

APPENDIX A: SYSTEM CHECKING SCANS

Plot 1

Date/Time: 2015-07-01 09:52:32

Test Laboratory: TCC Microsoft

Type: D750V3; Serial: D750V3 - SN:1075

Communication System: CW

Frequency: 750 MHz; Duty Cycle: 1:1

Medium: HSL750; Medium Notes: t= 21.3 C

Medium parameters used: f = 750 MHz; $\sigma = 0.887$ S/m; $\epsilon_r = 41.054$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(9.14, 9.14, 9.14); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #1 SAM, SAR4; Type: SAM; Serial: TP-1018
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=15mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 49.512 V/m

Fast SAR: SAR(1 g) = 2.05 W/kg

Fast SAR(10 g) = 1.39 W/kg

Maximum value of SAR (interpolated) = 2.34 W/kg

d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 49.512 V/m

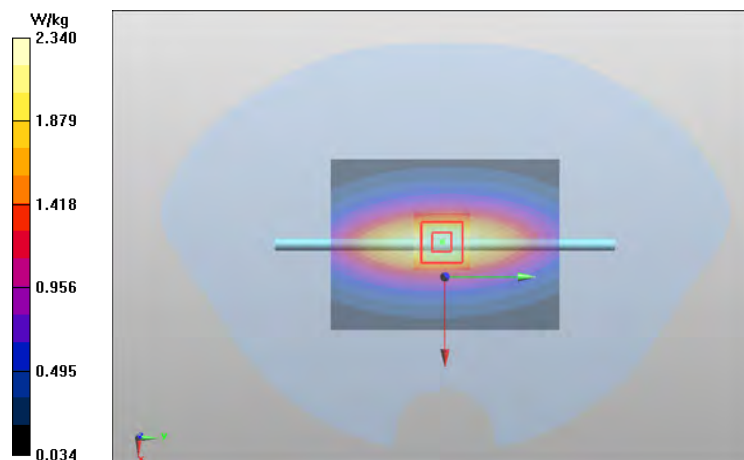
Peak SAR (extrapolated) = 2.95 W/kg

SAR(1 g) = 2 W/kg

SAR(10 g) = 1.32 W/kg

Power Drift = 0.00 dB

Maximum value of SAR (measured) = 2.33 W/kg



Plot 2

Date/Time: 2015-07-01 09:51:30

Test Laboratory: TCC Microsoft

Type: **D835V2**; Serial: **D835V2** - SN:480

Communication System: CW

Frequency: **835 MHz**; Duty Cycle: 1:1

Medium: HSL835; Medium Notes: t= 22.0 C

Medium parameters used: f = 835 MHz; $\sigma = 0.902$ S/m; $\epsilon_r = 41.18$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(6.04, 6.04, 6.04); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1596
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=15mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 52.563 V/m

Fast SAR: SAR(1 g) = 2.28 W/kg

Fast SAR(10 g) = 1.54 W/kg

Maximum value of SAR (interpolated) = 2.61 W/kg

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.563 V/m

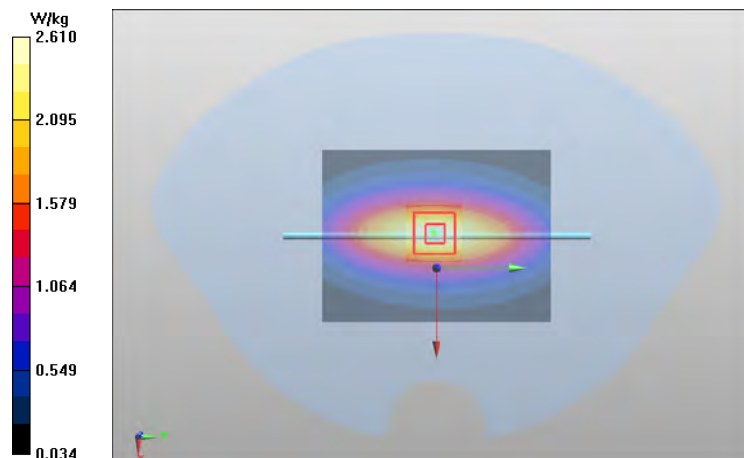
Peak SAR (extrapolated) = 3.32 W/kg

SAR(1 g) = 2.24 W/kg

SAR(10 g) = 1.47 W/kg

Power Drift = -0.03 dB

Maximum value of SAR (measured) = 2.42 W/kg



Plot 3

Date/Time: 2015-08-31 12:33:07

Test Laboratory: TCC Microsoft

Type: **D1750V2**; Serial: **D1750V2 - SN:1082**

Communication System: CW

Frequency: **1750 MHz**; Duty Cycle: 1:1

Medium: HSL1750; Medium Notes: t= 21 C

Medium parameters used: f = 1750 MHz; $\sigma = 1.321$ S/m; $\epsilon_r = 39.773$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3276
- ConvF(5.17, 5.17, 5.17); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2015-01-21
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1692
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 87.20 V/m

Fast SAR: SAR(1 g) = 9.11 W/kg

Fast SAR(10 g) = 4.85 W/kg

Maximum value of SAR (interpolated) = 11.7 W/kg

d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 87.20 V/m

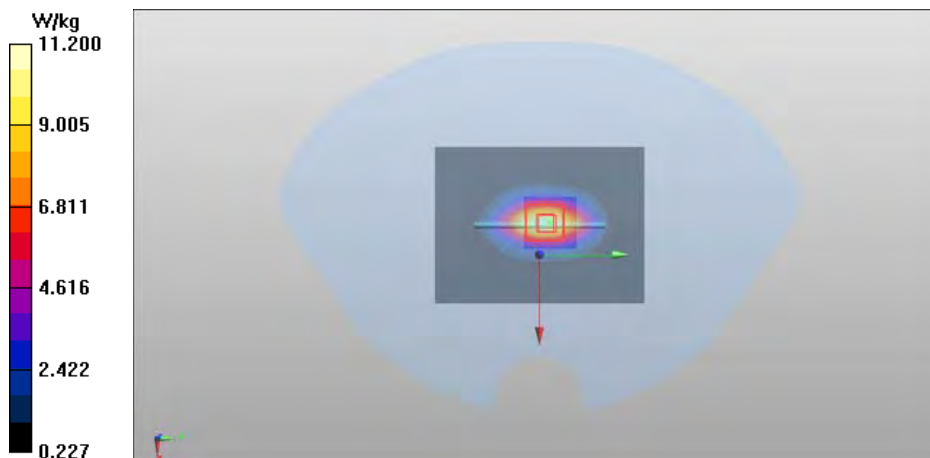
Peak SAR (extrapolated) = 15.9 W/kg

SAR(1 g) = 8.91 W/kg

SAR(10 g) = 4.72 W/kg

Power Drift = 0.00 dB

Maximum value of SAR (measured) = 11.2 W/kg



Plot 4

Date/Time: 2015-07-01 10:05:18

Test Laboratory: TCC Microsoft

Type: D1750V2; Serial: D1750V2 - SN:1082

Communication System: CW

Frequency: **1750 MHz**; Duty Cycle: 1:1

Medium: HSL1800; Medium Notes: t= 22.9 C

Medium parameters used: f = 1750 MHz; $\sigma = 1.354$ S/m; $\epsilon_r = 39.624$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(5.22, 5.22, 5.22); Calibrated: 2015-01-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2014-11-03
- Phantom: SAM 1; Type: SAM; Serial: TP-1167
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 88.492 V/m

Fast SAR: SAR(1 g) = 9.61 W/kg

Fast SAR(10 g) = 5.15 W/kg

Maximum value of SAR (interpolated) = 12.1 W/kg

d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 88.492 V/m

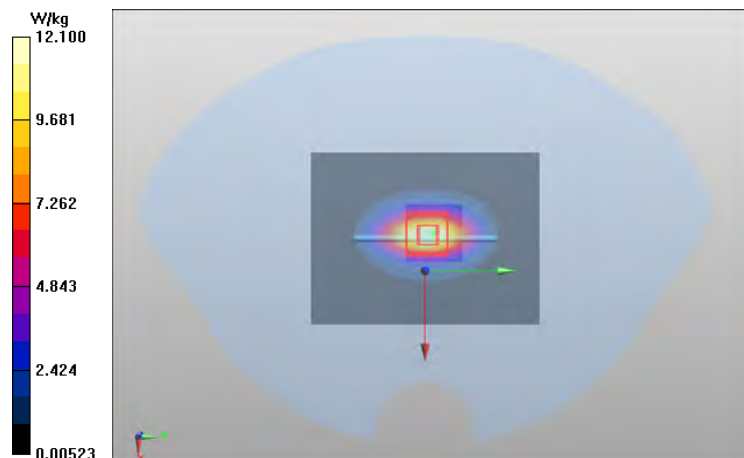
Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 9.37 W/kg

SAR(10 g) = 4.98 W/kg

Power Drift = -0.01 dB

Maximum value of SAR (measured) = 11.6 W/kg



Plot 5

Date/Time: 2015-09-01 9:25:55

Test Laboratory: TCC Microsoft

Type: D1900V2; Serial: D1900V2 - SN:5d013

Communication System: CW

Frequency: **1900 MHz**; Duty Cycle: 1:1

Medium: HSL1900; Medium Notes: $t = 22.8$ C

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.357$ S/m; $\epsilon_r = 38.498$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.85, 4.85, 4.85); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: SAM 1; Type: Twin Phantom GF-VE 20; Serial: TP-1736
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Reference Value = 90.01 V/m

Fast SAR: SAR(1 g) = 9.81 W/kg

Fast SAR(10 g) = 5.06 W/kg

Maximum value of SAR (interpolated) = 12.5 W/kg

d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 90.01 V/m

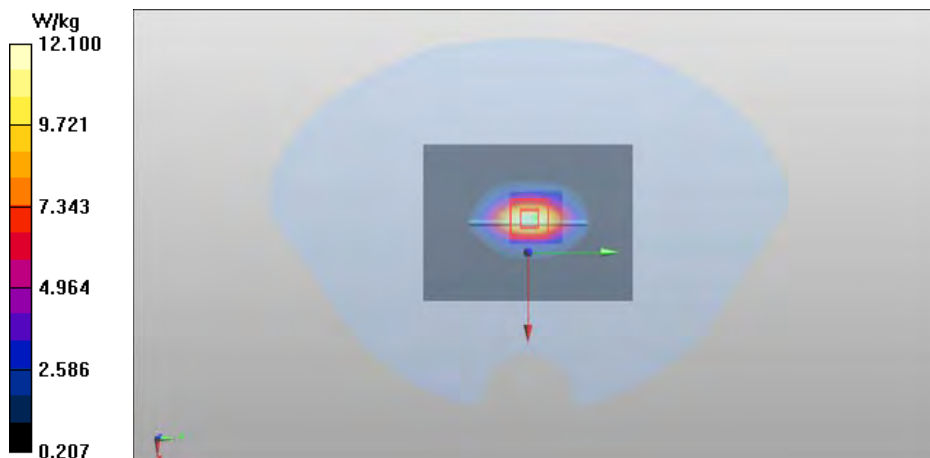
Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 9.7 W/kg

SAR(10 g) = 5.08 W/kg

Power Drift = 0.00 dB

Maximum value of SAR (measured) = 12.1 W/kg



Plot 6

Date/Time: 2015-09-01 10:12:44

Test Laboratory: TCC Microsoft

Type: D2450V2; Serial: D2450V2 - SN:749

Communication System: CW

Frequency: **2450 MHz**; Duty Cycle: 1:1

Medium: HSL2450; Medium Notes: $t=22,6$ C

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.749$ S/m; $\epsilon_r = 38.752$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.24, 7.24, 7.24); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: SAM2; Type: SAM; Serial: TP-1570
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Reference Value = 89.52 V/m

Fast SAR: SAR(1 g) = 12.6 W/kg

Fast SAR(10 g) = 5.92 W/kg

Maximum value of SAR (interpolated) = 16.7 W/kg

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

Reference Value = 89.52 V/m

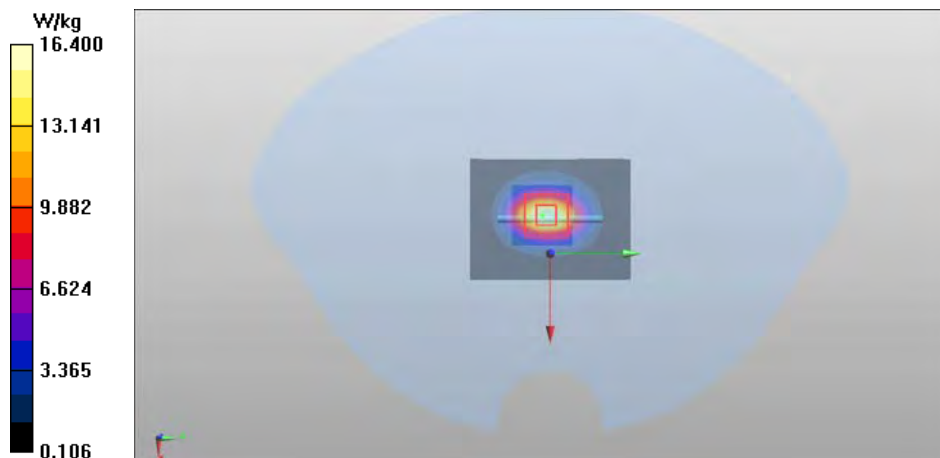
Peak SAR (extrapolated) = 25.7 W/kg

SAR(1 g) = 12.5 W/kg

SAR(10 g) = 5.86 W/kg

Power Drift = -0.06 dB

Maximum value of SAR (measured) = 16.4 W/kg



Plot 7

Date/Time: 2015-07-02 07:51:04

Test Laboratory: TCC Microsoft

Type: D2450V2; Serial: D2450V2 - SN:749

Communication System: CW

Frequency: **2450 MHz**; Duty Cycle: 1:1

Medium: HSL2450-2600; Medium Notes: t = 21.4 C

Medium parameters used: f = 2450 MHz; $\sigma = 1.836$ S/m; $\epsilon_r = 38.591$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(6.86, 6.86, 6.86); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: ROBOSAM 2.4GHz; Type: SAM; Serial: 0001
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 91.967 V/m

Fast SAR: SAR(1 g) = 13.7 W/kg

Fast SAR(10 g) = 6.08 W/kg

Maximum value of SAR (interpolated) = 18.0 W/kg

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

Reference Value = 91.967 V/m

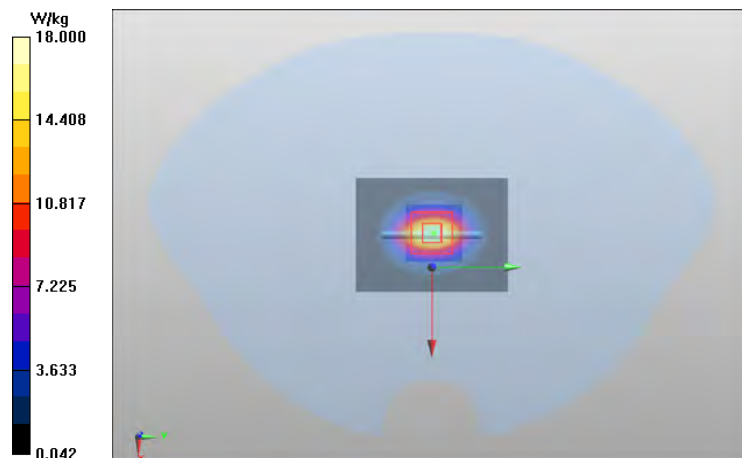
Peak SAR (extrapolated) = 29.0 W/kg

SAR(1 g) = 13.8 W/kg

SAR(10 g) = 6.41 W/kg

Power Drift = 0.09 dB

Maximum value of SAR (measured) = 18.3 W/kg



Plot 8

Date/Time: 2015-07-07 06:19:56

Test Laboratory: TCC Microsoft

Type: **D2600V2**; Serial: **D2600V2 - SN:1056**

Communication System: CW

Frequency: **2600 MHz**; Duty Cycle: 1:1

Medium: HSL2300-2600; Medium Notes: t = 22.3 C

Medium parameters used: f = 2600 MHz; $\sigma = 1.933$ S/m; $\epsilon_r = 37.618$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.13, 7.13, 7.13); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: SAM2; Type: SAM; Serial: TP-1570
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 92.447 V/m

Fast SAR: SAR(1 g) = 14.6 W/kg

Fast SAR(10 g) = 6.57 W/kg

Maximum value of SAR (interpolated) = 19.3 W/kg

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

Reference Value = 92.447 V/m

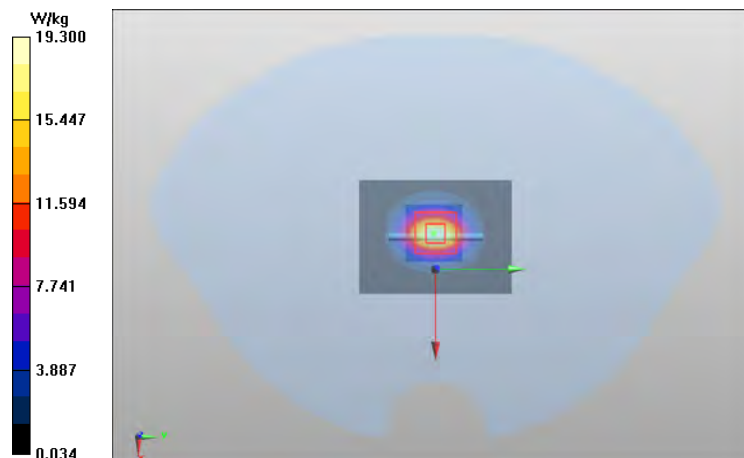
Peak SAR (extrapolated) = 31.6 W/kg

SAR(1 g) = 14.6 W/kg

SAR(10 g) = 6.51 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 19.6 W/kg



Plot 9

Date/Time: 2015-07-01 08:59:29

Test Laboratory: TCC Microsoft

Type: D5GHzV2; Serial: D5GHzV2 - SN: 1048

Communication System: CW

Frequency: **5200 MHz**; Duty Cycle: 1:1

Medium: HSL5000; Medium Notes: $t=21.3$ C

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.618$ S/m; $\epsilon_r = 36.34$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.87, 4.87, 4.87); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW 5200/Area Scan (61x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 16.9 W/kg

d=10mm, Pin=100mW 5200/Zoom Scan (8x8x12)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm

Reference Value = 63.388 V/m

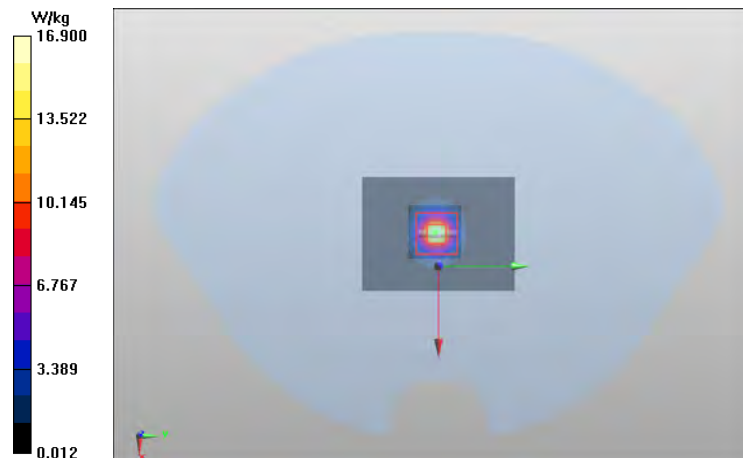
Peak SAR (extrapolated) = 33.9 W/kg

SAR(1 g) = 8.1 W/kg

SAR(10 g) = 2.31 W/kg

Power Drift = 0.09 dB

Maximum value of SAR (measured) = 16.1 W/kg



Plot 10

Date/Time: 2015-07-06 10:38:31

Test Laboratory: TCC Microsoft

Type: D5GHzV2; Serial: D5GHzV2 - SN: 1048

Communication System: CW

Frequency: **5300 MHz**; Duty Cycle: 1:1

Medium: HSL5000; Medium Notes: $t=21.6$ C

Medium parameters used: $f = 5300$ MHz; $\sigma = 4.731$ S/m; $\epsilon_r = 36.527$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.68, 4.68, 4.68); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW 5300/Area Scan (61x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 13.2 W/kg

d=10mm, Pin=100mW 5300/Zoom Scan (8x8x12)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm

Reference Value = 63.451 V/m

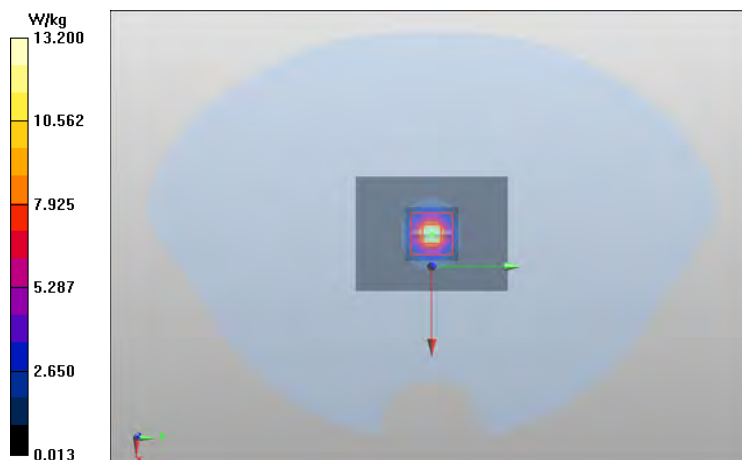
Peak SAR (extrapolated) = 35.3 W/kg

SAR(1 g) = 8.19 W/kg

SAR(10 g) = 2.32 W/kg

Power Drift = 0.09 dB

Maximum value of SAR (measured) = 15.8 W/kg



Plot 11

Date/Time: 2015-07-01 10:13:39

Test Laboratory: TCC Microsoft

Type: **D5GHzV2**; Serial: **D5GHzV2** - SN: **1048**

Communication System: CW

Frequency: **5500 MHz**; Duty Cycle: 1:1

Medium: HSL5000; Medium Notes: $t=21.3$ C

Medium parameters used: $f = 5500$ MHz; $\sigma = 4.914$ S/m; $\epsilon_r = 35.946$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.7, 4.7, 4.7); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW 5500/Area Scan (61x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 15.5 W/kg

d=10mm, Pin=100mW 5500/Zoom Scan (8x8x12)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm

Reference Value = 59.346 V/m

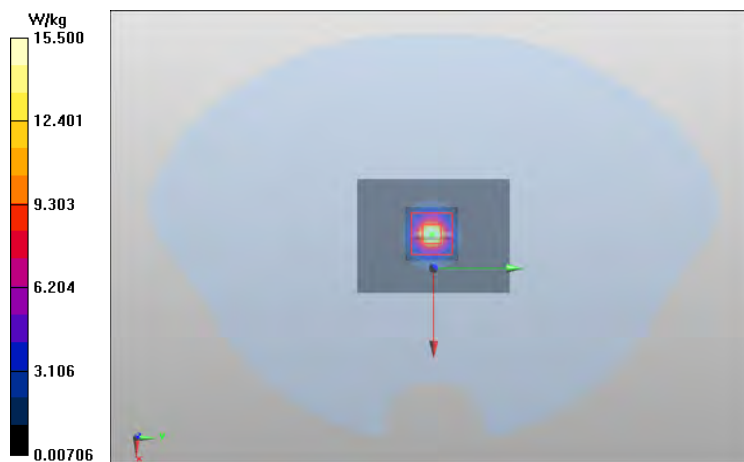
Peak SAR (extrapolated) = 33.3 W/kg

SAR(1 g) = 7.56 W/kg

SAR(10 g) = 2.13 W/kg

Power Drift = 0.15 dB

Maximum value of SAR (measured) = 14.7 W/kg



Plot 12

Date/Time: 2015-07-01 11:18:52

Test Laboratory: TCC Microsoft

Type: **D5GHzV2**; Serial: **D5GHzV2** - SN: **1048**

Communication System: CW

Frequency: **5600 MHz**; Duty Cycle: 1:1

Medium: HSL5000; Medium Notes: $t=21.3$ C

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.031$ S/m; $\epsilon_r = 35.842$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.53, 4.53, 4.53); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW 5600/Area Scan (61x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 18.7 W/kg

d=10mm, Pin=100mW 5600/Zoom Scan (8x8x12)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm

Reference Value = 63.315 V/m

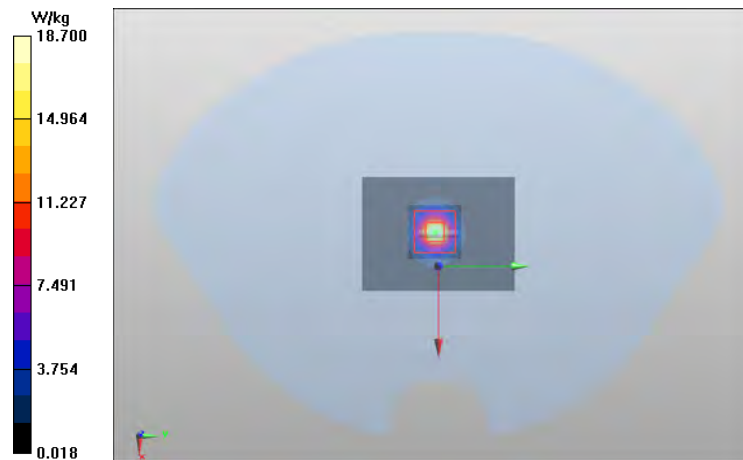
Peak SAR (extrapolated) = 39.4 W/kg

SAR(1 g) = 8.75 W/kg

SAR(10 g) = 2.46 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 17.1 W/kg



Plot 13

Date/Time: 2015-07-06 11:52:23

Test Laboratory: TCC Microsoft

Type: D5GHzV2; Serial: D5GHzV2 - SN: 1048

Communication System: CW

Frequency: **5800 MHz**; Duty Cycle: 1:1

Medium: HSL5000; Medium Notes: $t=21.6$ C

Medium parameters used: $f = 5800$ MHz; $\sigma = 5.26$ S/m; $\epsilon_r = 35.807$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.5, 4.5, 4.5); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW 5800/Area Scan (61x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 12.0 W/kg

d=10mm, Pin=100mW 5800/Zoom Scan (8x8x12)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm

Reference Value = 57.012 V/m

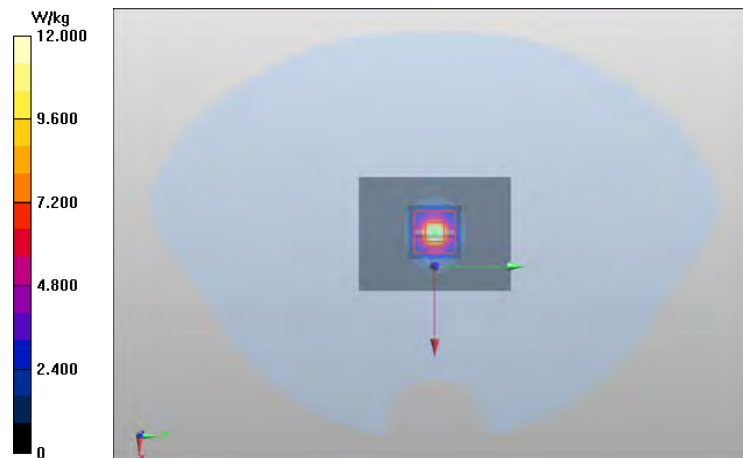
Peak SAR (extrapolated) = 33.4 W/kg

SAR(1 g) = 7.2 W/kg

SAR(10 g) = 2.03 W/kg

Power Drift = 0.12 dB

Maximum value of SAR (measured) = 14.0 W/kg



Plot 14

Date/Time: 2015-07-07 06:42:58

Test Laboratory: TCC Microsoft

Type: **D750V3**; Serial: **D750V3** - SN:1075

Communication System: CW

Frequency: **750 MHz**; Duty Cycle: 1:1

Medium: BSL750; Medium Notes: $t = 22.0$ C

Medium parameters used: $f = 750$ MHz; $\sigma = 0.982$ S/m; $\epsilon_r = 54.197$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(8.8, 8.8, 8.8); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #2 Triple, SAR4; Type: QD 000 P51 CA; Serial: TP-1123/1 (750 MHz), TP-1124/1 (2450 MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=15mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Reference Value = 50.292 V/m

Fast SAR: SAR(1 g) = 2.3 W/kg

Fast SAR(10 g) = 1.56 W/kg

Maximum value of SAR (interpolated) = 2.63 W/kg

d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 50.292 V/m

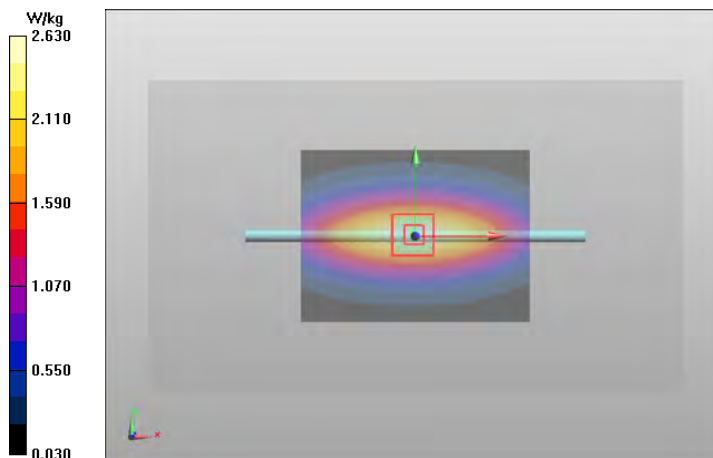
Peak SAR (extrapolated) = 3.29 W/kg

SAR(1 g) = 2.26 W/kg

SAR(10 g) = 1.5 W/kg

Power Drift = -0.03 dB

Maximum value of SAR (measured) = 2.63 W/kg



Plot 15

Date/Time: 2015-07-15 08:04:08

Test Laboratory: TCC Microsoft

Type: **D835V2**; Serial: **D835V2** - SN:480

Communication System: CW

Frequency: **835 MHz**; Duty Cycle: 1:1

Medium: BSL835; Medium Notes: t= 21,9 C

Medium parameters used: f = 835 MHz; σ = 0.983 S/m; ϵ_r = 53.626; ρ = 1000 kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=15mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 52.242 V/m

Fast SAR: SAR(1 g) = 2.46 W/kg

Fast SAR(10 g) = 1.65 W/kg

Maximum value of SAR (interpolated) = 2.83 W/kg

d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 52.242 V/m

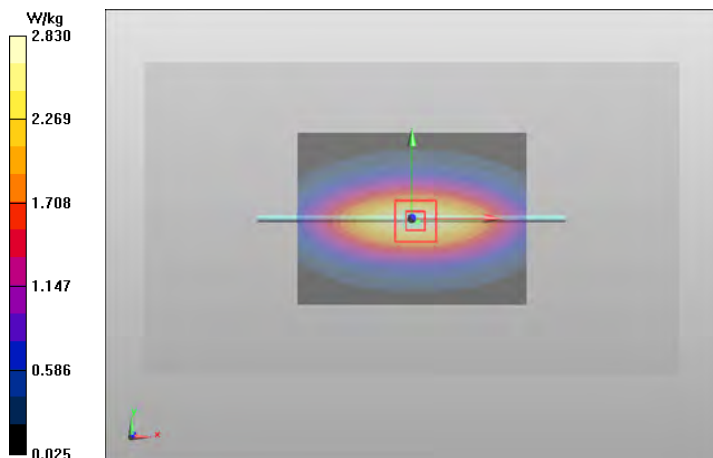
Peak SAR (extrapolated) = 3.57 W/kg

SAR(1 g) = 2.43 W/kg

SAR(10 g) = 1.6 W/kg

Power Drift = -0.03 dB

Maximum value of SAR (measured) = 2.84 W/kg



Plot 16

Date/Time: 2015-08-30 8:31:30

Test Laboratory: TCC Microsoft

Type: D1750V2; Serial: D1750V2 - SN:1082

Communication System: CW

Frequency: **1750 MHz**; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t = 20.8 C

Medium parameters used: f = 1750 MHz; $\sigma = 1.453$ S/m; $\epsilon_r = 51.511$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3276
- ConvF(4.91, 4.91, 4.91); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2015-01-21
- Phantom: SAM 2 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/2 (1800MHz), TP-1123/2 (1900MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 86.55 V/m

Fast SAR: SAR(1 g) = 9.51 W/kg

Fast SAR(10 g) = 4.97 W/kg

Maximum value of SAR (interpolated) = 12.0 W/kg

d=10mm, Pin=250mW/Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 86.55 V/m

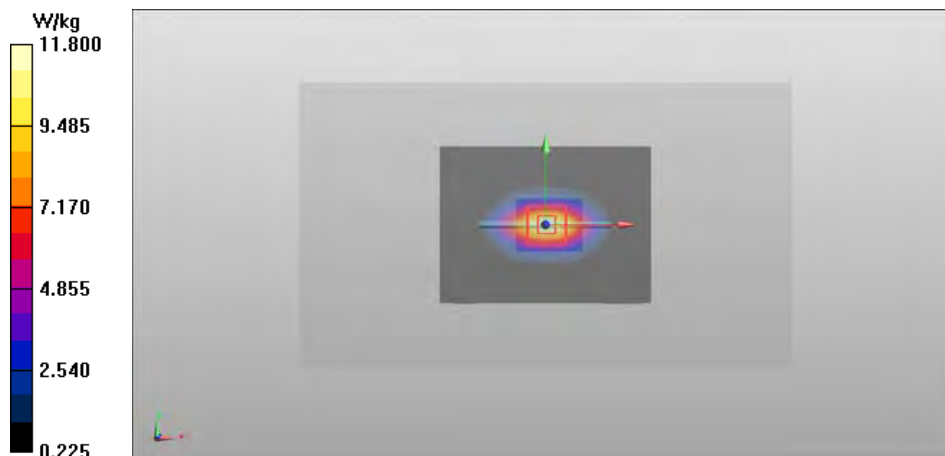
Peak SAR (extrapolated) = 16.3 W/kg

SAR(1 g) = 9.38 W/kg

SAR(10 g) = 5.03 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 11.8 W/kg



Plot 17

Date/Time: 2015-07-25 09:00:33

Test Laboratory: TCC Microsoft

Type: **D1750V2**; Serial: **D1750V2 - SN:1082**

Communication System: CW

Frequency: **1750 MHz**; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t=22,65 C

Medium parameters used: $f = 1750 \text{ MHz}$; $\sigma = 1.446 \text{ S/m}$; $\epsilon_r = 51.449$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.92, 4.92, 4.92); Calibrated: 2015-01-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2014-11-03
- Phantom: Triple Flat Phantom 5.1C; Type: SN 000 T01 DA; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 82.107 V/m

Fast SAR: SAR(1 g) = 9.21 W/kg

Fast SAR(10 g) = 4.76 W/kg

Maximum value of SAR (interpolated) = 12.1 W/kg

d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 82.107 V/m

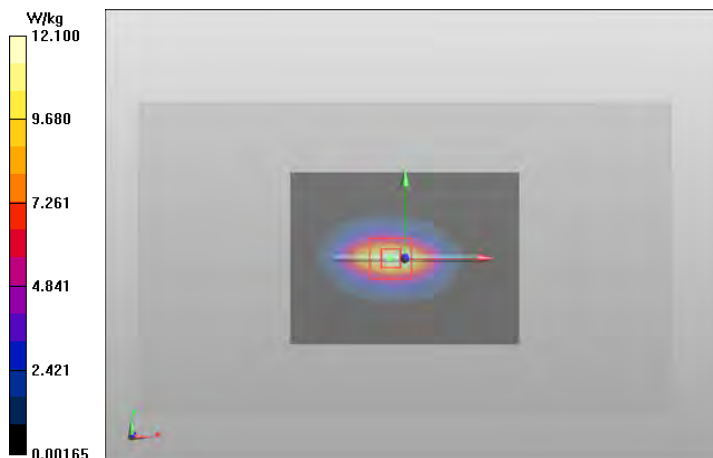
Peak SAR (extrapolated) = 15.7 W/kg

SAR(1 g) = 9.02 W/kg

SAR(10 g) = 4.84 W/kg

Power Drift = -0.00 dB

Maximum value of SAR (measured) = 11.3 W/kg



Plot 18

Date/Time: 2015-09-02 10:47:18

Test Laboratory: TCC Microsoft

Type: **D1900V2**; Serial: **D1900V2 - SN:5d013**

Communication System: CW

Frequency: **1900 MHz**; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t = 22.1 C

Medium parameters used: f = 1900 MHz; $\sigma = 1.488$ S/m; $\epsilon_r = 51.693$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 87.69 V/m

Fast SAR: SAR(1 g) = 9.54 W/kg

Fast SAR(10 g) = 4.77 W/kg

Maximum value of SAR (interpolated) = 12.3 W/kg

d=10mm, Pin=250mW/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 87.69 V/m

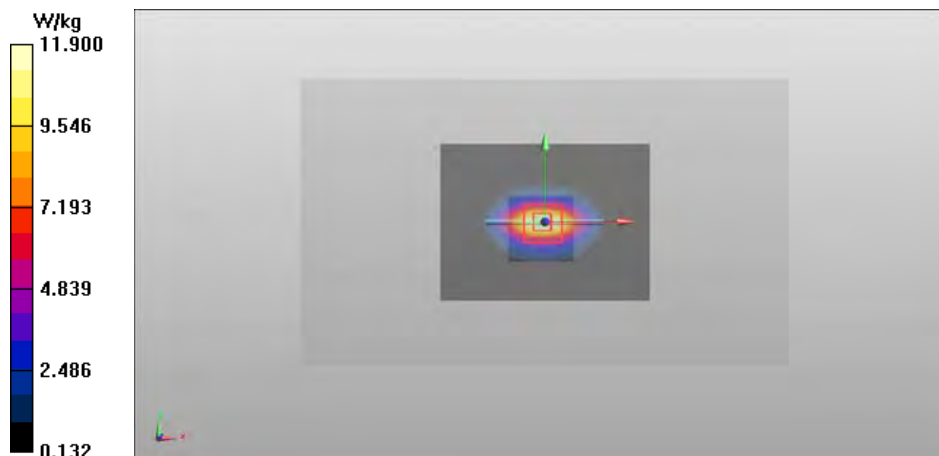
Peak SAR (extrapolated) = 16.4 W/kg

SAR(1 g) = 9.53 W/kg

SAR(10 g) = 5.04 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 11.9 W/kg



Plot 19

Date/Time: 2015-08-28 12:32:54

Test Laboratory: TCC Microsoft

Type: D2450V2; Serial: D2450V2 - SN:749

Communication System: CW

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: t = 22.5 C

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.909$ S/m; $\epsilon_r = 51.6$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.32, 7.32, 7.32); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 85.15 V/m

Fast SAR: SAR(1 g) = 11.8 W/kg

Fast SAR(10 g) = 5.13 W/kg

Maximum value of SAR (interpolated) = 15.7 W/kg

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

Reference Value = 85.15 V/m

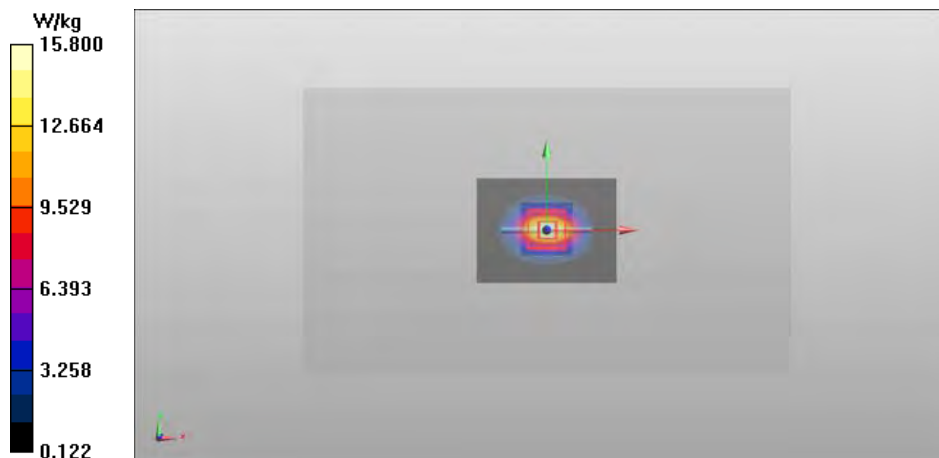
Peak SAR (extrapolated) = 24.0 W/kg

SAR(1 g) = 11.9 W/kg

SAR(10 g) = 5.6 W/kg

Power Drift = -0.04 dB

Maximum value of SAR (measured) = 15.8 W/kg



Plot 20

Date/Time: 2015-07-03 06:14:39

Test Laboratory: TCC Microsoft

Type: D2450V2; Serial: D2450V2 - SN:749

Communication System: CW

Frequency: **2450 MHz**; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.2$ C

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.958$ S/m; $\epsilon_r = 52.529$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA; Serial:
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 88.153 V/m

Fast SAR: SAR(1 g) = 13.4 W/kg

Fast SAR(10 g) = 5.85 W/kg

Maximum value of SAR (interpolated) = 17.9 W/kg

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

Reference Value = 88.153 V/m

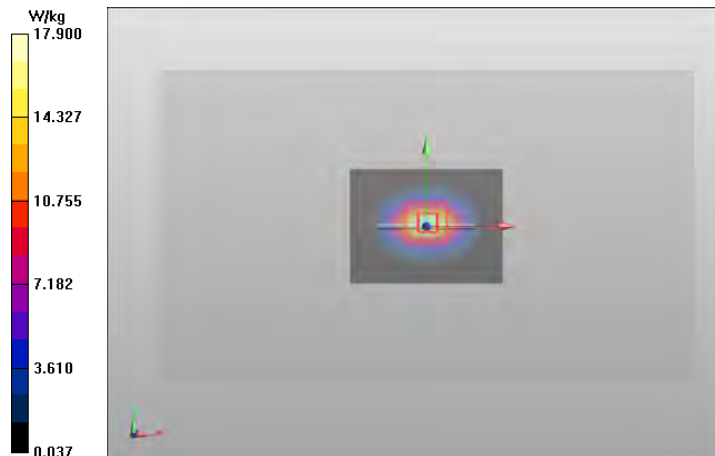
Peak SAR (extrapolated) = 26.6 W/kg

SAR(1 g) = 13.6 W/kg

SAR(10 g) = 6.44 W/kg

Power Drift = 0.05 dB

Maximum value of SAR (measured) = 17.6 W/kg



Plot 21

Date/Time: 2015-08-28 8:49:07

Test Laboratory: TCC Microsoft

Type: D2600V2; Serial: D2600V2 - SN:1056

Communication System: CW

Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: t = 22.5 C

Medium parameters used: f = 2600 MHz; σ = 2.089 S/m; ϵ_r = 51.15; ρ = 1000 kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 85.22 V/m

Fast SAR: SAR(1 g) = 13.5 W/kg

Fast SAR(10 g) = 5.88 W/kg

Maximum value of SAR (interpolated) = 18.2 W/kg

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

Reference Value = 85.22 V/m

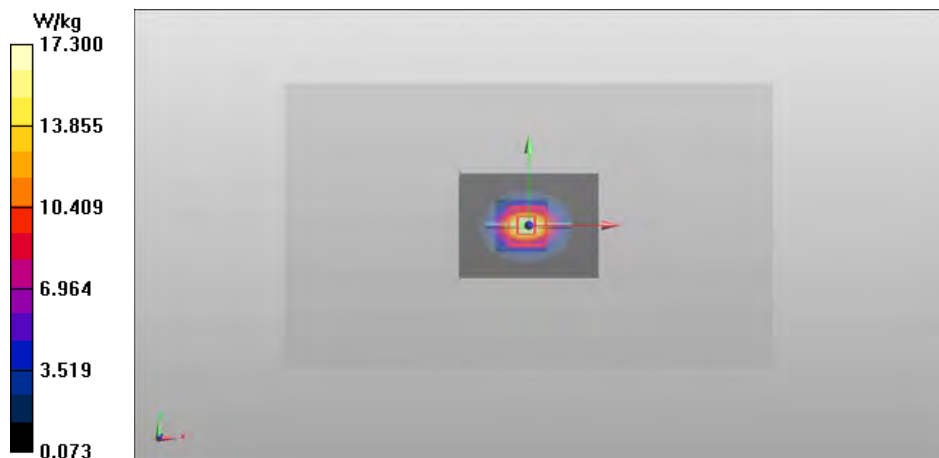
Peak SAR (extrapolated) = 27.4 W/kg

SAR(1 g) = 13.2 W/kg

SAR(10 g) = 5.94 W/kg

Power Drift = -0.06 dB

Maximum value of SAR (measured) = 17.3 W/kg



Plot 22

Date/Time: 2015-08-30 18:34:11

Test Laboratory: TCC Microsoft

Type: D5GHzV2; Serial: D5GHzV2 - SN: 1048

Communication System: CW

Frequency: **5200 MHz**; Duty Cycle: 1:1

Medium: BSL 5000; Medium Notes: t= 21.7 C

Medium parameters used: f = 5200 MHz; σ = 5.489 S/m; ϵ_r = 46.875; ρ = 1000 kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.51, 4.51, 4.51); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=100mW 5200/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 55.72 V/m

Fast SAR: SAR(1 g) = 7.15 W/kg

Fast SAR(10 g) = 2.01 W/kg

Maximum value of SAR (interpolated) = 16.0 W/kg

d=10mm, Pin=100mW 5200/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 55.72 V/m

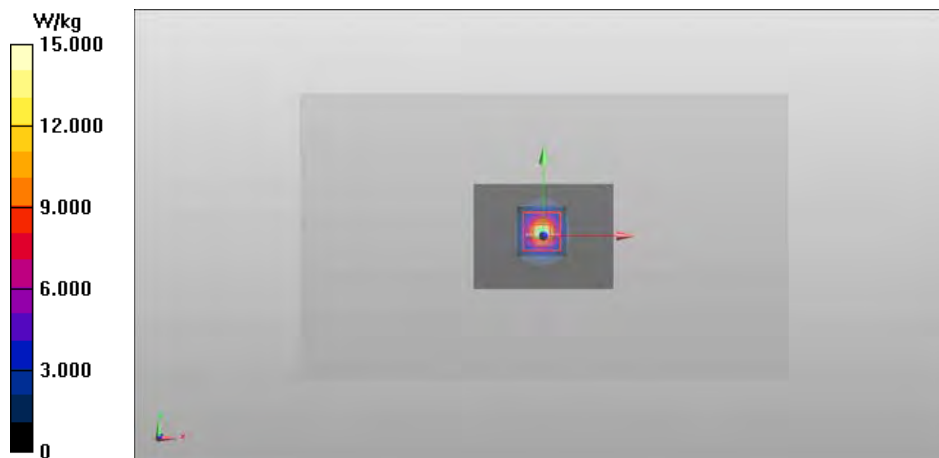
Peak SAR (extrapolated) = 32.8 W/kg

SAR(1 g) = 7.78 W/kg

SAR(10 g) = 2.18 W/kg

Power Drift = -0.06 dB

Maximum value of SAR (measured) = 15.0 W/kg



Plot 23

Date/Time: 2015-07-04 12:43:49

Test Laboratory: TCC Microsoft

Type: **D5GHzV2**; Serial: **D5GHzV2** - SN: **1048**

Communication System: CW

Frequency: **5300 MHz**; Duty Cycle: 1:1

Medium: BSL5000; Medium Notes: 21.3 C

Medium parameters used: $f = 5300 \text{ MHz}$; $\sigma = 5.576 \text{ S/m}$; $\epsilon_r = 47.759$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.35, 4.35, 4.35); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA; Serial:
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW 5300/Area Scan (81x61x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 16.9 W/kg

d=10mm, Pin=100mW 5300/Zoom Scan (8x8x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 58.955 V/m

