

WCDMA Band 4 Head

Date: 2023-11-17

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used (interpolated): $f = 1732.6$ MHz; $\sigma = 1.368$ S/m; $\epsilon_r = 39.377$; $\rho = 1000$ kg/m³

Communication System: UID 0, WCDMA (0) Frequency: 1732.6 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

Right Cheek Middle/Area Scan (61x61x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 1.49 W/kg

Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 13.20 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.850 W/kg; SAR(10 g) = 0.467 W/kg

Maximum value of SAR (measured) = 1.09 W/kg

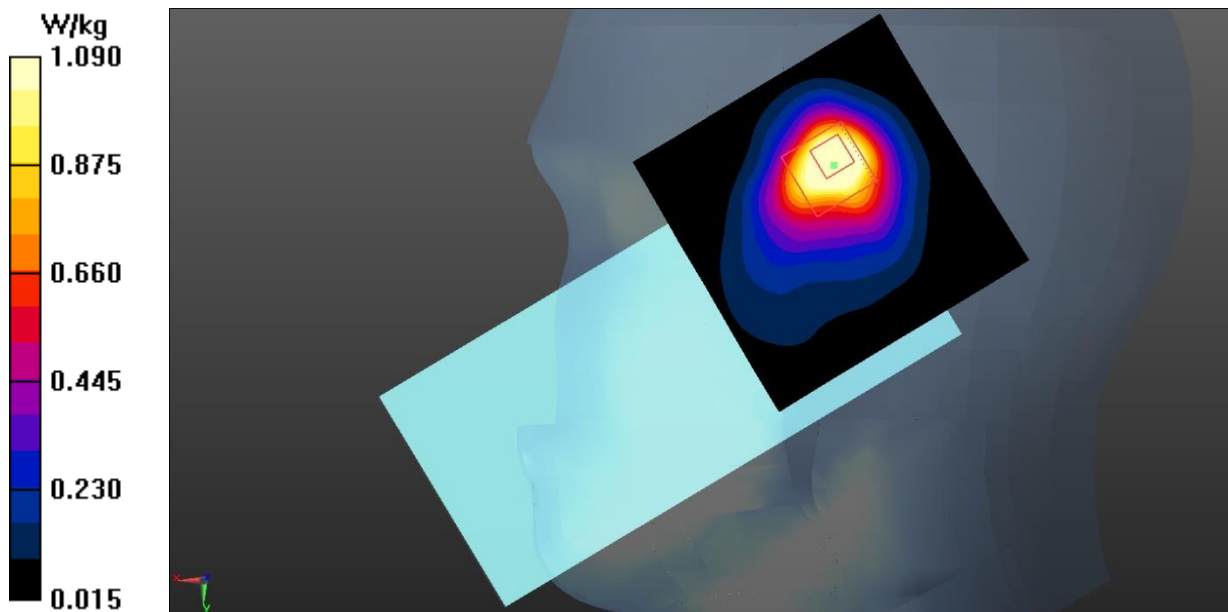


Fig.7 WCDMA Band 4 Head

WCDMA Band 4 Body

Date: 2023-11-17

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used (interpolated): $f = 1712.4$ MHz; $\sigma = 1.35$ S/m; $\epsilon_r = 39.456$; $\rho = 1000$ kg/m³

Communication System: UID 0, WCDMA (0) Frequency: 1712.4 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

Bottom Side Low/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

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

Reference Value = 23.05 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.834 W/kg; SAR(10 g) = 0.458 W/kg

Maximum value of SAR (measured) = 1.11 W/kg

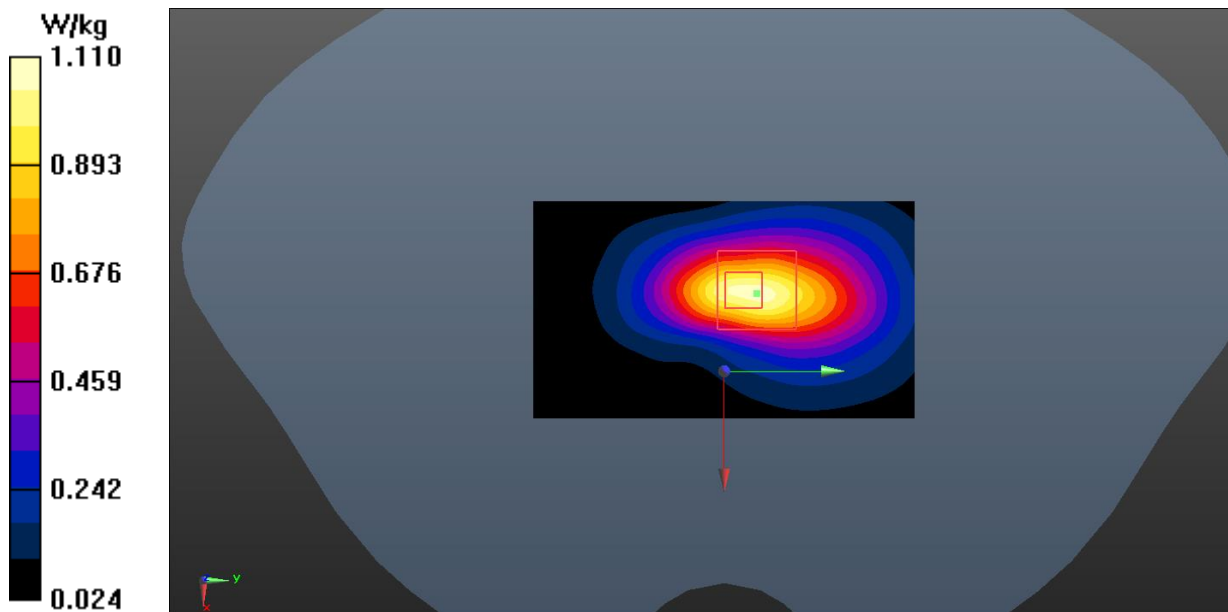


Fig.8 WCDMA Band 4 Body

WCDMA Band 5 Head

Date: 2023-11-12

Electronics: DAE4 Sn1790

Medium: Head 835MHz

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.91$ S/m; $\epsilon_r = 40.828$; $\rho = 1000$ kg/m³

Communication System: UID 0, WCDMA (0) Frequency: 836.6 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

Right Cheek Middle/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.15 W/kg

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

Reference Value = 18.91 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.77 W/kg

SAR(1 g) = 0.789 W/kg; SAR(10 g) = 0.463 W/kg

Maximum value of SAR (measured) = 1.16 W/kg

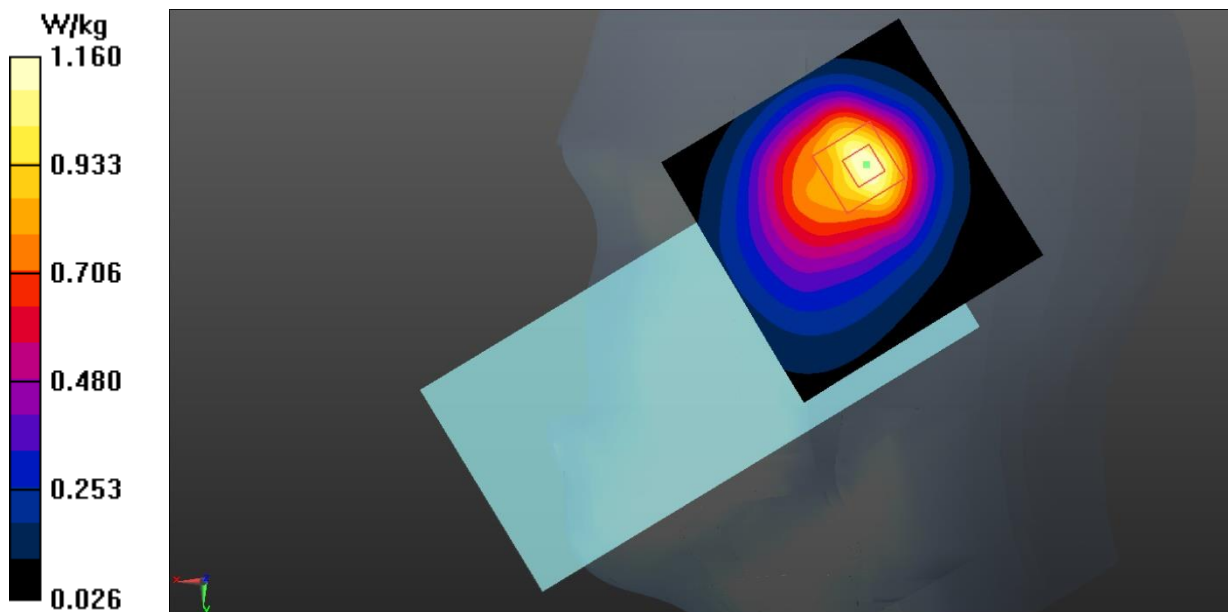


Fig.9 WCDMA Band 5 Head

WCDMA Band 5 Body

Date: 2023-11-12

Electronics: DAE4 Sn1790

Medium: Head 835MHz

Medium parameters used (interpolated): $f = 826.4$ MHz; $\sigma = 0.901$ S/m; $\epsilon_r = 40.951$; $\rho = 1000$ kg/m³

Communication System: UID 0, WCDMA (0) Frequency: 826.4 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

Rear Side Low/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

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

Reference Value = 10.13 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.452 W/kg

SAR(1 g) = 0.258 W/kg; SAR(10 g) = 0.154 W/kg

Maximum value of SAR (measured) = 0.353 W/kg

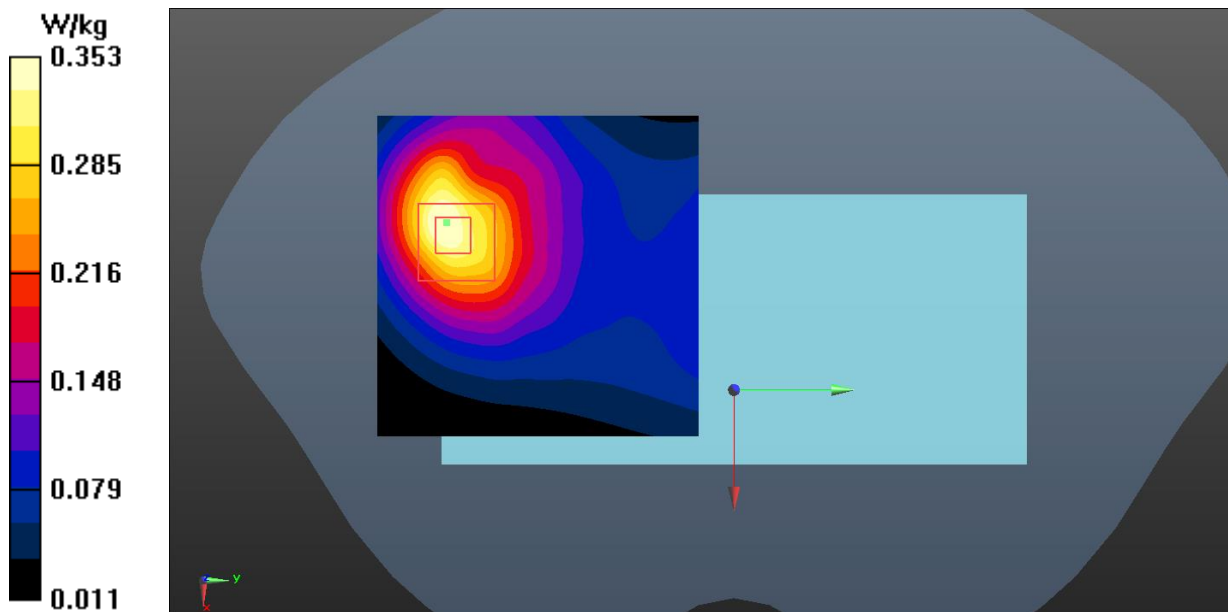


Fig.10 WCDMA Band 5 Body

LTE Band 2 Head

Date: 2023-11-24

Electronics: DAE4 Sn1790

Medium: Head 1900MHz

Medium parameters used: $f = 1860$ MHz; $\sigma = 1.376$ S/m; $\epsilon_r = 39.728$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 1860 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.55, 8.55, 8.55)

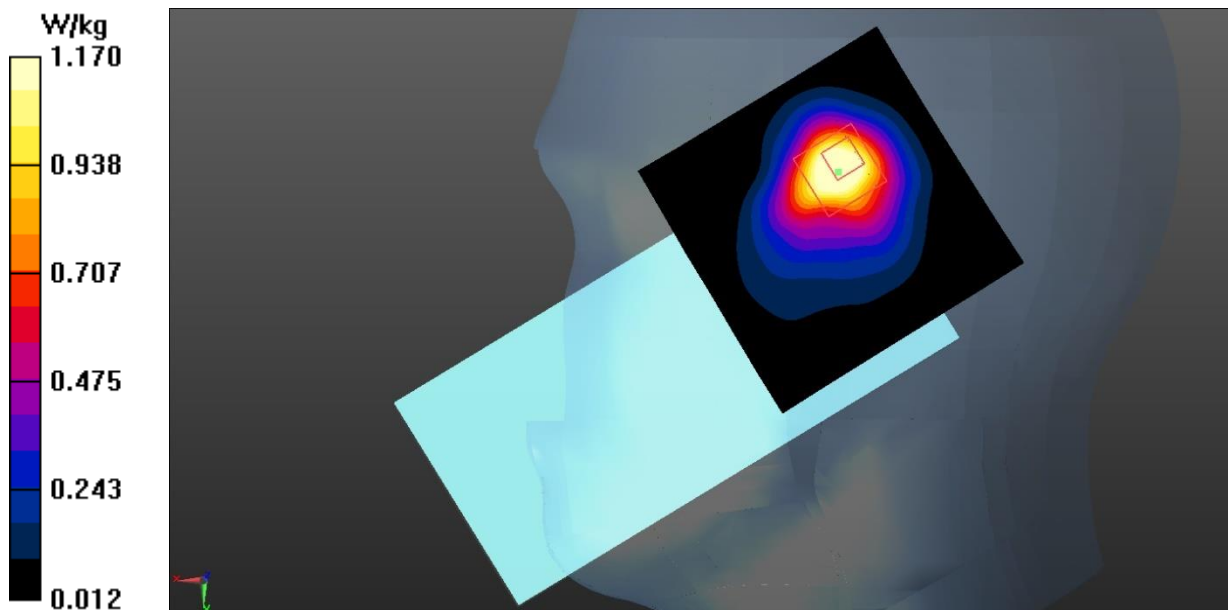
Right Cheek Low 100RB/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.46 W/kg**Right Cheek Low 100RB/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.22 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.56 W/kg

SAR(1 g) = 0.815 W/kg; SAR(10 g) = 0.434 W/kg

Maximum value of SAR (measured) = 1.17 W/kg

**Fig.11 LTE Band 2 Head**

LTE Band 2 Body

Date: 2023-11-24

Electronics: DAE4 Sn1790

Medium: Head 1900MHz

Medium parameters used: $f = 1860$ MHz; $\sigma = 1.376$ S/m; $\epsilon_r = 39.728$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 1860 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.55, 8.55, 8.55)

Top Side Low 1RB0/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.03 W/kg

Top Side Low 1RB0/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.70 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.34 W/kg

SAR(1 g) = 0.767 W/kg; SAR(10 g) = 0.429 W/kg

Maximum value of SAR (measured) = 1.07 W/kg

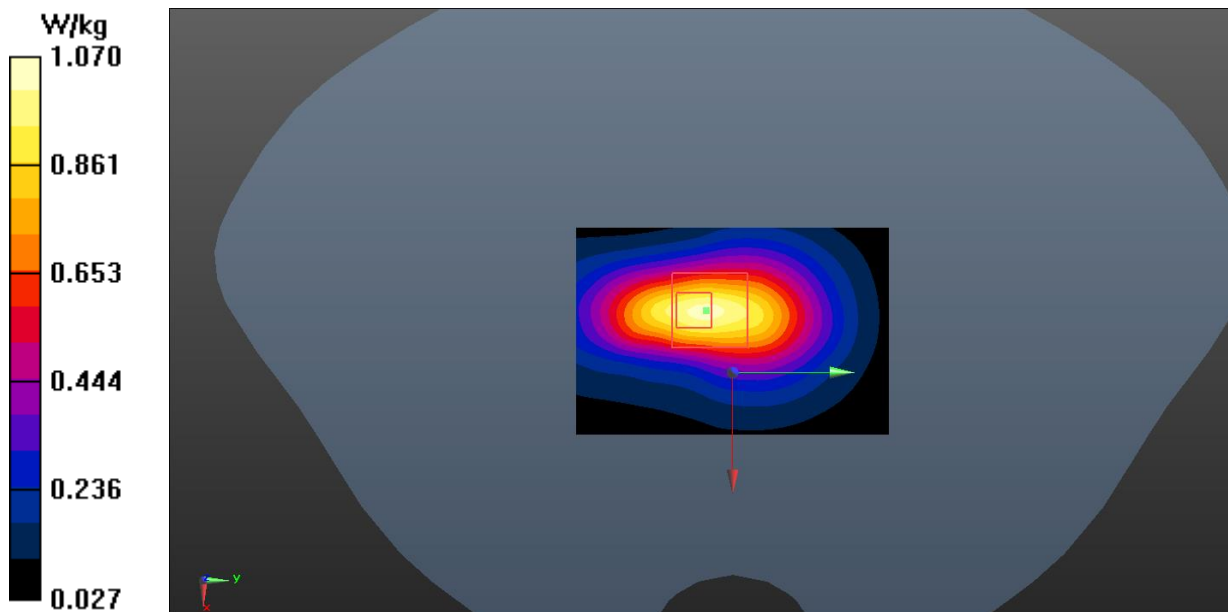


Fig.12 LTE Band 2 Body

LTE Band 4 Head

Date: 2023-11-17

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used: $f = 1720$ MHz; $\sigma = 1.357$ S/m; $\epsilon_r = 39.425$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 1720 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

Right Cheek Low 1RB99/Area Scan (61x61x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 1.27 W/kg**Right Cheek Low 1RB99/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 6.077 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 2.01 W/kg

SAR(1 g) = 0.884 W/kg; SAR(10 g) = 0.399 W/kg

Maximum value of SAR (measured) = 1.24 W/kg

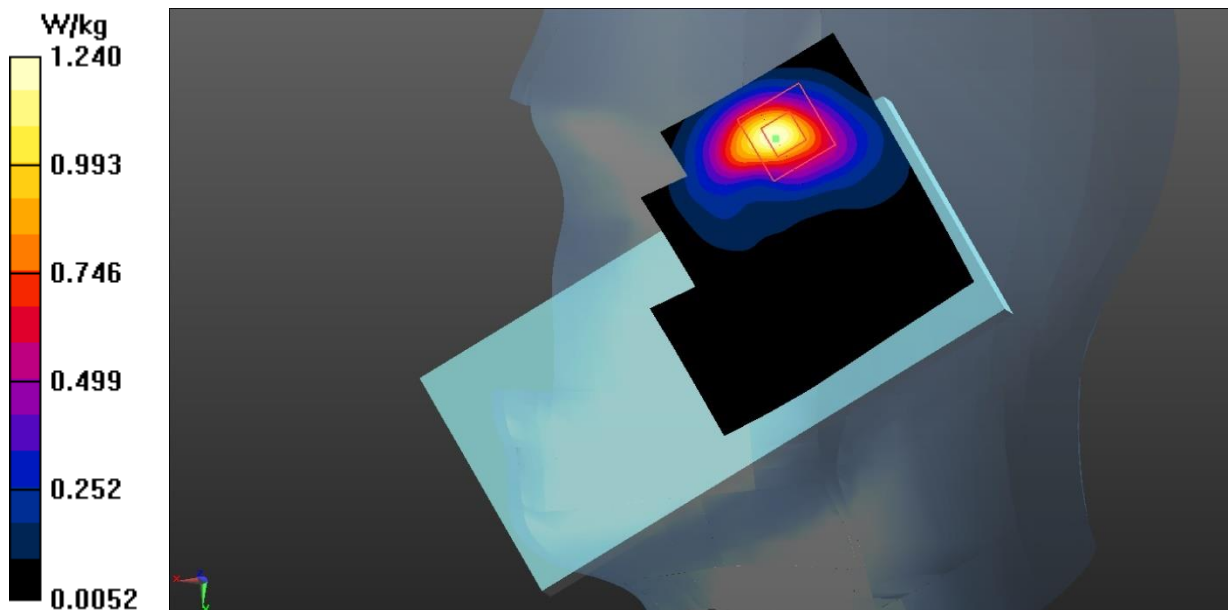


Fig.13 LTE Band 4 Head

LTE Band 4 Body

Date: 2023-11-17

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used (interpolated): $f = 1745$ MHz; $\sigma = 1.379$ S/m; $\epsilon_r = 39.329$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 1745 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

Left Side High 1RB99/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.970 W/kg

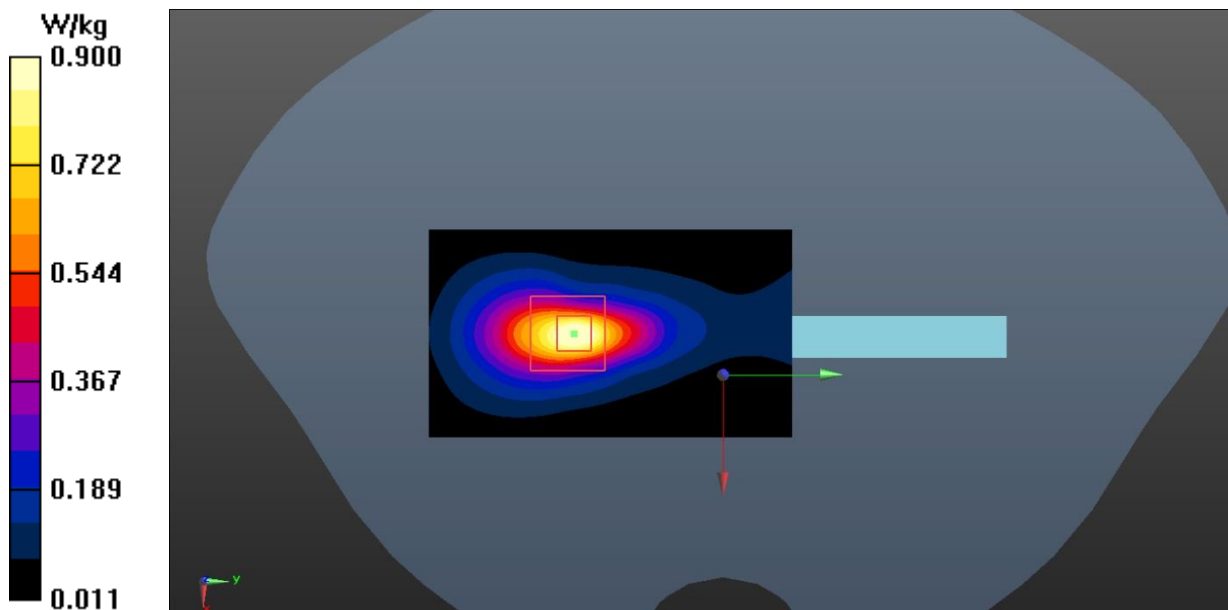
Left Side High 1RB99/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.634 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.706 W/kg; SAR(10 g) = 0.349 W/kg

Maximum value of SAR (measured) = 0.900 W/kg

**Fig.14 LTE Band 4 Body**

LTE Band 7 Head

Date: 2023-11-21

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used: $f = 2560$ MHz; $\sigma = 1.958$ S/m; $\epsilon_r = 38.288$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 2560 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

