Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 01/05/05 14:52:47

Body_GSM850 Ch189_Keypad Up With Touch_20050105

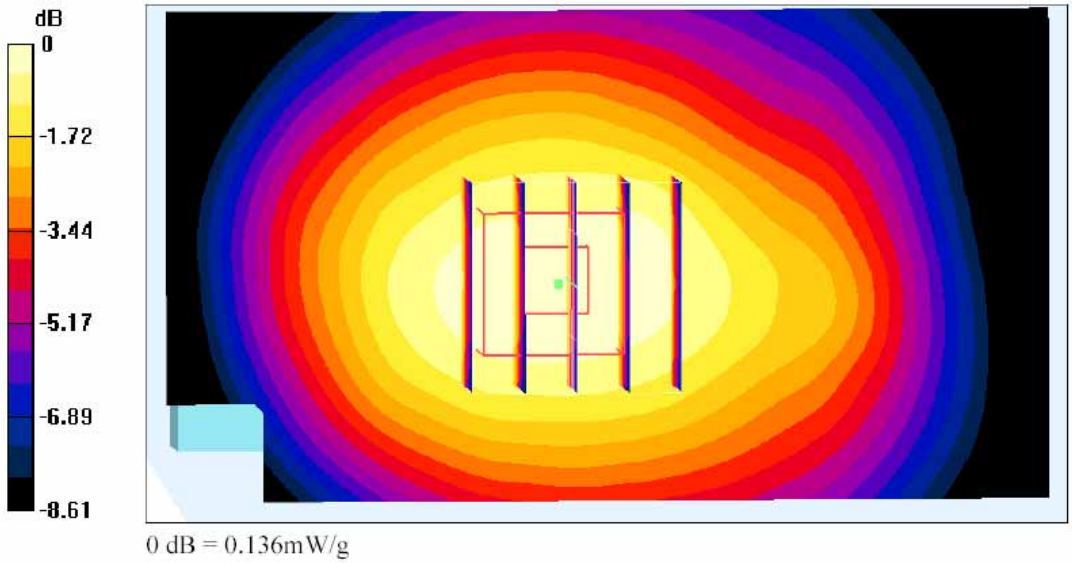
DUT: BenQ P50; Type: PDA Phone; Serial: 354768000000001

Communication System: GSM850; Frequency: 836.4 MHz;Duty Cycle: 1:4
Medium: MSL_850 Medium parameters used : f = 836.4 MHz; σ = 0.937 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Ambient Temperature : 21.8 ℃; Liquid Temperature : 22.1 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(6.53, 6.53, 6.53); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Ch189/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.135 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.67 V/m; Power Drift = 0.2 dB
Peak SAR (extrapolated) = 0.171 W/kg
SAR(1 g) = 0.130 mW/g; SAR(10 g) = 0.097 mW/g
Maximum value of SAR (measured) = 0.136 mW/g



0 dB = 0.136mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 01/05/05 13:40:37

Body_PCS Ch661_Keypad Up Touch_20050105

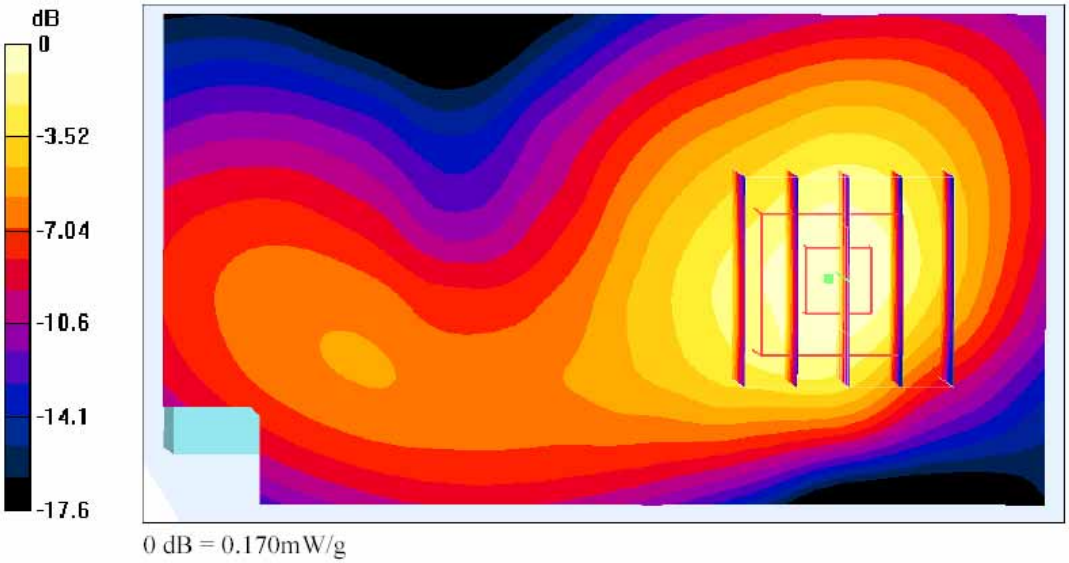
DUT: BenQ P50; Type: PDA Phone; Serial: 354768000000001

