

Date/Time: 03/01/04 21:28:02

Test Laboratory: SPORTON

**DELL NB BTM Touch CH 661**

**DUT: BenQ; Type: 56W11**  
**Program Name: NB BTM Touch**

Communication System: DCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4  
Medium: MSL1900 ( $\sigma = 1.58222$  mho/m,  $\epsilon_r = 52.5119$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
Phantom section: Flat Section

DASY4 Configuration:

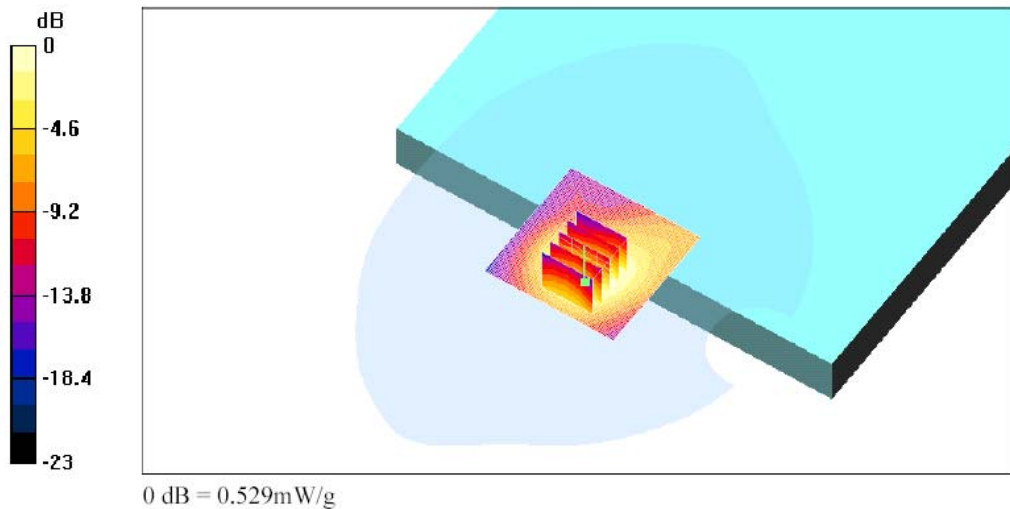
- Probe: ET3DV6 - SN1788; ConvF(5, 5, 5); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

**CH 661 1880.0MHz-Middle/Area Scan (81x81x1):** Measurement grid: dx=10mm, dy=10mm

Reference Value = 12.6 V/m  
Power Drift = -0.08 dB  
Maximum value of SAR = 0.51 mW/g

**CH 661 1880.0MHz-Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 0.731 W/kg  
SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.285 mW/g  
Reference Value = 12.6 V/m  
Power Drift = -0.08 dB  
Maximum value of SAR = 0.529 mW/g



Date/Time: 03/01/04 22:01:40

Test Laboratory: SPORTON

**DELL NB BTM with 1.5cm GAP CH 661**

**DUT: BenQ; Type: 56W11**

**Program Name: NB BTM with 1.5cm GAP**

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4

Medium: MSL1900 ( $\sigma = 1.58222$  mho/m,  $\epsilon_r = 52.5119$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5, 5, 5); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

