Schmid & Partner
Engineering AG

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Calibration Certificate

900 MHz System Validation Dipole

Type:	**D900V2**
Serial Number:	**013**
Place of Calibration:	**Zurich**
Date of Calibration:	**December 19, 2002**
Calibration Interval:	~~24 months~~ 12 months S.T.S

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:	D. Vella
Approved by:	Katja

Schmid & Partner
Engineering AG

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DASY

Dipole Validation Kit

Type: D900V2

Serial: 013

Manufactured: July 1997
Calibrated: December 19, 2002

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	**42.4**	± 5%
Conductivity	**0.97 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6 5 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 holder 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 ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**10.6 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**6.72 mW/g**

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:	**1.418 ns**	(one direction)
Transmission factor:	**0.994**	(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 900 MHz:	Re{Z} = **50.3 Ω**
	Im {Z} = **0.7 Ω**
Return Loss at 900 MHz	**-41.9 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

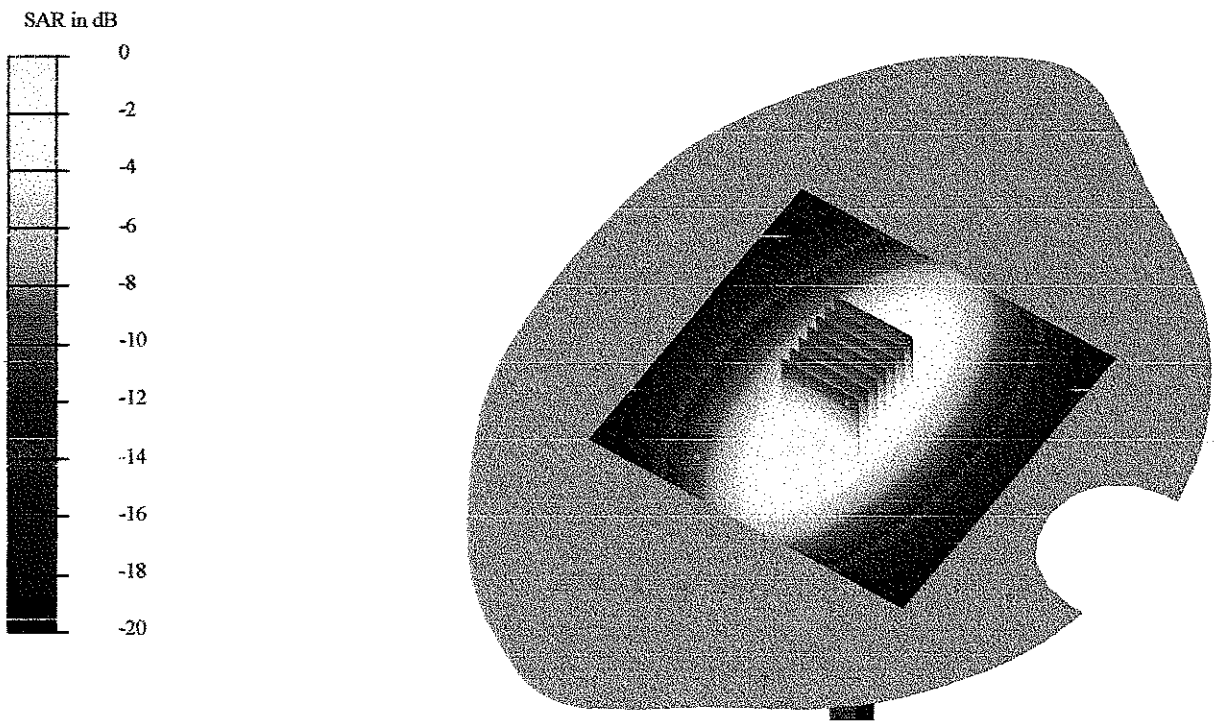
Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN013_SN1507_HSL900_191202.da4

DUT: Dipole 900 MHz Type & Serial Number: D900V2 - SN013
Program: Dipole Calibration; Pin = 250 mW; d = 15 mm

Communication System: CW-900; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL 900 MHz (σ = 0.97 mho/m, ε = 42.44, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1507; ConvF(6.5, 6.5, 6.5); Calibrated: 1/24/2002
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN410; Calibrated: 7/18/2002
- Phantom: SAM 4.0 - TP:1006
- Software: DASY4, V4.0 Build 51

Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 56.5 V/m
Peak SAR = 4.03 mW/g
SAR(1 g) = 2.66 mW/g; SAR(10 g) = 1.68 mW/g
Power Drift = -0.003 dB

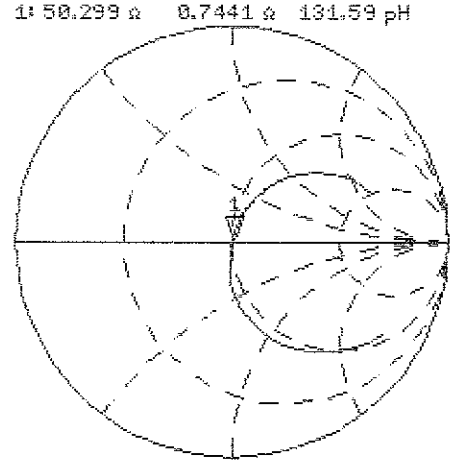


19 Dec 2002 11:10:24

CH1 S11 1 U FS 1: 50.299 Ω 0.7441 Ω 131.59 pH 900.000 000 MHz

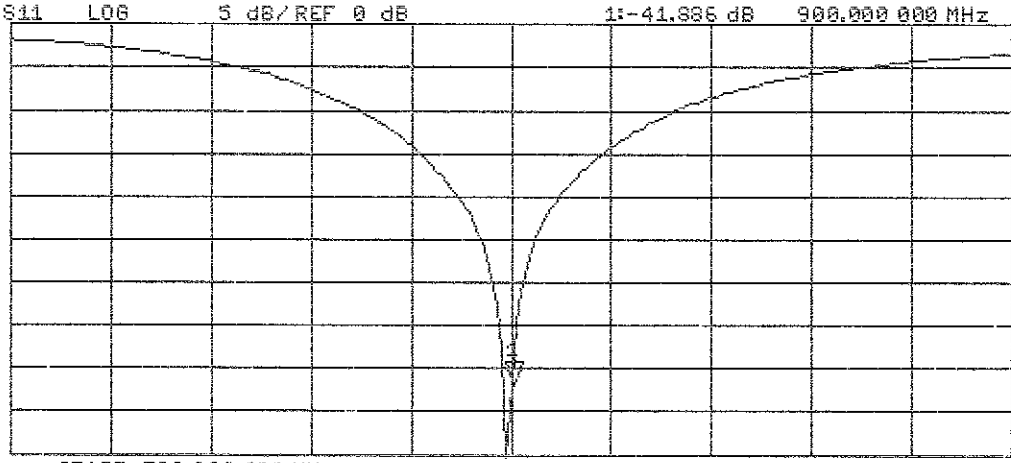
Del

PRm
Cor
Avg
16



CH2 S11 LOG 5 dB/ REF 0 dB 1:-41.886 dB 900.000 000 MHz

PRm
Cor



START 700.000 000 MHz STOP 1 100.000 000 MHz