

APPENDIX A: SAR TEST DATA

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Head; Medium parameters used (interpolated):

$f = 836.52$ MHz; $\sigma = 0.914$ S/m; $\epsilon_r = 40.137$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Test Date: 01-13-2020; Ambient Temp: 21.9°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7308; ConvF(9.87, 9.87, 9.87) @ 836.52 MHz; Calibrated: 8/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1450; Calibrated: 8/14/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: Cell. CDMA, BC 0, Left Head, Cheek, Mid.ch

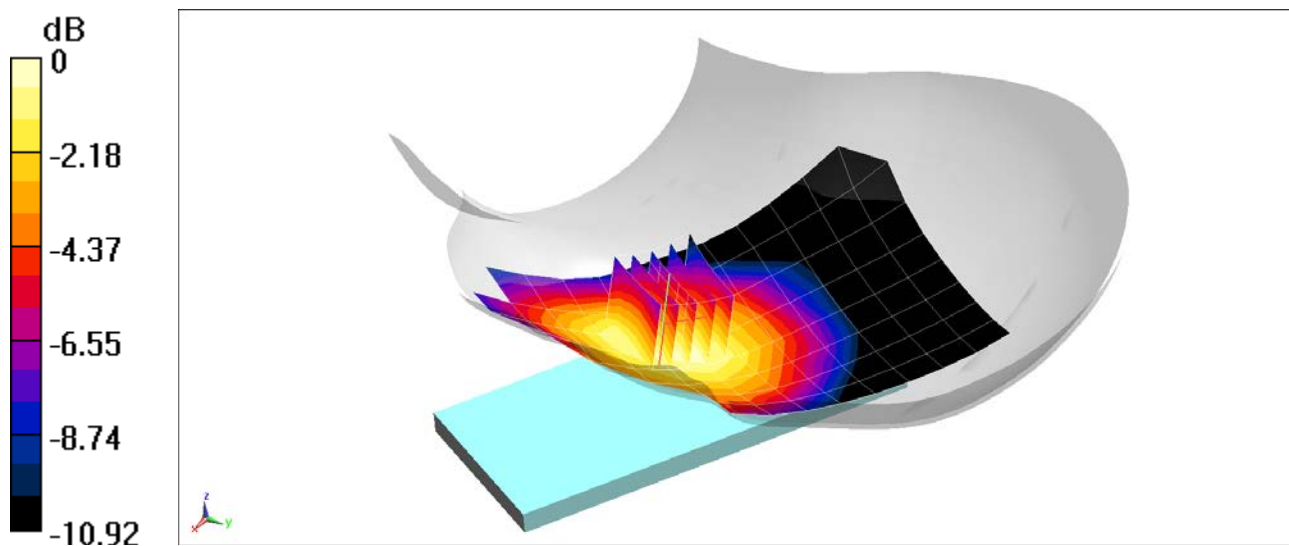
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.26 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.168 W/kg

SAR(1 g) = 0.127 W/kg



0 dB = 0.151 W/kg = -8.21 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, _GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Head; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.914 \text{ S/m}$; $\epsilon_r = 40.137$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-13-2020; Ambient Temp: 21.9°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7308; ConvF(9.87, 9.87, 9.87) @ 836.6 MHz; Calibrated: 8/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1450; Calibrated: 8/14/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: GPRS 850, Left Head, Cheek, Mid.ch, 2 Tx slots

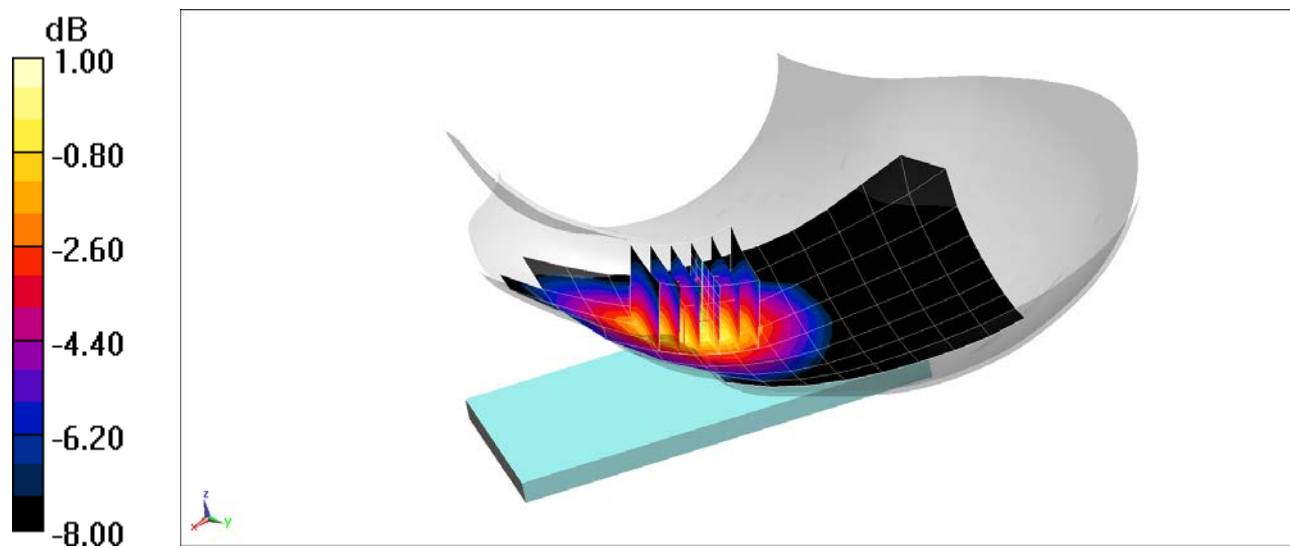
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 9.615 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 0.270 W/kg

SAR(1 g) = 0.079 W/kg



0 dB = 0.157 W/kg = -8.04 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Head; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.914 \text{ S/m}$; $\epsilon_r = 40.137$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-13-2020; Ambient Temp: 21.9°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7308; ConvF(9.87, 9.87, 9.87) @ 836.6 MHz; Calibrated: 8/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1450; Calibrated: 8/14/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 850, Left Head, Cheek, Mid.ch

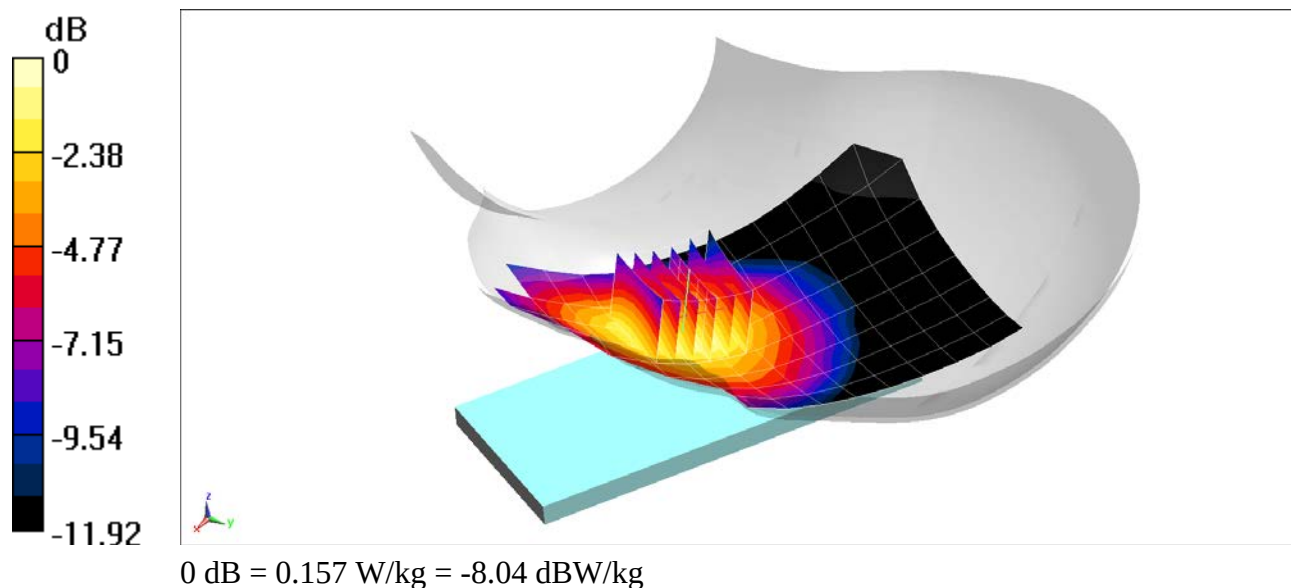
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.23 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.173 W/kg

SAR(1 g) = 0.128 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1

Medium: 1750 Head; Medium parameters used (interpolated):

$f = 1732.4 \text{ MHz}$; $\sigma = 1.367 \text{ S/m}$; $\epsilon_r = 39.17$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-02-2019; Ambient Temp: 23.7°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN7551; ConvF(8.34, 8.34, 8.34) @ 1732.4 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 1750, Left Head, Cheek, Mid.ch

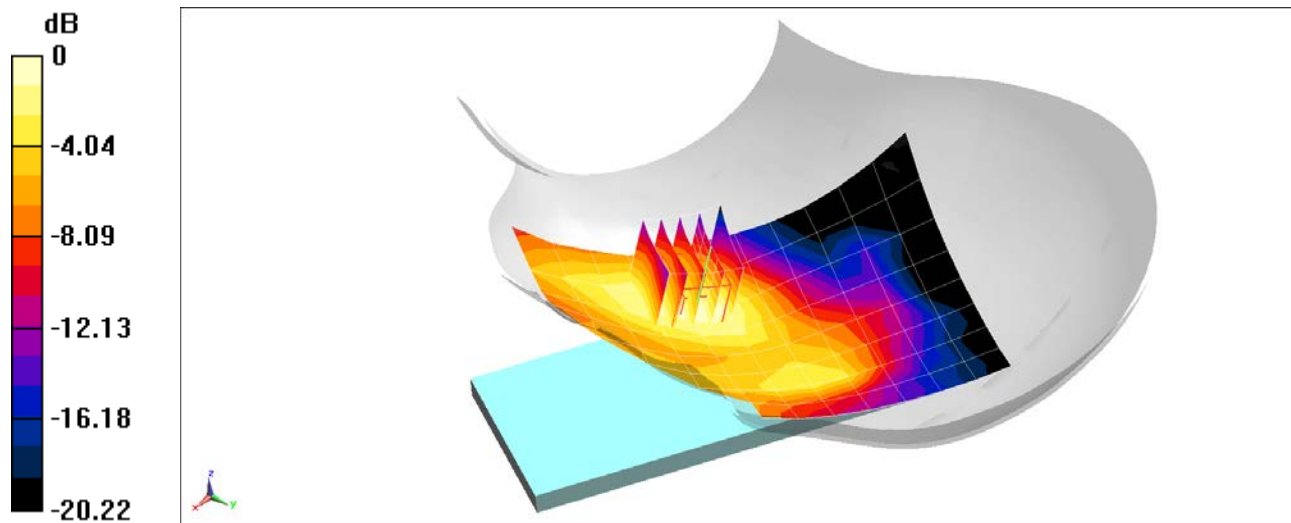
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 8.230 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.133 W/kg

SAR(1 g) = 0.088 W/kg



0 dB = 0.114 W/kg = -9.43 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.423 \text{ S/m}$; $\epsilon_r = 39.364$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-04-2020; Ambient Temp: 23.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7410; ConvF(8.11, 8.11, 8.11) @ 1880 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: PCS CDMA, Right Head, Tilt, Mid.ch

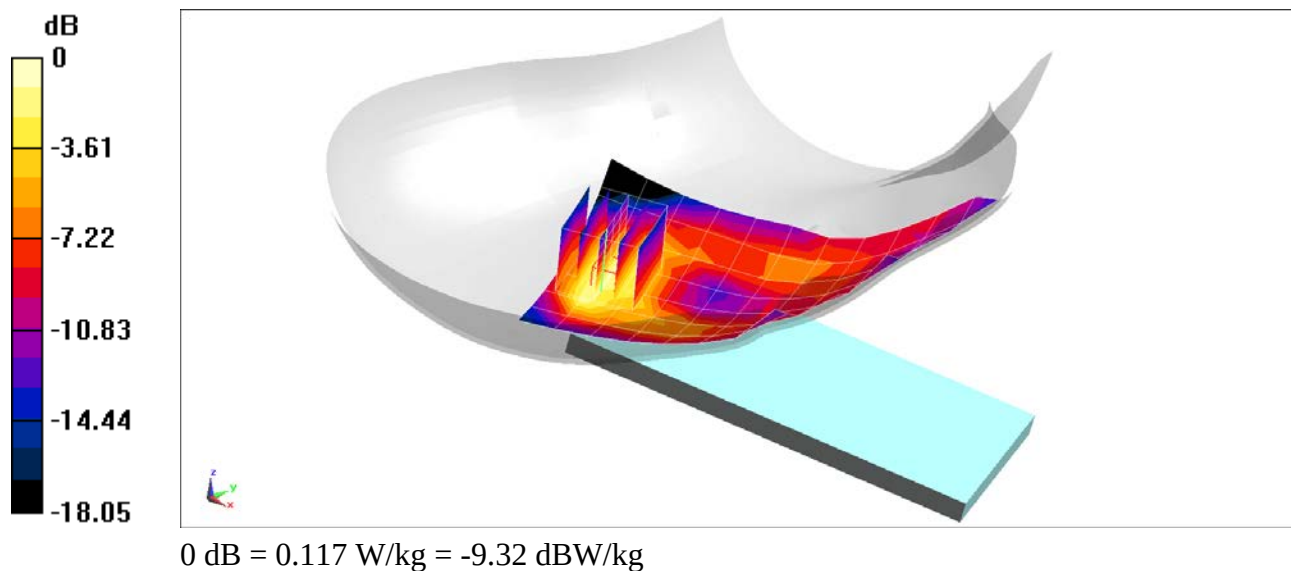
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 7.823 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.137 W/kg

SAR(1 g) = 0.078 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: 1900 Head; Medium parameters used:

$f = 1880$ MHz; $\sigma = 1.423$ S/m; $\epsilon_r = 39.364$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Test Date: 01-04-2020; Ambient Temp: 23.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7410; ConvF(8.11, 8.11, 8.11) @ 1880 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: GPRS 1900, Right Head, Cheek, Mid.ch, 2 Tx slots

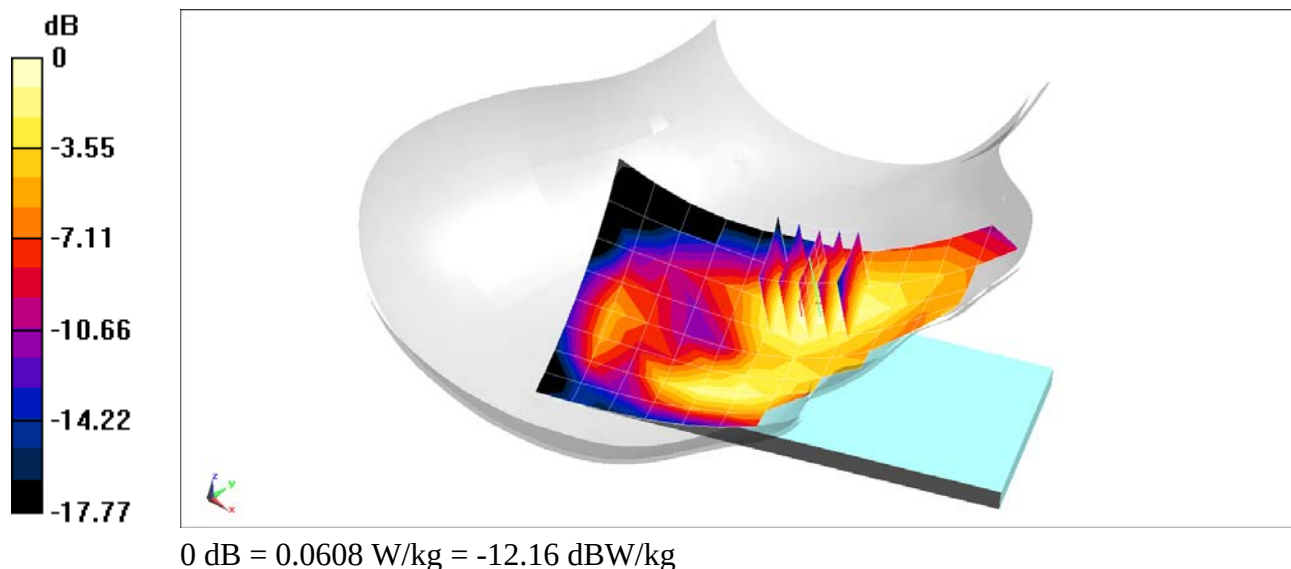
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 5.991 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.0730 W/kg

SAR(1 g) = 0.048 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.423 \text{ S/m}$; $\epsilon_r = 39.364$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-04-2020; Ambient Temp: 23.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7410; ConvF(8.11, 8.11, 8.11) @ 1880 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 1900, Right Head, Cheek, Mid.ch

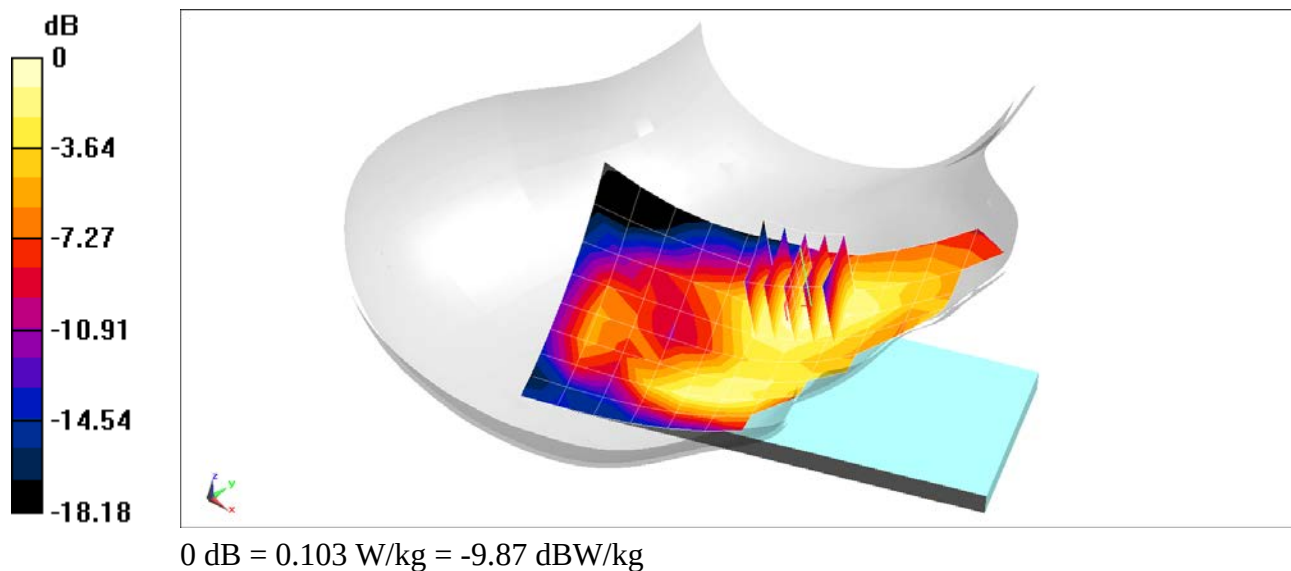
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 7.880 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.121 W/kg

SAR(1 g) = 0.081 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 750 Head; Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.882 \text{ S/m}$; $\epsilon_r = 41.893$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-29-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95) @ 707.5 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 12, Left Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset**

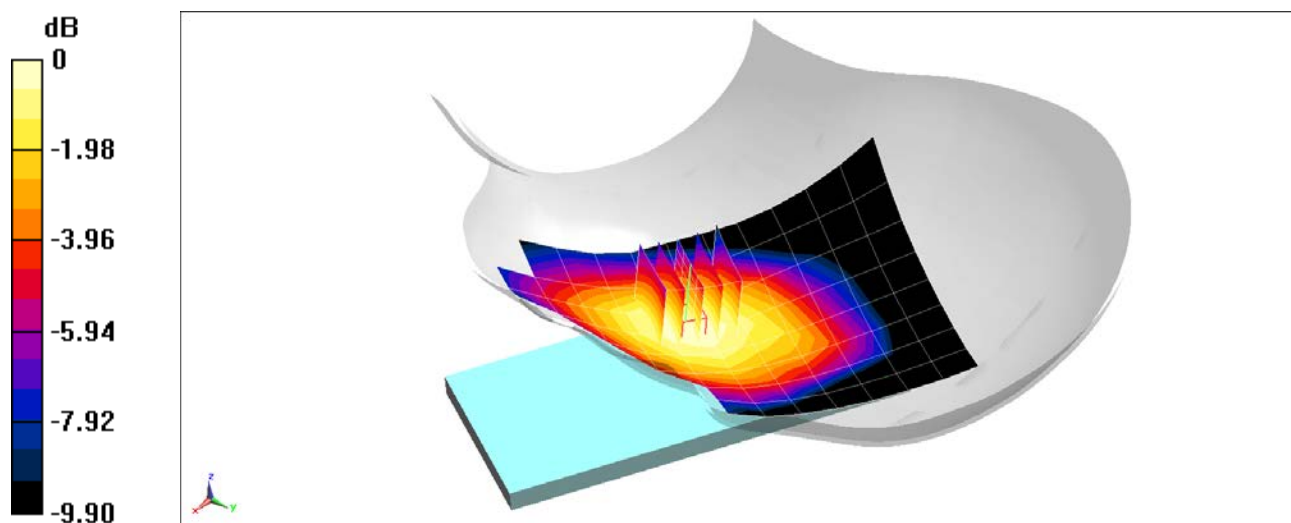
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.11 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.117 W/kg

SAR(1 g) = 0.098 W/kg



0 dB = 0.112 W/kg = -9.51 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 750 Head; Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.908 \text{ S/m}$; $\epsilon_r = 41.686$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-29-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95) @ 782 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 13, Left Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset**

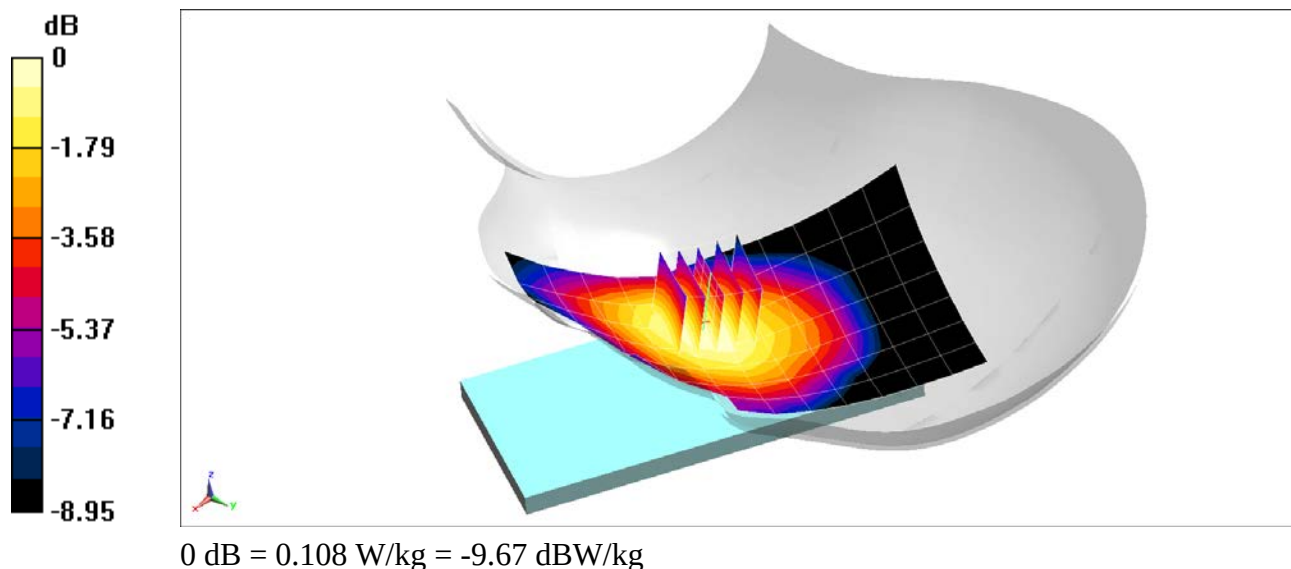
Area Scan (8x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.90 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.113 W/kg

SAR(1 g) = 0.095 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 14; Frequency: 793 MHz; Duty Cycle: 1:1

Medium: 750 Head; Medium parameters used (interpolated):

$f = 793 \text{ MHz}$; $\sigma = 0.911 \text{ S/m}$; $\epsilon_r = 41.657$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-29-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95) @ 793 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 14, Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

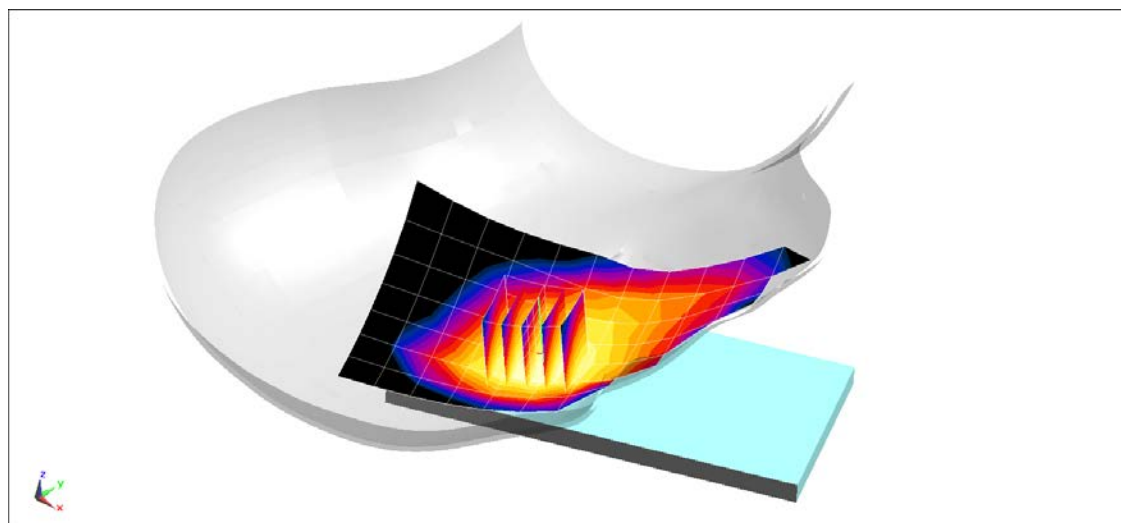
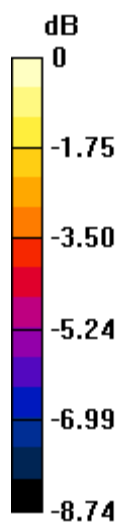
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.57 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.107 W/kg

SAR(1 g) = 0.092 W/kg



0 dB = 0.103 W/kg = -9.87 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00379

Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Head; Medium parameters used (interpolated):

$f = 836.5 \text{ MHz}$; $\sigma = 0.914 \text{ S/m}$; $\epsilon_r = 40.137$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-13-2020; Ambient Temp: 21.9°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7308; ConvF(9.87, 9.87, 9.87) @ 836.5 MHz; Calibrated: 8/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1450; Calibrated: 8/14/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: LTE Band 5 (Cell.) ULCA, Left Head, Cheek,
PCC: 10 MHz Bandwidth, QPSK, Ch. 20525, 1 RB, 49 RB Offset
SCC: 5 MHz Bandwidth, QPSK, Ch. 20597, 1 RB, 0 RB Offset

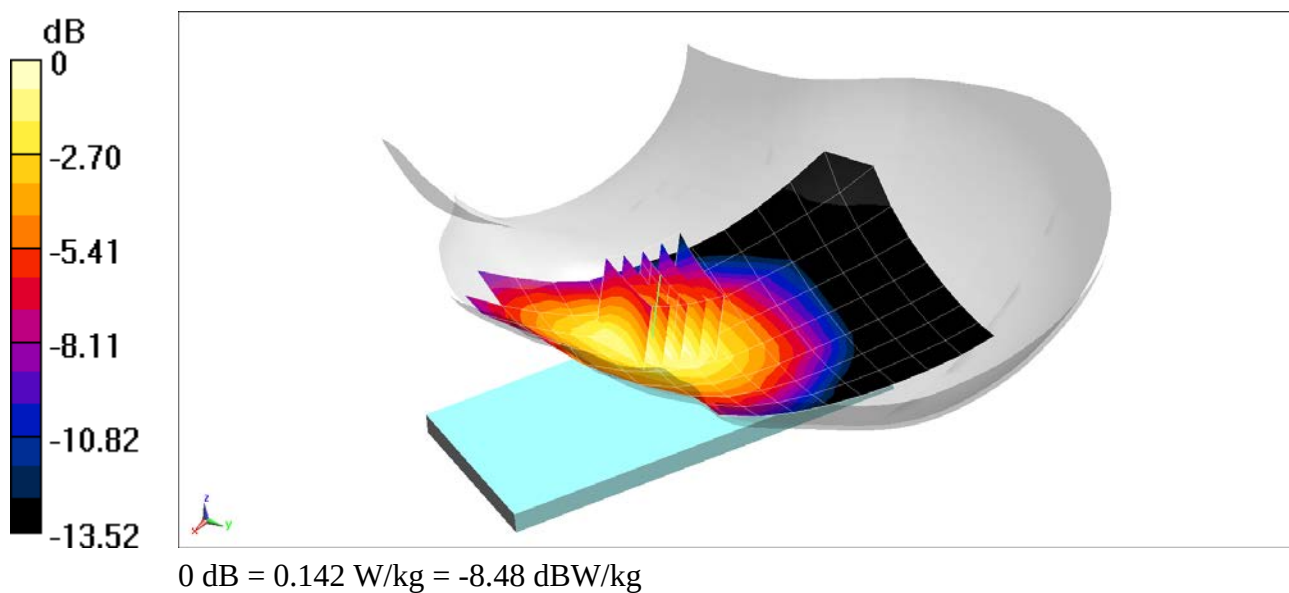
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.93 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.159 W/kg

SAR(1 g) = 0.116 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1

Medium: 1750 Head; Medium parameters used:

$f = 1770 \text{ MHz}$; $\sigma = 1.426 \text{ S/m}$; $\epsilon_r = 38.315$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-26-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7406; ConvF(8.57, 8.57, 8.57) @ 1770 MHz; Calibrated: 5/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Left 30; Type: QD 000 P40 CD; Serial: 1715

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 66 (AWS), Left Head, Cheek, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

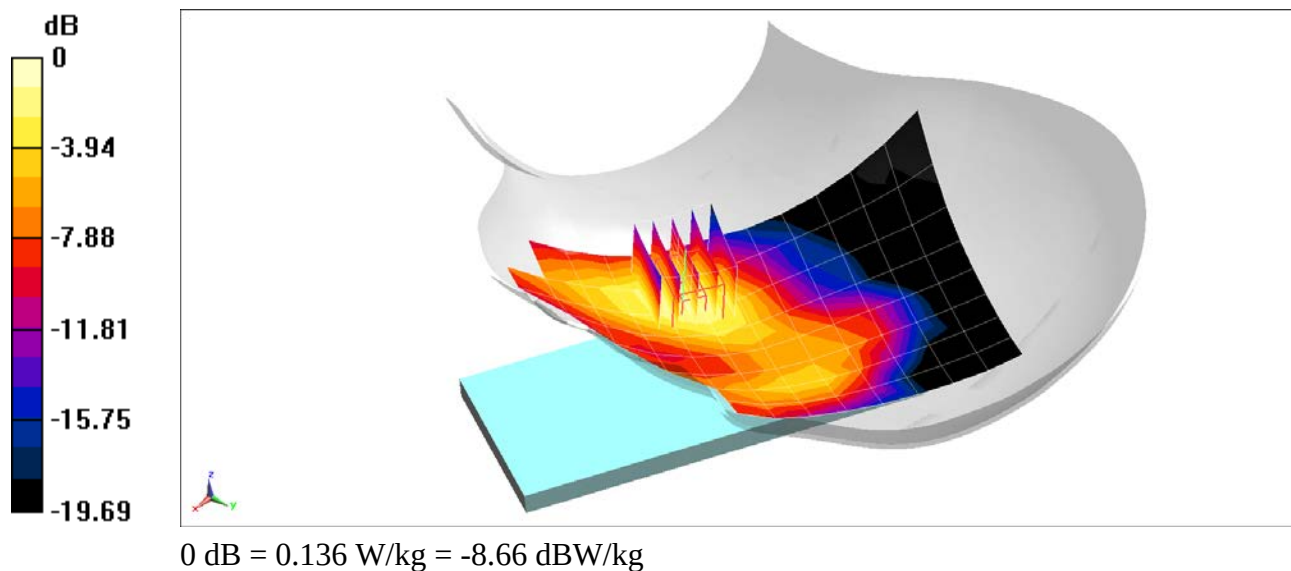
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 8.060 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.159 W/kg

SAR(1 g) = 0.101 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00361

Communication System: UID 0, _LTE Band 2 (PCS); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.421 \text{ S/m}$; $\epsilon_r = 39.306$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-31-2019; Ambient Temp: 22.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7410; ConvF(8.11, 8.11, 8.11) @ 1880 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 2 (PCS), Left Head, Cheek, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset**

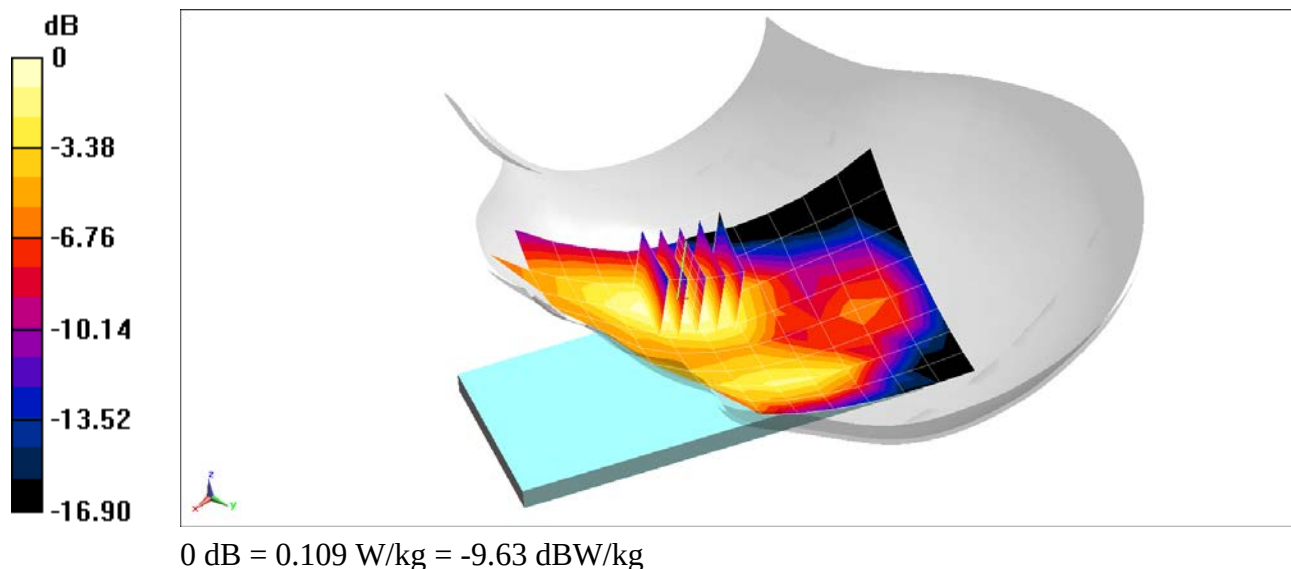
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 8.424 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.132 W/kg

SAR(1 g) = 0.085 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00361

Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used:

$f = 2310$ MHz; $\sigma = 1.696$ S/m; $\epsilon_r = 37.896$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Test Date: 01-16-2020; Ambient Temp: 22.3°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7417; ConvF(7.73, 7.73, 7.73) @ 2310 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/13/2019

Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 30, Left Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

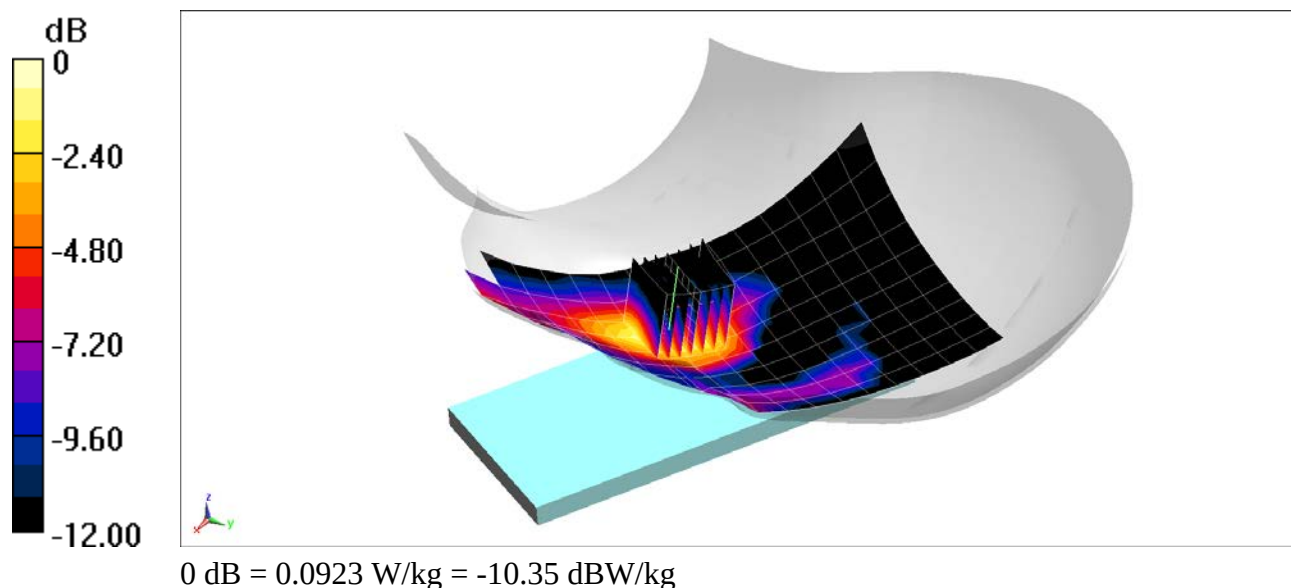
Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 6.416 V/m; Power Drift = 0.21 dB

Peak SAR (extrapolated) = 0.113 W/kg

SAR(1 g) = 0.059 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00379

Communication System: UID 0, LTE Band 48; Frequency: 3646.7 MHz; Duty Cycle: 1:1.58

Medium: 3500 Head; Medium parameters used (interpolated):

$f = 3646.7 \text{ MHz}$; $\sigma = 3.065 \text{ S/m}$; $\epsilon_r = 36.691$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-16-2019; Ambient Temp: 20.4°C; Tissue Temp: 20.3°C

Probe: EX3DV4 - SN3589; ConvF(6.02, 6.02, 6.02) @ 3646.7 MHz; Calibrated: 1/25/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 48, Left Head, Cheek, Mid-High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset**

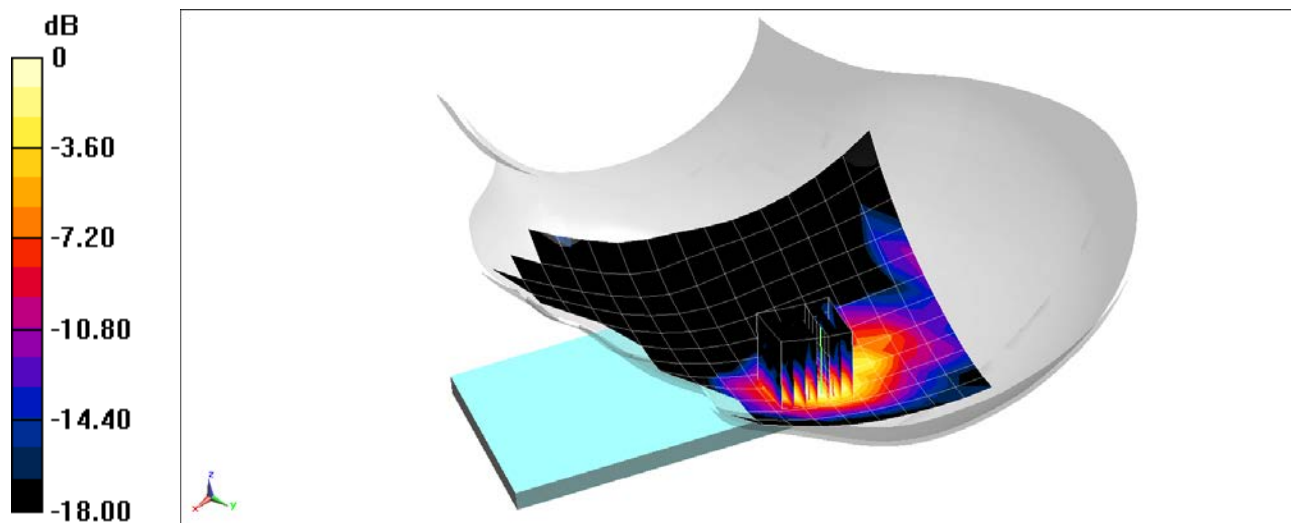
Area Scan (13x18x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 5.906 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.243 W/kg

SAR(1 g) = 0.069 W/kg



0 dB = 0.149 W/kg = -8.27 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00361

Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58

Medium: 2450 Head; Medium parameters used:

$f = 2680$ MHz; $\sigma = 2.034$ S/m; $\epsilon_r = 38.431$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Test Date: 12-09-2019; Ambient Temp: 20.8°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7417; ConvF(7.17, 7.17, 7.17) @ 2680 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/13/2019

Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 41, Left Head, Cheek, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset**

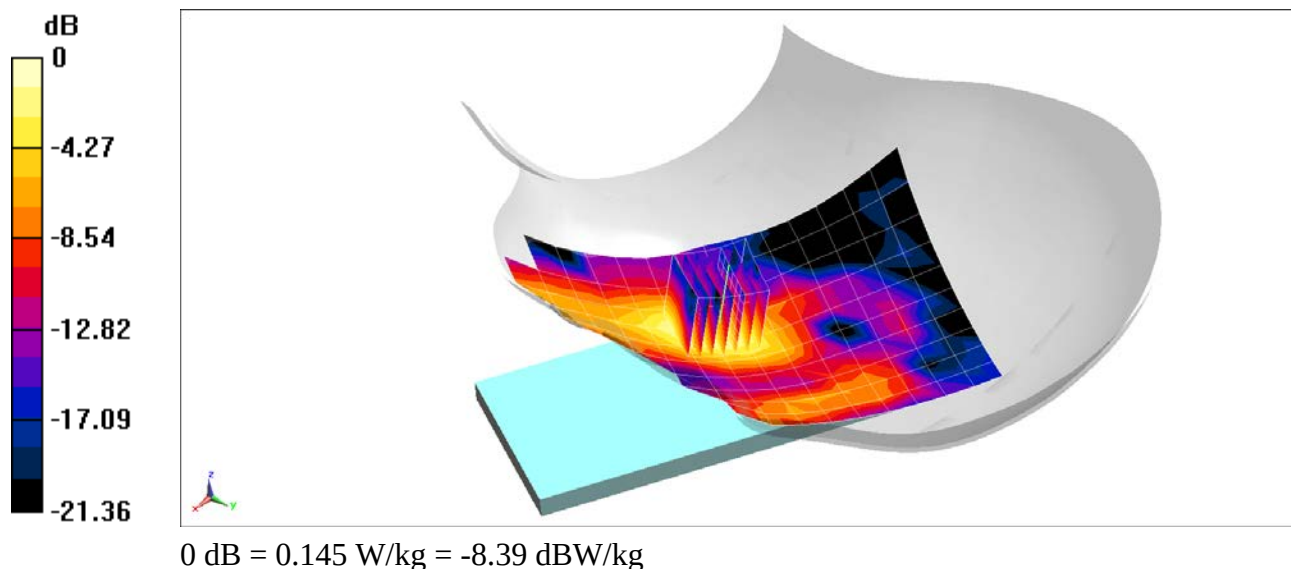
Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 7.225 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.180 W/kg

SAR(1 g) = 0.094 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00395

Communication System: UID 0, NR Band n5; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Head; Medium parameters used (interpolated):

$f = 836.5 \text{ MHz}$; $\sigma = 0.914 \text{ S/m}$; $\epsilon_r = 40.137$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-13-2020; Ambient Temp: 21.9°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7308; ConvF(9.87, 9.87, 9.87) @ 836.5 MHz; Calibrated: 8/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1450; Calibrated: 8/14/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n5, Left Head, Cheek,
20 MHz Bandwidth, DFT-s-OFDM QPSK, Ch. 167300, 1 RB, 53 RB Offset**

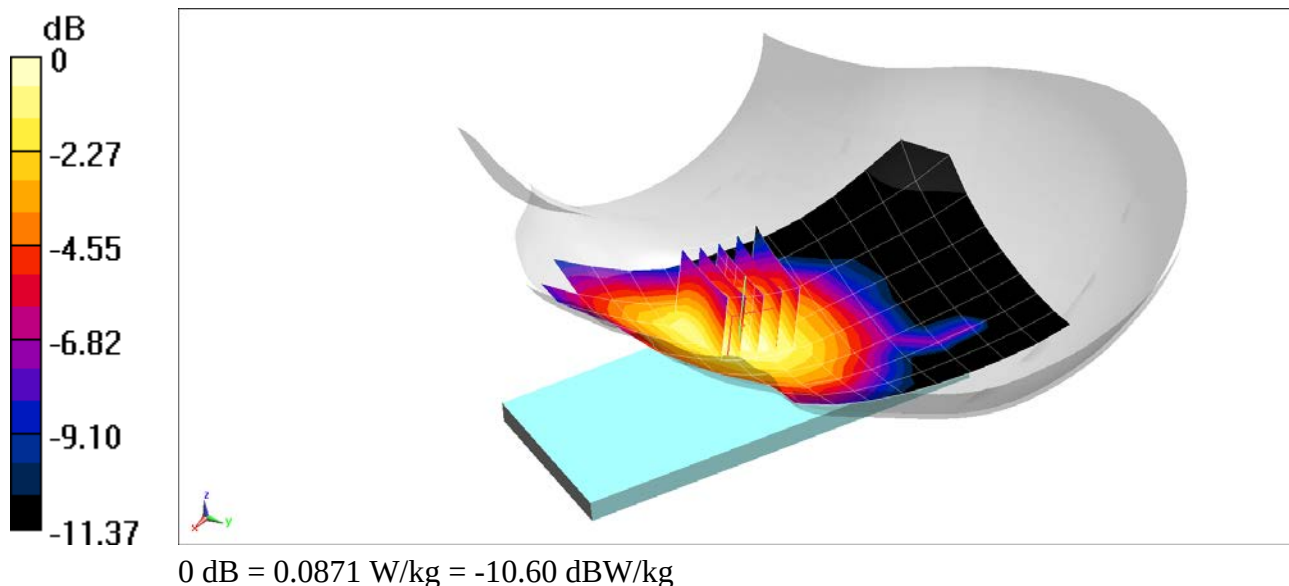
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.460 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.0950 W/kg

SAR(1 g) = 0.073 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00395

Communication System: UID 0, NR Band n66; Frequency: 1720 MHz; Duty Cycle: 1:1

Medium: 1750 Head; Medium parameters used:

$f = 1720 \text{ MHz}$; $\sigma = 1.356 \text{ S/m}$; $\epsilon_r = 38.857$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-10-2020; Ambient Temp: 22.1°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7406; ConvF(8.57, 8.57, 8.57) @ 1720 MHz; Calibrated: 5/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Right 30; Type: QD 000 P40 CD; Serial: 1759

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n66, Right Head, Cheek,
20 MHz Bandwidth, DFT-s-OFDM QPSK, Ch. 344000, 1 RB, 104 RB Offset**

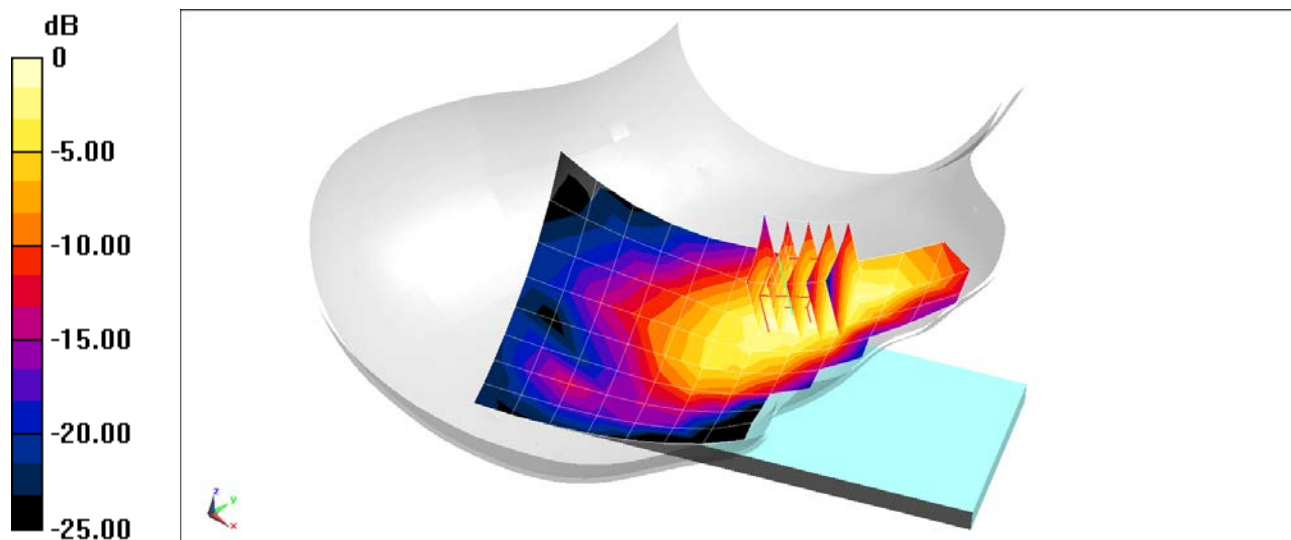
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.81 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.295 W/kg

SAR(1 g) = 0.192 W/kg



0 dB = 0.257 W/kg = -5.90 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00387

Communication System: UID 0, NR Band n2; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.421 \text{ S/m}$; $\epsilon_r = 39.306$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-31-2019; Ambient Temp: 22.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7410; ConvF(8.11, 8.11, 8.11) @ 1880 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n2, Right Head, Cheek,
20 MHz Bandwidth, DFT-s-OFDM QPSK, Ch. 376000, 50 RB, 28 RB Offset**

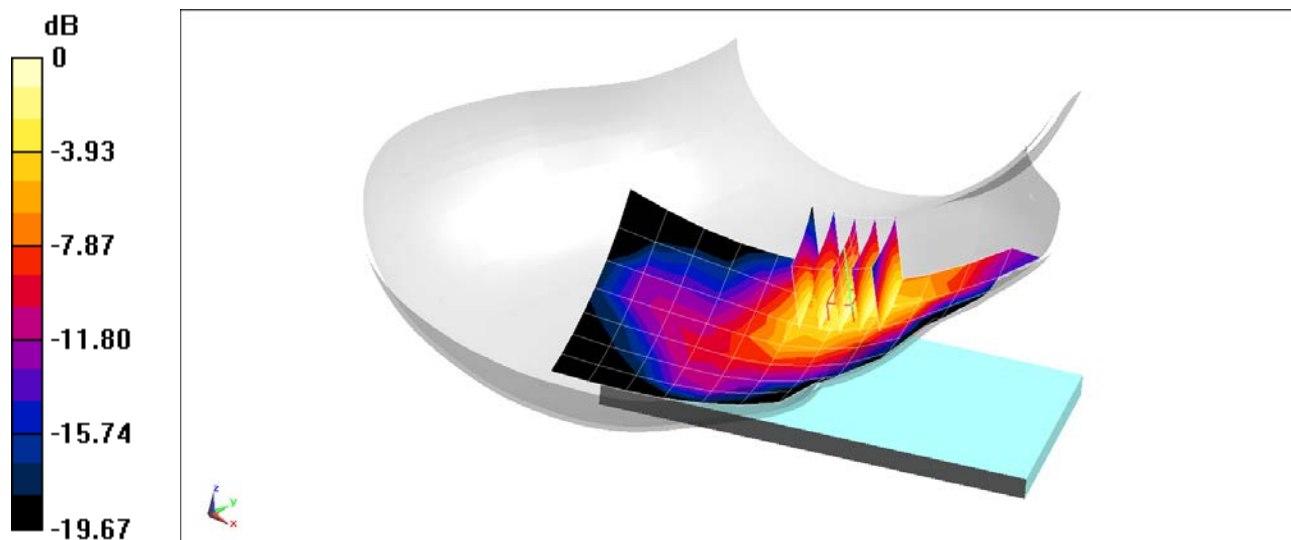
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.82 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.591 W/kg

SAR(1 g) = 0.390 W/kg



0 dB = 0.519 W/kg = -2.85 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 1.851 \text{ S/m}$; $\epsilon_r = 40.353$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-19-2019; Ambient Temp: 22.7°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7417; ConvF(7.46, 7.46, 7.46) @ 2437 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/13/2019

Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: IEEE 802.11b Ant 1, 22 MHz Bandwidth,
Right Head, Cheek, Ch 6, 1 Mbps**

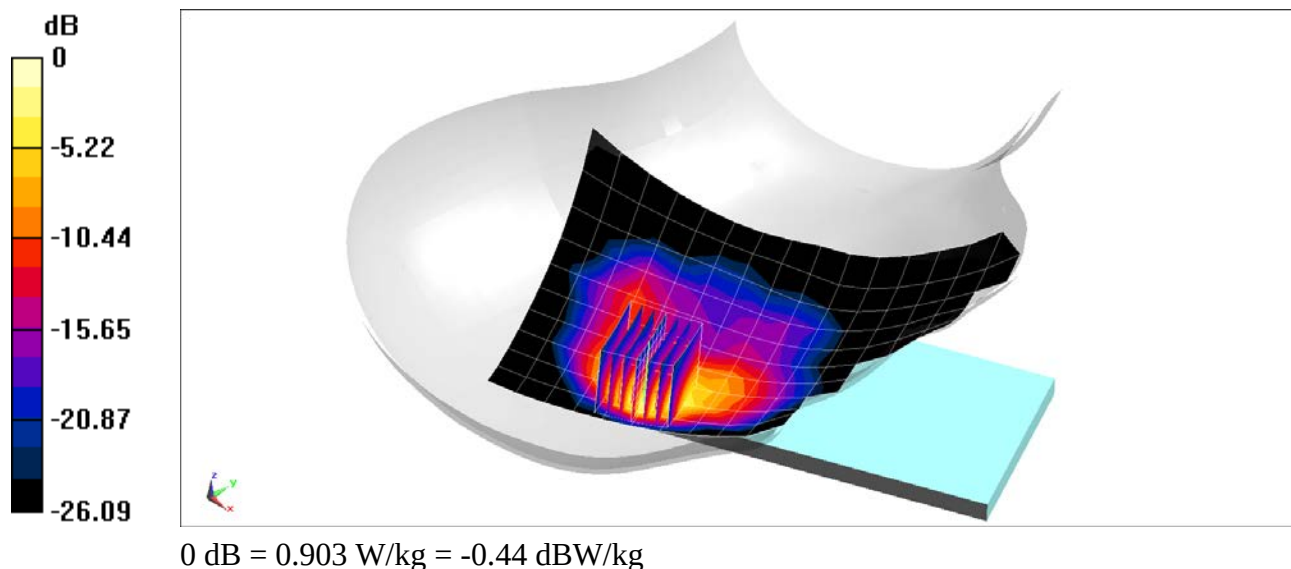
Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 5.798 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.480 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, IEEE 802.11a; Frequency: 5280 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Head; Medium parameters used:

