

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

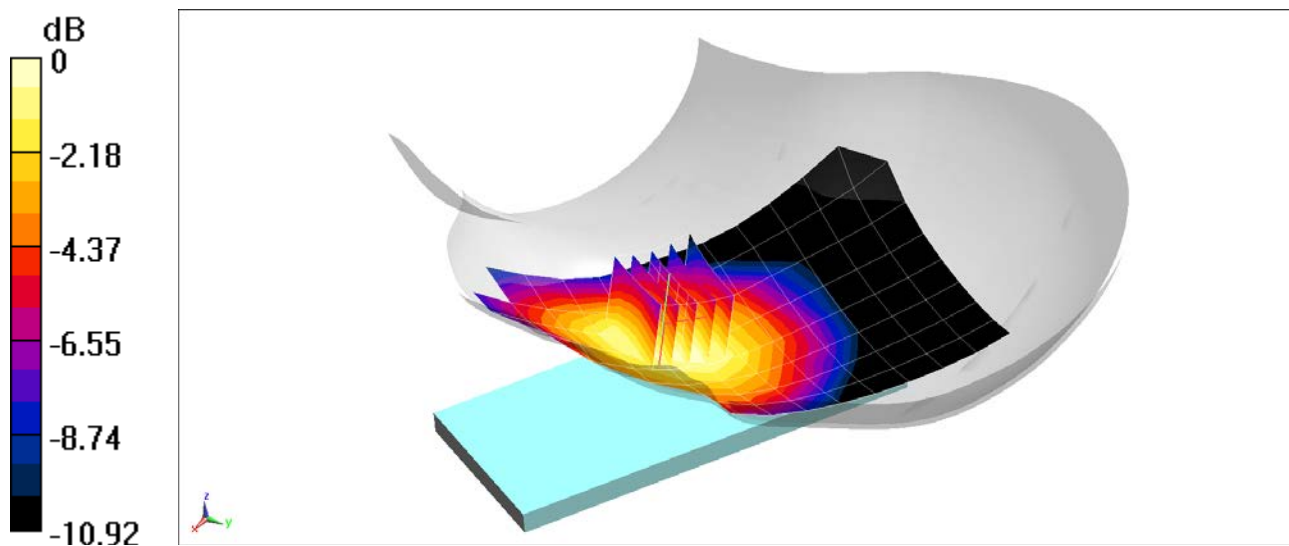
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

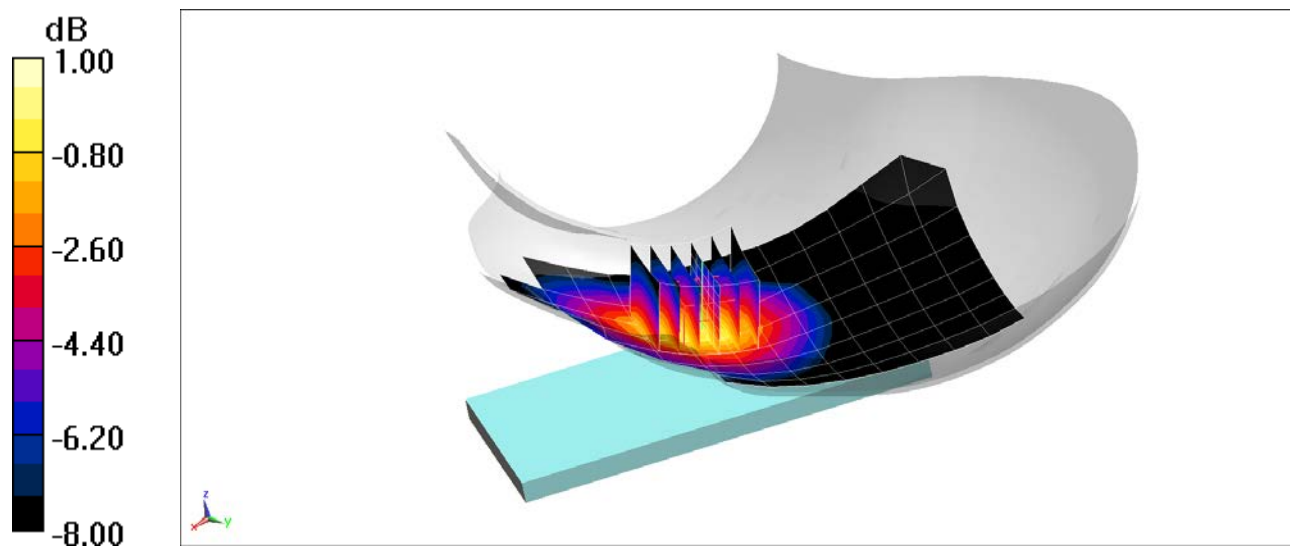
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

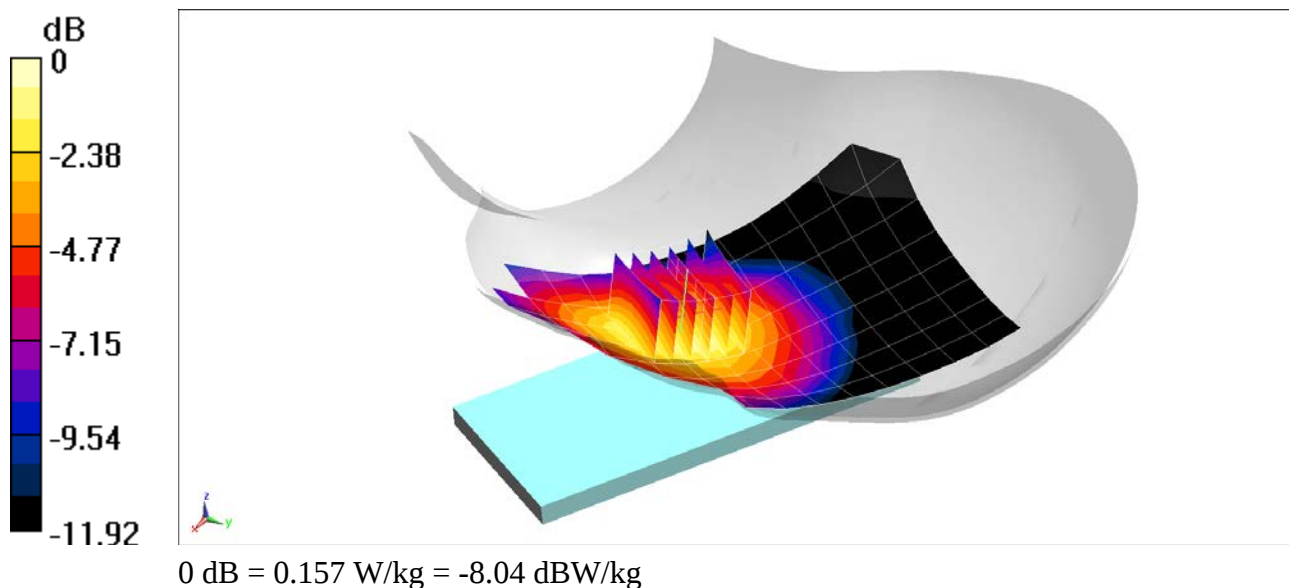
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

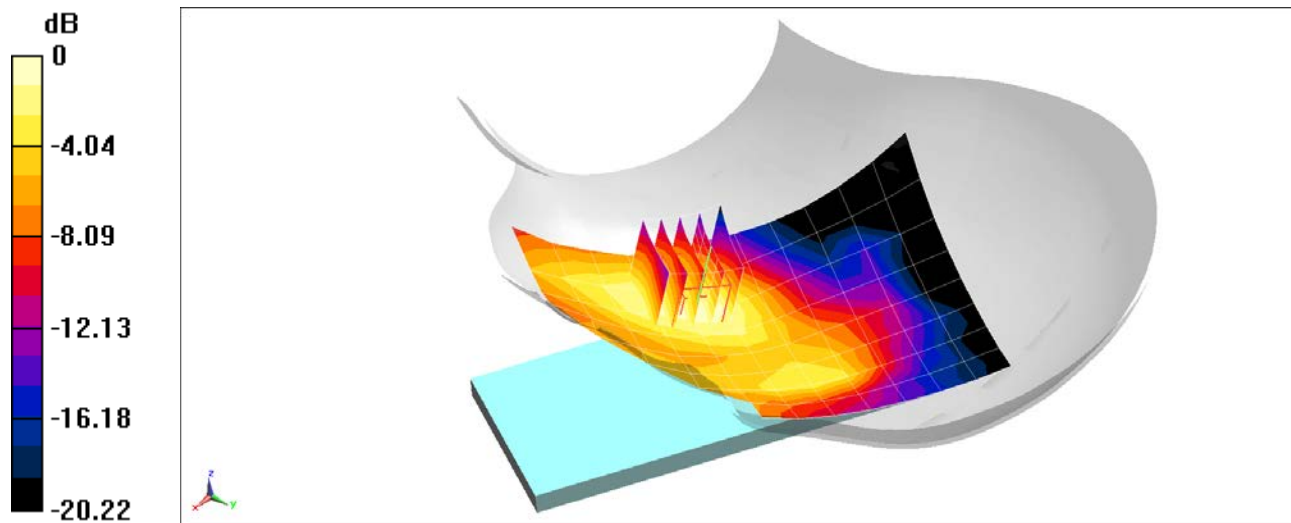
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

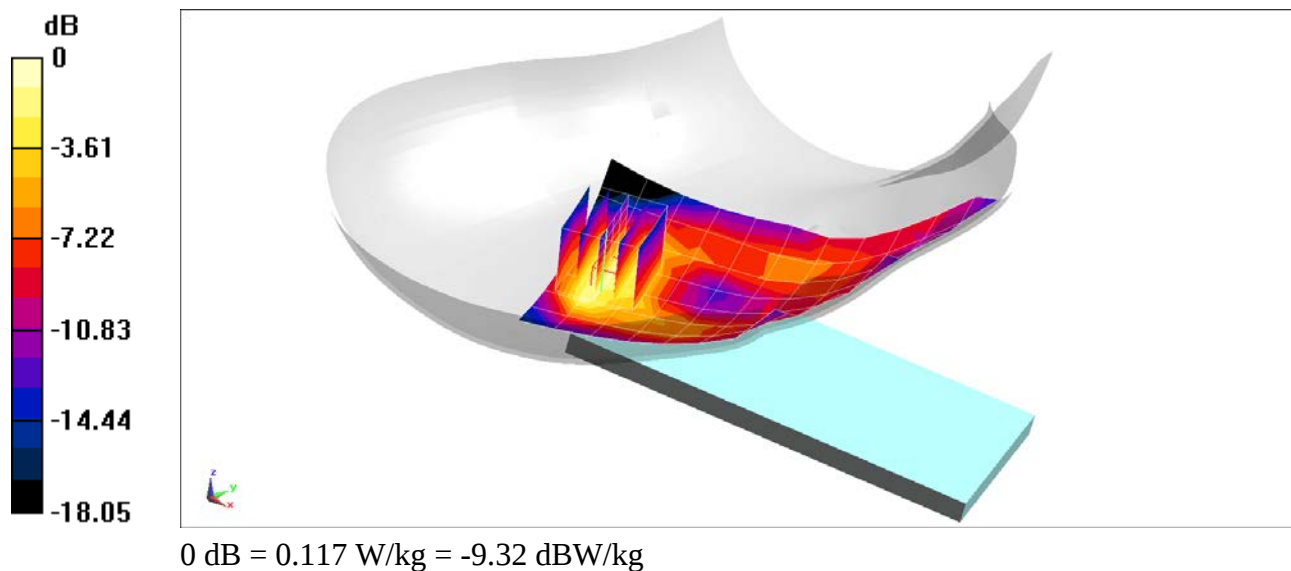
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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:

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

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

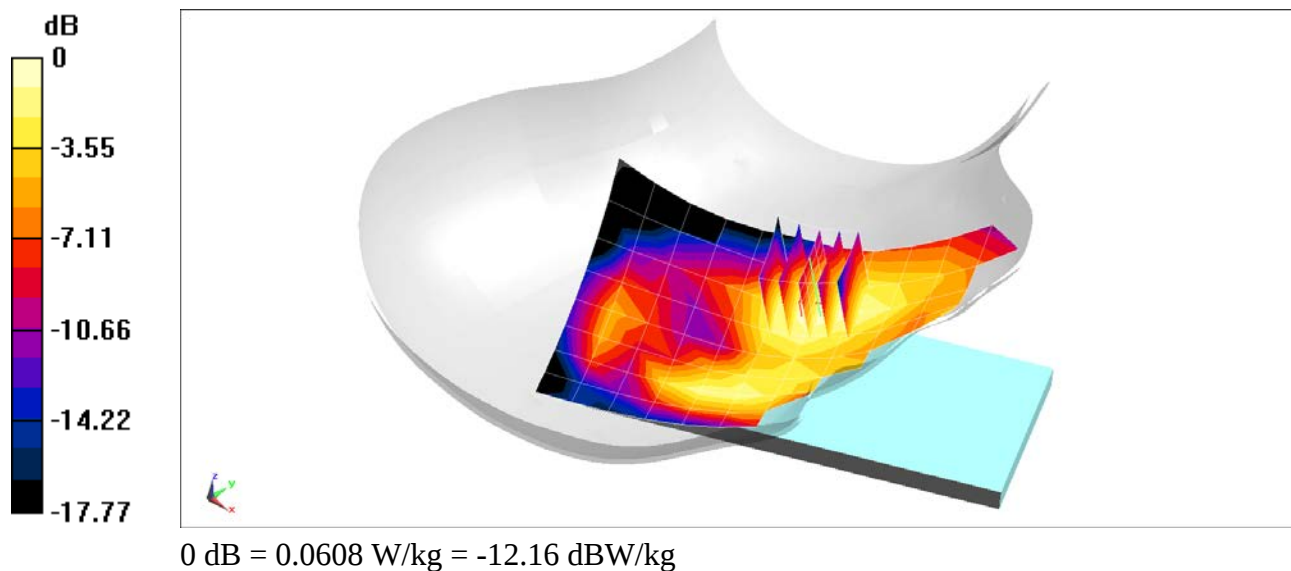
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 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

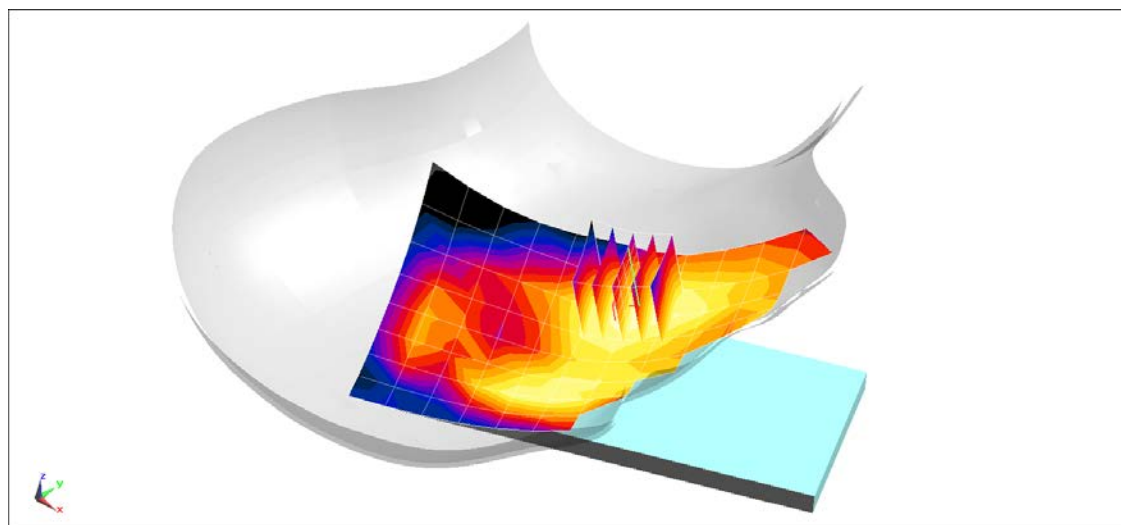
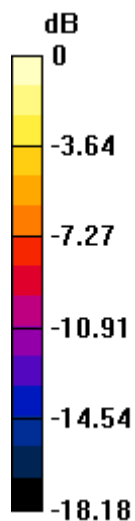
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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



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

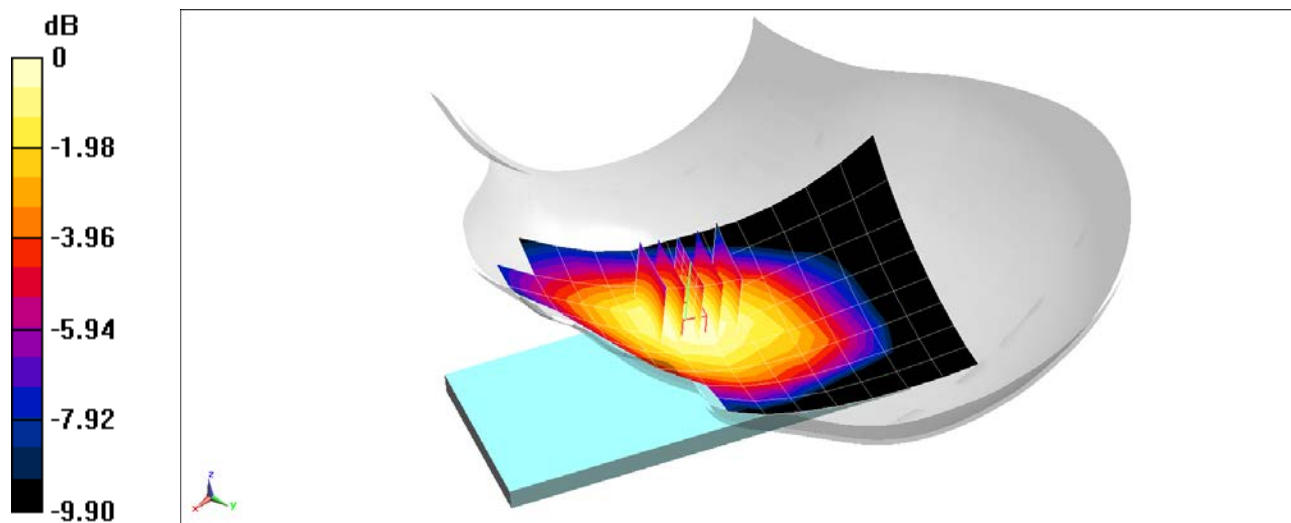
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

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**

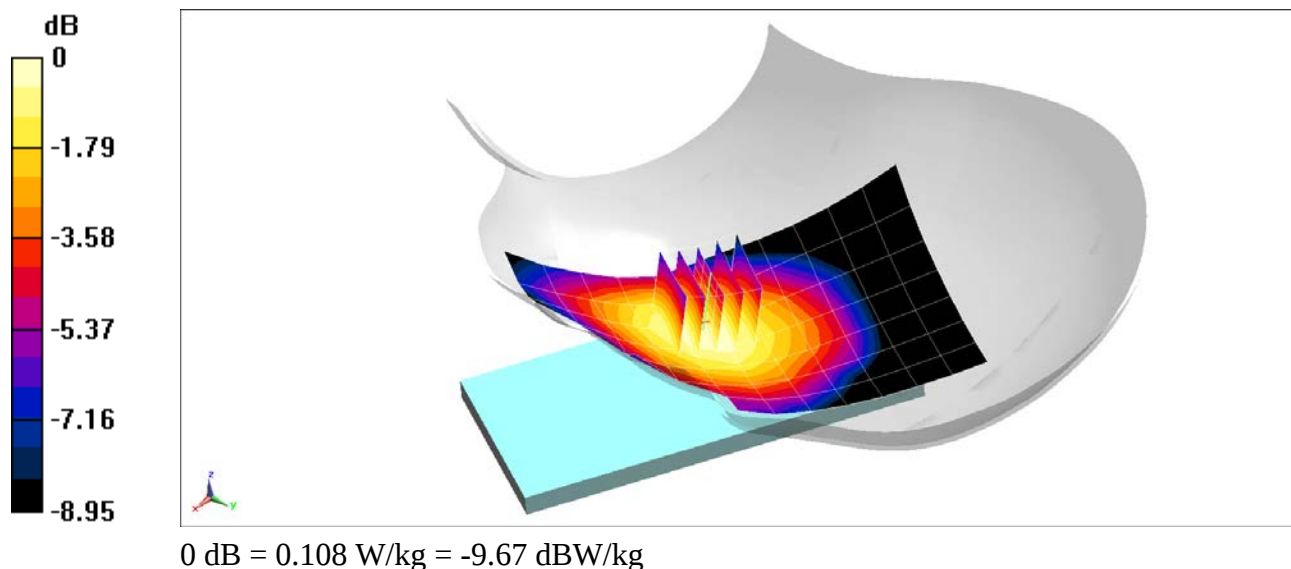
Area Scan (8x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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**

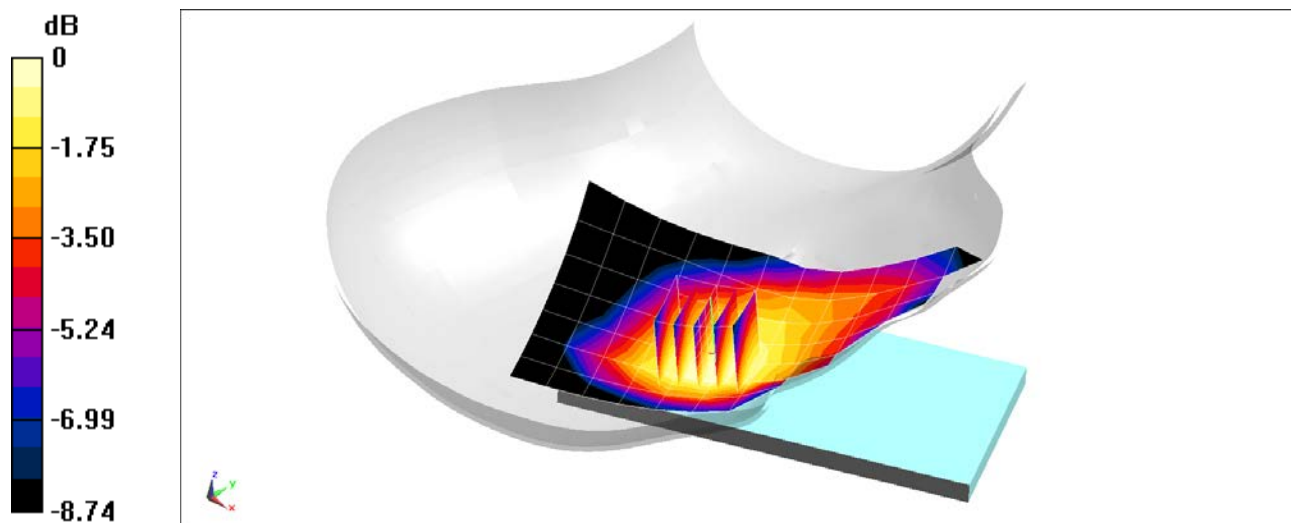
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

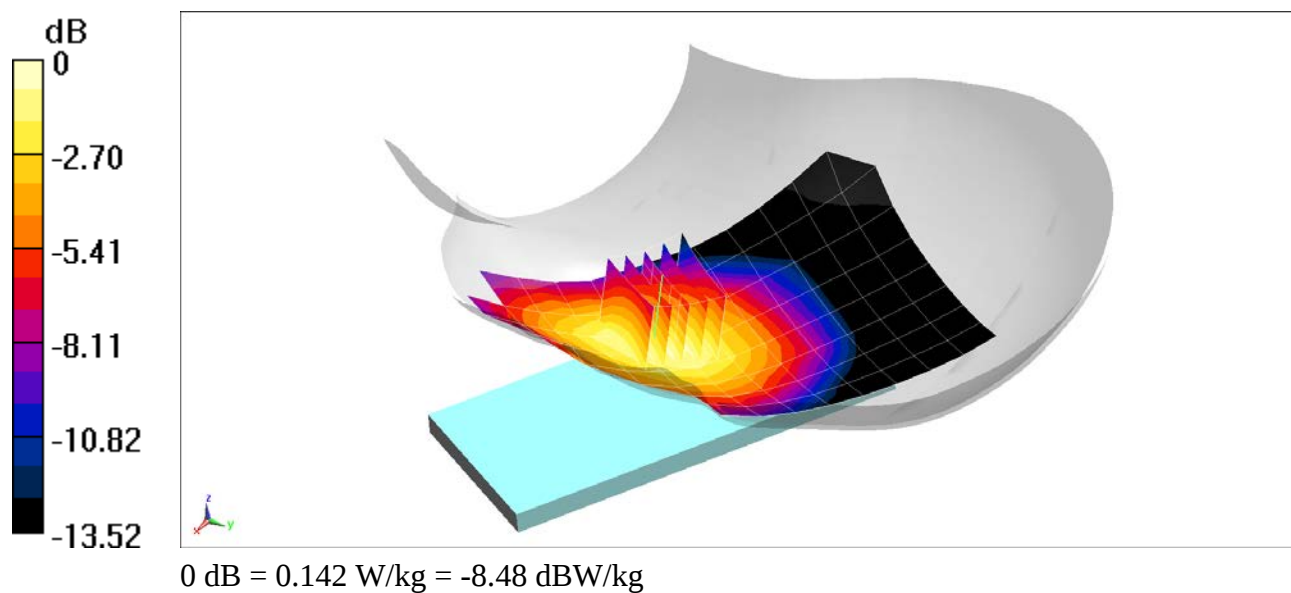
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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**

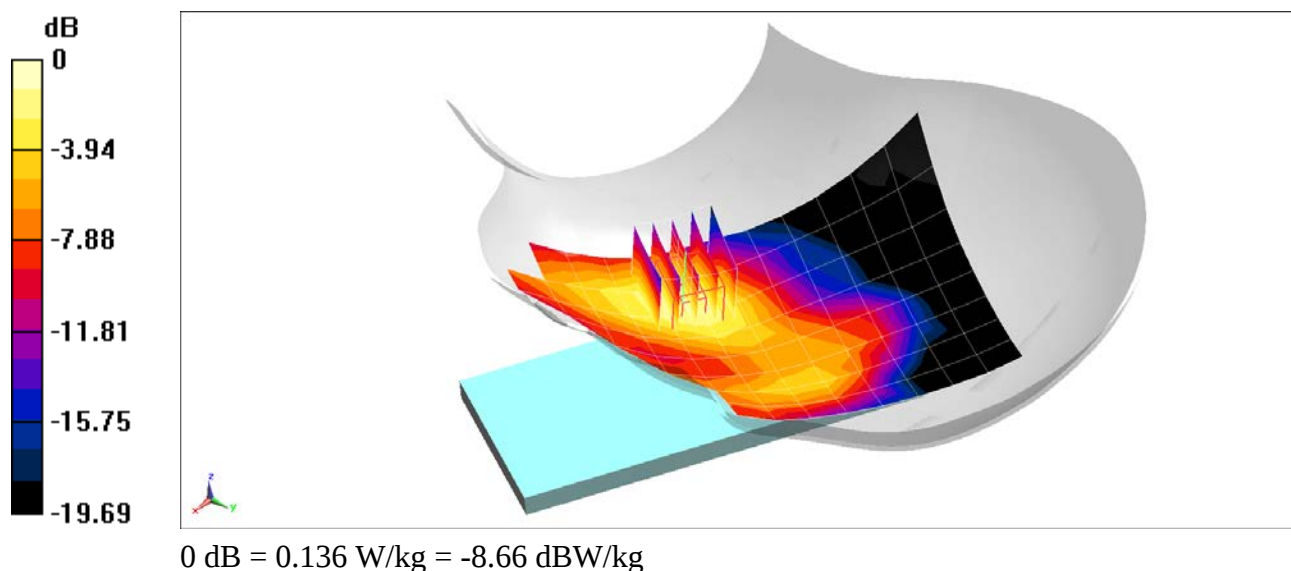
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

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**

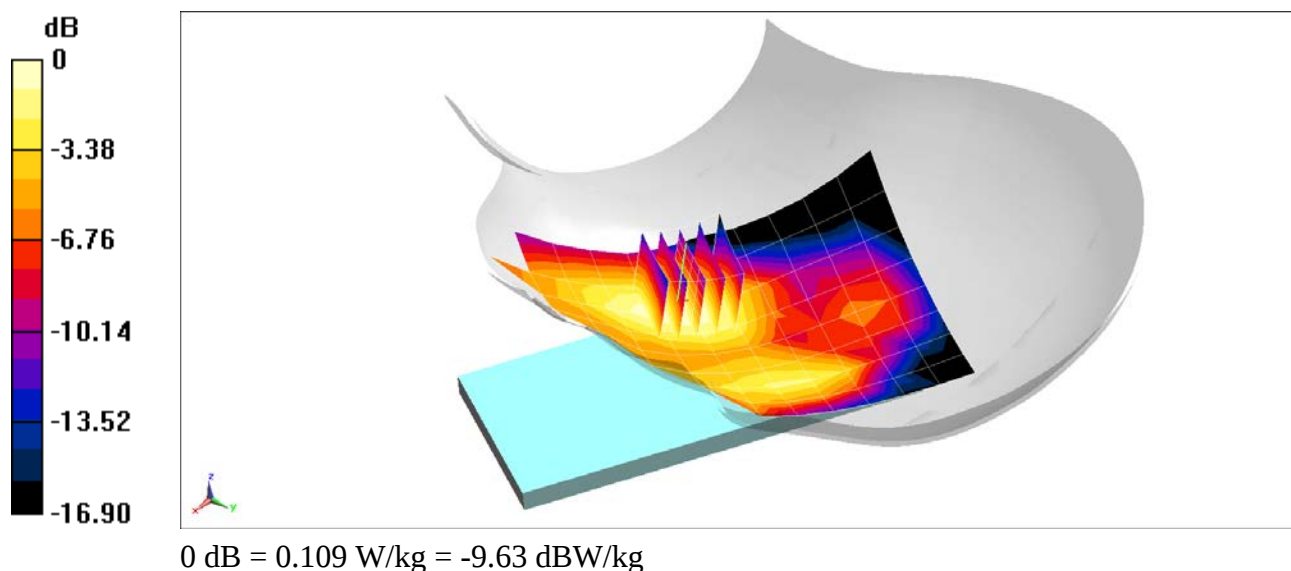
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