**CH 661 1880.0MHz-Middle/Area Scan (81x81x1):** Measurement grid: dx=10mm, dy=10mm

Reference Value = 9.18 V/m

Power Drift = 0.01 dB

Maximum value of SAR = 0.179 mW/g

**CH 661 1880.0MHz-Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

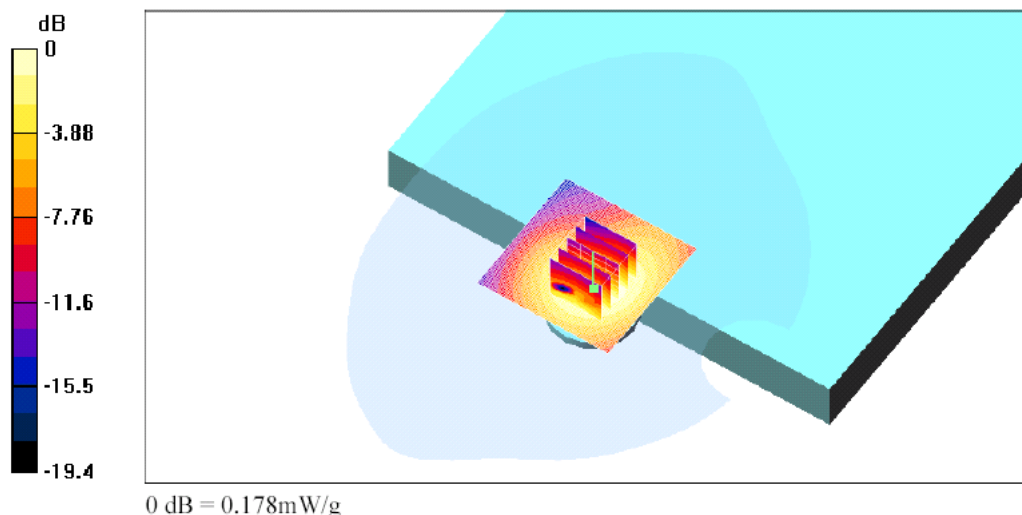
Peak SAR (extrapolated) = 0.238 W/kg

SAR(1 g) = 0.164 mW/g; SAR(10 g) = 0.103 mW/g

Reference Value = 9.18 V/m

Power Drift = 0.01 dB

Maximum value of SAR = 0.178 mW/g



Date/Time: 03/01/04 15:56:44

Test Laboratory: SPORTON

**SPECTEC NB BTM Touch CH 661**

**DUT: BenQ; Type: 56W11**  
**Program Name: NB BTM Touch**

Communication System: DCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4  
Medium: MSL1900 ( $\sigma = 1.58222$  mho/m,  $\epsilon_r = 52.5119$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
Phantom section: Flat Section

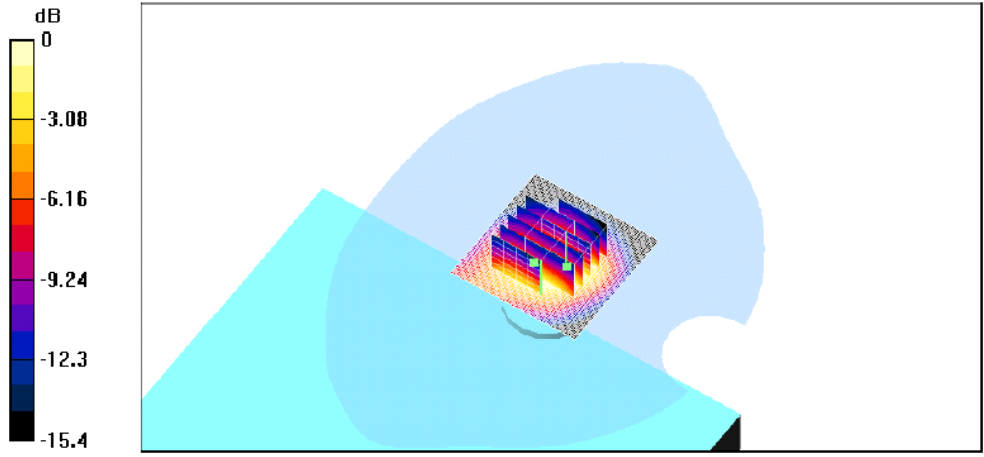
DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5, 5, 5); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

**CH 661 1880.0MHz-Middle/Area Scan (81x81x1):** Measurement grid: dx=10mm, dy=10mm  
Reference Value = 23.2 V/m  
Power Drift = -0.01 dB  
Maximum value of SAR = 0.934 mW/g

**CH 661 1880.0MHz-Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Peak SAR (extrapolated) = 1.36 W/kg  
SAR(1 g) = 0.827 mW/g; SAR(10 g) = 0.486 mW/g  
Reference Value = 23.2 V/m  
Power Drift = -0.01 dB  
Maximum value of SAR = 0.874 mW/g

**CH 661 1880.0MHz-Middle/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Peak SAR (extrapolated) = 1.26 W/kg  
SAR(1 g) = 0.743 mW/g; SAR(10 g) = 0.469 mW/g  
Reference Value = 23.2 V/m  
Power Drift = -0.01 dB  
Maximum value of SAR = 0.879 mW/g



