



Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/4/2007 5:18:16 PM

Body_GSM850 Ch189_Keypad Up with 1.5cm Gap_20070204_EDGE8_PC528

DUT: 710211

Communication System: GSM850; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium: MSL_850 Medium parameters used : $f = 836.4$ MHz; $\sigma = 0.972$ mho/m; $\epsilon_r = 56.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.6 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006

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

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

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

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch189/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.086 mW/g

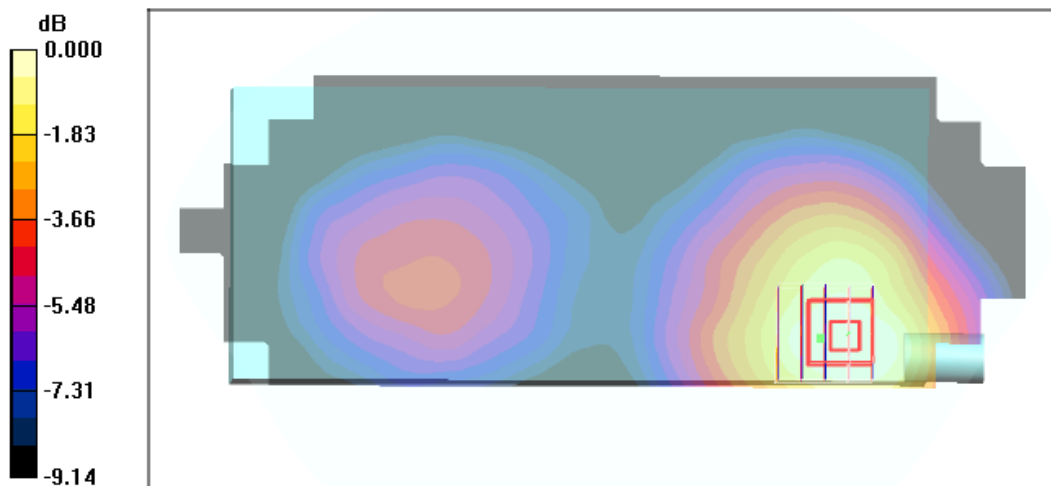
Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.79 V/m; Power Drift = -0.132 dB

Peak SAR (extrapolated) = 0.113 W/kg

SAR(1 g) = 0.081 mW/g; SAR(10 g) = 0.058 mW/g

Maximum value of SAR (measured) = 0.086 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/4/2007 5:49:37 PM

Body_GSM850 Ch189_Keypad Up with 1.5cm Gap_20070204_EDGE10_PC528

DUT: 710211

Communication System: GSM850; Frequency: 836.4 MHz; Duty Cycle: 1:4

Medium: MSL_850 Medium parameters used : $f = 836.4$ MHz; $\sigma = 0.972$ mho/m; $\epsilon_r = 56.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006

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

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

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

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch189/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.096 mW/g

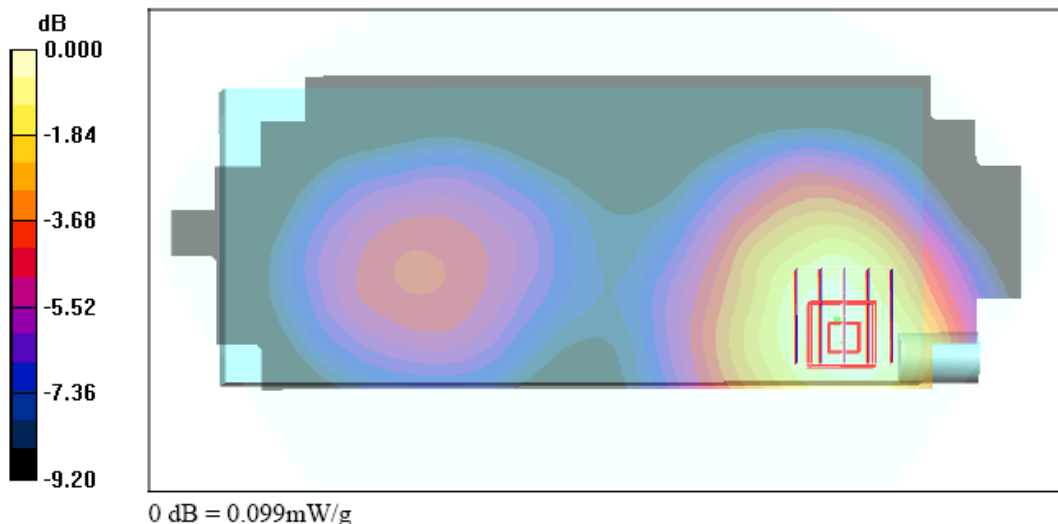
Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.23 V/m; Power Drift = -0.172 dB

Peak SAR (extrapolated) = 0.125 W/kg

SAR(1 g) = 0.093 mW/g; SAR(10 g) = 0.067 mW/g

Maximum value of SAR (measured) = 0.099 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/4/2007 6:11:41 PM

Body_GSM850 Ch189_Keypad Up with 1.5cm Gap_20070204_EDGE12_PC528

DUT: 710211

Communication System: GSM850; Frequency: 836.4 MHz; Duty Cycle: 1:2

Medium: MSL_850 Medium parameters used : $f = 836.4$ MHz; $\sigma = 0.972$ mho/m; $\epsilon_r = 56.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.6 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006

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

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

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

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch189/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.069 mW/g

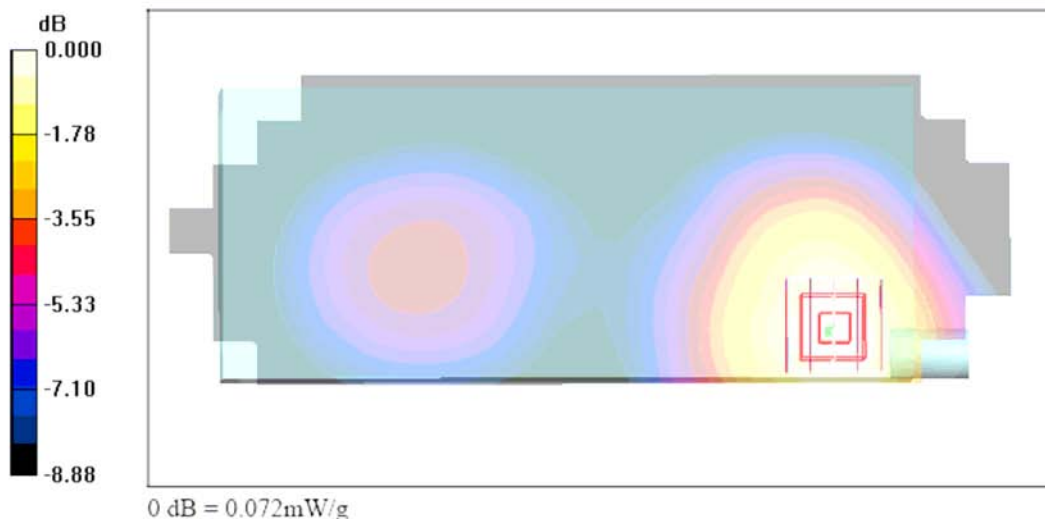
Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.49 V/m; Power Drift = -0.132 dB

Peak SAR (extrapolated) = 0.088 W/kg

SAR(1 g) = 0.068 mW/g; SAR(10 g) = 0.049 mW/g

Maximum value of SAR (measured) = 0.072 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 11:57:01 AM

Body_PCS Ch661_Keypad Up with 1.5cm Gap_20070205_GPRS8_PC528

DUT: 710211

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: MSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.5 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch661/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.132 mW/g

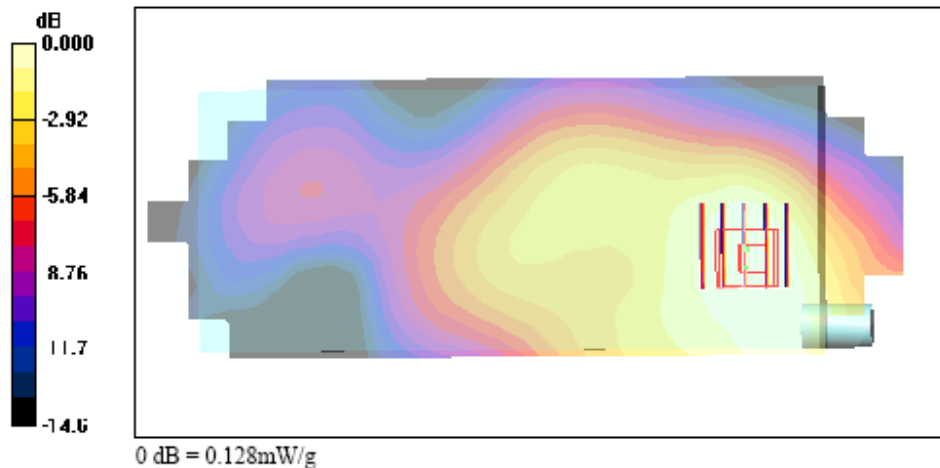
Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.23 V/m; Power Drift = -0.069 dB