Communication System: PCS; Frequency: 1880 MHz;Duty Cycle: 1:4
Medium: MSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Ambient Temperature : 21.6 ℃; Liquid Temperature : 22.0 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(4.56, 4.56, 4.56); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Ch661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.183 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.31 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 0.235 W/kg
SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.091 mW/g
Maximum value of SAR (measured) = 0.170 mW/g



0 dB = 0.170mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 01/05/05 14:38:29

Body_GSM850 Ch251_Keypad Down Touch_20050105

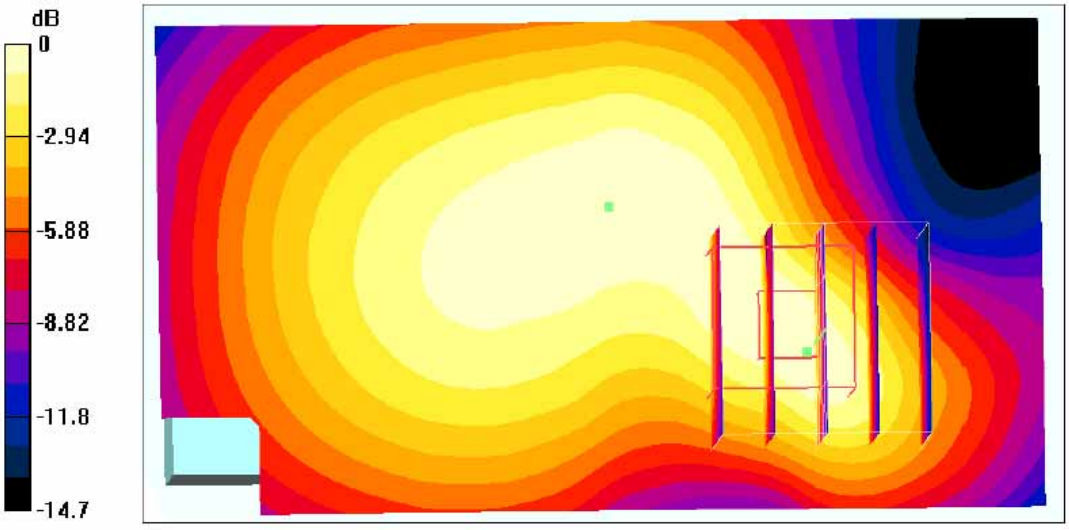
DUT: BenQ P50; Type: PDA Phone; Serial: 354768000000001

Communication System: GSM850; Frequency: 848.8 MHz;Duty Cycle: 1:4
Medium: MSL_850 Medium parameters used : f = 848.8 MHz; σ = 0.948 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Ambient Temperature : 21.8 ℃; Liquid Temperature : 22.1 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(6.53, 6.53, 6.53); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Ch251/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.679 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.63 V/m; Power Drift = -0.2 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.642 mW/g; SAR(10 g) = 0.385 mW/g
Maximum value of SAR (measured) = 0.694 mW/g



0 dB = 0.694mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 01/05/05 13:56:04

Body_PCS Ch512_Keypad Down Touch_20050105

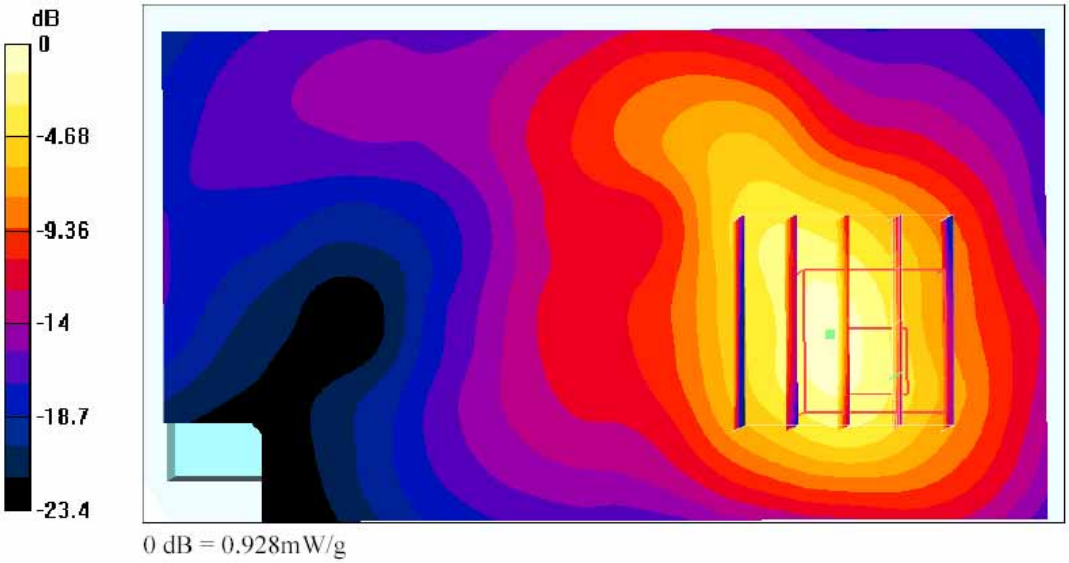
DUT: BenQ P50; Type: PDA Phone; Serial: 354768000000001