0 dB = 0.874mW/g

Date/Time: 03/10/04 19:01:22

Test Laboratory: SPORTON

**DELL NB BTM Touch CH 251**

**DUT: BenQ; Type: 56W11**  
**Program Name: NB BTM Touch**

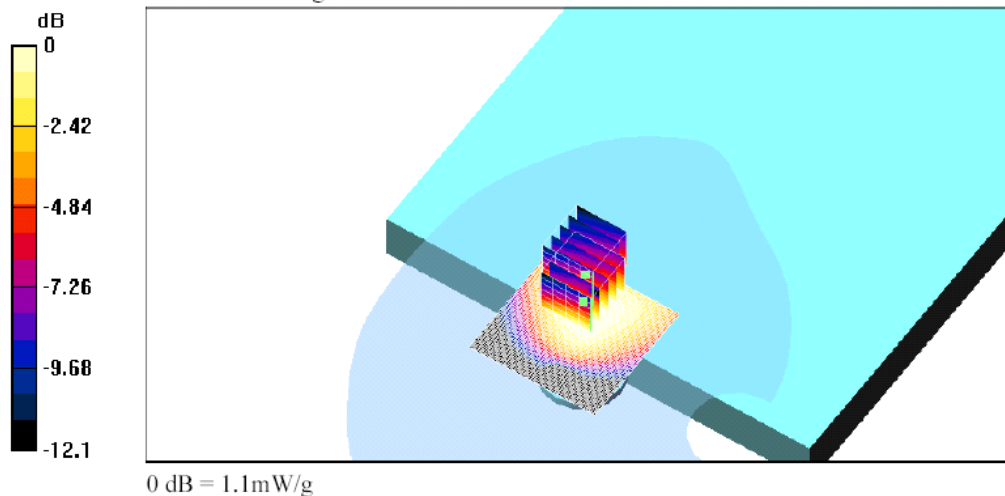
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:4  
Medium: MSL850 ( $\sigma = 1.00001$  mho/m,  $\epsilon_r = 56.841$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
Phantom section: Flat Section;Ambient Temp=21~23C; Liquid Temp=21.5C; Liquid height=15.2cm

DASY4 Configuration:  
- Probe: ET3DV6 - SN1788; ConvF(6.5, 6.5, 6.5); Calibrated: 8/29/2003  
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)  
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003  
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150  
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

**CH 251 848.8MHz/Area Scan (81x81x1):** Measurement grid: dx=10mm, dy=10mm  
Reference Value = 30.9 V/m  
Power Drift = -0.1 dB  
Maximum value of SAR = 1.32 mW/g

**CH 251 848.8MHz/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Peak SAR (extrapolated) = 1.34 W/kg  
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.716 mW/g  
Reference Value = 30.9 V/m  
Power Drift = -0.1 dB  
Maximum value of SAR = 1.09 mW/g

**CH 251 848.8MHz/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Peak SAR (extrapolated) = 1.35 W/kg  
SAR(1 g) = 0.966 mW/g; SAR(10 g) = 0.598 mW/g  
Reference Value = 30.9 V/m  
Power Drift = -0.1 dB  
Maximum value of SAR = 1.1 mW/g



Date/Time: 03/10/04 23:11:38

Test Laboratory: SPORTON

**ASUS NB BTM Touch CH 661**

**DUT: BenQ; Type: 56W11**

**Program Name: NB BTM Touch**

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4

Medium: MSL1900 ( $\sigma = 1.5133$  mho/m,  $\epsilon_r = 52.0311$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Flat Section;Ambient Temp=21~23C; Liquid Temp=21.5C; Liquid height=15.2cm

**DASY4 Configuration:**

- Probe: ET3DV6 - SN1788; ConvF(5, 5, 5); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM I2; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