Peak SAR (extrapolated) = 0.175 W/kg

SAR(1 g) = 0.121 mW/g; SAR(10 g) = 0.079 mW/g

Maximum value of SAR (measured) = 0.128 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 5:31:33 PM

Body_PCS Ch512_Keypad Up with 1.5cm Gap_20070205_GPRS10_PC528

DUT: 710211

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: MSL_1900 Medium parameters used : $f = 1850.2$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch512/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.173 mW/g

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

Reference Value = 8.40 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.233 W/kg

SAR(1 g) = 0.161 mW/g; SAR(10 g) = 0.106 mW/g

Maximum value of SAR (measured) = 0.172 mW/g

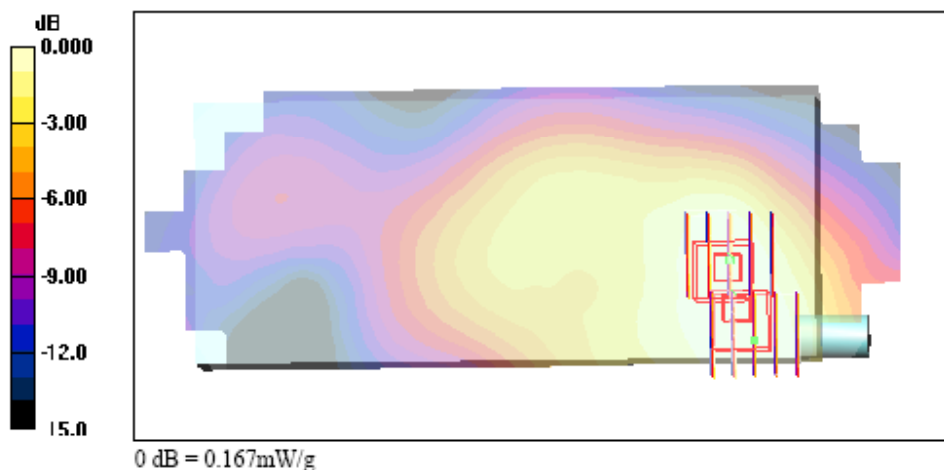
Ch512/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.40 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.230 W/kg

SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.101 mW/g

Maximum value of SAR (measured) = 0.167 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 1:27:57 PM

Body_PCS Ch661_Keypad Up with 1.5cm Gap_20070205_GPRS12_PC528

DUT: 710211

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:2

Medium: MSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch661/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.130 mW/g

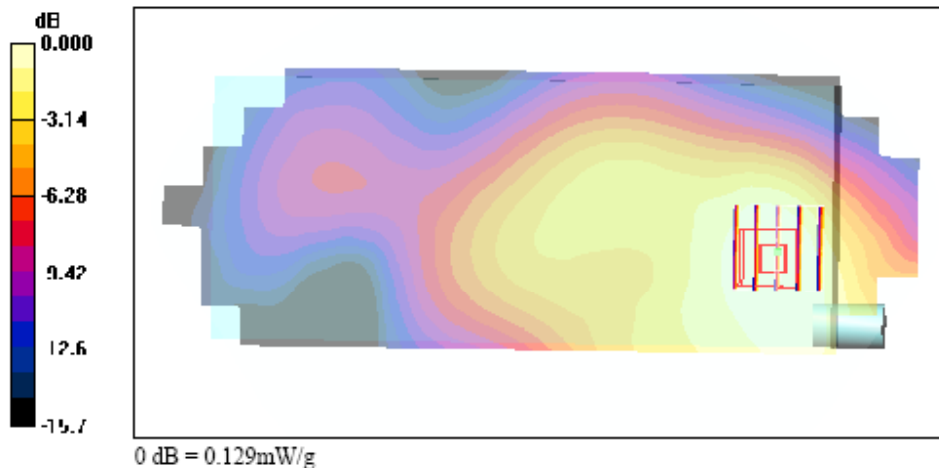
Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.00 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 0.176 W/kg

SAR(1 g) = 0.120 mW/g; SAR(10 g) = 0.079 mW/g

Maximum value of SAR (measured) = 0.129 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 3:37:01 PM

Body_PCS Ch661_Keypad Up with 1.5cm Gap_20070205_EDGE8_PC528

DUT: 710211

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: MSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.7 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch661/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.039 mW/g

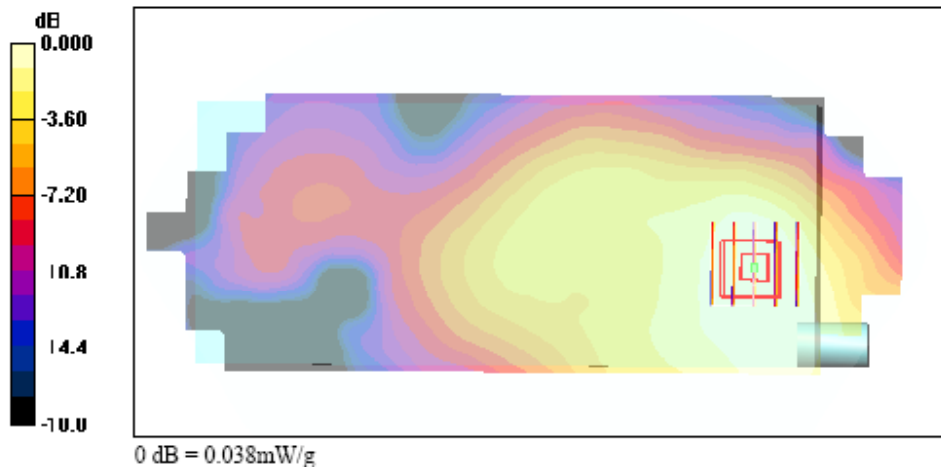
Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.80 V/m; Power Drift = -0.152 dB

Peak SAR (extrapolated) = 0.052 W/kg

SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.023 mW/g

Maximum value of SAR (measured) = 0.038 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 3:03:49 PM

Body_PCS Ch661_Keypad Up with 1.5cm Gap_20070205_EDGE10_PC528

DUT: 710211

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

Medium: MSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.6 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch661/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.046 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.16 V/m; Power Drift = -0.150 dB

Peak SAR (extrapolated) = 0.065 W/kg

SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.028 mW/g

Maximum value of SAR (measured) = 0.047 mW/g

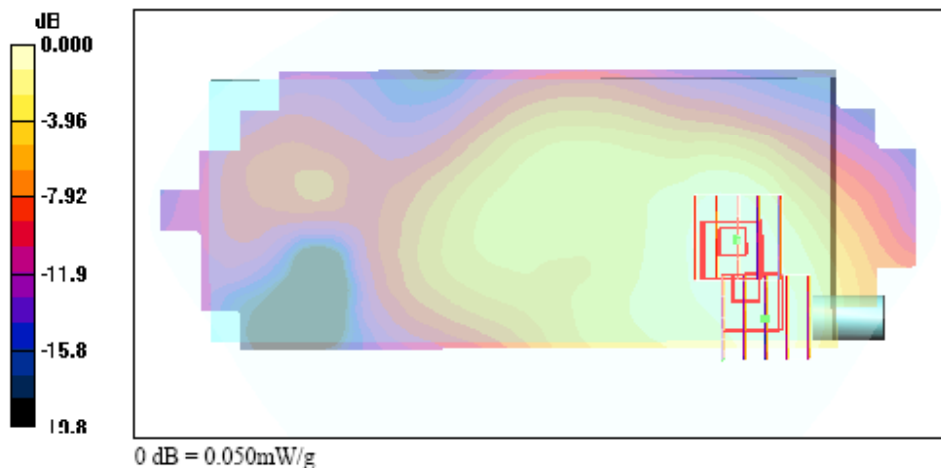
Ch661/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.16 V/m; Power Drift = -0.150 dB

Peak SAR (extrapolated) = 0.100 W/kg

SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.025 mW/g

Maximum value of SAR (measured) = 0.050 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 4:06:24 PM

Body_PCS Ch661_Keypad Up with 1.5cm Gap_20070205_EDGE12_PC528

DUT: 710211

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:2

Medium: MSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.7 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch661/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.039 mW/g