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900 Medium parameters used : f = 1850.2 MHz; σ = 1.53 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Ambient Temperature : 21.7 ℃; Liquid Temperature : 22.0 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(4.56, 4.56, 4.56); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Ch512/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.742 mW/g

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = -0.2 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.784 mW/g; SAR(10 g) = 0.370 mW/g
Maximum value of SAR (measured) = 0.928 mW/g



0 dB = 0.928mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 01/05/05 15:19:45

Body_GSM850 Ch189_Keypad Down With 1.5cm Gap _20041109

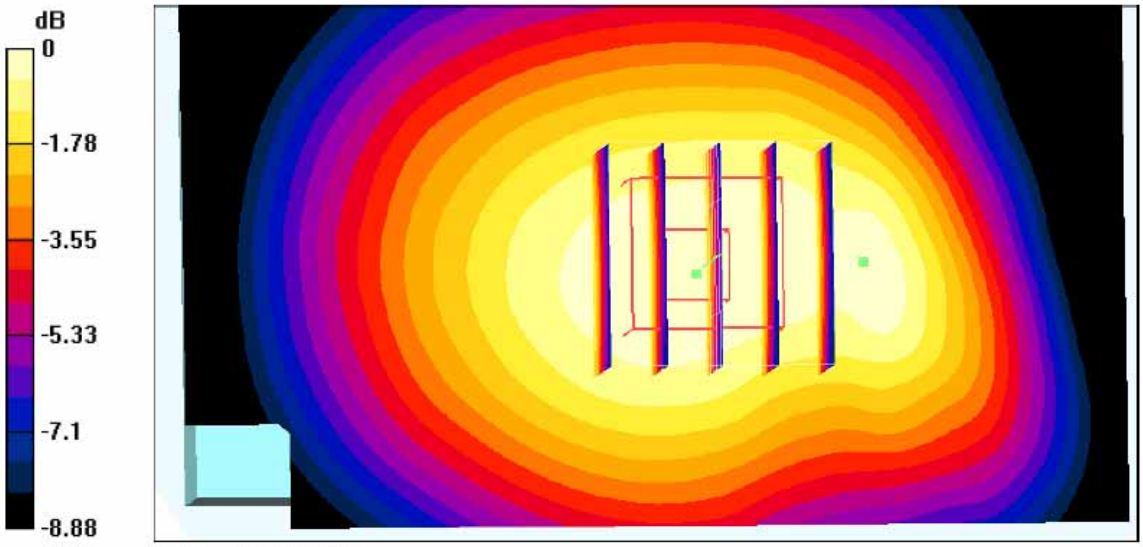
DUT: BenQ P50; Type: GSM Smart Phone; Serial:354768000000001

Communication System: GSM850; Frequency: 836.4 MHz;Duty Cycle: 1:4
Medium: MSL_850 Medium parameters used : f = 836.4 MHz; σ = 0.964 mho/m; ε_r = 55.4; ρ = 1000 kg/m^3
Ambient Temperature : 23.2 ℃; Liquid Temperature : 22.9 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(6.53, 6.53, 6.53); Calibrated: 9/30/2004
- 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, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Ch189/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.668 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.4 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 0.811 W/kg
SAR(1 g) = 0.634 mW/g; SAR(10 g) = 0.512 mW/g
Maximum value of SAR (measured) = 0.673 mW/g



0 dB = 0.673mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 01/05/05 12:16:56

Body_PCS Ch512_Keypad Down With 1.5cm Gap _20041109

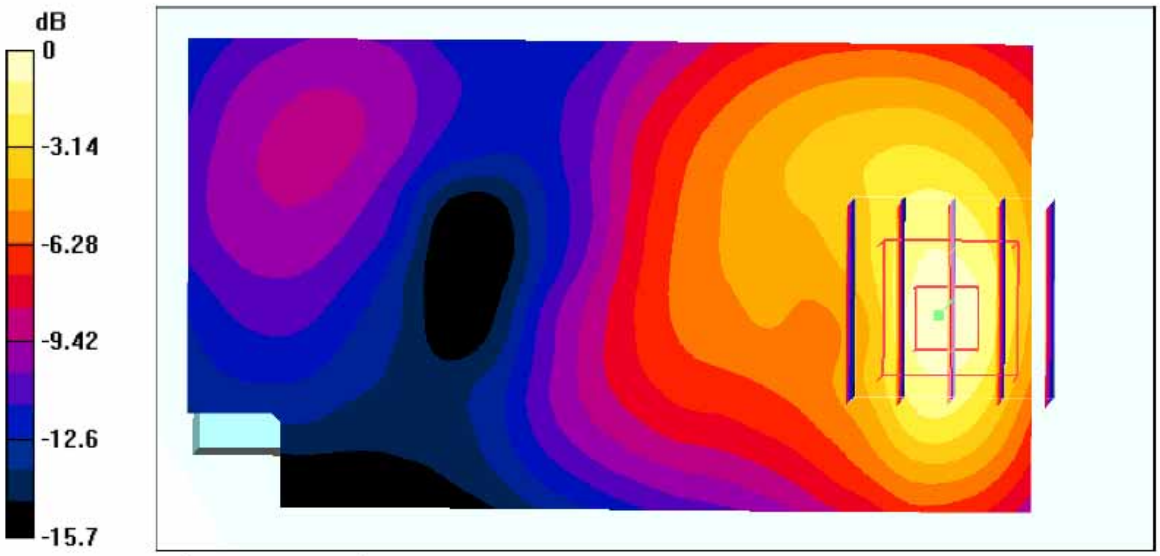
DUT: BenQ P50; Type: GSM Smart Phone; Serial:354768000000001

Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900 Medium parameters used : f = 1850.2 MHz; σ = 1.5 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Ambient Temperature : 23.0 ℃; Liquid Temperature : 22.7 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(4.56, 4.56, 4.56); Calibrated: 9/30/2004
- 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, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Ch512/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.457 mW/g

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 0.622 W/kg
SAR(1 g) = 0.395 mW/g; SAR(10 g) = 0.221 mW/g
Maximum value of SAR (measured) = 0.448 mW/g



0 dB = 0.448mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 10/13/04 11:13:01

Left Cheek_GSM850 Ch189_20041013

DUT: BenQ P50; Type: PDA Phone; Serial: 354768000000001

Communication System: GSM850; Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: HSL_850 Medium parameters used : f = 836.4 MHz; σ = 0.879 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Ambient Temperature : 21.6 ℃; Liquid Temperature : 21.7 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1787; 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, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

Ch189/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.478 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.9 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 0.577 W/kg
SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.328 mW/g
Maximum value of SAR (measured) = 0.473 mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 10/28/04 11:27:48

Left Tilted_PCS Ch512_20041028

DUT: BenQ P50; Type: PDA Phone; Serial: 354768000000001

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900 Medium parameters used : f = 1850.2 MHz; σ = 1.38 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Ambient Temperature : 21.8 ℃; Liquid Temperature : 22.0 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.16, 5.16, 5.16); Calibrated: 9/30/2004
- 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, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Ch512/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.311 mW/g

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.2 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 0.419 W/kg
SAR(1 g) = 0.282 mW/g; SAR(10 g) = 0.169 mW/g
Maximum value of SAR (measured) = 0.309 mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 01/05/05 14:38:29

Body_GSM850 Ch251_Keypad Down Touch_20050105

DUT: BenQ P50; Type: PDA Phone; Serial: 354768000000001

Communication System: GSM850; Frequency: 848.8 MHz;Duty Cycle: 1:4
Medium: MSL_850 Medium parameters used : f = 848.8 MHz; σ = 0.948 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Ambient Temperature : 21.8 ℃; Liquid Temperature : 22.1 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(6.53, 6.53, 6.53); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Ch251/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.679 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.63 V/m; Power Drift = -0.2 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.642 mW/g; SAR(10 g) = 0.385 mW/g
Maximum value of SAR (measured) = 0.694 mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 01/05/05 13:56:04

Body_PCS Ch512_Keypad Down Touch_20050105

DUT: BenQ P50; Type: PDA Phone; Serial: 354768000000001

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900 Medium parameters used : f = 1850.2 MHz; σ = 1.53 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Ambient Temperature : 21.7 ℃; Liquid Temperature : 22.0 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(4.56, 4.56, 4.56); Calibrated: 9/30/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/17/2004
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Ch512/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.742 mW/g

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = -0.2 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.784 mW/g; SAR(10 g) = 0.370 mW/g
Maximum value of SAR (measured) = 0.928 mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Appendix C – Calibration Data

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

Client Sproton Int. (Auden)

CALIBRATION CERTIFICATE

Object(s) D835V2 - SN:499

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

Calibration date: February 12, 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: February 18, 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)

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

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: D835V2

Serial: 499

Manufactured: July 10, 2003
Calibrated: February 12, 2004

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. Rev.02

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 835 MHz:

Relative Dielectricity	**42.1**	± 5%
Conductivity	**0.89 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.3 at 835 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:	**9.96 mW/g** ± 16.8 % (k=2)[1]
averaged over 10 cm^3 (10 g) of tissue:	**6.48 mW/g** ± 16.2 % (k=2)[1]

[1] validation uncertainty

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

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:	**1.382 ns**	(one direction)
Transmission factor:	**0.985**	(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 835 MHz:	Re{Z} = **51.2 Ω**
	Im {Z} = **-1.7 Ω**
Return Loss at 835 MHz	**-33.9 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 835 MHz:

Relative Dielectricity	**55.5**	± 5%
Conductivity	**0.99 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.13 at 835 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 1 W input power.

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

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^3 (1 g) of tissue:	**10.3 mW/g** ± 16.8 % (k=2)[2]
averaged over 10 cm^3 (10 g) of tissue:	**6.76 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 holder was in place during impedance measurements.