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

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**

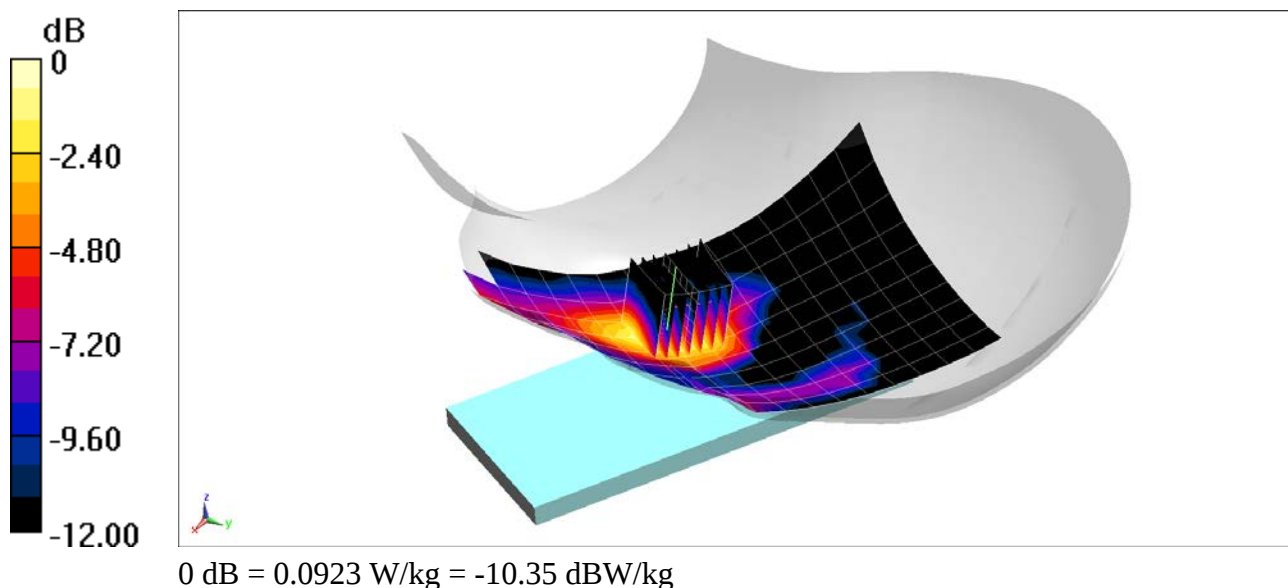
Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm

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**

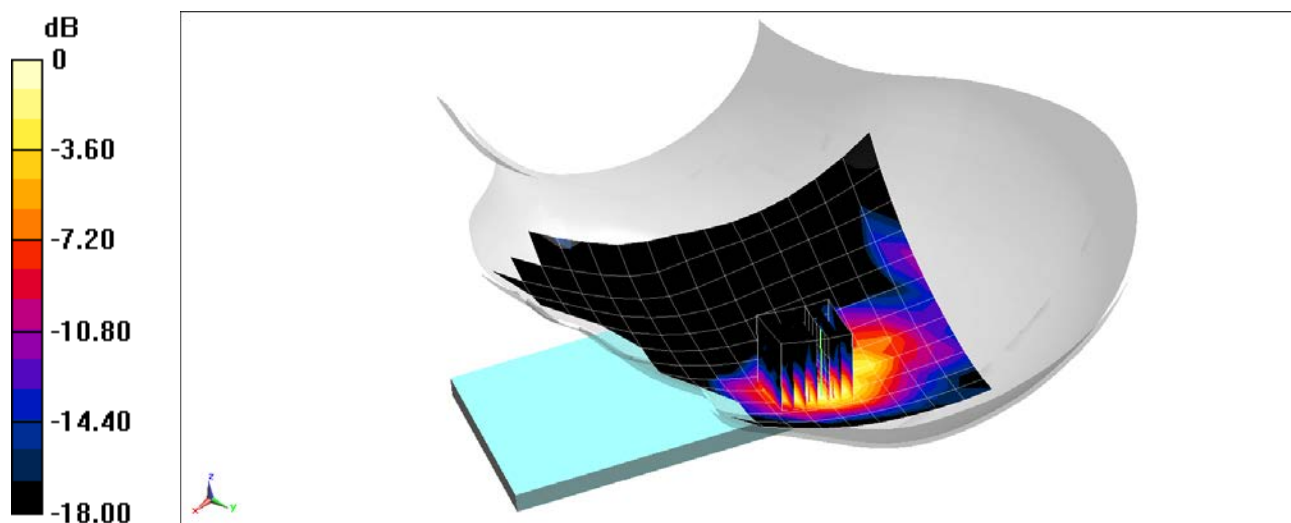
Area Scan (13x18x1): Measurement grid: dx=12mm, dy=12mm

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**

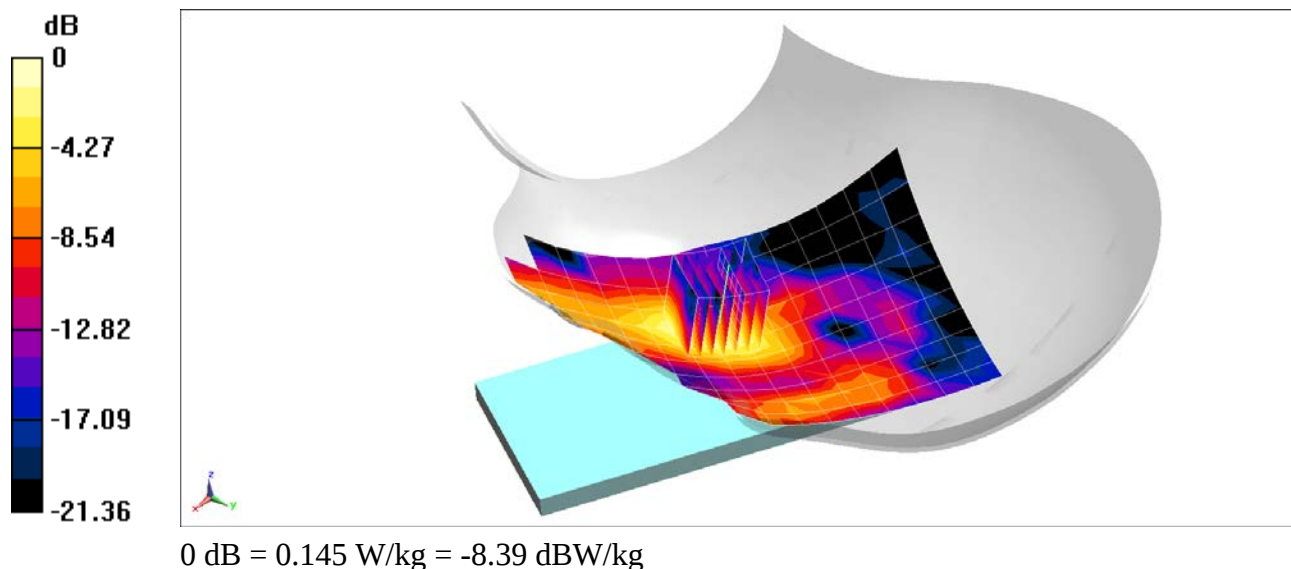
Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm

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**

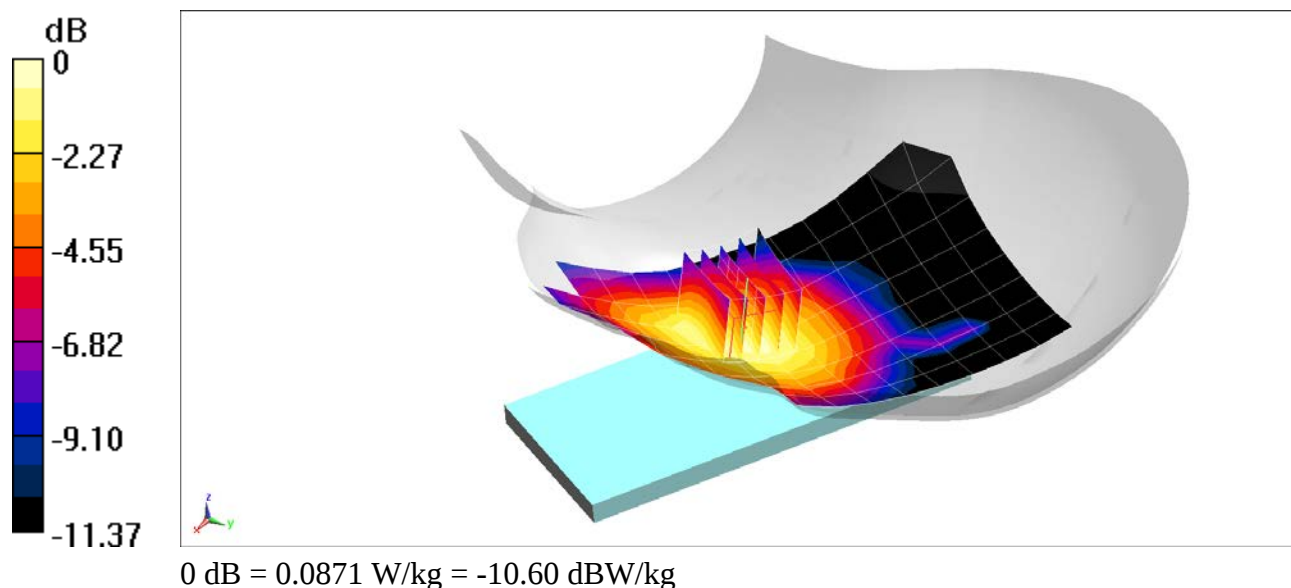
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 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**

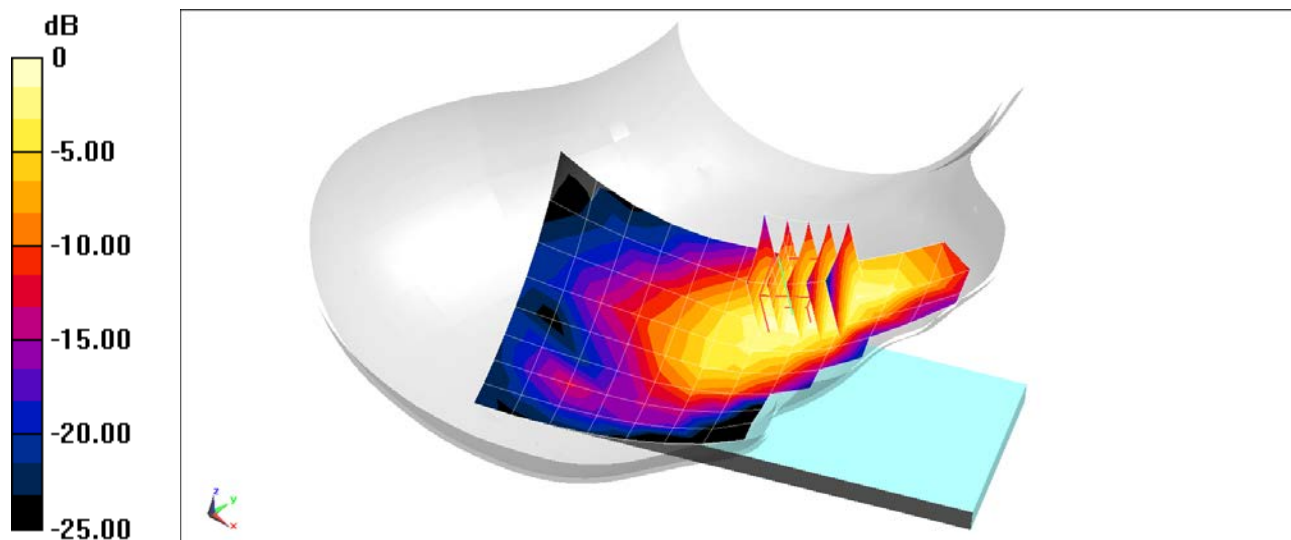
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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**

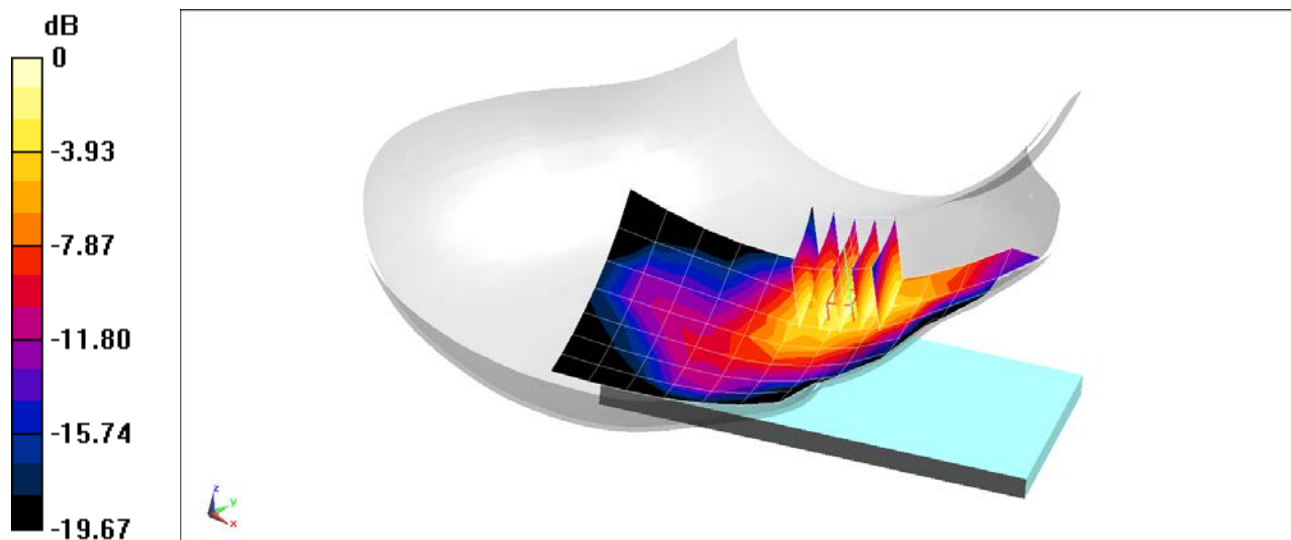
Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

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

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**

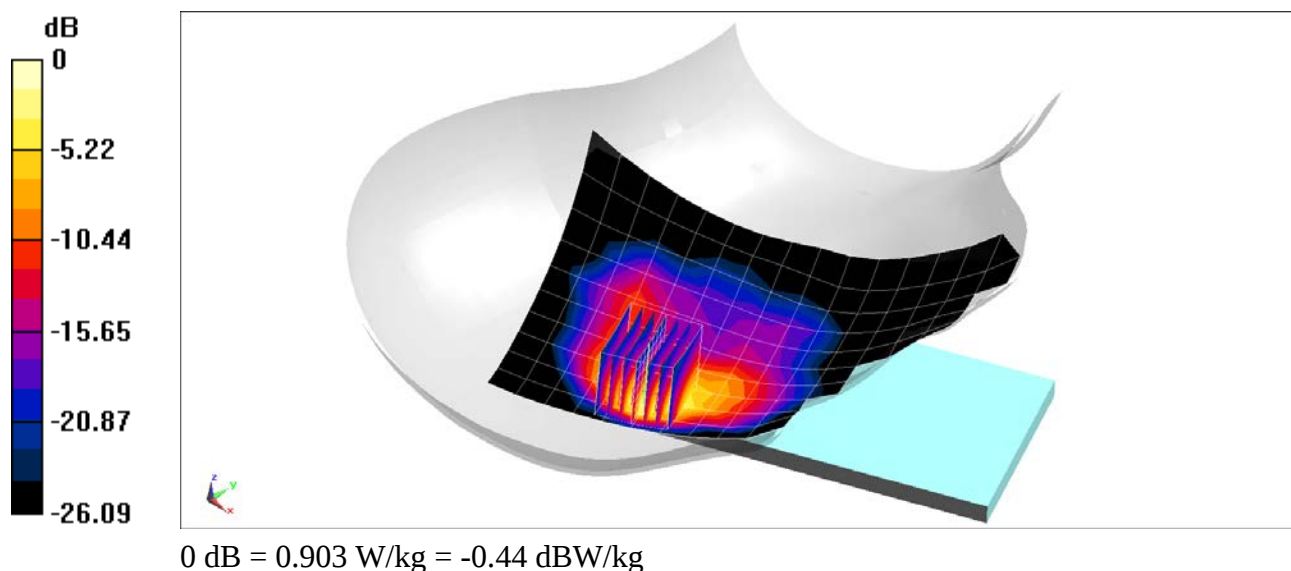
Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm

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**

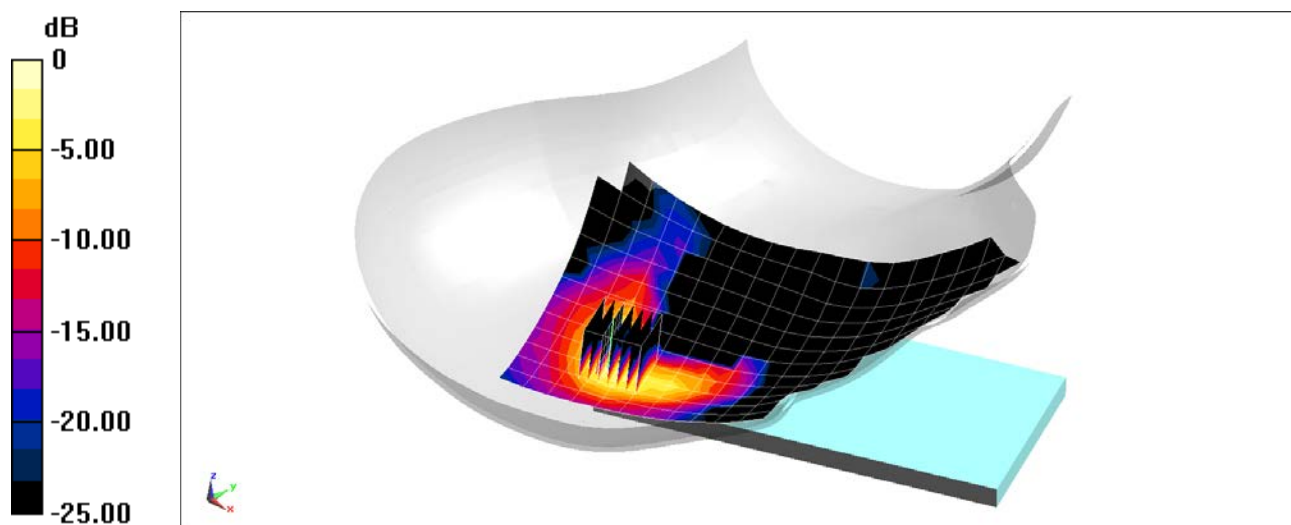
Area Scan (13x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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):

$f = 2441$ MHz; $\sigma = 1.848$ S/m; $\epsilon_r = 38.229$; $\rho = 1000$ kg/m³

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

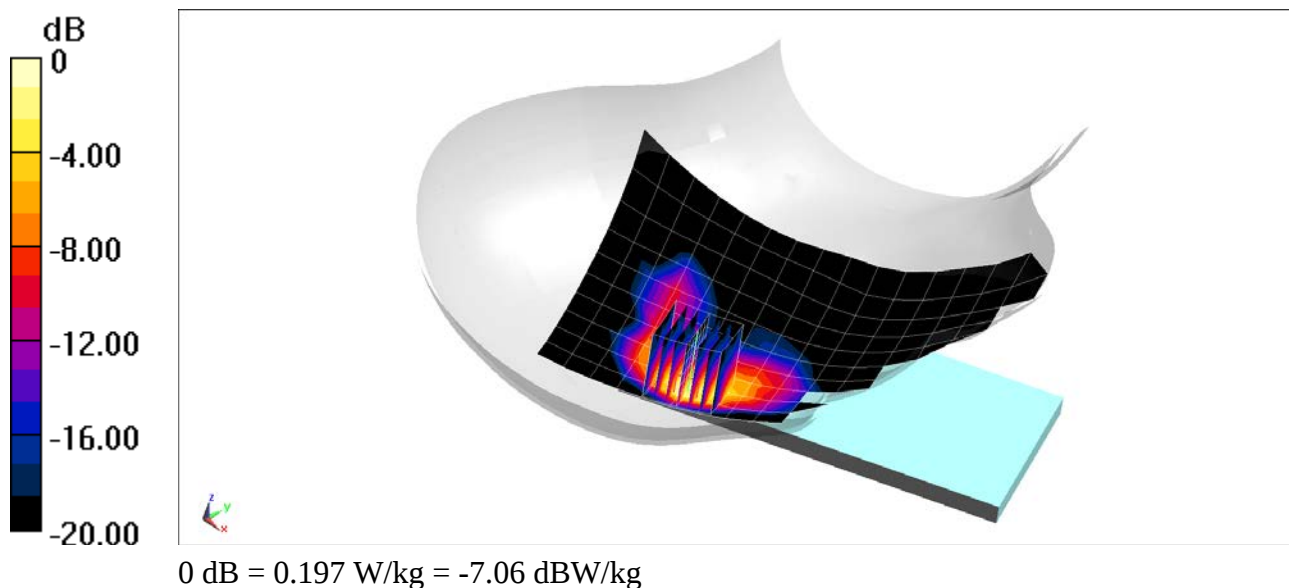
Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm

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

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



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

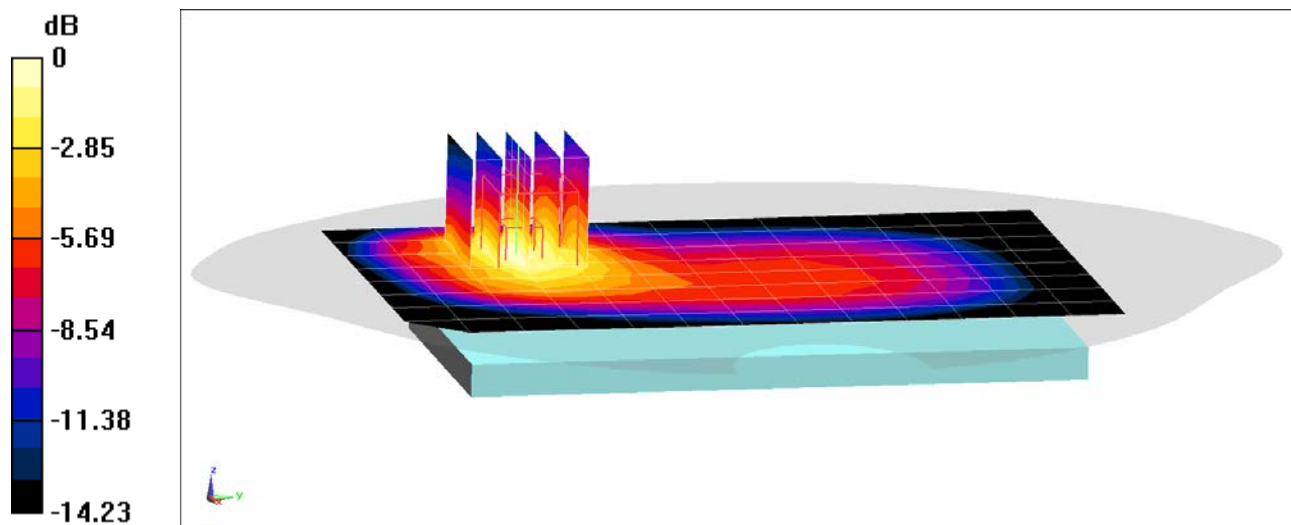
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

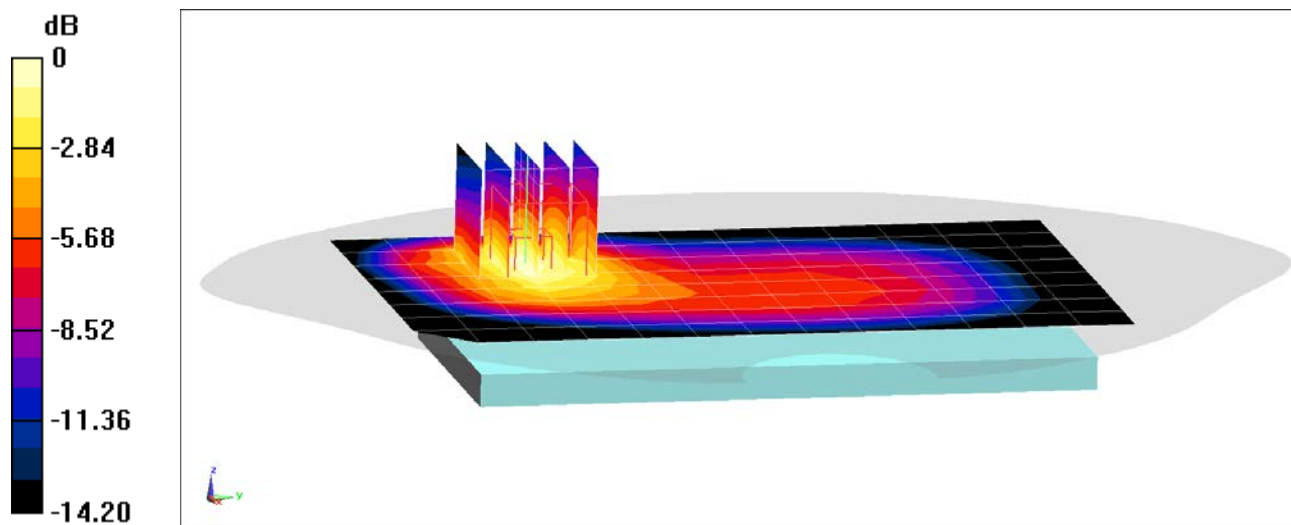
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

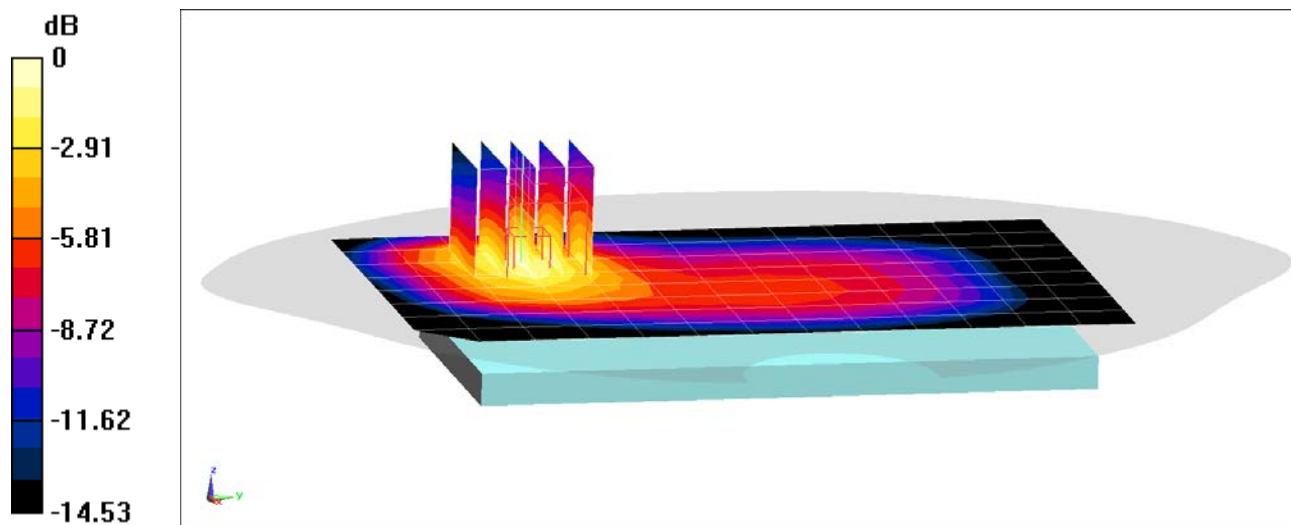
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

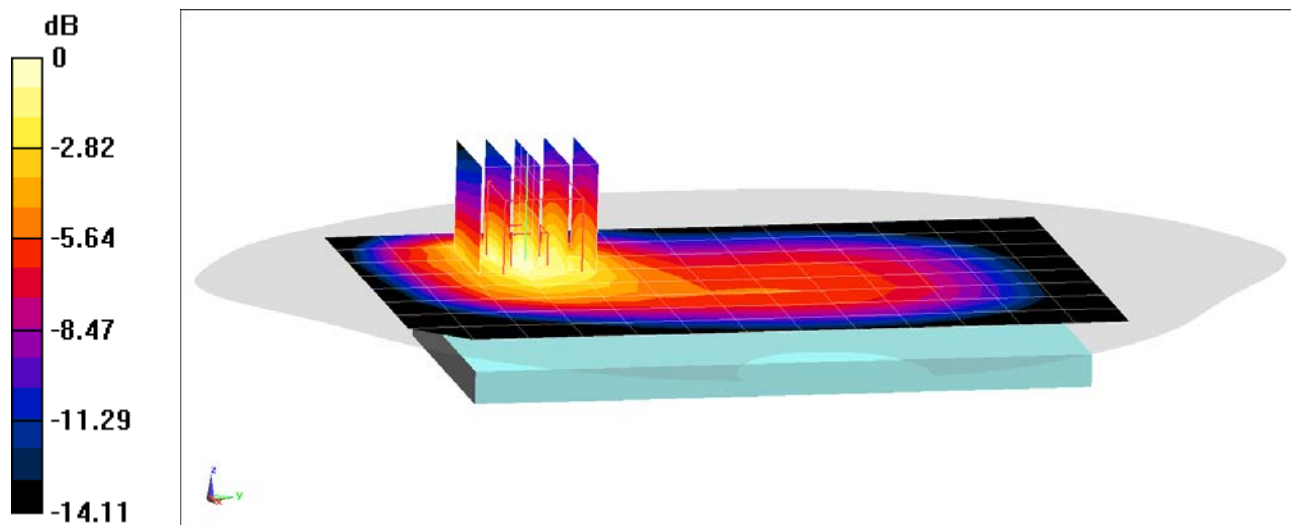
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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



0 dB = 0.691 W/kg = -1.61 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, Front side, Mid.ch

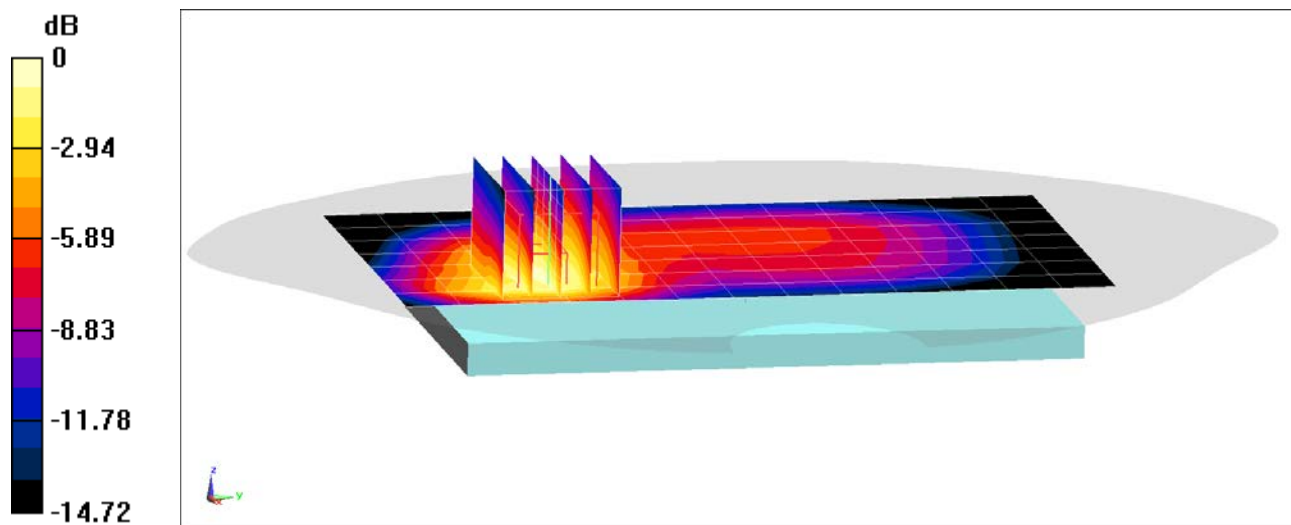
Area Scan (8x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