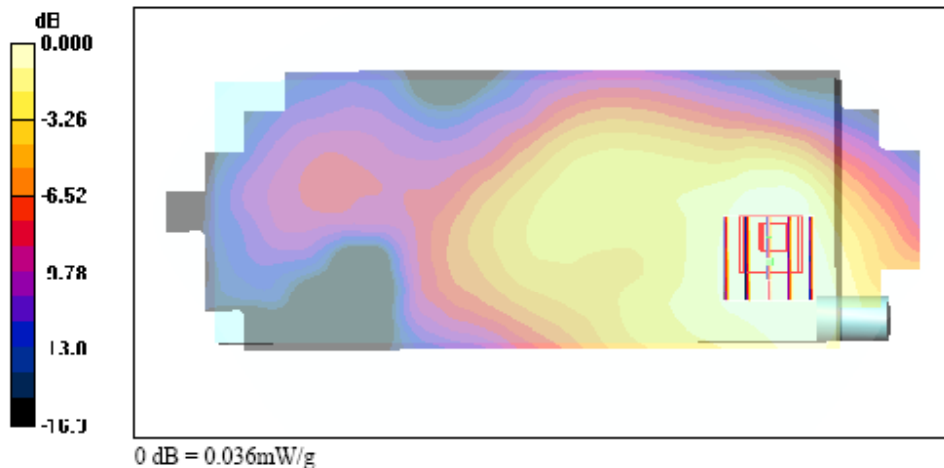
Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.74 V/m; Power Drift = -0.110 dB

Peak SAR (extrapolated) = 0.048 W/kg

SAR(1 g) = 0.033 mW/g; SAR(10 g) = 0.022 mW/g

Maximum value of SAR (measured) = 0.036 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/4/2007 3:30:58 PM

Body_GSM850 Ch189_Keypad Down with 1.5cm Gap_20070204_GPRS8_PC528

DUT: 710211

Communication System: GSM850; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium: MSL_850 Medium parameters used : $f = 836.4$ MHz; $\sigma = 0.972$ mho/m; $\epsilon_r = 56.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.1 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch189/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.262 mW/g

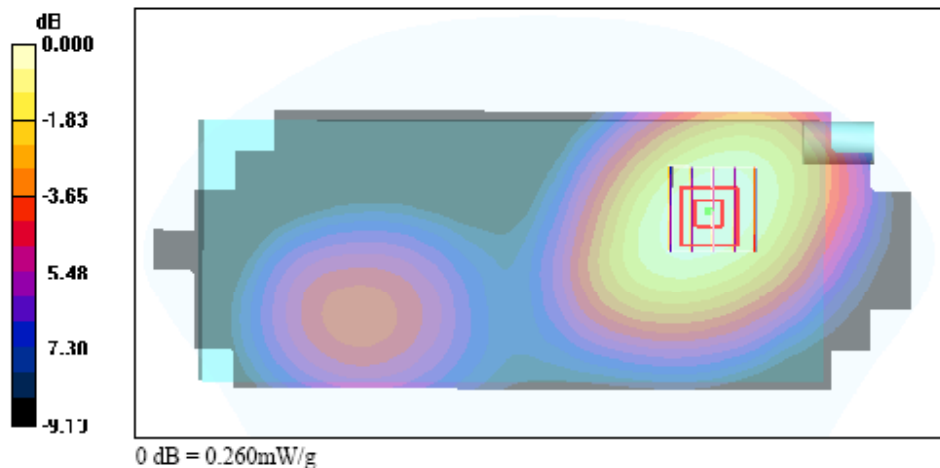
Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.69 V/m; Power Drift = -0.156 dB

Peak SAR (extrapolated) = 0.318 W/kg

SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.179 mW/g

Maximum value of SAR (measured) = 0.260 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 11:02:10 AM

Body_PCS Ch661_Keypad Down with 1.5cm Gap_20070205_GPRS8_PC528

DUT: 710211

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: MSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.4 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch661/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.079 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.08 V/m; Power Drift = -0.062 dB

Peak SAR (extrapolated) = 0.118 W/kg

SAR(1 g) = 0.072 mW/g; SAR(10 g) = 0.043 mW/g

Maximum value of SAR (measured) = 0.078 mW/g

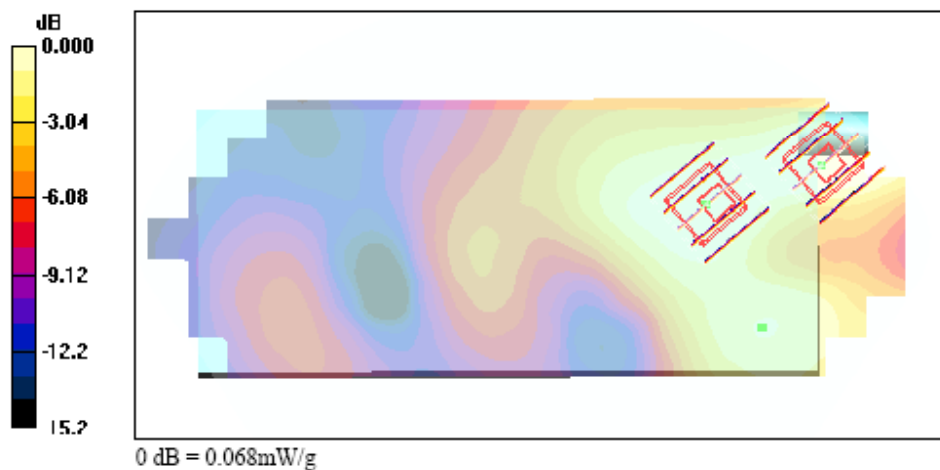
Ch661/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.08 V/m; Power Drift = -0.062 dB

Peak SAR (extrapolated) = 0.094 W/kg

SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.041 mW/g

Maximum value of SAR (measured) = 0.068 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/4/2007 7:20:15 PM

Body_GSM850 Ch251_Keypad Up with 1.5cm Gap_20070204_GPRS10_BT On_PC528

DUT: 710211

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:4

Medium: MSL_850 Medium parameters used: $f = 849$ MHz; $\sigma = 0.984$ mho/m; $\epsilon_r = 56.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch251/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.435 mW/g

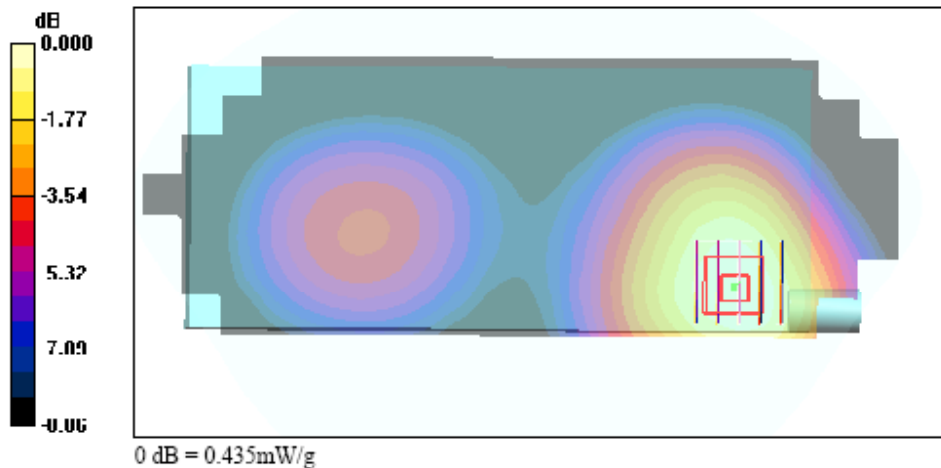
Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.72 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 0.519 W/kg

SAR(1 g) = 0.409 mW/g; SAR(10 g) = 0.299 mW/g

Maximum value of SAR (measured) = 0.435 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 6:59:36 PM

Body_PCS Ch512_Keypad Up with 1.5cm Gap_20070205_GPRS10_Bluetooth On_PC528

DUT: 710211

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: MSL_1900 Medium parameters used : $f = 1850.2$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.6 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch512/Area Scan (71x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.161 mW/g

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

Reference Value = 8.38 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 0.218 W/kg

SAR(1 g) = 0.151 mW/g; SAR(10 g) = 0.100 mW/g

Maximum value of SAR (measured) = 0.162 mW/g

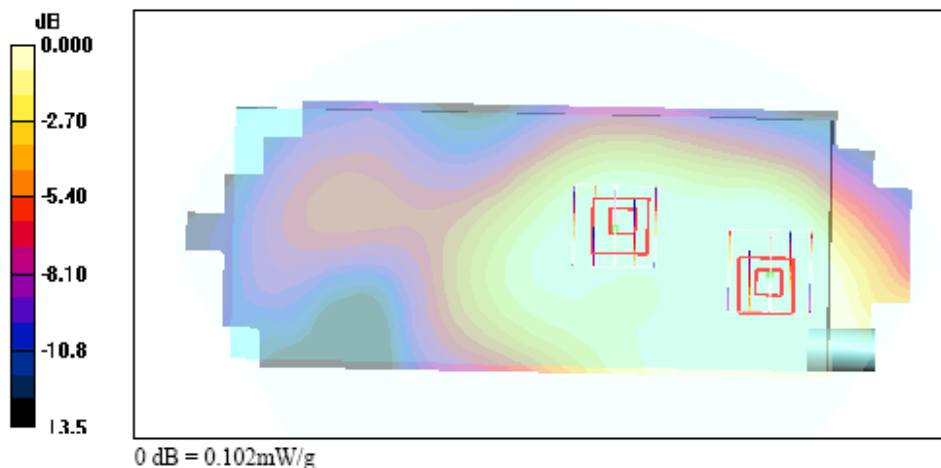
Ch512/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.38 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 0.136 W/kg

SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.064 mW/g

Maximum value of SAR (measured) = 0.102 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/4/2007 8:00:53 PM

Body_GSM850 Ch251_Keypad Up with 1.5cm Gap_20070204_GPRS10_PC529

DUT: 710211

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:4

Medium: MSL_850 Medium parameters used: $f = 849$ MHz; $\sigma = 0.984$ mho/m; $\epsilon_r = 56.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch251/Area Scan (71x171x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.519 mW/g

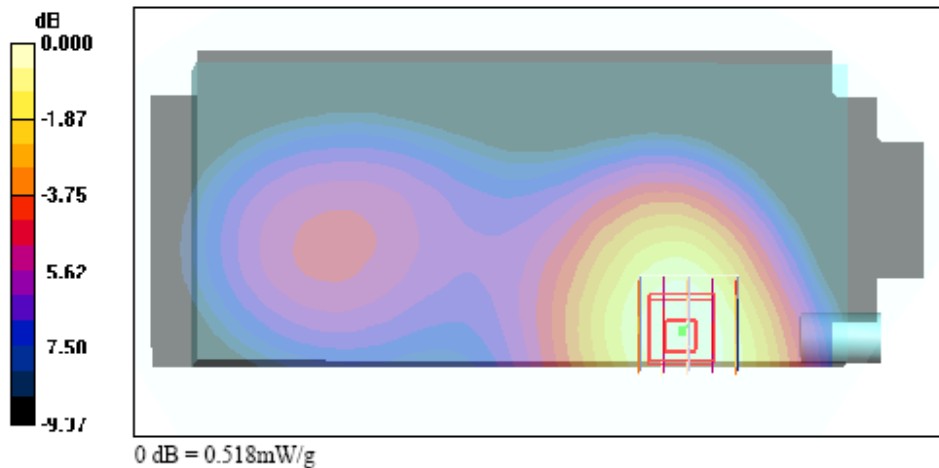
Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.9 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.647 W/kg

SAR(1 g) = 0.489 mW/g; SAR(10 g) = 0.348 mW/g

Maximum value of SAR (measured) = 0.518 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 7:56:43 PM

Body_PCS Ch512_Keypad Up with 1.5cm Gap_GPRS10_PC529

DUT: 710211

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: MSL_1900 Medium parameters used : $f = 1850.2$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.5 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch512/Area Scan (71x171x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.182 mW/g

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

Reference Value = 8.93 V/m; Power Drift = -0.119 dB

Peak SAR (extrapolated) = 0.256 W/kg

SAR(1 g) = 0.171 mW/g; SAR(10 g) = 0.114 mW/g

Maximum value of SAR (measured) = 0.183 mW/g

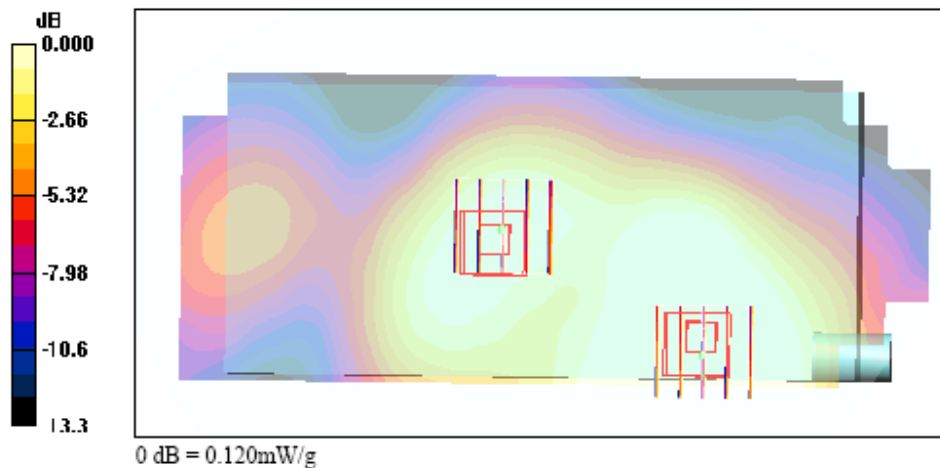
Ch512/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.93 V/m; Power Drift = -0.119 dB

Peak SAR (extrapolated) = 0.160 W/kg

SAR(1 g) = 0.113 mW/g; SAR(10 g) = 0.076 mW/g

Maximum value of SAR (measured) = 0.120 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/4/2007 11:20:15 AM

Left Tilted_GSM850 Ch251_20070204_Bluetooth On_PC529_2D

DUT: 710211

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium: HSL_850 Medium parameters used: $f = 849$ MHz; $\sigma = 0.912$ mho/m; $\epsilon_r = 42.9$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.4 °C; Liquid Temperature : 20.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.6, 6.6, 6.6); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch251/Area Scan (71x161x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.25 mW/g

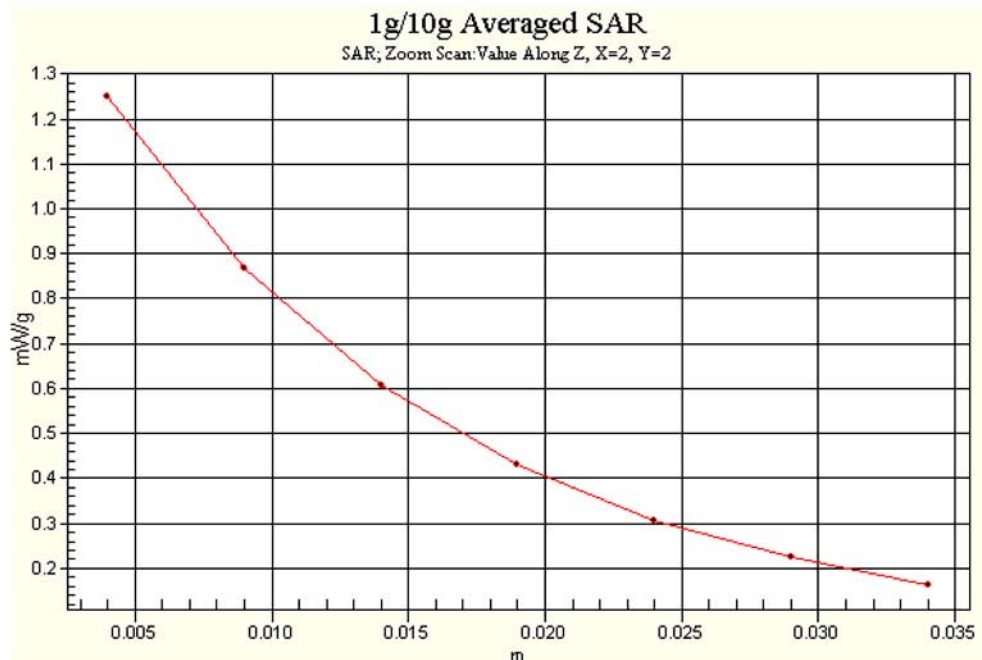
Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 28.3 V/m; Power Drift = -0.184 dB

Peak SAR (extrapolated) = 1.63 W/kg

SAR(1 g) = 1.15 mW/g; SAR(10 g) = 0.775 mW/g

Maximum value of SAR (measured) = 1.25 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/4/2007 2:42:50 PM

Left Tilted_PCS Ch512_20070204_Bluetooth On_PC529_2D

DUT: 710211

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

Medium: HSL_1900 Medium parameters used : $f = 1850.2$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 41.6$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 20.3 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.3, 5.3, 5.3); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch512/Area Scan (71x161x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.696 mW/g

