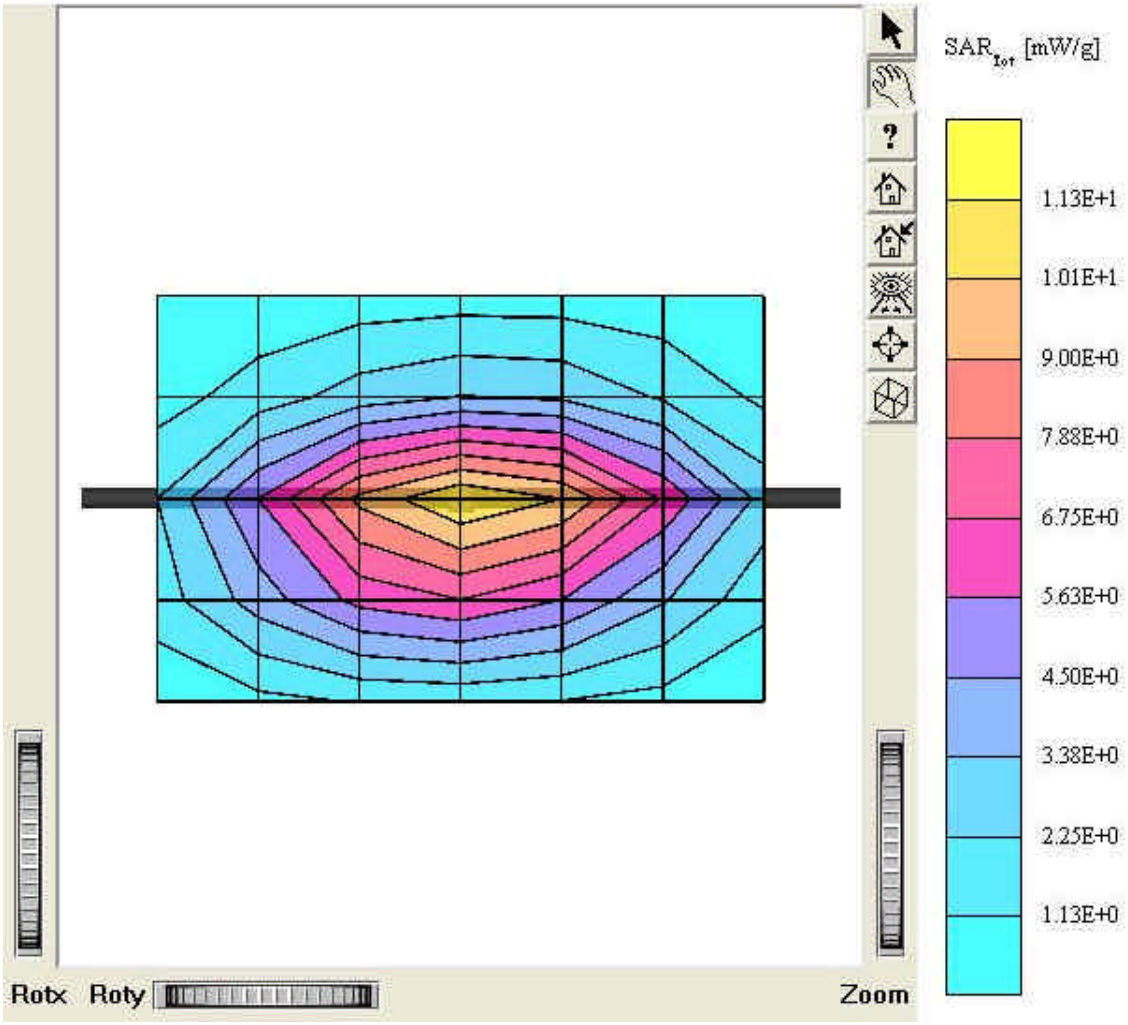
Validation Data (900MHz Brain)