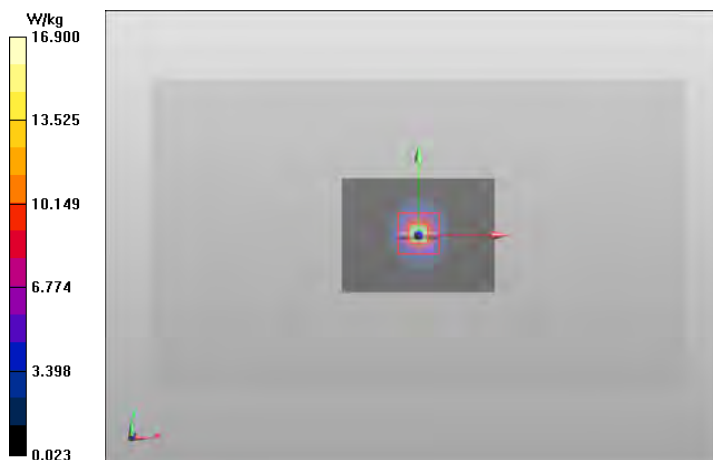
Peak SAR (extrapolated) = 35.2 W/kg

SAR(1 g) = 8.18 W/kg

SAR(10 g) = 2.28 W/kg

Power Drift = -0.04 dB

Maximum value of SAR (measured) = 16.3 W/kg



Plot 24

Date/Time: 2015-08-31 9:37:19

Test Laboratory: TCC Microsoft

Type: D5GHzV2; Serial: D5GHzV2 - SN: 1048

Communication System: CW

Frequency: **5500 MHz**; Duty Cycle: 1:1

Medium: BSL 5000; Medium Notes: t= 21.7 C

Medium parameters used: f = 5500 MHz; $\sigma = 5.862$ S/m; $\epsilon_r = 46.291$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(3.82, 3.82, 3.82); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=100mW 5500/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 57.68 V/m

Fast SAR: SAR(1 g) = 7.62 W/kg

Fast SAR(10 g) = 2.11 W/kg

Maximum value of SAR (interpolated) = 17.2 W/kg

d=10mm, Pin=100mW 5500/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 57.68 V/m

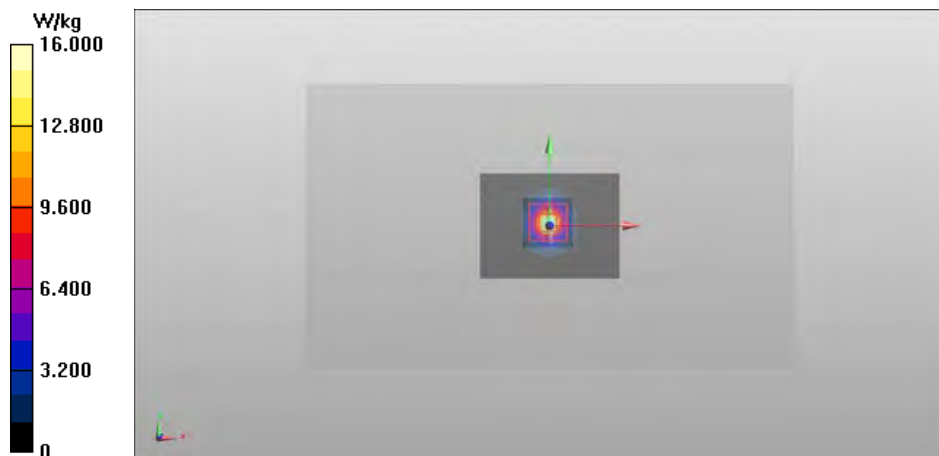
Peak SAR (extrapolated) = 34.4 W/kg

SAR(1 g) = 8.27 W/kg

SAR(10 g) = 2.32 W/kg

Power Drift = 0.06 dB

Maximum value of SAR (measured) = 16.0 W/kg



Plot 25

Date/Time: 2015-07-04 14:34:51

Test Laboratory: TCC Microsoft

Type: **D5GHzV2**; Serial: **D5GHzV2** - SN: **1048**

Communication System: CW

Frequency: **5800 MHz**; Duty Cycle: 1:1

Medium: BSL5000; Medium Notes: 21.3 C

Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 6.246 \text{ S/m}$; $\epsilon_r = 46.981$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.1, 4.1, 4.1); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA; Serial:
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW 5800/Area Scan (81x61x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 16.0 W/kg

d=10mm, Pin=100mW 5800/Zoom Scan (8x8x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 54.139 V/m

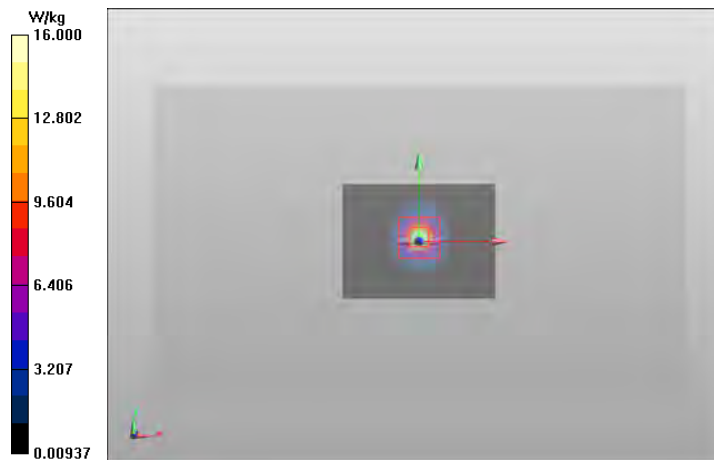
Peak SAR (extrapolated) = 33.4 W/kg

SAR(1 g) = 7.56 W/kg

SAR(10 g) = 2.09 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 15.7 W/kg



APPENDIX B: MEASUREMENT SCANS

Plot H1

Date/Time: 2015-06-30 14:32:10

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217825/8

Communication System: LTE700 (Band 12)

Frequency: **707.5 MHz**; Duty Cycle: 1:1

Medium: HSL750; Medium Notes: t= 22.1 C

Medium parameters used (interpolated): f = 707.5 MHz; $\sigma = 0.868$ S/m; $\epsilon_r = 41.375$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(9.14, 9.14, 9.14); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #1 SAM, SAR4; Type: SAM; Serial: TP-1018
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE700 (Band 12) - Right/Cheek - CH 23095 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 18.002 V/m

Fast SAR: SAR(1 g) = 0.237 W/kg

Fast SAR(10 g) = 0.170 W/kg

Maximum value of SAR (interpolated) = 0.267 W/kg

LTE700 (Band 12) - Right/Cheek - CH 23095 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 1/Zoom Scan

(6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 17.953 V/m

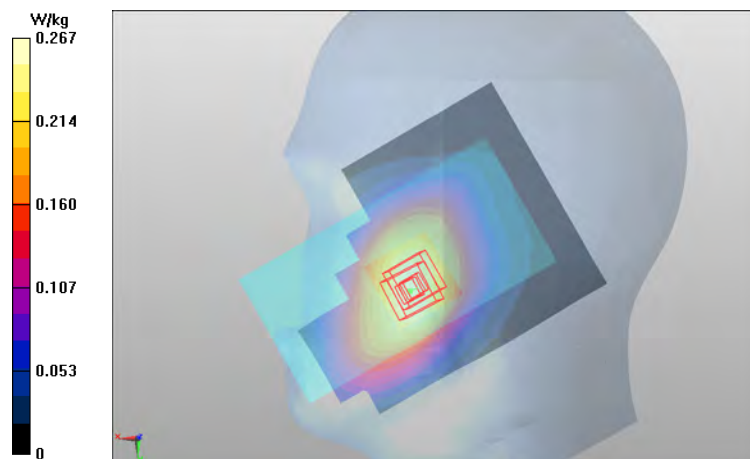
Peak SAR (extrapolated) = 0.300 W/kg

SAR(1 g) = 0.242 W/kg

SAR(10 g) = 0.189 W/kg

Power Drift = 0.06 dB

Maximum value of SAR (measured) = 0.263 W/kg



Plot H2

Date/Time: 2015-08-27 12:11:17

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091276/5

Communication System: LTE700 (Band 12)

Frequency: **707.5 MHz**; Duty Cycle: 1:1

Medium: HSL750; Medium Notes: t= 22.0 C

Medium parameters used (interpolated): f = 707.5 MHz; $\sigma = 0.883$ S/m; $\epsilon_r = 41.108$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(9.14, 9.14, 9.14); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #1 SAM, SAR4; Type: SAM; Serial: TP-1018
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE700 (Band 12) - Right/Cheek- CH 23095 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 18.38 V/m

Fast SAR: SAR(1 g) = 0.256 W/kg

Fast SAR(10 g) = 0.183 W/kg

Maximum value of SAR (interpolated) = 0.289 W/kg

LTE700 (Band 12) - Right/Cheek- CH 23095 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 1/Zoom Scan

(6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 18.38 V/m

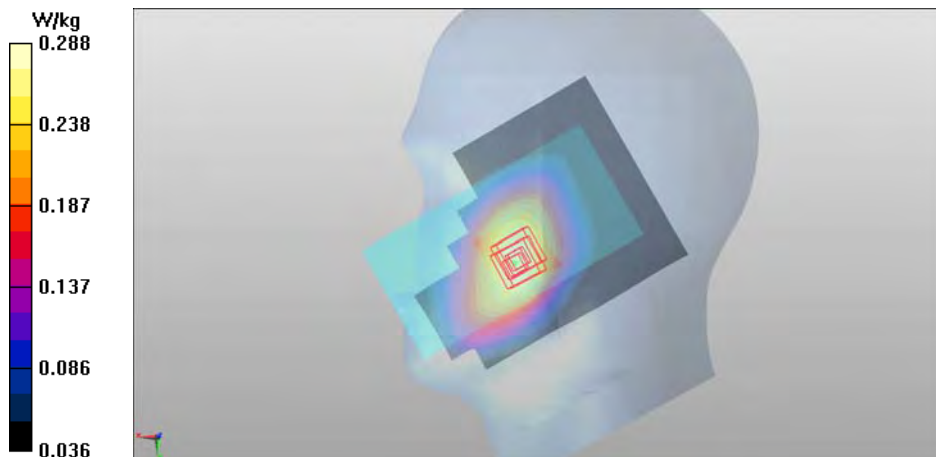
Peak SAR (extrapolated) = 0.329 W/kg

SAR(1 g) = 0.266 W/kg

SAR(10 g) = 0.208 W/kg

Power Drift = 0.06 dB

Maximum value of SAR (measured) = 0.288 W/kg



Plot H3

Date/Time: 2015-07-02 11:36:20

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217825/8

Communication System: LTE700 (Band 17)

Frequency: **709 MHz**; Duty Cycle: 1:1

Medium: HSL750; Medium Notes: t= 21.9 C

Medium parameters used: f = 709 MHz; $\sigma = 0.853$ S/m; $\epsilon_r = 40.764$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(9.14, 9.14, 9.14); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #1 SAM, SAR4; Type: SAM; Serial: TP-1018
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE700 (Band 17) - Right/Cheek - CH 23780 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 17.952 V/m

Fast SAR: SAR(1 g) = 0.243 W/kg

Fast SAR(10 g) = 0.173 W/kg

Maximum value of SAR (interpolated) = 0.275 W/kg

LTE700 (Band 17) - Right/Cheek - CH 23780 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 1/Zoom Scan

(6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 18.055 V/m

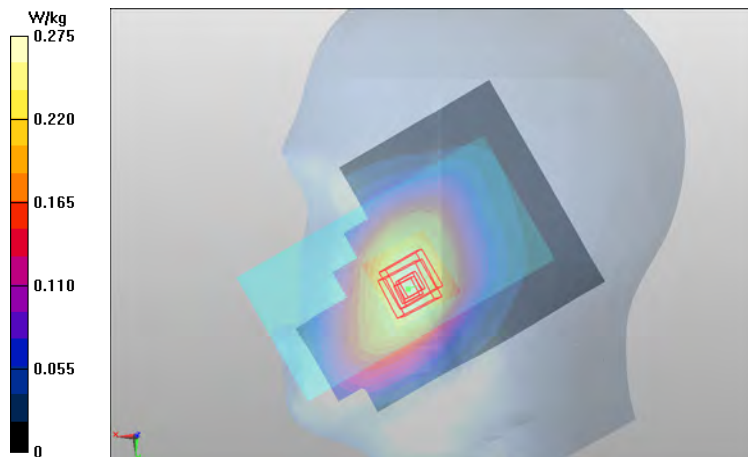
Peak SAR (extrapolated) = 0.308 W/kg

SAR(1 g) = 0.244 W/kg

SAR(10 g) = 0.191 W/kg

Power Drift = 0.03 dB

Maximum value of SAR (measured) = 0.264 W/kg



Plot H4

Date/Time: 2015-08-27 14:32:03

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091276/5

Communication System: LTE700 (Band 17)

Frequency: **709 MHz**; Duty Cycle: 1:1

Medium: HSL750; Medium Notes: t= 22.0 C

Medium parameters used: f = 709 MHz; $\sigma = 0.885$ S/m; $\epsilon_r = 41.13$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(9.14, 9.14, 9.14); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #1 SAM, SAR4; Type: SAM; Serial: TP-1018
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE700 (Band 17) - Right/Cheek - CH 23780 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 18.57 V/m

Fast SAR: SAR(1 g) = 0.259 W/kg

Fast SAR(10 g) = 0.184 W/kg

Maximum value of SAR (interpolated) = 0.293 W/kg

LTE700 (Band 17) - Right/Cheek - CH 23780 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 1/Zoom Scan

(6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 18.57 V/m

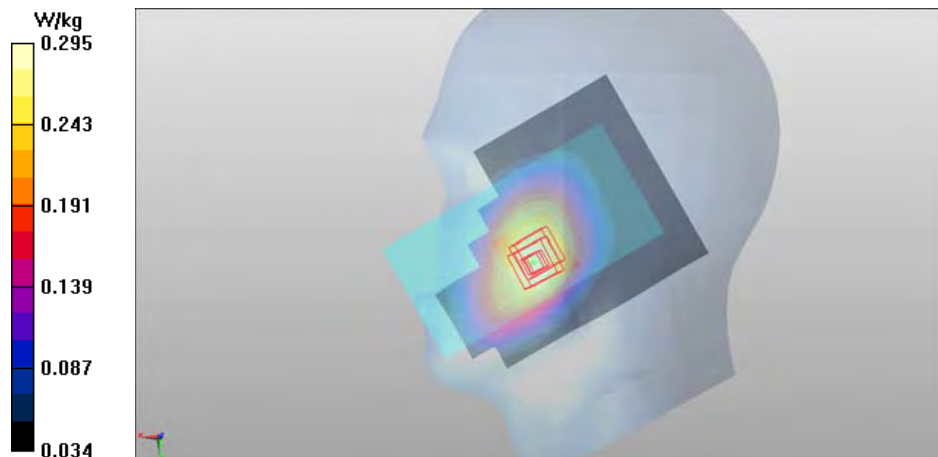
Peak SAR (extrapolated) = 0.342 W/kg

SAR(1 g) = 0.270 W/kg

SAR(10 g) = 0.209 W/kg

Power Drift = 0.08 dB

Maximum value of SAR (measured) = 0.295 W/kg



Plot H5

Date/Time: 2015-07-01 13:57:24

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: 4-slot GPRS850

Frequency: **836.6 MHz**; Duty Cycle: 1:2.09991

Medium: HSL835; Medium Notes: t= 22.0 C

Medium parameters used: f = 837 MHz; $\sigma = 0.904$ S/m; $\epsilon_r = 41.179$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(6.04, 6.04, 6.04); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1596
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

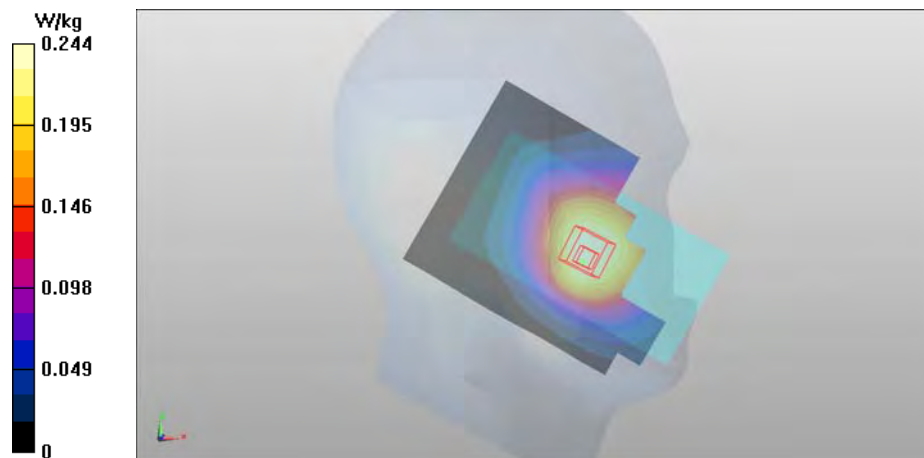
4-slot GPRS850 - Left/Cheek - CH 190 - Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 16.91 V/m

Fast SAR: SAR(1 g) = 0.216 W/kg

FastAR(10 g) = 0.154 W/kg

Maximum value of SAR (interpolated) = 0.244 W/kg



Plot H6

Date/Time: 2015-08-26 12:15:01

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091256/7

Communication System: 4-slot GPRS850

Frequency: **836.6 MHz**; Duty Cycle: 1:2.09991

Medium: HSL835; Medium Notes: t= 22.5 C

Medium parameters used: f = 837 MHz; σ = 0.906 S/m; ϵ_r = 40.491; ρ = 1000 kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(6.04, 6.04, 6.04); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1596
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS850 - Left/Cheek - CH 190 - Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 22.31 V/m

Fast SAR: SAR(1 g) = 0.374 W/kg

Fast SAR(10 g) = 0.260 W/kg

Maximum value of SAR (interpolated) = 0.425 W/kg

4-slot GPRS850 - Left/Cheek - CH 190 - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 22.31 V/m

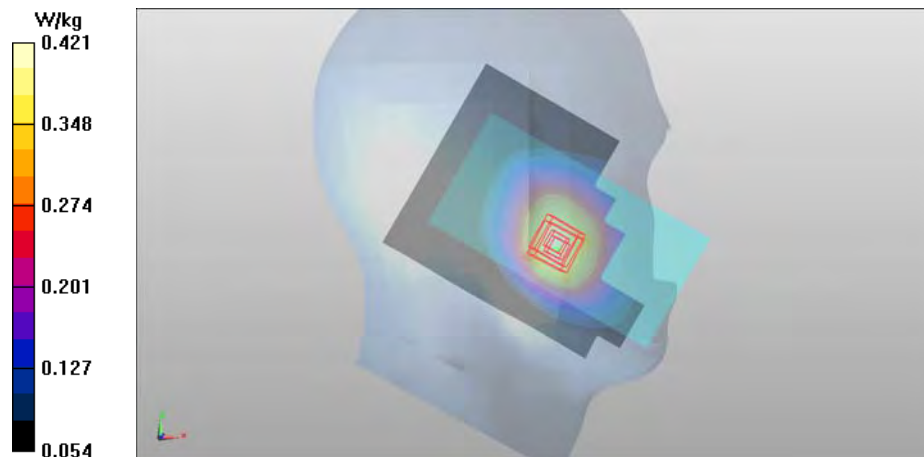
Peak SAR (extrapolated) = 0.483 W/kg

SAR(1 g) = 0.386 W/kg

SAR(10 g) = 0.295 W/kg

Power Drift = -0.01 dB

Maximum value of SAR (measured) = 0.421 W/kg



Plot H7

Date/Time: 2015-07-02 11:18:51

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: WCDMA850 (Band 5)

Frequency: **846.6 MHz**; Duty Cycle: 1:1

Medium: HSL835; Medium Notes: t= 22.2 C

Medium parameters used: f = 847 MHz; $\sigma = 0.914$ S/m; $\epsilon_r = 41.109$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(6.04, 6.04, 6.04); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1596
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WCDMA850 (Band 5) - Left/Cheek - CH 4233 - Antenna 2/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 21.807 V/m

Fast SAR: SAR(1 g) = 0.424 W/kg

Fast SAR(10 g) = 0.296 W/kg

Maximum value of SAR (interpolated) = 0.482 W/kg

WCDMA850 (Band 5) - Left/Cheek - CH 4233 - Antenna 2/Zoom Scan (6x6x7)/Cube 0: Measurement grid:

dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 21.756 V/m

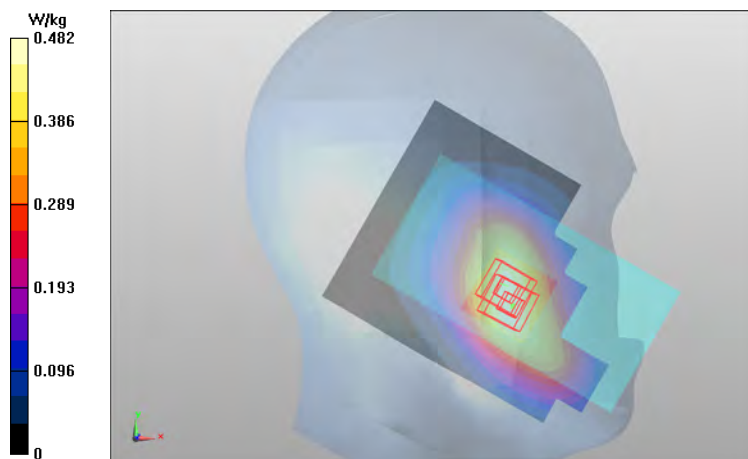
Peak SAR (extrapolated) = 0.559 W/kg

SAR(1 g) = 0.431 W/kg

SAR(10 g) = 0.326 W/kg

Power Drift = 0.03 dB

Maximum value of SAR (measured) = 0.478 W/kg



Plot H8

Date/Time: 2015-08-26 14:09:13

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091256/7

Communication System: WCDMA850 (Band 5)

Frequency: **846.6 MHz**; Duty Cycle: 1:1

Medium: HSL835; Medium Notes: t= 22.5 C

Medium parameters used: f = 847 MHz; $\sigma = 0.909$ S/m; $\epsilon_r = 40.422$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(6.04, 6.04, 6.04); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1596
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA850 (Band 5) - Left/Cheek - CH 4233 - Antenna 2/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 23.20 V/m

Fast SAR: SAR(1 g) = 0.396 W/kg

Fast SAR(10 g) = 0.277 W/kg

Maximum value of SAR (interpolated) = 0.450 W/kg

WCDMA850 (Band 5) - Left/Cheek - CH 4233 - Antenna 2/Zoom Scan (6x6x7)/Cube 0: Measurement grid:

dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 23.20 V/m

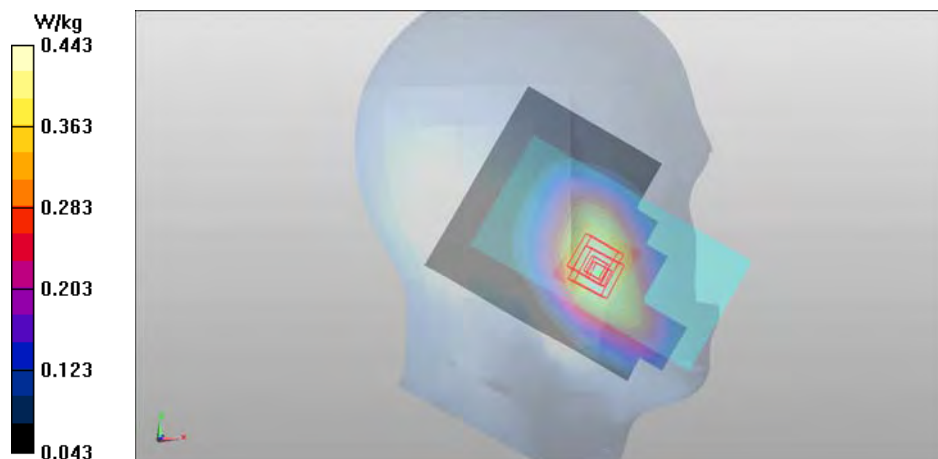
Peak SAR (extrapolated) = 0.525 W/kg

SAR(1 g) = 0.403 W/kg

SAR(10 g) = 0.305 W/kg

Power Drift = 0.02 dB

Maximum value of SAR (measured) = 0.443 W/kg



Plot H9

Date/Time: 2015-07-03 13:55:59

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: LTE850 (Band 5)

Frequency: **844 MHz**; Duty Cycle: 1:1

Medium: HSL835; Medium Notes: t= 22.2 C

Medium parameters used: f = 844 MHz; $\sigma = 0.912$ S/m; $\epsilon_r = 41.044$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(6.04, 6.04, 6.04); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1596
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE850 (Band 5) - Left/Cheek - CH 20600 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 2/Area Scan (81x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 20.971 V/m

Fast SAR: SAR(1 g) = 0.318 W/kg

Fast SAR(10 g) = 0.223 W/kg

Maximum value of SAR (interpolated) = 0.361 W/kg

LTE850 (Band 5) - Left/Cheek - CH 20600 - 10MHz - QPSK - 1 RB - Offset 24 - Antenna 2/Zoom Scan

(6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 20.721 V/m

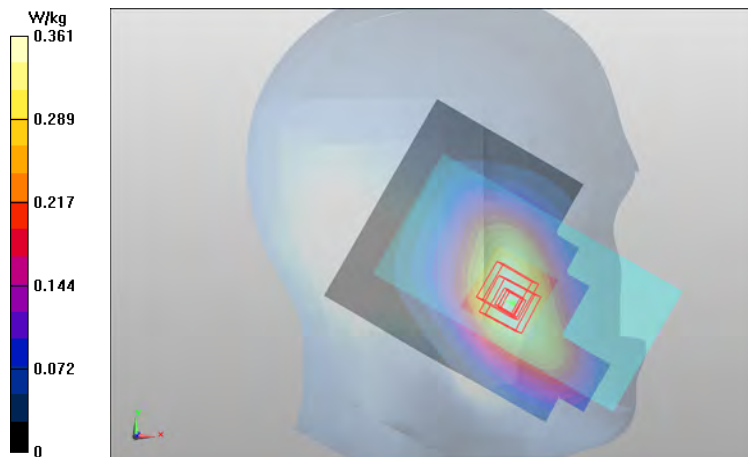
Peak SAR (extrapolated) = 0.416 W/kg

SAR(1 g) = 0.316 W/kg

SAR(10 g) = 0.240 W/kg

Power Drift = -0.13 dB

Maximum value of SAR (measured) = 0.348 W/kg



Plot H10

Date/Time: 2015-08-26 14:38:46

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091256/7

Communication System: LTE850 (Band 5)

Frequency: **844 MHz**; Duty Cycle: 1:1

Medium: HSL835; Medium Notes: t= 22.5 C

Medium parameters used: f = 844 MHz; $\sigma = 0.909$ S/m; $\epsilon_r = 40.459$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(6.04, 6.04, 6.04); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1596
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE850 (Band 5) - Left/Cheek - CH 20600 - 10MHz - 1 RB - Offset 24 - Antenna 2/Area Scan (81x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 19.91 V/m

Fast SAR: SAR(1 g) = 0.289 W/kg

Fast SAR(10 g) = 0.203 W/kg

Maximum value of SAR (interpolated) = 0.328 W/kg

LTE850 (Band 5) - Left/Cheek - CH 20600 - 10MHz - 1 RB - Offset 24 - Antenna 2/Zoom Scan (7x6x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.91 V/m

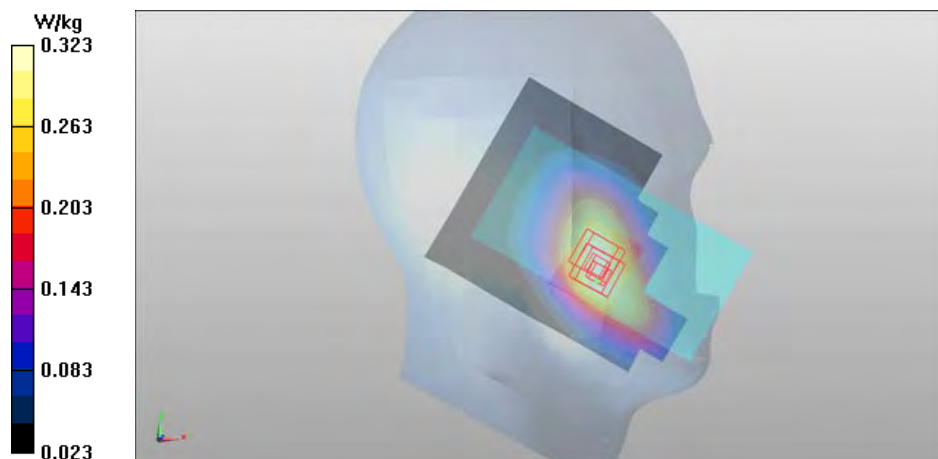
Peak SAR (extrapolated) = 0.392 W/kg

SAR(1 g) = 0.294 W/kg

SAR(10 g) = 0.221 W/kg

Power Drift = -0.00 dB

Maximum value of SAR (measured) = 0.323 W/kg



Plot H11

Date/Time: 2015-07-01 14:19:50

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217821/7

Communication System: WCDMA1700/2100 (Band 4)

Frequency: **1752.6 MHz**; Duty Cycle: 1:1

Medium: HSL1800; Medium Notes: t= 22.9 C

Medium parameters used: f = 1753 MHz; $\sigma = 1.356$ S/m; $\epsilon_r = 39.633$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(5.22, 5.22, 5.22); Calibrated: 2015-01-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2014-11-03
- Phantom: SAM 1; Type: SAM; Serial: TP-1167
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WCDMA1700/2100 (Band 4) - Left/Cheek - CH 1513 - Antenna 1/Area Scan (81x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Reference Value = 21.417 V/m

Fast SAR: SAR(1 g) = 0.587 W/kg

Fast SAR(10 g) = 0.343 W/kg

Maximum value of SAR (interpolated) = 0.738 W/kg

WCDMA1700/2100 (Band 4) - Left/Cheek - CH 1513 - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 21.310 V/m

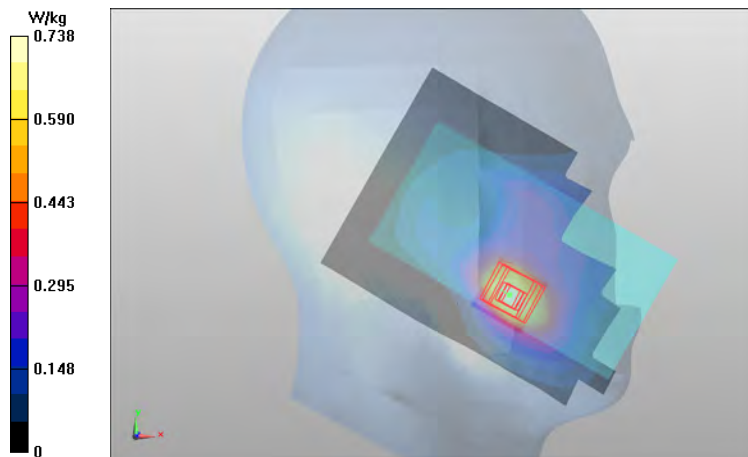
Peak SAR (extrapolated) = 0.918 W/kg

SAR(1 g) = 0.613 W/kg

SAR(10 g) = 0.388 W/kg

Power Drift = 0.04 dB

Maximum value of SAR (measured) = 0.722 W/kg



Plot H12

Date/Time: 2015-08-31 13:02:41

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091264/1

Communication System: WCDMA1700/2100 (Band 4)

Frequency: **1752.6 MHz**; Duty Cycle: 1:1

Medium: HSL1750; Medium Notes: t= 21 C

Medium parameters used: f = 1753 MHz; $\sigma = 1.331$ S/m; $\epsilon_r = 39.804$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3276
- ConvF(5.17, 5.17, 5.17); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2015-01-21
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1692
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA1700/2100 (Band 4) - Left/Cheek - CH 1513 - Antenna 1/Area Scan (81x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Reference Value = 20.32 V/m

Fast SAR: SAR(1 g) = 0.502 W/kg

Fast SAR(10 g) = 0.297 W/kg

Maximum value of SAR (interpolated) = 0.625 W/kg

WCDMA1700/2100 (Band 4) - Left/Cheek - CH 1513 - Antenna 1/Zoom Scan (6x5x7)/Cube 0: Measurement grid:

dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 20.32 V/m

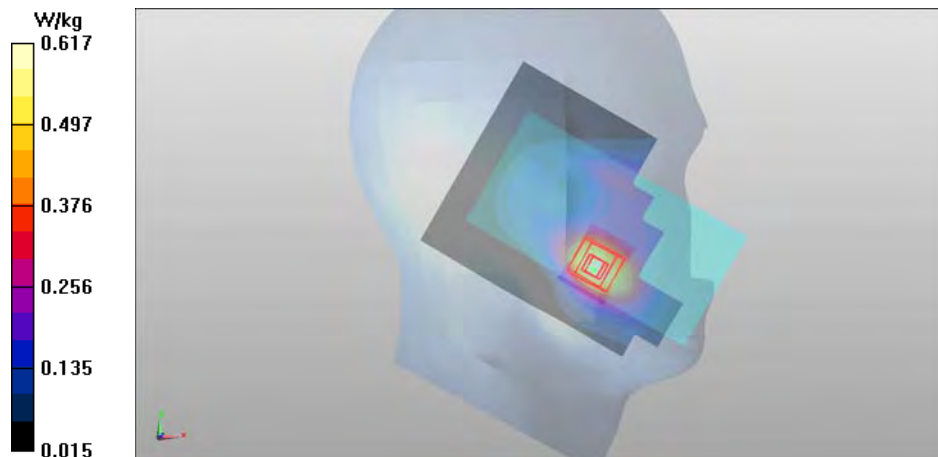
Peak SAR (extrapolated) = 0.792 W/kg

SAR(1 g) = 0.524 W/kg

SAR(10 g) = 0.328 W/kg

Power Drift = 0.13 dB

Maximum value of SAR (measured) = 0.617 W/kg



Plot H13

Date/Time: 2015-07-02 10:50:34

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217821/7

Communication System: LTE1700/2100 (Band 4)

Frequency: **1745 MHz**; Duty Cycle: 1:1

Medium: HSL1800; Medium Notes: t= 23.0 C

Medium parameters used: f = 1745 MHz; $\sigma = 1.339$ S/m; $\epsilon_r = 40.106$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(5.22, 5.22, 5.22); Calibrated: 2015-01-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2014-11-03
- Phantom: SAM 1; Type: SAM; Serial: TP-1167
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE1700/2100 (Band 4) - Left/Cheek - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 18.353 V/m

Fast SAR: SAR(1 g) = 0.415 W/kg

Fast SAR(10 g) = 0.241 W/kg

Maximum value of SAR (interpolated) = 0.522 W/kg

LTE1700/2100 (Band 4) - Left/Cheek - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 18.285 V/m

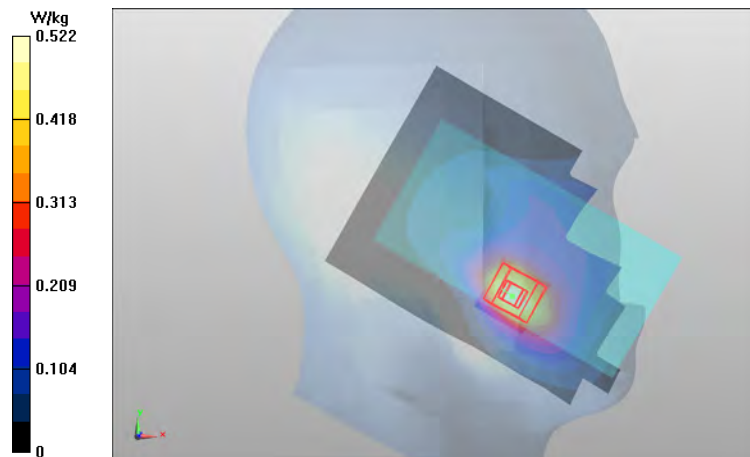
Peak SAR (extrapolated) = 0.617 W/kg

SAR(1 g) = 0.415 W/kg

SAR(10 g) = 0.264 W/kg

Power Drift = 0.08 dB

Maximum value of SAR (measured) = 0.485 W/kg



Plot H14

Date/Time: 2015-08-31 20:25:44

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091264/1

Communication System: LTE1700/2100 (Band 4)

Frequency: **1745 MHz**; Duty Cycle: 1:1

Medium: HSL1750; Medium Notes: t= 21 C

Medium parameters used: f = 1745 MHz; $\sigma = 1.319$ S/m; $\epsilon_r = 39.818$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3276
- ConvF(5.17, 5.17, 5.17); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2015-01-21
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1692
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE1700/2100 (Band 4) - Left/Cheek - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 19.16 V/m

Fast SAR: SAR(1 g) = 0.408 W/kg

Fast SAR(10 g) = 0.245 W/kg

Maximum value of SAR (interpolated) = 0.500 W/kg

LTE1700/2100 (Band 4) - Left/Cheek - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.16 V/m

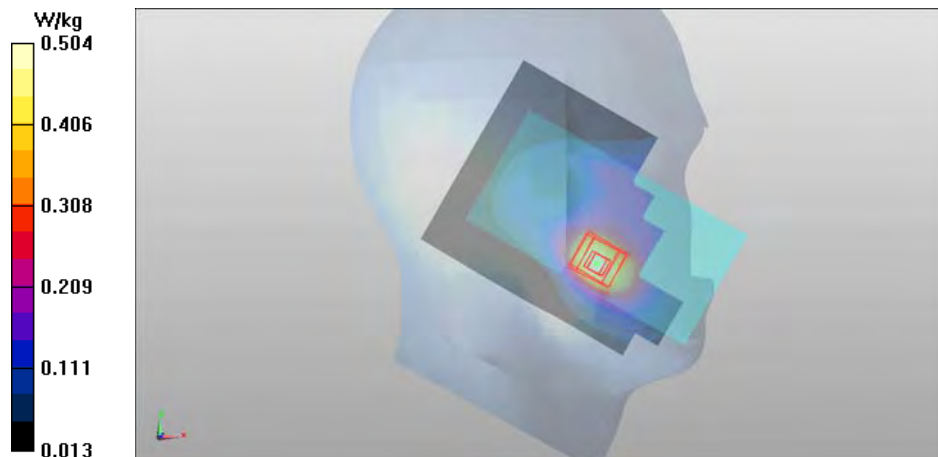
Peak SAR (extrapolated) = 0.631 W/kg

SAR(1 g) = 0.428 W/kg

SAR(10 g) = 0.275 W/kg

Power Drift = -0.03 dB

Maximum value of SAR (measured) = 0.504 W/kg



Plot H15

Date/Time: 2015-07-02 11:01:33

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: 1-slot GPRS1900

Frequency: **1850.2 MHz**; Duty Cycle: 1:8.30042

Medium: HSL 1900; Medium Notes: t= 22.8 C

Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma = 1.34$ S/m; $\epsilon_r = 40.262$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.85, 4.85, 4.85); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: SAM 1; Type: Twin Phantom GF-VE 20; Serial: TP-1736
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

1-slot GPRS 1900 - Left/Cheek - CH 512 - Antenna 2/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 14.106 V/m

Fast SAR: SAR(1 g) = 0.289 W/kg

Fast SAR(10 g) = 0.167 W/kg

Maximum value of SAR (interpolated) = 0.363 W/kg

1-slot GPRS 1900 - Left/Cheek - CH 512 - Antenna 2/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.118 V/m

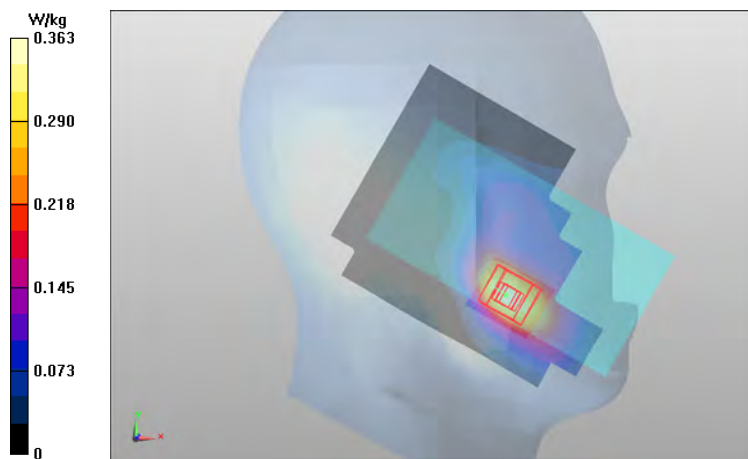
Peak SAR (extrapolated) = 0.452 W/kg

SAR(1 g) = 0.292 W/kg

SAR(10 g) = 0.179 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.346 W/kg



Plot H16

Date/Time: 2015-09-01 14:52:55

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091300/3

Communication System: 4-slot GPRS1900

Frequency: **1850.2 MHz**; Duty Cycle: 1:2.09991

Medium: HSL1900; Medium Notes: t= 22.8 C

Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma = 1.315$ S/m; $\epsilon_r = 38.657$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.85, 4.85, 4.85); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: SAM 1; Type: Twin Phantom GF-VE 20; Serial: TP-1736
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS1900 - Left/Cheek - CH 512 - Antenna 2/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 12.73 V/m

Fast SAR: SAR(1 g) = 0.223 W/kg

Fast SAR(10 g) = 0.130 W/kg

Maximum value of SAR (interpolated) = 0.278 W/kg

4-slot GPRS1900 - Left/Cheek - CH 512 - Antenna 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.73 V/m

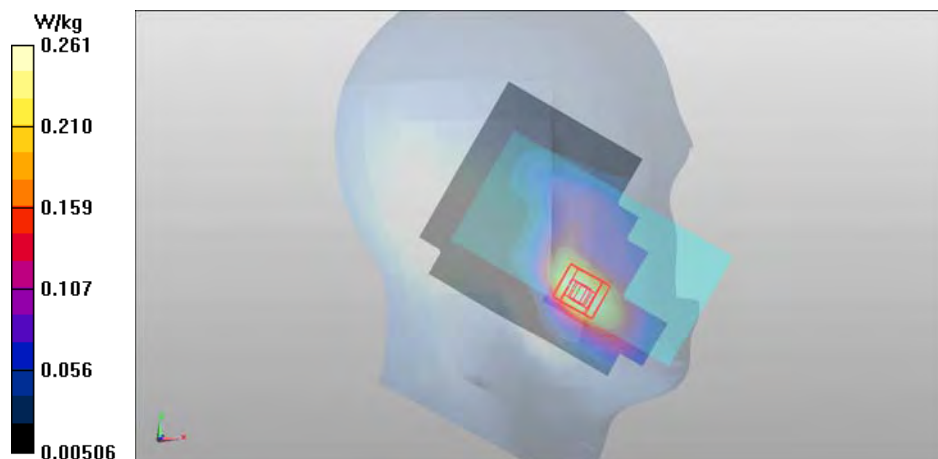
Peak SAR (extrapolated) = 0.341 W/kg

SAR(1 g) = 0.224 W/kg

SAR(10 g) = 0.142 W/kg

Power Drift = 0.15 dB

Maximum value of SAR (measured) = 0.261 W/kg



Plot H17

Date/Time: 2015-07-01 13:36:11

Test Laboratory: TCC Nokia

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: WCDMA1900 (Band 2)

Frequency: **1852.4 MHz**; Duty Cycle: 1:1

Medium: HSL 1900; Medium Notes: t= 22,9 C

Medium parameters used (interpolated): f = 1852.4 MHz; $\sigma = 1.331$ S/m; $\epsilon_r = 38.731$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.85, 4.85, 4.85); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: SAM 1; Type: Twin Phantom GF-VE 20; Serial: TP-1736
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WCDMA 1900 (Band 2) - Right/Cheek - CH 9262 - Antenna 1/Area Scan (81x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 25.834 V/m

Fast SAR: SAR(1 g) = 0.659 W/kg

Fast SAR(10 g) = 0.380 W/kg

Maximum value of SAR (interpolated) = 0.813 W/kg

WCDMA 1900 (Band 2) - Right/Cheek - CH 9262 - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 25.588 V/m

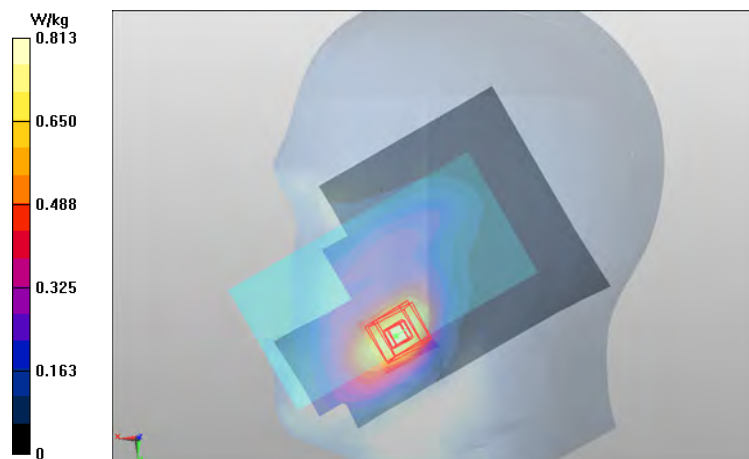
Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.658 W/kg

SAR(10 g) = 0.413 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.782 W/kg



Plot H18

Date/Time: 2015-09-02 10:09:02

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091300/3

Communication System: WCDMA1900 (Band 2)

Frequency: **1852.4 MHz**; Duty Cycle: 1:1

Medium: HSL1900; Medium Notes: t= 22.5 C

Medium parameters used (interpolated): f = 1852.4 MHz; $\sigma = 1.332$ S/m; $\epsilon_r = 38.874$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.85, 4.85, 4.85); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: SAM 1; Type: Twin Phantom GF-VE 20; Serial: TP-1736
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA1900 (Band 2) - Right/Cheek - CH 9262 - Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 21.44 V/m

Fast SAR: SAR(1 g) = 0.616 W/kg

Fast SAR(10 g) = 0.365 W/kg

Maximum value of SAR (interpolated) = 0.807 W/kg

WCDMA1900 (Band 2) - Right/Cheek - CH 9262 - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 21.44 V/m

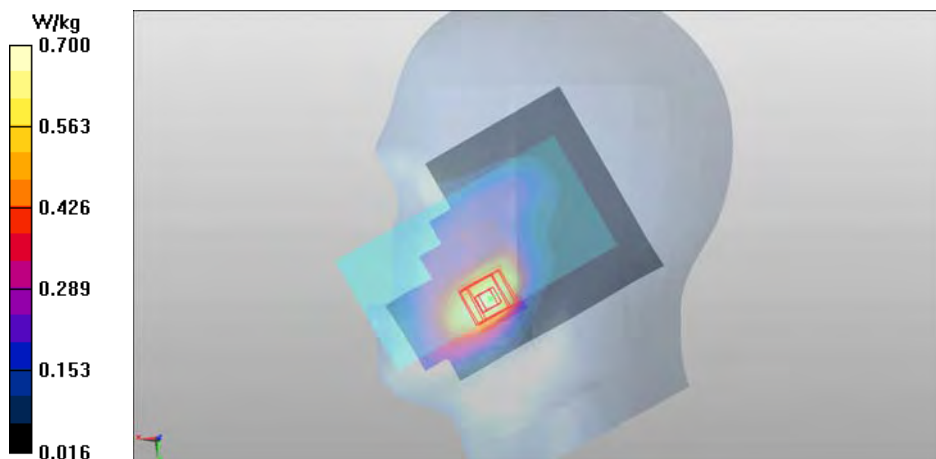
Peak SAR (extrapolated) = 0.999 W/kg

SAR(1 g) = 0.646 W/kg

SAR(10 g) = 0.407 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.700 W/kg



Plot H19

Date/Time: 2015-07-02 14:32:01

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: LTE1900 (Band 2)

Frequency: **1860 MHz**; Duty Cycle: 1:1

Medium: HSL 1900; Medium Notes: t= 22.8 C

Medium parameters used: f = 1860 MHz; $\sigma = 1.349$ S/m; $\epsilon_r = 40.246$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.85, 4.85, 4.85); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: SAM 1; Type: Twin Phantom GF-VE 20; Serial: TP-1736
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE1900 (Band 2) - Right/Cheek - CH 18700 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 21.07 V/m