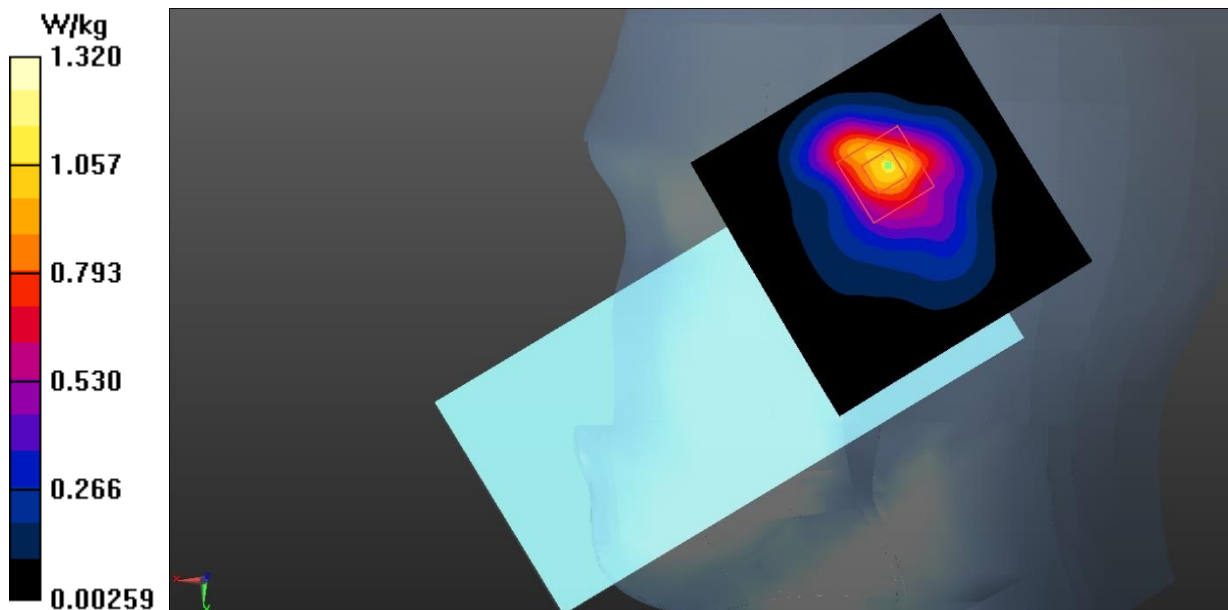
Right Cheek High 100RB/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.08 W/kg**Right Cheek High 100RB/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.88 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 1.79 W/kg

SAR(1 g) = 0.795 W/kg; SAR(10 g) = 0.344 W/kg

Maximum value of SAR (measured) = 1.32 W/kg

**Fig.15 LTE Band 7 Head**

LTE Band 7 Body

Date: 2023-11-21

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used: $f = 2560$ MHz; $\sigma = 1.958$ S/m; $\epsilon_r = 38.288$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 2560 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

Left Side High 1RB99/Area Scan (61x91x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 1.02 W/kg

Left Side High 1RB99/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 7.853 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.44 W/kg

SAR(1 g) = 0.721 W/kg; SAR(10 g) = 0.333 W/kg

Maximum value of SAR (measured) = 1.10 W/kg

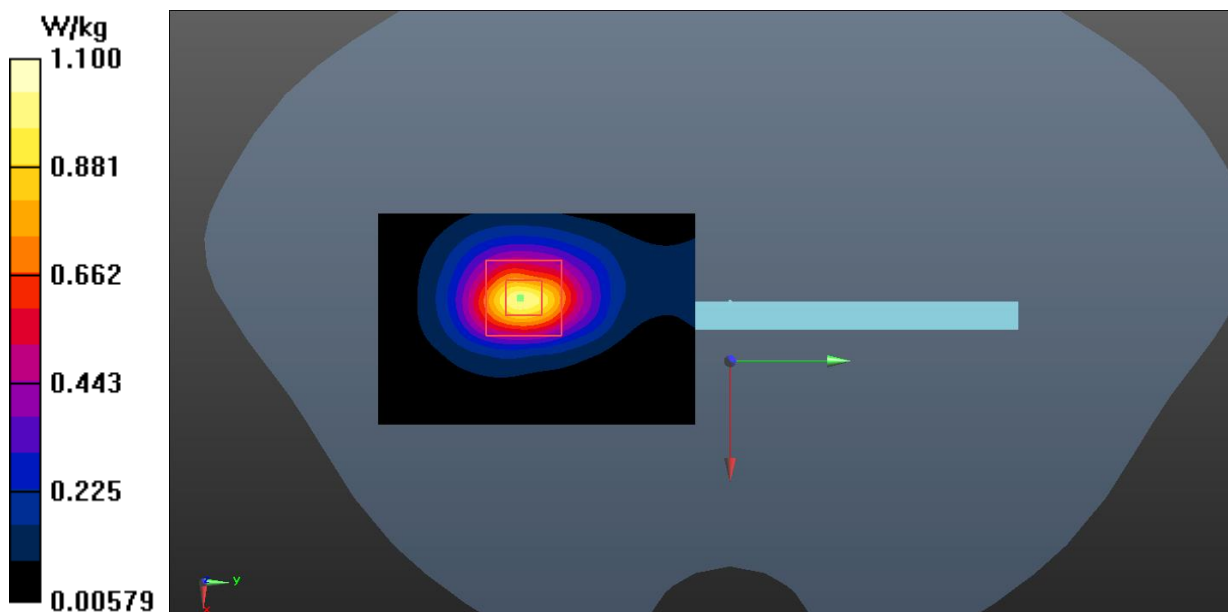


Fig.16 LTE Band 7 Body

LTE Band 12 Head

Date: 2023-11-15

Electronics: DAE4 Sn1790

Medium: Head 750MHz

Medium parameters used: $f = 708 \text{ MHz}$; $\sigma = 0.852 \text{ S/m}$; $\epsilon_r = 43.148$; $\rho = 1000 \text{ kg/m}^3$

Communication System: UID 0, LTE_FDD (0) Frequency: 707.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

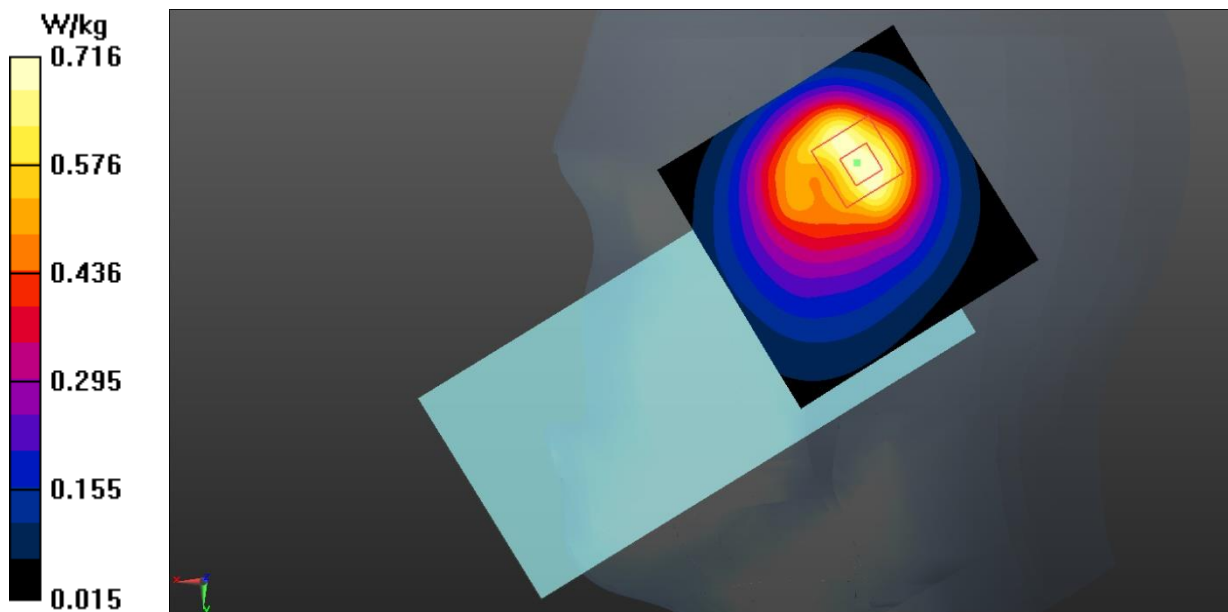
Right Cheek Middle 1RB24/Area Scan (61x61x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.589 W/kg**Right Cheek Middle 1RB24/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$,
 $dz=5\text{mm}$

Reference Value = 15.07 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.446 W/kg; SAR(10 g) = 0.237 W/kg

Maximum value of SAR (measured) = 0.716 W/kg

**Fig.17 LTE Band 12 Head**

LTE Band 12 Body

Date: 2023-11-15

Electronics: DAE4 Sn1790

Medium: Head 750MHz

Medium parameters used (interpolated): $f = 711$ MHz; $\sigma = 0.855$ S/m; $\epsilon_r = 43.112$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 711 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

Left Side High 1RB24/Area Scan (41x81x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.209 W/kg

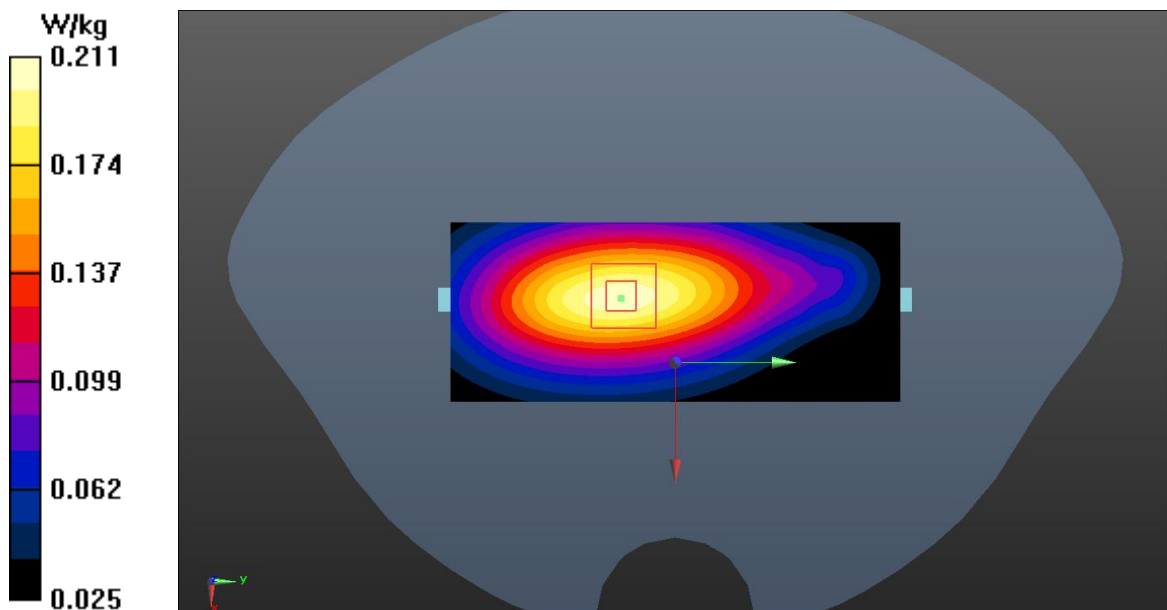
Left Side High 1RB24/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 14.58 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.269 W/kg

SAR(1 g) = 0.184 W/kg; SAR(10 g) = 0.127 W/kg

Maximum value of SAR (measured) = 0.211 W/kg

**Fig.18 LTE Band 12 Body**

LTE Band 13 Head

Date: 2023-11-15

Electronics: DAE4 Sn1790

Medium: Head 750MHz

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.898 \text{ S/m}$; $\epsilon_r = 42.26$; $\rho = 1000 \text{ kg/m}^3$

Communication System: UID 0, LTE_FDD (0) Frequency: 782 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

Right Cheek Low 1RB24/Area Scan (61x61x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.804 W/kg**Right Cheek Low 1RB24/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.75 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.34 W/kg

SAR(1 g) = 0.566 W/kg; SAR(10 g) = 0.317 W/kg

Maximum value of SAR (measured) = 0.888 W/kg

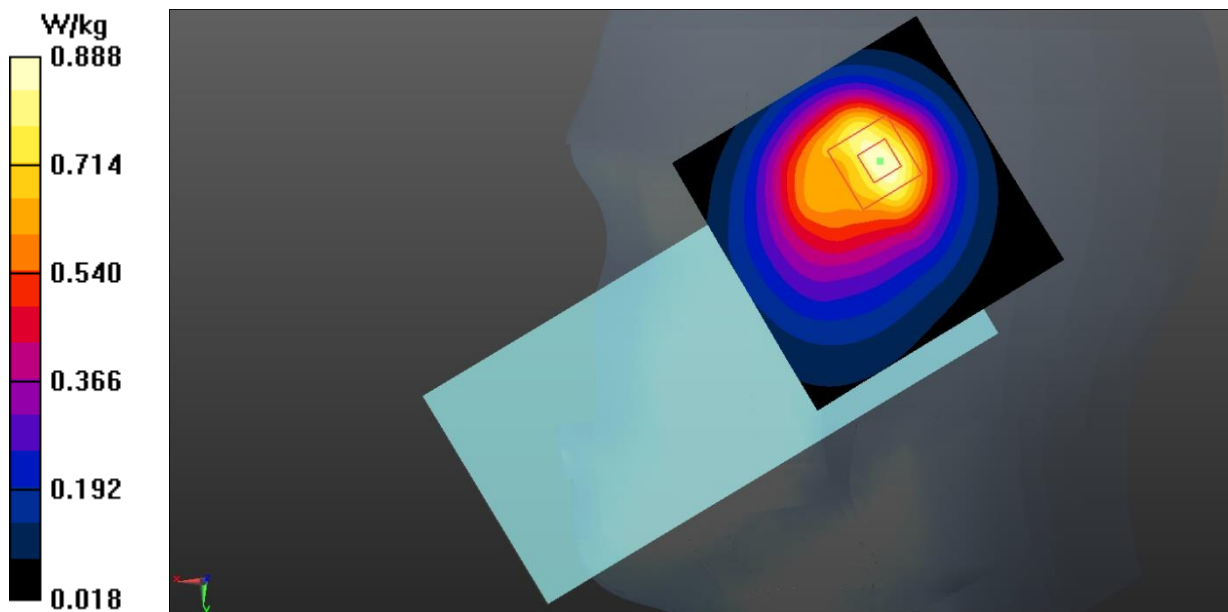


Fig.19 LTE Band 13 Head

LTE Band 13 Body

Date: 2023-11-15

Electronics: DAE4 Sn1790

Medium: Head 750MHz

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.898 \text{ S/m}$; $\epsilon_r = 42.26$; $\rho = 1000 \text{ kg/m}^3$

Communication System: UID 0, LTE_FDD (0) Frequency: 782 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

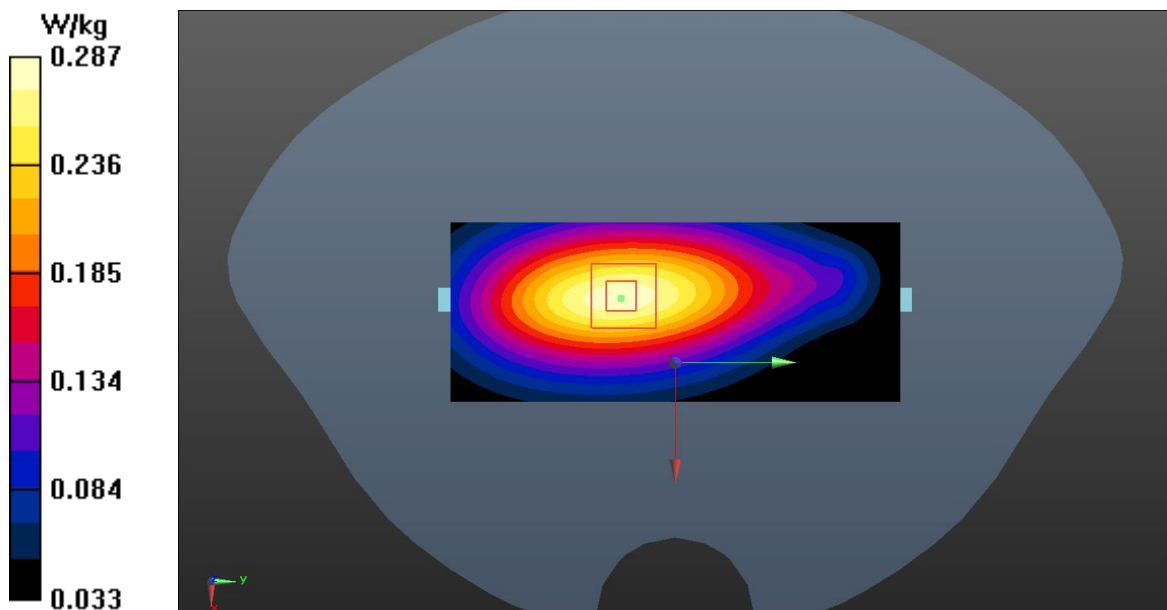
Left Side Middle 1RB24/Area Scan (41x81x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.283 W/kg**Left Side Middle 1RB24/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.64 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.366 W/kg

SAR(1 g) = 0.248 W/kg; SAR(10 g) = 0.170 W/kg

Maximum value of SAR (measured) = 0.287 W/kg

**Fig.20 LTE Band 13 Body**

LTE Band 26 Head

Date: 2023-11-14

Electronics: DAE4 Sn1790

Medium: Head 835MHz

Medium parameters used: $f = 832$ MHz; $\sigma = 0.92$ S/m; $\epsilon_r = 41.148$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 831.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

Right Cheek Middle 1RB74/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.33 W/kg**Right Cheek Middle 1RB74/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.38 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.99 W/kg

SAR(1 g) = 0.854 W/kg; SAR(10 g) = 0.503 W/kg

Maximum value of SAR (measured) = 1.32 W/kg

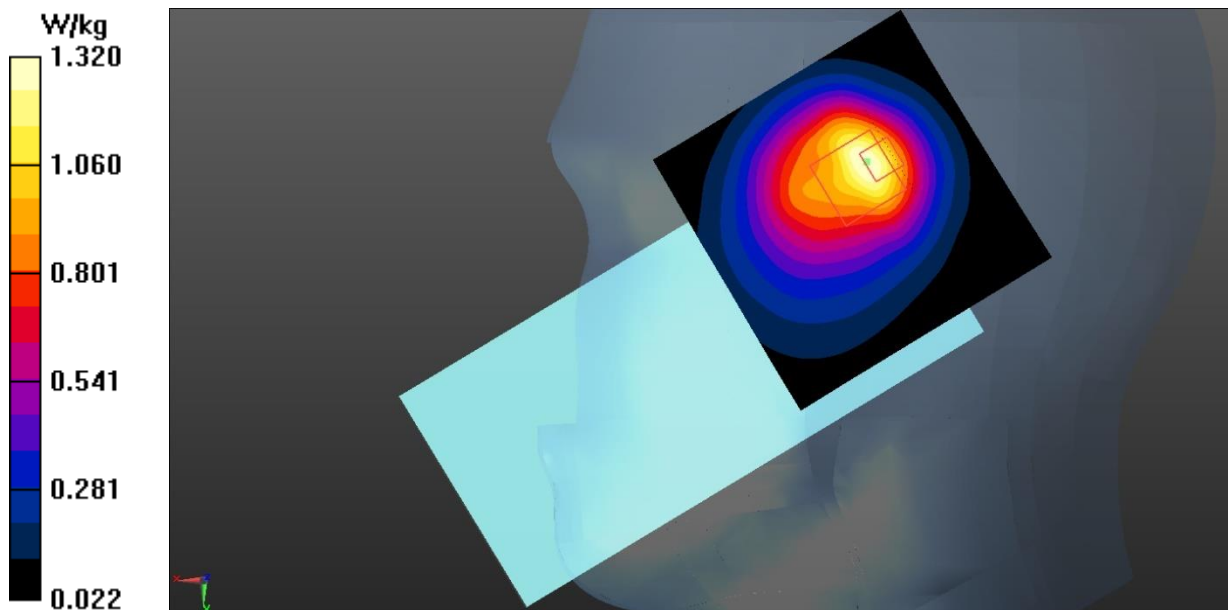


Fig.21 LTE Band 26 Head

LTE Band 26 Body

Date: 2023-11-14

Electronics: DAE4 Sn1790

Medium: Head 835MHz

Medium parameters used (interpolated): $f = 821.5$ MHz; $\sigma = 0.911$ S/m; $\epsilon_r = 41.273$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 821.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

Rear Side Low 1RB74/Area Scan (61x61x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

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

Rear Side Low 1RB74/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 10.58 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.483 W/kg

SAR(1 g) = 0.270 W/kg; SAR(10 g) = 0.158 W/kg

Maximum value of SAR (measured) = 0.359 W/kg

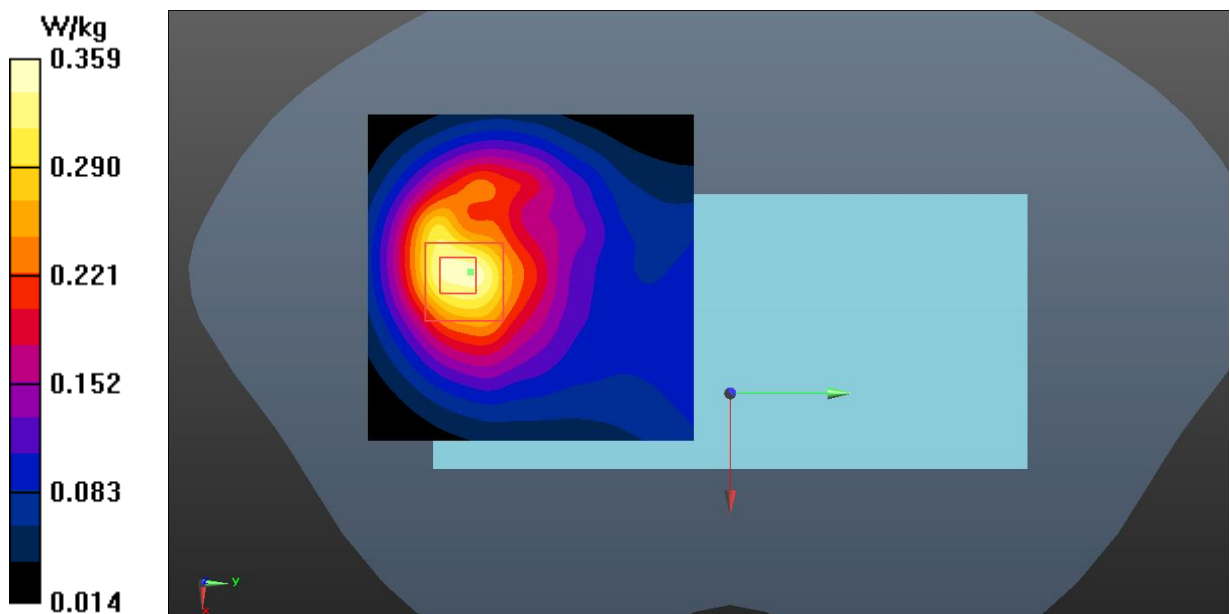


Fig.22 LTE Band 26 Body

LTE Band 38 Head

Date: 2023-11-21

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used: $f = 2580$ MHz; $\sigma = 1.981$ S/m; $\epsilon_r = 38.222$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_TDD (0) Frequency: 2580 MHz Duty Cycle: 1:1.58

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

Right Cheek Low 50RB25/Area Scan (91x91x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 1.14 W/kg**Right Cheek Low 50RB25/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 12.76 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.98 W/kg