**CH 661 1880.0MHz /Area Scan (81x81x1):** Measurement grid: dx=10mm, dy=10mm

Reference Value = 27.9 V/m

Power Drift = -0.07 dB

Maximum value of SAR = 1.32 mW/g

**CH 661 1880.0MHz /Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 1.83 W/kg

SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.663 mW/g

Reference Value = 27.9 V/m

Power Drift = -0.07 dB

Maximum value of SAR = 1.32 mW/g

**CH 661 1880.0MHz /Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

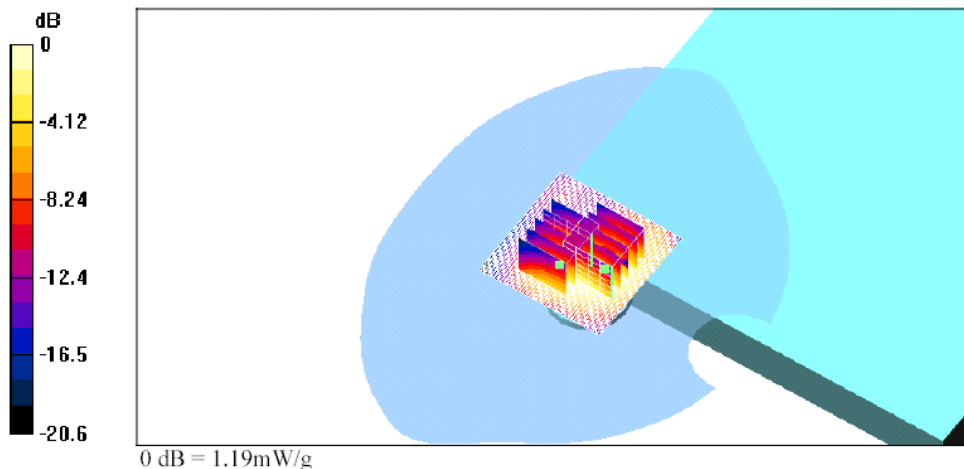
Peak SAR (extrapolated) = 1.84 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.595 mW/g

Reference Value = 27.9 V/m

Power Drift = -0.07 dB



Maximum value of SAR = 1.19 mW/g



**Appendix C –  
Calibration Data**

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

Client **Auden**

CALIBRATION CERTIFICATE			
Object(s)	D900V2 - SN:172		
Calibration procedure(s)	QA-CAL-05.v2 Calibration procedure for dipole validation kits		
Calibration date:	January 13, 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
Calibrated by:	Name Judith Mueßer	Function Technician	Signature 
Approved by:	Name Kaja Pokovic	Function Laboratory Director	Signature 
Date issued: January 19, 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.			

Schmid & Partner Engineering AG

**s p e a g**

Zeughausstrasse 43, 8004 Zurich, Switzerland  
Phone +41 1 245 9700, Fax +41 1 245 9779  
info@speag.com, <http://www.speag.com>

# DASY

## Dipole Validation Kit

Type: D900V2

Serial: 172

Manufactured: September 23, 2002

Calibrated: January 13, 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	<b>40.3</b>	$\pm 5\%$
Conductivity	<b>0.94 mho/m</b>	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.6 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 250mW  $\pm 3\%$ . 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 advanced extrapolation are:

averaged over 1 cm <sup>3</sup> (1 g) of tissue:	<b>10.3 mW/g <math>\pm 16.8\%</math> (k=2)<sup>1</sup></b>
averaged over 10 cm <sup>3</sup> (10 g) of tissue:	<b>6.68 mW/g <math>\pm 16.2\%</math> (k=2)<sup>1</sup></b>



### 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:	<b>1.399 ns</b>	(one direction)
Transmission factor:	<b>0.987</b>	(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:             $\text{Re}\{Z\} = 51.0 \Omega$

$\text{Im}\{Z\} = -4.3 \Omega$

Return Loss at 900 MHz                      **-27.1 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 900 MHz:

Relative Dielectricity	<b>54.4</b>	$\pm 5\%$
Conductivity	<b>1.04 mho/m</b>	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.3 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 250mW  $\pm 3\%$ . The results are normalized to 1W input

## 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 advanced extrapolation are:

averaged over 1 cm<sup>3</sup> (1 g) of tissue:      **10.8 mW/g ± 16.8 % (k=2)<sup>2</sup>**

averaged over 10 cm<sup>3</sup> (10 g) of tissue:      **7.00 mW/g ± 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 900 MHz:      **Re {Z} = 46.1 Ω**

**Im {Z} = -6.4 Ω**

Return Loss at 900 MHz      **-22.2 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

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN172**

Communication System: CW-900; Frequency: 900 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 900 \text{ MHz}$ ;  $\sigma = 0.94 \text{ mho/m}$ ;  $\epsilon_r = 40.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASYS4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.6, 6.6, 6.6); 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: DASYS4, V4.2 Build 12; Postprocessing SW: SEMCAD, V1.8 Build 93

