

APPENDIX D

The Validation Measurements

DUT: Dipole 1900 MHz; Serial: 5d023

Program Name: 1900MHz Dipole Validation 2012.10.12

Procedure Name: 1900MHz @ 100mW

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 5.33 mW/g

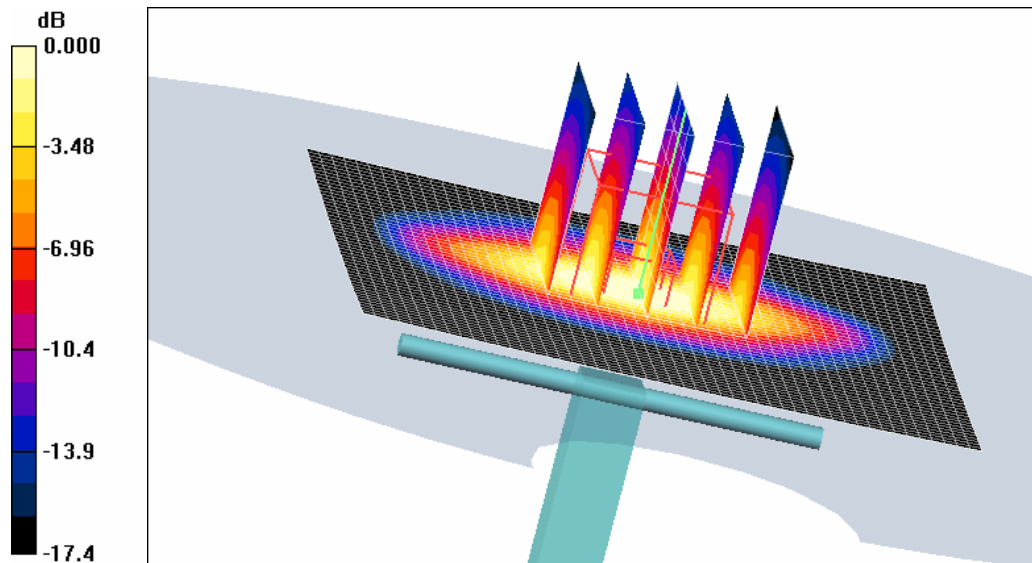
1900MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 45.6 V/m; Power Drift = -0.026 dB

Peak SAR (extrapolated) = 7.46 W/kg

SAR(1 g) = 4.08 mW/g; SAR(10 g) = 2.14 mW/g

Maximum value of SAR (measured) = 4.57 mW/g



0 dB = 4.57mW/g

DUT: Dipole 1900 MHz; Serial: 5d023

Program Name: 1900MHz Dipole Validation 2012.10.12

Procedure Name: 1900MHz @ 100mW

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.19, 8.19, 8.19); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 5.48 mW/g

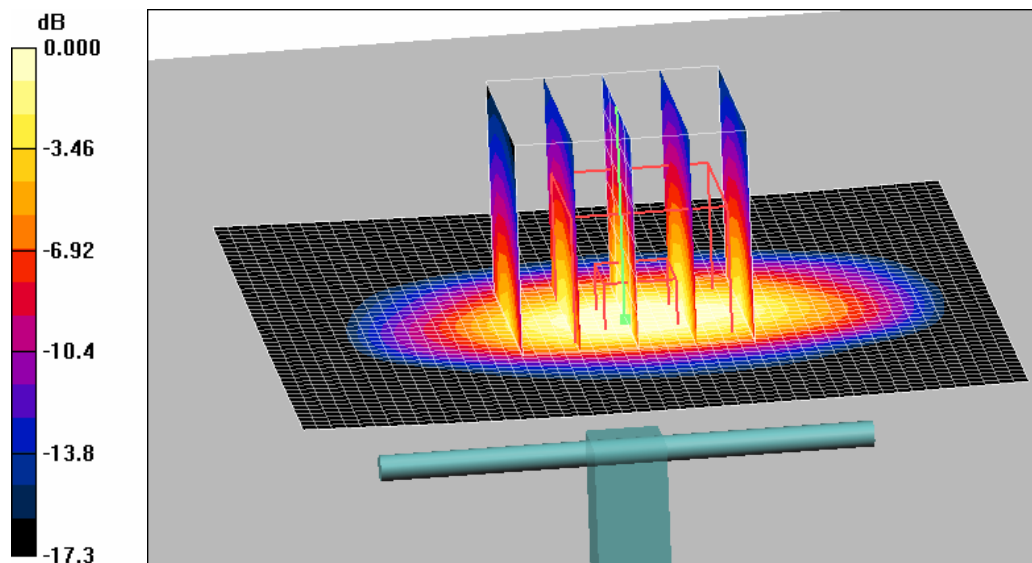
1900MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 52.9 V/m; Power Drift = -0.191 dB

Peak SAR (extrapolated) = 6.85 W/kg

SAR(1 g) = 3.87 mW/g; SAR(10 g) = 2.05 mW/g

Maximum value of SAR (measured) = 4.32 mW/g



0 dB = 4.32mW/g

DUT: Dipole 2450 MHz; Serial: 807

Program Name: 2450MHz Dipole Validation 2012.10.15

Procedure Name: 2450MHz @ 100mW

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

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

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.43, 7.43, 7.43); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

2450MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 7.23 mW/g

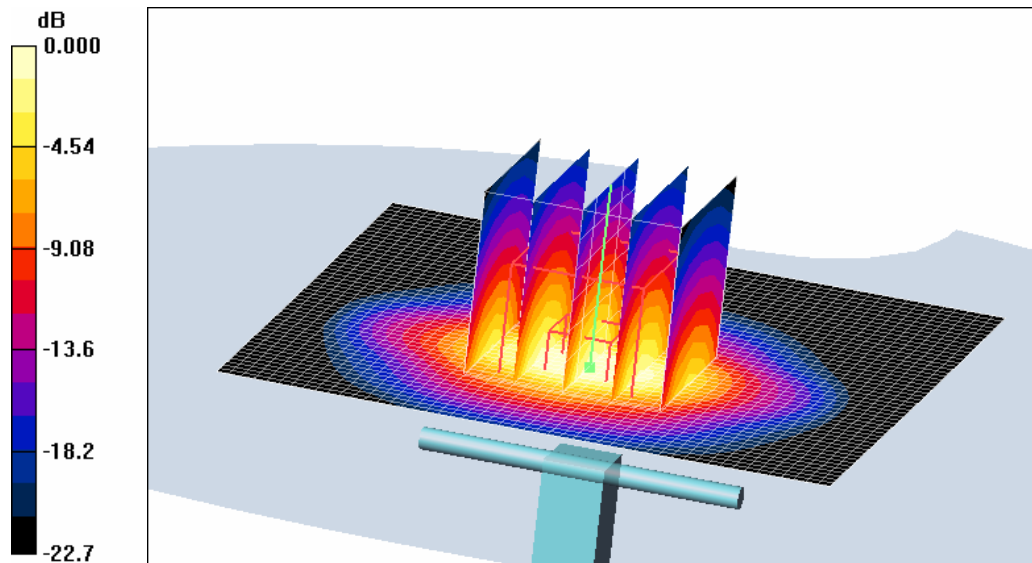
2450MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 35.9 V/m; Power Drift = 0.058 dB

Peak SAR (extrapolated) = 11.9 W/kg

SAR(1 g) = 5.56 mW/g; SAR(10 g) = 2.55 mW/g

Maximum value of SAR (measured) = 6.31 mW/g



0 dB = 6.31mW/g

DUT: Dipole 2450 MHz; Serial: D2450V2 - SN:807

Program Name: 2450MHz Dipole Validation 2012.10.15

Procedure Name: 2450MHz @ 100mW

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

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

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

2450MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 6.12 mW/g

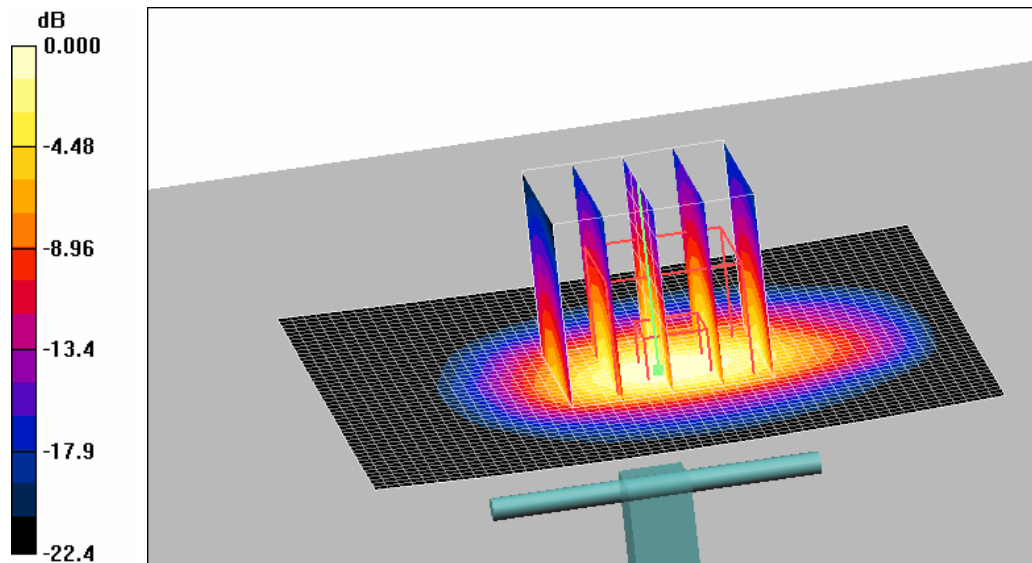
2450MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 50.5 V/m; Power Drift = -0.013 dB

Peak SAR (extrapolated) = 9.87 W/kg

SAR(1 g) = 4.97 mW/g; SAR(10 g) = 2.34 mW/g

Maximum value of SAR (measured) = 5.55 mW/g



0 dB = 5.55mW/g

APPENDIX E

Plots of The SAR Measurements

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GSM1900 Right (Job No. : FJ-279)

Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.285 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

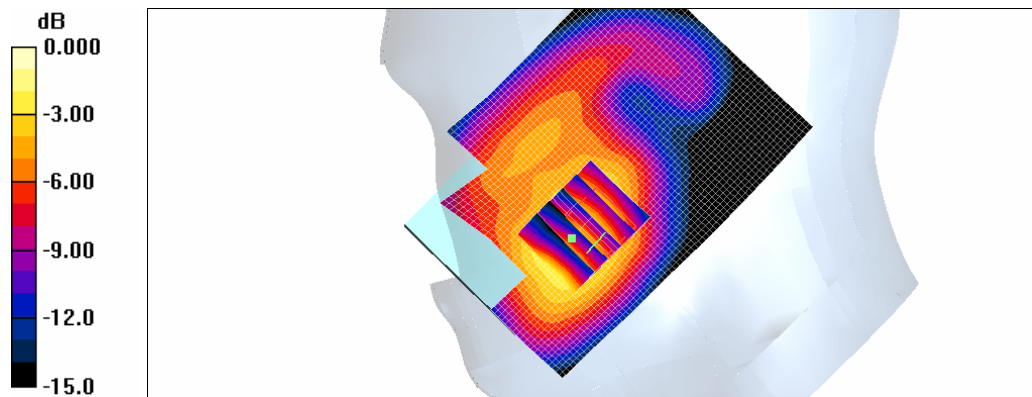
dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.42 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 0.412 W/kg

SAR(1 g) = 0.267 mW/g; SAR(10 g) = 0.160 mW/g

Maximum value of SAR (measured) = 0.331 mW/g



0 dB = 0.331mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GSM1900 Right (Job No. : FJ-279)

Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.082 mW/g

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

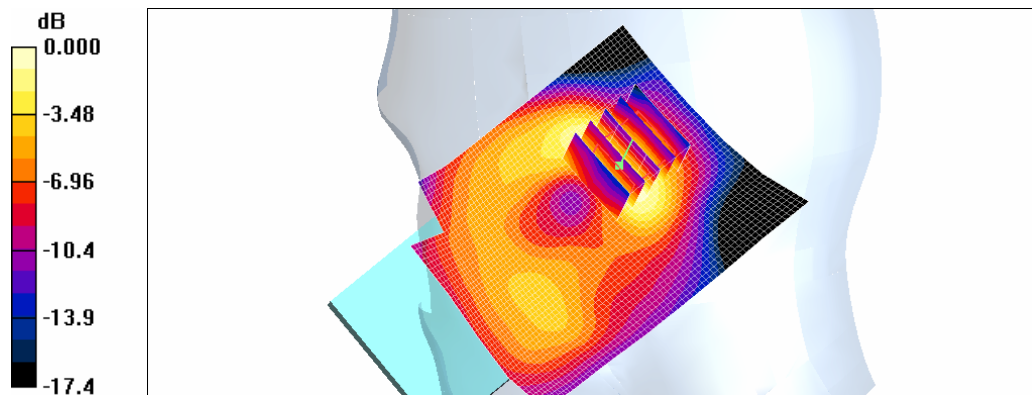
dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.72 V/m; Power Drift = 0.181 dB

Peak SAR (extrapolated) = 0.102 W/kg

SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.036 mW/g

Maximum value of SAR (measured) = 0.081 mW/g



0 dB = 0.081mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GSM1900 Left (Job No. : FJ-279)

Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.209 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

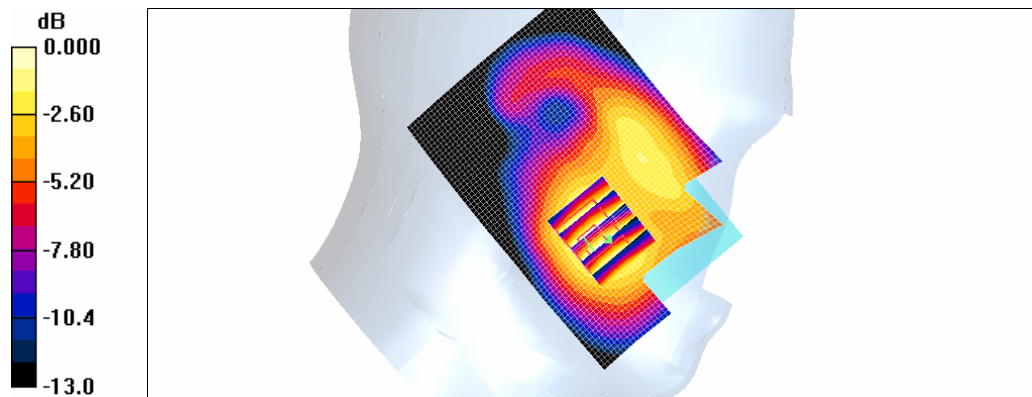
dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.40 V/m; Power Drift = -0.048 dB

Peak SAR (extrapolated) = 0.263 W/kg

SAR(1 g) = 0.184 mW/g; SAR(10 g) = 0.119 mW/g

Maximum value of SAR (measured) = 0.224 mW/g



0 dB = 0.224mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GSM1900 Left (Job No. : FJ-279)

Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.084 mW/g

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

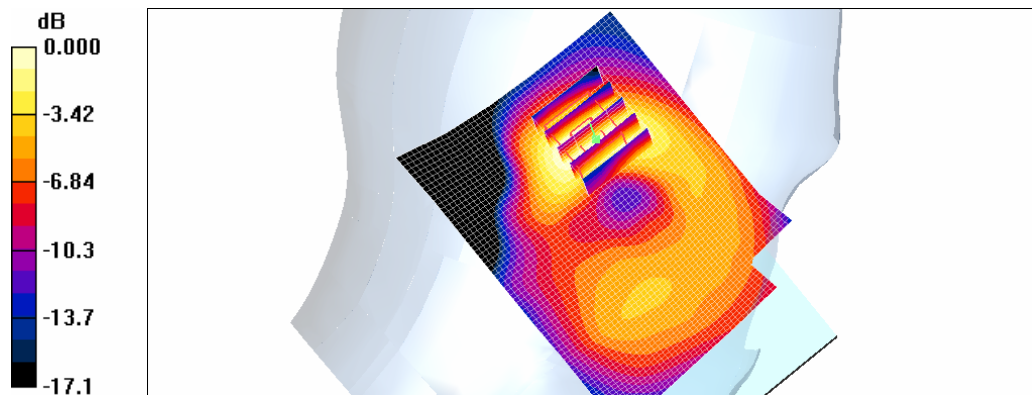
dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.80 V/m; Power Drift = -0.003 dB

Peak SAR (extrapolated) = 0.108 W/kg

SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.039 mW/g

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



0 dB = 0.086mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GSM1900 Right (Job No. : FJ-279)

Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.285 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

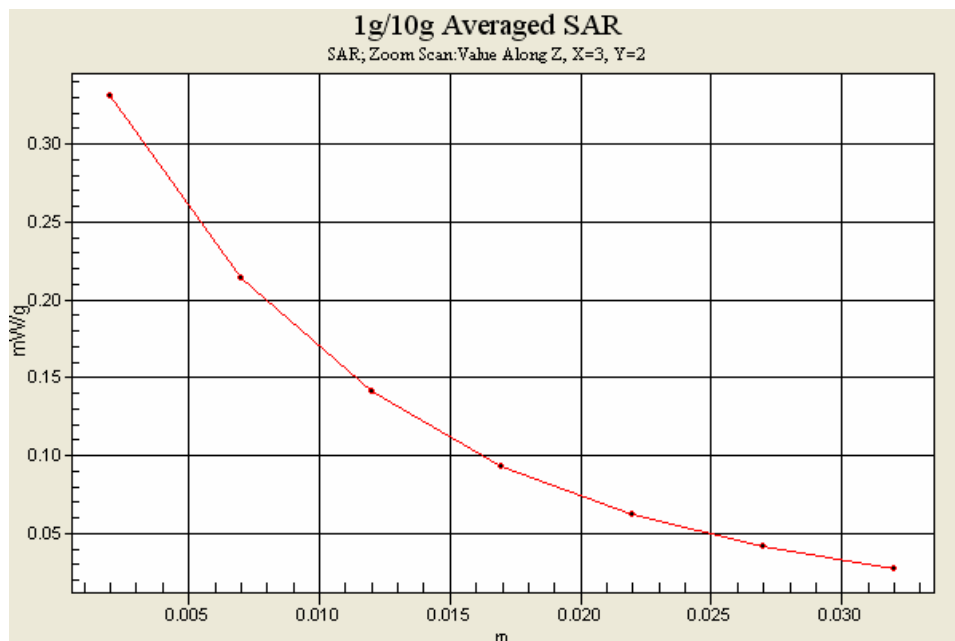
dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.42 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 0.412 W/kg

SAR(1 g) = 0.267 mW/g; SAR(10 g) = 0.160 mW/g

Maximum value of SAR (measured) = 0.331 mW/g



DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GSM1900 Body (Job No. : FJ-279)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, 1Tx, Back, 10mm

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

Communication System: Body GSM ; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.19, 8.19, 8.19); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard, 1Tx, Back, 10mm/Area Scan (51x71x1):

Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.330 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard, 1Tx, Back, 10mm/Zoom Scan (5x5x7)/Cube 0:

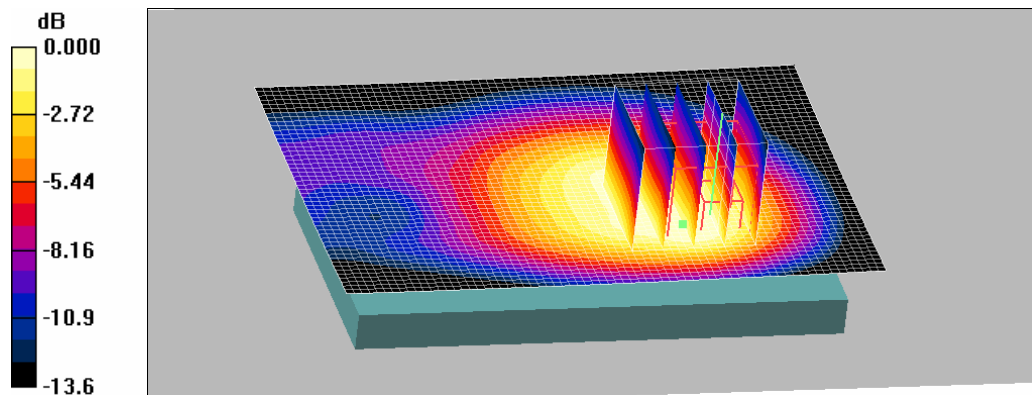
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.8 V/m; Power Drift = -0.016 dB

Peak SAR (extrapolated) = 0.339 W/kg

SAR(1 g) = 0.223 mW/g; SAR(10 g) = 0.139 mW/g

Maximum value of SAR (measured) = 0.284 mW/g



0 dB = 0.284mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GPRS1900 Body (Job No. : FJ-279)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Back, 10mm

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.19, 8.19, 8.19); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Back, 10mm/Area Scan (51x71x1):

Measurement grid: $dx=20$ mm, $dy=20$ mm

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

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Back, 10mm/Zoom Scan (5x5x7)/Cube 0:

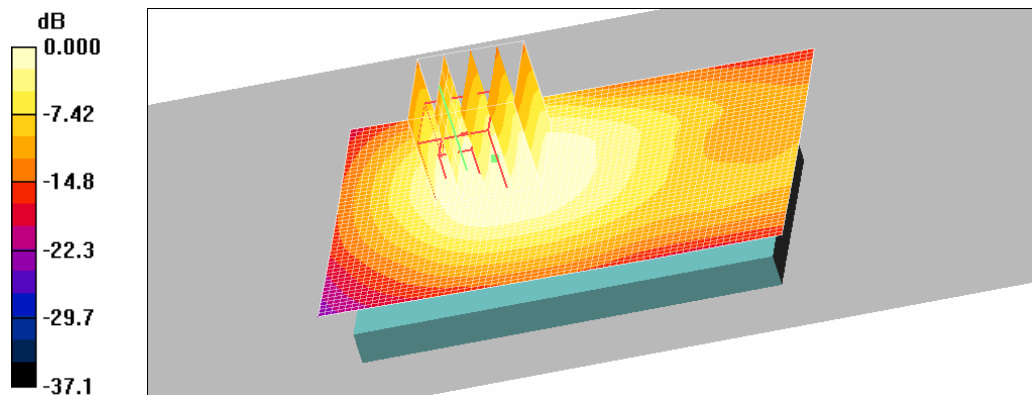
Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 14.4 V/m; Power Drift = -0.005 dB

Peak SAR (extrapolated) = 0.583 W/kg

SAR(1 g) = 0.359 mW/g; SAR(10 g) = 0.211 mW/g

Maximum value of SAR (measured) = 0.429 mW/g



0 dB = 0.429mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GPRS1900 Body (Job No. : FJ-279)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, 3Tx, Back, 10mm

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:2.767

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.19, 8.19, 8.19); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard, 3Tx, Back, 10mm/Area Scan (51x71x1):

Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.468 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard, 3Tx, Back, 10mm/Zoom Scan (5x5x7)/Cube 0:

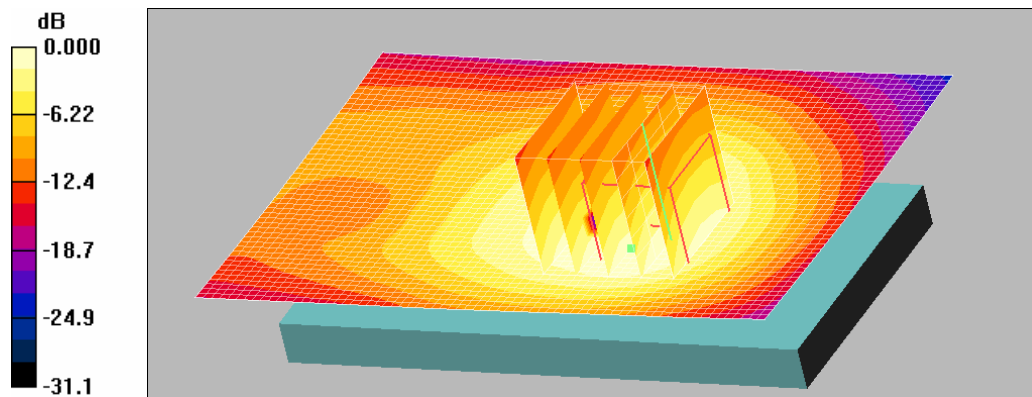
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.0 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 0.592 W/kg

SAR(1 g) = 0.313 mW/g; SAR(10 g) = 0.193 mW/g

Maximum value of SAR (measured) = 0.399 mW/g



0 dB = 0.399mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GPRS1900 Body (Job No. : FJ-279)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, 4Tx, Back, 10mm

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:2.075

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.19, 8.19, 8.19); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard, 4Tx, Back, 10mm/Area Scan (51x71x1):

Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.399 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard, 4Tx, Back, 10mm/Zoom Scan (5x5x7)/Cube 0:

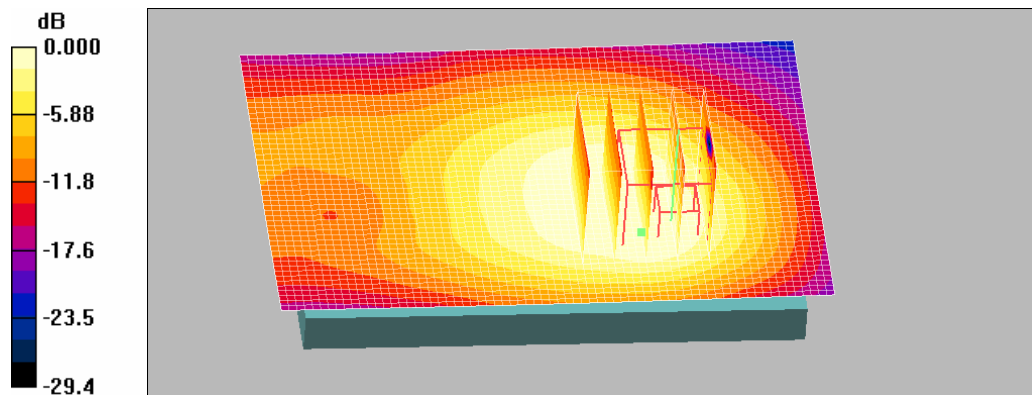
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.9 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 0.405 W/kg

SAR(1 g) = 0.266 mW/g; SAR(10 g) = 0.167 mW/g

Maximum value of SAR (measured) = 0.342 mW/g



0 dB = 0.342mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GPRS1900 Body (Job No. : FJ-279)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Front, 10mm

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.19, 8.19, 8.19); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Front, 10mm/Area Scan (51x71x1):

Measurement grid: dx=20mm, dy=20mm

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

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Front, 10mm/Zoom Scan (5x5x7)/Cube 0:

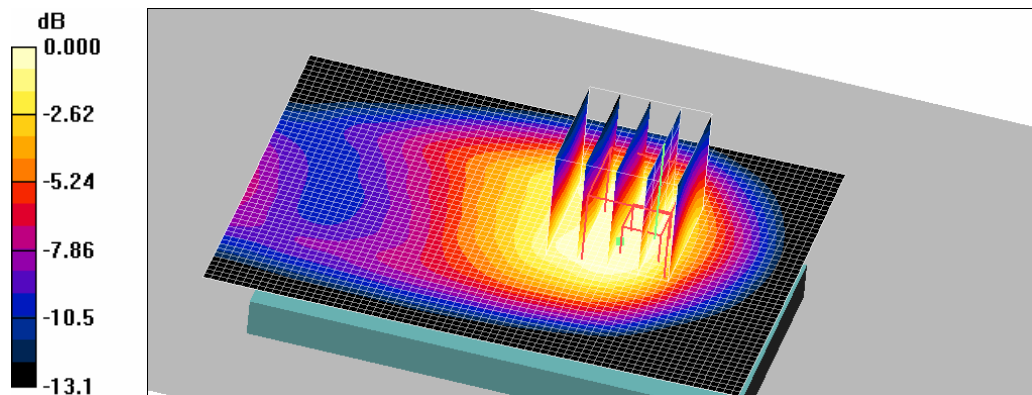
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.6 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 0.501 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.210 mW/g

Maximum value of SAR (measured) = 0.432 mW/g



0 dB = 0.432mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GPRS1900 Body (Job No. : FJ-279)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Right, 10mm

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.19, 8.19, 8.19); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Right, 10mm/Area Scan (51x71x1):

Measurement grid: $dx=20$ mm, $dy=20$ mm

Maximum value of SAR (interpolated) = 0.141 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Right, 10mm/Zoom Scan (5x5x7)/Cube 0:

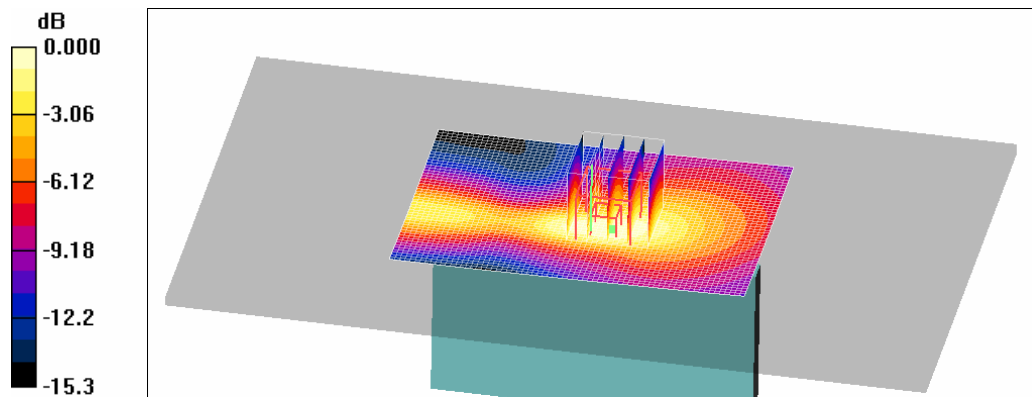
Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 7.71 V/m; Power Drift = 0.037 dB

Peak SAR (extrapolated) = 0.166 W/kg

SAR(1 g) = 0.107 mW/g; SAR(10 g) = 0.063 mW/g

Maximum value of SAR (measured) = 0.131 mW/g



0 dB = 0.131mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GPRS1900 Body (Job No. : FJ-279)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Bottom, 10mm

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.19, 8.19, 8.19); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Bottom, 10mm/Area Scan (51x51x1):

Measurement grid: $dx=20$ mm, $dy=20$ mm

Maximum value of SAR (interpolated) = 0.351 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Bottom, 10mm/Zoom Scan (5x5x7)/Cube 0:

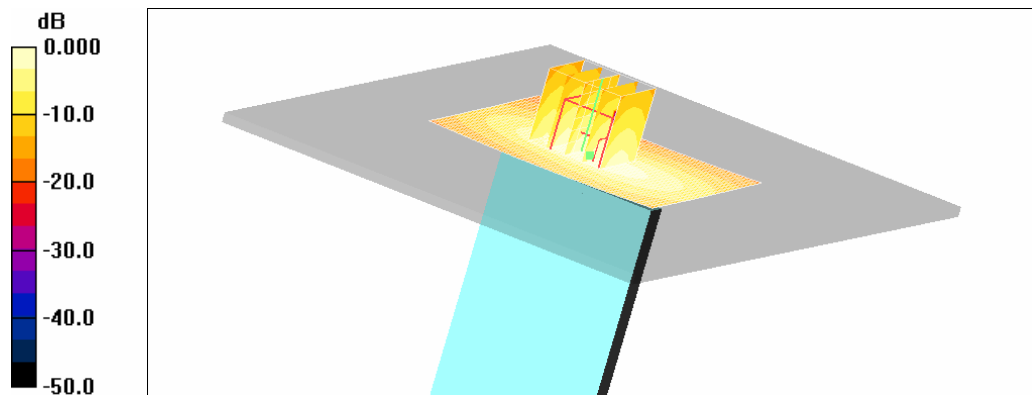
Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 15.7 V/m; Power Drift = -0.073 dB

Peak SAR (extrapolated) = 0.462 W/kg

SAR(1 g) = 0.289 mW/g; SAR(10 g) = 0.159 mW/g

Maximum value of SAR (measured) = 0.388 mW/g



0 dB = 0.388mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 GPRS1900 Body (Job No. : FJ-279)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Back, 10mm

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.4;Test Date-12/Oct/2012

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(8.19, 8.19, 8.19); Calibrated: 2012-02-21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Back, 10mm/Area Scan (51x71x1):

Measurement grid: dx=20mm, dy=20mm

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

Body, Ch.661, Ant.Intenna, Bat.Standard, 2Tx, Back, 10mm/Zoom Scan (5x5x7)/Cube 0:

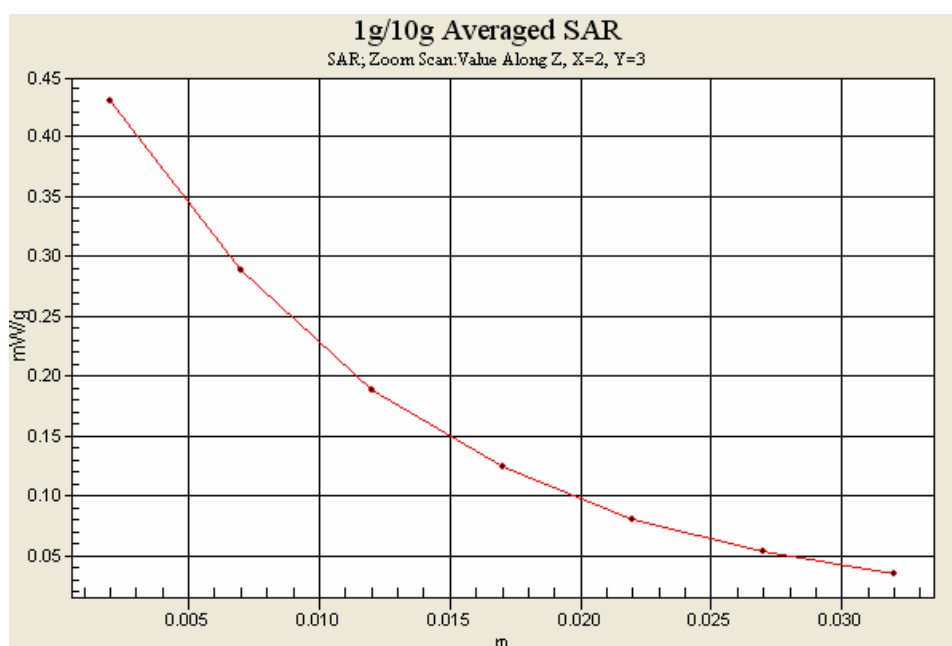
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.4 V/m; Power Drift = -0.005 dB

