



Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/13

Left Tilted_PCS Ch512_Sample B_Samsung Battery_BT On_2D

DUT: 780314

Communication System: PCS; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: HSL_1900 Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.34$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.9 °C; Liquid Temperature : 21.5 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.16, 5.16, 5.16); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch512/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.53 mW/g

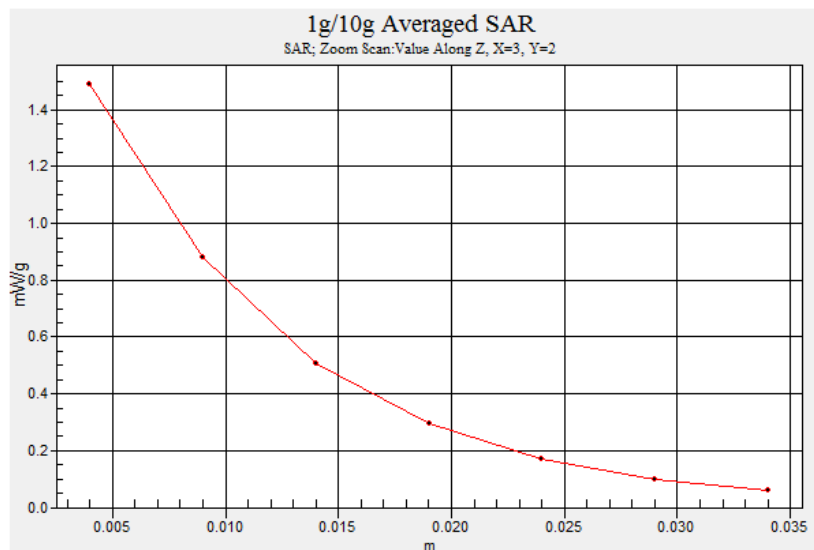
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 29.1 V/m; Power Drift = 0.275 dB

Peak SAR (extrapolated) = 2.38 W/kg

SAR(1 g) = 1.33 mW/g; SAR(10 g) = 0.693 mW/g

Maximum value of SAR (measured) = 1.49 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab Date: 2007/9/14

Right Cheek_802.11b Ch11_Sample A_Samsung Battery_2D

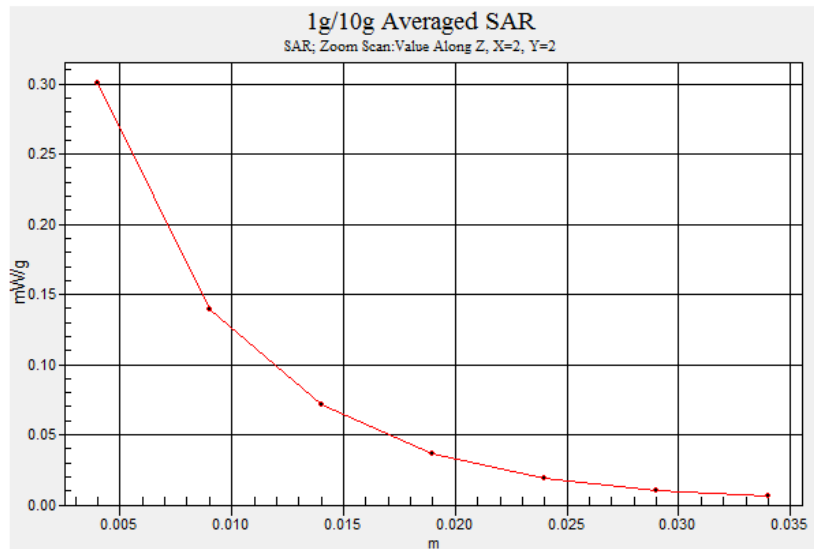
DUT: 780314

Communication System: 802.11b ; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: HSL_2450 Medium parameters used: $f = 2462$ MHz; $\sigma = 1.78$ mho/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³
Ambient Temperature : 22.9 °C; Liquid Temperature : 21.6 °C

- DASY4 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.5, 4.5, 4.5); Calibrated: 2007/8/28
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn577; Calibrated: 2006/11/21
 - Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
 - Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch11/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.311 mW/g

Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.84 V/m; Power Drift = -0.084 dB
Peak SAR (extrapolated) = 0.619 W/kg
SAR(1 g) = 0.272 mW/g; SAR(10 g) = 0.135 mW/g
Maximum value of SAR (measured) = 0.301 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab Date: 2007/9/14

Right Cheek_802.11b Ch11_Sample B_Samsung Battery_2D

DUT: 780314

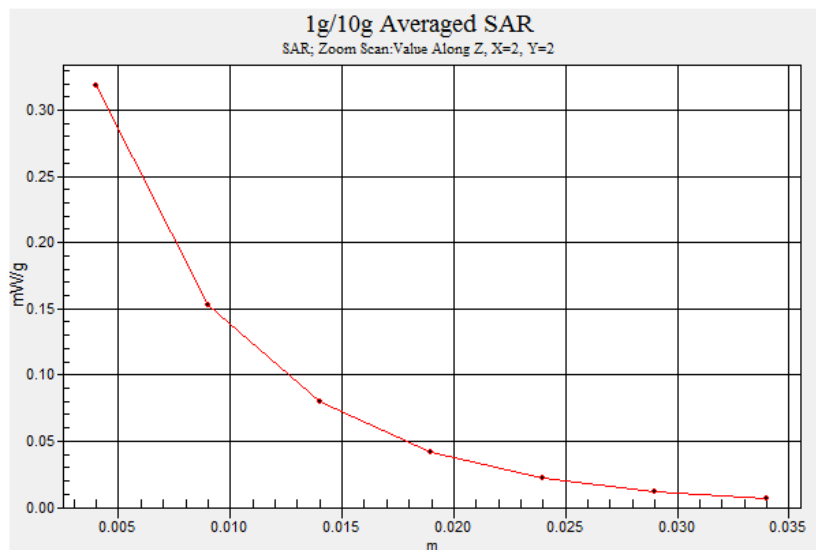
Communication System: 802.11b ; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: HSL_2450 Medium parameters used: $f = 2462$ MHz; $\sigma = 1.78$ mho/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.5, 4.5, 4.5); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch11/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.341 mW/g

Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.45 V/m; Power Drift = -0.132 dB
Peak SAR (extrapolated) = 0.656 W/kg
SAR(1 g) = 0.294 mW/g; SAR(10 g) = 0.152 mW/g
Maximum value of SAR (measured) = 0.319 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/15

Body_GSM850 Ch128_Keypad Down with 1.5cm Gap_Sample A_TWS Battery_GPRS10_2D

DUT: 780314

Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium: MSL_850 Medium parameters used : $f = 824.2$ MHz; $\sigma = 0.956$ mho/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.1 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(6.1, 6.1, 6.1); Calibrated: 2007/8/28

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn577; Calibrated: 2006/11/21

- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303

- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch128/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.19 mW/g

Ch128/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.8 V/m; Power Drift = -0.135 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.997 mW/g; SAR(10 g) = 0.730 mW/g

Maximum value of SAR (measured) = 1.05 mW/g

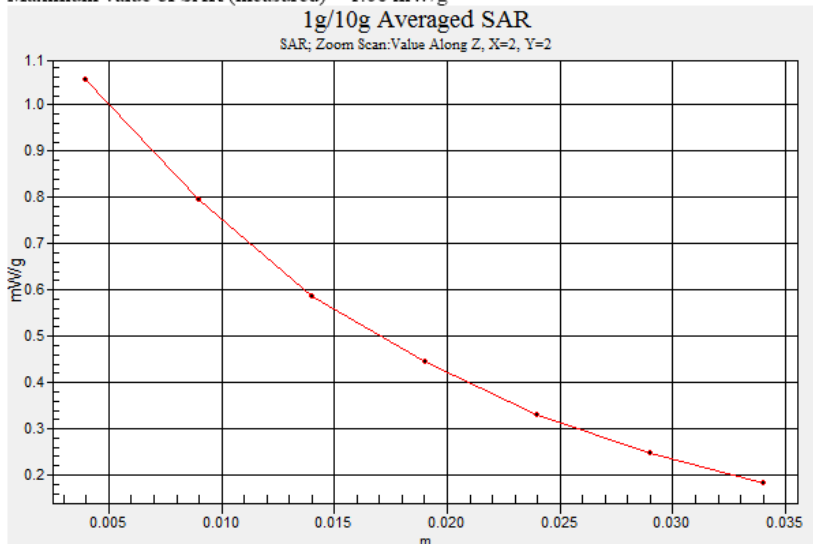
Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.8 V/m; Power Drift = -0.135 dB

Peak SAR (extrapolated) = 1.42 W/kg

SAR(1 g) = 0.990 mW/g; SAR(10 g) = 0.707 mW/g

Maximum value of SAR (measured) = 1.06 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/15

Body_GSM850 Ch128_Keypad Down with 1.5cm Gap_Sample B_TWS Battery_GPRS10_2D

DUT: 780314

Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium: MSL_850 Medium parameters used : $f = 824.2$ MHz; $\sigma = 0.956$ mho/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.9 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(6.1, 6.1, 6.1); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch128/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.20 mW/g

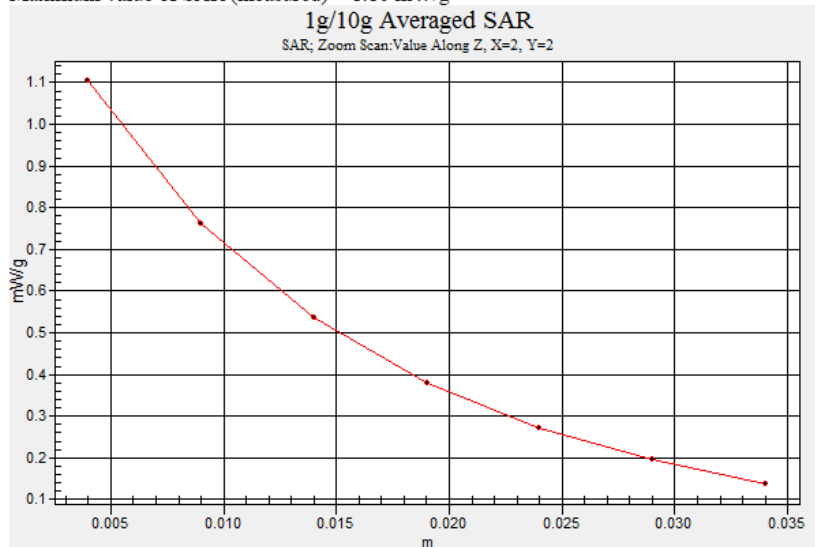
Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.6 V/m; Power Drift = -0.190 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.692 mW/g

Maximum value of SAR (measured) = 1.10 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date : 2007/9/16

**Body_PCS Ch512_Keypad Down with 1.5cm Gap_Sample A_Samsung Battery
_GPRS10_2D**

DUT: 780314

Communication System: PCS; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: MSL_1900 Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.8 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.68, 4.68, 4.68); Calibrated: 2007/8/28

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn577; Calibrated: 2006/11/21

- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383

- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch512/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.753 mW/g

