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 2450 MHz:

Relative Dielectricity	**38.2**	± 5%
Conductivity	**1.89 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ES3DV2 (SN:3013, Conversion factor 4.8 at 2450 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. Lossless 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 250mW ± 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 ES3DV2 SN:3013 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue: **55.2 mW/g** ± 16.8 % (k=2)[1]

averaged over 10 cm^3 (10 g) of tissue: **24.8 mW/g** ± 16.2 % (k=2)[1]

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[1] 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:	**1.162 ns**	(one direction)
Transmission factor:	**0.983**	(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 2450 MHz: $Re\{Z\} =$ **52.5 Ω**

                                                                        $Im\{Z\} =$ **5.4 Ω**

Return Loss at 2450 MHz   **-24.8 dB**

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 2450 MHz:

Relative Dielectricity	**50.8**	$\pm 5\%$
Conductivity	**2.03 mho/m**	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ES3DV2 (SN:3013, Conversion factor 4.2 at 2450 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. Lossless 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 250mW $\pm 3\%$. 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 ES3DV2 SN:3013 and applying the underlined advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue: **55.2 mW/g** ± 16.8 % (k=2)[2]

averaged over 10 cm^3 (10 g) of tissue: **25.4 mW/g** ± 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 spacer was in place during impedance measurements.

Feedpoint impedance at 2450 MHz: $Re\{Z\} =$ **48.5** Ω

$Im\{Z\} =$ **6.1** Ω

Return Loss at 2450 MHz   **-23.9 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 Sections 1and 4. 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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[2] validation uncertainty

Test Laboratory: SPEAG, Zurich, Switzerland

File Name: SN737_SN3013_HSL2450_270803.da4

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN737
Program: Dipole Calibration

Communication System: CW-2450; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium: HSL 2450 MHz (σ = 1.89 mho/m, ε_r = 38.19, ρ = 1000 kg/m^3)

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3013; ConvF(4.8, 4.8, 4.8); Calibrated: 1/19/2003
- 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 = 90.7 V/m

Power Drift = -0.07 dB

Maximum value of SAR = 15.2 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
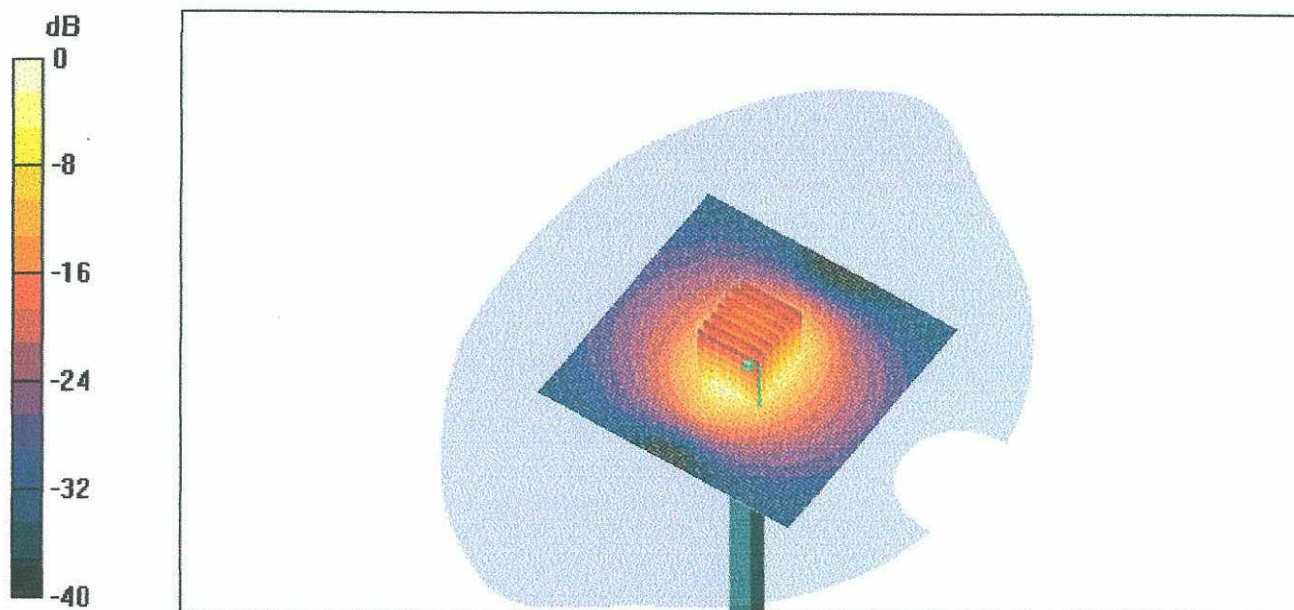
Peak SAR (extrapolated) = 29.6 W/kg

SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.2 mW/g

Reference Value = 90.7 V/m

Power Drift = -0.07 dB

Maximum value of SAR = 15.1 mW/g

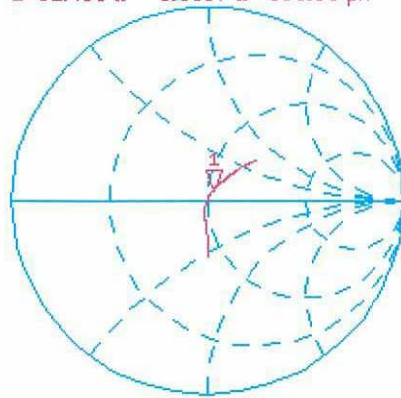0 dB = 15.1mW/g

27 Aug 2003 09:59:05

CH1 S11   1 U FS   1: 52.490 Ω   5.3887 Ω 350.05 pH   2 450.000 000 MHz
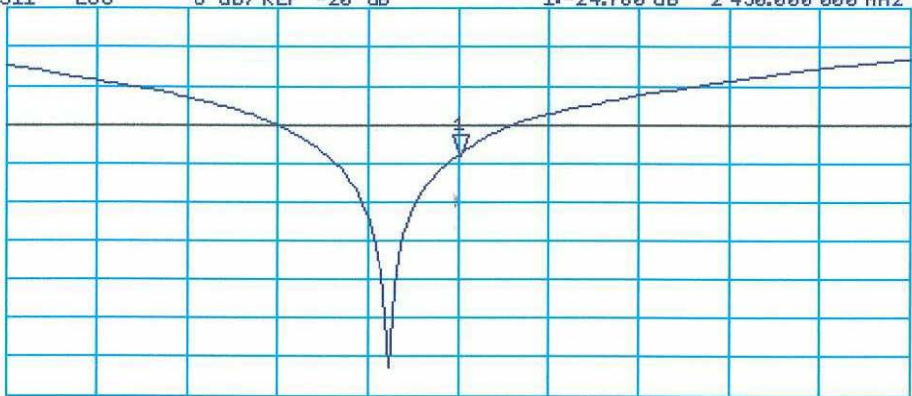
De1

Cor

Avg
16

↑

CH2 S11   LOG   6 dB/ REF -20 dB   1:-24.760 dB   2 450.000 000 MHz

Cor

↑

CENTER 2 450.000 000 MHz   SPAN 400.000 000 MHz

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN737_SN3013_M2450_270803.da4

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN737
Program: Dipole Calibration