Dipole 900 MHz

SAM II Phantom; Flat Section; Position: (90°,90°); Frequency: 900 MHz
Probe: ET3DV6 - SN1607; ConvF(6.22,6.22,6.22); Crest factor: 1.0; Head 900 MHz: σ = 0.96 mho/m ε_r = 42.3 ρ = 1.00 g/cm^3
Cubes (2): SAR (1g): 10.7 mW/g ± 0.04 dB, SAR (10g): 6.72 mW/g ± 0.04 dB
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Powerdrift: -0.00 dB
Comment :
900 MHz Brain Dipole Validation
Antenna Input Power: 30 dBm (1 W)
HCT Co., Ltd. Brain Tissue Simulating Liquid
Liquid Temperature : 21.2 ℃
Date Tested : October 29, 2004

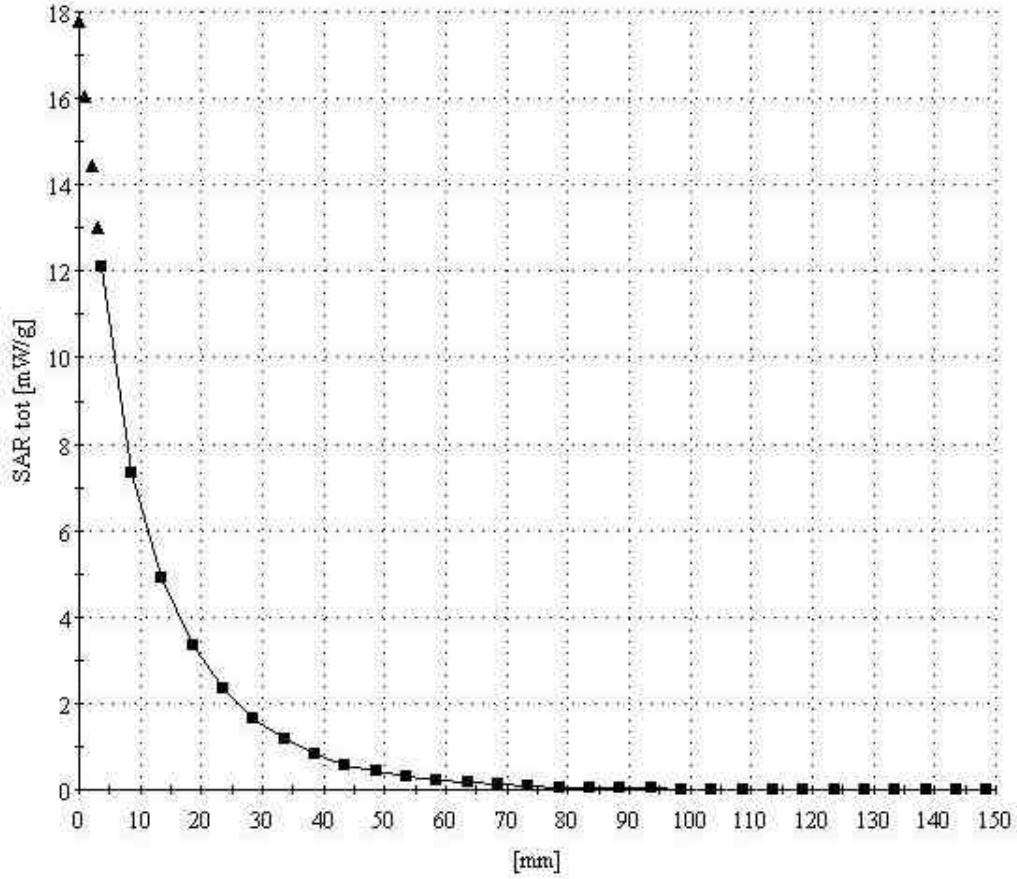


Validation Data (900 Brain- z)

Dipole 900 MHz

SAM II Phantom; Section; Position: ; Frequency: 900 MHz
Probe: ET3DV6 - SN1607; ConvF(6.22,6.22,6.22); Crest factor: 1.0; Head 900 MHz: σ = 0.96 mho/m ε_r = 42.3 ρ = 1.00 g/cm^3
.
Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 5.0

