



ESTECH Co., Ltd.

Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea

TEL: 82-2-867-3201
FAX: 82-2-867-3204

APPENDIX C : SAR Test Data



ESTECH Co., Ltd.

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TEL: 82-2-867-3201
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– GSM850

Date: 2007-09-05

Test Laboratory: ESTECH

LEFT TOUCH 190

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.893$ mho/m; $\epsilon_r = 41.5$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.000 mW/g

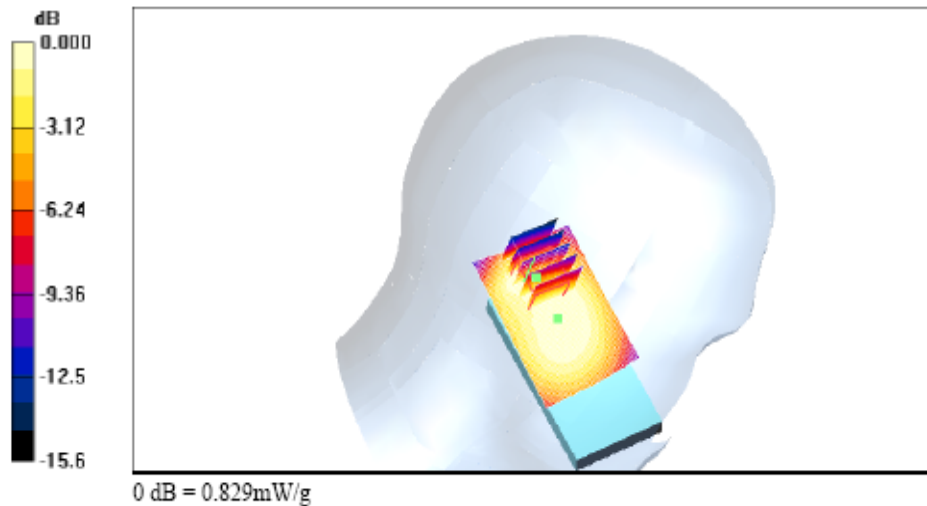
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 28.8 V/m; Power Drift = -0.101 dB

Peak SAR (extrapolated) = 1.48 W/kg

SAR(1 g) = 0.783 mW/g; SAR(10 g) = 0.494 mW/g

Maximum value of SAR (measured) = 0.829 mW/g



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RIGHT TOUCH 190

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.893$ mho/m; $\epsilon_r = 41.5$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.36 mW/g

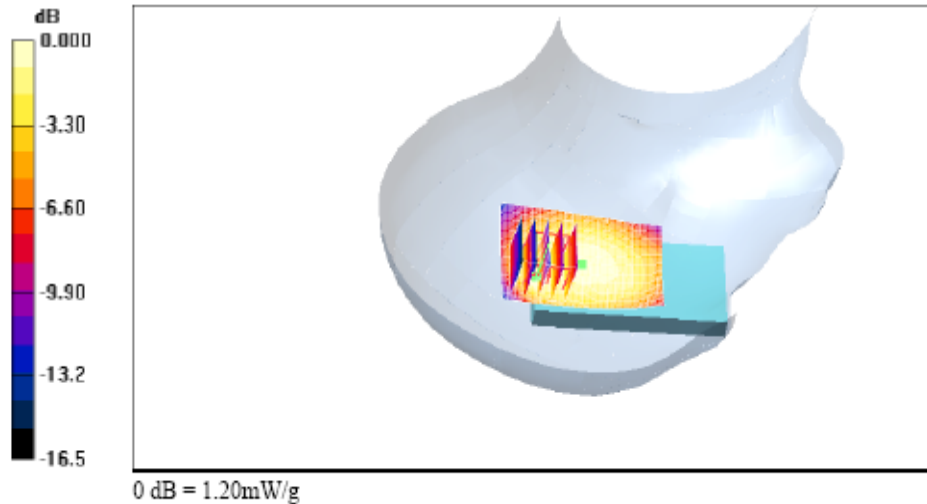
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 32.7 V/m; Power Drift = -0.088 dB

Peak SAR (extrapolated) = 2.23 W/kg

SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.611 mW/g

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



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Test Laboratory: ESTECH

LEFT TILT 190

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.893$ mho/m; $\epsilon_r = 41.5$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.50 mW/g

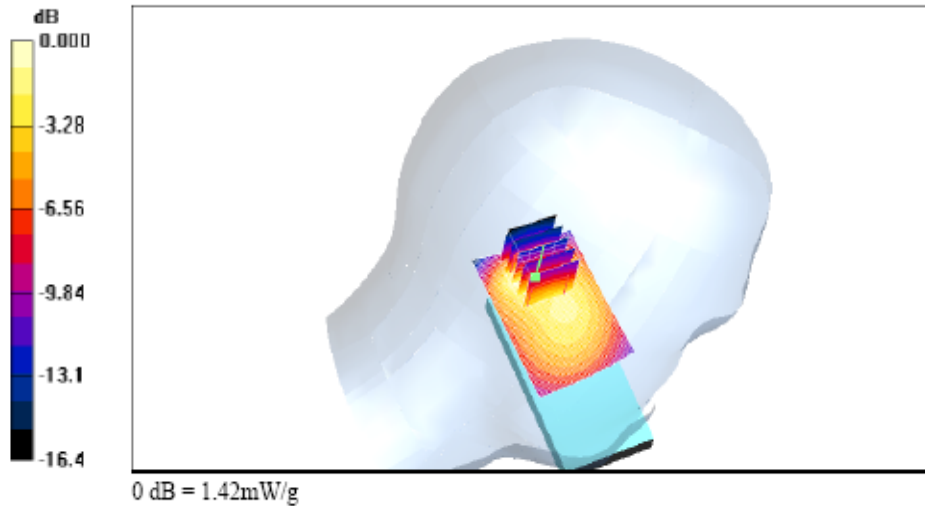
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 35.0 V/m; Power Drift = -0.148 dB

Peak SAR (extrapolated) = 2.62 W/kg

SAR(1 g) = 1.24 mW/g; SAR(10 g) = 0.663 mW/g

Maximum value of SAR (measured) = 1.42 mW/g



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RIGHT TILT 190

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.893$ mho/m; $\epsilon_r = 41.5$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.85 mW/g

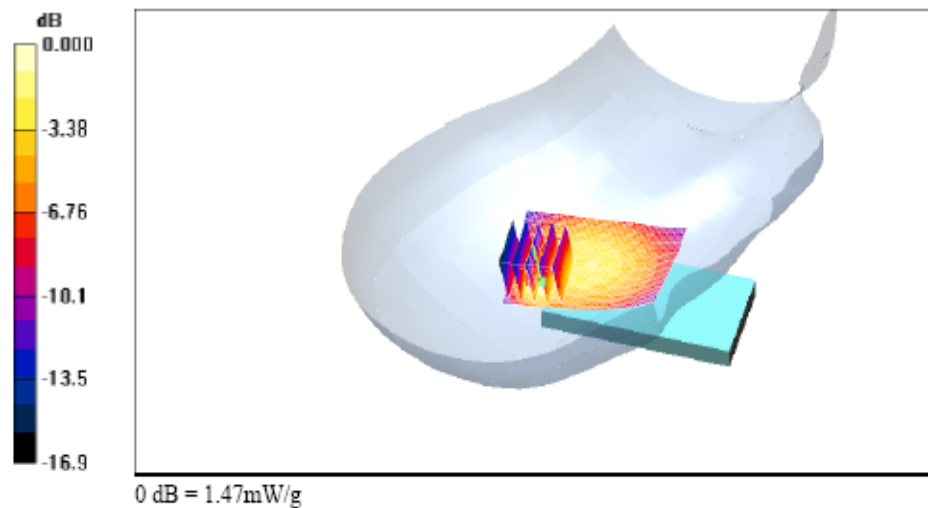
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 31.4 V/m; Power Drift = -0.077 dB

Peak SAR (extrapolated) = 3.23 W/kg

SAR(1 g) = 1.32 mW/g; SAR(10 g) = 0.669 mW/g

Maximum value of SAR (measured) = 1.47 mW/g





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RIGHT TOUCH 128

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.882$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.03 mW/g

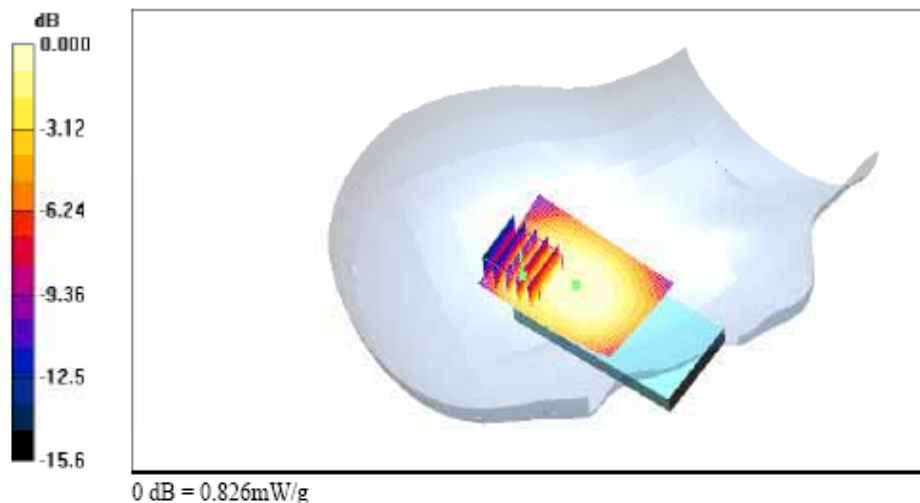
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 29.6 V/m; Power Drift = -0.148 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 0.748 mW/g; SAR(10 g) = 0.466 mW/g

Maximum value of SAR (measured) = 0.826 mW/g



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RIGHT TOUCH 251

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.904$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.52 mW/g

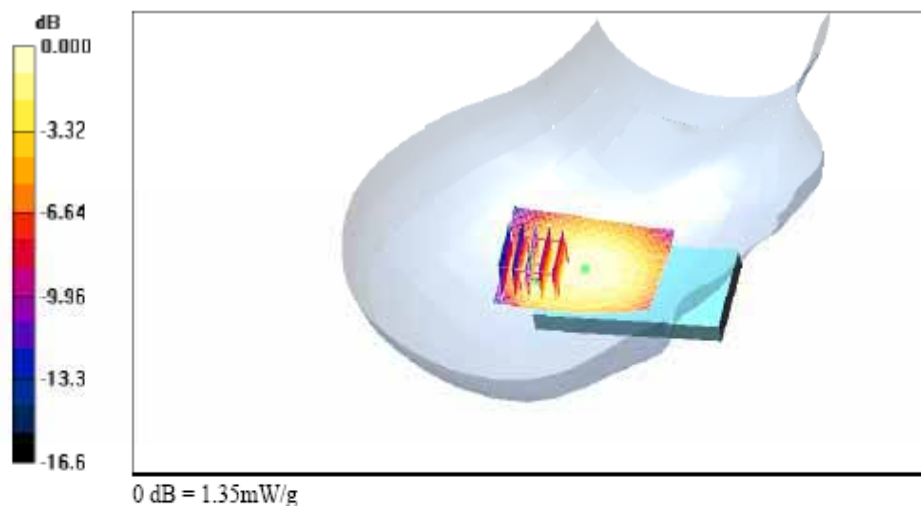
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 34.6 V/m; Power Drift = -0.112 dB