Feedpoint impedance at 835 MHz:	Re{Z} = **46.7 Ω**
	Im{Z} = **-4.5 Ω**
Return Loss at 835 MHz	**-24.7 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 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

[2] validation uncertainty

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Date/Time: 02/12/04 12:33:41

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN499

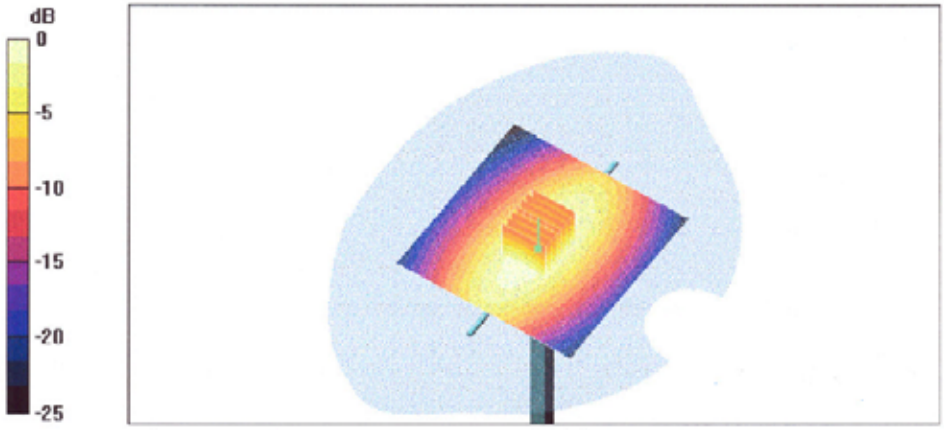
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 42.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.3, 6.3, 6.3); 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 25; Postprocessing SW: SEMCAD, V1.8 Build 98

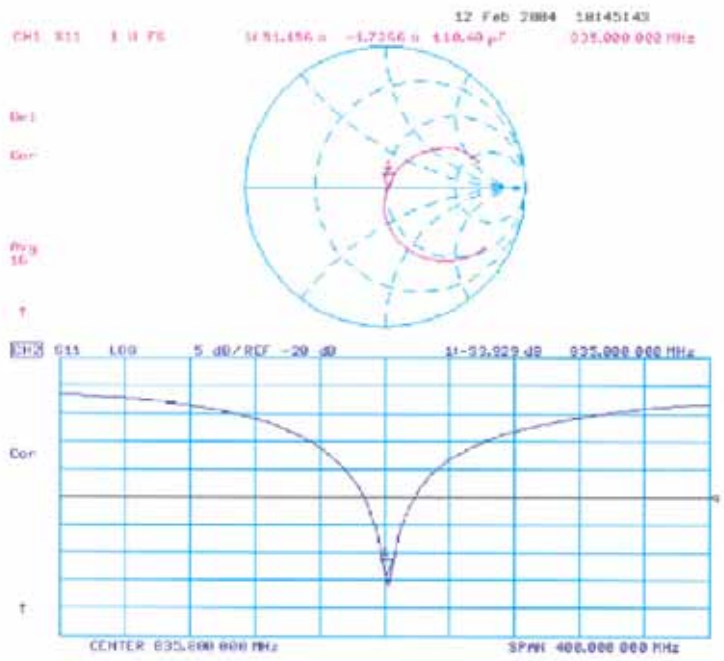
Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 56.5 V/m
Power Drift = -0.0 dB
Maximum value of SAR = 2.68 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.62 mW/g
Reference Value = 56.5 V/m
Power Drift = -0.0 dB
Maximum value of SAR = 2.68 mW/g



0 dB = 2.68mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**



©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Date/Time: 02/10/04 15:14:12

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN499

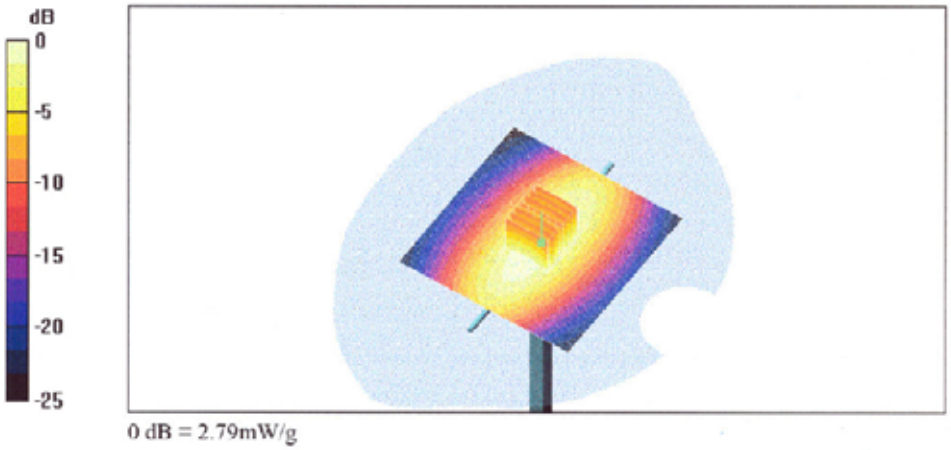
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Muscle 835 MHz;
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.13, 6.13, 6.13); 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 25; Postprocessing SW: SEMCAD, V1.8 Build 101