SAR(1 g) = 0.867 W/kg; SAR(10 g) = 0.363 W/kg

Maximum value of SAR (measured) = 1.46 W/kg

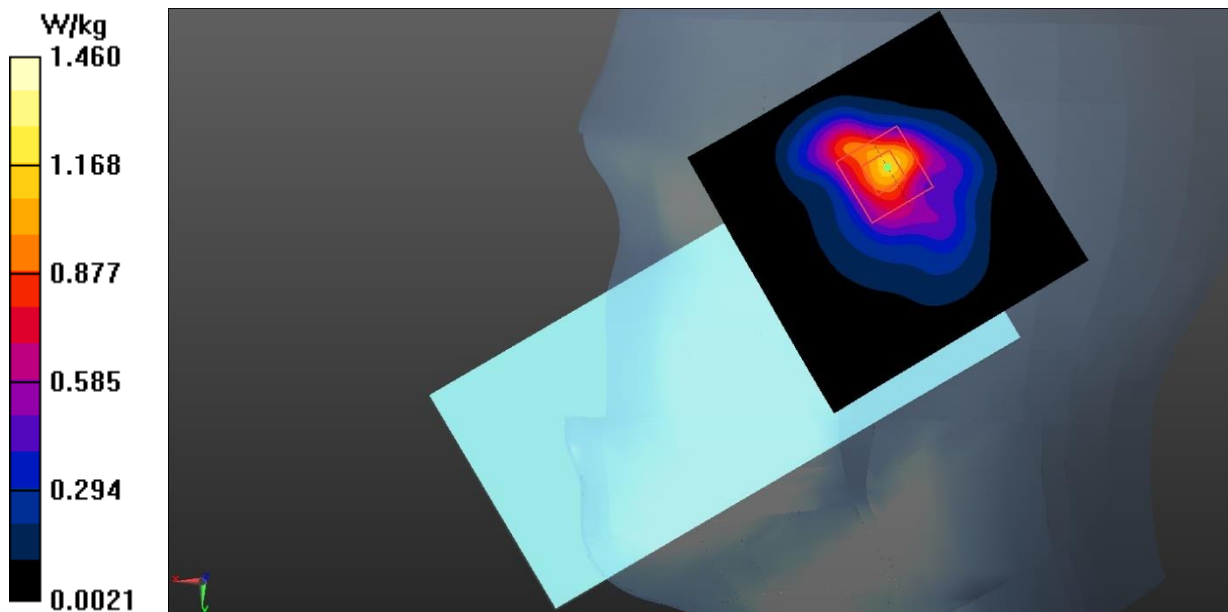


Fig.23 LTE Band 38 Head

LTE Band 38 Body

Date: 2023-11-21

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used (interpolated): $f = 2595$ MHz; $\sigma = 1.999$ S/m; $\epsilon_r = 38.173$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_TDD (0) Frequency: 2595 MHz Duty Cycle: 1:1.58

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

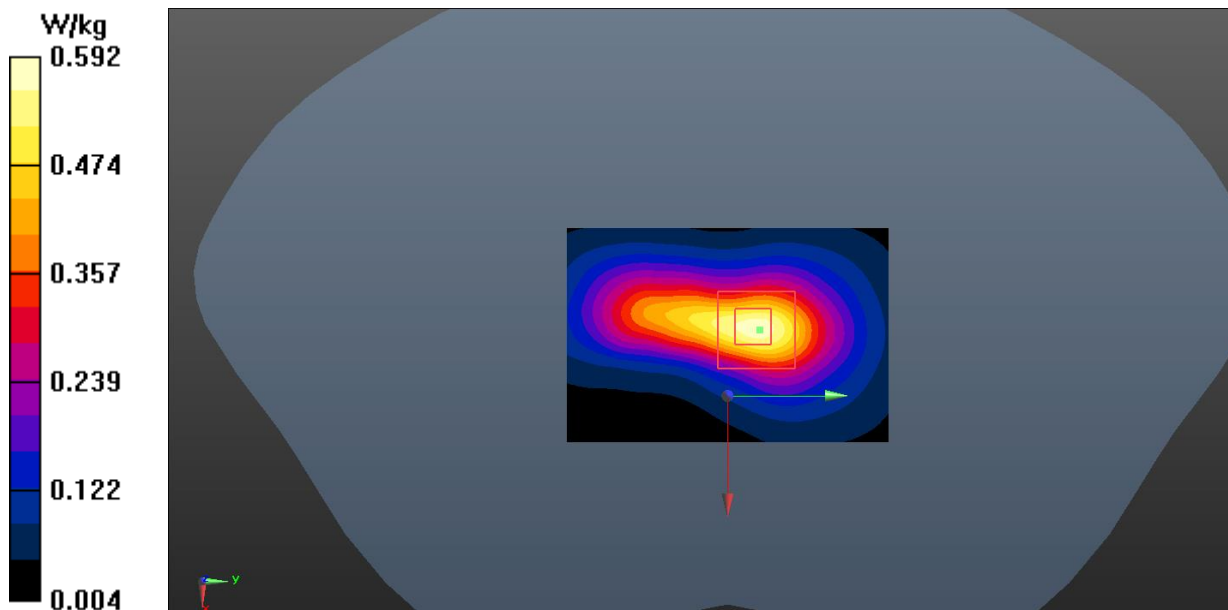
Bottom Side Middle 1RB50/Area Scan (61x91x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 0.581 W/kg**Bottom Side Middle 1RB50/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 15.40 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.890 W/kg

SAR(1 g) = 0.463 W/kg; SAR(10 g) = 0.235 W/kg

Maximum value of SAR (measured) = 0.592 W/kg

**Fig.24 LTE Band 38 Body**

LTE Band 41 Head

Date: 2023-11-21

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used (interpolated): $f = 2593$ MHz; $\sigma = 1.997$ S/m; $\epsilon_r = 38.179$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_TDD (0) Frequency: 2593 MHz Duty Cycle: 1:1.58

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

Right Cheek Middle 100RB/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.14 W/kg**Right Cheek Middle 100RB/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.04 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.94 W/kg

SAR(1 g) = 0.847 W/kg; SAR(10 g) = 0.364 W/kg

Maximum value of SAR (measured) = 1.36 W/kg

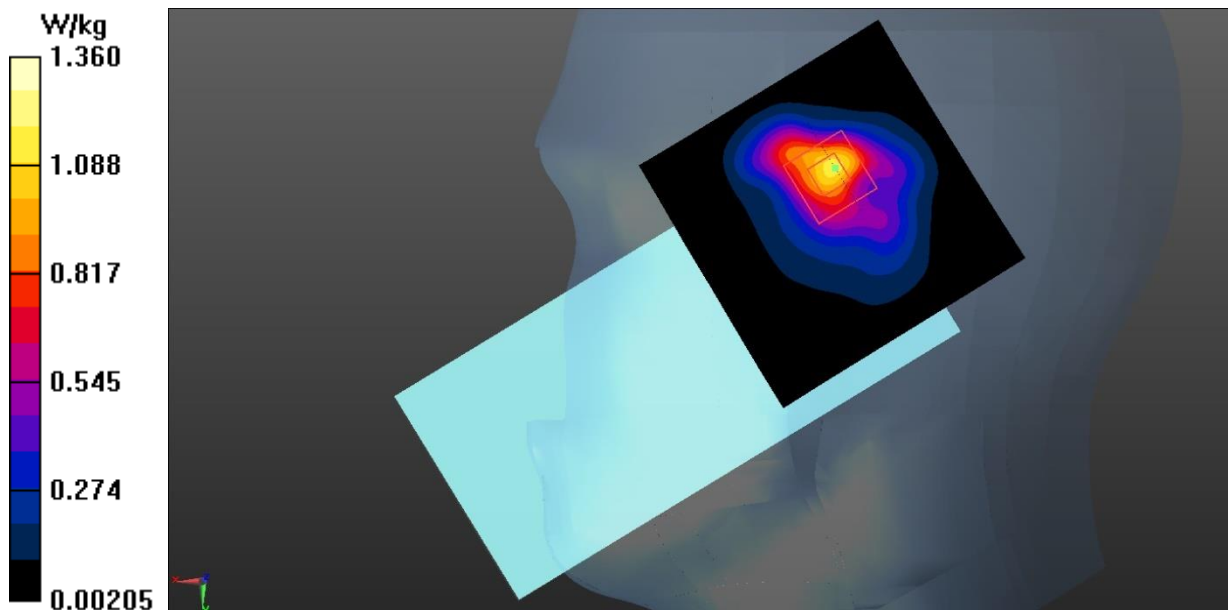


Fig.25 LTE Band 41 Head

LTE Band 41 Body

Date: 2023-11-21

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used (interpolated): $f = 2593$ MHz; $\sigma = 1.997$ S/m; $\epsilon_r = 38.179$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_TDD (0) Frequency: 2593 MHz Duty Cycle: 1:1.58

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

Bottom Side Middle 50RB50/Area Scan (61x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
 Maximum value of SAR (interpolated) = 0.588 W/kg

Bottom Side Middle 50RB50/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.62 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.900 W/kg

SAR(1 g) = 0.465 W/kg; SAR(10 g) = 0.235 W/kg

Maximum value of SAR (measured) = 0.596 W/kg

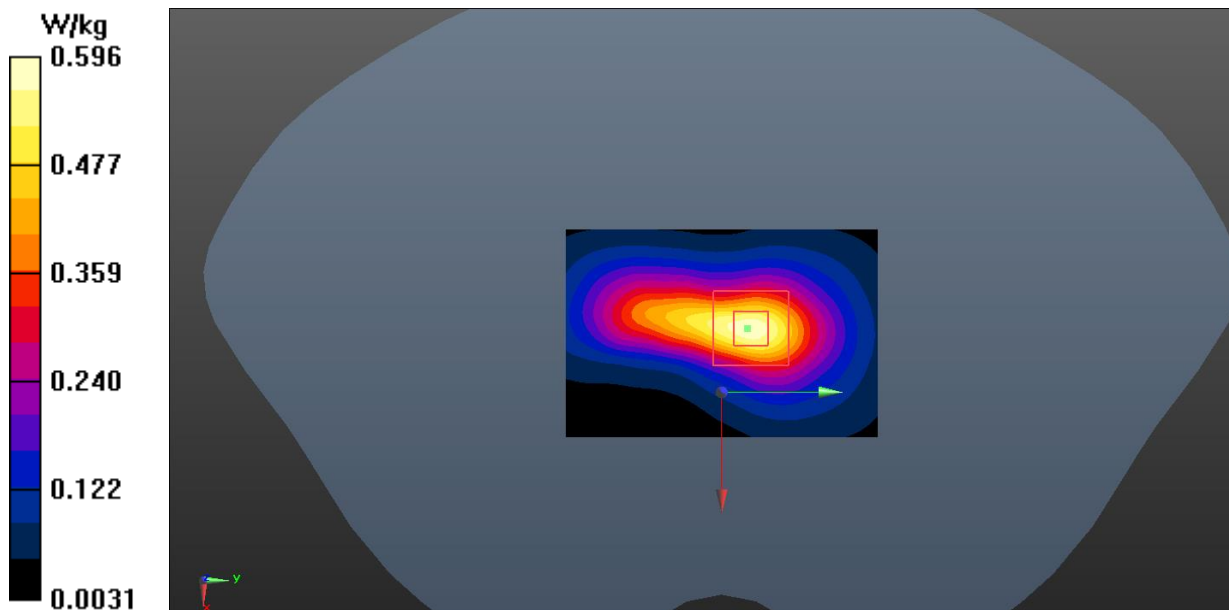


Fig.26 LTE Band 41 Body

LTE Band 66 Head

Date: 2023-11-25

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used (interpolated): $f = 1745$ MHz; $\sigma = 1.356$ S/m; $\epsilon_r = 39.762$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 1745 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

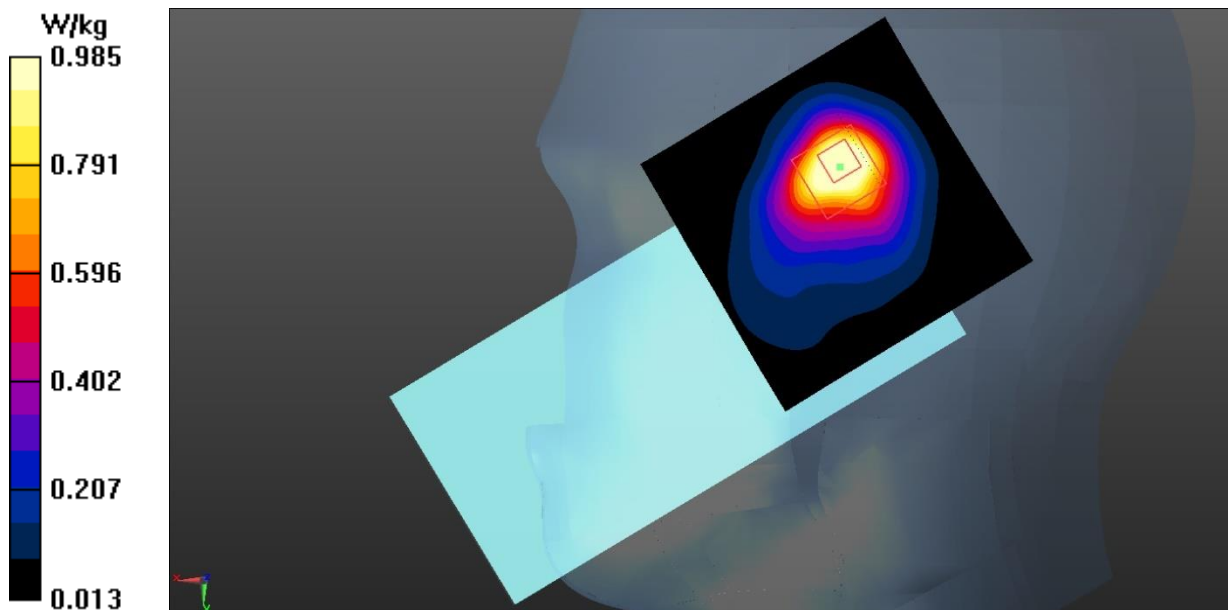
Right Cheek Middle 50RB50/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.30 W/kg**Right Cheek Middle 50RB50/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.88 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 0.749 W/kg; SAR(10 g) = 0.413 W/kg

Maximum value of SAR (measured) = 0.985 W/kg

**Fig.27 LTE Band 66 Head**

LTE Band 66 Body

Date: 2023-11-25

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used: $f = 1770$ MHz; $\sigma = 1.378$ S/m; $\epsilon_r = 39.664$; $\rho = 1000$ kg/m³

Communication System: UID 0, LTE_FDD (0) Frequency: 1770 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

Bottom Side High 1RB0/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.10 W/kg

Bottom Side High 1RB0/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 22.78 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.756 W/kg; SAR(10 g) = 0.424 W/kg

Maximum value of SAR (measured) = 1.05 W/kg

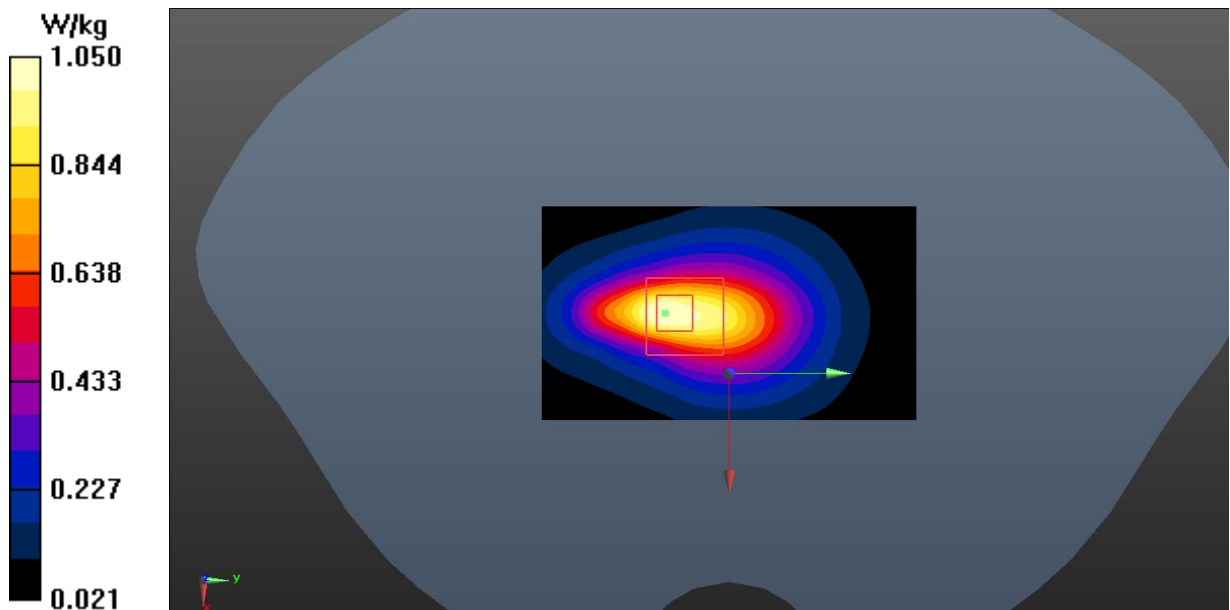


Fig.28 LTE Band 66 Body

NR n5 Head

Date: 2023-11-14

Electronics: DAE4 Sn1790

Medium: Head 835MHz

Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.924$ S/m; $\epsilon_r = 41.092$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 836.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

Right Tilt Middle 50@25/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.747 W/kg

Right Tilt Middle 50@25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.86 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.626 W/kg; SAR(10 g) = 0.313 W/kg

Maximum value of SAR (measured) = 0.998 W/kg

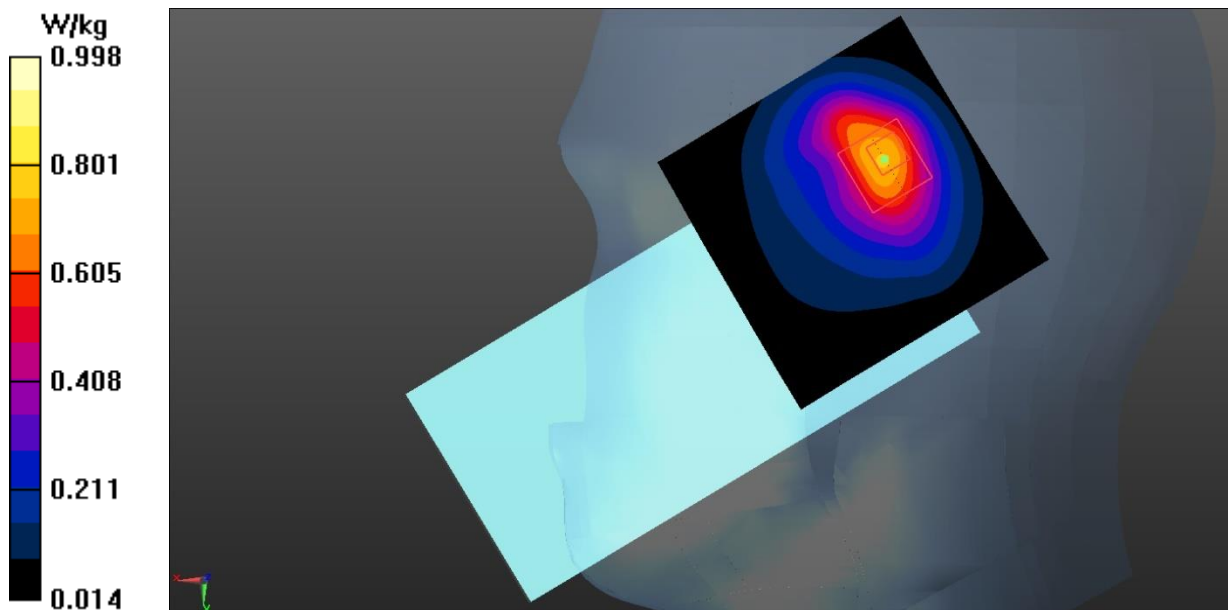


Fig.29 NR n5 Head

NR n5 Body

Date: 2023-11-14

Electronics: DAE4 Sn1790

Medium: Head 835MHz

Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.924$ S/m; $\epsilon_r = 41.092$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 836.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

Rear Side Middle 50@25/Area Scan (61x61x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
 Maximum value of SAR (interpolated) = 0.317 W/kg

Rear Side Middle 50@25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 8.748 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.453 W/kg

SAR(1 g) = 0.253 W/kg; SAR(10 g) = 0.148 W/kg

Maximum value of SAR (measured) = 0.297 W/kg

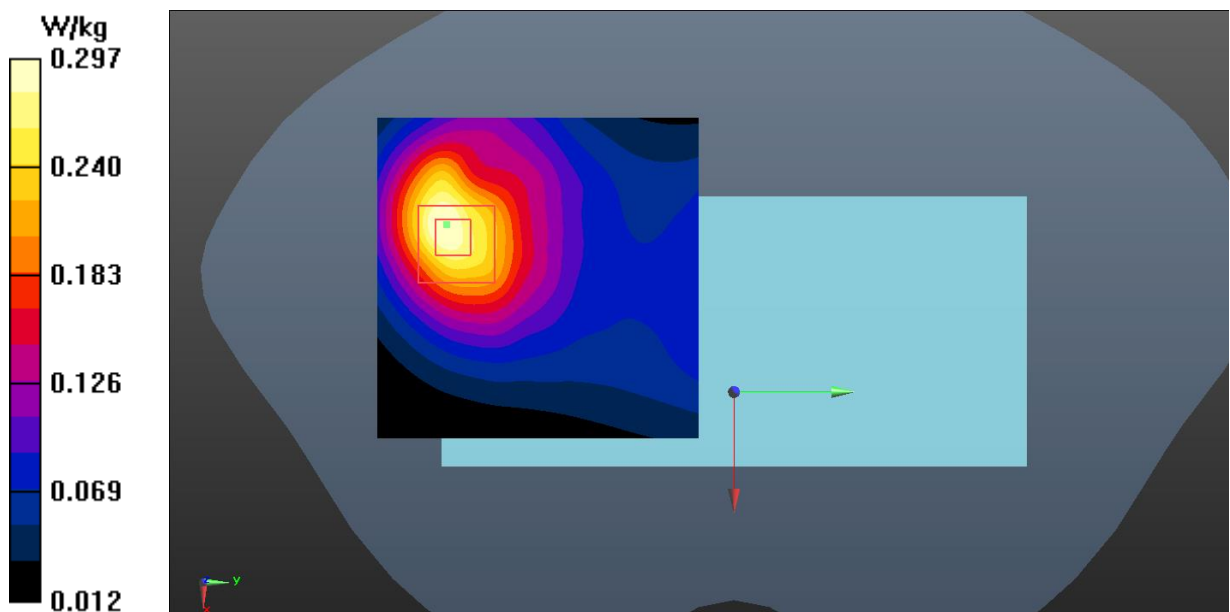


Fig.30 NR n5 Body

NR n7 Head

Date: 2023-11-30

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used (interpolated): $f = 2535$ MHz; $\sigma = 1.919$ S/m; $\epsilon_r = 38.439$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 2535 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

Right Cheek Middle 108@54/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.03 W/kg**Right Cheek Middle 108@54/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.30 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.83 W/kg