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

Reference Value = 56.5 V/m

Power Drift = 0.002 dB

Maximum value of SAR = 2.8 mW/g

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

Peak SAR (extrapolated) = 3.86 W/kg

**SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.67 mW/g**

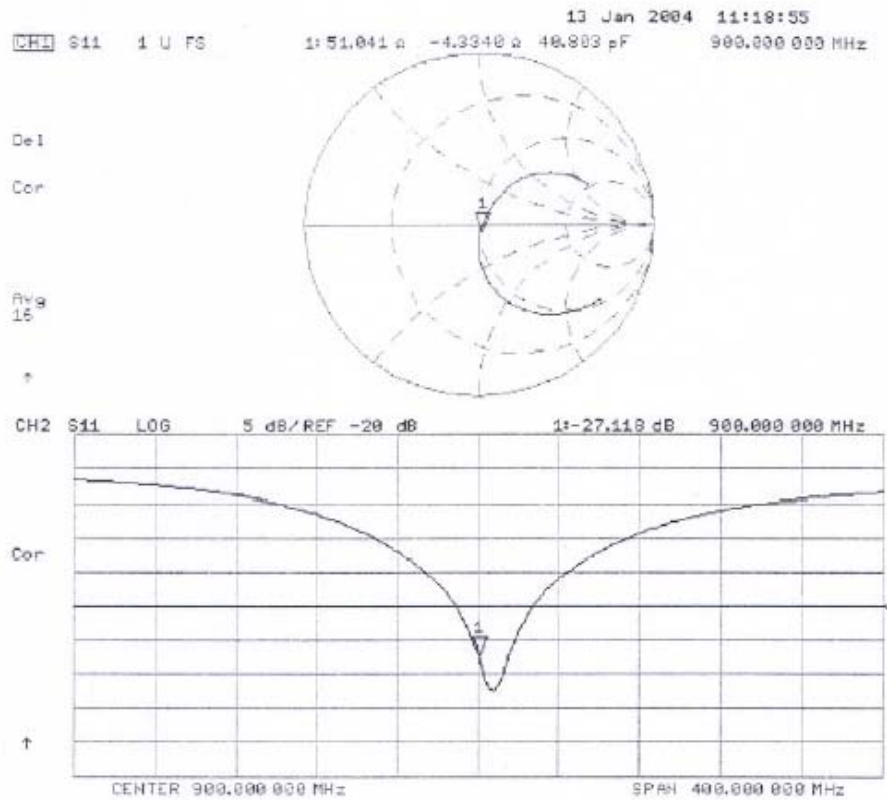
Reference Value = 56.5 V/m

Power Drift = 0.002 dB

Maximum value of SAR = 2.79 mW/g



172



Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN172**

Communication System: CW-900; Frequency: 900 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 900$  MHz;  $\sigma = 1.04$  mho/m;  $\epsilon_r = 54.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

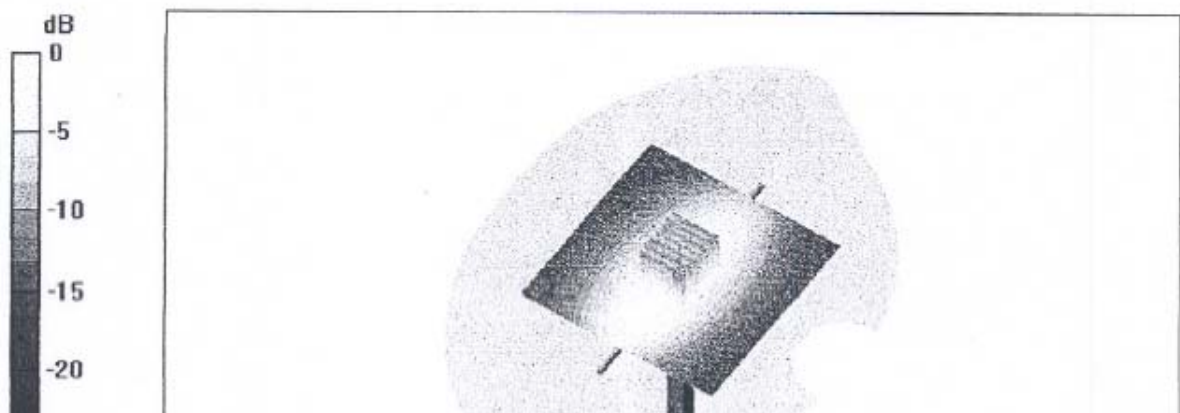
Measurement Standard: DASY4 (High Precision Assessment)