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Muscle 2450 MHz ($\sigma = 2.03$ mho/m, $\varepsilon_r = 50.75$, $\rho = 1000$ kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3013; ConvF(4.2, 4.2, 4.2); Calibrated: 1/19/2003
- 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 = 90.4 V/m
Power Drift = -0.03 dB
Maximum value of SAR = 15.7 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
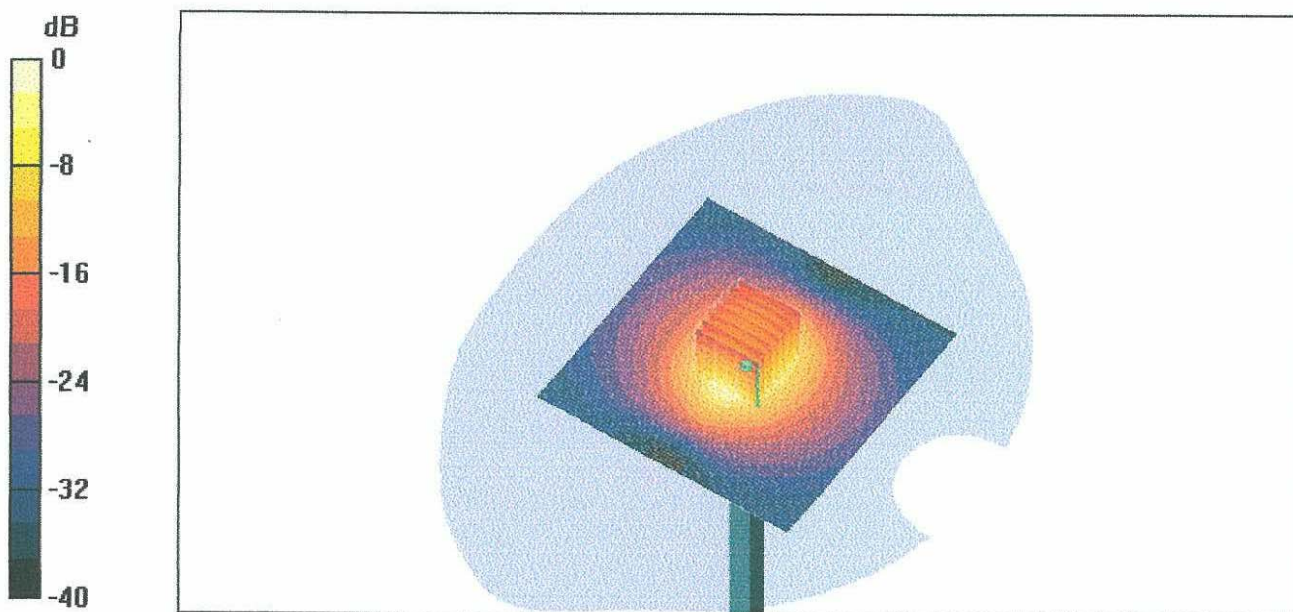Peak SAR (extrapolated) = 27.3 W/kg
SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.36 mW/g
Reference Value = 90.4 V/m
Power Drift = -0.03 dB
Maximum value of SAR = 15.7 mW/g

0 dB = 15.7mW/g

737
Body

27 Aug 2003 13:31:47

CH1 S11   1 U FS   1: 48.492 Ω   6.1309 Ω 398.27 pH   2 450.000 000 MHz
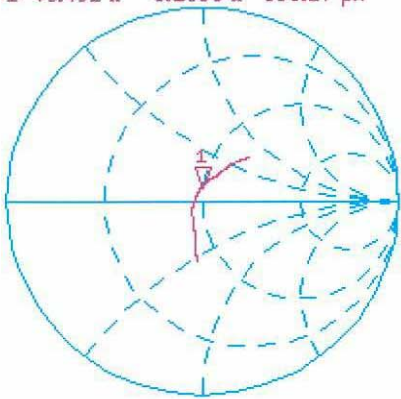
Del
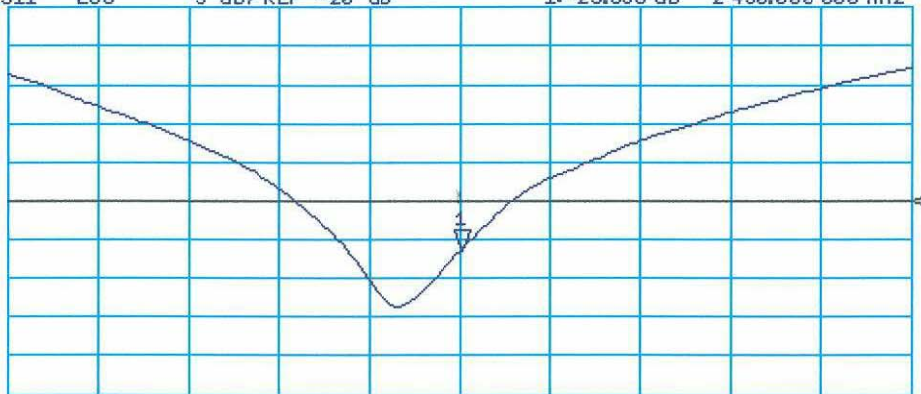
Cor

Avg
16

↑

CH2 S11   LOG   3 dB/ REF -20 dB   1:-23.855 dB   2 450.000 000 MHz

Cor

↑

CENTER 2 450.000 000 MHz   SPAN 400.000 000 MHz