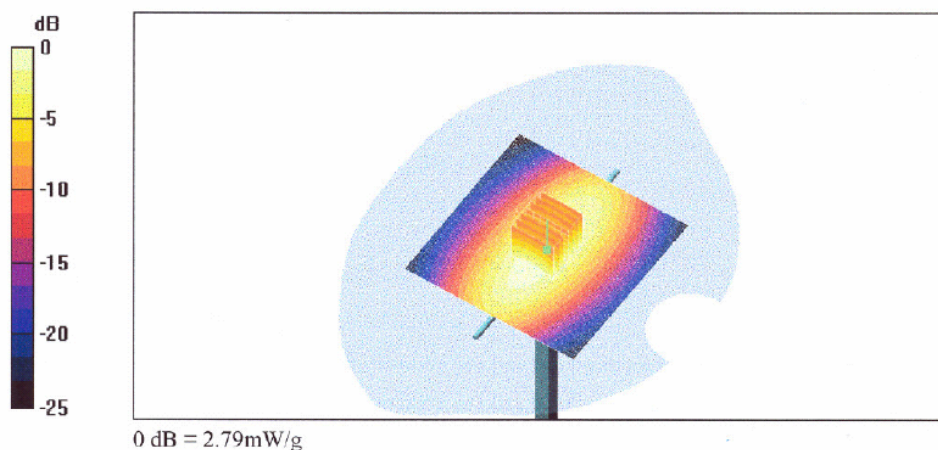
**Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

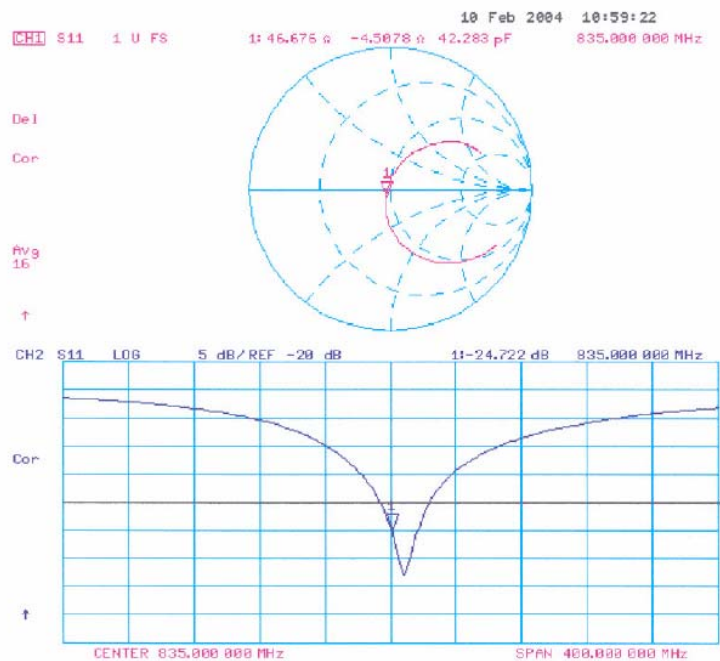
Reference Value = 54.7 V/m; Power Drift = 0.002 dB

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**









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

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:	Name Katja Pokovic	Function Laboratory Director	Signature 
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.			



Schmid & Partner Engineering AG

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info@speag.com, <http://www.speag.com>

# DASY

## Dipole Validation Kit

Type: D1900V2

Serial: 5d041

Manufactured: July 4, 2003

Calibrated: February 17, 2004



## **1. Measurement Conditions**

The measurements were performed in the flat section of the SAM twin phantom filled with **head simulating liquid** of the following electrical parameters at 1900 MHz:

Relative Dielectricity	<b>38.8</b>	$\pm 5\%$
Conductivity	<b>1.47 mho/m</b>	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 4.96 at 1900 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was  $250\text{mW} \pm 3\%$ . The results are normalized to 1W input power.

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

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (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:	<b>41.6 mW/g <math>\pm 16.8\%</math> (k=2)<sup>1</sup></b>
averaged over $10\text{ cm}^3$ (10 g) of tissue:	<b>21.6 mW/g <math>\pm 16.2\%</math> (k=2)<sup>1</sup></b>

<sup>1</sup> validation uncertainty



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

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	<b>1.200 ns</b>	(one direction)
Transmission factor:	<b>0.993</b>	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance spacer was in place during impedance measurements.

Feedpoint impedance at 1900 MHz:	$\text{Re}\{Z\} = 51.2 \Omega$
	$\text{Im}\{Z\} = 4.9 \Omega$
Return Loss at 1900 MHz	<b>-26.1 dB</b>

### **4. Measurement Conditions**

The measurements were performed in the flat section of the SAM twin phantom filled with **body simulating tissue** of the following electrical parameters at 1900 MHz:

Relative Dielectricity	<b>52.5</b>	$\pm 5\%$
Conductivity	<b>1.58 mho/m</b>	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 4.57 at 1900 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was  $250\text{mW} \pm 3\%$ . The results are normalized to 1W input power.



## **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 cm<sup>3</sup> (1 g) of tissue:      **42.0 mW/g ± 16.8 % (k=2)<sup>2</sup>**

averaged over 10 cm<sup>3</sup> (10 g) of tissue:      **22.0 mW/g ± 16.2 % (k=2)<sup>2</sup>**

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

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

Feedpoint impedance at 1900 MHz:      **Re{Z} = 46.6 Ω**

**Im {Z} = 5.1 Ω**

Return Loss at 1900 MHz      **-24.0 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.

Small end caps have been added to the dipole arms in order to improve matching when loaded according to the position as explained in Section 1. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

## **9. Power Test**

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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<sup>2</sup> validation uncertainty