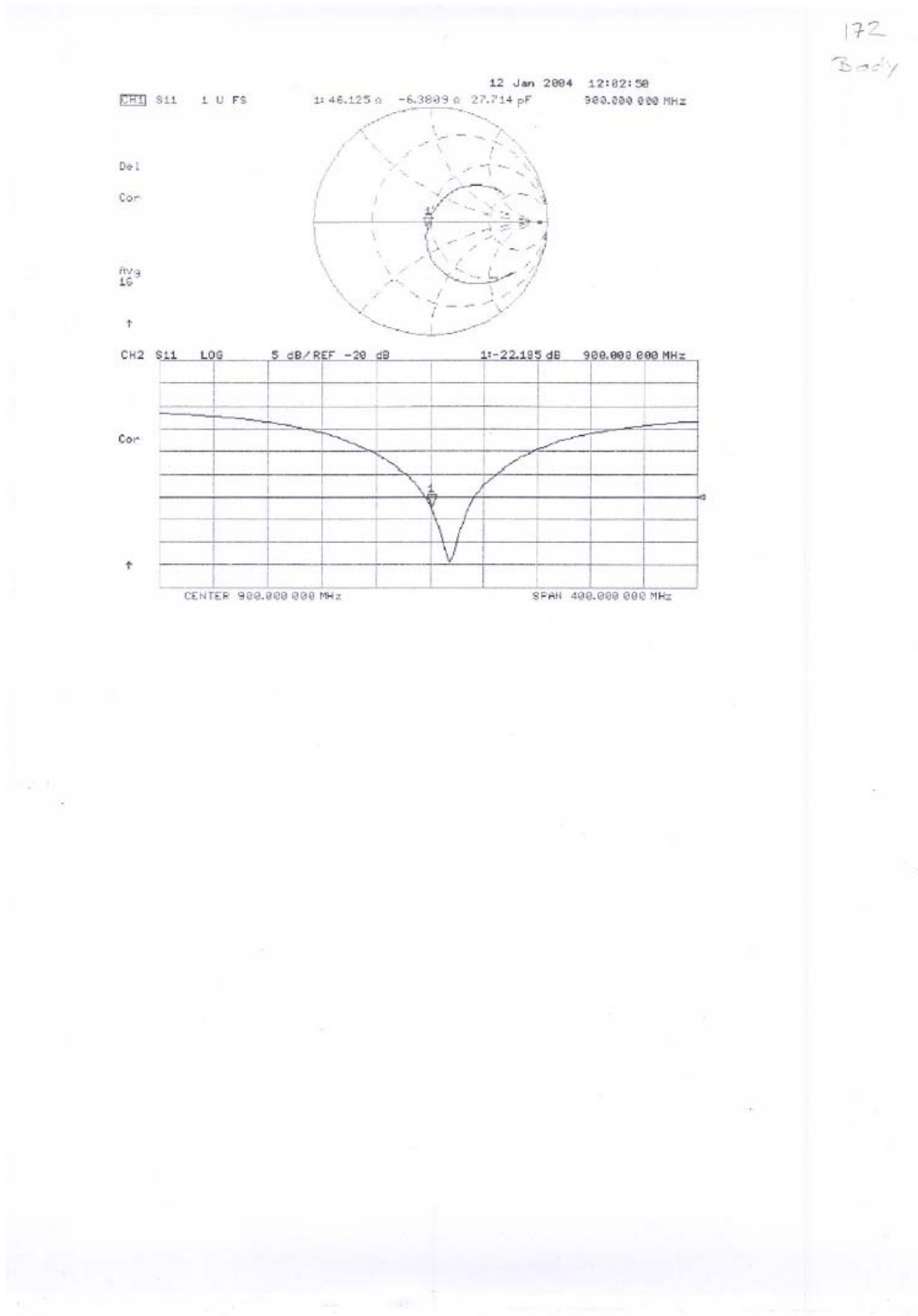
DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.3, 6.3, 6.3); 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, V4.2 Build 12; Postprocessing SW: SEMCAD, V1.8 Build 93

**Pin = 250 mW; d = 15 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm  
 Reference Value = 55 V/m  
 Power Drift = 0.0 dB  
 Maximum value of SAR = 2.89 mW/g

**Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Peak SAR (extrapolated) = 4.01 W/kg  
**SAR(1 g) = 2.7 mW/g; SAR(10 g) = 1.75 mW/g**  
 Reference Value = 55 V/m  
 Power Drift = 0.0 dB  
 Maximum value of SAR = 2.93 mW/g





D1800V2\_265\_20030514\_P01 (1275x1755x16M jpeg)

AEL007

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

Client **Auden**

CALIBRATION CERTIFICATE			
Object(s)	D1800V2 - SN:265		
Calibration procedure(s)	QA CAL-05.v2 Calibration procedure for dipole validation kits		
Calibration date:	May 14, 2003		
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
RF generator RAS SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Power sensor HP 8481A	MY41062317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Network Analyzer HP 8753E	US38432426	3-May-00 (Agilent, No. 8702K054602)	In house check: May 03
Calibrated by:	Name Judith Mueller	Function Technician	Signature <i>J. Mueller</i>
Approved by:	Name Katja Rokovic	Function Laboratory Director	Signature <i>Katja Rokovic</i>
Date issued: May 14, 2003			
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)