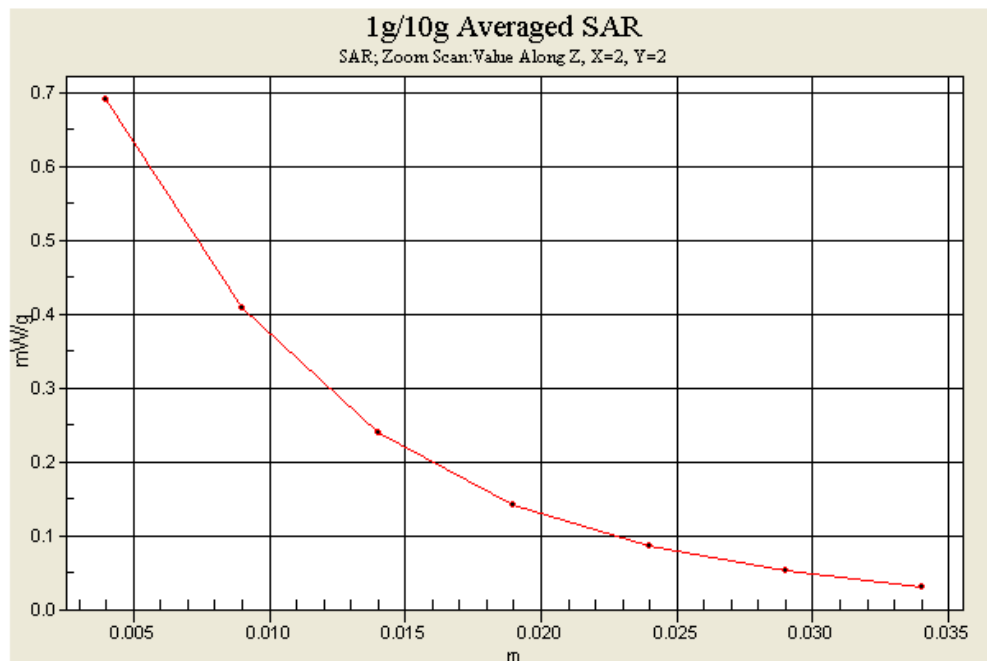
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.9 V/m; Power Drift = -0.149 dB

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.632 mW/g; SAR(10 g) = 0.368 mW/g

Maximum value of SAR (measured) = 0.690 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/4/2007 8:00:53 PM

Body_GSM850 Ch251_Keypad Up with 1.5cm Gap_20070204_GPRS10_PC529_2D

DUT: 710211

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:4

Medium: MSL_850 Medium parameters used: $f = 849$ MHz; $\sigma = 0.984$ mho/m; $\epsilon_r = 56.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch251/Area Scan (71x171x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.519 mW/g

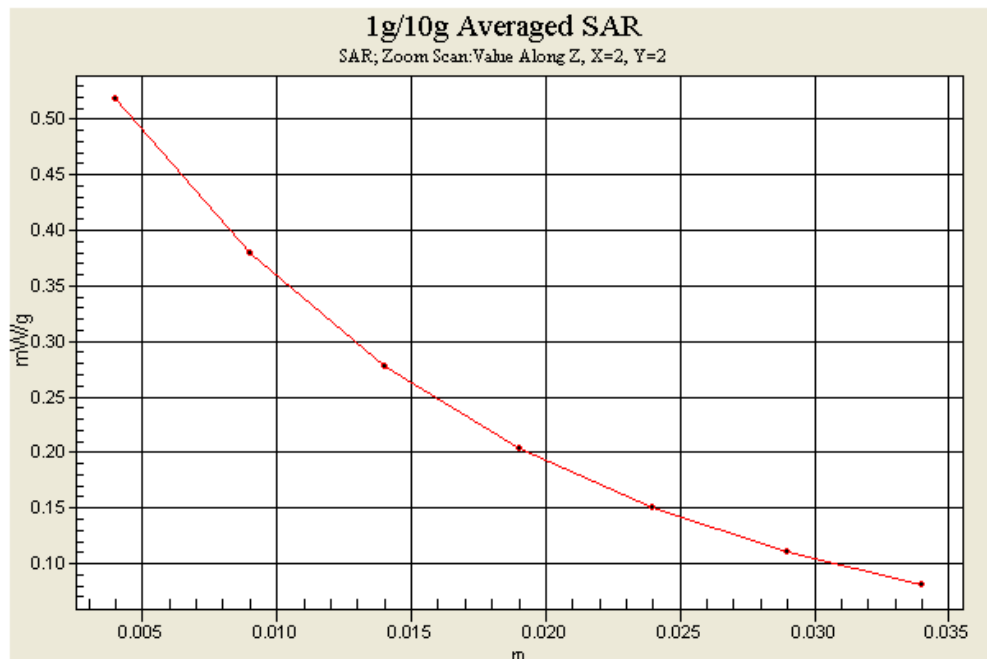
Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.9 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.647 W/kg

SAR(1 g) = 0.489 mW/g; SAR(10 g) = 0.348 mW/g

Maximum value of SAR (measured) = 0.518 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 2/5/2007 7:56:43 PM

Body_PCS Ch512_Keypad Up with 1.5cm Gap_GPRS10_PC529_2D

DUT: 710211

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: MSL_1900 Medium parameters used : f = 1850.2 MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.5 °C; Liquid Temperature : 18.9 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Ch512/Area Scan (71x171x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.182 mW/g

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

Reference Value = 8.93 V/m; Power Drift = -0.119 dB

Peak SAR (extrapolated) = 0.256 W/kg

SAR(1 g) = 0.171 mW/g; SAR(10 g) = 0.114 mW/g

Maximum value of SAR (measured) = 0.183 mW/g

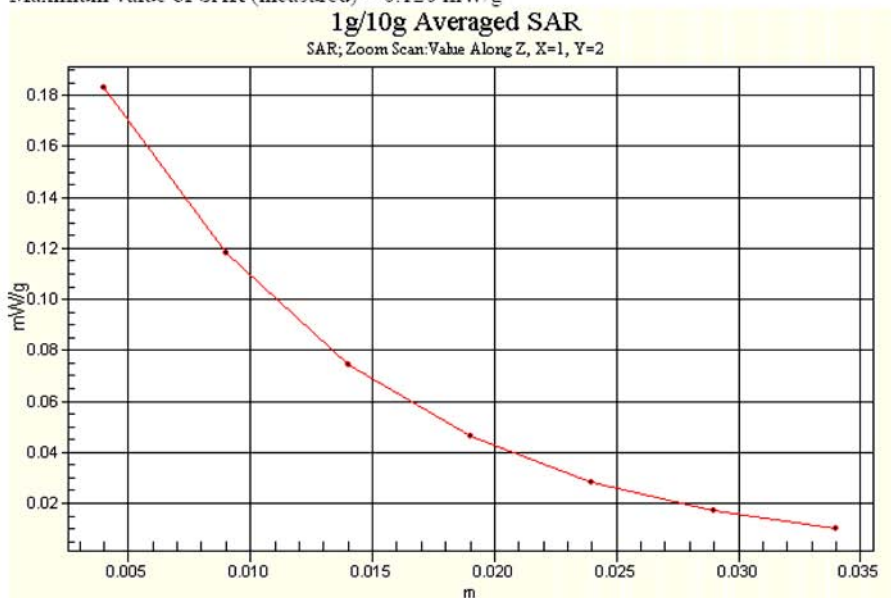
Ch512/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.93 V/m; Power Drift = -0.119 dB

Peak SAR (extrapolated) = 0.160 W/kg

SAR(1 g) = 0.113 mW/g; SAR(10 g) = 0.076 mW/g

Maximum value of SAR (measured) = 0.120 mW/g





Appendix C – Calibration Data

Calibration Laboratory of Schmid & Partner Engineering AG



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S Swiss Calibration Service

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Accreditation No.: SCS 108

Client Sporton (Auden)

Certificate No: D835V2-499_Mar06

CALIBRATION CERTIFICATE

Object D835V2 - SN: 499
Calibration procedure(s) QA CAL-05.v6
Calibration procedure for dipole validation kits
Calibration date March 15, 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&E critical for calibration)

Table with 4 columns: Primary Standards, ID #, Cal Date (Calibrated by, Certificate No.), Scheduled Calibration. Lists equipment like Power meter EPM-442A, Power sensor HP 8481A, etc.

Table with 4 columns: Secondary Standards, ID #, Check Date (in house), Scheduled Check. Lists equipment like Power sensor HP 8481A, RF generator Agilent E4421B, etc.

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

Issued: March 16, 2006

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



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

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 V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.1 ± 6 %	0.94mho/m ± 6 %
Head TSL temperature during test	(22.2 ± 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	2.35 mW / g
SAR normalized	normalized to 1W	9.40 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	9.24 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 mW / g
SAR normalized	normalized to 1W	6.12 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	6.07 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	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	56.8 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature during test	(21.4 ± 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	2.45 mW / g
SAR normalized	normalized to 1W	9.80 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	9.91 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.62 mW / g
SAR normalized	normalized to 1W	6.48 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	6.55 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	52.1 Ω - 2.9 j Ω
Return Loss	- 29.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.9 Ω - 5.1 j Ω
Return Loss	- 24.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.391ns
----------------------------------	---------

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 10, 2003

DASY4 Validation Report for Head TSL

Date/Time: 15.03.2006 12:51:44

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:499

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

Medium: HSL U10 BB;

Medium parameters used: $f = 835$ MHz; $\sigma = 0.942$ mho/m; $\epsilon_r = 42.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

Pin = 250 mW; d = 10 mm/Area Scan (71x81x1); Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 2.54 mW/g