SAR(1 g) = 0.808 W/kg; SAR(10 g) = 0.342 W/kg

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

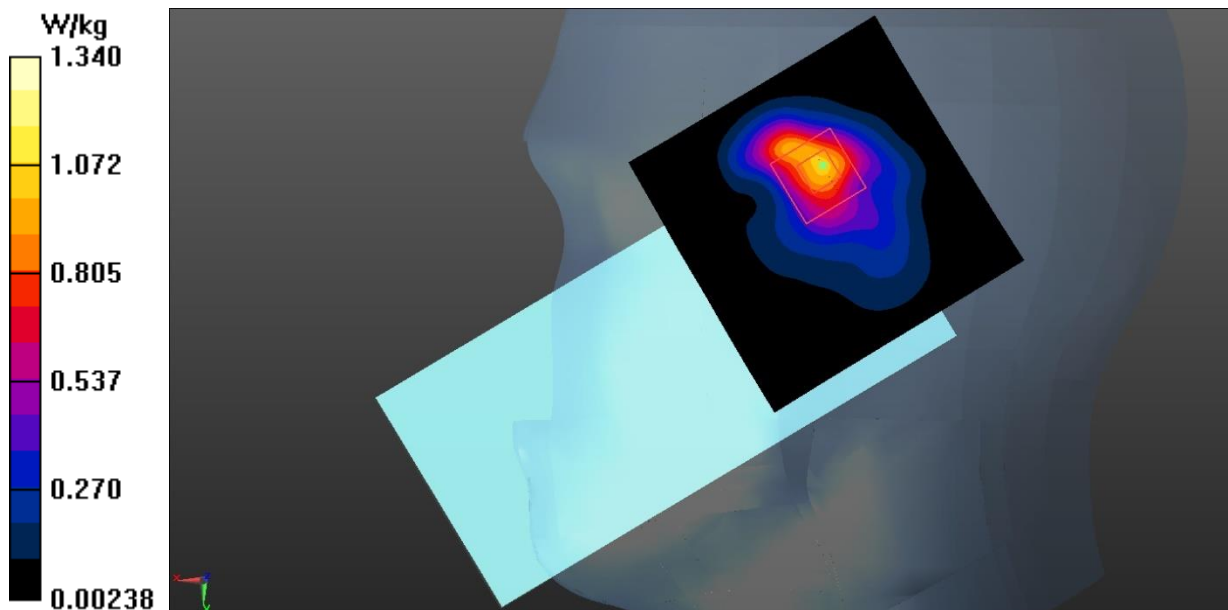


Fig.31 NR n7 Head

NR n7 Body

Date: 2023-11-30

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used (interpolated): $f = 2535$ MHz; $\sigma = 1.919$ S/m; $\epsilon_r = 38.439$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 2535 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

Left Cheek Middle 108@54/Area Scan (61x121x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 0.862 W/kg**Left Cheek Middle 108@54/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 7.137 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.701 W/kg; SAR(10 g) = 0.331 W/kg

Maximum value of SAR (measured) = 0.915 W/kg

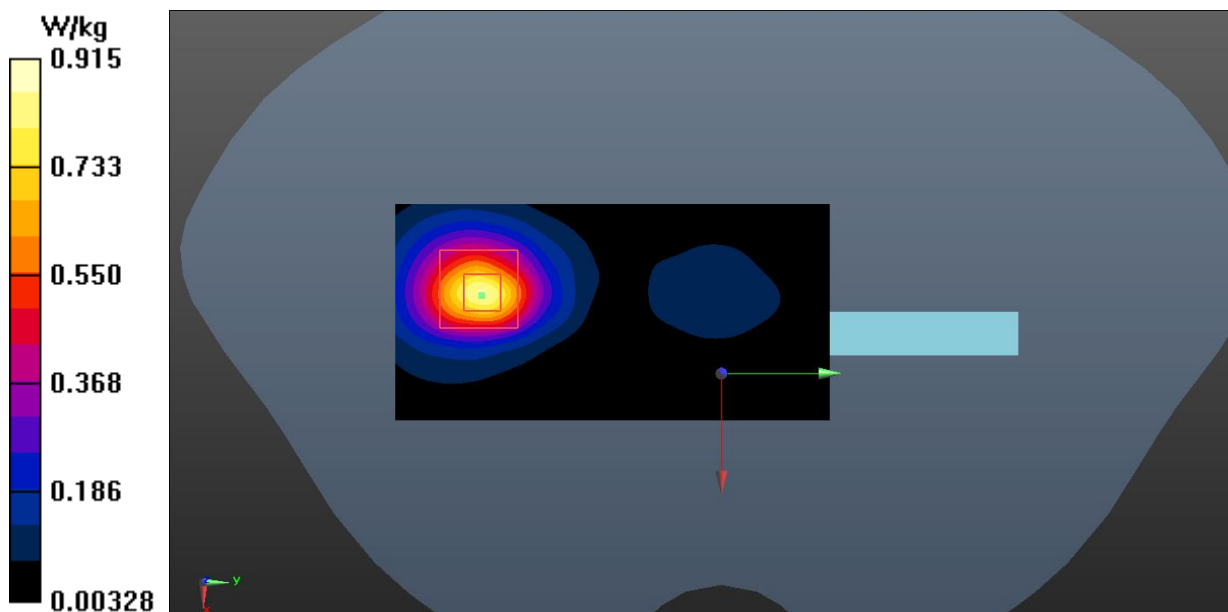


Fig.32 NR n7 Body

NR n38 Head

Date: 2023-11-30

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used (interpolated): $f = 2595$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 38.442$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 2595 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

Right Cheek Middle 50@25/Area Scan (91x91x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 1.43 W/kg**Right Cheek Middle 50@25/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 2.084 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 2.12 W/kg

SAR(1 g) = 0.929 W/kg; SAR(10 g) = 0.408 W/kg

Maximum value of SAR (measured) = 1.43 W/kg

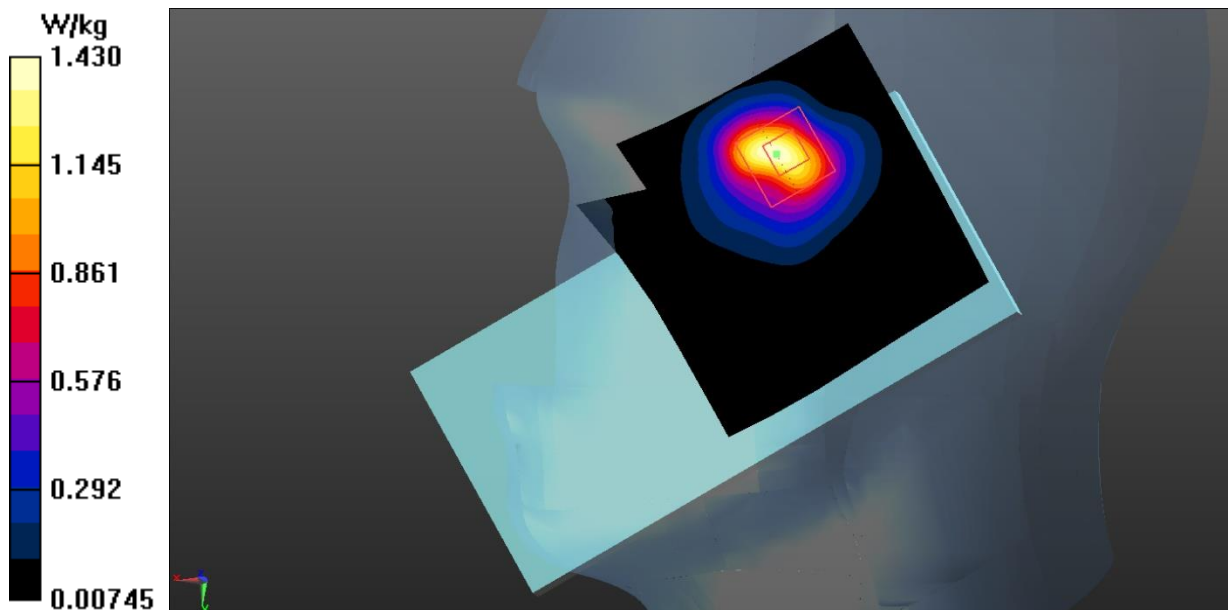


Fig.33 NR n38 Head

NR n38 Body

Date: 2023-11-30

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used (interpolated): $f = 2595$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 38.442$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 2595 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

Rear Cheek Middle 50@25/Area Scan (91x111x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
 Maximum value of SAR (interpolated) = 0.589 W/kg

Rear Cheek Middle 50@25/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 4.667 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.918 W/kg

SAR(1 g) = 0.443 W/kg; SAR(10 g) = 0.215 W/kg

Maximum value of SAR (measured) = 0.566 W/kg

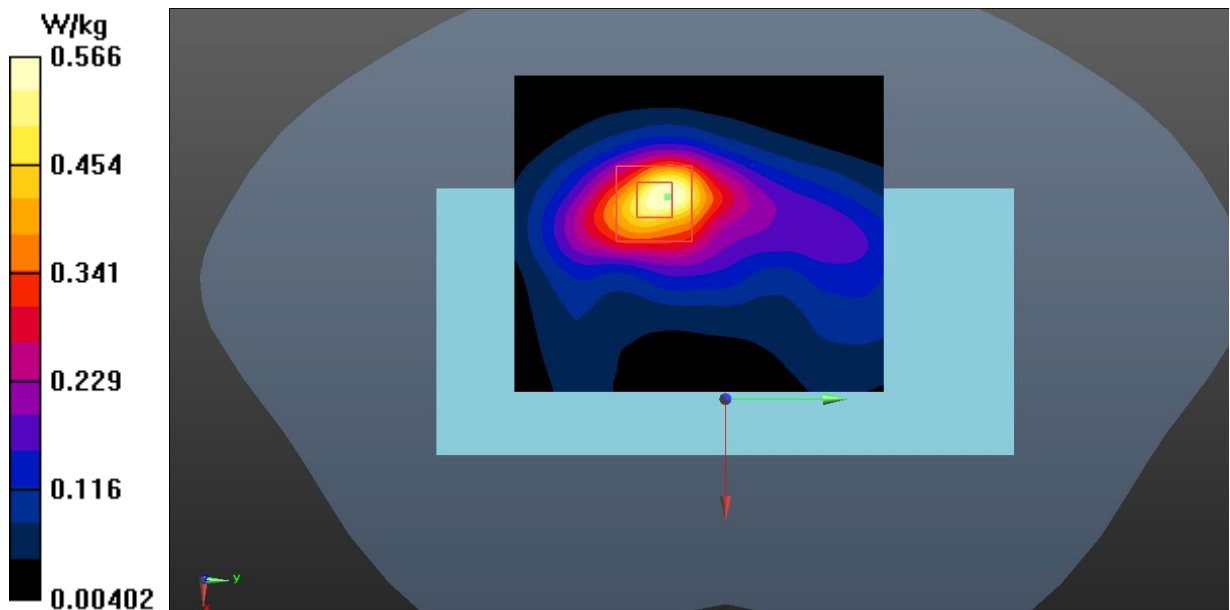


Fig.34 NR n38 Body

NR n41 Head

Date: 2023-11-30

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used (interpolated): $f = 2592.99$ MHz; $\sigma = 1.988$ S/m; $\epsilon_r = 38.446$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 2592.99 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

Right Cheek Middle 135@67/Area Scan (91x91x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 1.14 W/kg**Right Cheek Middle 135@67/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 2.115 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.72 W/kg

SAR(1 g) = 0.746 W/kg; SAR(10 g) = 0.326 W/kg

Maximum value of SAR (measured) = 1.17 W/kg

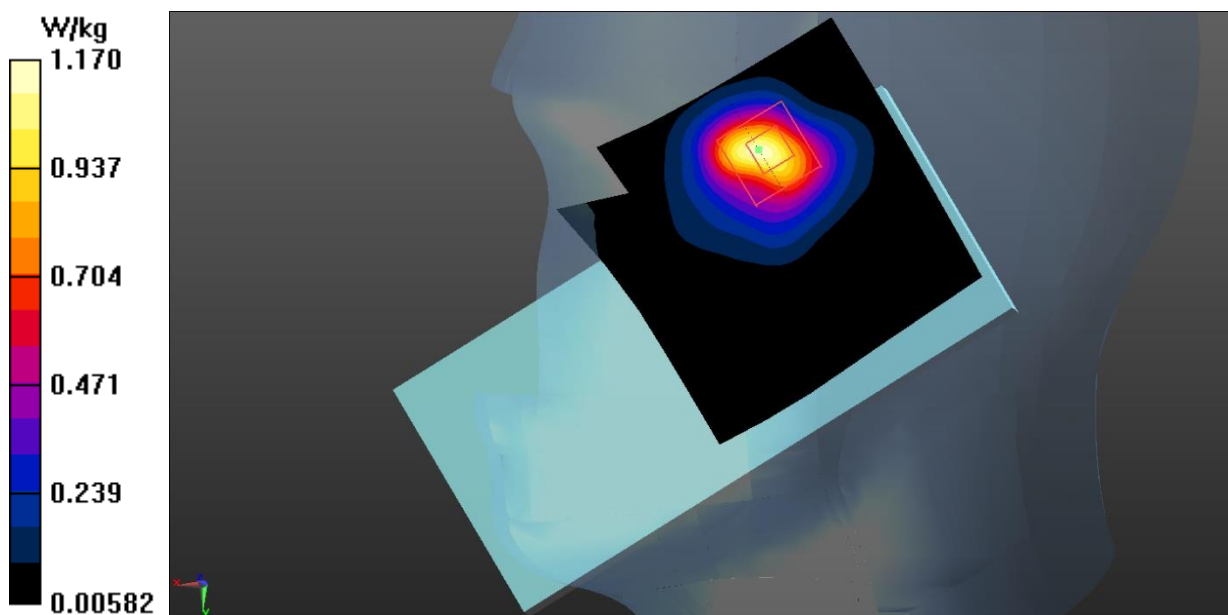


Fig.35 NR n41 Head

NR n41 Body

Date: 2023-11-30

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used (interpolated): $f = 2592.99$ MHz; $\sigma = 1.988$ S/m; $\epsilon_r = 38.446$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 2592.99 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.76, 7.76, 7.76)

Bottom Side Middle 135@67/Area Scan (61x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.620 W/kg**Bottom Side Middle 135@67/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.54 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.945 W/kg

SAR(1 g) = 0.488 W/kg; SAR(10 g) = 0.247 W/kg

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

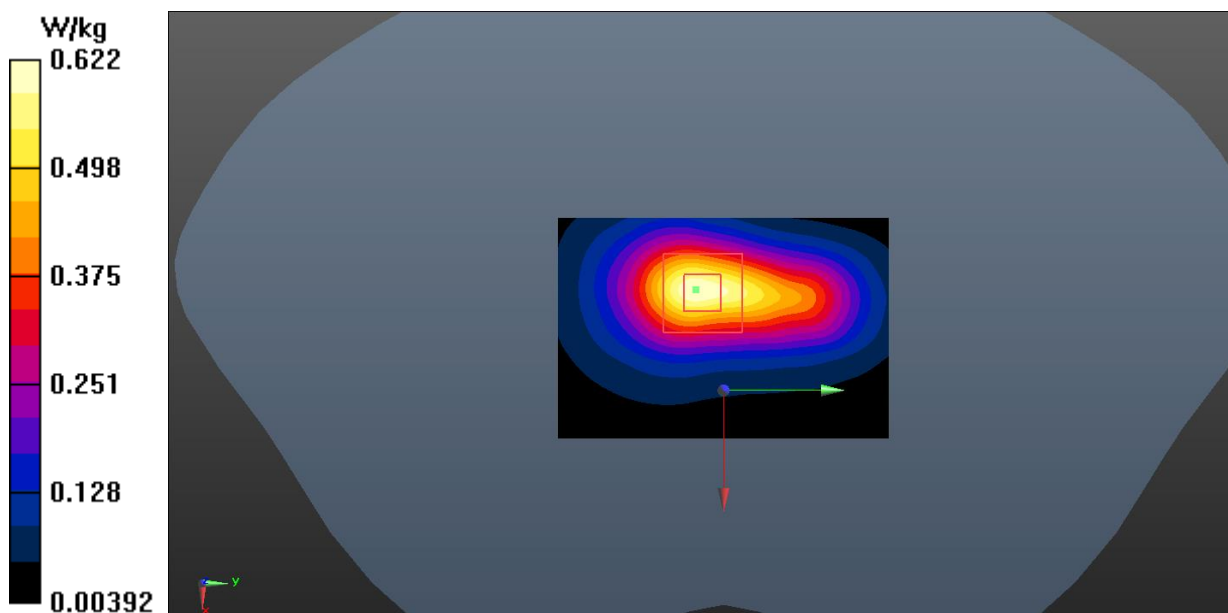


Fig.36 NR n41 Body

NR n66 Head

Date: 2023-11-25

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used: $f = 1730$ MHz; $\sigma = 1.342$ S/m; $\epsilon_r = 39.82$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 1730 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

Right Cheek Low 108@54/Area Scan (61x61x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 1.33 W/kg**Right Cheek Low 108@54/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 4.730 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 2.15 W/kg

SAR(1 g) = 0.934 W/kg; SAR(10 g) = 0.422 W/kg

Maximum value of SAR (measured) = 1.56 W/kg

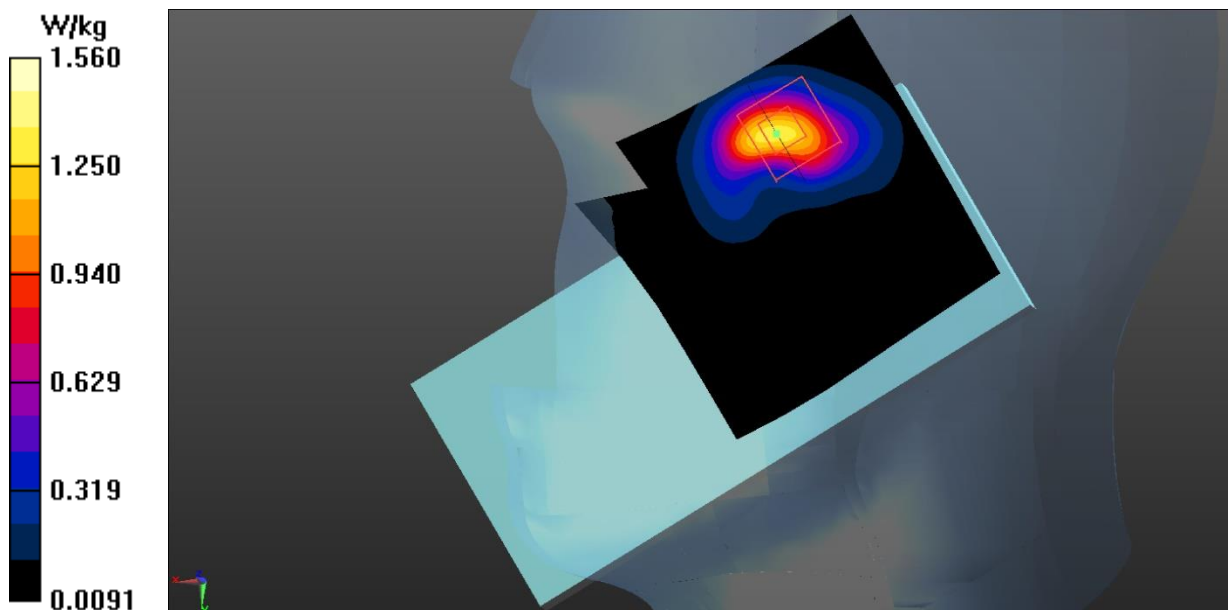


Fig.37 NR n66 Head

NR n66 Body

Date: 2023-11-25

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used: $f = 1730$ MHz; $\sigma = 1.342$ S/m; $\epsilon_r = 39.82$; $\rho = 1000$ kg/m³

Communication System: UID 0, NR (0) Frequency: 1730 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

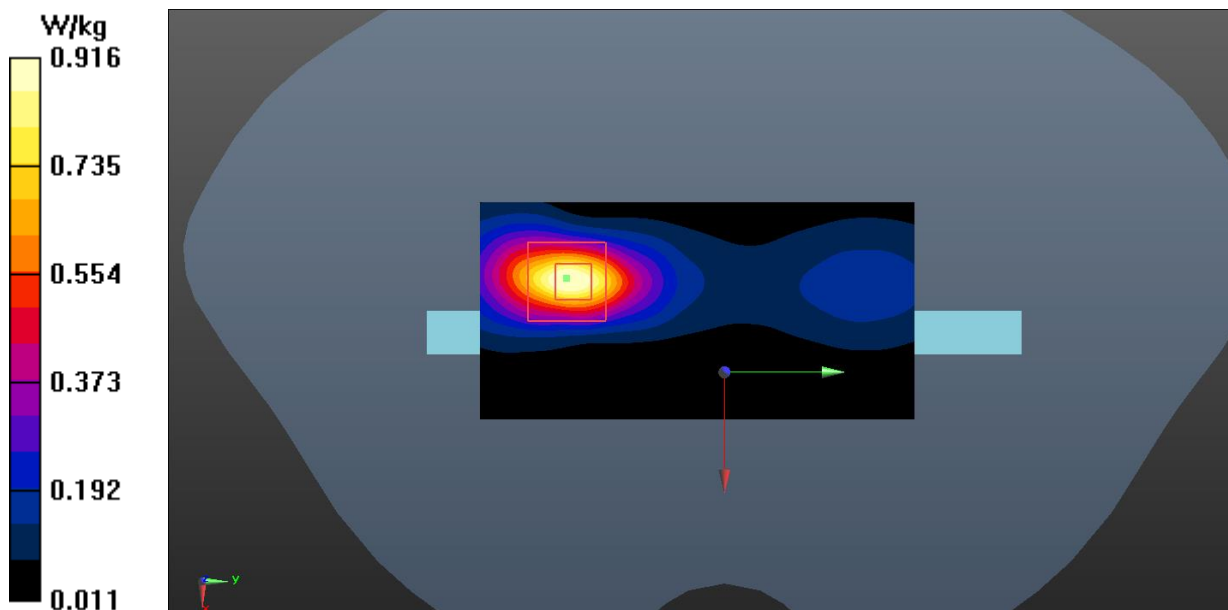
Left Cheek Low 108@54/Area Scan (41x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.952 W/kg**Left Cheek Low 108@54/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.099 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.714 W/kg; SAR(10 g) = 0.356 W/kg

Maximum value of SAR (measured) = 0.916 W/kg

**Fig.38 NR n66 Body**

Bluetooth Head

Date: 2023-12-01

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used (interpolated): $f = 2441$ MHz; $\sigma = 1.829$ S/m; $\epsilon_r = 38.293$; $\rho = 1000$ kg/m³

Communication System: UID 0, BT (0) Frequency: 2441 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

Left Tilt Ch.39/Area Scan (91x91x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.163 W/kg

Left Tilt Ch.39/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 5.111 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.274 W/kg