Peak SAR (extrapolated) = 2.49 W/kg

SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.698 mW/g

Maximum value of SAR (measured) = 1.35 mW/g



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LEFT TILT 251

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.904$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.55 mW/g

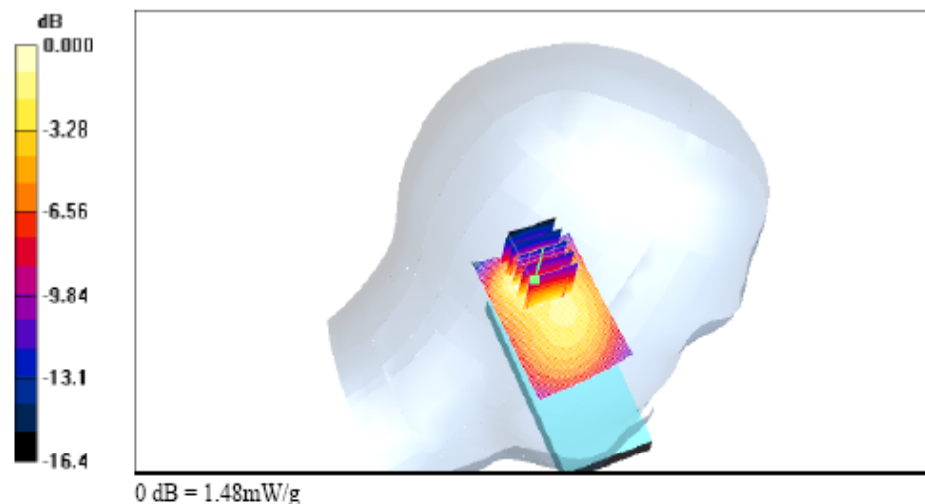
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 35.5 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 2.75 W/kg

SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.701 mW/g

Maximum value of SAR (measured) = 1.48 mW/g





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RIGHT TILT 128

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.882$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.51 mW/g

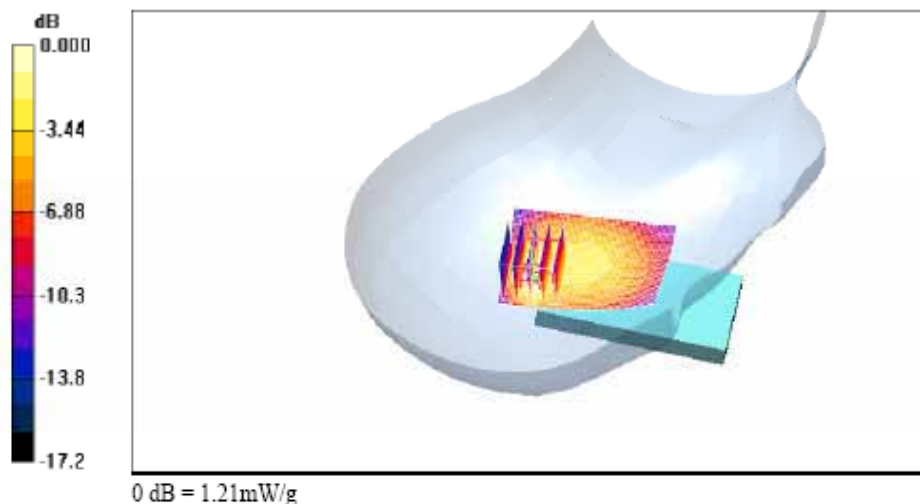
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 27.7 V/m; Power Drift = -0.096 dB

Peak SAR (extrapolated) = 2.80 W/kg

SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.527 mW/g

Maximum value of SAR (measured) = 1.21 mW/g





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RIGHT TILT 251

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.904$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.72 mW/g

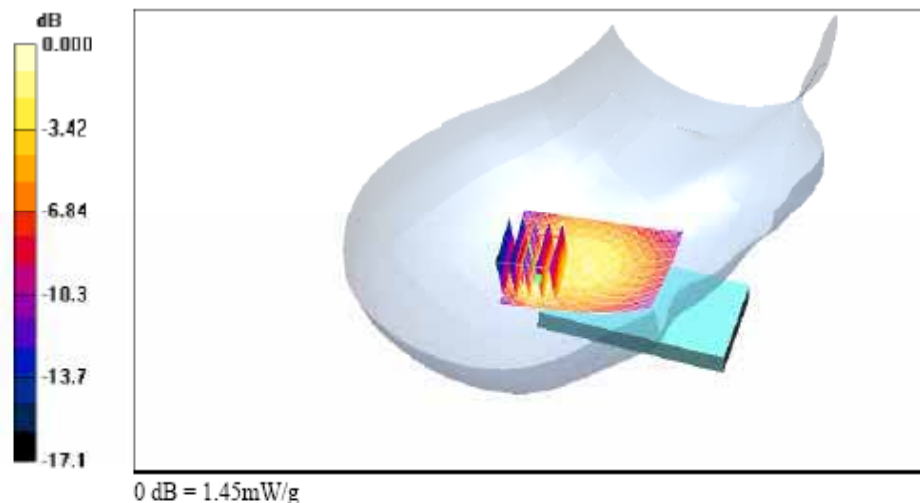
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 31.4 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 3.24 W/kg

SAR(1 g) = 1.32 mW/g; SAR(10 g) = 0.669 mW/g

Maximum value of SAR (measured) = 1.45 mW/g



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RIGHT TILT 251

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

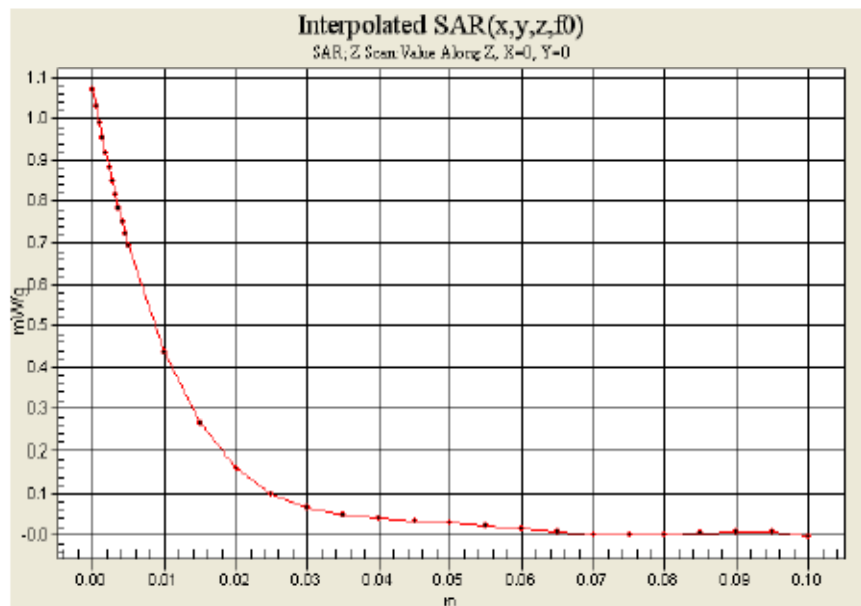
Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.904$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%



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Date: 2007-09-05

Test Laboratory: ESTECH

RIGHT TILT 251-BT

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.904$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.69 mW/g

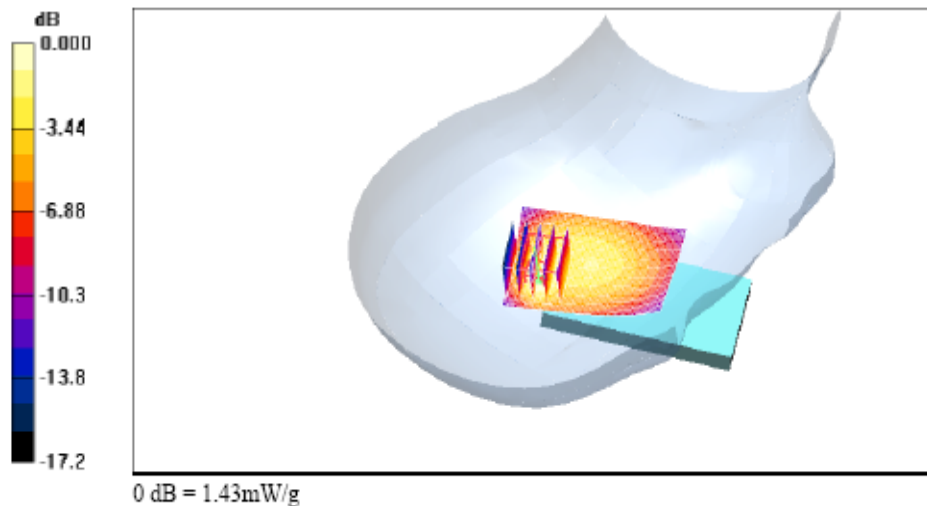
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 31.1 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 3.17 W/kg

SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.653 mW/g

Maximum value of SAR (measured) = 1.43 mW/g



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850-BODY

Date: 2007-09-05

Test Laboratory: ESTECH

BODY FRONT 190

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 52.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.384 mW/g

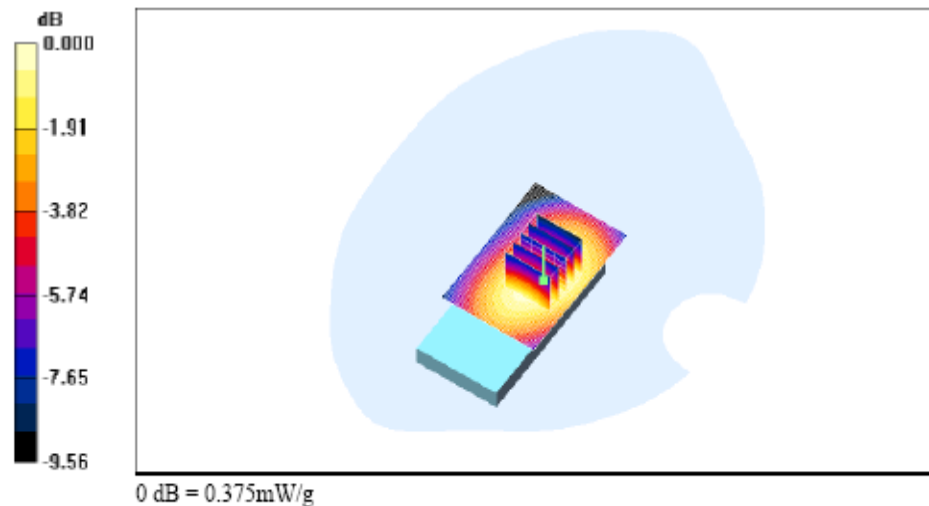
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 15.4 V/m; Power Drift = 0.022 dB

Peak SAR (extrapolated) = 0.464 W/kg

SAR(1 g) = 0.354 mW/g; SAR(10 g) = 0.252 mW/g

Maximum value of SAR (measured) = 0.375 mW/g



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Date: 2007-09-05

Test Laboratory: ESTECH

BODY REAR 190

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 52.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.455 mW/g