Fast SAR: SAR(1 g) = 0.442 W/kg

Fast SAR(10 g) = 0.257 W/kg

Maximum value of SAR (interpolated) = 0.576 W/kg

LTE1900 (Band 2) - Right/Cheek - CH 18700 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Zoom Scan

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

Reference Value = 21.40 V/m

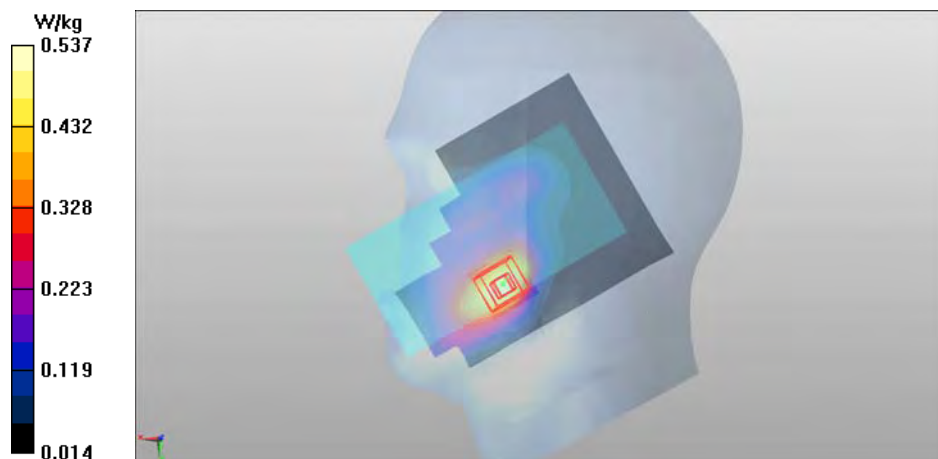
Peak SAR (extrapolated) = 0.707 W/kg

SAR(1 g) = 0.462 W/kg

SAR(10 g) = 0.290 W/kg

Power Drift = -0.13 dB

Maximum value of SAR (measured) = 0.537 W/kg



Plot H20

Date/Time: 2015-09-01 12:59:05

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091300/3

Communication System: LTE1900 (Band 2)

Frequency: **1860 MHz**; Duty Cycle: 1:1

Medium: HSL1900; Medium Notes: t= 22.8 C

Medium parameters used: f = 1860 MHz; $\sigma = 1.319$ S/m; $\epsilon_r = 38.666$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.85, 4.85, 4.85); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: SAM 1; Type: Twin Phantom GF-VE 20; Serial: TP-1736
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE1900 (Band 2) - Right/Cheek - CH 18700 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 19.17 V/m

Fast SAR: SAR(1 g) = 0.477 W/kg

Fast SAR(10 g) = 0.282 W/kg

Maximum value of SAR (interpolated) = 0.622 W/kg

LTE1900 (Band 2) - Right/Cheek - CH 18700 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Zoom Scan

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

Reference Value = 19.17 V/m

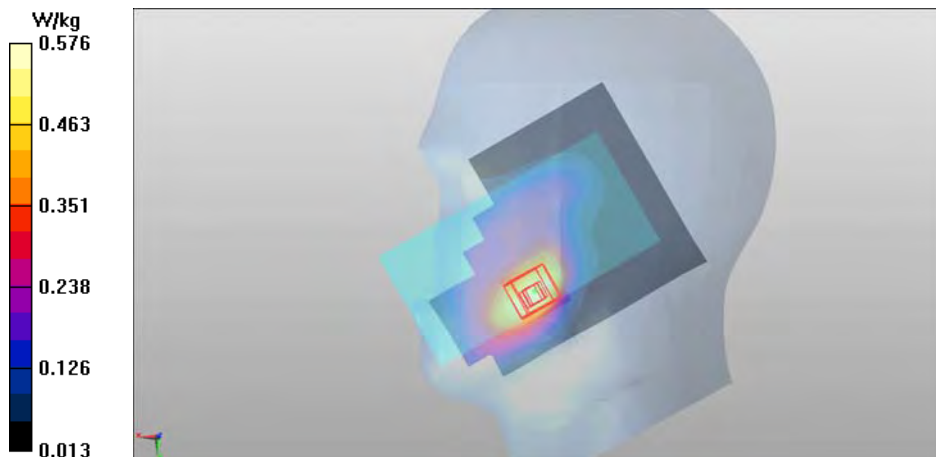
Peak SAR (extrapolated) = 0.756 W/kg

SAR(1 g) = 0.500 W/kg

SAR(10 g) = 0.318 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 0.576 W/kg



Plot H21

Date/Time: 2015-07-07 08:16:52

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217827/4

Communication System: LTE2500 (Band 7)

Frequency: **2535 MHz**; Duty Cycle: 1:1

Medium: HSL2300-2600; Medium Notes: t= 22.3 C

Medium parameters used: f = 2535 MHz; $\sigma = 1.858$ S/m; $\epsilon_r = 37.852$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.13, 7.13, 7.13); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: SAM2; Type: SAM; Serial: TP-1570
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE2500 (Band 7) - Right/Cheek - CH 21100 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Area Scan

(121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 16.826 V/m

Fast SAR: SAR(1 g) = 0.610 W/kg

Fast SAR(10 g) = 0.319 W/kg

Maximum value of SAR (interpolated) = 0.796 W/kg

LTE2500 (Band 7) - Right/Cheek - CH 21100 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Zoom Scan

(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.233 V/m

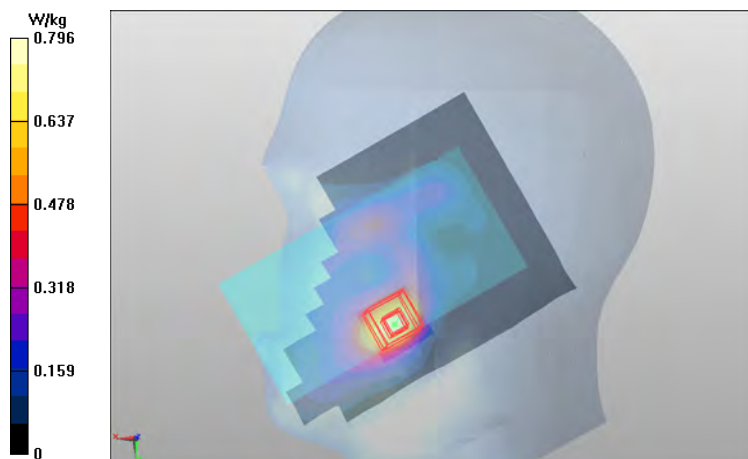
Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.642 W/kg

SAR(10 g) = 0.343 W/kg

Power Drift = -0.15 dB

Maximum value of SAR (measured) = 0.808 W/kg



Plot H22

Date/Time: 2015-08-27 10:30:31

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091313/6

Communication System: LTE2500 (Band 7)

Frequency: **2535 MHz**; Duty Cycle: 1:1

Medium: HSL2450; Medium Notes: t=23,4 C

Medium parameters used: f = 2535 MHz; $\sigma = 1.813$ S/m; $\epsilon_r = 38.752$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.13, 7.13, 7.13); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: SAM2; Type: SAM; Serial: TP-1570
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE2500 (Band 7) - Right/Cheek - CH 21100- 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Area Scan

(121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 18.01 V/m

Fast SAR: SAR(1 g) = 0.756 W/kg

Fast SAR(10 g) = 0.384 W/kg

Maximum value of SAR (interpolated) = 0.995 W/kg

LTE2500 (Band 7) - Right/Cheek - CH 21100- 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Zoom Scan

(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.01 V/m

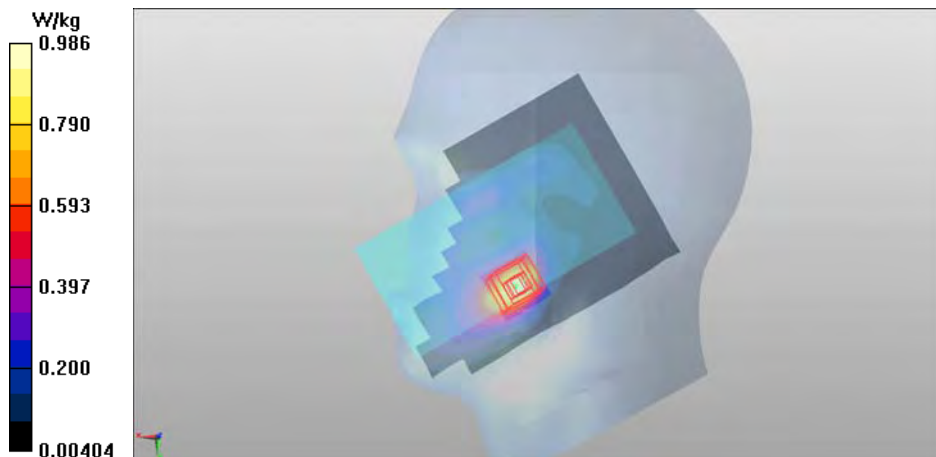
Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.794 W/kg

SAR(10 g) = 0.417 W/kg

Power Drift = -0.09 dB

Maximum value of SAR (measured) = 0.986 W/kg



Plot H23

Date/Time: 2015-07-02 11:04:23

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN2450

Frequency: **2412 MHz**; Duty Cycle: 1:1

Medium: HSL2450-2600; Medium Notes: t= 21.4 C

Medium parameters used: f = 2412 MHz; $\sigma = 1.797 \text{ S/m}$; $\epsilon_r = 38.736$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(6.86, 6.86, 6.86); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: ROBOSAM 2.4GHz; Type: SAM; Serial: 0001
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

WLAN2450 b-mode - Left/Cheek - CH 1 - 20 MHz DSSS QPSK 2Mbps SS 1 - Antenna 1 and 2/Area Scan

(121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 22.762 V/m

Fast SAR: SAR(1 g) = 0.789 W/kg

Fast SAR(10 g) = 0.370 W/kg

Maximum value of SAR (interpolated) = 1.08 W/kg

WLAN2450 b-mode - Left/Cheek - CH 1 - 20 MHz DSSS QPSK 2Mbps SS 1 - Antenna 1 and 2/Zoom Scan

(8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.359 V/m

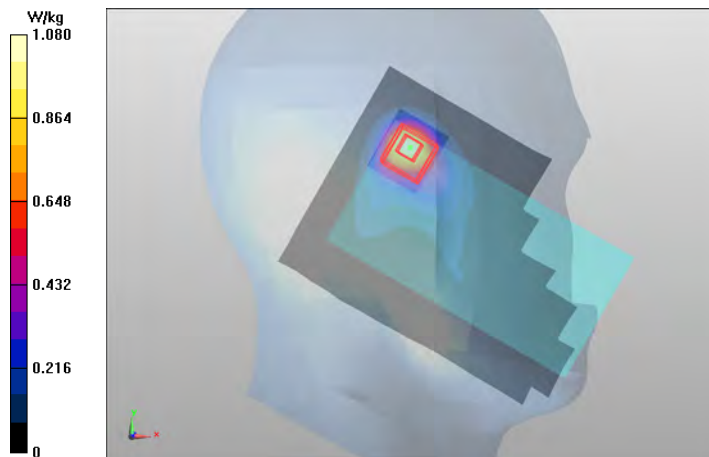
Peak SAR (extrapolated) = 1.70 W/kg

SAR(1 g) = 0.762 W/kg

SAR(10 g) = 0.358 W/kg

Power Drift = -0.06 dB

Maximum value of SAR (measured) = 1.01 W/kg



Plot H24

Date/Time: 2015-09-01 15:06:43

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091330/0

Communication System: WLAN2450

Frequency: **2412 MHz**; Duty Cycle: 1:1

Medium: HSL2450; Medium Notes: t=22,6 C

Medium parameters used: f = 2412 MHz; $\sigma = 1.709$ S/m; $\epsilon_r = 38.859$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.24, 7.24, 7.24); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: SAM2; Type: SAM; Serial: TP-1570
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WLAN2450 b-mode - Left/Cheek - CH 1 - 20 MHz DSSS 1 Mbps SS 1 - Antenna 1 and 2/Area Scan (121x181x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 17.79 V/m

Fast SAR: SAR(1 g) = 0.642 W/kg

Fast SAR(10 g) = 0.306 W/kg

Maximum value of SAR (interpolated) = 0.887 W/kg

WLAN2450 b-mode - Left/Cheek - CH 1 - 20 MHz DSSS 1 Mbps SS 1 - Antenna 1 and 2/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.79 V/m

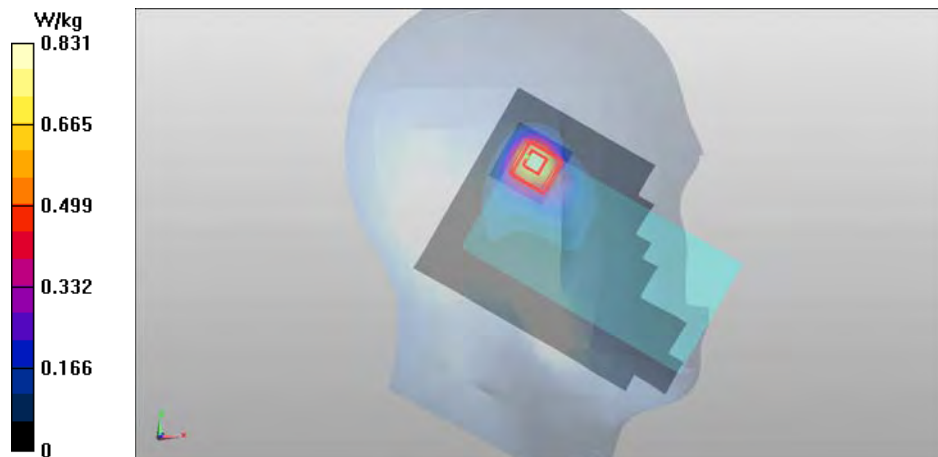
Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 0.629 W/kg

SAR(10 g) = 0.306 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.831 W/kg



Plot H25

Date/Time: 2015-07-01 13:04:56

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000

Frequency: **5290 MHz**; Duty Cycle: 1:1

Medium: HSL5000; Medium Notes: t=21.3 C

Medium parameters used: f = 5290 MHz; $\sigma = 4.706$ S/m; $\epsilon_r = 36.205$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.68, 4.68, 4.68); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

WLAN5000 ac-mode - Left/Left Cheek Ch 58 /Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.35 W/kg

WLAN5000 ac-mode - Left/Left Cheek Ch 58 /Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 22.864 V/m

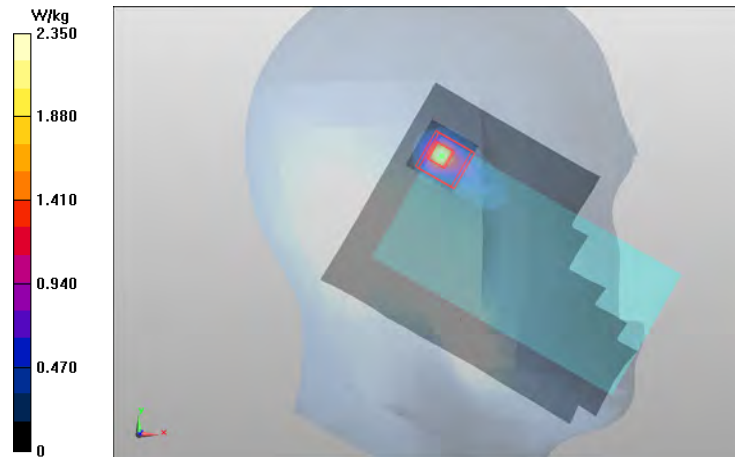
Peak SAR (extrapolated) = 4.27 W/kg

SAR(1 g) = 0.969 W/kg

SAR(10 g) = 0.271 W/kg

Power Drift = -0.01 dB

Maximum value of SAR (measured) = 1.98 W/kg



Plot H26

Date/Time: 2015-08-30 17:05:46

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091330/0

Communication System: WLAN5000

Frequency: **5290 MHz**; Duty Cycle: 1:1

Medium: HSL5000; Medium Notes: $t = 21.8\text{ C}$

Medium parameters used: $f = 5290\text{ MHz}$; $\sigma = 4.597\text{ S/m}$; $\epsilon_r = 35.513$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.68, 4.68, 4.68); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WLAN5000 ac-mode - Left/Cheek - CH 58 - 80 MHz OFDM BPSK 29.3 Mbps SS 1 - Antenna 1 and 2/Area Scan (121x181x1): Interpolated grid: $dx=1.000\text{ mm}$, $dy=1.000\text{ mm}$

Maximum value of SAR (interpolated) = 1.62 W/kg

WLAN5000 ac-mode - Left/Cheek - CH 58 - 80 MHz OFDM BPSK 29.3 Mbps SS 1 - Antenna 1 and 2/Zoom Scan (8x9x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 18.14 V/m

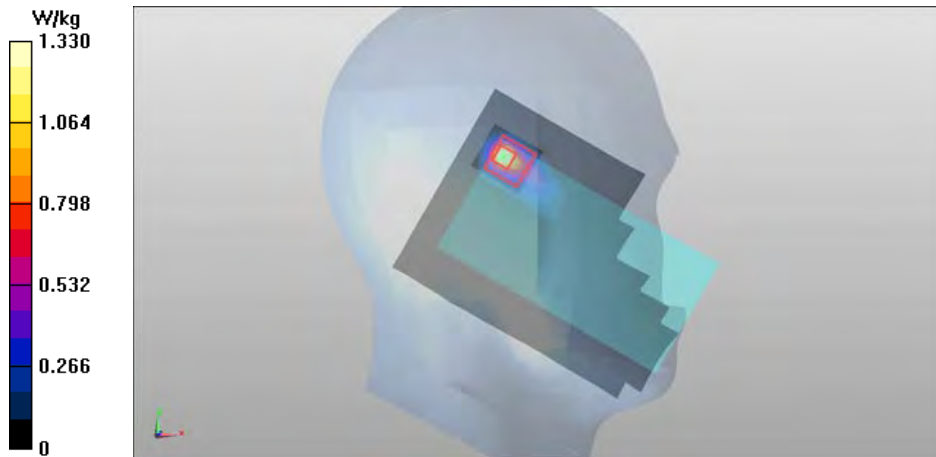
Peak SAR (extrapolated) = 2.81 W/kg

SAR(1 g) = 0.662 W/kg

SAR(10 g) = 0.189 W/kg

Power Drift = -0.06 dB

Maximum value of SAR (measured) = 1.33 W/kg



Plot H27

Date/Time: 2015-07-01 14:19:50

DASY Configuration for WCDMA1700/2100 (Band 4) - Left/Cheek - CH 1513 - Antenna 1/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217821/7

Communication System: WCDMA1700/2100 (Band 4); Frequency: 1752.6 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL1800 Medium parameters used: $f = 1753$ MHz; $\sigma = 1.356$ S/m; $\epsilon_r = 39.633$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Probe: ES3DV3 - SN3194; ConvF(5.22, 5.22, 5.22); Calibrated: 2015-01-20;

Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))

Electronics: DAE4 Sn555; Calibrated: 2014-11-03

Phantom: SAM 1; Type: SAM; Serial: TP-1167

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-01 13:04:56

DASY Configuration for WLAN5000 ac-mode - Left/Left Cheek Ch 58 /Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000; Frequency: 5290 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL5000 Medium parameters used: $f = 5290$ MHz; $\sigma = 4.706$ S/m; $\epsilon_r = 36.205$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Probe: EX3DV4 - SN3852; ConvF(4.68, 4.68, 4.68); Calibrated: 2015-04-24;

Sensor-Surface: 2mm (Mechanical Surface Detection)

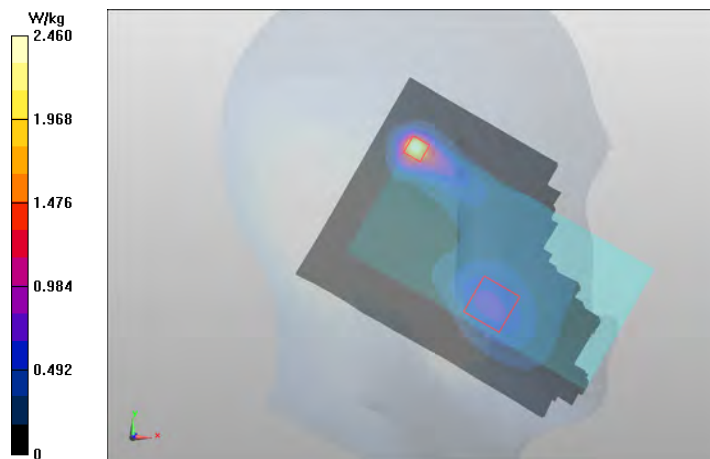
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001

Measurement SW: DASY52, Version 52.8 (6)

Fast SAR of Combined Scans: SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.364 W/kg

Maximum value of SAR (interpolated) = 2.46 W/kg



WLAN5000 ac-mode was scaled with factor 1.17 and WCDMA1700/2100 (Band 4) Antenna 1 with factor 1.07 before combining in SEMCAD SW.

Plot H28

Date/Time: 2015-08-27 9:41:33

DASY Configuration for LTE2500 (Band 7) - Left/Cheek - CH 21100 - 20MHz - QPSK - 1 RB - Offset 0 - Antenna 1/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091313/6

Communication System: LTE2500 (Band 7); Frequency: 2535 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL2450 Medium parameters used: $f = 2535 \text{ MHz}$; $\sigma = 1.813 \text{ S/m}$; $\epsilon_r = 38.752$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Probe: EX3DV4 - SN3892; ConvF(7.13, 7.13, 7.13); Calibrated: 2015-04-24;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn538; Calibrated: 2015-04-20

Phantom: SAM2; Type: SAM; Serial: TP-1570

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-01 13:04:56

DASY Configuration for WLAN5000 ac-mode - Left/Left Cheek Ch 58 /Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000; Frequency: 5290 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL5000 Medium parameters used: $f = 5290 \text{ MHz}$; $\sigma = 4.706 \text{ S/m}$; $\epsilon_r = 36.205$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Probe: EX3DV4 - SN3852; ConvF(4.68, 4.68, 4.68); Calibrated: 2015-04-24;

Sensor-Surface: 2mm (Mechanical Surface Detection)

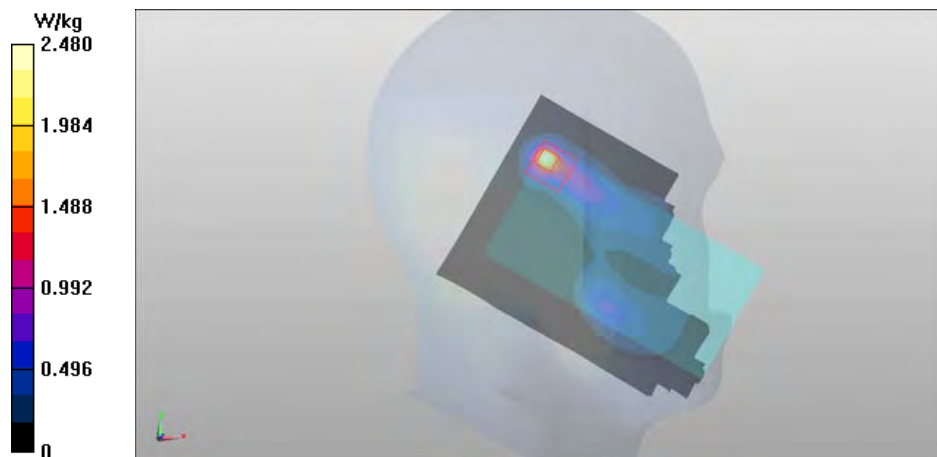
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001

Measurement SW: DASY52, Version 52.8 (6)

Fast SAR of Combined Scans: SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.343 W/kg

Maximum value of SAR (interpolated) = 2.48 W/kg



WLAN5000 ac-mode was scaled with factor 1.17 and LTE2500 (Band 7) Antenna 1 with factor 1.10 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

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Plot H29

Date/Time: 2015-07-02 11:18:51

DASY Configuration for WCDMA850 (Band 5) - Left/Cheek - CH 4233 - Antenna 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: WCDMA850 (Band 5); Frequency: 846.6 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL835 Medium parameters used: $f = 847$ MHz; $\sigma = 0.914$ S/m; $\epsilon_r = 41.109$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Probe: ES3DV3 - SN3131; ConvF(6.04, 6.04, 6.04); Calibrated: 2014-10-21;
Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn793; Calibrated: 2014-10-14
Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1596
Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-02 11:04:23

DASY Configuration for WLAN2450 b-mode - Left/Cheek - CH 1 - 20 MHz DSSS QPSK 2Mbps SS 1 - Antenna 1 and 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN2450; Frequency: 2412 MHz; Duty Cycle: 1:1; PMF: 1

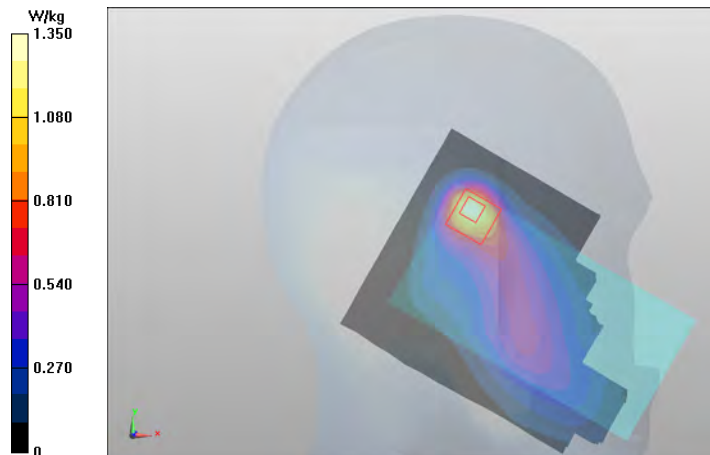
Medium: HSL2450-2600 Medium parameters used: $f = 2412$ MHz; $\sigma = 1.797$ S/m; $\epsilon_r = 38.736$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Probe: EX3DV4 - SN3852; ConvF(6.86, 6.86, 6.86); Calibrated: 2015-04-24;
Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn756; Calibrated: 2015-04-20
Phantom: ROBOSAM 2.4GHz; Type: SAM; Serial: 0001
Measurement SW: DASY52, Version 52.8 (6)

Fast SAR of Combined Scans: SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.506 W/kg

Maximum value of SAR (interpolated) = 1.35 W/kg



WLAN2450 b-mode was scaled with factor 1.20 and WCDMA850 (Band 5) Antenna 2 with factor 1.05 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

Copyright © 2015 TCC Microsoft

Plot H30

Date/Time: 2015-07-03 10:24:47

DASY Configuration for WCDMA1900 (Band 2) - Left/Cheek - CH 9262 - Antenna 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: WCDMA1900 (Band 2); Frequency: 1852.4 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL 1900 Medium parameters used (interpolated): $f = 1852.4 \text{ MHz}$; $\sigma = 1.344 \text{ S/m}$; $\epsilon_r = 39.715$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Probe: ES3DV3 - SN3275; ConvF(4.85, 4.85, 4.85); Calibrated: 2015-04-27;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1302; Calibrated: 2015-04-21

Phantom: SAM 1; Type: Twin Phantom GF-VE 20; Serial: TP-1736

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-02 11:04:23

DASY Configuration for WLAN2450 b-mode - Left/Cheek - CH 1 - 20 MHz DSSS QPSK 2Mbps SS 1 - Antenna 1 and 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN2450; Frequency: 2412 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL2450-2600 Medium parameters used: $f = 2412 \text{ MHz}$; $\sigma = 1.797 \text{ S/m}$; $\epsilon_r = 38.736$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Probe: EX3DV4 - SN3852; ConvF(6.86, 6.86, 6.86); Calibrated: 2015-04-24;

Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))

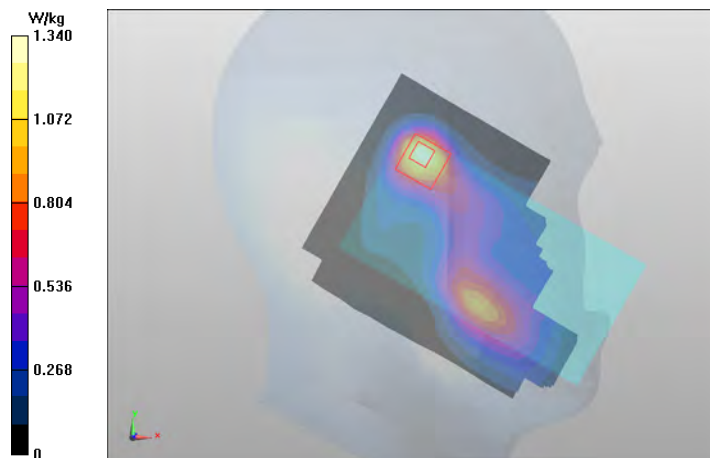
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: ROBOSAM 2.4GHz; Type: SAM; Serial: 0001

Measurement SW: DASY52, Version 52.8 (6)

Fast SAR of Combined Scans: SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.489 W/kg

Maximum value of SAR (interpolated) = 1.34 W/kg



WLAN2450 b-mode was scaled with factor 1.20 and WCDMA1900 (Band 2) Antenna 2 with factor 1.15 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

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Plot H31

Date/Time: 2015-07-02 11:18:51

DASY Configuration for WCDMA850 (Band 5) - Left/Cheek - CH 4233 - Antenna 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: WCDMA850 (Band 5); Frequency: 846.6 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL835 Medium parameters used: $f = 847$ MHz; $\sigma = 0.914$ S/m; $\epsilon_r = 41.109$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Probe: ES3DV3 - SN3131; ConvF(6.04, 6.04, 6.04); Calibrated: 2014-10-21;

Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))

Electronics: DAE4 Sn793; Calibrated: 2014-10-14

Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1596

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-01 13:04:56

DASY Configuration for WLAN5000 ac-mode - Left/Left Cheek Ch 58 /Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000; Frequency: 5290 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL5000 Medium parameters used: $f = 5290$ MHz; $\sigma = 4.706$ S/m; $\epsilon_r = 36.205$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Probe: EX3DV4 - SN3852; ConvF(4.68, 4.68, 4.68); Calibrated: 2015-04-24;

Sensor-Surface: 2mm (Mechanical Surface Detection)

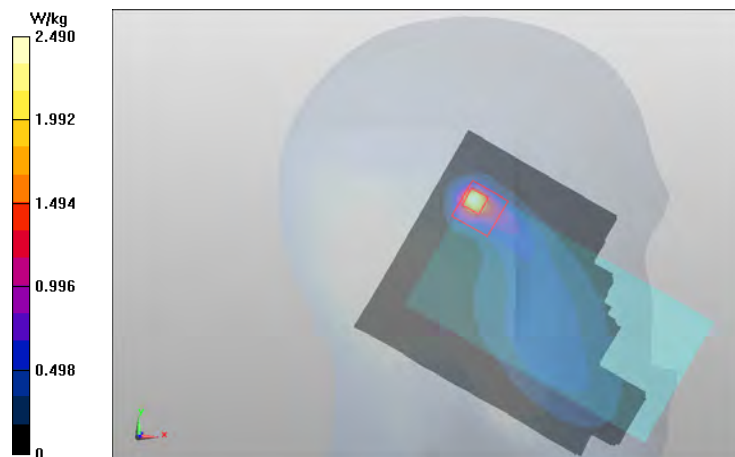
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001

Measurement SW: DASY52, Version 52.8 (6)

Fast SAR of Combined Scans: SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.353 W/kg

Maximum value of SAR (interpolated) = 2.49 W/kg



WLAN5000 ac-mode was scaled with factor 1.17 and WCDMA850 (Band 5) Antenna 2 with factor 1.05 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

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Plot H32

Date/Time: 2015-07-03 10:24:47

DASY Configuration for WCDMA1900 (Band 2) - Left/Cheek - CH 9262 - Antenna 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: WCDMA1900 (Band 2); Frequency: 1852.4 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL 1900 Medium parameters used (interpolated): $f = 1852.4$ MHz; $\sigma = 1.344$ S/m; $\epsilon_r = 39.715$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Probe: ES3DV3 - SN3275; ConvF(4.85, 4.85, 4.85); Calibrated: 2015-04-27;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1302; Calibrated: 2015-04-21

Phantom: SAM 1; Type: Twin Phantom GF-VE 20; Serial: TP-1736

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-01 13:04:56

DASY Configuration for WLAN5000 ac-mode - Left/Left Cheek Ch 58 /Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000; Frequency: 5290 MHz; Duty Cycle: 1:1; PMF: 1

Medium: HSL5000 Medium parameters used: $f = 5290$ MHz; $\sigma = 4.706$ S/m; $\epsilon_r = 36.205$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Probe: EX3DV4 - SN3852; ConvF(4.68, 4.68, 4.68); Calibrated: 2015-04-24;

Sensor-Surface: 2mm (Mechanical Surface Detection)

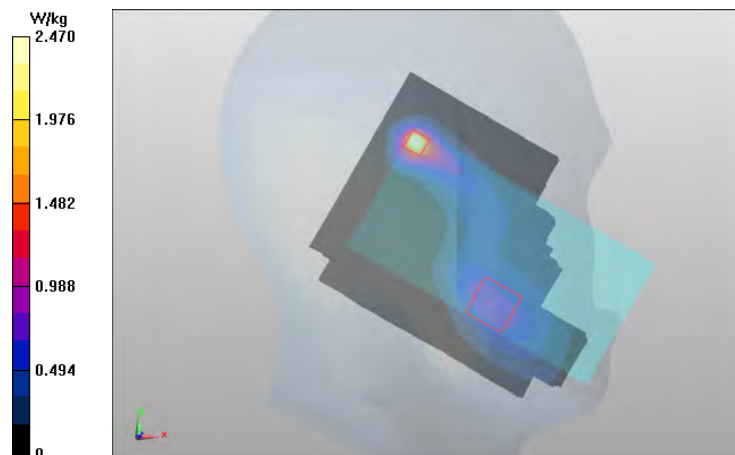
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: ROBOSAM 5.0GHz; Type: SAM; Serial: 0001

Measurement SW: DASY52, Version 52.8 (6)

Fast SAR of Combined Scans: SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.398 W/kg

Maximum value of SAR (interpolated) = 2.47 W/kg



WLAN5000 ac-mode was scaled with factor 1.17 and WCDMA1900 (Band 2) Antenna 2 with factor 1.15 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

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Plot B1

Date/Time: 2015-07-06 11:04:02

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217825/8

Communication System: LTE700 (Band 12)

Frequency: **707.5 MHz**; Duty Cycle: 1:1

Medium: BSL750; Medium Notes: $t = 22.0\text{ C}$

Medium parameters used (interpolated): $f = 707.5\text{ MHz}$; $\sigma = 0.951\text{ S/m}$; $\epsilon_r = 54.523$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(8.8, 8.8, 8.8); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #2 Triple, SAR4; Type: QD 000 P51 CA; Serial: TP-1123/1 (750 MHz), TP-1124/1 (2450 MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE700 (Band 12)/Body - CH 23095 - 10MHz - QPSK - 1 RB - Offset 24 - 15 mm - No Headset - Display -

Antenna 1/Area Scan (81x121x1): Interpolated grid: $dx=1.500\text{ mm}$, $dy=1.500\text{ mm}$

Reference Value = 18.215 V/m

Fast SAR: $\text{SAR}(1\text{ g}) = 0.282\text{ W/kg}$

Fast SAR(10 g) = 0.205 W/kg

Maximum value of SAR (interpolated) = 0.315 W/kg

LTE700 (Band 12)/Body - CH 23095 - 10MHz - QPSK - 1 RB - Offset 24 - 15 mm - No Headset - Display -

Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.257 V/m

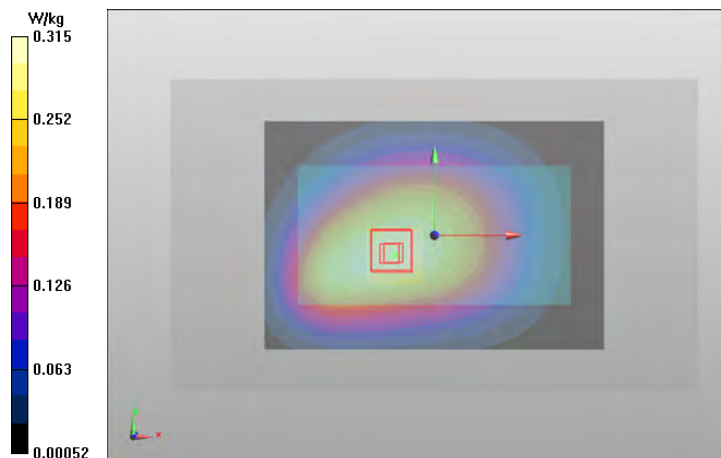
Peak SAR (extrapolated) = 0.360 W/kg

SAR(1 g) = 0.285 W/kg

SAR(10 g) = 0.221 W/kg

Power Drift = -0.01 dB

Maximum value of SAR (measured) = 0.311 W/kg



Plot B2

Date/Time: 2015-08-28 13:59:58

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091276/5

Communication System: LTE700 (Band 12)

Frequency: **707.5 MHz**; Duty Cycle: 1:1

Medium: BSL750; Medium Notes: $t = 22.0\text{ C}$

Medium parameters used (interpolated): $f = 707.5\text{ MHz}$; $\sigma = 0.951\text{ S/m}$; $\epsilon_r = 53.754$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(8.8, 8.8, 8.8); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #2 Triple, SAR4; Type: QD 000 P51 CA; Serial: TP-1123/1 (750 MHz), TP-1124/1 (2450 MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE700 (Band 12)/Body - CH 23095 -10MHz - QPSK - 1 RB - Offset 24 - 15 mm - No Headset - Display -

Antenna 1/Area Scan (81x121x1): Interpolated grid: $dx=1.500\text{ mm}$, $dy=1.500\text{ mm}$

Reference Value = 18.71 V/m

Fast SAR: $\text{SAR}(1\text{ g}) = 0.308\text{ W/kg}$

Fast SAR(10 g) = 0.223 W/kg

Maximum value of SAR (interpolated) = 0.345 W/kg

LTE700 (Band 12)/Body - CH 23095 -10MHz - QPSK - 1 RB - Offset 24 - 15 mm - No Headset - Display -

Antenna 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.71 V/m

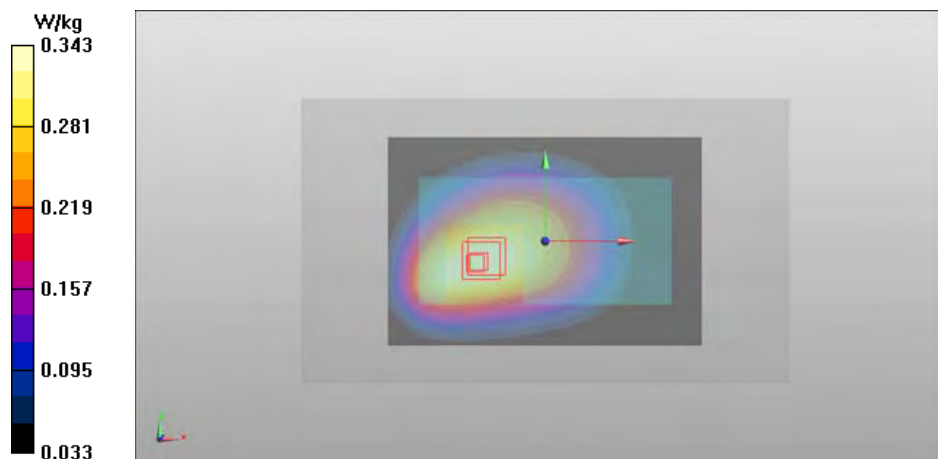
Peak SAR (extrapolated) = 0.393 W/kg

SAR(1 g) = 0.313 W/kg

SAR(10 g) = 0.241 W/kg

Power Drift = 0.07 dB

Maximum value of SAR (measured) = 0.343 W/kg



Plot B3

Date/Time: 2015-07-06 11:51:19

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217825/8

Communication System: LTE700 (Band 17)

Frequency: **709 MHz**; Duty Cycle: 1:1

Medium: BSL750; Medium Notes: $t = 22.0$ C

Medium parameters used: $f = 709$ MHz; $\sigma = 0.953$ S/m; $\epsilon_r = 54.547$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(8.8, 8.8, 8.8); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #2 Triple, SAR4; Type: QD 000 P51 CA; Serial: TP-1123/1 (750 MHz), TP-1124/1 (2450 MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE700 (Band 17)/Body - CH 23780 - 10MHz - QPSK - 1 RB - Offset 24 - 15 mm - No Headset - Display -

Antenna 1/Area Scan (81x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Reference Value = 18.161 V/m

Fast SAR: SAR(1 g) = 0.280 W/kg

Fast SAR(10 g) = 0.203 W/kg

Maximum value of SAR (interpolated) = 0.313 W/kg

LTE700 (Band 17)/Body - CH 23780 - 10MHz - QPSK - 1 RB - Offset 24 - 15 mm - No Headset - Display -

Antenna 1/Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 18.184 V/m

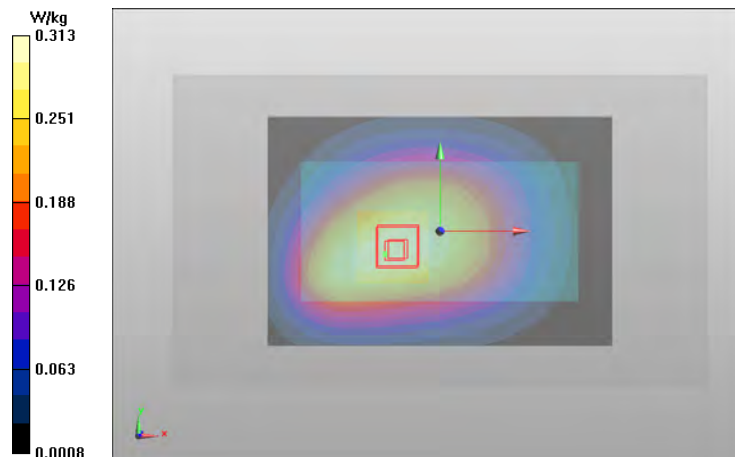
Peak SAR (extrapolated) = 0.357 W/kg

SAR(1 g) = 0.286 W/kg

SAR(10 g) = 0.222 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.313 W/kg



Plot B4

Date/Time: 2015-08-28 9:30:31

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091276/5

Communication System: LTE700 (Band 17)

Frequency: **709 MHz**; Duty Cycle: 1:1

Medium: BSL750; Medium Notes: $t = 22.0$ C

Medium parameters used: $f = 709$ MHz; $\sigma = 0.952$ S/m; $\epsilon_r = 53.775$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(8.8, 8.8, 8.8); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #2 Triple, SAR4; Type: QD 000 P51 CA; Serial: TP-1123/1 (750 MHz), TP-1124/1 (2450 MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE700 (Band 17)/Body - CH23780 -10MHz - QPSK - 1 RB - Offset 24 - 15 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated grid: $dx = 1.500$ mm, $dy = 1.500$ mm

Reference Value = 18.31 V/m

Fast SAR: SAR(1 g) = 0.293 W/kg

Fast SAR(10 g) = 0.212 W/kg

Maximum value of SAR (interpolated) = 0.329 W/kg

LTE700 (Band 17)/Body - CH23780 -10MHz - QPSK - 1 RB - Offset 24 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx = 7.5$ mm, $dy = 7.5$ mm, $dz = 5$ mm

Reference Value = 18.31 V/m

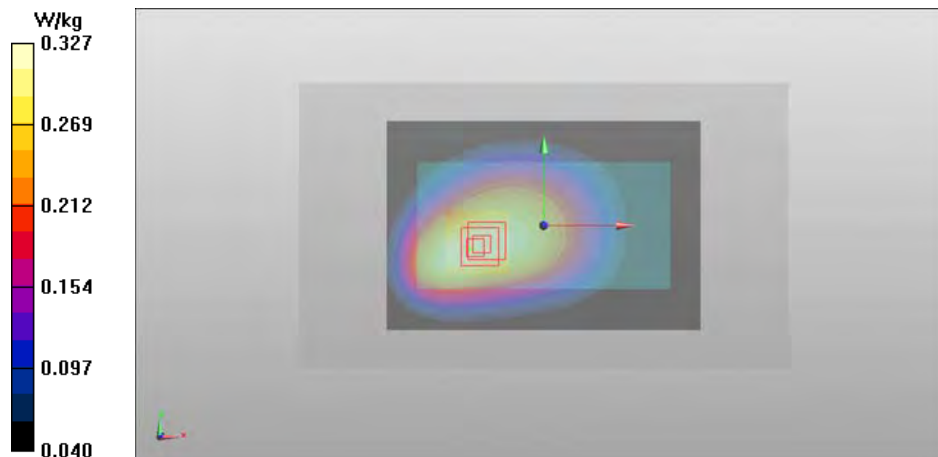
Peak SAR (extrapolated) = 0.377 W/kg

SAR(1 g) = 0.298 W/kg

SAR(10 g) = 0.228 W/kg

Power Drift = 0.02 dB

Maximum value of SAR (measured) = 0.327 W/kg



Plot B5

Date/Time: 2015-07-07 11:20:25

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: 4-slot GPRS850

Frequency: **836.6 MHz**; Duty Cycle: 1:2.09991

Medium: BSL835; Medium Notes: t= 21,9 C

Medium parameters used: f = 837 MHz; $\sigma = 0.98$ S/m; $\epsilon_r = 53.926$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS850/Body - CH 190 - 15 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 21.53 V/m

Fast SAR: SAR(1 g) = 0.367 W/kg

Fast SAR(10 g) = 0.265 W/kg

Maximum value of SAR (interpolated) = 0.411 W/kg

4-slot GPRS850/Body - CH 190 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan (8x12x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 16.16 V/m

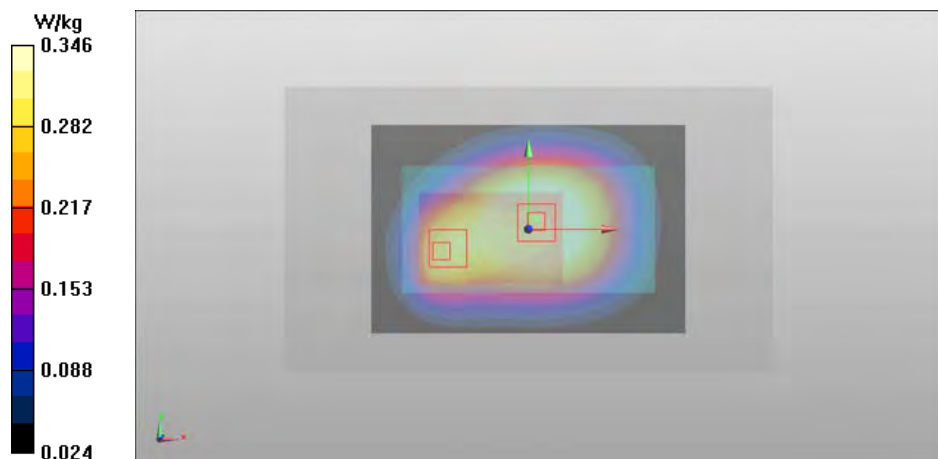
Peak SAR (extrapolated) = 0.425 W/kg

SAR(1 g) = 0.311 W/kg

SAR(10 g) = 0.222 W/kg

Power Drift = -0.04 dB

Maximum value of SAR (measured) = 0.346 W/kg



Plot B6

Date/Time: 2015-08-27 13:22:41

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091256/7

Communication System: 4-slot GPRS850

Frequency: **836.6 MHz**; Duty Cycle: 1:2.09991

Medium: BSL835; Medium Notes: t= 22.2 C

Medium parameters used: f = 837 MHz; $\sigma = 0.978$ S/m; $\epsilon_r = 54.093$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS850/Cheek - CH 190- 15mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 19.95 V/m

Fast SAR: SAR(1 g) = 0.341 W/kg

Fast SAR(10 g) = 0.246 W/kg

Maximum value of SAR (interpolated) = 0.382 W/kg

4-slot GPRS850/Cheek - CH 190- 15mm - No Headset - Display - Antenna 1/Zoom Scan (6x6x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.95 V/m