$f = 5280 \text{ MHz}$; $\sigma = 4.623 \text{ S/m}$; $\epsilon_r = 35.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-17-2019; Ambient Temp: 22.1°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7406; ConvF(5.54, 5.54, 5.54) @ 5280 MHz; Calibrated: 5/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

**Mode: IEEE 802.11a Ant 1, U-NII-2A, 20 MHz Bandwidth,
Right Head, Cheek, Ch 56, 6 Mbps**

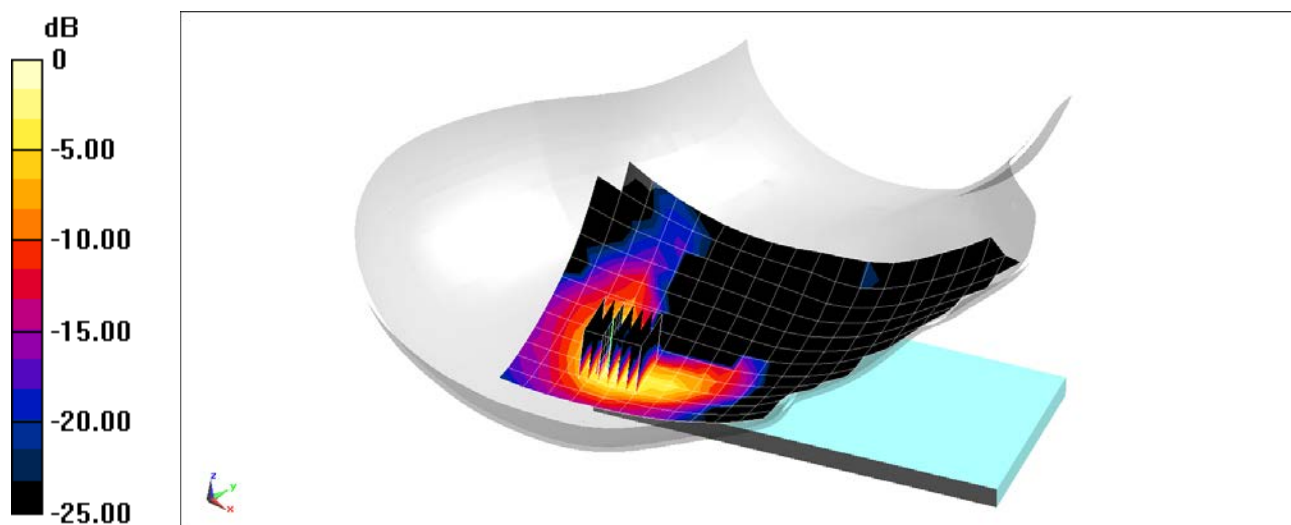
Area Scan (13x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 4.485 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 1.54 W/kg

SAR(1 g) = 0.327 W/kg



0 dB = 0.829 W/kg = -0.81 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.294

Medium: 2450 Head; Medium parameters used (interpolated):

$f = 2441 \text{ MHz}$; $\sigma = 1.848 \text{ S/m}$; $\epsilon_r = 38.229$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-08-2020; Ambient Temp: 22.9°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7417; ConvF(7.46, 7.46, 7.46) @ 2441 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/13/2019

Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: Bluetooth, Right Head, Cheek, Ch 39, 1Mbps

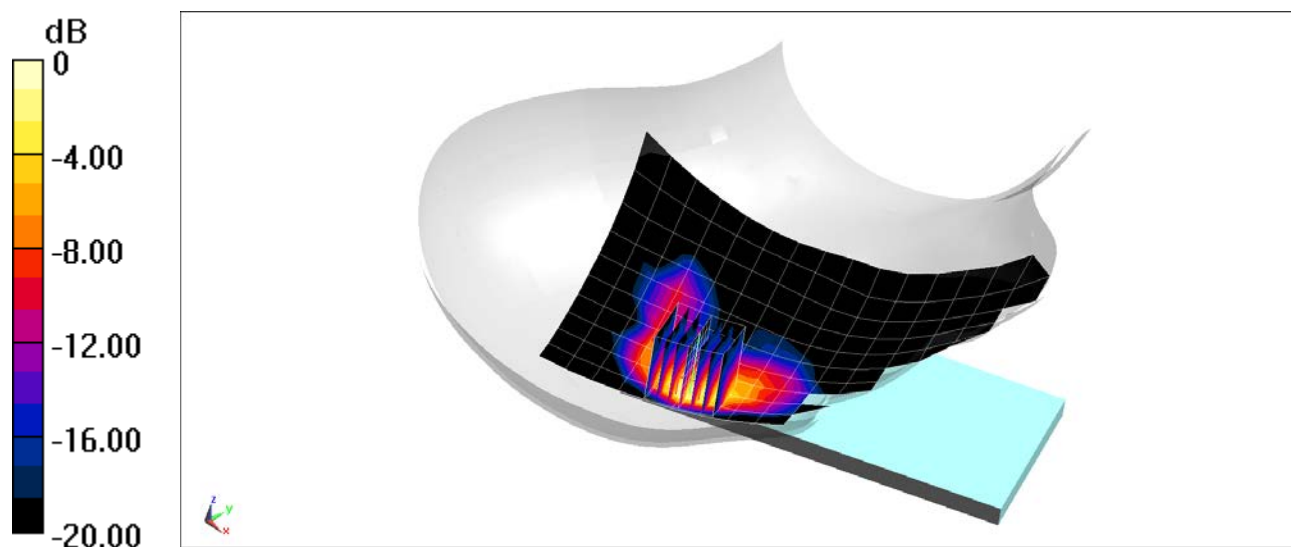
Area Scan (11x19x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Reference Value = 8.129 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.269 W/kg

SAR(1 g) = 0.101 W/kg



0 dB = 0.197 W/kg = -7.06 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.965 \text{ S/m}$; $\epsilon_r = 54.005$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-20-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 836.52 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: Cell. CDMA, BC 0, Body SAR, Back side, Mid.ch

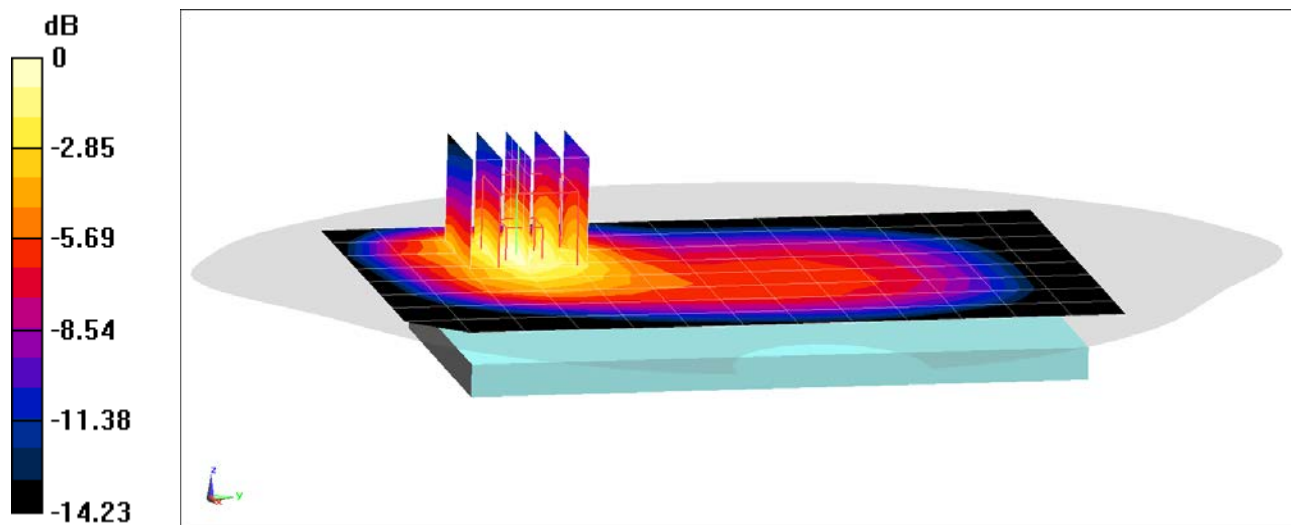
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 24.30 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.824 W/kg

SAR(1 g) = 0.527 W/kg



0 dB = 0.724 W/kg = -1.40 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.965 \text{ S/m}$; $\epsilon_r = 54.005$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-20-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 836.52 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: Cell. EVDO, BC 0, Body SAR, Back side, Mid.ch

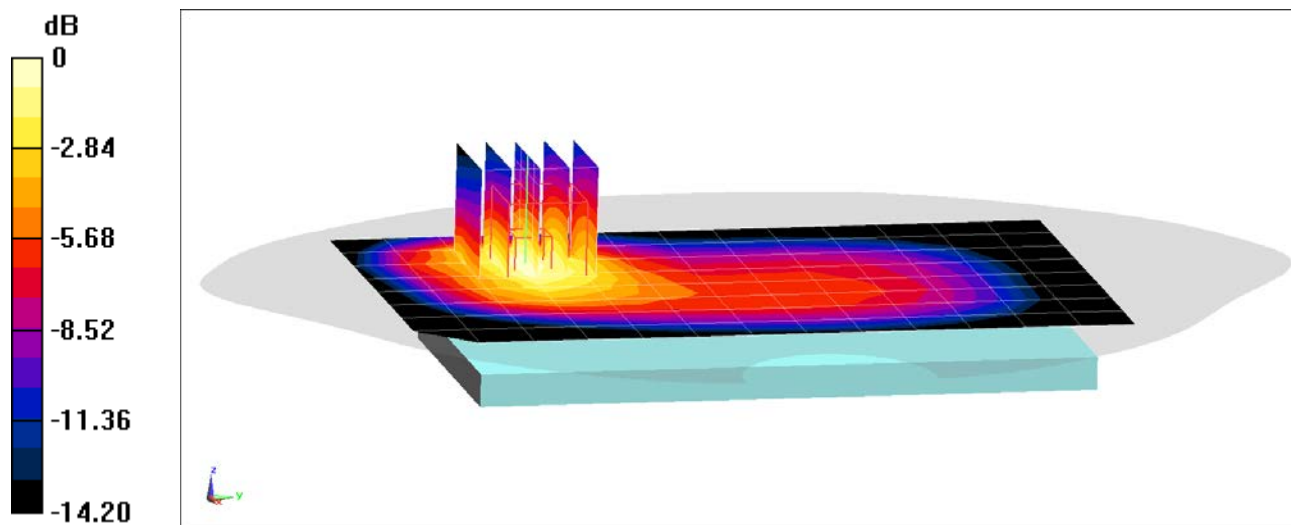
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.53 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.480 W/kg

SAR(1 g) = 0.305 W/kg



0 dB = 0.420 W/kg = -3.77 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00346

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.965 \text{ S/m}$; $\epsilon_r = 54.004$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-20-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 836.6 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: GPRS 850, Body SAR, Back side, Mid.ch, 2 Tx Slots

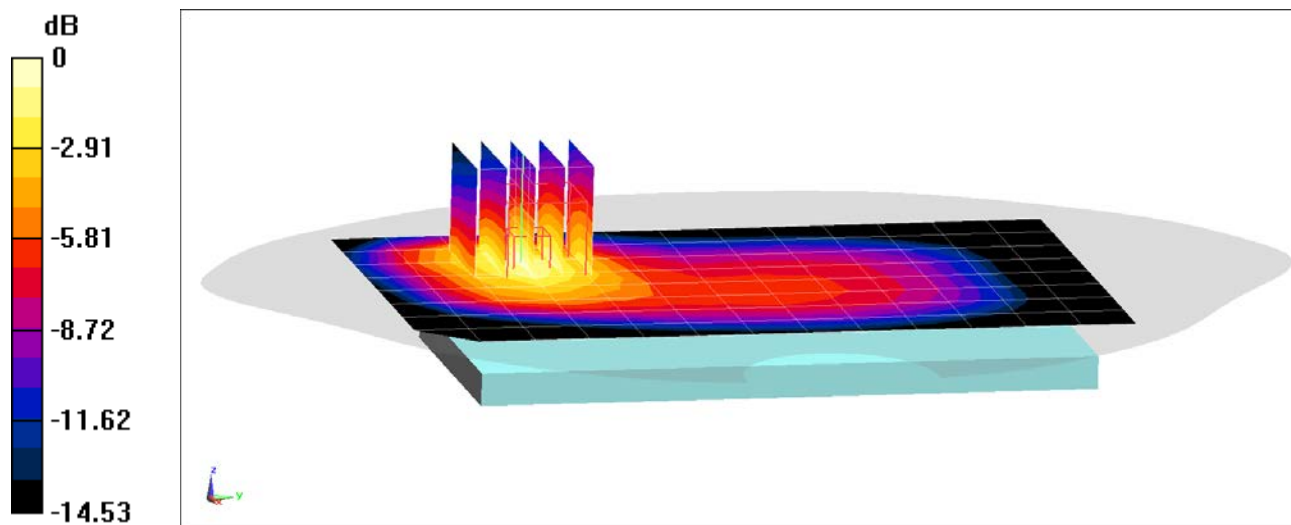
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.64 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.493 W/kg

SAR(1 g) = 0.313 W/kg



0 dB = 0.430 W/kg = -3.67 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00346

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.984 \text{ S/m}$; $\epsilon_r = 53.682$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-05-2019; Ambient Temp: 23.9°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 836.6 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 850, Body SAR, Back side, Mid.ch

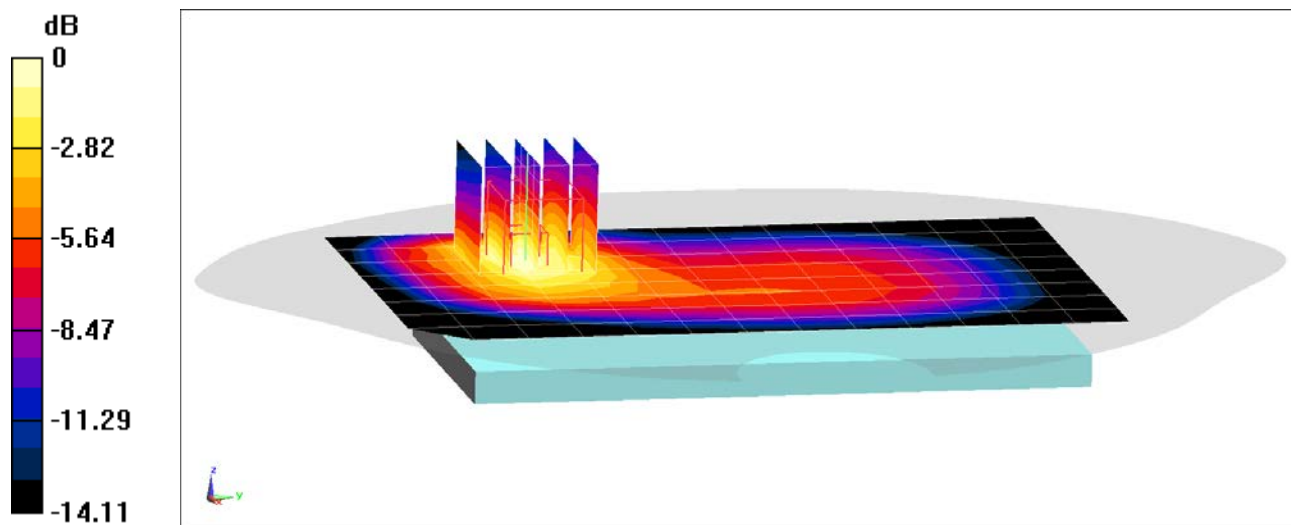
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 23.89 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.791 W/kg

SAR(1 g) = 0.511 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00346

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.984 \text{ S/m}$; $\epsilon_r = 53.682$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-05-2019; Ambient Temp: 23.9°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 836.6 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 850, Body SAR, Front side, Mid.ch

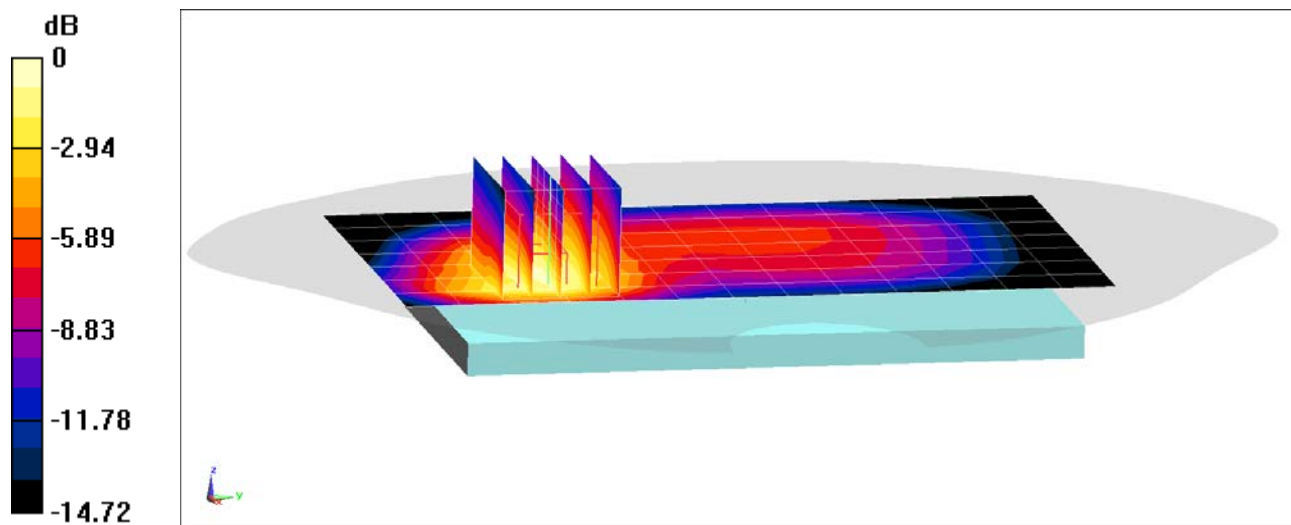
Area Scan (8x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 24.09 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.847 W/kg

SAR(1 g) = 0.531 W/kg



0 dB = 0.717 W/kg = -1.44 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00346

Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used (interpolated):

$f = 1732.4 \text{ MHz}$; $\sigma = 1.492 \text{ S/m}$; $\epsilon_r = 52.271$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-28-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1732.4 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 1750, Body SAR, Back side, Mid.ch

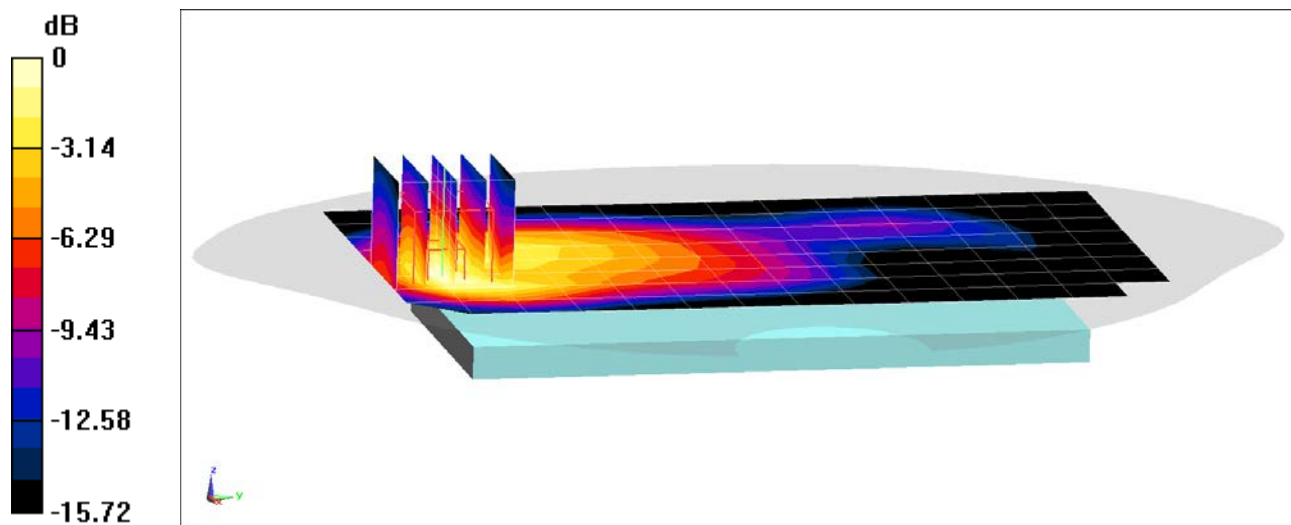
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.96 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.898 W/kg

SAR(1 g) = 0.526 W/kg



0 dB = 0.780 W/kg = -1.08 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00361

Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used (interpolated):

$f = 1752.6 \text{ MHz}$; $\sigma = 1.513 \text{ S/m}$; $\epsilon_r = 52.189$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-28-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1752.6 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 1750, Body SAR, Bottom Edge, High.ch

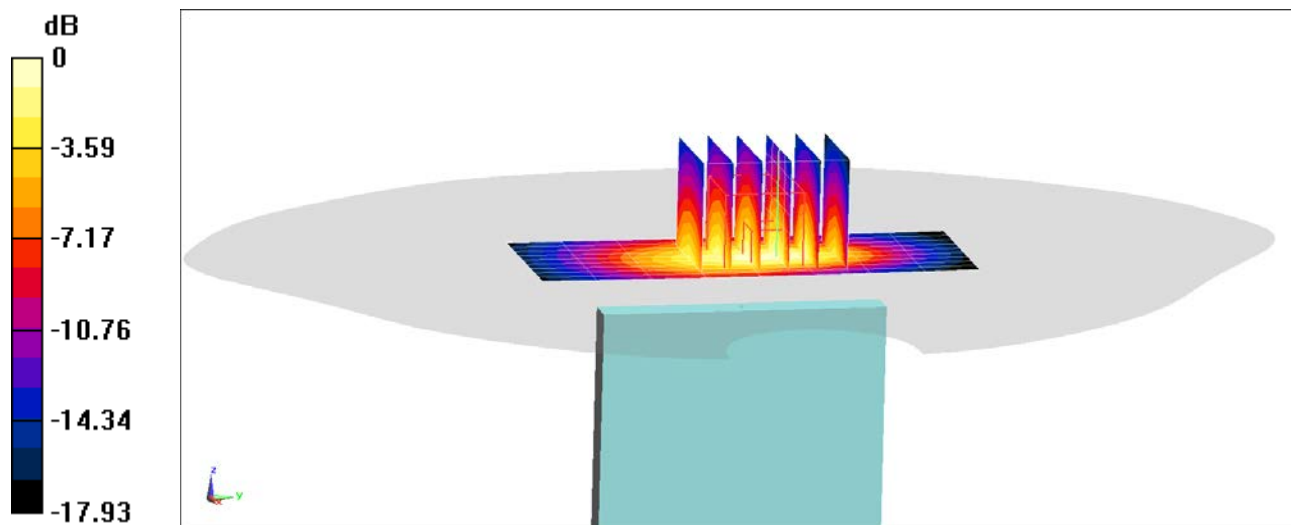
Area Scan (10x9x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 23.29 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.746 W/kg



0 dB = 1.11 W/kg = 0.45 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, CDMA; Frequency: 1851.25 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1851.25$ MHz; $\sigma = 1.524$ S/m; $\epsilon_r = 51.414$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-11-2020; Ambient Temp: 21.9°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1851.25 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: PCS CDMA, Body SAR, Back side, Low.ch

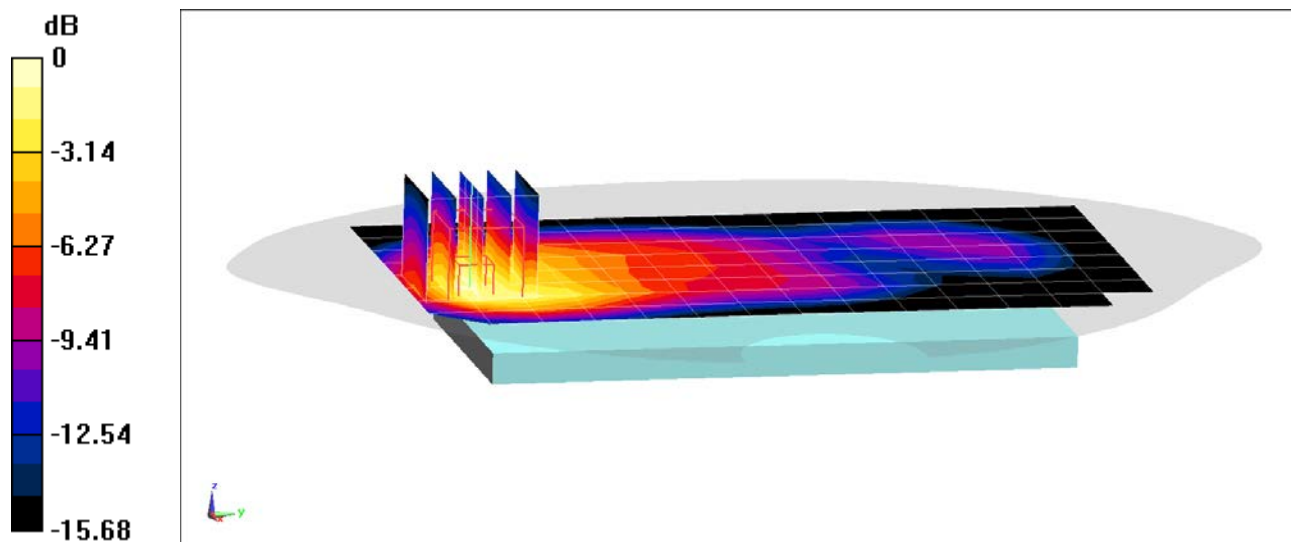
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 21.65 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.644 W/kg



0 dB = 0.940 W/kg = -0.27 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1908.75 \text{ MHz}$; $\sigma = 1.589 \text{ S/m}$; $\epsilon_r = 51.193$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-11-2020; Ambient Temp: 21.9°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1908.75 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: PCS EVDO, Body SAR, Bottom Edge, High.ch

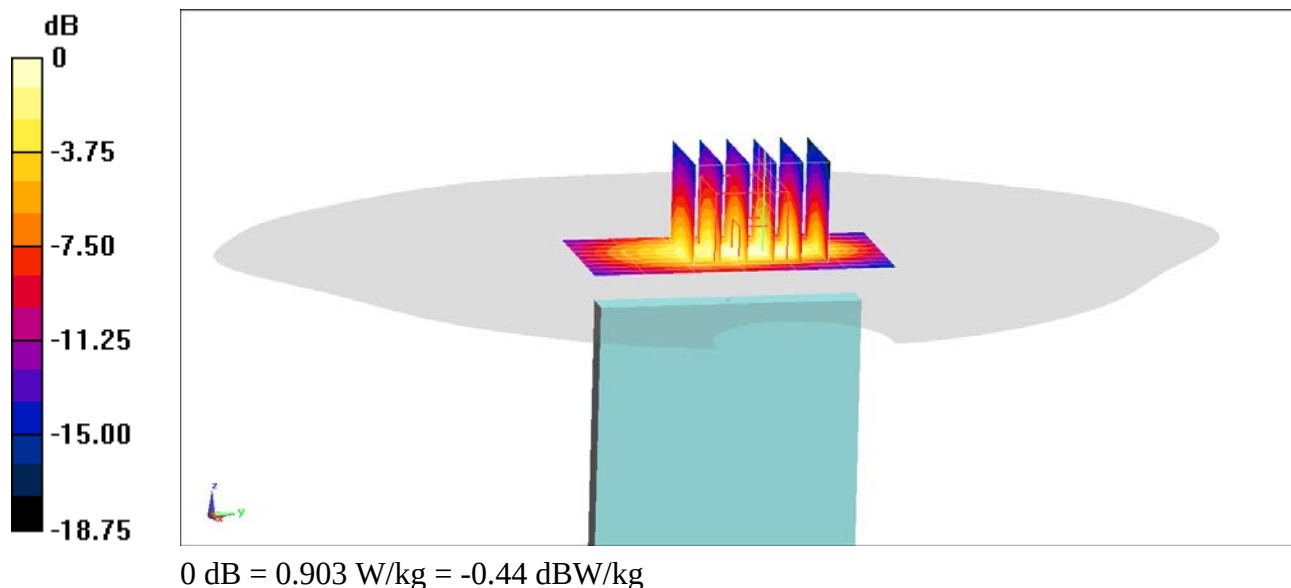
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 20.42 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.599 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 51.836$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2019; Ambient Temp: 20.2°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1880 MHz; Calibrated: 1/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1530; Calibrated: 1/15/2019

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: GPRS 1900, Body SAR, Back side, Mid.ch, 2 Tx Slots

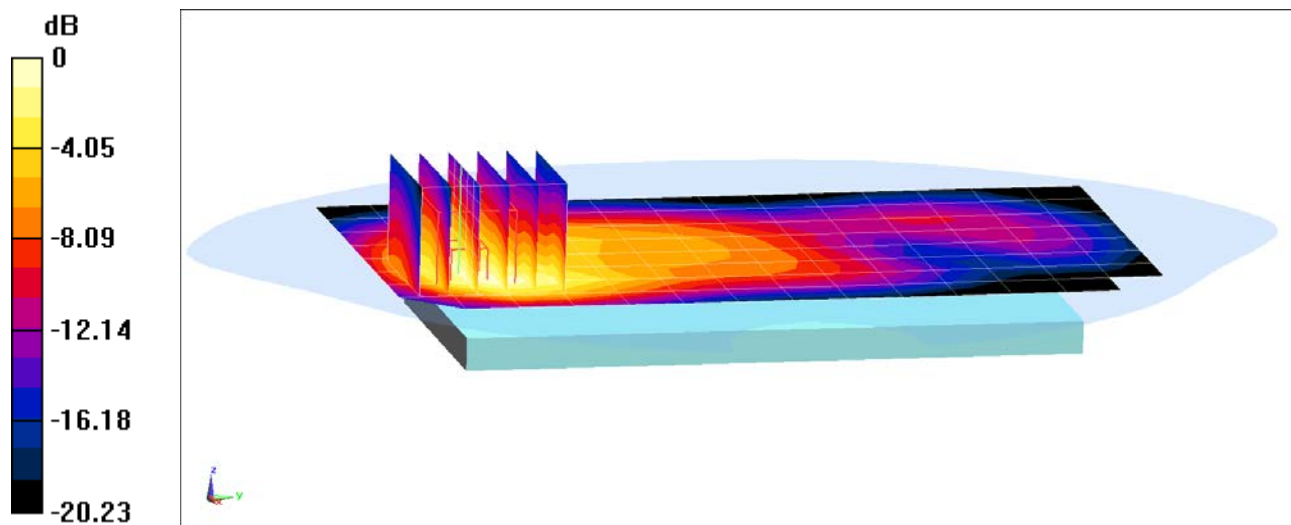
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.63 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.773 W/kg

SAR(1 g) = 0.432 W/kg



0 dB = 0.657 W/kg = -1.82 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body; Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.593 \text{ S/m}$; $\epsilon_r = 51.763$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2019; Ambient Temp: 20.2°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1909.8 MHz; Calibrated: 1/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1530; Calibrated: 1/15/2019

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: GPRS 1900, Body SAR, Bottom Edge, High.ch, 2 Tx Slots

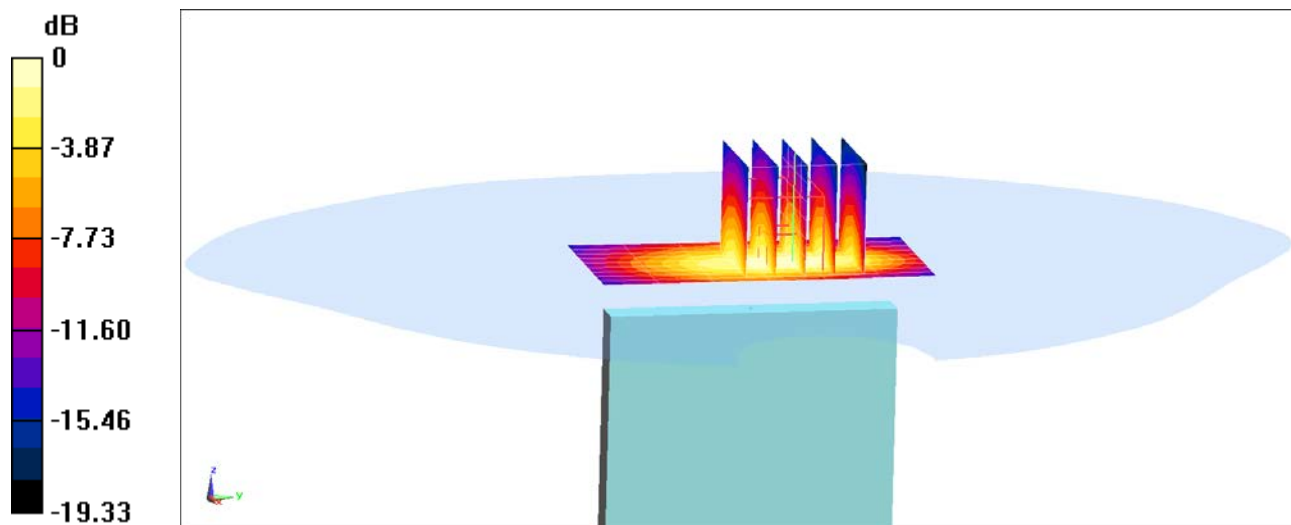
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 23.48 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.43 W/kg

SAR(1 g) = 0.791 W/kg



0 dB = 1.20 W/kg = 0.79 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00338

Communication System: UID 0, UMTS; Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1852.4 \text{ MHz}$; $\sigma = 1.521 \text{ S/m}$; $\epsilon_r = 51.585$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2019; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1852.4 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 1900, Body SAR, Back side, Low.ch

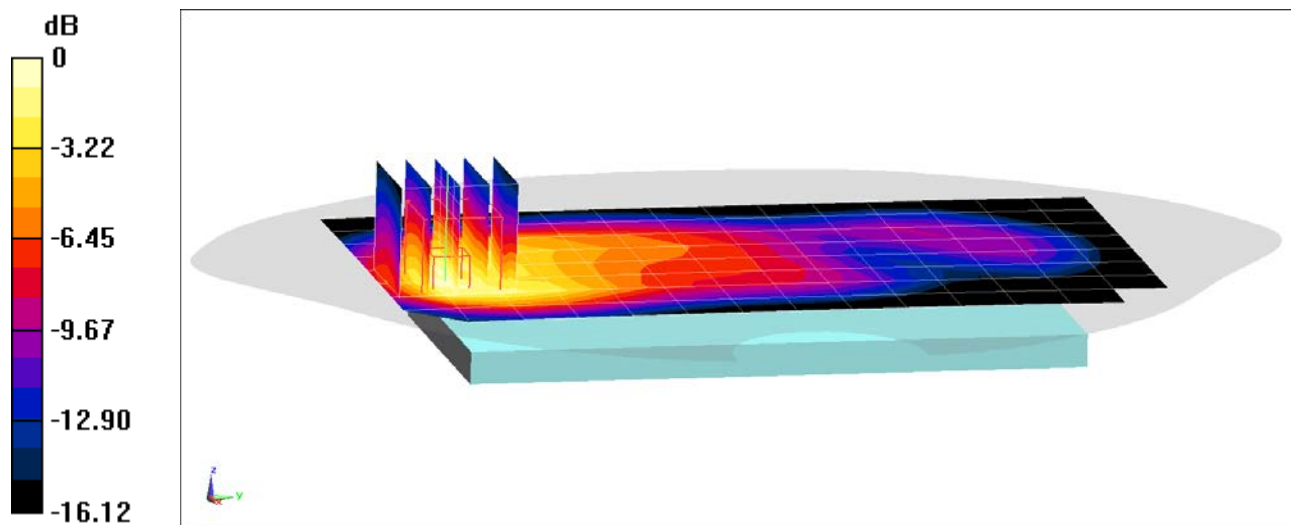
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 22.96 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.702 W/kg



0 dB = 1.04 W/kg = 0.17 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, UMTS; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.591 \text{ S/m}$; $\epsilon_r = 52.434$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-03-2020; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7571; ConvF(7.56, 7.56, 7.56) @ 1907.6 MHz; Calibrated: 12/11/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1533; Calibrated: 12/5/2019

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 1900, Body SAR, Bottom Edge, High.ch

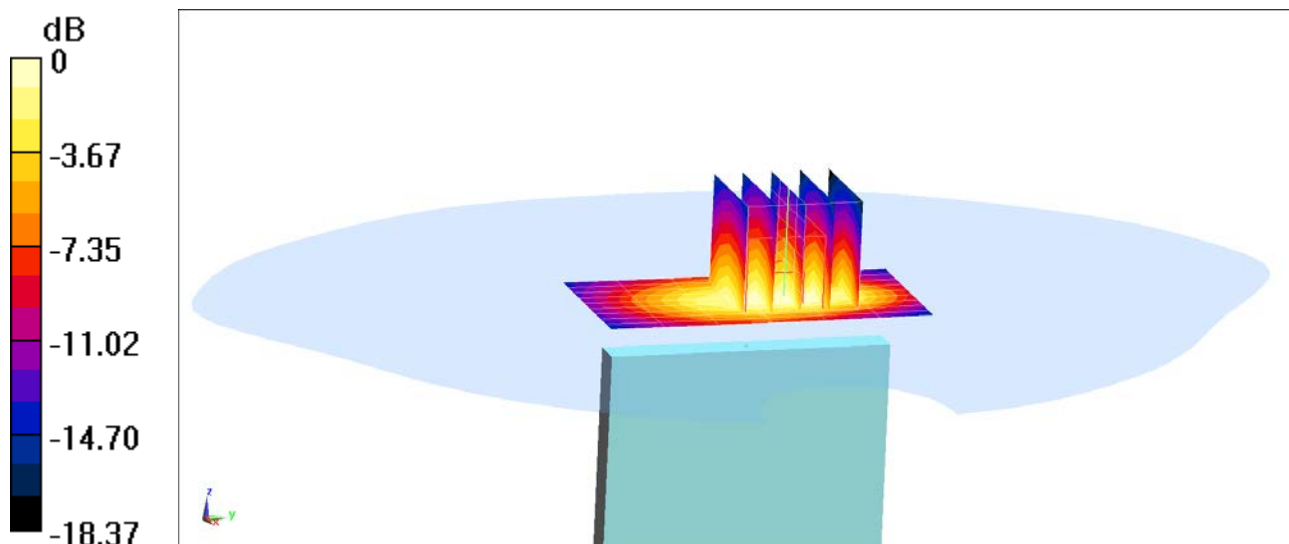
Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 23.97 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 0.835 W/kg



0 dB = 1.21 W/kg = 0.83 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 750 Body; Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.924 \text{ S/m}$; $\epsilon_r = 53.671$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7410; ConvF(10.01, 10.01, 10.01) @ 707.5 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 12, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset**

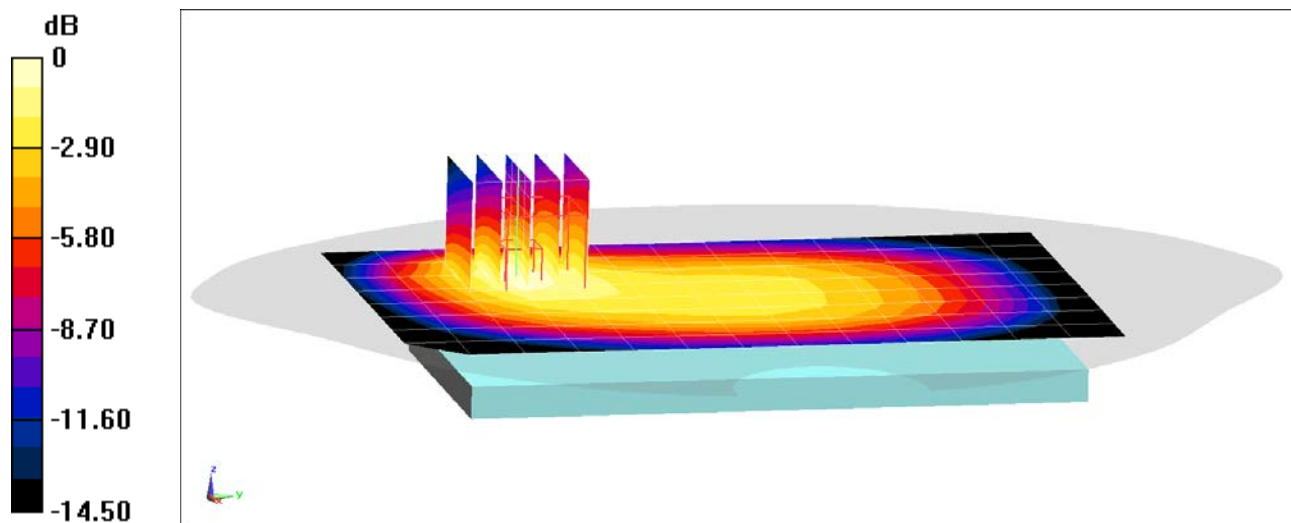
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.45 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.394 W/kg

SAR(1 g) = 0.259 W/kg



0 dB = 0.347 W/kg = -4.60 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 750 Body; Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.953 \text{ S/m}$; $\epsilon_r = 53.456$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7410; ConvF(10.01, 10.01, 10.01) @ 782 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 13, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset**

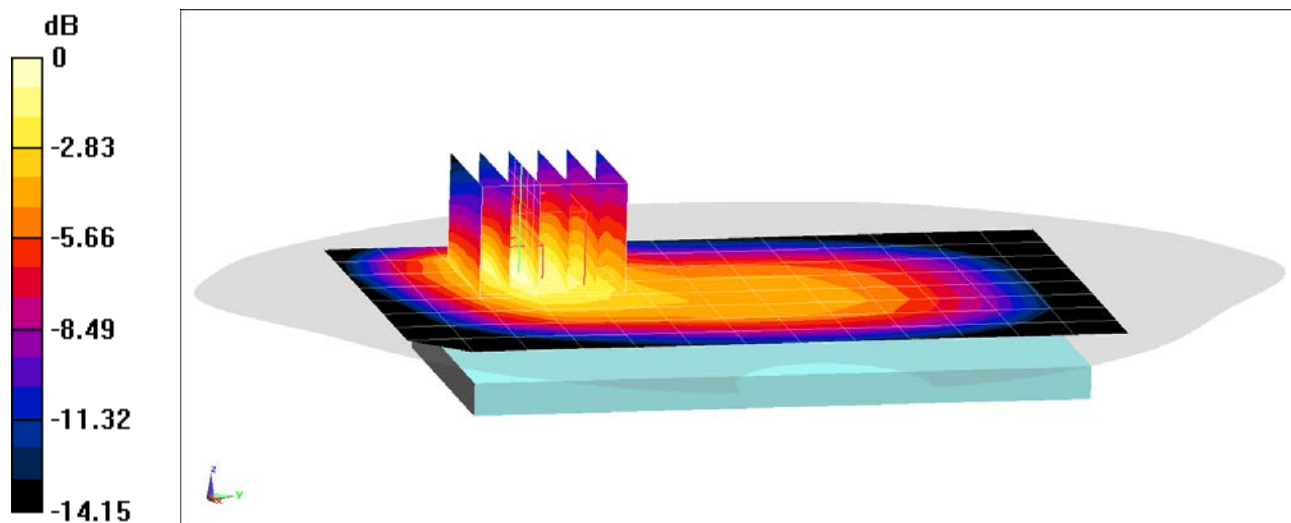
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.57 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.502 W/kg

SAR(1 g) = 0.319 W/kg



0 dB = 0.435 W/kg = -3.62 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 14; Frequency: 793 MHz; Duty Cycle: 1:1

Medium: 750 Body; Medium parameters used (interpolated):

$f = 793 \text{ MHz}$; $\sigma = 0.957 \text{ S/m}$; $\epsilon_r = 53.448$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7410; ConvF(10.01, 10.01, 10.01) @ 793 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 14, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

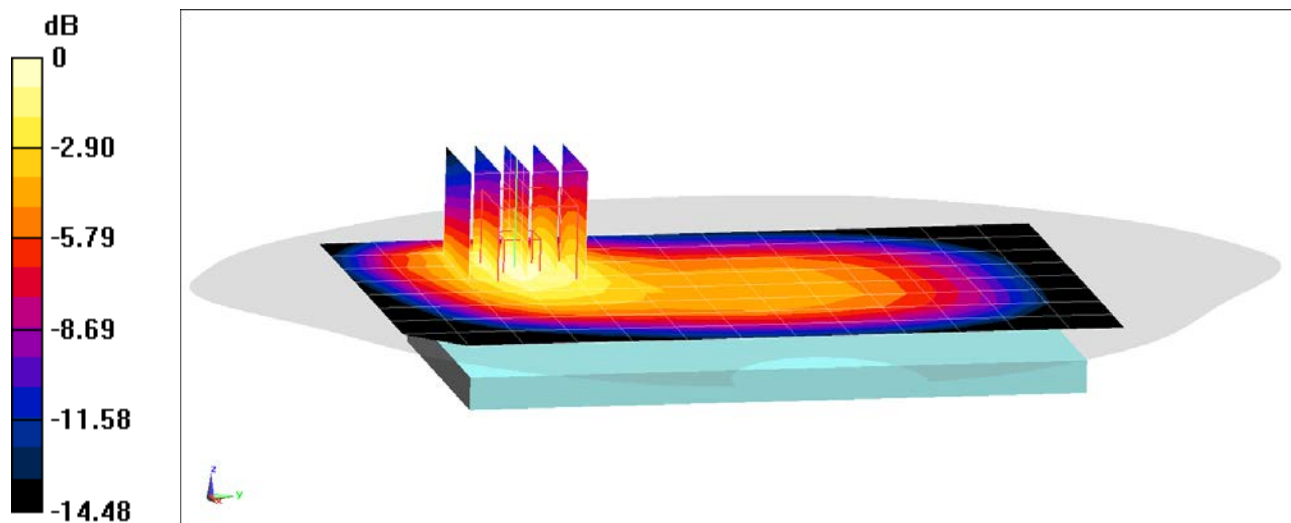
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 19.77 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.532 W/kg

SAR(1 g) = 0.342 W/kg



0 dB = 0.464 W/kg = -3.33 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 14; Frequency: 793 MHz; Duty Cycle: 1:1

Medium: 750 Body; Medium parameters used (interpolated):

$f = 793 \text{ MHz}$; $\sigma = 0.957 \text{ S/m}$; $\epsilon_r = 53.448$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7410; ConvF(10.01, 10.01, 10.01) @ 793 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 14, Body SAR, Front side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

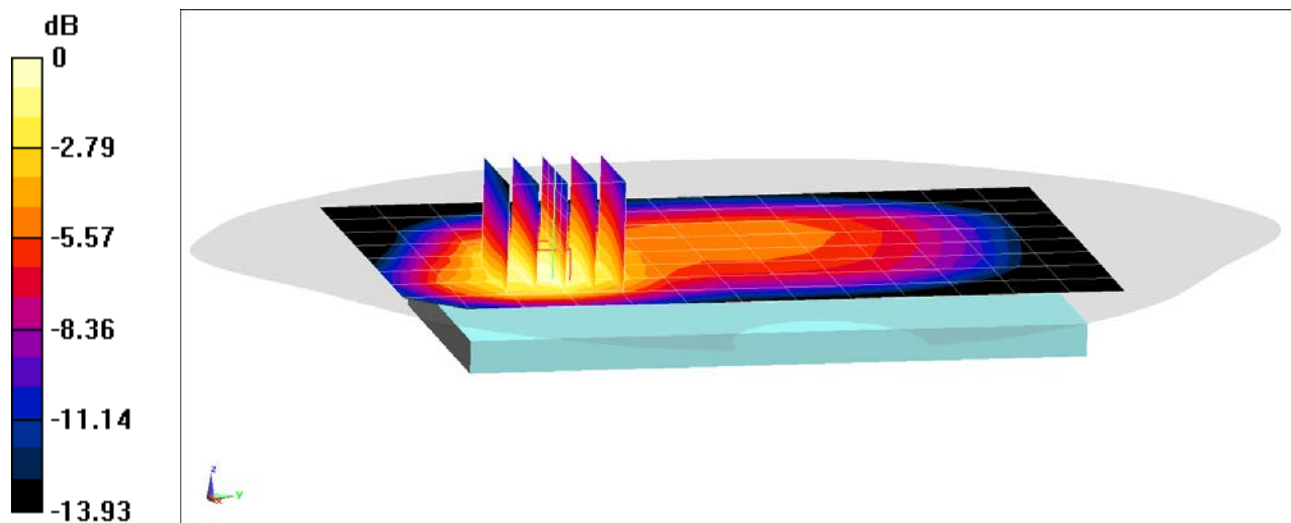
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.64 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.536 W/kg

SAR(1 g) = 0.344 W/kg



0 dB = 0.458 W/kg = -3.39 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.5 \text{ MHz}$; $\sigma = 0.965 \text{ S/m}$; $\epsilon_r = 54.005$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-20-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 836.5 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: LTE Band 5 (Cell.) ULCA, Body SAR, Back side,
PCC: 10 MHz Bandwidth, QPSK, Ch. 20525, 1 RB, 49 RB Offset
SCC: 5 MHz Bandwidth, QPSK, Ch. 20597, 1 RB, 0 RB Offset

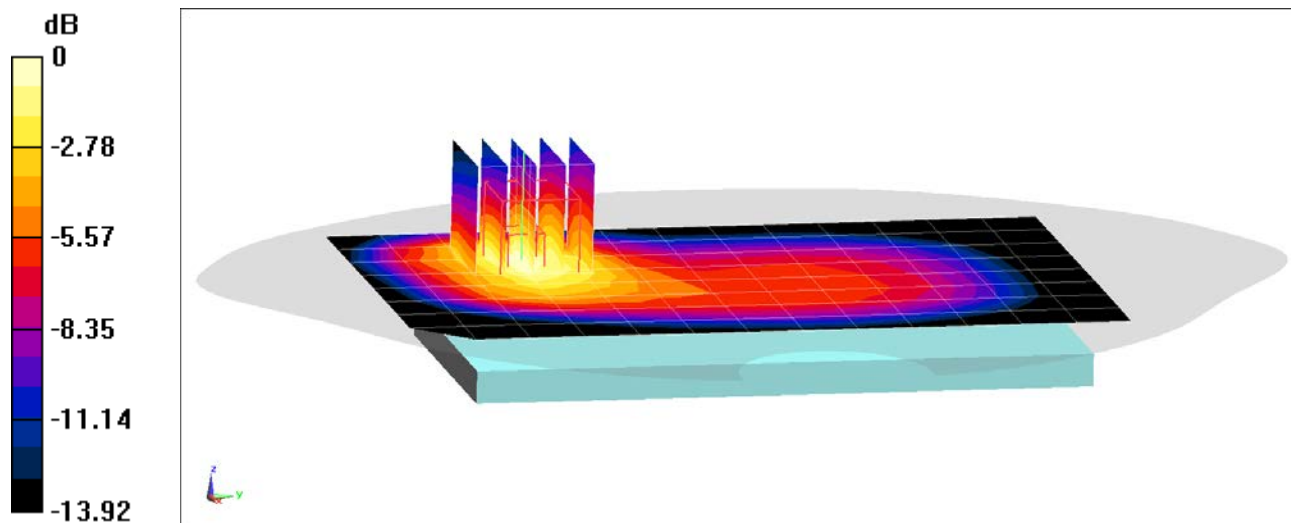
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 22.36 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.693 W/kg

SAR(1 g) = 0.446 W/kg



0 dB = 0.609 W/kg = -2.15 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00361

Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1770 \text{ MHz}$; $\sigma = 1.533 \text{ S/m}$; $\epsilon_r = 54.139$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-11-2020; Ambient Temp: 20.8°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1770 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 66 (AWS), Body SAR, Back side, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

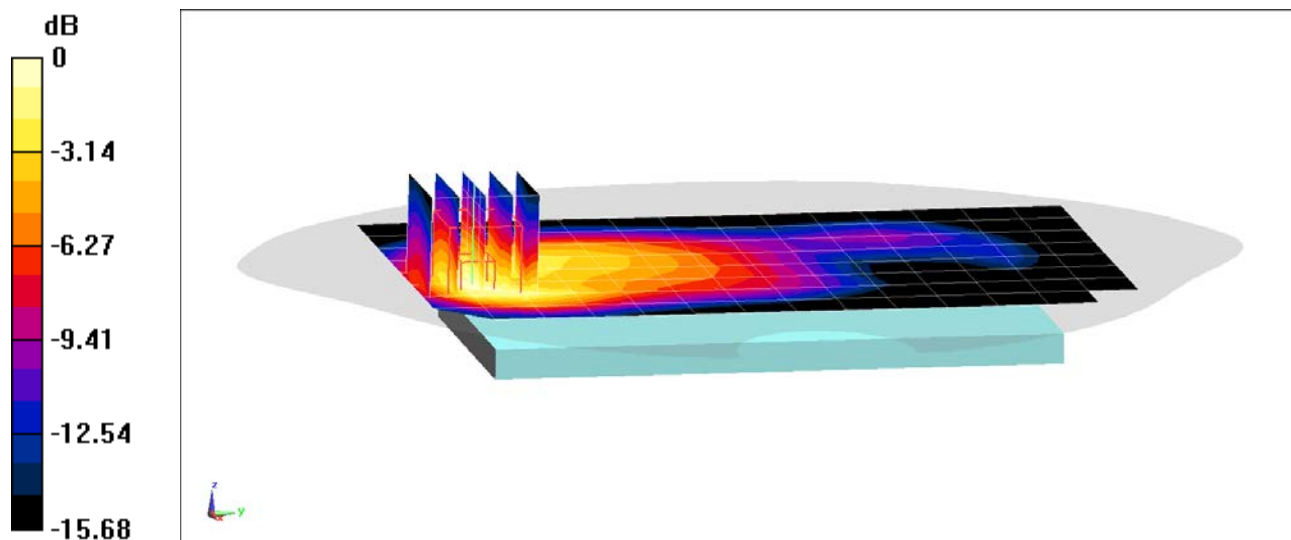
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.75 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.00 W/kg

SAR(1 g) = 0.580 W/kg



0 dB = 0.865 W/kg = -0.63 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00346

Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1770 \text{ MHz}$; $\sigma = 1.53 \text{ S/m}$; $\epsilon_r = 52.978$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-09-2020; Ambient Temp: 21.5°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1770 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 66 (AWS), Body SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset**

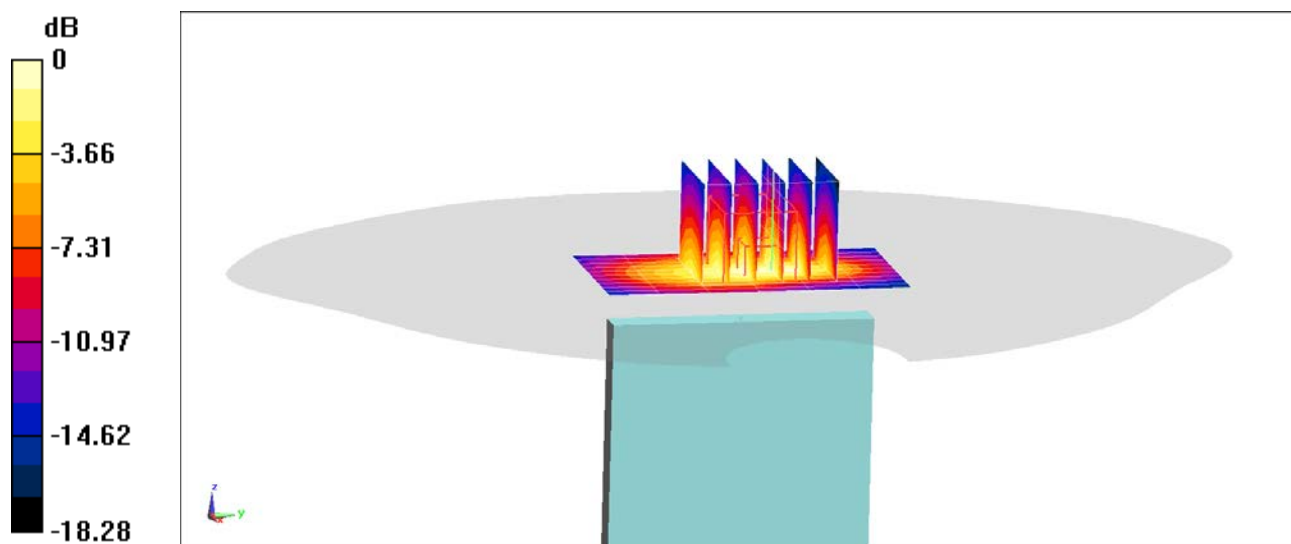
Area Scan (11x7x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 22.05 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.677 W/kg