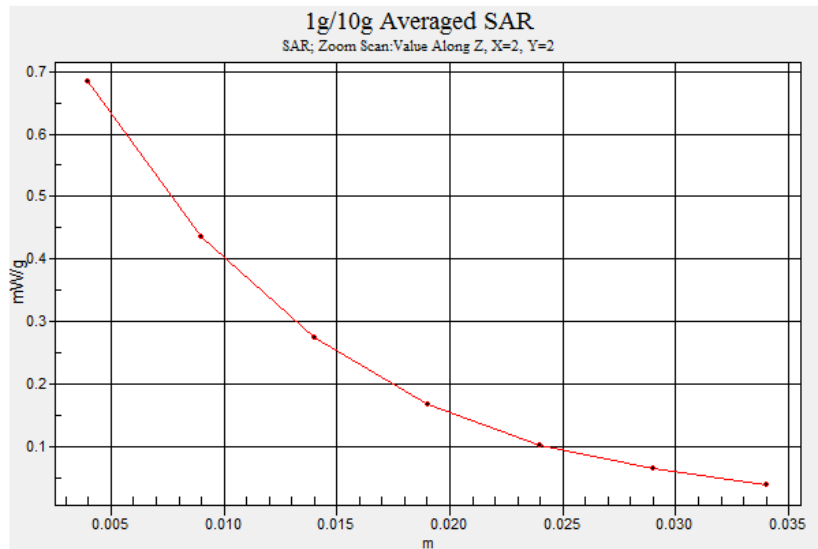
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.1 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.643 mW/g; SAR(10 g) = 0.377 mW/g

Maximum value of SAR (measured) = 0.683 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/16

Body_PCS Ch512_Keypad Down with 1.5cm Gap_Sample B_Samsung Battery_GPRS10_2D

DUT: 780314

Communication System: PCS; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: MSL_1900 Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.8 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.68, 4.68, 4.68); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch512/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.784 mW/g

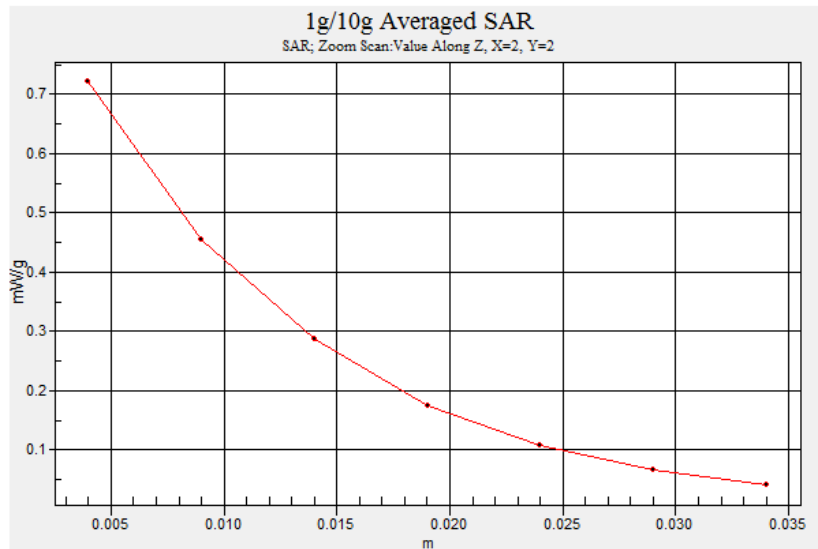
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.4 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.669 mW/g; SAR(10 g) = 0.385 mW/g

Maximum value of SAR (measured) = 0.721 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/16

Body_802.11g_Ch1_Keypad Down with 1.5cm Gap_Sample A_Samsung Battery_2D

DUT: 780314

Communication System: 802.11g; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: MSL_2450 Medium parameters used: $f = 2412$ MHz; $\sigma = 1.92$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.9 °C; Liquid Temperature : 21.7 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.02, 4.02, 4.02); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch1/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.267 mW/g

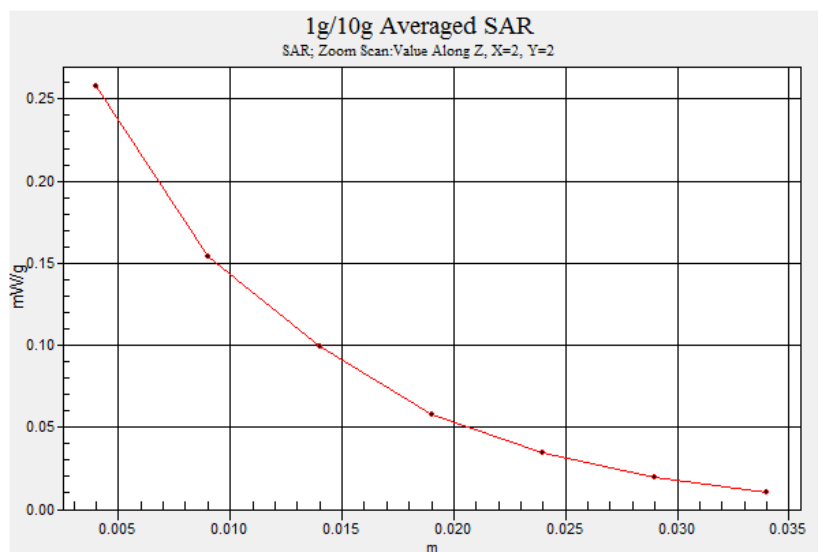
Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.4 V/m; Power Drift = -0.097 dB

Peak SAR (extrapolated) = 0.466 W/kg

SAR(1 g) = 0.245 mW/g; SAR(10 g) = 0.132 mW/g

Maximum value of SAR (measured) = 0.257 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date : 2007/9/16

Body_802.11g_Ch1_Keypad Down with 1.5cm Gap_Sample B_Samsung Battery_2D

DUT: 780314

Communication System: 802.11g; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: MSL_2450 Medium parameters used: $f = 2412$ MHz; $\sigma = 1.92$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.9 °C; Liquid Temperature : 21.7 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.02, 4.02, 4.02); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch1/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.355 mW/g