Peak SAR (extrapolated) = 0.583 W/kg

SAR(1 g) = 0.359 mW/g; SAR(10 g) = 0.211 mW/g

Maximum value of SAR (measured) = 0.429 mW/g



DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Right(Job No. : FJ-279)

Procedure Name: Cheek, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.43, 7.43, 7.43); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (51x71x1): Measurement grid:
dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.063 mW/g

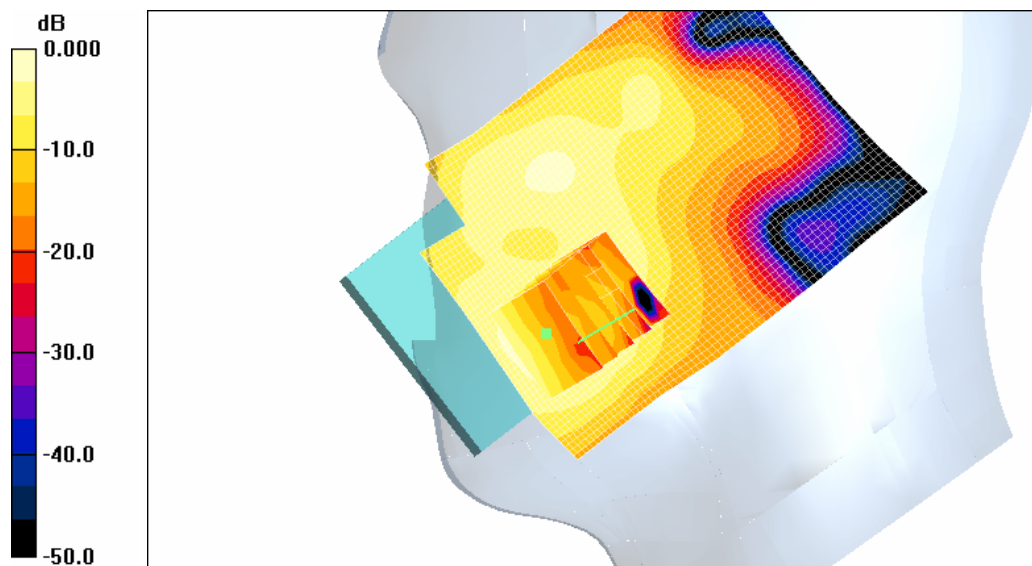
Cheek, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.71 V/m; Power Drift = -0.194 dB

Peak SAR (extrapolated) = 0.118 W/kg

SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.033 mW/g

Maximum value of SAR (measured) = 0.065 mW/g



0 dB = 0.065mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Right(Job No. : FJ-279)

Procedure Name: Tilted, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.43, 7.43, 7.43); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilted, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (51x71x1): Measurement grid:
dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.040 mW/g

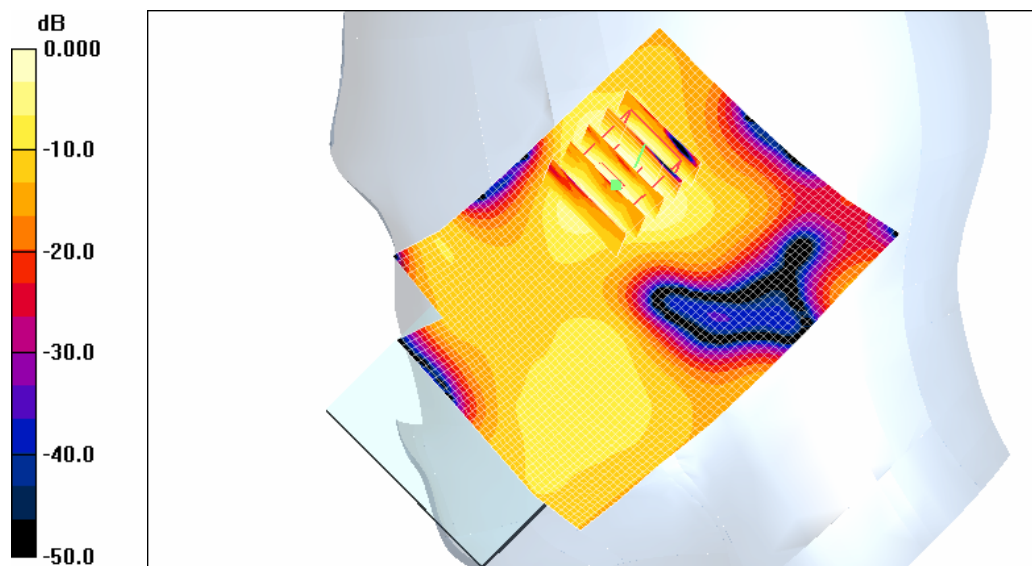
Tilted, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan (5x5x7)/Cube 0: Measurement
grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.35 V/m; Power Drift = 0.187 dB

Peak SAR (extrapolated) = 0.047 W/kg

SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.015 mW/g

Maximum value of SAR (measured) = 0.034 mW/g



0 dB = 0.034mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Left(Job No. : FJ-279)

Procedure Name: Cheek, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.43, 7.43, 7.43); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (101x141x1): Measurement
grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.112 mW/g

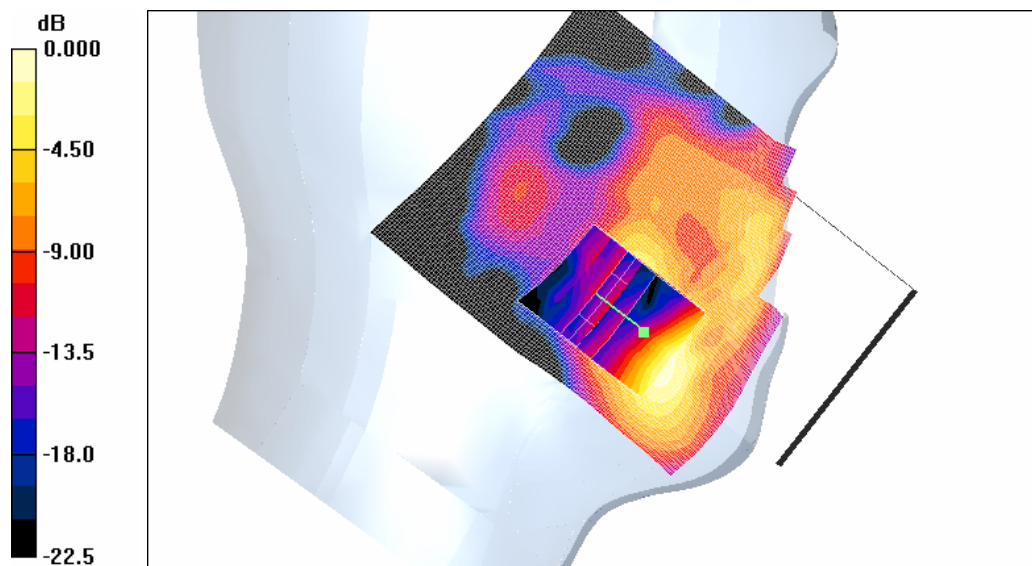
Cheek, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan (5x5x7)/Cube 0: Measurement
grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.00 V/m; Power Drift = 0.093 dB

Peak SAR (extrapolated) = 0.179 W/kg

SAR(1 g) = 0.095 mW/g; SAR(10 g) = 0.049 mW/g

Maximum value of SAR (measured) = 0.106 mW/g



0 dB = 0.106mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Left(Job No. : FJ-279)

Procedure Name: Tilted, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.43, 7.43, 7.43); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilted, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (101x141x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.033 mW/g

Tilted, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan 2 (5x5x7)/Cube 0:

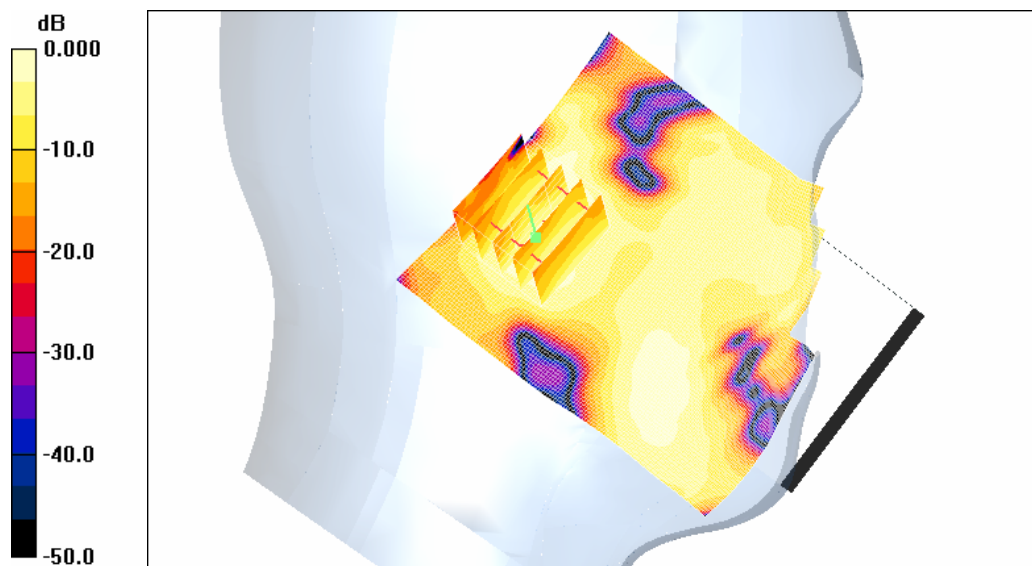
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.02 V/m; Power Drift = -0.178 dB

Peak SAR (extrapolated) = 0.091 W/kg

SAR(1 g) = 0.031 mW/g; SAR(10 g) = 0.016 mW/g

Maximum value of SAR (measured) = 0.033 mW/g



0 dB = 0.033mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Left(Job No. : FJ-279)

Procedure Name: Cheek, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.43, 7.43, 7.43); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (101x141x1): Measurement
grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.112 mW/g

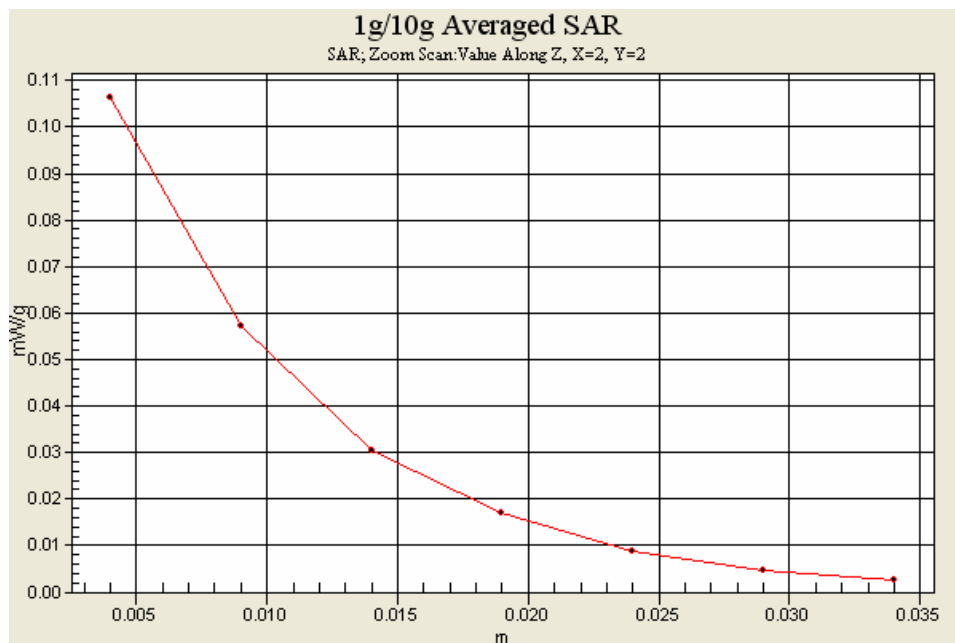
Cheek, Ch.6, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan (5x5x7)/Cube 0: Measurement
grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.00 V/m; Power Drift = 0.093 dB