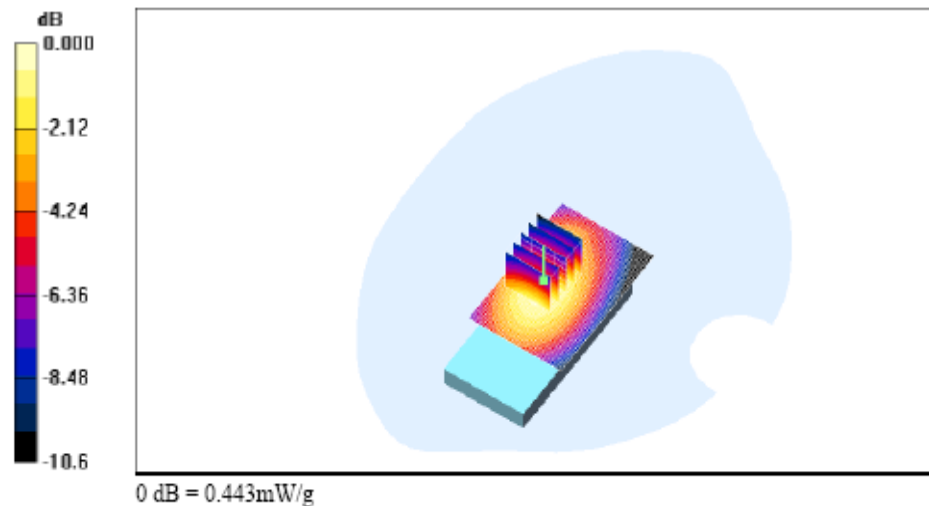
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 15.5 V/m; Power Drift = -0.136 dB

Peak SAR (extrapolated) = 0.574 W/kg

SAR(1 g) = 0.415 mW/g; SAR(10 g) = 0.287 mW/g

Maximum value of SAR (measured) = 0.443 mW/g



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BODY REAR 190-BT

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 52.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.390 mW/g

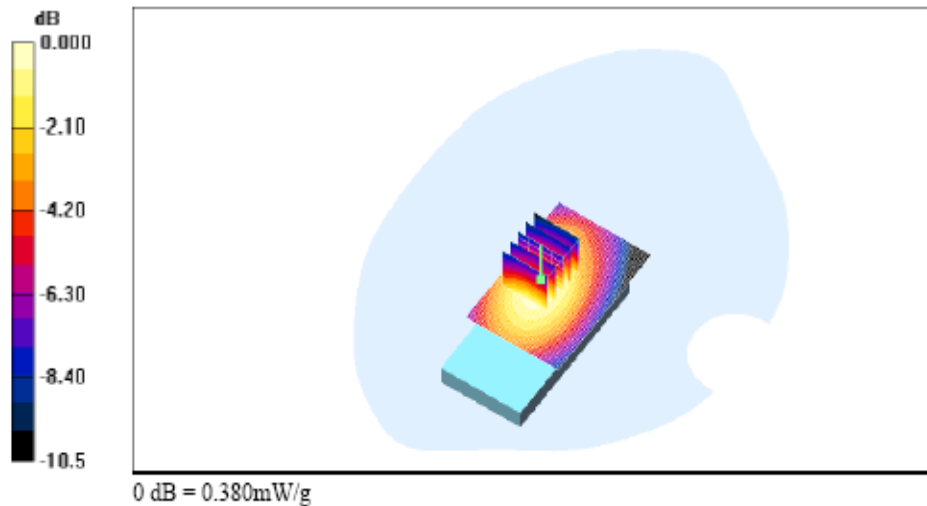
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.7 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 0.485 W/kg

SAR(1 g) = 0.356 mW/g; SAR(10 g) = 0.250 mW/g

Maximum value of SAR (measured) = 0.380 mW/g



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BODY GPRS FRONT 190

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 52.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.451 mW/g

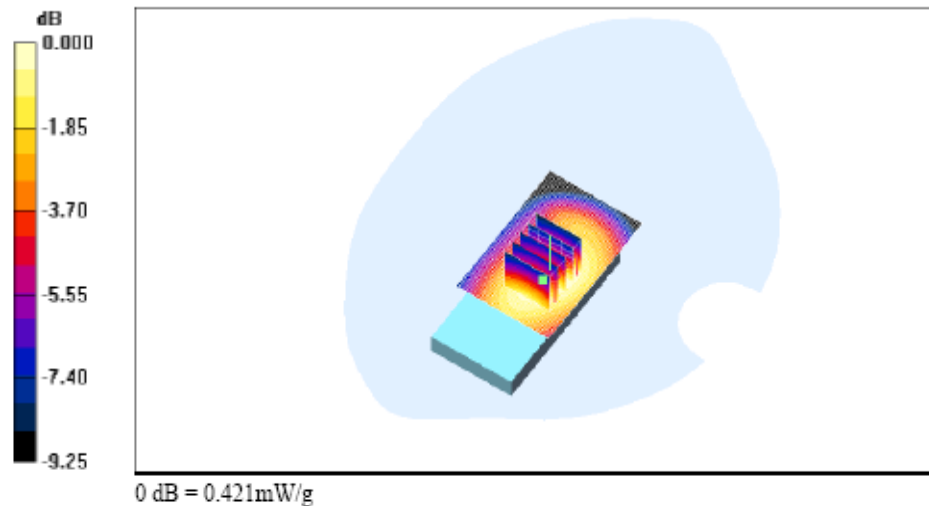
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 16.6 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.520 W/kg

SAR(1 g) = 0.402 mW/g; SAR(10 g) = 0.289 mW/g

Maximum value of SAR (measured) = 0.421 mW/g



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BODY GPRS REAR 190

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 836.8 \text{ MHz}$; $\sigma = 0.951 \text{ mho/m}$; $\epsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.521 mW/g

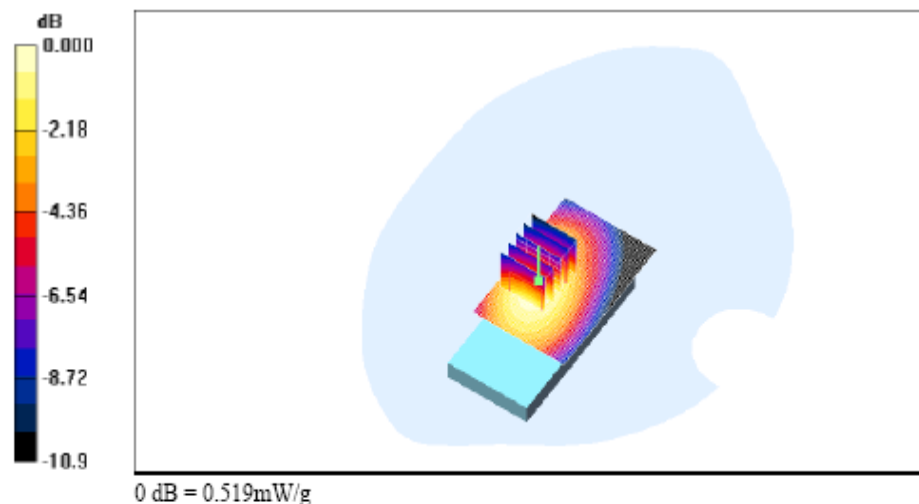
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.2 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 0.658 W/kg

SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.338 mW/g

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



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BODY GPRS REAR 190

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

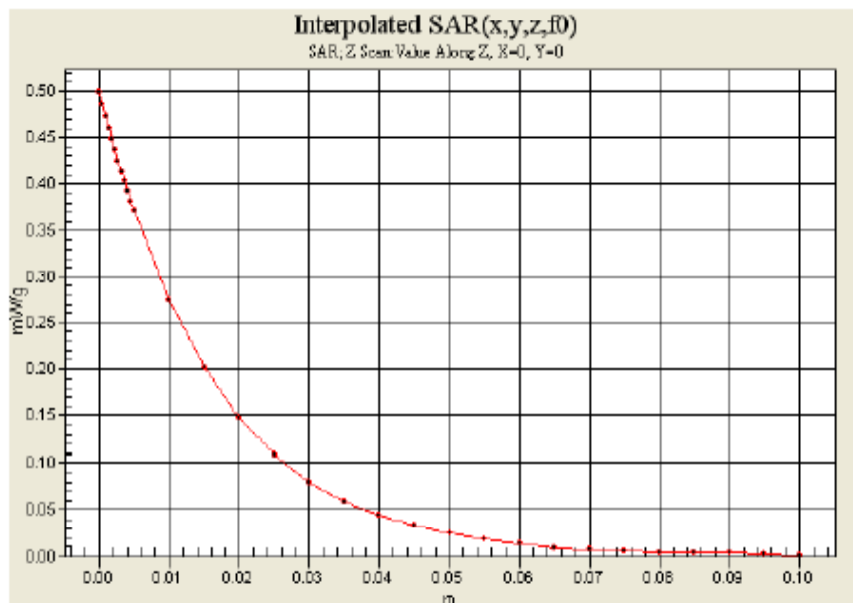
Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 52.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%



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Date: 2007-09-05

Test Laboratory: ESTECH

BODY GPRS REAR 190-BT

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 836.8$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 52.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.507 mW/g

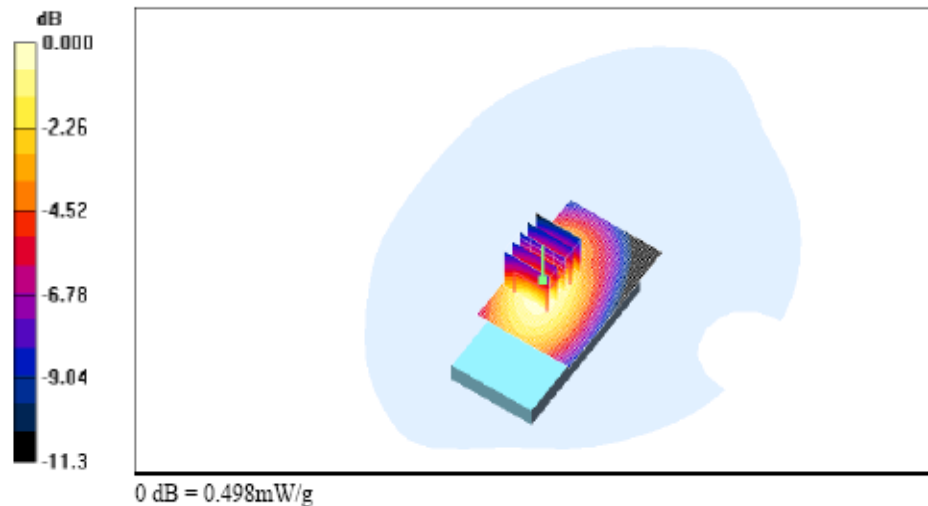
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.0 V/m; Power Drift = -0.104 dB

Peak SAR (extrapolated) = 0.642 W/kg

SAR(1 g) = 0.467 mW/g; SAR(10 g) = 0.328 mW/g

Maximum value of SAR (measured) = 0.498 mW/g





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1900-HEAD

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LEFT TOUCH CH661

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.754 mW/g

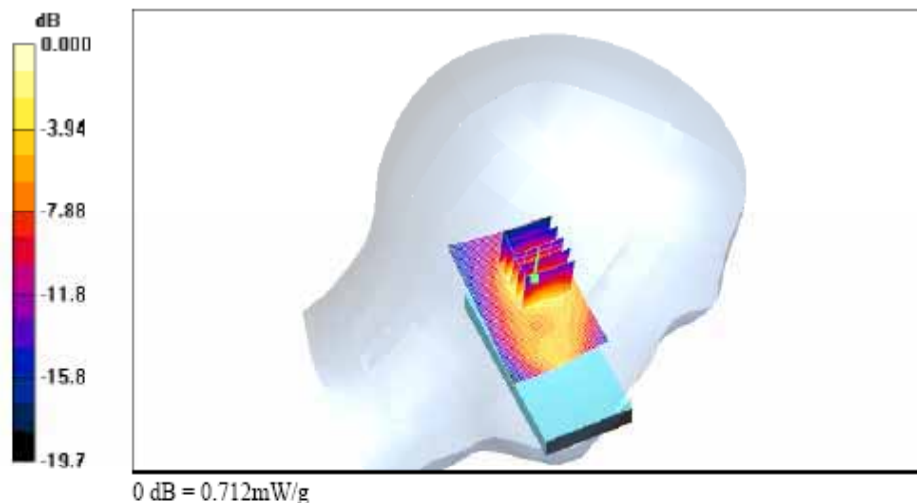
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.9 V/m; Power Drift = -0.068 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.670 mW/g; SAR(10 g) = 0.364 mW/g