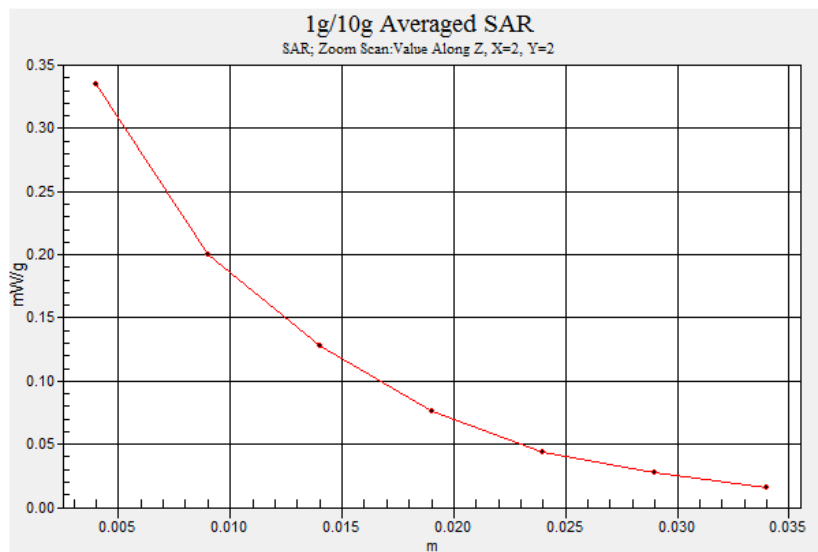
Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.4 V/m; Power Drift = -0.181 dB

Peak SAR (extrapolated) = 0.626 W/kg

SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.171 mW/g

Maximum value of SAR (measured) = 0.335 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date : 2007/9/15

**Body_GSM850 Ch128_Keypad Down with Holster Touch_Sample A_Samsung Battery
_GPRS10_BT On_2D**

DUT: 780314

Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium: MSL_850 Medium parameters used : $f = 824.2$ MHz; $\sigma = 0.956$ mho/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³

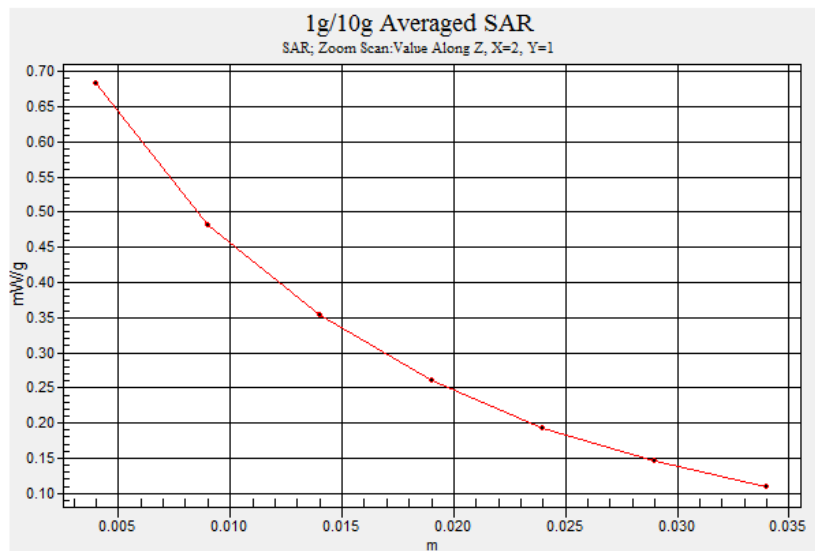
Ambient Temperature : 23.0 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(6.1, 6.1, 6.1); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch128/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.692 mW/g

Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.0 V/m; Power Drift = 0.058 dB
Peak SAR (extrapolated) = 0.922 W/kg
SAR(1 g) = 0.642 mW/g; SAR(10 g) = 0.457 mW/g
Maximum value of SAR (measured) = 0.683 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/15

**Body_GSM850 Ch128_Keypad Down with Holster Touch_Sample B_Samsung Battery
_GPRS10_BT On_2D**

DUT: 780314

Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium: MSL_850 Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.956$ mho/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.0 °C; Liquid Temperature : 22.0 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(6.1, 6.1, 6.1); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch128/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.713 mW/g

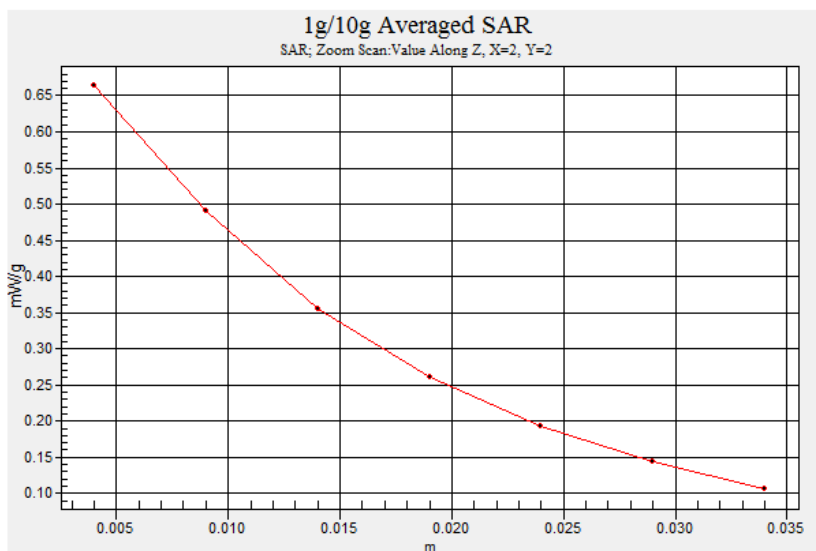
Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.1 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 0.831 W/kg

SAR(1 g) = 0.621 mW/g; SAR(10 g) = 0.437 mW/g

Maximum value of SAR (measured) = 0.664 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/11