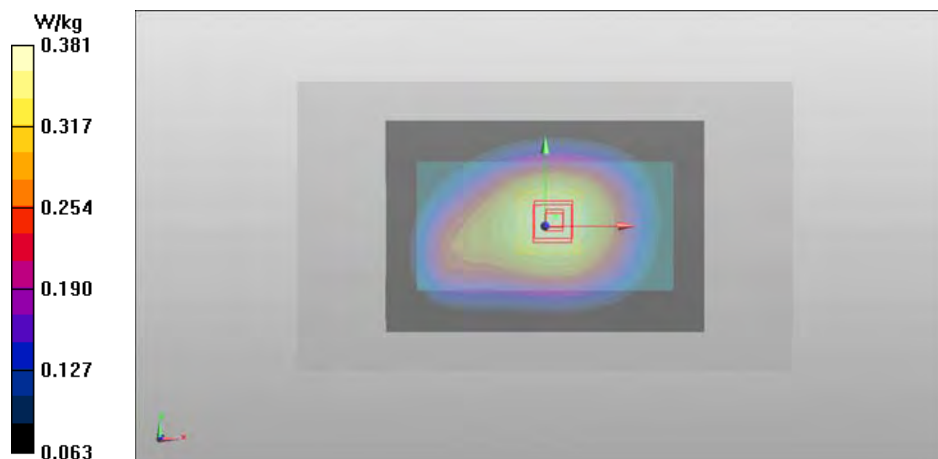
Peak SAR (extrapolated) = 0.437 W/kg

SAR(1 g) = 0.348 W/kg

SAR(10 g) = 0.267 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 0.381 W/kg



Plot B7

Date/Time: 2015-07-07 15:21:52

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: WCDMA850 (Band 5)

Frequency: **846.6 MHz**; Duty Cycle: 1:1

Medium: BSL835; Medium Notes: t= 21,9 C

Medium parameters used: f = 847 MHz; $\sigma = 0.986$ S/m; $\epsilon_r = 53.86$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WCDMA850 (Band 5)/Body - CH 4233 - 15 mm - No Headset - Display - Antenna 2/Area Scan (81x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 19.610 V/m

Fast SAR: SAR(1 g) = 0.404 W/kg

Fast SAR(10 g) = 0.291 W/kg

Maximum value of SAR (interpolated) = 0.453 W/kg

WCDMA850 (Band 5)/Body - CH 4233 - 15 mm - No Headset - Display - Antenna 2/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 22.314 V/m

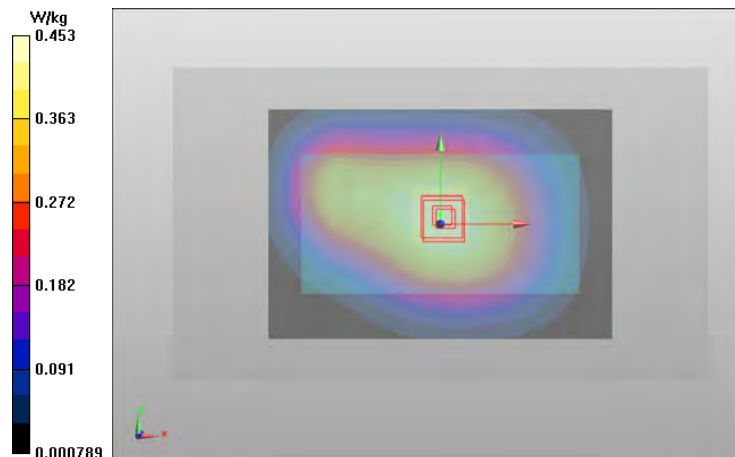
Peak SAR (extrapolated) = 0.518 W/kg

SAR(1 g) = 0.412 W/kg

SAR(10 g) = 0.315 W/kg

Power Drift = -0.00 dB

Maximum value of SAR (measured) = 0.452 W/kg



Plot B8

Date/Time: 2015-08-27 12:28:27

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091256/7

Communication System: WCDMA850 (Band 5)

Frequency: **846.6 MHz**; Duty Cycle: 1:1

Medium: BSL835; Medium Notes: $t = 22.2\text{ C}$

Medium parameters used: $f = 847\text{ MHz}$; $\sigma = 0.984\text{ S/m}$; $\epsilon_r = 54.06$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA850 (Band 5)/Cheek - CH 4233 - 15mm - No Headset - Display - Antenna 2/Area Scan (81x121x1):

Interpolated grid: $dx=1.500\text{ mm}$, $dy=1.500\text{ mm}$

Reference Value = 21.34 V/m

Fast SAR: $SAR(1\text{ g}) = 0.389\text{ W/kg}$

Fast SAR(10 g) = 0.281 W/kg

Maximum value of SAR (interpolated) = 0.435 W/kg

WCDMA850 (Band 5)/Cheek - CH 4233 - 15mm - No Headset - Display - Antenna 2/Zoom Scan (6x6x7)/Cube

0: Measurement grid: $dx=7.5\text{ mm}$, $dy=7.5\text{ mm}$, $dz=5\text{ mm}$

Reference Value = 21.34 V/m

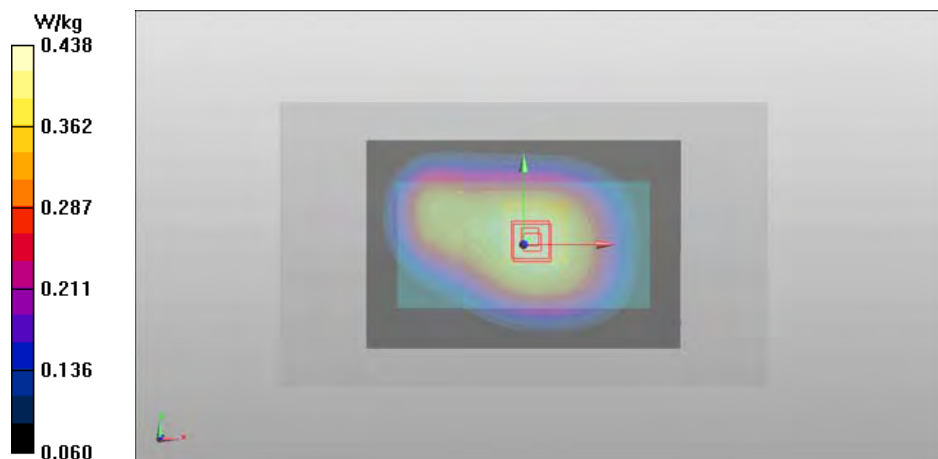
Peak SAR (extrapolated) = 0.500 W/kg

SAR(1 g) = 0.399 W/kg

SAR(10 g) = 0.305 W/kg

Power Drift = 0.00 dB

Maximum value of SAR (measured) = 0.438 W/kg



Plot B9

Date/Time: 2015-07-07 09:17:18

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: LTE850 (Band 5)

Frequency: **844 MHz**; Duty Cycle: 1:1

Medium: BSL835; Medium Notes: $t = 21,9$ C

Medium parameters used: $f = 844$ MHz; $\sigma = 0.985$ S/m; $\epsilon_r = 53.876$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE850 (Band 5)/Body - CH 20600 - 10MHz - QPSK - 1 RB - offset 24 - 15 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated grid: $dx = 1.500$ mm, $dy = 1.500$ mm

Reference Value = 20.094 V/m

Fast SAR: SAR(1 g) = 0.332 W/kg

Fast SAR(10 g) = 0.234 W/kg

Maximum value of SAR (interpolated) = 0.373 W/kg

LTE850 (Band 5)/Body - CH 20600 - 10MHz - QPSK - 1 RB - offset 24 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan (6x5x7)/Cube 0: Measurement grid: $dx = 7.5$ mm, $dy = 7.5$ mm, $dz = 5$ mm

Reference Value = 19.621 V/m

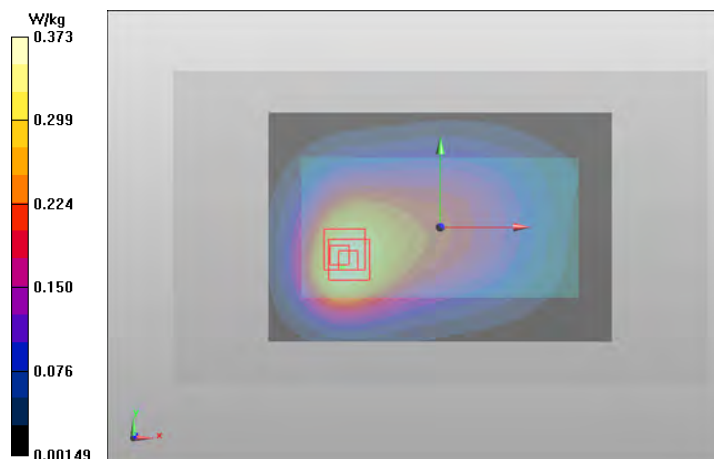
Peak SAR (extrapolated) = 0.452 W/kg

SAR(1 g) = 0.330 W/kg

SAR(10 g) = 0.234 W/kg

Power Drift = -0.01 dB

Maximum value of SAR (measured) = 0.370 W/kg



Plot B10

Date/Time: 2015-08-27 9:04:17

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091256/7

Communication System: LTE850 (Band 5)

Frequency: **844 MHz**; Duty Cycle: 1:1

Medium: BSL835; Medium Notes: $t = 22.2$ C

Medium parameters used: $f = 844$ MHz; $\sigma = 0.982$ S/m; $\epsilon_r = 54.077$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE850 (Band 5)/Cheek - CH 20600 - 10MHz - 1 RB - Offset 24 - 15mm - No Headset - Display - Antenna

1/Area Scan (81x121x1): Interpolated grid: $dx = 1.500$ mm, $dy = 1.500$ mm

Reference Value = 18.32 V/m

Fast SAR: SAR(1 g) = 0.297 W/kg

Fast SAR(10 g) = 0.210 W/kg

Maximum value of SAR (interpolated) = 0.337 W/kg

LTE850 (Band 5)/Cheek - CH 20600 - 10MHz - 1 RB - Offset 24 - 15mm - No Headset - Display - Antenna

1/Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx = 7.5$ mm, $dy = 7.5$ mm, $dz = 5$ mm

Reference Value = 18.32 V/m

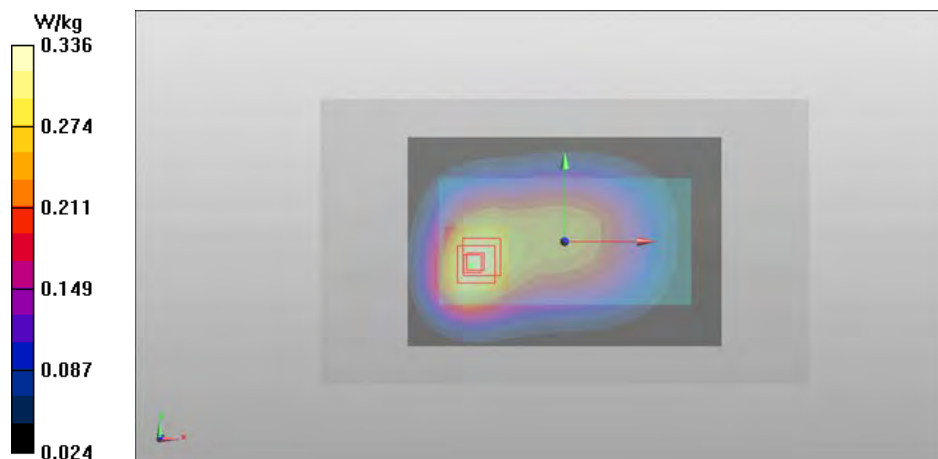
Peak SAR (extrapolated) = 0.407 W/kg

SAR(1 g) = 0.297 W/kg

SAR(10 g) = 0.212 W/kg

Power Drift = 0.00 dB

Maximum value of SAR (measured) = 0.336 W/kg



Plot B11

Date/Time: 2015-07-06 13:32:57

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217821/7

Communication System: WCDMA1700/2100 (Band 4)

Frequency: **1732.4 MHz**; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t= 23.0 C

Medium parameters used (interpolated): f = 1732.4 MHz; $\sigma = 1.419$ S/m; $\epsilon_r = 52.557$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.92, 4.92, 4.92); Calibrated: 2015-01-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2014-11-03
- Phantom: Triple Flat Phantom 5.1C; Type: SN 000 T01 DA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WCDMA1700/2100 (Band 4)/Body - CH 1412 - 15 mm - No Headset - Display - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 21.834 V/m

Fast SAR: SAR(1 g) = 0.688 W/kg

Fast SAR(10 g) = 0.435 W/kg

Maximum value of SAR (interpolated) = 0.813 W/kg

WCDMA1700/2100 (Band 4)/Body - CH 1412 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan

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

Reference Value = 23.194 V/m

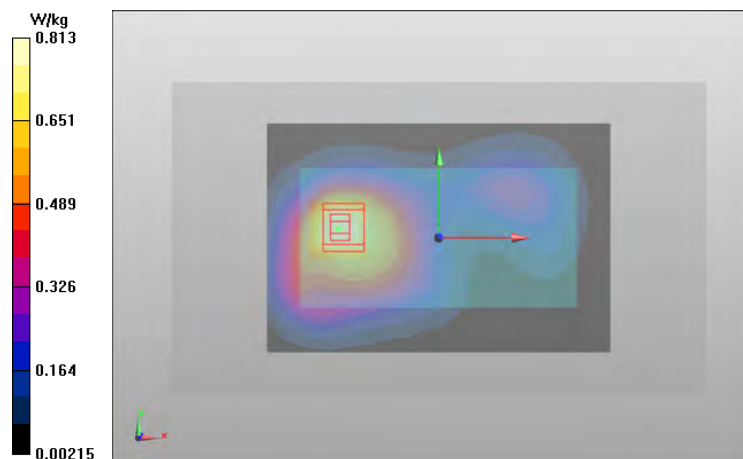
Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.708 W/kg

SAR(10 g) = 0.475 W/kg

Power Drift = -0.03 dB

Maximum value of SAR (measured) = 0.811 W/kg



Plot B12

Date/Time: 2015-08-30 15:29:58

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091264/1

Communication System: WCDMA1700/2100 (Band 4)

Frequency: **1732.4 MHz**; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t= 20.8 C

Medium parameters used (interpolated): f = 1732.4 MHz; $\sigma = 1.44$ S/m; $\epsilon_r = 51.593$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3276
- ConvF(4.91, 4.91, 4.91); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2015-01-21
- Phantom: SAM 2 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/2 (1800MHz), TP-1123/2 (1900MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA1750_2100 (Band 4)/Body - CH 1412 - 15 mm - No Headset - Display - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 19.65 V/m

Fast SAR: SAR(1 g) = 0.661 W/kg

Fast SAR(10 g) = 0.420 W/kg

Maximum value of SAR (interpolated) = 0.778 W/kg

WCDMA1750_2100 (Band 4)/Body - CH 1412 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan

(6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.68 V/m

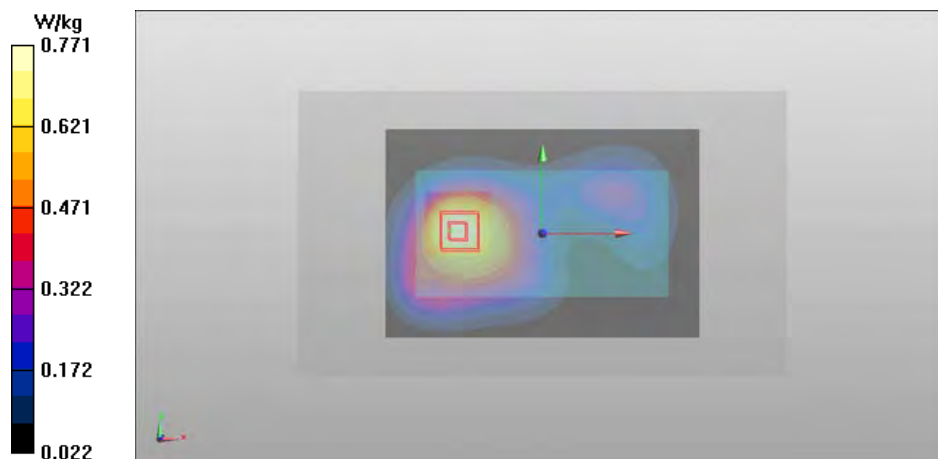
Peak SAR (extrapolated) = 0.988 W/kg

SAR(1 g) = 0.674 W/kg

SAR(10 g) = 0.448 W/kg

Power Drift = 0.00 dB

Maximum value of SAR (measured) = 0.771 W/kg



Plot B13

Date/Time: 2015-07-06 08:53:12

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217821/7

Communication System: LTE1700/2100 (Band 4)

Frequency: 1745 MHz; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t= 23.0 C

Medium parameters used: f = 1745 MHz; σ = 1.428 S/m; ϵ_r = 52.498; ρ = 1000 kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.92, 4.92, 4.92); Calibrated: 2015-01-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2014-11-03
- Phantom: Triple Flat Phantom 5.1C; Type: SN 000 T01 DA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE 1700_2100 (Band 4)/Body - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Display -

Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 19.582 V/m

Fast SAR: SAR(1 g) = 0.539 W/kg

Fast SAR(10 g) = 0.339 W/kg

Maximum value of SAR (interpolated) = 0.638 W/kg

LTE 1700_2100 (Band 4)/Body - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Display -

Antenna 1/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.555 V/m

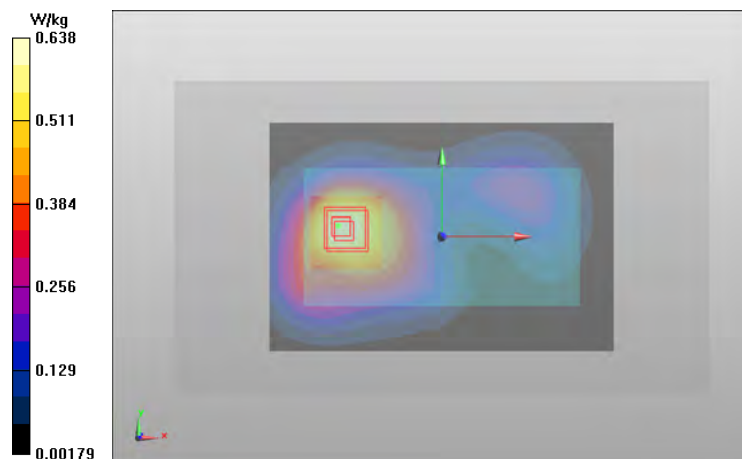
Peak SAR (extrapolated) = 0.819 W/kg

SAR(1 g) = 0.562 W/kg

SAR(10 g) = 0.376 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 0.638 W/kg



Plot B14

Date/Time: 2015-08-30 11:37:49

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091264/1

Communication System: LTE1700/2100 (Band 4)

Frequency: 1745 MHz; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t = 20.8 C

Medium parameters used: f = 1745 MHz; $\sigma = 1.45$ S/m; $\epsilon_r = 51.591$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3276
- ConvF(4.91, 4.91, 4.91); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2015-01-21
- Phantom: SAM 2 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/2 (1800MHz), TP-1123/2 (1900MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE1700/2100 (Band 4)/Body - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Display -

Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 16.73 V/m

Fast SAR: SAR(1 g) = 0.484 W/kg

Fast SAR(10 g) = 0.307 W/kg

Maximum value of SAR (interpolated) = 0.568 W/kg

LTE1700/2100 (Band 4)/Body - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Display -

Antenna 1/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 16.73 V/m

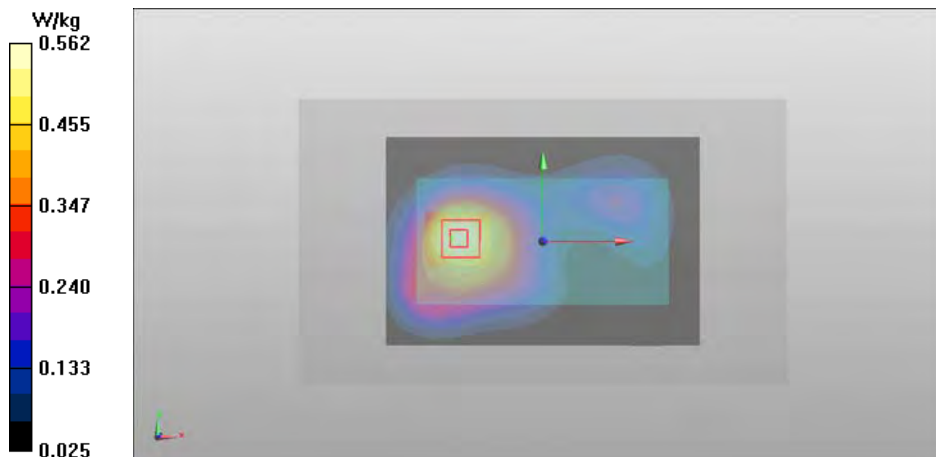
Peak SAR (extrapolated) = 0.720 W/kg

SAR(1 g) = 0.493 W/kg

SAR(10 g) = 0.328 W/kg

Power Drift = 0.00 dB

Maximum value of SAR (measured) = 0.562 W/kg



Plot B15

Date/Time: 2015-07-07 21:28:59

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: 1-slot GPRS1900

Frequency: **1880 MHz**; Duty Cycle: 1:8.30042

Medium: BSL1900; Medium Notes: t = 21.4 C

Medium parameters used: f = 1880 MHz; $\sigma = 1.519$ S/m; $\epsilon_r = 52.357$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

1-slot GPRS1900/Body - CH 661 - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Reference Value = 12.422 V/m

Fast SAR: SAR(1 g) = 0.225 W/kg

Fast SAR(10 g) = 0.135 W/kg

Maximum value of SAR (interpolated) = 0.272 W/kg

1-slot GPRS1900/Body - CH 661 - No Headset - Display - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement

grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.418 V/m

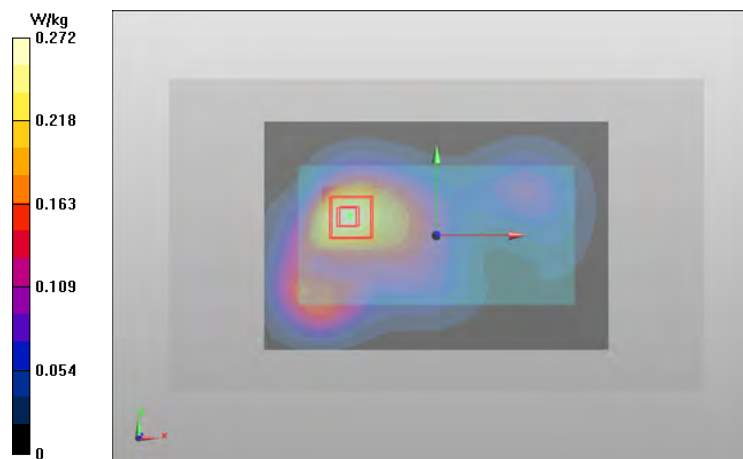
Peak SAR (extrapolated) = 0.339 W/kg

SAR(1 g) = 0.229 W/kg

SAR(10 g) = 0.148 W/kg

Power Drift = 0.02 dB

Maximum value of SAR (measured) = 0.266 W/kg



Plot B16

Date/Time: 2015-09-02 12:21:09

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091300/3

Communication System: 4-slot GPRS1900

Frequency: **1880 MHz**; Duty Cycle: 1:2.09991

Medium: BSL1900; Medium Notes: t= 22.1 C

Medium parameters used: f = 1880 MHz; $\sigma = 1.471$ S/m; $\epsilon_r = 51.757$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS1900/Body - CH 661 - 15 mm - No Headset - Display - Antenna 1/Area Scan (81x141x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 13.51 V/m

Fast SAR: SAR(1 g) = 0.240 W/kg

Fast SAR(10 g) = 0.147 W/kg

Maximum value of SAR (interpolated) = 0.286 W/kg

4-slot GPRS1900/Body - CH 661 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 13.51 V/m

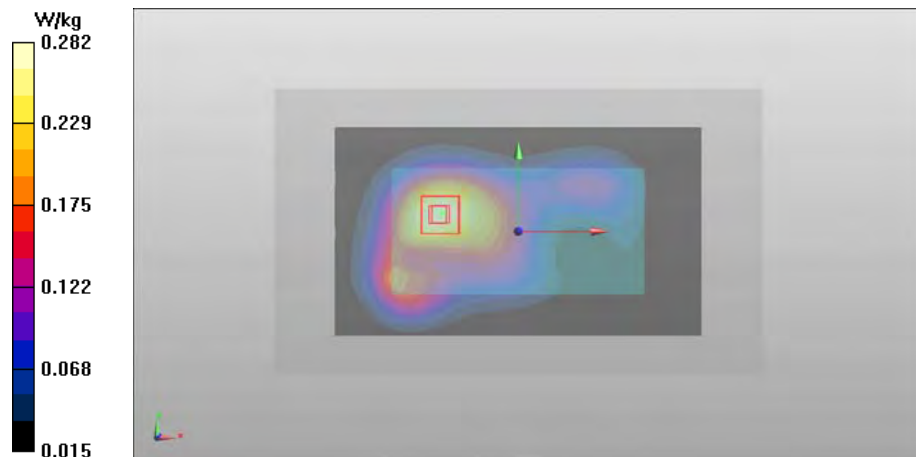
Peak SAR (extrapolated) = 0.358 W/kg

SAR(1 g) = 0.246 W/kg

SAR(10 g) = 0.163 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.282 W/kg



SAR Report

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

Type: RM-1104

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Plot B17

Date/Time: 2015-07-07 18:57:06

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: WCDMA1900 (Band 2)

Frequency: **1852.4 MHz**; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t= 21.4 C

Medium parameters used (interpolated): f = 1852.4 MHz; $\sigma = 1.485$ S/m; $\epsilon_r = 52.431$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WCDMA1900 (Band 2)/Body - CH 9262 - 15 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.679 W/kg

WCDMA1900 (Band 2)/Body - CH 9262 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan (5x5x7)/Cube

0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 21.906 V/m

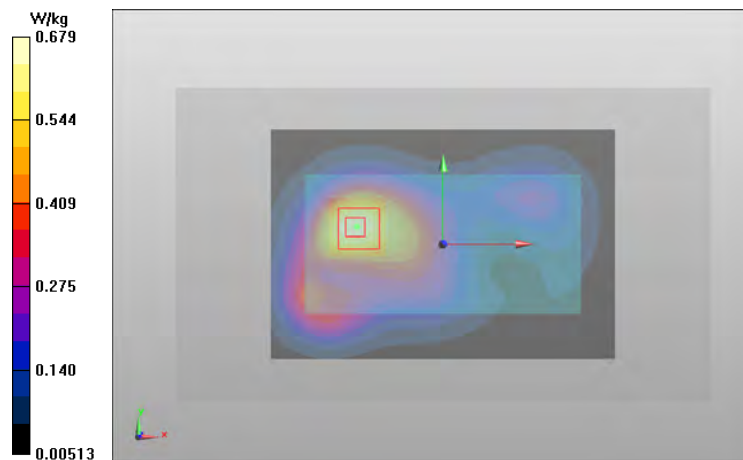
Peak SAR (extrapolated) = 0.854 W/kg

SAR(1 g) = 0.584 W/kg

SAR(10 g) = 0.379 W/kg

Power Drift = -0.10 dB

Maximum value of SAR (measured) = 0.675 W/kg



Plot B18

Date/Time: 2015-09-02 11:16:30

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091300/3

Communication System: WCDMA1900 (Band 2)

Frequency: **1852.4 MHz**; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t= 22.1 C

Medium parameters used (interpolated): f = 1852.4 MHz; $\sigma = 1.444$ S/m; $\epsilon_r = 51.767$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA1900 (Band 2)/Body - CH 9262 - 15 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 21.02 V/m

Fast SAR: SAR(1 g) = 0.628 W/kg

Fast SAR(10 g) = 0.383 W/kg

Maximum value of SAR (interpolated) = 0.755 W/kg

WCDMA1900 (Band 2)/Body - CH 9262 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan (5x6x7)/Cube

0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 21.02 V/m

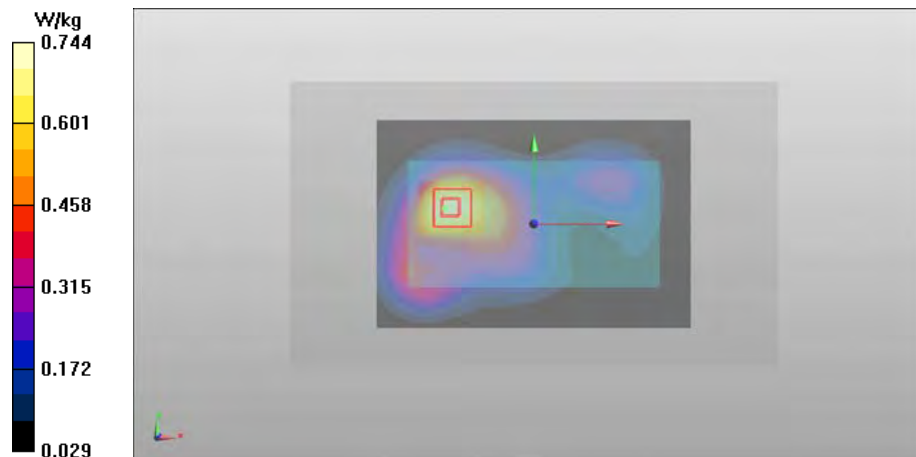
Peak SAR (extrapolated) = 0.944 W/kg

SAR(1 g) = 0.643 W/kg

SAR(10 g) = 0.421 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.744 W/kg



Plot B19

Date/Time: 2015-07-07 17:17:04

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: LTE1900 (Band 2)

Frequency: **1860 MHz**; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t= 21.4 C

Medium parameters used: f = 1860 MHz; $\sigma = 1.493$ S/m; $\epsilon_r = 52.402$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE1900 (Band 2)/Body - CH 18700 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 17.786 V/m

Fast SAR: SAR(1 g) = 0.468 W/kg

Fast SAR(10 g) = 0.285 W/kg

Maximum value of SAR (interpolated) = 0.562 W/kg

LTE1900 (Band 2)/Body - CH 18700 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 17.786 V/m

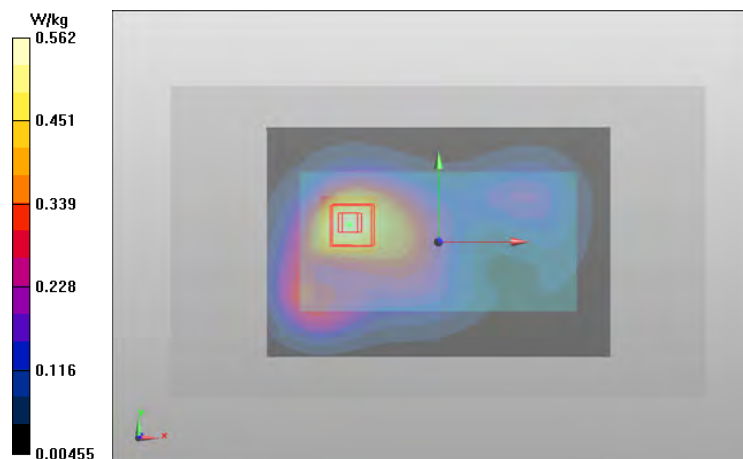
Peak SAR (extrapolated) = 0.699 W/kg

SAR(1 g) = 0.475 W/kg

SAR(10 g) = 0.308 W/kg

Power Drift = -0.01 dB

Maximum value of SAR (measured) = 0.553 W/kg



Plot B20

Date/Time: 2015-09-02 12:49:10

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091300/3

Communication System: LTE1900 (Band 2)

Frequency: **1860 MHz**; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t= 22.1 C

Medium parameters used: f = 1860 MHz; $\sigma = 1.446$ S/m; $\epsilon_r = 51.746$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE1900 (Band 2)/Body - CH 18700 - 20MHz - QPSK - 1RB - Offset 0 - 15 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 19.72 V/m

Fast SAR: SAR(1 g) = 0.539 W/kg

Fast SAR(10 g) = 0.328 W/kg

Maximum value of SAR (interpolated) = 0.648 W/kg

LTE1900 (Band 2)/Body - CH 18700 - 20MHz - QPSK - 1RB - Offset 0 - 15 mm - No Headset - Display - Antenna 1/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.72 V/m

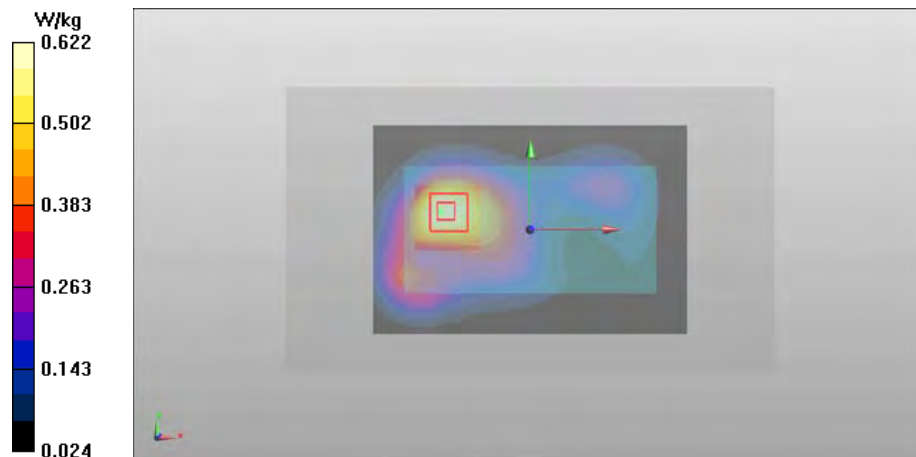
Peak SAR (extrapolated) = 0.790 W/kg

SAR(1 g) = 0.543 W/kg

SAR(10 g) = 0.358 W/kg

Power Drift = -0.06 dB

Maximum value of SAR (measured) = 0.622 W/kg



Plot B21

Date/Time: 2015-07-06 12:39:11

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217827/4

Communication System: LTE2500 (Band 7)

Frequency: 2510 MHz; Duty Cycle: 1:1

Medium: BSL2450-2600; Medium Notes: t= 22.5 C

Medium parameters used: f = 2510 MHz; $\sigma = 1.998$ S/m; $\epsilon_r = 51.95$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE2500 (Band 7)/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Back - Antenna 1/Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 21.905 V/m

Fast SAR: SAR(1 g) = 0.801 W/kg

Fast SAR(10 g) = 0.444 W/kg

Maximum value of SAR (interpolated) = 0.992 W/kg

LTE2500 (Band 7)/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Back - Antenna 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.659 V/m

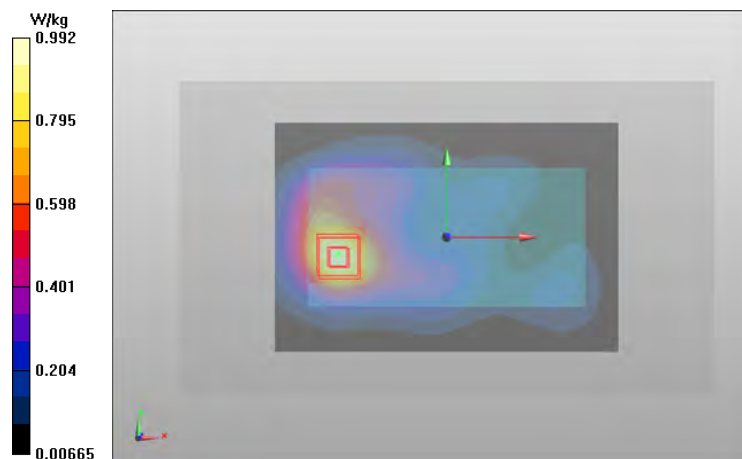
Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.793 W/kg

SAR(10 g) = 0.464 W/kg

Power Drift = -0.10 dB

Maximum value of SAR (measured) = 0.952 W/kg



Plot B22

Date/Time: 2015-08-28 9:26:44

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091313/6

Communication System: LTE2500 (Band 7)

Frequency: **2510 MHz**; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: t= 22.5 C

Medium parameters used: f = 2510 MHz; $\sigma = 1.986$ S/m; $\epsilon_r = 51.372$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**LTE2500 (Band 7)/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Back - Antenna
1/Area Scan (121x181x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 22.44 V/m

Fast SAR: SAR(1 g) = 0.806 W/kg

Fast SAR(10 g) = 0.451 W/kg

Maximum value of SAR (interpolated) = 0.986 W/kg

**LTE2500 (Band 7)/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Back - Antenna
1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.44 V/m

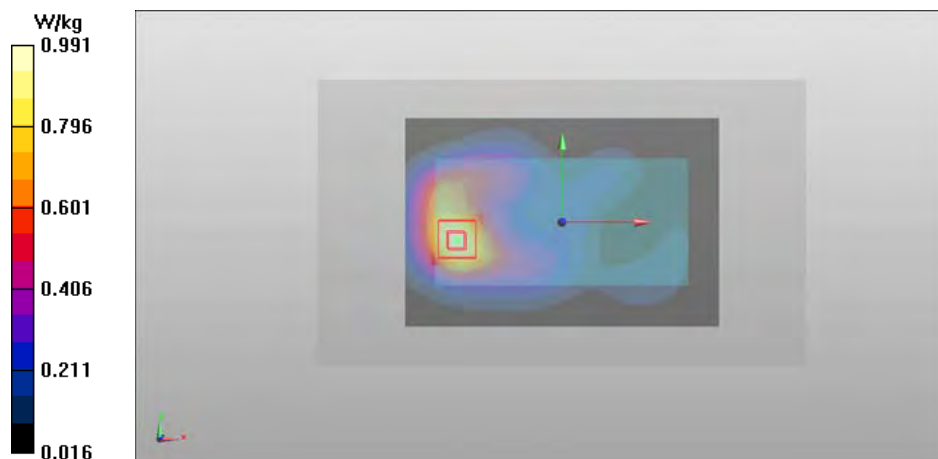
Peak SAR (extrapolated) = 1.38 W/kg

SAR(1 g) = 0.818 W/kg

SAR(10 g) = 0.478 W/kg

Power Drift = -0.06 dB

Maximum value of SAR (measured) = 0.991 W/kg



Plot B23

Date/Time: 2015-07-03 09:12:13

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN2450

Frequency: **2412 MHz**; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: t= 21.2 C

Medium parameters used: f = 2412 MHz; $\sigma = 1.916$ S/m; $\epsilon_r = 52.619$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 1Mbps SS 1 - 15mm - No Headset - Display - Antenna 1 and 2/Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 8.805 V/m

Fast SAR: SAR(1 g) = 0.134 W/kg

Fast SAR(10 g) = 0.070 W/kg

Maximum value of SAR (interpolated) = 0.173 W/kg

WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 1Mbps SS 1 - 15mm - No Headset - Display - Antenna 1 and 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.271 V/m

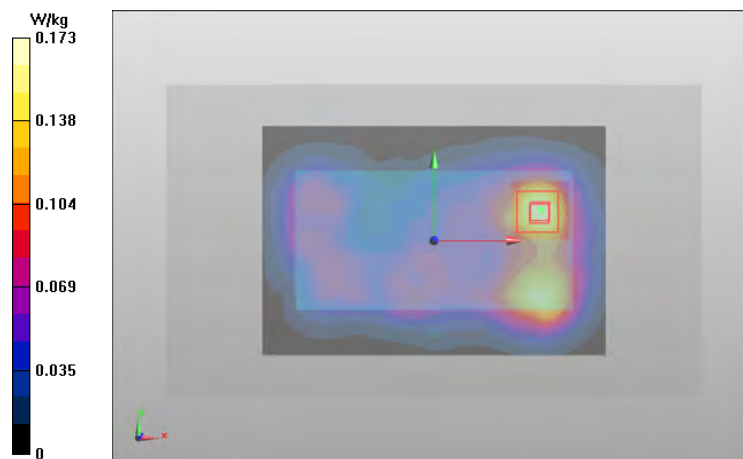
Peak SAR (extrapolated) = 0.231 W/kg

SAR(1 g) = 0.133 W/kg

SAR(10 g) = 0.078 W/kg

Power Drift = -0.20 dB

Maximum value of SAR (measured) = 0.166 W/kg



Plot B24

Date/Time: 2015-08-28 13:07:16

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091330/0

Communication System: WLAN2450

Frequency: **2412 MHz**; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: t= 22.5 C

Medium parameters used: f = 2412 MHz; $\sigma = 1.872$ S/m; $\epsilon_r = 51.662$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.32, 7.32, 7.32); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 2 Mbps SS 1 - 15mm - No Headset - Display - Antenna 1 and 2/Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 7.230 V/m

Fast SAR: SAR(1 g) = 0.111 W/kg

Fast SAR(10 g) = 0.058 W/kg

Maximum value of SAR (interpolated) = 0.141 W/kg

WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 2 Mbps SS 1 - 15mm - No Headset - Display - Antenna 1 and 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.230 V/m

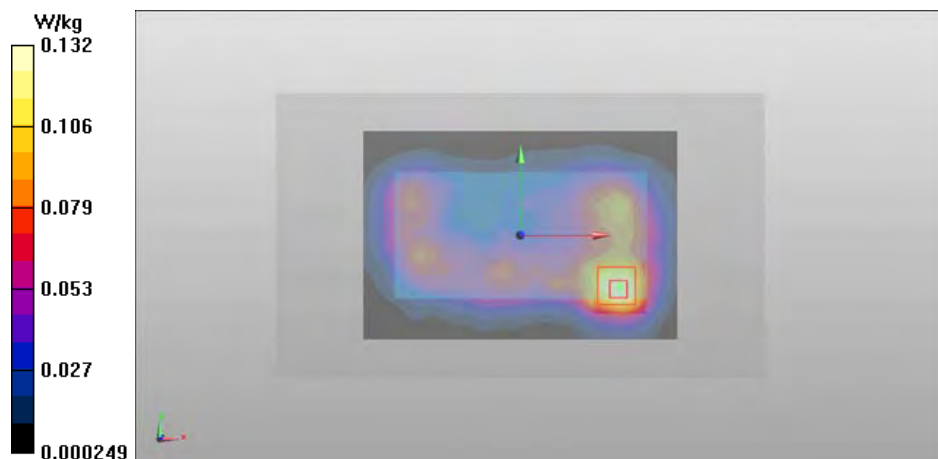
Peak SAR (extrapolated) = 0.197 W/kg

SAR(1 g) = 0.108 W/kg

SAR(10 g) = 0.059 W/kg

Power Drift = -0.10 dB

Maximum value of SAR (measured) = 0.132 W/kg



SAR Report

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

Type: RM-1104

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Plot B25

Date/Time: 2015-07-04 16:18:22

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000

Frequency: **5510 MHz**; Duty Cycle: 1:1

Medium: BSL5000; Medium Notes: 21.3 C

Medium parameters used: $f = 5510 \text{ MHz}$; $\sigma = 5.861 \text{ S/m}$; $\epsilon_r = 47.418$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(3.82, 3.82, 3.82); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WLAN5000 ac-mode/Body - CH 102 - 40 MHz OFDM BPSK MCS0 SS 1 - 15mm - No Headset - Display -

Antenna 1 and 2/Area Scan (121x181x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.983 W/kg

WLAN5000 ac-mode/Body - CH 102 - 40 MHz OFDM BPSK MCS0 SS 1 - 15mm - No Headset - Display -

Antenna 1 and 2/Zoom Scan (8x8x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 13.852 V/m

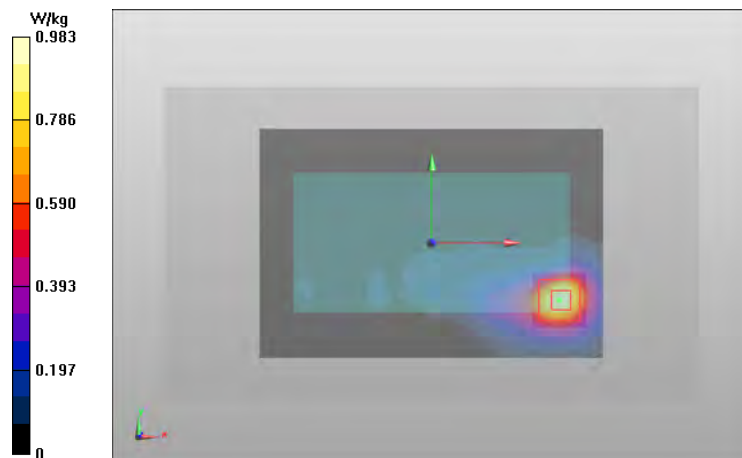
Peak SAR (extrapolated) = 1.77 W/kg

SAR(1 g) = 0.496 W/kg

SAR(10 g) = 0.189 W/kg

Power Drift = 0.02 dB

Maximum value of SAR (measured) = 0.931 W/kg



Plot B26

Date/Time: 2015-08-31 10:44:00

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091330/0

Communication System: WLAN5000

Frequency: **5510 MHz**; Duty Cycle: 1:1

Medium: BSL 5000; Medium Notes: t= 21.7 C

Medium parameters used: f = 5510 MHz; $\sigma = 5.879 \text{ S/m}$; $\epsilon_r = 46.265$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(3.82, 3.82, 3.82); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WLAN5000 ac-mode/Body - CH 102 - 40 MHz OFDM 13.5 Mbps SS 1 - 15mm - No Headset - Display - Antenna 1 and 2/Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.605 W/kg

WLAN5000 ac-mode/Body - CH 102 - 40 MHz OFDM 13.5 Mbps SS 1 - 15mm - No Headset - Display - Antenna 1 and 2/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 10.69 V/m

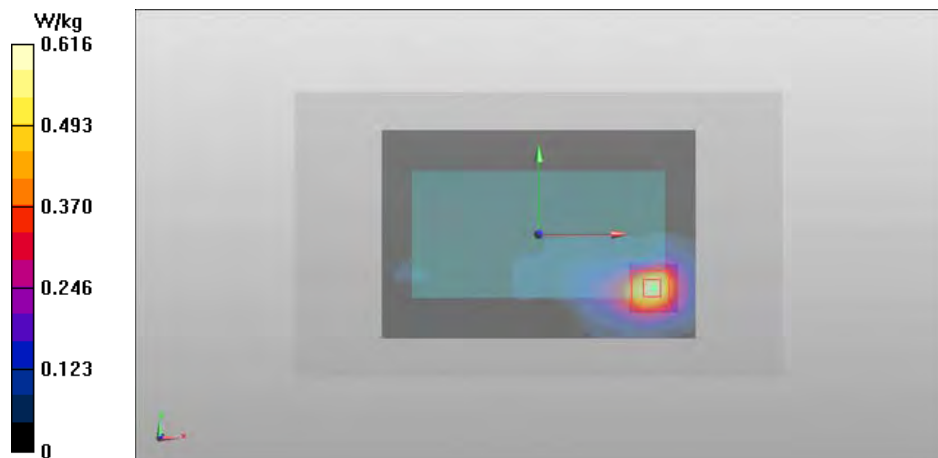
Peak SAR (extrapolated) = 1.23 W/kg

SAR(1 g) = 0.330 W/kg

SAR(10 g) = 0.123 W/kg

Power Drift = 0.02 dB

Maximum value of SAR (measured) = 0.616 W/kg



Plot B27

Date/Time: 2015-07-06 11:17:28

DASY Configuration for LTE2500 (Band 7)/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Display - Antenna 1/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217827/4

Communication System: LTE2500 (Band 7); Frequency: 2510 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL2450-2600 Medium parameters used: $f = 2510$ MHz; $\sigma = 1.998$ S/m; $\epsilon_r = 51.95$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: EX3DV4 - SN3892; ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;

Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))

Electronics: DAE4 Sn538; Calibrated: 2015-04-20

Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-03 09:12:13

DASY Configuration for WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 1Mbps SS 1 - 15mm - No Headset - Display - Antenna 1 and 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN2450; Frequency: 2412 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL2450 Medium parameters used: $f = 2412$ MHz; $\sigma = 1.916$ S/m; $\epsilon_r = 52.619$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: EX3DV4 - SN3852; ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;

Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))

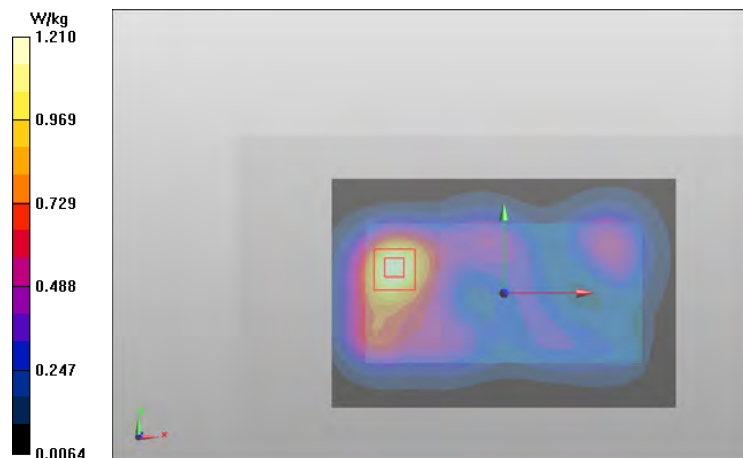
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: Triple, SAR-8; Type: QD 000 P51 CA;

Measurement SW: DASY52, Version 52.8 (8)

Fast SAR of Combined Scans: SAR(1 g) = 0.976 W/kg; SAR(10 g) = 0.534 W/kg

Maximum value of SAR (interpolated) = 1.21 W/kg



WLAN2450 b-mode was scaled with factor 1.35 and LTE2500 (Band 7) Antenna 1 with factor 1.17 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

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Plot B28

Date/Time: 2015-07-06 11:17:28

DASY Configuration for LTE2500 (Band 7)/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 0 - 15 mm - No Headset - Display - Antenna 1/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217827/4

Communication System: LTE2500 (Band 7); Frequency: 2510 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL2450-2600 Medium parameters used: $f = 2510$ MHz; $\sigma = 1.998$ S/m; $\epsilon_r = 51.95$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: EX3DV4 - SN3892; ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;

Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))

Electronics: DAE4 Sn538; Calibrated: 2015-04-20

Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-04 16:18:22

DASY Configuration for WLAN5000 ac-mode/Body - CH 102 - 40 MHz OFDM BPSK MCS0 SS 1 - 15mm - No Headset - Display - Antenna 1 and 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000; Frequency: 5510 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL5000 Medium parameters used: $f = 5510$ MHz; $\sigma = 5.861$ S/m; $\epsilon_r = 47.418$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: EX3DV4 - SN3852; ConvF(3.82, 3.82, 3.82); Calibrated: 2015-04-24;

Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used))

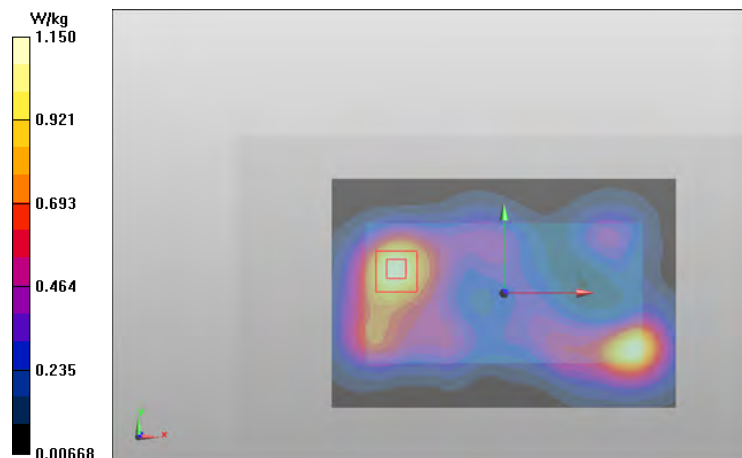
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: Triple, SAR-8; Type: QD 000 P51 CA;

Measurement SW: DASY52, Version 52.8 (8)

Fast SAR of Combined Scans: SAR(1 g) = 0.917 W/kg; SAR(10 g) = 0.498 W/kg

Maximum value of SAR (interpolated) = 1.15 W/kg



WLAN5000 ac-mode was scaled with factor 1.15 and LTE2500 (Band 7) Antenna 1 with factor 1.17 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

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Plot W1

Date/Time: 2015-07-07 12:27:50

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217825/8

Communication System: LTE700 (Band 12)

Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: BSL750; Medium Notes: t= 22.0 C

Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.957 S/m; ϵ_r = 54.474; ρ = 1000 kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(8.8, 8.8, 8.8); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #2 Triple, SAR4; Type: QD 000 P51 CA; Serial: TP-1123/1 (750 MHz), TP-1124/1 (2450 MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE700 (Band 12)/Body - CH 23095 - 10MHz - QPSK - 1 RB - Offset 24 - 10 mm - No Headset - Display -

Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 20.516 V/m

Fast SAR: SAR(1 g) = 0.362 W/kg

Fast SAR(10 g) = 0.261 W/kg

Maximum value of SAR (interpolated) = 0.407 W/kg

LTE700 (Band 12)/Body - CH 23095 - 10MHz - QPSK - 1 RB - Offset 24 - 10 mm - No Headset - Display -

Antenna 1/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 20.516 V/m

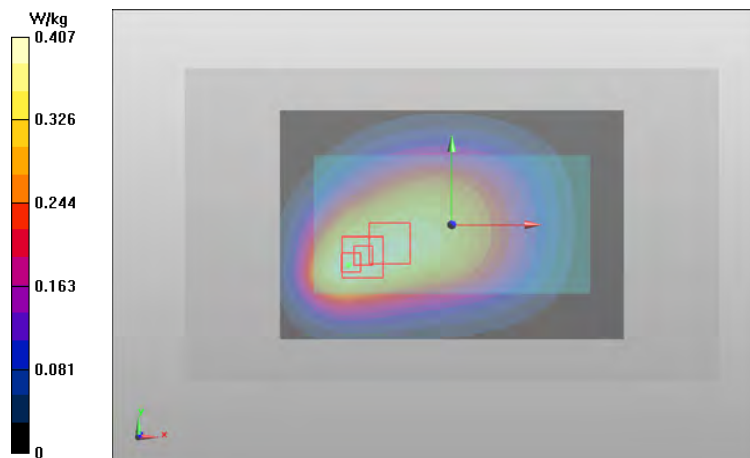
Peak SAR (extrapolated) = 0.472 W/kg

SAR(1 g) = 0.363 W/kg

SAR(10 g) = 0.275 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.401 W/kg



SAR Report

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

Type: RM-1104

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Plot W2

Date/Time: 2015-08-28 13:13:18

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091276/5

Communication System: LTE700 (Band 12)

Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: BSL750; Medium Notes: $t = 22.0$ C

Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.951$ S/m; $\epsilon_r = 53.754$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(8.8, 8.8, 8.8); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #2 Triple, SAR4; Type: QD 000 P51 CA; Serial: TP-1123/1 (750 MHz), TP-1124/1 (2450 MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE700 (Band 12)/Body - CH 23095 -10MHz - QPSK - 1 RB - Offset 24 - 10 mm - No Headset - Display -

Antenna 1/Area Scan (81x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Reference Value = 9.775 V/m

Fast SAR: SAR(1 g) = 0.411 W/kg

Fast SAR(10 g) = 0.294 W/kg

Maximum value of SAR (interpolated) = 0.461 W/kg

LTE700 (Band 12)/Body - CH 23095 -10MHz - QPSK - 1 RB - Offset 24 - 10 mm - No Headset - Display -

Antenna 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 9.775 V/m

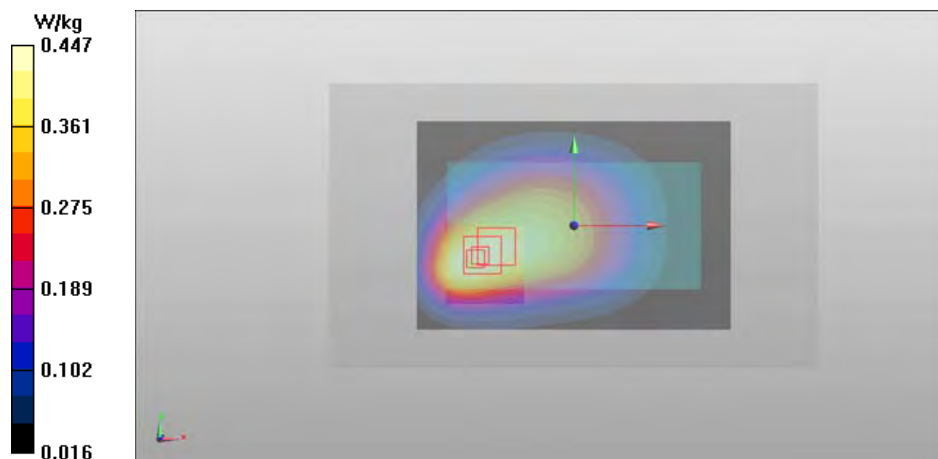
Peak SAR (extrapolated) = 0.537 W/kg

SAR(1 g) = 0.406 W/kg

SAR(10 g) = 0.303 W/kg

Power Drift = -0.04 dB

Maximum value of SAR (measured) = 0.447 W/kg



Plot W3

Date/Time: 2015-07-07 13:00:58

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217825/8

Communication System: LTE700 (Band 17)

Frequency: **709 MHz**; Duty Cycle: 1:1

Medium: BSL750; Medium Notes: $t = 22.0$ C

Medium parameters used: $f = 709$ MHz; $\sigma = 0.958$ S/m; $\epsilon_r = 54.466$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(8.8, 8.8, 8.8); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #2 Triple, SAR4; Type: QD 000 P51 CA; Serial: TP-1123/1 (750 MHz), TP-1124/1 (2450 MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE700 (Band 17)/Body - CH 23780 - 10MHz - QPSK - 1 RB - Offset 24 - 10 mm - No Headset - Display -

Antenna 1/Area Scan (81x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Reference Value = 20.334 V/m

Fast SAR: SAR(1 g) = 0.351 W/kg

Fast SAR(10 g) = 0.254 W/kg

Maximum value of SAR (interpolated) = 0.393 W/kg

LTE700 (Band 17)/Body - CH 23780 - 10MHz - QPSK - 1 RB - Offset 24 - 10 mm - No Headset - Display -

Antenna 1/Zoom Scan (7x8x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 20.334 V/m

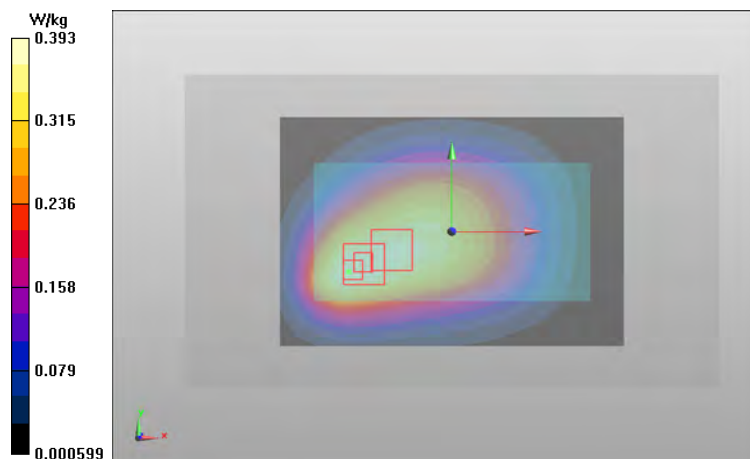
Peak SAR (extrapolated) = 0.462 W/kg

SAR(1 g) = 0.351 W/kg

SAR(10 g) = 0.266 W/kg

Power Drift = -0.03 dB

Maximum value of SAR (measured) = 0.390 W/kg



Plot W4

Date/Time: 2015-08-28 9:54:26

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091276/5

Communication System: LTE700 (Band 17)

Frequency: 709 MHz; Duty Cycle: 1:1

Medium: BSL750; Medium Notes: $t = 22.0$ C

Medium parameters used: $f = 709$ MHz; $\sigma = 0.952$ S/m; $\epsilon_r = 53.775$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3835
- ConvF(8.8, 8.8, 8.8); Calibrated: 2014-10-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1213; Calibrated: 2014-10-14
- Phantom: #2 Triple, SAR4; Type: QD 000 P51 CA; Serial: TP-1123/1 (750 MHz), TP-1124/1 (2450 MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE700 (Band 17)/Body - CH23780 -10MHz - QPSK - 1 RB - Offset 24 - 10 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated grid: $dx = 1.500$ mm, $dy = 1.500$ mm

Reference Value = 20.53 V/m

Fast SAR: SAR(1 g) = 0.369 W/kg

Fast SAR(10 g) = 0.265 W/kg

Maximum value of SAR (interpolated) = 0.415 W/kg

LTE700 (Band 17)/Body - CH23780 -10MHz - QPSK - 1 RB - Offset 24 - 10 mm - No Headset - Display - Antenna 1/Zoom Scan (6x8x7)/Cube 0: Measurement grid: $dx = 7.5$ mm, $dy = 7.5$ mm, $dz = 5$ mm

Reference Value = 20.53 V/m

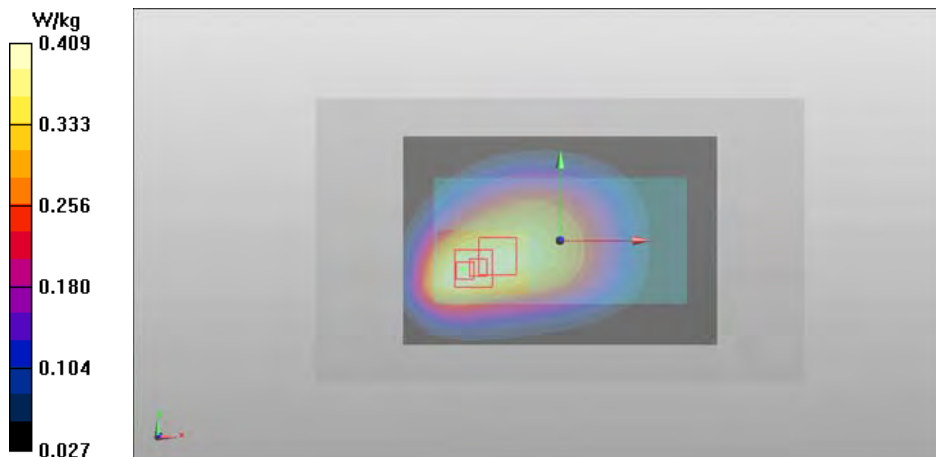
Peak SAR (extrapolated) = 0.481 W/kg

SAR(1 g) = 0.367 W/kg

SAR(10 g) = 0.279 W/kg

Power Drift = 0.02 dB

Maximum value of SAR (measured) = 0.409 W/kg



Plot W5

Date/Time: 2015-07-07 19:59:35

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: 4-slot GPRS850

Frequency: **848.8 MHz**; Duty Cycle: 1:2.09991

Medium: BSL835; Medium Notes: t= 21,9 C

Medium parameters used: f = 849 MHz; $\sigma = 0.987$ S/m; $\epsilon_r = 53.855$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS850/Body - CH 251 - 10 mm - No Headset - Display - Antenna 2/Area Scan (81x121x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 22.28 V/m

Fast SAR: SAR(1 g) = 0.459 W/kg

Fast SAR(10 g) = 0.315 W/kg

Maximum value of SAR (interpolated) = 0.533 W/kg

4-slot GPRS850/Body - CH 251 - 10 mm - No Headset - Display - Antenna 2/Zoom Scan (6x6x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 22.88 V/m

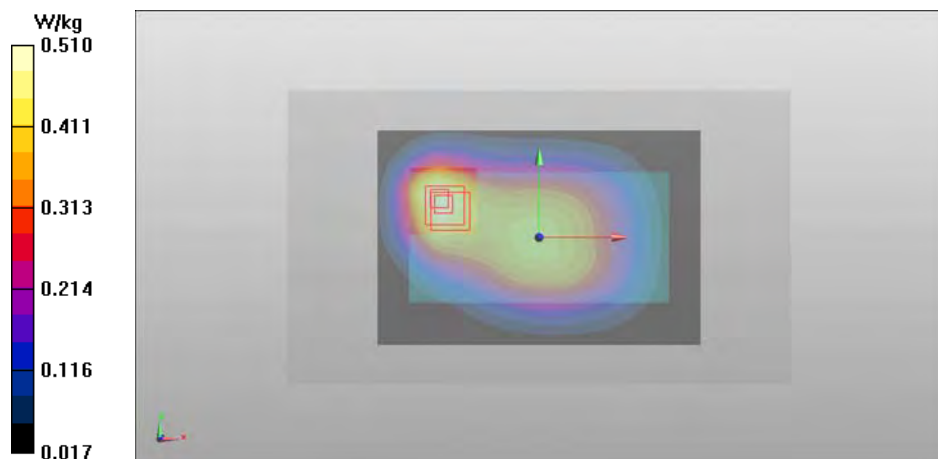
Peak SAR (extrapolated) = 0.673 W/kg

SAR(1 g) = 0.451 W/kg

SAR(10 g) = 0.313 W/kg

Power Drift = -0.01 dB

Maximum value of SAR (measured) = 0.510 W/kg



Plot W6

Date/Time: 2015-08-27 14:15:37

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091256/7

Communication System: 4-slot GPRS850

Frequency: **848.8 MHz**; Duty Cycle: 1:2.09991

Medium: BSL835; Medium Notes: t= 22.2 C

Medium parameters used: f = 849 MHz; σ = 0.986 S/m; ϵ_r = 54.056; ρ = 1000 kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS850/Cheek - CH 251 - 10mm - No Headset - Display - Antenna 2/Area Scan (81x121x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 25.67 V/m

Fast SAR: SAR(1 g) = 0.603 W/kg

Fast SAR(10 g) = 0.412 W/kg

Maximum value of SAR (interpolated) = 0.700 W/kg

4-slot GPRS850/Cheek - CH 251 - 10mm - No Headset - Display - Antenna 2/Zoom Scan (7x6x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 25.67 V/m

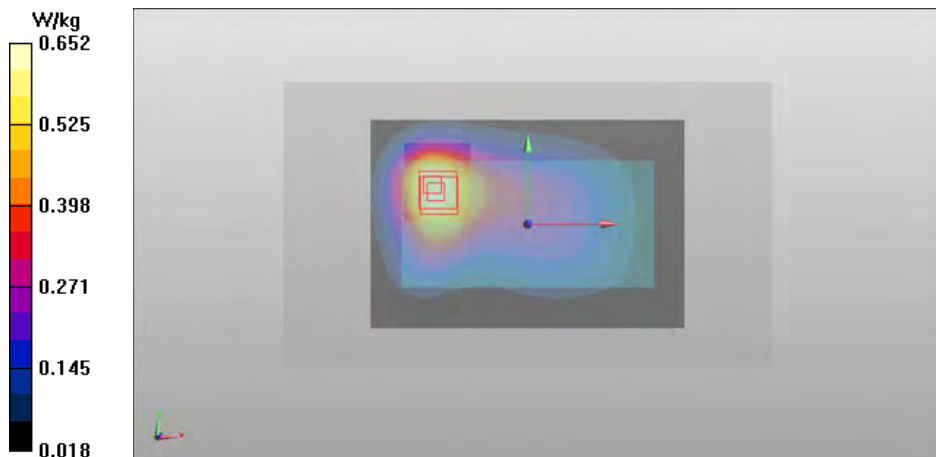
Peak SAR (extrapolated) = 0.815 W/kg

SAR(1 g) = 0.582 W/kg

SAR(10 g) = 0.407 W/kg

Power Drift = 0.07 dB

Maximum value of SAR (measured) = 0.652 W/kg



Plot W7

Date/Time: 2015-07-15 17:46:39

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: WCDMA850 (Band 5)

Frequency: **835 MHz**; Duty Cycle: 1:1

Medium: BSL835; Medium Notes: t= 21,9 C

Medium parameters used: f = 835 MHz; $\sigma = 0.983 \text{ S/m}$; $\epsilon_r = 53.626$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WCDMA850 (Band 5)/Body - CH 4175 - 10 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 28.192 V/m

Fast SAR: SAR(1 g) = 0.700 W/kg

Fast SAR(10 g) = 0.479 W/kg

Maximum value of SAR (interpolated) = 0.806 W/kg

WCDMA850 (Band 5)/Body - CH 4175 - 10 mm - No Headset - Display - Antenna 1/Zoom Scan (6x6x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 28.192 V/m

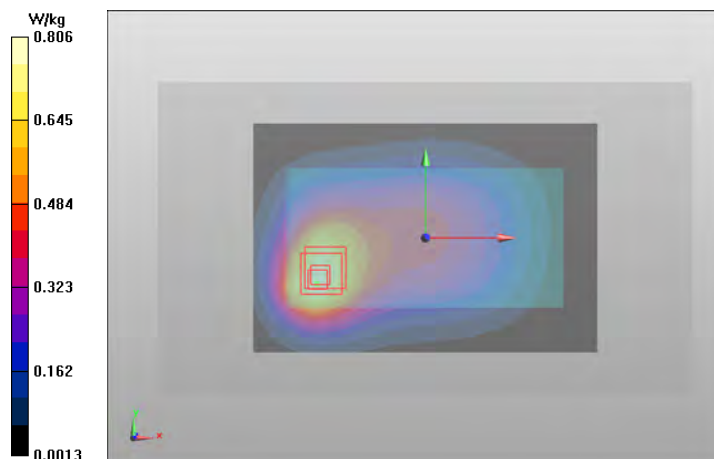
Peak SAR (extrapolated) = 0.963 W/kg

SAR(1 g) = 0.662 W/kg

SAR(10 g) = 0.452 W/kg

Power Drift = -0.08 dB

Maximum value of SAR (measured) = 0.755 W/kg



Plot W8

Date/Time: 2015-08-27 10:55:18

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091256/7

Communication System: WCDMA850 (Band 5)

Frequency: **835 MHz**; Duty Cycle: 1:1

Medium: BSL835; Medium Notes: t= 22.2 C

Medium parameters used: f = 835 MHz; $\sigma = 0.977$ S/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA850 (Band 5)/Cheek - CH 4175 - 10mm - No Headset - Display - Antenna 1/Area Scan (81x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 27.00 V/m

Fast SAR: SAR(1 g) = 0.640 W/kg

Fast SAR(10 g) = 0.441 W/kg

Maximum value of SAR (interpolated) = 0.734 W/kg

WCDMA850 (Band 5)/Cheek - CH 4175 - 10mm - No Headset - Display - Antenna 1/Zoom Scan (6x6x7)/Cube

0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 27.00 V/m

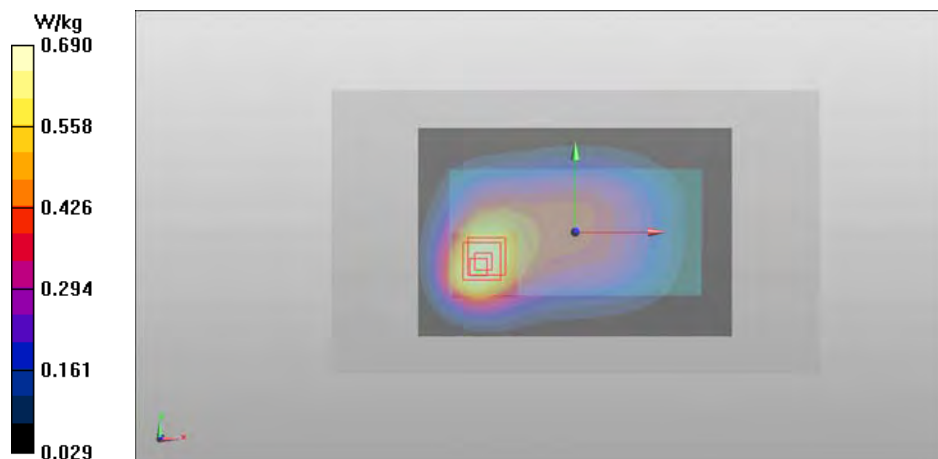
Peak SAR (extrapolated) = 0.871 W/kg

SAR(1 g) = 0.609 W/kg

SAR(10 g) = 0.419 W/kg

Power Drift = -0.11 dB

Maximum value of SAR (measured) = 0.690 W/kg



Plot W9

Date/Time: 2015-07-08 11:38:18

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217820/9

Communication System: LTE850 (Band 5)

Frequency: **844 MHz**; Duty Cycle: 1:1

Medium: BSL835; Medium Notes: $t = 21,7$ C

Medium parameters used: $f = 844$ MHz; $\sigma = 0.981$ S/m; $\epsilon_r = 53.614$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE850 (Band 5)/Body - CH 20600 - 10MHz - QPSK - 1 RB - Offset 24 - 10mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated grid: $dx = 1.500$ mm, $dy = 1.500$ mm

Reference Value = 24.409 V/m

Fast SAR: SAR(1 g) = 0.530 W/kg

Fast SAR(10 g) = 0.360 W/kg

Maximum value of SAR (interpolated) = 0.611 W/kg

LTE850 (Band 5)/Body - CH 20600 - 10MHz - QPSK - 1 RB - Offset 24 - 10mm - No Headset - Display - Antenna 1/Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx = 7.5$ mm, $dy = 7.5$ mm, $dz = 5$ mm

Reference Value = 23.746 V/m

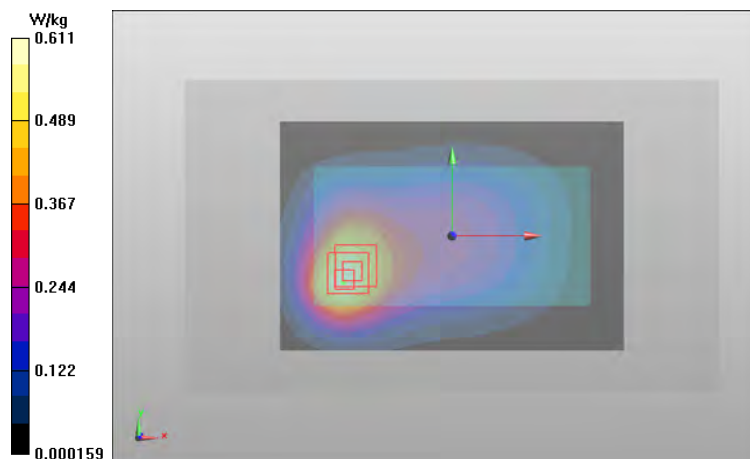
Peak SAR (extrapolated) = 0.693 W/kg

SAR(1 g) = 0.490 W/kg

SAR(10 g) = 0.337 W/kg

Power Drift = -0.01 dB

Maximum value of SAR (measured) = 0.516 W/kg



Plot W10

Date/Time: 2015-08-27 10:24:16

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091256/7

Communication System: LTE850 (Band 5)

Frequency: **844 MHz**; Duty Cycle: 1:1

Medium: BSL835; Medium Notes: $t = 22.2$ C

Medium parameters used: $f = 844$ MHz; $\sigma = 0.982$ S/m; $\epsilon_r = 54.077$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.96, 5.96, 5.96); Calibrated: 2014-10-21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2014-10-14
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1123/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE850 (Band 5)/Cheek - CH 20600 - 10MHz - 1 RB - Offset 24 - 10mm - No Headset - Display - Antenna

1/Area Scan (81x121x1): Interpolated grid: $dx = 1.500$ mm, $dy = 1.500$ mm

Reference Value = 23.75 V/m

Fast SAR: SAR(1 g) = 0.503 W/kg

Fast SAR(10 g) = 0.345 W/kg

Maximum value of SAR (interpolated) = 0.581 W/kg

LTE850 (Band 5)/Cheek - CH 20600 - 10MHz - 1 RB - Offset 24 - 10mm - No Headset - Display - Antenna

1/Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx = 7.5$ mm, $dy = 7.5$ mm, $dz = 5$ mm

Reference Value = 23.75 V/m

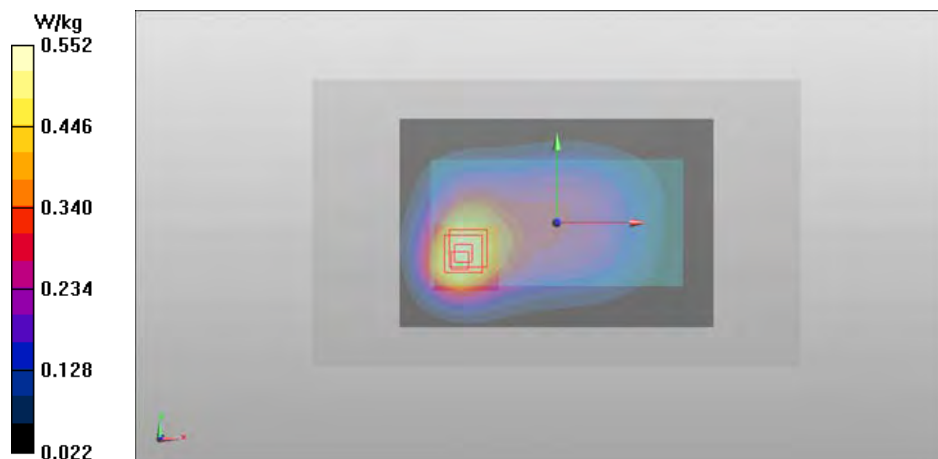
Peak SAR (extrapolated) = 0.698 W/kg

SAR(1 g) = 0.488 W/kg

SAR(10 g) = 0.336 W/kg

Power Drift = 0.03 dB

Maximum value of SAR (measured) = 0.552 W/kg



Plot W11

Date/Time: 2015-07-06 14:42:03

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217821/7

Communication System: WCDMA1700/2100 (Band 4)

Frequency: **1732.4 MHz**; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t= 23.0 C

Medium parameters used (interpolated): f = 1732.4 MHz; $\sigma = 1.419$ S/m; $\epsilon_r = 52.557$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.92, 4.92, 4.92); Calibrated: 2015-01-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2014-11-03
- Phantom: Triple Flat Phantom 5.1C; Type: SN 000 T01 DA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WCDMA1700/2100 (Band 4)/Body - CH 1412 - 10 mm - No Headset - Display - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 28.814 V/m

Fast SAR: SAR(1 g) = 1.11 W/kg

Fast SAR(10 g) = 0.694 W/kg

Maximum value of SAR (interpolated) = 1.32 W/kg

WCDMA1700/2100 (Band 4)/Body - CH 1412 - 10 mm - No Headset - Display - Antenna 1/Zoom Scan

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

Reference Value = 28.734 V/m

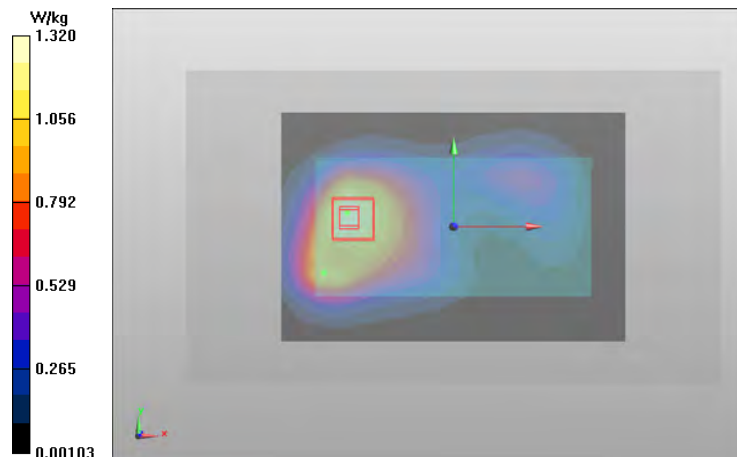
Peak SAR (extrapolated) = 1.65 W/kg

SAR(1 g) = 1.13 W/kg

SAR(10 g) = 0.749 W/kg

Power Drift = -0.04 dB

Maximum value of SAR (measured) = 1.29 W/kg



Plot W12

Date/Time: 2015-08-30 14:11:51

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091264/1

Communication System: WCDMA1700/2100 (Band 4)

Frequency: **1732.4 MHz**; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t= 20.8 C

Medium parameters used (interpolated): f = 1732.4 MHz; $\sigma = 1.44$ S/m; $\epsilon_r = 51.593$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3276
- ConvF(4.91, 4.91, 4.91); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2015-01-21
- Phantom: SAM 2 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/2 (1800MHz), TP-1123/2 (1900MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA1700/2100 (Band 4)/Body - CH 1412 - 10 mm - No Headset - Display - Antenna 1/Area Scan

(81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 24.80 V/m

Fast SAR: SAR(1 g) = 1.02 W/kg

Fast SAR(10 g) = 0.645 W/kg

Maximum value of SAR (interpolated) = 1.21 W/kg

WCDMA1700/2100 (Band 4)/Body - CH 1412 - 10 mm - No Headset - Display - Antenna 1/Zoom Scan

(5x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 24.80 V/m

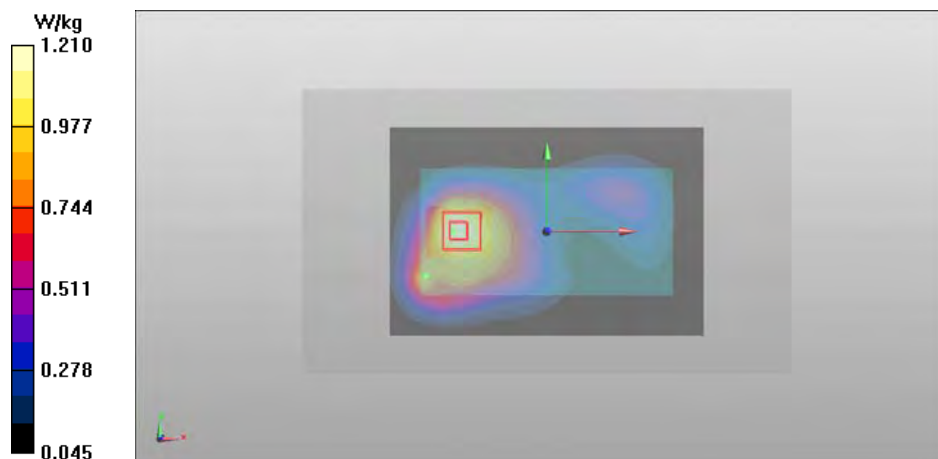
Peak SAR (extrapolated) = 1.54 W/kg

SAR(1 g) = 1.06 W/kg

SAR(10 g) = 0.698 W/kg

Power Drift = -0.09 dB

Maximum value of SAR (measured) = 1.21 W/kg



Plot W13

Date/Time: 2015-07-07 13:14:32

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217821/7

Communication System: LTE1700/2100 (Band 4)

Frequency: 1745 MHz; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t = 22.9 C

Medium parameters used: $f = 1745$ MHz; $\sigma = 1.444$ S/m; $\epsilon_r = 52.281$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.92, 4.92, 4.92); Calibrated: 2015-01-20;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2014-11-03
- Phantom: Triple Flat Phantom 5.1C; Type: SN 000 T01 DA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE1700/2100 (Band 4)/Body - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - 10 mm - No Headset - Display - Antenna 1 - Repeated/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 26.788 V/m

Fast SAR: SAR(1 g) = 0.865 W/kg

Fast SAR(10 g) = 0.540 W/kg

Maximum value of SAR (interpolated) = 1.03 W/kg

LTE1700/2100 (Band 4)/Body - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - 10 mm - No Headset - Display - Antenna 1 - Repeated/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 27.092 V/m

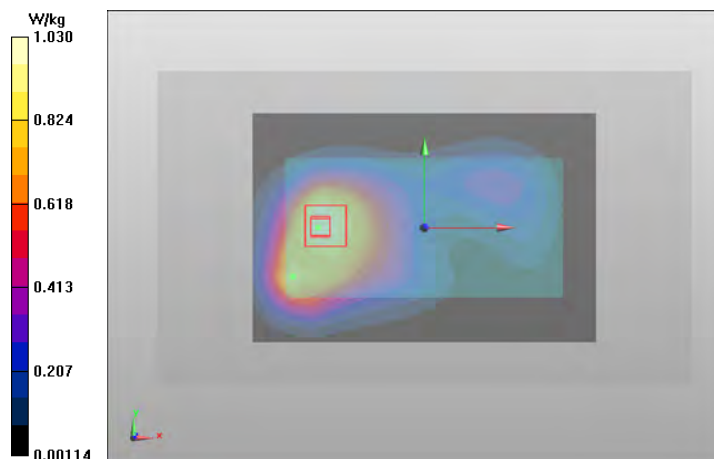
Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.893 W/kg

SAR(10 g) = 0.588 W/kg

Power Drift = -0.03 dB

Maximum value of SAR (measured) = 1.04 W/kg



Plot W14

Date/Time: 2015-08-30 13:04:42

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091264/1

Communication System: LTE1700/2100 (Band 4)

Frequency: 1745 MHz; Duty Cycle: 1:1

Medium: BSL1750; Medium Notes: t = 20.8 C

Medium parameters used: f = 1745 MHz; $\sigma = 1.45$ S/m; $\epsilon_r = 51.591$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3276
- ConvF(4.91, 4.91, 4.91); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2015-01-21
- Phantom: SAM 2 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/2 (1800MHz), TP-1123/2 (1900MHz)
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE1700/2100 (Band 4)/Body - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - 10 mm - No Headset - Display -

Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 20.93 V/m

Fast SAR: SAR(1 g) = 0.766 W/kg

Fast SAR(10 g) = 0.484 W/kg

Maximum value of SAR (interpolated) = 0.914 W/kg

LTE1700/2100 (Band 4)/Body - CH 20300 - 20MHz - QPSK - 1 RB - Offset 0 - 10 mm - No Headset - Display -

Antenna 1/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 20.93 V/m

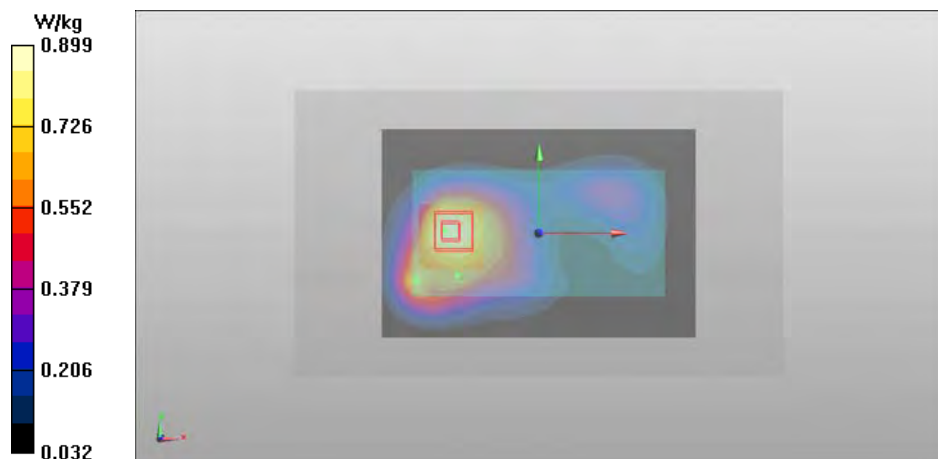
Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.784 W/kg

SAR(10 g) = 0.521 W/kg

Power Drift = 0.00 dB

Maximum value of SAR (measured) = 0.899 W/kg



Plot W15

Date/Time: 2015-07-06 08:48:30

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: 1-slot GPRS1900

Frequency: **1880 MHz**; Duty Cycle: 1:8.30042

Medium: BSL1900; Medium Notes: t = 21.4 C

Medium parameters used: f = 1880 MHz; $\sigma = 1.51$ S/m; $\epsilon_r = 52.455$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

1-slot GPRS1900/Body - CH 661 - 10 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 14.688 V/m

Fast SAR: SAR(1 g) = 0.419 W/kg

Fast SAR(10 g) = 0.256 W/kg

Maximum value of SAR (interpolated) = 0.509 W/kg

1-slot GPRS1900/Body - CH 661 - 10 mm - No Headset - Display - Antenna 1/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.755 V/m

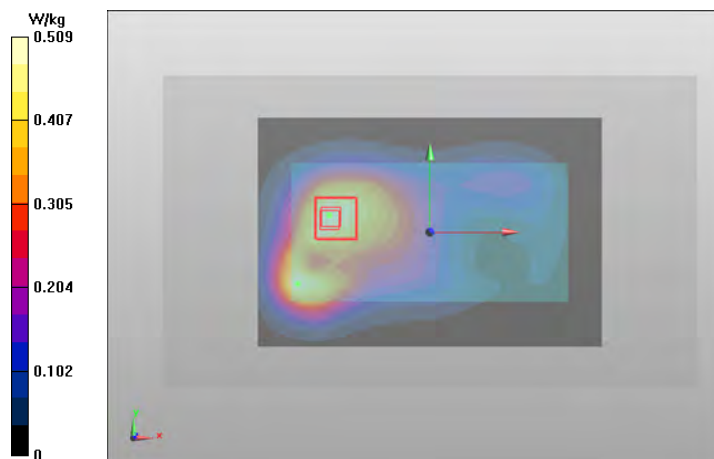
Peak SAR (extrapolated) = 0.642 W/kg

SAR(1 g) = 0.433 W/kg

SAR(10 g) = 0.281 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.503 W/kg



Plot W16

Date/Time: 2015-09-03 9:31:27

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091300/3

Communication System: 4-slot GPRS1900

Frequency: **1880 MHz**; Duty Cycle: 1:2.09991

Medium: BSL1900; Medium Notes: t= 22.8 C

Medium parameters used: f = 1880 MHz; $\sigma = 1.482$ S/m; $\epsilon_r = 51.536$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS1900/Body - CH 661 - 10 mm - No Headset - Display - Antenna 1/Area Scan (81x141x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 14.98 V/m

Fast SAR: SAR(1 g) = 0.327 W/kg

Fast SAR(10 g) = 0.190 W/kg

Maximum value of SAR (interpolated) = 0.418 W/kg

4-slot GPRS1900/Body - CH 661 - 10 mm - No Headset - Display - Antenna 1/Zoom Scan (6x6x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.98 V/m

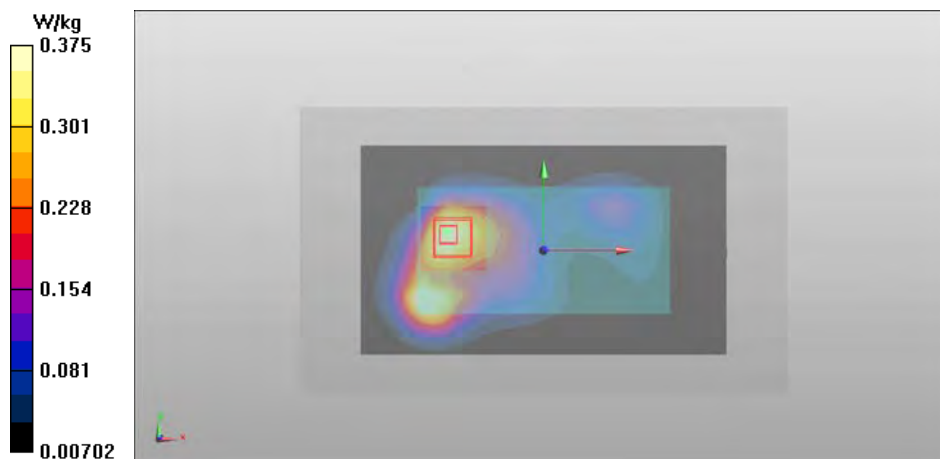
Peak SAR (extrapolated) = 0.483 W/kg

SAR(1 g) = 0.322 W/kg

SAR(10 g) = 0.208 W/kg

Power Drift = 0.09 dB

Maximum value of SAR (measured) = 0.375 W/kg



Plot W17

Date/Time: 2015-07-06 16:33:17

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: WCDMA1900 (Band 2)

Frequency: **1852.4 MHz**; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t= 21.4 C

Medium parameters used (interpolated): f = 1852.4 MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 52.527$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WCDMA1900 (Band 2)/Body - CH 9262 - 10 mm - No Headset - Display - Antenna 1 - Repeated/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 27.748 V/m

Fast SAR: SAR(1 g) = 0.956 W/kg

Fast SAR(10 g) = 0.577 W/kg

Maximum value of SAR (interpolated) = 1.18 W/kg

WCDMA1900 (Band 2)/Body - CH 9262 - 10 mm - No Headset - Display - Antenna 1 - Repeated/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 27.685 V/m

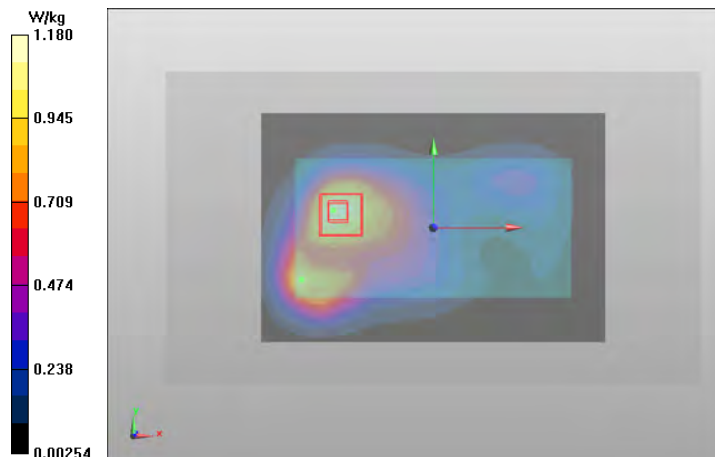
Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 0.980 W/kg

SAR(10 g) = 0.626 W/kg

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 1.14 W/kg



Plot W18

Date/Time: 2015-09-03 9:56:57

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091300/3

Communication System: WCDMA1900 (Band 2)

Frequency: **1852.4 MHz**; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t = 22.8 C

Medium parameters used (interpolated): f = 1852.4 MHz; $\sigma = 1.453$ S/m; $\epsilon_r = 51.616$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA1900 (Band 2)/Body - CH 9262 - 10 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 27.50 V/m

Fast SAR: SAR(1 g) = 1.04 W/kg

Fast SAR(10 g) = 0.622 W/kg

Maximum value of SAR (interpolated) = 1.30 W/kg

WCDMA1900 (Band 2)/Body - CH 9262 - 10 mm - No Headset - Display - Antenna 1/Zoom Scan (5x5x7)/Cube

0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 27.50 V/m

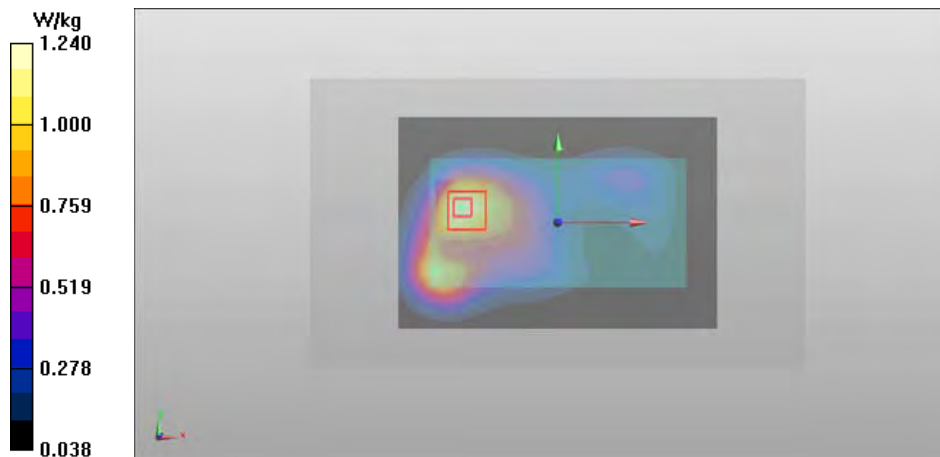
Peak SAR (extrapolated) = 1.57 W/kg

SAR(1 g) = 1.06 W/kg

SAR(10 g) = 0.684 W/kg

Power Drift = 0.00 dB

Maximum value of SAR (measured) = 1.24 W/kg



Plot W19

Date/Time: 2015-07-07 08:34:46

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: LTE1900 (Band 2)