0 dB = 1.02 W/kg = 0.09 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1860 \text{ MHz}$; $\sigma = 1.513 \text{ S/m}$; $\epsilon_r = 51.943$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-30-2019; Ambient Temp: 23.3°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1860 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 2 (PCS), Body SAR, Back side, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

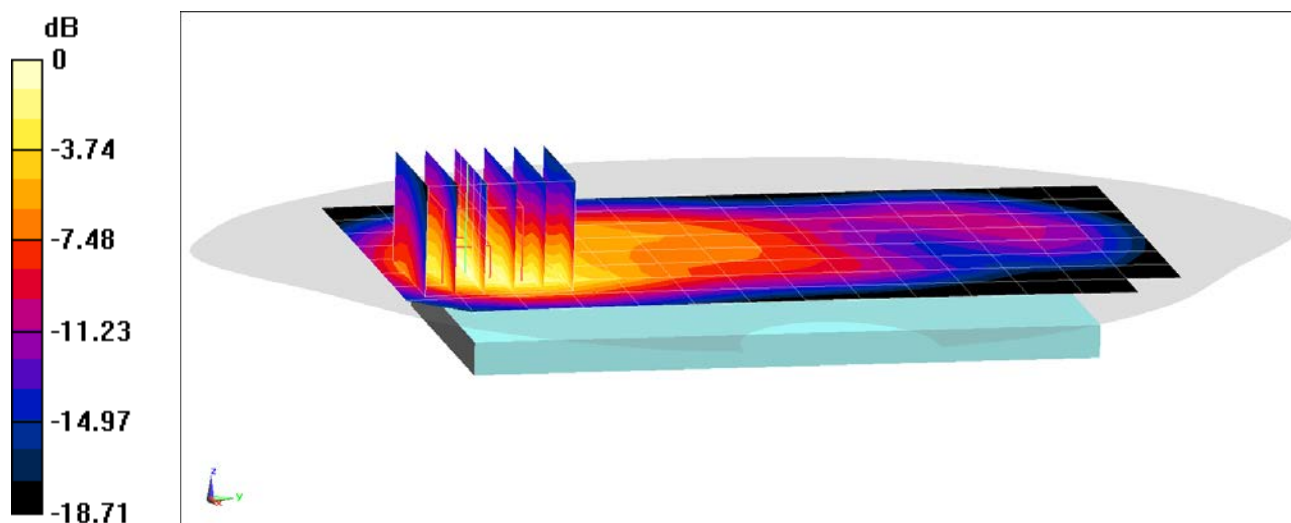
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 22.82 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 1.48 W/kg

SAR(1 g) = 0.840 W/kg



0 dB = 1.27 W/kg = 1.04 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.583 \text{ S/m}$; $\epsilon_r = 52.463$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-03-2020; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7571; ConvF(7.56, 7.56, 7.56) @ 1900 MHz; Calibrated: 12/11/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1533; Calibrated: 12/5/2019

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 2 (PCS), Body SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

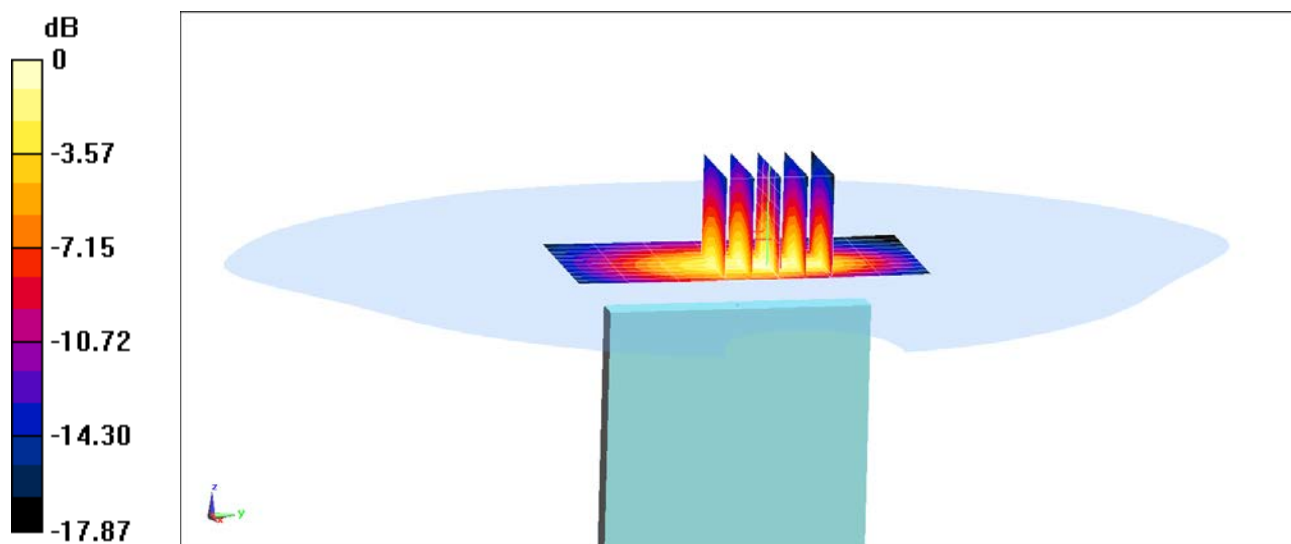
Area Scan (11x8x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 25.41 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.59 W/kg

SAR(1 g) = 0.906 W/kg



0 dB = 1.35 W/kg = 1.30 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00379

Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used:

$f = 2310 \text{ MHz}$; $\sigma = 1.873 \text{ S/m}$; $\epsilon_r = 51.75$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-27-2019; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7547; ConvF(7.47, 7.47, 7.47) @ 2310 MHz; Calibrated: 7/15/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 7/11/2019

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 30, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

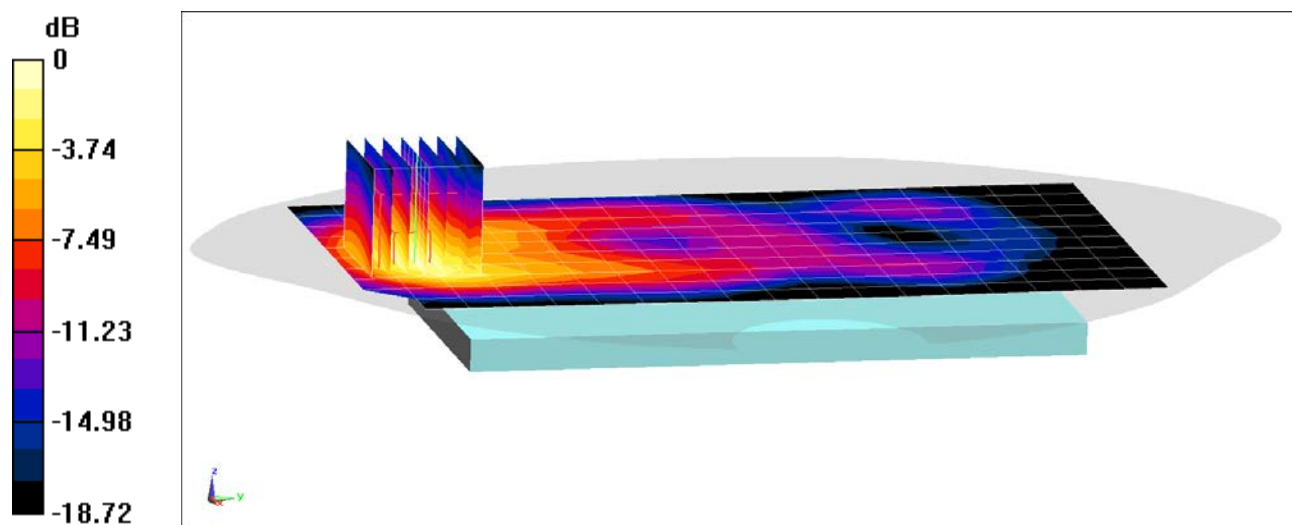
Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 11.43 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.399 W/kg

SAR(1 g) = 0.219 W/kg



0 dB = 0.334 W/kg = -4.76 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00379

Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used:

$f = 2310 \text{ MHz}$; $\sigma = 1.873 \text{ S/m}$; $\epsilon_r = 51.75$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-27-2019; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7547; ConvF(7.47, 7.47, 7.47) @ 2310 MHz; Calibrated: 7/15/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 7/11/2019

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 30, Body SAR, Bottom Edge, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

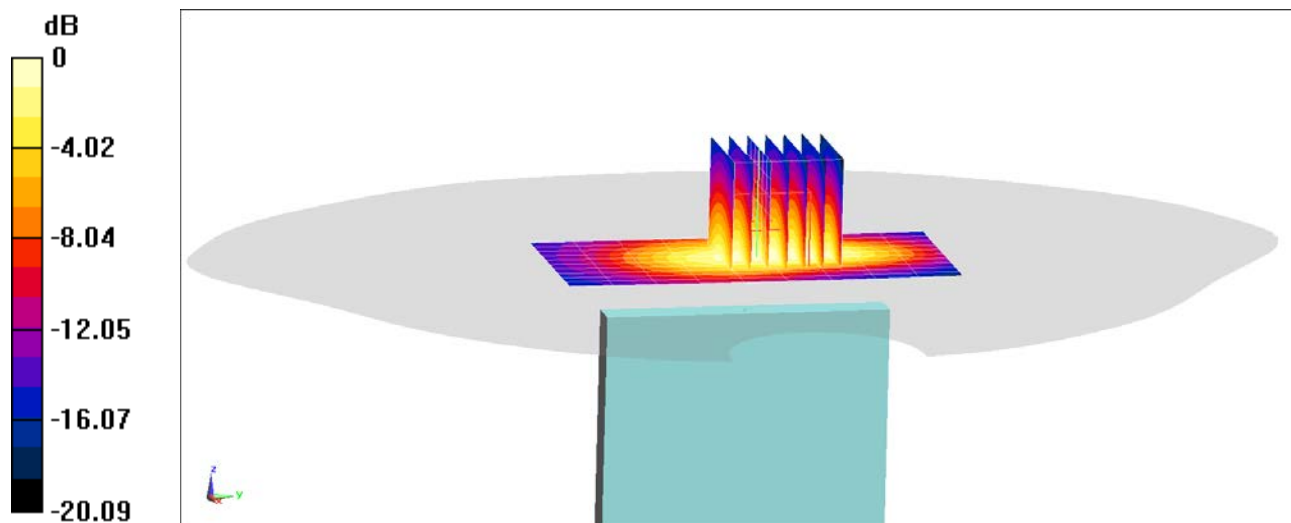
Area Scan (11x10x1): Measurement grid: dx=5mm, dy=12mm

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

Reference Value = 16.14 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.803 W/kg

SAR(1 g) = 0.433 W/kg



0 dB = 0.666 W/kg = -1.77 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 48; Frequency: 3646.7 MHz; Duty Cycle: 1:1.58

Medium: 3600 Body; Medium parameters used (interpolated):

$f = 3646.7 \text{ MHz}$; $\sigma = 3.511 \text{ S/m}$; $\epsilon_r = 49.249$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-18-2019; Ambient Temp: 22.1°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3914; ConvF(6.58, 6.58, 6.58) @ 3646.7 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/14/2019

Phantom: Twin-SAM V5.0 Left 30; Type: QD 000 P40 CD; Serial: 1687

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 48, Body SAR, Back side, Mid-High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset**

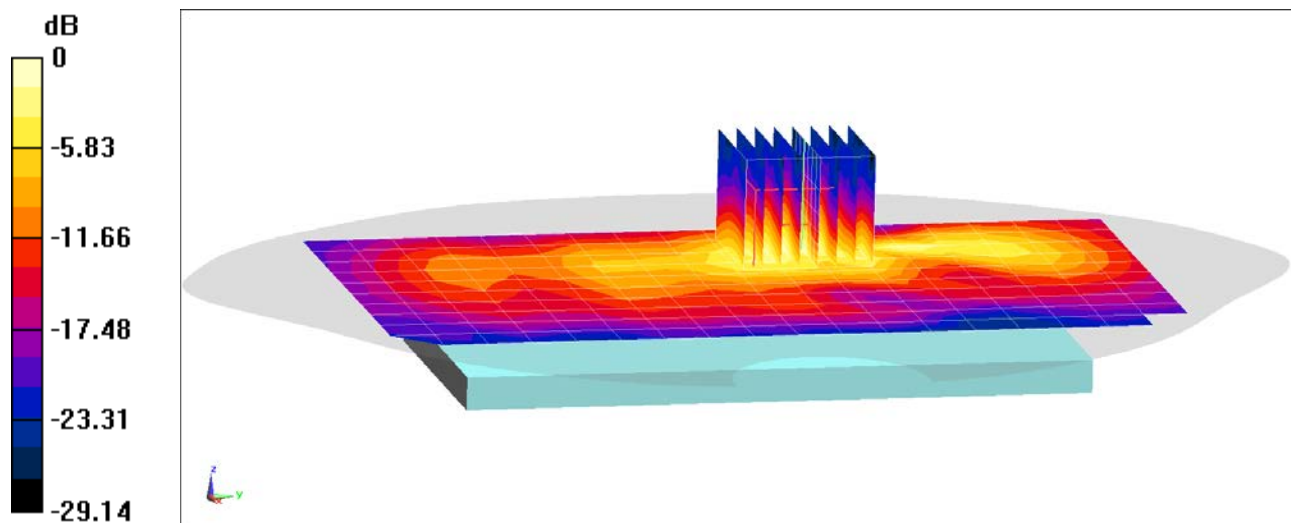
Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 12.11 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.57 W/kg

SAR(1 g) = 0.513 W/kg



0 dB = 1.05 W/kg = 0.21 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58

Medium: 2500 Body; Medium parameters used:

$f = 2680 \text{ MHz}$; $\sigma = 2.316 \text{ S/m}$; $\epsilon_r = 50.94$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-08-2020; Ambient Temp: 24.2°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7547; ConvF(7.18, 7.18, 7.18) @ 2680 MHz; Calibrated: 7/15/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 7/11/2019

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 41, Body SAR, Back side, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset**

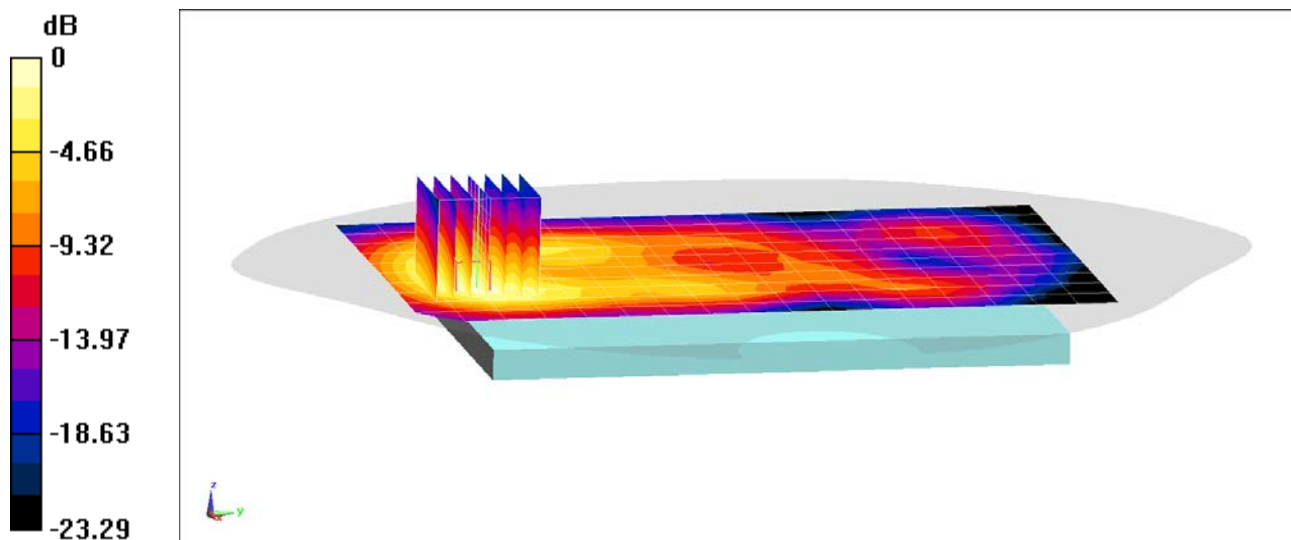
Area Scan (11x16x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 15.00 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.944 W/kg

SAR(1 g) = 0.468 W/kg



0 dB = 0.532 W/kg = -2.74 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58

Medium: 2450 Body; Medium parameters used:

$f = 2680 \text{ MHz}$; $\sigma = 2.316 \text{ S/m}$; $\epsilon_r = 50.94$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-08-2020; Ambient Temp: 24.2°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7547; ConvF(7.18, 7.18, 7.18) @ 2680 MHz; Calibrated: 7/15/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 7/11/2019

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 41, Body SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset**

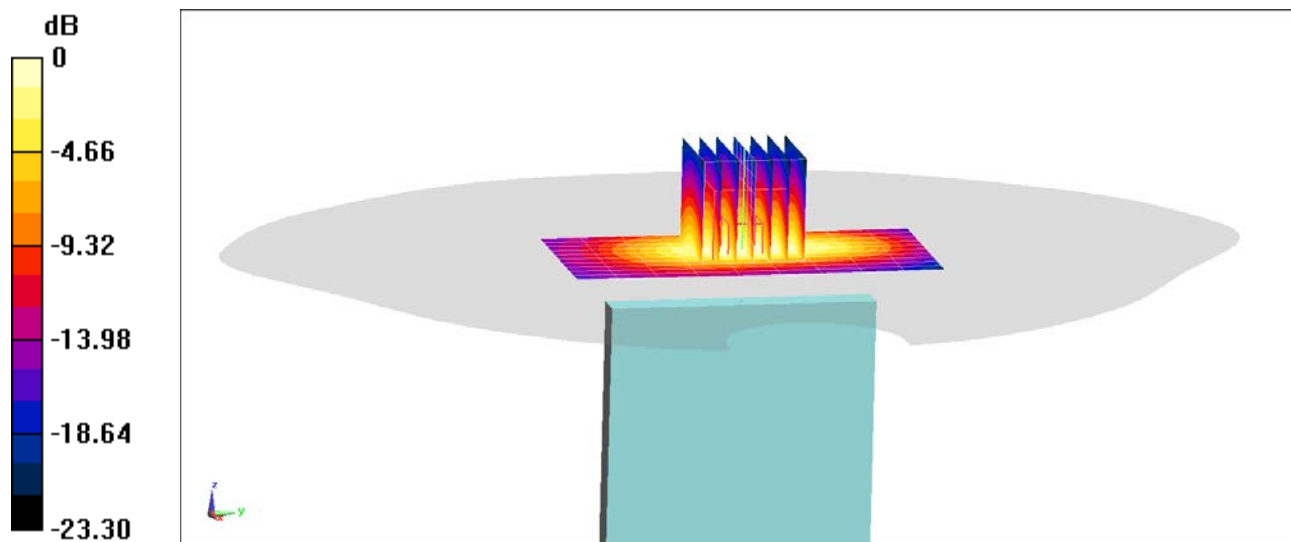
Area Scan (11x10x1): Measurement grid: dx=5mm, dy=12mm

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

Reference Value = 22.36 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 2.20 W/kg

SAR(1 g) = 1.03 W/kg



0 dB = 1.74 W/kg = 2.41 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00395

Communication System: UID 0, NR Band n5; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.5 \text{ MHz}$; $\sigma = 0.965 \text{ S/m}$; $\epsilon_r = 54.005$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-20-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 836.5 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n5, Body SAR, Back Side,
20 MHz Bandwidth, DFT-s-OFDM QPSK, Ch. 167300, 50 RB, 28 RB Offset**

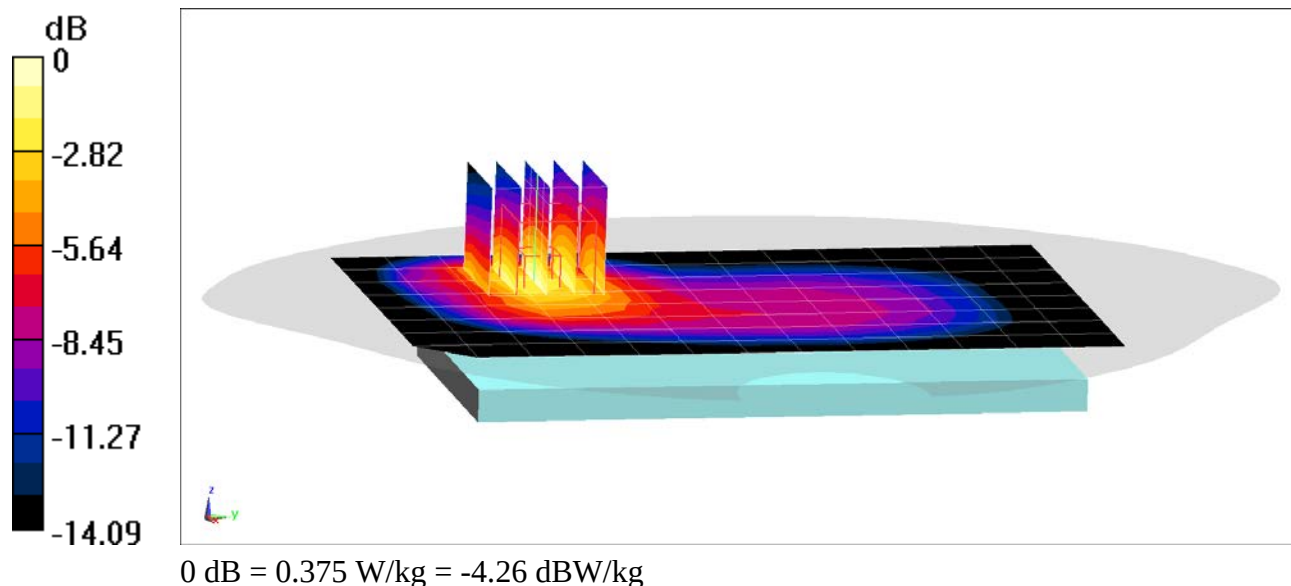
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.68 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.428 W/kg

SAR(1 g) = 0.275 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00395

Communication System: UID 0, NR Band n5; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.5 \text{ MHz}$; $\sigma = 0.965 \text{ S/m}$; $\epsilon_r = 54.005$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-20-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 836.5 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n5, Body SAR, Front Side,
20 MHz Bandwidth, DFT-s-OFDM QPSK, Ch. 167300, 1 RB, 53 RB Offset**

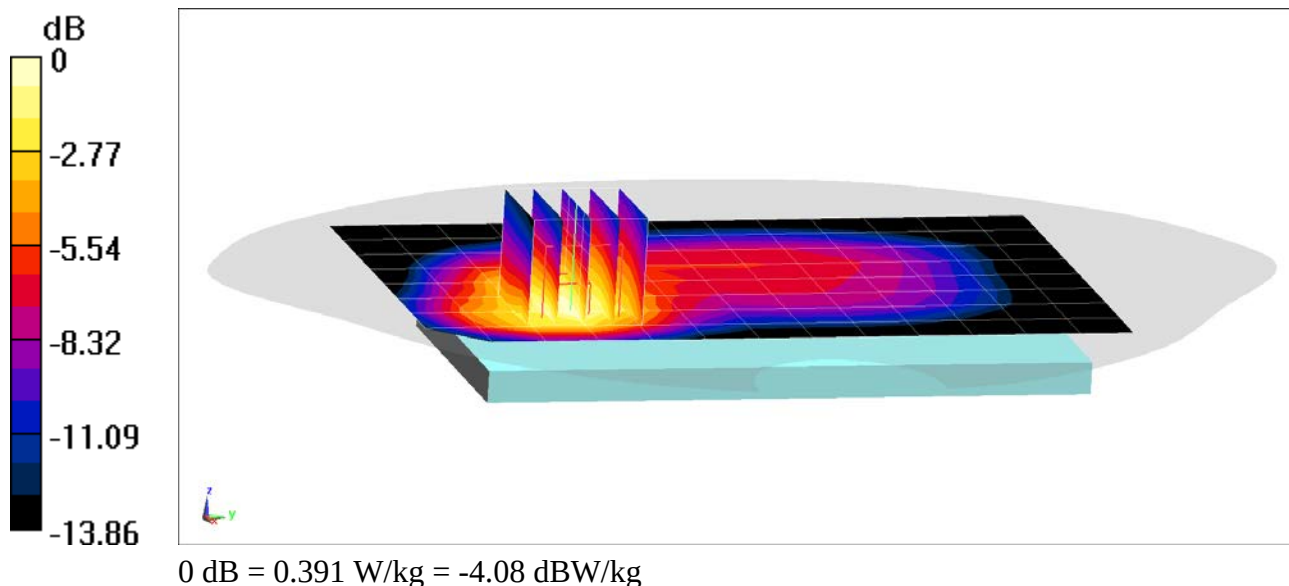
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.03 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.461 W/kg

SAR(1 g) = 0.288 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00387

Communication System: UID 0, NR Band n66; Frequency: 1720 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1720 \text{ MHz}$; $\sigma = 1.487 \text{ S/m}$; $\epsilon_r = 52.79$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-30-2019; Ambient Temp: 20.4°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1720 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n66, Body SAR, Back Side,
20 MHz Bandwidth, DFT-s-OFDM QPSK, Ch. 344000, 50 RB, 56 RB Offset**

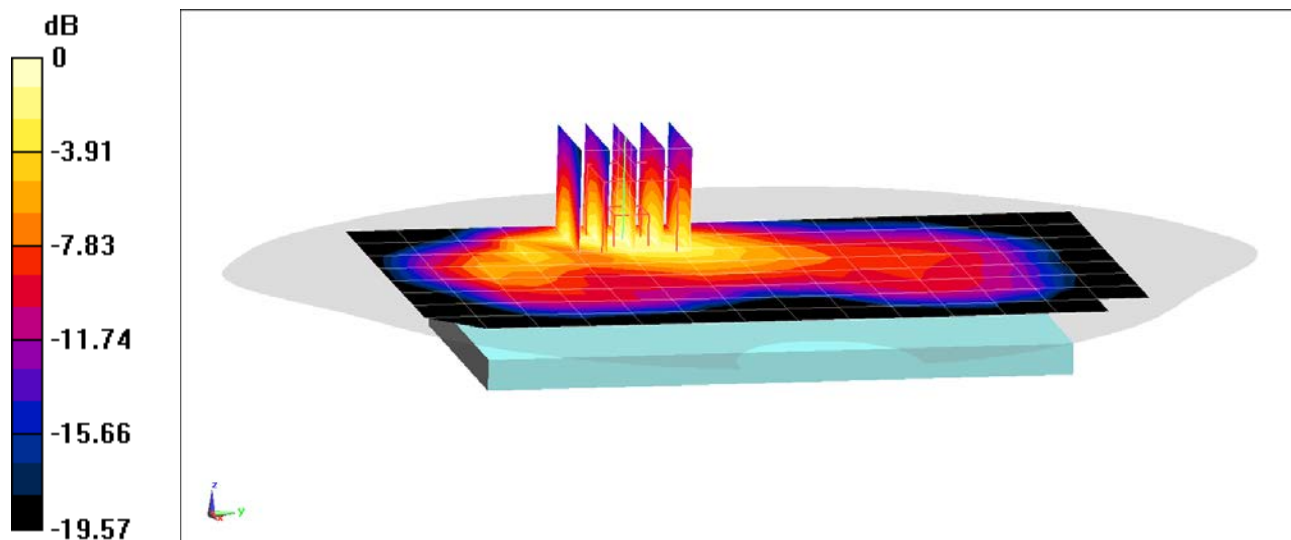
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 14.38 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.495 W/kg

SAR(1 g) = 0.278 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00387

Communication System: UID 0, NR Band n66; Frequency: 1770 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1770 \text{ MHz}$; $\sigma = 1.543 \text{ S/m}$; $\epsilon_r = 52.586$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-30-2019; Ambient Temp: 20.4°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1770 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n66, Body SAR, Right Edge,
20 MHz Bandwidth, DFT-s-OFDM QPSK, Ch. 354000, 50 RB, 56 RB Offset**

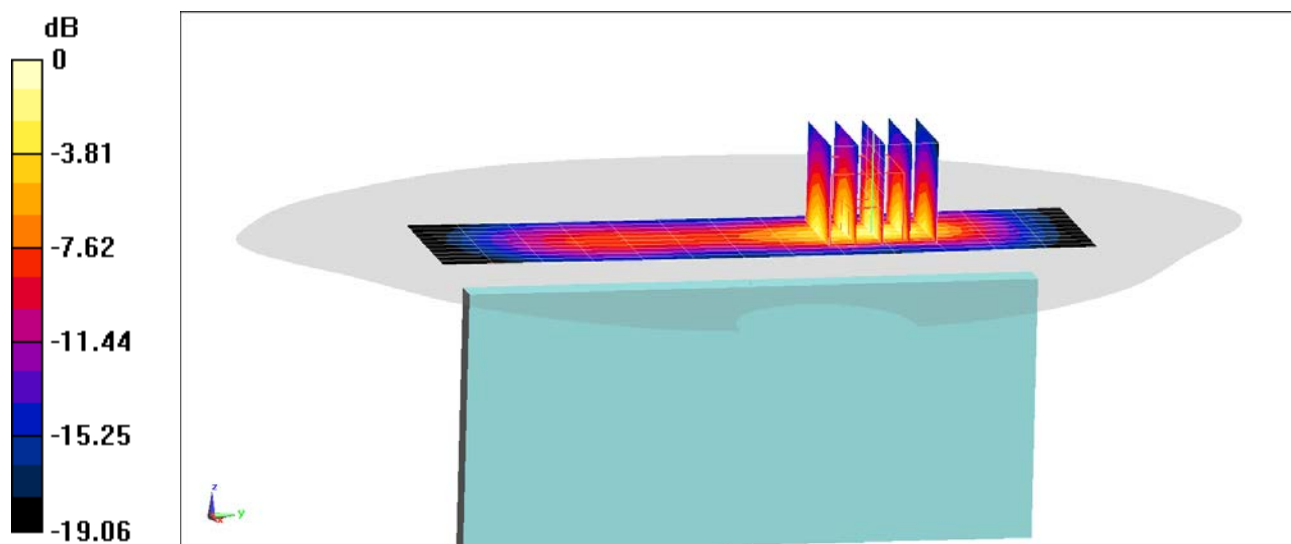
Area Scan (11x14x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 24.92 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.59 W/kg

SAR(1 g) = 0.864 W/kg



0 dB = 1.33 W/kg = 1.24 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00395

Communication System: UID 0, NR Band n2; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.555 \text{ S/m}$; $\epsilon_r = 51.892$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-27-2019; Ambient Temp: 21.5°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1880 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n2, Body SAR, Back Side,
20 MHz Bandwidth, DFT-s-OFDM QPSK, Ch. 376000, 50 RB, 28 RB Offset**

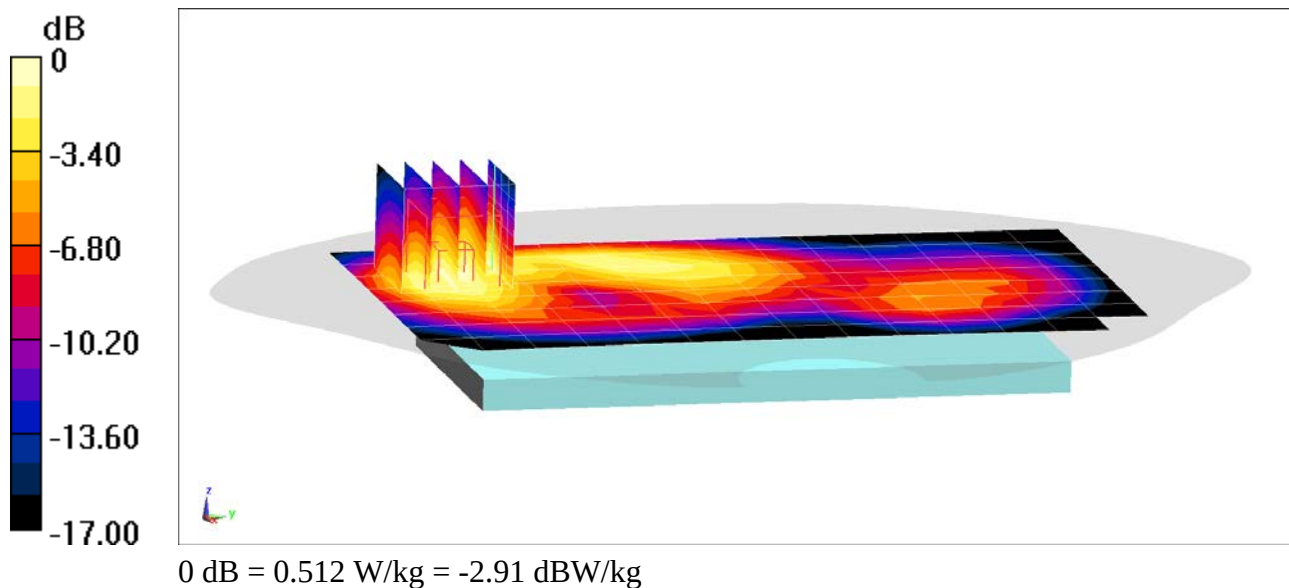
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 15.83 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.603 W/kg

SAR(1 g) = 0.364 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00395

Communication System: UID 0, NR Band n2; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1860 \text{ MHz}$; $\sigma = 1.533 \text{ S/m}$; $\epsilon_r = 51.962$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-27-2019; Ambient Temp: 21.5°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1860 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n2, Body SAR, Right Edge,
20 MHz Bandwidth, DFT-s-OFDM QPSK, Ch. 372000, 50 RB, 28 RB Offset**

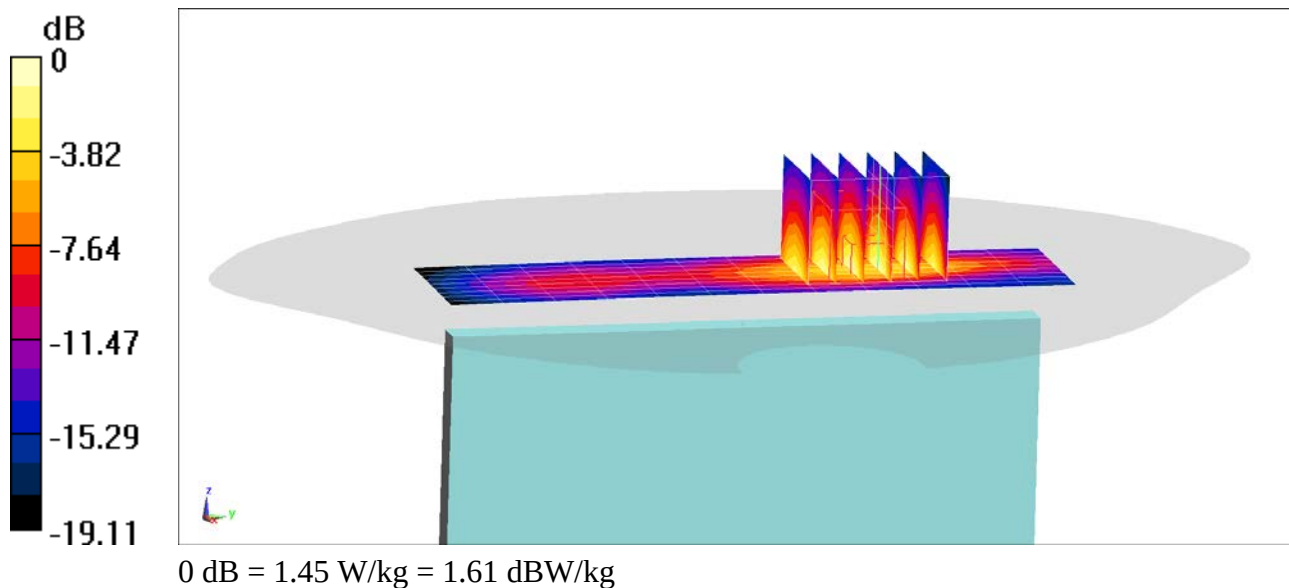
Area Scan (10x13x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.13 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.74 W/kg

SAR(1 g) = 0.956 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 2.002 \text{ S/m}$; $\epsilon_r = 50.379$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-13-2020; Ambient Temp: 21.9°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.44, 7.44, 7.44) @ 2437 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

**Mode: IEEE 802.11b Ant 1, 22 MHz Bandwidth,
Body SAR, Ch 6, 1 Mbps, Back Side**

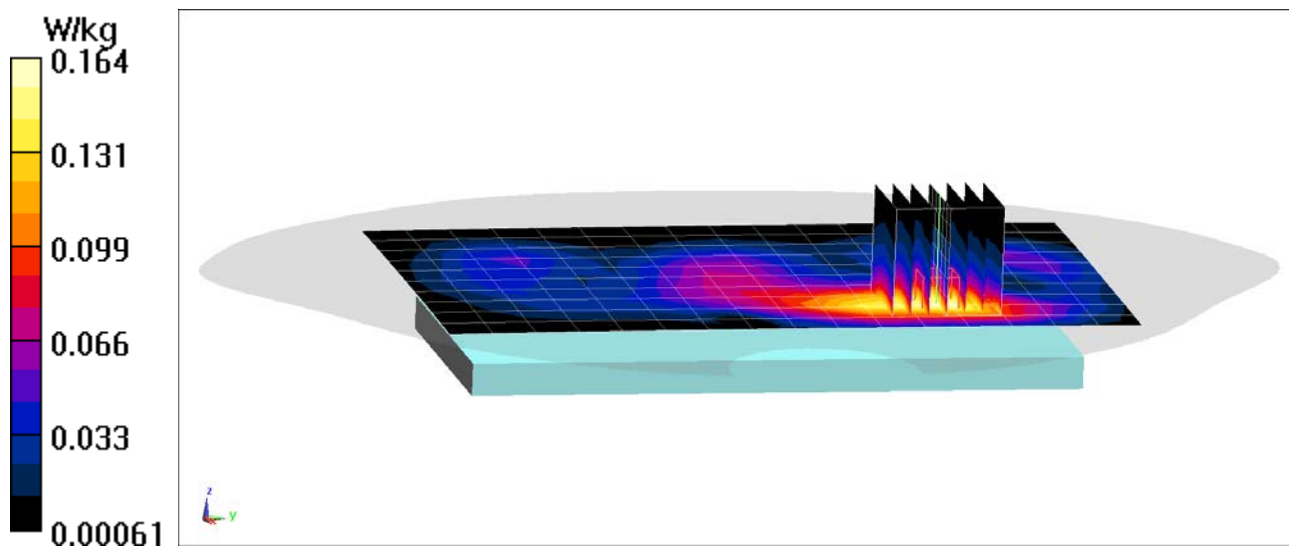
Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 7.681 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.202 W/kg

SAR(1 g) = 0.107 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 2.002 \text{ S/m}$; $\epsilon_r = 50.379$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-13-2020; Ambient Temp: 21.9°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.44, 7.44, 7.44) @ 2437 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: IEEE 802.11b Ant 1, 22 MHz Bandwidth,
Body SAR, Ch 6, 1 Mbps, Left Edge**

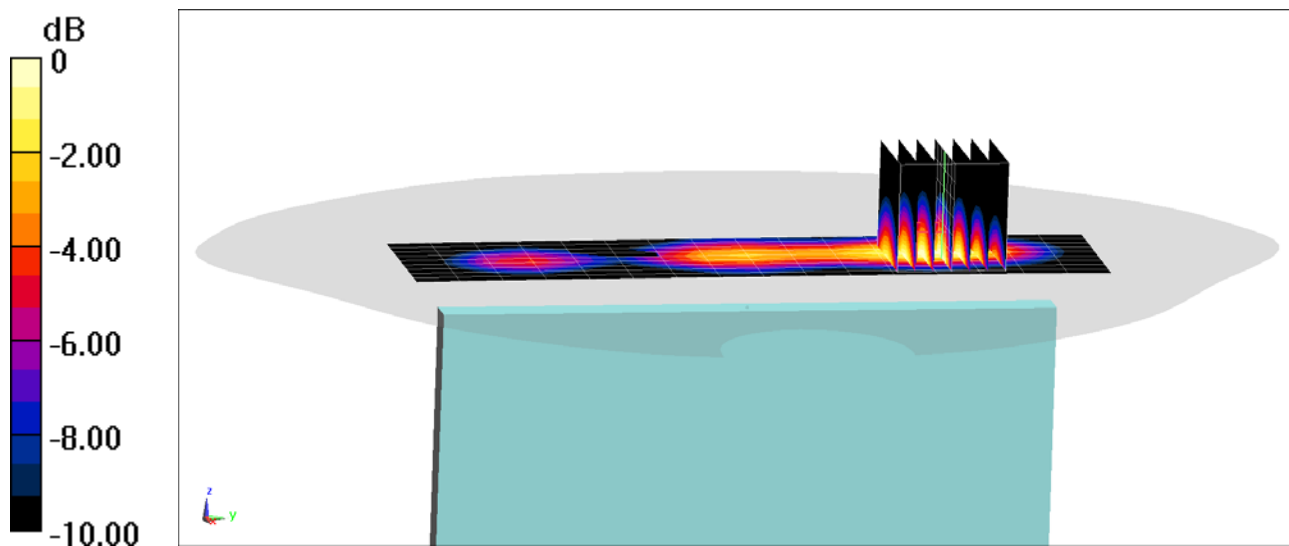
Area Scan (10x17x1): Measurement grid: dx=5mm, dy=12mm

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

Reference Value = 13.54 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.679 W/kg

SAR(1 g) = 0.330 W/kg



0 dB = 0.431 W/kg = -3.66 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5280 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Body; Medium parameters used:

$f = 5280 \text{ MHz}$; $\sigma = 5.585 \text{ S/m}$; $\epsilon_r = 46.908$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-23-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7409; ConvF(4.7, 4.7, 4.7) @ 5280 MHz; Calibrated: 6/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/20/2019

Phantom: Front; Type: QD 000 P40 CD; Serial: 1686

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: IEEE 802.11a Ant 2, UNII-2A, 20 MHz Bandwidth,
Body SAR, Ch 56, 6 Mbps, Back Side**

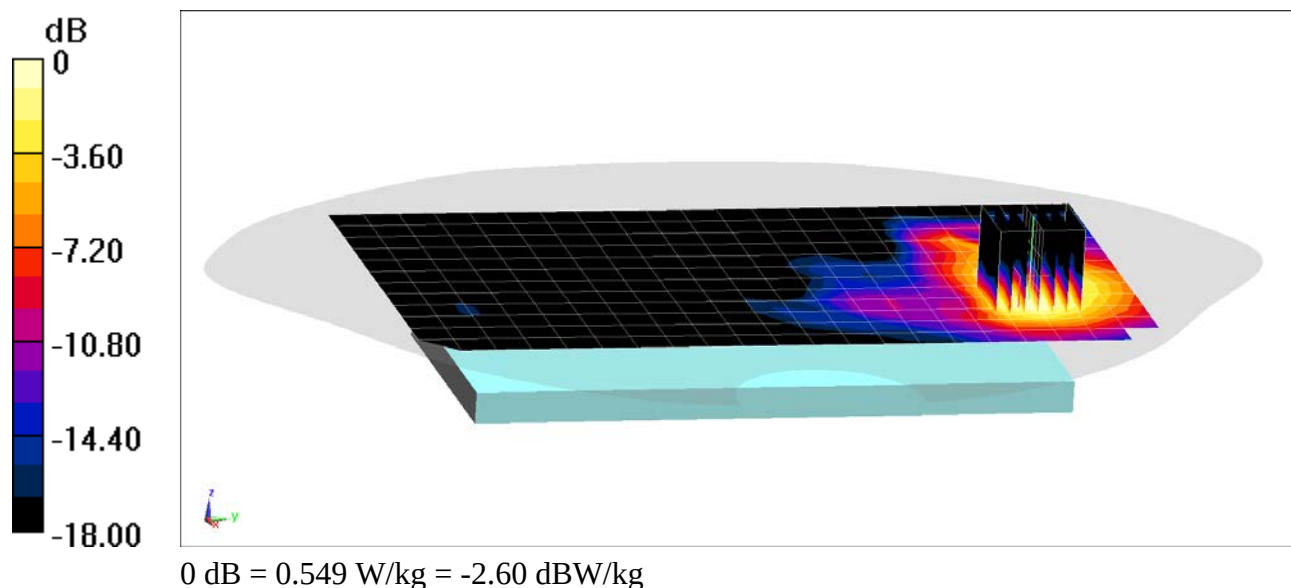
Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 6.827 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.898 W/kg

SAR(1 g) = 0.243 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5825 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Body; Medium parameters used:

$f = 5825 \text{ MHz}$; $\sigma = 6.289 \text{ S/m}$; $\epsilon_r = 46.125$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-13-2020; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7409; ConvF(4.23, 4.23, 4.23) @ 5825 MHz; Calibrated: 6/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/20/2019

Phantom: Front; Type: QD 000 P40 CD; Serial: 1686

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: IEEE 802.11a Ant 2, UNII-3, 20 MHz Bandwidth,
Body SAR, Ch 165, 6 Mbps, Back Side**

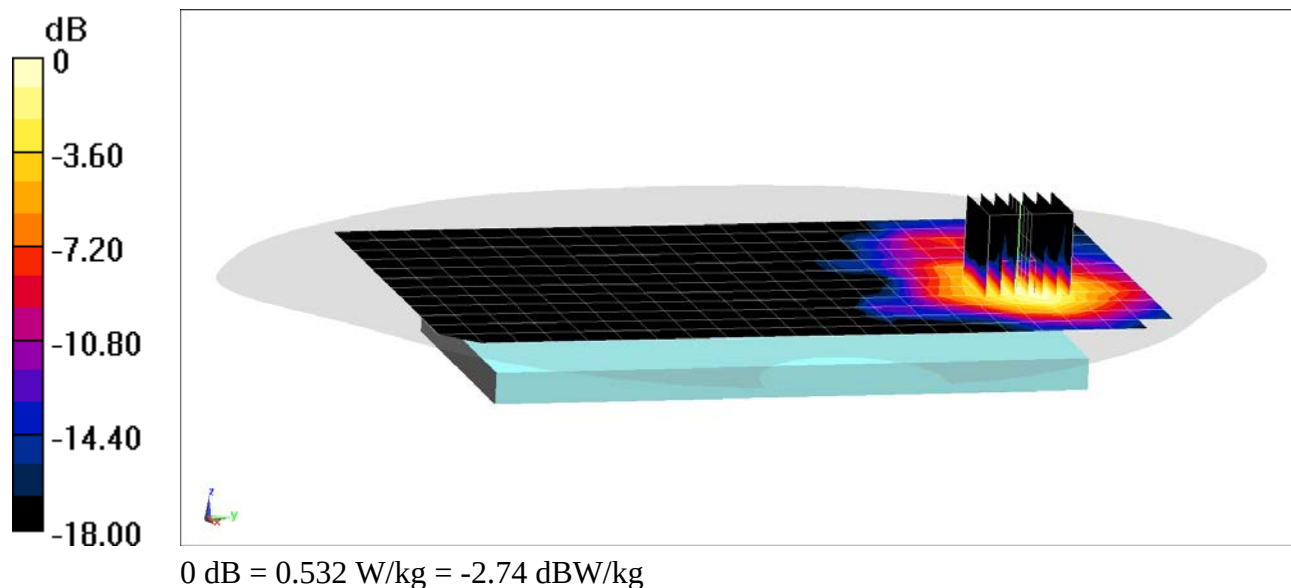
Area Scan (9x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 5.908 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.971 W/kg

SAR(1 g) = 0.214 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.294

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2441 \text{ MHz}$; $\sigma = 1.998 \text{ S/m}$; $\epsilon_r = 50.796$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-10-2019; Ambient Temp: 23.1°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7308; ConvF(7.46, 7.46, 7.46) @ 2441 MHz; Calibrated: 8/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1450; Calibrated: 8/14/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Back Side

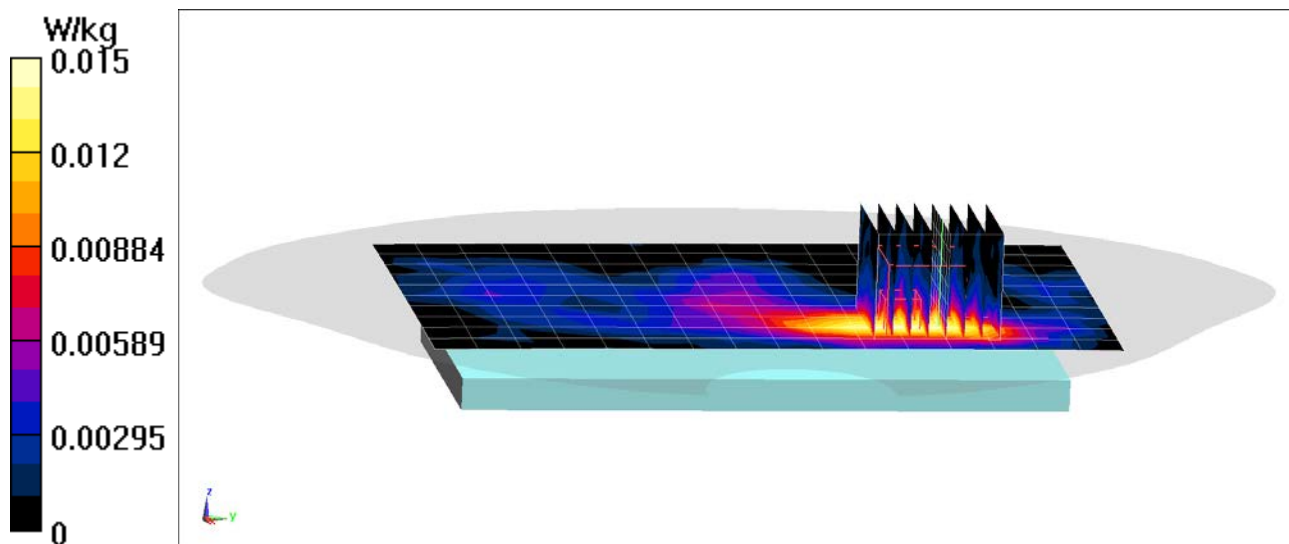
Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.258 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 0.0210 W/kg

SAR(1 g) = 0.009 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.294

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2441 \text{ MHz}$; $\sigma = 1.998 \text{ S/m}$; $\epsilon_r = 50.796$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-10-2019; Ambient Temp: 23.1°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7308; ConvF(7.46, 7.46, 7.46) @ 2441 MHz; Calibrated: 8/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1450; Calibrated: 8/14/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Left Edge

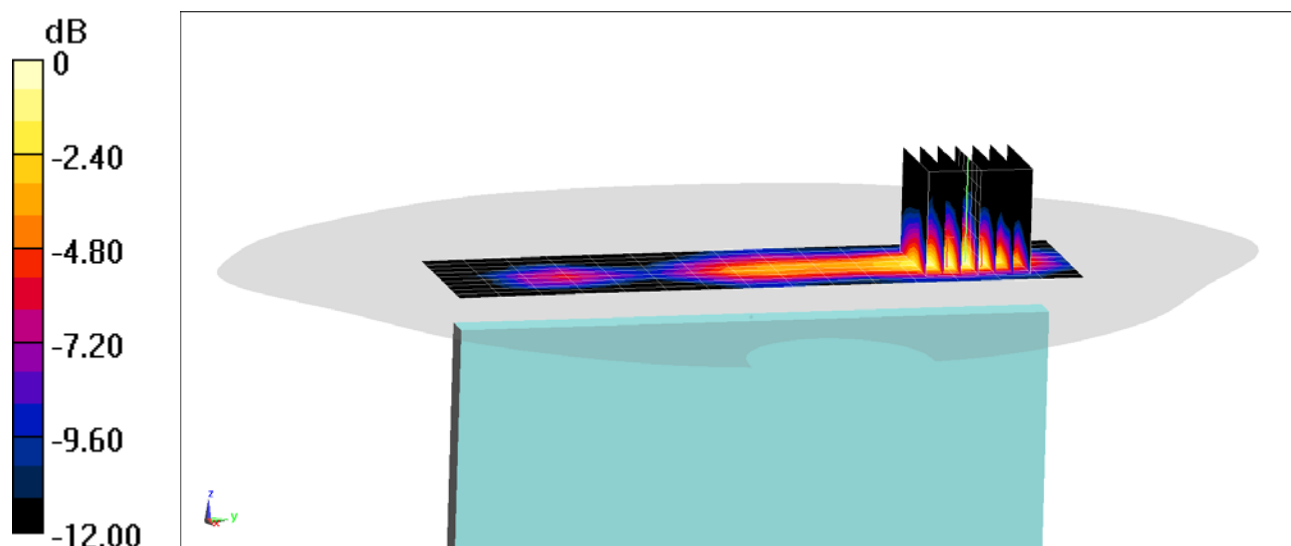
Area Scan (10x16x1): Measurement grid: $dx=5\text{mm}$, $dy=12\text{mm}$

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

Reference Value = 4.164 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.0650 W/kg

SAR(1 g) = 0.030 W/kg



0 dB = 0.0518 W/kg = -12.86 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00361

Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used (interpolated):

$f = 1752.6 \text{ MHz}$; $\sigma = 1.513 \text{ S/m}$; $\epsilon_r = 54.211$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-11-2020; Ambient Temp: 20.8°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1752.6 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 1750, Phablet SAR, Bottom Edge, High.ch

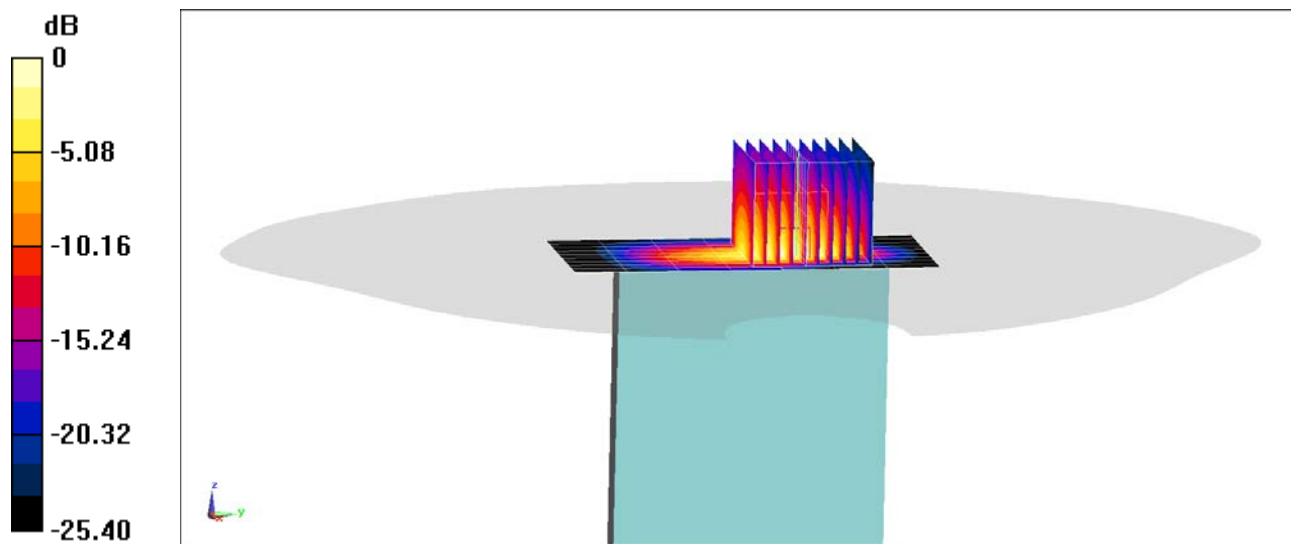
Area Scan (10x8x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (10x10x8)/Cube 0: Measurement grid: $dx=3.8\text{mm}$, $dy=3.8\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 73.26 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 24.7 W/kg