SAR(1 g) = 0.115 W/kg; SAR(10 g) = 0.047 W/kg

Maximum value of SAR (measured) = 0.182 W/kg

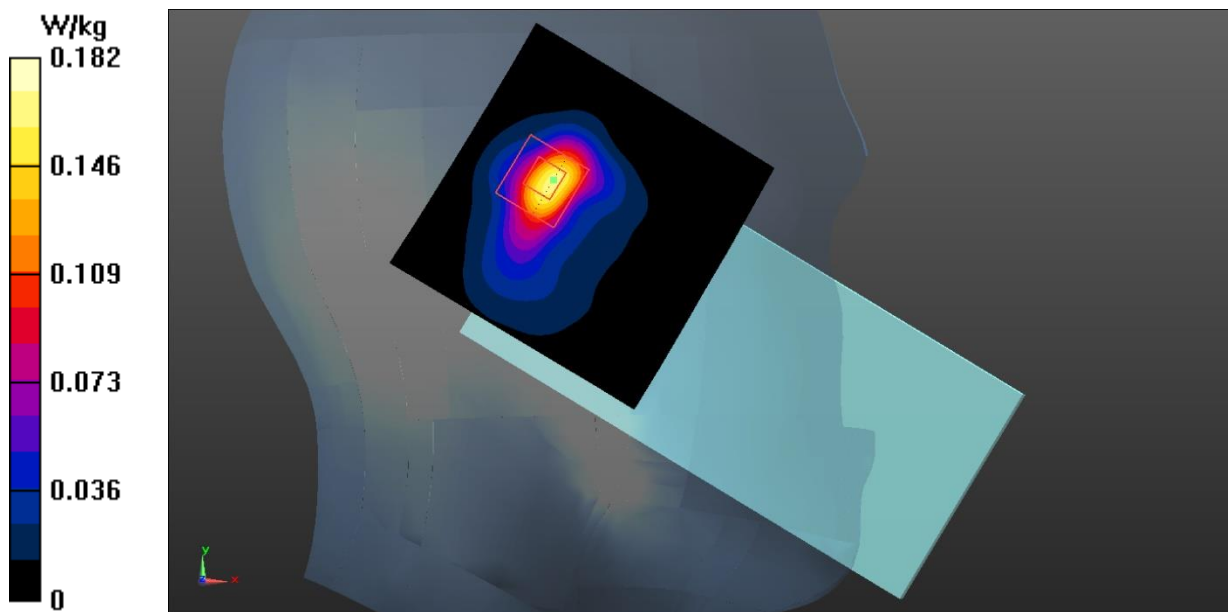


Fig.39 Bluetooth Head

Bluetooth Body

Date: 2023-12-01

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used (interpolated): $f = 2441$ MHz; $\sigma = 1.829$ S/m; $\epsilon_r = 38.293$; $\rho = 1000$ kg/m³

Communication System: UID 0, BT (0) Frequency: 2441 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

Top Side Ch.39/Area Scan (61x111x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.0596 W/kg

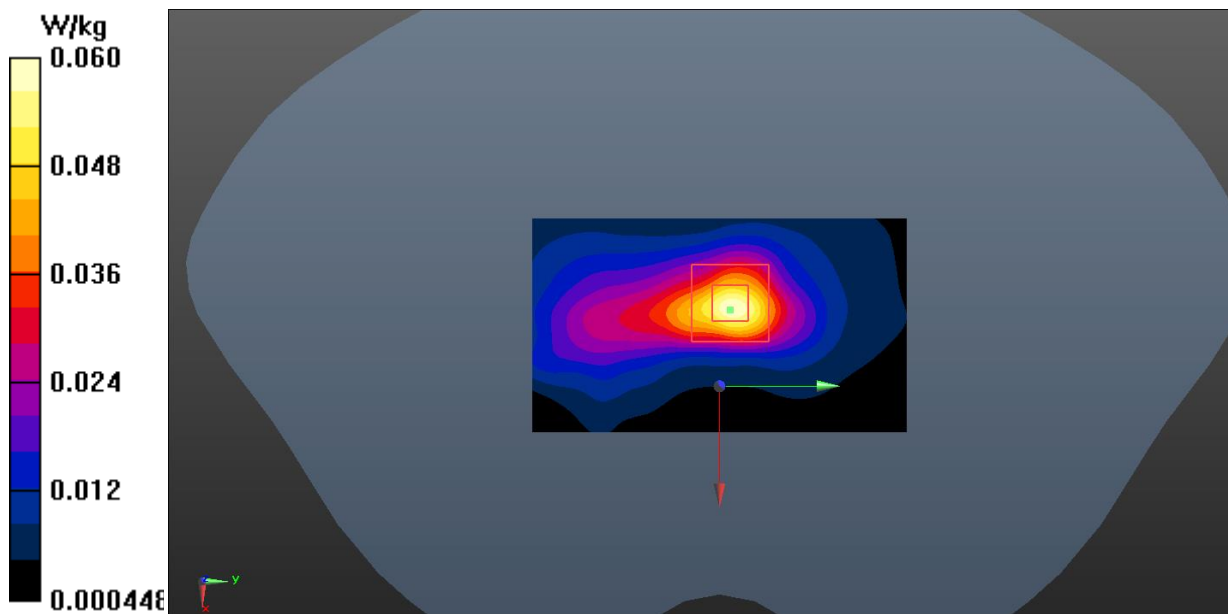
Top Side Ch.39/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 4.158 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.0800 W/kg

SAR(1 g) = 0.040 W/kg; SAR(10 g) = 0.018 W/kg

Maximum value of SAR (measured) = 0.0602 W/kg

**Fig.40 Bluetooth Body**

WLAN 2.4GHz Head

Date: 2023-11-16

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used: $f = 2412$ MHz; $\sigma = 1.774$ S/m; $\epsilon_r = 38.95$; $\rho = 1000$ kg/m³

Communication System: UID 0, WLAN (0) Frequency: 2412 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

Left Tilt Ch.1/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.04 W/kg

Left Tilt Ch.1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.31 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.59 W/kg

SAR(1 g) = 0.698 W/kg; SAR(10 g) = 0.299 W/kg

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

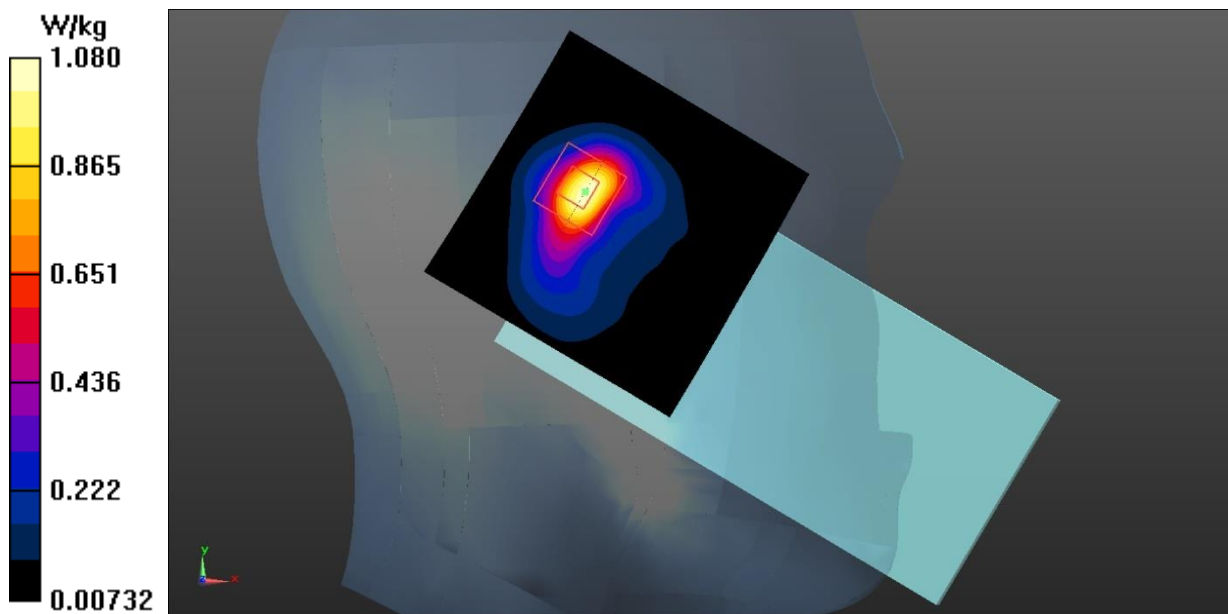


Fig.41 WLAN 2.4GHz Head

WLAN 2.4GHz Body

Date: 2023-11-16

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used: $f = 2412$ MHz; $\sigma = 1.774$ S/m; $\epsilon_r = 38.95$; $\rho = 1000$ kg/m³

Communication System: UID 0, WLAN (0) Frequency: 2412 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

Top Side Ch.1/Area Scan (61x111x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.513 W/kg

Top Side Ch.1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 11.41 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.725 W/kg

SAR(1 g) = 0.362 W/kg; SAR(10 g) = 0.169 W/kg

Maximum value of SAR (measured) = 0.550 W/kg

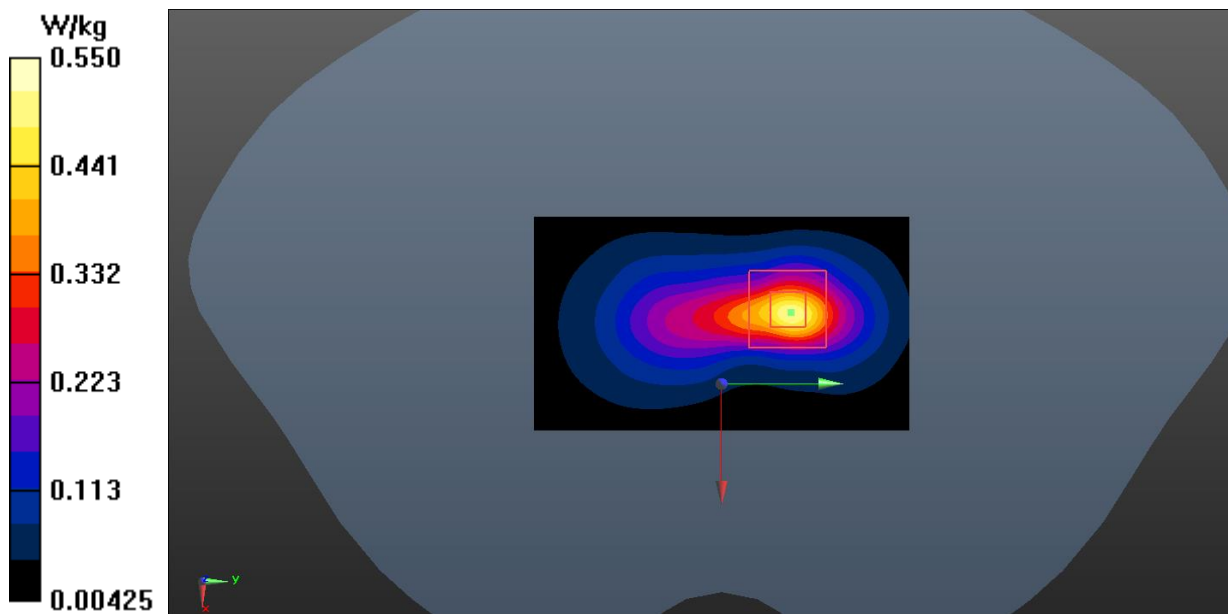


Fig.42 WLAN 2.4GHz Body

WLAN 5GHz Head

Date: 2023-11-28

Electronics: DAE4 Sn1790

Medium: Head 5600MHz

Medium parameters used: $f = 5660$ MHz; $\sigma = 5.098$ S/m; $\epsilon_r = 36.056$; $\rho = 1000$ kg/m³

Communication System: UID 0, WLAN 5G (0) Frequency: 5660 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.13, 5.13, 5.13)

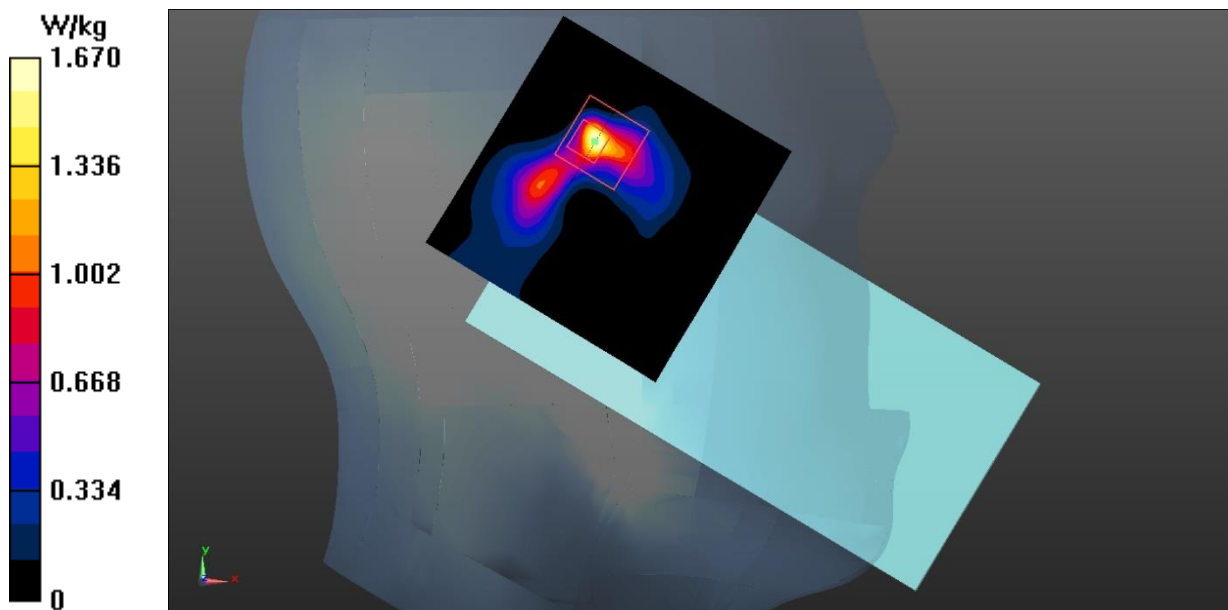
Left Cheek Ch.132/Area Scan (81x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 1.76 W/kg**Left Cheek Ch.132/Zoom Scan (8x8x21)/Cube 0:** Measurement grid: $dx=4$ mm, $dy=4$ mm,
 $dz=1.4$ mm

Reference Value = 7.884 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 3.09 W/kg

SAR(1 g) = 0.748 W/kg; SAR(10 g) = 0.202 W/kg

Maximum value of SAR (measured) = 1.67 W/kg

**Fig.43 WLAN 5GHz Head**

WLAN 5GHz Body

Date: 2023-11-28

Electronics: DAE4 Sn1790

Medium: Head 5250MHz

Medium parameters used : $f = 5220$ MHz; $\sigma = 4.593$ S/m; $\epsilon_r = 36.825$; $\rho = 1000$ kg/m³

Communication System: UID 0, WLAN 5G (0) Frequency: 5220 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.72, 5.72, 5.72)

Top Side Ch.44/Area Scan (61x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.05 W/kg

Top Side Ch.44/Zoom Scan (8x8x21)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 10.28 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.95 W/kg

SAR(1 g) = 0.556 W/kg; SAR(10 g) = 0.190 W/kg

Maximum value of SAR (measured) = 1.03 W/kg

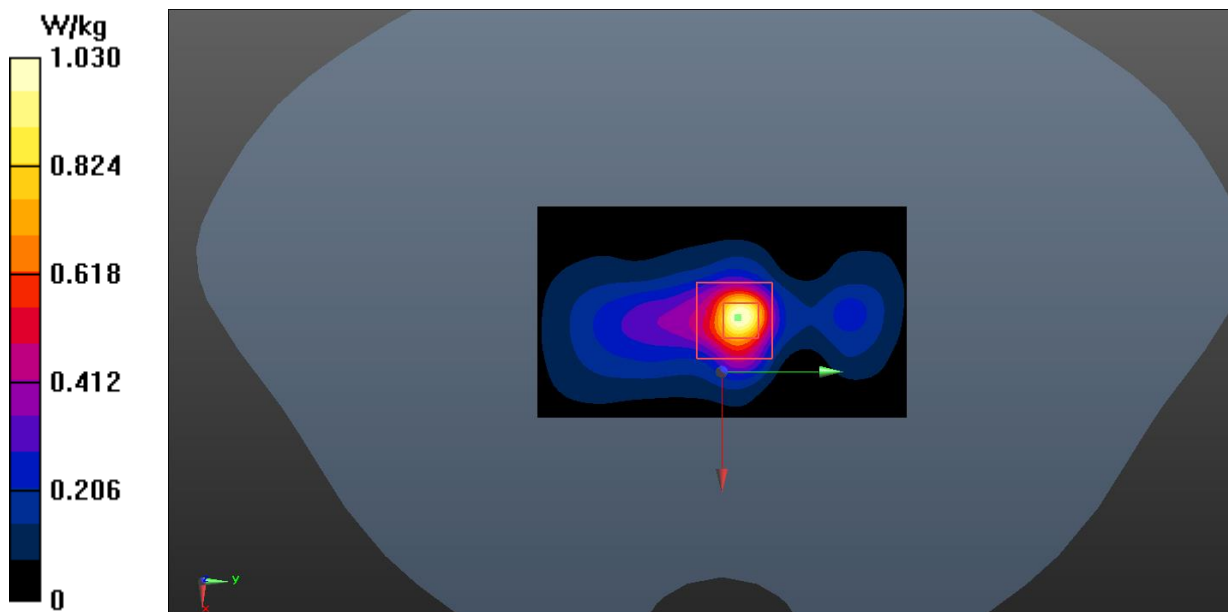


Fig.44 WLAN 5GHz Body

WLAN 5GHz Extremity

Date: 2023-11-28

Electronics: DAE4 Sn1790

Medium: Head 5600MHz

Medium parameters used: $f = 5660$ MHz; $\sigma = 5.098$ S/m; $\epsilon_r = 36.056$; $\rho = 1000$ kg/m³

Communication System: UID 0, WLAN 5G (0) Frequency: 5660 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.13, 5.13, 5.13)

Top Side Ch.132/Area Scan (61x111x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 7.05 W/kg

Top Side Ch.132/Zoom Scan (8x8x21)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 7.371 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 23.4 W/kg

SAR(1 g) = 4.04 W/kg; SAR(10 g) = 0.902 W/kg

Maximum value of SAR (measured) = 9.72 W/kg

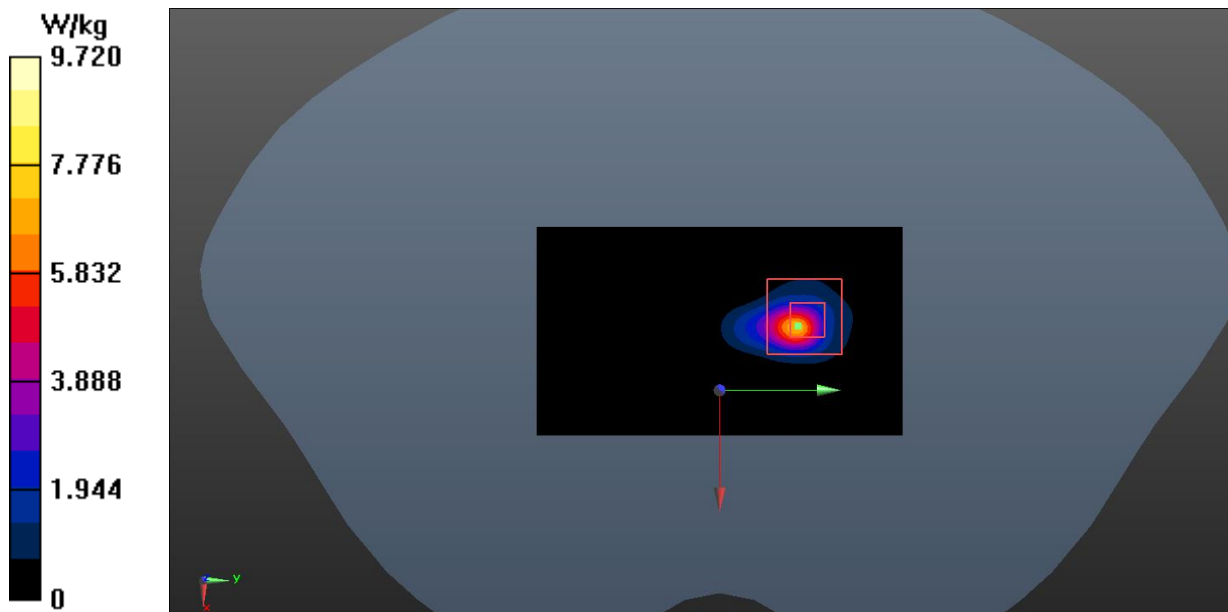


Fig.45 WLAN 5GHz Extremity

ANNEX B: System Verification Results

750MHz

Date: 2023-11-15

Electronics: DAE4 Sn1790

Medium: Head 750MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.878 \text{ S/m}$; $\epsilon_r = 42.644$; $\rho = 1000 \text{ kg/m}^3$

Communication System: CW Frequency: 750 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

System Validation/Area Scan (81x161x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 60.552 V/m; Power Drift = -0.08 dB

SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.42 W/kg

Maximum value of SAR (interpolated) = 2.78 W/kg

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

Reference Value = 60.552 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 3.03 W/kg

SAR(1 g) = 2.08 W/kg; SAR(10 g) = 1.40 W/kg

Maximum value of SAR (measured) = 2.75 W/kg

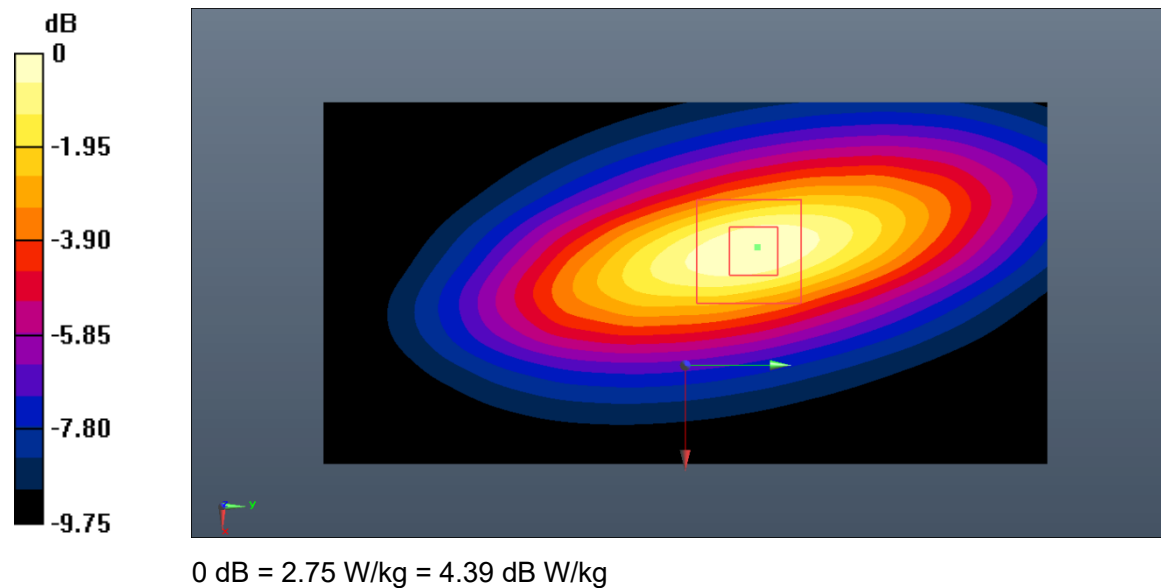


Fig.B.1. Validation 750MHz 250mW

835MHz

Date: 2023-11-12

Electronics: DAE4 Sn1790

Medium: Head 835MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.909 \text{ S/m}$; $\epsilon_r = 40.847$; $\rho = 1000 \text{ kg/m}^3$

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

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

System Validation/Area Scan (91x161x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 63.911 V/m; Power Drift = 0.09 dB

SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.57 W/kg

Maximum value of SAR (interpolated) = 3.65 W/kg

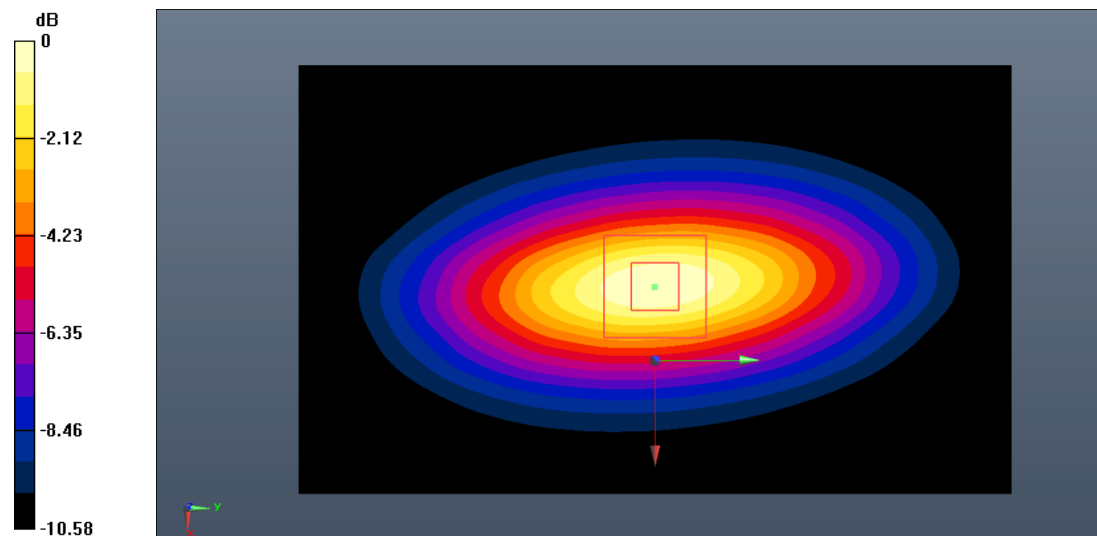
System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 63.911 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 4.32 W/kg

SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (measured) = 3.68 W/kg



0 dB = 3.68 W/kg = 5.66 dB W/kg

Fig.B.2. Validation 835MHz 250mW

835MHz

Date: 2023-11-14

Electronics: DAE4 Sn1790

Medium: Head 835MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.923 \text{ S/m}$; $\epsilon_r = 41.111$; $\rho = 1000 \text{ kg/m}^3$

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

Probe: EX3DV4 - SN7683 ConvF (10.75, 10.75, 10.75)

System Validation/Area Scan (91x161x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 66.045 V/m; Power Drift = 0.13 dB

SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (interpolated) = 3.70 W/kg

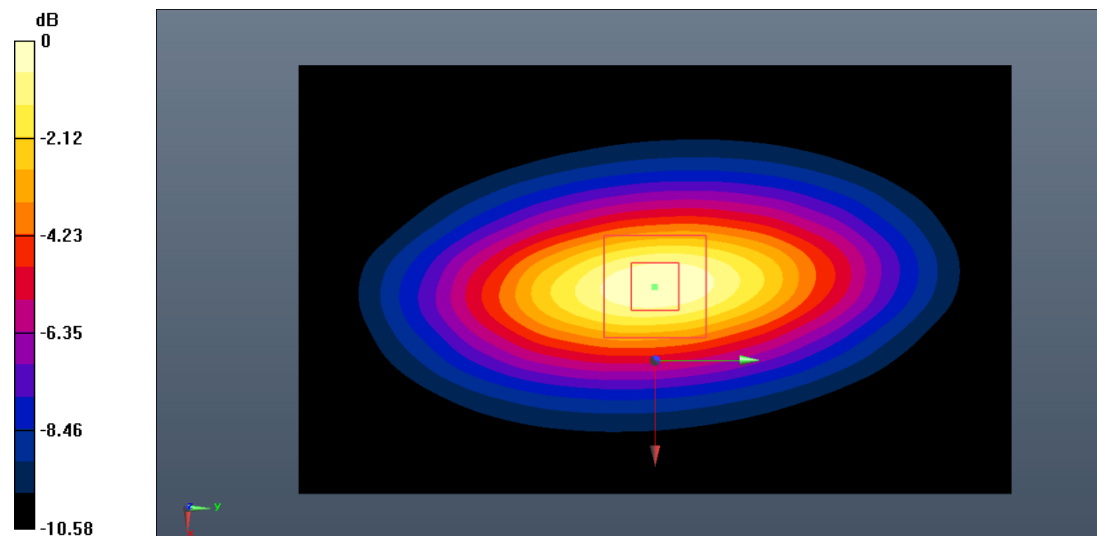
System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 66.045 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 4.49 W/kg

SAR(1 g) = 2.50 W/kg; SAR(10 g) = 1.62 W/kg

Maximum value of SAR (measured) = 3.73 W/kg



0 dB = 3.73 W/kg = 5.72 dB W/kg

Fig.B.3. Validation 835MHz 250mW

1750MHz

Date: 2023-11-17

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used: $f = 1750 \text{ MHz}$; $\sigma = 1.383 \text{ S/m}$; $\epsilon_r = 39.309$; $\rho = 1000 \text{ kg/m}^3$

Communication System: CW Frequency: 1750 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

System Validation/Area Scan (81x121x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 79.876 V/m; Power Drift = 0.06 dB

SAR(1 g) = 9.24 W/kg; SAR(10 g) = 4.94 W/kg

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

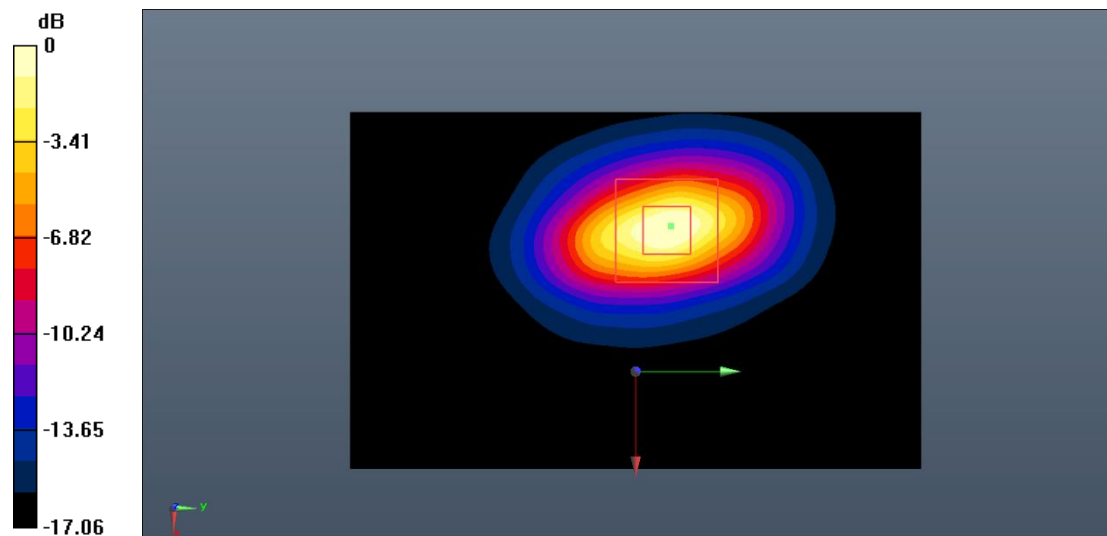
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 79.876 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 22.1 W/kg

SAR(1 g) = 9.38 W/kg; SAR(10 g) = 5.00 W/kg

Maximum value of SAR (measured) = 11.5 W/kg



0 dB = 11.5 W/kg = 10.61 dB W/kg

Fig.B.4. Validation 1750MHz 250mW

1750MHz

Date: 2023-11-25

Electronics: DAE4 Sn1790

Medium: Head 1750MHz

Medium parameters used: $f = 1750 \text{ MHz}$; $\sigma = 1.36 \text{ S/m}$; $\epsilon_r = 39.742$; $\rho = 1000 \text{ kg/m}^3$

Communication System: CW Frequency: 1750 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.81, 8.81, 8.81)

System Validation/Area Scan (81x121x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 79.778 V/m; Power Drift = -0.11 dB

SAR(1 g) = 8.99 W/kg; SAR(10 g) = 4.95 W/kg

Maximum value of SAR (interpolated) = 11.0 W/kg

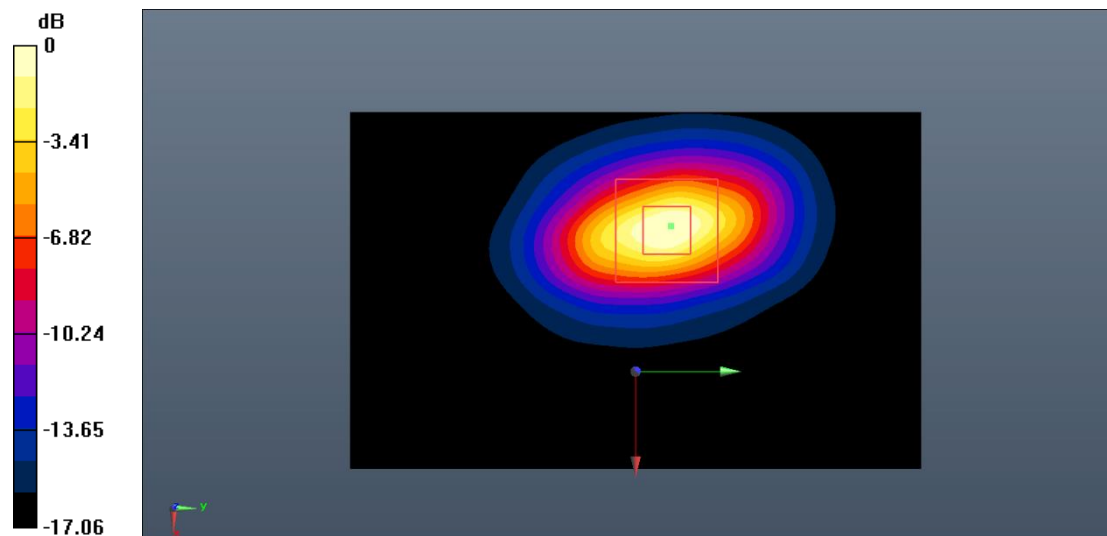
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 79.778 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 20.5 W/kg

SAR(1 g) = 8.84 W/kg; SAR(10 g) = 4.86 W/kg

Maximum value of SAR (measured) = 10.8 W/kg



0 dB = 10.8 W/kg = 10.33 dB W/kg

Fig.B.5. Validation 1750MHz 250mW

1900MHz

Date: 2023-11-17

Electronics: DAE4 Sn1790

Medium: Head 1900MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.428$ S/m; $\epsilon_r = 39.102$; $\rho = 1000$ kg/m³

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

Probe: EX3DV4 - SN7683 ConvF (8.55, 8.55, 8.55)

System Validation/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 84.838 V/m; Power Drift = 0.03 dB

SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.14 W/kg

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

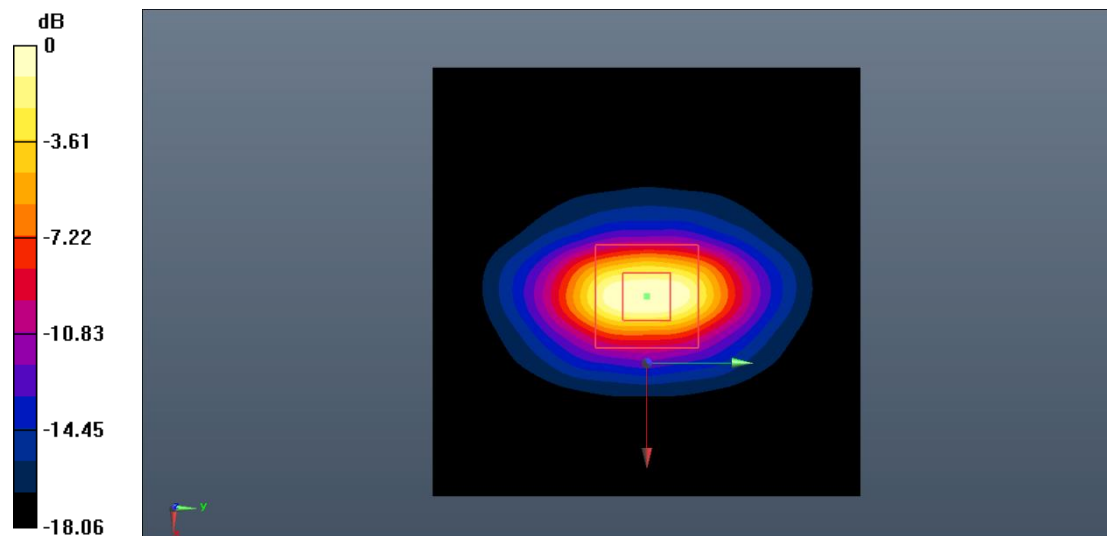
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 84.838 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 26.9 W/kg

SAR(1 g) = 10.5 W/kg; SAR(10 g) = 5.27 W/kg

Maximum value of SAR (measured) = 12.4 W/kg



0 dB = 12.4 W/kg = 10.93 dB W/kg

Fig.B.6. Validation 1900MHz 250mW

1900MHz

Date: 2023-11-24

Electronics: DAE4 Sn1790

Medium: Head 1900MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.411 \text{ S/m}$; $\epsilon_r = 39.573$; $\rho = 1000 \text{ kg/m}^3$

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

Probe: EX3DV4 - SN7683 ConvF (8.55, 8.55, 8.55)

System Validation/Area Scan (91x91x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 83.456 V/m ; Power Drift = 0.10 dB

SAR(1 g) = 10.0 W/kg ; SAR(10 g) = 5.08 W/kg

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

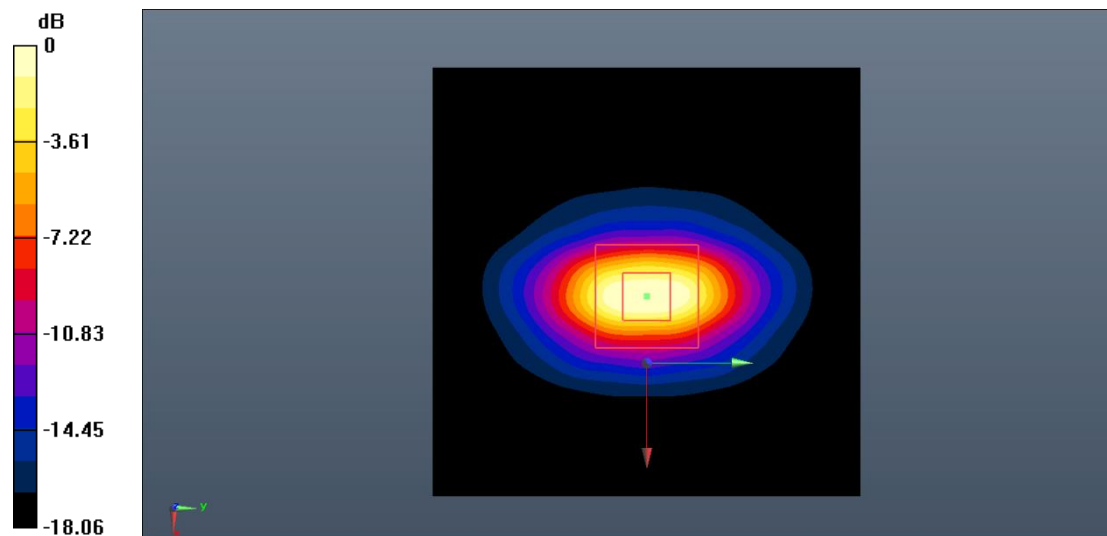
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 83.456 V/m ; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 24.5 W/kg

SAR(1 g) = 10.2 W/kg ; SAR(10 g) = 5.16 W/kg

Maximum value of SAR (measured) = 12.2 W/kg



0 dB = 12.2 W/kg = 10.86 dB W/kg

Fig.B.7. Validation 1900MHz 250mW

2450MHz

Date: 2023-11-16

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.819 \text{ S/m}$; $\epsilon_r = 38.825$; $\rho = 1000 \text{ kg/m}^3$

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

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

System Validation/Area Scan (81x121x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 91.783 V/m; Power Drift = 0.05 dB

SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.03 W/kg

Maximum value of SAR (interpolated) = 15.4 W/kg

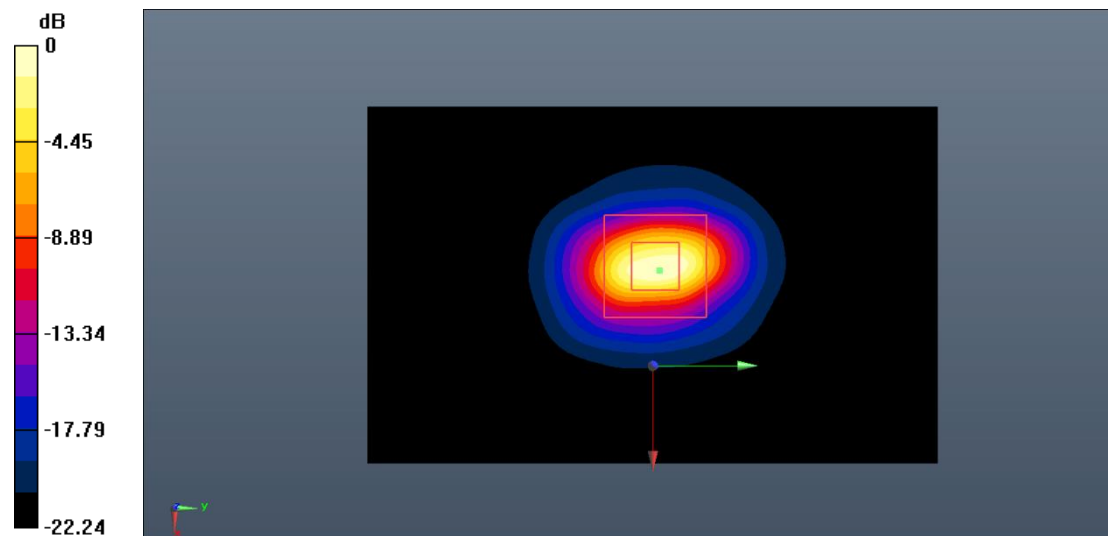
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 91.783 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 30.8 W/kg

SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.09 W/kg

Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dB W/kg

Fig.B.8. Validation 2450MHz 250mW

2450MHz

Date: 2023-12-01

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.84 \text{ S/m}$; $\epsilon_r = 38.262$; $\rho = 1000 \text{ kg/m}^3$

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

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

System Validation/Area Scan (81x121x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 92.472 V/m; Power Drift = 0.07 dB

SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.11 W/kg

Maximum value of SAR (interpolated) = 15.6 W/kg

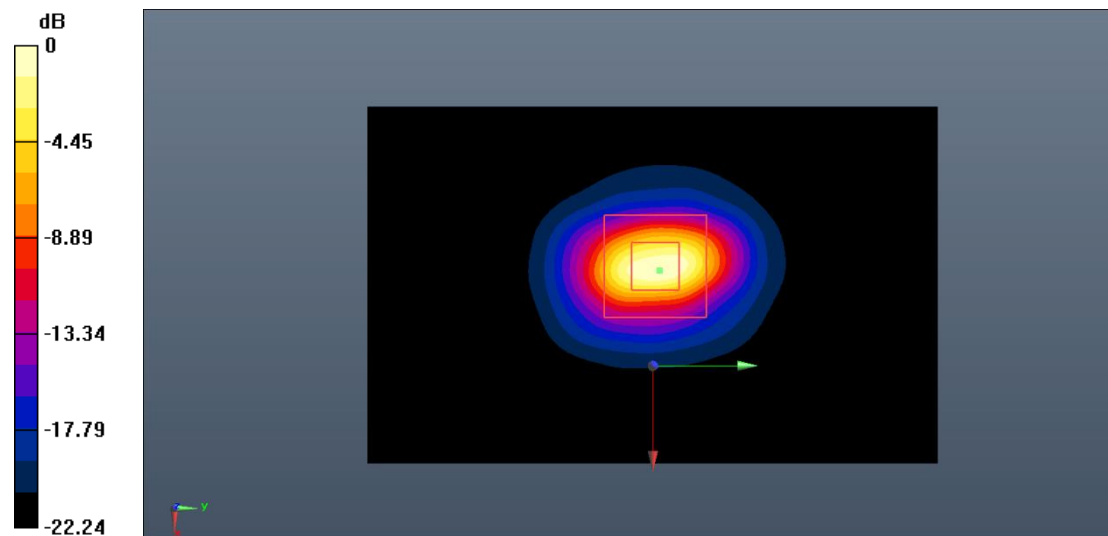
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 92.472 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 31.8 W/kg

SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.20 W/kg

Maximum value of SAR (measured) = 15.9 W/kg



0 dB = 15.9 W/kg = 12.01 dB W/kg

Fig.B.9. Validation 2450MHz 250mW

2550MHz

Date: 2023-11-21

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used: $f = 2550$ MHz; $\sigma = 1.946$ S/m; $\epsilon_r = 38.322$; $\rho = 1000$ kg/m³

Communication System: CW Frequency: 2550 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

System Validation/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 95.432 V/m; Power Drift = 0.09 dB

SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.38 W/kg

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

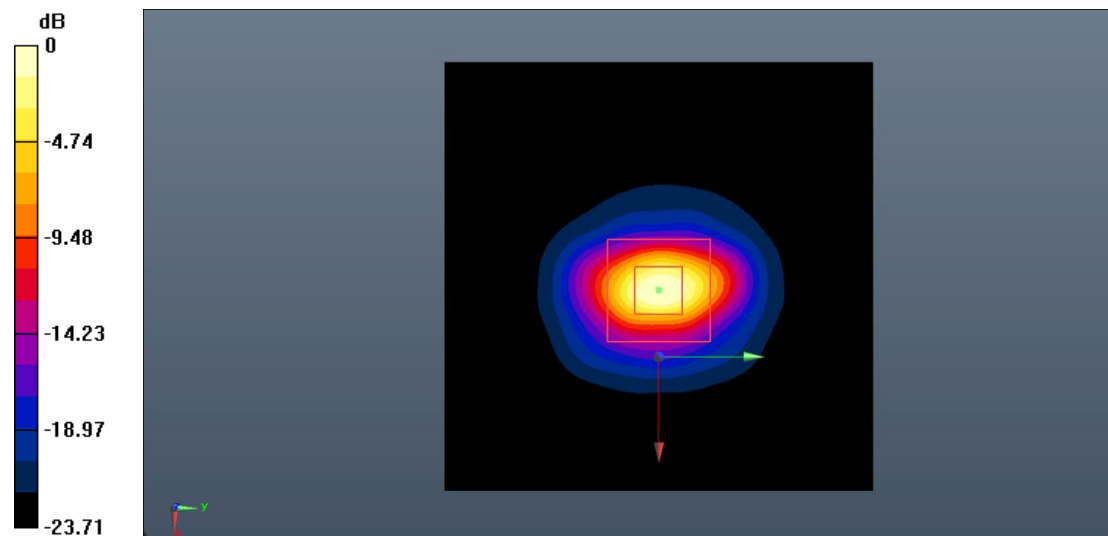
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.432 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 33.8 W/kg

SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.47 W/kg

Maximum value of SAR (measured) = 16.6 W/kg



0 dB = 16.6 W/kg = 12.20 dB W/kg

Fig.B.10. Validation 2550MHz 250mW

2550MHz

Date: 2023-11-30

Electronics: DAE4 Sn1790

Medium: Head 2550MHz

Medium parameters used: $f = 2550$ MHz; $\sigma = 1.937$ S/m; $\epsilon_r = 38.589$; $\rho = 1000$ kg/m³

Communication System: CW Frequency: 2550 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

System Validation/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 93.685 V/m; Power Drift = 0.01 dB