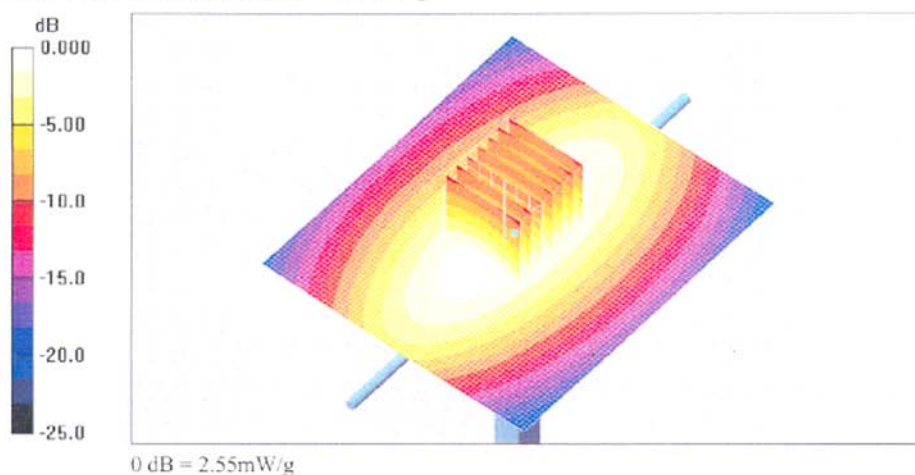
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0; Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.7 V/m; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 3.53 W/kg

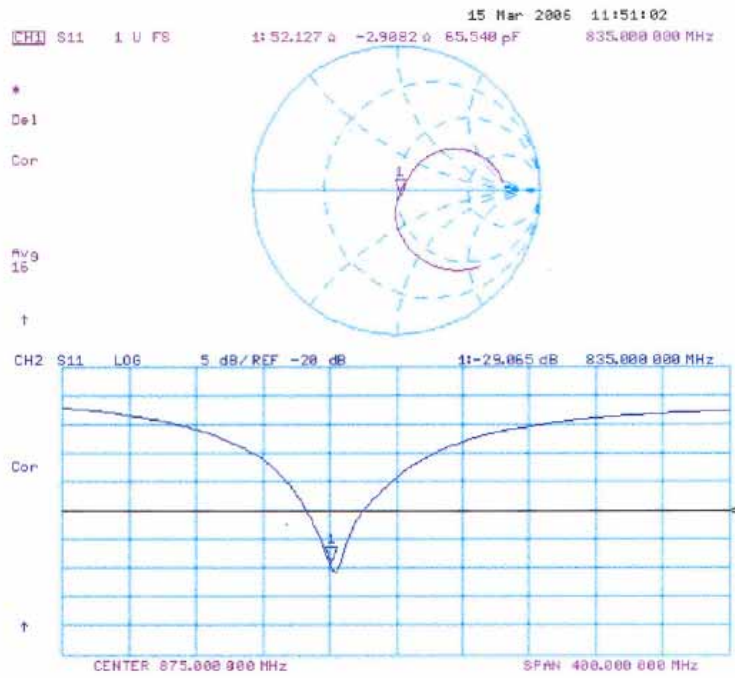
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.53 mW/g

Maximum value of SAR (measured) = 2.55 mW/g





Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 14.03.2006 12:37:15

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:499

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

Medium: MSL U10;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.972 \text{ mho/m}$; $\epsilon_r = 56.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.84, 5.84, 5.84); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

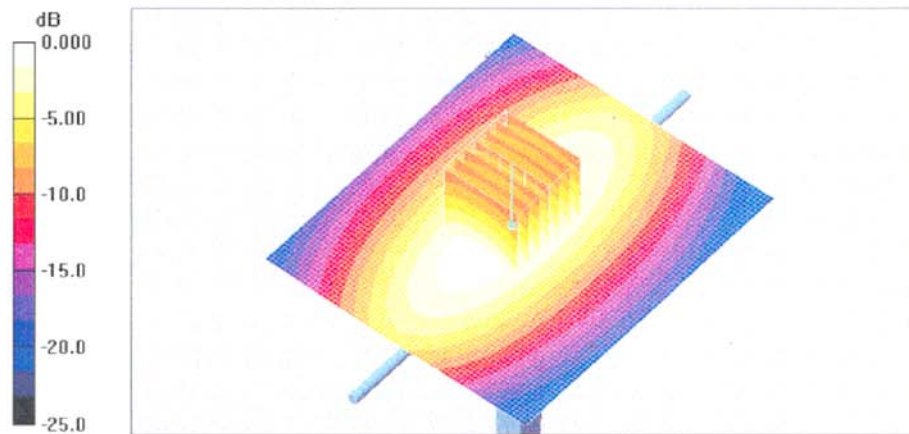
Pin = 250 mW; d = 10 mm/Area Scan (71x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.63 mW/g**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.3 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 3.51 W/kg

SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.62 mW/g

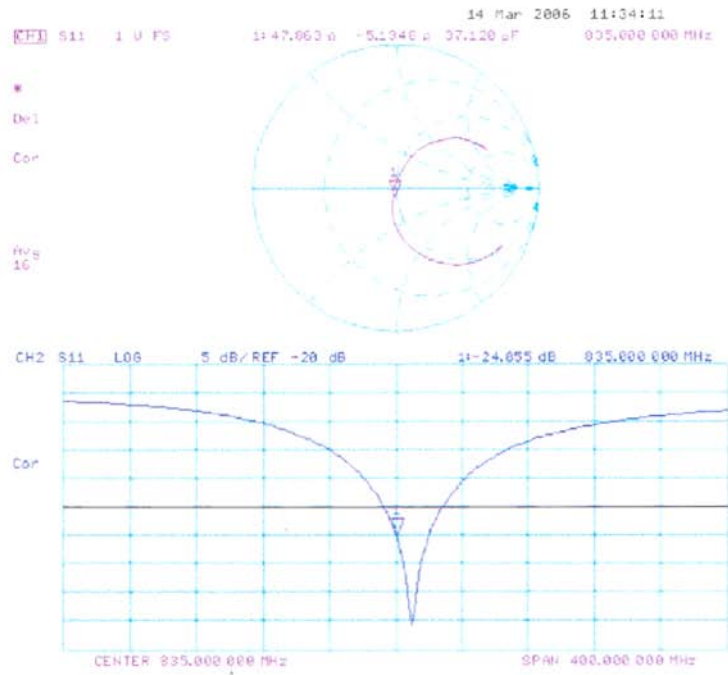
Maximum value of SAR (measured) = 2.65 mW/g



0 dB = 2.65mW/g



Impedance Measurement Plot Body TSL





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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 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)...



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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

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
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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: $f = 1900 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.4$; $\rho = 1000 \text{ kg/m}^3$

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

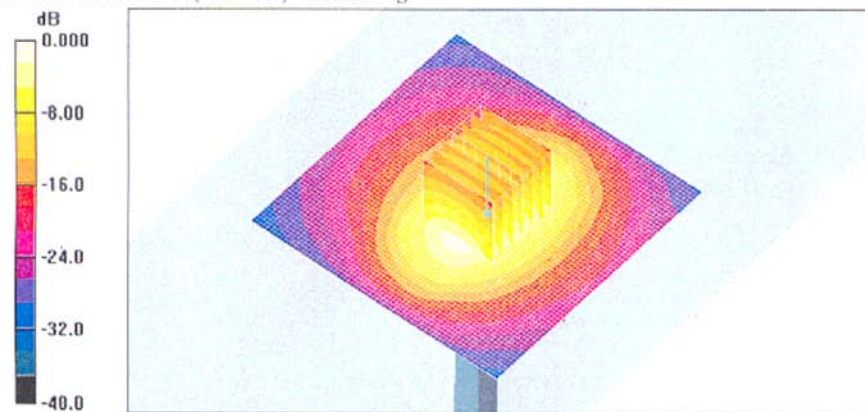
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

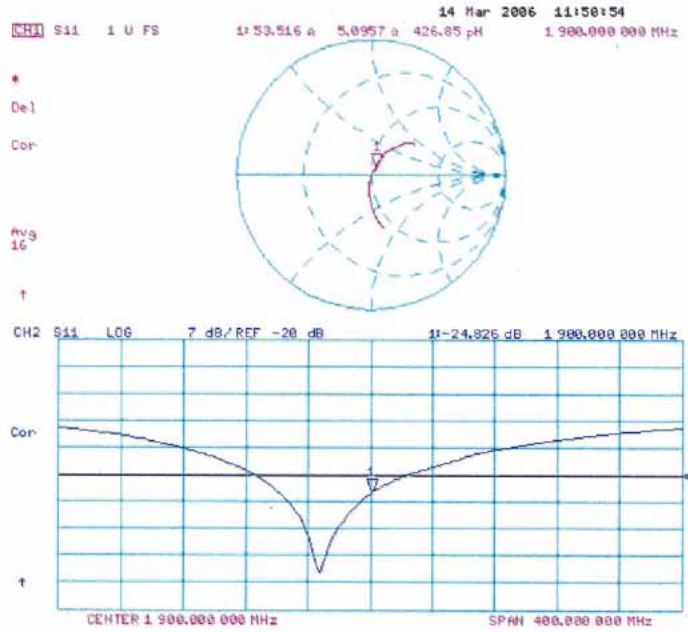
Maximum value of SAR (measured) = 11.1 mW/g