SAR(10 g) = 2.84 W/kg



0 dB = 14.6 W/kg = 11.64 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.558 \text{ S/m}$; $\epsilon_r = 51.254$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-13-2020; Ambient Temp: 22.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1880 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Mode: PCS EVDO, Phablet SAR, Bottom Edge, Mid.ch

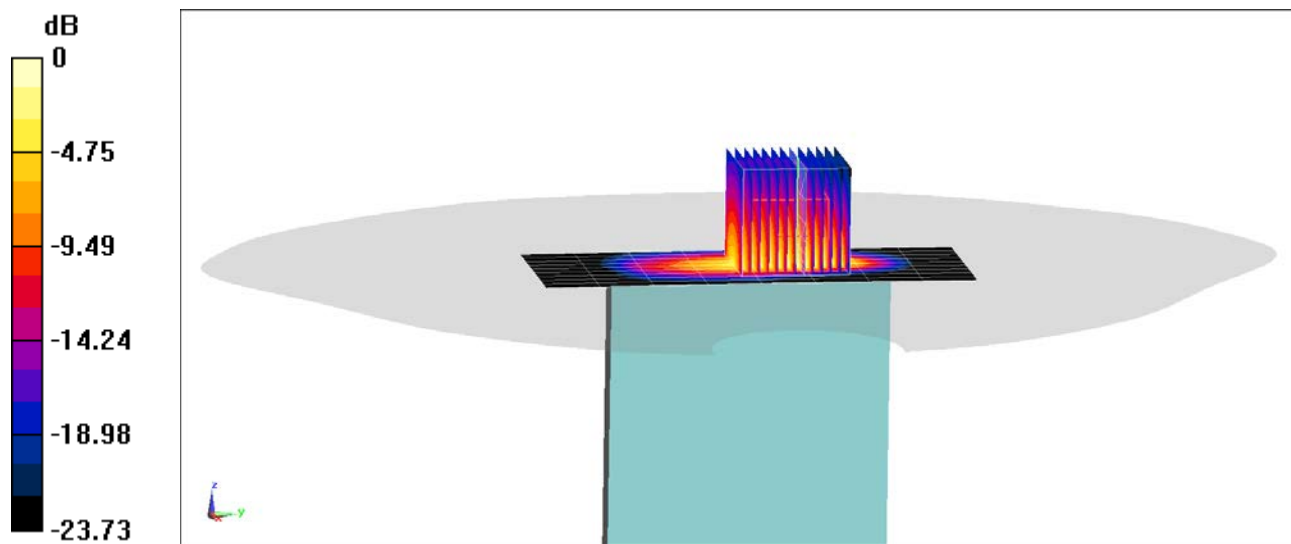
Area Scan (10x9x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (13x13x8)/Cube 0: Measurement grid: $dx=2.5\text{mm}$, $dy=2.5\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 66.08 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 19.1 W/kg

SAR(10 g) = 2.26 W/kg



0 dB = 11.8 W/kg = 10.72 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00353

Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 52.538$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-03-2020; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7571; ConvF(7.56, 7.56, 7.56) @ 1880 MHz; Calibrated: 12/11/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1533; Calibrated: 12/5/2019

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

Mode: UMTS 1900, Phablet SAR, Bottom Edge, Mid.ch

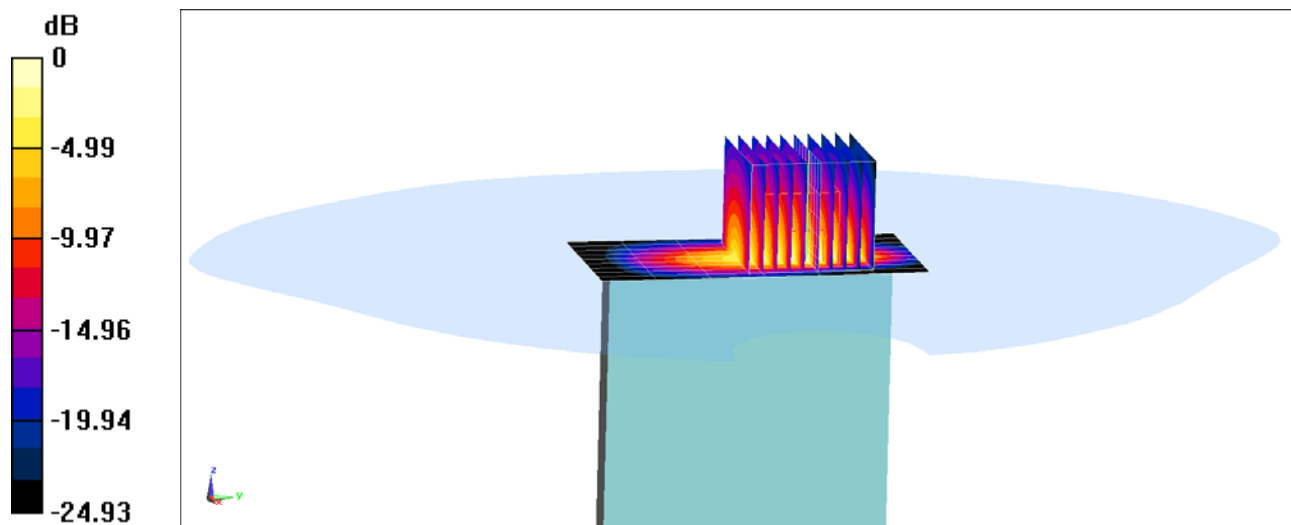
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (10x10x8)/Cube 0: Measurement grid: $dx=3.8\text{mm}$, $dy=3.8\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 77.10 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 27.8 W/kg

SAR(10 g) = 3.1 W/kg



PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00346

Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1770 \text{ MHz}$; $\sigma = 1.533 \text{ S/m}$; $\epsilon_r = 54.139$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-11-2020; Ambient Temp: 20.8°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1770 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 66 (AWS), Phablet SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset**

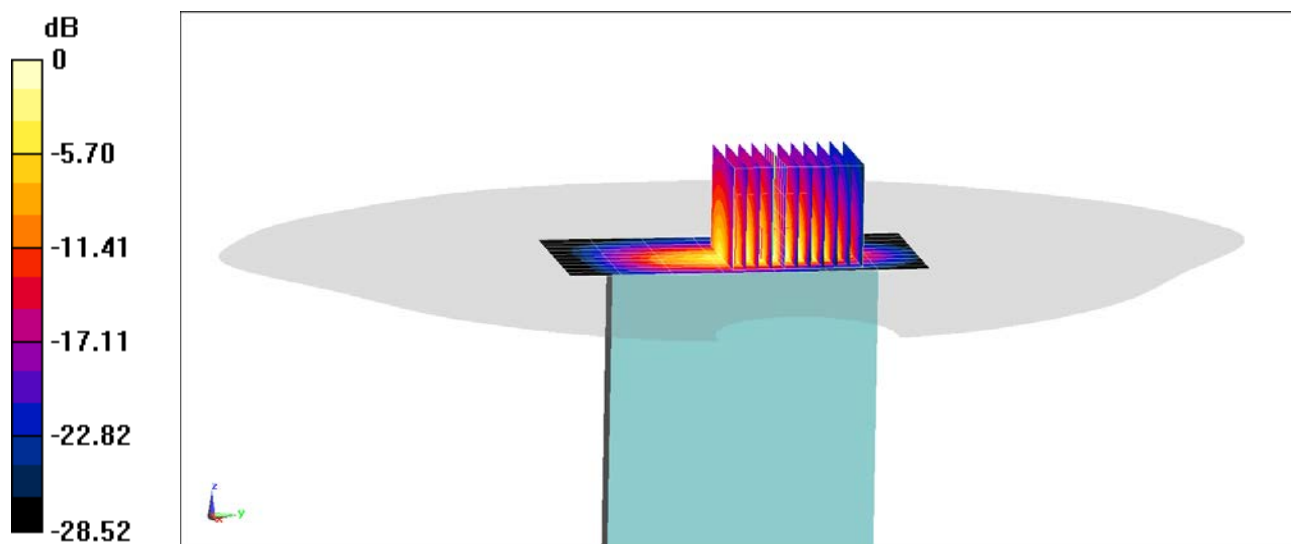
Area Scan (11x8x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (10x11x8)/Cube 0: Measurement grid: dx=3.8mm, dy=3.8mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 65.82 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 25.9 W/kg

SAR(10 g) = 2.94 W/kg



0 dB = 15.5 W/kg = 11.90 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00346

Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1860 \text{ MHz}$; $\sigma = 1.517 \text{ S/m}$; $\epsilon_r = 52.129$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-12-2020; Ambient Temp: 24.1°C; Tissue Temp: 23.5°C

Probe: EX3DV4 - SN7571; ConvF(7.56, 7.56, 7.56) @ 1860 MHz; Calibrated: 12/11/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1533; Calibrated: 12/5/2019

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: LTE Band 2 (PCS), Phablet SAR, Bottom Edge, Low.ch,
20 MHz Bandwidth, QPSK, 100 RB, 0 RB Offset**

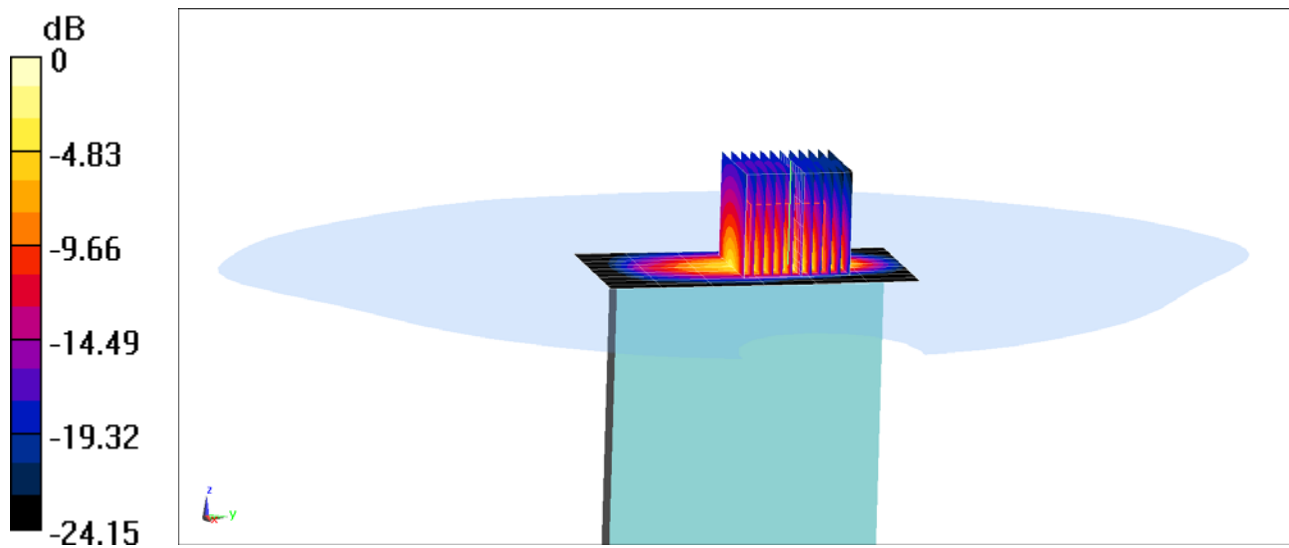
Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (12x12x8)/Cube 0: Measurement grid: dx=2.8mm, dy=2.8mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 78.34 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 29.6 W/kg

SAR(10 g) = 3.05 W/kg



0 dB = 17.4 W/kg = 12.41 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00395

Communication System: UID 0, NR Band n66; Frequency: 1745 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1745 \text{ MHz}$; $\sigma = 1.495 \text{ S/m}$; $\epsilon_r = 56.078$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 02-17-2020; Ambient Temp: 21.9°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1745 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n66, Phablet SAR, Right Edge, 20 MHz Bandwidth,
DFT-s-OFDM QPSK, Ch. 349000, 1 RB, 104 RB Offset**

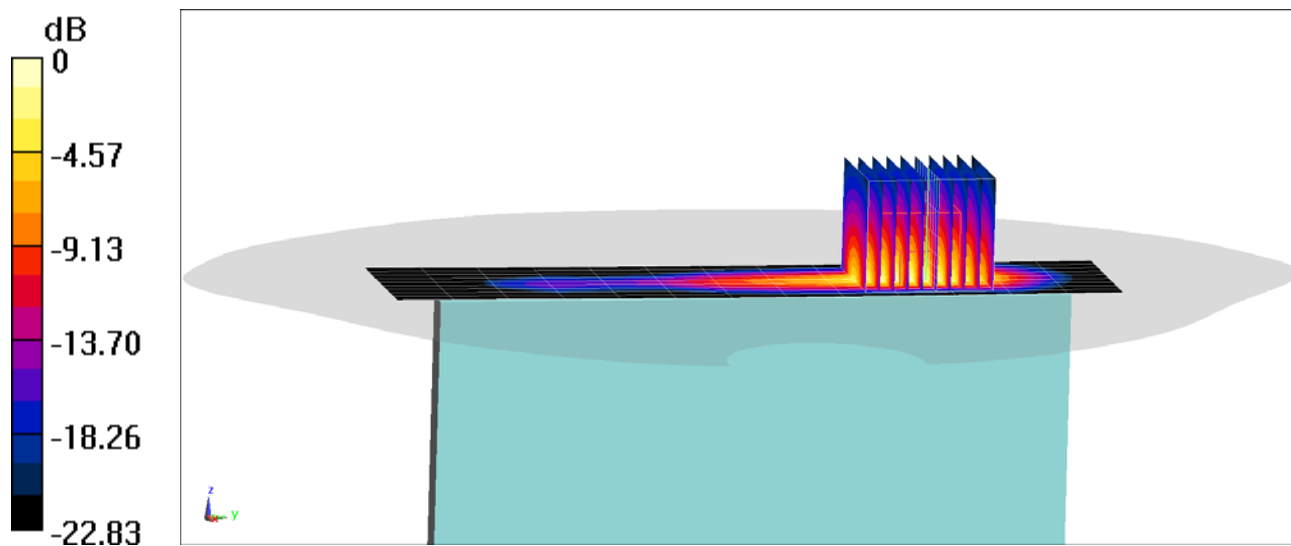
Area Scan (10x14x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (10x10x8)/Cube 0: Measurement grid: dx=3.8mm, dy=3.8mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 77.71 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 30.5 W/kg

SAR(10 g) = 2.96 W/kg



0 dB = 16.8 W/kg = 12.25 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00387

Communication System: UID 0, NR Band n2; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1860 \text{ MHz}$; $\sigma = 1.513 \text{ S/m}$; $\epsilon_r = 51.943$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-30-2019; Ambient Temp: 23.3°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1860 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Mode: NR Band n2, Phablet SAR, Right Edge, 20 MHz Bandwidth,
DFT-s-OFDM QPSK, Ch. 372000, 50 RB, 28 RB Offset**

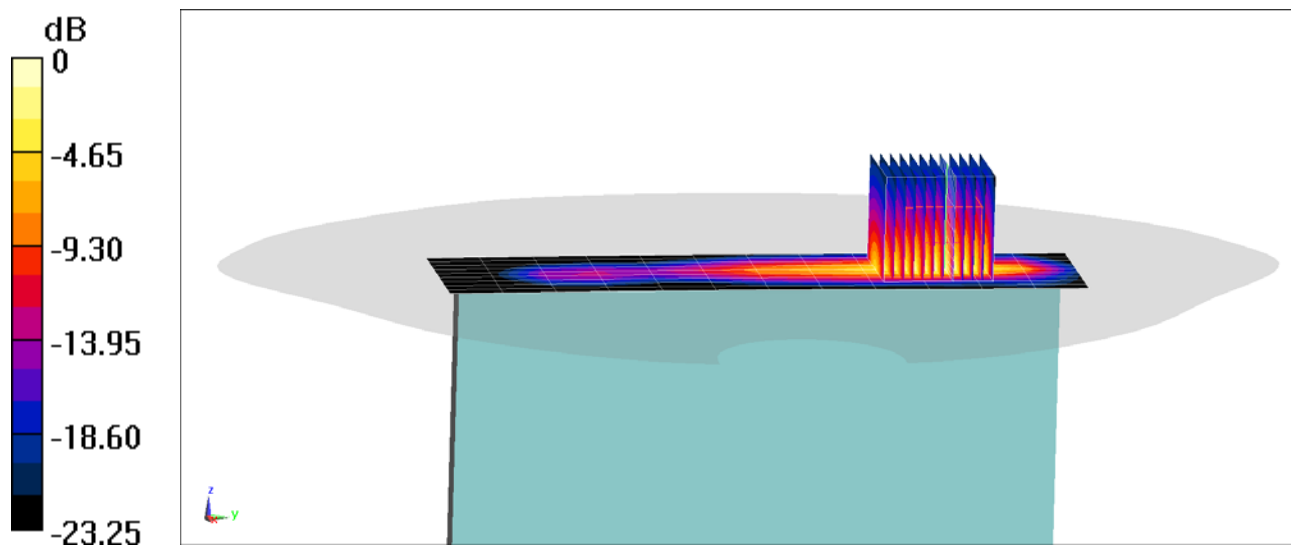
Area Scan (10x13x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (12x12x8)/Cube 0: Measurement grid: dx=2.8mm, dy=2.8mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 77.33 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 30.9 W/kg

SAR(10 g) = 3 W/kg



0 dB = 18.2 W/kg = 12.60 dBW/kg

PCTEST

DUT: ZNFV600VM; Type: Portable Handset; Serial: 00296

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Body; Medium parameters used:

$f = 5600$ MHz; $\sigma = 6.015$ S/m; $\epsilon_r = 46.347$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-23-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7409; ConvF(4.22, 4.22, 4.22) @ 5600 MHz; Calibrated: 6/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/20/2019

Phantom: Front; Type: QD 000 P40 CD; Serial: 1686

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

**Mode: IEEE 802.11a Ant 2, U-NII-2C, 20 MHz Bandwidth,
Phablet SAR, Ch 120, 6 Mbps, Back Side**

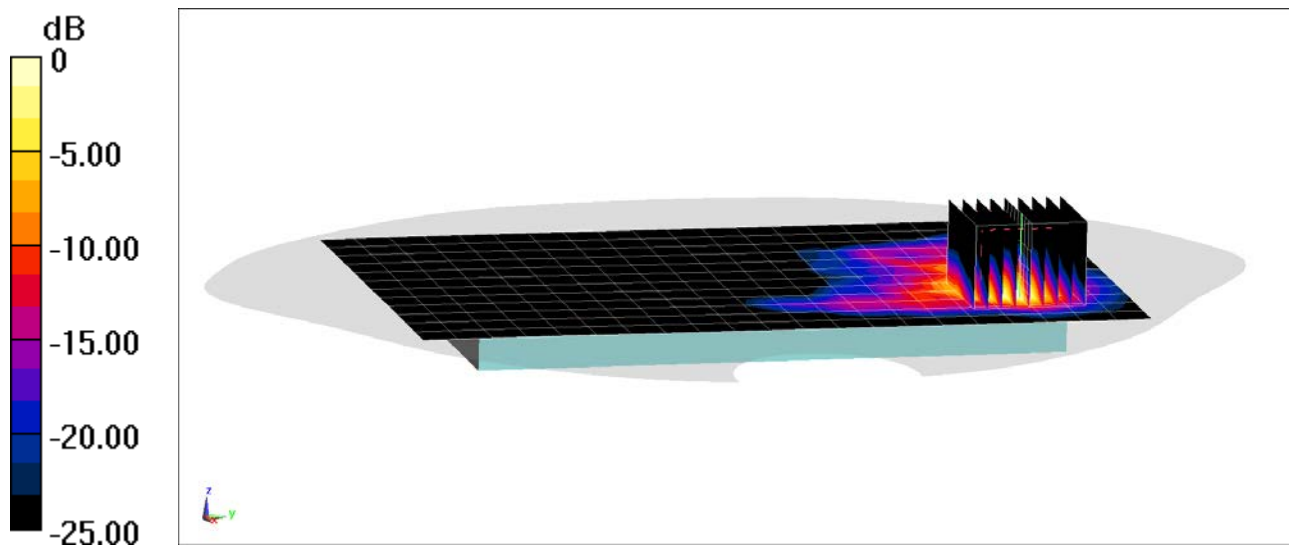
Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 21.86 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 13.8 W/kg

SAR(10 g) = 0.965 W/kg



0 dB = 7.18 W/kg = 8.56 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1161

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Head; Medium parameters used:

$f = 750 \text{ MHz}$; $\sigma = 0.897 \text{ S/m}$; $\epsilon_r = 41.772$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-29-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95) @ 750 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

750 MHz System Verification at 23.0 dBm (200 mW)

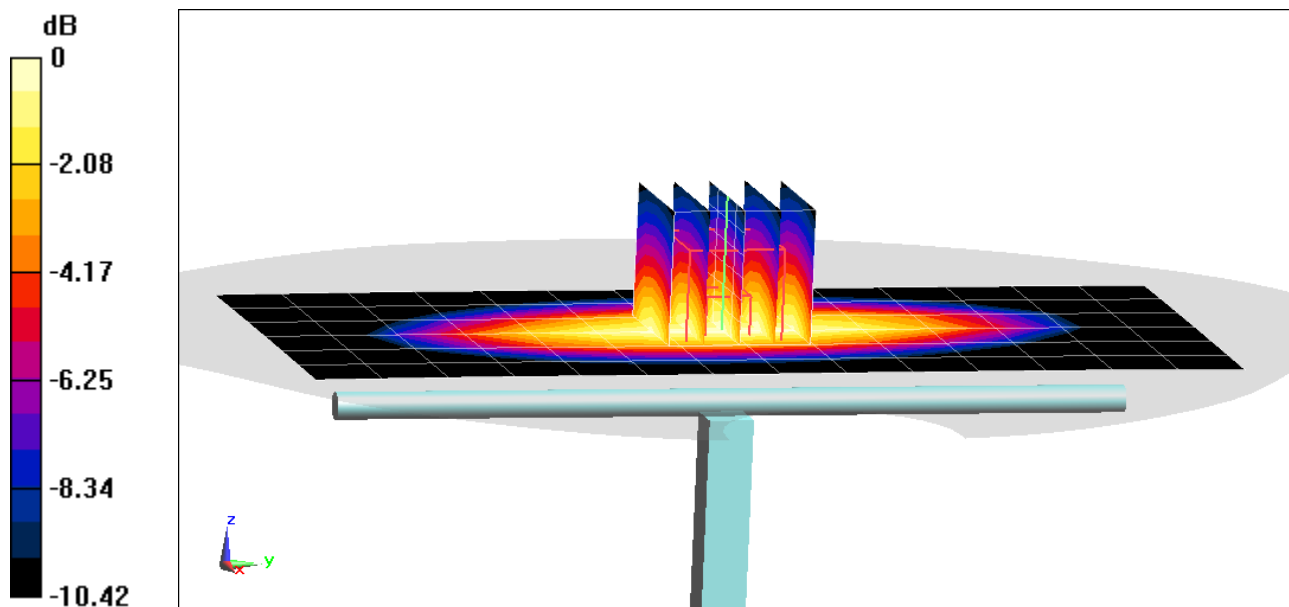
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.46 W/kg

SAR(1 g) = 1.71 W/kg

Deviation(1 g) = 6.48%



0 dB = 2.23 W/kg = 3.48 dBW/kg

PCTEST

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.913 \text{ S/m}$; $\epsilon_r = 40.142$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-13-2020; Ambient Temp: 21.9°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7308; ConvF(9.87, 9.87, 9.87) @ 835 MHz; Calibrated: 8/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1450; Calibrated: 8/14/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

835 MHz System Verification at 23.0 dBm (200 mW)

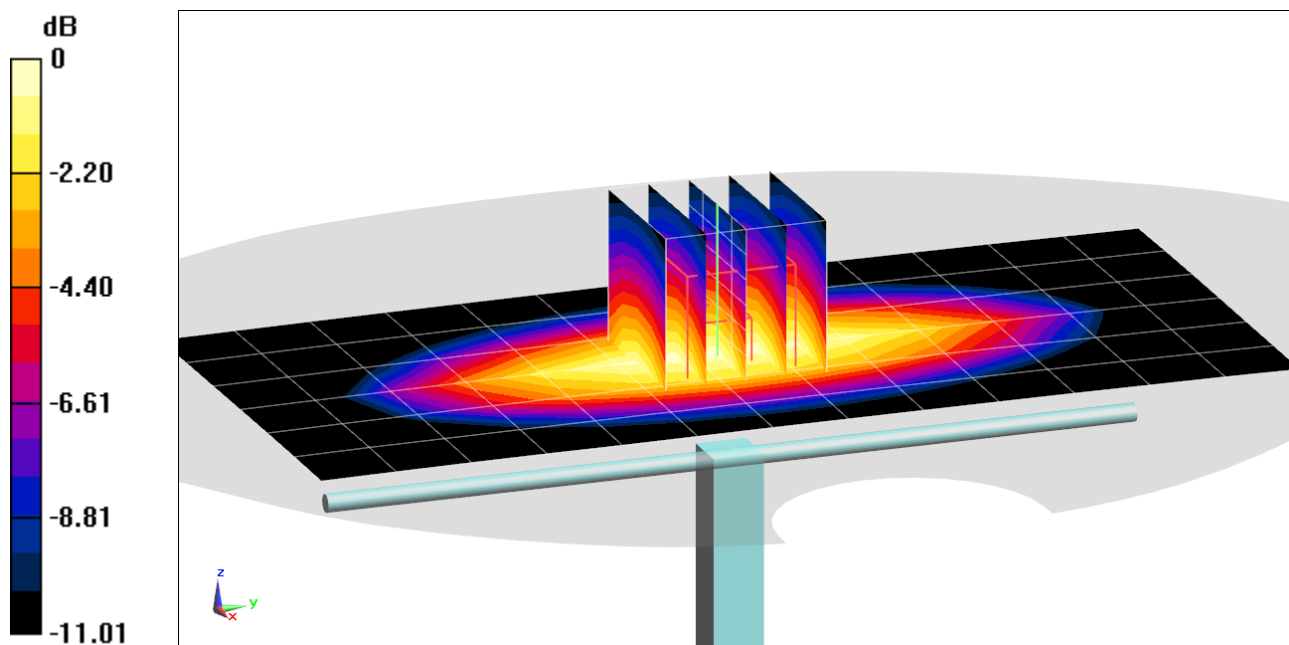
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 3.10 W/kg

SAR(1 g) = 2.03 W/kg

Deviation(1 g) = 7.75%



0 dB = 2.74 W/kg = 4.38 dBW/kg

PCTEST

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head; Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.379 \text{ S/m}$; $\epsilon_r = 39.153$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-02-2019; Ambient Temp: 23.7°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN7551; ConvF(8.34, 8.34, 8.34) @ 1750 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

1750 MHz System Verification at 20.0 dBm (100 mW)

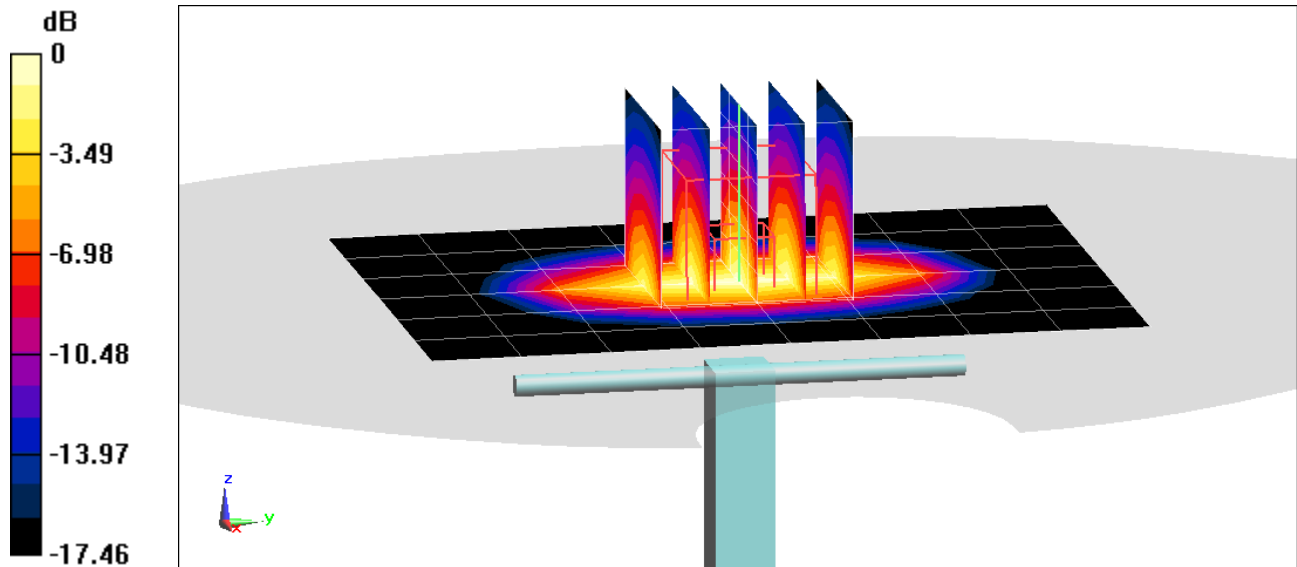
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.28 W/kg

SAR(1 g) = 3.78 W/kg

Deviation(1 g) = 3.56%



0 dB = 6.00 W/kg = 7.78 dBW/kg

PCTEST

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1148

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.405 \text{ S/m}$; $\epsilon_r = 38.409$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7406; ConvF(8.57, 8.57, 8.57) @ 1750 MHz; Calibrated: 5/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Left 30; Type: QD 000 P40 CD; Serial: 1715

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

1750 MHz System Verification at 20.0 dBm (100 mW)

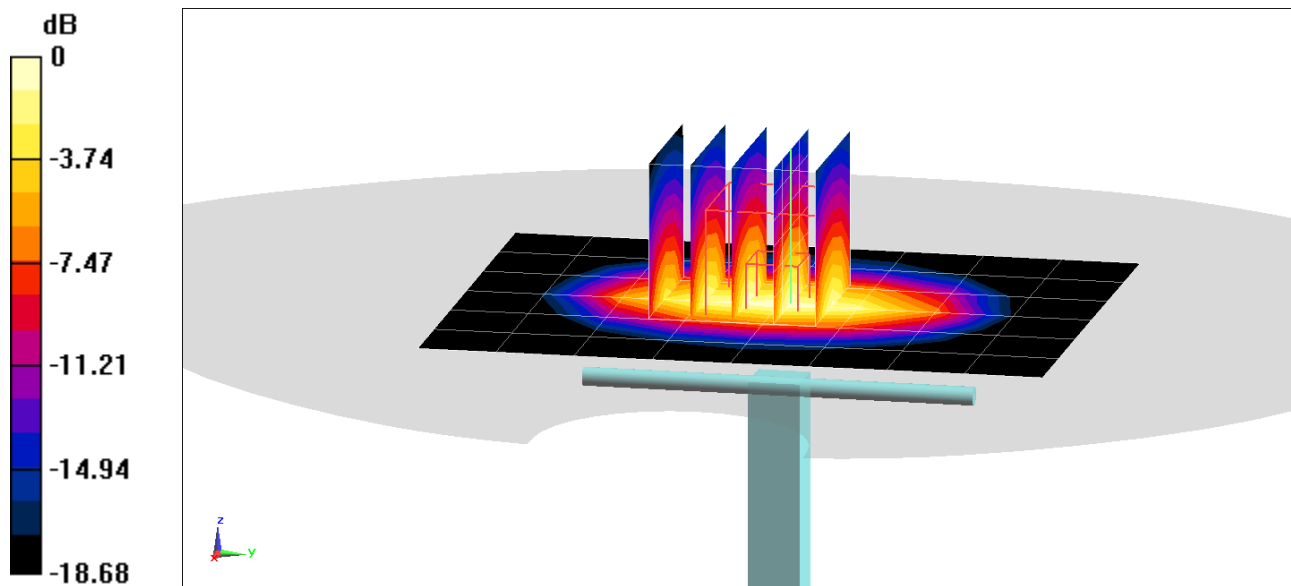
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 6.47 W/kg

SAR(1 g) = 3.44 W/kg

Deviation(1 g) = -7.03%



0 dB = 5.34 W/kg = 7.28 dBW/kg

PCTEST

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head; Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.373 \text{ S/m}$; $\epsilon_r = 38.803$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-10-2020; Ambient Temp: 22.1°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7406; ConvF(8.57, 8.57, 8.57) @ 1750 MHz; Calibrated: 5/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Right 30; Type: QD 000 P40 CD; Serial: 1759

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1750 MHz System Verification at 20.0 dBm (100 mW)

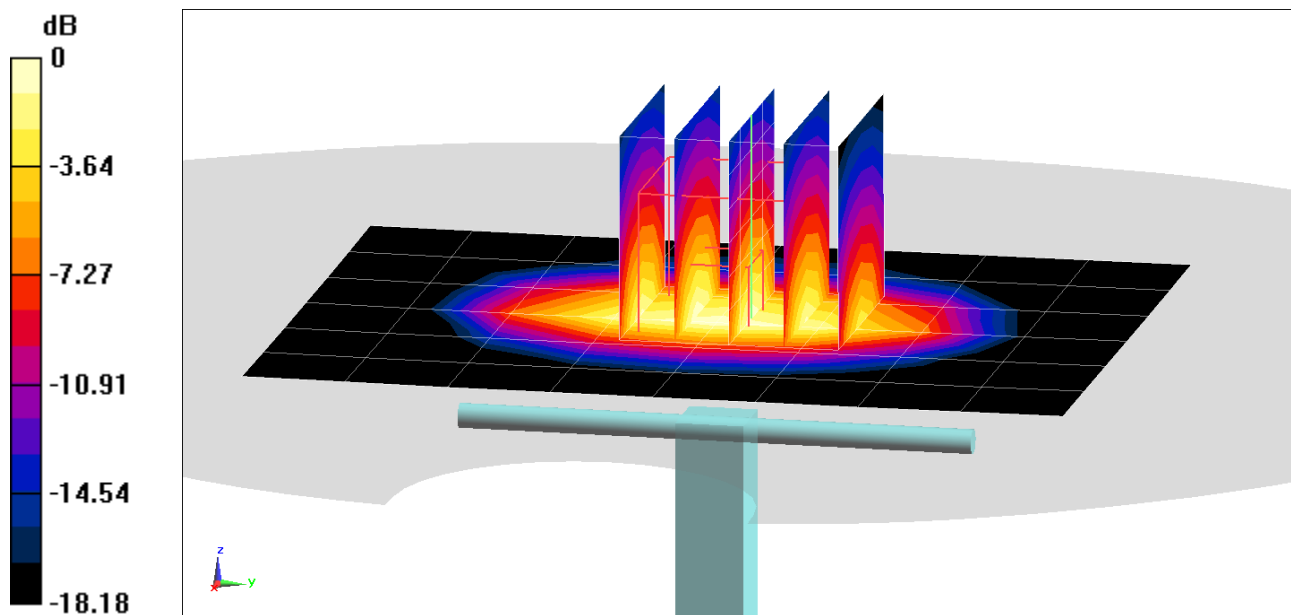
Area Scan (7x9x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.02 W/kg

SAR(1 g) = 3.77 W/kg

Deviation(1 g) = 4.14%



0 dB = 5.75 W/kg = 7.60 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.433 \text{ S/m}$; $\epsilon_r = 39.28$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-31-2019; Ambient Temp: 22.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7410; ConvF(8.11, 8.11, 8.11) @ 1900 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0 (20); Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

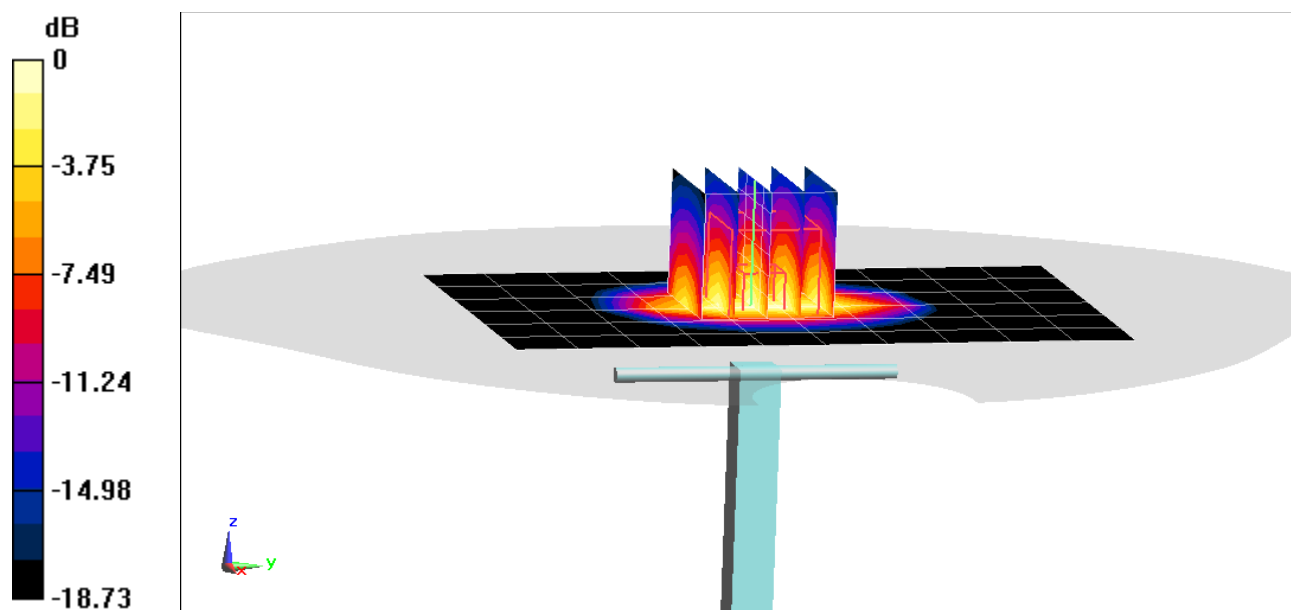
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.59 W/kg

SAR(1 g) = 4.08 W/kg

Deviation(1 g) = 4.35%



0 dB = 6.36 W/kg = 8.03 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.433 \text{ S/m}$; $\epsilon_r = 39.339$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-04-2020; Ambient Temp: 23.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7410; ConvF(8.11, 8.11, 8.11) @ 1900 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

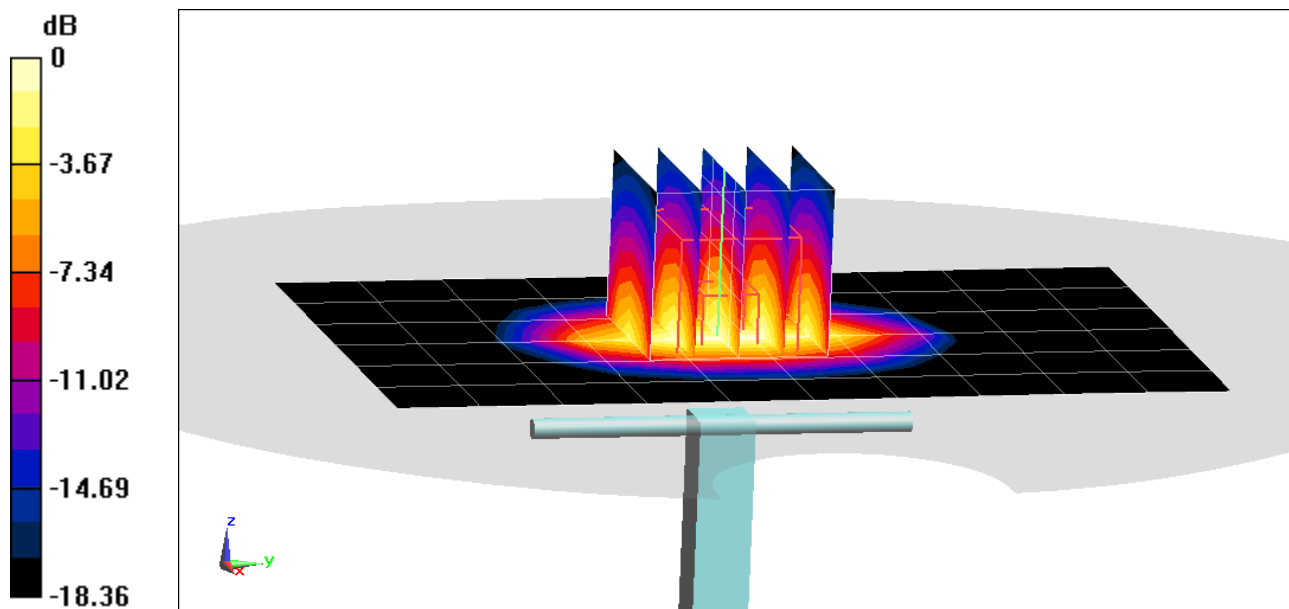
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.85 W/kg

SAR(1 g) = 4.15 W/kg

Deviation(1 g) = 6.14%



0 dB = 6.55 W/kg = 8.16 dBW/kg

PCTEST

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1073

Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2300 \text{ MHz}$; $\sigma = 1.689 \text{ S/m}$; $\epsilon_r = 37.912$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-16-2020; Ambient Temp: 22.3°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7417; ConvF(7.73, 7.73, 7.73) @ 2300 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/13/2019

Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

2300 MHz System Verification at 20.0 dBm (100 mW)

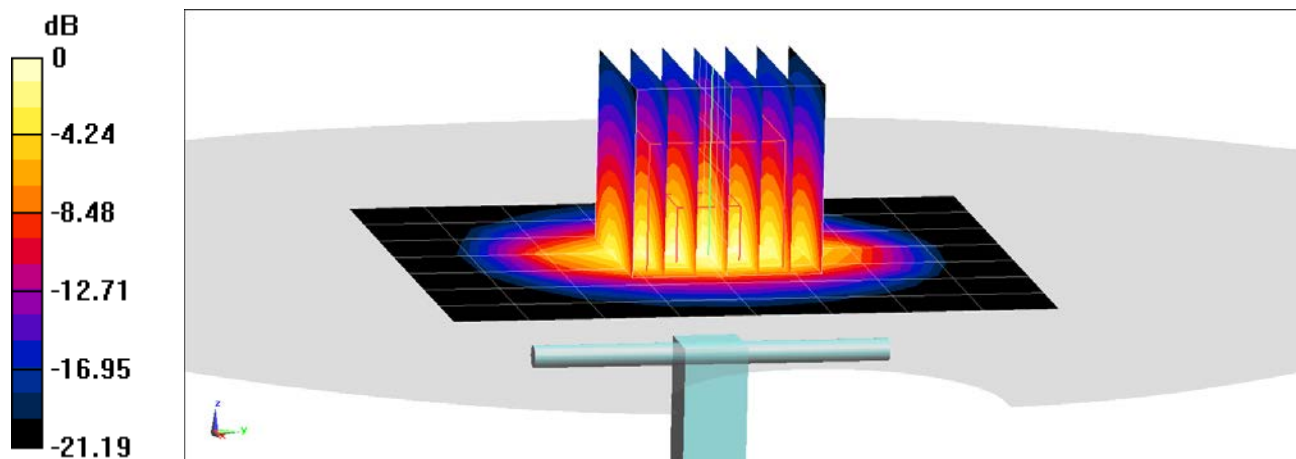
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 9.77 W/kg

SAR(1 g) = 4.77 W/kg

Deviation(1 g) = -3.05%



0 dB = 7.86 W/kg = 8.95 dBW/kg

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2450$ MHz; $\sigma = 1.861$ S/m; $\epsilon_r = 40.327$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2019; Ambient Temp: 22.7°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7417; ConvF(7.46, 7.46, 7.46) @ 2450 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/13/2019

Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

2450 MHz System Verification at 20.0 dBm (100 mW)

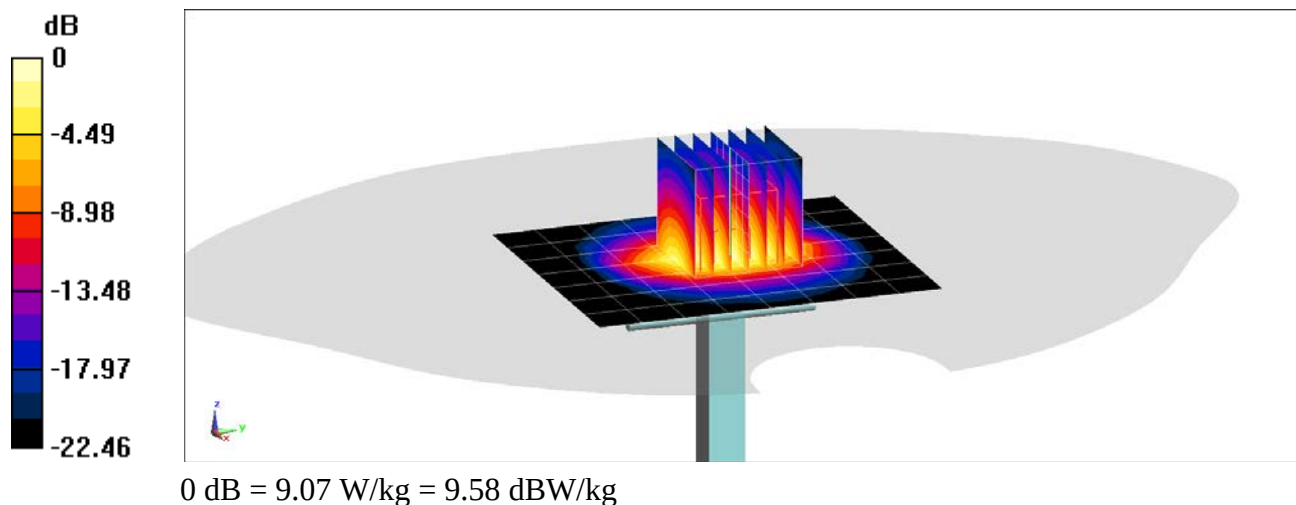
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 11.2 W/kg

SAR(1 g) = 5.44 W/kg

Deviation(1 g) = 4.02%



PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.855 \text{ S/m}$; $\epsilon_r = 38.213$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-08-2020; Ambient Temp: 22.9°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7417; ConvF(7.46, 7.46, 7.46) @ 2450 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/13/2019

Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

2450 MHz System Verification at 20.0 dBm (100 mW)

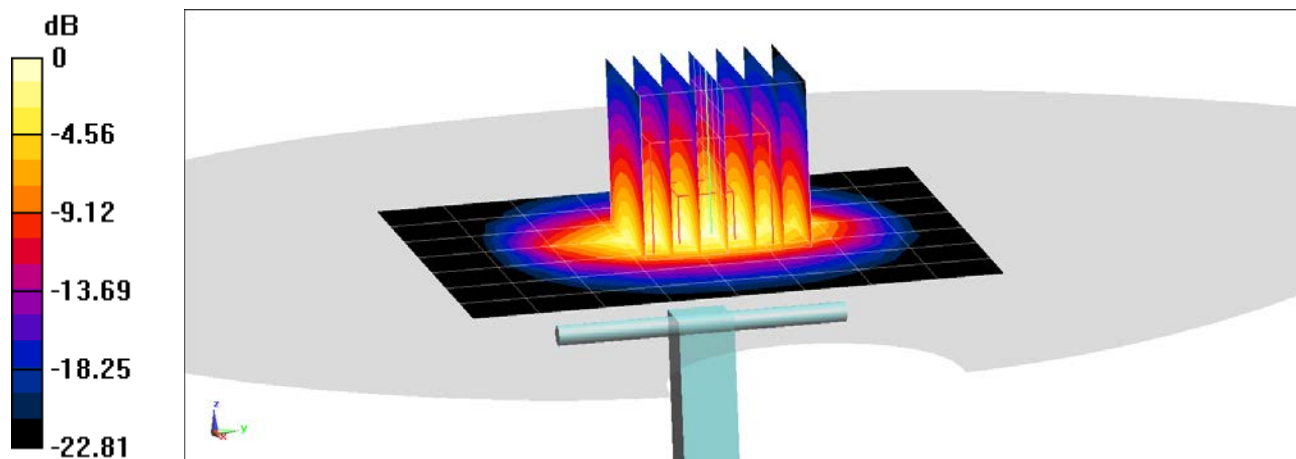
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 11.5 W/kg

SAR(1 g) = 5.55 W/kg

Deviation(1 g) = 4.52%



0 dB = 9.19 W/kg = 9.63 dBW/kg

PCTEST

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1064

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2600$ MHz; $\sigma = 1.968$ S/m; $\epsilon_r = 38.574$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2019; Ambient Temp: 20.8°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7417; ConvF(7.17, 7.17, 7.17) @ 2600 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/13/2019

Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

2600 MHz System Verification at 20.0 dBm (100 mW)

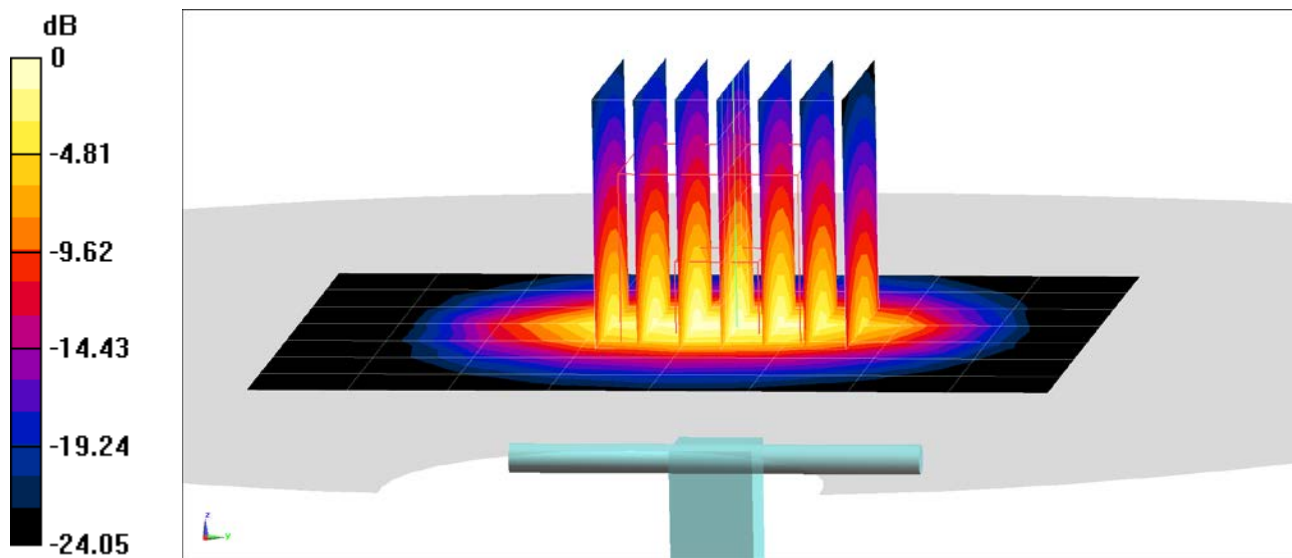
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 13.0 W/kg

SAR(1 g) = 6.02 W/kg

Deviation(1 g) = 3.61%



PCTEST

DUT: Dipole 3700 MHz; Type: D3700V2; Serial: 1018

Communication System: UID 0, CW; Frequency: 3700 MHz; Duty Cycle: 1:1

Medium: 3500 Head; Medium parameters used:

$f = 3700$ MHz; $\sigma = 3.107$ S/m; $\epsilon_r = 36.624$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-16-2019; Ambient Temp: 20.4°C; Tissue Temp: 20.3°C

Probe: EX3DV4 - SN3589; ConvF(6.02, 6.02, 6.02) @ 3700 MHz; Calibrated: 1/25/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

3700 MHz System Verification at 20.0 dBm (100 mW)

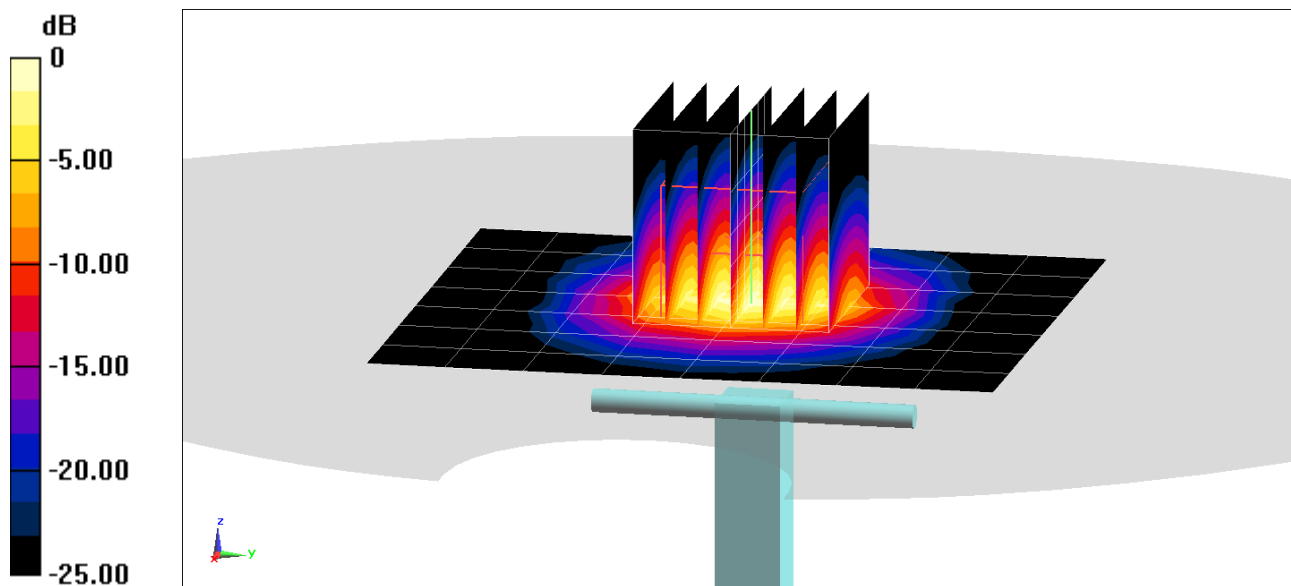
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 20.8 W/kg

SAR(1 g) = 7.01 W/kg

Deviation(1 g) = 6.53%



0 dB = 14.3 W/kg = 11.55 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Head; Medium parameters used:

$f = 5250$ MHz; $\sigma = 4.591$ S/m; $\epsilon_r = 35.155$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2019; Ambient Temp: 22.1°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7406; ConvF(5.54, 5.54, 5.54) @ 5250 MHz; Calibrated: 5/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

5250 MHz System Verification at 17.0 dBm (50 mW)

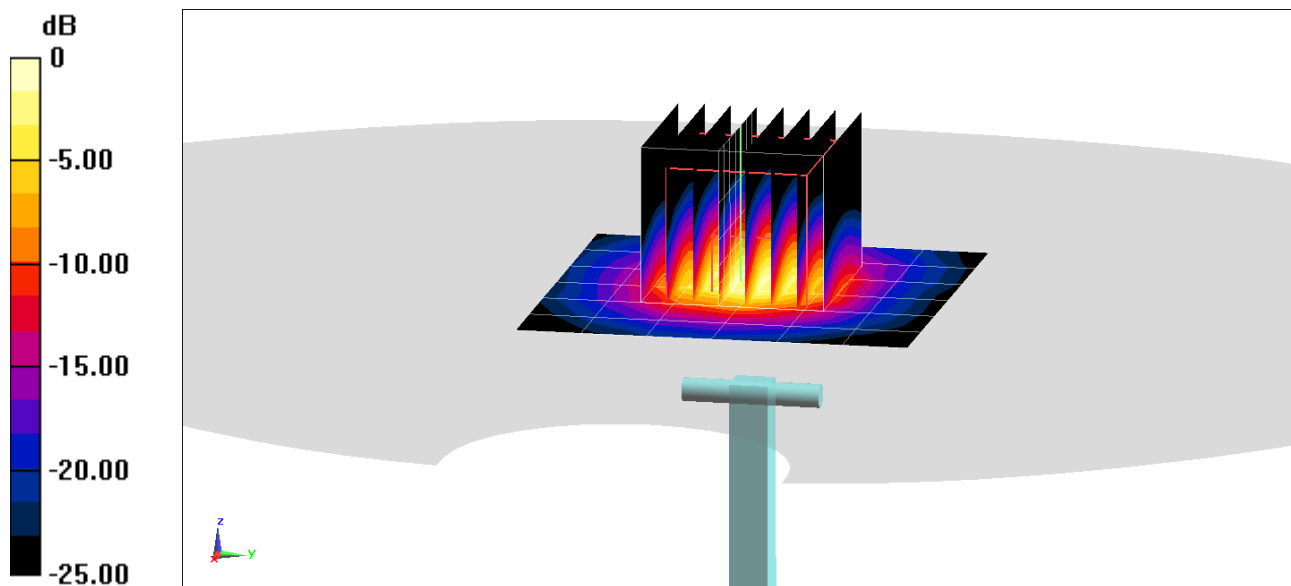
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 15.3 W/kg

