### 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 1900 MHz:

Relative Dielectricity 40.2  $\pm 5\%$ Conductivity 1.46 mho/m  $\pm 5\%$ 

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.2 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 <u>advanced extrapolation</u> are:

averaged over 1 cm<sup>3</sup> (1 g) of tissue: 41.2 mW/g  $\pm$  16.8 % (k=2)<sup>1</sup>

averaged over 10 cm<sup>3</sup> (10 g) of tissue: **21.4 mW/g**  $\pm$  16.2 % (k=2)<sup>1</sup>

<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:

1.186 ns (one direction)

Transmission factor:

0.985

(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:

 $Re{Z} = 50.3 \Omega$ 

Im  $\{Z\} = 4.2 \Omega$ 

Return Loss at 1900 MHz

-27.6 dB

## 4. Measurement Conditions

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

Relative Dielectricity

50.9

± 5%

Conductivity

1.60 mho/m  $\pm 5\%$ 

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 4.8 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 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the <u>advanced extrapolation</u> are:

averaged over 1 cm<sup>3</sup> (1 g) of tissue:

**43.6 mW/g**  $\pm$  16.8 % (k=2)<sup>2</sup>

averaged over 10 cm<sup>3</sup> (10 g) of tissue:

**22.6 mW/g**  $\pm$  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:

 $Re{Z} = 47.0 \Omega$ 

Im  $\{Z\} = 4.9 \Omega$ 

Return Loss at 1900 MHz

-24.6 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 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

<sup>&</sup>lt;sup>2</sup> validation uncertainty

Date/Time: 08/22/03 16:11:55

Test Laboratory: SPEAG, Zurich, Switzerland

File Name: SN5d036 SN1507 HSL1900 220803.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN5d036

Program: Dipole Calibration

Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium: HSL 1900 MHz ( $\sigma = 1.46 \text{ mho/m}$ ,  $\varepsilon_r = 40.17$ ,  $\rho = 1000 \text{ kg/m}^3$ )

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

### DASY4 Configuration:

- Probe: ET3DV6 SN1507; ConvF(5.2, 5.2, 5.2); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 94.4 V/m

Power Drift = 0.002 dB

Maximum value of SAR = 11.6 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5 mm, dy=5 mm, dz=5mm

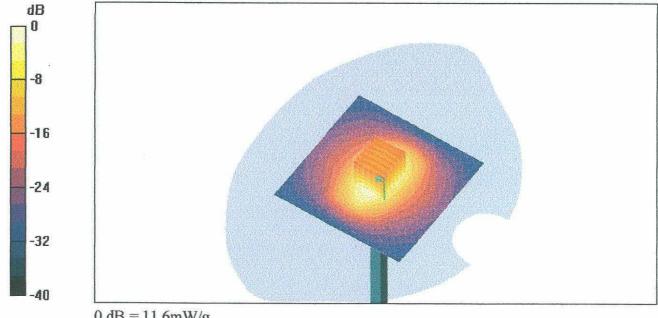
Peak SAR (extrapolated) = 17.9 W/kg

SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.35 mW/g

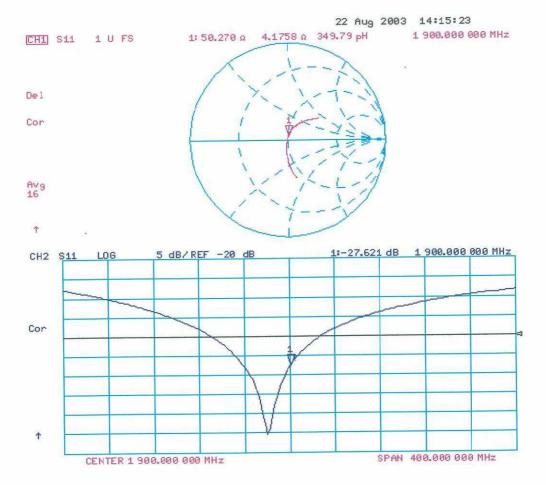
Reference Value = 94.4 V/m

Power Drift = 0.002 dB

Maximum value of SAR = 11.6 mW/g



0 dB = 11.6 mW/g



Date/Time: 08/25/03 15:40:37

Test Laboratory: SPEAG, Zurich, Switzerland File Name: SN5d036 SN1507 M1900 250803.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN5d036 Program: Dipole Calibration

Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium: Muscle 1900 MHz ( $\sigma = 1.6 \text{ mho/m}, \epsilon_r = 50.87, \rho = 1000 \text{ kg/m}^3$ )

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

## DASY4 Configuration:

- Probe: ET3DV6 SN1507; ConvF(4.8, 4.8, 4.8); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 92.8 V/m

Power Drift = -0.0006 dB

Maximum value of SAR = 12.1 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5 mm, dy=5 mm. dz=5mm

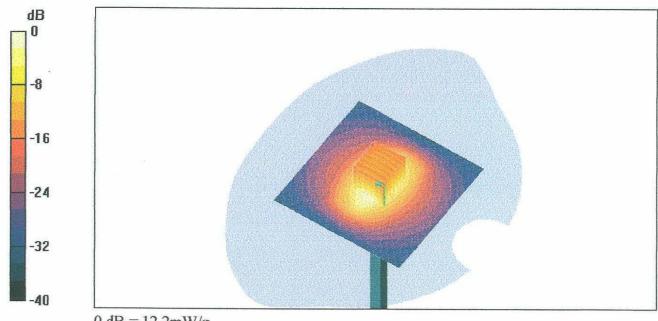
Peak SAR (extrapolated) = 19 W/kg

SAR(1 g) = 10.9 mW/g; SAR(10 g) = 5.64 mW/g

Reference Value = 92.8 V/m

Power Drift = -0.0006 dB

Maximum value of SAR = 12.2 mW/g



0 dB = 12.2 mW/g

