

Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|-------------------------------------|---------------------------|-------------|
| DASY Version | DASY4 | V4.7 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom V4.9 | |
| Distance Dipole Center - TSL | 15 mm | with Spacer |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 835 MHz \pm 1 MHz | |

Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---------------------|---------------------|----------------------|
| Nominal Head TSL parameters | 22.0 °C | 41.5 | 0.90 mho/m |
| Measured Head TSL parameters | (22.0 \pm 0.2) °C | 42.4 \pm 6 % | 0.90 mho/m \pm 6 % |
| Head TSL temperature during test | (21.5 \pm 0.2) °C | --- | --- |

SAR result with Head TSL

| SAR averaged over 1 cm³ (1 g) of Head TSL | condition | |
|---|--------------------|--------------------------------|
| SAR measured | 250 mW input power | 2.36 mW / g |
| SAR normalized | normalized to 1W | 9.44 mW / g |
| SAR for nominal Head TSL parameters ¹ | normalized to 1W | 9.55 mW / g \pm 17.0 % (k=2) |

| SAR averaged over 10 cm³ (10 g) of Head TSL | condition | |
|---|--------------------|--------------------------------|
| SAR measured | 250 mW input power | 1.55 mW / g |
| SAR normalized | normalized to 1W | 6.20 mW / g |
| SAR for nominal Head TSL parameters ¹ | normalized to 1W | 6.26 mW / g \pm 16.5 % (k=2) |

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

| | |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 48.8 Ω - 5.7 $j\Omega$ |
| Return Loss | - 24.5 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.381 ns |
|----------------------------------|----------|

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

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.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

| | |
|-----------------|--------------|
| Manufactured by | SPEAG |
| Manufactured on | May 19, 2003 |

DASY4 Validation Report for Head TSL

Date/Time: 14.08.2006 14:12:10

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 490

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL900;

Medium parameters used: $f = 835$ MHz; $\sigma = 0.9$ mho/m; $\epsilon_r = 42.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

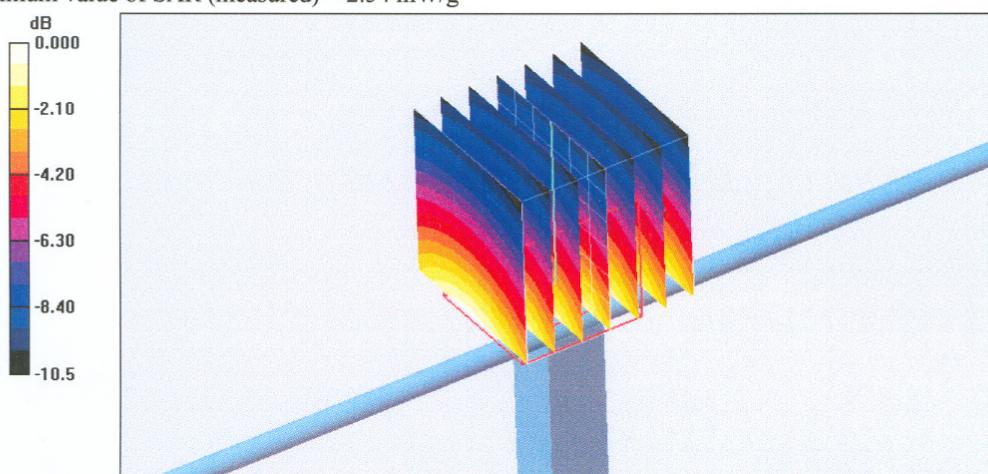
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.4 V/m; Power Drift = -0.214 dB