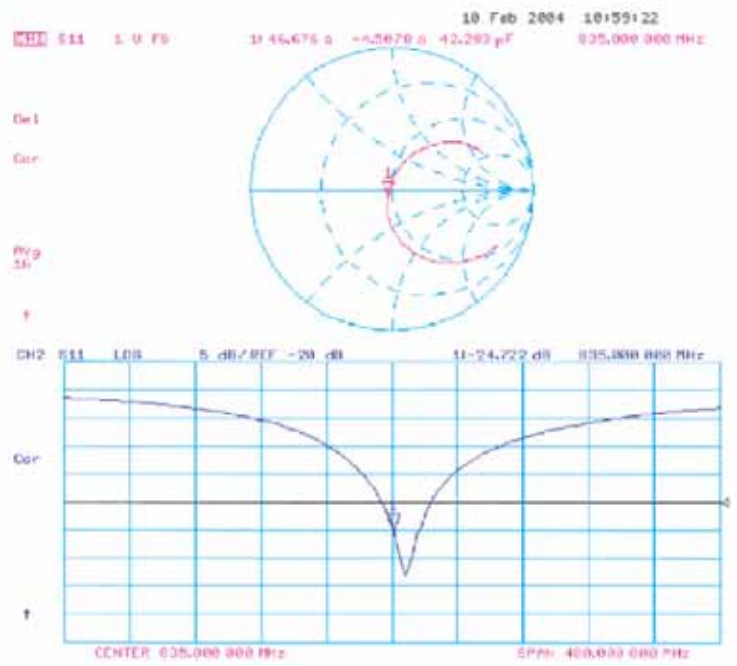
Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 54.7 V/m; Power Drift = 0.002 dB
Maximum value of SAR (interpolated) = 2.79 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.7 V/m; Power Drift = 0.002 dB
Maximum value of SAR (measured) = 2.79 mW/g
Peak SAR (extrapolated) = 3.82 W/kg
SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.69 mW/g



0 dB = 2.79mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**



©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

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

Client Sproton Int. (Auden)

CALIBRATION CERTIFICATE

Object(s)	D1900V2 - SN:5d041
Calibration procedure(s)	QA CAL-05.v2 Calibration procedure for dipole validation kits
Calibration date:	February 17, 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: February 18, 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

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. Rev.02

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: D1900V2

Serial: 5d041

Manufactured: July 4, 2003
Calibrated: February 17, 2004

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. Rev.02

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with **head simulating liquid** of the following electrical parameters at 1900 MHz:

Relative Dielectricity	**38.8**	± 5%
Conductivity	**1.47 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 4.96 at 1900 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 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 ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**41.6 mW/g** ± 16.8 % (k=2)[1]
averaged over 10 cm^3 (10 g) of tissue:	**21.6 mW/g** ± 16.2 % (k=2)[1]

[1] validation uncertainty

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

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:	**1.200 ns**	(one direction)
Transmission factor:	**0.993**	(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 1900 MHz:	Re{Z} = **51.2 Ω**
	Im {Z} = **4.9Ω**
Return Loss at 1900 MHz	**-26.1 dB**

4. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with **body simulating tissue** of the following electrical parameters at 1900 MHz:

Relative Dielectricity	**52.5**	± 5%
Conductivity	**1.58 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 4.57 at 1900 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 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.

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

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 1 W (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:	**42.0 mW/g** ± 16.8 % (k=2)[2]
averaged over 10 cm^3 (10 g) of tissue:	**22.0 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 1900 MHz:	Re{Z} = **46.6 Ω**
	Im {Z} = **5.1 Ω**
Return Loss at 1900 MHz	**-24.0 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 Section 1. 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.

[2] validation uncertainty

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Date/Time: 02/17/04 14:13:01

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN5d041

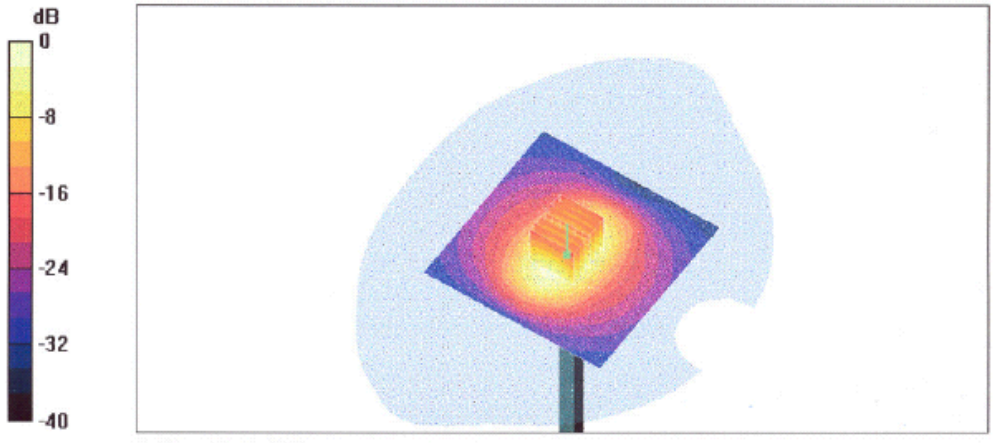
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.47 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.96, 4.96, 4.96); 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 30; Postprocessing SW: SEMCAD, V1.8 Build 98