**Body_PCS Ch512_Keypad Downb with Holster Touch_Sample A_Samsung Battery
_GPRS10_2D**

DUT: 780314

Communication System: PCS; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: MSL_1900 Medium parameters used : $f = 1850.2$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.68, 4.68, 4.68); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch512/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.790 mW/g

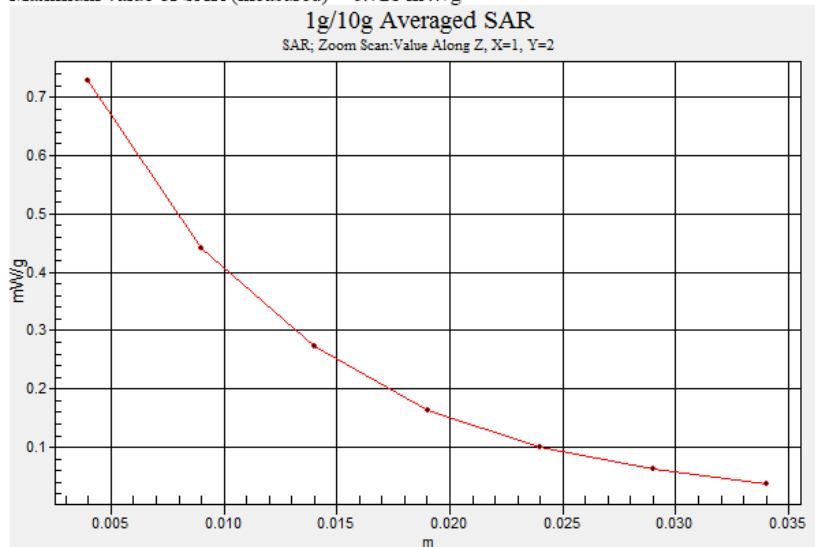
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.4 V/m; Power Drift = -0.145 dB

Peak SAR (extrapolated) = 1.14 W/kg

SAR(1 g) = 0.687 mW/g; SAR(10 g) = 0.398 mW/g

Maximum value of SAR (measured) = 0.728 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/11

**Body_PCS Ch512_Keypad Down with Holster Touch_Sample B_Samsung Battery
_GPRS10_2D**

DUT: 780314

Communication System: PCS; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: MSL_1900 Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 55.1$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.68, 4.68, 4.68); Calibrated: 2007/8/28

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn577; Calibrated: 2006/11/21

- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303

- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch512/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.662 mW/g

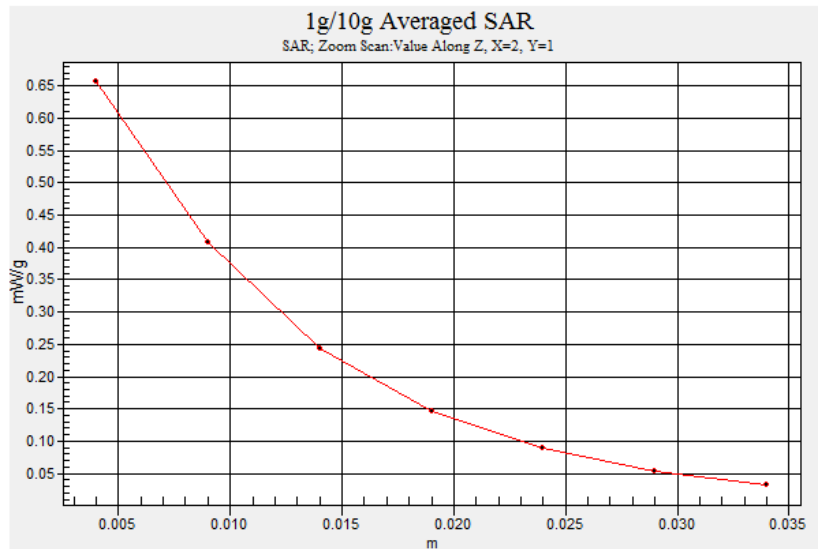
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.0 V/m; Power Drift = -0.159 dB

Peak SAR (extrapolated) = 0.975 W/kg

SAR(1 g) = 0.600 mW/g; SAR(10 g) = 0.343 mW/g

Maximum value of SAR (measured) = 0.656 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/16

Body_802.11g_Ch1_Keypad Down with Holster Touch_Sample A_TWS Battery_BT On_2D

DUT: 780314

Communication System: 802.11g; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: MSL_2450 Medium parameters used: $f = 2412$ MHz; $\sigma = 1.92$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.9 °C; Liquid Temperature : 21.7 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.02, 4.02, 4.02); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2006/11/21
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch1/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.07 mW/g

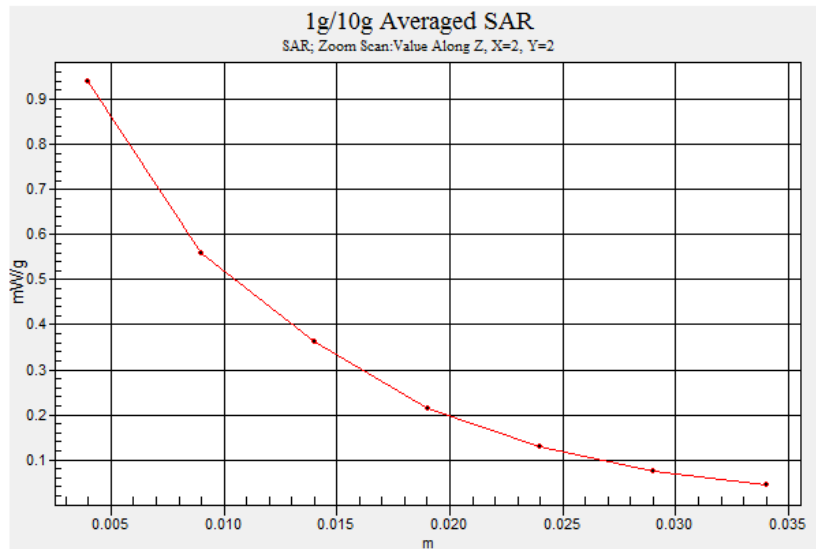
Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.2 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 1.78 W/kg