Maximum value of SAR (measured) = 0.712 mW/g



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RIGHT TOUCH CH661

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.916 mW/g

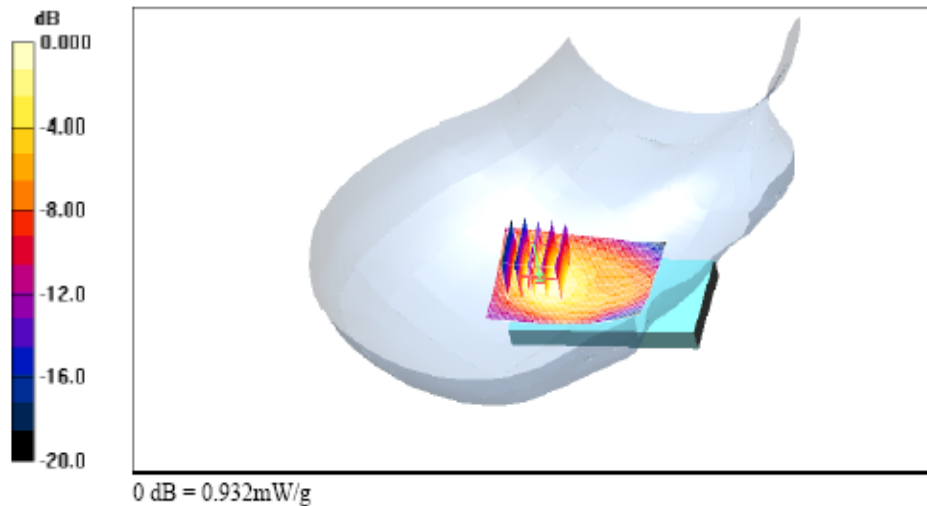
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 25.6 V/m; Power Drift = -0.080 dB

Peak SAR (extrapolated) = 1.52 W/kg

SAR(1 g) = 0.884 mW/g; SAR(10 g) = 0.487 mW/g

Maximum value of SAR (measured) = 0.932 mW/g



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LEFT TILT CH661

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.760 mW/g

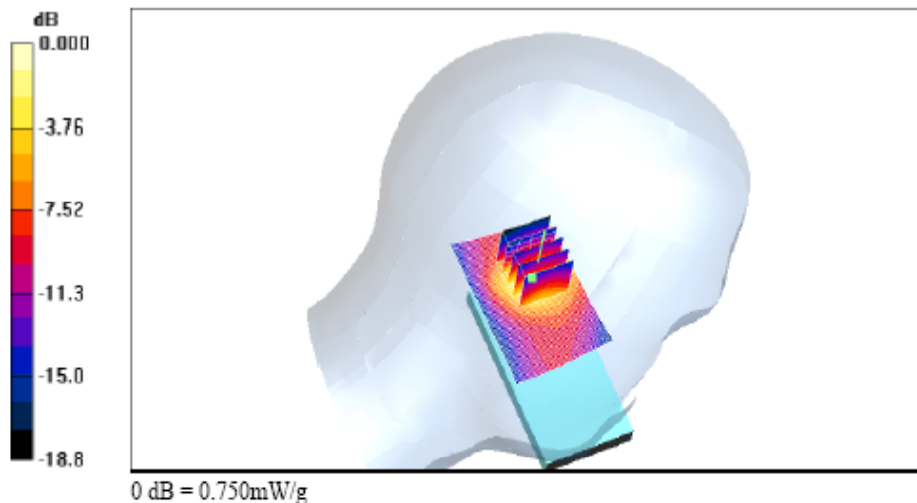
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 21.8 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.704 mW/g; SAR(10 g) = 0.370 mW/g

Maximum value of SAR (measured) = 0.750 mW/g



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RIGHT TILT CH661

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800MHz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.810 mW/g

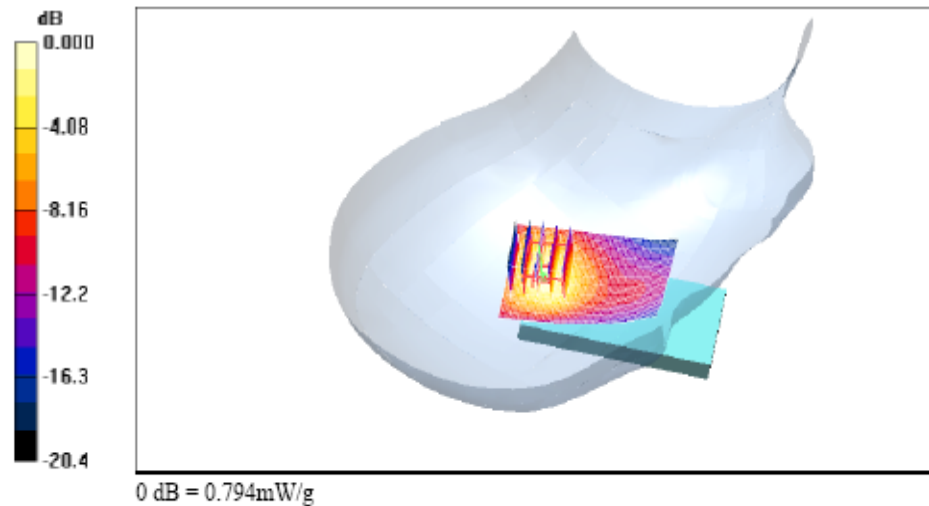
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 24.1 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.709 mW/g; SAR(10 g) = 0.360 mW/g

Maximum value of SAR (measured) = 0.794 mW/g



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RIGHT TOUCH CH512

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $\sigma = 1.4 \text{ mho/m}$; $\epsilon_r = 40$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.480 mW/g

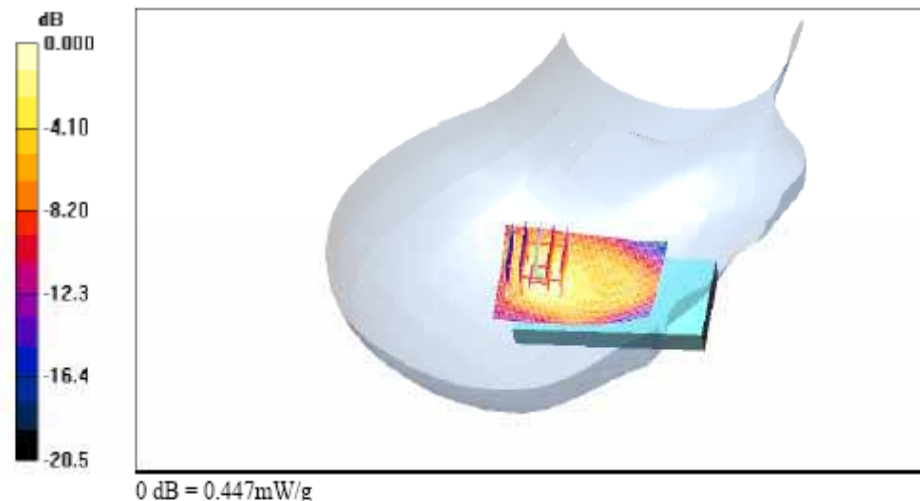
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.3 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 0.710 W/kg

SAR(1 g) = 0.414 mW/g; SAR(10 g) = 0.224 mW/g

Maximum value of SAR (measured) = 0.447 mW/g



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RIGHT TOUCH CH810

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 39.8$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.959 mW/g

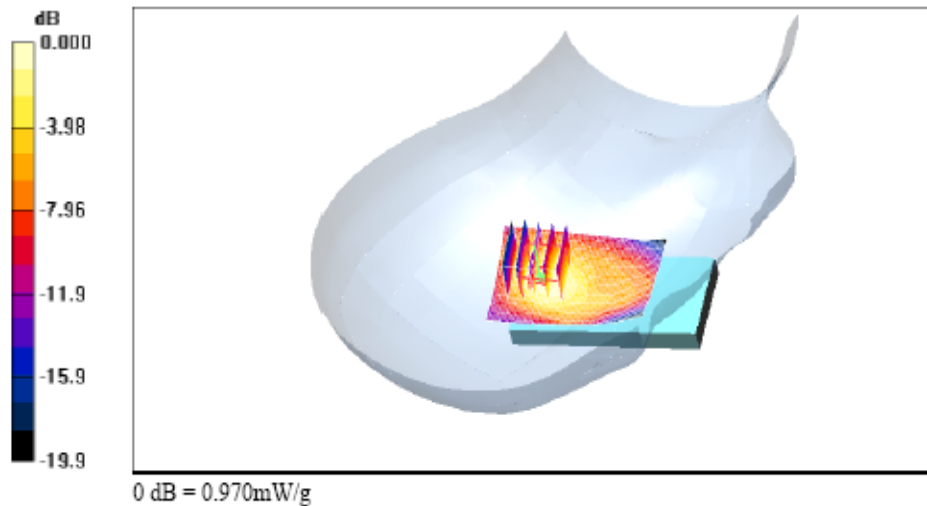
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 26.1 V/m; Power Drift = -0.113 dB

Peak SAR (extrapolated) = 1.57 W/kg

SAR(1 g) = 0.918 mW/g; SAR(10 g) = 0.508 mW/g

Maximum value of SAR (measured) = 0.970 mW/g



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RIGHT TOUCH CH810

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

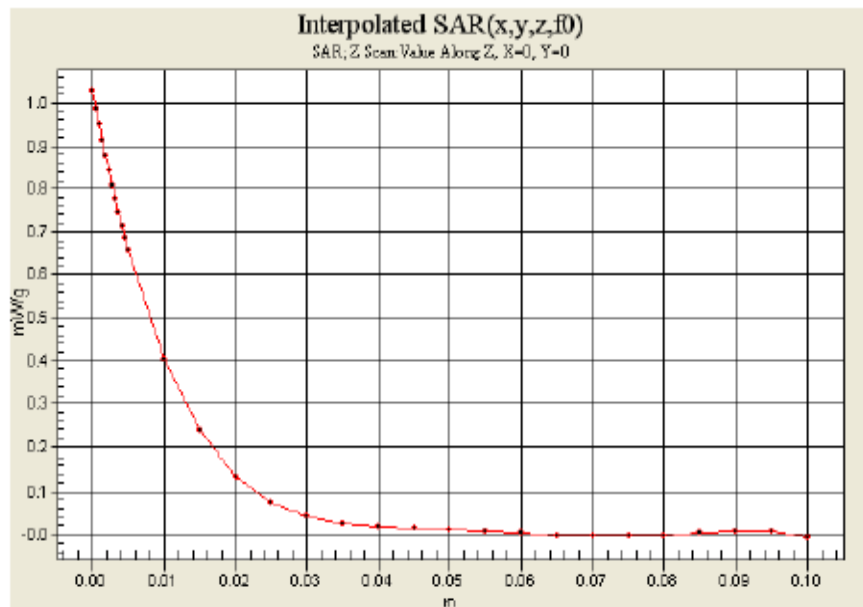
Medium parameters used: $f = 1910$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 39.8$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%