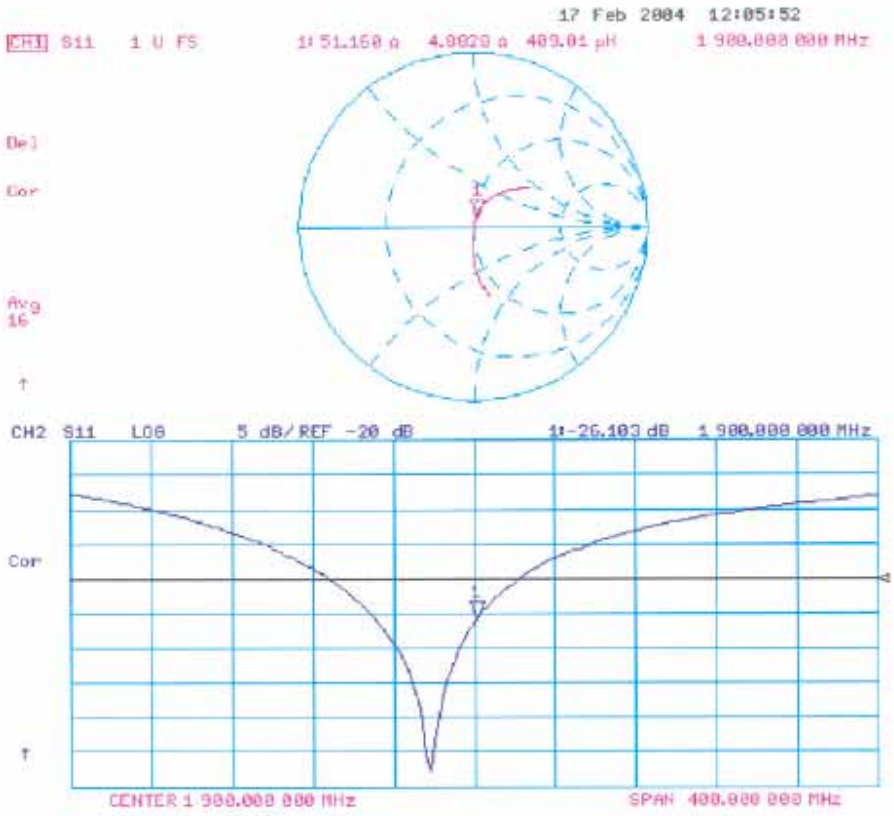
Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 93.8 V/m
Power Drift = 0.002 dB
Maximum value of SAR = 11.8 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.39 mW/g
Reference Value = 93.8 V/m
Power Drift = 0.002 dB
Maximum value of SAR = 11.7 mW/g



0 dB = 11.7mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**



©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

Date/Time: 02/09/04 15:58:45

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN5d041

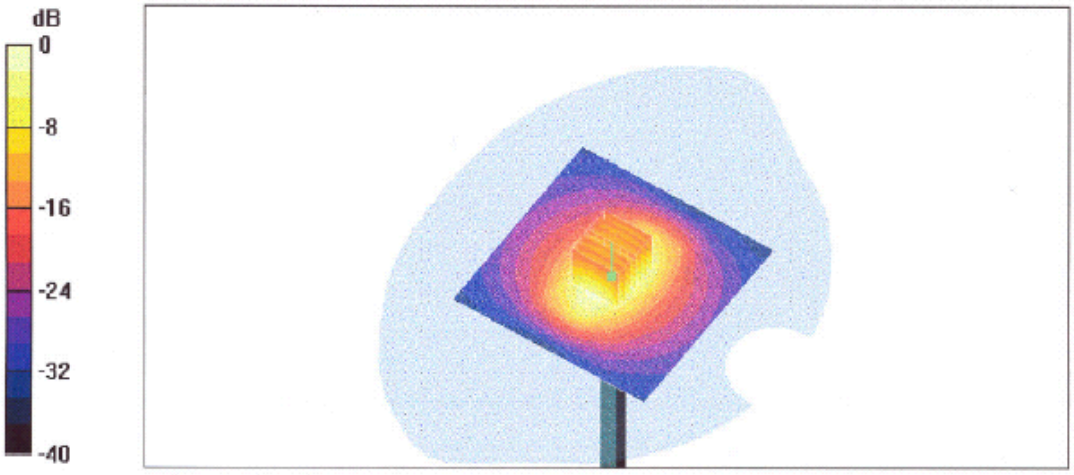
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: Muscle 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.58 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.57, 4.57, 4.57); 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 25; Postprocessing SW: SEMCAD, V1.8 Build 101