SAR(1 g) = 0.908 mW/g; SAR(10 g) = 0.455 mW/g

Maximum value of SAR (measured) = 0.939 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date: 2007/9/16

Body_802.11g_Ch1_Keypad Down with Holster Touch_Sample B_TWS Battery_BT On_2D

DUT: 780314

Communication System: 802.11g; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: MSL_2450 Medium parameters used: $f = 2412$ MHz; $\sigma = 1.92$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.9 °C; Liquid Temperature : 21.7 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.02, 4.02, 4.02); Calibrated: 2007/8/28

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn577; Calibrated: 2006/11/21

- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303

- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch1/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.22 mW/g

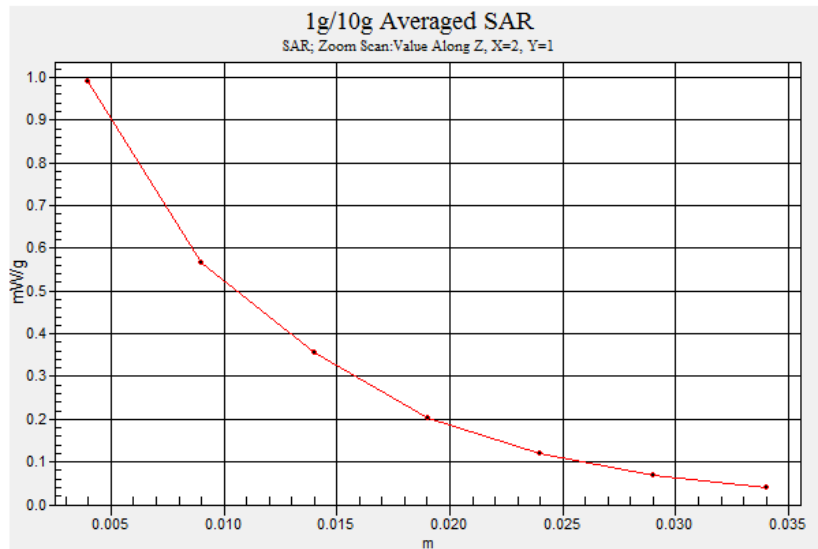
Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.5 V/m; Power Drift = -0.181 dB

Peak SAR (extrapolated) = 1.97 W/kg

SAR(1 g) = 0.992 mW/g; SAR(10 g) = 0.493 mW/g

Maximum value of SAR (measured) = 0.989 mW/g





Appendix C – Calibration Data

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



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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 Sporton (Auden)

Certificate No: D1900V2-5d041_Mar06

CALIBRATION CERTIFICATE

Object D1900V2 - SN: 5d041
Calibration procedure(s) QA CAL-05.v6
Calibration procedure for dipole validation kits
Calibration date: March 21, 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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Table with 4 columns: Primary Standards, ID #, Cal Date (Calibrated by, Certificate No.), Scheduled Calibration. Includes items like Power meter EPM-442A, Power sensor HP 8481A, Reference 20 dB Attenuator, Reference 10 dB Attenuator, Reference Probe ET3DV6, DAE4, Secondary Standards, and Network Analyzer HP 8753E.

Calibrated by: Judith Müller, Laboratory Technician
Approved by: Katja Pokovic, Technical Manager

Signatures of Judith Müller and Katja Pokovic

Issued: March 22, 2006

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



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Accreditation No.: SCS 108

Glossary:

TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.



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 V5.0 | |
| Distance Dipole Center - TSL | 10 mm | with Spacer |
| Area Scan resolution | dx, dy = 15 mm | |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 1900 MHz ± 1 MHz | |

Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters | 22.0 °C | 40.0 | 1.40 mho/m |
| Measured Head TSL parameters | (22.0 ± 0.2) °C | 39.4 ± 6 % | 1.42 mho/m ± 6 % |
| Head TSL temperature during test | (21.5 ± 0.2) °C | --- | --- |

SAR result with Head TSL

| SAR averaged over 1 cm ³ (1 g) of Head TSL | condition | |
|---|--------------------|-----------------------------------|
| SAR measured | 250 mW input power | 9.75 mW / g |
| SAR normalized | normalized to 1W | 39.0 mW / g |
| SAR for nominal Head TSL parameters ¹ | normalized to 1W | 38.4 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm ³ (10 g) of Head TSL | Condition | |
|---|--------------------|-----------------------------------|
| SAR measured | 250 mW input power | 5.17 mW / g |
| SAR normalized | normalized to 1W | 20.7 mW / g |
| SAR for nominal Head TSL parameters ¹ | normalized to 1W | 20.5 mW / g ± 16.5 % (k=2) |

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



Body TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters | 22.0 °C | 53.3 | 1.52 mho/m |
| Measured Body TSL parameters | (22.0 ± 0.2) °C | 54.7 ± 6 % | 1.54 mho/m ± 6 % |
| Body TSL temperature during test | (21.6 ± 0.2) °C | ---- | ---- |

SAR result with Body TSL

| SAR averaged over 1 cm ³ (1 g) of Body TSL | Condition | |
|---|--------------------|-----------------------------------|
| SAR measured | 250 mW input power | 10.2 mW / g |
| SAR normalized | normalized to 1W | 40.8 mW / g |
| SAR for nominal Body TSL parameters ² | normalized to 1W | 41.1 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm ³ (10 g) of Body TSL | condition | |
|---|--------------------|-----------------------------------|
| SAR measured | 250 mW Input power | 5.40 mW / g |
| SAR normalized | normalized to 1W | 21.6 mW / g |
| SAR for nominal Body TSL parameters ² | normalized to 1W | 21.8 mW / g ± 16.5 % (k=2) |

² Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"



Appendix

Antenna Parameters with Head TSL

| | |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.5 Ω + 5.1 j Ω |
| Return Loss | - 24.8 dB |

Antenna Parameters with Body TSL

| | |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 47.9 Ω + 6.3 j Ω |
| Return Loss | - 23.4 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.200 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 | July 4, 2003 |

DASY4 Validation Report for Head TSL

Date/Time: 14.03.2006 16:18:53

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d041

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.74, 4.74, 4.74); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

Pin = 250 mW; d = 10 mm/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.7 mW/g

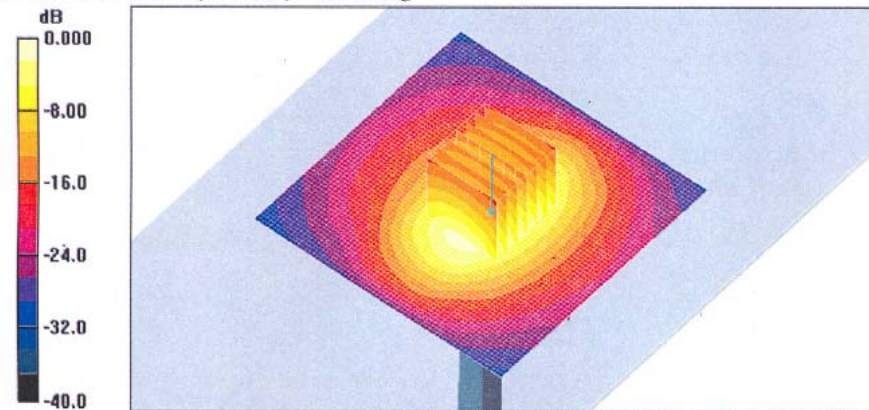
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.9 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 9.75 mW/g; SAR(10 g) = 5.17 mW/g

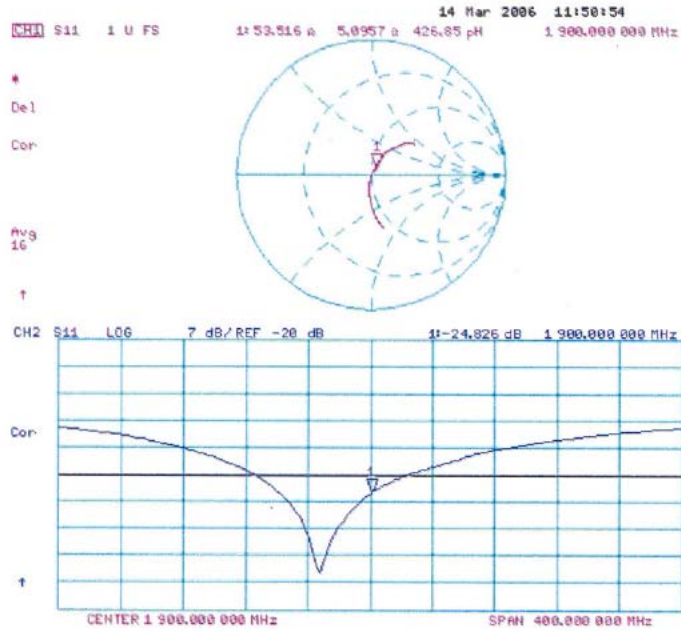
Maximum value of SAR (measured) = 11.1 mW/g



0 dB = 11.1 mW/g



Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 21.03.2006 13:59:55

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d041

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL U10;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 54.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

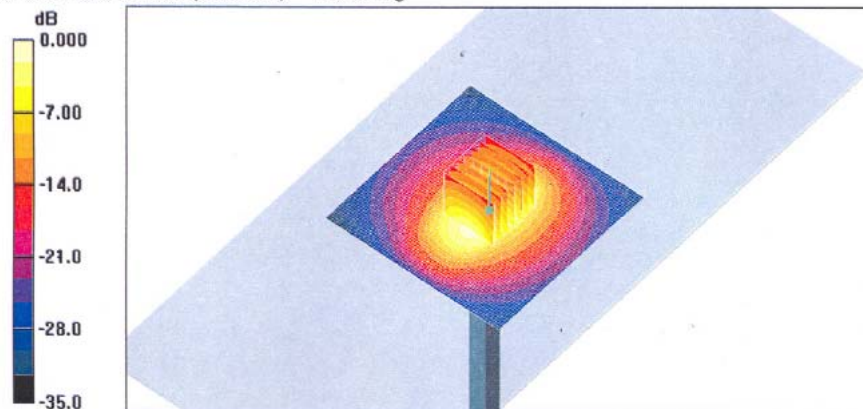
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.3, 4.3, 4.3); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Pin = 250 mW; d = 10 mm/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 11.8 mW/g