D1800V2\_265\_20030514\_P02 (1275x1755x16M jpeg)

Schmid & Partner Engineering AG

**s p e a g**

Zeughausstrasse 43, 8004 Zurich, Switzerland  
Phone +41 1 245 9700, Fax +41 1 245 9779  
info@speag.com, <http://www.speag.com>

DASY

Dipole Validation Kit

Type: D1800V2

Serial: 265

Manufactured: March 5, 2000  
Calibrated: May 14, 2003



D1800V2\_265\_20030514\_P03 (1275x1755x16M jpeg)

**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 1800 MHz:

Relative Dielectricity	39.2	± 5%
Conductivity	1.36 mho/m	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.3 at 1800 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 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 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 <sup>3</sup> (1 g) of tissue:	38.2 mW/g ± 16.8 % (k=2) <sup>1</sup>
averaged over 10 cm <sup>3</sup> (10 g) of tissue:	20.2 mW/g ± 16.2 % (k=2) <sup>1</sup>

<sup>1</sup> validation uncertainty

D1800V2\_265\_20030514\_P04 (1275x1755x16M.jpeg)

**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: **1.165 ns** (one direction)  
 Transmission factor: **0.998** (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 1800 MHz:  $Re\{Z\} = 48.3 \Omega$   
 $Im\{Z\} = -5.6 \Omega$   
 Return Loss at 1800 MHz: **-24.5 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 1800 MHz:

Relative Dielectricity **51.6**  $\pm 5\%$   
 Conductivity **1.49 mho/m**  $\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.0 at 1800 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 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 250 mW  $\pm 3\%$ . The results are normalized to 1W input power.

D1800V2\_265\_20030514\_P05 (1275x1755x16M jpeg)

**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 advanced extrapolation are:

averaged over 1 cm <sup>3</sup> (1 g) of tissue:	<b>37.6 mW/g ± 16.8 % (k=2)<sup>2</sup></b>
averaged over 10 cm <sup>3</sup> (10 g) of tissue:	<b>20.0 mW/g ± 16.2 % (k=2)<sup>2</sup></b>

**6. Dipole Impedance and Return Loss**

The dipole was positioned at the flat phantom sections according to section 4 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 1800 MHz:	Re {Z} = 44.4 Ω
	Im {Z} = -5.9 Ω
Return Loss at 1800 MHz	-21.3 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>2</sup> validation uncertainty

D1800V2\_265\_20030514\_P08 (1275x1755x16M jpeg)

Page 1 of 1

Date/Time: 05/12/03 14:45:52

Test Laboratory: SPEAG, Zurich, Switzerland  
File Name: SN265\_SN1507\_HSL1800\_120503.da4

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN265  
Program: Dipole Calibration

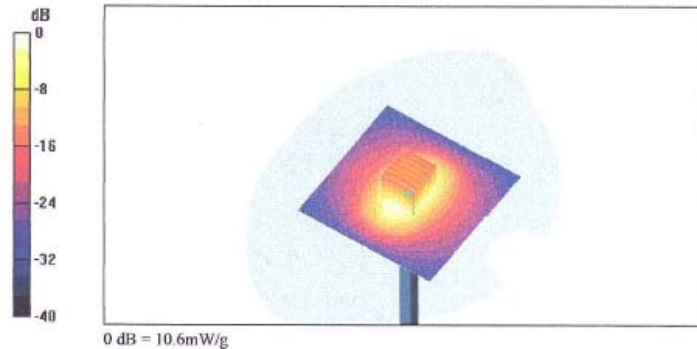
Communication System: CW-1800; Frequency: 1800 MHz; Duty Cycle: 1:1  
Medium: HSL 1800 MHz ( $\sigma = 1.36 \text{ mho/m}$ ,  $\epsilon_r = 39.22$ ,  $\rho = 1000 \text{ kg/m}^3$ )  
Phantom section: Flat Section  
Measurement Standard: DASy4 (High Precision Assessment)

DASy4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.3, 5.3, 5.3); 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