0 dB = 11.1mW/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

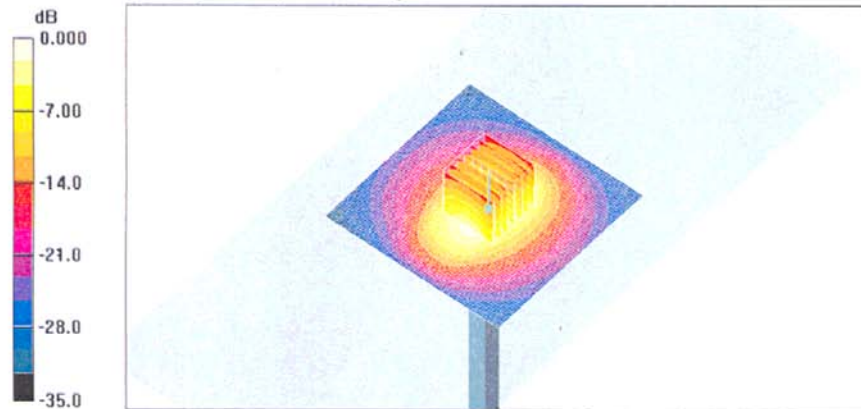
Measurement Standard: DASY4 (High Precision Assessment)

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

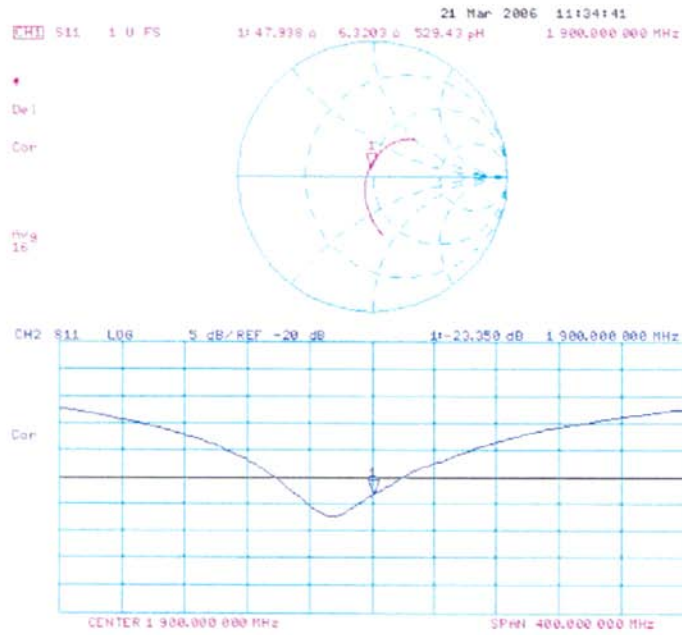
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 89.3 V/m; Power Drift = 0.045 dB
 Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.4 mW/g
 Maximum value of SAR (measured) = 11.6 mW/g



0 dB = 11.6mW/g



Impedance Measurement Plot for Body TSL





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Accreditation No.: SCS 108

Client Sporton (Auden)

Certificate No: ET3-1788_Sep06

CALIBRATION CERTIFICATE

Object: ET3DV6 - SN:1788
Calibration procedure(s): QA CAL-01.v5
Calibration procedure for dosimetric E-field probes
Calibration date: September 19, 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. Lists various power meters, sensors, and attenuators with their respective IDs and calibration dates.

Table with 4 columns: Secondary Standards, ID #, Check Date (in house), Scheduled Check. Lists RF generator and Network Analyzer with their IDs and check dates.

Calibrated by: Katja Pokovic, Technical Manager
Approved by: Niels Kuster, Quality Manager
Includes handwritten signatures for both roles.

Issued: September 19, 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
NORM_{x,y,z} sensitivity in free space
ConF sensitivity in TSL / NORM_{x,y,z}
DCP diode compression point
Polarization ϕ ϕ rotation around probe axis
Polarization θ θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ is normal to probe axis

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below ConF).
- NORM(f)_{x,y,z} = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConF.
- DCP_{x,y,z}: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConF whereby the uncertainty corresponds to that given for ConF. A frequency dependent ConF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.



ET3DV6 SN:1788

September 19, 2006

Probe ET3DV6

SN:1788

Manufactured:	May 28, 2003
Last calibrated:	September 30, 2004
Recalibrated:	September 19, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)



ET3DV6 SN:1788

September 19, 2006

DASY - Parameters of Probe: ET3DV6 SN:1788

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.73 ± 10.1%	$\mu V/(V/m)^2$	DCP X	95 mV
NormY	1.67 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	101 mV
NormZ	1.70 ± 10.1%	$\mu V/(V/m)^2$	DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL	900 MHz	Typical SAR gradient: 5 % per mm		
	Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
	SAR _{E₀} [%] Without Correction Algorithm		7.9	4.3
	SAR _{E₀} [%] With Correction Algorithm		0.1	0.3

TSL	1810 MHz	Typical SAR gradient: 10 % per mm		
	Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
	SAR _{E₀} [%] Without Correction Algorithm		11.8	7.0
	SAR _{E₀} [%] With Correction Algorithm		0.2	0.4

Sensor Offset

Probe Tip to Sensor Center 2.7 mm

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

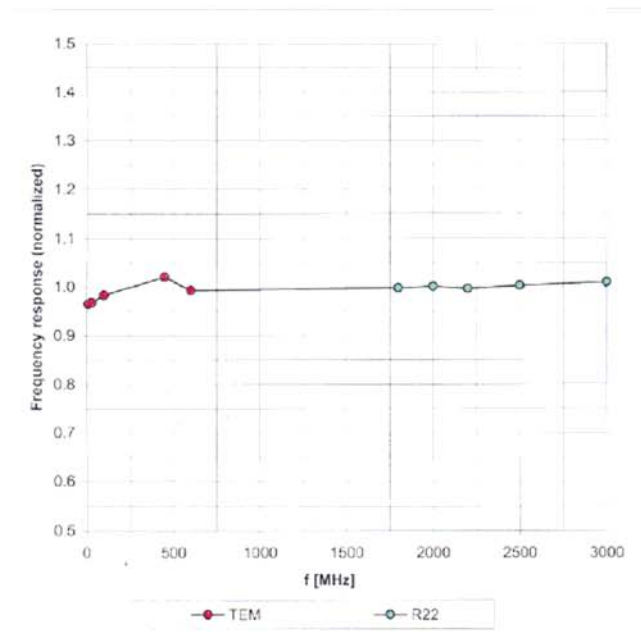


ET3DV6 SN:1788

September 19, 2006

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



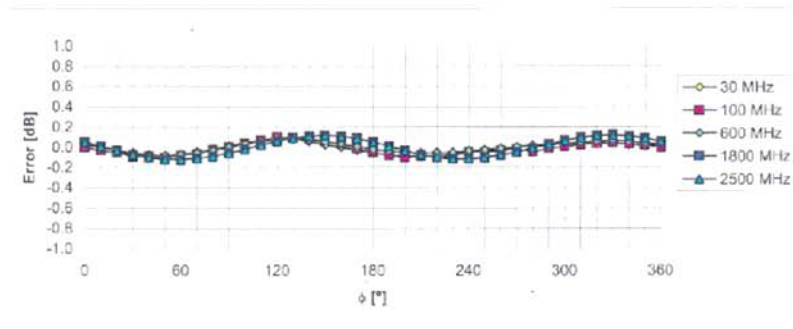
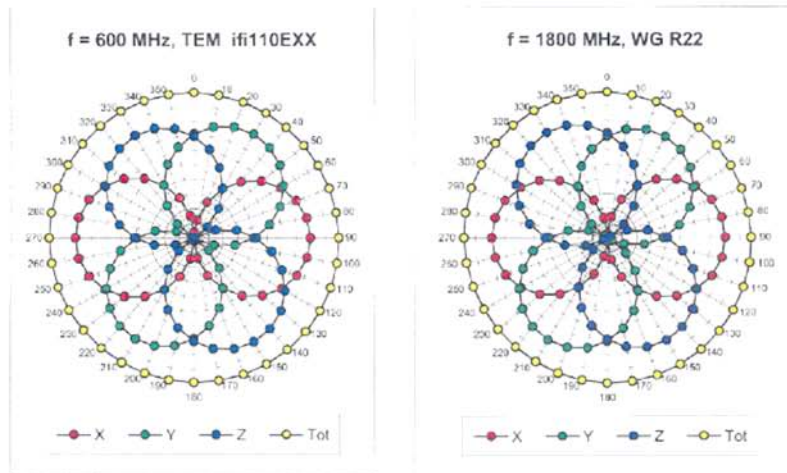
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)