Peak SAR (extrapolated) = 0.179 W/kg

SAR(1 g) = 0.095 mW/g; SAR(10 g) = 0.049 mW/g

Maximum value of SAR (measured) = 0.106 mW/g



DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Body (Job No. : FJ-279)

Procedure Name: Body, Ch.6, Ant.Intenna, Bat.Standard, Front, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.6, Ant.Intenna, Bat.Standard, Front, 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.101 mW/g

Body, Ch.6, Ant.Intenna, Bat.Standard, Front, 1Mbps/Zoom Scan (5x5x7)/Cube 0:

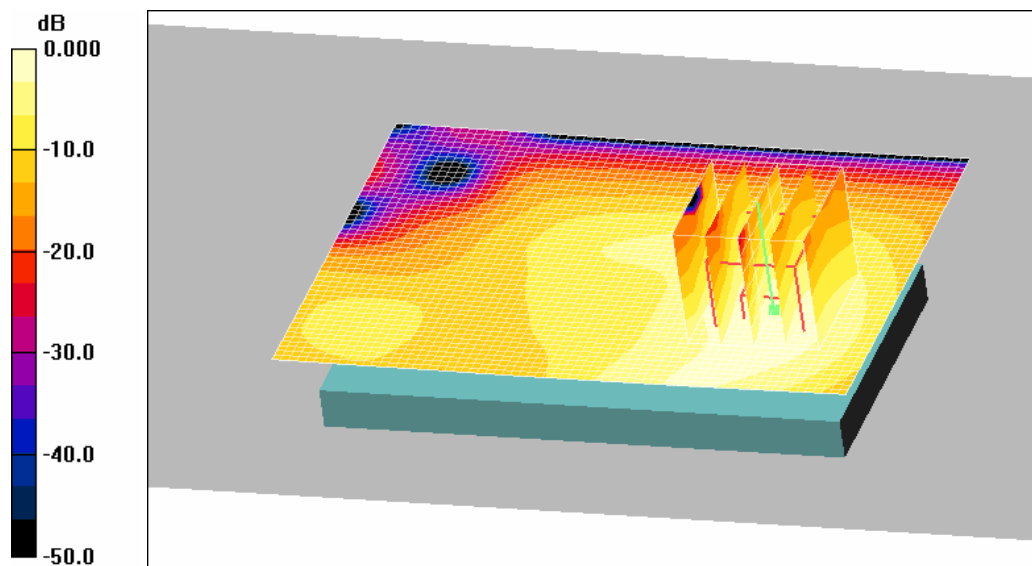
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.82 V/m; Power Drift = -0.182 dB

Peak SAR (extrapolated) = 0.195 W/kg

SAR(1 g) = 0.107 mW/g; SAR(10 g) = 0.057 mW/g

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



0 dB = 0.120mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Body (Job No. : FJ-279)

Procedure Name: Body, Ch.6, Ant.Intenna, Bat.Standard, Back, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.6, Ant.Intenna, Bat.Standard, Back, 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.127 mW/g

Body, Ch.6, Ant.Intenna, Bat.Standard, Back, 1Mbps/Zoom Scan (5x5x7)/Cube 0:

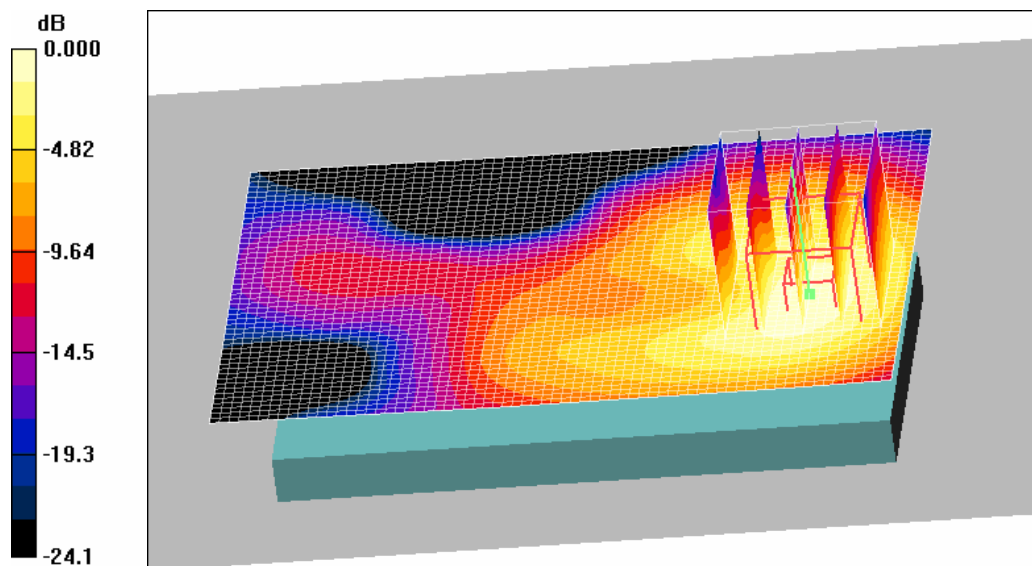
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.58 V/m; Power Drift = -0.066 dB

Peak SAR (extrapolated) = 0.206 W/kg

SAR(1 g) = 0.119 mW/g; SAR(10 g) = 0.066 mW/g

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



0 dB = 0.130mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Body (Job No. : FJ-279)

Procedure Name: Body, Ch.6, Ant.Intenna, Bat.Standard, Left, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.6, Ant.Intenna, Bat.Standard, Left, 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.014 mW/g

Body, Ch.6, Ant.Intenna, Bat.Standard, Left, 1Mbps/Zoom Scan (5x5x7)/Cube 0:

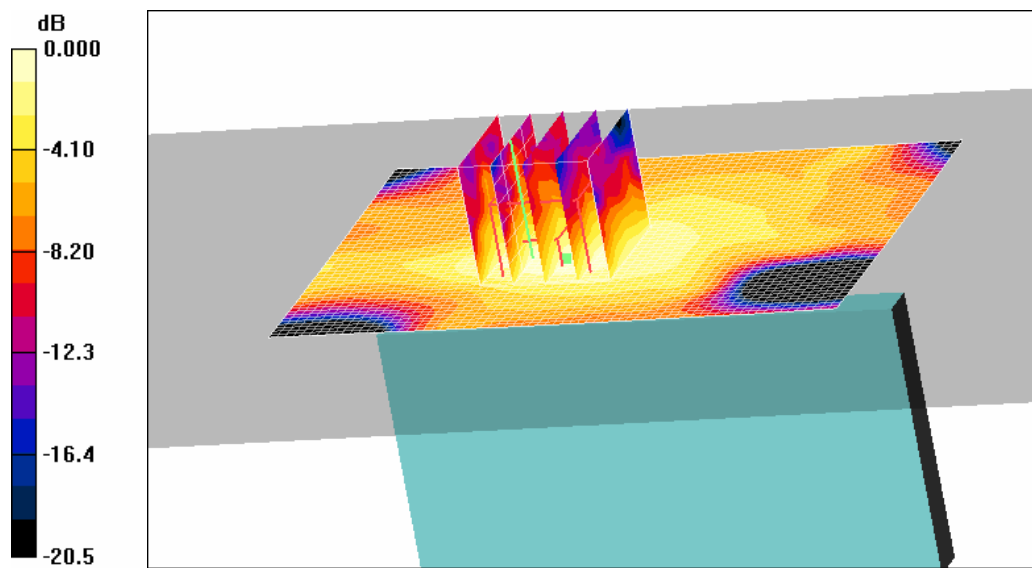
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.40 V/m; Power Drift = 0.120 dB

Peak SAR (extrapolated) = 0.022 W/kg

SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.00736 mW/g

Maximum value of SAR (measured) = 0.015 mW/g



0 dB = 0.015mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Body (Job No. : FJ-279)

Procedure Name: Body, Ch.6, Ant.Intenna, Bat.Standard, Bottom, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.6, Ant.Intenna, Bat.Standard, Bottom, 1Mbps/Area Scan (51x51x1):

Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.010 mW/g

Body, Ch.6, Ant.Intenna, Bat.Standard, Bottom, 1Mbps/Zoom Scan (5x5x7)/Cube 0:

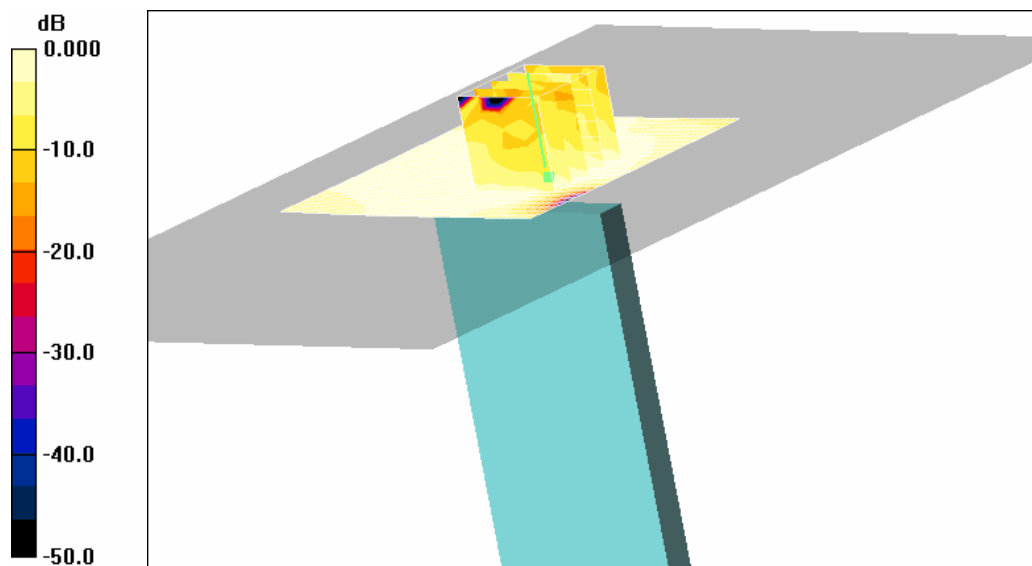
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.12 V/m; Power Drift = 0.191 dB

Peak SAR (extrapolated) = 0.017 W/kg

SAR(1 g) = 0.0084 mW/g; SAR(10 g) = 0.00503 mW/g

Maximum value of SAR (measured) = 0.009 mW/g



0 dB = 0.009mW/g

DUT: GT-I8258; Serial: FJ-279-C

Program Name: GT-I8258 WLAN Body (Job No. : FJ-279)

Procedure Name: Body, Ch.6, Ant.Intenna, Bat.Standard, Back, 1Mbps

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.2;Test Date-15/Oct/2012

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2012-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2012-03-19
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.6, Ant.Intenna, Bat.Standard, Back, 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.127 mW/g

Body, Ch.6, Ant.Intenna, Bat.Standard, Back, 1Mbps/Zoom Scan (5x5x7)/Cube 0:

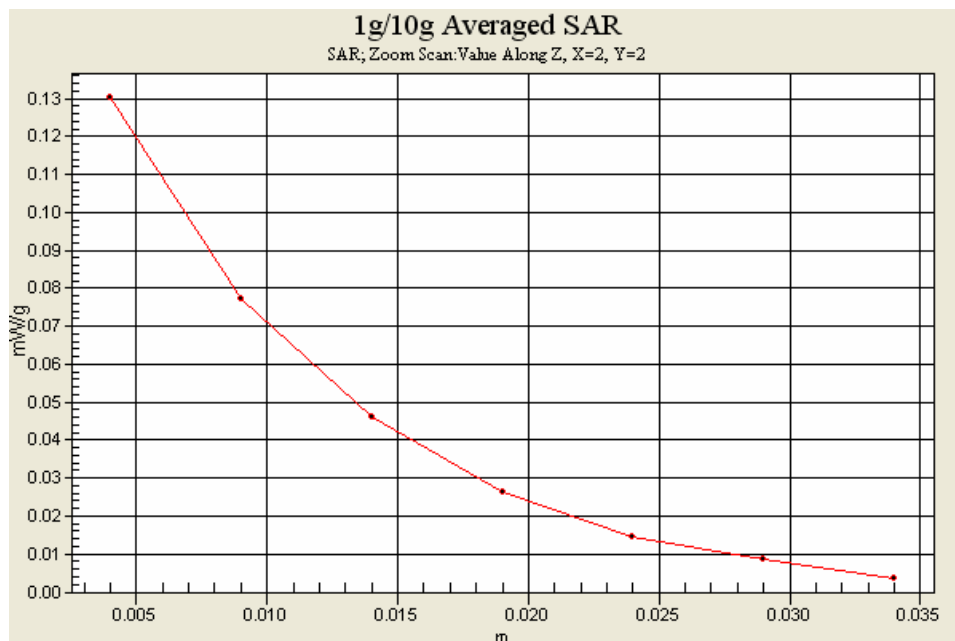
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.58 V/m; Power Drift = -0.066 dB

Peak SAR (extrapolated) = 0.206 W/kg

SAR(1 g) = 0.119 mW/g; SAR(10 g) = 0.066 mW/g

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



APPENDIX F

Probe Calibration



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Client **Samsung (Dymstec)**

Certificate No: **EX3-3520_Feb12**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3520**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4**
Calibration procedure for dosimetric E-field probes

Calibration date: **February 21, 2012**

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 (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: February 21, 2012

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

O.k. to use

 2012.4.19



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

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 affect the E^2 -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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,y,z}**: A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- 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 EX3DV4

SN:3520

Manufactured: March 8, 2004
Calibrated: February 21, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3520

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.76	0.65	0.65	± 10.1 %
DCP (mV) ^B	100.8	99.9	102.1	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	112.0	±3.0 %
			Y	0.00	0.00	1.00	134.2	
			Z	0.00	0.00	1.00	105.9	

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 E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3520

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
850	41.5	0.92	9.62	9.62	9.62	0.28	0.95	± 12.0 %
1750	40.1	1.37	8.80	8.80	8.80	0.31	0.87	± 12.0 %
1900	40.0	1.40	8.54	8.54	8.54	0.66	0.61	± 12.0 %
2450	39.2	1.80	7.43	7.43	7.43	0.32	0.91	± 12.0 %
5200	36.0	4.66	4.91	4.91	4.91	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.72	4.72	4.72	0.30	1.80	± 13.1 %
5500	35.6	4.96	4.52	4.52	4.52	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.46	4.46	4.46	0.35	1.80	± 13.1 %
5800	35.3	5.27	4.28	4.28	4.28	0.40	1.80	± 13.1 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3520

Calibration Parameter Determined in Body Tissue Simulating Media

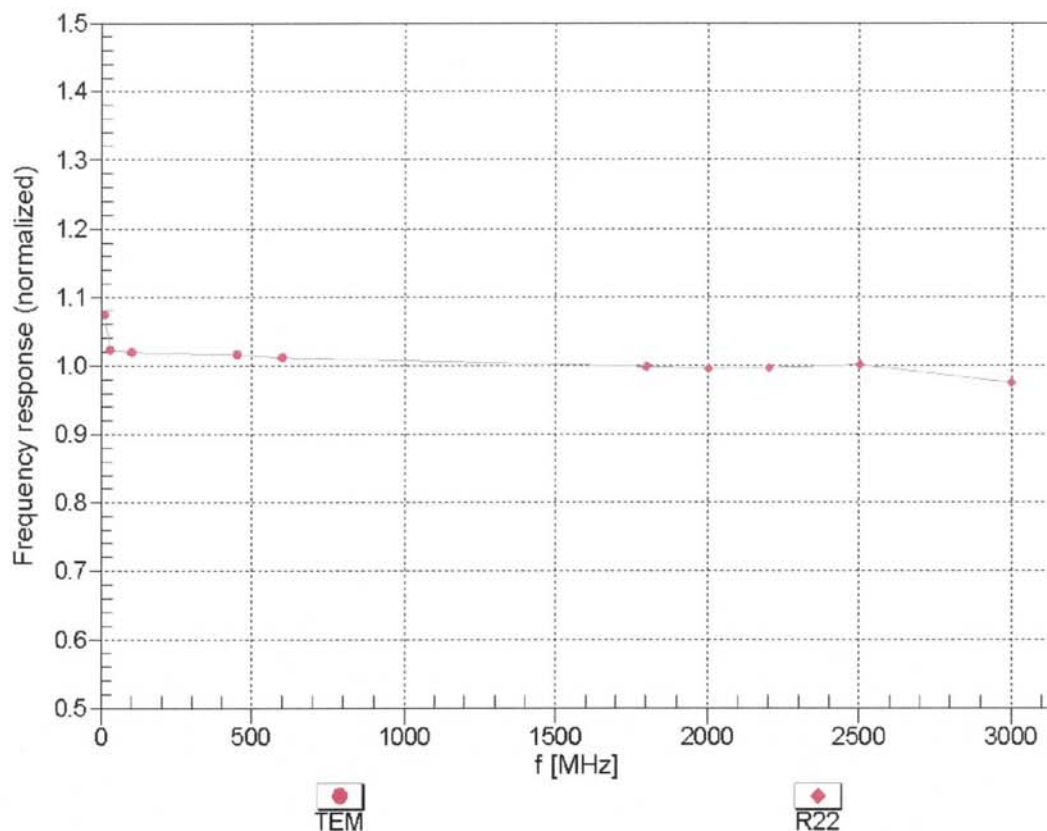
f (MHz) ^c	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
850	55.2	0.99	9.72	9.72	9.72	0.32	0.92	± 12.0 %
1750	53.4	1.49	8.78	8.78	8.78	0.29	1.13	± 12.0 %
1900	53.3	1.52	8.19	8.19	8.19	0.21	1.22	± 12.0 %
2450	52.7	1.95	7.45	7.45	7.45	0.80	0.50	± 12.0 %
5200	49.0	5.30	3.90	3.90	3.90	0.50	1.90	± 13.1 %
5300	48.9	5.42	3.64	3.64	3.64	0.55	1.90	± 13.1 %
5500	48.6	5.65	3.38	3.38	3.38	0.55	1.90	± 13.1 %
5600	48.5	5.77	3.27	3.27	3.27	0.55	1.90	± 13.1 %
5800	48.2	6.00	3.50	3.50	3.50	0.60	1.90	± 13.1 %

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Frequency Response of E-Field

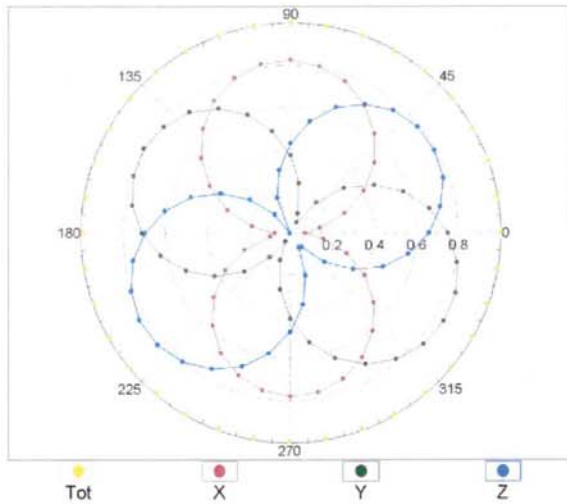
(TEM-Cell:ifi110 EXX, Waveguide: R22)



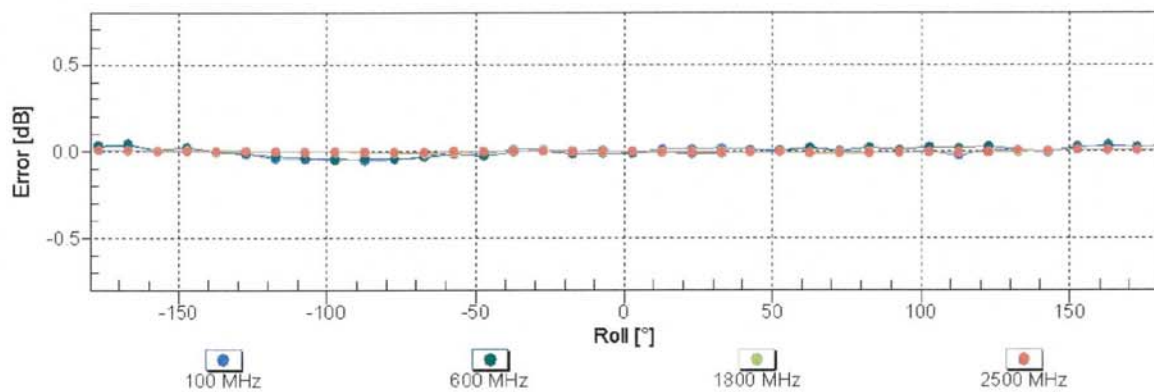
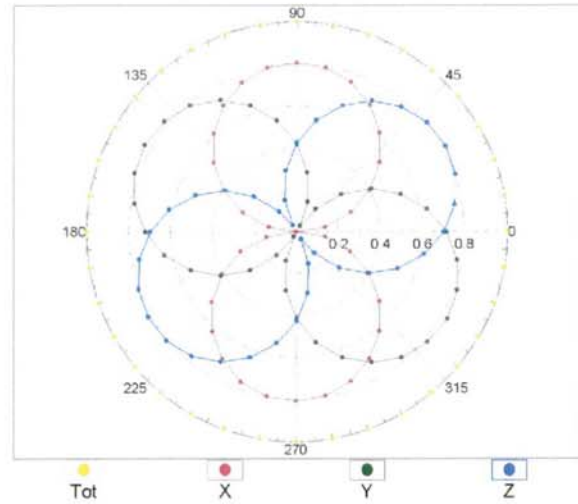
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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