Comment :
900 MHz Brain Dipole Validation
Antenna Input Power: 30 dBm (1 W)
HCT Co., Ltd. Brain Tissue Simulating Liquid
Liquid Temperature : 21.2 ℃
Date Tested : October 29, 2004



Dielectric Parameter (900 MHz Brain)

Title: REH-100
SubTitle: 900MHz Brain
October 29, 2004 09:32 AM

Frequency	e'	e''
850.000000 MHz	42.9838	19.4061
855.000000 MHz	42.8819	19.4135
860.000000 MHz	42.7947	19.3962
865.000000 MHz	42.7370	19.3706
870.000000 MHz	42.7009	19.3798
875.000000 MHz	42.6152	19.4242
880.000000 MHz	42.5993	19.3765
885.000000 MHz	42.5082	19.3621
890.000000 MHz	42.4320	19.3436
895.000000 MHz	42.3897	19.2851
900.000000 MHz	42.3473	19.2572
905.000000 MHz	42.2875	19.2349
910.000000 MHz	42.1829	19.2565
915.000000 MHz	42.1545	19.2497
920.000000 MHz	42.0359	19.2027
925.000000 MHz	42.0032	19.1929
930.000000 MHz	41.8718	19.1755
935.000000 MHz	41.7794	19.1851
940.000000 MHz	41.6653	19.1681
945.000000 MHz	41.5867	19.1835
950.000000 MHz	41.4174	19.1946

Dielectric Parameter (900 MHz Body)

Title: REH-100
SubTitle: 900MHz Brain
October 29, 2004 09:10 AM

Frequency	e'	e''
850.000000 MHz	55.9222	20.6024
855.000000 MHz	55.9378	20.6086
860.000000 MHz	55.9612	20.6331
865.000000 MHz	56.0111	20.6680
870.000000 MHz	55.9517	20.6700
875.000000 MHz	56.0156	20.6818
880.000000 MHz	56.0604	20.7647
885.000000 MHz	56.0042	20.7274
890.000000 MHz	56.0470	20.7351
895.000000 MHz	55.9733	20.6893
900.000000 MHz	55.9441	20.6469
905.000000 MHz	55.9161	20.6568
910.000000 MHz	55.8238	20.6096
915.000000 MHz	55.6824	20.5420
920.000000 MHz	55.6280	20.4807
925.000000 MHz	55.5218	20.4418
930.000000 MHz	55.4183	20.3819
935.000000 MHz	55.2844	20.3564
940.000000 MHz	55.1843	20.2867
945.000000 MHz	55.0521	20.2825
950.000000 MHz	54.9423	20.2794

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

Client **Pantech & Curitel (Dymstec)**

CALIBRATION CERTIFICATE

Object(s) D900V2 - SN:062

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

Calibration date: March 22, 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

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: March 23, 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.

880-KP0301061-A Page 1 (1)

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DASY

Dipole Validation Kit

Type: D900V2

Serial: 062

Manufactured: September 25, 1999
Calibrated: March 22, 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 900 MHz:

Relative Dielectricity	**41.4**	± 5%
Conductivity	**0.95 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.18 at 900 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 ± 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^3 (1 g) of tissue:	**10.9 mW/g** ± 16.8 % (k=2)[1]
averaged over 10 cm^3 (10 g) of tissue:	**7.08 mW/g** ± 16.2 % (k=2)[1]

[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:	**1.393 ns**	(one direction)
Transmission factor:	**0.990**	(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 900 MHz:	Re{Z} = **50.9 Ω**
	Im {Z} = **-0.3 Ω**
Return Loss at 900 MHz	**-40.6 dB**

4. 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.

5. 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.