ET3DV6 SN:1788

September 19, 2006

Receiving Pattern (ϕ), $\vartheta = 0^\circ$



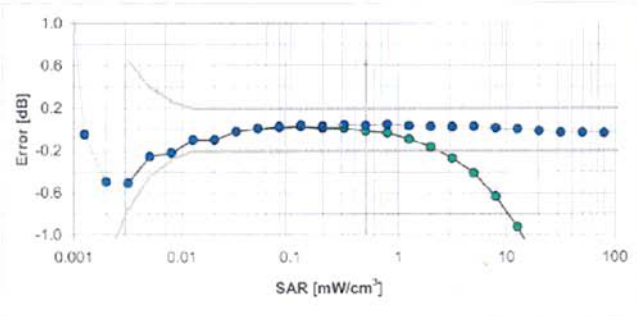
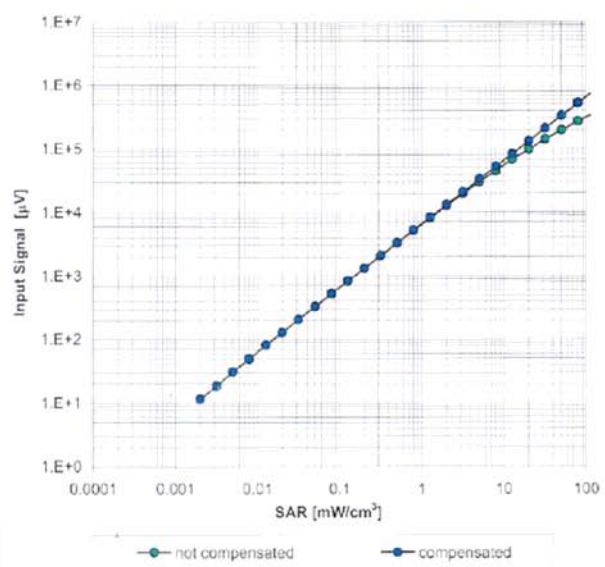
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)



ET3DV6 SN:1788

September 19, 2006

Dynamic Range $f(SAR_{head})$ (Waveguide R22, $f = 1800$ MHz)



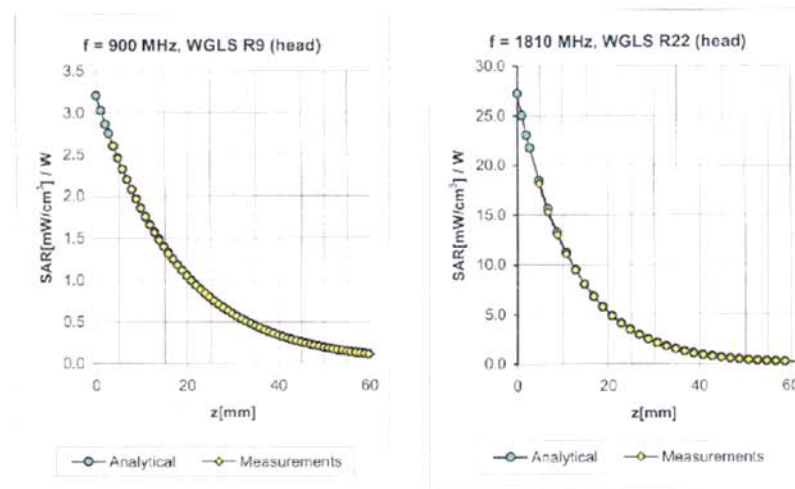
Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)



ET3DV6 SN:1788

September 19, 2006

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.49	1.94	6.60 ± 11.0% (k=2)	
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.48	2.74	5.30 ± 11.0% (k=2)	
2000	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.53	2.75	5.00 ± 11.0% (k=2)	
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.68	1.96	4.66 ± 11.8% (k=2)	
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.45	2.12	6.33 ± 11.0% (k=2)	
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.59	2.89	4.67 ± 11.0% (k=2)	
2000	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.56	2.79	4.50 ± 11.0% (k=2)	
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.60	1.70	4.11 ± 11.8% (k=2)	

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

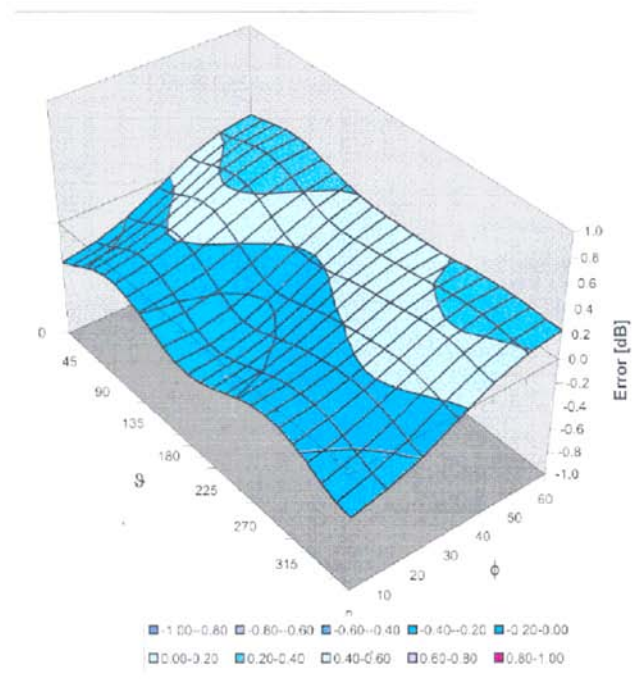


ET3DV6 SN:1788

September 19, 2006

Deviation from Isotropy in HSL

Error (ϕ , θ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)



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Client Sporton (Auden)

Certificate No: DAE3-577_Nov06

CALIBRATION CERTIFICATE			
Object	DAE3 - SD 000 D03 AA - SN: 577		
Calibration procedure(s)	QA CAL-06.v12 Calibration procedure for the data acquisition electronics (DAE)		
Calibration date:	November 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)			
Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Fluke Process Calibrator Type 702	SN: 6295803	13-Oct-06 (Elcal AG, No: 5492)	Oct-07
Keithley Multimeter Type 2001	SN: 0810278	03-Oct-06 (Elcal AG, No: 5478)	Oct-07
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Calibrator Box V1.1	SE UMS 006 AB 1002	15-Jun-06 (SPEAG, in house check)	In house check Jun-07
Calibrated by:	Name Eric Hairfeld	Function Technician	Signature
Approved by:	Fin Bornholt	R&D Director	
			Issued: November 21, 2006
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Accreditation No.: SCS 108

Glossary

DAE data acquisition electronics
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters contain technical information as a result from the performance test and require no uncertainty.
- *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
- *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
- *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
- *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
- *Input Offset Measurement:* Output voltage and statistical results over a large number of zero voltage measurements.
- *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
- *Input resistance:* DAE input resistance at the connector, during internal auto-zeroing and during measurement.
- *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
- *Power consumption:* Typical value for information. Supply currents in various operating modes.



DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1µV , full range = -100..+300 mV

Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.355 ± 0.1% (k=2)	403.806 ± 0.1% (k=2)	404.276 ± 0.1% (k=2)
Low Range	3.92854 ± 0.7% (k=2)	3.93862 ± 0.7% (k=2)	3.93591 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	268 ° ± 1 °
---	-------------



Appendix

1. DC Voltage Linearity

High Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	200000	199999.5	0.00
Channel X + Input	20000	20005.87	0.03
Channel X - Input	20000	-19998.71	-0.01
Channel Y + Input	200000	200000	0.00
Channel Y + Input	20000	20004.22	0.02
Channel Y - Input	20000	-20003.23	0.02
Channel Z + Input	200000	200000.6	0.00
Channel Z + Input	20000	20005.24	0.03
Channel Z - Input	20000	-20001.80	0.01

Low Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	2000	1999.9	0.00
Channel X + Input	200	200.27	0.13
Channel X - Input	200	-200.73	0.36
Channel Y + Input	2000	2000.1	0.00
Channel Y + Input	200	199.22	-0.39
Channel Y - Input	200	-200.86	0.43
Channel Z + Input	2000	1999.9	0.00
Channel Z + Input	200	199.28	-0.36
Channel Z - Input	200	-200.94	0.47

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	14.24	12.49
	-200	-12.13	-12.92
Channel Y	200	-6.51	-7.06
	-200	6.05	5.81
Channel Z	200	1.09	0.86
	-200	-2.86	-2.63

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.51	0.09
Channel Y	200	0.43	-	3.37
Channel Z	200	-0.55	0.96	-



4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15970	16306
Channel Y	15851	16305
Channel Z	16208	17068

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.51	-1.55	0.47	0.50
Channel Y	-2.05	-4.32	-0.65	0.60
Channel Z	-1.63	-2.56	-0.15	0.35

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2000	199.8
Channel Y	0.2000	200.7
Channel Z	0.2000	199.8

8. Low Battery Alarm Voltage (verified during pre test)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	-0.01	-8	-9