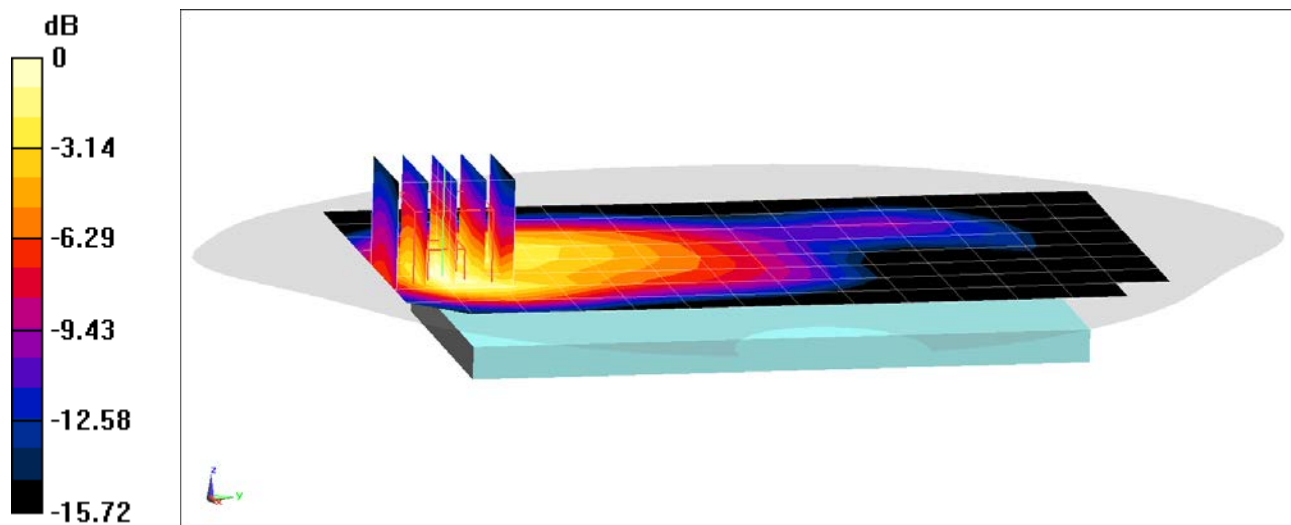
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

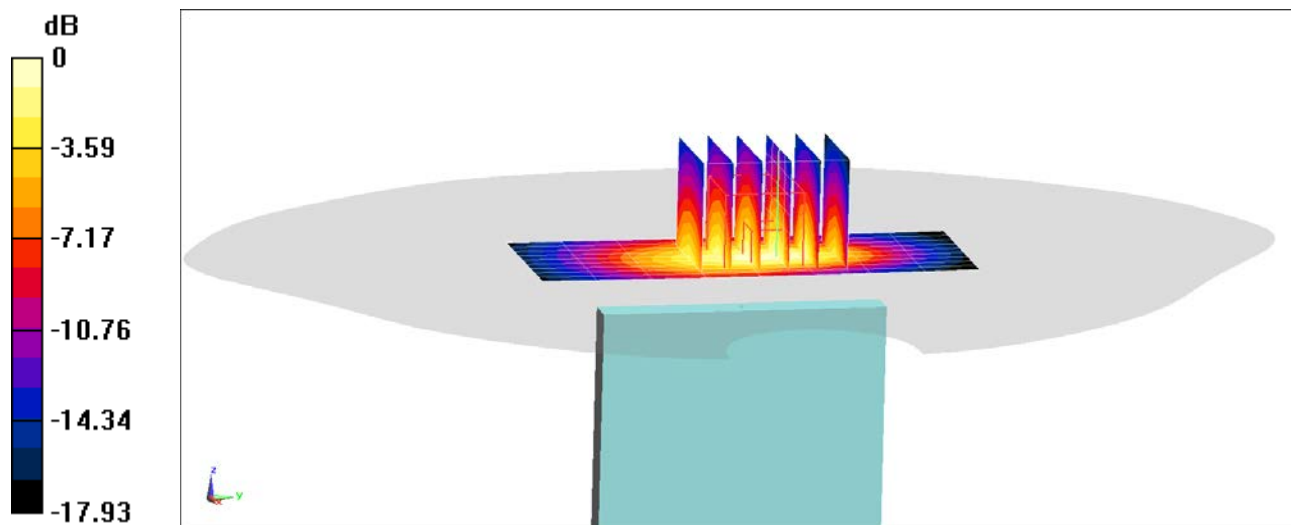
Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm

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

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):

$f = 1851.25 \text{ MHz}$; $\sigma = 1.524 \text{ S/m}$; $\epsilon_r = 51.414$; $\rho = 1000 \text{ kg/m}^3$

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) @ 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

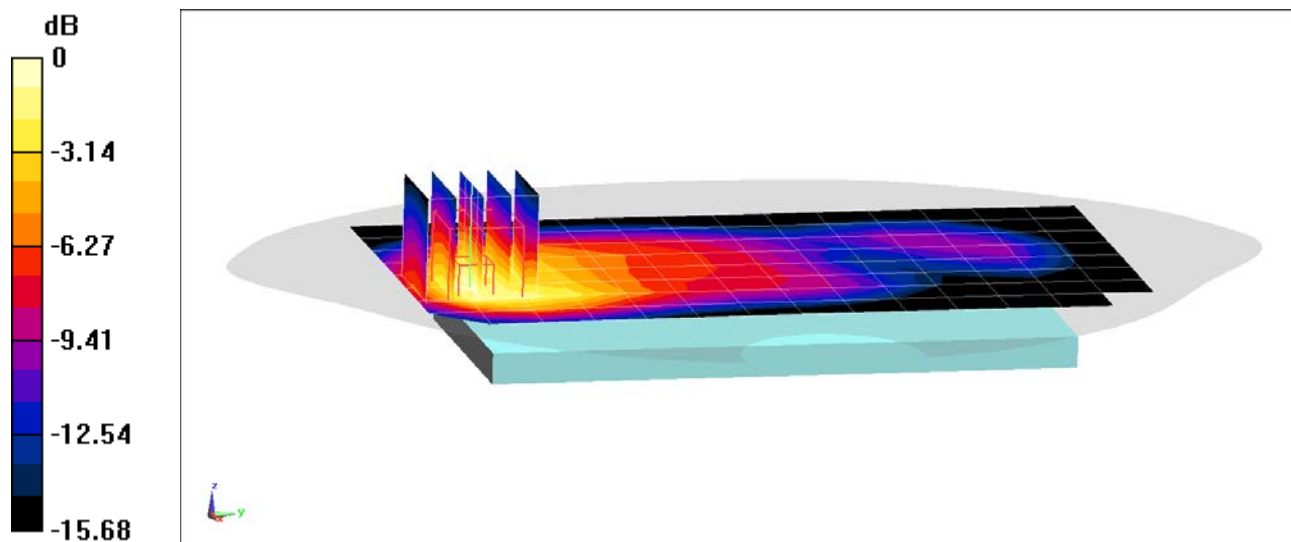
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 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

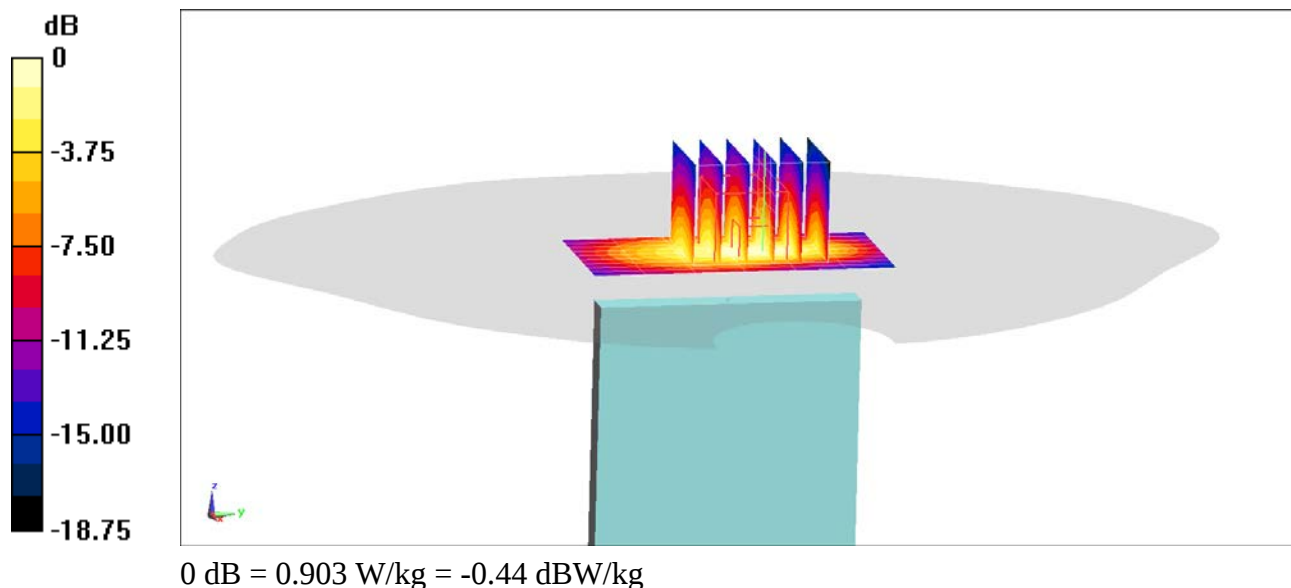
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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

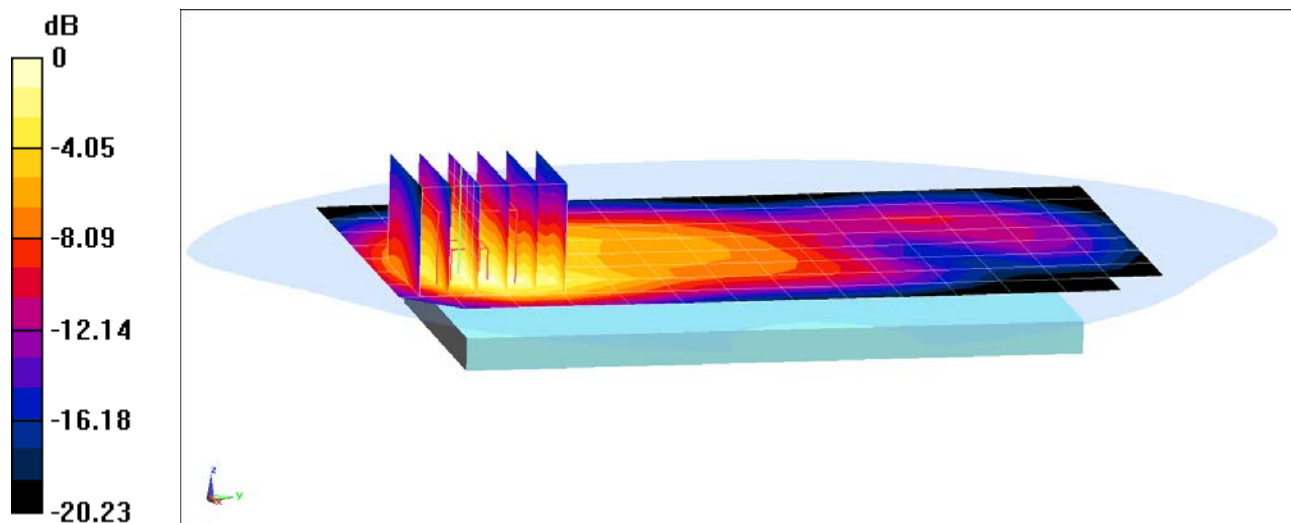
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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:

$f = 1910$ MHz; $\sigma = 1.593$ S/m; $\epsilon_r = 51.763$; $\rho = 1000$ kg/m³

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

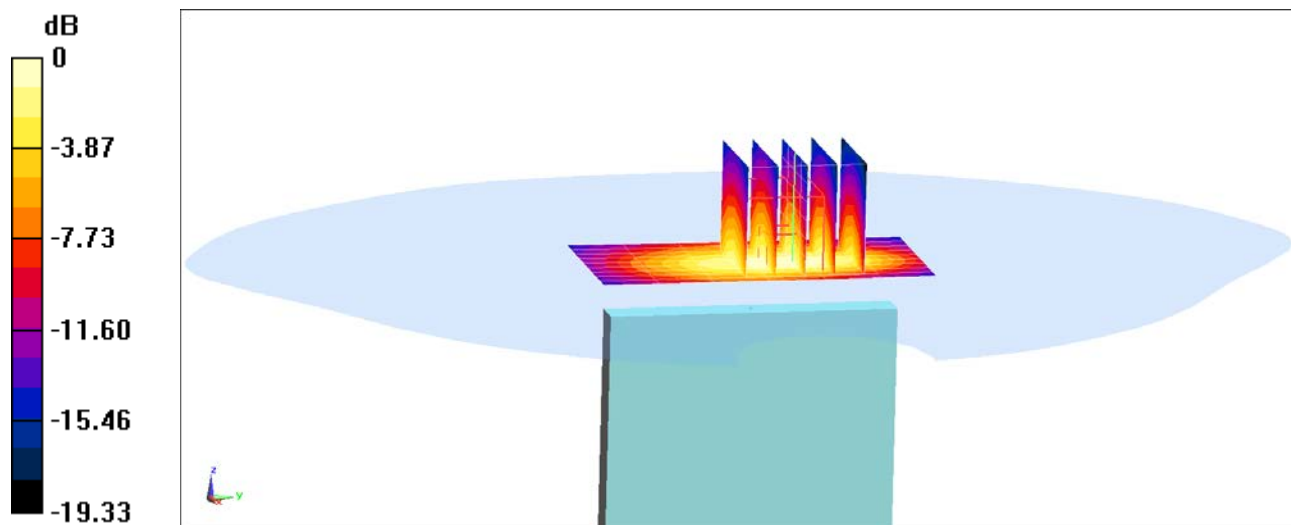
Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm

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

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

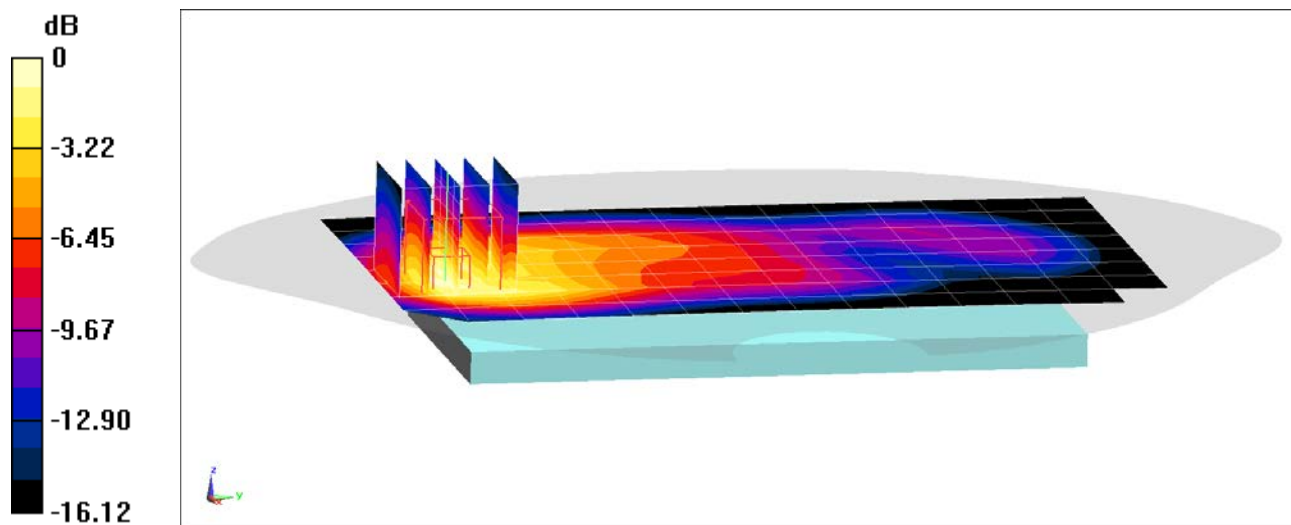
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 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

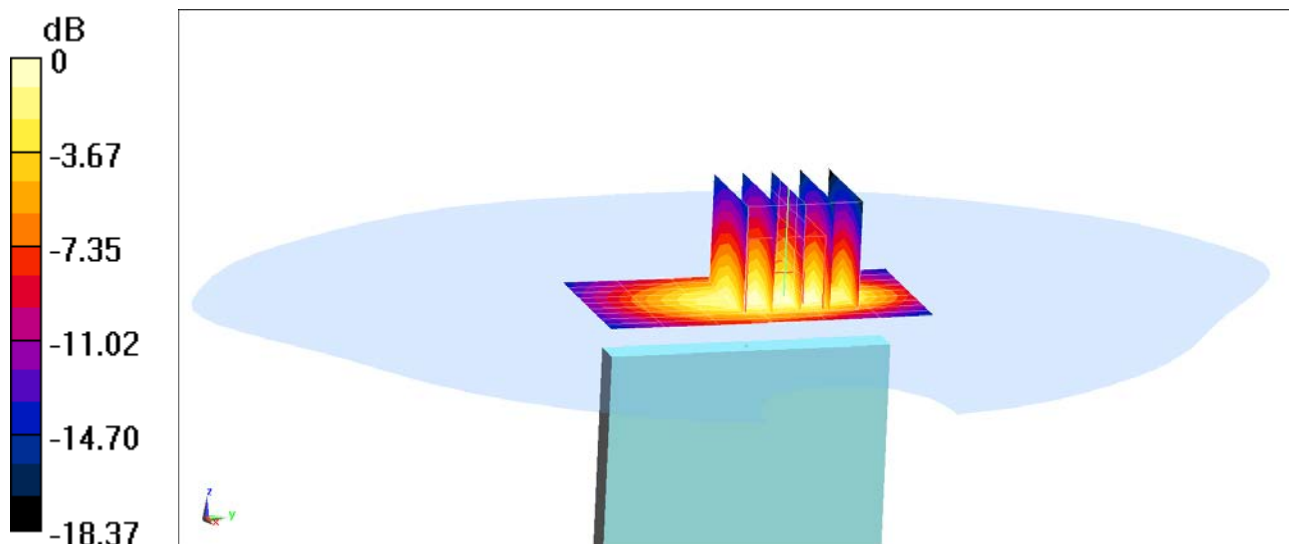
Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm

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**

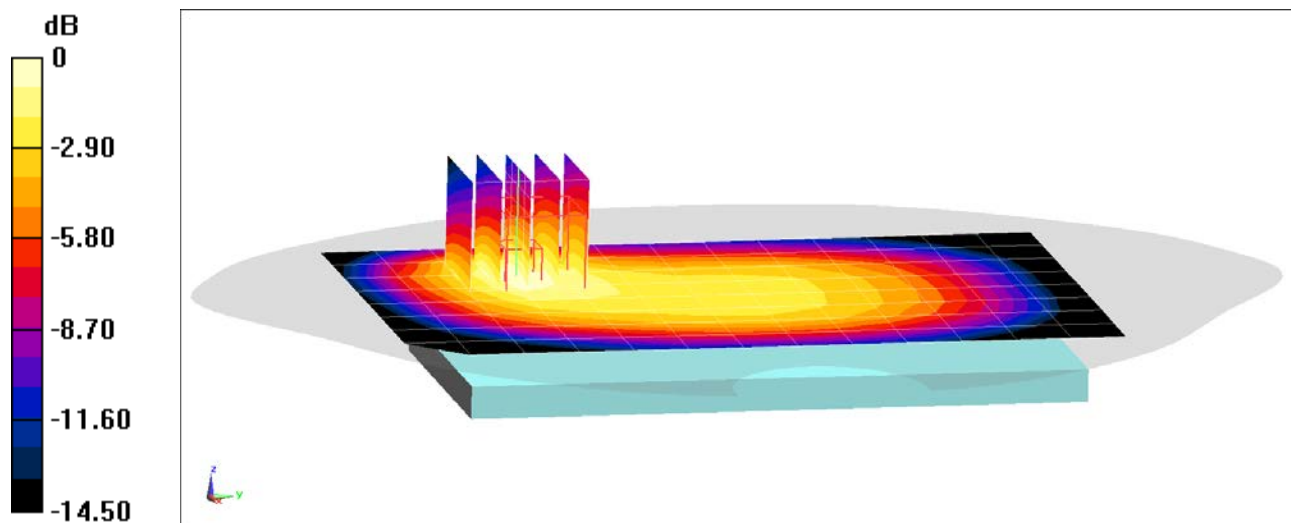
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

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**

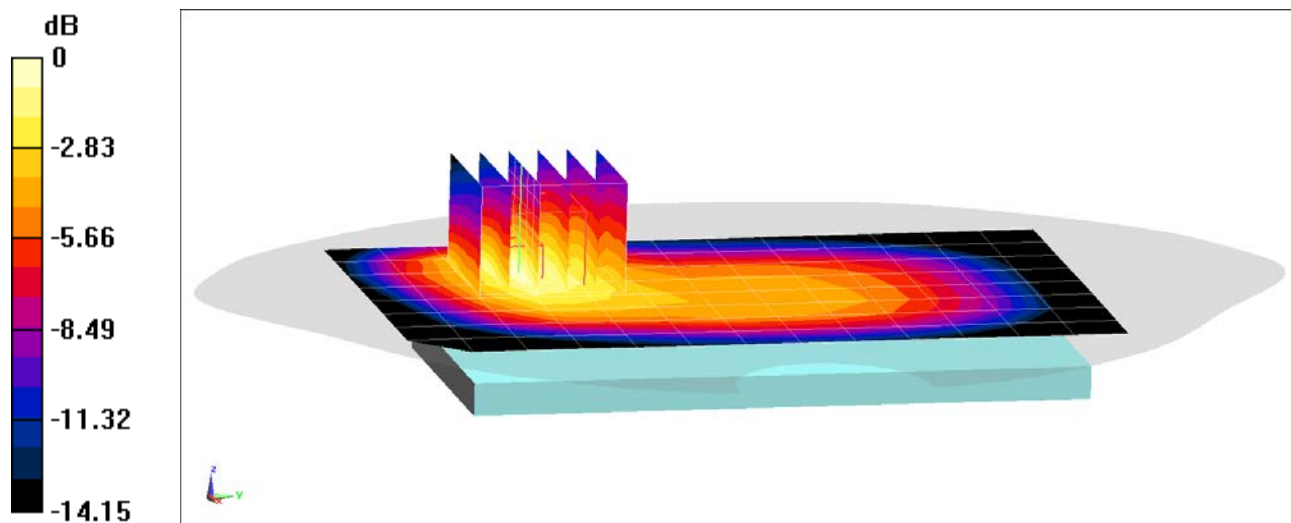
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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**

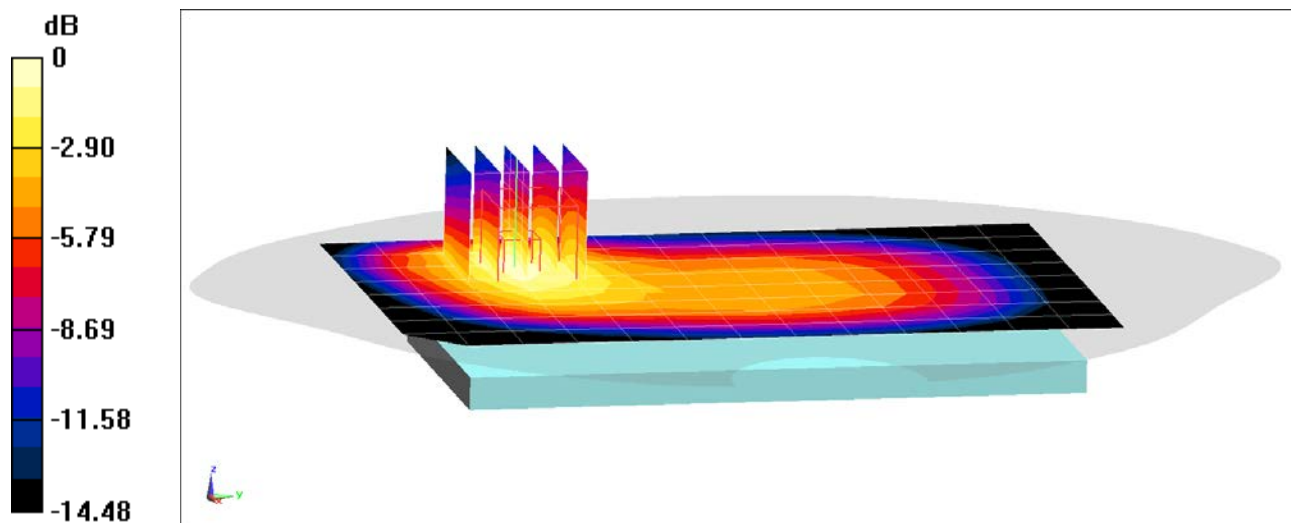
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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**

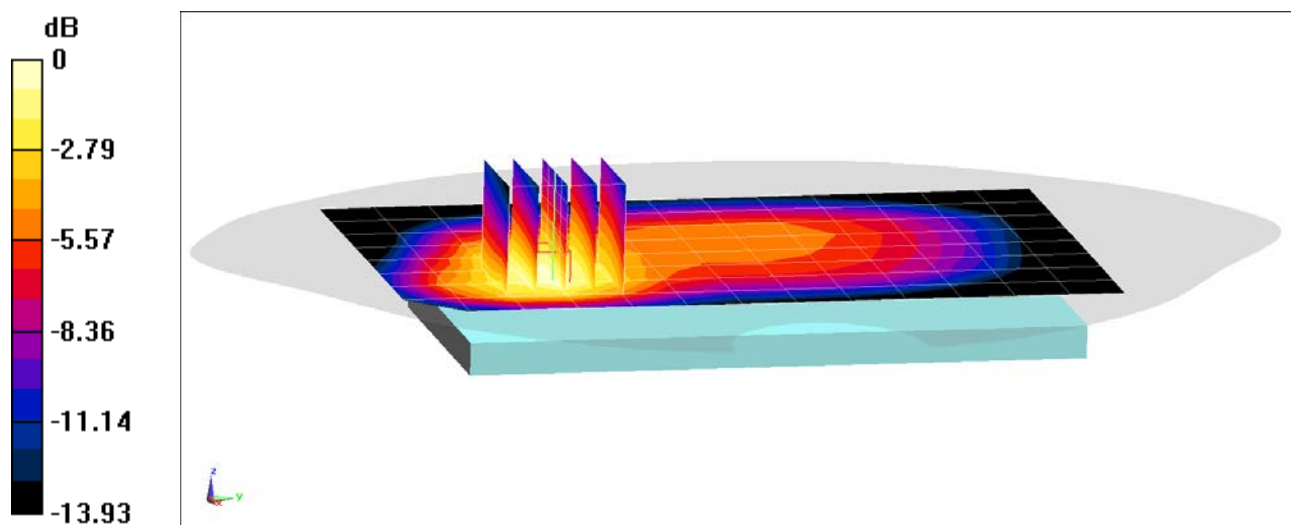
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

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

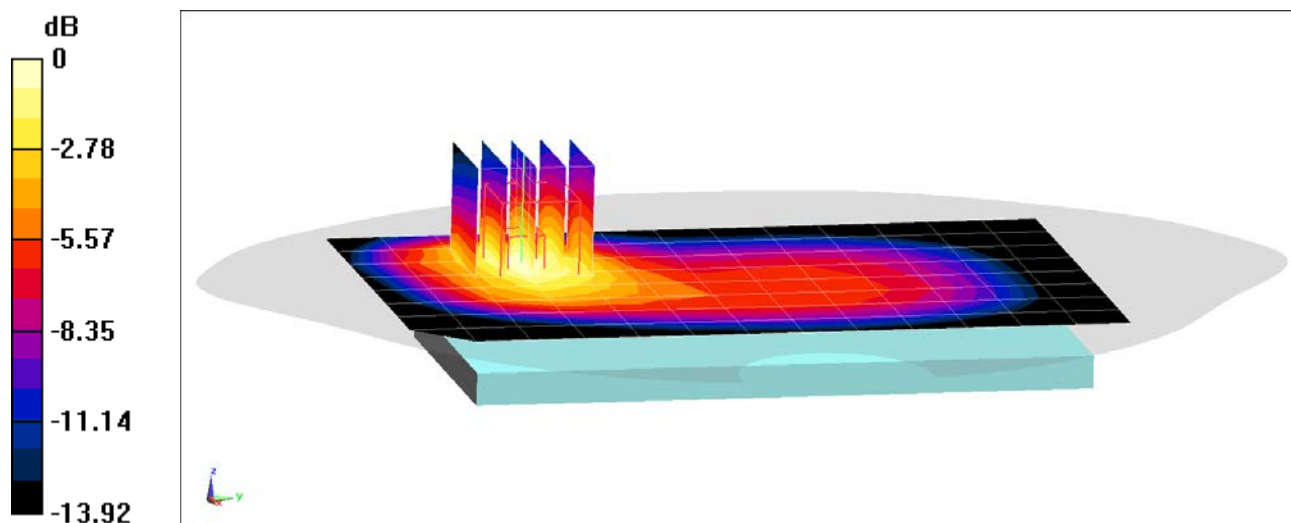
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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**

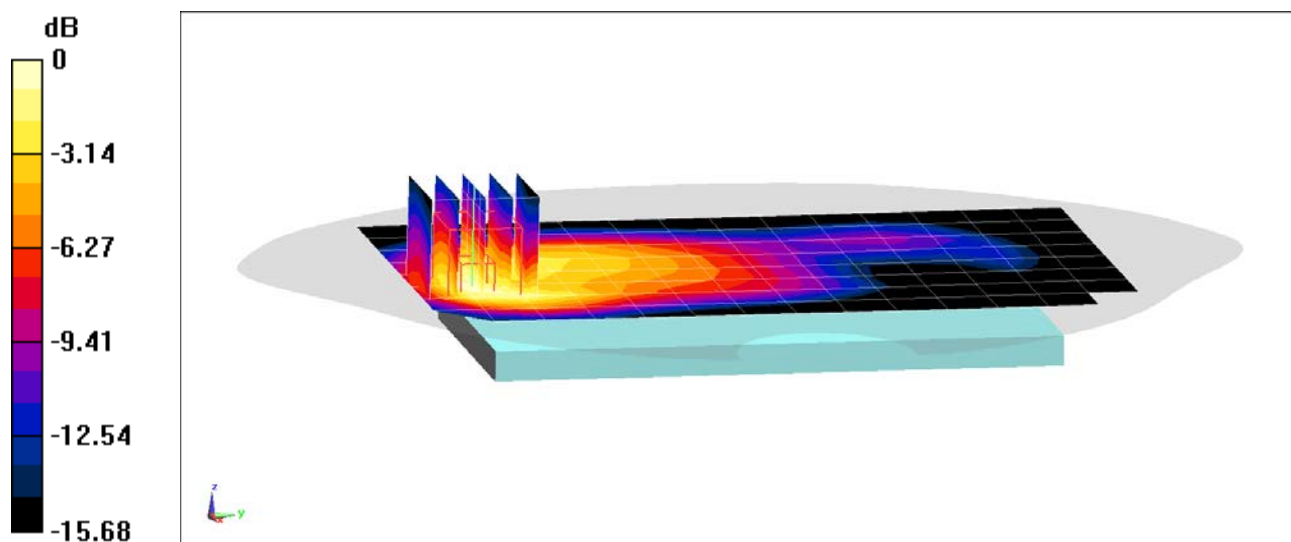
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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**