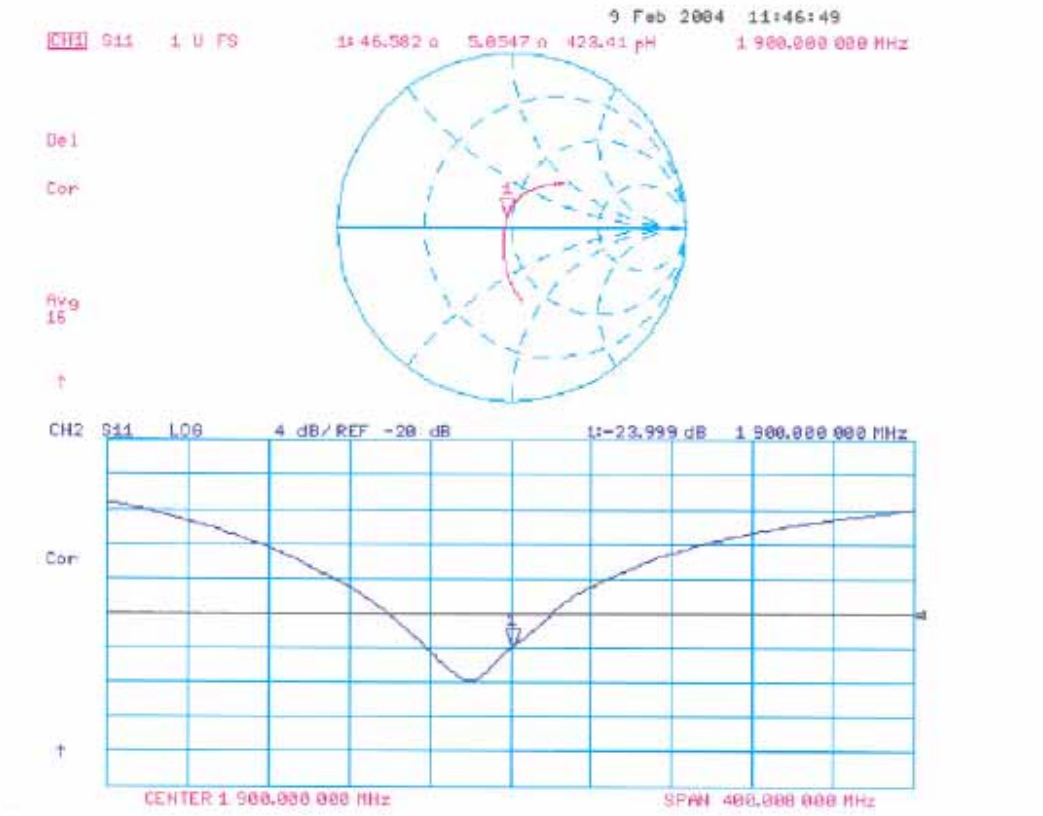
Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 92.6 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 11.8 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.6 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 11.9 mW/g
Peak SAR (extrapolated) = 18.8 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.49 mW/g



0 dB = 11.9mW/g

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**



©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

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

Client Auden > Sporton Int. Inc.

CALIBRATION CERTIFICATE

Object(s) ET3DV6 - SN:1787

Calibration procedure(s) QA CAL-01.v2
Calibration procedure for dosimetric E-field probes

Calibration date: August 29, 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 HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	Sep-03
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01 (ELCAL, No.2360)	Sep 03

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: August 28, 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)

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. **Rev.02**

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

Probe ET3DV6

SN:1787

Manufactured: May 28, 2003
Last calibration: August 29, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. Rev.02

ET3DV6 SN:1787 August 29, 2003

DASY - Parameters of Probe: ET3DV6 SN:1787

Sensitivity in Free Space

Diode Compression

NormX	1.62 $\mu V/(V/m)^2$	DCP X	94	mV
NormY	1.63 $\mu V/(V/m)^2$	DCP Y	94	mV
NormZ	1.96 $\mu V/(V/m)^2$	DCP Z	94	mV

Sensitivity in Tissue Simulating Liquid

Head 900 MHz ε_r = 41.5 ± 5% σ = 0.97 ± 5% mho/m

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	6.5 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.5 ± 9.5% (k=2)	Alpha	0.41
ConvF Z	6.5 ± 9.5% (k=2)	Depth	2.23

Head 1800 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	5.3 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.3 ± 9.5% (k=2)	Alpha	0.43
ConvF Z	5.3 ± 9.5% (k=2)	Depth	2.90

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	8.6	4.8
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

Head 1800 MHz Typical SAR gradient: 10 % per mm

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	13.3	9.3
SAR_{be} [%]	With Correction Algorithm	0.2	0.1

Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.4 ± 0.2	mm

©2004 SPORTON International Inc..SAR Testing Lab
This report shall not be reproduced except in full, without the written approval of Sporton. Rev.02