Frequency: **1860 MHz**; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t = 21.4 C

Medium parameters used: f = 1860 MHz; $\sigma = 1.493$ S/m; $\epsilon_r = 52.402$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE1900 (Band 2)/Body - CH 18700 - 20MHz - QPSK - 1 RB - Offset 0 - 10 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 26.871 V/m

Fast SAR: SAR(1 g) = 0.913 W/kg

Fast SAR(10 g) = 0.538 W/kg

Maximum value of SAR (interpolated) = 1.15 W/kg

LTE1900 (Band 2)/Body - CH 18700 - 20MHz - QPSK - 1 RB - Offset 0 - 10 mm - No Headset - Display - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 27.060 V/m

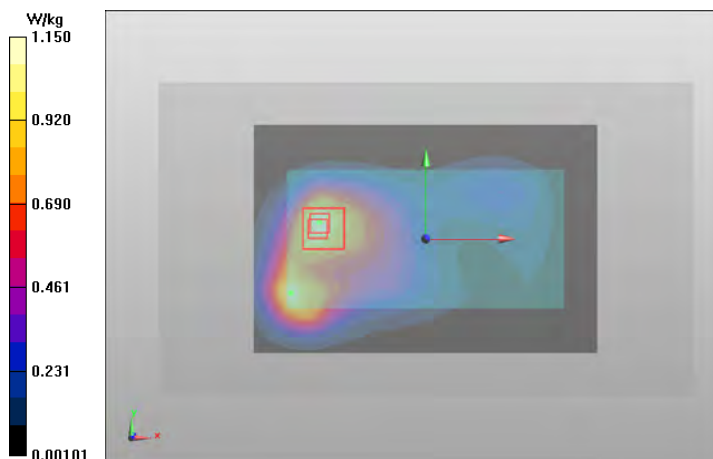
Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.941 W/kg

SAR(10 g) = 0.600 W/kg

Power Drift = -0.09 dB

Maximum value of SAR (measured) = 1.09 W/kg



Plot W20

Date/Time: 2015-09-03 8:58:00

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091300/3

Communication System: LTE1900 (Band 2)

Frequency: **1860 MHz**; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t= 22.8 C

Medium parameters used: f = 1860 MHz; $\sigma = 1.458$ S/m; $\epsilon_r = 51.61$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3275
- ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1302; Calibrated: 2015-04-21
- Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE1900 (Band 2)/Body - CH 18700 - 20MHz - QPSK - 1RB - Offset 0 - 10 mm - No Headset - Display - Antenna 1/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 24.71 V/m

Fast SAR: SAR(1 g) = 0.849 W/kg

Fast SAR(10 g) = 0.506 W/kg

Maximum value of SAR (interpolated) = 1.06 W/kg

LTE1900 (Band 2)/Body - CH 18700 - 20MHz - QPSK - 1RB - Offset 0 - 10 mm - No Headset - Display - Antenna 1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 24.71 V/m

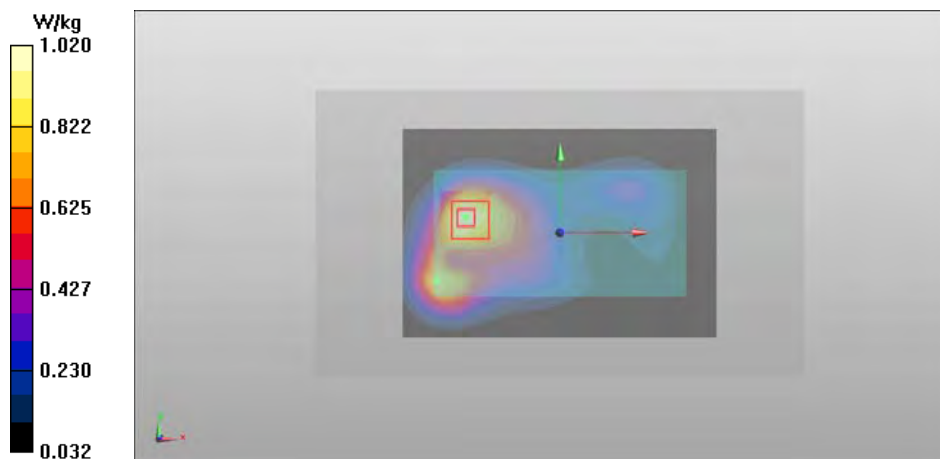
Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.863 W/kg

SAR(10 g) = 0.555 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 1.02 W/kg



Plot W21

Date/Time: 2015-07-15 11:46:58

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217835/7

Communication System: LTE2500 (Band 7)

Frequency: **2535 MHz**; Duty Cycle: 1:1

Medium: BSL2600; Medium Notes: t= 22,4 C

Medium parameters used: f = 2535 MHz; $\sigma = 2.023$ S/m; $\epsilon_r = 51.617$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

LTE2500 (Band 7)/Body - CH 21100 - 20MHz - QPSK - 1 RB - Offset 49 - 10 mm - No Headset - Back - Antenna 1/Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 22.390 V/m

Fast SAR: SAR(1 g) = 0.863 W/kg

Fast SAR(10 g) = 0.466 W/kg

Maximum value of SAR (interpolated) = 1.08 W/kg

LTE2500 (Band 7)/Body - CH 21100 - 20MHz - QPSK - 1 RB - Offset 49 - 10 mm - No Headset - Back - Antenna 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.107 V/m

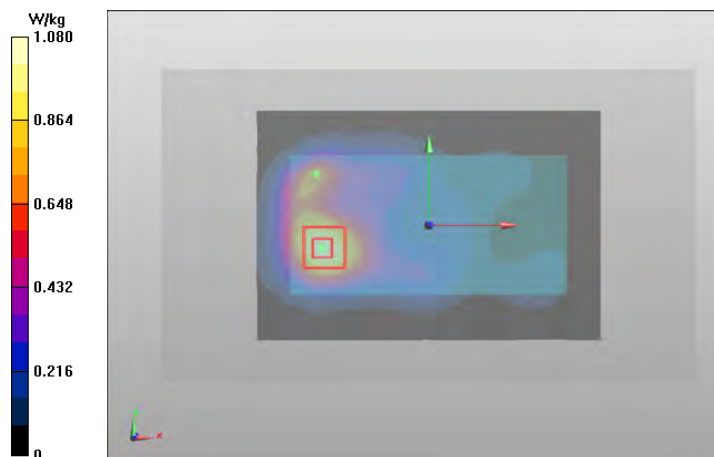
Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 0.851 W/kg

SAR(10 g) = 0.479 W/kg

Power Drift = -0.14 dB

Maximum value of SAR (measured) = 1.06 W/kg



Plot W22

Date/Time: 2015-08-28 10:52:10

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091302/9

Communication System: LTE2500 (Band 7)

Frequency: **2535 MHz**; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: t= 22.5 C

Medium parameters used: f = 2535 MHz; $\sigma = 2.02$ S/m; $\epsilon_r = 51.324$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE2500 (Band 7)/Body - CH 21100 - 20MHz - QPSK - 1 RB - Offset 0 - 10 mm - No Headset - Back - Antenna

1/Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 24.60 V/m

Fast SAR: SAR(1 g) = 0.996 W/kg

Fast SAR(10 g) = 0.542 W/kg

Maximum value of SAR (interpolated) = 1.23 W/kg

LTE2500 (Band 7)/Body - CH 21100 - 20MHz - QPSK - 1 RB - Offset 0 - 10 mm - No Headset - Back - Antenna

1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.60 V/m

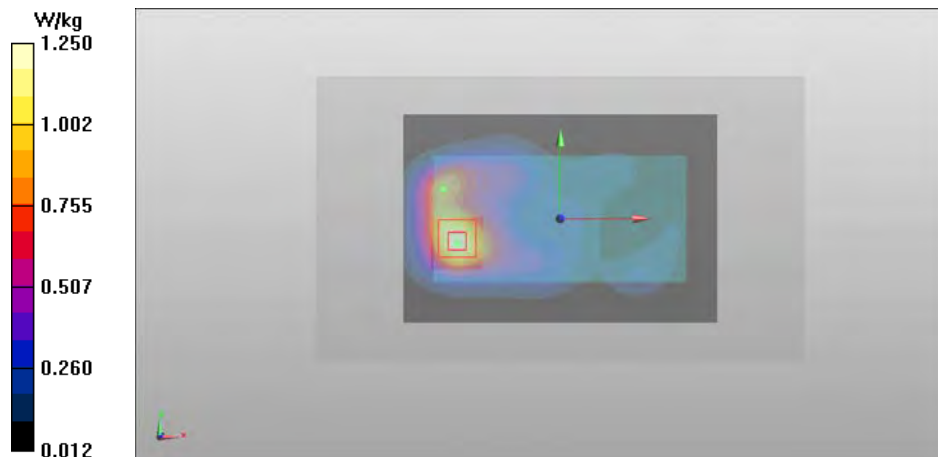
Peak SAR (extrapolated) = 1.76 W/kg

SAR(1 g) = 1.02 W/kg

SAR(10 g) = 0.579 W/kg

Power Drift = 0.04 dB

Maximum value of SAR (measured) = 1.25 W/kg



Plot W23

Date/Time: 2015-07-03 11:39:02

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN2450

Frequency: **2412 MHz**; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: t= 21.2 C

Medium parameters used: f = 2412 MHz; $\sigma = 1.916 \text{ S/m}$; $\epsilon_r = 52.619$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 1Mbps SS 1 - 10mm - No Headset - Display - Antenna 1 and 2/Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 13.528 V/m

Fast SAR: SAR(1 g) = 0.272 W/kg

Fast SAR(10 g) = 0.134 W/kg

Maximum value of SAR (interpolated) = 0.361 W/kg

WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 1Mbps SS 1 - 10mm - No Headset - Display - Antenna 1 and 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.716 V/m

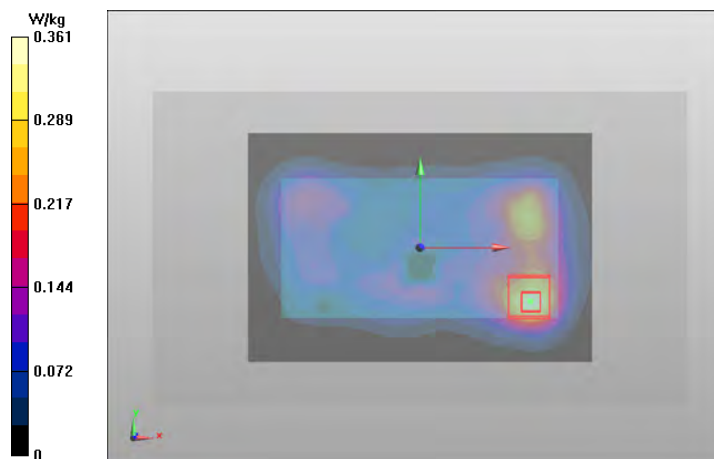
Peak SAR (extrapolated) = 0.544 W/kg

SAR(1 g) = 0.276 W/kg

SAR(10 g) = 0.147 W/kg

Power Drift = -0.16 dB

Maximum value of SAR (measured) = 0.364 W/kg



Plot W24

Date/Time: 2015-08-28 13:49:45

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091330/0

Communication System: WLAN2450

Frequency: **2412 MHz**; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: t= 22.5 C

Medium parameters used: f = 2412 MHz; $\sigma = 1.872 \text{ S/m}$; $\epsilon_r = 51.662$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3892
- ConvF(7.32, 7.32, 7.32); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 2 Mbps SS 1 - 10mm - No Headset - Display - Antenna 1 and 2/Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 12.04 V/m

Fast SAR: SAR(1 g) = 0.233 W/kg

Fast SAR(10 g) = 0.117 W/kg

Maximum value of SAR (interpolated) = 0.300 W/kg

WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 2 Mbps SS 1 - 10mm - No Headset - Display - Antenna 1 and 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.04 V/m

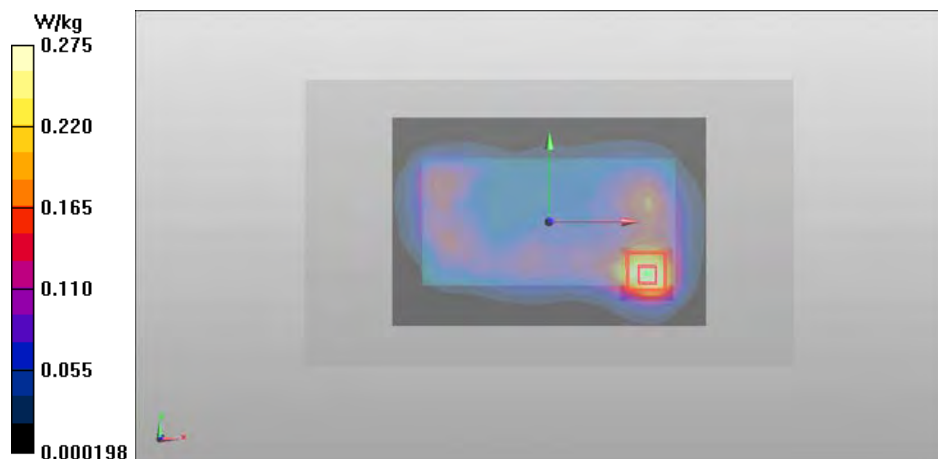
Peak SAR (extrapolated) = 0.413 W/kg

SAR(1 g) = 0.221 W/kg

SAR(10 g) = 0.120 W/kg

Power Drift = 0.07 dB

Maximum value of SAR (measured) = 0.275 W/kg



Plot W25

Date/Time: 2015-07-05 12:42:39

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000

Frequency: **5230 MHz**; Duty Cycle: 1:1

Medium: BSL5000; Medium Notes: 21.3 C

Medium parameters used: $f = 5230 \text{ MHz}$; $\sigma = 5.469 \text{ S/m}$; $\epsilon_r = 47.563$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.51, 4.51, 4.51); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.9 (7117)

WLAN5000 ac-mode - Top_Bottom/Body - CH 46 - 40 MHz OFDM BPSK MCS0 SS 1 - 10mm - No Headset - Top - Antenna 1 and 2/Area Scan (61x121x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 1.47 W/kg

WLAN5000 ac-mode - Top_Bottom/Body - CH 46 - 40 MHz OFDM BPSK MCS0 SS 1 - 10mm - No Headset - Top - Antenna 1 and 2/Zoom Scan (8x8x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 14.550 V/m

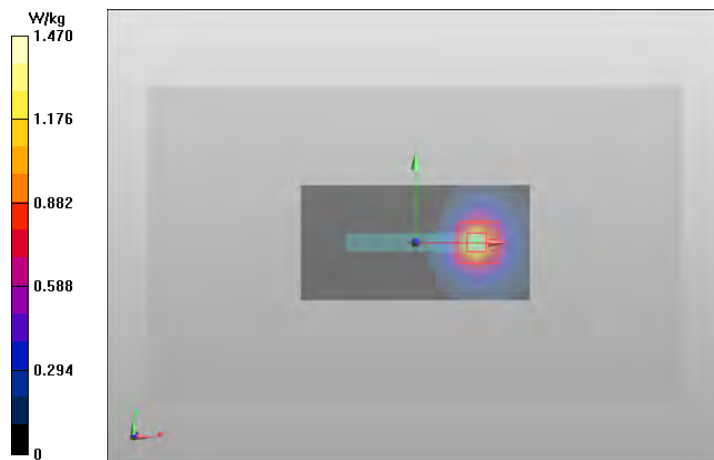
Peak SAR (extrapolated) = 2.90 W/kg

SAR(1 g) = 0.765 W/kg

SAR(10 g) = 0.278 W/kg

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 1.41 W/kg



Plot W26

Date/Time: 2015-08-31 12:59:11

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091330/0

Communication System: WLAN5000

Frequency: 5230 MHz; Duty Cycle: 1:1

Medium: BSL 5000; Medium Notes: t= 21.7 C

Medium parameters used: f = 5230 MHz; σ = 5.516 S/m; ϵ_r = 46.811; ρ = 1000 kg/m³

Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3852
- ConvF(4.51, 4.51, 4.51); Calibrated: 2015-04-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn756; Calibrated: 2015-04-20
- Phantom: Triple, SAR-8; Type: QD 000 P51 CA;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WLAN5000 ac-mode - Top_Bottom/Body - CH 46 - 40 MHz OFDM BPSK MCS0 SS 1 - 10mm - No Headset - Top - Antenna 1 and 2/Area Scan (61x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.08 W/kg

WLAN5000 ac-mode - Top_Bottom/Body - CH 46 - 40 MHz OFDM BPSK MCS0 SS 1 - 10mm - No Headset - Top - Antenna 1 and 2/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 12.12 V/m

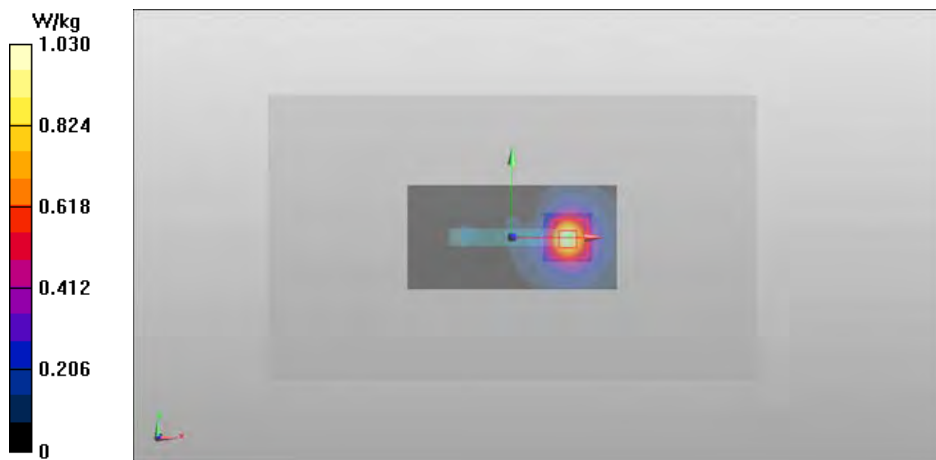
Peak SAR (extrapolated) = 2.16 W/kg

SAR(1 g) = 0.555 W/kg

SAR(10 g) = 0.196 W/kg

Power Drift = 0.08 dB

Maximum value of SAR (measured) = 1.03 W/kg



Plot W27

Date/Time: 2015-07-06 14:42:03

DASY Configuration for WCDMA1700/2100 (Band 4)/Body - CH 1412 - 10 mm - No Headset - Display - Antenna 1/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217821/7

Communication System: WCDMA1700/2100 (Band 4); Frequency: 1732.4 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL1750 Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.419$ S/m; $\epsilon_r = 52.557$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: ES3DV3 - SN3194; ConvF(4.92, 4.92, 4.92); Calibrated: 2015-01-20;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn555; Calibrated: 2014-11-03

Phantom: Triple Flat Phantom 5.1C; Type: SN 000 T01 DA;

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-03 11:39:02

DASY Configuration for WLAN2450 b-mode/Body - CH 1 - 20 MHz DSSS BPSK 1Mbps SS 1 - 10mm - No Headset - Display - Antenna 1 and 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN2450; Frequency: 2412 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL2450 Medium parameters used: $f = 2412$ MHz; $\sigma = 1.916$ S/m; $\epsilon_r = 52.619$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: EX3DV4 - SN3852; ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;

Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))

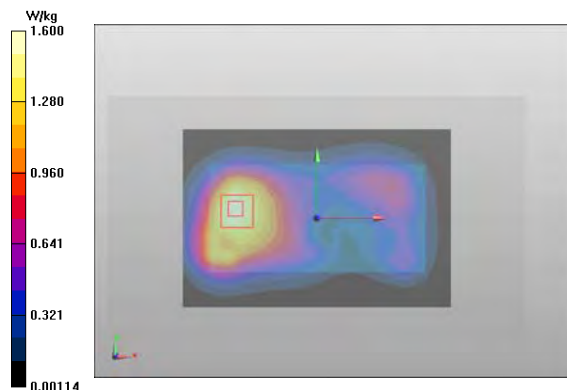
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: Triple, SAR-8; Type: QD 000 P51 CA;

Measurement SW: DASY52, Version 52.8 (8)

Fast SAR of Combined Scans: SAR(1 g) = 1.35 W/kg; SAR(10 g) = 0.834 W/kg

Maximum value of SAR (interpolated) = 1.60 W/kg



WLAN2450 b-mode was scaled with factor 1.35 and WCDMA1700/2100 (Band 4) Antenna 1 with factor 1.10 before combining in SEMCAD SW.

Plot W28

Date/Time: 2015-07-06 14:42:03

DASY Configuration for WCDMA1700/2100 (Band 4)/Body - CH 1412 - 10 mm - No Headset - Display - Antenna 1/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217821/7

Communication System: WCDMA1700/2100 (Band 4); Frequency: 1732.4 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL1750 Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.419$ S/m; $\epsilon_r = 52.557$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: ES3DV3 - SN3194; ConvF(4.92, 4.92, 4.92); Calibrated: 2015-01-20;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn555; Calibrated: 2014-11-03

Phantom: Triple Flat Phantom 5.1C; Type: SN 000 T01 DA;

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-05 09:58:19

DASY Configuration for WLAN5000 ac-mode/Body - CH 46 - 40 MHz OFDM BPSK MCS0 SS 1 - 10mm - No Headset - Display - Antenna 1 and 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000; Frequency: 5230 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL5000 Medium parameters used: $f = 5230$ MHz; $\sigma = 5.469$ S/m; $\epsilon_r = 47.563$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: EX3DV4 - SN3852; ConvF(4.51, 4.51, 4.51); Calibrated: 2015-04-24;

Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used))

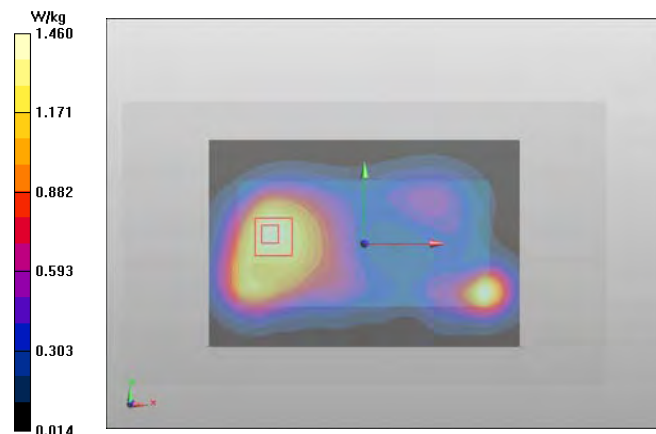
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: Triple, SAR-8; Type: QD 000 P51 CA;

Measurement SW: DASY52, Version 52.8 (8)

Fast SAR of Combined Scans: SAR(1 g) = 1.23 W/kg; SAR(10 g) = 0.770 W/kg

Maximum value of SAR (interpolated) = 1.46 W/kg



WLAN5000 ac-mode was scaled with factor 1.12 and WCDMA1700/2100 (Band 4) Antenna 1 with factor 1.10 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

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Plot W29

Date/Time: 2015-07-06 16:33:17

DASY Configuration for WCDMA1900 (Band 2)/Body - CH 9262 - 10 mm - No Headset - Display - Antenna 1 - Repeated/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217830/8

Communication System: WCDMA1900 (Band 2); Frequency: 1852.4 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL1900 Medium parameters used (interpolated): $f = 1852.4$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 52.527$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: ES3DV3 - SN3275; ConvF(4.63, 4.63, 4.63); Calibrated: 2015-04-27;

Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))

Electronics: DAE4 Sn1302; Calibrated: 2015-04-21

Phantom: Triple, SAR6; Type: QD 000 P51 CA; Serial: 1124/1

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-05 09:58:19

DASY Configuration for WLAN5000 ac-mode/Body - CH 46 - 40 MHz OFDM BPSK MCS0 SS 1 - 10mm - No Headset - Display - Antenna 1 and 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000; Frequency: 5230 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL5000 Medium parameters used: $f = 5230$ MHz; $\sigma = 5.469$ S/m; $\epsilon_r = 47.563$; $\rho = 1000$ kg/m³

Phantom section: Center Section

Probe: EX3DV4 - SN3852; ConvF(4.51, 4.51, 4.51); Calibrated: 2015-04-24;

Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used))

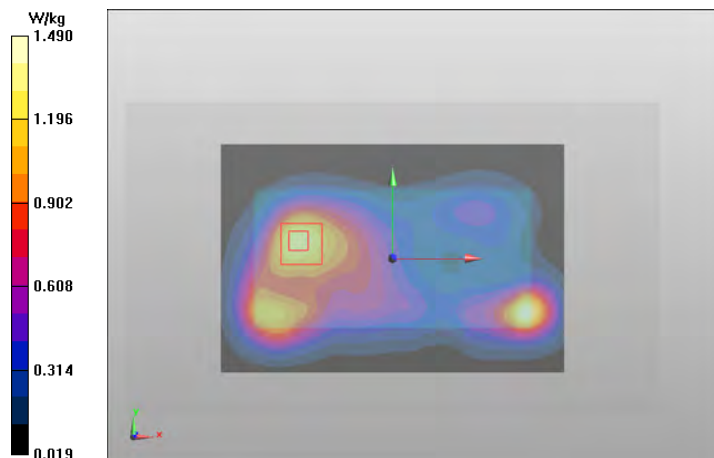
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: Triple, SAR-8; Type: QD 000 P51 CA;

Measurement SW: DASY52, Version 52.8 (8)

Fast SAR of Combined Scans: SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.673 W/kg

Maximum value of SAR (interpolated) = 1.49 W/kg



WLAN5000 ac-mode was scaled with factor 1.12 and WCDMA1900 (Band 2) Antenna 1 with factor 1.15 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

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Plot W30

Date/Time: 2015-08-28 11:37:13

DASY Configuration for LTE2500 (Band 7)/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 0 - 10 mm - No Headset - Display - Antenna 1/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1118, HW:2060; Serial: 004402/74/091302/9

Communication System: LTE2500 (Band 7); Frequency: 2510 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL2450 Medium parameters used: $f = 2510 \text{ MHz}$; $\sigma = 1.986 \text{ S/m}$; $\epsilon_r = 51.372$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

Probe: EX3DV4 - SN3892; ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;

Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))

Electronics: DAE4 Sn538; Calibrated: 2015-04-20

Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3

Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-05 9:58:19

DASY Configuration for WLAN5000 ac-mode/Body - CH 46 - 40 MHz OFDM BPSK MCS0 SS 1 - 10mm - No Headset - Display - Antenna 1 and 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1104, HW:2012; Serial: 004402/74/217903/3

Communication System: WLAN5000; Frequency: 5230 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL5000 Medium parameters used: $f = 5230 \text{ MHz}$; $\sigma = 5.469 \text{ S/m}$; $\epsilon_r = 47.563$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

Probe: EX3DV4 - SN3852; ConvF(4.51, 4.51, 4.51); Calibrated: 2015-04-24;

Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used))

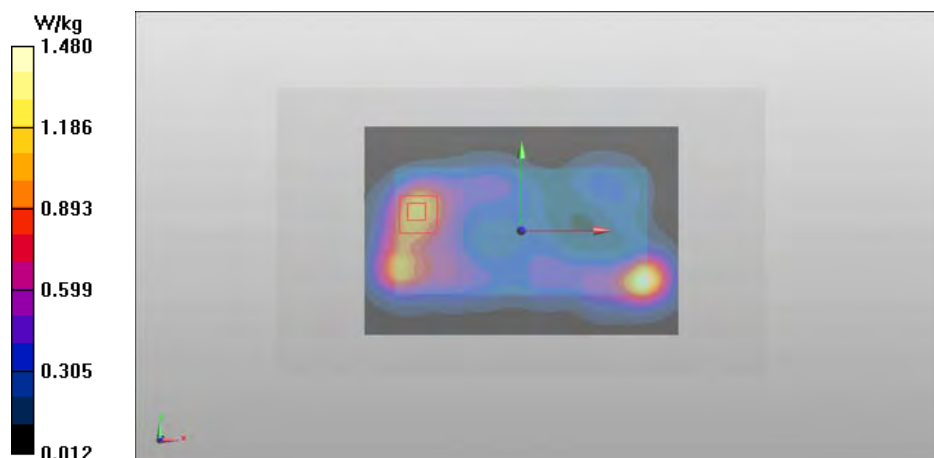
Electronics: DAE4 Sn756; Calibrated: 2015-04-20

Phantom: Triple, SAR-8; Type: QD 000 P51 CA;

Measurement SW: DASY52, Version 52.8 (8)

Fast SAR of Combined Scans: SAR(1 g) = 0.932 W/kg; SAR(10 g) = 0.503 W/kg

Maximum value of SAR (interpolated) = 1.48 W/kg



WLAN5000 ac-mode was scaled with factor 1.12 and LTE2500 (Band 7) Antenna 1 with factor 1.05 before combining in SEMCAD SW.

SAR Report

Type: RM-1104

Appendix_B_FCC_SAR_RM-1104_05

Applicant: Microsoft

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APPENDIX C: DIELECTRIC PARAMETERS OF THE TISSUE SIMULANTS

Head tissue simulant dielectric parameters used in the measurements:

f (MHz)	LTE700 (Band 12)	Dielectric Parameters					
	Date	CH 23060 704.0 MHz		CH 23095 707.5 MHz		CH 23130 711.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
707	2015-06-30	41.4	0.86	41.4	0.87	41.4	0.87
	2015-07-01	41.4	0.86	41.3	0.86	41.3	0.86
	2015-07-02	40.8	0.85	40.8	0.85	40.8	0.85
	2015-07-03	41.6	0.86	41.5	0.87	41.5	0.87
	2015-08-27	41.2	0.88	41.1	0.88	41.1	0.88
f (MHz)	LTE700 (Band 17)	Dielectric Parameters					
	Date	CH 23780 709.0 MHz		CH 23790 710.0 MHz		CH 23800 711.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
710	2015-06-30	41.4	0.87	41.4	0.87	41.4	0.87
	2015-07-01	41.3	0.86	41.3	0.86	41.3	0.86
	2015-07-02	40.8	0.85	40.8	0.85	40.8	0.85
	2015-07-03	41.5	0.87	41.5	0.87	41.5	0.87
	2015-08-27	41.1	0.88	41.1	0.88	41.1	0.88
f (MHz)	GSM850	Dielectric Parameters					
	Date	CH 128 824.2 MHz		CH 190 836.6 MHz		CH 251 848.8 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
836	2015-06-30	41.2	0.91	41.1	0.91	41.0	0.92
	2015-07-01	41.2	0.89	41.2	0.90	41.1	0.91
	2015-07-02	41.2	0.90	41.2	0.91	41.1	0.91
	2015-07-03	41.2	0.90	41.1	0.91	41.1	0.91
	2015-07-06	41.2	0.90	41.1	0.91	41.0	0.92
	2015-08-26	40.6	0.90	40.5	0.90	40.4	0.91
f (MHz)	WCDMA850 (Band 5)	Dielectric Parameters					
	Date	CH 4132 826.4 MHz		CH 4175 835.0 MHz		CH 4233 846.6 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
835	2015-06-30	41.1	0.91	41.1	0.91	41.0	0.92
	2015-07-01	41.3	0.90	41.2	0.90	41.1	0.91
	2015-07-02	41.2	0.90	41.2	0.90	41.1	0.91
	2015-07-03	41.2	0.90	41.1	0.90	41.0	0.91
	2015-07-06	41.2	0.90	41.1	0.91	41.1	0.92
	2015-08-26	40.6	0.90	40.5	0.90	40.4	0.91

(Head tissue simulant table continues)

(Head tissue simulant table continues)

f (MHz)	LTE850 (Band 5)	Dielectric Parameters					
	Date	CH 20450 829.0 MHz		CH 20525 836.5 MHz		CH 20600 844.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
836	2015-06-30	41.1	0.91	41.1	0.91	41.1	0.92
	2015-07-01	41.2	0.90	41.2	0.90	41.1	0.91
	2015-07-02	41.2	0.90	41.2	0.91	41.1	0.91
	2015-07-03	41.1	0.90	41.1	0.91	41.0	0.91
	2015-07-06	41.2	0.91	41.1	0.91	41.1	0.92
	2015-08-26	40.5	0.90	40.5	0.90	40.5	0.91
f (MHz)	WCDMA1700/2100 (Band 4)	Dielectric Parameters					
	Date	CH 1312 1712.4 MHz		CH 1412 1732.4 MHz		CH 1513 1752.6 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
1732	2015-07-01	39.8	1.32	39.7	1.34	39.6	1.35
	2015-07-02	40.2	1.31	40.1	1.32	40.1	1.34
	2015-07-03	39.3	1.29	39.2	1.31	39.1	1.33
	2015-07-05	39.7	1.31	39.6	1.33	39.5	1.35
	2015-08-31	39.9	1.29	39.8	1.31	39.8	1.33
f (MHz)	LTE1700/2100 (Band 4)	Dielectric Parameters					
	Date	CH 20050 1720.0 MHz		CH 20175 1732.5 MHz		CH 20300 1745.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
1732	2015-07-01	39.8	1.32	39.7	1.34	39.7	1.35
	2015-07-02	40.2	1.31	40.1	1.32	40.1	1.34
	2015-07-03	39.3	1.30	39.2	1.31	39.2	1.32
	2015-07-05	39.7	1.32	39.6	1.33	39.6	1.34
	2015-08-31	39.9	1.29	39.8	1.31	39.8	1.32
f (MHz)	GSM1900	Dielectric Parameters					
	Date	CH 512 1850.2 MHz		CH 661 1880.0 MHz		CH 810 1909.8 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
1880	2015-06-30	40.1	1.34	40.1	1.37	40.0	1.40
	2015-07-01	38.7	1.33	38.7	1.35	38.6	1.39
	2015-07-02	40.3	1.34	40.2	1.37	40.1	1.40
	2015-07-03	39.7	1.34	39.7	1.37	39.5	1.40
	2015-07-04	39.9	1.36	39.8	1.39	39.7	1.43
	2015-07-06	39.2	1.37	39.1	1.40	38.9	1.43
	2015-09-01	38.7	1.31	38.6	1.34	38.5	1.36
	2015-09-02	38.9	1.33	38.8	1.35	38.7	1.38

(Head tissue simulant table continues)

(Head tissue simulant table continues)

f (MHz)	WCDMA1900 (Band 2)	Dielectric Parameters					
	Date	CH 9262 1852.4 MHz		CH 9400 1880.0 MHz		CH 9538 1907.6 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
1880	2015-06-30	40.1	1.34	40.1	1.37	40.0	1.40
	2015-07-01	38.7	1.33	38.7	1.35	38.6	1.38
	2015-07-02	40.3	1.34	40.2	1.37	40.1	1.39
	2015-07-03	39.7	1.34	39.7	1.37	39.5	1.40
	2015-07-04	39.9	1.36	39.8	1.39	39.7	1.42
	2015-07-06	39.2	1.38	39.1	1.40	38.9	1.43
	2015-09-01	38.7	1.32	38.6	1.34	38.5	1.36
	2015-09-02	38.9	1.33	38.8	1.35	38.7	1.38
f (MHz)	LTE1900 (Band 2)	Dielectric Parameters					
	Date	CH 18700 1860.0 MHz		CH 18900 1880.0 MHz		CH 19100 1900.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
1880	2015-06-30	40.0	1.35	40.1	1.37	40.0	1.39
	2015-07-01	38.7	1.34	38.7	1.35	38.6	1.38
	2015-07-02	40.2	1.35	40.2	1.37	40.1	1.39
	2015-07-03	39.7	1.35	39.7	1.37	39.6	1.39
	2015-07-04	39.9	1.37	39.8	1.39	39.8	1.42
	2015-07-06	39.2	1.38	39.1	1.40	39.0	1.42
	2015-09-01	38.7	1.32	38.6	1.34	38.5	1.36
	2015-09-02	38.9	1.33	38.8	1.35	38.7	1.37
f (MHz)	WLAN2450	Dielectric Parameters					
	Date	CH 1 2412.0 MHz		CH 6 2437.0 MHz		CH 11 2462.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
2437	2015-07-02	38.7	1.79	38.7	1.82	38.5	1.85
	2015-09-01	38.9	1.71	38.8	1.74	38.7	1.76
f (MHz)	LTE2500 (Band 7)	Dielectric Parameters					
	Date	CH 20850 2510.0 MHz		CH 21100 2535.0 MHz		CH 21350 2560.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
2535	2015-07-07	37.9	1.83	37.9	1.86	37.7	1.88
	2015-08-26	38.8	1.79	38.8	1.81	38.6	1.84

Head tissue simulant dielectric parameters used in the measurements 5180 – 5815 MHz:

f (MHz)	WLAN5200	Dielectric Parameters									
	Date	5200.0		5210.0		5220.0		5230.0		5240.0	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
5210	2015-07-01	36.3	4.61	36.3	4.63	36.3	4.64	36.3	4.65	36.3	4.66
f (MHz)	WLAN5300	Dielectric Parameters									
	Date	5260.0		5290.0		5300.0		5310.0		5320.0	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
5290	2015-07-01	36.3	4.66	36.2	4.70	36.2	4.71	36.2	4.72	36.2	4.74
	2015-07-06	36.6	4.68	36.5	4.71	36.5	4.72	36.5	4.73	36.5	4.74
	2015-08-30	35.6	4.55	35.5	4.59	35.5	4.60	35.5	4.61	35.5	4.63
f (MHz)	WLAN5500-5600	Dielectric Parameters									
	Date	5520.0		5600.0		5620.0		5640.0		5700.0	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
5520	2015-07-01	35.9	4.93	35.8	5.02	35.8	5.04	35.7	5.06	35.7	5.15
5620	2015-07-06	36.2	4.95	36.1	5.03	36.1	5.06	36.0	5.08	36.0	5.14
f (MHz)	WLAN5800	Dielectric Parameters									
	Date	5745.0		5760.0		5785.0		5805.0		5815.0	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
5760	2015-07-01	35.6	5.17	35.6	5.18	35.5	5.23	35.5	5.26	35.5	5.27
	2015-07-06	35.9	5.19	35.9	5.21	35.8	5.24	35.8	5.26	35.8	5.26

Body tissue simulant dielectric parameters used in the measurements:

f (MHz)	LTE700 (Band 12)	Dielectric Parameters					
	Date	CH 23060 704.0 MHz		CH 23095 707.5 MHz		CH 23130 711.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
707	2015-07-06	54.6	0.95	54.5	0.95	54.5	0.95
	2015-07-07	54.5	0.95	54.5	0.96	54.5	0.96
	2015-08-28	53.8	0.95	53.8	0.95	53.7	0.95
f (MHz)	LTE700 (Band 17)	Dielectric Parameters					
	Date	CH 23780 709.0 MHz		CH 23790 710.0 MHz		CH 23800 711.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
710	2015-07-06	54.5	0.95	54.5	0.95	54.5	0.95
	2015-07-07	54.5	0.96	54.5	0.96	54.5	0.96
	2015-08-28	53.8	0.95	53.8	0.95	53.7	0.95
f (MHz)	GSM850	Dielectric Parameters					
	Date	CH 128 824.2 MHz		CH 190 836.6 MHz		CH 251 848.8 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
836	2015-07-07	54.0	0.97	53.9	0.98	53.9	0.99
	2015-07-08	53.8	0.97	53.7	0.98	53.6	0.98
	2015-07-15	53.7	0.98	53.6	0.98	53.6	0.99
	2015-08-27	54.2	0.97	54.1	0.98	54.1	0.98
f (MHz)	WCDMA850 (Band 5)	Dielectric Parameters					
	Date	CH 4132 826.4 MHz		CH 4175 835.0 MHz		CH 4233 846.6 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
835	2015-07-07	54.0	0.97	53.9	0.98	53.9	0.98
	2015-07-08	53.8	0.97	53.7	0.97	53.6	0.98
	2015-07-15	53.7	0.98	53.6	0.98	53.6	0.99
	2015-08-27	54.1	0.97	54.1	0.98	54.1	0.98
f (MHz)	LTE850 (Band 5)	Dielectric Parameters					
	Date	CH 20450 829.0 MHz		CH 20525 836.5 MHz		CH 20600 844.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
836	2015-07-07	54.0	0.97	53.9	0.98	53.9	0.98
	2015-07-08	53.7	0.97	53.7	0.98	53.6	0.98
	2015-07-15	53.7	0.98	53.6	0.98	53.6	0.99
	2015-08-27	54.1	0.97	54.1	0.98	54.1	0.98

(Body tissue simulant table continues)

(Body tissue simulant table continues)

f (MHz)	WCDMA1700/2100 (Band 4)	Dielectric Parameters					
	Date	CH 1312 1712.4 MHz		CH 1412 1732.4 MHz		CH 1513 1752.6 MHz	
		e _r	s [S/m]	e _r	s [S/m]	e _r	s [S/m]
1732	2015-07-06	52.6	1.40	52.6	1.42	52.5	1.44
	2015-07-07	52.4	1.41	52.3	1.43	52.2	1.45
	2015-07-08	52.3	1.42	52.2	1.44	52.2	1.46
	2015-07-10	52.1	1.42	52.0	1.44	52.0	1.46
	2015-07-25	51.5	1.41	51.5	1.43	51.4	1.44
	2015-08-30	51.7	1.42	51.6	1.44	51.6	1.45
f (MHz)	LTE1700/2100 (Band 4)	Dielectric Parameters					
	Date	CH 20050 1720.0 MHz		CH 20175 1732.5 MHz		CH 20300 1745.0 MHz	
		e _r	s [S/m]	e _r	s [S/m]	e _r	s [S/m]
1732	2015-07-06	52.6	1.41	52.6	1.42	52.5	1.43
	2015-07-07	52.4	1.42	52.3	1.43	52.3	1.44
	2015-07-08	52.3	1.43	52.2	1.44	52.2	1.45
	2015-07-10	52.1	1.43	52.0	1.44	52.0	1.44
	2015-07-25	51.5	1.42	51.5	1.43	51.5	1.44
	2015-08-30	51.6	1.43	51.6	1.44	51.6	1.45
f (MHz)	GSM1900	Dielectric Parameters					
	Date	CH 512 1850.2 MHz		CH 661 1880.0 MHz		CH 810 1909.8 MHz	
		e _r	s [S/m]	e _r	s [S/m]	e _r	s [S/m]
1880	2015-07-06	39.2	1.37	39.1	1.40	38.9	1.43
	2015-07-07	52.4	1.48	52.4	1.52	52.3	1.55
	2015-09-02	51.8	1.44	51.8	1.47	51.6	1.49
	2015-09-03	51.6	1.45	51.5	1.48	51.5	1.51
f (MHz)	WCDMA1900 (Band 2)	Dielectric Parameters					
	Date	CH 9262 1852.4 MHz		CH 9400 1880.0 MHz		CH 9538 1907.6 MHz	
		e _r	s [S/m]	e _r	s [S/m]	e _r	s [S/m]
1880	2015-07-06	39.2	1.38	39.1	1.40	38.9	1.43
	2015-07-07	52.4	1.48	52.4	1.52	52.3	1.55
	2015-09-02	51.8	1.44	51.8	1.47	51.6	1.49
	2015-09-03	51.6	1.45	51.5	1.48	51.5	1.50
f (MHz)	LTE1900 (Band 2)	Dielectric Parameters					
	Date	CH 18700 1860.0 MHz		CH 18900 1880.0 MHz		CH 19100 1900.0 MHz	
		e _r	s [S/m]	e _r	s [S/m]	e _r	s [S/m]
1880	2015-07-06	39.2	1.38	39.1	1.40	39.0	1.42
	2015-07-07	52.4	1.49	52.4	1.52	52.3	1.54
	2015-09-02	51.7	1.44	51.8	1.47	51.7	1.49
	2015-09-03	51.6	1.46	51.5	1.48	51.4	1.50

(Body tissue simulant table continues)

(Body tissue simulant table continues)

f (MHz)	WLAN2450	Dielectric Parameters					
	Date	CH 1 2412.0 MHz		CH 6 2437.0 MHz		CH 11 2462.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
2437	2015-07-03	52.6	1.91	52.6	1.94	52.5	1.97
	2015-08-28	51.7	1.87	51.6	1.90	51.6	1.93
f (MHz)	LTE2500 (Band 7)	Dielectric Parameters					
	Date	CH 20850 2510.0 MHz		CH 21100 2535.0 MHz		CH 21350 2560.0 MHz	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
2535	2015-07-06	52.0	2.00	51.9	2.02	51.8	2.05
	2015-07-15	51.7	1.99	51.6	2.02	51.5	2.05
	2015-08-28	51.4	1.98	51.3	2.02	51.3	2.04

Body tissue simulant dielectric parameters used in the measurements 5180 – 5815 MHz:

f (MHz)	WLAN5200	Dielectric Parameters									
	Date	5200.0		5210.0		5220.0		5230.0		5240.0	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
5210	2015-07-05	47.6	5.43	47.6	5.44	47.6	5.45	47.6	5.46	47.5	5.47
	2015-08-30	46.9	5.48	46.9	5.49	46.8	5.50	46.8	5.51	46.8	5.52
f (MHz)	WLAN5300	Dielectric Parameters									
	Date	5260.0		5290.0		5300.0		5310.0		5320.0	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
5290	2015-07-04	47.8	5.51	47.8	5.56	47.8	5.57	47.7	5.58	47.7	5.59
f (MHz)	WLAN5500-5600	Dielectric Parameters									
	Date	5520.0		5600.0		5620.0		5640.0		5700.0	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
5520	2015-07-04	47.4	5.87	47.3	5.97	47.3	6.01	47.3	6.04	47.1	6.11
5620	2015-08-31	46.3	5.89	46.2	6.00	46.1	6.03	46.1	6.05	46.0	6.14
f (MHz)	WLAN5800	Dielectric Parameters									
	Date	5745.0		5760.0		5785.0		5805.0		5815.0	
		ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]	ϵ_r	s [S/m]
5760	2015-07-04	47.1	6.19	47.1	6.20	47.0	6.22	47.0	6.24	46.9	6.26

APPENDIX D: RELEVANT PAGES FROM PROBE CALIBRATION REPORTS



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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

Client **TCC Microsoft**

Certificate No: **ES3-3276_Apr15**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3276**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6**
Calibration procedure for dosimetric E-field probes

Calibration date: **April 27, 2015**

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	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

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

Issued: April 27, 2015

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3276

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	6.44	6.44	6.44	0.40	1.55	± 12.0 %
835	41.5	0.90	6.17	6.17	6.17	0.29	2.00	± 12.0 %
1750	40.1	1.37	5.17	5.17	5.17	0.49	1.45	± 12.0 %
1900	40.0	1.40	4.98	4.98	4.98	0.80	1.19	± 12.0 %
2300	39.5	1.67	4.66	4.66	4.66	0.62	1.39	± 12.0 %
2450	39.2	1.80	4.42	4.42	4.42	0.72	1.34	± 12.0 %
2600	39.0	1.96	4.25	4.25	4.25	0.80	1.22	± 12.0 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3276

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 ^g	Depth ^g (mm)	Unct. (k=2)
750	55.5	0.96	6.17	6.17	6.17	0.50	1.48	± 12.0 %
835	55.2	0.97	6.09	6.09	6.09	0.28	2.07	± 12.0 %
1750	53.4	1.49	4.91	4.91	4.91	0.58	1.41	± 12.0 %
1900	53.3	1.52	4.72	4.72	4.72	0.53	1.55	± 12.0 %
2300	52.9	1.81	4.44	4.44	4.44	0.76	1.27	± 12.0 %
2450	52.7	1.95	4.32	4.32	4.32	0.80	1.08	± 12.0 %
2600	52.5	2.16	4.18	4.18	4.18	0.80	1.04	± 12.0 %

^c Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^g Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.