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BODY FRONT CH661

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(4.65, 4.65, 4.65); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800MHz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.215 mW/g

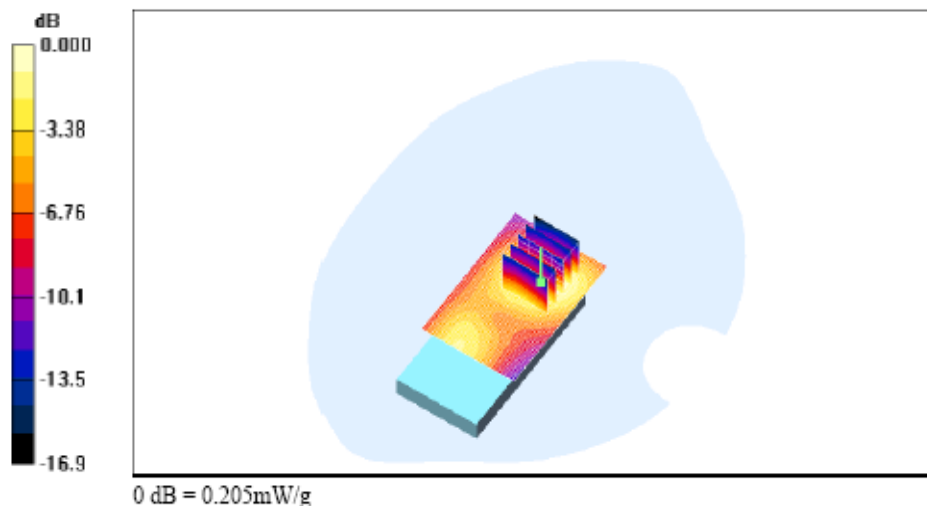
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 11.4 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 0.302 W/kg

SAR(1 g) = 0.189 mW/g; SAR(10 g) = 0.110 mW/g

Maximum value of SAR (measured) = 0.205 mW/g



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BODY REAR CH661

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(4.65, 4.65, 4.65); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.487 mW/g

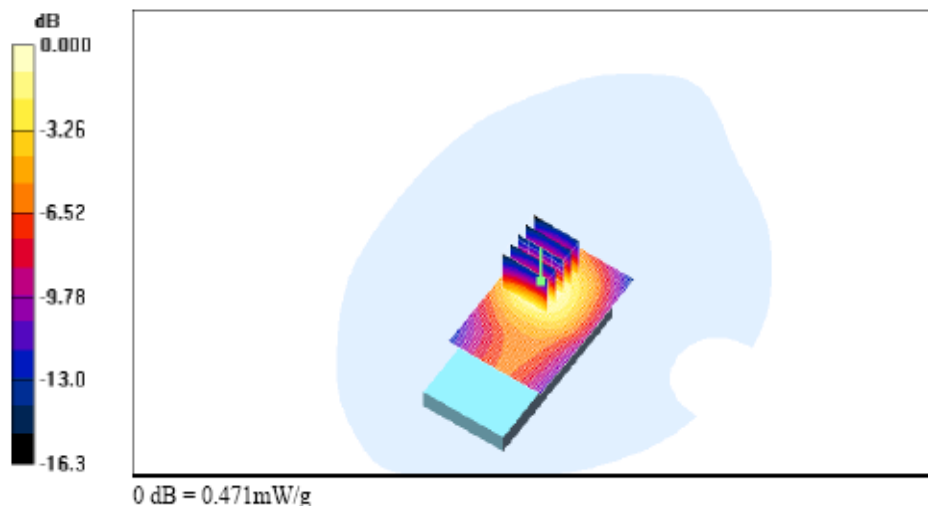
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 15.2 V/m; Power Drift = -0.078 dB

Peak SAR (extrapolated) = 0.731 W/kg

SAR(1 g) = 0.431 mW/g; SAR(10 g) = 0.248 mW/g

Maximum value of SAR (measured) = 0.471 mW/g





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TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-09-05

Test Laboratory: ESTECH

BODY REAR CH661-BT

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(4.65, 4.65, 4.65); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.478 mW/g

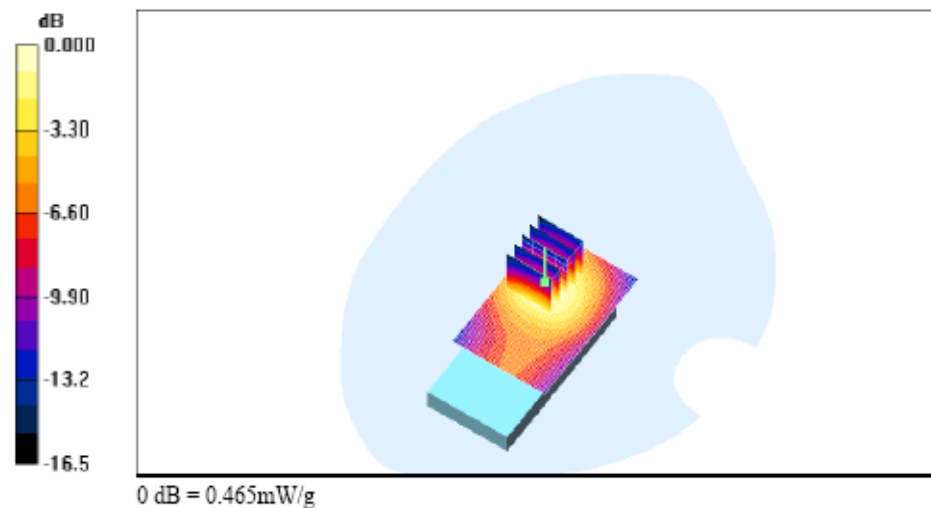
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 15.1 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 0.718 W/kg

SAR(1 g) = 0.425 mW/g; SAR(10 g) = 0.244 mW/g

Maximum value of SAR (measured) = 0.465 mW/g





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FAX: 82-2-867-3204

Date: 2007-09-05

Test Laboratory: ESTECH

BODY FRONT GPRS CH661

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(4.65, 4.65, 4.65); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800MHz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.360 mW/g

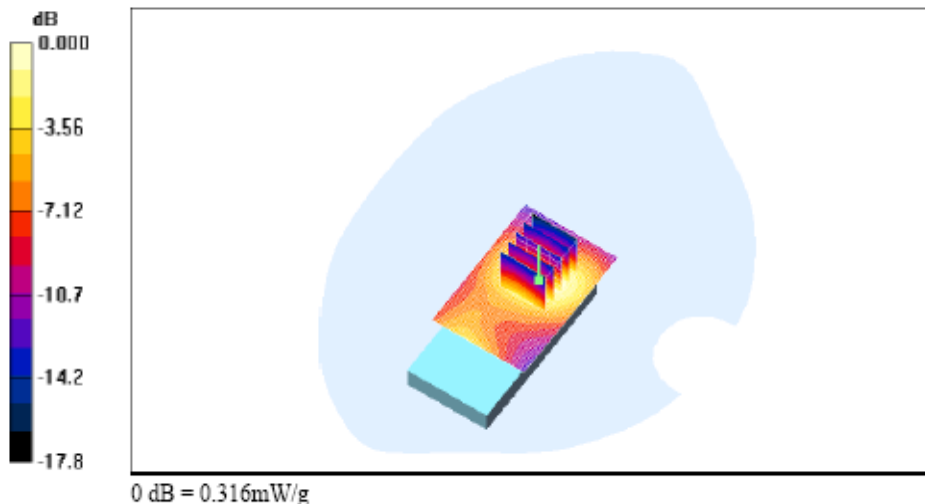
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.2 V/m; Power Drift = -0.089 dB

Peak SAR (extrapolated) = 0.466 W/kg

SAR(1 g) = 0.291 mW/g; SAR(10 g) = 0.167 mW/g

Maximum value of SAR (measured) = 0.316 mW/g





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FAX: 82-2-867-3204

Date: 2007-09-05

Test Laboratory: ESTECH

BODY REAR GPRS CH661

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(4.65, 4.65, 4.65); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.691 mW/g

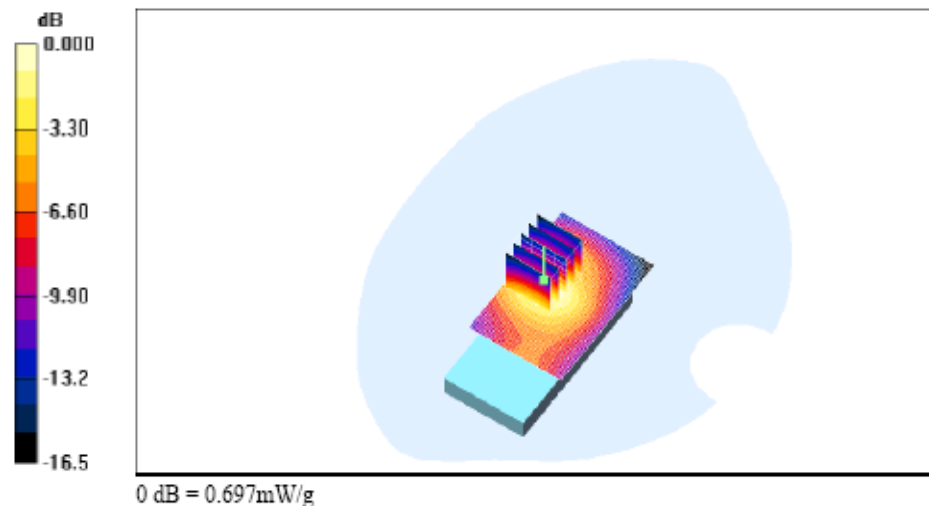
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 13.5 V/m; Power Drift = -0.109 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.634 mW/g; SAR(10 g) = 0.361 mW/g

Maximum value of SAR (measured) = 0.697 mW/g



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FAX: 82-2-867-3204

Date: 2007-09-05

Test Laboratory: ESTECH

BODY REAR GPRS CH661

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15

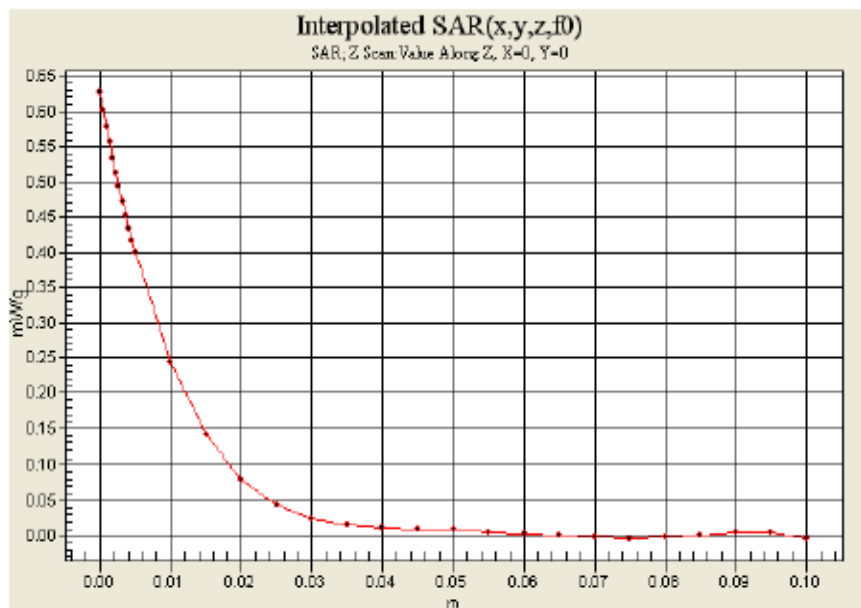
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(4.65, 4.65, 4.65); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23°C, Humidity : 46%