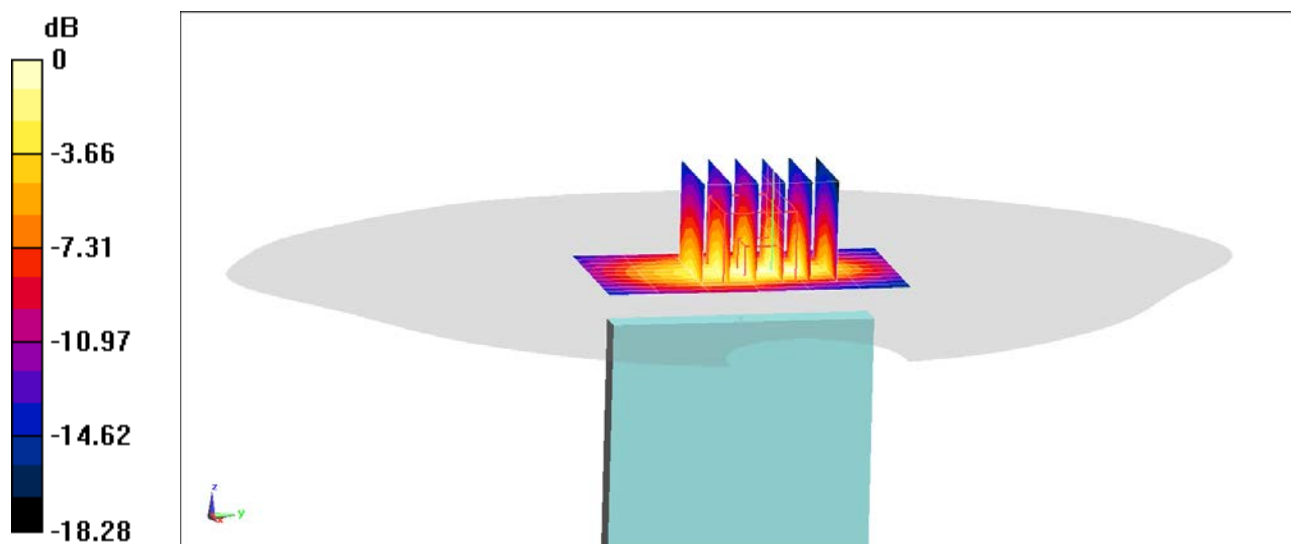
Area Scan (11x7x1): Measurement grid: dx=5mm, dy=15mm

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**

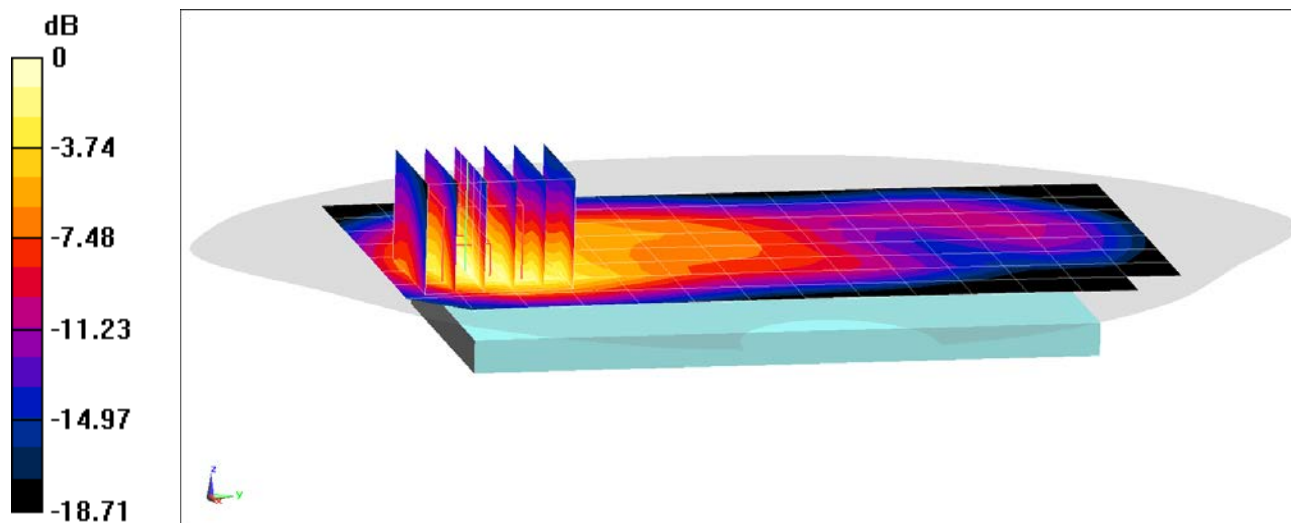
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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**

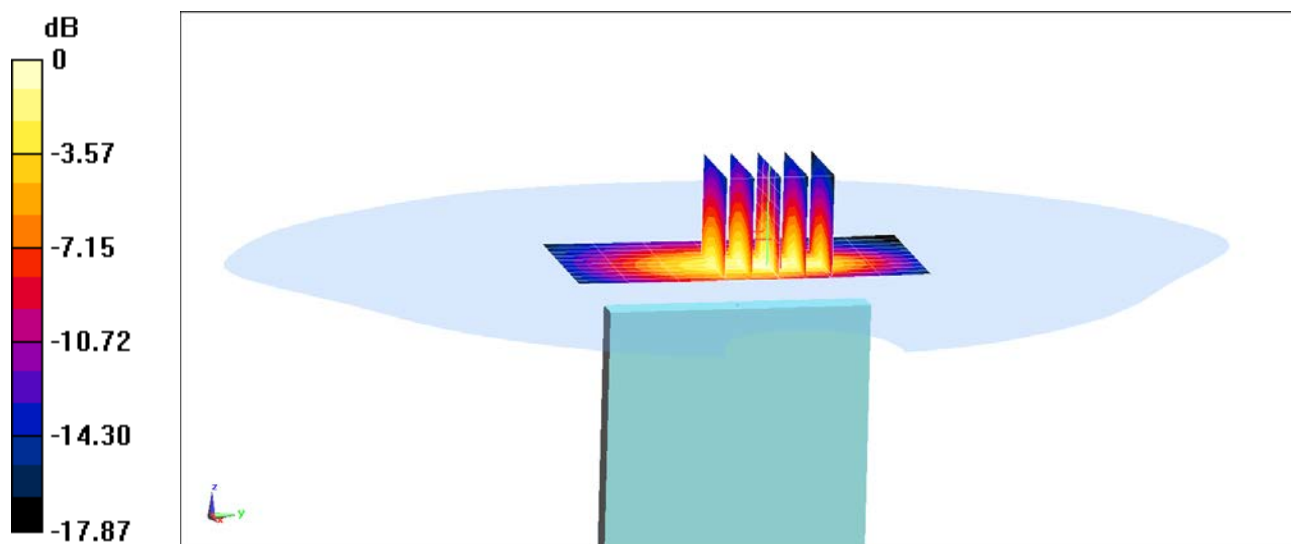
Area Scan (11x8x1): Measurement grid: dx=5mm, dy=15mm

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**

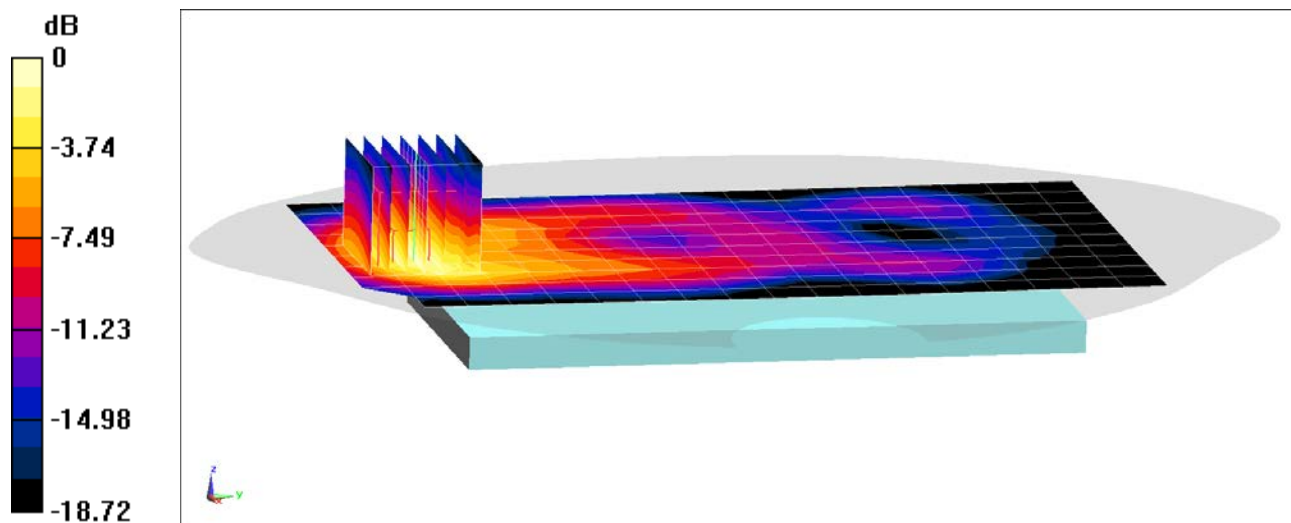
Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm

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**

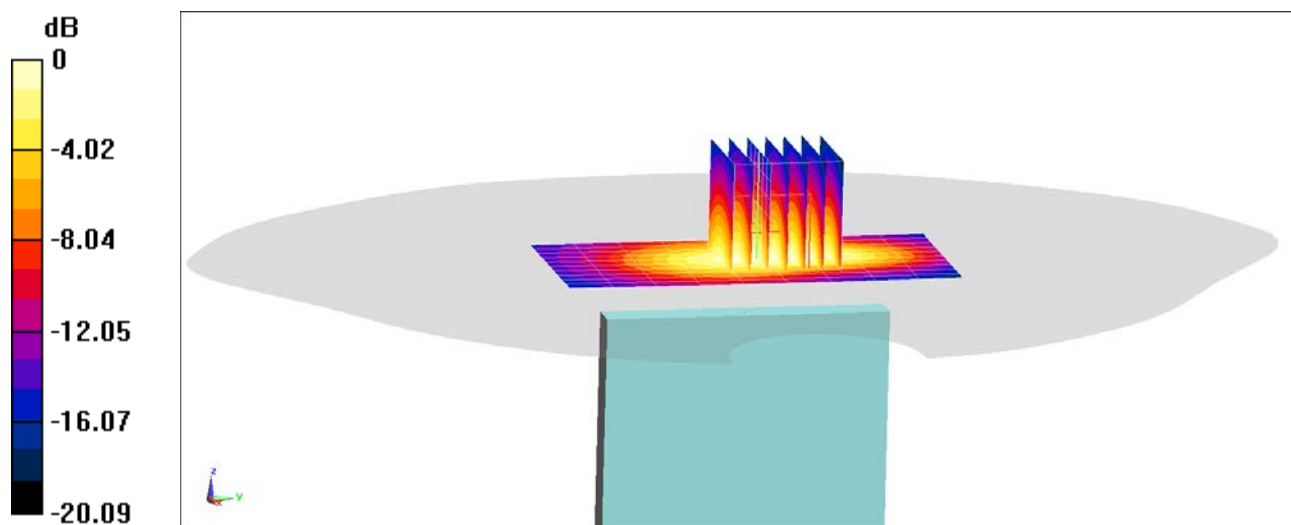
Area Scan (11x10x1): Measurement grid: dx=5mm, dy=12mm

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**

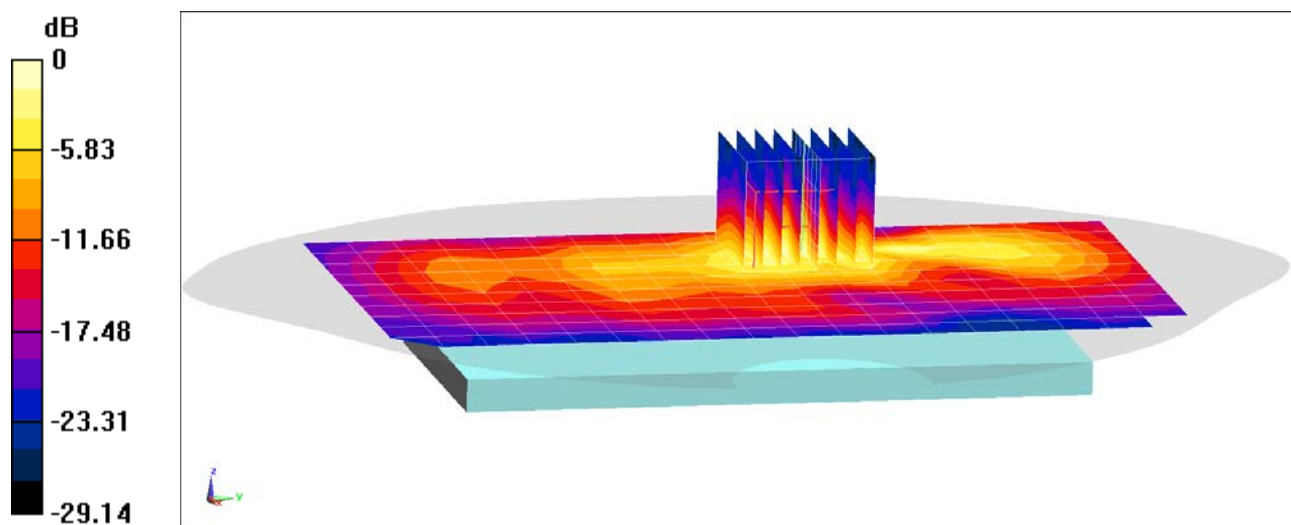
Area Scan (11x19x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (8x8x8)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=1.4\text{mm}$; 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**

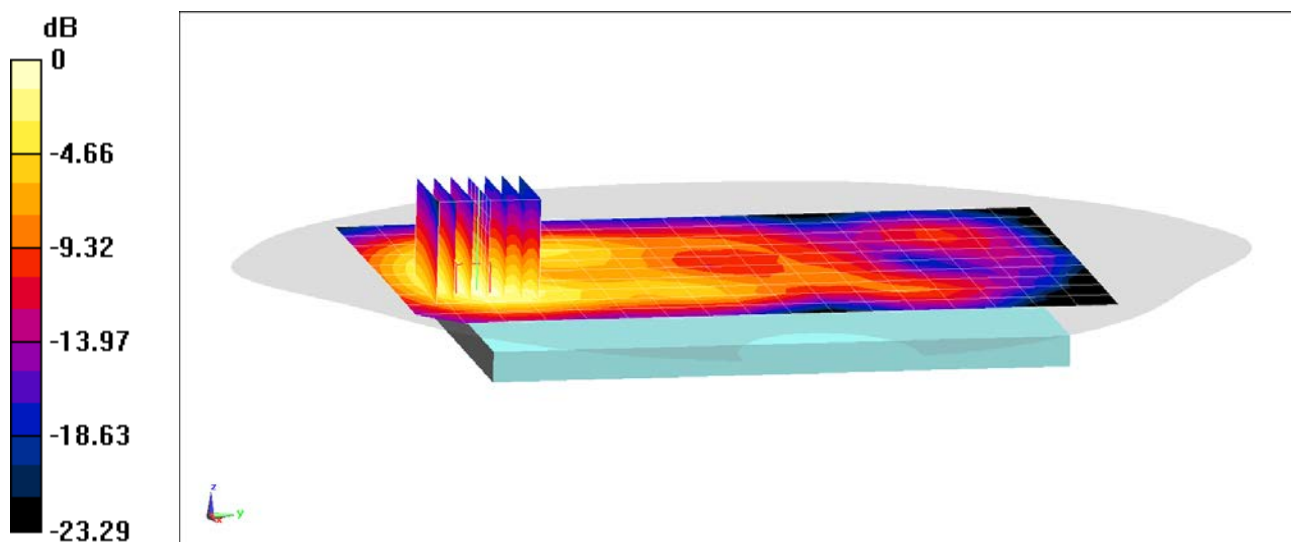
Area Scan (11x16x1): Measurement grid: dx=12mm, dy=12mm

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**

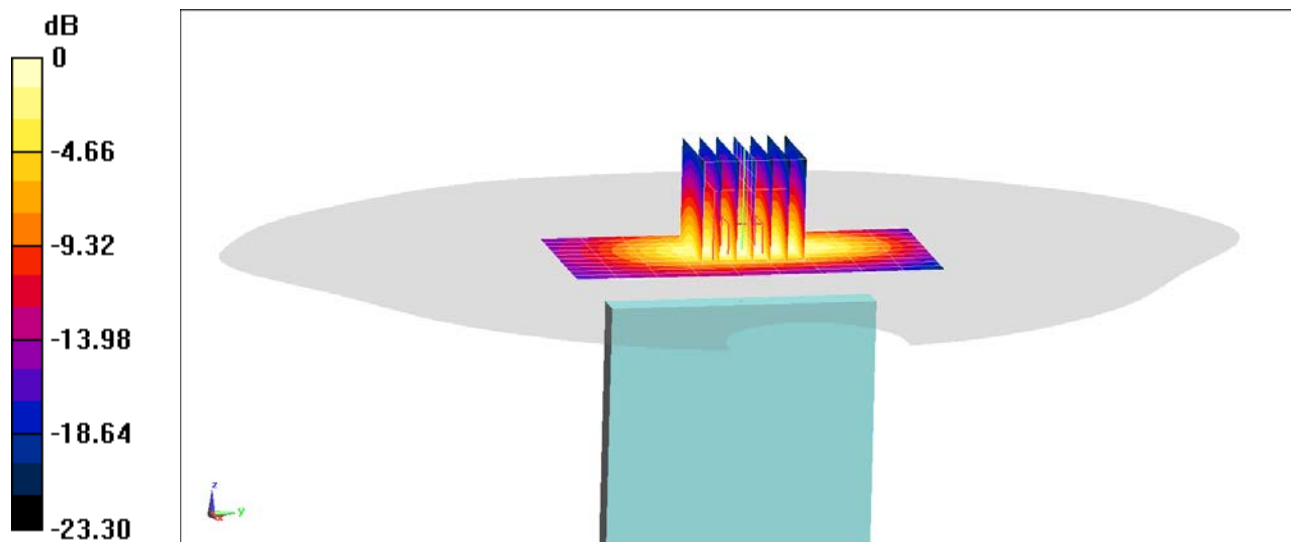
Area Scan (11x10x1): Measurement grid: dx=5mm, dy=12mm

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**

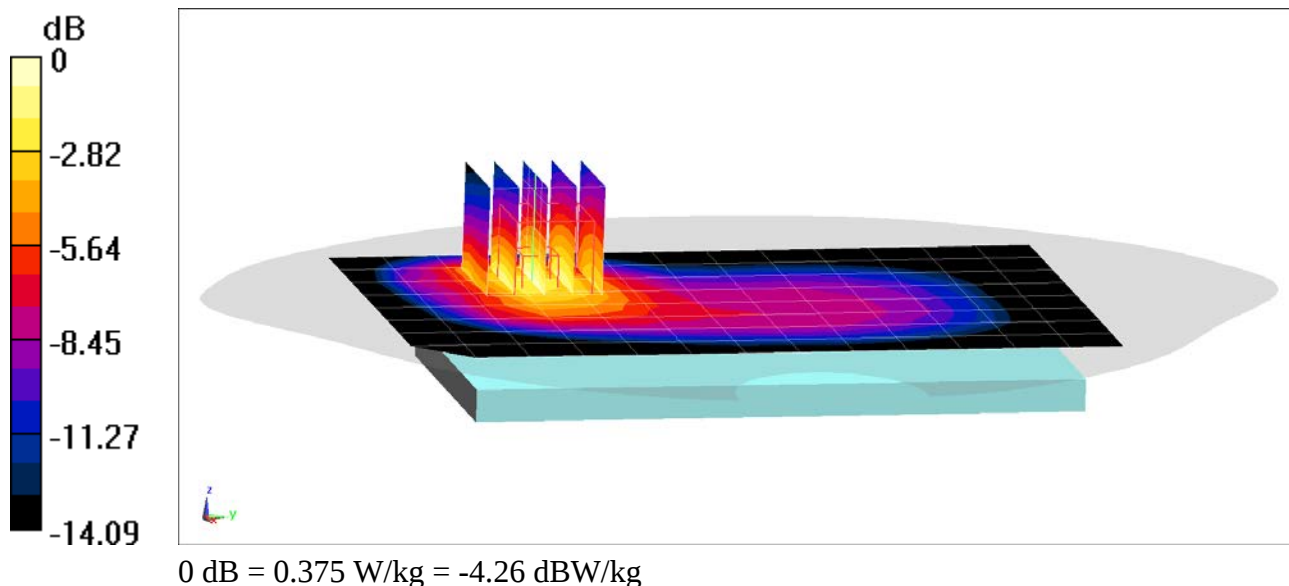
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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**

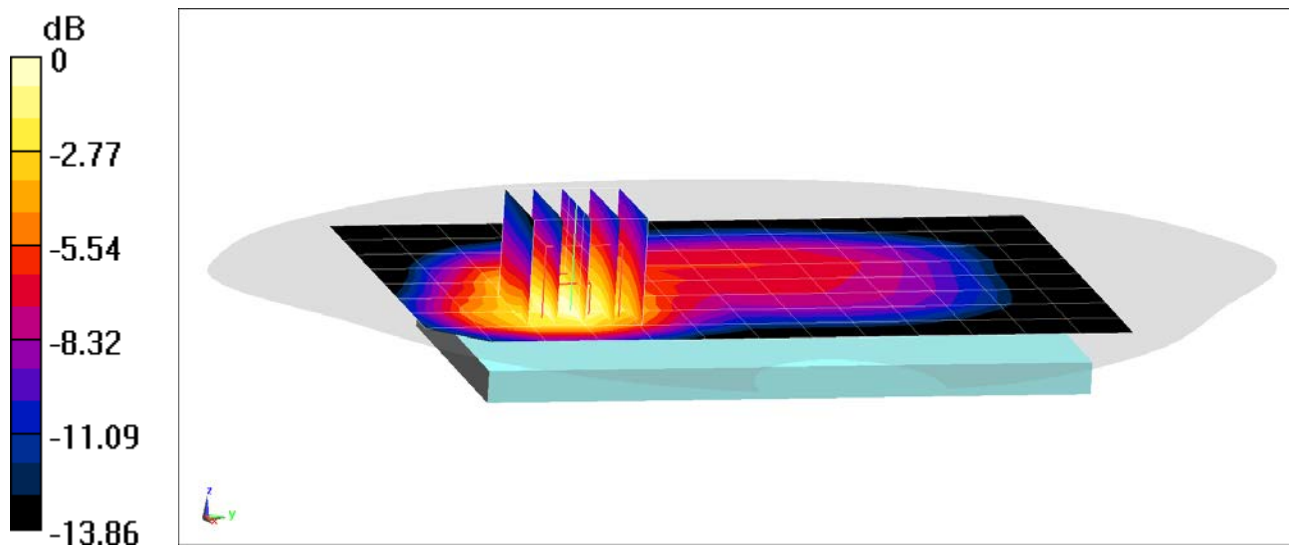
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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



0 dB = 0.391 W/kg = -4.08 dBW/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**

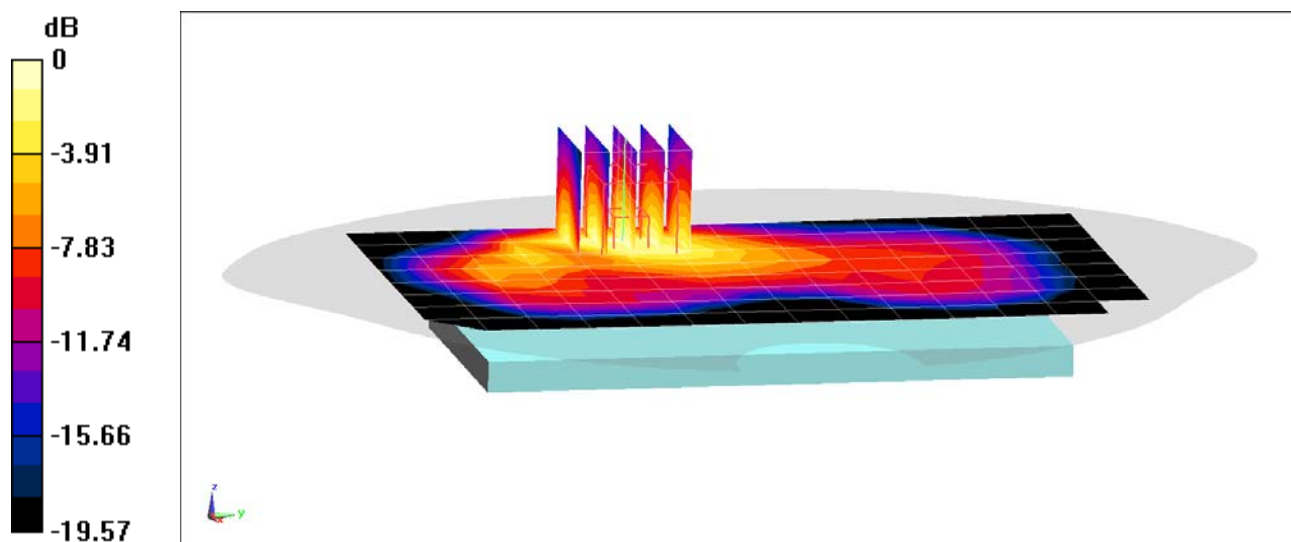
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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



0 dB = 0.409 W/kg = -3.88 dBW/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**

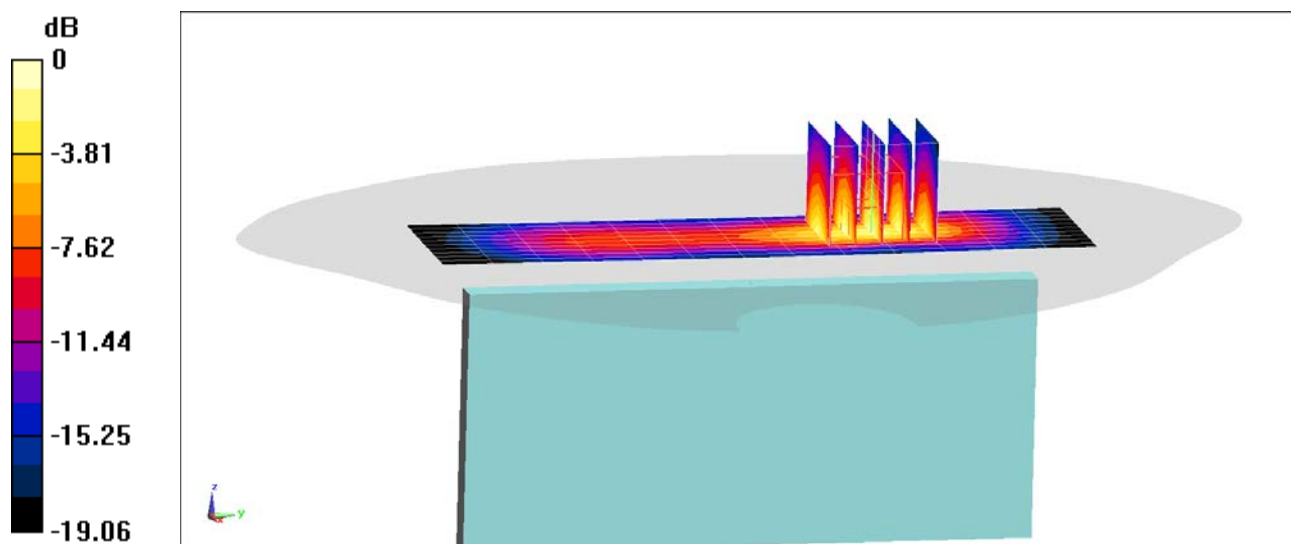
Area Scan (11x14x1): Measurement grid: dx=5mm, dy=15mm

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**

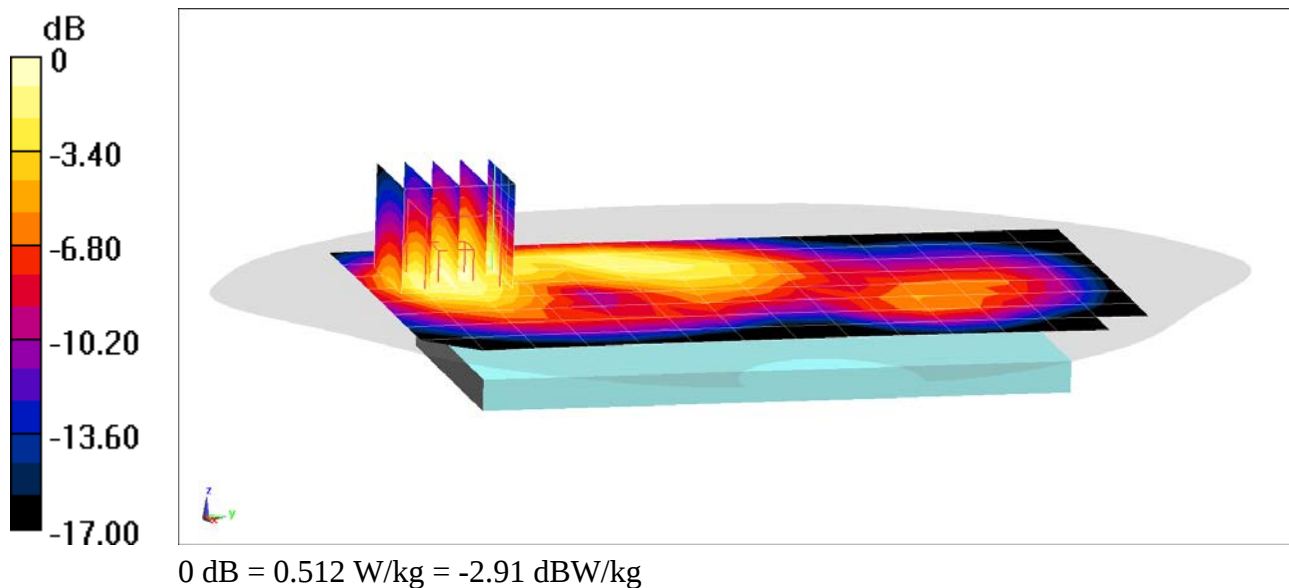
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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**