SAR(1 g) = 3.72 W/kg

Deviation(1 g) = -7.92%



0 dB = 8.69 W/kg = 9.39 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Head; Medium parameters used:

$f = 5600$ MHz; $\sigma = 4.963$ S/m; $\epsilon_r = 34.631$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2019; Ambient Temp: 22.1°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7406; ConvF(4.94, 4.94, 4.94) @ 5600 MHz; Calibrated: 5/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

5600 MHz System Verification at 17.0 dBm (50 mW)

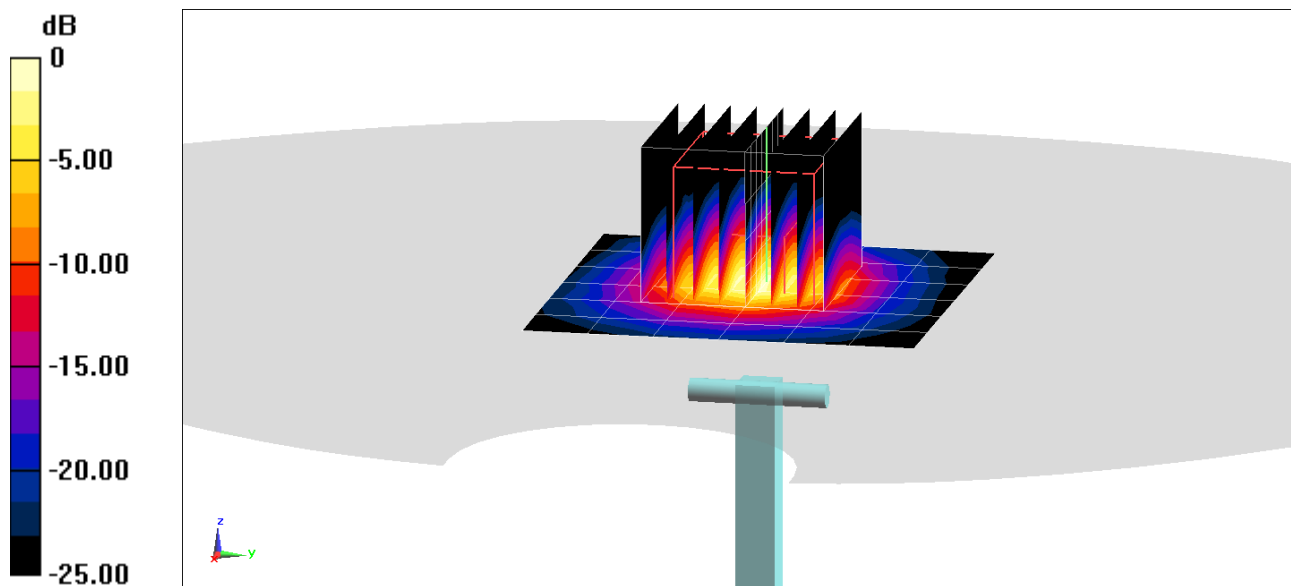
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 3.94 W/kg

Deviation(1 g) = -4.72%



0 dB = 9.82 W/kg = 9.92 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Head; Medium parameters used:

$f = 5750 \text{ MHz}$; $\sigma = 5.128 \text{ S/m}$; $\epsilon_r = 34.427$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2019; Ambient Temp: 22.1°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7406; ConvF(5.23, 5.23, 5.23) @ 5750 MHz; Calibrated: 5/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 5/8/2019

Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

5750 MHz System Verification at 17.0 dBm (50 mW)

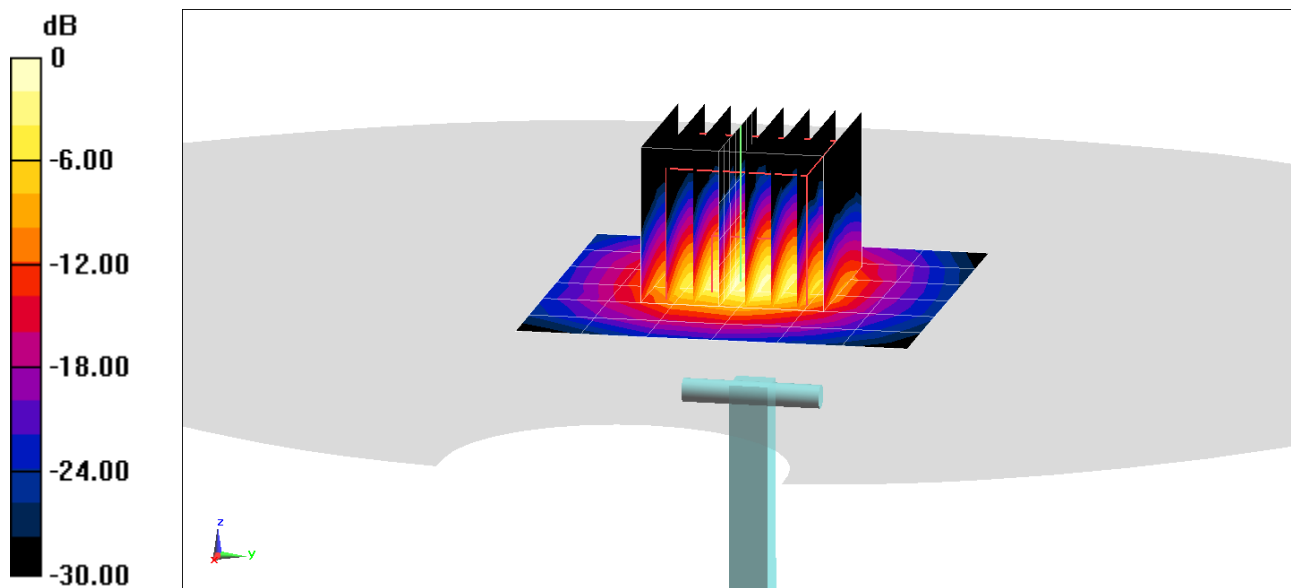
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 17.3 W/kg

SAR(1 g) = 3.76 W/kg

Deviation(1 g) = -6.23%



0 dB = 9.07 W/kg = 9.58 dBW/kg

PCTEST

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1161

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Body; Medium parameters used:

$f = 750 \text{ MHz}$; $\sigma = 0.939 \text{ S/m}$; $\epsilon_r = 53.514$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-26-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7410; ConvF(10.01, 10.01, 10.01) @ 750 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

750 MHz System Verification at 23.0 dBm (200 mW)

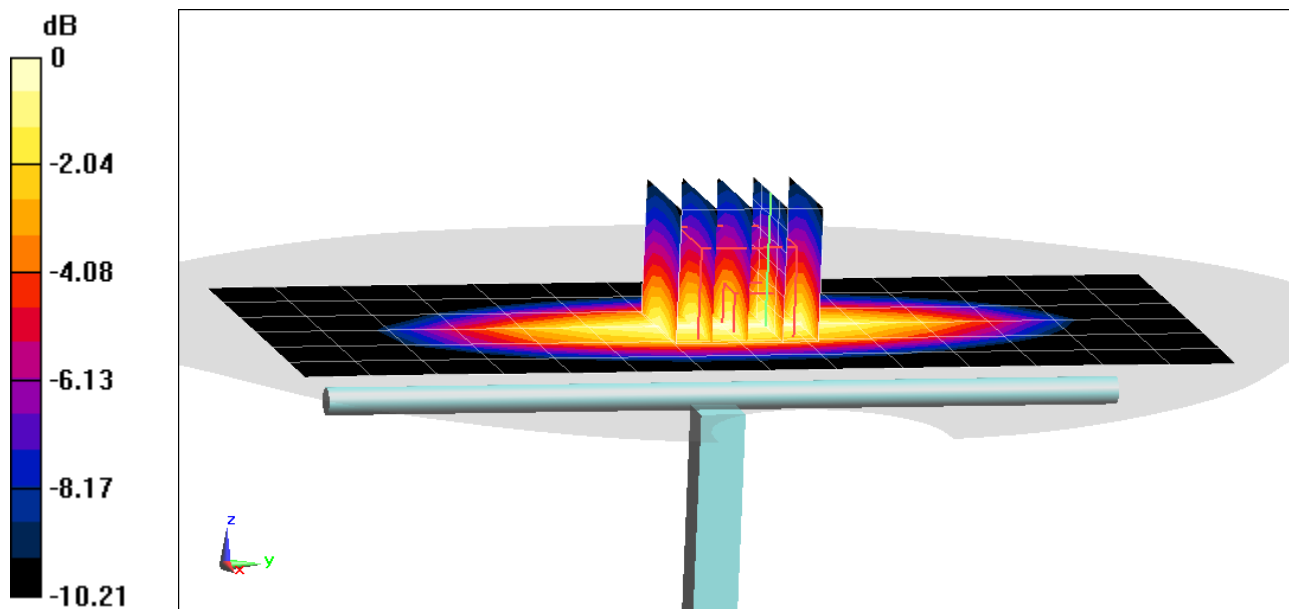
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.51 W/kg

SAR(1 g) = 1.68 W/kg

Deviation(1 g) = -0.36%



0 dB = 2.25 W/kg = 3.52 dBW/kg

PCTEST

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.984 \text{ S/m}$; $\epsilon_r = 53.684$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-05-2019; Ambient Temp: 23.9°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 835 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

835 MHz System Verification at 23.0 dBm (200 mW)

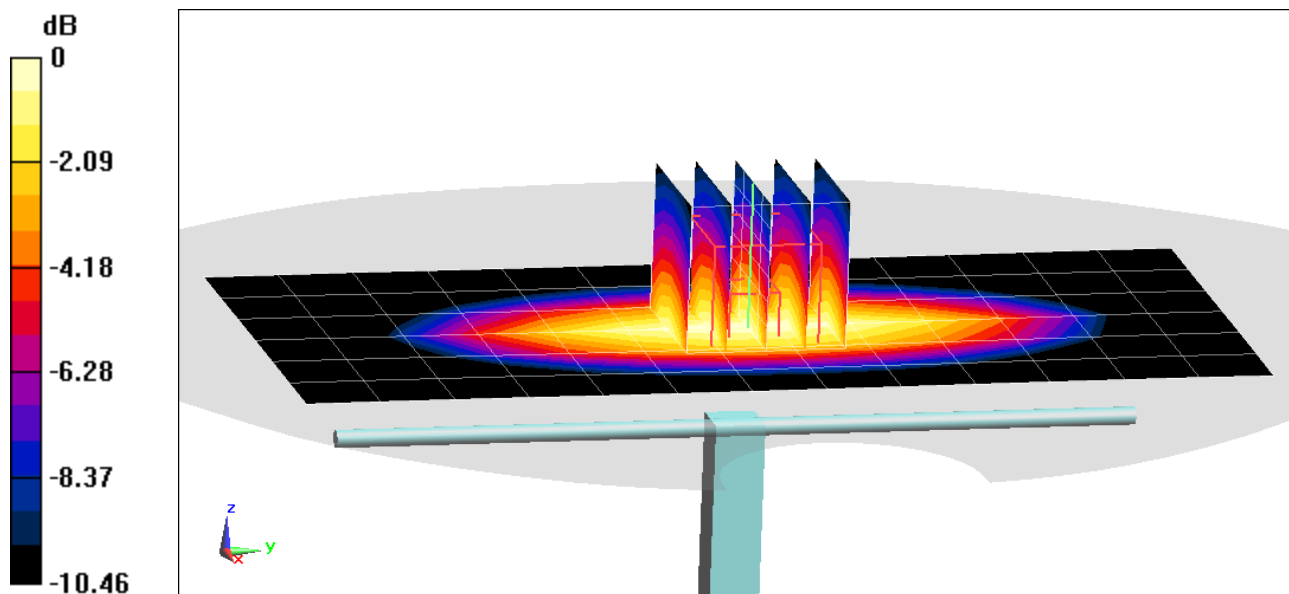
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.92 W/kg

SAR(1 g) = 1.97 W/kg

Deviation(1 g) = 4.01%



0 dB = 2.61 W/kg = 4.17 dBW/kg

PCTEST

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.965 \text{ S/m}$; $\epsilon_r = 54.007$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-20-2019; Ambient Temp: 20.3°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7410; ConvF(9.79, 9.79, 9.79) @ 835 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

835 MHz System Verification at 23.0 dBm (200 mW)

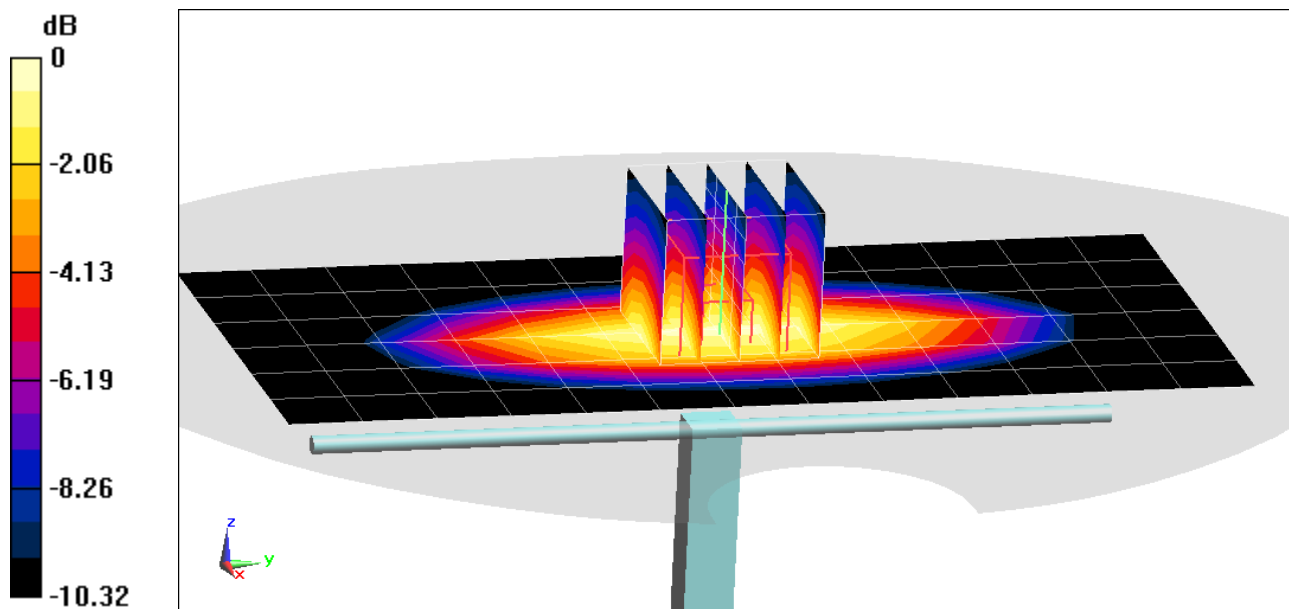
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 3.02 W/kg

SAR(1 g) = 2.02 W/kg

Deviation(1 g) = 6.65%



0 dB = 2.69 W/kg = 4.30 dBW/kg

PCTEST

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.511 \text{ S/m}$; $\epsilon_r = 52.198$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-28-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1750 MHz System Verification at 20.0 dBm (100 mW)

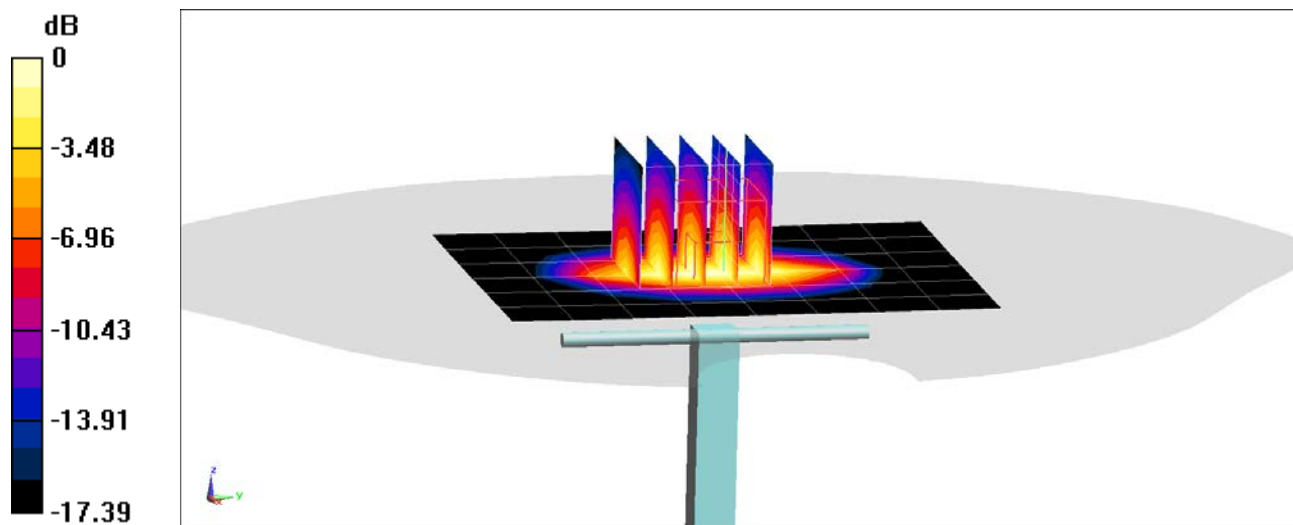
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.13 W/kg

SAR(1 g) = 3.87 W/kg

Deviation(1 g) = 5.74%



0 dB = 5.85 W/kg = 7.67 dBW/kg

PCTEST

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1148

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.521 \text{ S/m}$; $\epsilon_r = 52.663$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-30-2019; Ambient Temp: 20.4°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1750 MHz System Verification at 20.0 dBm (100 mW)

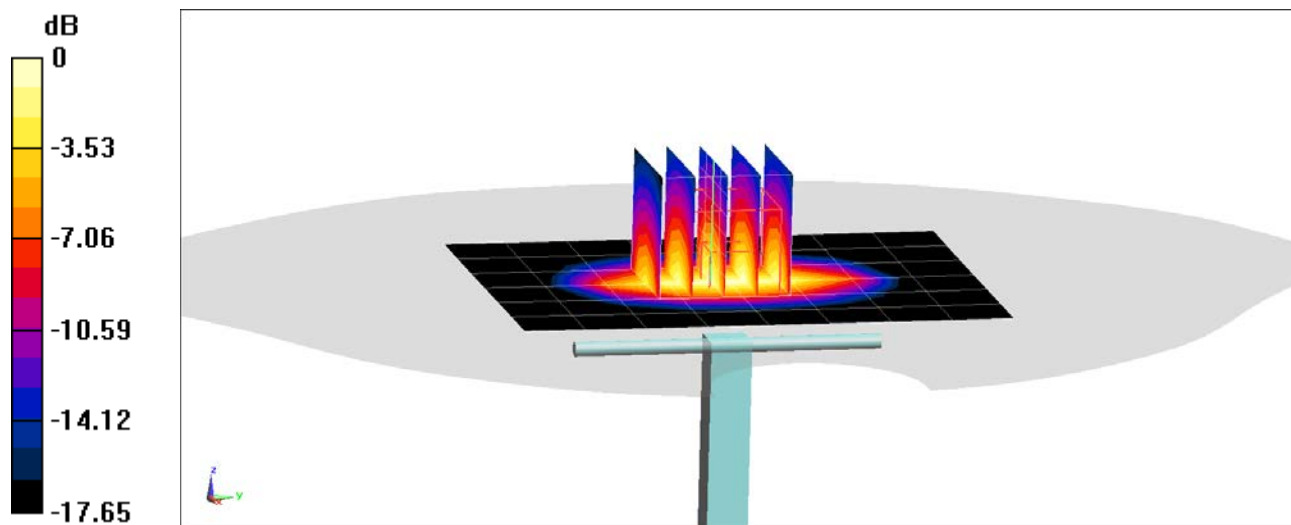
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 6.35 W/kg

SAR(1 g) = 3.48 W/kg

Deviation(1 g) = -7.69%



0 dB = 5.27 W/kg = 7.22 dBW/kg

PCTEST

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1148

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.51 \text{ S/m}$; $\epsilon_r = 53.069$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-09-2020; Ambient Temp: 21.5°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1750 MHz System Verification at 20.0 dBm (100 mW)

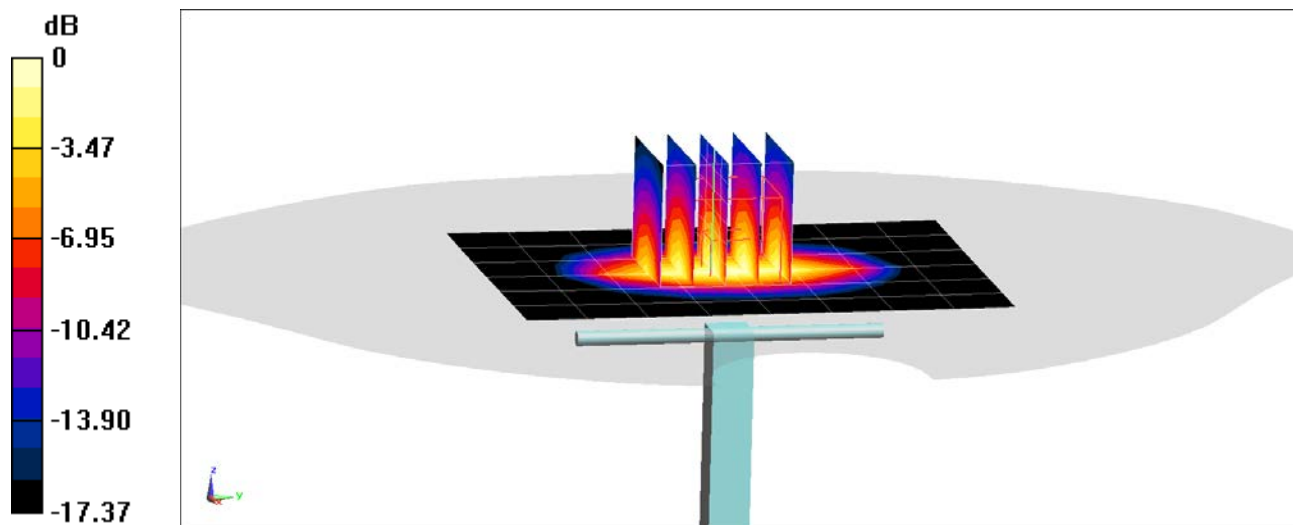
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.27 W/kg

SAR(1 g) = 3.92 W/kg

Deviation(1 g) = 3.98%



0 dB = 5.99 W/kg = 7.77 dBW/kg

PCTEST

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.51 \text{ S/m}$; $\epsilon_r = 54.222$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-11-2020; Ambient Temp: 20.8°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1750 MHz System Verification at 20.0 dBm (100 mW)

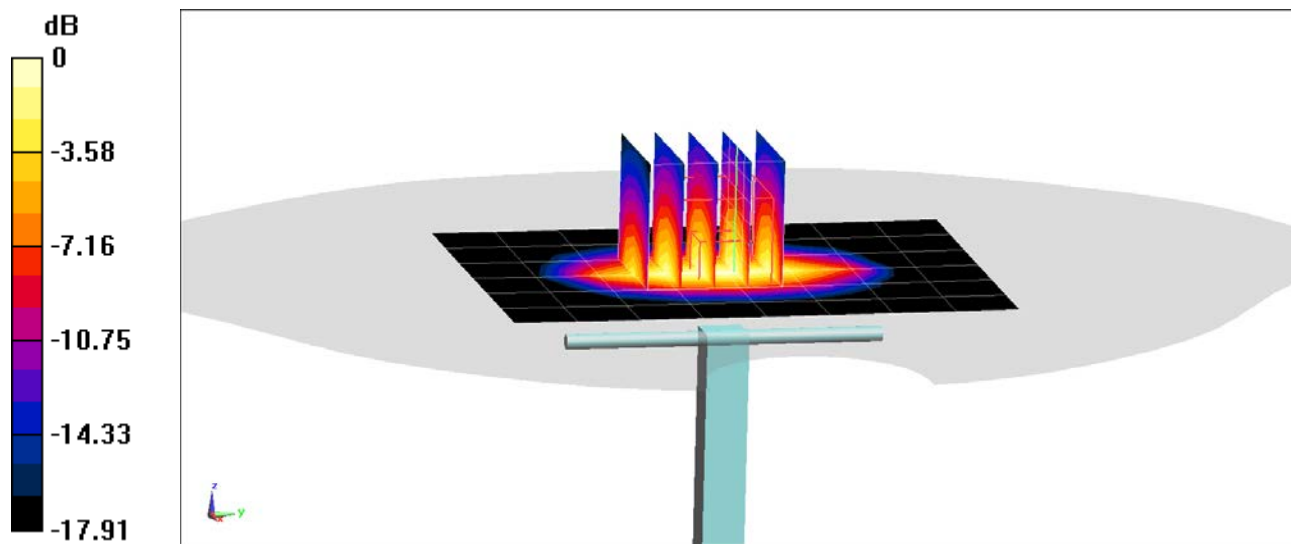
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.28 W/kg

SAR(1 g) = 3.97 W/kg; SAR(10 g) = 2.08 W/kg

Deviation(1 g) = 6.15%; Deviation(10 g) = 4.52%



0 dB = 6.00 W/kg = 7.78 dBW/kg

PCTEST

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1148

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body; Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.5 \text{ S/m}$; $\epsilon_r = 56.062$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-17-2020; Ambient Temp: 21.9°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/18/2019

Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1750 MHz System Verification at 20.0 dBm (100 mW)

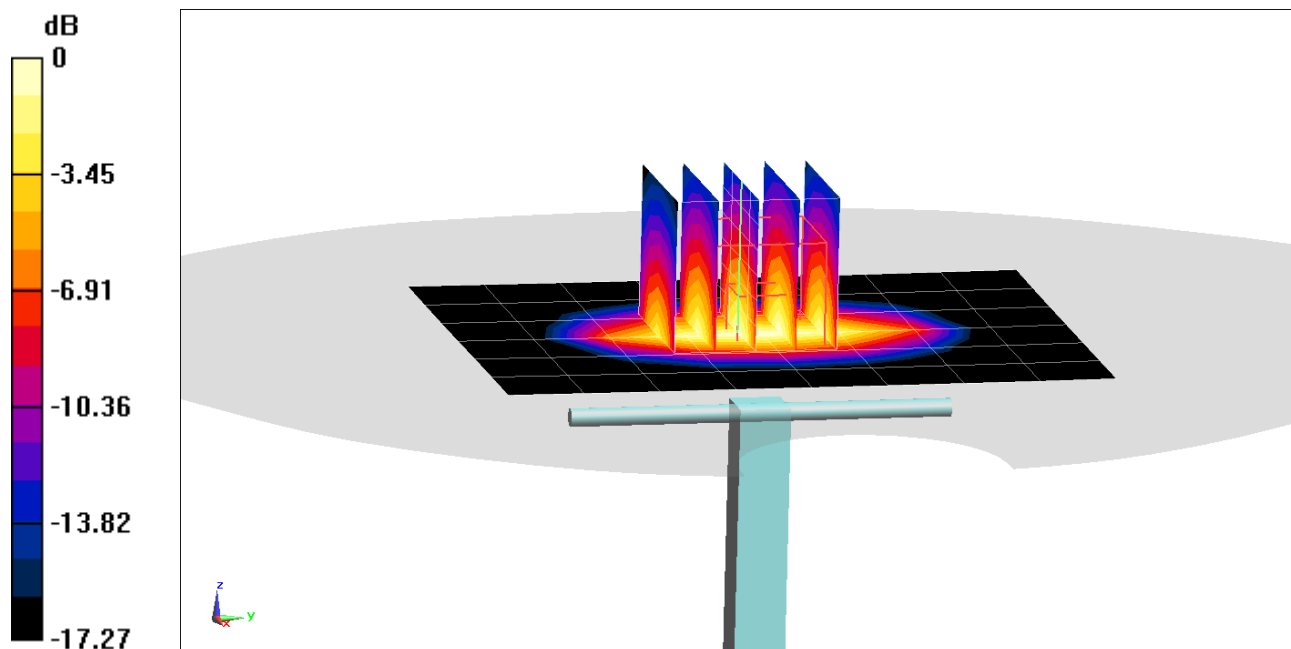
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.24 W/kg

SAR(10 g) = 2.12 W/kg

Deviation(10 g) = 7.07%



0 dB = 6.00 W/kg = 7.78 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.572 \text{ S/m}$; $\epsilon_r = 51.438$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2019; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1900 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

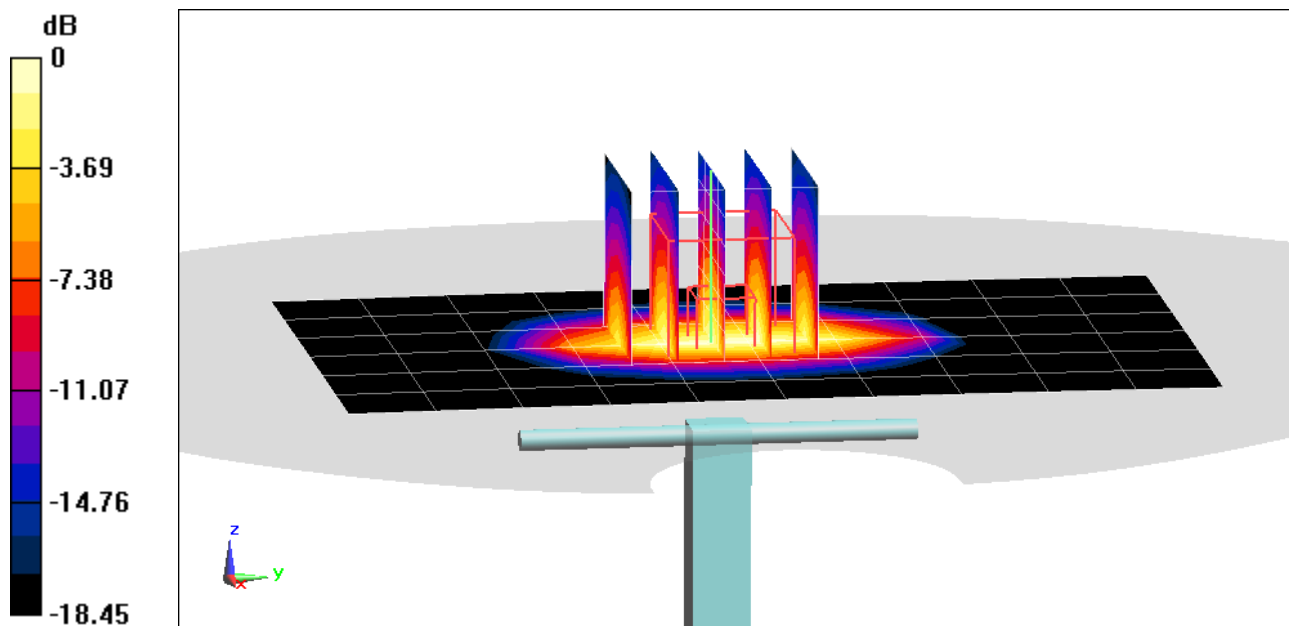
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.68 W/kg

SAR(1 g) = 4.14 W/kg

Deviation(1 g) = 5.61%



0 dB = 6.47 W/kg = 8.11 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.582 \text{ S/m}$; $\epsilon_r = 51.779$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-09-2019; Ambient Temp: 20.2°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1900 MHz; Calibrated: 1/24/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1530; Calibrated: 1/15/2019

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

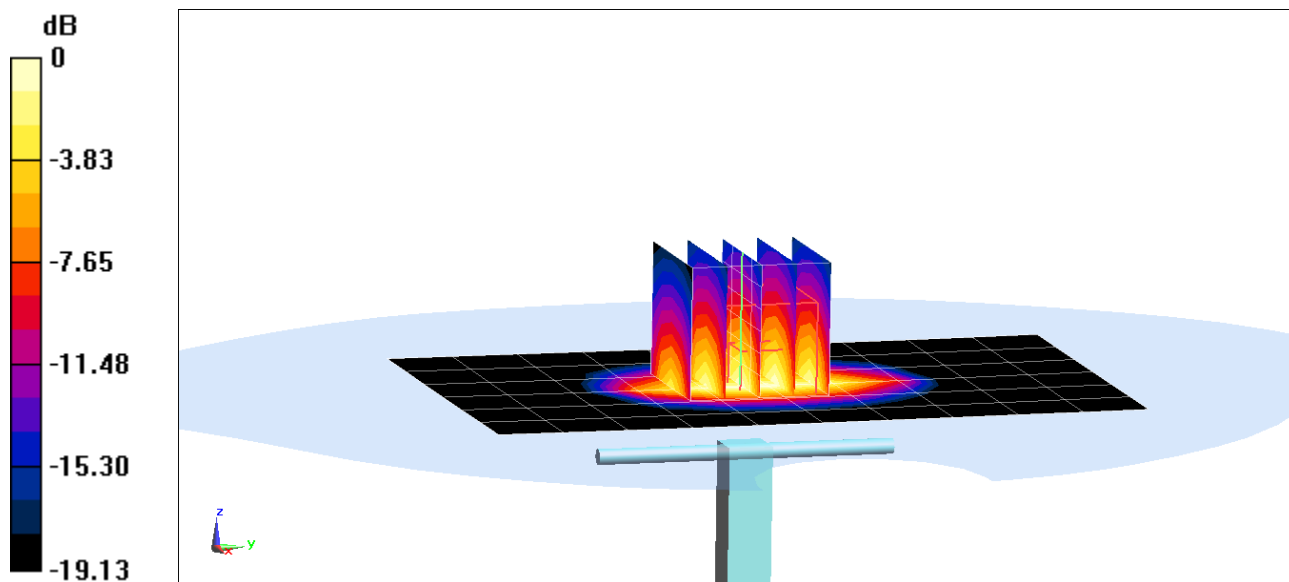
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.83 W/kg

SAR(1 g) = 4.19 W/kg

Deviation(1 g) = 6.35%



0 dB = 6.45 W/kg = 8.10 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.577 \text{ S/m}$; $\epsilon_r = 51.821$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-27-2019; Ambient Temp: 21.5°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1900 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

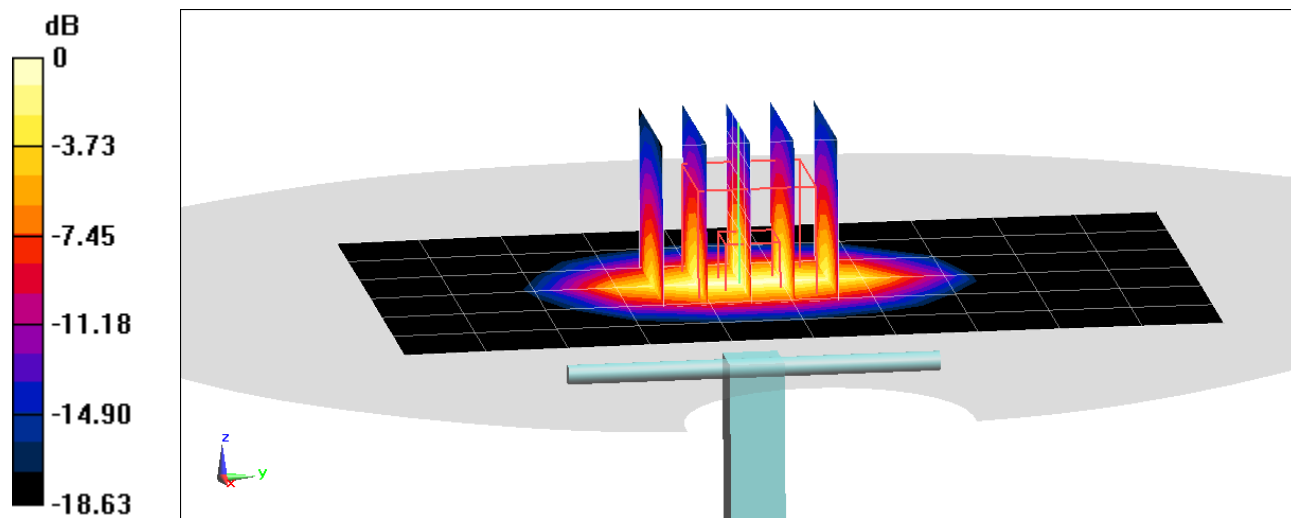
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.77 W/kg

SAR(1 g) = 4.18 W/kg

Deviation(1 g) = 6.91%



0 dB = 6.52 W/kg = 8.14 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.559 \text{ S/m}$; $\epsilon_r = 51.78$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-30-2019; Ambient Temp: 23.3°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1900 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

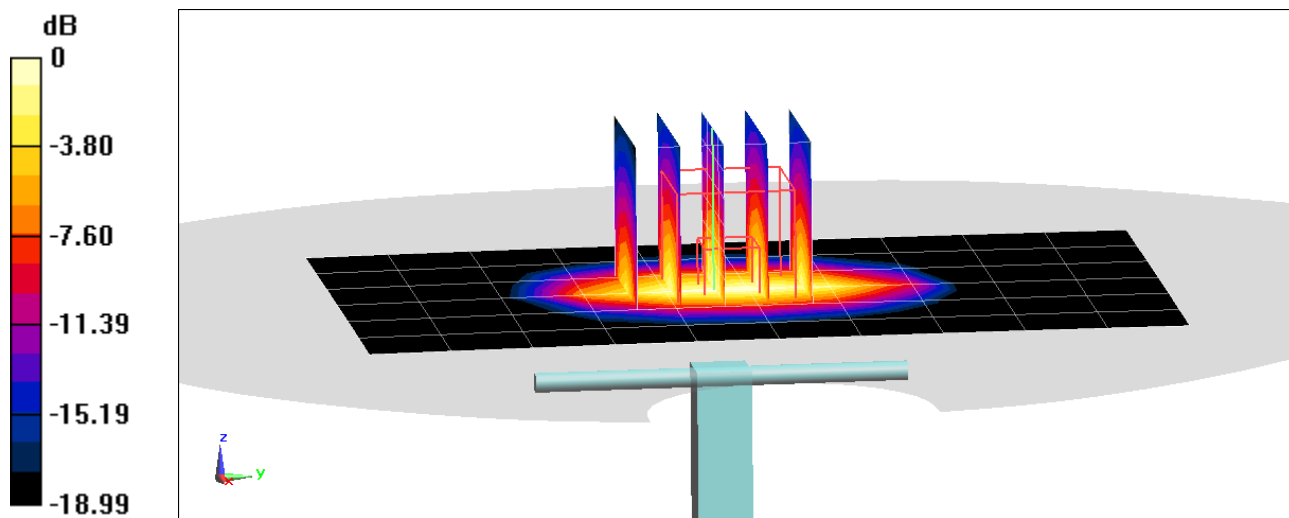
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.66 W/kg

SAR(1 g) = 4.1 W/kg; SAR(10 g) = 2.09 W/kg

Deviation(1 g) = 4.86%; Deviation(10 g) = 1.95%



PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1900$ MHz; $\sigma = 1.583$ S/m; $\epsilon_r = 52.463$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-03-2020; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7571; ConvF(7.56, 7.56, 7.56) @ 1900 MHz; Calibrated: 12/11/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1533; Calibrated: 12/5/2019

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

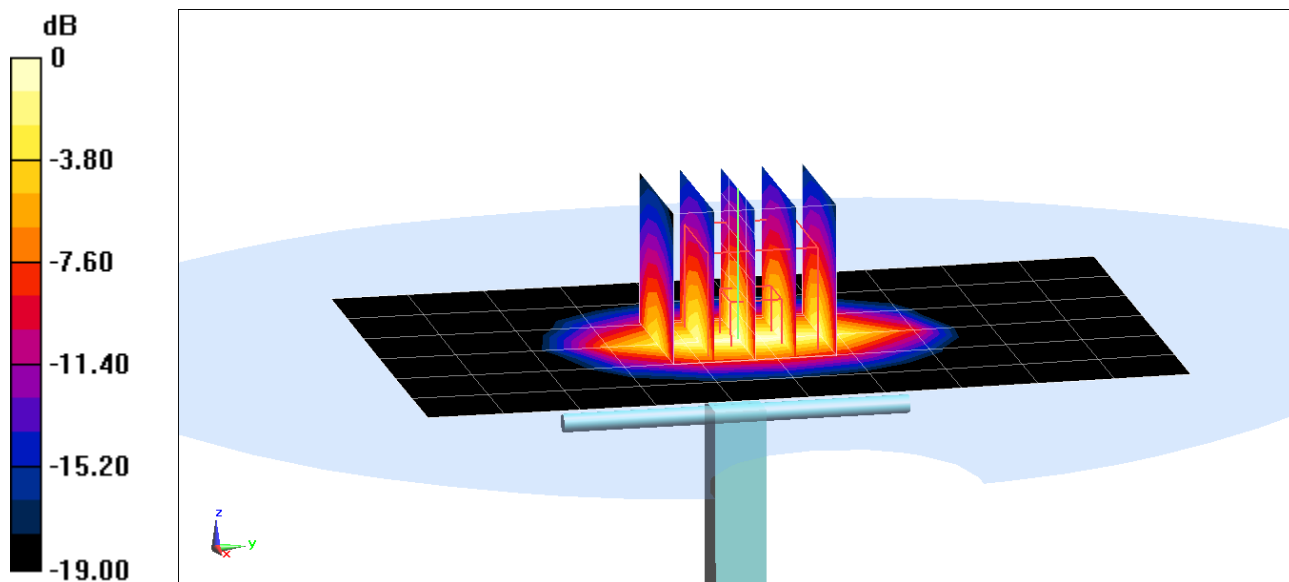
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.88 W/kg

SAR(1 g) = 4.26 W/kg; SAR(10 g) = 2.18 W/kg

Deviation(1 g) = 8.67%; Deviation(10 g) = 5.83%



0 dB = 6.57 W/kg = 8.18 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.579 \text{ S/m}$; $\epsilon_r = 51.23$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-11-2020; Ambient Temp: 21.9°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1900 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

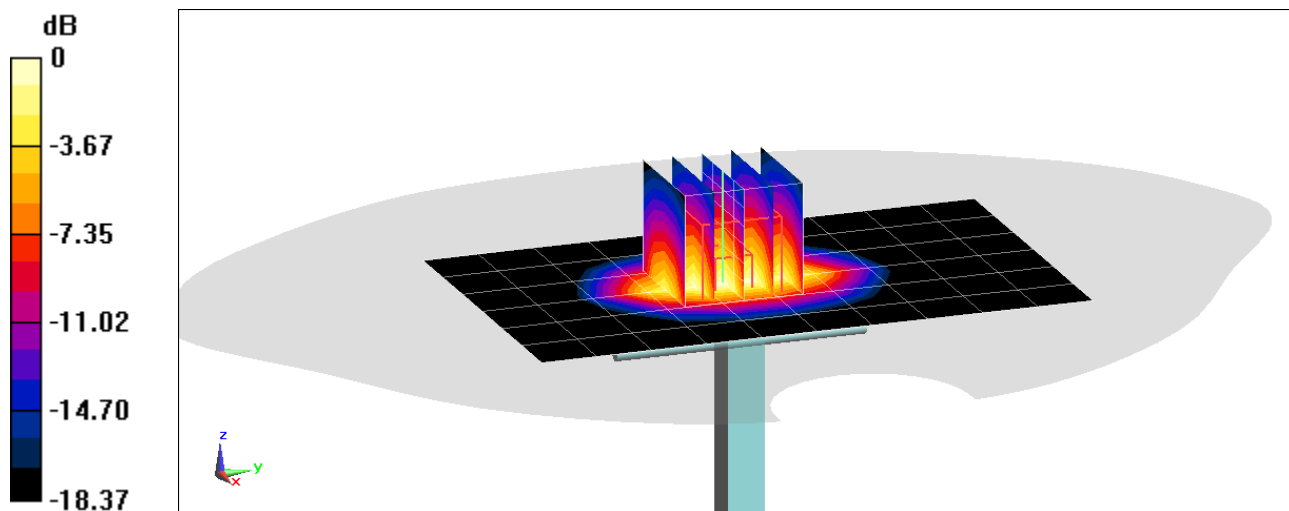
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.84 W/kg

SAR(1 g) = 4.16 W/kg

Deviation(1 g) = 5.58%



0 dB = 6.50 W/kg = 8.13 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 52.007$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-12-2020; Ambient Temp: 24.1°C; Tissue Temp: 23.5°C

Probe: EX3DV4 - SN7571; ConvF(7.56, 7.56, 7.56) @ 1900 MHz; Calibrated: 12/11/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1533; Calibrated: 12/5/2019

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

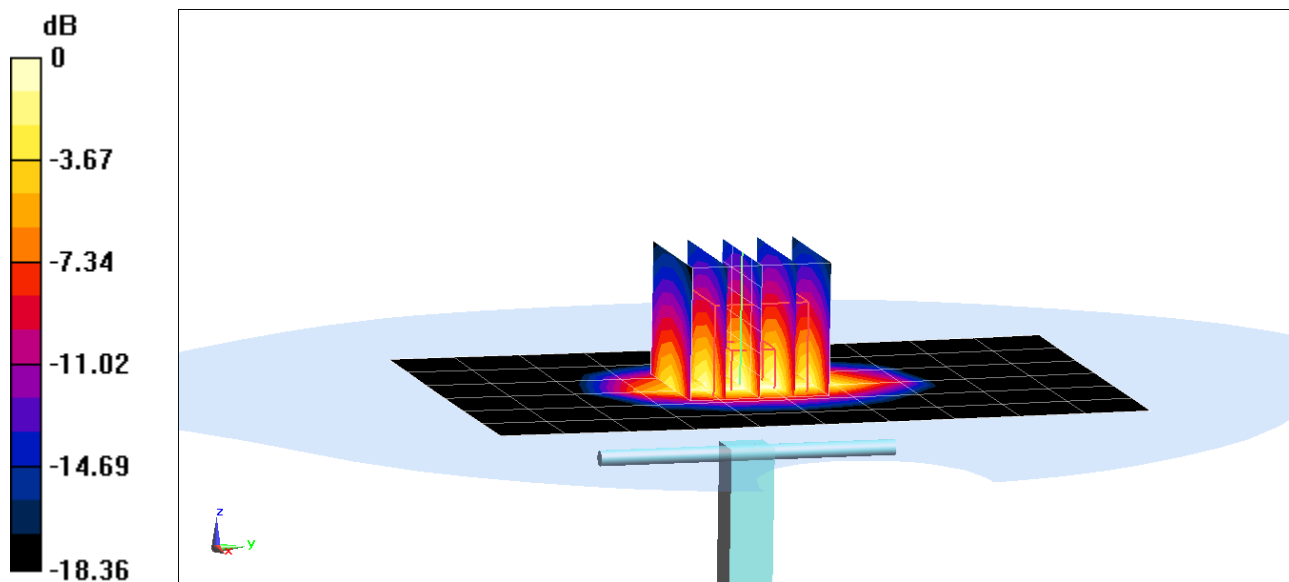
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.54 W/kg

SAR(10 g) = 2.13 W/kg

Deviation(10 g) = 3.40%



0 dB = 6.39 W/kg = 8.06 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1900 \text{ MHz}$; $\sigma = 1.579 \text{ S/m}$; $\epsilon_r = 51.161$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-13-2020; Ambient Temp: 22.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7551; ConvF(7.69, 7.69, 7.69) @ 1900 MHz; Calibrated: 9/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 9/17/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

1900 MHz System Verification at 20.0 dBm (100 mW)

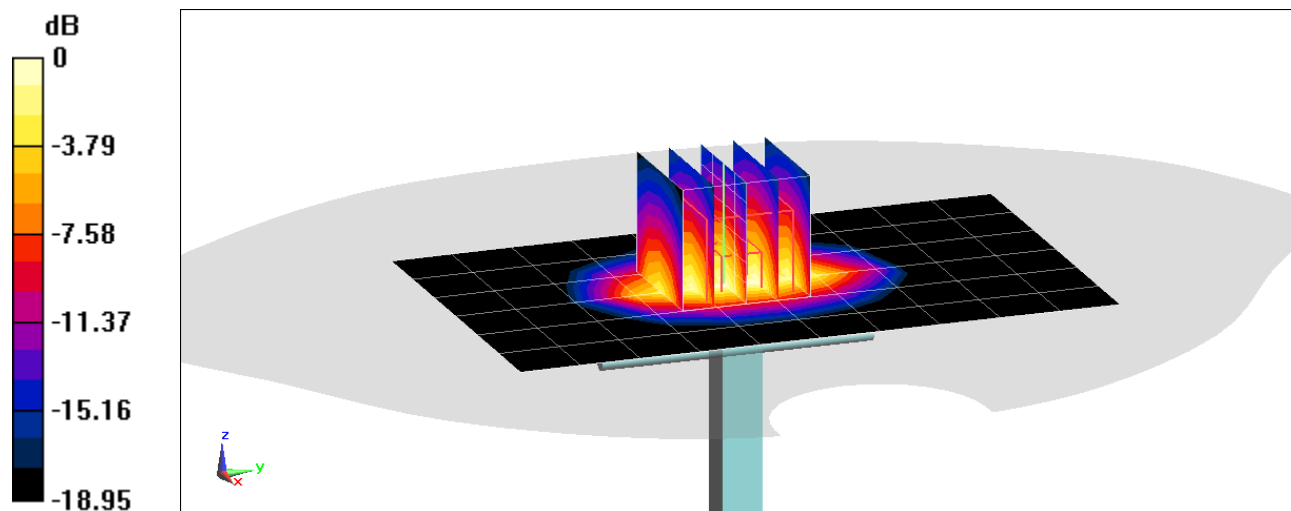
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.94 W/kg

SAR(10 g) = 2.14 W/kg

Deviation(10 g) = 3.38%



0 dB = 6.56 W/kg = 8.17 dBW/kg

PCTEST

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1073

Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used:

$f = 2300$ MHz; $\sigma = 1.862$ S/m; $\epsilon_r = 51.785$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-27-2019; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7547; ConvF(7.47, 7.47, 7.47) @ 2300 MHz; Calibrated: 7/15/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 7/11/2019

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

2300 MHz System Verification at 20.0 dBm (100 mW)

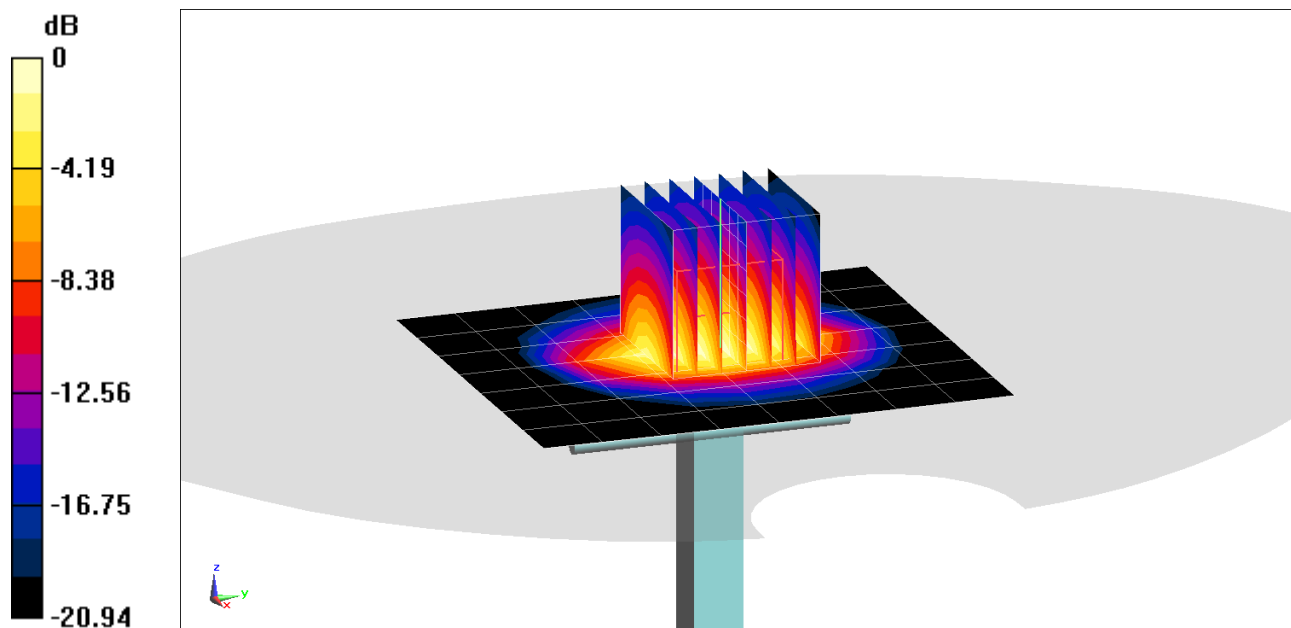
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 9.00 W/kg

SAR(1 g) = 4.57 W/kg

Deviation(1 g) = -4.19%



PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.01 \text{ S/m}$; $\epsilon_r = 50.763$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-10-2019; Ambient Temp: 23.10°C; Tissue Temp: 22.80°C

Probe: EX3DV4 - SN7308; ConvF(7.46, 7.46, 7.46) @ 2450 MHz; Calibrated: 8/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1450; Calibrated: 8/14/2019

Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

2450 MHz System Verification at 20.0 dBm (100 mW)

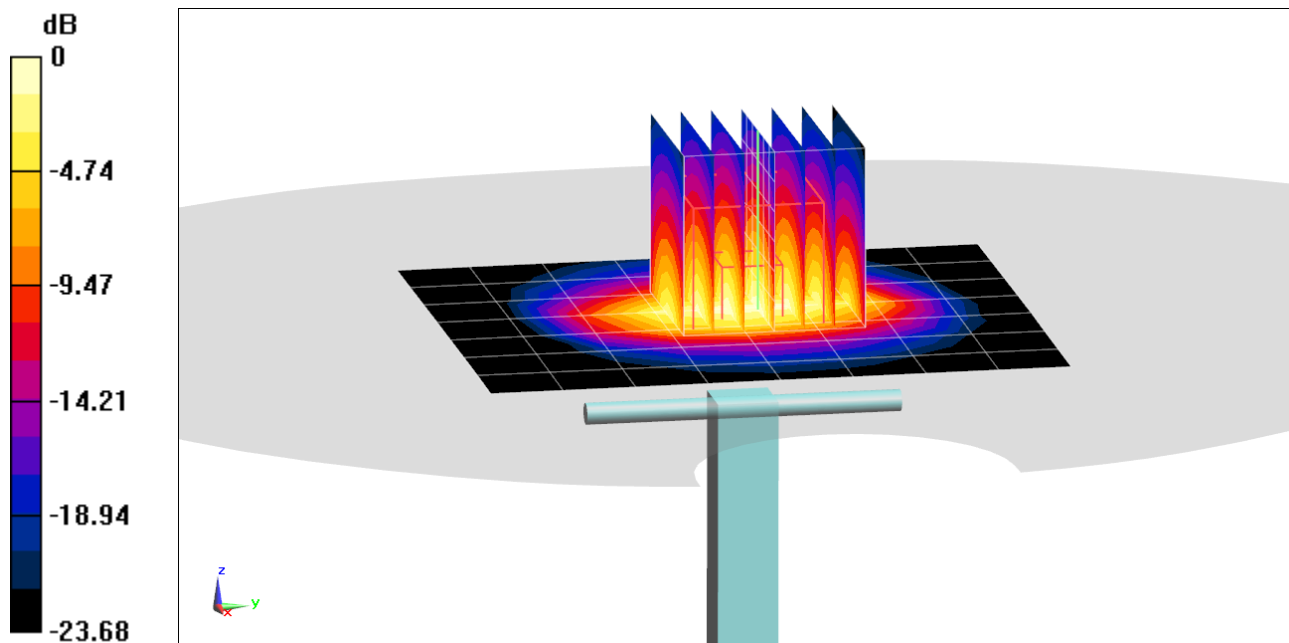
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 11.1 W/kg