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Seoul, 153-803, Korea

TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-09-05

Test Laboratory: ESTECH

BODY REAR GPRS CH661-BT

DUT: VK180; Type: BAR TYPE; Serial: NONE

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(4.65, 4.65, 4.65); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2007-04-23
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 23 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.578 mW/g

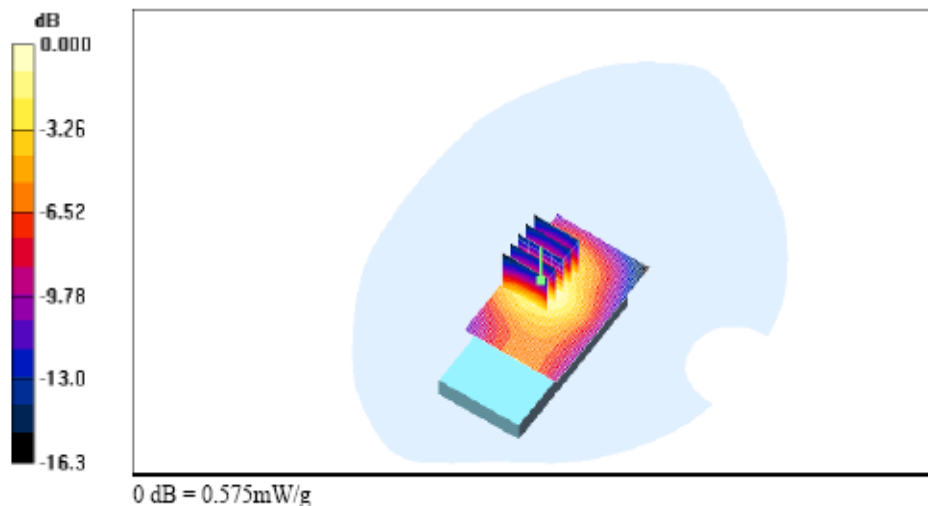
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 13.0 V/m; Power Drift = -0.045 dB

Peak SAR (extrapolated) = 0.881 W/kg

SAR(1 g) = 0.524 mW/g; SAR(10 g) = 0.302 mW/g

Maximum value of SAR (measured) = 0.575 mW/g





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TEL: 82-2-867-3201
FAX: 82-2-867-3204

APPENDIX D : Calibration Certificates



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

Accreditation No.: **SCS 108**

Client **Estech (Dymstec)**

Certificate No: **D835V2-475_Sep06**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 475**

Calibration procedure(s) **QA CAL-05.v6**
Calibration procedure for dipole validation kits

Calibration date: **September 12, 2006**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Power sensor HP 8481A	US37292783	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6	SN 1507	28-Oct-05 (SPEAG, No. ET3-1507_Oct05)	Oct-06
DAE4	SN 601	15-Dec-05 (SPEAG, No. DAE4-601_Dec05)	Dec-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov-06

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 13, 2006

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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:

- 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
- 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
- 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:

- 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
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.7 $\pm$ 6 %	0.89 mho/m $\pm$ 6 %
Head TSL temperature during test	(23.6 $\pm$ 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	2.29 mW / g
SAR normalized	normalized to 1W	9.16 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	9.25 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.49 mW / g
SAR normalized	normalized to 1W	5.96 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	6.00 mW / g $\pm$ 16.5 % (k=2)

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

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω - 0.5 j Ω
Return Loss	- 35.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.383 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	November 15, 2002

DASY4 Validation Report for Head TSL

Date/Time: 12.09.2006 18:38:05

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 475

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

Medium: HSL 900 MHz;

Medium parameters used: $f = 835$ MHz; $\sigma = 0.893$ mho/m; $\epsilon_r = 42.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

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

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:

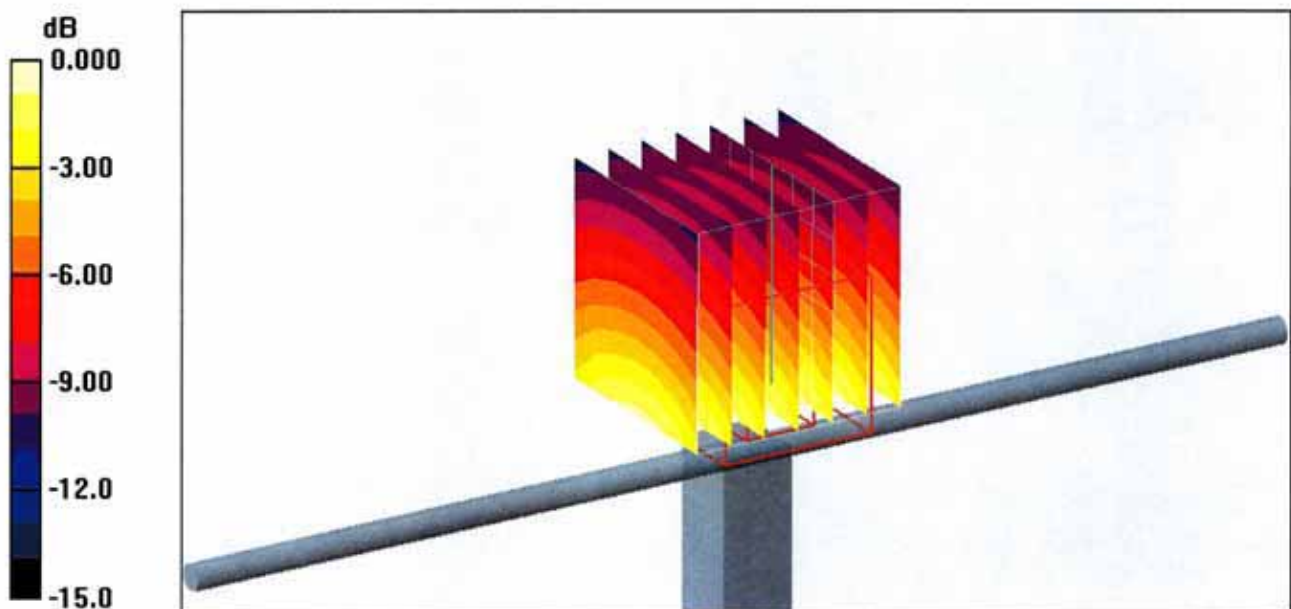
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.6 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 3.41 W/kg

SAR(1 g) = 2.29 mW/g; SAR(10 g) = 1.49 mW/g

Maximum value of SAR (measured) = 2.48 mW/g



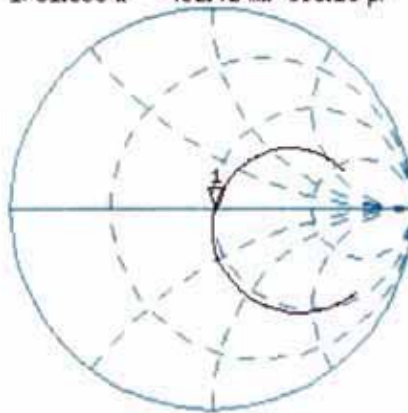
Impedance Measurement Plot for Head TSL

12 Sep 2006 12:23:32
 [CH1] S11 1 U FS 1: 51.656 Ω -482.42 m Ω 395.10 pF 835.000 000 MHz

De1

CA

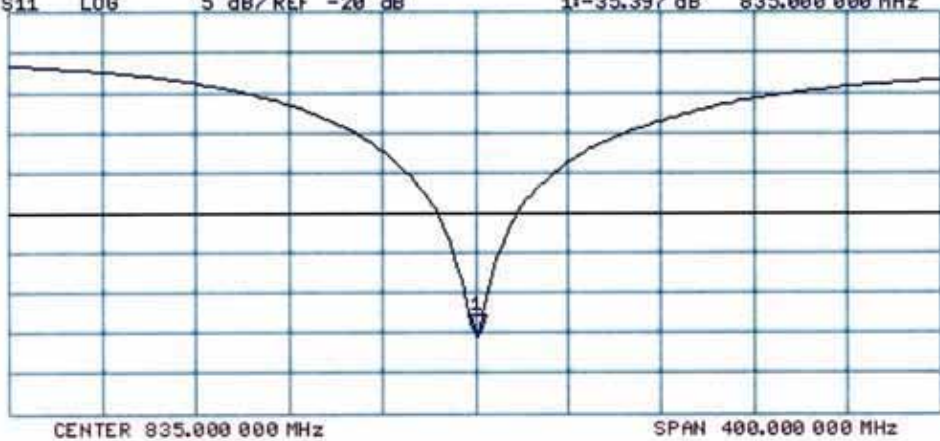
avg
16



CH2 S11 LOG 5 dB/REF -20 dB 1: -35.397 dB 835.000 000 MHz

CA

avg
16





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Accreditation No.: **SCS 108**

Client **Estech (Dymstec)**

Certificate No: **D1900V2-5d058_Sep06**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d058**

Calibration procedure(s) **QA CAL-05.v6**
Calibration procedure for dipole validation kits

Calibration date: **September 13, 2006**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Power sensor HP 8481A	US37292783	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6	SN: 1507	28-Oct-05 (SPEAG, No. ET3-1507_Oct05)	Oct-06
DAE4	SN: 601	15-Dec-05 (SPEAG, No. DAE4-601_Dec05)	Dec-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov-06

Calibrated by: **Marcel Fehr** **Function**
Laboratory Technician

Signature

Approved by: **Katja Pokovic** **Technical Manager**

[Signature]

Issued: September 20, 2006

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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
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 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 $\pm$ 0.2) °C	38.6 $\pm$ 6 %	1.41 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.4 $\pm$ 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.33 mW / g
SAR normalized	normalized to 1W	37.3 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	36.5 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.95 mW / g
SAR normalized	normalized to 1W	19.8 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	19.5 mW / g $\pm$ 16.5 % (k=2)

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

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$54.9\ \Omega + 3.4\ j\Omega$
Return Loss	- 24.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.202 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	March 19, 2004

DASY4 Validation Report for Head TSL

Date/Time: 13.09.2006 15:41:51

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d058

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

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 38.6$; $\rho = 1000$ 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 44; Postprocessing SW: SEMCAD, V1.8 Build 171