SAR(1 g) = 14.0 W/kg; SAR(10 g) = 6.32 W/kg

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

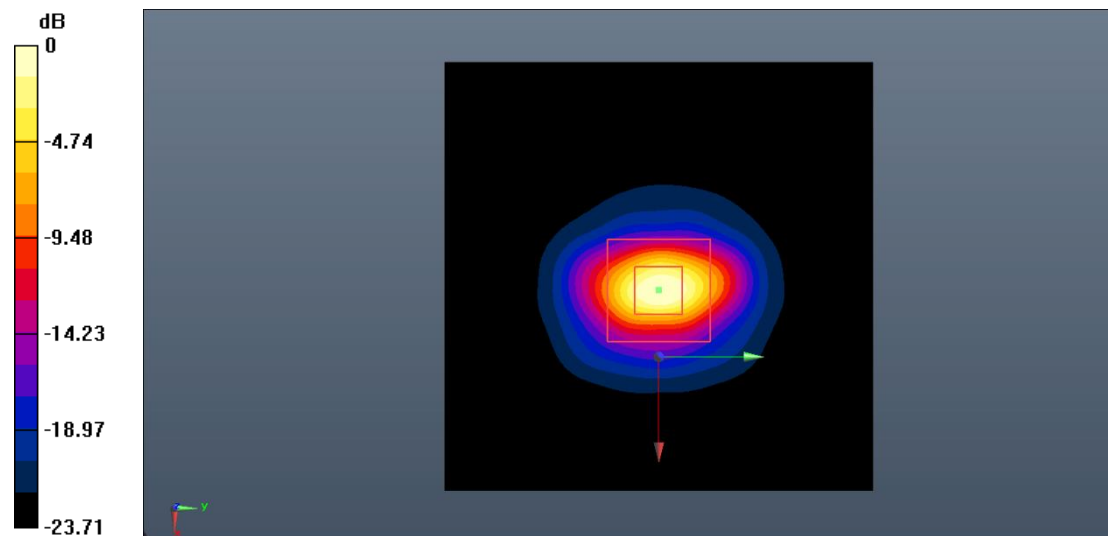
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.685 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 32.9 W/kg

SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.38 W/kg

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



0 dB = 16.3 W/kg = 12.12 dB W/kg

Fig.B.11. Validation 2550MHz 250mW

5250MHz

Date: 2023-11-28

Electronics: DAE4 Sn1790

Medium: Head 5250MHz

Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 4.633 \text{ S/m}$; $\epsilon_r = 36.745$; $\rho = 1000 \text{ kg/m}^3$

Communication System: CW Frequency: 5250 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.72, 5.72, 5.72)

System Validation/Area Scan (61x91x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 64.173 V/m; Power Drift = -0.05 dB

SAR(1 g) = 7.86 W/kg; SAR(10 g) = 2.28 W/kg

Maximum value of SAR (interpolated) = 17.8 W/kg

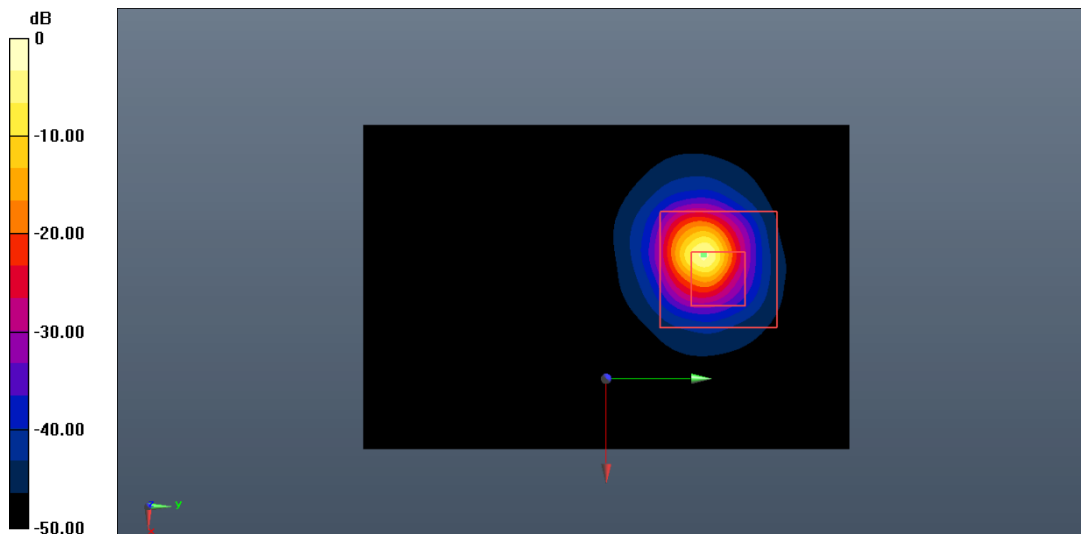
System Validation/Zoom Scan (8x8x21)/Cube0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 64.173 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 31.2 W/kg

SAR(1 g) = 7.72 W/kg; SAR(10 g) = 2.24 W/kg

Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg = 10.43 dB W/kg

Fig.B.12. Validation 5250MHz 100mW

5600MHz

Date: 2023-11-28

Electronics: DAE4 Sn1790

Medium: Head 5600MHz

Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.016 \text{ S/m}$; $\epsilon_r = 36.218$; $\rho = 1000 \text{ kg/m}^3$

Communication System: CW Frequency: 5600 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.13, 5.13, 5.13)

System Validation/Area Scan (61x91x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 68.359 V/m; Power Drift = -0.08 dB

SAR(1 g) = 8.23 W/kg; SAR(10 g) = 2.39 W/kg

Maximum value of SAR (interpolated) = 20.8 W/kg

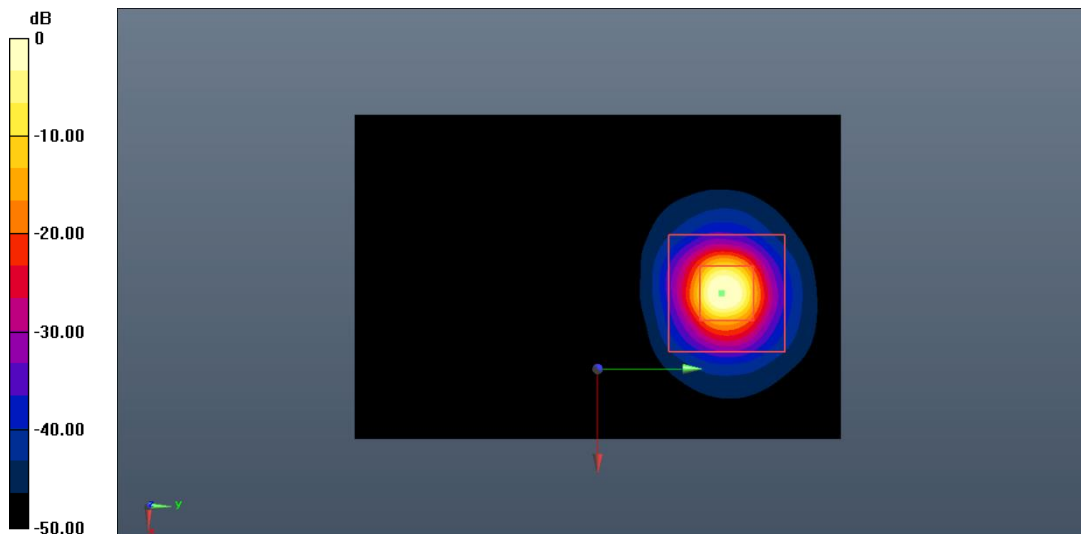
System Validation/Zoom Scan (8x8x21)/Cube0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 68.359 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 36.8 W/kg

SAR(1 g) = 8.10 W/kg; SAR(10 g) = 2.35 W/kg

Maximum value of SAR (measured) = 20.5 W/kg



0 dB = 20.5 W/kg = 13.12 dB W/kg

Fig.B.13. Validation 5600MHz 100mW

5750MHz

Date: 2023-11-28

Electronics: DAE4 Sn1790

Medium: Head 5750MHz

Medium parameters used: $f = 5750$ MHz; $\sigma = 5.315$ S/m; $\epsilon_r = 34.771$; $\rho = 1000$ kg/m³

Communication System: CW Frequency: 5750 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.23, 5.23, 5.23)

System Validation/Area Scan (61x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 66.786 V/m; Power Drift = 0.03 dB

SAR(1 g) = 8.05 W/kg; SAR(10 g) = 2.23 W/kg

Maximum value of SAR (interpolated) = 18.6 W/kg

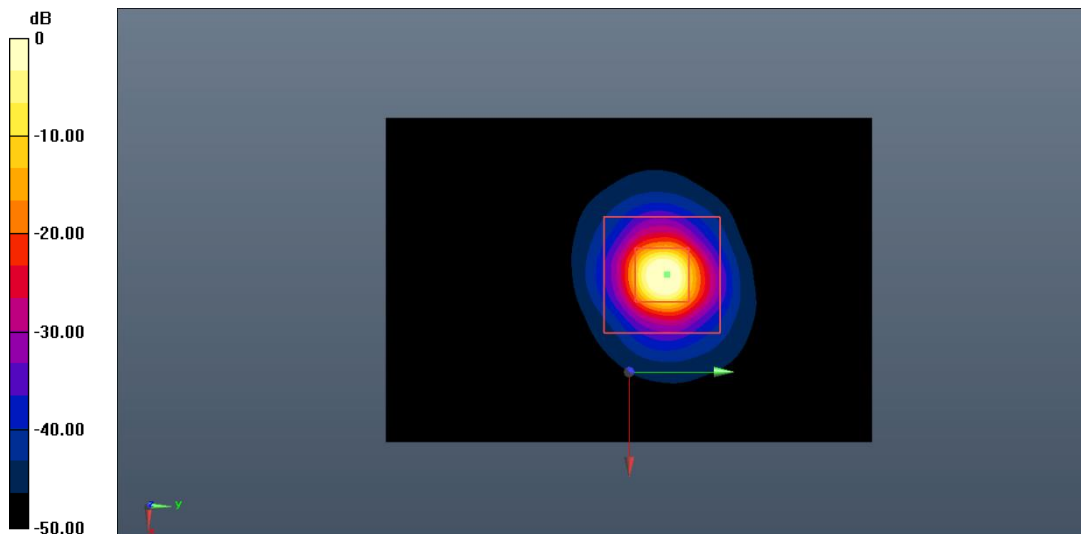
System Validation/Zoom Scan (8x8x21)/Cube0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66.786 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 33.5 W/kg

SAR(1 g) = 8.19 W/kg; SAR(10 g) = 2.27 W/kg

Maximum value of SAR (measured) = 18.8 W/kg



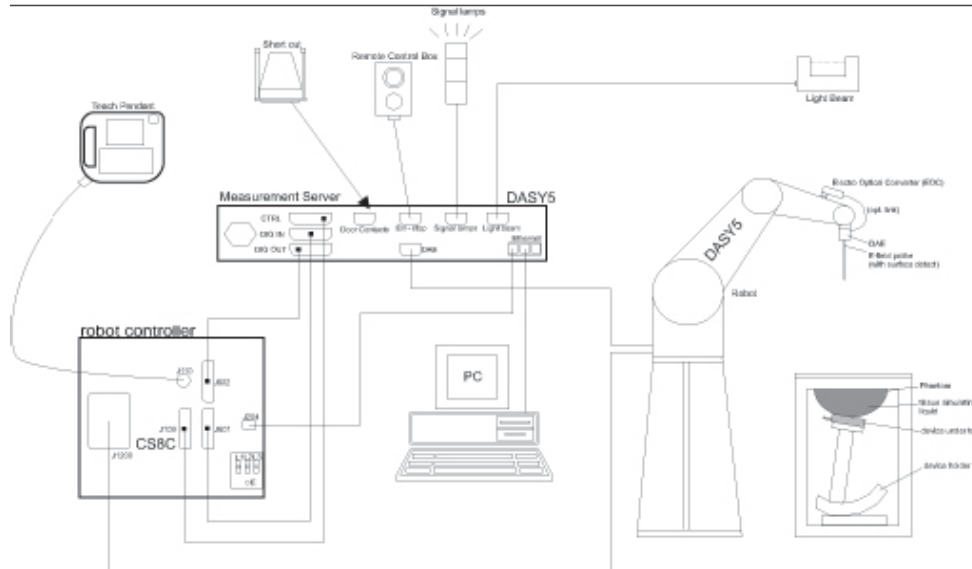
0 dB = 18.8 W/kg = 12.74 dB W/kg

Fig.B.14. Validation 5750MHz 100mW

ANNEX C: SAR Measurement Setup

C.1. Measurement Set-up

DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Picture C.1 SAR Lab Test Measurement Set-up

- A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as
- warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

C.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection during a software approach and looks for the maximum using 2nd order curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model:	ES3DV3, EX3DV4
Frequency	10MHz — 6.0GHz(EX3DV4)
Range:	10MHz — 4GHz(ES3DV3)
Calibration:	In head and body simulating tissue at Frequencies from 835 up to 5800MHz
Linearity:	± 0.2 dB(30 MHz to 6 GHz) for EX3DV4 ± 0.2 dB(30 MHz to 4 GHz) for ES3DV3
Dynamic Range:	10 mW/kg — 100W/kg
Probe Length:	330 mm
Probe Tip	
Length:	20 mm
Body Diameter:	12 mm
Tip Diameter:	2.5 mm (3.9 mm for ES3DV3)
Tip-Center:	1 mm (2.0mm for ES3DV3)
Application:	SAR Dosimetry Testing Compliance tests of mobile phones Dosimetry in strong gradient fields



Picture C.2 Near-field Probe



Picture C.3 E-field Probe

C.3. E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm²) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equate to 1 mW/cm².

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

Where:

Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m³).

C.4. Other Test Equipment

C.4.1. Data Acquisition Electronics (DAE)

The data acquisition electronics consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



PictureC.4: DAE

C.4.2. Robot

The SPEAG DASY system uses the high precision robots (DASY5: RX90L) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)



Picture C.5 DASY 5

C.4.3. Measurement Server

The Measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5:128MB), RAM (DASY5:128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.



Picture C.6 Server for DASY 5

C.4.4. Device Holder for Phantom

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of $\pm 0.5\text{mm}$ would produce a SAR uncertainty of $\pm 20\%$. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.



Picture C.7-1: Device Holder



Picture C.7-2: Laptop Extension Kit

C.4.5. Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness: 2 ± 0.2 mm
Filling Volume: Approx. 25 liters
Dimensions: 810 x 1000 x 500 mm (H x L x W)
Available: Special

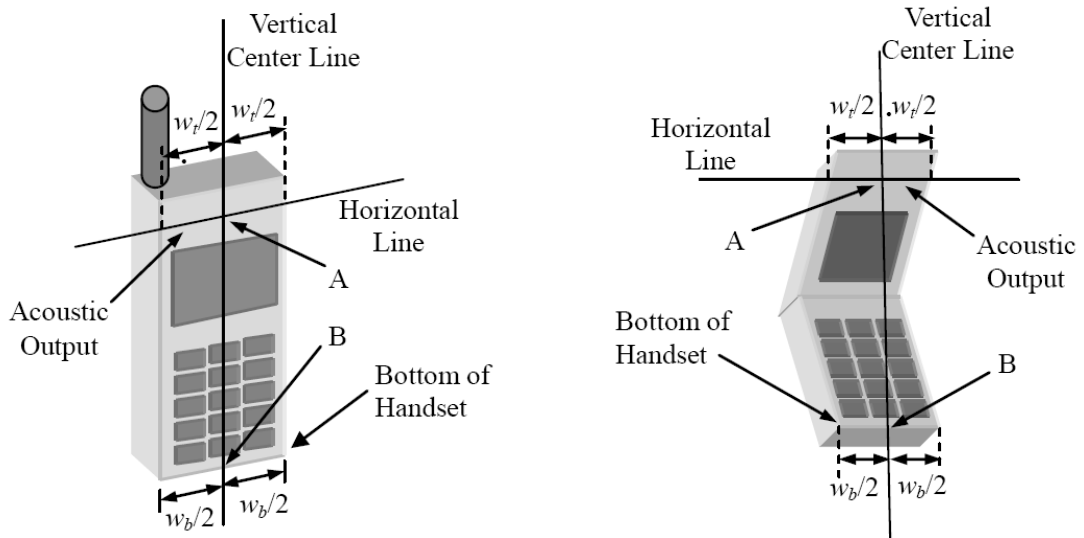


Picture C.8: SAM Twin Phantom

ANNEX D: Position of the wireless device in relation to the phantom

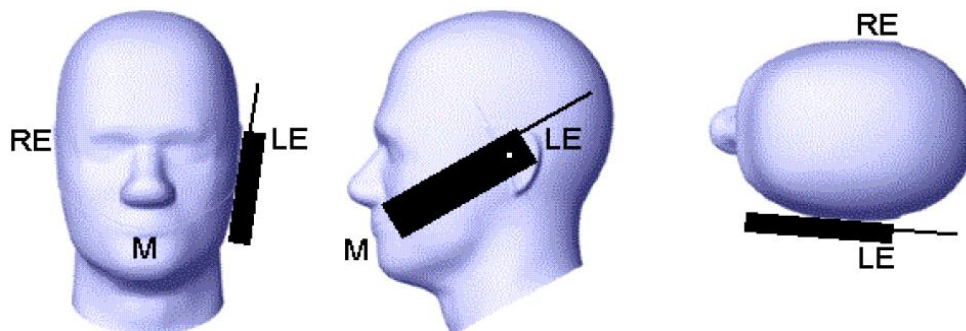
D.1. General considerations

This standard specifies two handset test positions against the head phantom – the “cheek” position and the “tilt” position.

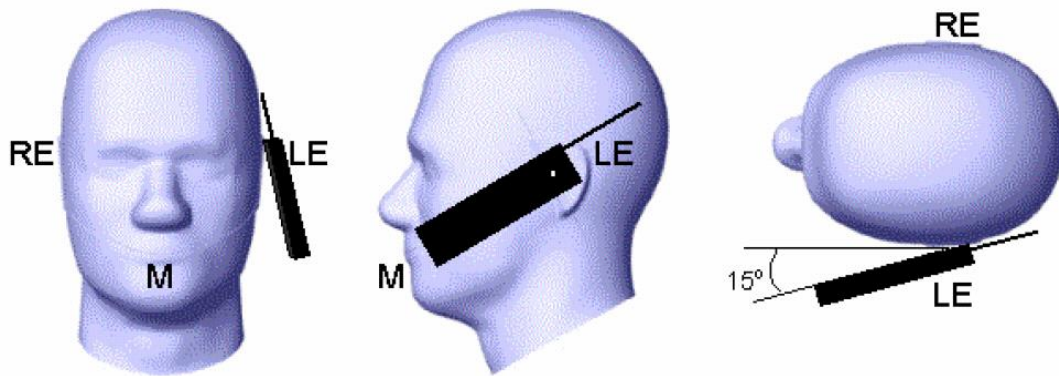


- w_t Width of the handset at the level of the acoustic
- w_b Width of the bottom of the handset
- A Midpoint of the width w_t of the handset at the level of the acoustic output
- B Midpoint of the width w_b of the bottom of the handset

Picture D.1-a Typical “fixed” case handset Picture D.1-b Typical “clam-shell” case handset



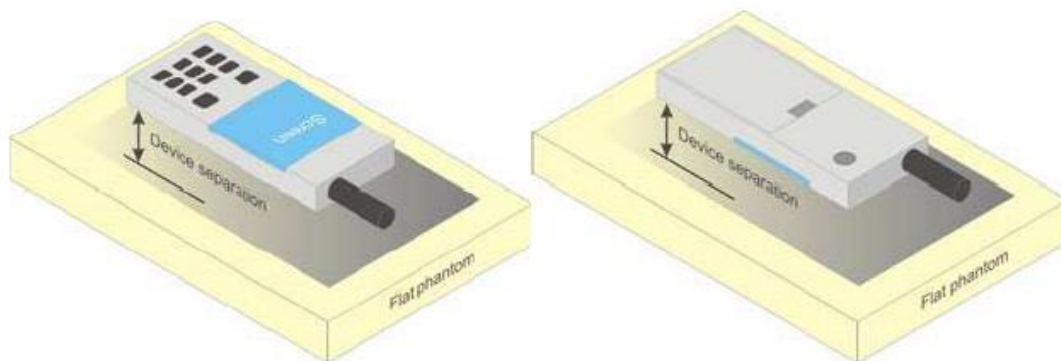
Picture D.2 Cheek position of the wireless device on the left side of SAM



Picture D.3 Tilt position of the wireless device on the left side of SAM

D.2. Body-worn device

A typical example of a body-worn device is a mobile phone, wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer.

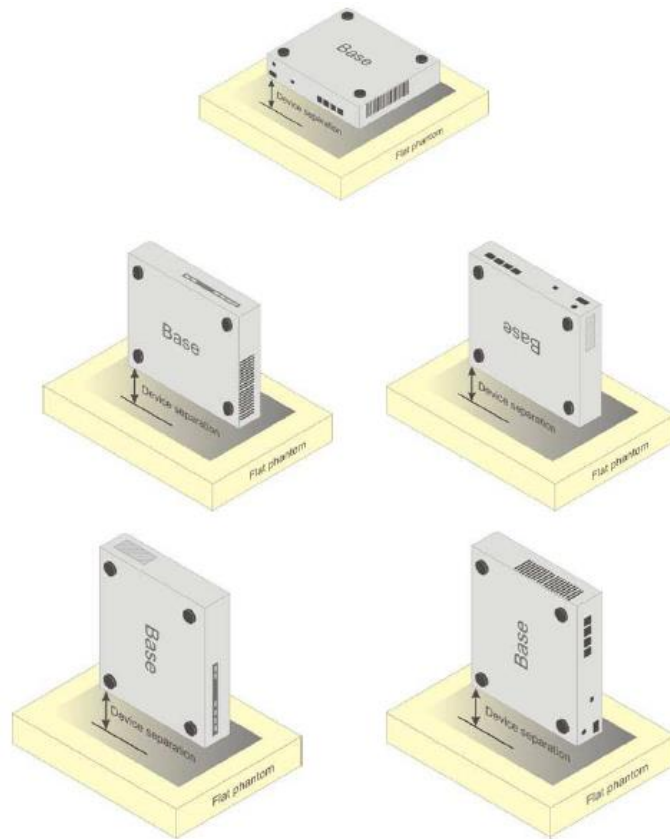


Picture D.4 Test positions for body-worn devices

D.3. Desktop device

A typical example of a desktop device is a wireless enabled desktop computer placed on a table or desk when used.

The DUT shall be positioned at the distance and in the orientation to the phantom that corresponds to the intended use as specified by the manufacturer in the user instructions. For devices that employ an external antenna with variable positions, tests shall be performed for all antenna positions specified. Picture 8.5 show positions for desktop device SAR tests. If the intended use is not specified, the device shall be tested directly against the flat phantom.



Picture D.5 Test positions for desktop devices

D.4. DUT Setup Photos



Picture D.6

ANNEX E: Equivalent Media Recipes

The liquid used for the frequency range of 700-6000 MHz consisted of water, sugar, salt, preventol, glycol monobutyl and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table E.1 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528 and IEC 62209.

Table E.1: Composition of the Tissue Equivalent Matter

Frequency (MHz)	835	1750	1900	2450	2600	5200	5800
Water	41.45	55.242	55.242	58.79	58.79	65.53	66.10
Sugar	56.0	/	/	/	/	/	/
Salt	1.45	0.306	0.306	0.06	0.06		
Preventol	0.1	/	/	/	/	17.24	16.95
Cellulose	1.0	/	/	/	/	17.24	16.95
Glycol Monobutyl	/	44.452	44.452	41.15	41.15	/	/
Diethylenglycol monohexylether	/	/	/	/	/	/	/
Triton X-100	/	/	/	/	/	/	/
Dielectric Parameters Target Value	$\epsilon=41.5$ $\sigma=0.90$	$\epsilon=40.08$ $\sigma=1.37$	$\epsilon=40.0$ $\sigma=1.40$	$\epsilon=39.20$ $\sigma=1.80$	$\epsilon=39.01$ $\sigma=1.96$	$\epsilon=35.99$ $\sigma=4.66$	$\epsilon=35.30$ $\sigma=5.27$

Note: There is a little adjustment respectively for 750, 5300 and 5600, based on the recipe of closest frequency in table E.1

ANNEX F: System Validation

The SAR system must be validated against its performance specifications before it is deployed. When SAR probes, system components or software are changed, upgraded or recalibrated, these must be validated with the SAR system(s) that operates with such components.