SAR(1 g) = 5.24 W/kg

Deviation(1 g) = 3.15%



0 dB = 8.84 W/kg = 9.46 dBW/kg

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.036 \text{ S/m}$; $\epsilon_r = 51.644$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-08-2020; Ambient Temp: 24.2°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7547; ConvF(7.3, 7.3, 7.3) @ 2450 MHz; Calibrated: 7/15/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 7/11/2019

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

2450 MHz System Verification at 20.0 dBm (100 mW)

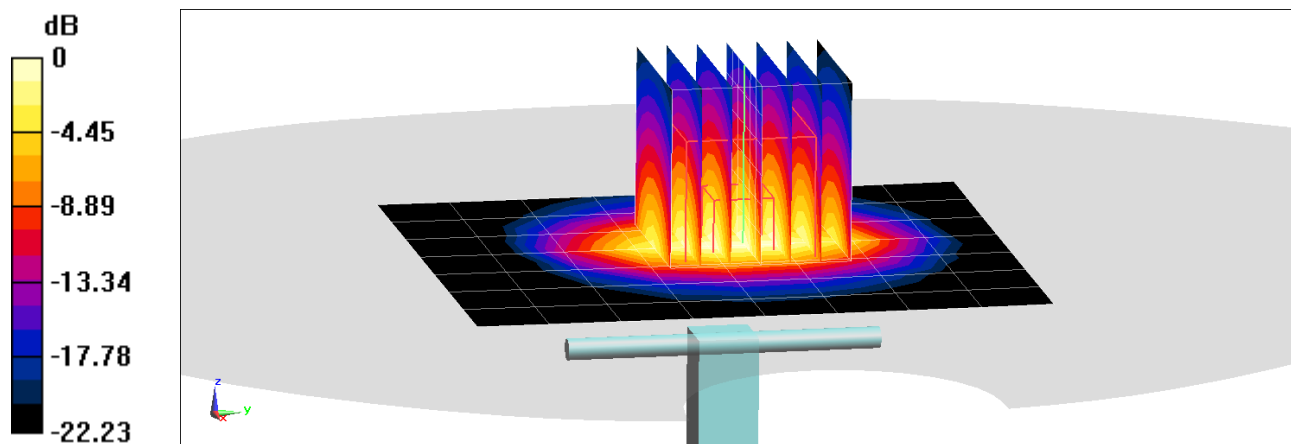
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 10.8 W/kg

SAR(1 g) = 5.2 W/kg

Deviation(1 g) = 2.16%



0 dB = 8.74 W/kg = 9.42 dBW/kg

PCTEST

DUT: D2450V2 - SN719; Type: D2450V2; Serial: 719

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.012 \text{ S/m}$; $\epsilon_r = 50.309$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-13-2020; Ambient Temp: 21.9°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.44, 7.44, 7.44) @ 2450 MHz; Calibrated: 7/16/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/11/2019

Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

2450 MHz System Verification at 20.0 dBm (100 mW)

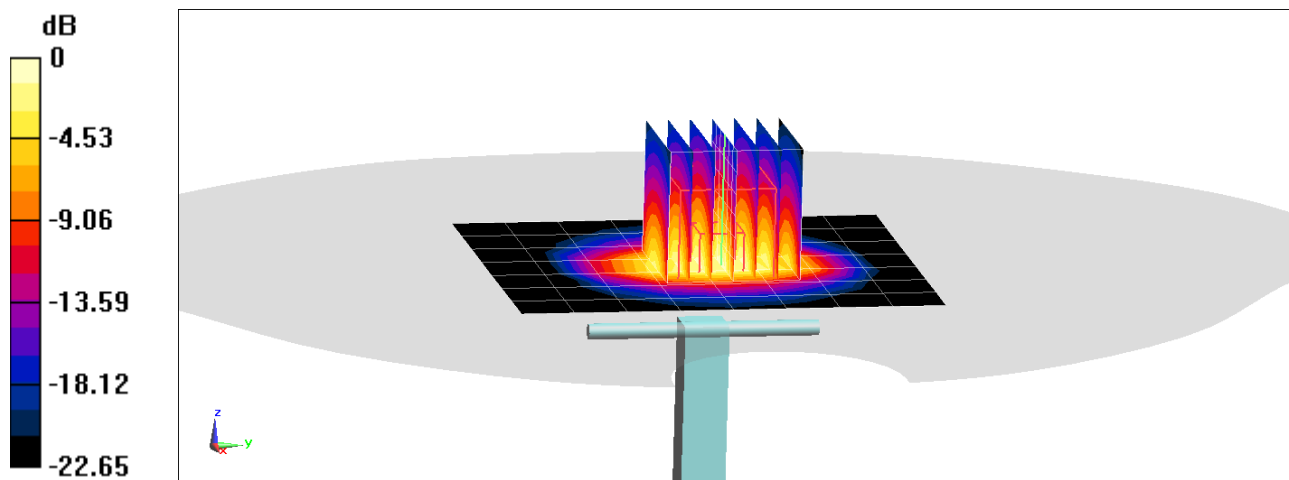
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 11.4 W/kg

SAR(1 g) = 5.45 W/kg

Deviation(1 g) = 7.28%



0 dB = 9.20 W/kg = 9.64 dBW/kg

PCTEST

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1064

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used:

$f = 2600$ MHz; $\sigma = 2.217$ S/m; $\epsilon_r = 51.187$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-08-2020; Ambient Temp: 24.2°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7547; ConvF(7.18, 7.18, 7.18) @ 2600 MHz; Calibrated: 7/15/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 7/11/2019

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

2600 MHz System Verification at 20.0 dBm (100 mW)

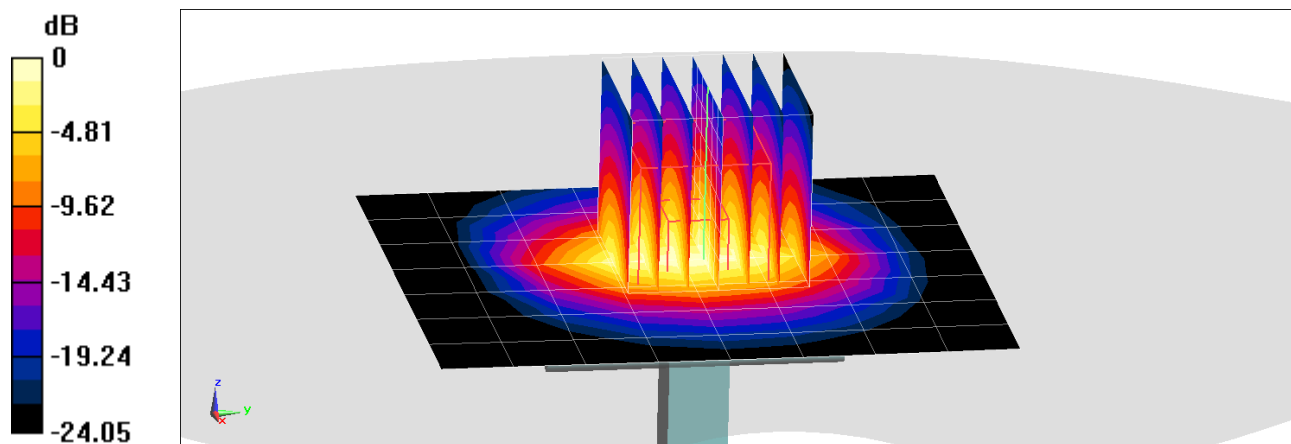
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 12.2 W/kg

SAR(1 g) = 5.59 W/kg

Deviation(1 g) = 0.54%



0 dB = 9.56 W/kg = 9.80 dBW/kg

PCTEST

DUT: Dipole 3700 MHz; Type: D3700V2; Serial: 1018

Communication System: UID 0, CW; Frequency: 3700 MHz; Duty Cycle: 1:1

Medium: 3500 Body Medium parameters used:

$f = 3700 \text{ MHz}$; $\sigma = 3.566 \text{ S/m}$; $\epsilon_r = 49.166$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-18-2019; Ambient Temp: 22.1°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3914; ConvF(6.58, 6.58, 6.58) @ 3700 MHz; Calibrated: 2/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/14/2019

Phantom: Twin-SAM V5.0 Left 30; Type: QD 000 P40 CD; Serial: 1687

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

3700 MHz System Verification at 20.0 dBm (100 mW)

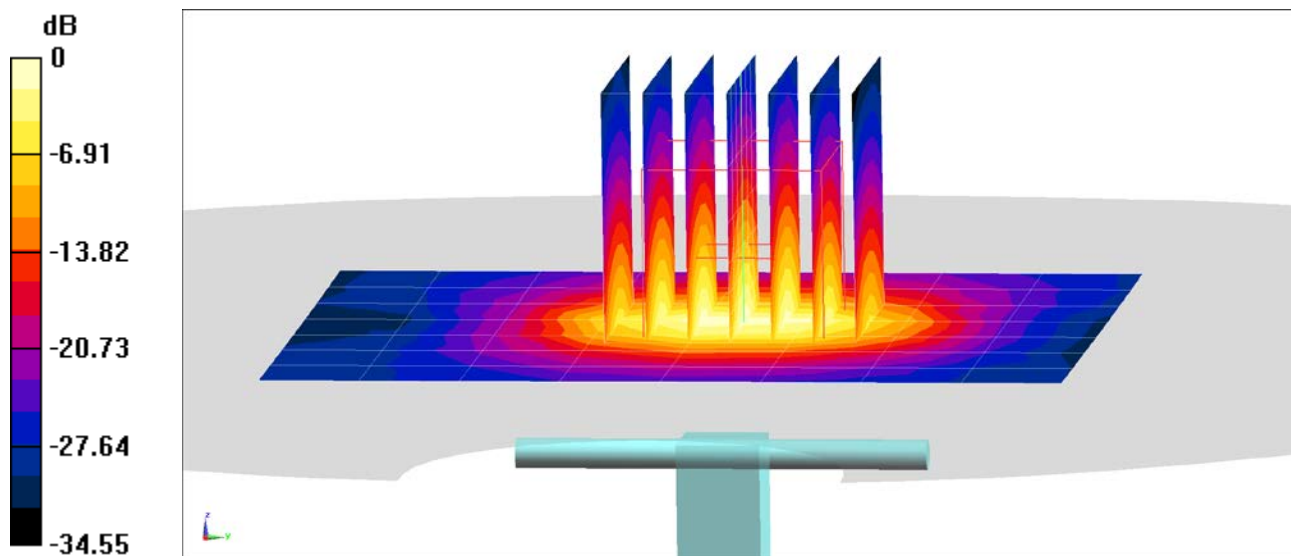
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 19.4 W/kg

SAR(1 g) = 6.44 W/kg

Deviation(1 g) = 0.16%



0 dB = 13.4 W/kg = 11.27 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Body Medium parameters used:

$f = 5250$ MHz; $\sigma = 5.545$ S/m; $\epsilon_r = 46.967$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-23-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7409; ConvF(4.7, 4.7, 4.7) @ 5250 MHz; Calibrated: 6/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/20/2019

Phantom: Front; Type: QD 000 P40 CD; Serial: 1686

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

5250 MHz System Verification at 17.0 dBm (50 mW)

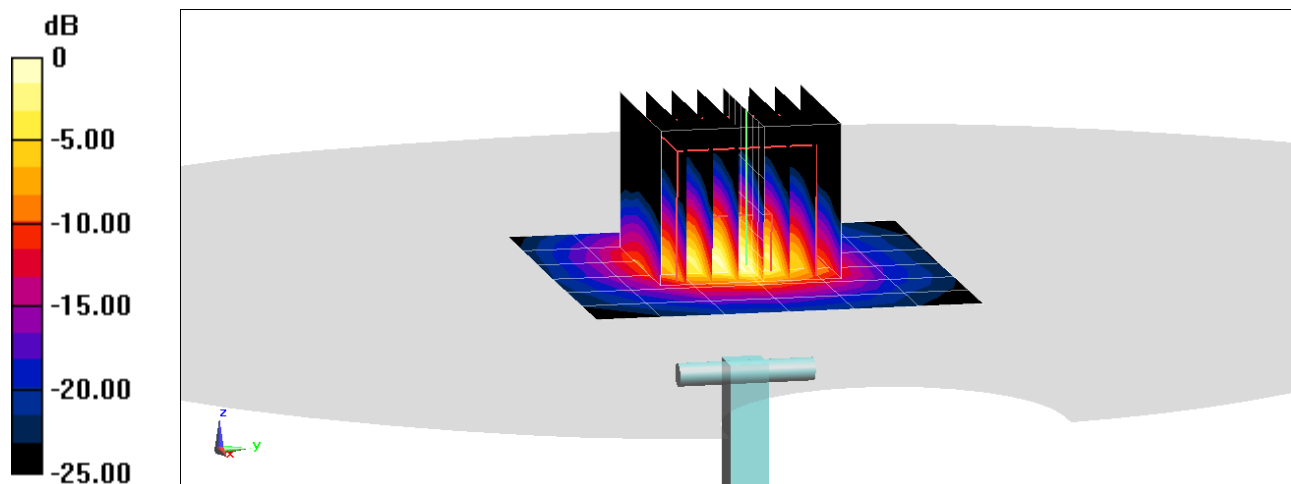
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 15.7 W/kg

SAR(1 g) = 3.8 W/kg; SAR(10 g) = 1.06 W/kg

Deviation(1 g) = -1.30%; Deviation(10 g) = -0.93%



0 dB = 9.02 W/kg = 9.55 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Body Medium parameters used:

$f = 5600$ MHz; $\sigma = 6.015$ S/m; $\epsilon_r = 46.347$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-23-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7409; ConvF(4.22, 4.22, 4.22) @ 5600 MHz; Calibrated: 6/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/20/2019

Phantom: Front; Type: QD 000 P40 CD; Serial: 1686

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

5600 MHz System Verification at 17.0 dBm (50 mW)

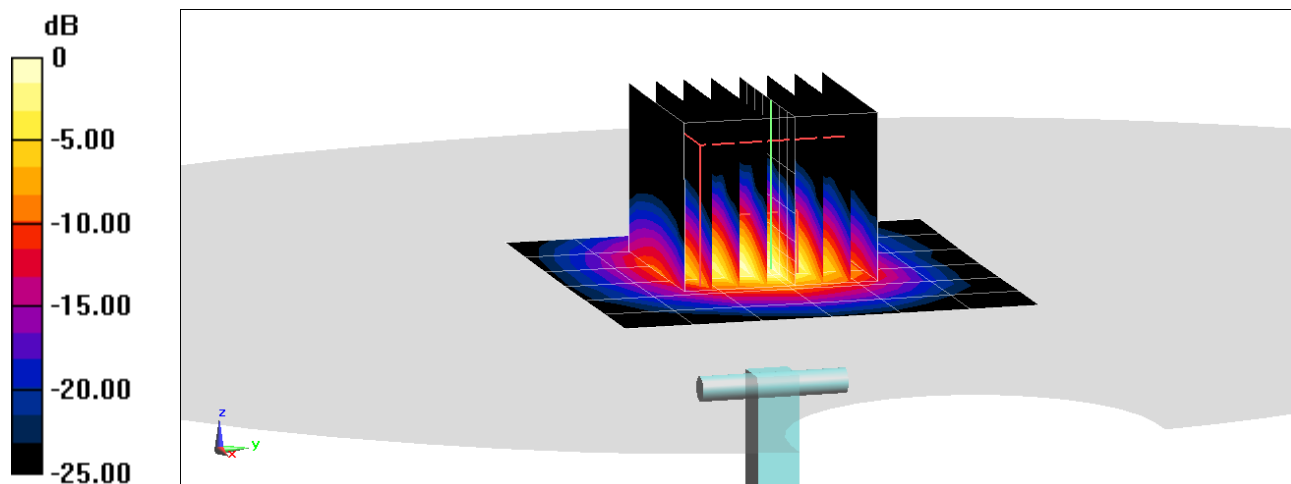
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 18.5 W/kg

SAR(1 g) = 4.08 W/kg; SAR(10 g) = 1.12 W/kg

Deviation(1 g) = 3.82%; Deviation(10 g) = 2.28%



PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Body Medium parameters used:

$f = 5750$ MHz; $\sigma = 6.221$ S/m; $\epsilon_r = 46.118$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-23-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7409; ConvF(4.23, 4.23, 4.23) @ 5750 MHz; Calibrated: 6/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/20/2019

Phantom: Front; Type: QD 000 P40 CD; Serial: 1686

Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

5750 MHz System Verification at 17.0 dBm (50 mW)

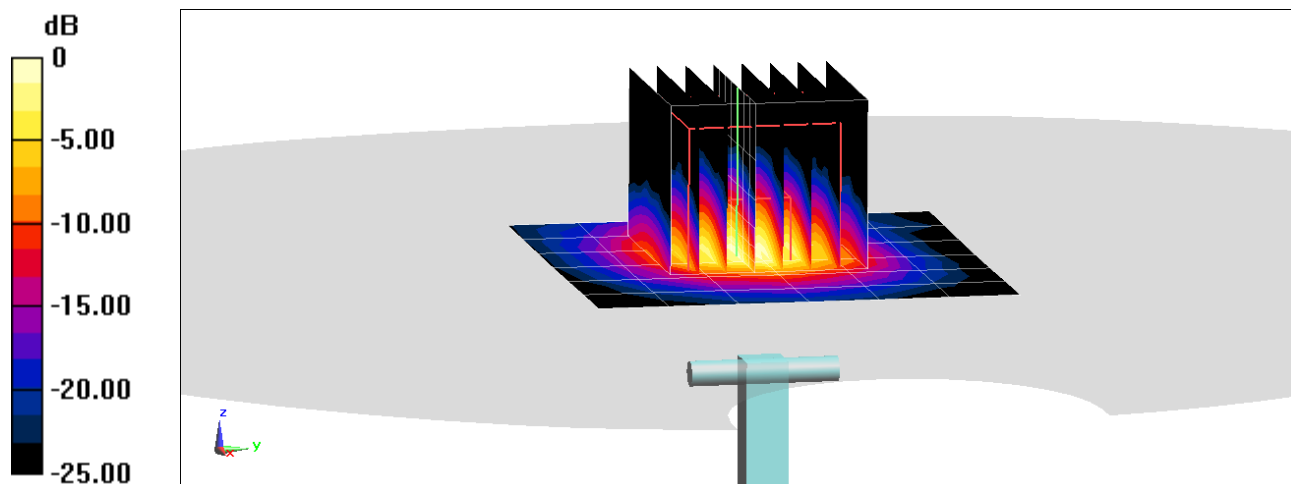
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 3.88 W/kg; SAR(10 g) = 1.06 W/kg

Deviation(1 g) = 0.91%; Deviation(10 g) = -0.47%



0 dB = 9.52 W/kg = 9.79 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5200-5800 Body Medium parameters used:

$f = 5750 \text{ MHz}$; $\sigma = 6.187 \text{ S/m}$; $\epsilon_r = 46.26$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-13-2020; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7409; ConvF(4.23, 4.23, 4.23) @ 5750 MHz; Calibrated: 6/19/2019

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/20/2019

Phantom: Front; Type: QD 000 P40 CD; Serial: 1686

Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7470)

5750 MHz System Verification at 17.0 dBm (50 mW)

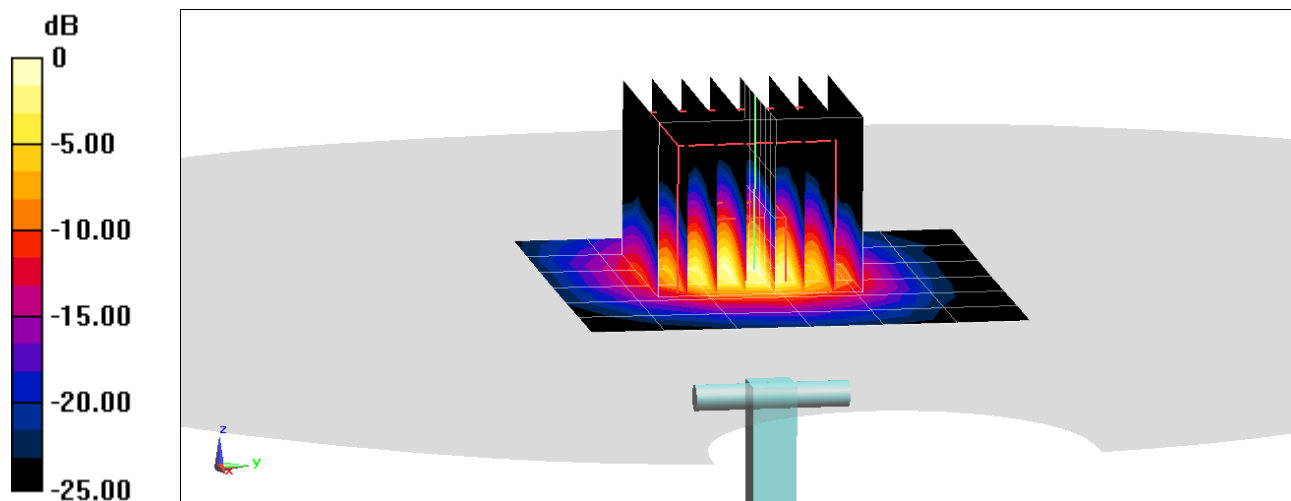
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 17.7 W/kg

SAR(1 g) = 3.81 W/kg

Deviation(1 g) = -0.91%



APPENDIX C: SAR TISSUE SPECIFICATIONS

Measurement Procedure for Tissue verification:

- 1) The network analyzer and probe system was configured and calibrated.
- 2) The probe was immersed in the tissue. The tissue was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
- 3) The complex admittance with respect to the probe aperture was measured
- 4) The complex relative permittivity ϵ' can be calculated from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\epsilon_r\epsilon_0}{[\ln(b/a)]^2} \int_a^b \int_a^b \int_0^\pi \cos\phi' \frac{\exp[-j\omega r(\mu_0\epsilon_r'\epsilon_0)^{1/2}]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

3 Composition / Information on ingredients

3.2 Mixtures

Description: Aqueous solution with surfactants and inhibitors

Declarable, or hazardous components:

CAS: 107-21-1 EINECS: 203-473-3 Reg.nr.: 01-2119456816-28-0000	Ethanedial STOT RE 2, H373; Acute Tox. 4, H302	>1.0-4.9%
CAS: 68608-26-4 EINECS: 271-781-5 Reg.nr.: 01-2119527859-22-0000	Sodium petroleum sulfonate Eye Irrit. 2, H319	< 2.9%
CAS: 107-41-5 EINECS: 203-489-0 Reg.nr.: 01-2119539582-35-0000	Hexylene Glycol / 2-Methyl-pentane-2,4-diol Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.9%
CAS: 68920-66-1 NLP: 500-236-9 Reg.nr.: 01-2119489407-26-0000	Alkoxylated alcohol, > C₁₆ Aquatic Chronic 2, H411; Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.0%

Additional information:

For the wording of the listed risk phrases refer to section 16.

Not mentioned CAS-, EINECS- or registration numbers are to be regarded as Proprietary/Confidential.

The specific chemical identity and/or exact percentage concentration of proprietary components is withheld as a trade secret.

Figure C-1

Note: Liquid recipes are proprietary SPEAG. Since the composition is approximate to the actual liquids utilized, the manufacturer tissue-equivalent liquid data sheets are provided below.

FCC ID: ZNFV600VM	 PCTEST	SAR EVALUATION REPORT	 LG	Approved by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX C: Page 1 of 3

Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MBBL600-6000V6)**
 Product No. SL AAM U16 BC (Batch: 181029-1)
 Manufacturer SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

Target Parameters

Target parameters as defined in the KDB 865664 compliance standard.

Test Condition

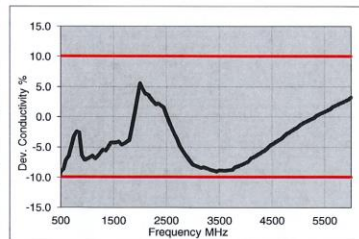
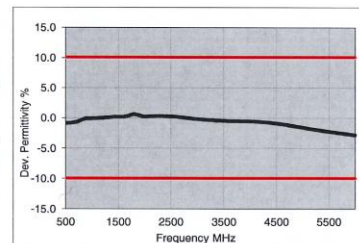
Ambient Condition 22°C ; 30% humidity
 TSL Temperature 22°C
 Test Date 30-Oct-18
 Operator CL

Additional Information

TSL Density
 TSL Heat-capacity

Results

f [MHz]	Measured			Target		Diff.to Target [%]	
	e'	e''	sigma	eps	sigma	Δ-eps	Δ-sigma
800	55.1	21.3	0.95	55.3	0.97	-0.4	-2.1
825	55.1	20.8	0.96	55.2	0.98	-0.3	-2.0
835	55.1	20.6	0.96	55.1	0.99	0.0	-2.5
850	55.1	20.4	0.96	55.2	0.99	-0.1	-3.0
900	55.0	19.7	0.98	55.0	1.05	0.0	-6.7
1400	54.2	15.6	1.22	54.1	1.28	0.2	-4.7
1450	54.1	15.4	1.24	54.0	1.30	0.2	-4.6
1500	54.1	15.3	1.27	53.9	1.33	0.3	-4.5
1550	54.0	15.1	1.30	53.9	1.36	0.2	-4.4
1600	53.9	15.0	1.33	53.8	1.39	0.2	-4.3
1625	53.9	14.9	1.35	53.8	1.41	0.3	-4.3
1640	53.9	14.9	1.36	53.7	1.42	0.3	-4.2
1650	53.8	14.9	1.36	53.7	1.43	0.2	-4.9
1700	53.8	14.8	1.40	53.6	1.46	0.4	-4.1
1750	53.7	14.7	1.43	53.4	1.49	0.5	-4.0
1800	53.7	14.6	1.46	53.3	1.52	0.8	-3.9
1810	53.7	14.6	1.47	53.3	1.52	0.8	-3.3
1825	53.7	14.6	1.48	53.3	1.52	0.8	-2.6
1850	53.6	14.5	1.50	53.3	1.52	0.6	-1.3
1900	53.5	14.5	1.53	53.3	1.52	0.4	0.7
1950	53.5	14.5	1.57	53.3	1.52	0.4	3.3
2000	53.4	14.4	1.60	53.3	1.52	0.2	5.3
2050	53.4	14.4	1.64	53.2	1.57	0.3	4.5
2100	53.3	14.4	1.68	53.2	1.62	0.2	3.7
2150	53.3	14.4	1.72	53.1	1.66	0.4	3.6
2200	53.2	14.4	1.76	53.0	1.71	0.3	2.9
2250	53.1	14.4	1.81	53.0	1.76	0.2	2.8
2300	53.1	14.4	1.85	52.9	1.81	0.4	2.2
2350	53.0	14.5	1.89	52.8	1.85	0.3	2.2
2400	52.9	14.5	1.94	52.8	1.90	0.2	2.1
2450	52.9	14.5	1.98	52.7	1.95	0.4	1.5
2500	52.8	14.6	2.03	52.6	2.02	0.3	0.5
2550	52.7	14.6	2.07	52.6	2.09	0.2	-1.0
2600	52.6	14.7	2.12	52.5	2.16	0.2	-1.9



3500	51.1	15.5	3.02	51.3	3.31	-0.4	-8.8
3700	50.8	15.7	3.24	51.1	3.55	-0.5	-8.8
5200	48.1	18.2	5.27	49.0	5.30	-1.8	-0.6
5250	48.0	18.3	5.34	49.0	5.36	-1.9	-0.4
5300	47.9	18.4	5.41	48.9	5.42	-2.0	-0.2
5500	47.5	18.6	5.70	48.6	5.65	-2.2	0.8
5600	47.3	18.8	5.84	48.5	5.77	-2.3	1.3
5700	47.1	18.9	5.99	48.3	5.88	-2.5	1.8
5800	47.0	19.0	6.14	48.2	6.00	-2.6	2.3

TSL Dielectric Parameters

1

Figure C-2
 600 – 5800 MHz Body Tissue Equivalent Matter

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Approved by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX C: Page 2 of 3

Measurement Certificate / Material Test

Item Name	Head Tissue Simulating Liquid (HBBL600-10000V6)
Product No.	SL AAH U16 BC (Batch: 181031-2)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

Target Parameters

Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

Test Condition

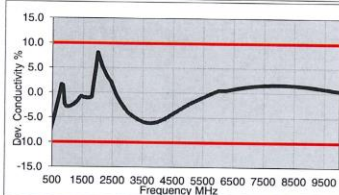
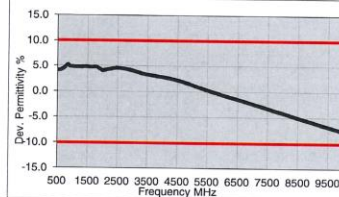
Ambient Condition 22°C ; 30% humidity
TSL Temperature 22°C
Test Date 31-Oct-18
Operator CL

Additional Information

TSL Density
TSL Heat-capacity

Results

f [MHz]	Measured			Target		Diff.to Target [%]	
	e'	e''	sigma	eps	sigma	Δ-eps	Δ-sigma
800	43.8	20.5	0.91	41.7	0.90	5.1	1.4
825	43.8	20.1	0.92	41.6	0.91	5.3	1.5
835	43.8	19.9	0.93	41.5	0.91	5.4	2.0
850	43.7	19.7	0.93	41.5	0.92	5.3	1.5
900	43.5	18.9	0.95	41.5	0.97	4.8	-2.1
1400	42.5	15.0	1.17	40.6	1.18	4.7	-0.8
1450	42.5	14.8	1.19	40.5	1.20	4.9	-0.8
1600	42.2	14.3	1.27	40.3	1.28	4.7	-1.1
1625	42.2	14.2	1.29	40.3	1.30	4.8	-0.7
1640	42.2	14.2	1.30	40.3	1.31	4.8	-0.5
1650	42.1	14.2	1.30	40.2	1.31	4.6	-1.0
1700	42.1	14.0	1.33	40.2	1.34	4.8	-0.9
1750	42.0	13.9	1.36	40.1	1.37	4.8	-0.8
1800	41.9	13.9	1.39	40.0	1.40	4.7	-0.7
1810	41.9	13.8	1.40	40.0	1.40	4.7	0.0
1825	41.9	13.8	1.41	40.0	1.40	4.7	0.7
1850	41.8	13.8	1.42	40.0	1.40	4.5	1.4
1900	41.8	13.7	1.45	40.0	1.40	4.5	3.6
1950	41.7	13.7	1.48	40.0	1.40	4.3	5.7
2000	41.6	13.6	1.51	40.0	1.40	4.0	7.9
2050	41.6	13.6	1.55	39.9	1.44	4.2	7.3
2100	41.5	13.5	1.58	39.8	1.49	4.2	6.1
2150	41.4	13.5	1.62	39.7	1.53	4.2	5.7
2200	41.4	13.5	1.65	39.6	1.58	4.4	4.6
2250	41.3	13.5	1.69	39.6	1.62	4.4	4.2
2300	41.2	13.5	1.72	39.5	1.67	4.4	3.2
2350	41.1	13.5	1.76	39.4	1.71	4.4	2.9
2400	41.1	13.5	1.80	39.3	1.76	4.6	2.5
2450	41.0	13.5	1.84	39.2	1.80	4.6	2.2
2500	40.9	13.5	1.88	39.1	1.85	4.5	1.4
2550	40.8	13.5	1.92	39.1	1.91	4.4	0.6
2600	40.8	13.6	1.96	39.0	1.96	4.6	-0.2
3500	39.2	14.1	2.74	37.9	2.91	3.3	-5.8
3700	38.9	14.2	2.93	37.7	3.12	3.1	-6.1



5200	36.3	15.8	4.57	36.0	4.66	0.9	-1.7
5250	36.2	15.9	4.63	35.9	4.71	0.8	-1.6
5300	36.1	15.9	4.69	35.9	4.76	0.7	-1.4
5500	35.8	16.1	4.92	35.6	4.96	0.3	-0.9
5600	35.6	16.2	5.04	35.5	5.07	0.1	-0.6
5700	35.4	16.2	5.15	35.4	5.17	0.0	-0.3
5800	35.2	16.3	5.27	35.3	5.27	-0.2	0.0
6000	34.9	16.5	5.50	35.1	5.48	-0.6	0.5
6500	34.0	16.9	6.12	34.5	6.07	-1.4	0.9
7000	33.1	17.3	6.74	33.9	6.65	-2.3	1.3
7500	32.2	17.6	7.36	33.3	7.24	-3.2	1.6
8000	31.4	17.9	7.97	32.7	7.84	-4.1	1.7
8500	30.5	18.2	8.59	32.1	8.45	-5.0	1.6
9000	29.7	18.4	9.20	31.5	9.08	-5.9	1.3
9500	28.9	18.5	9.80	31.0	9.71	-6.8	0.9
10000	28.1	18.7	10.40	30.4	10.36	-7.6	0.4

Figure C-3
600 – 5800 MHz Head Tissue Equivalent Matter

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Approved by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX C: Page 3 of 3

APPENDIX D: SAR SYSTEM VALIDATION

Per FCC KDB Publication 865664 D02v01r02, SAR system validation status should be documented to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probes and tissue dielectric parameters has been included.

Table D-1
SAR System Validation Summary – 1g

SAR SYSTEM #	FREQ. [MHz]	DATE	PROBE SN	PROBE CAL. POINT	COND.	PERM.	CW VALIDATION			MOD. VALIDATION		
					(σ)	(ε _r)	SENSITIVITY	PROBE LINEARITY	PROBE ISOTROPY	MOD. TYPE	DUTY FACTOR	PAR
L	750	9/24/2019	7410	750	Head	0.878	42.471	PASS	PASS	PASS	N/A	N/A
M	835	10/8/2019	7308	835	Head	0.926	40.749	PASS	PASS	PASS	PASS	N/A
P	1750	10/2/2019	7551	1750	Head	1.346	39.450	PASS	PASS	PASS	N/A	N/A
H	1750	12/20/2019	7406	1750	Head	1.379	39.702	PASS	PASS	PASS	N/A	N/A
L	1900	9/24/2019	7410	1900	Head	1.442	39.947	PASS	PASS	PASS	PASS	N/A
E	2300	9/6/2019	7417	2300	Head	1.737	39.748	PASS	PASS	PASS	N/A	N/A
E	2450	9/5/2019	7417	2450	Head	1.855	39.542	PASS	PASS	PASS	OFDM/TDD	PASS
E	2600	9/5/2019	7417	2600	Head	1.979	39.302	PASS	PASS	PASS	TDD	PASS
H	3700	12/5/2019	3589	3700	Head	2.973	39.247	PASS	PASS	PASS	TDD	PASS
H	5250	12/7/2019	7406	5250	Head	4.709	35.885	PASS	PASS	PASS	OFDM	N/A
H	5600	12/7/2019	7406	5600	Head	5.120	35.211	PASS	PASS	PASS	OFDM	N/A
H	5750	12/7/2019	7406	5750	Head	5.309	34.961	PASS	PASS	PASS	OFDM	N/A
L	750	8/20/2019	7410	750	Body	0.941	54.921	PASS	PASS	PASS	N/A	N/A
L	835	8/20/2019	7410	835	Body	0.974	54.739	PASS	PASS	PASS	GMSK	PASS
I	1750	5/21/2019	7357	1750	Body	1.442	55.384	PASS	PASS	PASS	N/A	N/A
P	1900	10/8/2019	7551	1900	Body	1.542	51.760	PASS	PASS	PASS	GMSK	PASS
J	1900	10/7/2019	7488	1900	Body	1.555	51.080	PASS	PASS	PASS	GMSK	PASS
J	1900	1/1/2020	7571	1900	Body	1.579	51.919	PASS	PASS	PASS	GMSK	PASS
K	2300	9/5/2019	7547	2300	Body	1.893	52.450	PASS	PASS	PASS	N/A	N/A
M	2450	10/10/2019	7308	2450	Body	1.962	51.230	PASS	PASS	PASS	OFDM/TDD	PASS
K	2450	9/6/2019	7547	2450	Body	1.996	51.898	PASS	PASS	PASS	OFDM/TDD	PASS
L	2450	8/15/2019	7410	2450	Body	2.018	52.505	PASS	PASS	PASS	OFDM/TDD	PASS
K	2600	9/5/2019	7547	2600	Body	2.716	52.040	PASS	PASS	PASS	TDD	PASS
D	3700	6/12/2019	3914	3700	Body	3.593	50.776	PASS	PASS	PASS	TDD	PASS
G	5250	10/4/2019	7409	5250	Body	5.223	47.070	PASS	PASS	PASS	OFDM	N/A
G	5600	10/7/2019	7409	5600	Body	5.884	47.080	PASS	PASS	PASS	OFDM	N/A
G	5750	10/7/2019	7409	5750	Body	6.111	46.780	PASS	PASS	PASS	OFDM	N/A

Table D-2
SAR System Validation Summary – 10g

SAR SYSTEM #	FREQ. [MHz]	DATE	PROBE SN	PROBE CAL. POINT	COND.	PERM.	CW VALIDATION			MOD. VALIDATION		
					(σ)	(ε _r)	SENSITIVITY	PROBE LINEARITY	PROBE ISOTROPY	MOD. TYPE	DUTY FACTOR	PAR
I	1750	5/21/2019	7357	1750	Body	1.442	55.384	PASS	PASS	PASS	N/A	N/A
J	1900	1/1/2020	7571	1900	Body	1.579	51.919	PASS	PASS	PASS	GMSK	PASS
P	1900	10/8/2019	7551	1900	Body	1.542	51.760	PASS	PASS	PASS	GMSK	PASS
G	5250	10/4/2019	7409	5250	Body	5.223	47.070	PASS	PASS	PASS	OFDM	N/A
G	5600	10/7/2019	7409	5600	Body	5.884	47.080	PASS	PASS	PASS	OFDM	N/A
G	5750	10/7/2019	7409	5750	Body	6.111	46.780	PASS	PASS	PASS	OFDM	N/A

NOTE: While the probes have been calibrated for both CW and modulated signals, all measurements were performed using communication systems calibrated for CW signals only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r04 for scenarios when CW probe calibrations are used with other signal types. SAR systems were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to FCC KDB Publication 865664 D01v01r04.

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Approved by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset	APPENDIX D: Page 1 of 1		

APPENDIX F: DOWNLINK LTE CA RF CONDUCTED POWERS

1.1 LTE Downlink Only Carrier Aggregation Test Reduction Methodology

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number of component carriers (CCs) supported by the product implementation. Per April 2018 TCBC Workshop Notes, the following test reduction methodology was applied to determine the combinations required for conducted power measurements.

LTE DLCA Test Reduction Methodology:

- The supported combinations were arranged by the number of component carriers in columns.
- Any limitations on the PCC or SCC for each combination were identified alongside the combination (e.g. CA_2A-2A-4A-12A, but B12 can only be configured as a SCC).
- Power measurements were performed for "supersets" (LTE CA combinations with multiple components carriers) and any "subsets" (LTE CA combinations with fewer component carriers) that were not completely covered by the supersets.
- Only subsets that have the exact same components as a superset were excluded for measurement.
- When there were certain restrictions on component carriers that existed in the superset that were not applied for the subset, the subset configuration was additionally evaluated.
- Both inter-band and intra-band downlink carrier aggregation scenarios were considered.
- Downlink CA combinations for SISO and 4x4 Downlink MIMO operations were measured independently, per May 2017 TCBC Workshop notes.

Table 1 – Example of Exclusion Table for SISO Configurations

[illegible]

Table 2 – Example of Exclusion Table for 4x4 Downlink MIMO Configurations

Supported Channel Bandwidth (MHz)							Restriction	Completely Covered by Measurement Superset	Supported Channel Bandwidth (MHz)							Restriction	Completely Covered by Measurement Superset
Index	ZCC	CC1		CC2		CC3			Index	ZCC	CC1		CC2		CC3		
ACC #M1	CA [2C]	5, 10, 15, 20					3CC #M6		3CC #M1	CA [2A] 2A-4A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	No			
ACC #M2	CA [2A] 2A	5, 10, 15, 20					3CC #M1		ACC #M2	CA [2A] 2A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10	No			
3CC #M1	CA [2A] [2A]	5, 10, 15, 20	5, 10, 15, 20				3CC #M1		3CC #M3	CA [2A] 2A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10	No			
3CC #M4	CA [2A] 4A [2]	5, 10, 15, 20	5, 10, 15, 20				3CC #M1		3CC #M4	CA [2A] 2A-13A	5, 10, 15, 20	5, 10, 15, 20	5, 10	No			
3CC #M5	CA [2A] 14A [2]	5, 10, 15, 20	5, 10, 15, 20				3CC #M5		3CC #M5	CA [2A] 2A-30A	5, 10, 15, 20	5, 10, 15, 20	5, 10	No			
3CC #M6	CA [2A] 5A	5, 10, 15, 20	5, 10				ACC #M3		3CC #M6	CA [2C] 66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	No			
3CC #M7	CA [2A] [2C] [1]	5, 10, 15, 20	5, 10				3CC #M7		3CC #M7	CA [2C] 66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	No			
3CC #M8	CA [2A] 13A	5, 10, 15, 20	5, 10				3CC #M4		3CC #M8	CA [2C] 66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	No			
3CC #M9	CA [2A] 17A	5, 10	5, 10					3CC #M9	CA [2A] 2A-66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	No			
3CC #M10	CA [2A] 29A [2]	5, 10, 15, 20	5, 10			B29 SCC Only	3CC #M12		3CC #M10	CA 2A-2A (66A)	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	No			
3CC #M11	CA [2A] 30A	5, 10, 15, 20	5, 10				3CC #M11		3CC #M11	CA [2A] 29A-71A	5, 10, 15, 20	5, 10, 15, 20	5, 10	No			
3CC #M12	CA [2A] 66A [2]	5, 10, 15, 20	5, 10, 15, 20				3CC #M12		3CC #M12	CA [2A] 4A-29A	5, 10, 15, 20	5, 10, 15, 20	5, 10	B29 SCC Only			
3CC #M13	CA 2A (66A) [2]	5, 10, 15, 20	5, 10, 15, 20				4CC #M7		3CC #M13	CA [2A] 4A-71A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	No			
3CC #M14	CA [2A] (66A) [2]	5, 10, 15, 20	5, 10, 15, 20					3CC #M14	CA [2A] 66A	5, 10, 15, 20	5, 10			ACC #M1			
3CC #M15	CA [2A] 73A	5, 10, 15, 20	5, 10, 15, 20				3CC #M11		3CC #M15	CA [2A] 5A-66A	5, 10, 15, 20	5, 10	5, 10, 15, 20	No			
3CC #M16	CA 5A (66A)	5, 10	5, 10, 15, 20				3CC #M16		3CC #M16	CA 2A-5A (66A)	5, 10, 15, 20	5, 10	5, 10, 15, 20	No			
3CC #M17	CA [2A] 66A [4]	5, 10	5, 10, 15, 20				3CC #M17		3CC #M17	CA 2A-12A (66A)	5, 10, 15, 20	5, 10	5, 10, 15, 20	No			
3CC #M18	CA [2A] 13A (66A)	5, 10, 15, 20	5, 10, 15, 20				3CC #M18		3CC #M18	CA [2A] 13A-66A	5, 10, 15, 20	5, 10	5, 10, 15, 20	No			
3CC #M19	CA 30A (66A)	5, 10	5, 10, 15, 20				3CC #M20		3CC #M19	CA 2A-13A (66A)	5, 10, 15, 20	5, 10	5, 10, 15, 20	No			
3CC #M20	CA (66A)	5, 10, 15	5, 10, 15				4CC #M4		3CC #M20	CA 2A-30A (66A)	5, 10, 15, 20	5, 10	5, 10, 15, 20	No			
ACC #M1	66C	5, 10, 15, 20	5, 10, 15, 20				4CC #M6		3CC #M21	CA [2A] 66B	5, 10, 15, 20	5, 10, 15	5, 10, 15	ACC #M9			
ACC #M2	66A (66A)	5, 10, 15, 20	5, 10, 15, 20				4CC #M28		3CC #M22	CA 2A-66B	5, 10, 15, 20	5, 10, 15	5, 10, 15	ACC #M4			
ACC #M3	66A (66A)	5, 10, 15, 20	5, 10, 15, 20					3CC #M23	CA [2A] (66B)	5, 10, 15, 20	5, 10, 15	5, 10, 15					

Note: [CC] indicates component carrier with 4x4 DL MIMO antenna configuration

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset	APPENDIX F: Page 1 of 8		

1.2 LTE Downlink Only Carrier Aggregation Test Selection and Setup

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number component carriers (CCs) supported by the product implementation. For those configurations required by April 2018 TCBC Workshop Notes, conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. Additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

This device supports LAA with downlink carrier aggregation only. It uses carrier aggregation in the downlink to combine LTE in the unlicensed spectrum (i.e. LTE Band 46) with LTE in the licensed band (served as PCC). All uplink communications and acknowledgements on the PCC remain identical to specifications when downlink carrier aggregation is inactive.

Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the maximum average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive. All bands required for SAR testing per FCC KDB procedures were considered. Based on the measured maximum powers below, no additional SAR tests were required for DLCA SAR configurations.

General PCC and SCC configuration selection procedure

- PCC uplink channel, channel bandwidth, modulation and RB configurations were selected based on section C)3)b)ii) of KDB 941225 D05 V01r02. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation.
- To maximize aggregated bandwidth, highest channel bandwidth available for that CA combination was selected for SCC. For inter-band CA, the SCC downlink channels were selected near the middle of their transmission bands. For contiguous intra-band CA, the downlink channel spacing between the component carriers was set to multiple of 300 kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521. For non-contiguous intra-band CA, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers.
- All selected PCC and SCC(s) remained fully within the uplink/downlink transmission band of the respective component carrier.

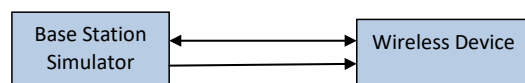


Figure 1
DL CA Power Measurement Setup

FCC ID: ZNFV600VM	 PCTEST	SAR EVALUATION REPORT	 LG	Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset			APPENDIX F: Page 2 of 8

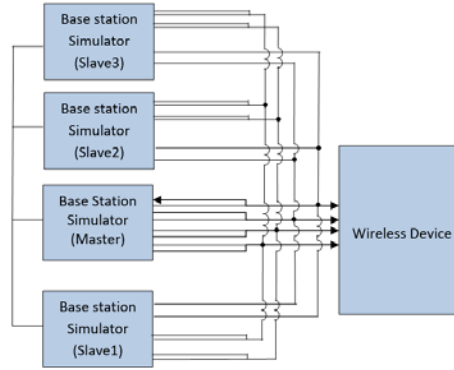


Figure 2
DL CA with DL 4x4 MIMO Power Measurement Setup

1.3 Downlink Carrier Aggregation RF Conducted Powers

1.3.1 LTE Band 12 as PCC

Table 1
Maximum Output Powers

Combination	PCC										SCC 1				SCC 2				SCC 3				SCC 4				Power	
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)	
CA 2A-12A (1)	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B2	20	800	1960	-	-	-	-	-	-	-	-	-	-	-	-	-	26.28	25.20
CA 12A-66A (1)	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B66	20	66786	2345	-	-	-	-	-	-	-	-	-	-	-	-	-	25.23	25.20
CA 12A-66A (2)	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B66	20	66786	2345	-	-	-	-	-	-	-	-	-	-	-	-	-	25.23	25.20
CA 4A-12A (1)	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	-	25.26	25.20
CA 4A-12A (2)	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	-	25.26	25.20
CA 2A-4A-12A-30A	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B2	20	800	1960	LTE B4	20	2175	2132.5	LTE B30	10	9600	2395	-	-	-	-	-	25.25	25.20
CA 2A-4A-4A-12A	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B2	20	800	1960	LTE B4	20	2175	2132.5	LTE B4	10	2360	2100	-	-	-	-	-	25.21	25.20
CA 4A-4A-12A-30A	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B4	20	2175	2132.5	LTE B4	20	2360	2100	LTE B30	10	9600	2395	-	-	-	-	-	25.23	25.20
CA 2A-12A-30A-66A-66A	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B2	20	800	1960	LTE B30	10	9600	2395	LTE B66	20	66786	2345	LTE B66	20	67236	2190	25.25	25.20	
CA 2A-2A-12A-30A-66A	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B2	20	800	1960	LTE B2	20	700	1940	LTE B30	10	9600	2365	LTE B66	20	67236	2190	25.27	25.20	
CA 2A-2A-12A-66A-66A	LTE B12	10	23005	707.5	QPSK	1	49	8095	737.5	LTE B2	20	800	1960	LTE B2	20	700	1940	LTE B66	20	66786	2345	LTE B66	20	67236	2190	25.24	25.20	

1.3.2 LTE Band 13 as PCC

Table 2
Maximum Output Powers

Combination	PCC Band	PCC										SCC 1				SCC 2				SCC 3				SCC 4				LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
		PCC BW [MHz]	PCC (DL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]				
CA 13A-46A-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B66	20	66786	2345	-	-	-	-	-	-	-	-	25.03	25.00		
CA 2A-13A-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50960	5537.5	-	-	-	-	-	-	-	-	25.03	25.00		
CA 2A-13A-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50960	5537.5	-	-	-	-	-	-	-	-	25.03	25.00		
CA 4A-4A-13A	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B4	20	2175	2132.5	LTE B4	10	2360	2100	-	-	-	-	-	-	-	-	25.09	25.00		
CA 13A-46C-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B46	20	50467	5537.5	LTE B66	20	66786	2345	-	-	-	-	25.03	25.00		
CA 13A-46A-66B	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B66	15	66786	2345	LTE B66	5	66786	2345	-	-	-	-	25.02	25.00		
CA 13A-46A-66C	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B66	20	66786	2345	-	-	-	-	-	-	-	-	25.08	25.00		
CA 2A-13A-46C	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50960	5537.5	LTE B46	20	50467	5537.5	-	-	-	-	25.03	25.00		
CA 2A-13A-46C	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50960	5537.5	LTE B46	20	50467	5537.5	-	-	-	-	25.09	25.00		
CA 13A-46A-46C-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B46	20	53460	5537.5	LTE B46	20	55338	5537.5	LTE B66	20	66786	2345	25.02	25.00		
CA 13A-46A-46D	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B46	20	53460	5537.5	LTE B46	20	55338	5537.5	LTE B66	20	66786	2345	25.03	25.00		
CA 13A-46C-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B46	20	56188	5644.8	LTE B46	20	56188	5644.8	LTE B66	20	66786	2345	25.03	25.00		
CA 13A-46C-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B46	20	56188	5644.8	LTE B46	20	56188	5644.8	LTE B66	20	66786	2345	25.03	25.00		
CA 2A-13A-46A-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50960	5537.5	LTE B46	20	56188	5644.8	LTE B66	20	66786	2345	25.03	25.00		
CA 2A-13A-46C-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50960	5537.5	LTE B46	20	56188	5644.8	LTE B66	20	66786	2345	25.03	25.00		
CA 2A-13A-46D	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50960	5537.5	LTE B46	20	56188	5644.8	LTE B66	20	66786	2345	25.03	25.00		
CA 2A-13A-46A-66B	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50960	5537.5	LTE B46	20	56188	5644.8	LTE B66	20	66786	2345	25.03	25.00		
CA 13A-46C-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B46	20	50467	5537.5	LTE B46	20	50960	5537.5	LTE B66	20	66786	2345	25.09	25.00		
CA 13A-46D-66A-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B46	20	50467	5537.5	LTE B46	20	50960	5537.5	LTE B66	20	66786	2345	25.05	25.00		
CA 13A-46D-66A-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B46	20	50467	5537.5	LTE B46	20	50960	5537.5	LTE B66	20	66786	2345	25.05	25.00		
CA 2A-13A-46E	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50467	5537.5	LTE B46	20	50960	5537.5	LTE B46	20	53363	5537.5	25.04	25.00		

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset	APPENDIX F: Page 3 of 8		

1.3.3 LTE Band 14 as PCC

Table 3
Maximum Output Powers

Combination	PCC Band	PCC BW [MHz]	PCC [UL] Ch	PCC				SCC 1				SCC 2				SCC 3				SCC 4				Power			
				PCC [UL] Freq. [MHz]	Mod.	PCC-UL RB	PCC-UL RB Offset	PCC [DL] Channel	PCC [DL] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [DL] Channel	SCC [DL] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [DL] Channel	SCC [DL] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [DL] Channel	SCC [DL] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [DL] Channel	SCC [DL] Freq. [MHz]	LTE Tx Power with Tx CA	LTE Single Carrier Tx Power (Enb) [dBm]
CA_2A-14A_3D-66A-66A	LTE-B34	3D	23130	793	QPSK	-	-	5.330	763	LTE-B2	20	900	1960	LTE-B3D	3D	9820	2355	LTE-B66	20	66786	2345	LTE-B66	20	67236	2190	25.3	25.28
CA_2A-14A_3D-66A-66A	LTE-B34	3D	23130	793	QPSK	-	-	5.330	763	LTE-B2	20	900	1960	LTE-B66	20	66536	2120	LTE-B66	20	66786	2345	LTE-B66	20	67236	2190	25.3	25.28
CA_2A-14A_3D-66A-66A	LTE-B34	3D	23130	793	QPSK	-	-	5.330	763	LTE-B2	20	900	1960	LTE-B66	20	66536	2120	LTE-B66	20	66786	2345	LTE-B66	20	67236	2190	25.3	25.28
CA_2A-14A_3D-66A-66A	LTE-B34	3D	23130	793	QPSK	-	-	5.330	763	LTE-B2	20	900	1960	LTE-B66	20	66536	2120	LTE-B66	20	66786	2345	LTE-B66	20	67236	2190	25.3	25.28

1.3.4 LTE Band 5 as PCC

Table 4
Maximum Output Powers

[illegible]

1.3.5 LTE Band 66 as PCC

Table 5
Maximum Output Powers

Combination	PCC Band	PCC BW [MHz]	PCC				SCS1				SCS2				SCS3				SCS4				SCS5				SCS6				Power
			PCC DU [Ch. Freq. (MHz)]	Mod.	PCC Upl. M	PCC BW Offset	PCC DU [Channel]	PCC DU [Freq. (MHz)]	SCC Band	SCC BW [MHz]	SCC DU [Channel]	SCC DU [Freq. (MHz)]	SCC Band	SCC BW [MHz]	SCC DU [Channel]	SCC DU [Freq. (MHz)]	SCC Band	SCC BW [MHz]	SCC DU [Channel]	SCC DU [Freq. (MHz)]	SCC Band	SCC BW [MHz]	SCC DU [Channel]	SCC DU [Freq. (MHz)]	SCC Band	SCC BW [MHz]	SCC DU [Channel]	SCC DU [Freq. (MHz)]	with SC CA (Power [dBm])	ET Shape (Power [dBm])	
CA 12A-GSA (1)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (2)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (3)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (4)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (5)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (6)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (7)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (8)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (9)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (10)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (11)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (12)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (13)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (14)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (15)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (16)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (17)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (18)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (19)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (20)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (21)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (22)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (23)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (24)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (25)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (26)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (27)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (28)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (29)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (30)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (31)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (32)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (33)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (34)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (35)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (36)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (37)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (38)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (39)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (40)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	1.8E-06	20	1257.0	20	23.0	23.0
CA 12A-GSA (41)	1.8E-06	20	1257.0	QPSK	0	0	0	1257.0	20	1.8E-06	20	1257.0	20																		

FCC ID: ZNFV600VM

Test Dates:
12/02/19 – 02/17/20

DUT Type:
Portable Handset

SAR EVALUATION REPORT



Reviewed by: Quality Manager

APPENDIX F:
Page 4 of 8

1.3.6 LTE Band 2 as PCC

Table 6
Maximum Output Powers

[illegible]

1.3.7 LTE Band 30 as PCC

Table 7
Maximum Output Powers

[illegible]

1.3.8 LTE Band 48 as PCC

Table 8
Maximum Output Powers

PCC																	SCC 1					SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC [U/L] Ch	PCC [U/L] Freq. [MHz]	Mod.	PCC UL BB	PCC UL RB Offset	PCC UL Channel	PCC [D/L] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [U/L] Channel	SCC [D/L] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [U/L] Channel	SCC [D/L] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [U/L] Channel	SCC [D/L] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [U/L] Channel	SCC [D/L] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [U/L] Channel	SCC [D/L] Freq. [MHz]	LTE Tx Power (dBm)	LTE Single Carrier Tx Power (dBm)							
CA 4B6	LTE B48	20	56207	3646.7	QPSK	1	69	56207	3646.7	LTE B48	20	56609	3609.9	LTE B48	20	55911	3607.1	LTE B48	20	55913	3627.9	-	-	-	-	-	-	-	-	-	-	21.55	21.53					
CA 4B6-4B6	LTE B48	20	56207	3646.7	QPSK	1	69	56207	3646.7	LTE B48	20	56609	3626.9	LTE B48	20	55911	3560	LTE B48	20	55338	3579.8	LTE B48	20	55436	3599.6	-	-	-	-	-	-	21.55	21.53					
CA 4B6-4B6	LTE B48	20	56207	3646.7	QPSK	1	69	56207	3646.7	LTE B48	20	56609	3609.9	LTE B48	20	55911	3607.1	LTE B48	20	55915	3648.7	-	-	-	-	-	-	-	-	-	-	21.55	21.53					

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset	APPENDIX F: Page 5 of 8		

1.4 DL CA with DL 4x4 MIMO RF Conduction Powers

This device supports downlink 4x4 MIMO operations for some LTE bands. Uplink transmission is limited to a single output stream. When carrier aggregation was applicable, the general test selection and setup procedures described in Section 1.2 were applied.