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

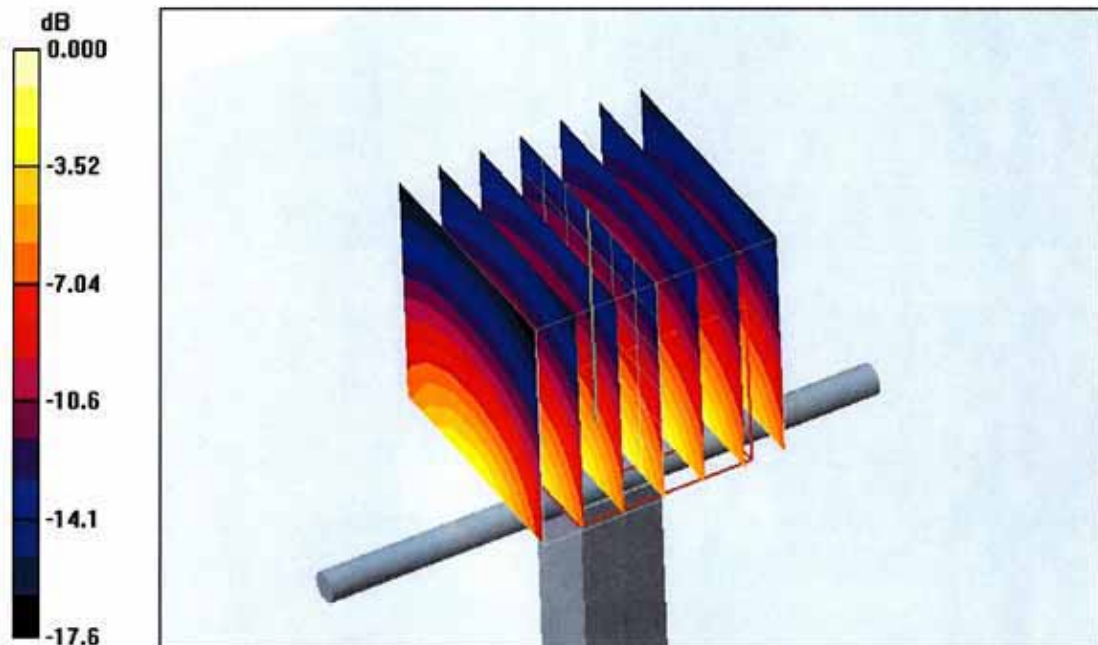
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.6 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 15.8 W/kg

SAR(1 g) = 9.33 mW/g; SAR(10 g) = 4.95 mW/g

Maximum value of SAR (measured) = 10.5 mW/g



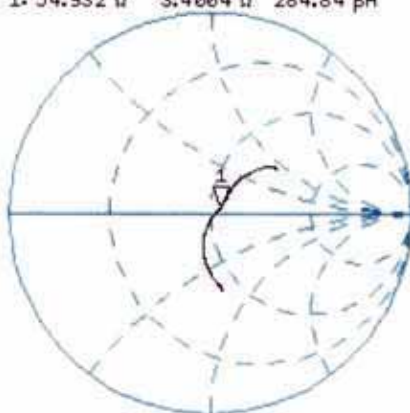
0 dB = 10.5mW/g

Impedance Measurement Plot for Head TSL

CH1 S11 1 U FS 13 Sep 2006 16:29:19
1: 54.932 Ω 3.4004 Ω 284.84 μH 1 900.000 000 MHz

*
Del
Cor

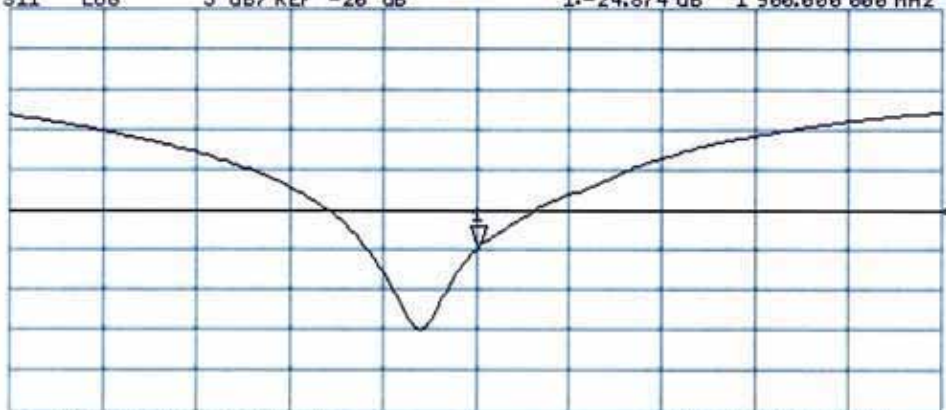
Avg
16



CH2 S11 LOG 5 dB/REF -20 dB 1:-24.874 dB 1 900.000 000 MHz

Cor

Avg
16



CENTER 1 900.000 000 MHz

SPAN 400.000 000 MHz

IMPORTANT NOTICE

USAGE OF PROBES IN ORGANIC SOLVENTS

Diethylene Glycol Monobuthy Ether (the basis for liquids above 1 GHz), as many other organic solvents, is a very effective softener for synthetic materials. These solvents can cause irreparable damage to certain SPEAG products, except those which are explicitly declared as compliant with organic solvents.

Compatible Probes:

- ET3DV6
- ET3DV6R
- ES3DVx
- EX3DVx
- ER3DV6
- H3DV6

Important Note for ET3DV6 Probes:

The ET3DV6 probes shall not be exposed to solvents longer than necessary for the measurements and shall be cleaned daily after use with warm water and stored dry.



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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 **Estech (Dymstec)**

Certificate No: **ES3-3123_Oct06**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3123**

Calibration procedure(s) **QA CAL-01.v5
Calibration procedure for dosimetric E-field probes**

Calibration date: **October 17, 2006**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41498087	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	4-Apr-06 (METAS, No. 251-00558)	Apr-07
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe ES3DV2	SN: 3013	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
DAE4	SN: 654	21-Jun-06 (SPEAG, No. DAE4-654_Jun06)	Jun-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov 06

Calibrated by: **Katja Pokovic** **Technical Manager**

Approved by: **Niels Kuster** **Quality Manager**

Issued: October 17, 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., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- 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
- 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 $\vartheta = 0$ ($f \leq 900$ 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 *ConvF*).
- 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 *ConvF*.
- 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.
- ConvF 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} * *ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* 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.

Probe ES3DV3

SN:3123

Manufactured:	July 11, 2006
Calibrated:	October 17, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3123**Sensitivity in Free Space^A****Diode Compression^B**

NormX	1.31 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	96 mV
NormY	1.34 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	94 mV
NormZ	1.10 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	96 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		3.0 mm	4.0 mm
SAR _{be} [%]	Without Correction Algorithm	5.7	2.3
SAR _{be} [%]	With Correction Algorithm	0.0	0.1

TSL 1810 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SAR _{be} [%]	Without Correction Algorithm	3.8	1.5
SAR _{be} [%]	With Correction Algorithm	0.0	0.2

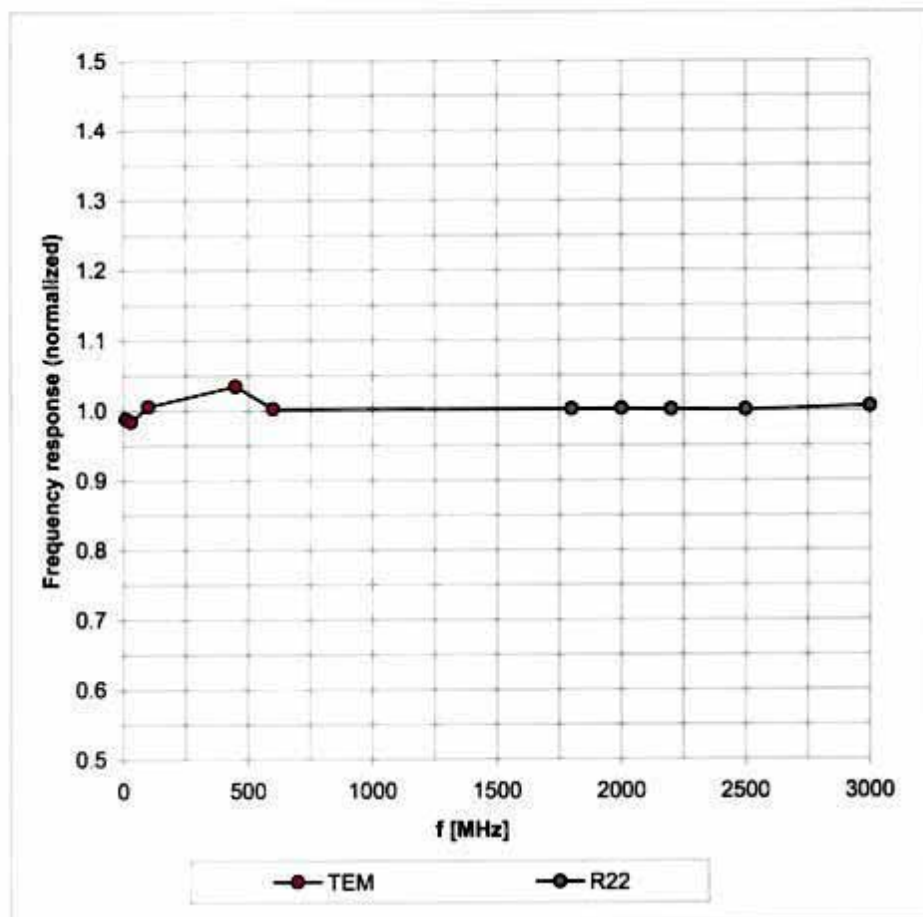
Sensor OffsetProbe Tip to Sensor Center **2.0 mm**

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.

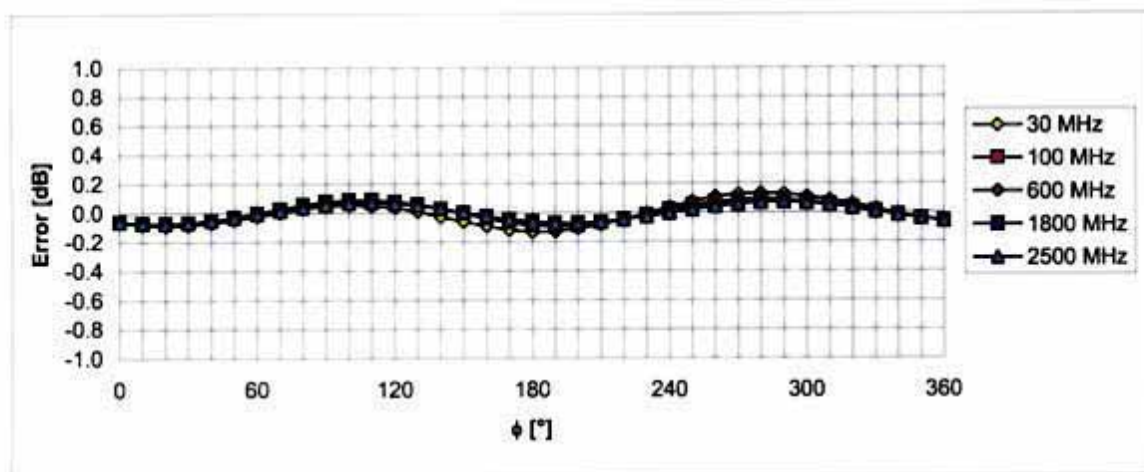
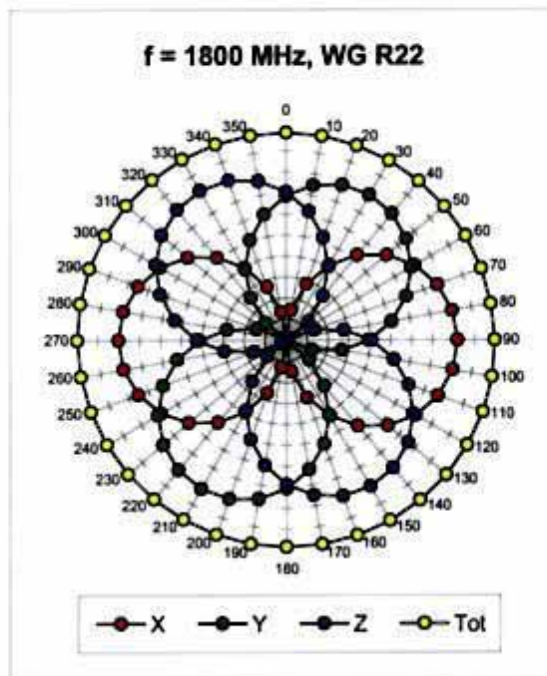
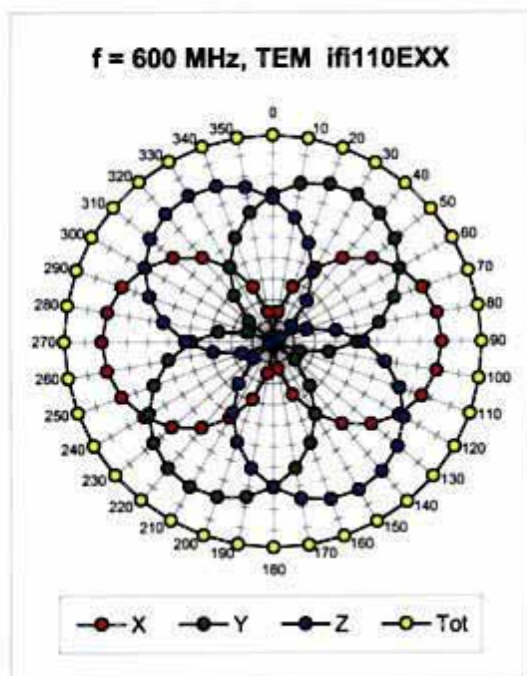
Frequency Response of E-Field