f=600 MHz,TEM

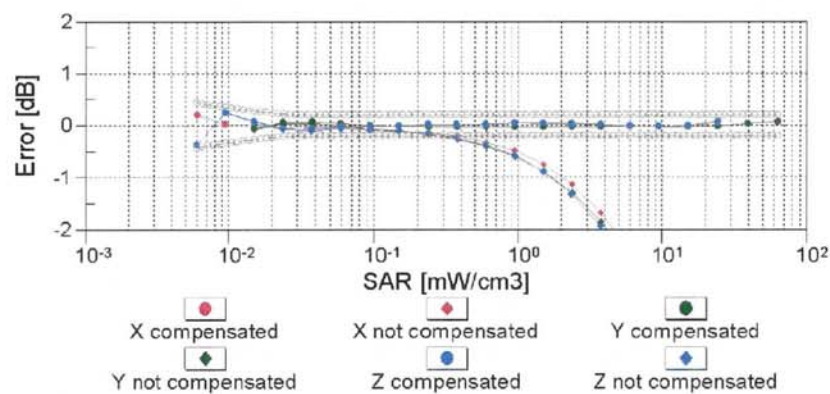
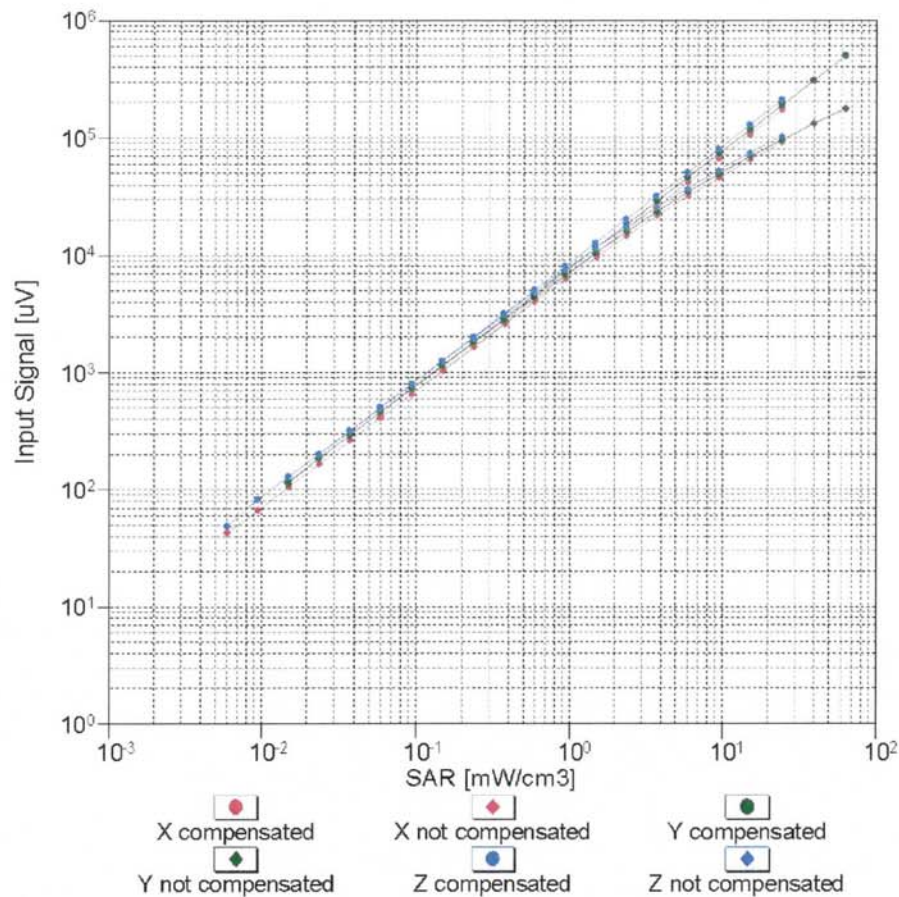


f=1800 MHz,R22



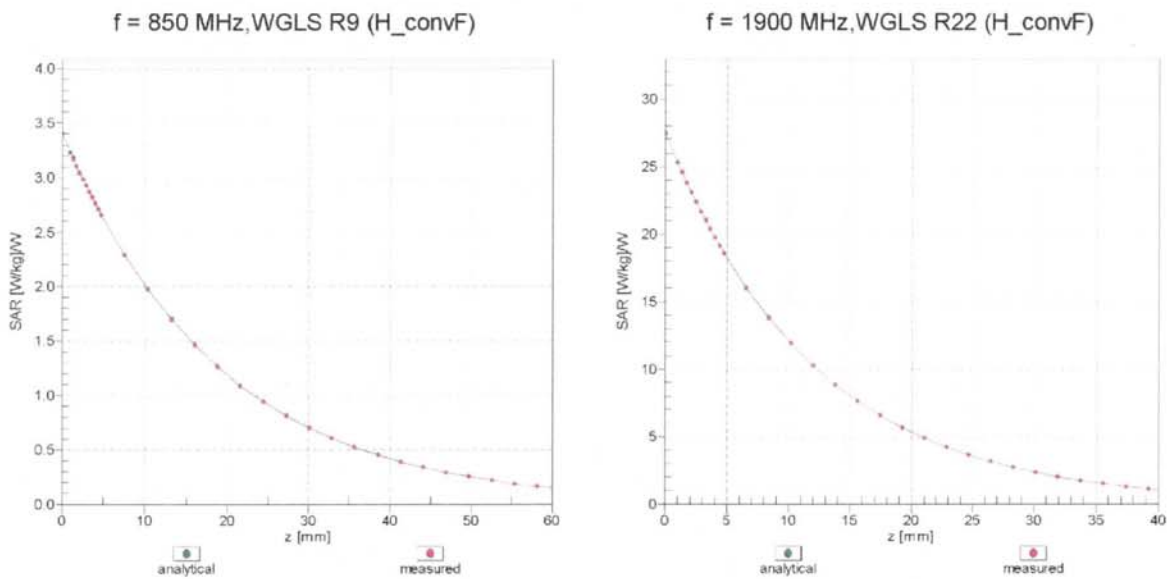
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)



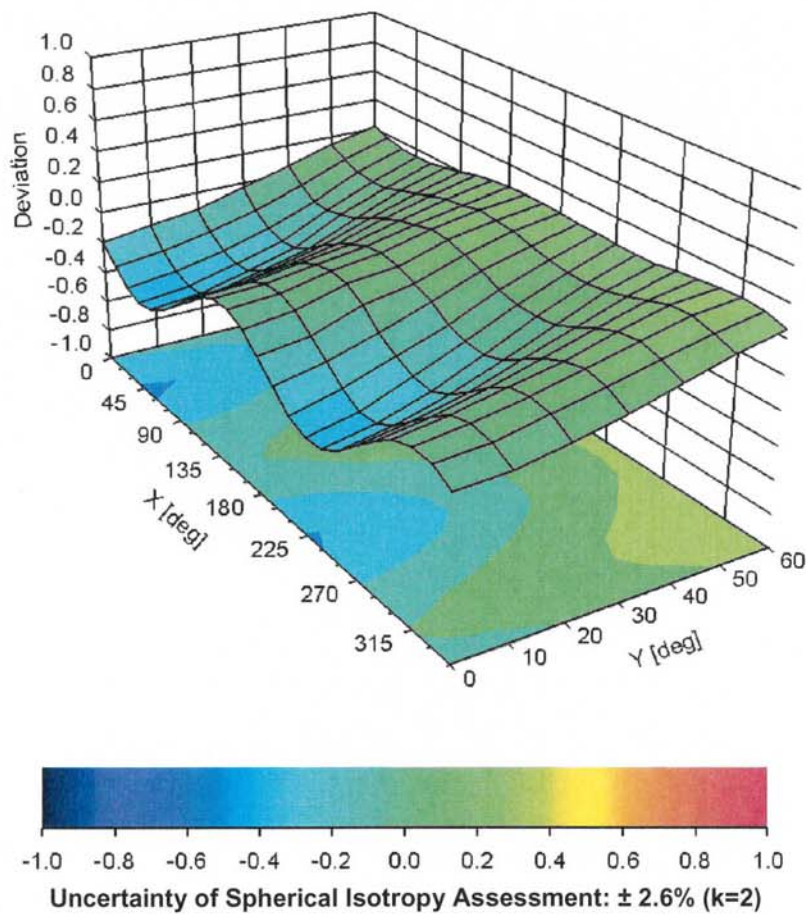
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



DASY/EASY - Parameters of Probe: EX3DV4 - SN:3520

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

APPENDIX G

Calibration of The Validation Dipole



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Client **Samsung (Dymstec)**

Certificate No: **D1900V2-5d023_Jan12**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d023**

Calibration procedure(s) **QA CAL-05.v8**
 Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **January 26, 2012**

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 (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Calibrated by: **Dimce Iliev** **Dimce Iliev** **Dimce Iliev**
 Name Function Signature
 Laboratory Technician

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

Issued: January 26, 2012

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



Accredited by the Swiss Accreditation Service (SAS)

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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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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:

- DASY4/5 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	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
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	40.8 $\pm$ 6 %	1.39 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.66 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	39.0 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	5.07 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	20.4 mW / g $\pm$ 16.5 % (k=2)

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 $\pm$ 0.2) °C	52.9 $\pm$ 6 %	1.52 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.72 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	38.8 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.4 mW / g $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$48.9\ \Omega + 8.1\ j\Omega$
Return Loss	- 21.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$45.3\ \Omega + 8.2\ j\Omega$
Return Loss	- 20.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 28, 2008

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d023

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 40.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Head Tissue/ $P_{in}=250$ mW, $d=10$ mm/Zoom Scan (7x7x7)/Cube 0:

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

Reference Value = 96.841 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 17.2900

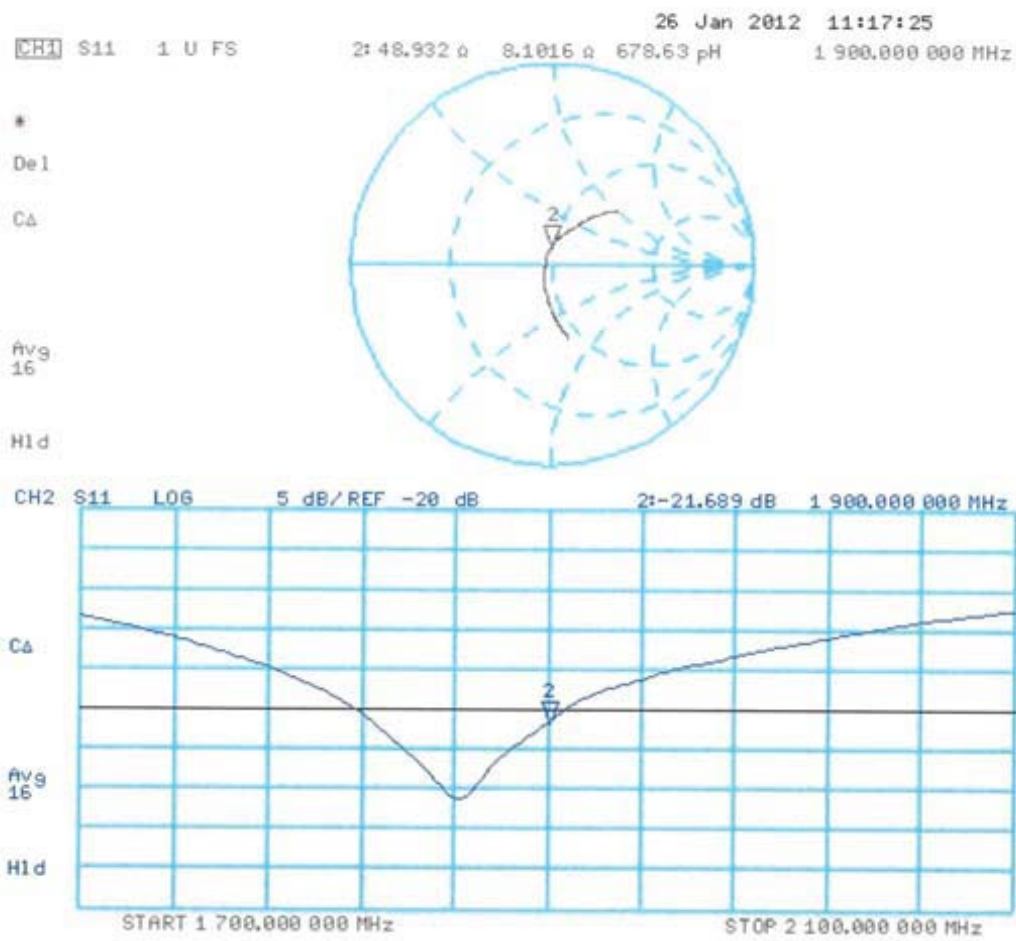
SAR(1 g) = 9.66 mW/g; SAR(10 g) = 5.07 mW/g