Per May 2017 TCB Workshop Notes, SAR for 4x4 DL MIMO was not needed since the maximum average output power in 4x4 DL MIMO mode was not more than 0.25 dB higher than the maximum output power with 4x4 DL MIMO inactive. Additionally, SAR for 4x4 MIMO Downlink Carrier Aggregation was not needed since the maximum average output power in 4x4 MIMO Downlink Carrier Aggregation mode was not more than 0.25 dB higher than the maximum output power with 4x4 MIMO Downlink and downlink carrier aggregation inactive.

1.4.1 LTE 4x4 MIMO DL Standalone Powers

Table 9
Maximum Output Powers

LTE Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Modulation	RB Size	RB Offset	4x4 DL MIMO Tx. Power [dBm]	Single Antenna Tx. Power [dBm]	Target Power [dBm]
66	20	132572	1770	QPSK	1	0	25.07	25.06	24.7
2	20	18900	1880	QPSK	1	50	25.04	25.00	24.7
48	20	56207	3646.7	QPSK	1	99	23.29	23.53	23.2

1.4.2 LTE Band 12 as PCC

Table 10
Maximum Output Powers

[illegible]

1.4.3 LTE Band 13 as PCC

Table 11
Maximum Output Powers

Combination	PCC Band	PCC				SCC 1				SCC 2				SCC 3				SCC 4				Power					
		PCC BW [MHz]	PCC [UL] [Freq. [MHz]	PCC [UL] [Mod.]	PCC [UL] RB	PCC [UL] RB Offset	PCC [DL] [Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DL] [Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DL] [Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DL] [Freq. [MHz]	DL Ant. Config.	SCC Band		SCC [DL] [Freq. [MHz]	DL Ant. Config.	LTE Tx Power [dBm]	LTE Single Carrier Tx Power [dBm]	
CA 13A-16A (60A)	LTE B13	5	21320	782	QPSK	1	12	5280	782	2x2	LTE B06	20	66786	2145	4x4	LTE B04	20	67236	2190	2x2				24.80	25.00		
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	25	5280	782	2x2	LTE B02	20	660	1960	4x4	LTE B04	20	2125	2123.5	2x2				24.80	25.01		
CA 12A-14A-13A	LTE B13	10	21320	782	QPSK	1	25	5280	782	2x2	LTE B02	20	660	1960	4x4	LTE B04	20	2125	2123.5	2x2				24.92	25.01		
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	25	5280	782	2x2	LTE B06	20	66786	2145	4x4	LTE B04	20	67236	2190	2x2				24.92	25.01		
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	25	5280	782	2x2	LTE B06	20	66786	2145	4x4	LTE B04	20	67236	2190	2x2				24.92	25.01		
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	12	5280	782	2x2	LTE B02	20	660	1960	4x4	LTE B06	20	66786	2145	2x2				24.80	25.00		
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	12	5280	782	2x2	LTE B02	20	660	1960	4x4	LTE B06	20	66786	2145	2x2				24.80	25.00		
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	25	5280	782	2x2	LTE B06	20	66786	2145	4x4	LTE B04	20	67236	2190	2x2				24.80	25.00		
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	25	5280	782	2x2	LTE B04	20	2125	2123.5	4x4	LTE B04	20	2125	2123.5	2x2				24.80	25.00		
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	12	5280	782	2x2	LTE B02	20	660	1960	4x4	LTE B06	20	66786	2145	4x4	LTE B06	20	66884	2164.8	4x4	24.80	25.00
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	12	5280	782	2x2	LTE B02	20	660	1960	4x4	LTE B06	20	66786	2145	4x4	LTE B06	20	67018	2181.2	4x4	24.80	25.00
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	12	5280	782	2x2	LTE B02	20	660	1960	4x4	LTE B06	20	66786	2145	4x4	LTE B06	20	67236	2190	4x4	24.80	25.00
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	12	5280	782	2x2	LTE B02	20	660	1960	4x4	LTE B06	20	66786	2145	4x4	LTE B06	20	67236	2190	4x4	24.80	25.00
CA 12A-13A (60A)	LTE B13	10	21320	782	QPSK	1	12	5280	782	2x2	LTE B02	20	660	1960	4x4	LTE B06	20	66786	2145	4x4	LTE B06	20	67236	2190	4x4	24.80	25.00

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset	APPENDIX F: Page 6 of 8		

1.4.4 LTE Band 5 as PCC

Table 12
Maximum Output Powers

[illegible]

1.4.5 LTE Band 66 as PCC

Table 13
Maximum Output Powers

[illegible]

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset			APPENDIX F: Page 7 of 8

1.4.6 LTE Band 2 as PCC

Table 14
Maximum Output Powers

Combination	PCC Band	PCC BW [MHz]	PCC UL Ch.	PCC DL Freq. [MHz]	PCC				SCC 1				SCC 2				SCC 3				SCC 4				SCC 5				SCC 6				SCC 7				SCC 8				SCC 9				SCC 10				SCC 11				SCC 12				SCC 13				SCC 14				SCC 15				SCC 16				SCC 17				SCC 18				SCC 19				SCC 20				SCC 21				SCC 22				SCC 23				SCC 24				SCC 25				SCC 26				SCC 27				SCC 28				SCC 29				SCC 30				SCC 31				SCC 32				SCC 33				SCC 34				SCC 35				SCC 36				SCC 37				SCC 38				SCC 39				SCC 40				SCC 41				SCC 42				SCC 43				SCC 44				SCC 45				SCC 46				SCC 47				SCC 48				SCC 49				SCC 50				SCC 51				SCC 52				SCC 53				SCC 54				SCC 55				SCC 56				SCC 57				SCC 58				SCC 59				SCC 60				SCC 61				SCC 62				SCC 63				SCC 64				SCC 65				SCC 66				SCC 67				SCC 68				SCC 69				SCC 70				SCC 71				SCC 72				SCC 73				SCC 74				SCC 75				SCC 76				SCC 77				SCC 78				SCC 79				SCC 80				SCC 81				SCC 82				SCC 83				SCC 84				SCC 85				SCC 86				SCC 87				SCC 88				SCC 89				SCC 90				SCC 91				SCC 92				SCC 93				SCC 94				SCC 95				SCC 96				SCC 97				SCC 98				SCC 99				SCC 100				SCC 101				SCC 102				SCC 103				SCC 104				SCC 105				SCC 106				SCC 107				SCC 108				SCC 109				SCC 110				SCC 111				SCC 112				SCC 113				SCC 114				SCC 115				SCC 116				SCC 117				SCC 118				SCC 119				SCC 120				SCC 121				SCC 122				SCC 123				SCC 124				SCC 125				SCC 126				SCC 127				SCC 128				SCC 129				SCC 130				SCC 131				SCC 132				SCC 133				SCC 134				SCC 135				SCC 136				SCC 137				SCC 138				SCC 139				SCC 140				SCC 141				SCC 142				SCC 143				SCC 144				SCC 145				SCC 146				SCC 147				SCC 148				SCC 149				SCC 150				SCC 151				SCC 152				SCC 153				SCC 154				SCC 155				SCC 156				SCC 157				SCC 158				SCC 159				SCC 160				SCC 161				SCC 162				SCC 163				SCC 164				SCC 165				SCC 166				SCC 167				SCC 168				SCC 169				SCC 170				SCC 171				SCC 172				SCC 173				SCC 174				SCC 175				SCC 176				SCC 177				SCC 178				SCC 179				SCC 180				SCC 181				SCC 182				SCC 183				SCC 184				SCC 185				SCC 186				SCC 187				SCC 188				SCC 189				SCC 190				SCC 191				SCC 192				SCC 193				SCC 194				SCC 195				SCC 196				SCC 197				SCC 198				SCC 199				SCC 200				SCC 201				SCC 202				SCC 203				SCC 204				SCC 205				SCC 206				SCC 207				SCC 208				SCC 209				SCC 210				SCC 211				SCC 212				SCC 213				SCC 214				SCC 215				SCC 216				SCC 217				SCC 218				SCC 219				SCC 220				SCC 221				SCC 222				SCC 223				SCC 224				SCC 225				SCC 226				SCC 227				SCC 228				SCC 229				SCC 230				SCC 231				SCC 232				SCC 233				SCC 234				SCC 235				SCC 236				SCC 237				SCC 238				SCC 239				SCC 240				SCC 241				SCC 242				SCC 243				SCC 244				SCC 245				SCC 246				SCC 247				SCC 248				SCC 249				SCC 250				SCC 251				SCC 252				SCC 253				SCC 254				SCC 255				SCC 256				SCC 257				SCC 258				SCC 259				SCC 260				SCC 261				SCC 262				SCC 263				SCC 264				SCC 265				SCC 266				SCC 267				SCC 268				SCC 269				SCC 270				SCC 271				SCC 272				SCC 273				SCC 274				SCC 275				SCC 276				SCC 277				SCC 278				SCC 279				SCC 280				SCC 281				SCC 282				SCC 283				SCC 284				SCC 285				SCC 286				SCC 287				SCC 288				SCC 289				SCC 290				SCC 291				SCC 292				SCC 293				SCC 294				SCC 295				SCC 296				SCC 297				SCC 298				SCC 299				SCC 300				SCC 301				SCC 302				SCC 303				SCC 304				SCC 305				SCC 306				SCC 307				SCC 308				SCC 309				SCC 310				SCC 311				SCC 312				SCC 313				SCC 314				SCC 315				SCC 316				SCC 317				SCC 318				SCC 319				SCC 320				SCC 321				SCC 322				SCC 323				SCC 324				SCC 325				SCC 326				SCC 327				SCC 328				SCC 329				SCC 330				SCC 331				SCC 332				SCC 333				SCC 334				SCC 335				SCC 336				SCC 337				SCC 338				SCC 339				SCC 340				SCC 341				SCC 342				SCC 343				SCC 344				SCC 345				SCC 346				SCC 347				SCC 348				SCC 349				SCC 350				SCC 351				SCC 352				SCC 353				SCC 354				SCC 355				SCC 356				SCC 357				SCC 358				SCC 359				SCC 360				SCC 361				SCC 362				SCC 363				SCC 364				SCC 365				SCC 366				SCC 367				SCC 368				SCC 369				SCC 370				SCC 371				SCC 372				SCC 373				SCC 374				SCC 375				SCC 376				SCC 377				SCC 378				SCC 379				SCC 380				SCC 381				SCC 382				SCC 383				SCC 384				SCC 385				SCC 386				SCC 387				SCC 388				SCC 389				SCC 390				SCC 391				SCC 392				SCC 393				SCC 394				SCC 395				SCC 396				SCC 397				SCC 398				SCC 399				SCC 400				SCC 401				SCC 402				SCC 403				SCC 404				SCC 405				SCC 406				SCC 407				SCC 408				SCC 409				SCC 410				SCC 411				SCC 412				SCC 413				SCC 414				SCC 415				SCC 416				SCC 417				SCC 418				SCC 419				SCC 420				SCC 421				SCC 422				SCC 423				SCC 424				SCC 425				SCC 426				SCC 427				SCC 428				SCC 429				SCC 430				SCC 431				SCC 432				SCC 433				SCC 434				SCC 435				SCC 436				SCC 437				SCC 438				SCC 439				SCC 440				SCC 441				SCC 442				SCC 443				SCC 444				SCC 445				SCC 446				SCC 447				SCC 448				SCC 449				SCC 450				SCC 451				SCC 452				SCC 453				SCC 454				SCC 455				SCC 456				SCC 457				SCC 458				SCC 459				SCC 460				SCC 461				SCC 462				SCC 463				SCC 464				SCC 465				SCC 466				SCC 467				SCC 468				SCC 469				SCC 470				SCC 471				SCC 472				SCC 473				SCC 474				SCC 475				SCC 476				SCC 477				SCC 478				SCC 479				SCC 480				SCC 481				SCC 482				SCC 483				SCC 484				SCC 485				SCC 486				SCC 487				SCC 488				SCC 489				SCC 490				SCC 491				SCC 492				SCC 493				SCC 494				SCC 495				SCC 496				SCC 497				SCC 498				SCC 499				SCC 500				SCC 501				SCC 502				SCC 503				SCC 504				SCC 505				SCC 506				SCC 507				SCC 508				SCC 509				SCC 510				SCC 511				SCC 512				SCC 513				SCC 514				SCC 515				SCC 516				SCC 517				SCC 518				SCC 519				SCC 520				SCC 521				SCC 522				SCC 523				SCC 524				SCC 525				SCC 526				SCC 527				SCC 528				SCC 529				SCC 530				SCC 531				SCC 532				SCC 533				SCC 534				SCC 535				SCC 536				SCC 537				SCC 538				SCC 539				SCC 540				SCC 541				SCC 542				SCC 543				SCC 544				SCC 545				SCC 546				SCC 547				SCC 548				SCC 549				SCC 550				SCC 551				SCC 552				SCC 553				SCC 554				SCC 555				SCC 556				SCC 557				SCC 558				SCC 559				SCC 560				SCC 561				SCC 562				SCC 563				SCC 564				SCC 565				SCC 566				SCC 567				SCC 568				SCC 569				SCC 570				SCC 571				SCC 572				SCC 573				SCC 574				SCC 575				SCC 576				SCC 577				SCC 578				SCC 579				SCC 580				SCC 581				SCC 582				SCC 583				SCC 584				SCC 585				SCC 586				SCC 587				SCC 588				SCC 589				SCC 590				SCC 591				SCC 592				SCC 593				SCC 594				SCC 595				SCC 596				SCC 597				SCC 598				SCC 599				SCC 600				SCC 601				SCC 602				SCC 603				SCC 604				SCC 605				SCC 606				SCC 607				SCC 608				SCC 609				SCC 610				SCC 611				SCC 612				SCC 613				SCC 614				SCC 615				SCC 616				SCC 617				SCC 618				SCC 619				SCC 620				SCC 621				SCC 622				SCC 623				SCC 624				SCC 625				SCC 626				SCC 627				SCC 628				SCC 629				SCC 630				SCC 631				SCC 632				SCC 633				SCC 634				SCC 635				SCC 636				SCC 637				SCC 638				SCC 639				SCC 640				SCC 641				SCC 642				SCC 643				SCC 644				SCC 645				SCC 646				SCC 647				SCC 648				SCC 649				SCC 650				SCC 651				SCC 652				SCC 653				SCC 654				SCC 655				SCC 656				SCC 657				SCC 658				SCC 659				SCC 660				SCC 661				SCC 662				SCC 663				SCC 664				SCC 665				SCC 666				SCC 667				SCC 668				SCC 669				SCC 670				SCC 671				SCC 672				SCC 673				SCC 674				SCC 675				SCC 676				SCC 677				SCC 678				SCC 679				SCC 680				SCC 681				SCC 682				SCC 683				SCC 684				SCC 685				SCC 686				SCC 687				SCC 688				SCC 689				SCC 690				SCC 691				SCC 692				SCC 693				SCC 694				SCC 695				SCC 696				SCC 697				SCC 698				SCC 699				SCC 700				SCC 701				SCC 702				SCC 703				SCC 704				SCC 705				SCC 706				SCC 707				SCC 708				SCC 709				SCC 710				SCC 711				SCC 712				SCC 713				SCC 714				SCC 715				SCC 716				SCC 717				SCC 718				SCC 719				SCC 720				SCC 721				SCC 722				SCC 723				SCC 724				SCC 725				SCC 726				SCC 727				SCC 728				SCC 729				SCC 730				SCC 731				SCC 732				SCC 733				SCC 734				SCC 735				SCC 736				SCC 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APPENDIX G POWER REDUCTION VERIFICATION

Per the May 2017 TCBC Workshop Notes, demonstration of proper functioning of the power reduction mechanisms is required to support the corresponding SAR configurations. The verification process was divided into two parts: (1) evaluation of output power levels for individual or multiple triggering mechanisms and (2) evaluation of the triggering distances for proximity-based sensors.

G.1 Power Verification Procedure

The power verification was performed according to the following procedure:

1. A base station simulator was used to establish a conducted RF connection and the output power was monitored. The power measurements were confirmed to be within expected tolerances for all states before and after a power reduction mechanism was triggered.
2. Step 1 was repeated for all relevant modes and frequency bands for the mechanism being investigated.
3. Steps 1 and 2 were repeated for all individual power reduction mechanisms and combinations thereof. For the combination cases, one mechanism was switched to a 'triggered' state at a time; powers were confirmed to be within tolerances after each additional mechanism was activated.

G.2 Distance Verification Procedure

The distance verification procedure was performed according to the following procedure:

1. A base station simulator was used to establish an RF connection and to monitor the power levels. The device being tested was placed below the relevant section of the phantom with the relevant side or edge of the device facing toward the phantom.
2. The device was moved toward and away from the phantom to determine the distance at which the mechanism triggers and the output power is reduced, per KDB Publication 616217 D04v01r02 and FCC Guidance. Each applicable test position was evaluated. The distances were confirmed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.
3. Steps 1 and 2 were repeated for low, mid, and high bands, as appropriate (see note below Table G-3 for more details).
4. Steps 1 through 3 were repeated for all distance-based power reduction mechanisms.

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset			APPENDIX G: Page 1 of 4

G.3 Main Antenna Verification Summary

Table G-1
Power Measurement Verification for Main Antenna

Mechanism(s)		Mode/Band	Conducted Power (dBm)		
1st	2nd		Un-triggered (Max)	Mechanism #1 (Reduced)	Mechanism #2 (Reduced)
Hotspot On		UMTS 1750	24.92	22.42	
Hotspot On	Grip	UMTS 1750	24.93	22.44	22.45
Grip		UMTS 1750	24.91	22.42	
Grip	Hotspot On	UMTS 1750	24.92	22.44	22.41
Hotspot On		UMTS 1900	24.75	22.18	
Hotspot On	Grip	UMTS 1900	24.76	22.19	22.18
Grip		UMTS 1900	24.77	22.15	
Grip	Hotspot On	UMTS 1900	24.76	22.18	22.17
Hotspot On		PCS EVDO	25.08	22.58	
Hotspot On	Grip	PCS EVDO	25.06	22.57	22.56
Grip		PCS EVDO	25.09	22.57	
Grip	Hotspot On	PCS EVDO	25.08	22.55	22.58
Hotspot On		LTE FDD Band 4	24.62	22.13	
Hotspot On	Grip	LTE FDD Band 4	24.60	22.14	22.11
Grip		LTE FDD Band 4	24.61	22.15	
Grip	Hotspot On	LTE FDD Band 4	24.63	22.18	22.13
Hotspot On		LTE FDD Band 66	24.80	22.29	
Hotspot On	Grip	LTE FDD Band 66	24.78	22.32	22.30
Grip		LTE FDD Band 66	24.77	22.33	
Grip	Hotspot On	LTE FDD Band 66	24.79	22.35	22.31
Hotspot On		LTE FDD Band 2	24.82	22.35	
Hotspot On	Grip	LTE FDD Band 2	24.80	22.31	22.33
Grip		LTE FDD Band 2	24.79	22.35	
Grip	Hotspot On	LTE FDD Band 2	24.78	22.32	22.29

Table G-2
Power Measurement Verification for Main Antenna with NR FR2 Active

	Mechanism(s)		Mode/Band	Conducted Power (dBm)		
	1st	2nd		Un-triggered (Max)	Mechanism #1 (Reduced)	Mechanism #2 (Reduced)
mmWave Active	Hotspot On		LTE FDD Band 2	24.76	22.24	
	Hotspot On	Grip		24.85	22.31	22.27
	Grip			24.94	22.36	
	Grip	Hotspot On		24.79	22.39	22.18
	Hotspot On		LTE FDD Band 66	24.83	22.24	
	Hotspot On	Grip		24.80	22.28	22.29
	Grip			24.87	22.27	
	Grip	Hotspot On		24.89	22.33	22.30

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset			APPENDIX G: Page 2 of 4

Table G-3
Distance Measurement Verification for Main Antenna

Mechanism(s)	Test Condition	Band	Distance Measurements (mm)		Minimum Distance per Manufacturer (mm)
			Moving Toward	Moving Away	
Grip	Phablet - Back Side	Mid	4	6	3
Grip	Phablet - Front Side	Mid	3	5	2
Grip	Phablet - Bottom Edge	Mid	5	7	4

*Note: Mid band refers to: CDMA BC1, UMTS B2/4, LTE B2/4/66.

G.4 WIFI Verification Summary

Table G-4
Power Measurement Verification WIFI – Antenna 1

Mechanism(s)	Mode/Band	Conducted Power (dBm)	
		Un-triggered (Max)	Mechanism #1 (Reduced)
1st			
Held-to-Ear	802.11b	18.62	14.97
Held-to-Ear	802.11g	19.41	15.03
Held-to-Ear	802.11n (2.4GHz)	16.68	15.07
Held-to-Ear	802.11ac (2.4GHz)	16.58	14.97

*Note: MIMO WIFI modes were not evaluated due to equipment limitations.

Table G-5
Power Measurement Verification WIFI – Antenna 2

Mechanism(s)	Mode/Band	Conducted Power (dBm)	
		Un-triggered (Max)	Mechanism #1 (Reduced)
1st			
Held-to-Ear	802.11b	18.75	15.23
Held-to-Ear	802.11g	19.12	15.41
Held-to-Ear	802.11n (2.4GHz)	16.72	15.39
Held-to-Ear	802.11ac (2.4GHz)	17.41	14.61

*Note: MIMO WIFI modes were not evaluated due to equipment limitations.

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset			APPENDIX G: Page 3 of 4

Table G-6
Power Measurement Verification WIFI with NR FR2 Active – Antenna 1

Mode/Band	Conducted Power (dBm)	
	Un-triggered (Max)	Mechanism #1 mmWave Active (Reduced)
802.11a	17.12	14.12
802.11n (5GHz, 20MHz BW)	17.13	14.03
802.11ac (20MHz BW)	17.10	14.11
802.11n (5GHz, 40MHz BW)	15.05	14.09
802.11ac (40MHz BW)	15.08	14.03

*Note: MIMO WIFI modes were not evaluated due to equipment limitations.

Table G-7
Power Measurement Verification WIFI with NR FR2 Active – Antenna 2

Mode/Band	Conducted Power (dBm)	
	Un-triggered (Max)	Mechanism #1 mmWave Active (Reduced)
802.11a	17.12	14.10
802.11n (5GHz, 20MHz BW)	17.03	14.08
802.11ac (20MHz BW)	17.08	14.07
802.11n (5GHz, 40MHz BW)	15.09	14.09
802.11ac (40MHz BW)	15.11	14.04

*Note: MIMO WIFI modes were not evaluated due to equipment limitations.

FCC ID: ZNFV600VM	 PCTEST	SAR EVALUATION REPORT	 LG	Reviewed by: Quality Manager
Test Dates: 12/02/19 – 02/17/20	DUT Type: Portable Handset			APPENDIX G: Page 4 of 4

APPENDIX H: IEEE 802.11AX RU SAR EXCLUSION

1.1 IEEE 802.11ax RU SAR Exclusion

To make the most efficient use of the additional available subcarriers (data tones), IEEE 802.11ax can utilize Orthogonal Frequency-Division Multiple Access (OFDMA) which divides the existing 802.11 channels into smaller subchannels called Resource Units (RUs). Possible RU sizes are: 26T, 52T, 106T, 242T, 484T and 996T.

Per FCC Guidance, 802.11ax was considered a higher order 802.11 mode when compared to a/b/g/n/ac to apply KDB Publication 248227 D01v02r02 for OFDM mode selection. Therefore, SAR tests were not required for 802.11ax based on the maximum allowed output powers of OFDM modes and the reported SAR values. Per FCC Guidance, maximum conducted powers were performed for each RU size to demonstrate that the output powers would not be higher than the other OFDM 802.11 modes.

1.2 IEEE 802.11ax RU Target Powers

1.2.1 Maximum 802.11ax RU WLAN Output Power

Tones		SISO (ANT1/2) /in dBm				MIMO (ALL) /in dBm			
		2.4GHz	5GHz/20MHz	5GHz/40MHz	5GHz/80MHz	2.4GHz	5GHz/20MHz	5GHz/40MHz	5GHz/80MHz
26T	Maximum	10.0	10.0	10.0	10.0	13.0	13.0	13.0	13.0
	Nominal	9.0	9.0	9.0	9.0	12.0	12.0	12.0	12.0
52T	Maximum	10.0	10.0	10.0	10.0	13.0	13.0	13.0	13.0
	Nominal	9.0	9.0	9.0	9.0	12.0	12.0	12.0	12.0
106T	Maximum	10.0	10.0	10.0	10.0	13.0	13.0	13.0	13.0
	Nominal	9.0	9.0	9.0	9.0	12.0	12.0	12.0	12.0
242T	Maximum	10.0	10.0	10.0	10.0	13.0	13.0	13.0	13.0
	Nominal	9.0	9.0	9.0	9.0	12.0	12.0	12.0	12.0
484T	Maximum			10.0	10.0			13.0	13.0
	Nominal			9.0	9.0			12.0	12.0
996T	Maximum				10.0				13.0
	Nominal				9.0				12.0

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX H: Page 1 of 9

1.3 IEEE 802.11ax Measured Powers

Table 1
Maximum 2.4 GHz 802.11ax RU Output Power – Ant 1

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	26T	0	9.49
			4	9.39
			8	9.55
2437	6	26T	0	9.95
			4	9.63
			8	9.06
2462	11	26T	0	9.48
			4	9.71
			8	9.55

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	52T	37	9.98
			38	9.89
			40	9.50
2437	6	52T	37	9.91
			38	9.81
			40	9.20
2462	11	52T	37	9.58
			38	9.70
			40	9.48

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	106T	53	9.84
			54	9.44
2437	6	106T	53	9.27
			54	9.71
2462	11	106T	53	9.62
			54	9.69

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	242T	61	9.31
2437	6	242T	61	9.98
2462	11	242T	61	9.84

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX H: Page 2 of 9

Table 2
Maximum 2.4 GHz 802.11ax RU Output Power – Ant 2

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	26T	0	9.02
			4	9.03
			8	9.66
2437	6	26T	0	9.68
			4	9.64
			8	9.18
2462	11	26T	0	9.01
			4	9.10
			8	9.15

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	52T	37	9.15
			38	9.12
			40	9.70
2437	6	52T	37	9.68
			38	9.98
			40	9.23
2462	11	52T	37	9.28
			38	9.16
			40	9.07

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	106T	53	9.63
			54	9.83
2437	6	106T	53	9.83
			54	9.45
2462	11	106T	53	9.12
			54	9.98

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	242T	61	9.93
2437	6	242T	61	9.95
2462	11	242T	61	9.75

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX H: Page 3 of 9

Table 3
Maximum 5 GHz 802.11ax RU Output Power – Ant 1

20MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	4	8
1		5180	36	26T	9.11	9.21	9.26
		5200	40	26T	9.07	9.08	9.11
		5240	48	26T	9.04	9.04	9.02
2A		5260	52	26T	9.07	9.11	9.09
		5280	56	26T	9.02	9.02	9.08
		5320	64	26T	9.12	9.08	9.15
2C		5500	100	26T	9.08	9.03	9.02
		5600	120	26T	9.16	9.20	9.20
		5720	144	26T	9.20	9.25	9.31
3		5745	149	26T	9.38	9.26	9.25
		5785	157	26T	9.25	9.34	9.30
		5825	165	26T	9.49	9.23	9.14

20MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	39	40
1		5180	36	52T	9.26	9.41	9.23
		5200	40	52T	9.19	9.32	9.11
		5240	48	52T	9.22	9.28	9.09
2A		5260	52	52T	9.20	9.22	9.17
		5280	56	52T	9.01	9.10	9.14
		5320	64	52T	9.28	9.28	9.14
2C		5500	100	52T	9.13	9.25	9.17
		5600	120	52T	9.16	9.20	9.24
		5720	144	52T	9.35	9.41	9.26
3		5745	149	52T	9.25	9.46	9.23
		5785	157	52T	9.28	9.15	9.40
		5825	165	52T	9.23	9.47	9.38

20MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	54	N/A
1		5180	36	106T	9.35	9.53	
		5200	40	106T	9.25	9.28	
		5240	48	106T	9.18	9.35	
2A		5260	52	106T	9.29	9.25	
		5280	56	106T	9.25	9.18	
		5320	64	106T	9.33	9.30	
2C		5500	100	106T	9.24	9.30	
		5600	120	106T	9.37	9.40	
		5720	144	106T	9.44	9.44	
3		5745	149	106T	9.51	9.47	
		5785	157	106T	9.50	9.51	
		5825	165	106T	9.59	9.47	

20MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	N/A	N/A
1		5180	36	242T	9.61		
		5200	40	242T	9.45		
		5240	48	242T	9.42		
2A		5260	52	242T	9.47		
		5280	56	242T	9.30		
		5320	64	242T	9.47		
2C		5500	100	242T	9.42		
		5600	120	242T	9.57		
		5720	144	242T	9.60		
3		5745	149	242T	9.74		
		5785	157	242T	9.71		
		5825	165	242T	9.69		

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX H: Page 4 of 9

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	8	17
1		5190	38	26T	9.15	9.57	9.13
		5230	46	26T	9.17	9.56	9.19
2A		5270	54	26T	9.13	9.54	9.06
		5310	62	26T	9.24	9.58	9.16
2C		5510	102	26T	9.04	9.30	9.16
		5590	118	26T	9.13	9.53	9.26
		5710	142	26T	9.30	9.65	9.35
3		5755	151	26T	9.41	9.82	9.31
		5795	159	26T	9.46	9.82	9.35

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	40	44
1		5190	38	52T	9.20	9.61	9.22
		5230	46	52T	9.21	9.57	9.17
2A		5270	54	52T	9.23	9.51	9.13
		5310	62	52T	9.25	9.54	9.17
2C		5510	102	52T	9.11	9.50	9.22
		5590	118	52T	9.29	9.61	9.30
		5710	142	52T	9.36	9.73	9.35
3		5755	151	52T	9.42	9.76	9.40
		5795	159	52T	9.58	9.80	9.39

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	54	56
1		5190	38	106T	9.39	9.66	9.43
		5230	46	106T	9.39	9.63	9.42
2A		5270	54	106T	9.42	9.60	9.31
		5310	62	106T	9.43	9.61	9.35
2C		5510	102	106T	9.38	9.58	9.45
		5590	118	106T	9.54	9.76	9.45
		5710	142	106T	9.61	9.82	9.52
3		5755	151	106T	9.71	9.90	9.62
		5795	159	106T	9.72	9.87	9.53

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	62	N/A
1		5190	38	242T	9.59	9.49	
		5230	46	242T	9.54	9.60	
2A		5270	54	242T	9.60	9.48	
		5310	62	242T	9.56	9.47	
2C		5510	102	242T	9.49	9.42	
		5590	118	242T	9.57	9.53	
		5710	142	242T	9.66	9.69	
3		5755	151	242T	9.76	9.75	
		5795	159	242T	9.82	9.68	

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					65	N/A	N/A
1		5190	38	484T	9.56		
		5230	46	484T	9.57		
2A		5270	54	484T	9.57		
		5310	62	484T	9.58		
2C		5510	102	484T	9.64		
		5590	118	484T	9.66		
		5710	142	484T	9.74		
3		5755	151	484T	9.90		
		5795	159	484T	9.81		

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX H: Page 5 of 9

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	18	36
	1	5210	42	26T	9.10	9.46	9.15
	2A	5290	58	26T	9.16	9.38	9.07
	2C	5530	106	26T	9.02	9.34	9.13
		5610	122	26T	9.14	9.32	9.20
		5690	138	26T	9.12	9.40	9.06
	3	5775	155	26T	9.45	9.67	9.01

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	44	52
	1	5210	42	52T	9.18	9.45	9.34
	2A	5290	58	52T	9.27	9.48	9.19
	2C	5530	106	52T	9.06	9.30	9.13
		5610	122	52T	9.21	9.51	9.27
		5690	138	52T	9.13	9.34	9.12
	3	5775	155	52T	9.48	9.64	9.34

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	56	60
	1	5210	42	106T	9.25	9.49	9.26
	2A	5290	58	106T	9.21	9.49	9.21
	2C	5530	106	106T	9.10	9.43	9.07
		5610	122	106T	9.29	9.53	9.30
		5690	138	106T	9.22	9.46	9.22
	3	5775	155	106T	9.55	9.73	9.38

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	62	64
	1	5210	42	242T	9.46	9.59	9.43
	2A	5290	58	242T	9.32	9.59	9.36
	2C	5530	106	242T	9.32	9.38	9.43
		5610	122	242T	9.37	9.51	9.47
		5690	138	242T	9.45	9.54	9.42
	3	5775	155	242T	9.75	9.83	9.59

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					65	66	N/A
	1	5210	42	484T	9.50	9.56	
	2A	5290	58	484T	9.59	9.58	
	2C	5530	106	484T	9.41	9.43	
		5610	122	484T	9.57	9.47	
		5690	138	484T	9.47	9.51	
	3	5775	155	484T	9.71	9.63	

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					67	N/A	N/A
	1	5210	42	996T	9.34		
	2A	5290	58	996T	9.36		
	2C	5530	106	996T	9.32		
		5610	122	996T	9.50		
		5690	138	996T	9.34		
	3	5775	155	996T	9.68		

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX H: Page 6 of 9

Table 4
Maximum 5 GHz 802.11ax RU Output Power – Ant 2

20MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	4	8
1		5180	36	26T	9.36	9.53	9.59
		5200	40	26T	9.68	9.77	9.81
		5240	48	26T	9.85	9.82	9.84
2A		5260	52	26T	9.80	9.85	9.56
		5280	56	26T	9.49	9.30	9.35
		5320	64	26T	9.43	9.43	9.44
2C		5500	100	26T	9.43	9.37	9.40
		5600	120	26T	9.87	9.86	9.83
		5720	144	26T	9.38	9.32	9.40
3		5745	149	26T	9.21	9.37	9.37
		5785	157	26T	9.45	9.29	9.39
		5825	165	26T	9.82	9.79	9.71

20MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	39	40
1		5180	36	52T	9.53	9.67	9.66
		5200	40	52T	9.74	9.90	9.85
		5240	48	52T	9.92	9.98	9.92
2A		5260	52	52T	9.92	9.97	9.82
		5280	56	52T	9.56	9.52	9.43
		5320	64	52T	9.46	9.60	9.51
2C		5500	100	52T	9.52	9.54	9.51
		5600	120	52T	9.91	9.94	9.87
		5720	144	52T	9.33	9.52	9.46
3		5745	149	52T	9.28	9.44	9.47
		5785	157	52T	9.51	9.53	9.47
		5825	165	52T	9.94	9.97	9.82

20MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	54	N/A
1		5180	36	106T	9.67	9.78	
		5200	40	106T	9.88	9.91	
		5240	48	106T	9.96	9.94	
2A		5260	52	106T	9.95	9.92	
		5280	56	106T	9.61	9.50	
		5320	64	106T	9.65	9.63	
2C		5500	100	106T	9.59	9.62	
		5600	120	106T	9.97	9.95	
		5720	144	106T	9.53	9.53	
3		5745	149	106T	9.43	9.46	
		5785	157	106T	9.62	9.60	
		5825	165	106T	9.97	9.92	

20MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	N/A	N/A
1		5180	36	242T	9.89		
		5200	40	242T	9.95		
		5240	48	242T	9.97		
2A		5260	52	242T	9.95		
		5280	56	242T	9.75		
		5320	64	242T	9.68		
2C		5500	100	242T	9.77		
		5600	120	242T	9.98		
		5720	144	242T	9.72		
3		5745	149	242T	9.69		
		5785	157	242T	9.75		
		5825	165	242T	9.77		

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX H: Page 7 of 9

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	8	17
1		5190	38	26T	9.03	9.54	9.22
		5230	46	26T	9.37	9.61	9.34
2A		5270	54	26T	9.37	9.79	9.40
		5310	62	26T	9.04	9.48	9.16
2C		5510	102	26T	9.01	9.43	9.15
		5590	118	26T	9.25	9.74	9.44
		5710	142	26T	9.01	9.28	9.05
3		5755	151	26T	9.02	9.39	9.11
		5795	159	26T	9.32	9.65	9.30

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	40	44
1		5190	38	52T	9.17	9.57	9.40
		5230	46	52T	9.39	9.75	9.39
2A		5270	54	52T	9.58	9.83	9.46
		5310	62	52T	9.25	9.60	9.18
2C		5510	102	52T	9.14	9.46	9.28
		5590	118	52T	9.53	9.83	9.56
		5710	142	52T	9.08	9.33	9.04
3		5755	151	52T	9.09	9.50	9.15
		5795	159	52T	9.36	9.73	9.36

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	54	56
1		5190	38	106T	9.35	9.62	9.49
		5230	46	106T	9.59	9.84	9.64
2A		5270	54	106T	9.71	9.93	9.61
		5310	62	106T	9.53	9.66	9.41
2C		5510	102	106T	9.34	9.61	9.43
		5590	118	106T	9.70	9.90	9.74
		5710	142	106T	9.10	9.40	9.31
3		5755	151	106T	9.37	9.53	9.41
		5795	159	106T	9.64	9.83	9.59

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	62	N/A
1		5190	38	242T	9.48	9.62	
		5230	46	242T	9.73	9.70	
2A		5270	54	242T	9.78	9.80	
		5310	62	242T	9.56	9.47	
2C		5510	102	242T	9.48	9.53	
		5590	118	242T	9.71	9.75	
		5710	142	242T	9.30	9.31	
3		5755	151	242T	9.37	9.53	
		5795	159	242T	9.73	9.63	

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					65	N/A	N/A
1		5190	38	484T	9.56		
		5230	46	484T	9.73		
2A		5270	54	484T	9.77		
		5310	62	484T	9.54		
2C		5510	102	484T	9.50		
		5590	118	484T	9.76		
		5710	142	484T	9.28		
3		5755	151	484T	9.44		
		5795	159	484T	9.69		

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX H: Page 8 of 9

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	18	36
	1	5210	42	26T	9.03	9.59	9.37
	2A	5290	58	26T	8.86	9.01	8.70
	2C	5530	106	26T	9.03	9.26	9.10
		5610	122	26T	9.35	9.73	9.45
		5690	138	26T	8.75	9.09	9.05
	3	5775	155	26T	8.92	9.18	9.06

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	44	52
	1	5210	42	52T	9.19	9.66	9.53
	2A	5290	58	52T	8.86	9.03	8.84
	2C	5530	106	52T	9.02	9.33	9.30
		5610	122	52T	9.47	9.85	9.64
		5690	138	52T	8.80	9.16	9.16
	3	5775	155	52T	9.01	9.43	9.18

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	56	60
	1	5210	42	106T	9.27	9.73	9.50
	2A	5290	58	106T	9.06	9.22	9.02
	2C	5530	106	106T	9.16	9.40	9.32
		5610	122	106T	9.63	9.85	9.68
		5690	138	106T	9.02	9.18	9.18
	3	5775	155	106T	9.17	9.47	9.28

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	62	64
	1	5210	42	242T	9.41	9.70	9.72
	2A	5290	58	242T	9.05	9.19	9.01
	2C	5530	106	242T	9.21	9.43	9.42
		5610	122	242T	9.71	9.86	9.81
		5690	138	242T	9.07	9.27	9.35
	3	5775	155	242T	9.35	9.51	9.38

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					65	66	N/A
	1	5210	42	484T	9.62	9.98	
	2A	5290	58	484T	9.21	9.79	
	2C	5530	106	484T	9.32	9.79	
		5610	122	484T	9.77	9.96	
		5690	138	484T	9.14	9.79	
	3	5775	155	484T	9.41	9.80	

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					67	N/A	N/A
	1	5210	42	996T	9.51		
	2A	5290	58	996T	9.02		
	2C	5530	106	996T	9.22		
		5610	122	996T	9.66		
		5690	138	996T	9.16		
	3	5775	155	996T	9.32		

FCC ID: ZNFV600VM		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Test Dates: 12/02/19 - 02/17/20	DUT Type: Portable Handset			APPENDIX H: Page 9 of 9

APPENDIX I: PROBE CALIBRATION



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 **PC Test**

Certificate No: **D750V3-1161_Oct18**

CALIBRATION CERTIFICATE

Object **D750V3 - SN:1161**

Calibration procedure(s) **QA CAL-05.v10**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **October 19, 2018**

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

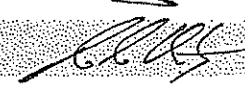
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by: **Manu Seitz** **Laboratory Technician** 

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

Issued: October 22, 2018

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "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"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	40.8 $\pm$ 6 %	0.89 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.03 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.26 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	55.1 $\pm$ 6 %	0.96 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.43 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.39 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.55 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.6 Ω - 1.9 j Ω
Return Loss	- 25.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.6 Ω - 4.2 j Ω
Return Loss	- 27.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.032 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 19, 2015

DASY5 Validation Report for Head TSL

Date: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.89 \text{ S/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22) @ 750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

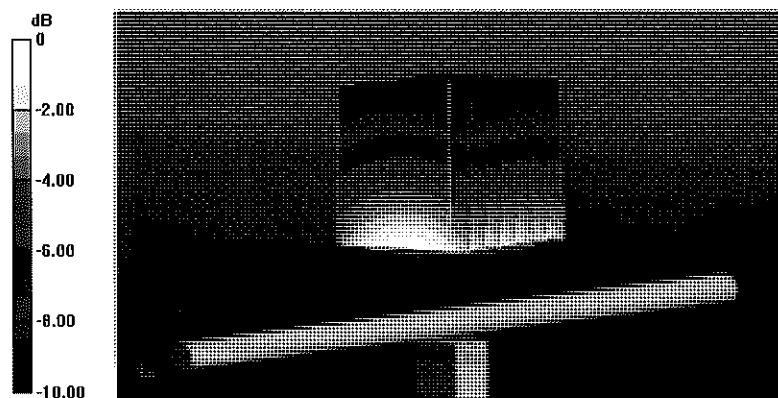
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 58.51 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.04 W/kg

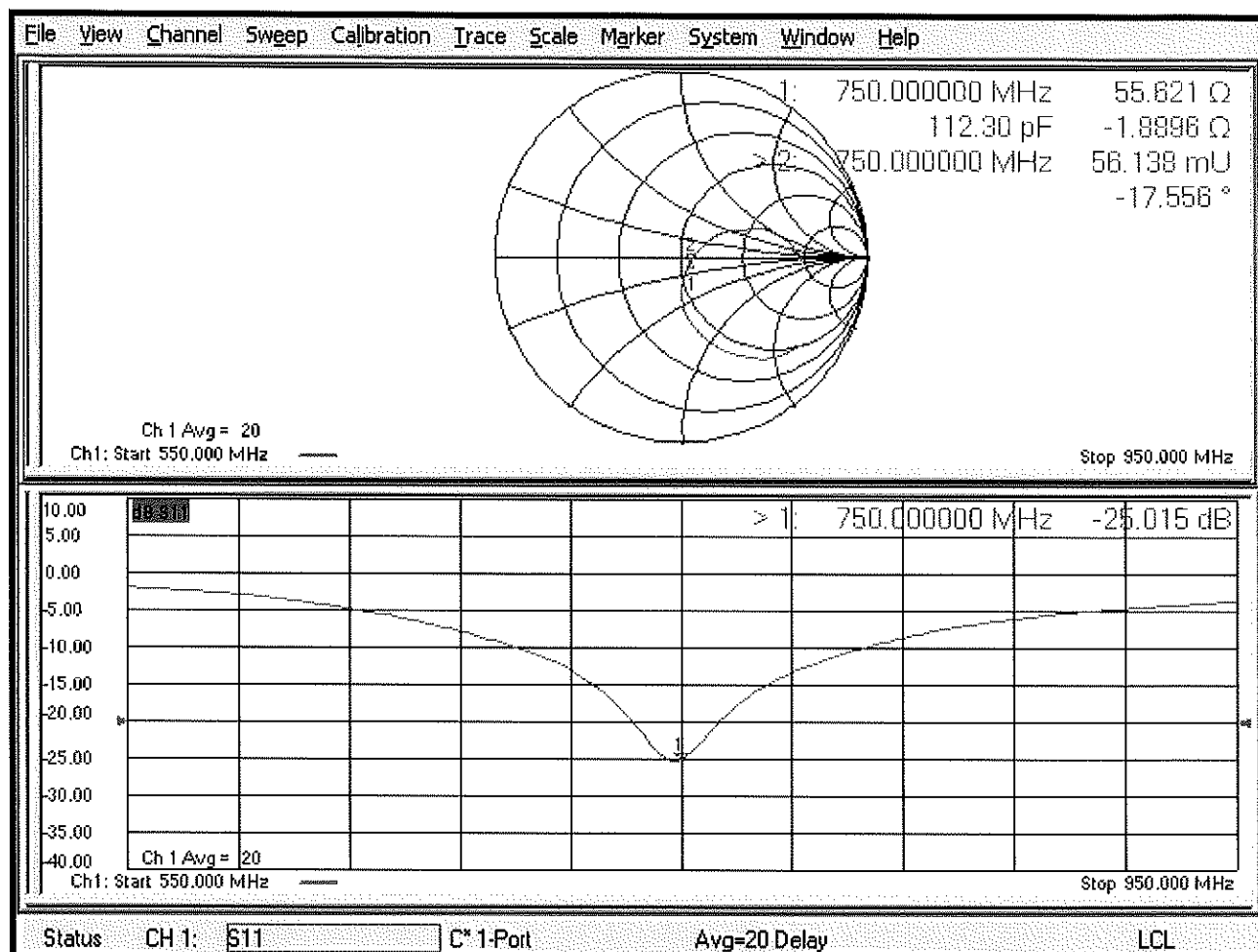
SAR(1 g) = 2.02 W/kg; SAR(10 g) = 1.32 W/kg

Maximum value of SAR (measured) = 2.70 W/kg



0 dB = 2.70 W/kg = 4.31 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.96 \text{ S/m}$; $\epsilon_r = 55.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.19, 10.19, 10.19) @ 750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

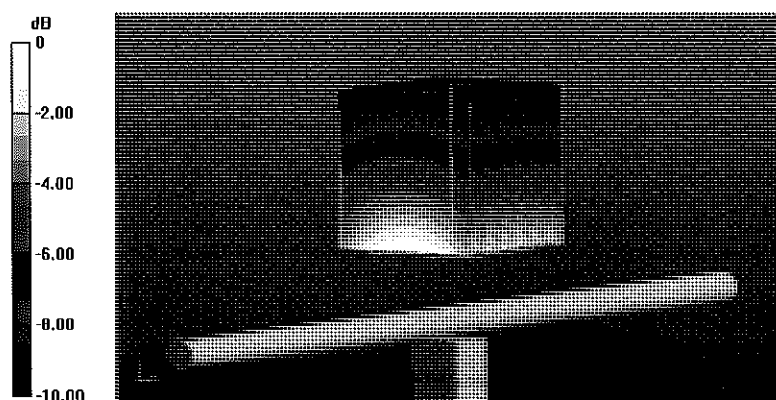
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 57.57 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.18 W/kg

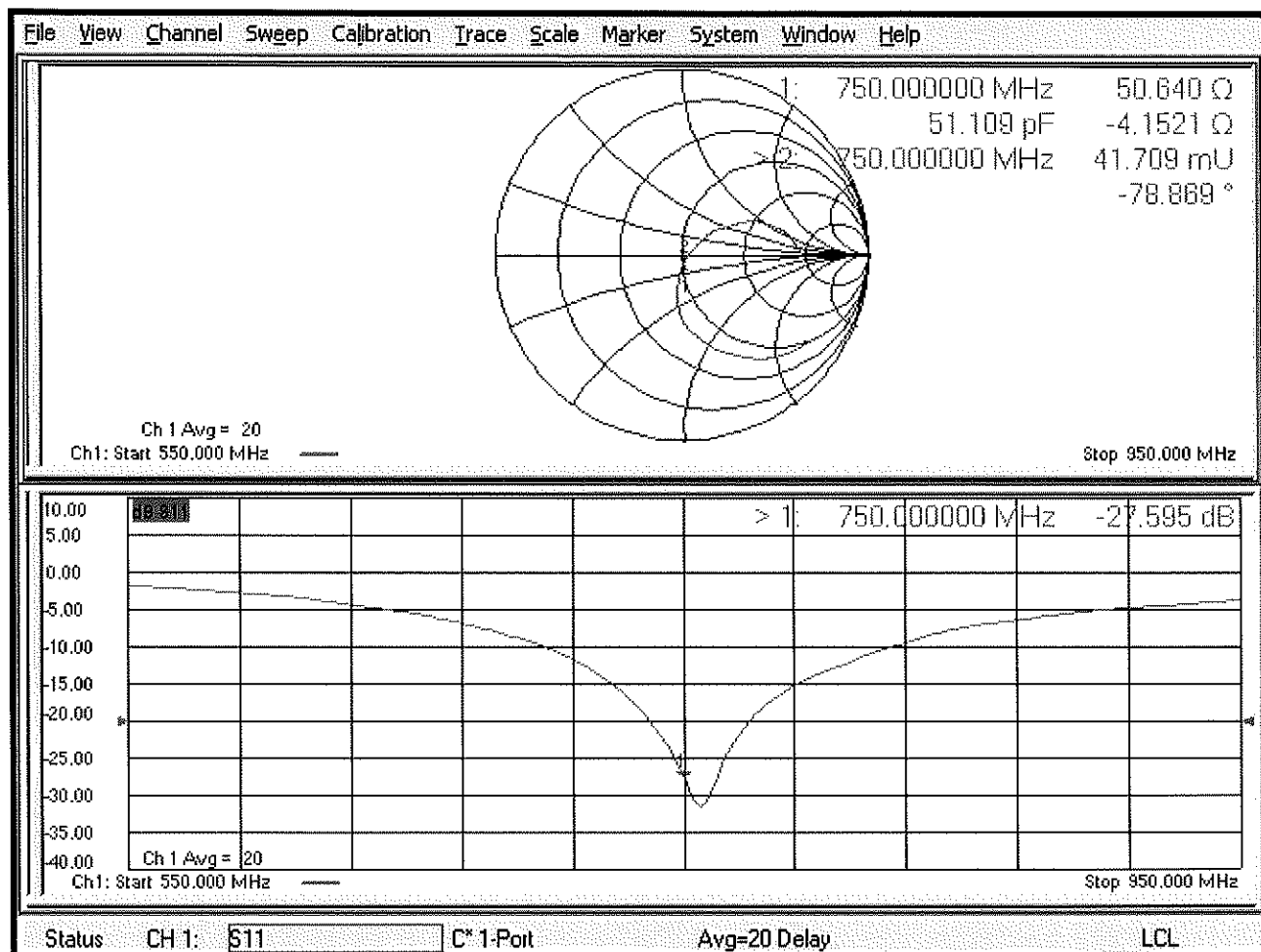
SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.39 W/kg

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



0 dB = 2.83 W/kg = 4.52 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object D750V3 – SN:1161

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extended Calibration date: October 18, 2019

Description: SAR Validation Dipole at 750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	6/29/2019	Biennial	6/29/2021	192291470
Control Company	4352	Ultra Long Stem Thermometer	8/2/2018	Biennial	8/2/2020	181334684
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	10/11/2019	Annual	10/11/2020	101307
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/13/2019	Annual	8/13/2020	1041
Anritsu	MA2411B	Pulse Power Sensor	8/14/2019	Annual	8/14/2020	1315051
Anritsu	MA2411B	Pulse Power Sensor	8/8/2019	Annual	8/8/2020	1339008
Anritsu	ML2495A	Power Meter	11/20/2018	Annual	11/20/2019	1039008
Agilent	N5182A	MXG Vector Signal Generator	8/19/2019	Annual	8/19/2020	MY47420837
Seekonk	NC-100	Torque Wrench	5/9/2018	Biennial	5/9/2020	22217
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
MiniCircuits	ZHDC-16-63-S+	Bidirectional Coupler	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
SPEAG	EX3DV4	SAR Probe	4/24/2019	Annual	4/24/2020	7357
SPEAG	EX3DV4	SAR Probe	7/16/2019	Annual	7/16/2020	7410
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2019	Annual	7/11/2020	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/18/2019	Annual	4/18/2020	1407

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

Measurement Uncertainty = $\pm 23\%$ (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halfoster	Team Lead Engineer	<i>BRODIE HALFOSTER</i>
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	<i>KOK</i>

DIPOLE CALIBRATION EXTENSION

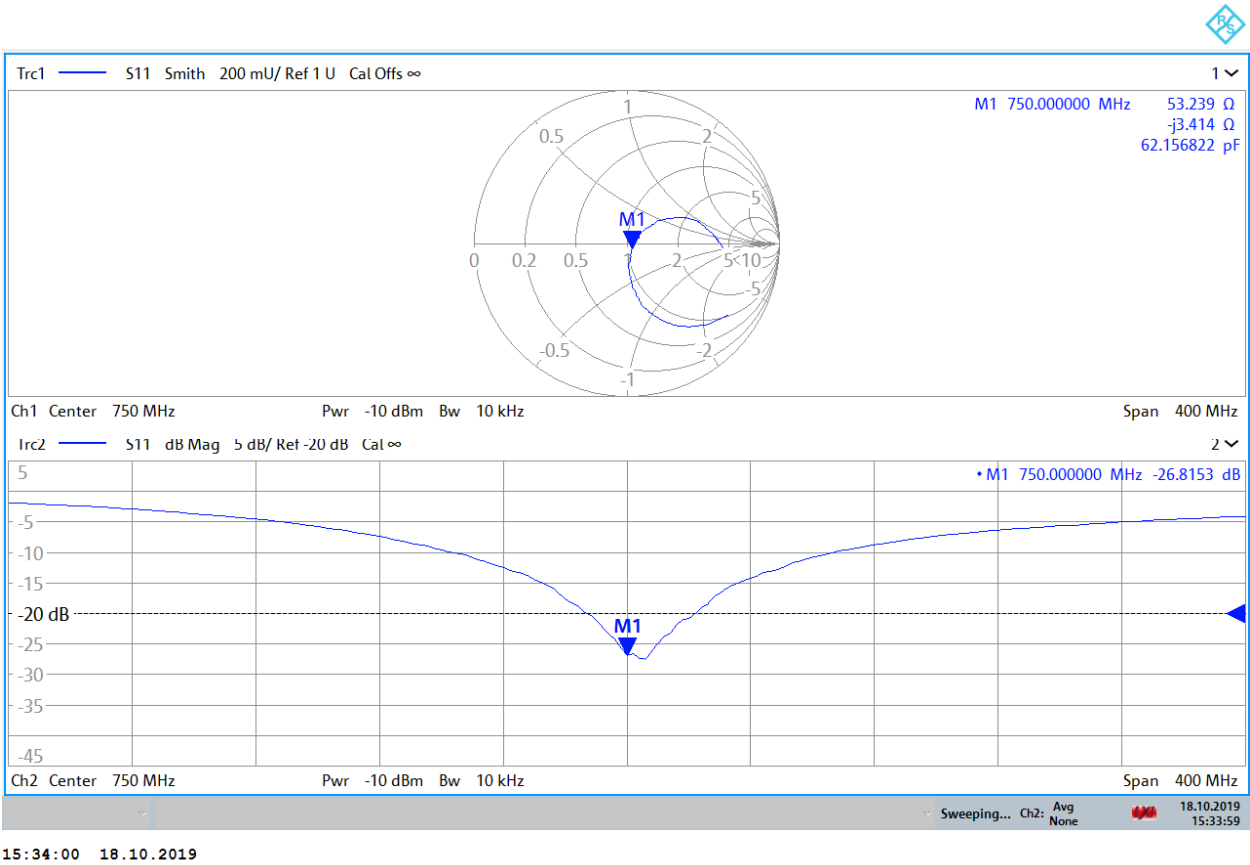
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