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



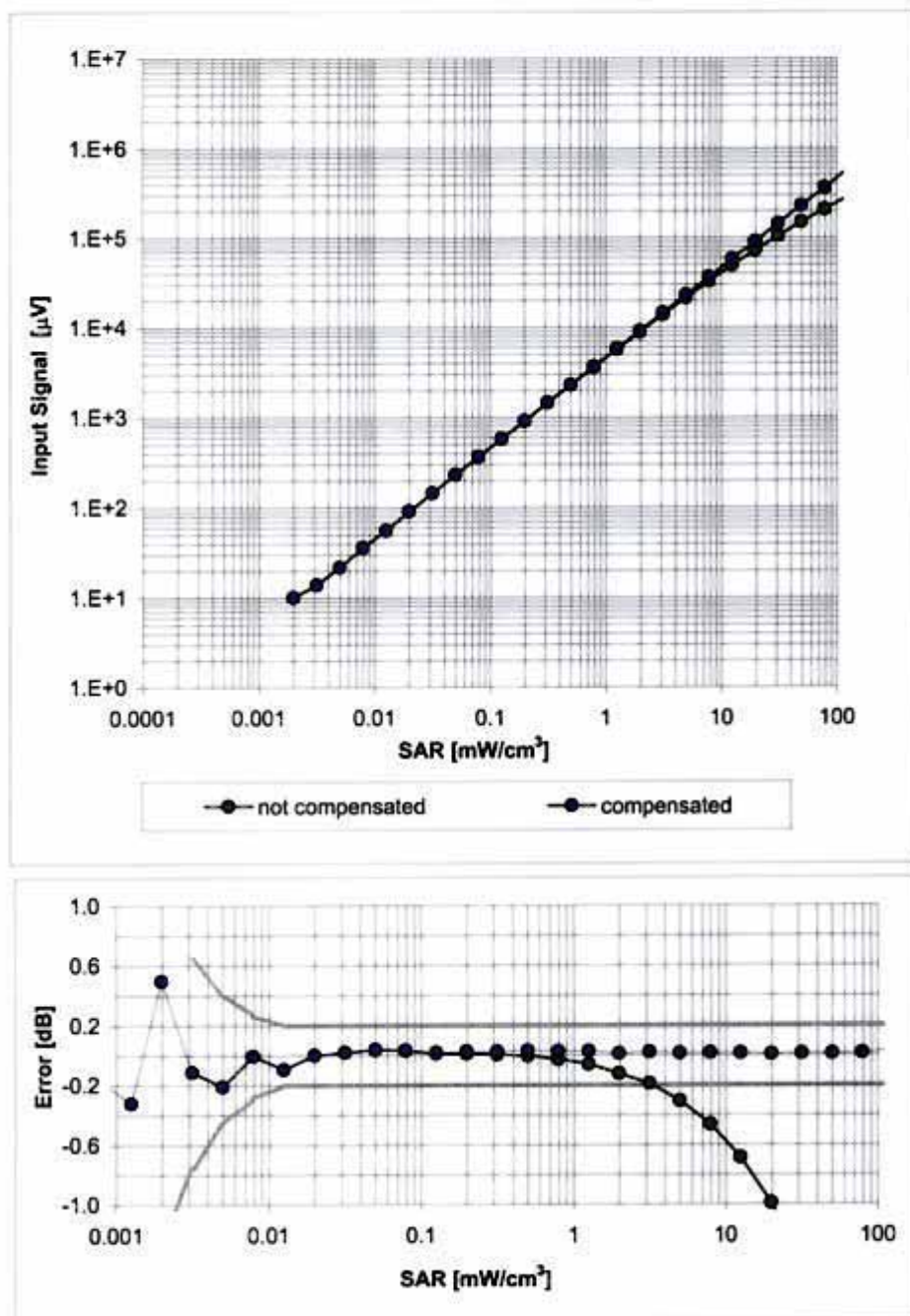
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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



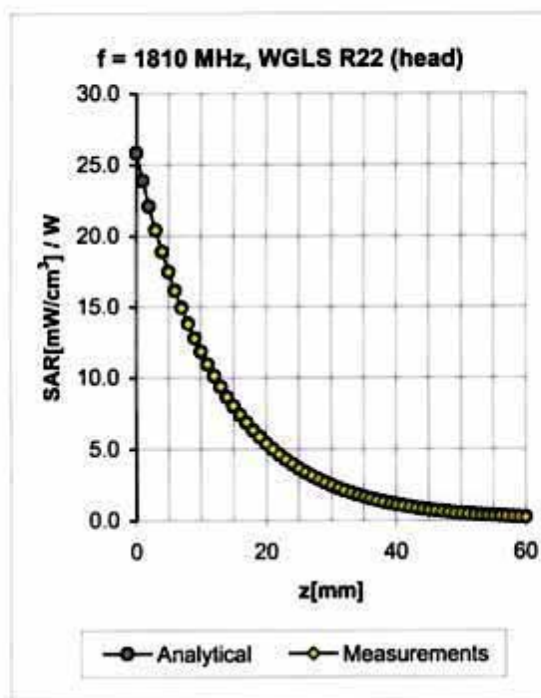
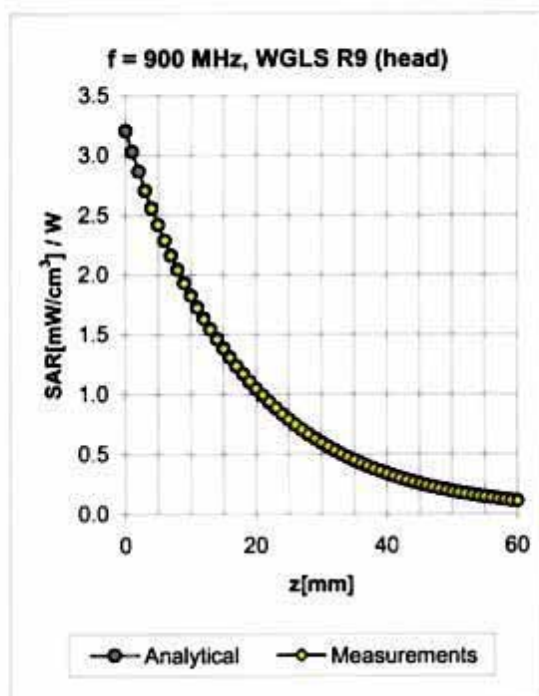
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (Waveguide R22, $f = 1800 \text{ MHz}$)



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

Conversion Factor Assessment

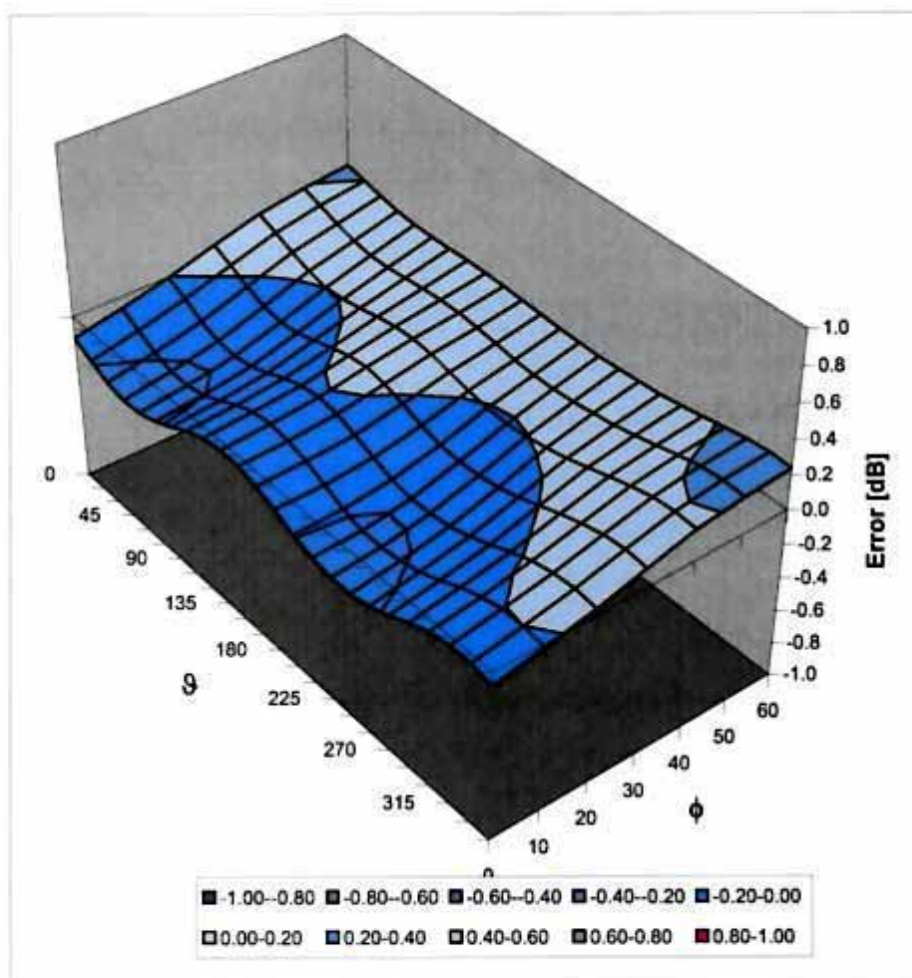


f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	1.00	1.09	6.42 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.92	1.16	5.23 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.79	1.29	5.08 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.87	1.17	4.66 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	1.00	1.17	6.32 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.85	1.26	4.81 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.75	1.37	4.65 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.87	0.91	4.32 ± 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.

Deviation from Isotropy in HSL

Error (ϕ , θ), $f = 900$ MHz



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