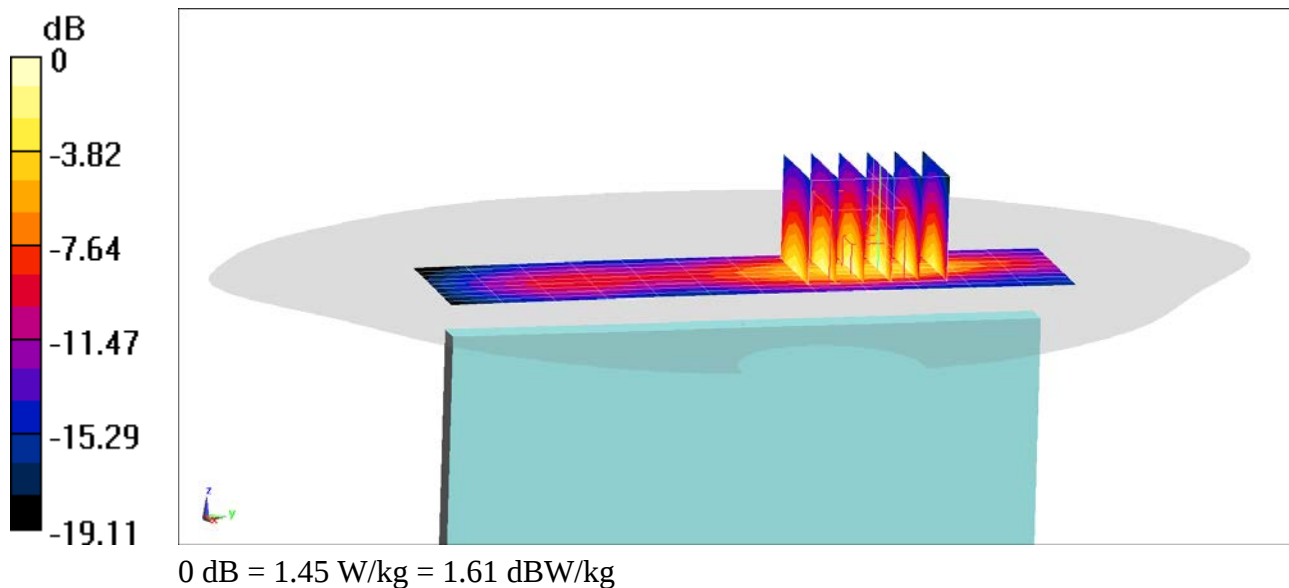
Area Scan (10x13x1): Measurement grid: dx=5mm, dy=15mm

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**

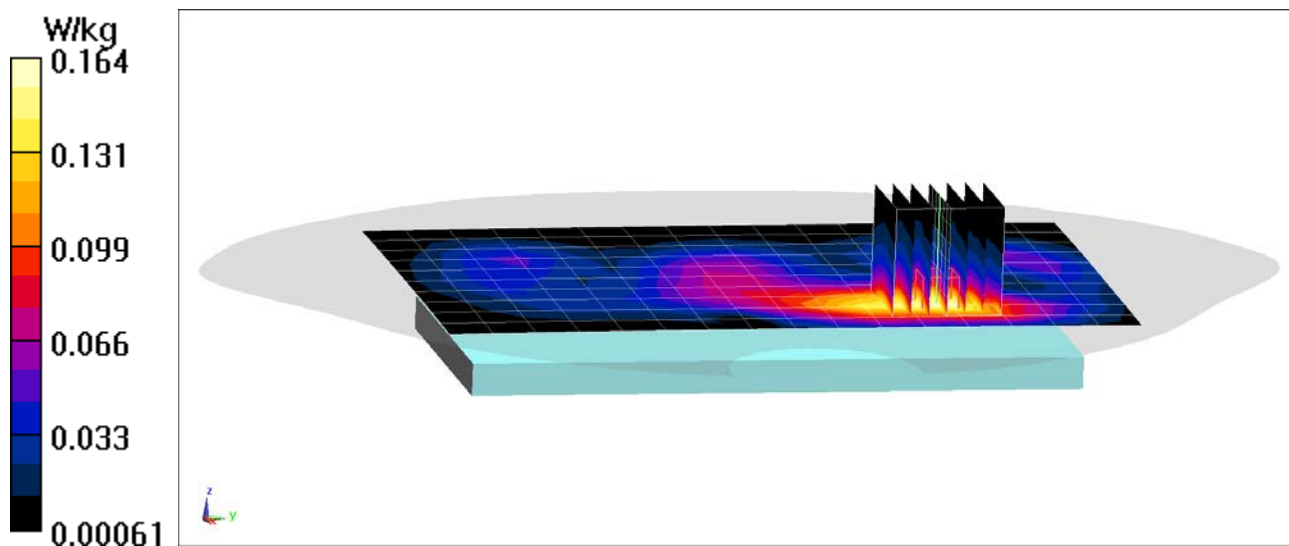
Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm

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**

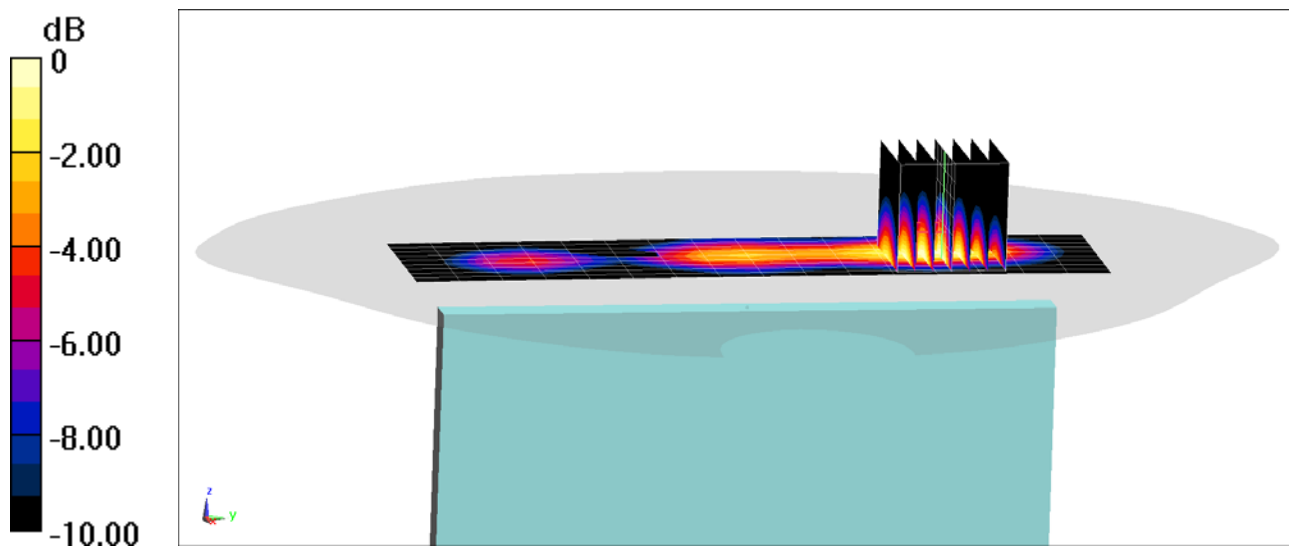
Area Scan (10x17x1): Measurement grid: dx=5mm, dy=12mm

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**

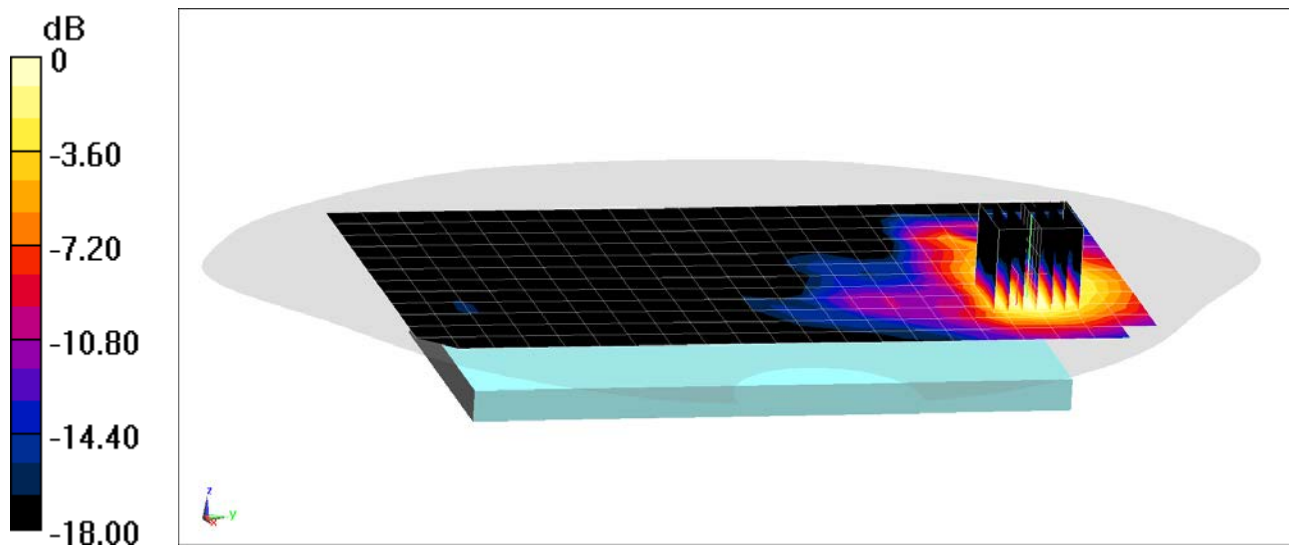
Area Scan (13x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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 = 6.827 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.898 W/kg

SAR(1 g) = 0.243 W/kg



0 dB = 0.549 W/kg = -2.60 dBW/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**

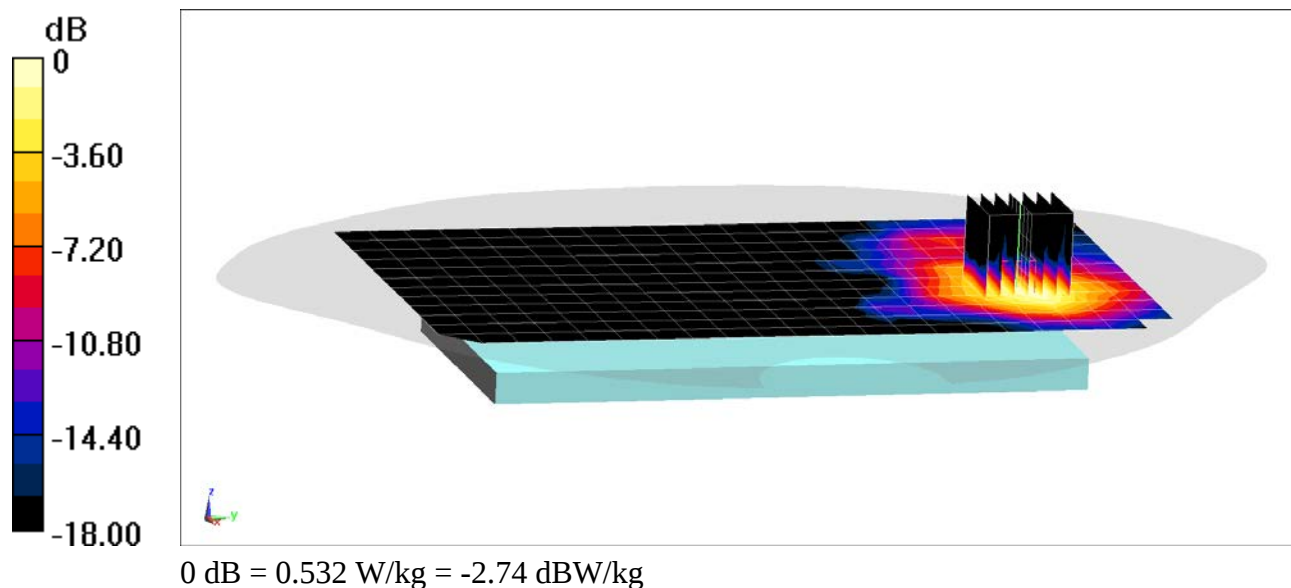
Area Scan (9x9x1): Measurement grid: dx=10mm, dy=10mm

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

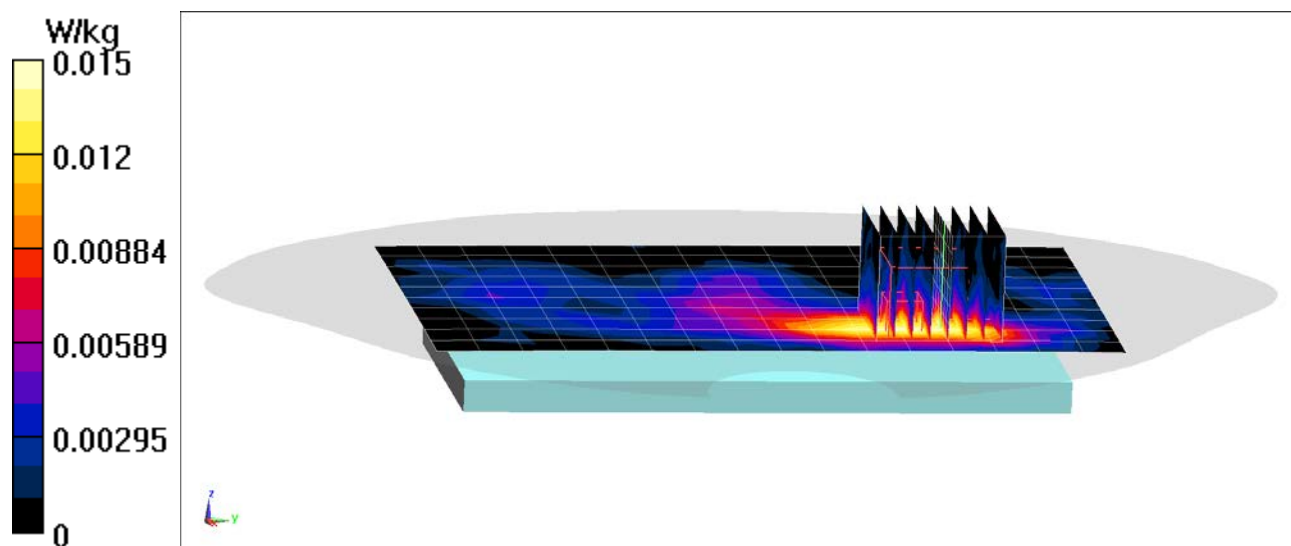
Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm

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

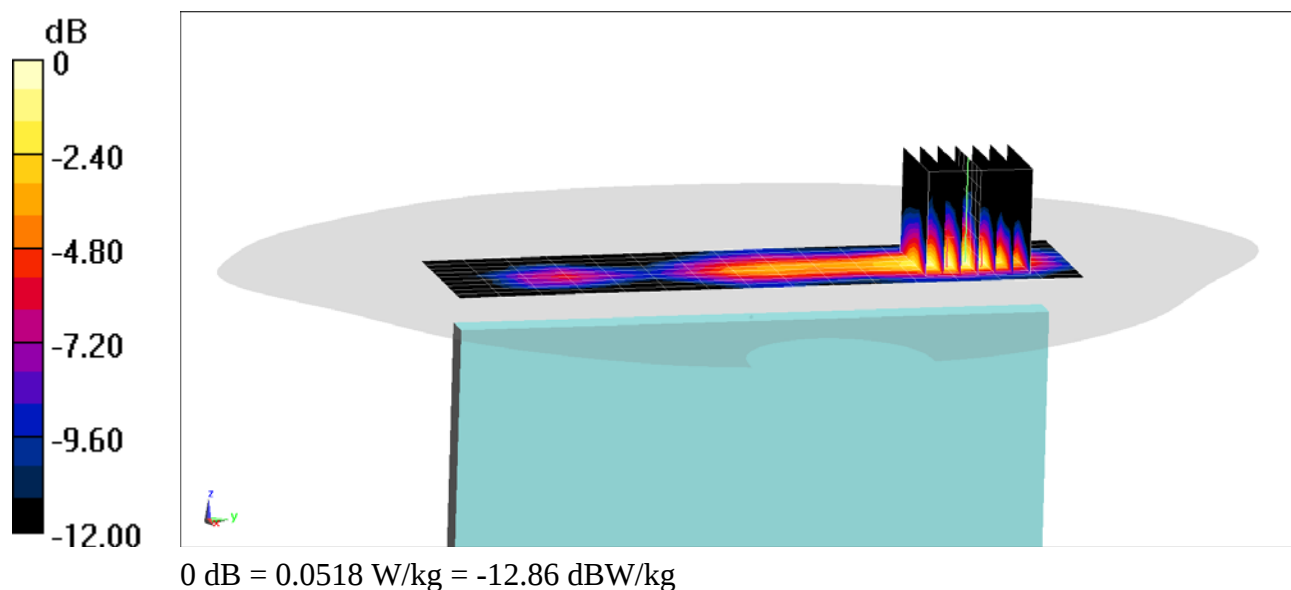
Area Scan (10x16x1): Measurement grid: dx=5mm, dy=12mm

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

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



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

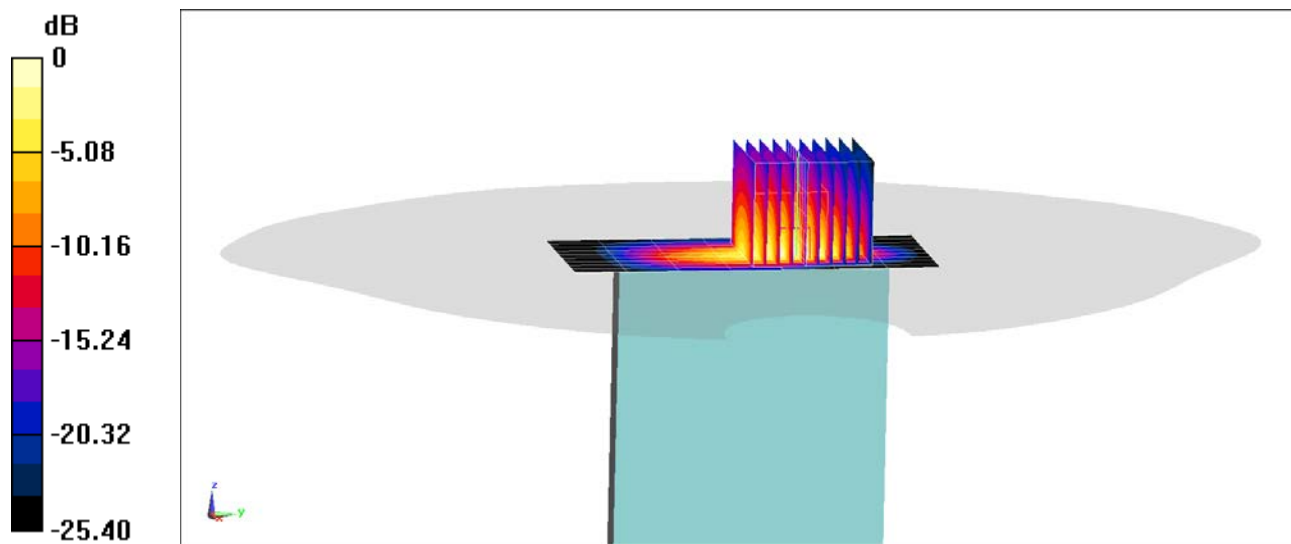
Area Scan (10x8x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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

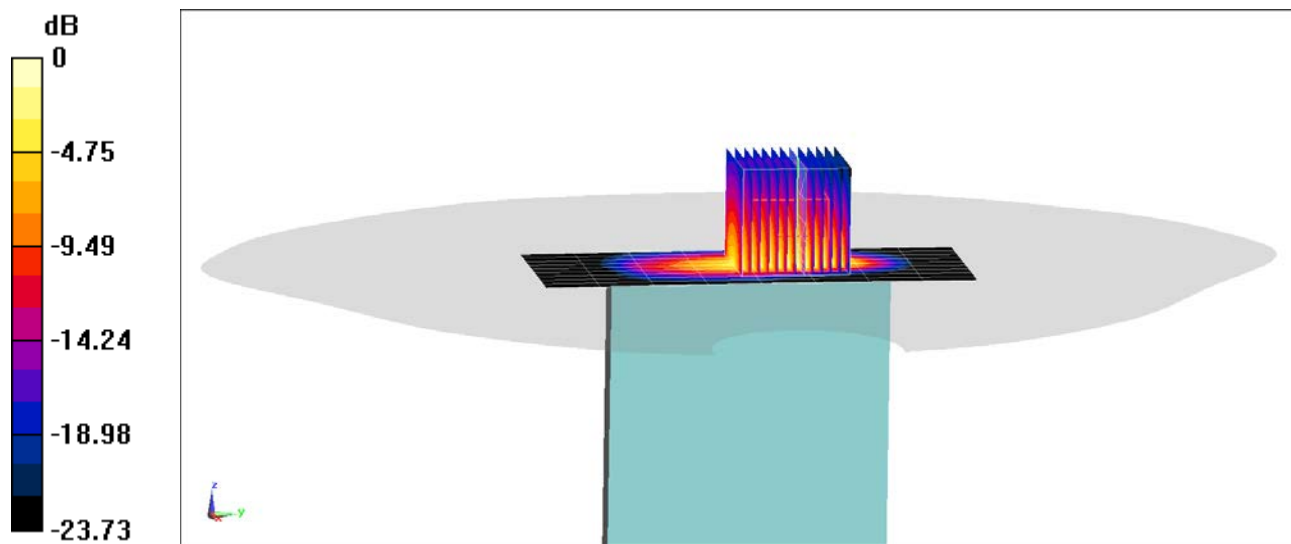
Area Scan (10x9x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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

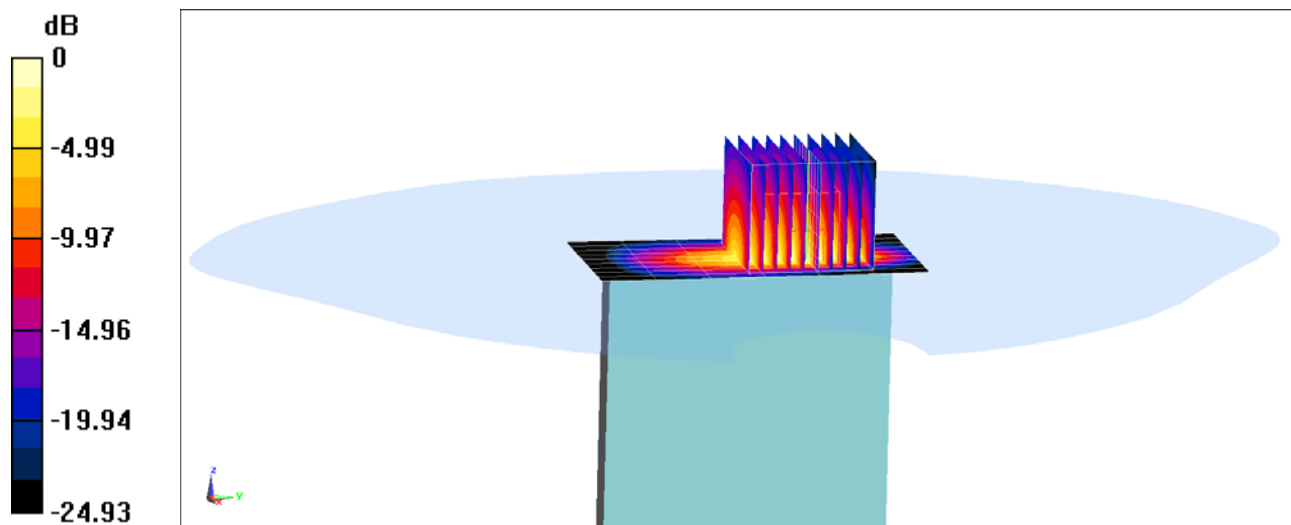
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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



0 dB = 15.8 W/kg = 11.99 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:

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

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**

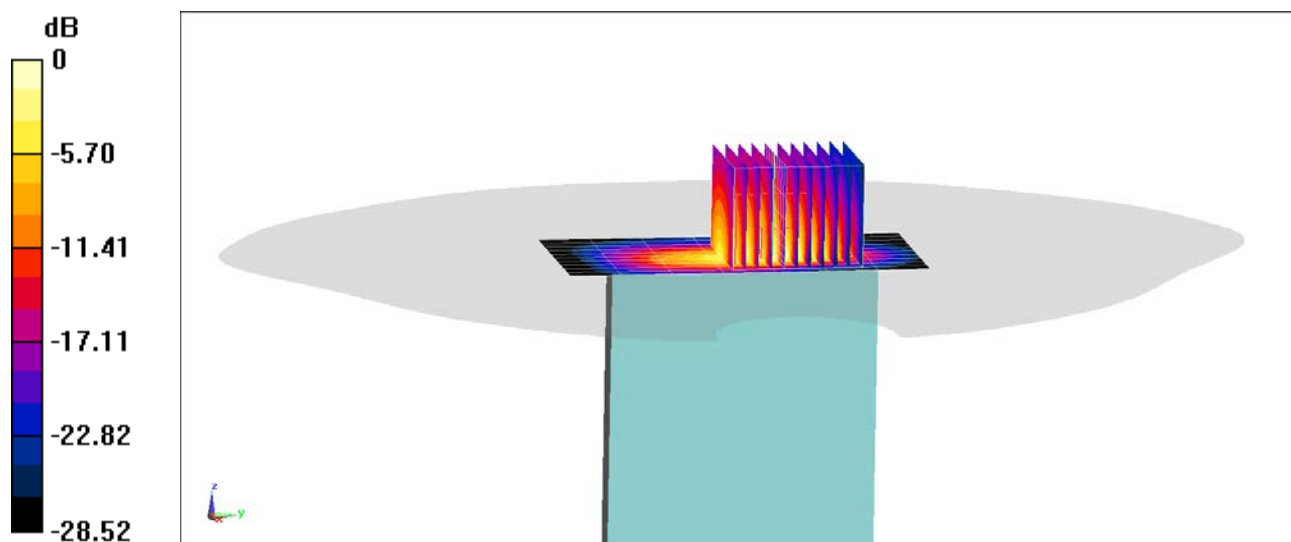
Area Scan (11x8x1): Measurement grid: dx=5mm, dy=15mm

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**

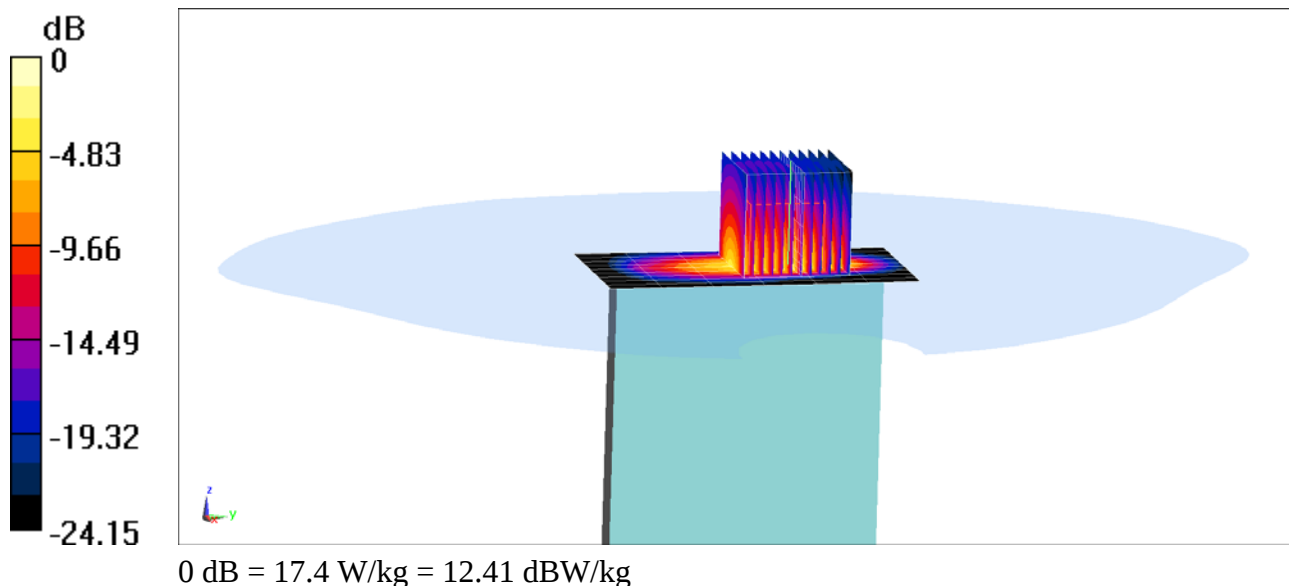
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (12x12x8)/Cube 0: Measurement grid: $dx=2.8\text{mm}$, $dy=2.8\text{mm}$, $dz=1.4\text{mm}$; 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



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**

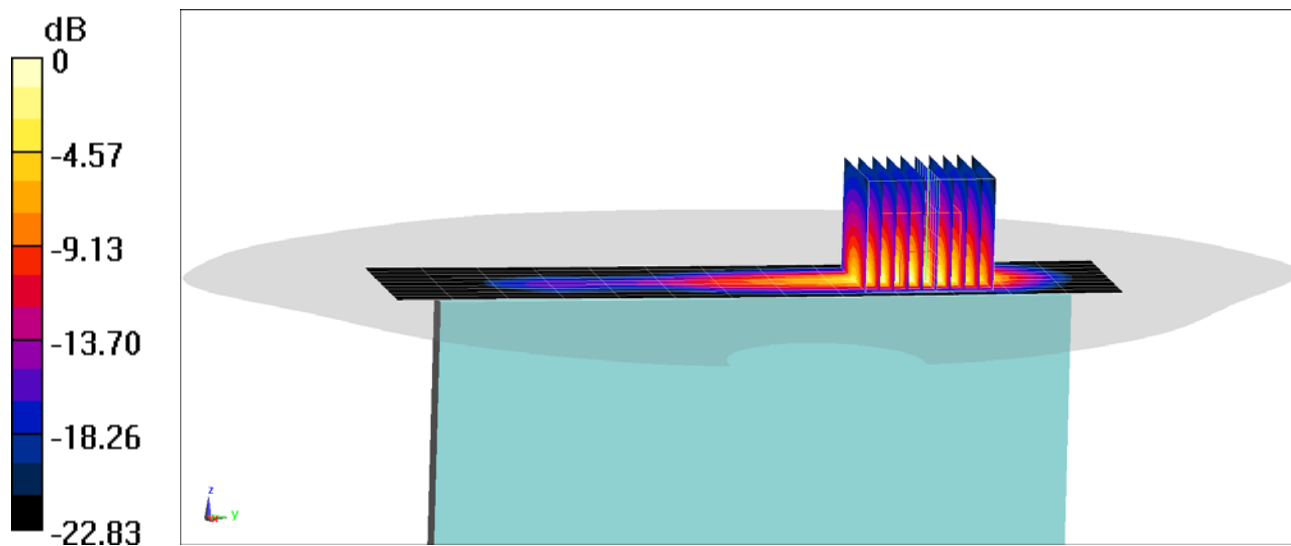
Area Scan (10x14x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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 = 77.71 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**