Table F.1: System Validation

Probe SN.	Liquid name (MHz)	Validation date	Frequency point	CW Validation	Modulation Signal Validation		
					Modulation Type	Duty Factor	PAR
7683	Head 750	2023-02-20	750MHz	Pass	N/A	N/A	N/A
7683	Head 835	2023-02-20	835MHz	Pass	GMSK	Pass	N/A
7683	Head 1750	2023-02-20	1750MHz	Pass	N/A	N/A	N/A
7683	Head 1900	2023-02-20	1900MHz	Pass	GMSK	Pass	N/A
7683	Head 2450	2023-02-22	2450MHz	Pass	OFDM/TDD	Pass	Pass
7683	Head 2550	2023-02-20	2550MHz	Pass	TDD	Pass	N/A
7683	Head 3500	2023-02-21	3500MHz	Pass	TDD	Pass	N/A
7683	Head 3700	2023-02-21	3700MHz	Pass	TDD	Pass	N/A
7683	Head 3900	2023-02-21	3900MHz	Pass	TDD	Pass	N/A
7683	Head 5250	2023-02-22	5250MHz	Pass	OFDM	N/A	Pass
7683	Head 5600	2023-02-22	5600MHz	Pass	OFDM	N/A	Pass
7683	Head 5750	2023-02-22	5750MHz	Pass	OFDM	N/A	Pass

ANNEX G: DAE Calibration Certificate

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





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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 SAICT-SZ

Certificate No: DAE4-1790_Mar23

CALIBRATION CERTIFICATE																							
Object	DAE4 - SD 000 D04 BP - SN: 1790																						
Calibration procedure(s)	QA CAL-06.v30 Calibration procedure for the data acquisition electronics (DAE)																						
Calibration date:	March 02, 2023																						
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Keithley Multimeter Type 2001</td> <td>SN: 0810278</td> <td>29-Aug-22 (No:34389)</td> <td>Aug-23</td> </tr> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> <tr> <td>Auto DAE Calibration Unit</td> <td>SE UWS 053 AA 1001</td> <td>27-Jan-23 (in house check)</td> <td>In house check: Jan-24</td> </tr> <tr> <td>Calibrator Box V2.1</td> <td>SE UMS 006 AA 1002</td> <td>27-Jan-23 (in house check)</td> <td>In house check: Jan-24</td> </tr> </tbody> </table>				Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Keithley Multimeter Type 2001	SN: 0810278	29-Aug-22 (No:34389)	Aug-23	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Auto DAE Calibration Unit	SE UWS 053 AA 1001	27-Jan-23 (in house check)	In house check: Jan-24	Calibrator Box V2.1	SE UMS 006 AA 1002	27-Jan-23 (in house check)	In house check: Jan-24
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Calibrator Box V2.1	SE UMS 006 AA 1002	27-Jan-23 (in house check)	In house check: Jan-24																				
Calibrated by:	Name Eric Hainfeld	Function Laboratory Technician	Signature 																				
Approved by:	Sven Kühn	Technical Manager																					
			Issued: March 2, 2023																				
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.																							

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



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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**

Glossary

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

Methods Applied and Interpretation of Parameters

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

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

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

Calibration Factors	X	Y	Z
High Range	404.604 ± 0.02% (k=2)	404.331 ± 0.02% (k=2)	404.468 ± 0.02% (k=2)
Low Range	4.00255 ± 1.50% (k=2)	3.99549 ± 1.50% (k=2)	3.98581 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	306,0 ° ± 1 °
---	---------------

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	200033.74	-1.44	-0.00
Channel X + Input	20005.39	-0.74	-0.00
Channel X - Input	-20004.02	1.76	-0.01
Channel Y + Input	200038.50	3.58	0.00
Channel Y + Input	20002.97	-3.15	-0.02
Channel Y - Input	-20007.14	-1.18	0.01
Channel Z + Input	200034.20	-0.88	-0.00
Channel Z + Input	20004.41	-1.63	-0.01
Channel Z - Input	-20005.73	0.32	-0.00

Low Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	2001.40	-0.14	-0.01
Channel X + Input	200.82	-0.59	-0.29
Channel X - Input	-198.28	0.23	-0.12
Channel Y + Input	2001.39	-0.05	-0.00
Channel Y + Input	200.26	-1.03	-0.51
Channel Y - Input	-199.92	-1.28	0.65
Channel Z + Input	2001.20	-0.22	-0.01
Channel Z + Input	200.40	-0.89	-0.44
Channel Z - Input	-199.63	-1.02	0.51

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-18.43	-19.65
	- 200	19.32	18.11
Channel Y	200	-17.38	-18.13
	- 200	16.56	16.01
Channel Z	200	-11.31	-11.64
	- 200	10.03	9.99

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	0.84	-2.57
Channel Y	200	4.84	-	3.21
Channel Z	200	7.42	2.89	-

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	16203	15690
Channel Y	16275	16445
Channel Z	15950	16110

5. Input Offset Measurement

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

Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.10	-1.05	1.63	0.45
Channel Y	-0.42	-2.31	0.79	0.40
Channel Z	-0.67	-1.34	0.29	0.34

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

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

9. Power Consumption (Typical values for information)

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

ANNEX H: Probe Calibration Certificate



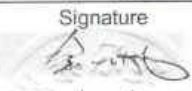

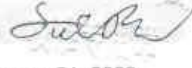
Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2117
 E-mail: cmf@caict.ac.cn http://www.caict.ac.cn



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 国际互认
 校准
 CALIBRATION
 CNAS L0570

Client **SAICT**

Certificate No: **Z23-60028**

CALIBRATION CERTIFICATE			
Object	EX3DV4 - SN : 7683		
Calibration Procedure(s)	FF-Z11-004-02 Calibration Procedures for Dosimetric E-field Probes		
Calibration date:	February 16, 2023.		
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility; environment temperature(22±3)°C and humidity<70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p>			
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Power sensor NRP-Z91	101547	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Power sensor NRP-Z91	101548	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Reference 10dBAttenuator	18N50W-10dB	19-Jan-23(CTTL, No.J23X00212)	Jan-25
Reference 20dBAttenuator	18N50W-20dB	19-Jan-23(CTTL, No.J23X00211)	Jan-25
Reference Probe EX3DV4	SN 3846	20-May-22(SPEAG, No.EX3-3846_May22)	May-23
DAE4	SN 771	20-Jan-22(SPEAG, No.DAE4-771_Jan22)	Jan-23
DAE4	SN 1555	25-Aug-22(SPEAG, No.DAE4-1555_Aug22)	Aug-23
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGenerator MG3700A	6201052605	14-Jun-22(CTTL, No.J22X04182)	Jun-23
Network Analyzer E5071C	MY46110673	10-Jan-23(CTTL, No.J23X00104)	Jan-24
	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	
Issued: February 21, 2023			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: Z23-60028

Page 1 of 22



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Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i $\theta=0$ is normal to probe axis

Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}:** Assessed for E-field polarization $\theta=0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E^2 -field uncertainty inside TSL (see below ConvF).
- NORM(*f*)_{x,y,z} = NORM_{x,y,z} * frequency_response** (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}:** DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR:** PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,y,z}; A,B,C** are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters:** Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy):** in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset:** The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle:** The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7683

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.63	0.63	0.62	±10.0%
DCP(mV) ^B	103.7	104.8	104.6	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB· μV	C	D dB	VR mV	Max Dev.	Max Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	207.3	±2.1%	±4.7%
		Y	0.0	0.0	1.0		206.5		
		Z	0.0	0.0	1.0		208.9		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	1.41	60.00	5.76	10.00	60	±2.1%	±9.6%
		Y	1.40	60.00	5.71		60		
		Z	1.40	60.00	5.74		60		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	6.00	68.00	7.00	6.99	80	±2.7%	±9.6%
		Y	6.00	68.00	7.00		80		
		Z	0.80	60.00	4.57		80		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	0.17	139.32	0.54	3.98	95	±2.3%	±9.6%
		Y	0.18	142.45	0.34		95		
		Z	0.39	152.48	0.68		95		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	8.34	159.94	4.53	2.22	120	±1.3%	±9.6%
		Y	6.71	159.96	17.92		120		
		Z	9.39	159.08	22.96		120		
10387-AAA	QPSK Waveform, 1 MHz	X	0.54	62.14	10.35	1.00	150	±4.5%	±9.6%
		Y	0.69	64.27	11.73		150		
		Z	0.65	64.12	11.72		150		
10388-AAA	QPSK Waveform, 10 MHz	X	1.29	64.42	12.76	0.00	150	±1.5%	±9.6%
		Y	1.44	65.67	13.79		150		
		Z	1.42	65.70	13.74		150		
10396-AAA	64-QAM Waveform, 100 kHz	X	1.75	65.11	16.63	3.01	150	±1.1%	±9.6%
		Y	1.85	66.39	17.86		150		
		Z	1.81	65.99	17.68		150		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	3.99	66.17	15.25	0.00	150	±4.7%	±9.6%
		Y	4.14	66.41	15.55		150		
		Z	4.12	66.53	15.58		150		

Note: For details on UID parameters see Appendix

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

^A The uncertainties of Norm X, Y, Z do not affect the E²-field uncertainty inside TSL (see Page 5).

^B Numerical linearization parameter; uncertainty not required.

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



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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7683

Sensor Model Parameters

	C1 fF	C2 fF	α V ⁻¹	T1 ms.V ⁻²	T2 ms.V ⁻¹	T3 ms	T4 V ⁻²	T5 V ⁻¹	T6
X	11.17	81.84	33.99	2.45	0.00	4.90	0.33	0.00	1.01
Y	12.84	94.42	34.34	2.69	0.00	4.90	0.30	0.00	1.02
Z	12.01	88.21	34.28	3.18	0.00	4.90	0.21	0.00	1.02

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	156.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

DASY/EASY – Parameters of Probe: EX3DV4 – SN:7683

Calibration Parameter Determined in Head Tissue Simulating Media

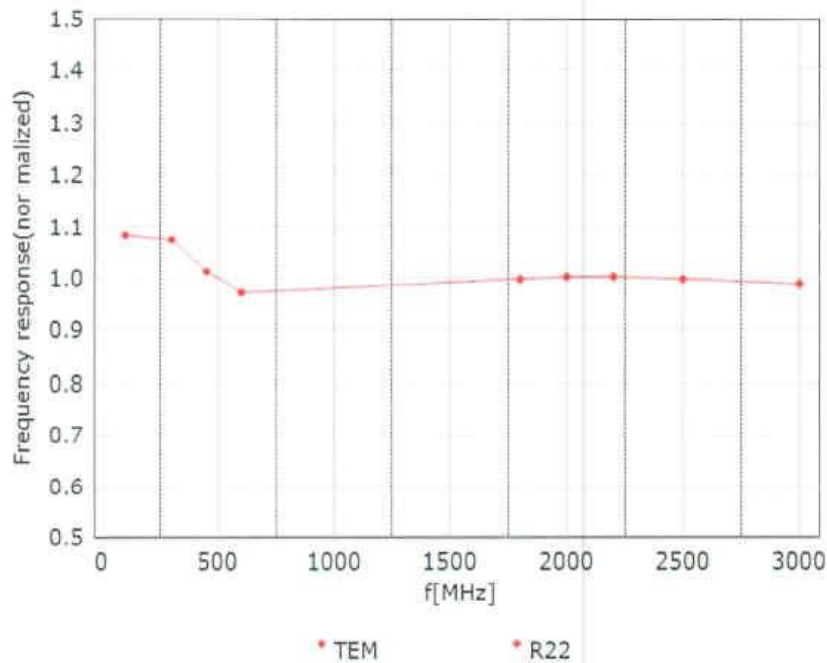
f [MHz] ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	10.75	10.75	10.75	0.11	1.60	± 12.7%
900	41.5	0.97	10.28	10.28	10.28	0.17	1.26	± 12.7%
1640	40.3	1.29	9.01	9.01	9.01	0.19	1.12	± 12.7%
1750	40.1	1.37	8.81	8.81	8.81	0.18	1.18	± 12.7%
1900	40.0	1.40	8.55	8.55	8.55	0.24	1.02	± 12.7%
2100	39.8	1.49	8.65	8.65	8.65	0.21	1.08	± 12.7%
2300	39.5	1.67	8.30	8.30	8.30	0.66	0.67	± 12.7%
2450	39.2	1.80	8.02	8.02	8.02	0.66	0.68	± 12.7%
2600	39.0	1.96	7.76	7.76	7.76	0.55	0.75	± 12.7%
3300	38.2	2.71	7.49	7.49	7.49	0.30	1.03	± 13.9%
3500	37.9	2.91	7.34	7.34	7.34	0.31	1.04	± 13.9%
3700	37.7	3.12	7.09	7.09	7.09	0.30	1.06	± 13.9%
3900	37.5	3.32	6.95	6.95	6.95	0.30	1.45	± 13.9%
4100	37.2	3.53	6.91	6.91	6.91	0.30	1.40	± 13.9%
4400	36.9	3.84	6.74	6.74	6.74	0.30	1.50	± 13.9%
4600	36.7	4.04	6.66	6.66	6.66	0.40	1.33	± 13.9%
4800	36.4	4.25	6.58	6.58	6.58	0.40	1.38	± 13.9%
4950	36.3	4.40	6.36	6.36	6.36	0.40	1.35	± 13.9%
5250	35.9	4.71	5.72	5.72	5.72	0.45	1.32	± 13.9%
5600	35.5	5.07	5.13	5.13	5.13	0.40	1.60	± 13.9%
5750	35.4	5.22	5.23	5.23	5.23	0.45	1.40	± 13.9%

^C Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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 frequency up to 6 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Frequency Response of E-Field (TEM-Cell: ifi110 EXX, Waveguide: R22)

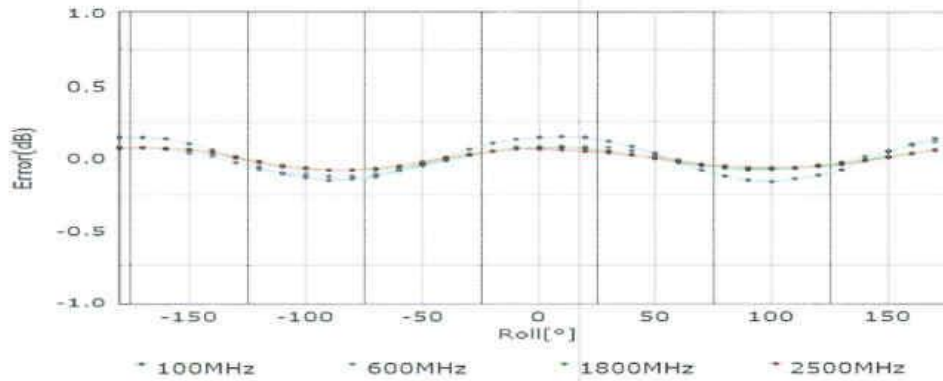
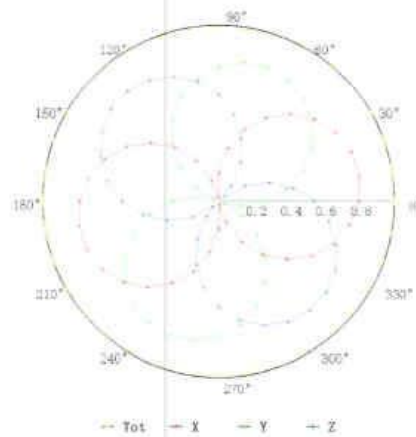
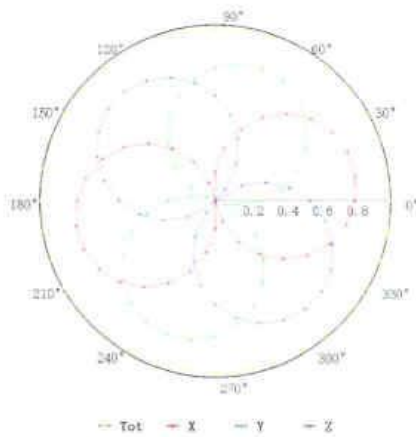


Uncertainty of Frequency Response of E-field: $\pm 7.4\%$ ($k=2$)

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

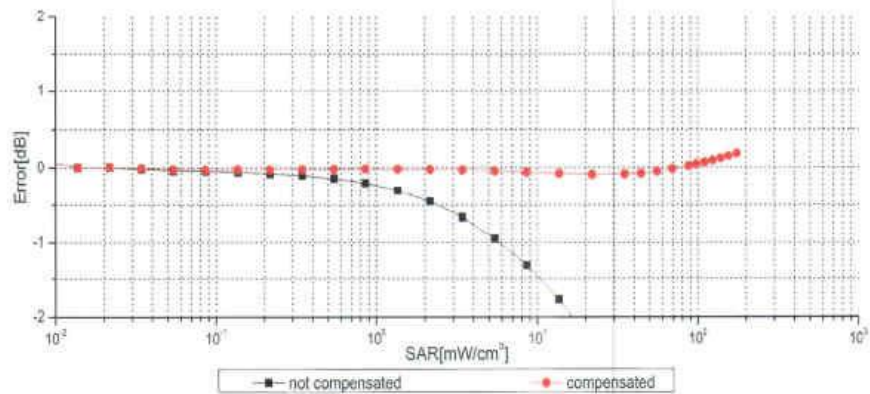
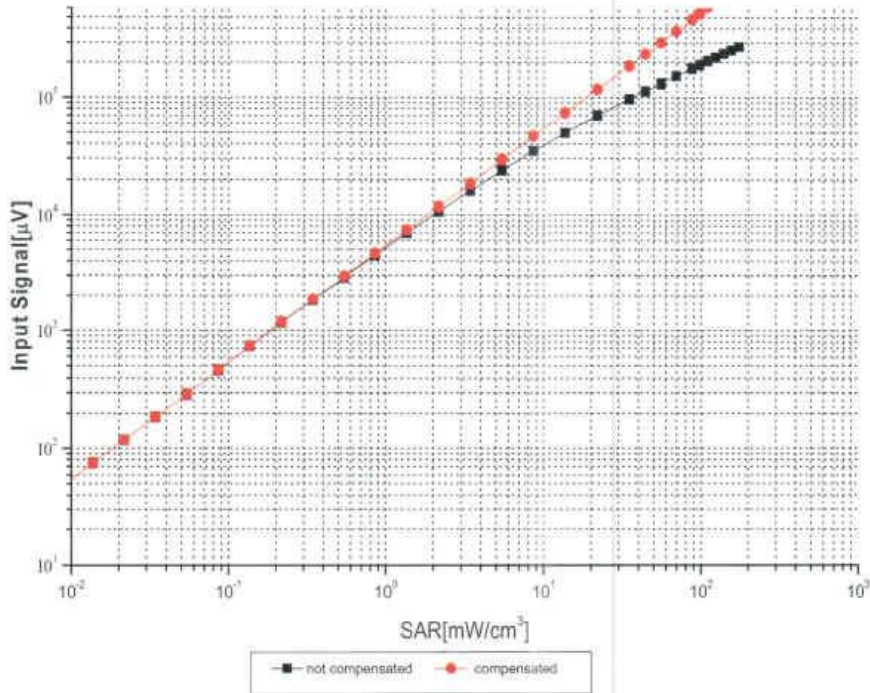
f=600 MHz, TEM

f=1800 MHz, R22



Uncertainty of Axial Isotropy Assessment: $\pm 1.2\%$ ($k=2$)

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

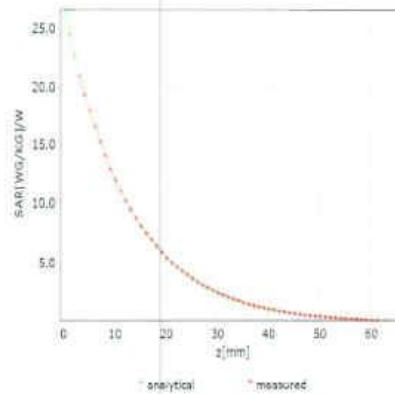
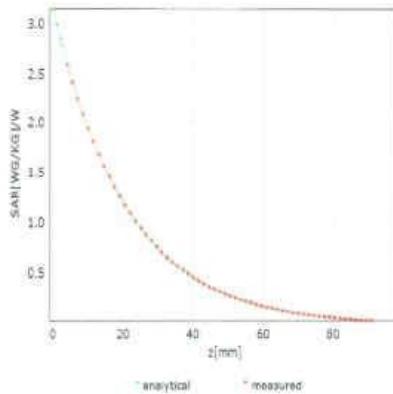


Uncertainty of Linearity Assessment: ±0.9% (k=2)

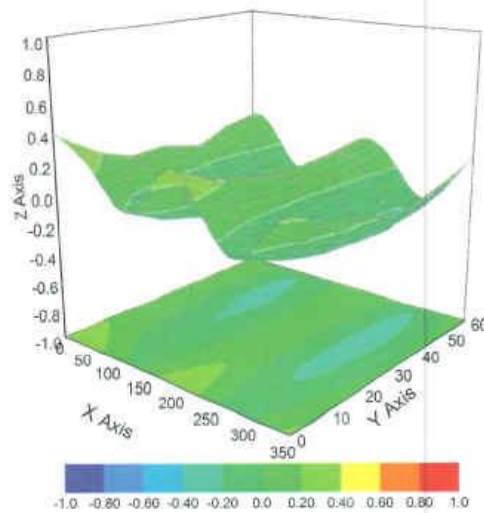
Conversion Factor Assessment

f=750 MHz,WGLS R9(H_convF)

f=1750 MHz,WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: $\pm 3.2\%$ ($k=2$)

Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	UncE (k=2)
0		CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	7.74	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	4.53	± 9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.01	± 9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	4.77	± 9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	± 9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	± 9.6 %
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	± 9.6 %
10062	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10063	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	± 9.6 %
10064	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	± 9.6 %
10067	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	± 9.6 %
10068	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9.83	± 9.6 %
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	± 9.6 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	± 9.6 %
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAC	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	DAC	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %
10100	CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %

10102	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	DAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	± 9.6 %
10108	CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	± 9.6 %
10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	± 9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	± 9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10114	CAG	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10115	CAG	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAG	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAG	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
10118	CAD	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
10119	CAD	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6 %
10140	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10143	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
10144	CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
10145	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
10146	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6 %
10147	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	± 9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10151	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6 %
10152	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10153	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6 %
10154	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10155	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10156	CAF	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	± 9.6 %
10157	CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10158	CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6 %
10160	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	± 9.6 %
10161	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10162	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	± 9.6 %
10166	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	± 9.6 %
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	± 9.6 %
10169	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10170	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10171	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6 %
10172	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10173	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10174	CAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10175	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10176	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10177	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10178	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10179	AAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10181	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10182	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10184	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10185	CAI	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %



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Table with 6 columns: ID, Code, Standard, Modulation, Test Method, and Result. It lists various LTE and UMTS test configurations and their corresponding results.



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Table with 6 columns: ID, Standard, Modulation, Bandwidth, Test Method, and Result. It lists various communication standards like LTE-TDD, UMTS-FDD, CDMA2000, WIMAX, and WLAN with their respective test results and error percentages.