6. Power Test

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

Date/Time: 03/22/04 12:03:47

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN062

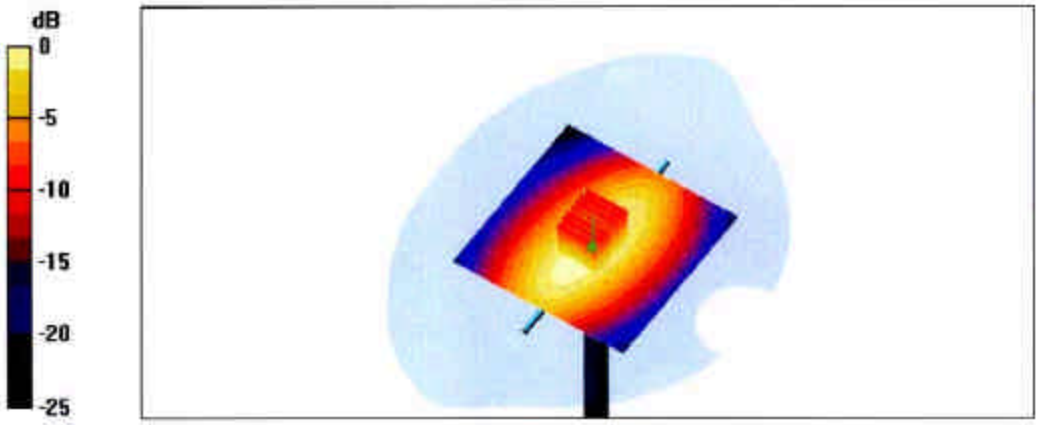
Communication System: CW-900; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: HSL 900 MHz;
Medium parameters used: f = 900 MHz; σ = 0.95 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

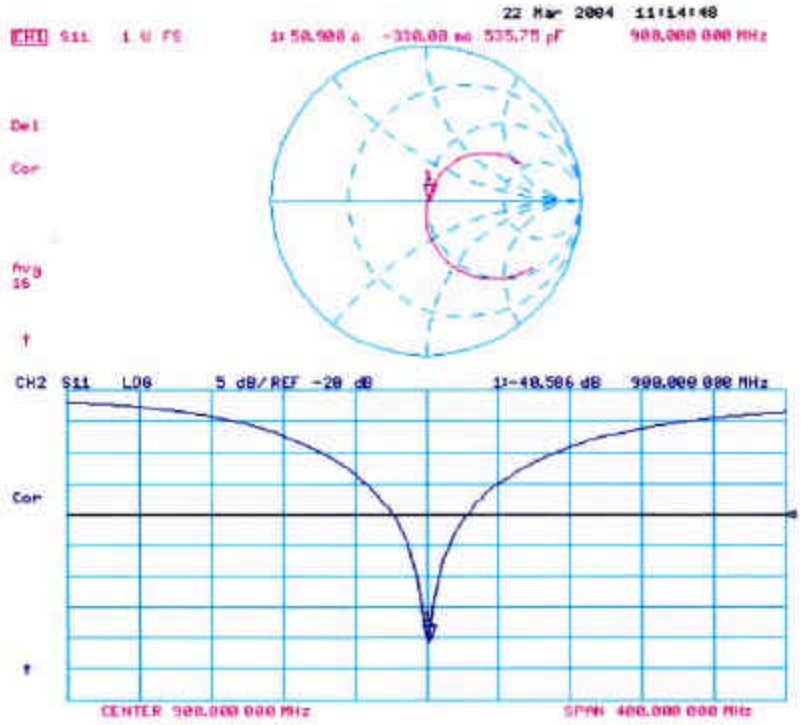
- Probe: ET3DV6 - SN1507; ConvF(6.18, 6.18, 6.18); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn411; Calibrated: 11/6/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 56.8 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 2.95 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.8 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 2.95 mW/g
Peak SAR (extrapolated) = 4.12 W/kg
SAR(1 g) = 2.73 mW/g; SAR(10 g) = 1.77 mW/g



0 dB = 2.95mW/g


22 Mar 2004 11:14:48
CH1 S11 1 U FS
Del
Cor
Avg
16
CH2 S11 LOG 5 dB/ REF -20 dB
1:-40.586 dB 900.000 000 MHz
Cor
CENTER 900.000 000 MHz
SPAN 400.000 000 MHz