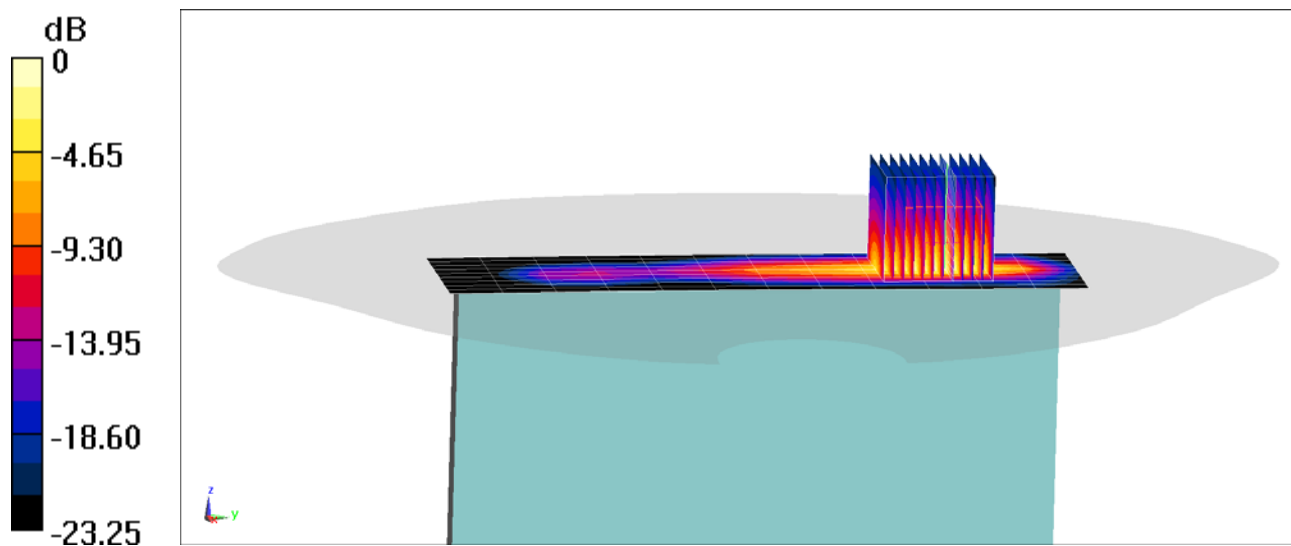
Area Scan (10x13x1): Measurement grid: dx=5mm, dy=15mm

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**

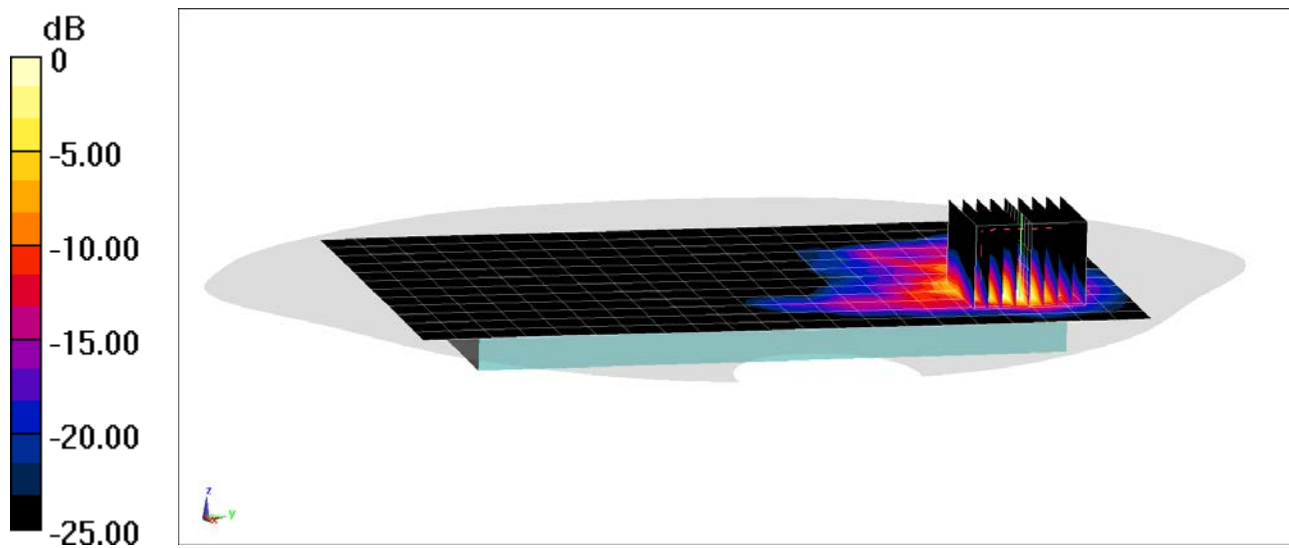
Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm

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)

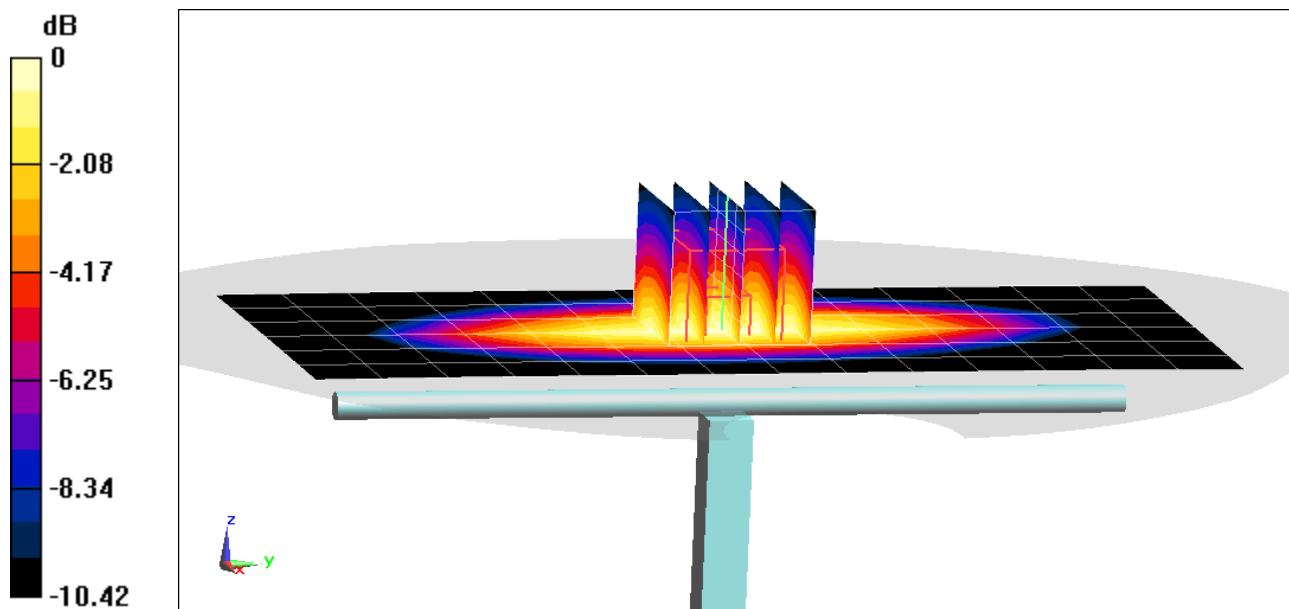
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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)

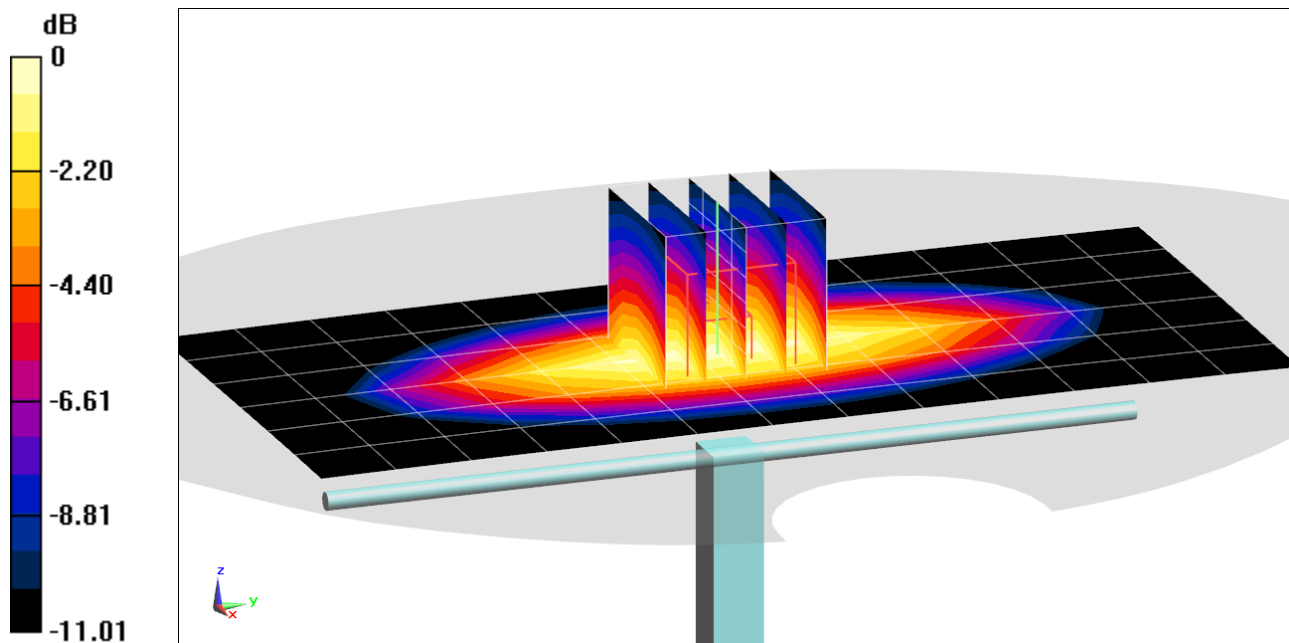
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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%



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)

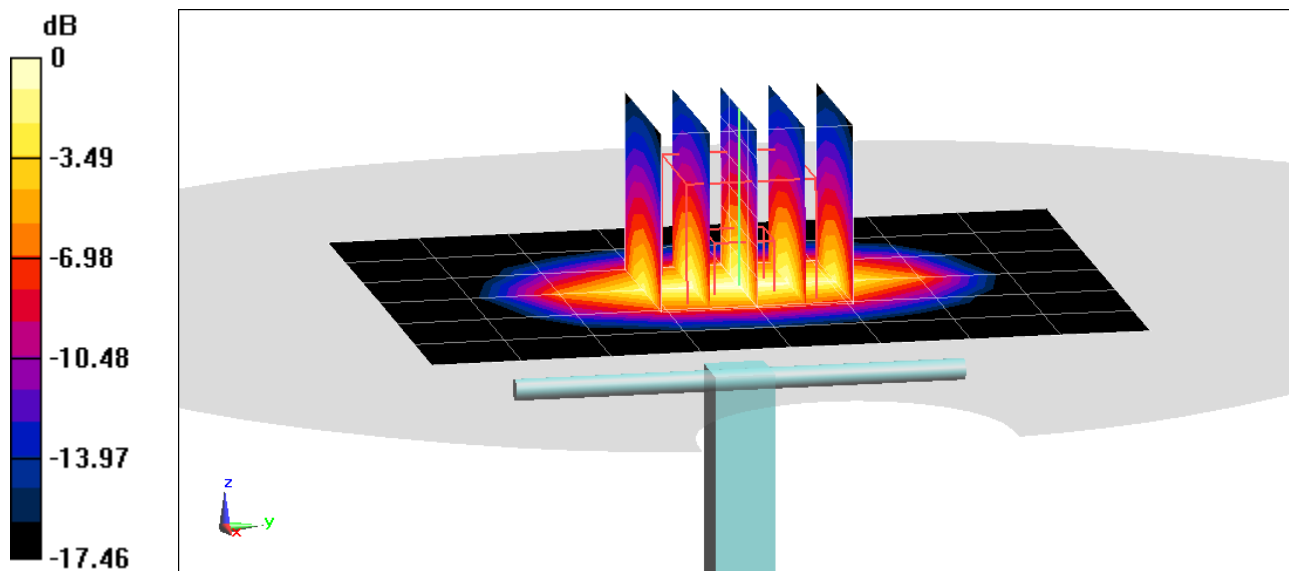
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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)

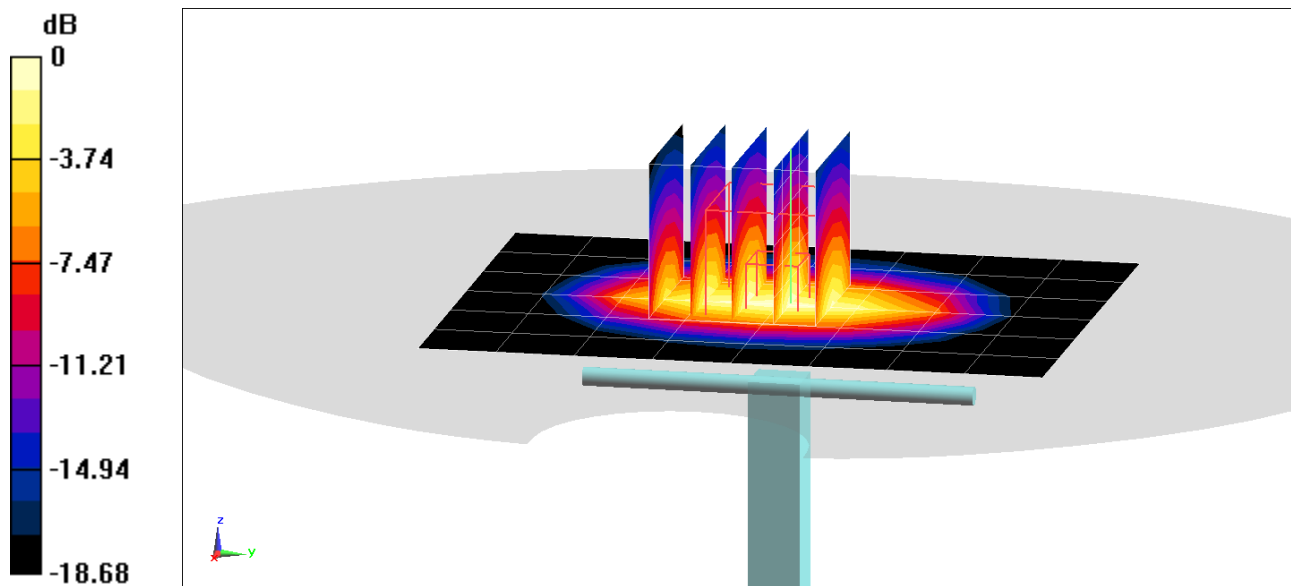
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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)

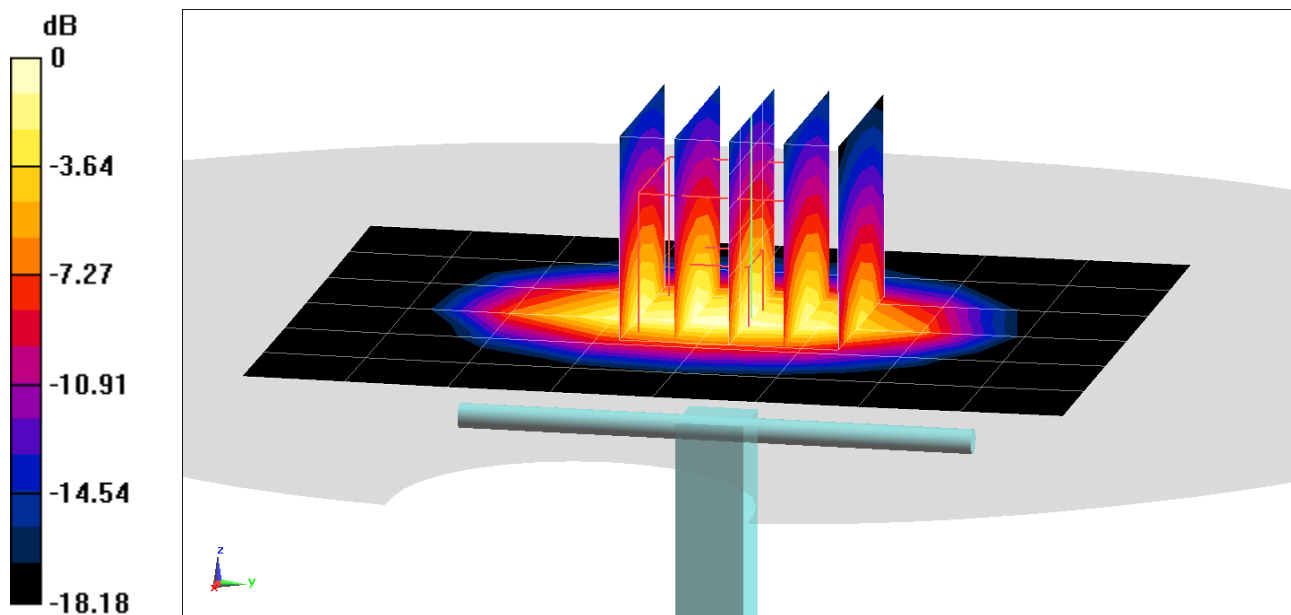
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

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)

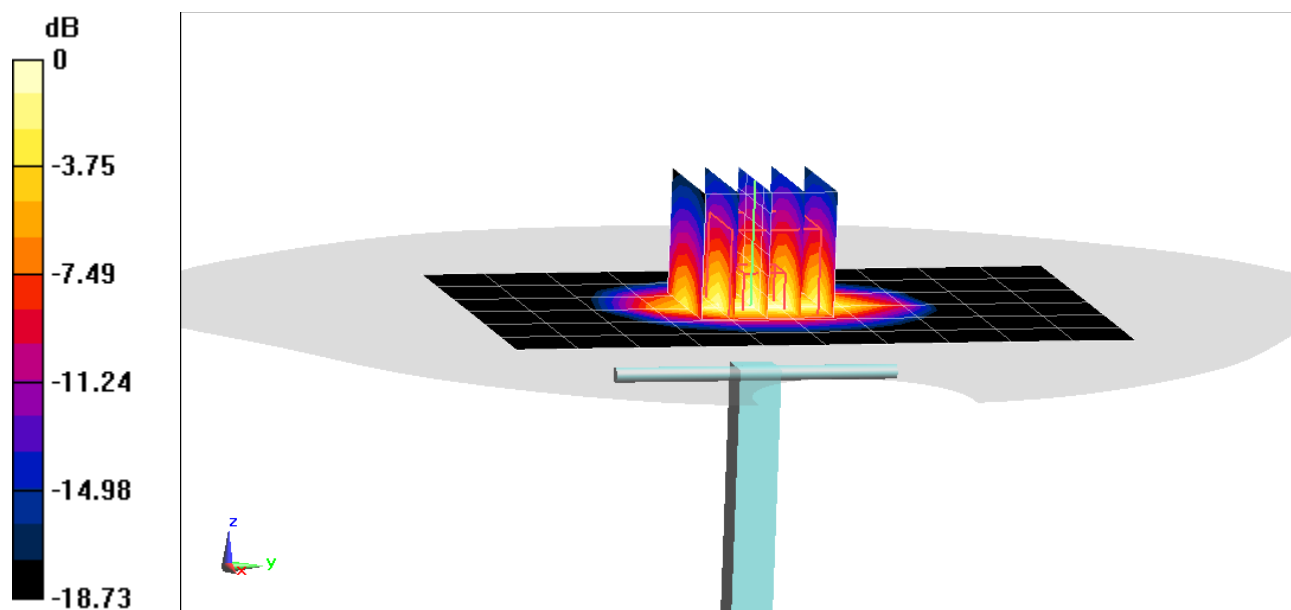
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

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)

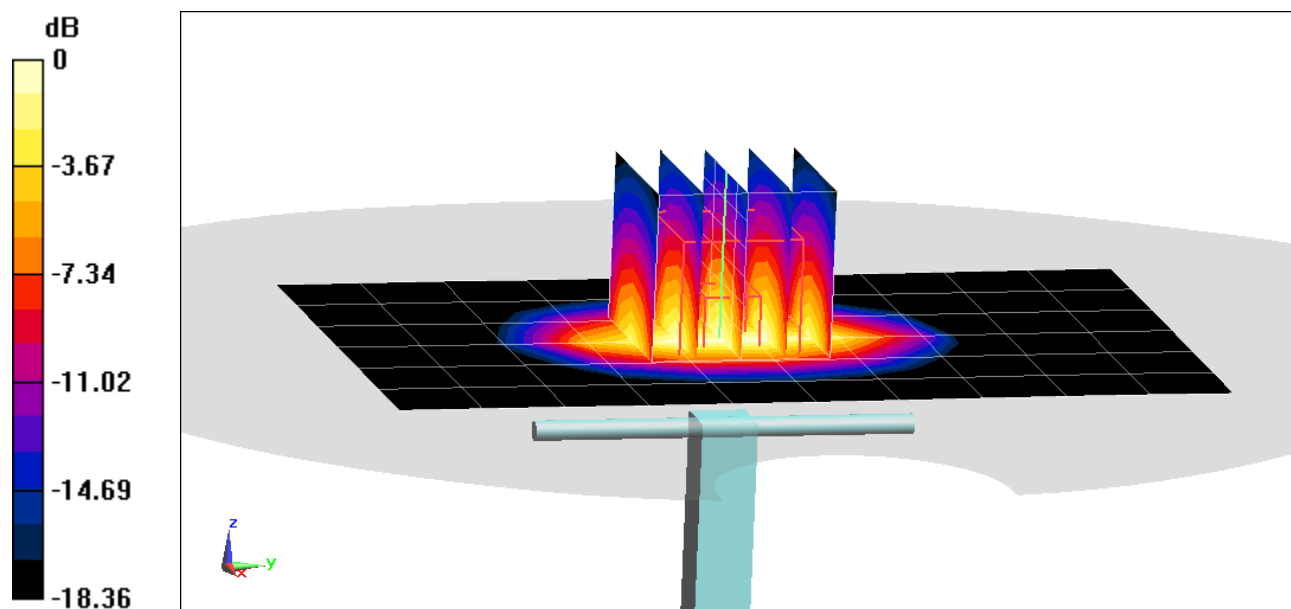
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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)

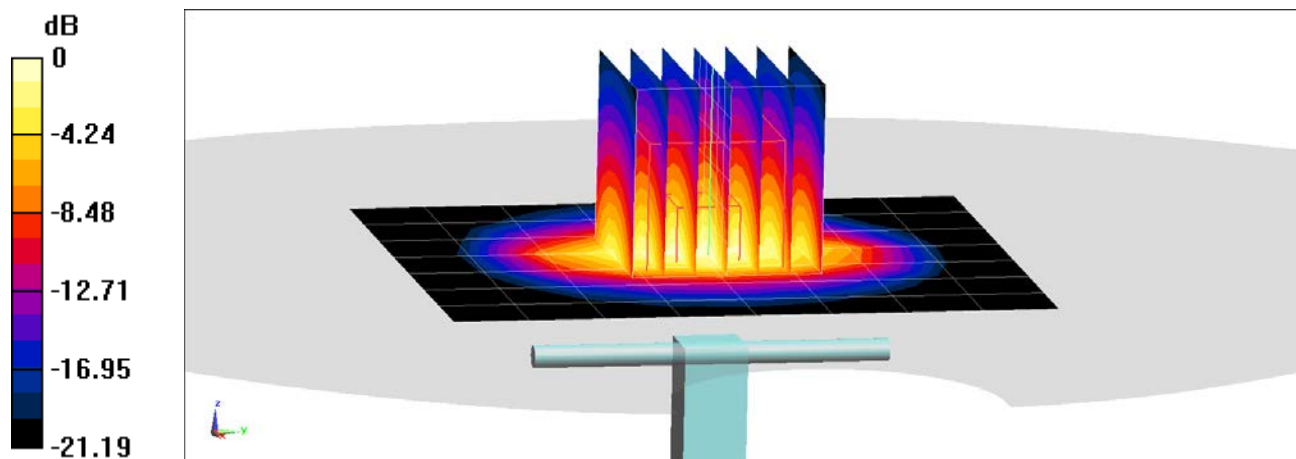
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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)

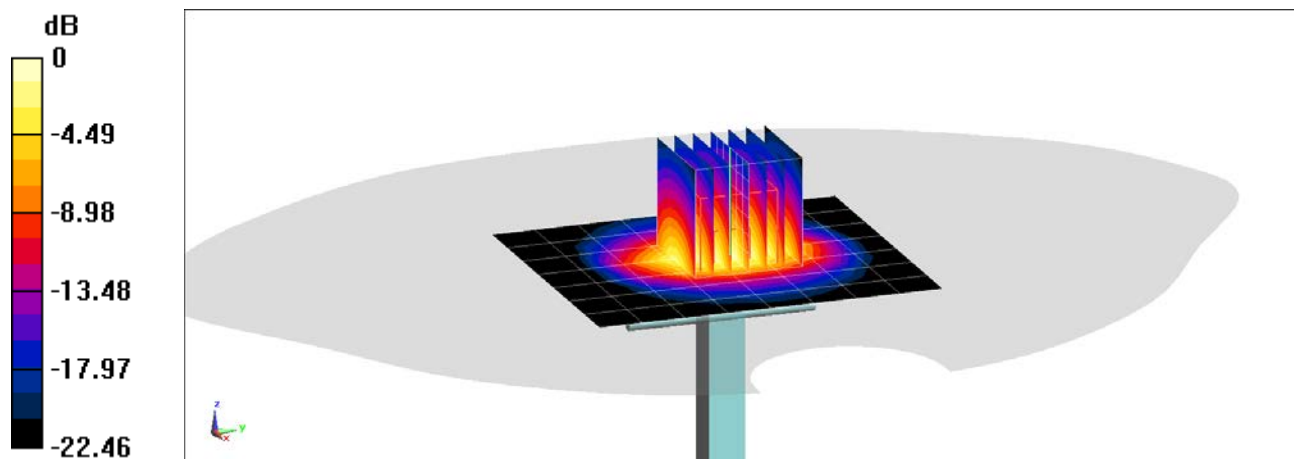
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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%



0 dB = 9.07 W/kg = 9.58 dBW/kg

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)

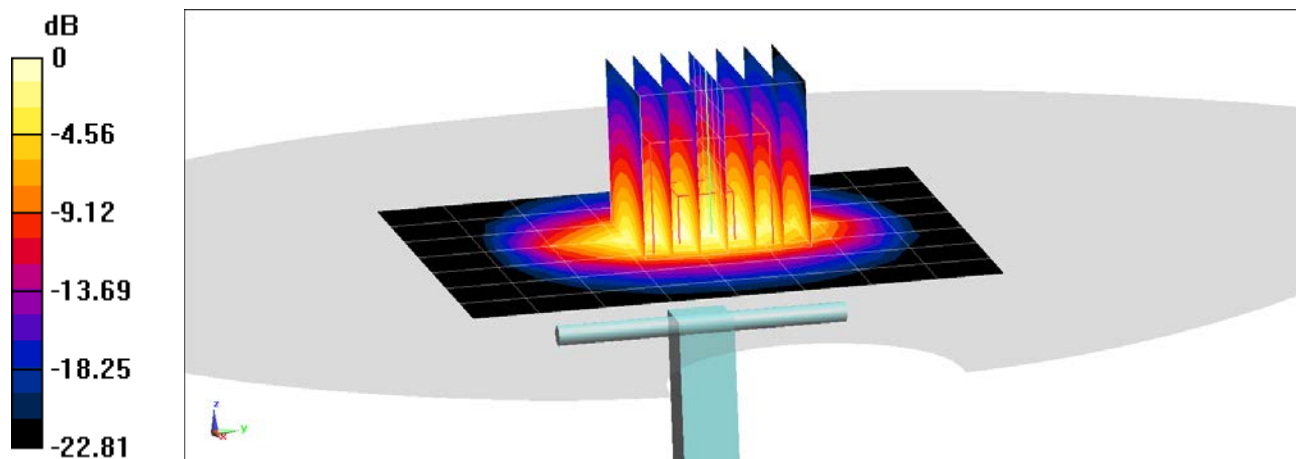
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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:

$f = 2600 \text{ MHz}$; $\sigma = 1.968 \text{ S/m}$; $\epsilon_r = 38.574$; $\rho = 1000 \text{ kg/m}^3$

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)

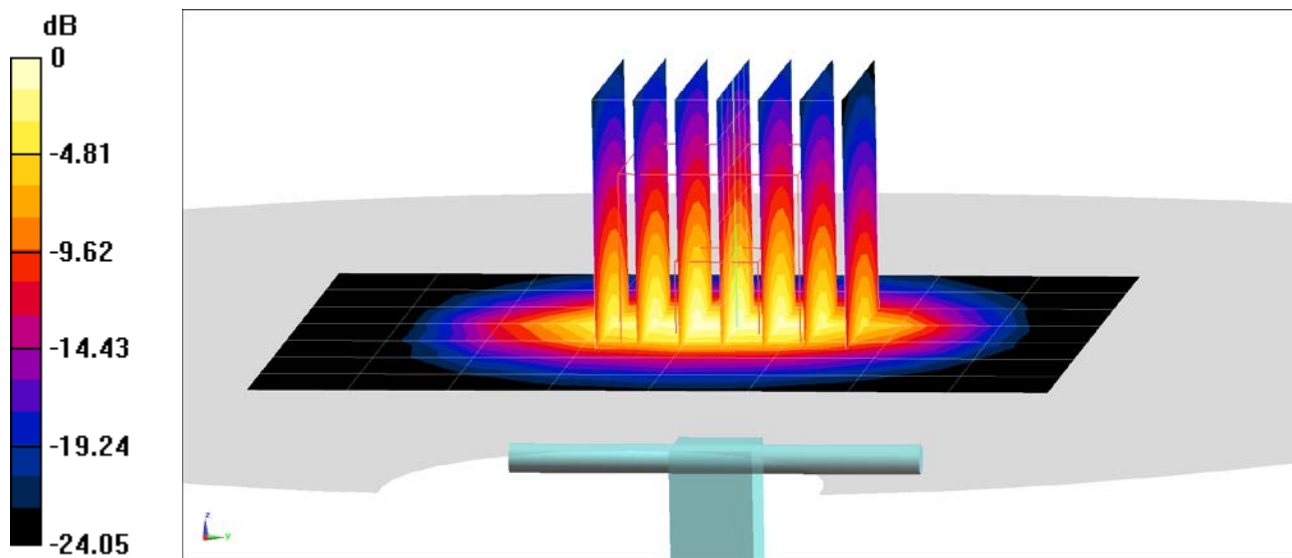
Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

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:

$f = 3700 \text{ MHz}$; $\sigma = 3.107 \text{ S/m}$; $\epsilon_r = 36.624$; $\rho = 1000 \text{ kg/m}^3$

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)