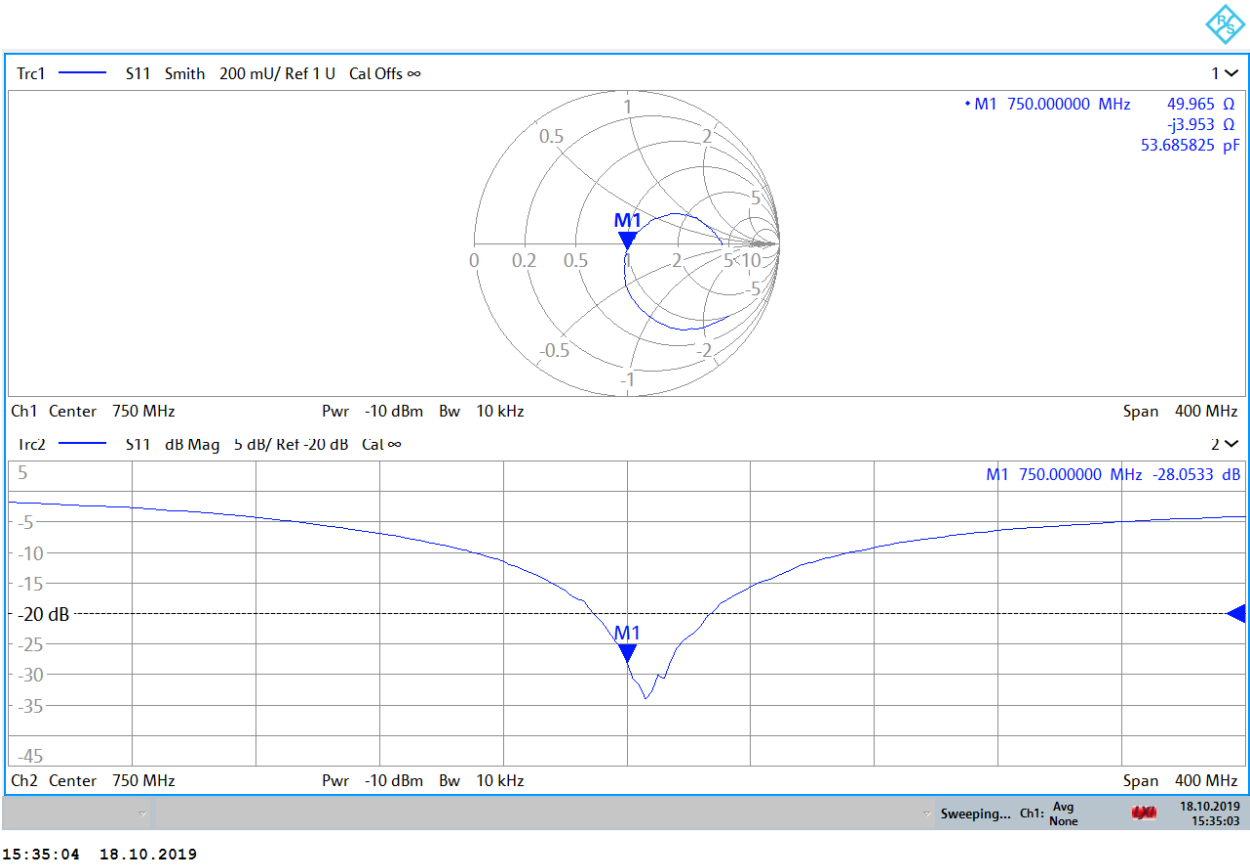
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Measured Head SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	Measured Head SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
10/19/2018	10/18/2019	1.032	1.61	1.64	2.12%	1.05	1.08	2.86%	55.6	53.2	2.4	-1.9	-3.4	1.5	-25	-25.8	-7.30%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
10/19/2018	10/18/2019	1.032	1.69	1.76	4.39%	1.11	1.17	5.41%	50.6	50	0.6	-4.2	-4	0.2	-27.6	-28.1	-1.80%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL



Impedance & Return-Loss Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D835V2-4d047_Mar19**

CALIBRATION CERTIFICATE

Object **D835V2 - SN:4d047**

Calibration procedure(s) **QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz**

Calibration date: **March 13, 2019**

BN ✓
04-12-2019

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	07-Oct-15 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by:	Name Manu Seitz	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 13, 2019

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Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "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"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.9 $\pm$ 6 %	0.91 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.42 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.13 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	54.3 $\pm$ 6 %	1.01 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.47 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.27 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω - 2.6 j Ω
Return Loss	- 30.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.8 Ω - 6.1 j Ω
Return Loss	- 22.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.387 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 13.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d047

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.91 \text{ S/m}$; $\epsilon_r = 41.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10, 10, 10) @ 835 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

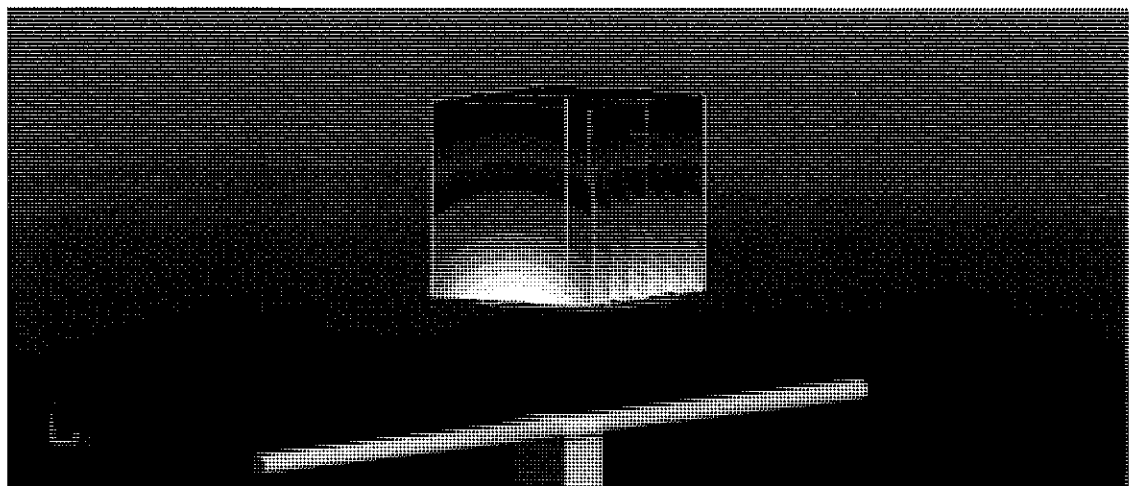
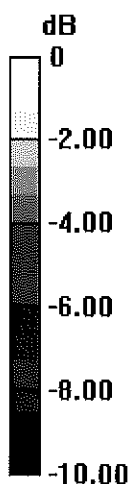
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 62.48 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 3.60 W/kg

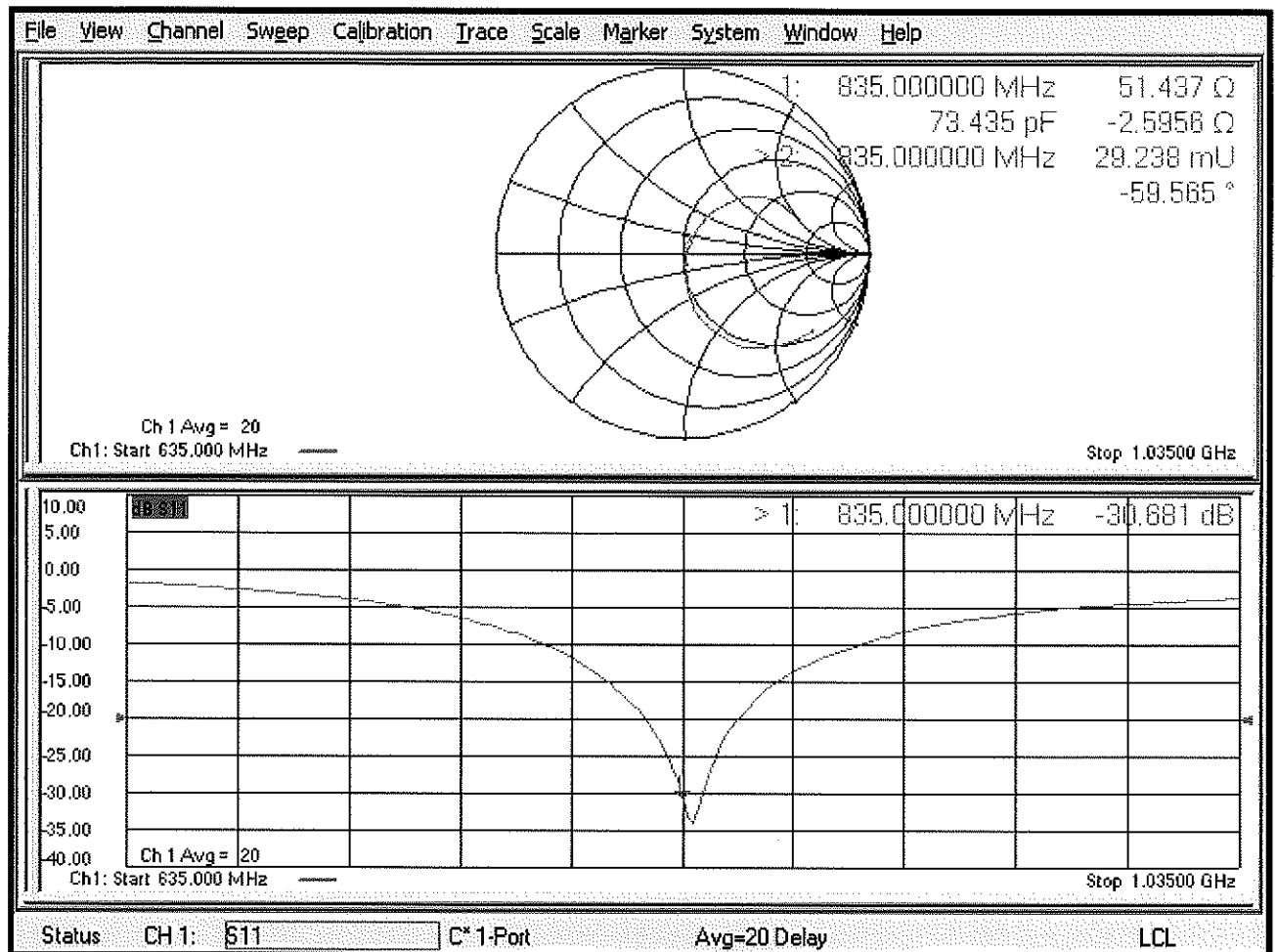
SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.54 W/kg

Maximum value of SAR (measured) = 3.18 W/kg



0 dB = 3.18 W/kg = 5.02 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d047

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1.01 \text{ S/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.15, 10.15, 10.15) @ 835 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

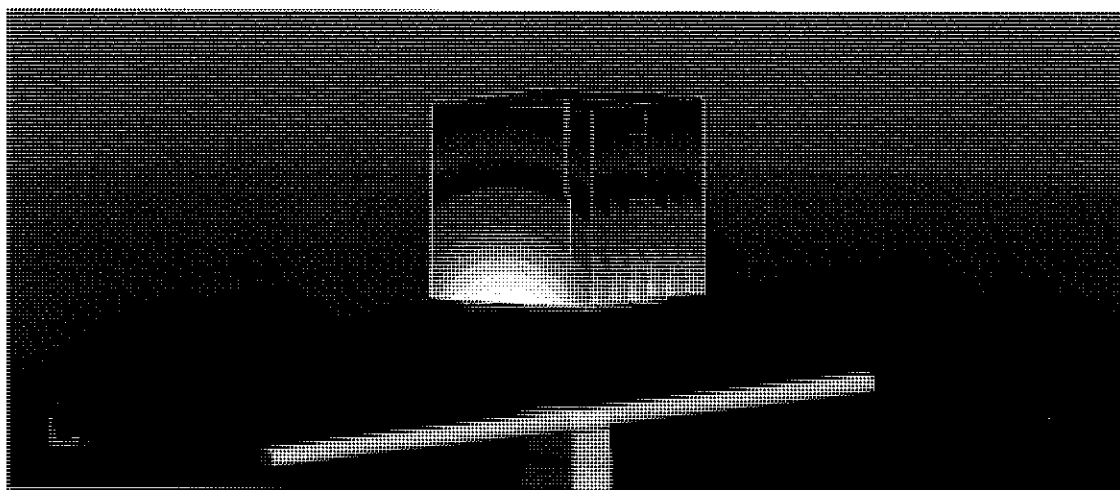
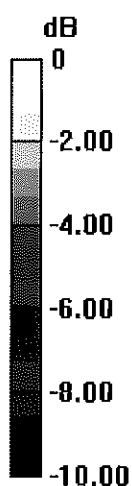
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 60.49 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.58 W/kg

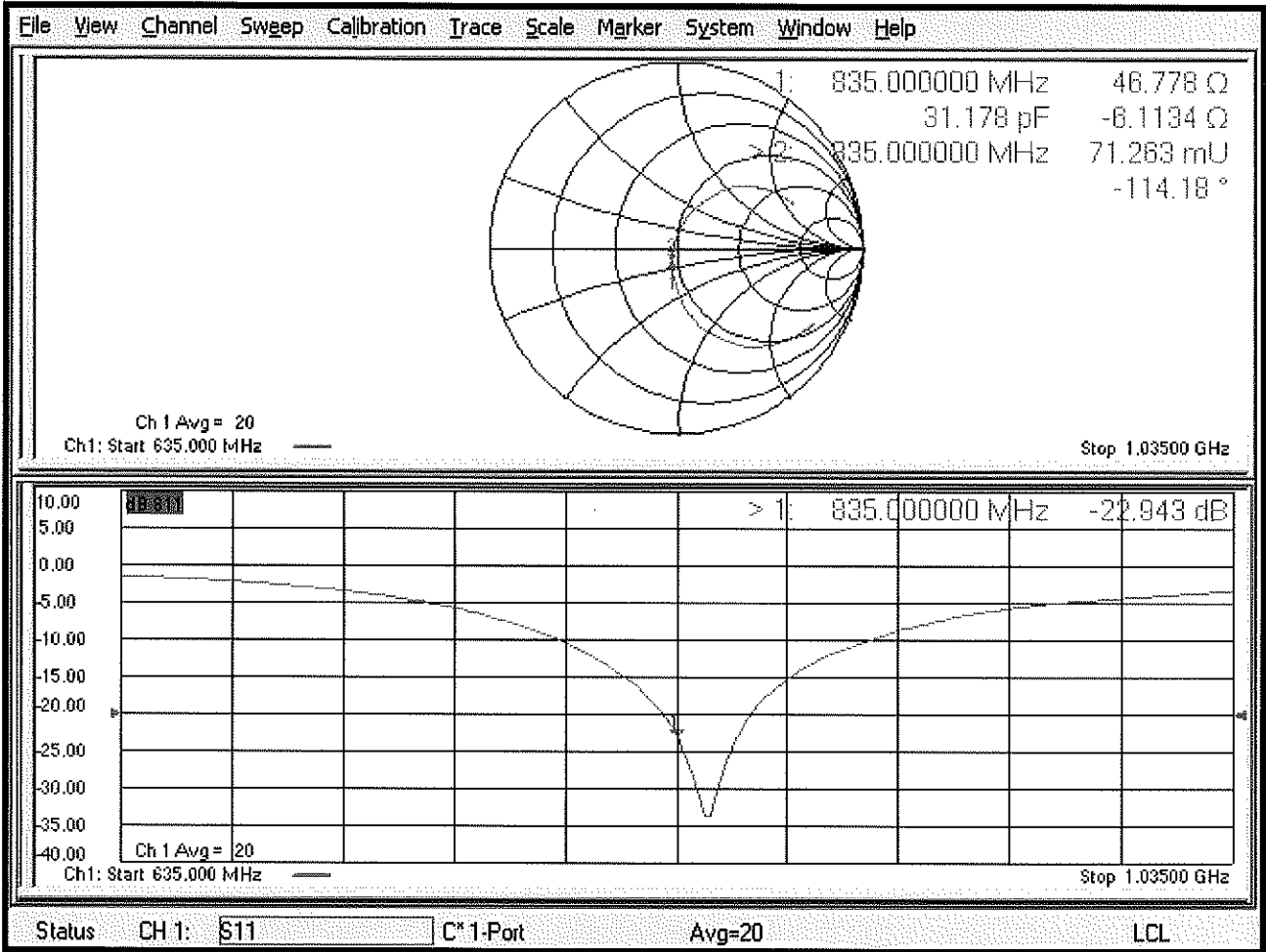
SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.61 W/kg

Maximum value of SAR (measured) = 3.23 W/kg



0 dB = 3.23 W/kg = 5.09 dBW/kg

Impedance Measurement Plot for Body TSL





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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D1750V2-1150_Oct18**

CALIBRATION CERTIFICATE

Object **D1750V2 - SN:1150**

Calibration procedure(s) **QA CAL-05.v10**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **October 22, 2018**

BNV
10/30/2018
BNV
10-20-2019

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by:	Name Michael Weber	Function Laboratory Technician	Signature <i>M. Weber</i>
Approved by:	Katja Pokovic	Technical Manager	<i>K. Pokovic</i>

Issued: October 22, 2018

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "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"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.8 $\pm$ 6 %	1.33 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.5 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.2 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	53.5 $\pm$ 6 %	1.46 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.04 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	36.6 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.82 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	19.4 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.9 Ω - 0.4 j Ω
Return Loss	- 40.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6 Ω - 0.1 j Ω
Return Loss	- 29.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.217 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 10, 2015

DASY5 Validation Report for Head TSL

Date: 22.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1150

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.33$ S/m; $\epsilon_r = 38.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

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

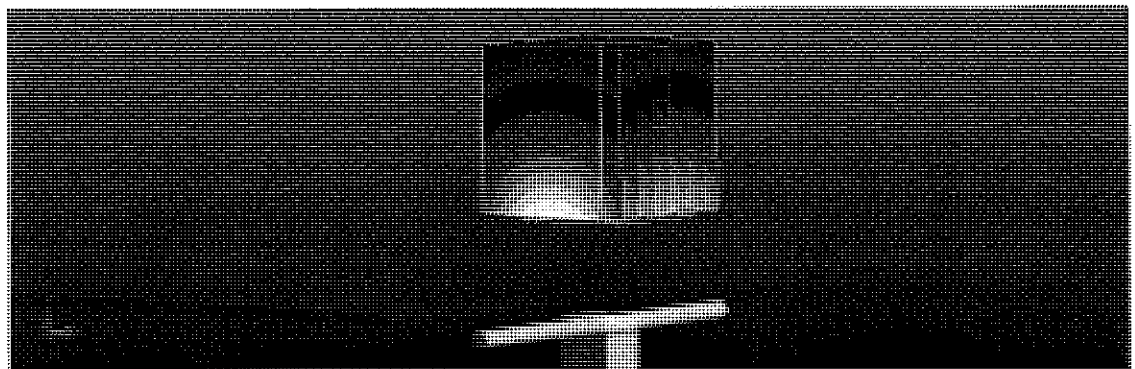
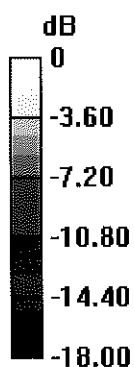
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 108.1 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 16.7 W/kg

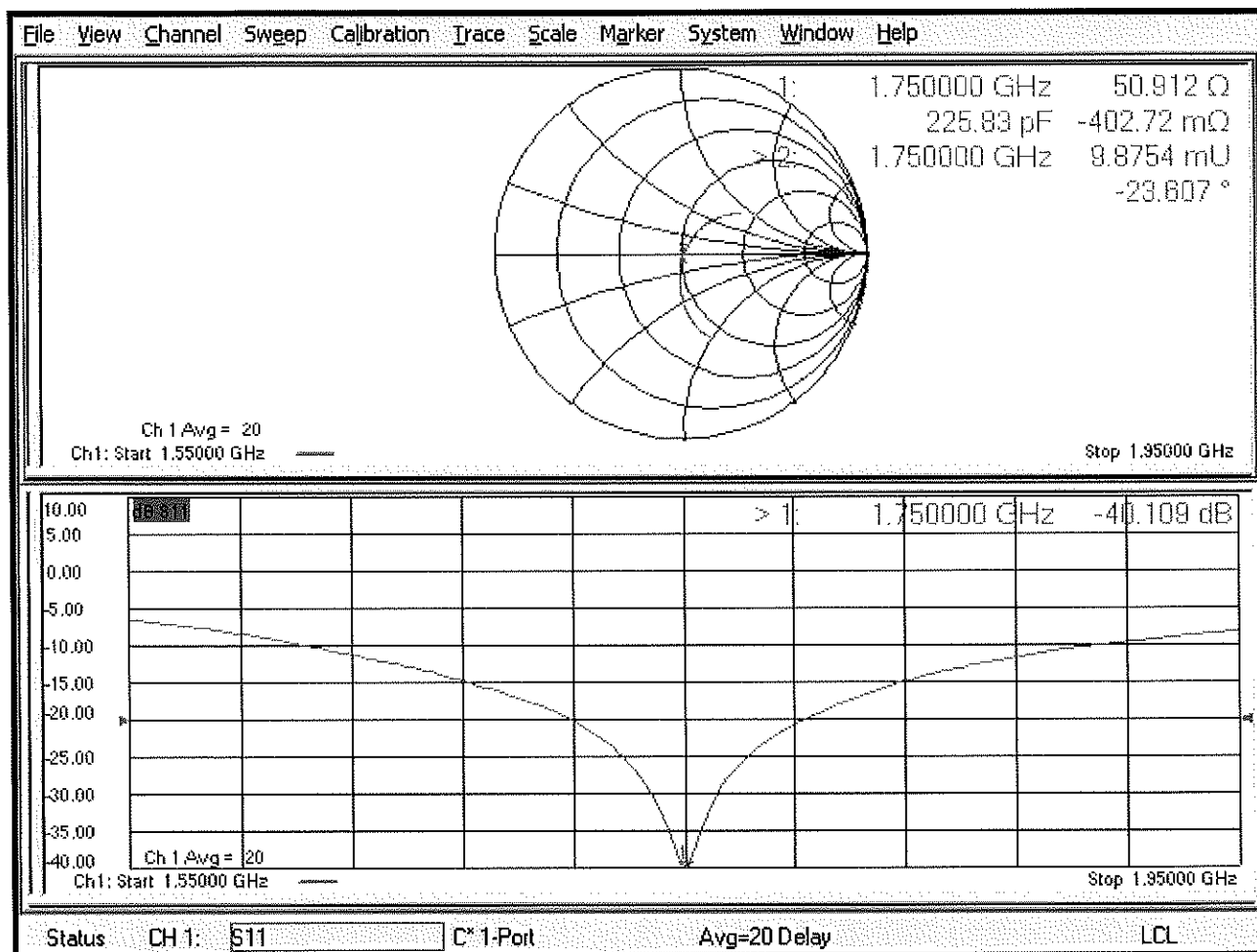
SAR(1 g) = 9.02 W/kg; SAR(10 g) = 4.76 W/kg

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



0 dB = 14.0 W/kg = 11.46 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1150

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.46$ S/m; $\epsilon_r = 53.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.35, 8.35, 8.35) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

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

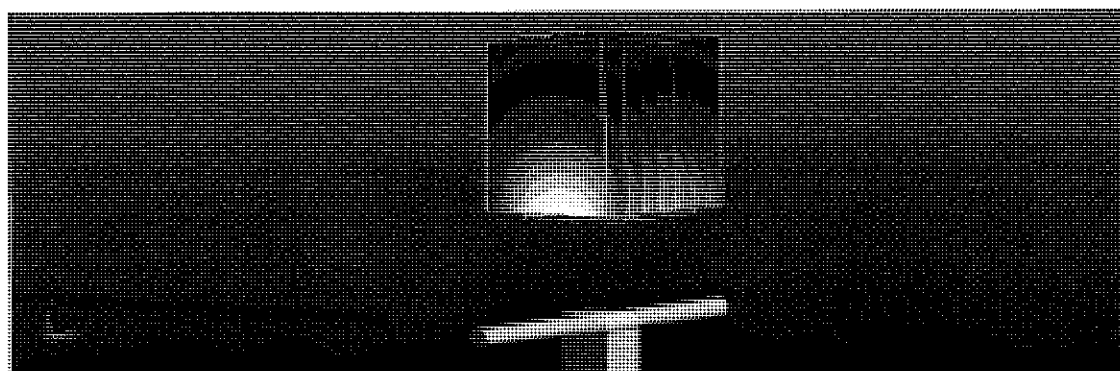
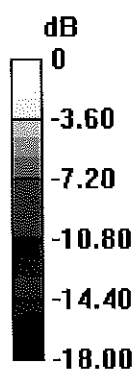
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.1 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 16.0 W/kg

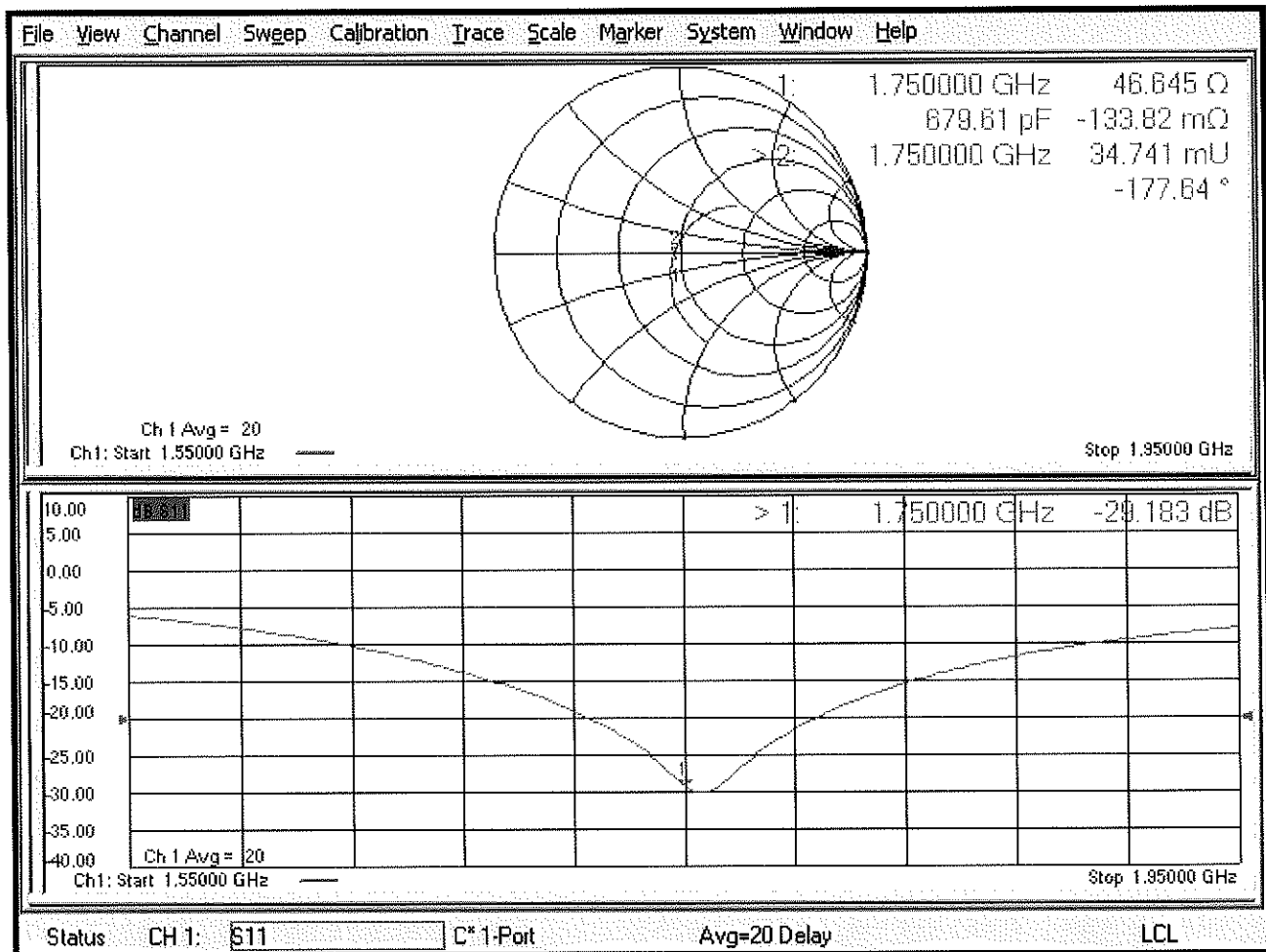
SAR(1 g) = 9.04 W/kg; SAR(10 g) = 4.82 W/kg

Maximum value of SAR (measured) = 13.6 W/kg



0 dB = 13.6 W/kg = 11.34 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object D1750V2 – SN:1150

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extended Calibration date: October 18, 2019

Description: SAR Validation Dipole at 1750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	6/29/2019	Biennial	6/29/2021	192291470
Control Company	4352	Ultra Long Stem Thermometer	8/2/2018	Biennial	8/2/2020	181334684
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	10/11/2019	Annual	10/11/2020	101307
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/13/2019	Annual	8/13/2020	1041
Anritsu	MA2411B	Pulse Power Sensor	8/14/2019	Annual	8/14/2020	1315051
Anritsu	MA2411B	Pulse Power Sensor	8/8/2019	Annual	8/8/2020	1339008
Anritsu	ML2495A	Power Meter	11/20/2018	Annual	11/20/2019	1039008
Agilent	N5182A	MXG Vector Signal Generator	8/19/2019	Annual	8/19/2020	MY47420837
Seekonk	NC-100	Torque Wrench	5/9/2018	Biennial	5/9/2020	22217
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
MiniCircuits	ZHDC-16-63-S+	Bidirectional Coupler	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
SPEAG	EX3DV4	SAR Probe	8/16/2019	Annual	8/16/2020	7308
SPEAG	EX3DV4	SAR Probe	4/24/2019	Annual	4/24/2020	7357
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/18/2019	Annual	4/18/2020	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/14/2019	Annual	8/14/2020	1450

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

Measurement Uncertainty = $\pm 23\%$ (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halfoster	Team Lead Engineer	<i>BRODIE HALFOSTER</i>
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	<i>KOK</i>

DIPOLE CALIBRATION EXTENSION

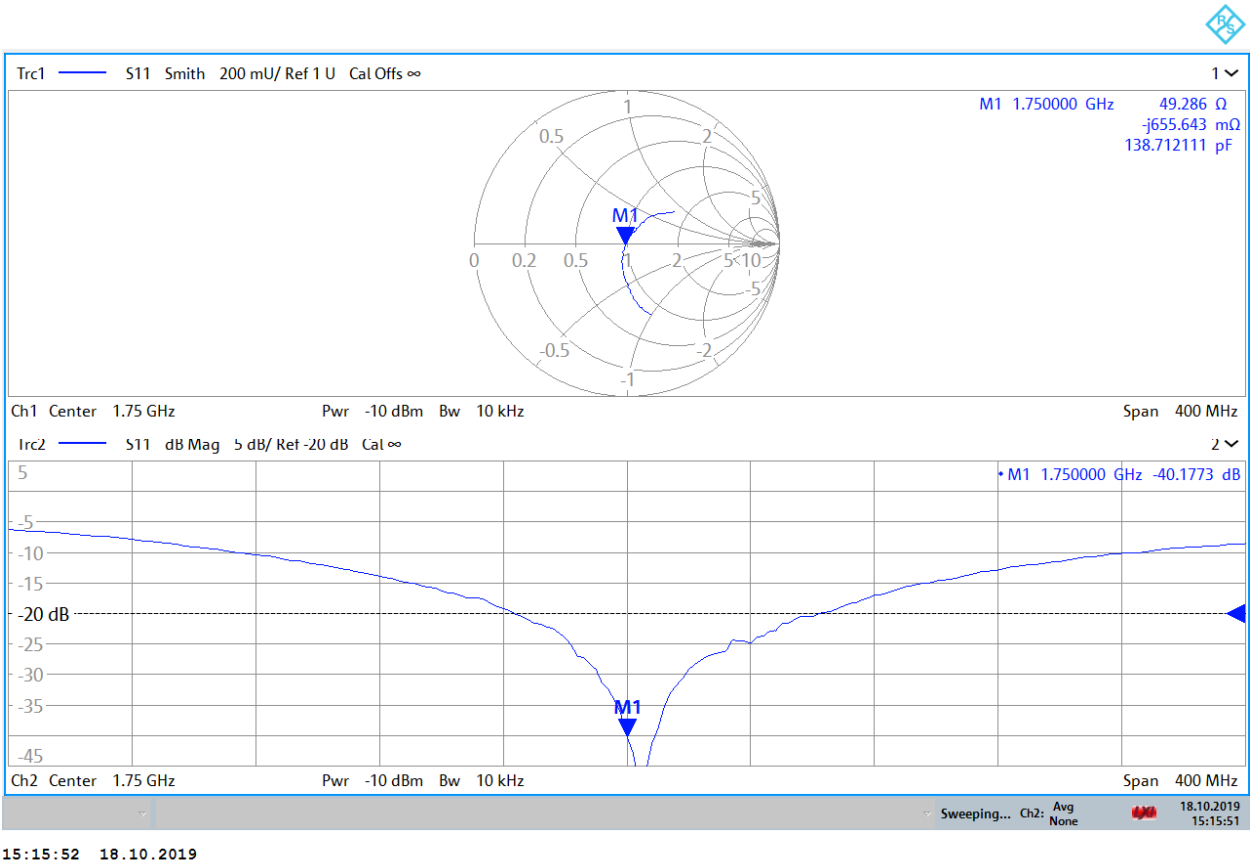
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

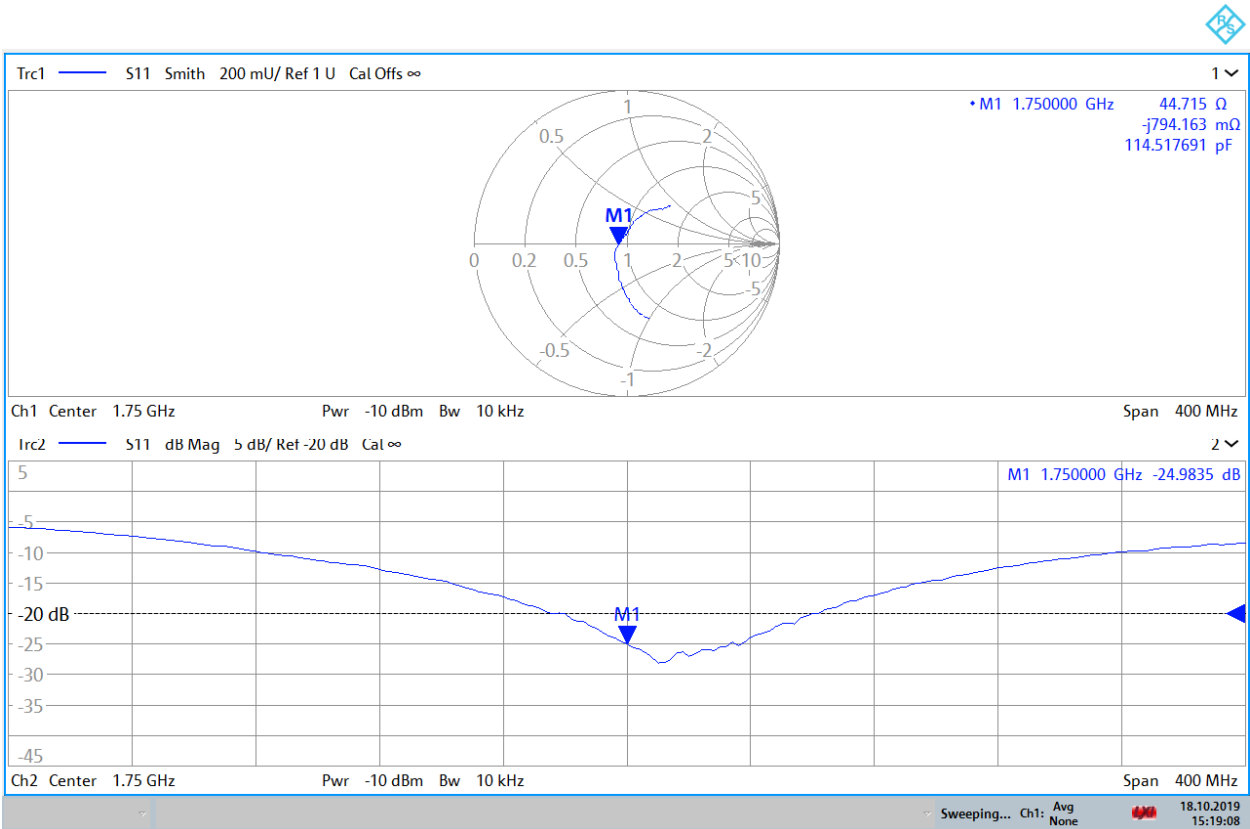
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
10/22/2018	10/18/2019	1.217	3.65	3.8	4.11%	1.92	2	4.17%	50.9	49.3	1.6	0.4	-0.7	1.1	-40.1	-40.2	-0.20%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
10/22/2018	10/18/2019	1.217	3.66	3.82	4.37%	1.94	2.02	4.12%	46.6	44.7	1.9	-0.1	-0.8	0.7	-29.2	-25	14.40%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL



Impedance & Return-Loss Measurement Plot for Body TSL



15:19:09 18.10.2019



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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D1750V2-1148_May19**

CALIBRATION CERTIFICATE

Object **D1750V2 - SN:1148**

Calibration procedure(s) **QA CAL-05.v11**
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: **May 15, 2019**

BNV
05-23-2019

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by:	Name Leif Klysner	Function Laboratory Technician	Signature <i>Leif Klysner</i>
Approved by:	Katja Pokovic	Technical Manager	<i>Katja Pokovic</i>

Issued: May 15, 2019

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "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"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	40.0 $\pm$ 6 %	1.34 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	---	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.0 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.83 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.5 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	53.5 $\pm$ 6 %	1.47 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	---	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.35 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.7 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.93 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	19.8 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω - 0.2 j Ω
Return Loss	- 37.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.4 Ω - 0.5 j Ω
Return Loss	- 31.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.222 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L
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SAR result with SAM Head (Top)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.9 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.3 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.8 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.3 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Neck)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.6 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.9 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Ear)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	7.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	28.7 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	3.98 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	16.0 W/kg ± 16.9 % (k=2)

DASY5 Validation Report for Head TSL

Date: 08.05.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.34$ S/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.59, 8.59, 8.59) @ 1750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

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

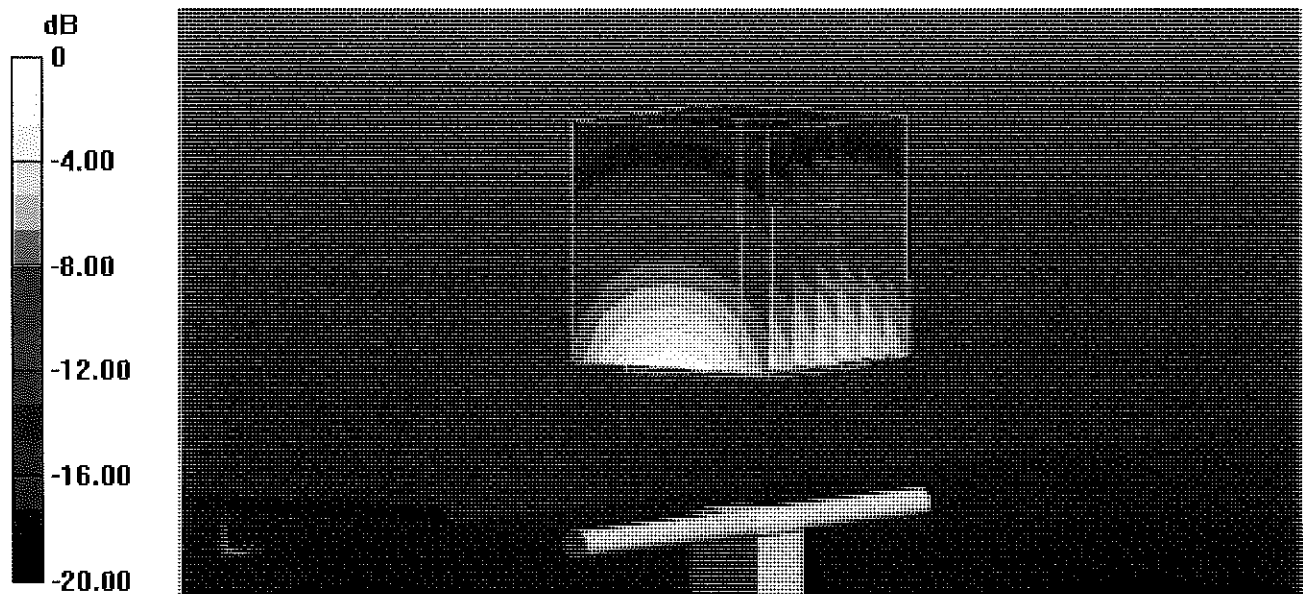
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 107.8 V/m; Power Drift = -0.01 dB

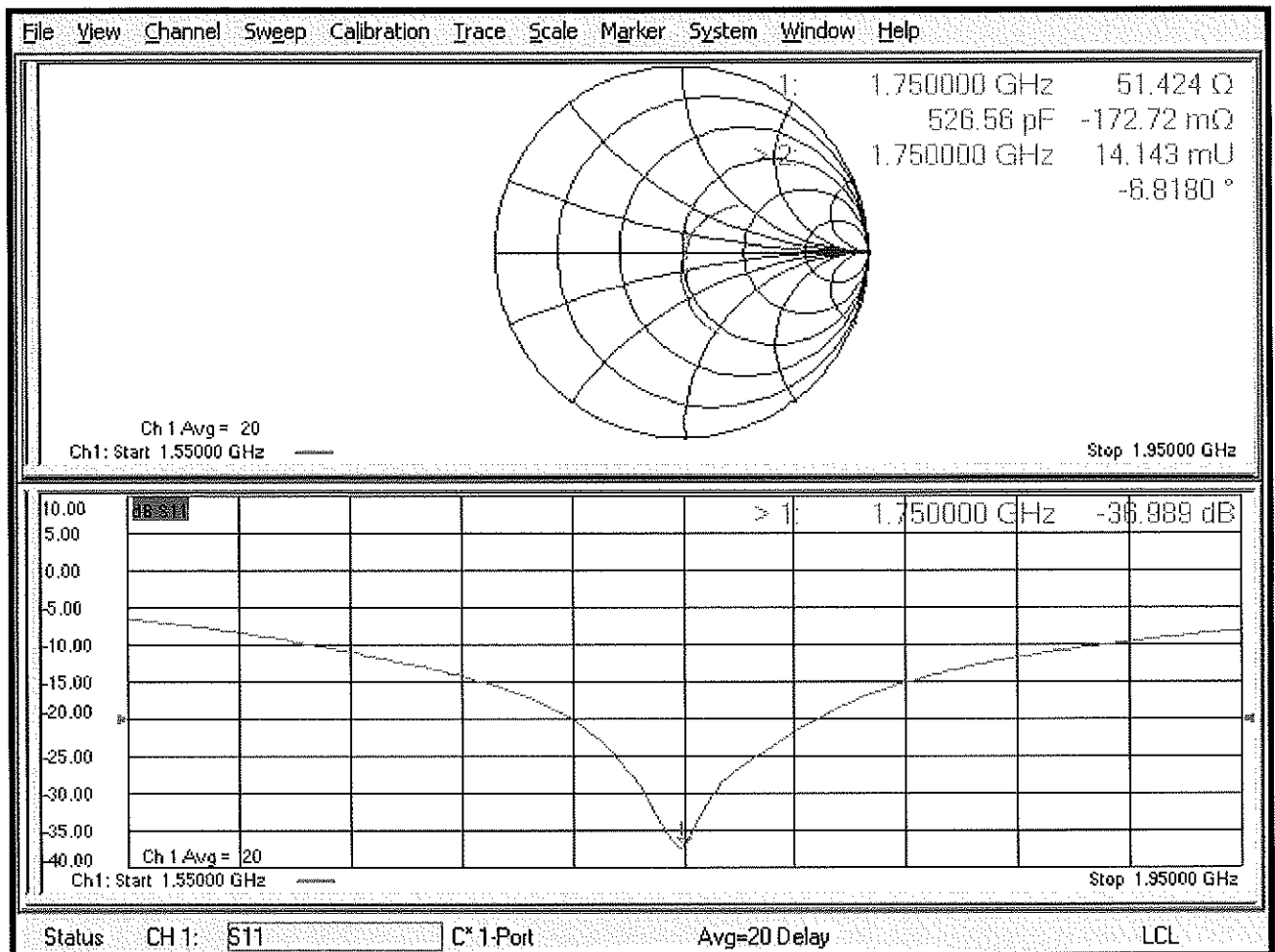
Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 9.13 W/kg; SAR(10 g) = 4.83 W/kg

Maximum value of SAR (measured) = 14.1 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.05.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.47$ S/m; $\epsilon_r = 53.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43) @ 1750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

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

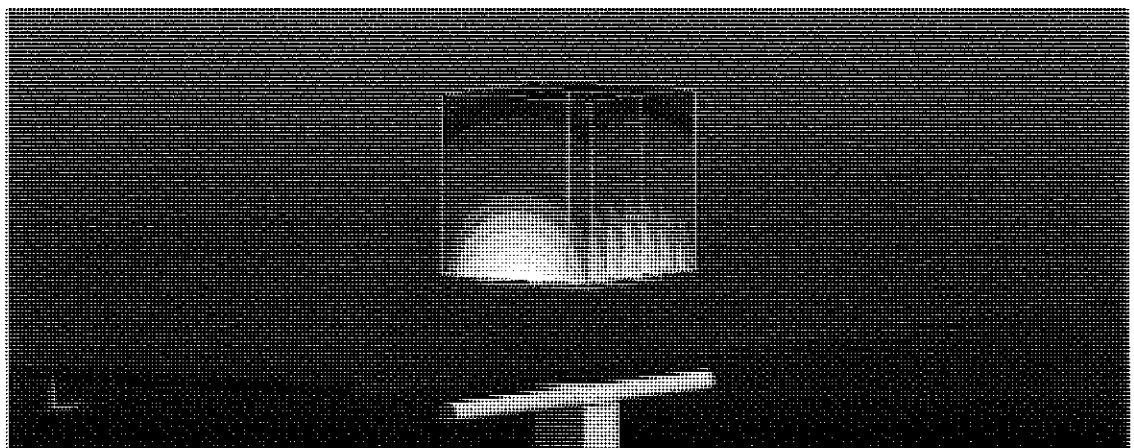
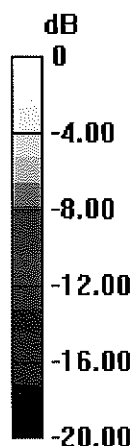
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.1 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 17.2 W/kg

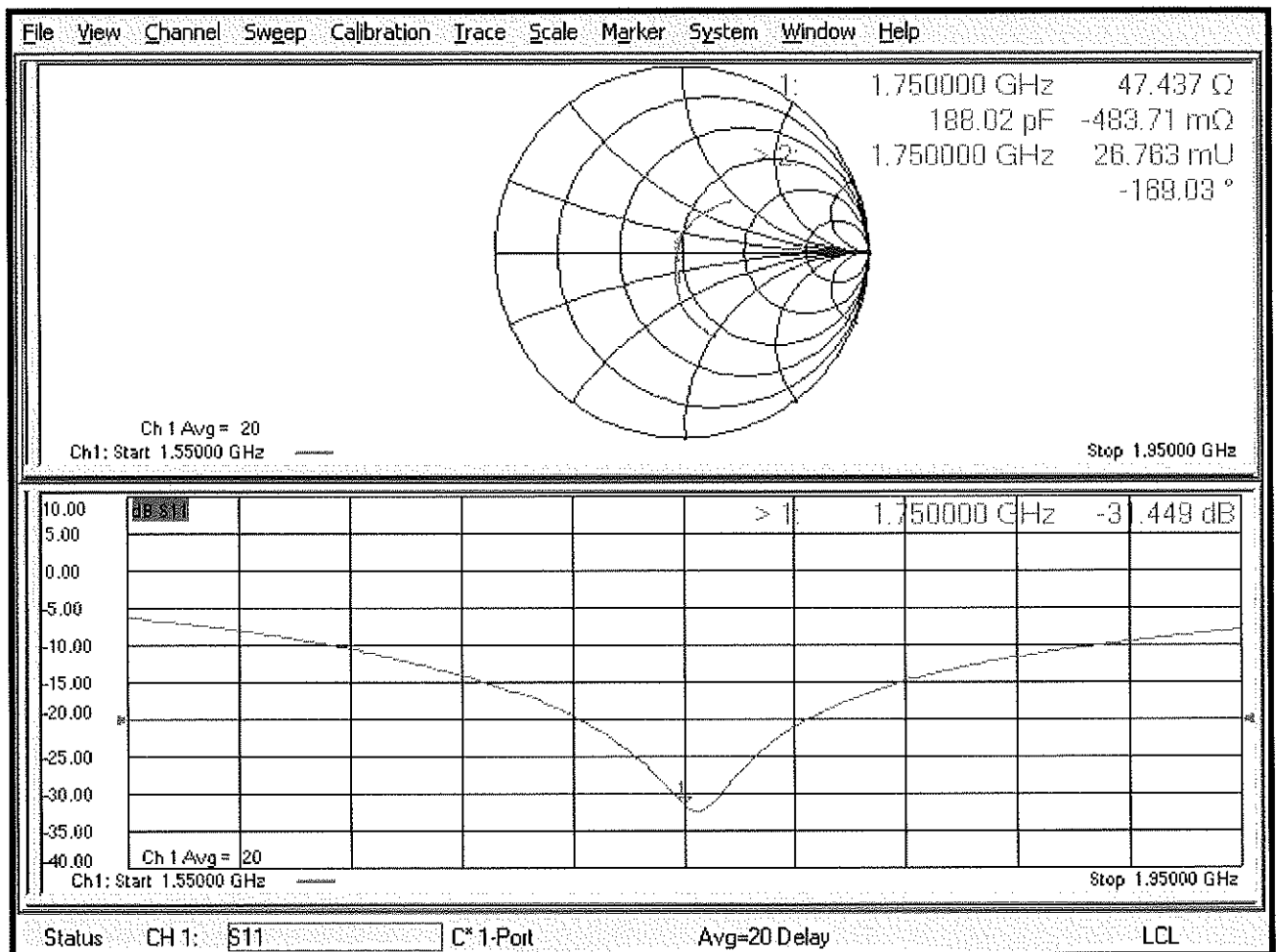
SAR(1 g) = 9.35 W/kg; SAR(10 g) = 4.93 W/kg

Maximum value of SAR (measured) = 14.4 W/kg



0 dB = 14.4 W/kg = 11.58 dBW/kg

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 15.05.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.37$ S/m; $\epsilon_r = 42.1$; $\rho = 1000$ kg/m³

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.59, 8.59, 8.59) @ 1750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: SAM Head
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

SAM Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 107.2 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 9.38 W/kg; SAR(10 g) = 5.04 W/kg

Maximum value of SAR (measured) = 14.2 W/kg

SAM Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.7 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 16.5 W/kg

SAR(1 g) = 9.34 W/kg; SAR(10 g) = 5.04 W/kg

Maximum value of SAR (measured) = 13.9 W/kg

SAM Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.3 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 15.5 W/kg

SAR(1 g) = 9.06 W/kg; SAR(10 g) = 4.95 W/kg

Maximum value of SAR (measured) = 13.1 W/kg

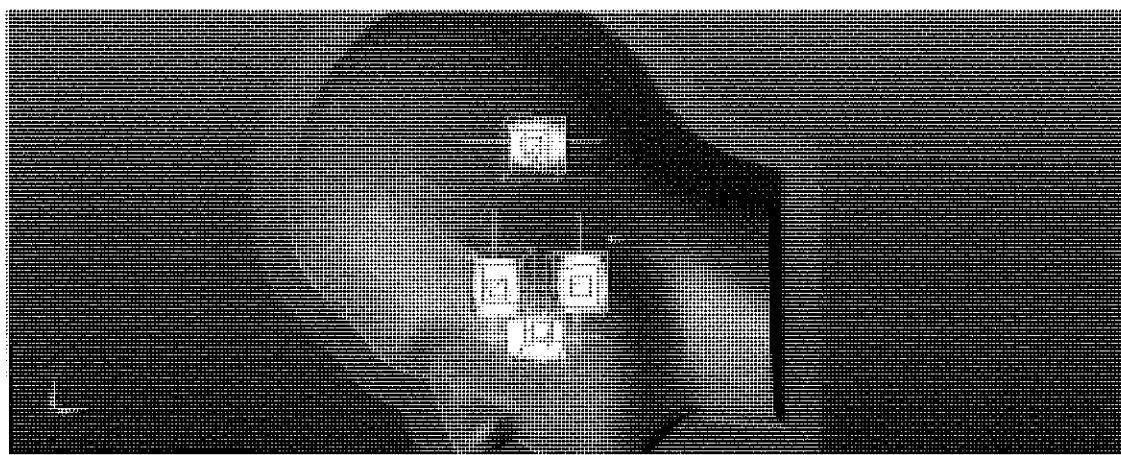
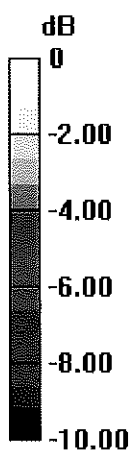
SAM Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.82 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 12.0 W/kg

SAR(1 g) = 7.11 W/kg; SAR(10 g) = 3.98 W/kg

Maximum value of SAR (measured) = 10.2 W/kg



0 dB = 10.2 W/kg = 10.09 dBW/kg



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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D1765V2-1008_May18**

CALIBRATION CERTIFICATE

Object **D1765V2 - SN:1008**

Calibration procedure(s) **QA CAL-05.v10**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **May 23, 2018**

BN ✓
 7/16/2018
 BN ✓
 05/20/2019

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390586	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

Calibrated by:	Name Manu Seitz	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 23, 2018

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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- 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"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.0 $\pm$ 6 %	1.34 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.94 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.2 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.71 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.0 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	53.2 $\pm$ 6 %	1.46 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.4 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.92 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	19.9 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.7 Ω - 6.5 j Ω
Return Loss	- 23.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.3 Ω - 6.0 j Ω
Return Loss	- 20.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.210 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 06, 2005

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L
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SAR result with SAM Head (Top)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.4 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.9 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	38.2 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.4 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Neck)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.4 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.2 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Ear)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	7.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	28.7 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	16.1 W/kg ± 16.9 % (k=2)