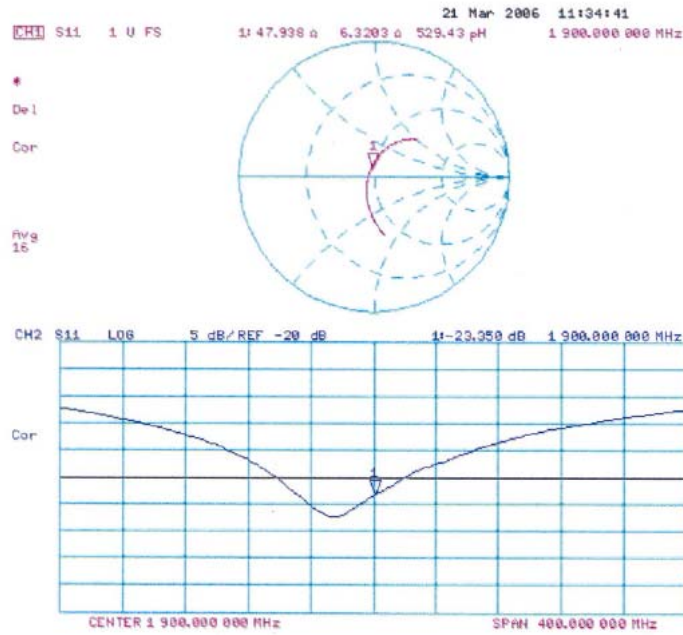
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 89.3 V/m; Power Drift = 0.045 dB
 Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.4 mW/g
 Maximum value of SAR (measured) = 11.6 mW/g



0 dB = 11.6mW/g



Impedance Measurement Plot for Body TSL





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Accreditation No.: SCS 108

Client Sporton (Auden)

Certificate No: D2450V2-736_Jul07

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 736
Calibration procedure(s): QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date: July 12, 2007
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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Table with 4 columns: Primary Standards, ID #, Cal Date (Calibrated by, Certificate No.), Scheduled Calibration. Includes items like Power meter EPM-442A, Power sensor HP 8431A, Reference 20 dB Attenuator, etc.

Calibrated by: Mike Meili, Laboratory Technician
Approved by: Katja Pokovic, Technical Manager
Signature: [Handwritten signatures]
Issued: July 12, 2007

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Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: SCS 108

Glossary:

TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.



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 V5.0 | |
| Distance Dipole Center - TSL | 10 mm | with Spacer |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 2450 MHz ± 1 MHz | |

Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters | 22.0 °C | 39.2 | 1.80 mho/m |
| Measured Head TSL parameters | (22.0 ± 0.2) °C | 38.6 ± 6 % | 1.81 mho/m ± 6 % |
| Head TSL temperature during test | (22.0 ± 0.2) °C | ----- | ----- |

SAR result with Head TSL

| SAR averaged over 1 cm ³ (1 g) of Head TSL | condition | |
|---|--------------------|----------------------------|
| SAR measured | 250 mW input power | 13.3 mW / g |
| SAR normalized | normalized to 1W | 53.2 mW / g |
| SAR for nominal Head TSL parameters ¹ | normalized to 1W | 52.7 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
|---|--------------------|----------------------------|
| SAR measured | 250 mW input power | 6.17 mW / g |
| SAR normalized | normalized to 1W | 24.7 mW / g |
| SAR for nominal Head TSL parameters ¹ | normalized to 1W | 24.5 mW / g ± 16.5 % (k=2) |

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



Body TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters | 22.0 °C | 52.7 | 1.95 mho/m |
| Measured Body TSL parameters | (22.0 ± 0.2) °C | 53.5 ± 6 % | 1.94 mho/m ± 6 % |
| Body TSL temperature during test | (22.0 ± 0.2) °C | ----- | ----- |

SAR result with Body TSL

| SAR averaged over 1 cm ³ (1 g) of Body TSL | Condition | |
|---|--------------------|-----------------------------------|
| SAR measured | 250 mW input power | 13.0 mW / g |
| SAR normalized | normalized to 1W | 52.0 mW / g |
| SAR for nominal Body TSL parameters ² | normalized to 1W | 52.5 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm ³ (10 g) of Body TSL | Condition | |
|---|--------------------|-----------------------------------|
| SAR measured | 250 mW input power | 6.05 mW / g |
| SAR normalized | normalized to 1W | 24.2 mW / g |
| SAR for nominal Body TSL parameters ² | normalized to 1W | 24.4 mW / g ± 16.5 % (k=2) |

² Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"



Appendix

Antenna Parameters with Head TSL

| | |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.1 Ω + 3.0 j Ω |
| Return Loss | - 27.6 dB |

Antenna Parameters with Body TSL

| | |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 48.7 Ω + 4.6 j Ω |
| Return Loss | - 26.3 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.158 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 | August 26, 2003 |

DASY4 Validation Report for Head TSL

Date/Time: 12.07.2007 11:00:03

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN736

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.81$ mho/m; $\epsilon_r = 38.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025 (HF); ConvF(4.5, 4.5, 4.5); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

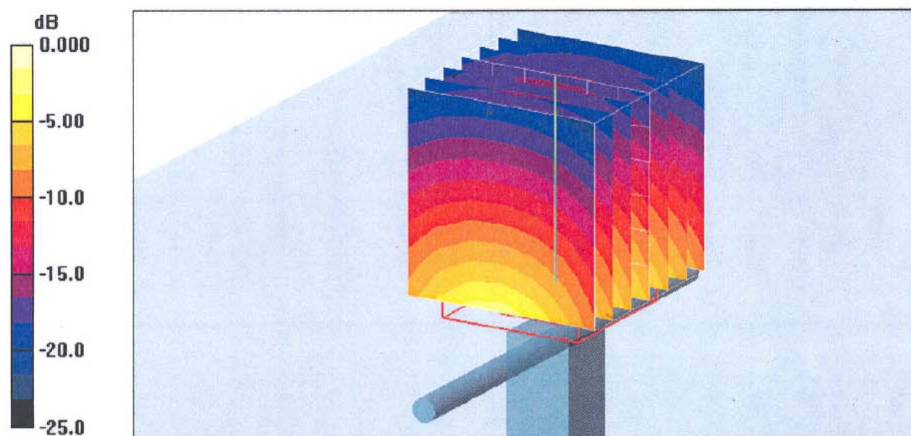
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.0 V/m; Power Drift = -0.004 dB

Peak SAR (extrapolated) = 28.1 W/kg

SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.17 mW/g

Maximum value of SAR (measured) = 15.0 mW/g



0 dB = 15.0mW/g