Maximum value of SAR (measured) = 11.991 mW/g



0 dB = 11.990mW/g = 21.58 dB mW/g

Impedance Measurement Plot for Head TSL



Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d023

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

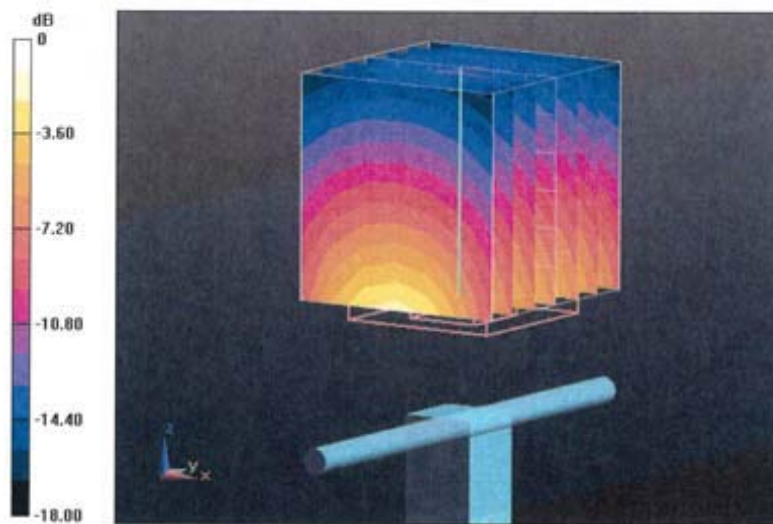
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.052 V/m; Power Drift = -6.9e-005 dB

Peak SAR (extrapolated) = 17.0640

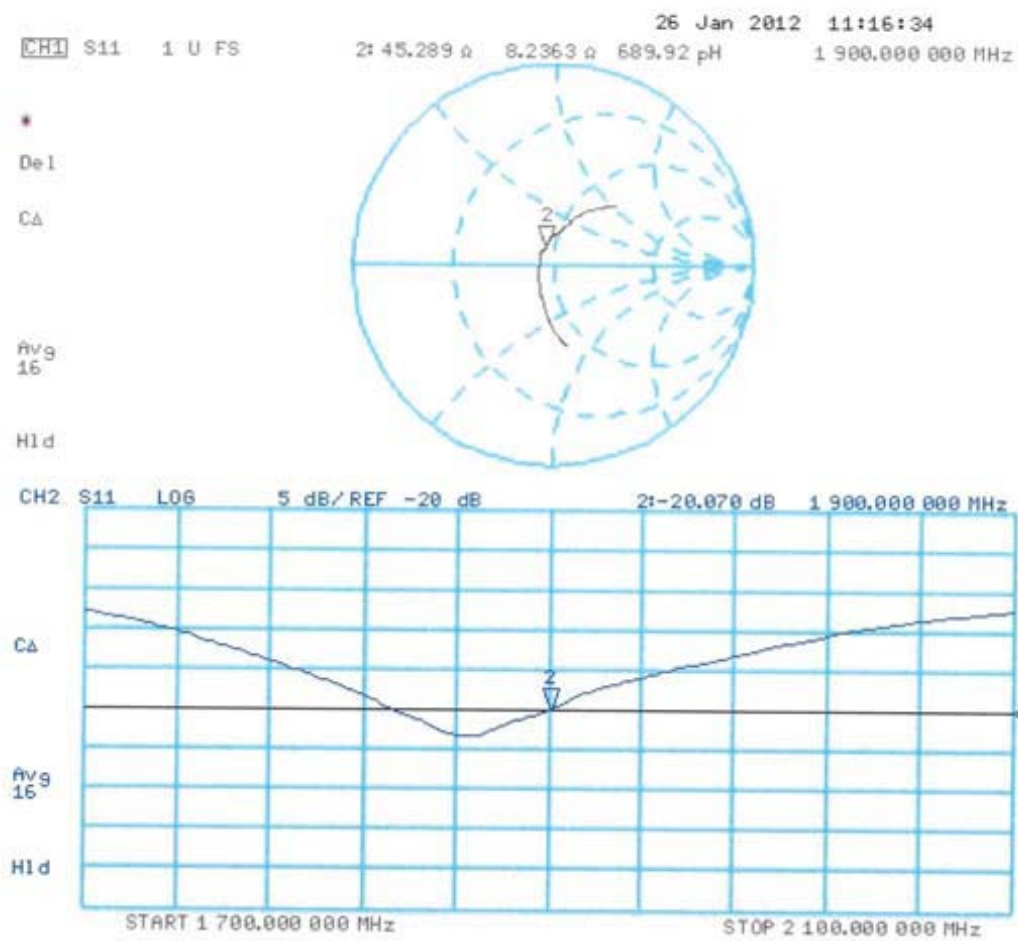
SAR(1 g) = 9.72 mW/g; SAR(10 g) = 5.1 mW/g

Maximum value of SAR (measured) = 12.349 mW/g



0 dB = 12.350mW/g = 21.83 dB mW/g

Impedance Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)
 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 **Samsung (Dymstec)**

Certificate No: **D2450V2-807_Feb12**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 807**

Calibration procedure(s) **QA CAL-05.v8**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **February 23, 2012**

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 (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 23, 2012

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



Accredited by the Swiss Accreditation Service (SAS)

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) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4/5 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	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.9 $\pm$ 6 %	1.86 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	53.5 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	6.25 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.8 mW / g $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	52.3 $\pm$ 6 %	2.02 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	50.3 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.95 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.6 mW / g $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$53.3 \Omega + 1.1 j\Omega$
Return Loss	- 29.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$49.6 \Omega + 2.6 j\Omega$
Return Loss	- 31.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.160 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 02, 2006

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 807

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.86$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

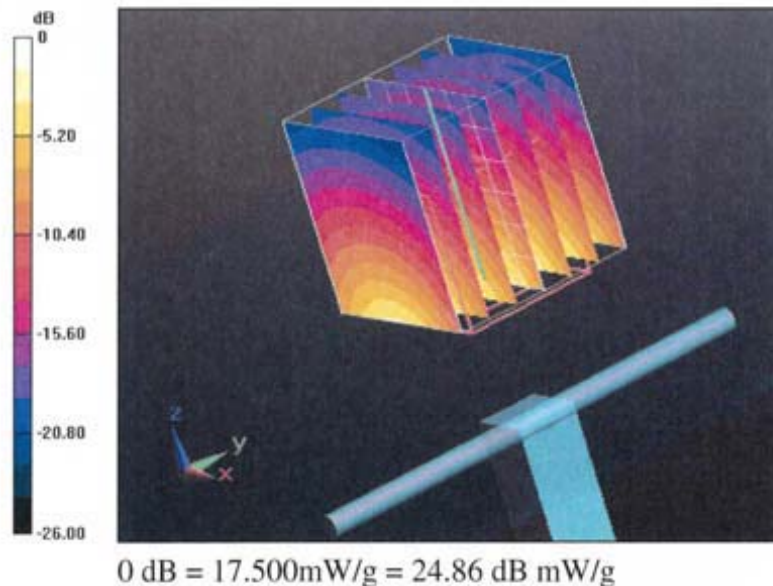
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.1 V/m; Power Drift = 0.07 dB

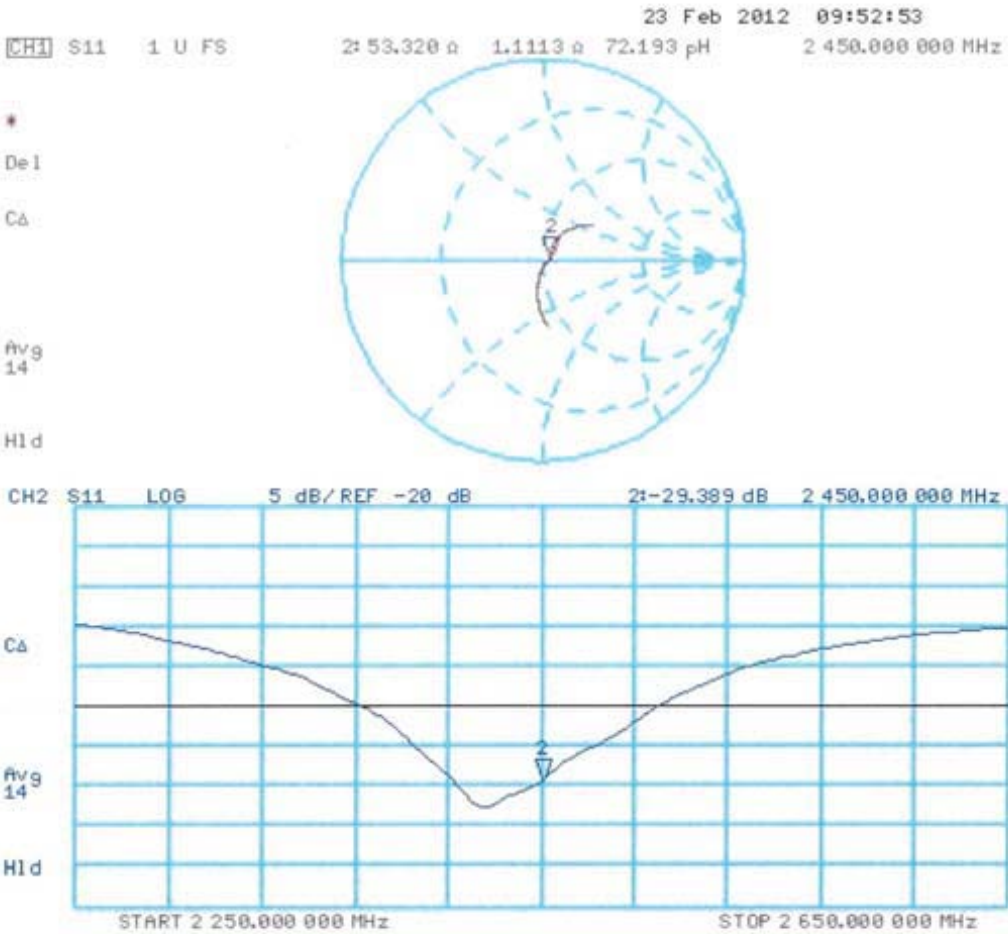
Peak SAR (extrapolated) = 28.6750

SAR(1 g) = 13.6 mW/g; SAR(10 g) = 6.25 mW/g

Maximum value of SAR (measured) = 17.500 mW/g



Impedance Measurement Plot for Head TSL



Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 807

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.02$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

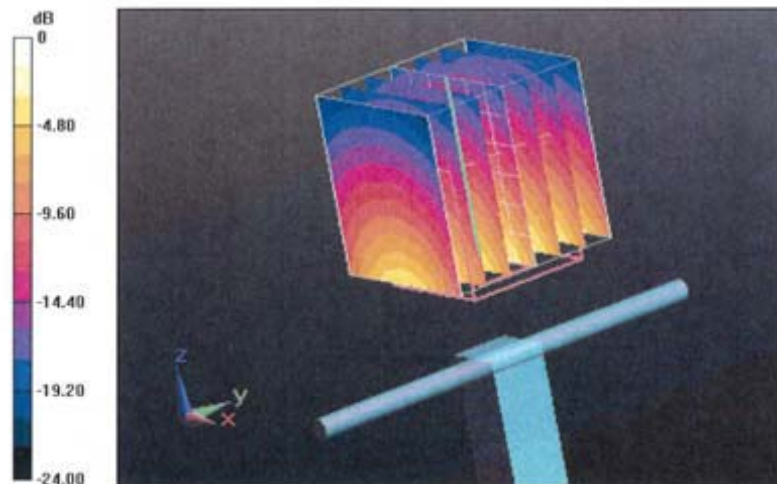
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.815 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 26.1870

SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.95 mW/g

Maximum value of SAR (measured) = 16.868 mW/g



0 dB = 16.870mW/g = 24.54 dB mW/g

Impedance Measurement Plot for Body TSL