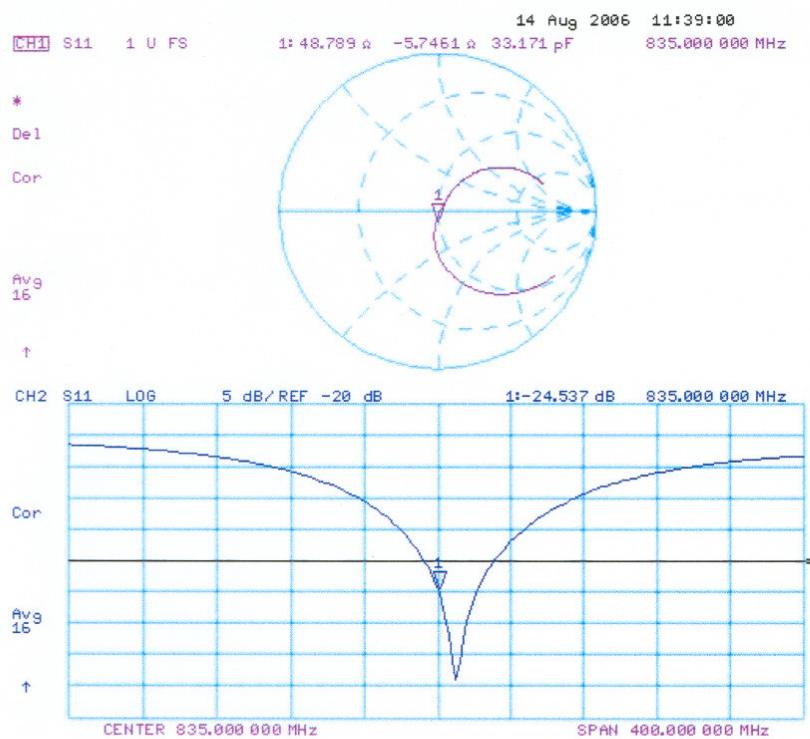
Peak SAR (extrapolated) = 3.50 W/kg

SAR(1 g) = 2.36 mW/g; SAR(10 g) = 1.55 mW/g

Maximum value of SAR (measured) = 2.54 mW/g



0 dB = 2.54mW/g

Impedance Measurement Plot for Head TSL

1900 MHz Dipole Calibration Certificate

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



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **SGS KES (Dymstec)**

Certificate No: **D1900V2-5d033_Aug06**

CALIBRATION CERTIFICATE

| | | | | | | |
|--|--|---|------------------------|--|--|--|
| Object | D1900V2 - SN: 5d033 | | | | | |
| Calibration procedure(s) | QA CAL-05.v6 Calibration procedure for dipole validation kits | | | | | |
| Calibration date: | August 16, 2006 | | | | | |
| Condition of the calibrated item | In Tolerance | | | | | |
| This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. | | | | | | |
| All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity < 70%. | | | | | | |
| Calibration Equipment used (M&TE critical for calibration) | | | | | | |
| Primary Standards | ID # | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration | | | |
| Power meter EPM-442A | GB37480704 | 04-Oct-05 (METAS, No. 251-00516) | Oct-06 | | | |
| Power sensor HP 8481A | US37292783 | 04-Oct-05 (METAS, No. 251-00516) | Oct-06 | | | |
| Reference 20 dB Attenuator | SN: 5086 (20g) | 10-Aug-06 (METAS, No 217-00591) | Aug-07 | | | |
| Reference 10 dB Attenuator | SN: 5047.2 (10r) | 10-Aug-06 (METAS, No 217-00591) | Aug-07 | | | |
| Reference Probe ET3DV6 | SN: 1507 | 28-Oct-05 (SPEAG, No. ET3-1507_Oct05) | Oct-06 | | | |
| DAE4 | SN: 601 | 15-Dec-05 (SPEAG, No. DAE4-601_Dec05) | Dec-06 | | | |
| Secondary Standards | ID # | Check Date (in house) | Scheduled Check | | | |
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (SPEAG, in house check Oct-05) | In house check: Oct-07 | | | |
| RF generator Agilent E4421B | MY41000675 | 11-May-05 (SPEAG, in house check Nov-05) | In house check: Nov-07 | | | |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (SPEAG, in house check Nov-05) | In house check: Nov-06 | | | |
| Calibrated by: | Name Claudio Leubler | Function Laboratory Technician | Signature | | | |
| Approved by: | Katja Pokovic | Technical Manager | | | | |
| Issued: August 17, 2006 | | | | | | |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory. | | | | | | |