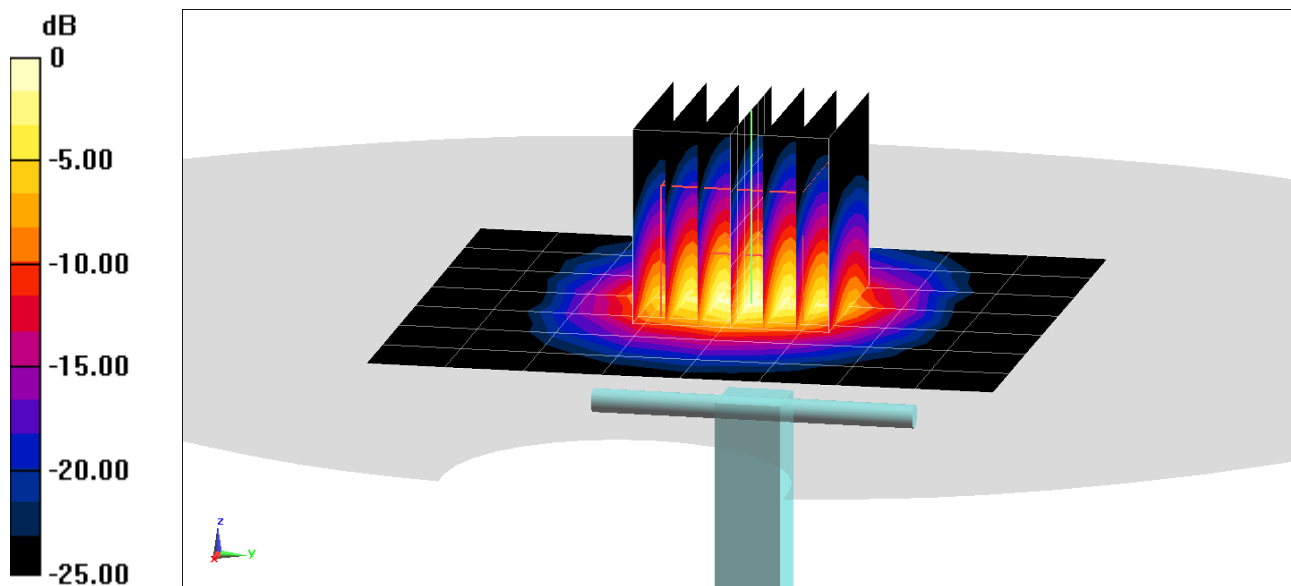
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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)

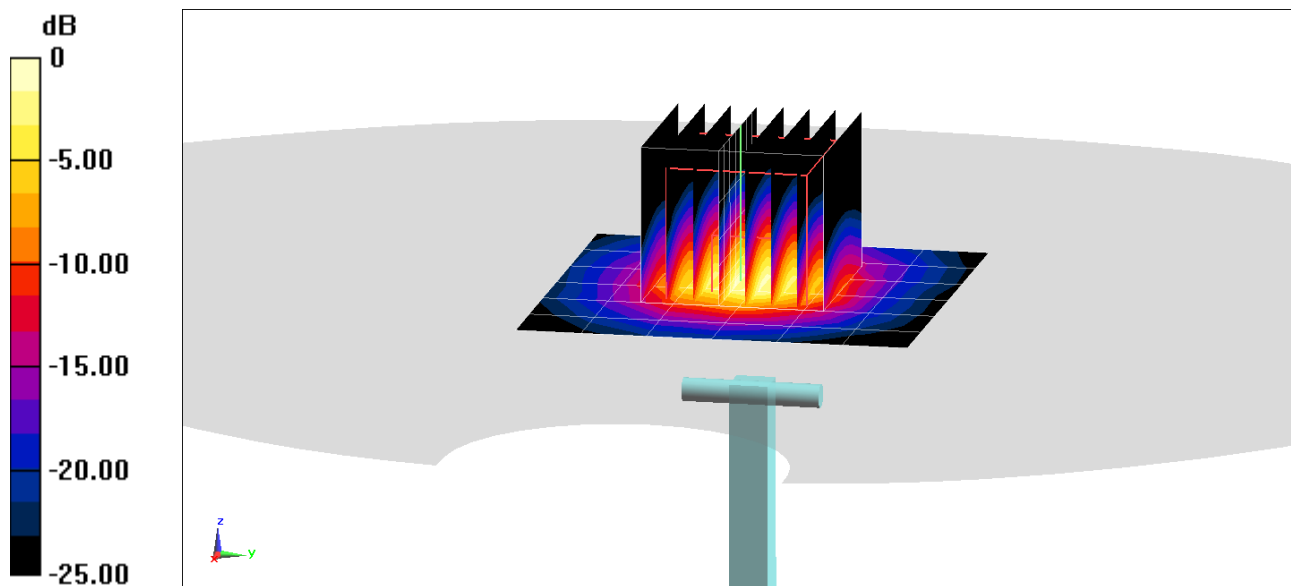
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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)

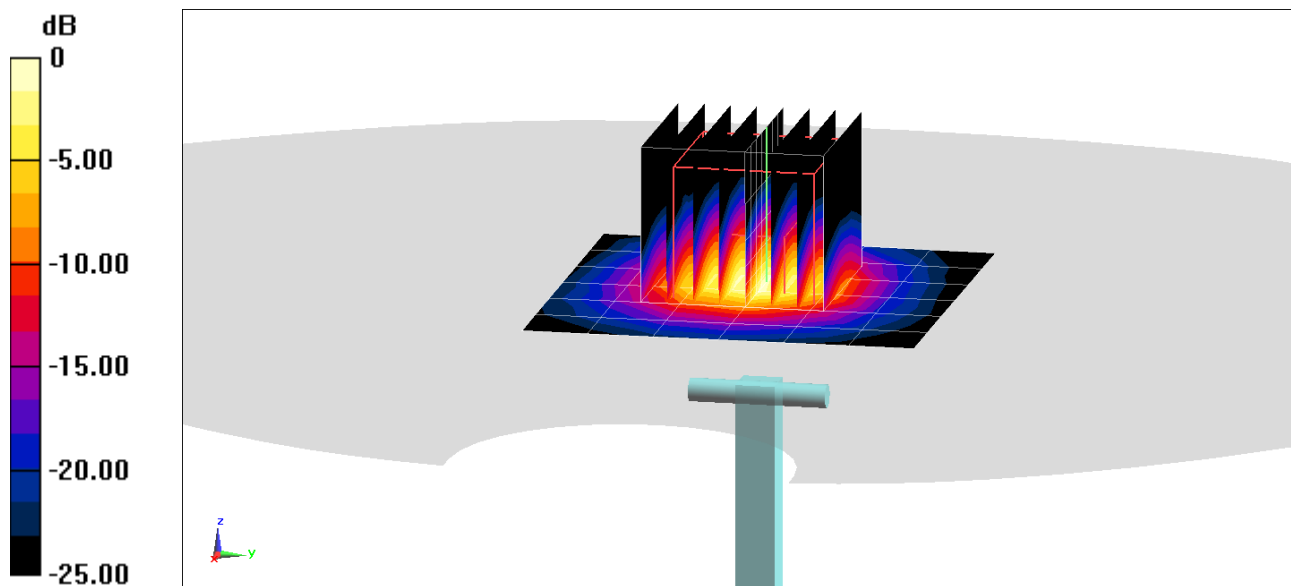
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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%



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)

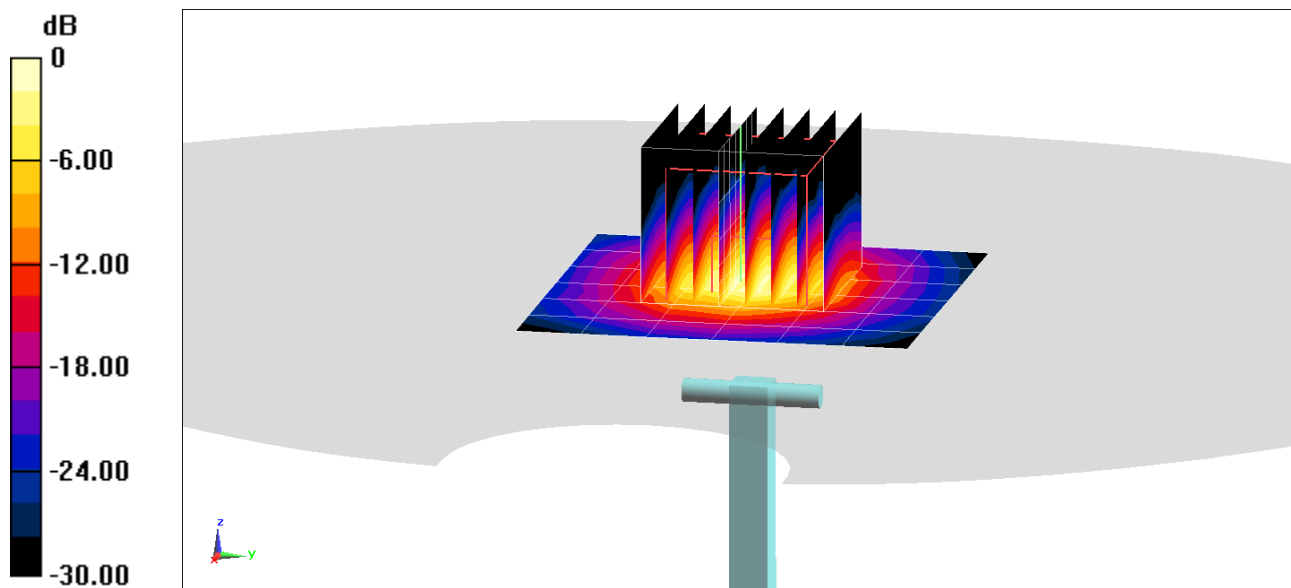
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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)

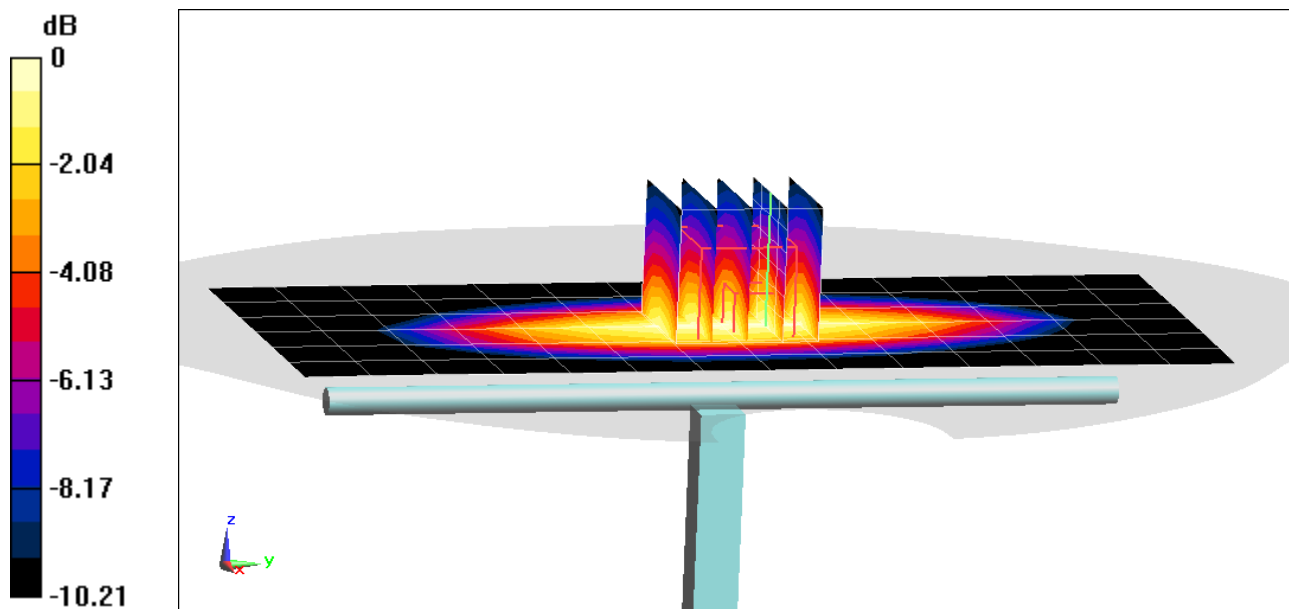
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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%



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)

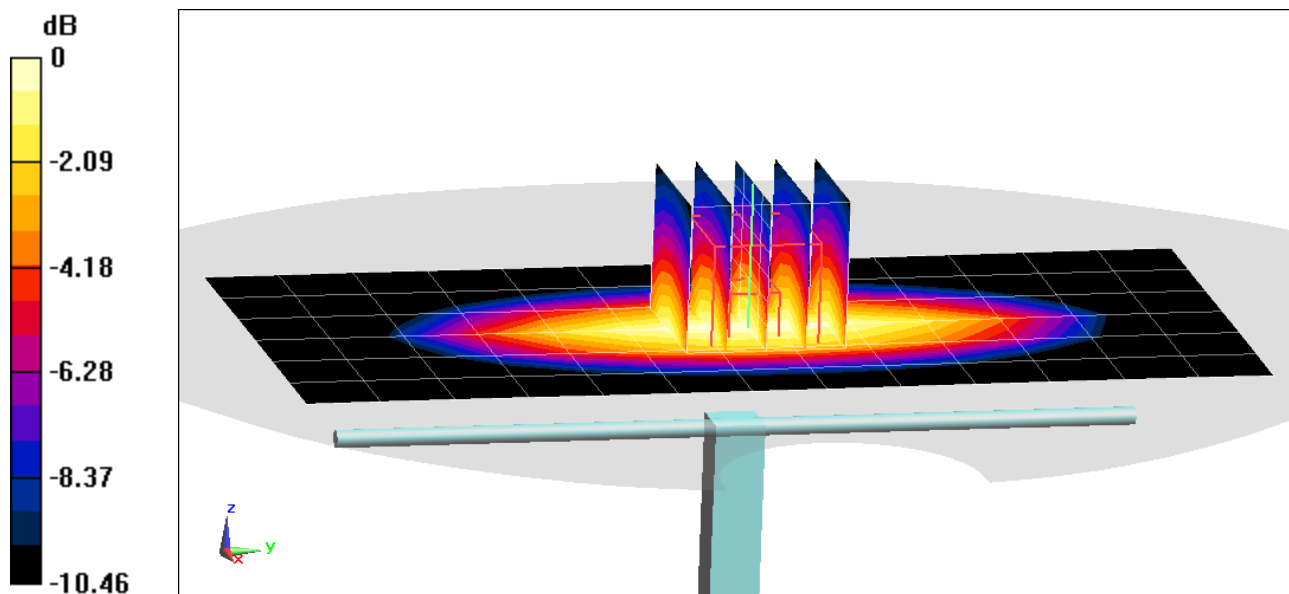
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

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)

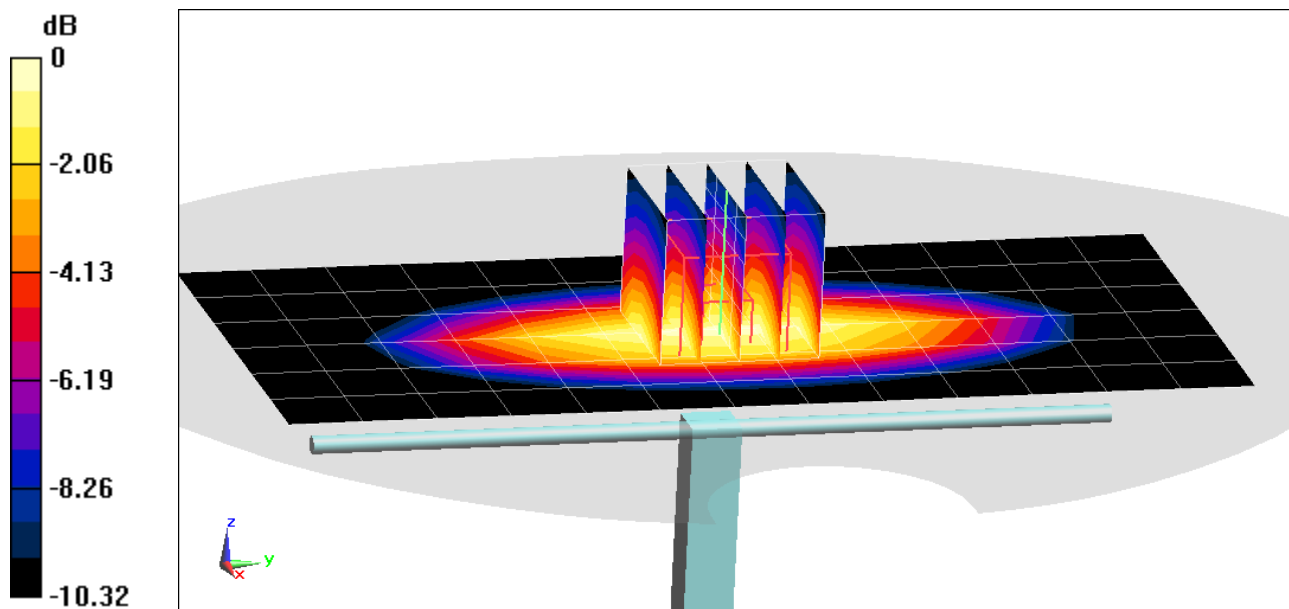
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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)

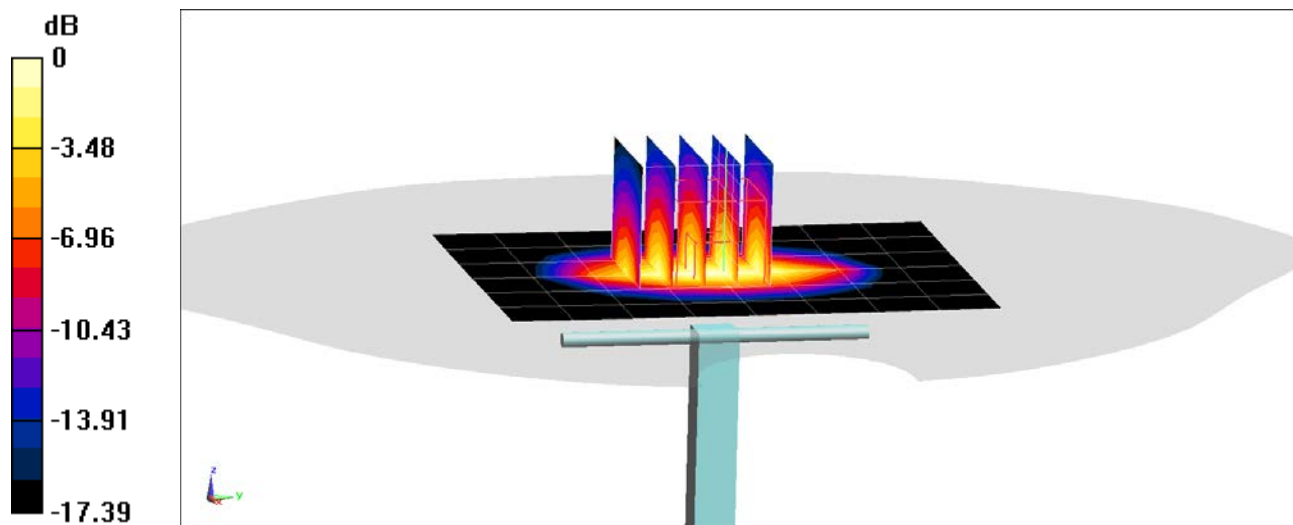
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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)

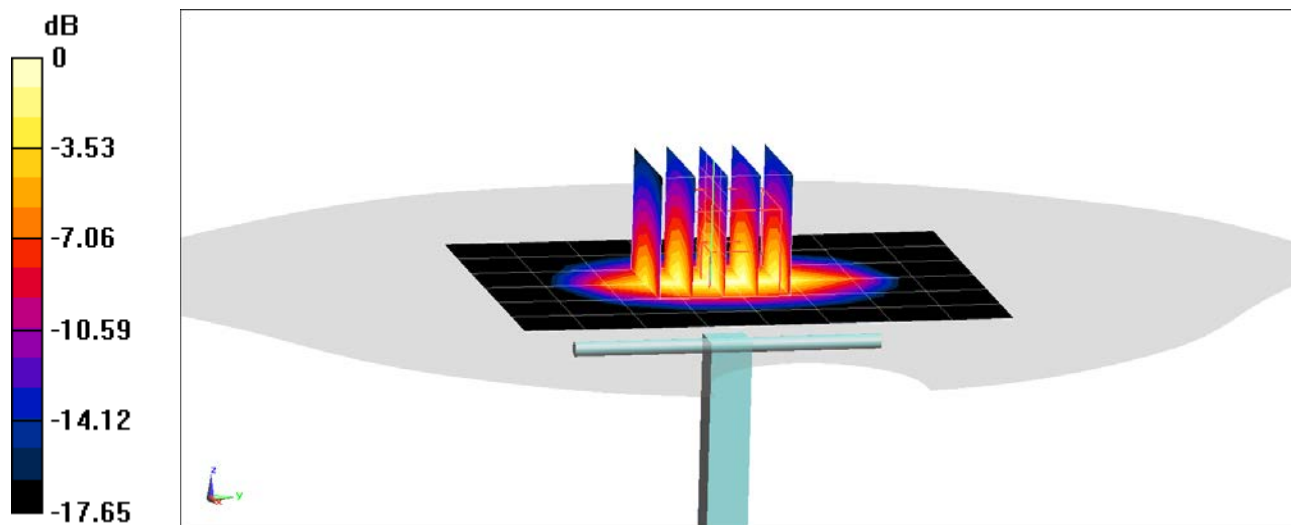
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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)

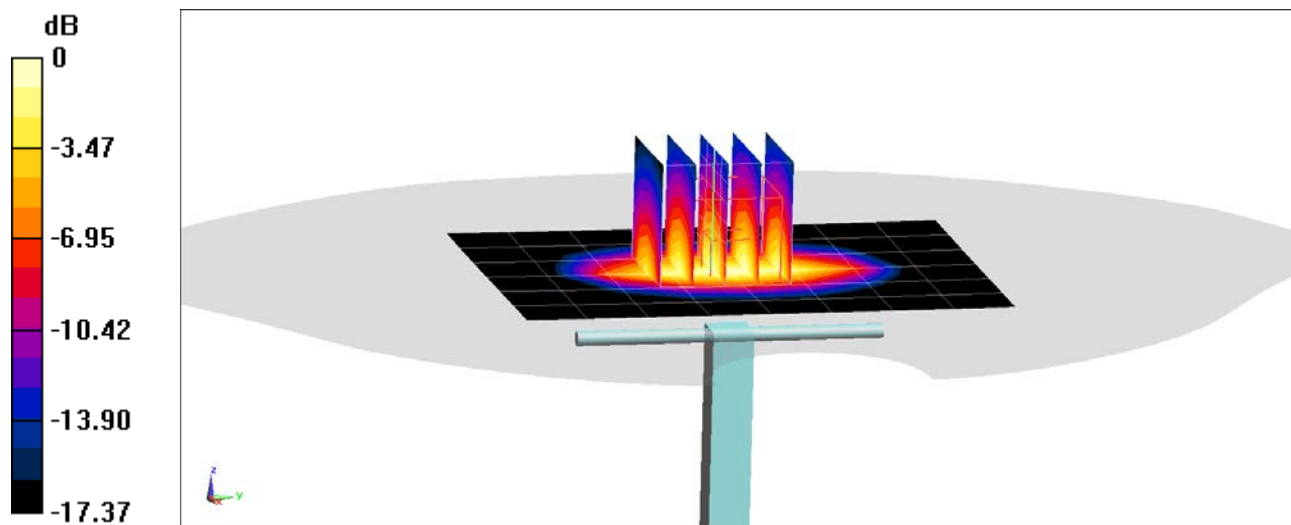
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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)

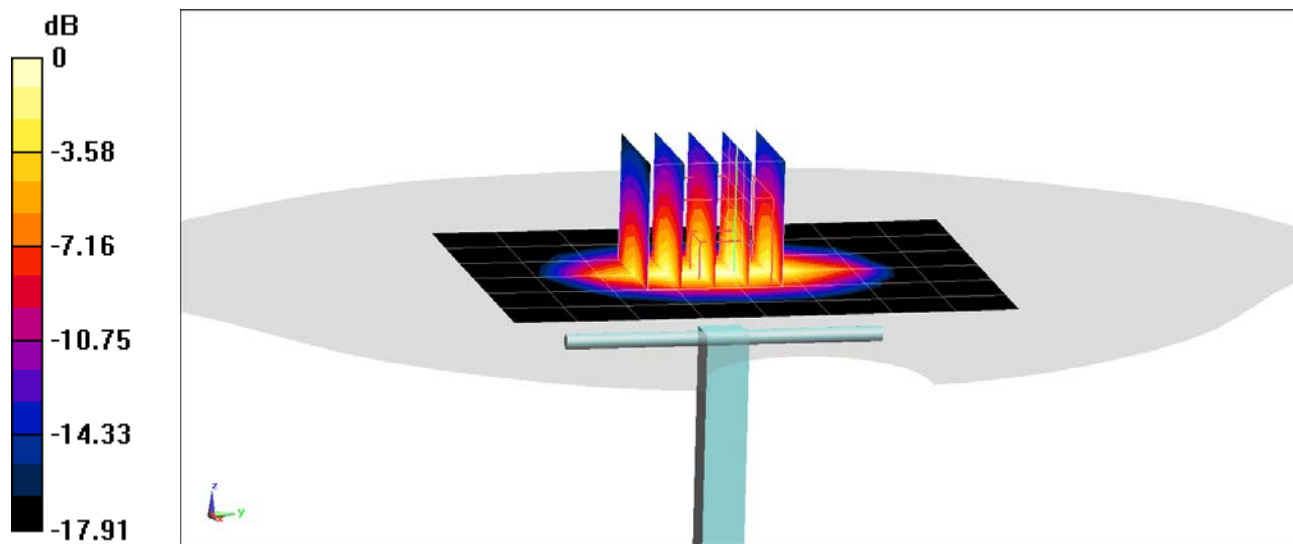
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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)

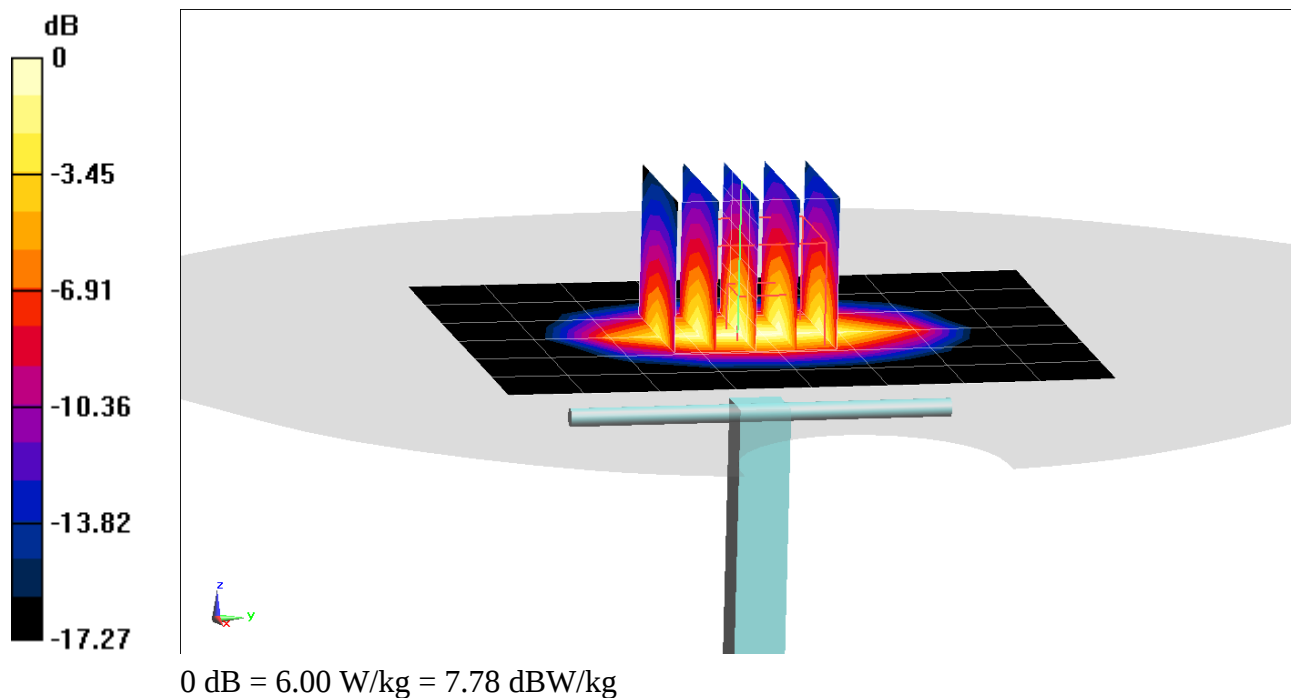
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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%



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)

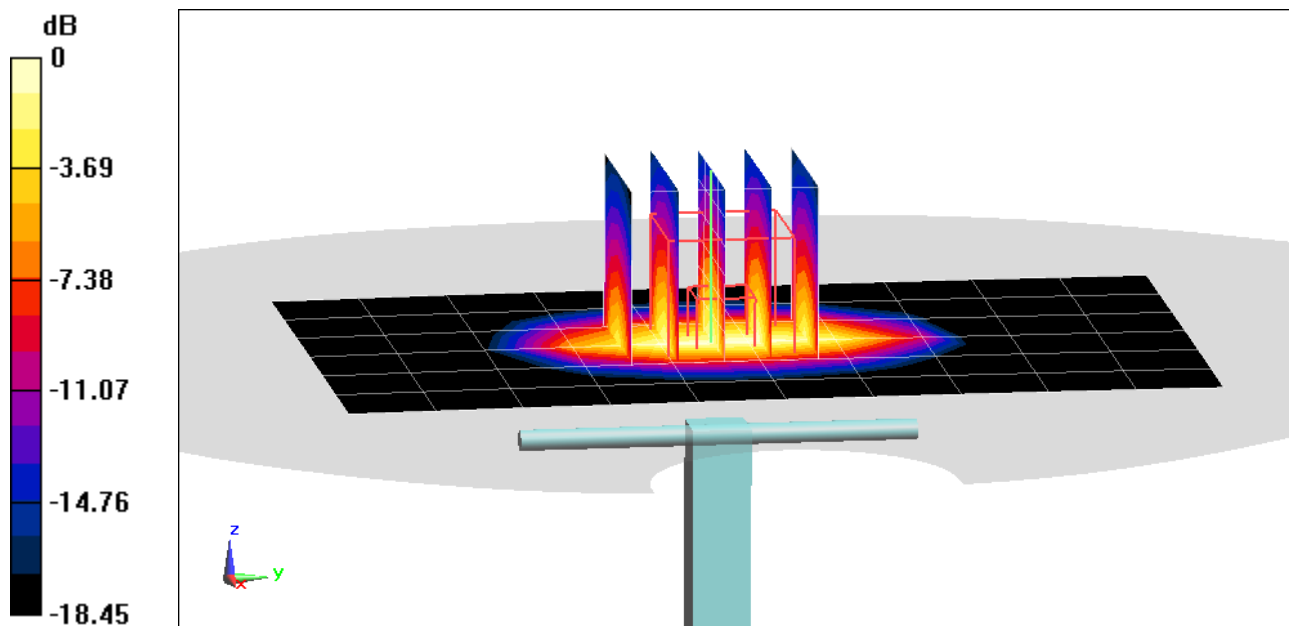
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 7.68 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)