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 **TCC Microsoft**

Certificate No: **ES3-3131_Oct14**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3131**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes**

Calibration date: **October 21, 2014**

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 E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

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

Issued: October 21, 2014

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DASY/EASY - Parameters of Probe: ES3DV3 - SN:3131

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	6.29	6.29	6.29	0.58	1.27	± 12.0 %
835	41.5	0.90	6.04	6.04	6.04	0.62	1.27	± 12.0 %
1750	40.1	1.37	5.10	5.10	5.10	0.43	1.55	± 12.0 %
1900	40.0	1.40	4.92	4.92	4.92	0.58	1.32	± 12.0 %
2300	39.5	1.67	4.62	4.62	4.62	0.78	1.17	± 12.0 %
2450	39.2	1.80	4.39	4.39	4.39	0.65	1.33	± 12.0 %
2600	39.0	1.96	4.25	4.25	4.25	0.79	1.22	± 12.0 %

^c Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3131

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	55.5	0.96	5.97	5.97	5.97	0.27	2.03	± 12.0 %
835	55.2	0.97	5.96	5.96	5.96	0.54	1.37	± 12.0 %
1750	53.4	1.49	4.79	4.79	4.79	0.43	1.72	± 12.0 %
1900	53.3	1.52	4.58	4.58	4.58	0.65	1.40	± 12.0 %
2300	52.9	1.81	4.33	4.33	4.33	0.76	1.21	± 12.0 %
2450	52.7	1.95	4.14	4.14	4.14	0.80	1.11	± 12.0 %
2600	52.5	2.16	4.03	4.03	4.03	0.80	1.06	± 12.0 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.



Accredited by the Swiss Accreditation Service (SAS)
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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **TCC Microsoft**

Certificate No: **EX3-3892_Apr15**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3892**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6**
Calibration procedure for dosimetric E-field probes

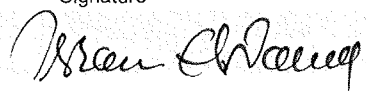
Calibration date: **April 24, 2015**

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	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by:	Name Israe Elnaouq	Function Laboratory Technician	Signature 
Approved by:	Katja Pokovic	Technical Manager	
Issued: April 27, 2015			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3892

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	10.14	10.14	10.14	0.23	1.36	± 12.0 %
835	41.5	0.90	9.65	9.65	9.65	0.21	1.36	± 12.0 %
1750	40.1	1.37	8.13	8.13	8.13	0.35	0.80	± 12.0 %
1900	40.0	1.40	7.92	7.92	7.92	0.35	0.80	± 12.0 %
2300	39.5	1.67	7.47	7.47	7.47	0.21	1.14	± 12.0 %
2450	39.2	1.80	7.24	7.24	7.24	0.24	0.97	± 12.0 %
2600	39.0	1.96	7.13	7.13	7.13	0.35	0.95	± 12.0 %
5200	36.0	4.66	5.07	5.07	5.07	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.84	4.84	4.84	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.78	4.78	4.78	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.60	4.60	4.60	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.52	4.52	4.52	0.40	1.80	± 13.1 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3892

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	55.5	0.96	9.62	9.62	9.62	0.41	0.92	± 12.0 %
835	55.2	0.97	9.55	9.55	9.55	0.36	1.05	± 12.0 %
1750	53.4	1.49	7.90	7.90	7.90	0.29	0.96	± 12.0 %
1900	53.3	1.52	7.68	7.68	7.68	0.41	0.80	± 12.0 %
2300	52.9	1.81	7.44	7.44	7.44	0.37	0.85	± 12.0 %
2450	52.7	1.95	7.32	7.32	7.32	0.35	0.90	± 12.0 %
2600	52.5	2.16	7.04	7.04	7.04	0.35	0.90	± 12.0 %
5200	49.0	5.30	4.54	4.54	4.54	0.40	1.90	± 13.1 %
5300	48.9	5.42	4.33	4.33	4.33	0.40	1.90	± 13.1 %
5500	48.6	5.65	4.01	4.01	4.01	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.93	3.93	3.93	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.05	4.05	4.05	0.50	1.90	± 13.1 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.



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 **TCC Microsoft**

Certificate No: **EX3-3835_Oct14**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3835**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6**
Calibration procedure for dosimetric E-field probes

Calibration date: **October 20, 2014**

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 E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by:	Name	Function	Signature
	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	
			Issued: October 21, 2014
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DASY/EASY - Parameters of Probe: EX3DV4 - SN:3835

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	9.14	9.14	9.14	0.28	1.12	± 12.0 %
835	41.5	0.90	8.87	8.87	8.87	0.29	1.03	± 12.0 %
1750	40.1	1.37	7.73	7.73	7.73	0.50	0.72	± 12.0 %
1900	40.0	1.40	7.52	7.52	7.52	0.76	0.57	± 12.0 %
2300	39.5	1.67	7.23	7.23	7.23	0.50	0.70	± 12.0 %
2450	39.2	1.80	6.92	6.92	6.92	0.41	0.80	± 12.0 %
2600	39.0	1.96	6.79	6.79	6.79	0.40	0.84	± 12.0 %
5200	36.0	4.66	4.91	4.91	4.91	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.73	4.73	4.73	0.35	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	4.32	4.32	4.32	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.36	4.36	4.36	0.40	1.80	± 13.1 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3835

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 ^g	Depth ^g (mm)	Unct. (k=2)
750	55.5	0.96	8.80	8.80	8.80	0.24	1.33	± 12.0 %
835	55.2	0.97	8.90	8.90	8.90	0.63	0.67	± 12.0 %
1750	53.4	1.49	7.46	7.46	7.46	0.78	0.63	± 12.0 %
1900	53.3	1.52	7.17	7.17	7.17	0.43	0.80	± 12.0 %
2300	52.9	1.81	7.03	7.03	7.03	0.80	0.61	± 12.0 %
2450	52.7	1.95	6.87	6.87	6.87	0.80	0.58	± 12.0 %
2600	52.5	2.16	6.74	6.74	6.74	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.20	4.20	4.20	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.03	4.03	4.03	0.45	1.90	± 13.1 %
5500	48.6	5.65	3.79	3.79	3.79	0.45	1.90	± 13.1 %
5600	48.5	5.77	3.63	3.63	3.63	0.45	1.90	± 13.1 %
5800	48.2	6.00	3.80	3.80	3.80	0.50	1.90	± 13.1 %

^c Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^g Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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 Multilateral Agreement for the recognition of calibration certificates

Client **TCC Microsoft**

Certificate No: **ES3-3194_Jan15**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3194**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6**
Calibration procedure for dosimetric E-field probes

Calibration date: **January 20, 2015**

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	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	
Issued: January 22, 2015			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3194

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 ^g	Depth ^g (mm)	Unct. (k=2)
750	41.9	0.89	6.52	6.52	6.52	0.56	1.42	± 12.0 %
835	41.5	0.90	6.34	6.34	6.34	0.59	1.36	± 12.0 %
1750	40.1	1.37	5.22	5.22	5.22	0.73	1.26	± 12.0 %
1900	40.0	1.40	5.09	5.09	5.09	0.80	1.16	± 12.0 %
2300	39.5	1.67	4.71	4.71	4.71	0.79	1.19	± 12.0 %
2450	39.2	1.80	4.50	4.50	4.50	0.75	1.30	± 12.0 %
2600	39.0	1.96	4.31	4.31	4.31	0.80	1.30	± 12.0 %

^c Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^g Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3194

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	55.5	0.96	6.08	6.08	6.08	0.46	1.57	± 12.0 %
835	55.2	0.97	6.11	6.11	6.11	0.49	1.56	± 12.0 %
1750	53.4	1.49	4.92	4.92	4.92	0.80	1.23	± 12.0 %
1900	53.3	1.52	4.75	4.75	4.75	0.78	1.28	± 12.0 %
2300	52.9	1.81	4.46	4.46	4.46	0.80	1.26	± 12.0 %
2450	52.7	1.95	4.35	4.35	4.35	0.68	1.20	± 12.0 %
2600	52.5	2.16	4.19	4.19	4.19	0.73	1.18	± 12.0 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.



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Client **TCC Microsoft**

Certificate No: **ES3-3275_Apr15**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3275**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes**

Calibration date: **April 27, 2015**

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 E4419B	GB41293874	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature
			Issued: April 29, 2015
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3275

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	6.19	6.19	6.19	0.31	2.01	± 12.0 %
835	41.5	0.90	5.95	5.95	5.95	0.29	2.09	± 12.0 %
1750	40.1	1.37	4.99	4.99	4.99	0.49	1.47	± 12.0 %
1900	40.0	1.40	4.85	4.85	4.85	0.61	1.32	± 12.0 %
2300	39.5	1.67	4.55	4.55	4.55	0.69	1.30	± 12.0 %
2450	39.2	1.80	4.33	4.33	4.33	0.80	1.35	± 12.0 %
2600	39.0	1.96	4.22	4.22	4.22	0.80	1.26	± 12.0 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3275

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	55.5	0.96	6.04	6.04	6.04	0.54	1.43	± 12.0 %
835	55.2	0.97	5.93	5.93	5.93	0.36	1.83	± 12.0 %
1750	53.4	1.49	4.78	4.78	4.78	0.52	1.60	± 12.0 %
1900	53.3	1.52	4.63	4.63	4.63	0.73	1.36	± 12.0 %
2300	52.9	1.81	4.38	4.38	4.38	0.77	1.23	± 12.0 %
2450	52.7	1.95	4.25	4.25	4.25	0.80	1.11	± 12.0 %
2600	52.5	2.16	4.07	4.07	4.07	0.85	1.35	± 12.0 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.



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Accreditation No.: **SCS 0108**

Client **TCC Microsoft**

Certificate No: **EX3-3852_Apr15**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3852**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6**
Calibration procedure for dosimetric E-field probes

Calibration date: **April 24, 2015**

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	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by:	Name Israe Elnaouq	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 27, 2015

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3852

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	9.36	9.36	9.36	0.35	0.99	± 12.0 %
835	41.5	0.90	8.96	8.96	8.96	0.23	1.28	± 12.0 %
1750	40.1	1.37	7.69	7.69	7.69	0.40	0.80	± 12.0 %
1900	40.0	1.40	7.49	7.49	7.49	0.32	0.80	± 12.0 %
2300	39.5	1.67	7.15	7.15	7.15	0.36	0.80	± 12.0 %
2450	39.2	1.80	6.86	6.86	6.86	0.37	0.83	± 12.0 %
2600	39.0	1.96	6.67	6.67	6.67	0.25	1.11	± 12.0 %
5200	36.0	4.66	4.87	4.87	4.87	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.68	4.68	4.68	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.70	4.70	4.70	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.53	4.53	4.53	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.50	4.50	4.50	0.40	1.80	± 13.1 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3852

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 ^G	Depth ^G (mm)	Unct. (k=2)
750	55.5	0.96	9.31	9.31	9.31	0.35	1.02	± 12.0 %
835	55.2	0.97	9.11	9.11	9.11	0.25	1.21	± 12.0 %
1750	53.4	1.49	7.50	7.50	7.50	0.43	0.85	± 12.0 %
1900	53.3	1.52	7.31	7.31	7.31	0.42	0.82	± 12.0 %
2300	52.9	1.81	7.18	7.18	7.18	0.41	0.80	± 12.0 %
2450	52.7	1.95	7.04	7.04	7.04	0.39	0.95	± 12.0 %
2600	52.5	2.16	6.83	6.83	6.83	0.40	0.95	± 12.0 %
5200	49.0	5.30	4.51	4.51	4.51	0.40	1.90	± 13.1 %
5300	48.9	5.42	4.35	4.35	4.35	0.40	1.90	± 13.1 %
5500	48.6	5.65	3.82	3.82	3.82	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.65	3.65	3.65	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.10	4.10	4.10	0.50	1.90	± 13.1 %

^c Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

APPENDIX E: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORTS



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 0108**

Client **TCC Microsoft**

Certificate No: **D750V3-1075_Jan15**

CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1075**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **January 16, 2015**

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by: **Michael Weber** Name: **Michael Weber** Function: **Laboratory Technician**

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

Signature

Issued: January 19, 2015

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

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	$dx, dy, dz \approx 5 \text{ mm}$	
Frequency	$750 \text{ MHz} \pm 1 \text{ MHz}$	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	$22.0 \text{ }^{\circ}\text{C}$	41.9	0.89 mho/m
Measured Head TSL parameters	$(22.0 \pm 0.2) \text{ }^{\circ}\text{C}$	$41.7 \pm 6 \%$	$0.91 \text{ mho/m} \pm 6 \%$
Head TSL temperature change during test	$< 0.5 \text{ }^{\circ}\text{C}$	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	$8.13 \text{ W/kg} \pm 17.0 \% (k=2)$

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	$5.36 \text{ W/kg} \pm 16.5 \% (k=2)$

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	$22.0 \text{ }^{\circ}\text{C}$	55.5	0.96 mho/m
Measured Body TSL parameters	$(22.0 \pm 0.2) \text{ }^{\circ}\text{C}$	$56.0 \pm 6 \%$	$0.99 \text{ mho/m} \pm 6 \%$
Body TSL temperature change during test	$< 0.5 \text{ }^{\circ}\text{C}$	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	$8.50 \text{ W/kg} \pm 17.0 \% (k=2)$

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.43 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	$5.62 \text{ W/kg} \pm 16.5 \% (k=2)$

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$54.2 \Omega + 0.6 j\Omega$
Return Loss	- 27.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$49.2 \Omega - 1.1 j\Omega$
Return Loss	- 37.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 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	September 04, 2012

DASY5 Validation Report for Head TSL

Date: 16.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1075

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750$ MHz; $\sigma = 0.91$ S/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.44, 6.44, 6.44); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

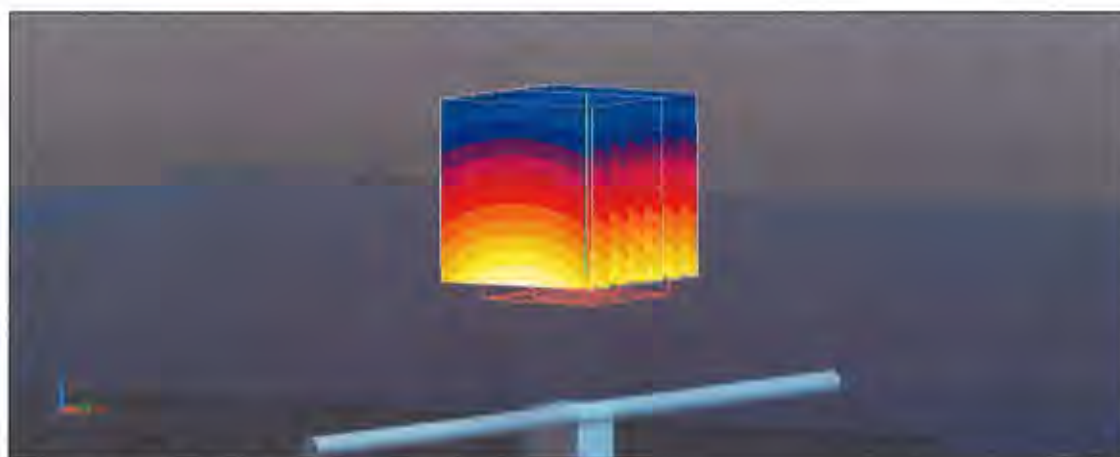
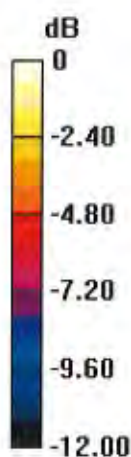
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.09 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.06 W/kg

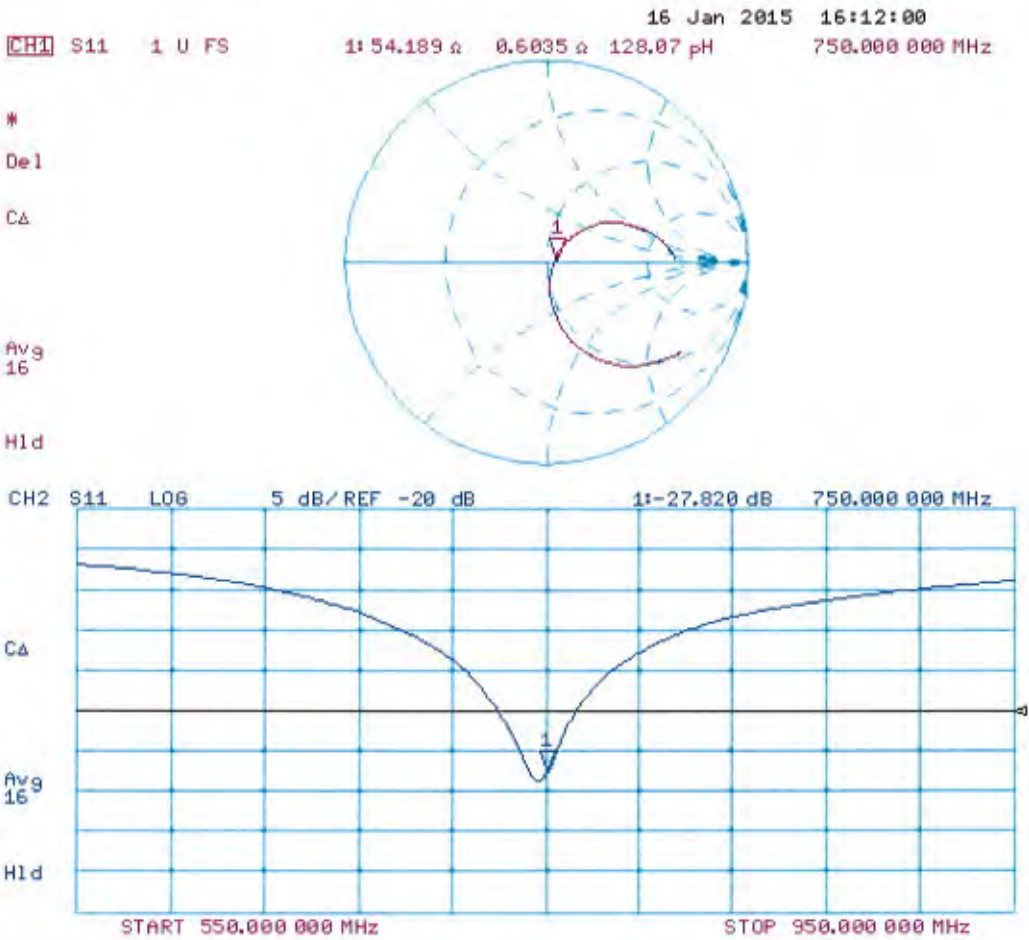
SAR(1 g) = 2.07 W/kg; SAR(10 g) = 1.36 W/kg

Maximum value of SAR (measured) = 2.41 W/kg



0 dB = 2.41 W/kg = 3.82 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1075

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.99 \text{ S/m}$; $\epsilon_r = 56$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.21, 6.21, 6.21); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

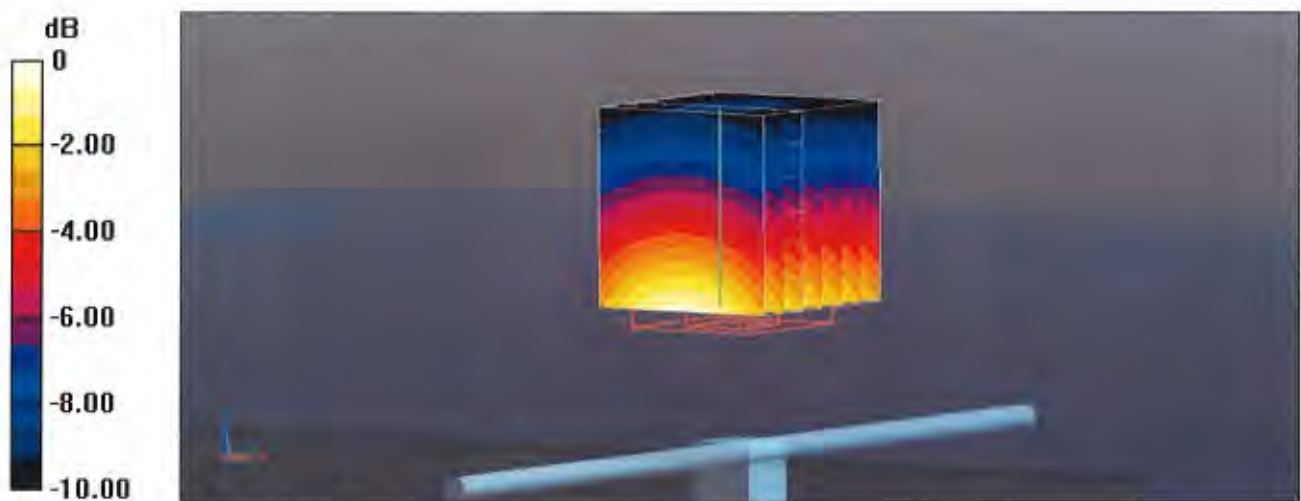
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 52.44 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.17 W/kg

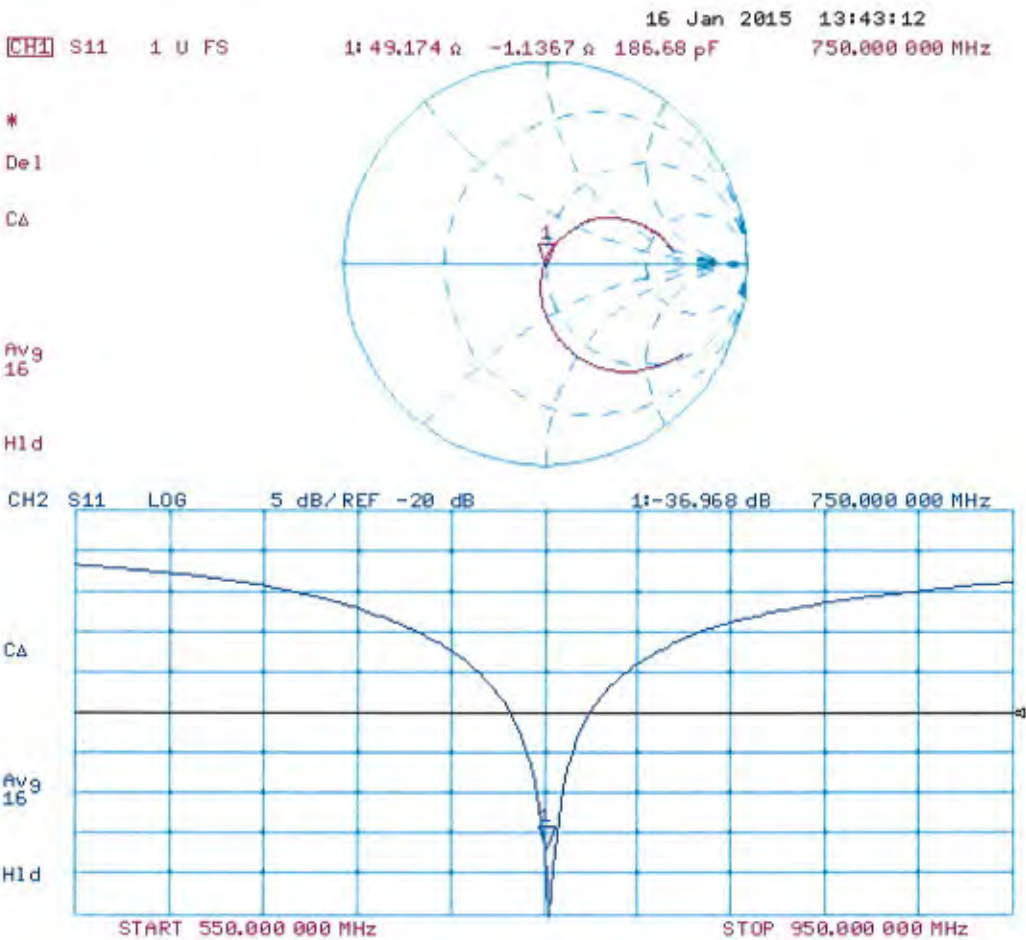
SAR(1 g) = 2.17 W/kg; SAR(10 g) = 1.43 W/kg

Maximum value of SAR (measured) = 2.53 W/kg



0 dB = 2.53 W/kg = 4.03 dBW/kg

Impedance Measurement Plot for Body TSL





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Accreditation No.: **SCS 0108**

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Multilateral Agreement for the recognition of calibration certificates

Client **TCC Microsoft**

Certificate No: **D835V2-480_Jan15**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 480**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **January 16, 2015**

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by: **Michael Weber** Name: **Michael Weber** Function: **Laboratory Technician**

Signature

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

Issued: January 19, 2015

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

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
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	41.5 $\pm$ 6 %	0.93 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	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.13 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.00 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	55.8 $\pm$ 6 %	1.01 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	2.32 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.02 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.52 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.95 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.9 Ω - 2.3 j Ω
Return Loss	- 30.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.3 Ω - 4.1 j Ω
Return Loss	- 26.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.389 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	January 28, 2003

DASY5 Validation Report for Head TSL

Date: 16.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 480

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.93 \text{ S/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.2, 6.2, 6.2); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

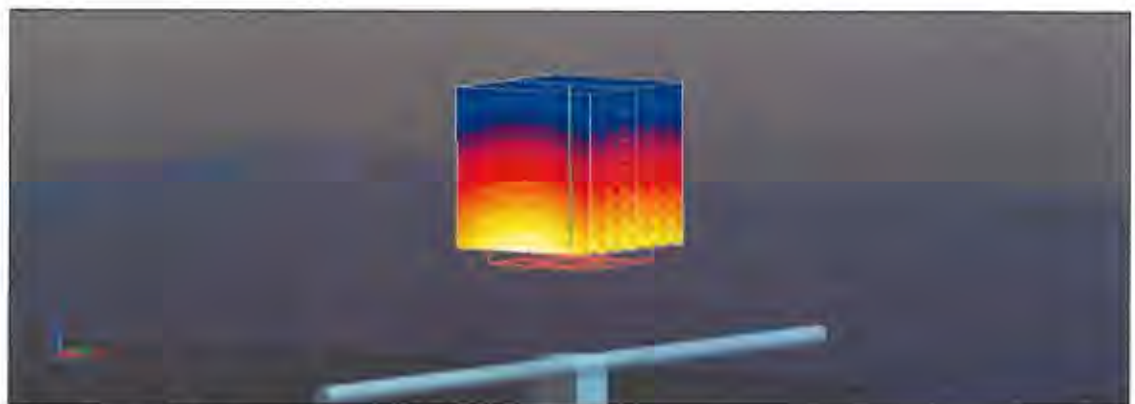
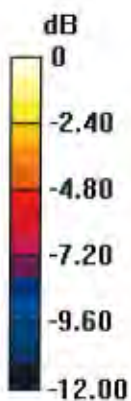
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.08 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.47 W/kg

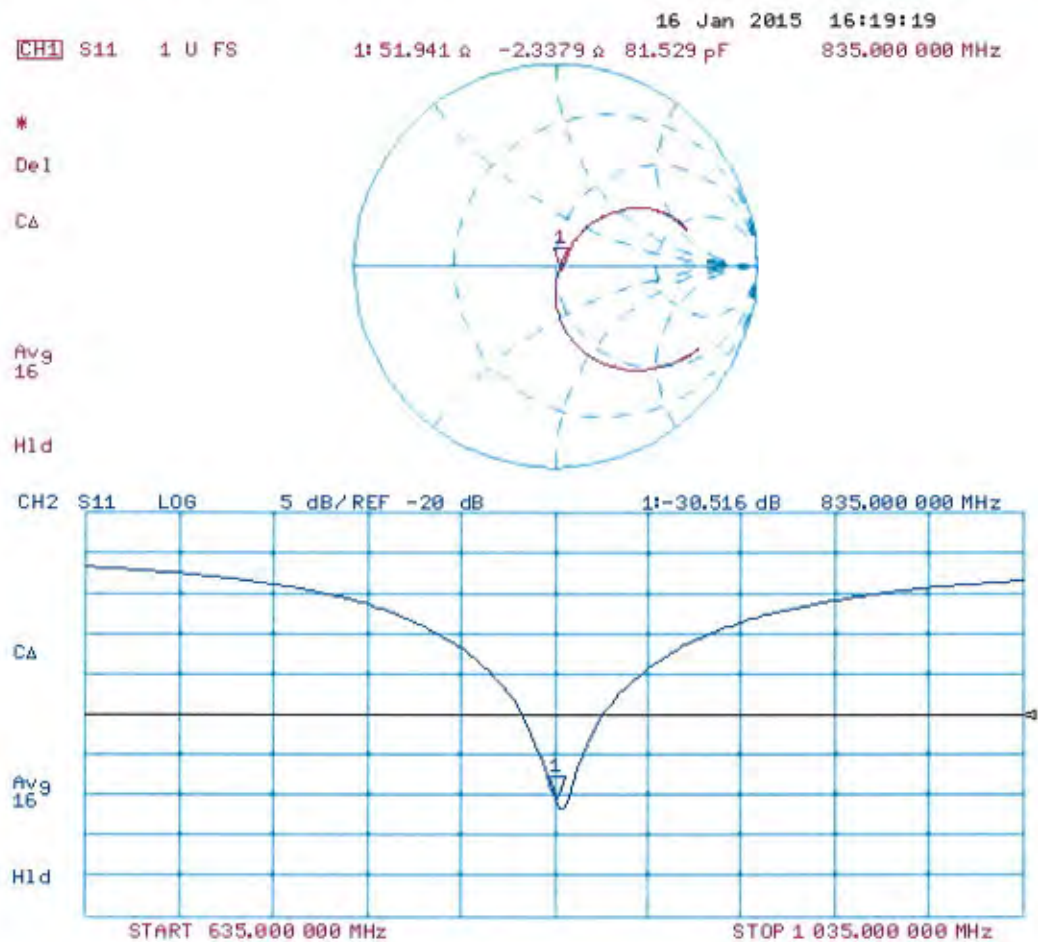
SAR(1 g) = 2.34 W/kg; SAR(10 g) = 1.53 W/kg

Maximum value of SAR (measured) = 2.74 W/kg



0 dB = 2.74 W/kg = 4.38 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 480

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 1.01$ S/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.17, 6.17, 6.17); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

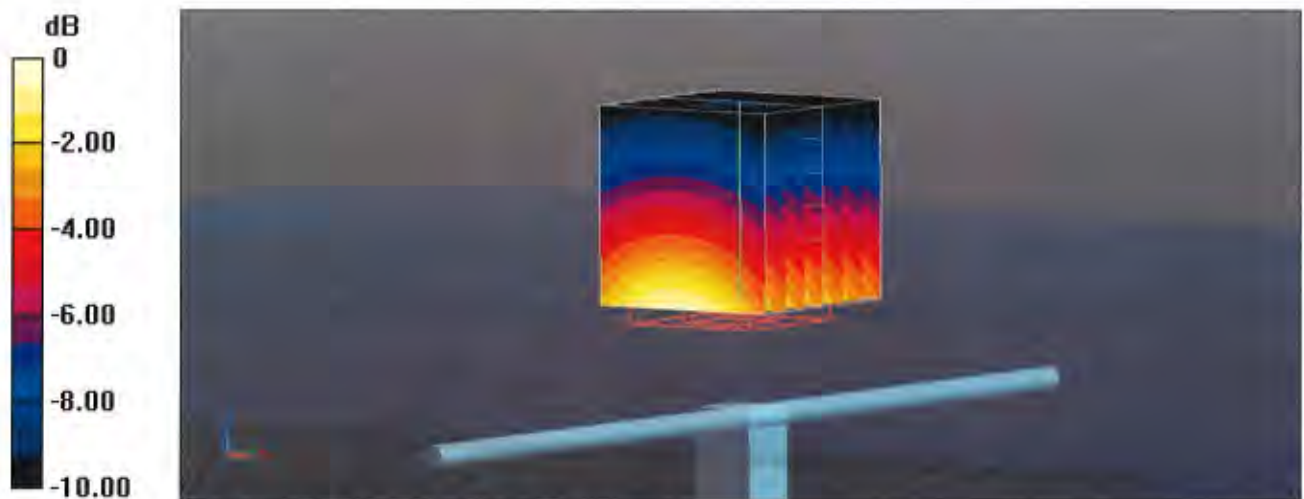
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.43 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 3.42 W/kg

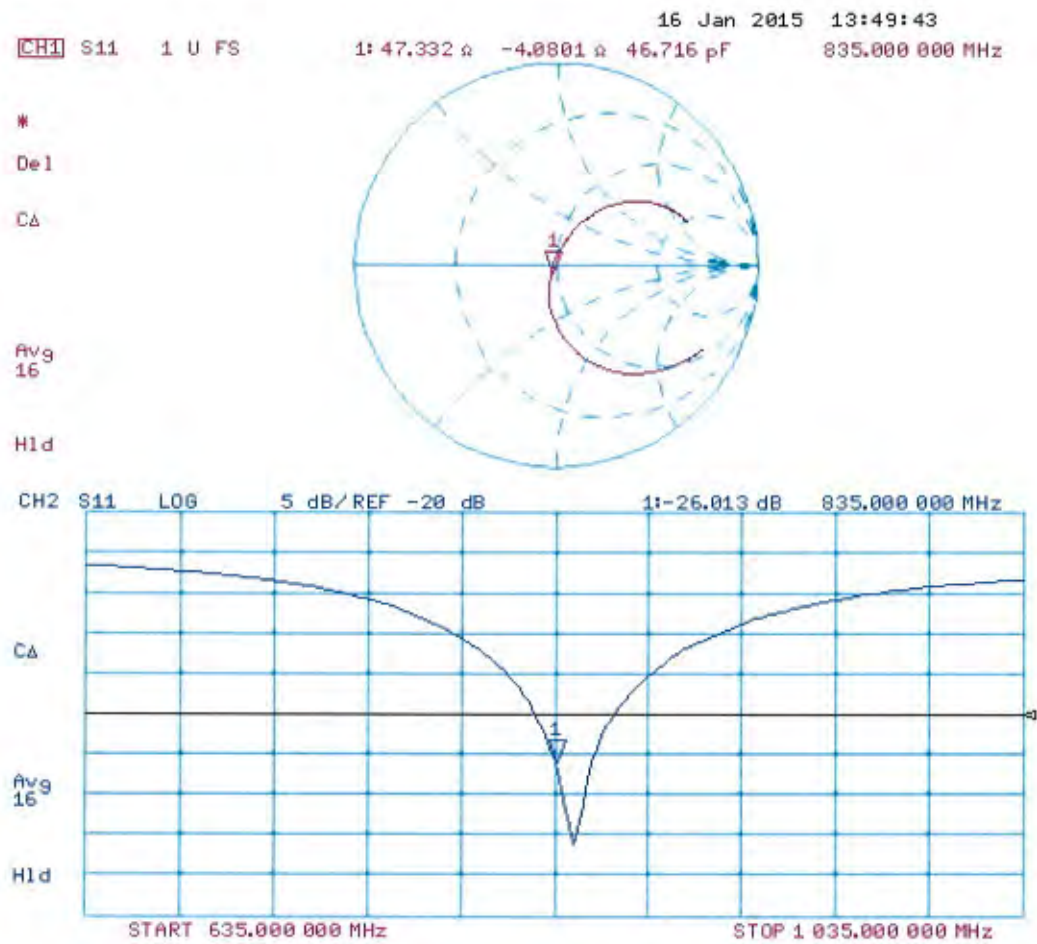
SAR(1 g) = 2.32 W/kg; SAR(10 g) = 1.52 W/kg

Maximum value of SAR (measured) = 2.69 W/kg



0 dB = 2.69 W/kg = 4.30 dBW/kg

Impedance Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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Multilateral Agreement for the recognition of calibration certificates

Client **TCC Microsoft**

Certificate No: **D1750V2-1082_Jan15**

CALIBRATION CERTIFICATE

Object **D1750V2 - SN: 1082**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **January 14, 2015**

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by: **Name** Michael Weber **Function** Laboratory Technician

Signature

M. Weber

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

K. Pokovic

Issued: January 15, 2015

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

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.0 $\pm$ 6 %	1.38 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	9.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.6 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.90 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.5 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	51.8 $\pm$ 6 %	1.49 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	9.43 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.5 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.2 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$50.9 \Omega + 0.5 j\Omega$
Return Loss	- 39.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$46.3 \Omega + 1.0 j\Omega$
Return Loss	- 28.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.219 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	January 19, 2011

DASY5 Validation Report for Head TSL

Date: 14.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1082

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.38$ S/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.2, 5.2, 5.2); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

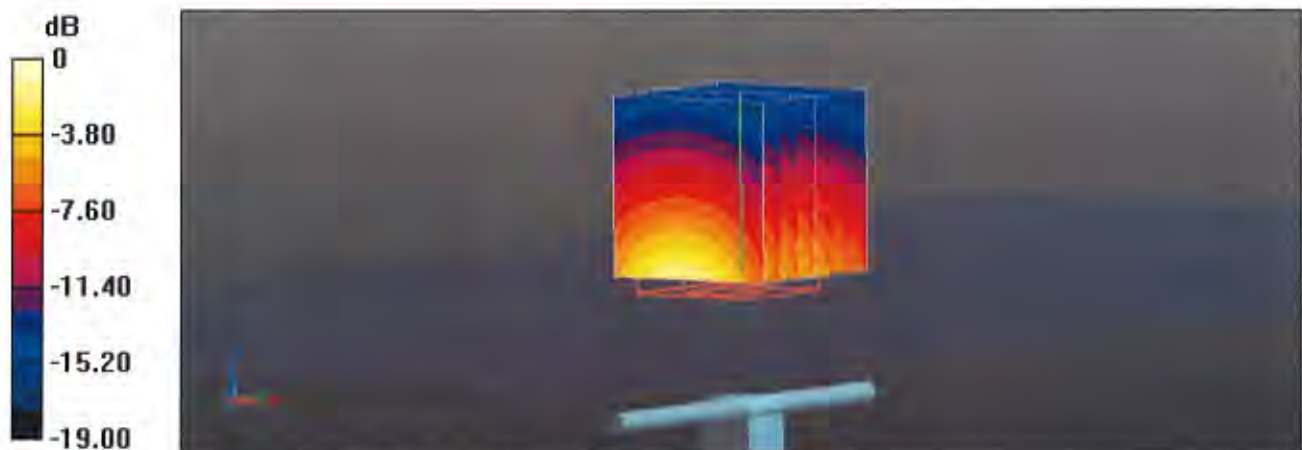
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.14 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 16.6 W/kg

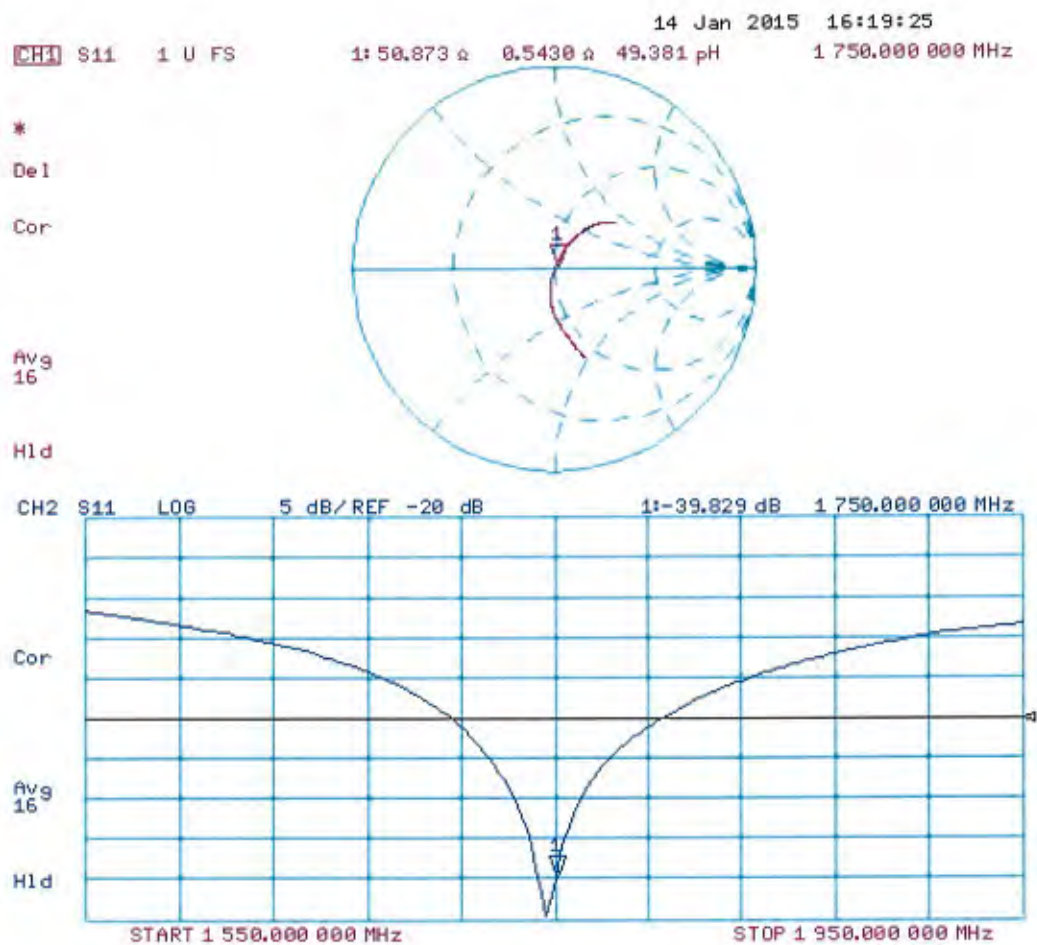
SAR(1 g) = 9.24 W/kg; SAR(10 g) = 4.9 W/kg

Maximum value of SAR (measured) = 11.5 W/kg



0 dB = 11.5 W/kg = 10.61 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1082

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.88, 4.88, 4.88); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

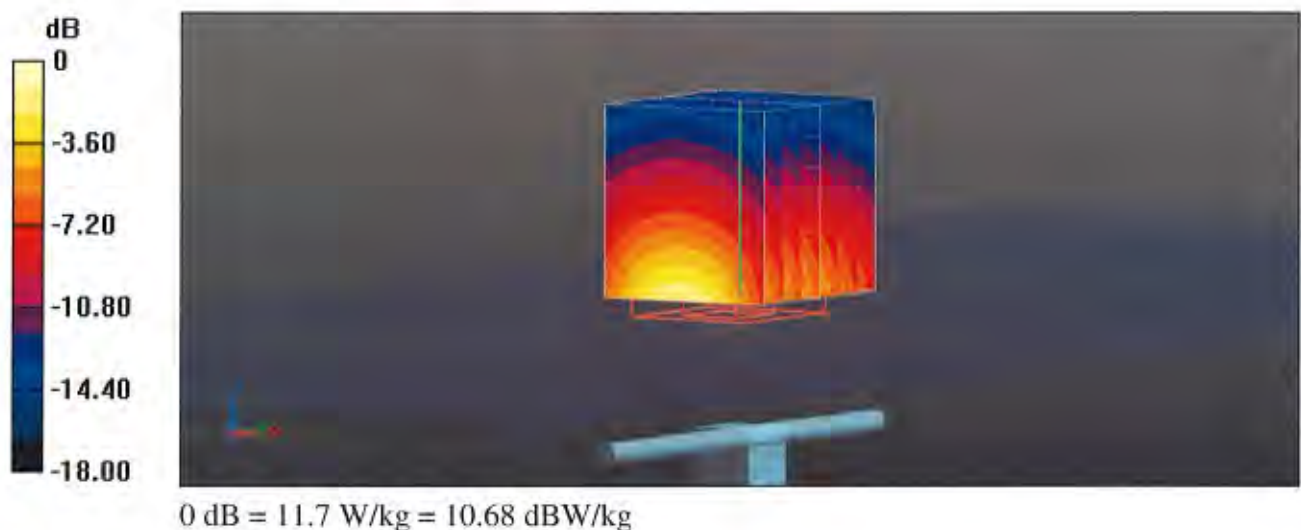
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.60 V/m; Power Drift = 0.03 dB

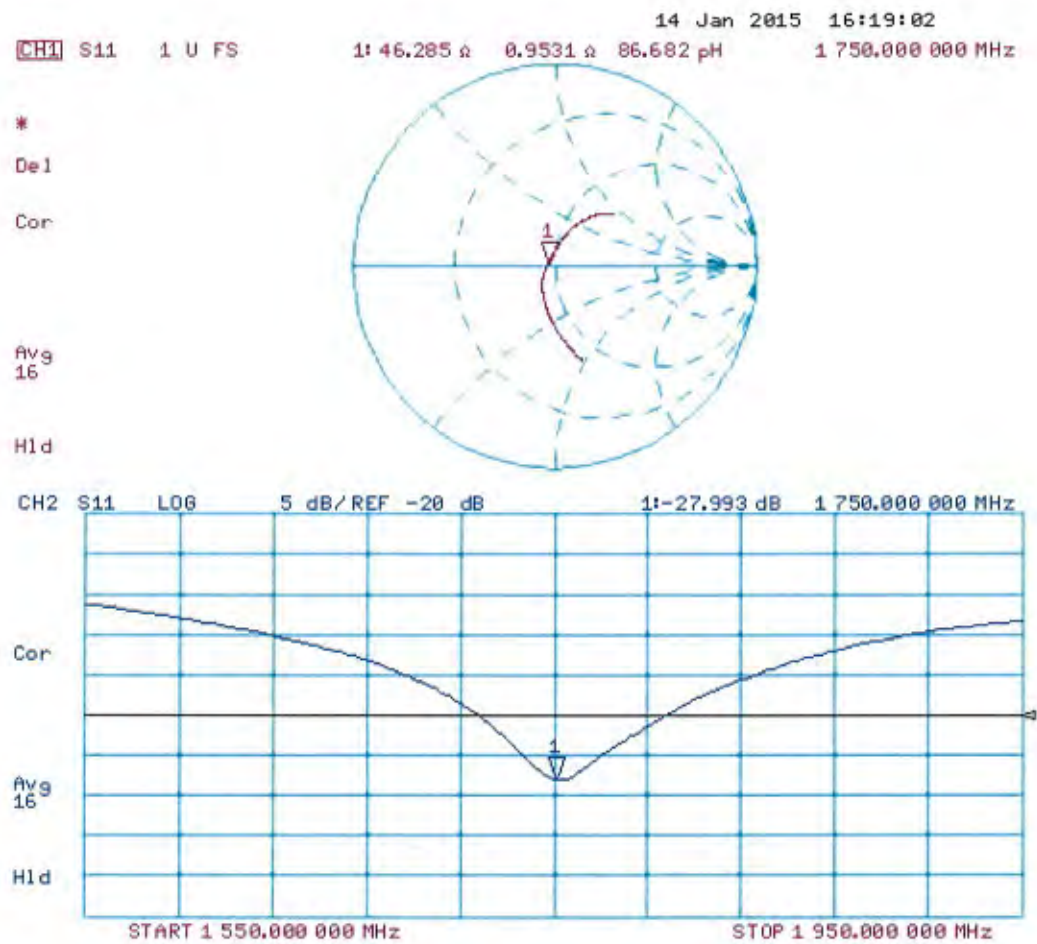
Peak SAR (extrapolated) = 16.1 W/kg

SAR(1 g) = 9.43 W/kg; SAR(10 g) = 5.07 W/kg

Maximum value of SAR (measured) = 11.7 W/kg



Impedance Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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

Client **TCC Microsoft**

Certificate No: **D1900V2-5d013_Jan15**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d013**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **January 14, 2015**

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by: **Name** **Michael Weber** **Function** **Laboratory Technician**

Signature

M. Weber

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

Katja Pokovic

Issued: January 15, 2015

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	$\Delta x, \Delta y, \Delta z = 5 \text{ mm}$	
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	$(22.0 \pm 0.2) \text{ °C}$	$39.4 \pm 6 \%$	$1.40 \text{ mho/m} \pm 6 \%$
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	10.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.7 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.2 W/kg $\pm$ 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	$(22.0 \pm 0.2) \text{ °C}$	$53.0 \pm 6 \%$	$1.51 \text{ mho/m} \pm 6 \%$
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	10.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	40.5 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.38 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.6 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$52.5 \Omega + 6.1 j\Omega$
Return Loss	- 23.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$48.1 \Omega + 6.9 j\Omega$
Return Loss	- 22.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 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	April 30, 2002

DASY5 Validation Report for Head TSL

Date: 14.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d013

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5, 5, 5); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