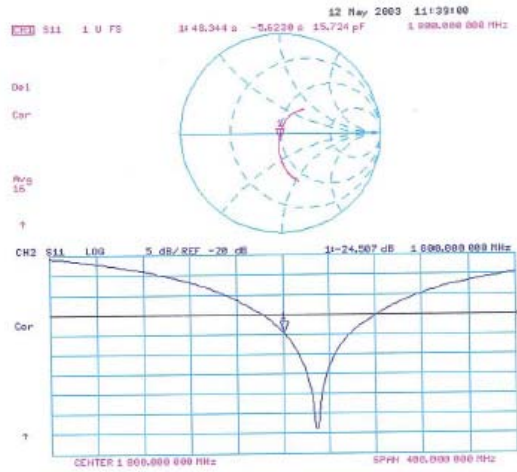
Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm  
Reference Value = 93.1 V/m  
Power Drift = 0.05 dB  
Maximum value of SAR = 10.5 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Peak SAR (extrapolated) = 16.3 W/kg  
SAR(1 g) = 9.55 mW/g; SAR(10 g) = 5.06 mW/g  
Reference Value = 93.1 V/m  
Power Drift = 0.05 dB  
Maximum value of SAR = 10.6 mW/g



D1800V2\_285\_20030514\_P07 (1275x1755x16M jpeg)

265



D1800V2\_265\_20030514\_P08 (1275x1755x16M jpeg)

Page 1 of 1

Date/Time: 05/14/03 12:24:50

Test Laboratory: SPEAG, Zurich, Switzerland  
File Name: SN265\_SN1507\_M1800\_140503da4.da4

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN265**  
**Program: Dipole Calibration**

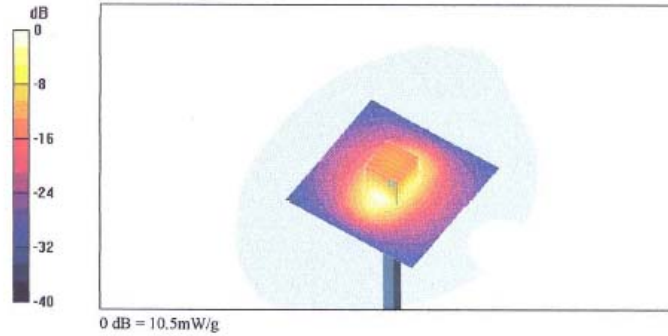
Communication System: CW-1800; Frequency: 1800 MHz; Duty Cycle: 1:1  
Medium: Muscle 1800 MHz ( $\sigma = 1.49 \text{ mho/m}$ ,  $\epsilon_r = 51.55$ ,  $\rho = 1000 \text{ kg/m}^3$ )  
Phantom section: Flat Section  
Measurement Standard: DASy4 (High Precision Assessment)

DASy4 Configuration:

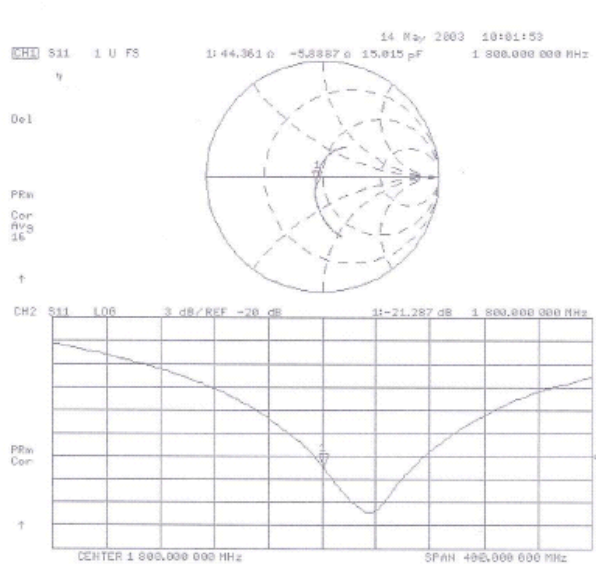
- Probe: ET3DV6 - SN1507; ConvF(5, 5, 5); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASy4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

**Pin = 250 mW; d = 10 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm  
Reference Value = 89.7 V/m  
Power Drift = 0.03 dB  
Maximum value of SAR = 10.5 mW/g

**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Peak SAR (extrapolated) = 15.5 W/kg  
SAR(1 g) = 9.39 mW/g; SAR(10 g) = 5.01 mW/g  
Reference Value = 89.7 V/m  
Power Drift = 0.03 dB  
Maximum value of SAR = 10.5 mW/g



D1800V2\_265\_20030514\_P09 (1275x1755x16M jpeg)



265  
Body