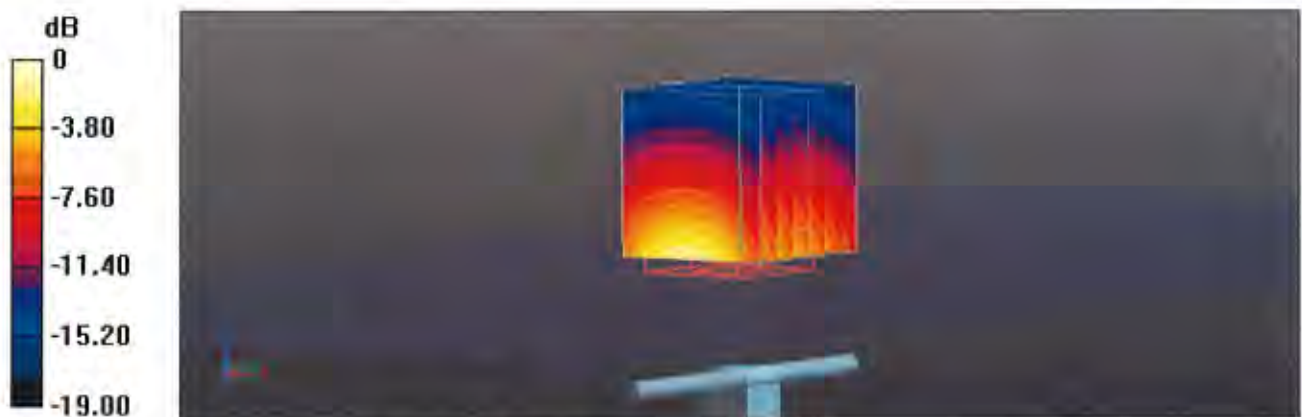
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.31 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 18.6 W/kg

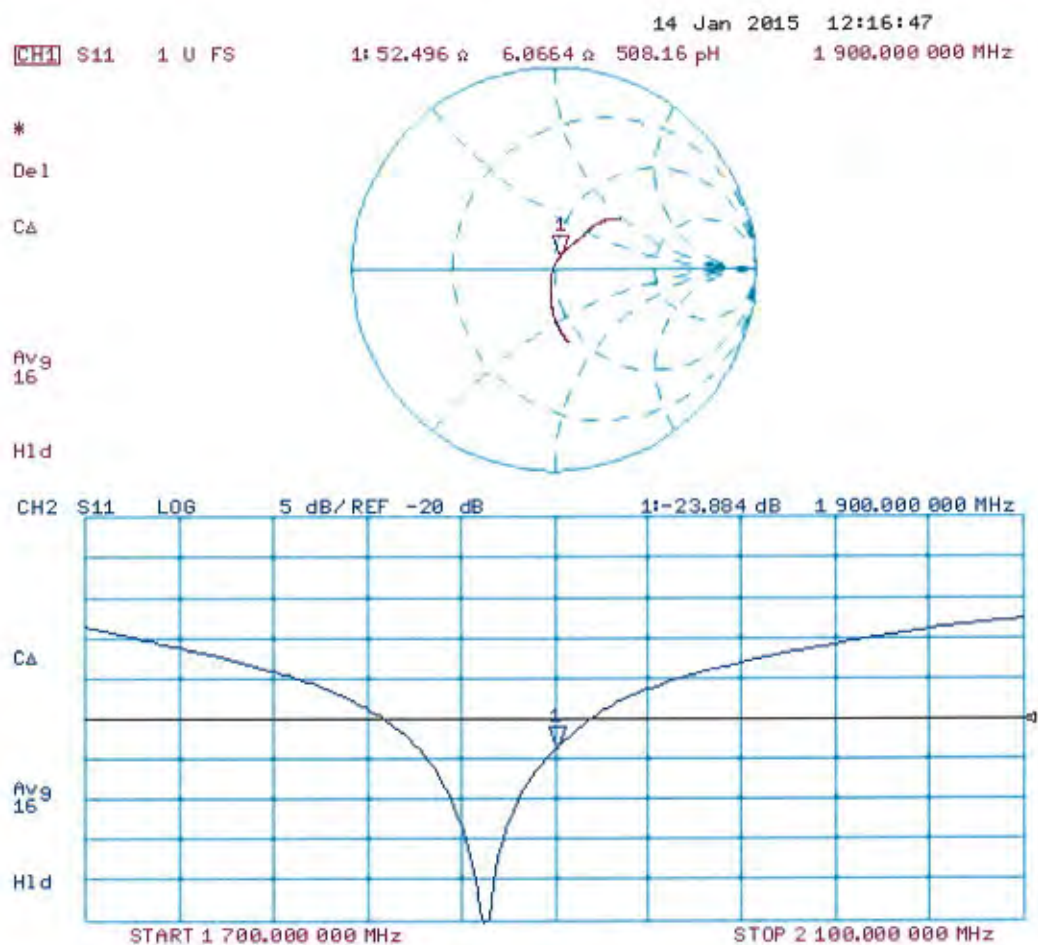
SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.3 W/kg

Maximum value of SAR (measured) = 12.8 W/kg



0 dB = 12.8 W/kg = 11.07 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d013

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.51$ S/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.65, 4.65, 4.65); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

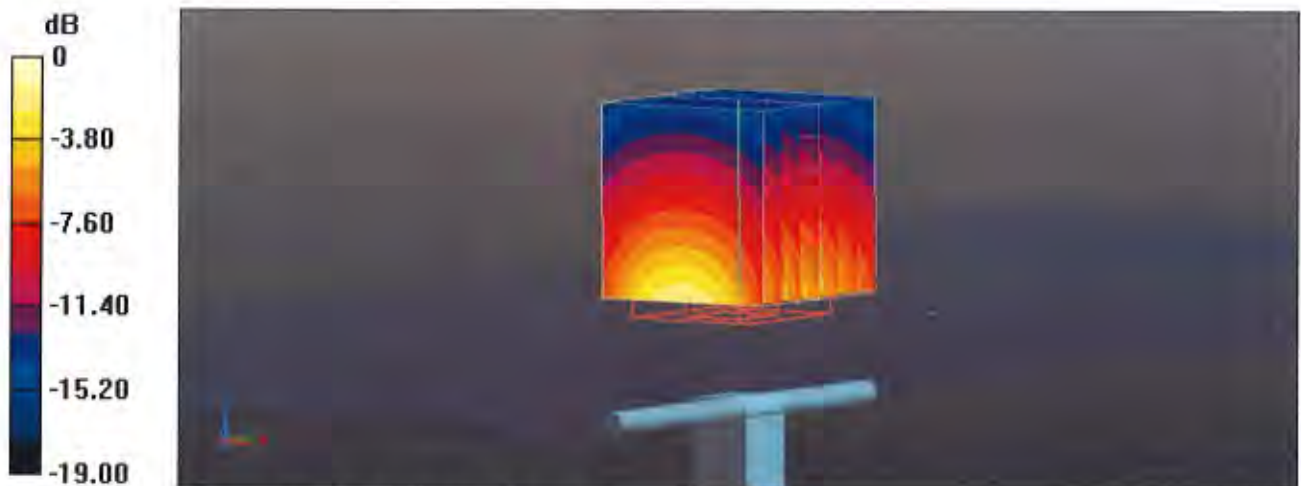
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.35 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 17.1 W/kg

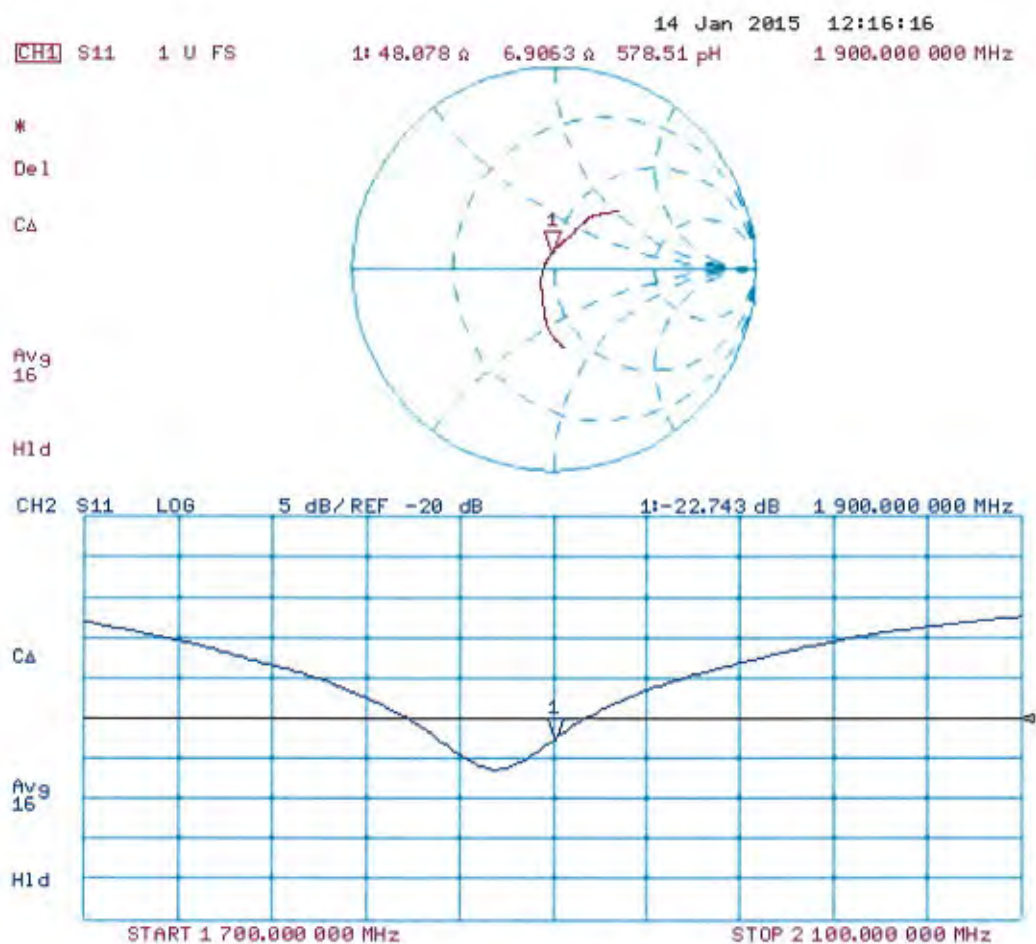
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.38 W/kg

Maximum value of SAR (measured) = 12.7 W/kg



0 dB = 12.7 W/kg = 11.04 dBW/kg

Impedance Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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

Client **TCC Microsoft**

Certificate No: **D2450V2-749_Jan15**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 749**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **January 15, 2015**

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

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

Issued: January 16, 2015

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
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	39.3 $\pm$ 6 %	1.88 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	13.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.1 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.4 W/kg $\pm$ 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	51.6 $\pm$ 6 %	2.03 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	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	50.8 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.96 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.5 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$52.8 \Omega + 3.4 j\Omega$
Return Loss	- 27.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$48.6 \Omega + 4.6 j\Omega$
Return Loss	- 26.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 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	December 01, 2003

DASY5 Validation Report for Head TSL

Date: 15.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 749

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.88$ S/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.54, 4.54, 4.54); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

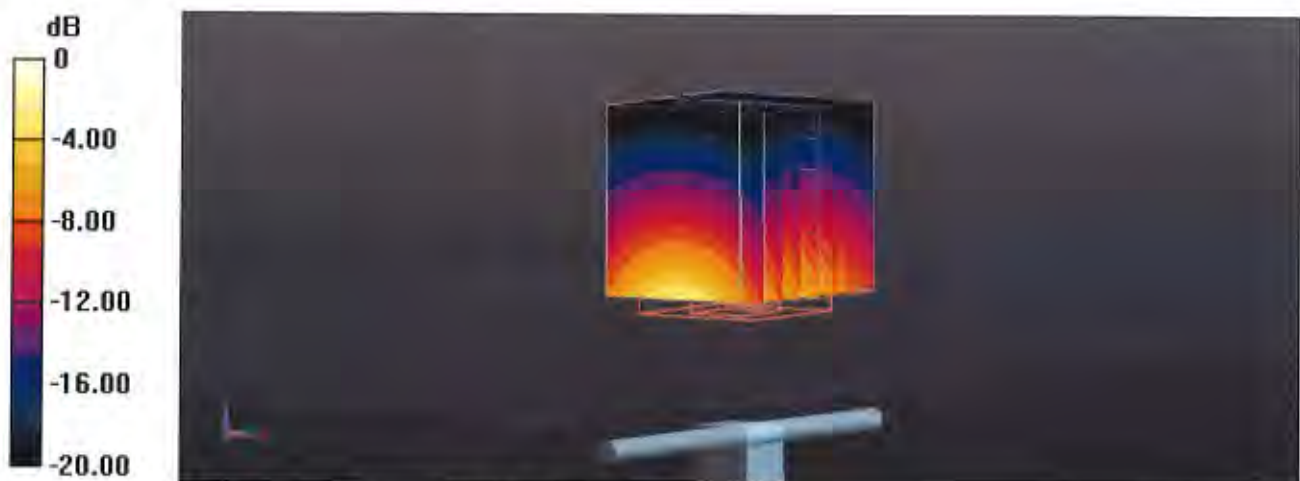
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.2 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 27.8 W/kg

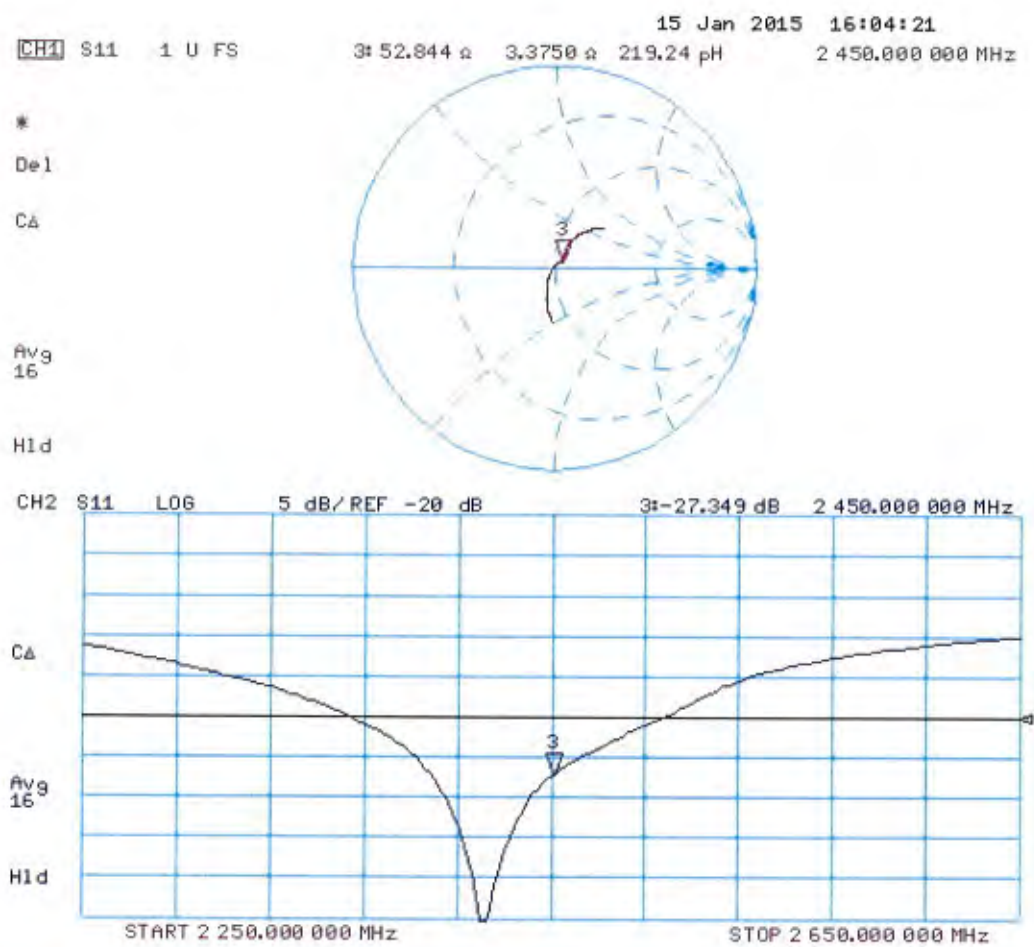
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.17 W/kg

Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg = 12.43 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 749

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.03$ S/m; $\epsilon_r = 51.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.32, 4.32, 4.32); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue 2/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

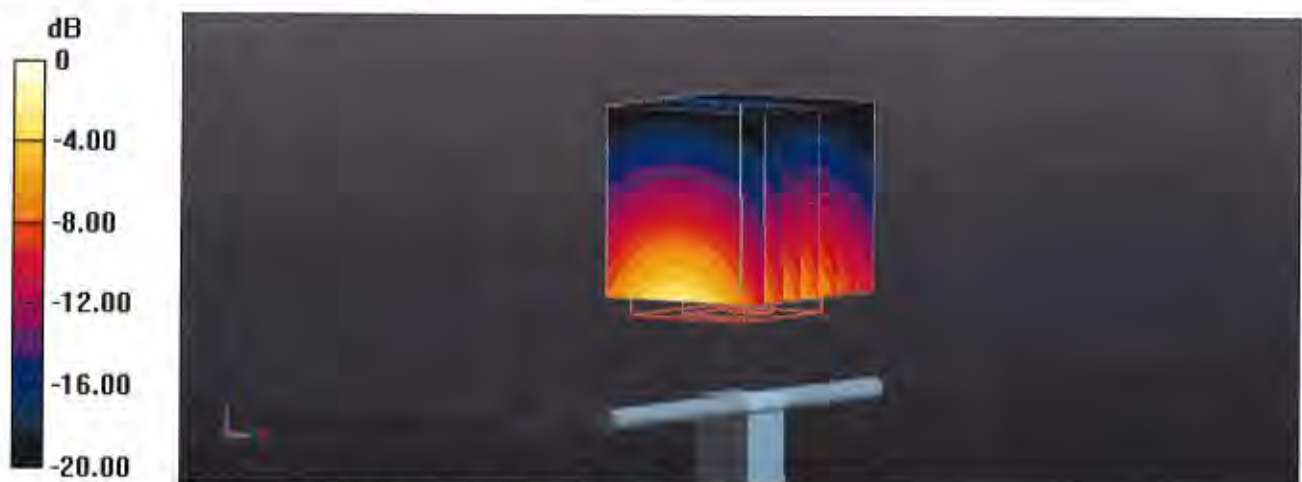
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.78 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 27.4 W/kg

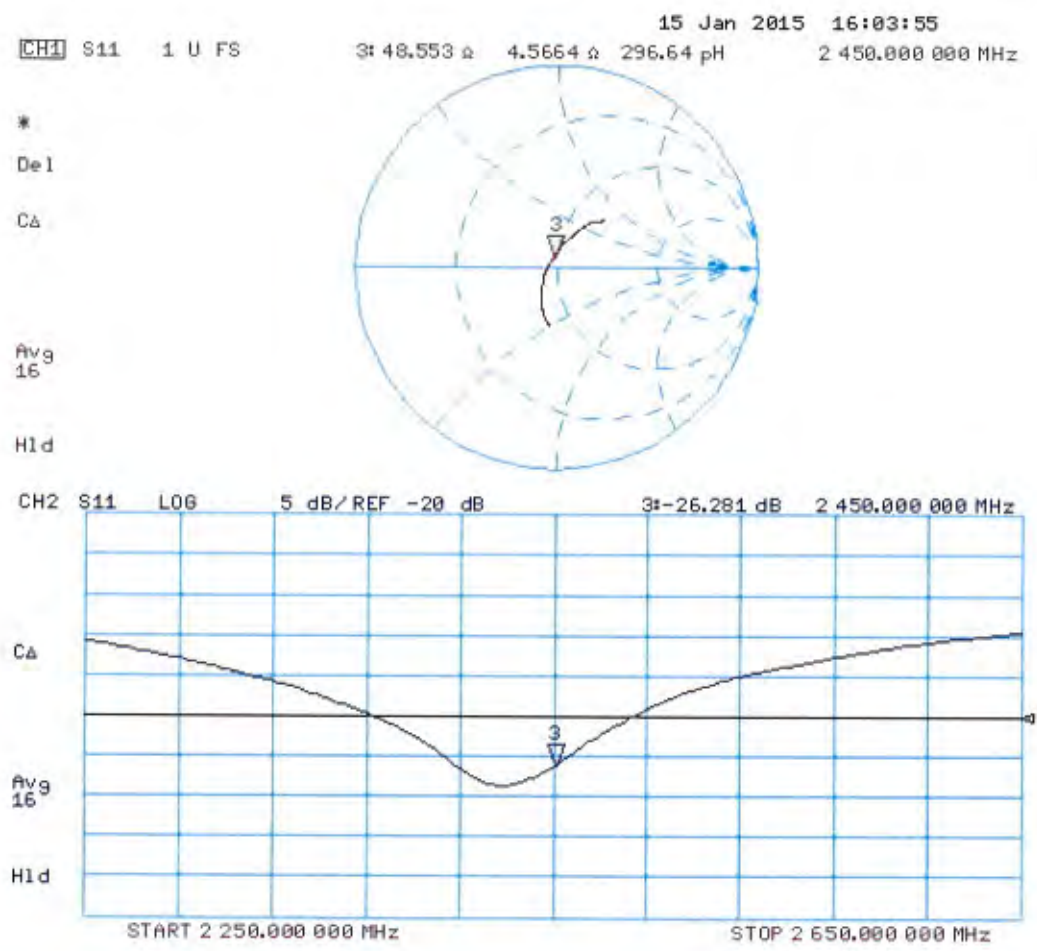
SAR(1 g) = 13 W/kg; SAR(10 g) = 5.96 W/kg

Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 12.28 dBW/kg

Impedance Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)

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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **TCC Microsoft**

Certificate No: **D2600V2-1056_Jan15**

CALIBRATION CERTIFICATE

Object **D2600V2 - SN: 1056**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **January 19, 2015**

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by: **Israe Elnaouq** Name: **Israe Elnaouq** Function: **Laboratory Technician**

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

Signature

Issued: January 19, 2015

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.8 $\pm$ 6 %	2.05 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	14.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	56.8 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.5 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	51.1 $\pm$ 6 %	2.21 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	14.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	55.9 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.8 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.4 Ω - 4.2 j Ω
Return Loss	- 27.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.9 Ω - 4.0 j Ω
Return Loss	- 25.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 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	August 14, 2012

DASY5 Validation Report for Head TSL

Date: 19.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1056

Communication System: UID 0 - CW; Frequency: 2600 MHz

Medium parameters used: $f = 2600$ MHz; $\sigma = 2.05$ S/m; $\epsilon_r = 38.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.49, 4.49, 4.49); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

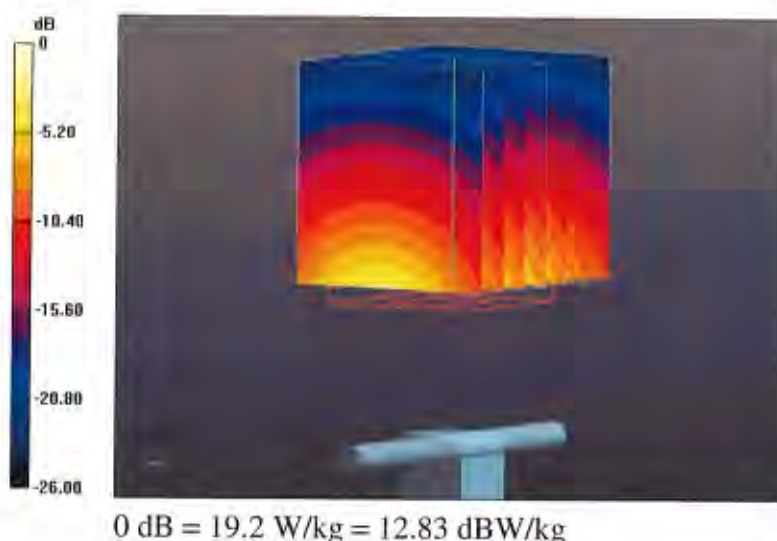
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.5 V/m; Power Drift = 0.04 dB

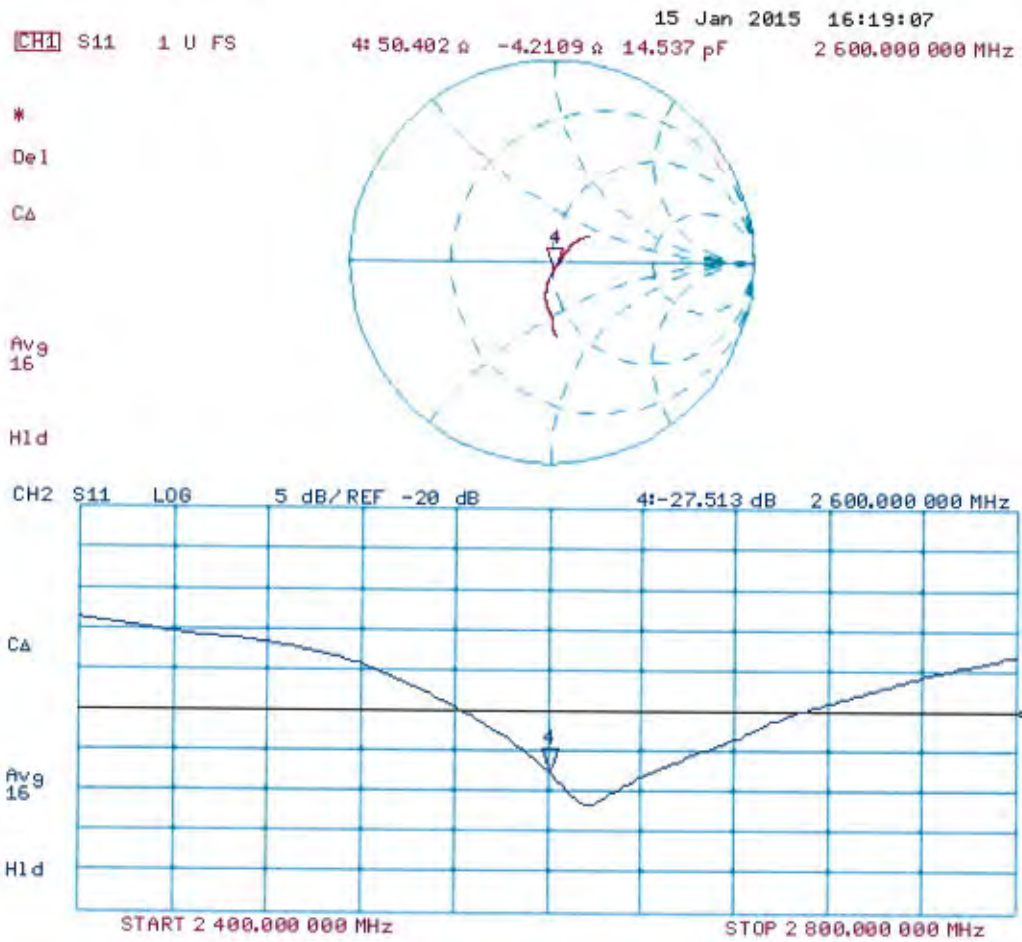
Peak SAR (extrapolated) = 30.7 W/kg

SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.44 W/kg

Maximum value of SAR (measured) = 19.2 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1056

Communication System: UID 0 - CW; Frequency: 2600 MHz

Medium parameters used: $f = 2600$ MHz; $\sigma = 2.21$ S/m; $\epsilon_r = 51.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.13, 4.13, 4.13); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

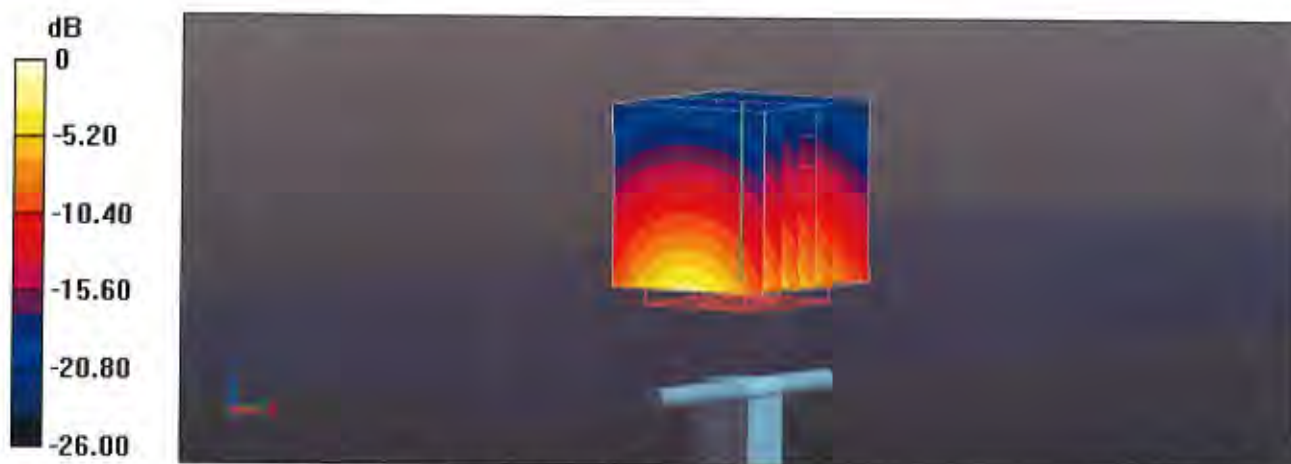
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.02 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 29.8 W/kg

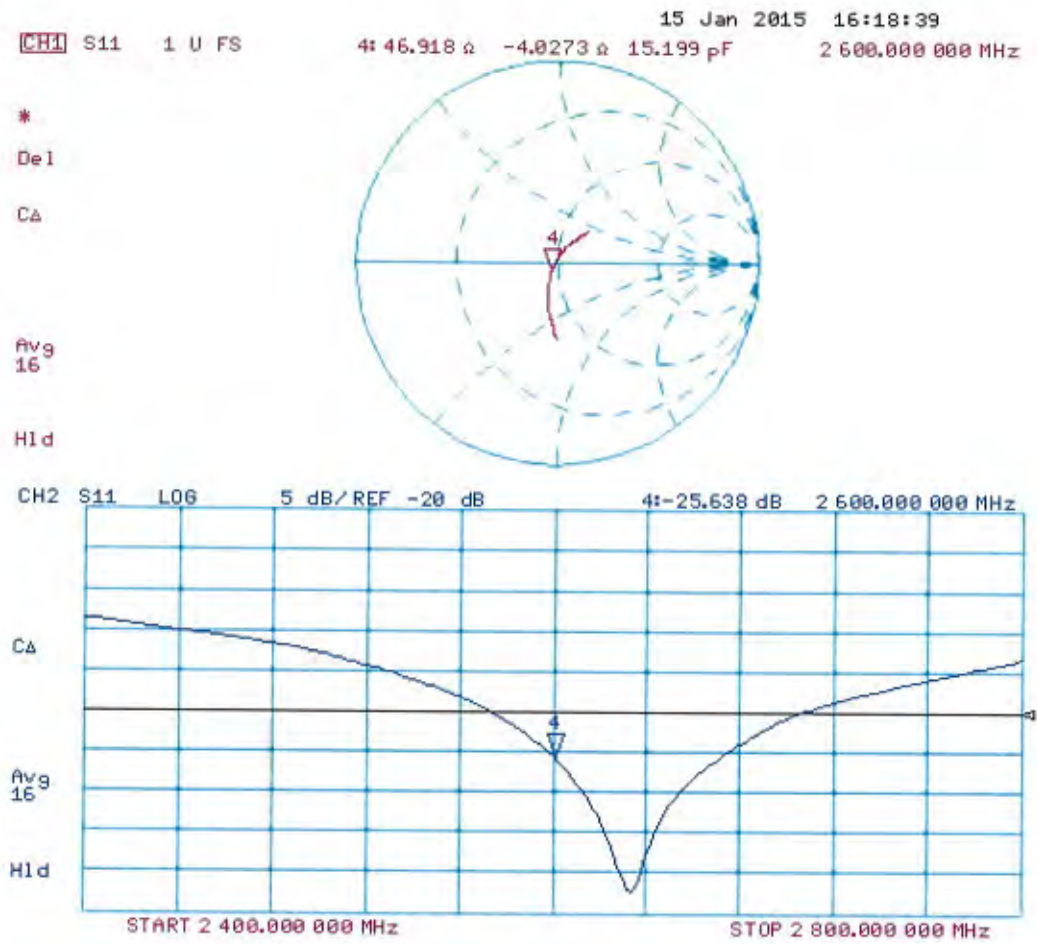
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.25 W/kg

Maximum value of SAR (measured) = 19.1 W/kg



0 dB = 19.1 W/kg = 12.81 dBW/kg

Impedance Measurement Plot for Body TSL





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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **TCC Microsoft**

Certificate No: **D5GHzV2-1048_Jan15**

CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN:1048**

Calibration procedure(s) **QA CAL-22.v2**
Calibration procedure for dipole validation kits between 3-6 GHz

Calibration date: **January 13, 2015**

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe EX3DV4	SN: 3503	30-Dec-14 (No. EX3-3503_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by: **Israe Elnaouq** Name: **Israe Elnaouq** Function: **Laboratory Technician**

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

Signature

Issued: January 14, 2015

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz $\pm$ 1 MHz 5300 MHz $\pm$ 1 MHz 5500 MHz $\pm$ 1 MHz 5600 MHz $\pm$ 1 MHz 5800 MHz $\pm$ 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	36.3 $\pm$ 6 %	4.56 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.89 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	79.0 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.5 W/kg $\pm$ 19.5 % (k=2)

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.1 ± 6 %	4.66 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	84.1 W / kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.1 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.9 ± 6 %	4.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.18 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	81.8 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.3 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.6 ± 6 %	4.97 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	81.4 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.1 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.4 ± 6 %	5.18 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.89 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	78.9 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.4 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.4 ± 6 %	5.42 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.42 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	74.4 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.8 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.2 ± 6 %	5.55 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.49 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	75.0 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.0 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.9 ± 6 %	5.82 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.85 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	78.7 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.18 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.9 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.7 ± 6 %	5.96 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.77 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	77.9 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.15 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.6 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.4 ± 6 %	6.25 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	76.0 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.9 W/kg ± 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	$50.9\ \Omega - 8.8\ j\Omega$
Return Loss	- 21.2 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	$51.0\ \Omega - 6.8\ j\Omega$
Return Loss	- 23.4 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	$55.9\ \Omega - 5.7\ j\Omega$
Return Loss	- 22.3 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	$58.5\ \Omega - 3.6\ j\Omega$
Return Loss	- 21.4 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	$57.6\ \Omega - 5.5\ j\Omega$
Return Loss	- 21.2 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	$53.8\ \Omega + 7.1\ j\Omega$
Return Loss	- 22.2 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	$53.7\ \Omega + 4.0\ j\Omega$
Return Loss	- 25.6 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	$50.4\ \Omega + 7.3\ j\Omega$
Return Loss	- 22.7 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	$47.9 \Omega + 8.6 j\Omega$
Return Loss	- 20.9 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	$51.4 \Omega + 9.0 j\Omega$
Return Loss	- 21.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.193 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	June 09, 2006

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1048

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.56$ S/m; $\epsilon_r = 36.3$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5300$ MHz; $\sigma = 4.66$ S/m; $\epsilon_r = 36.1$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5500$ MHz; $\sigma = 4.86$ S/m; $\epsilon_r = 35.9$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5600$ MHz; $\sigma = 4.97$ S/m; $\epsilon_r = 35.6$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 5.18$ S/m; $\epsilon_r = 35.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.51, 5.51, 5.51); Calibrated: 30.12.2014, ConvF(5.21, 5.21, 5.21); Calibrated: 30.12.2014, ConvF(5.12, 5.12, 5.12); Calibrated: 30.12.2014, ConvF(4.92, 4.92, 4.92); Calibrated: 30.12.2014, ConvF(4.9, 4.9, 4.9); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 65.32 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 28.9 W/kg

SAR(1 g) = 7.89 W/kg; SAR(10 g) = 2.25 W/kg

Maximum value of SAR (measured) = 17.8 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66.44 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 31.7 W/kg

SAR(1 g) = 8.41 W/kg; SAR(10 g) = 2.41 W/kg

Maximum value of SAR (measured) = 19.2 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.59 V/m; Power Drift = 0.05 dB

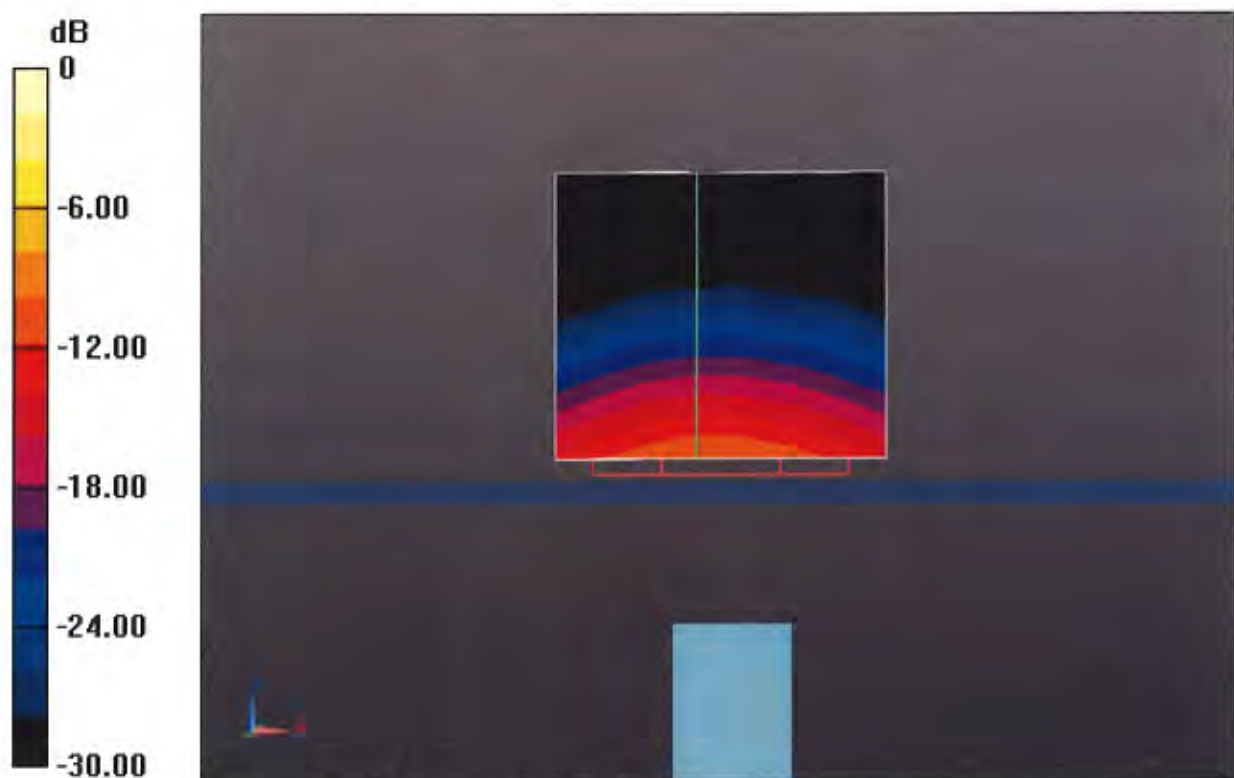
Peak SAR (extrapolated) = 32.3 W/kg

SAR(1 g) = 8.18 W/kg; SAR(10 g) = 2.33 W/kg

Maximum value of SAR (measured) = 19.1 W/kg

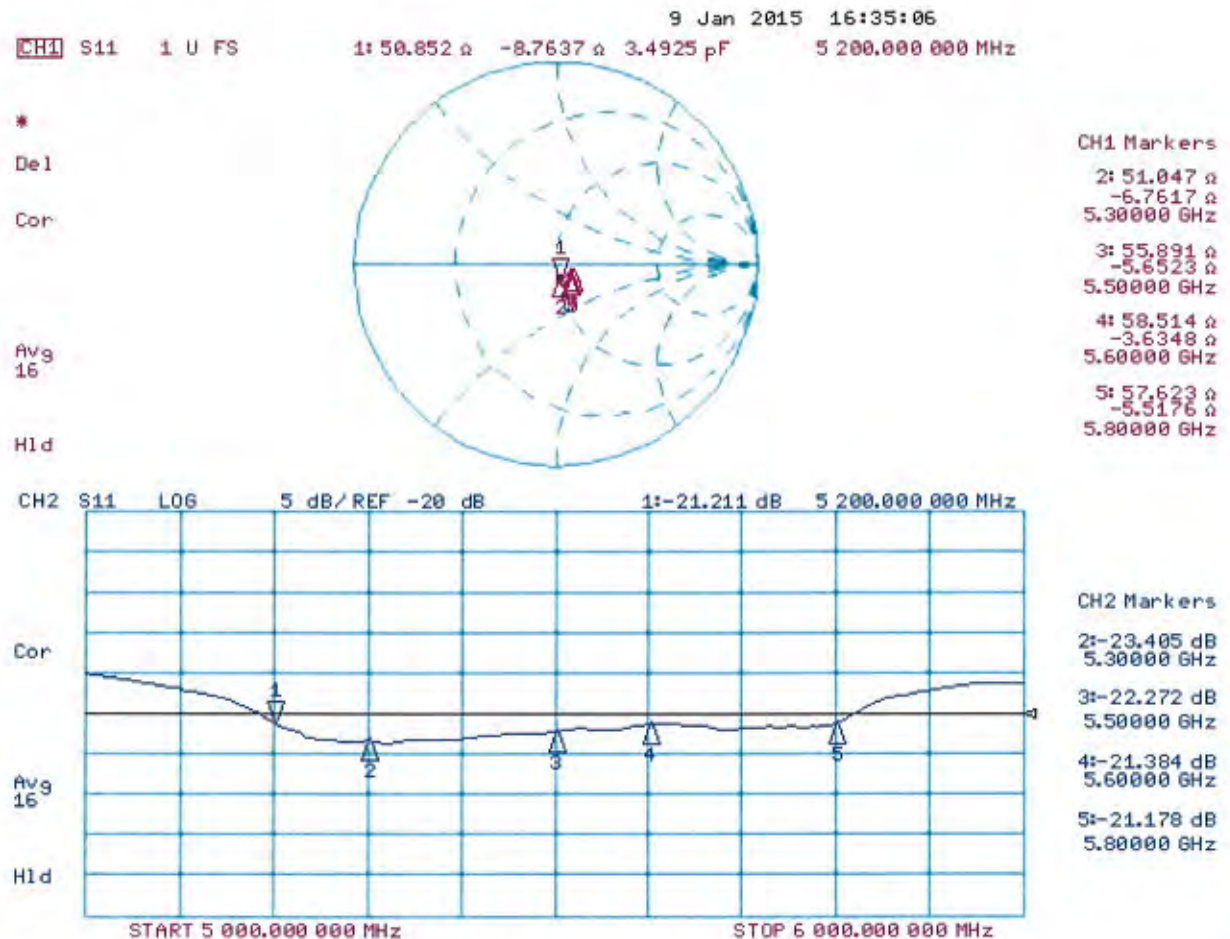
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.16 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 32.3 W/kg
SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.31 W/kg
Maximum value of SAR (measured) = 19.1 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 61.81 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 32.8 W/kg
SAR(1 g) = 7.89 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 19.0 W/kg



0 dB = 17.8 W/kg = 12.50 dBW/kg

Impedance Measurement Plot for Head TSL



Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1048

Communication System: UJD 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.42$ S/m; $\epsilon_r = 49.4$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5300$ MHz; $\sigma = 5.55$ S/m; $\epsilon_r = 49.2$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5500$ MHz; $\sigma = 5.82$ S/m; $\epsilon_r = 48.9$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5600$ MHz; $\sigma = 5.96$ S/m; $\epsilon_r = 48.7$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 6.25$ S/m; $\epsilon_r = 48.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.95, 4.95, 4.95); Calibrated: 30.12.2014, ConvF(4.78, 4.78, 4.78); Calibrated: 30.12.2014, ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2014, ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2014, ConvF(4.32, 4.32, 4.32); Calibrated: 30.12.2014;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 58.44 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 29.2 W/kg

SAR(1 g) = 7.42 W/kg; SAR(10 g) = 2.07 W/kg

Maximum value of SAR (measured) = 17.0 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 58.11 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 30.3 W/kg

SAR(1 g) = 7.49 W/kg; SAR(10 g) = 2.09 W/kg

Maximum value of SAR (measured) = 17.5 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 58.45 V/m; Power Drift = 0.03 dB

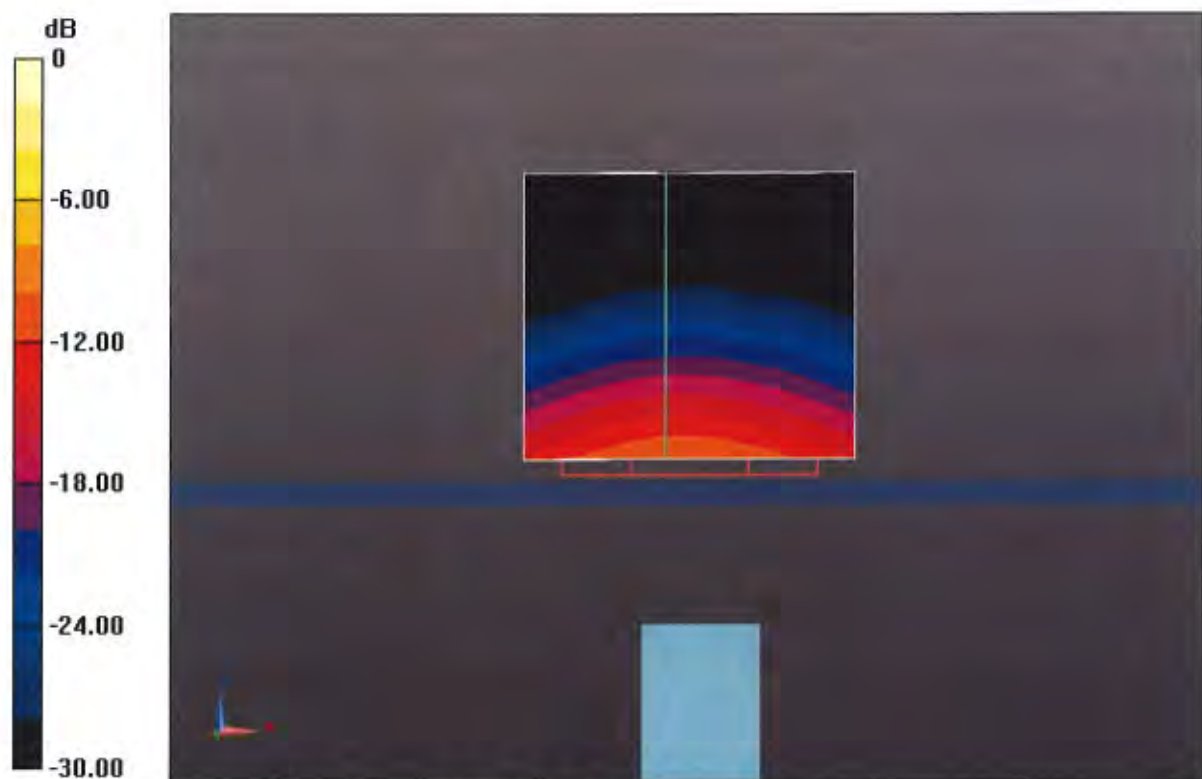
Peak SAR (extrapolated) = 33.7 W/kg

SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.18 W/kg

Maximum value of SAR (measured) = 18.6 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.07 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 34.4 W/kg
SAR(1 g) = 7.77 W/kg; SAR(10 g) = 2.15 W/kg
Maximum value of SAR (measured) = 18.8 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 55.75 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 35.6 W/kg
SAR(1 g) = 7.58 W/kg; SAR(10 g) = 2.09 W/kg
Maximum value of SAR (measured) = 18.5 W/kg



0 dB = 17.0 W/kg = 12.30 dBW/kg

Impedance Measurement Plot for Body TSL