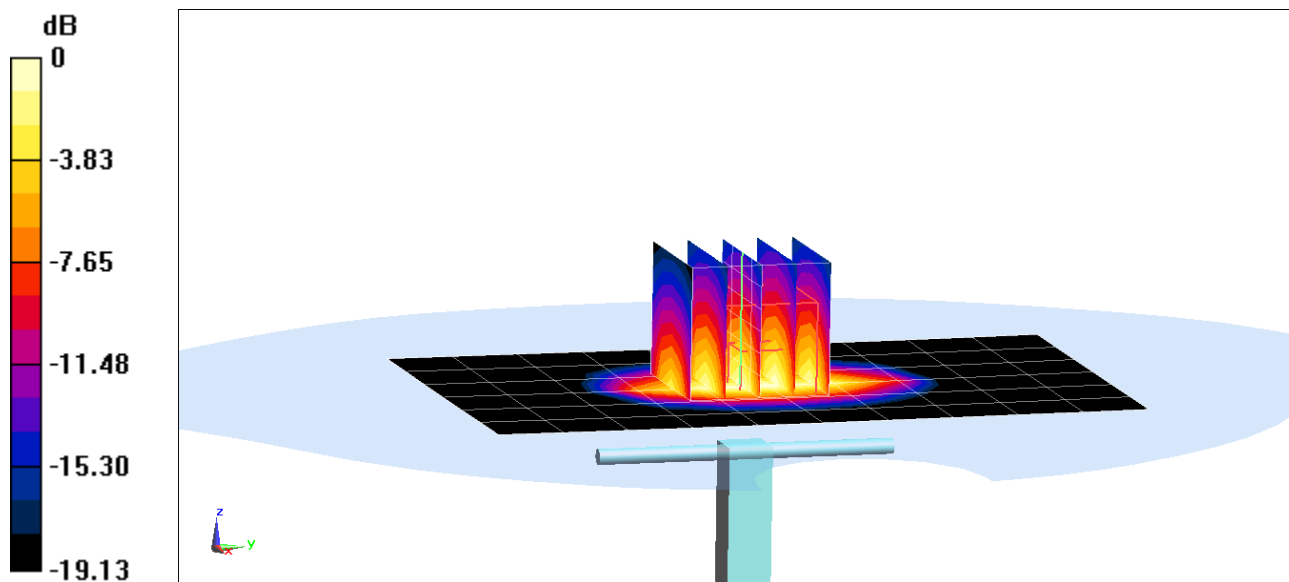
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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)

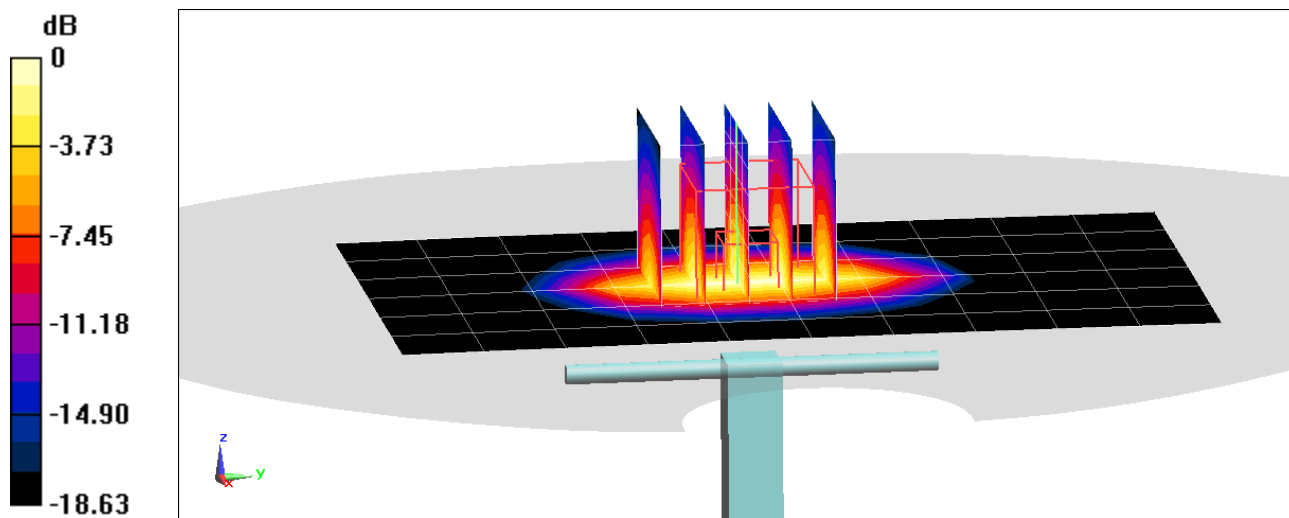
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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)

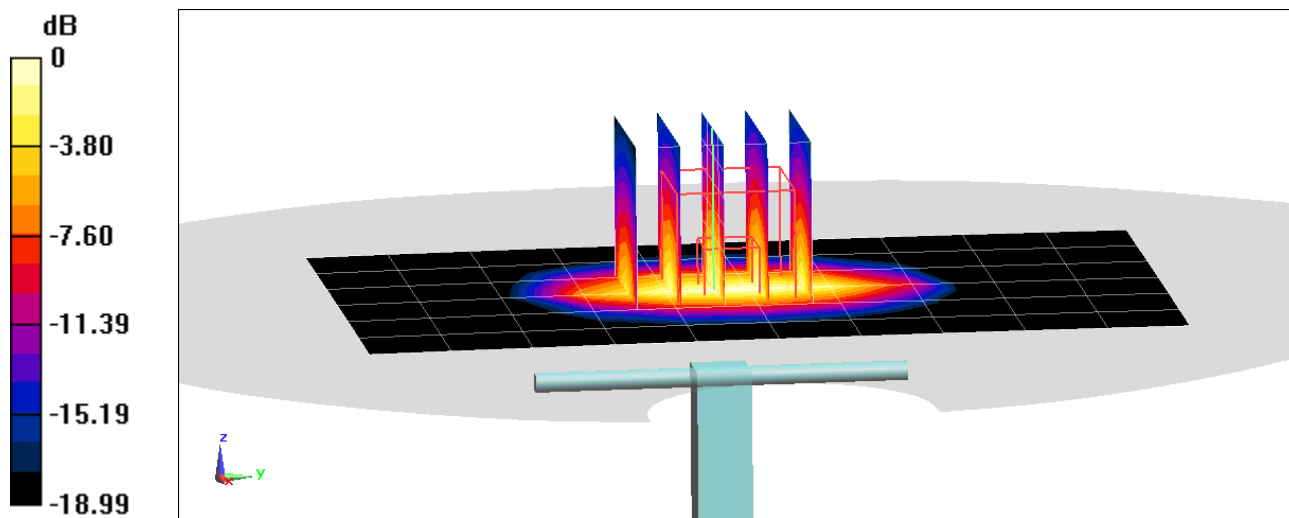
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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%



0 dB = 6.36 W/kg = 8.03 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:

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

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)

1900 MHz System Verification at 20.0 dBm (100 mW)

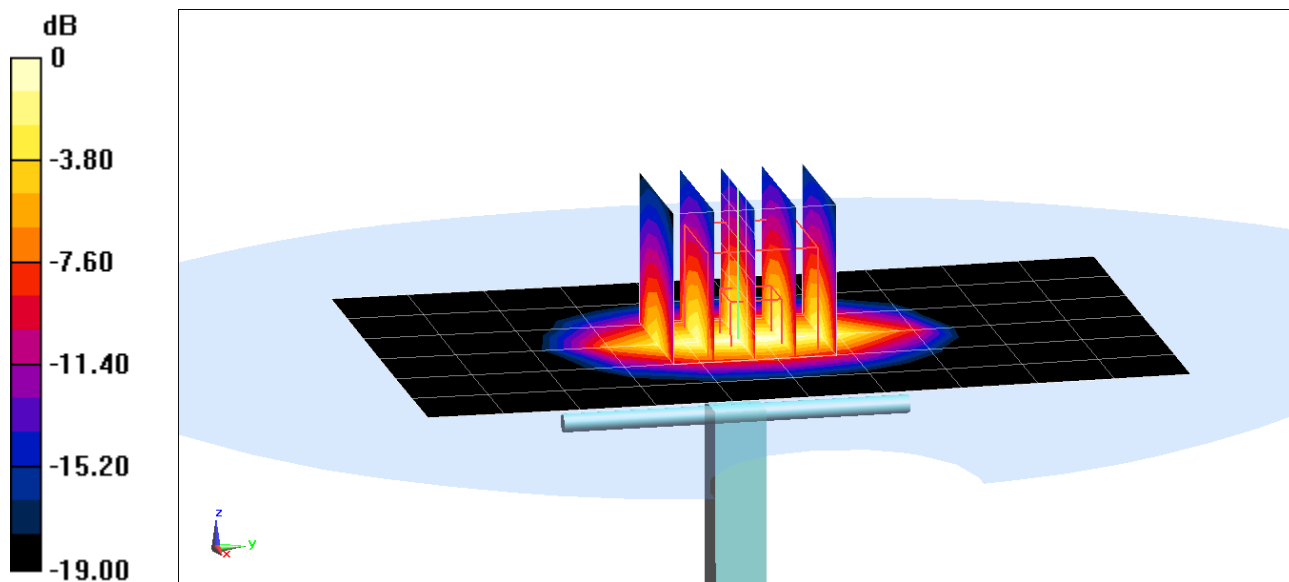
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 7.88 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)

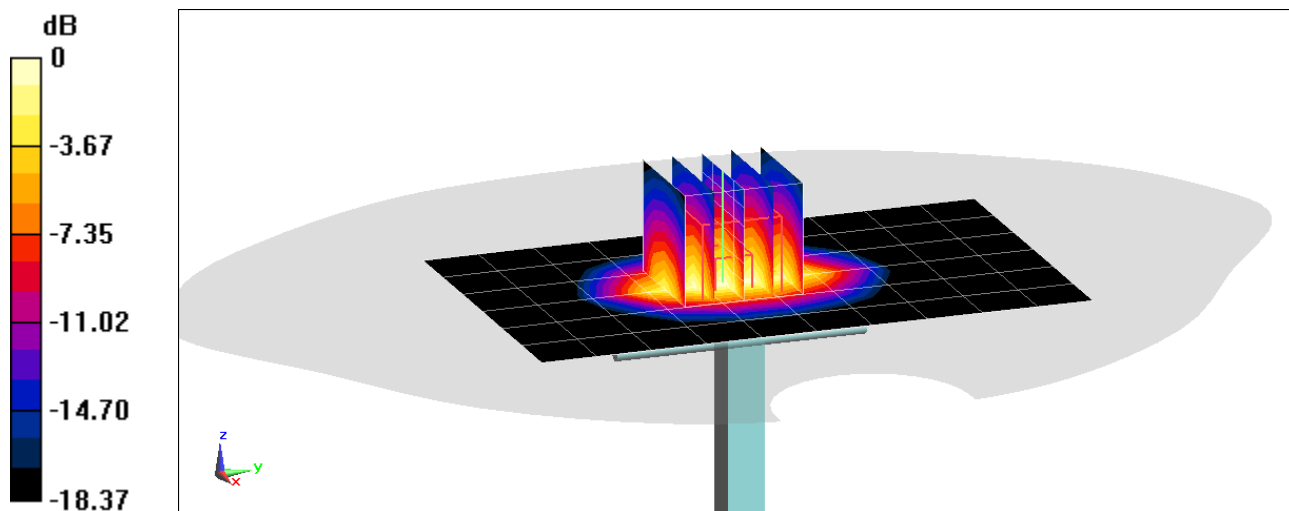
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

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)

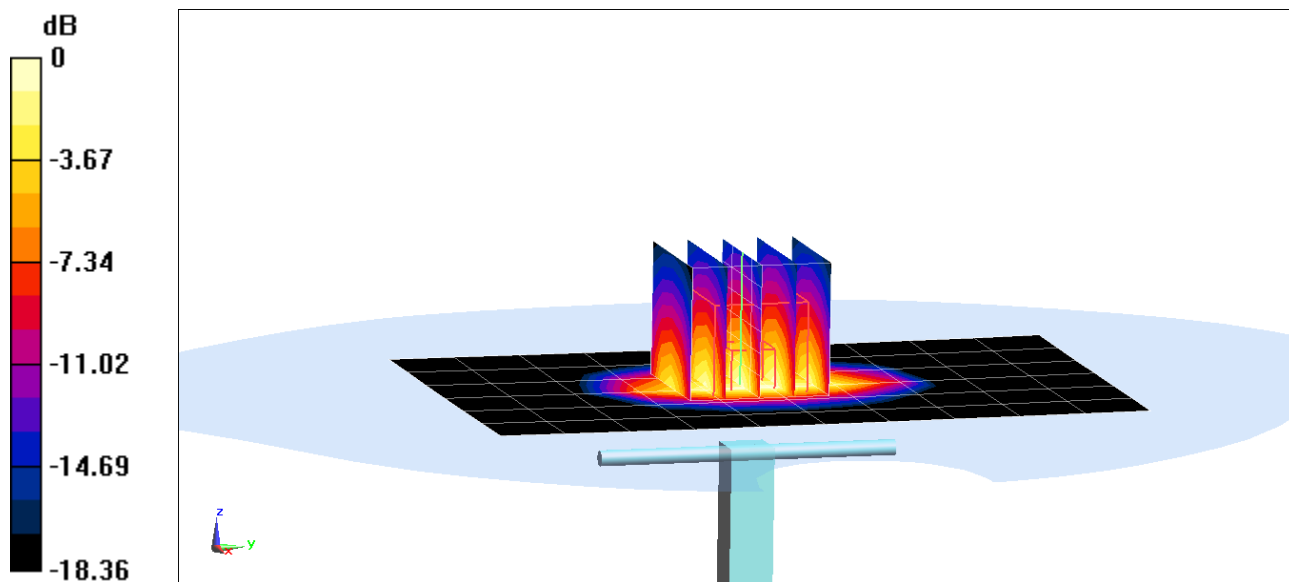
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

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)

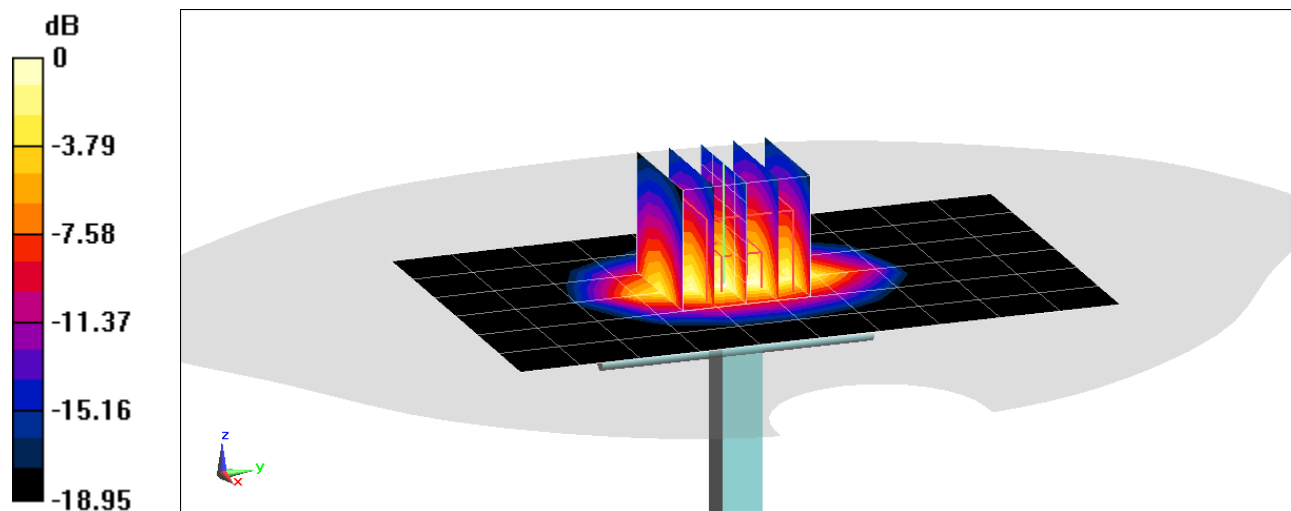
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

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)

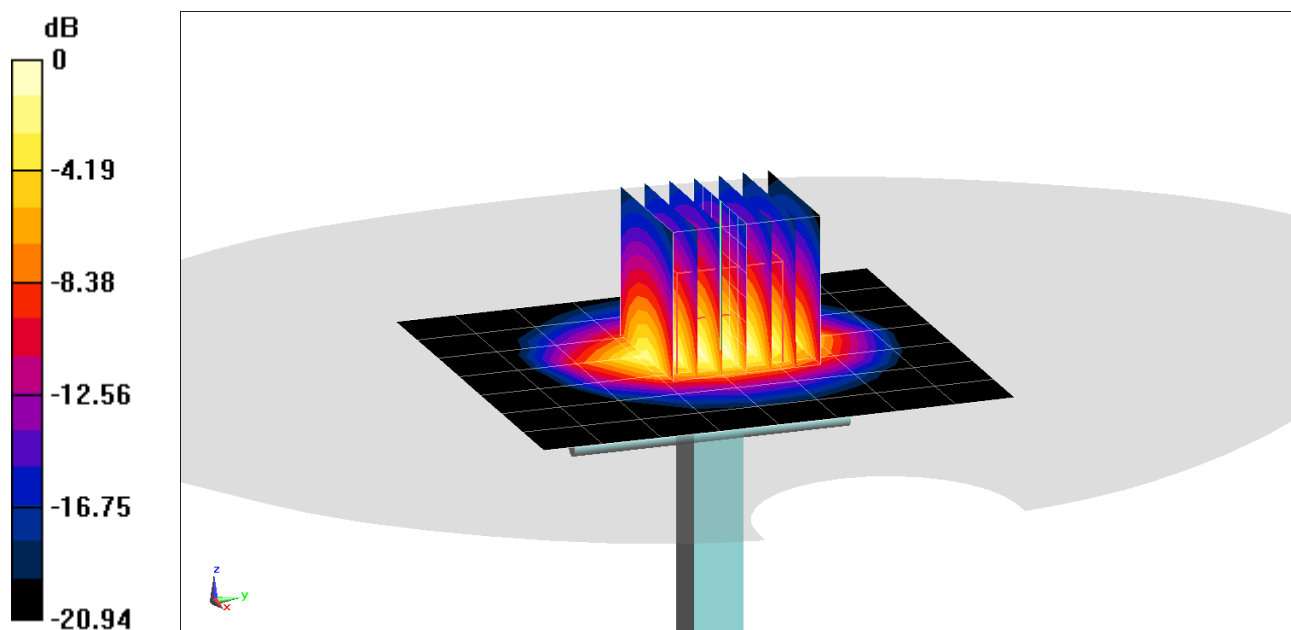
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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)

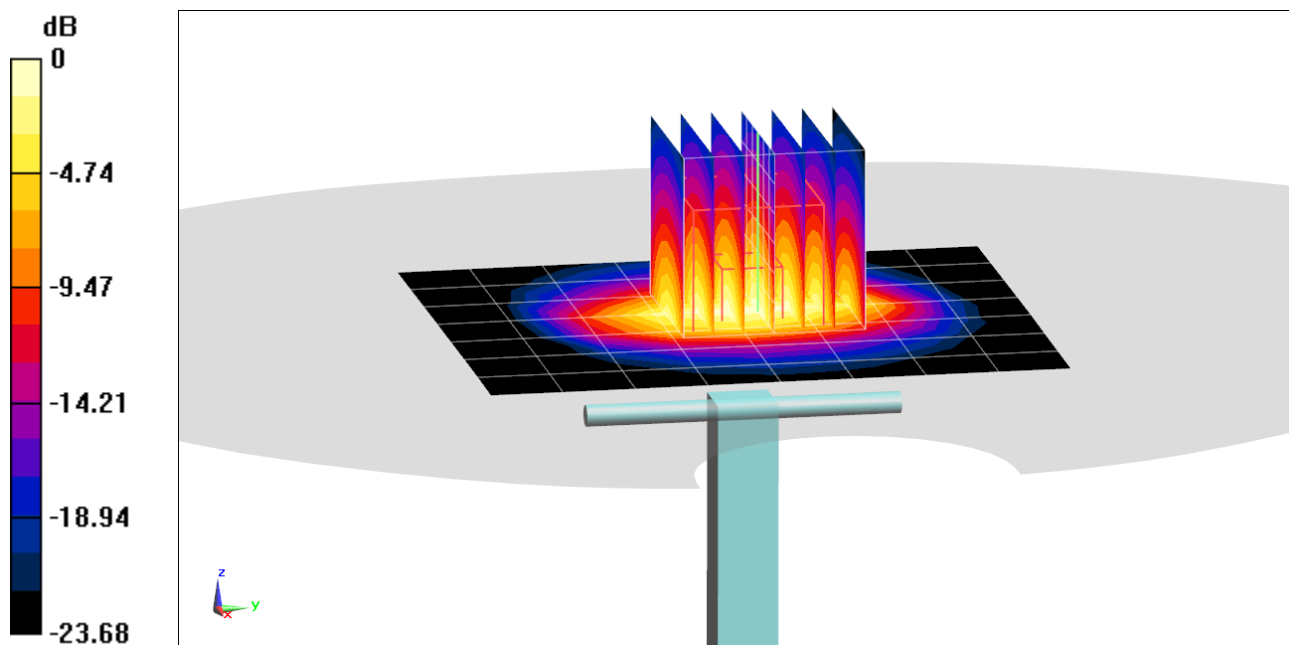
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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:

$f = 2450$ MHz; $\sigma = 2.036$ S/m; $\epsilon_r = 51.644$; $\rho = 1000$ 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(7.3, 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)

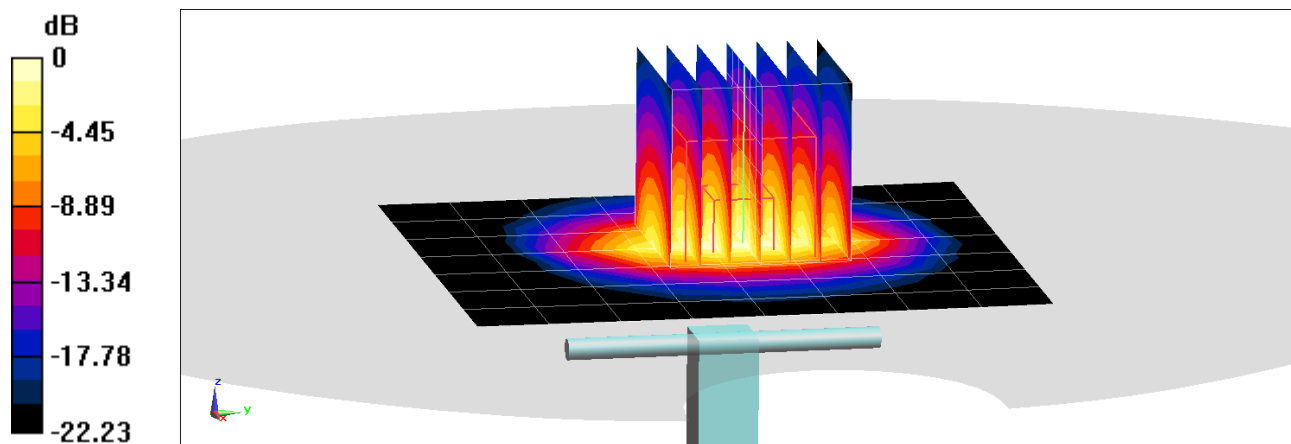
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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)

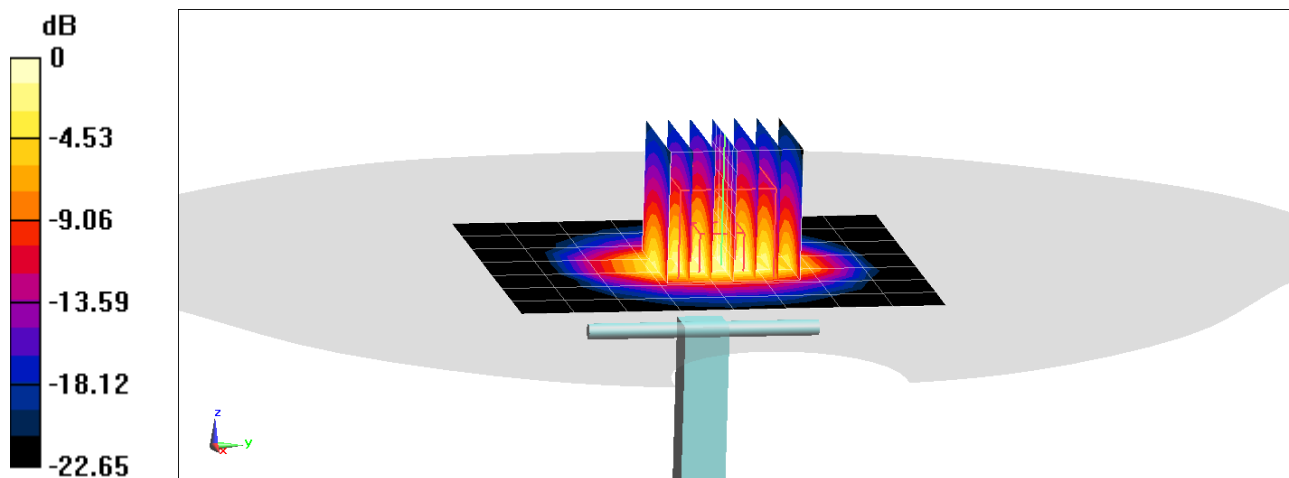
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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)

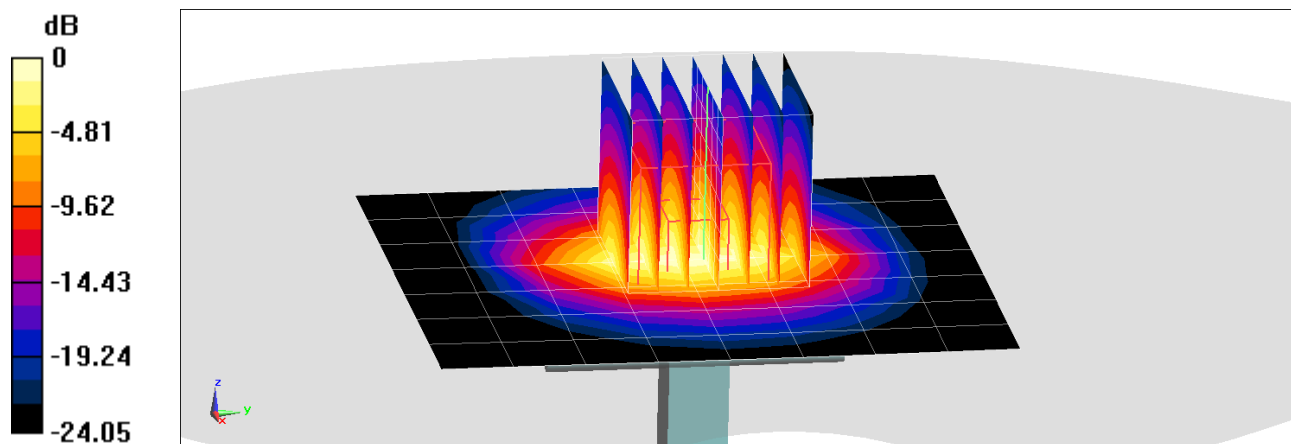
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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:

$f = 3700$ MHz; $\sigma = 3.566$ S/m; $\epsilon_r = 49.166$; $\rho = 1000$ kg/m³

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)

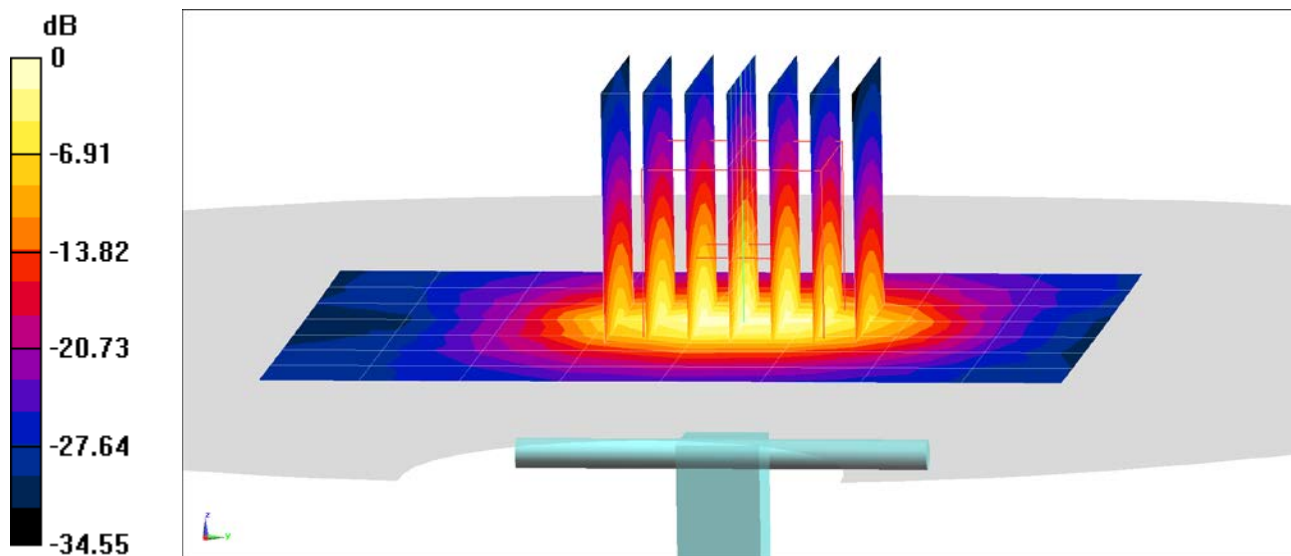
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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)

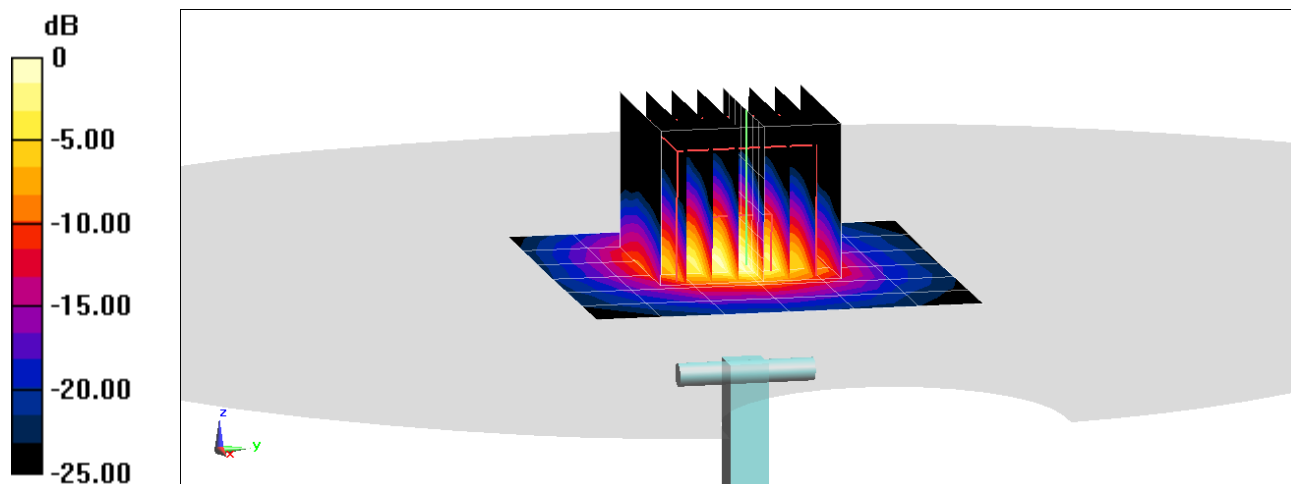
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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)

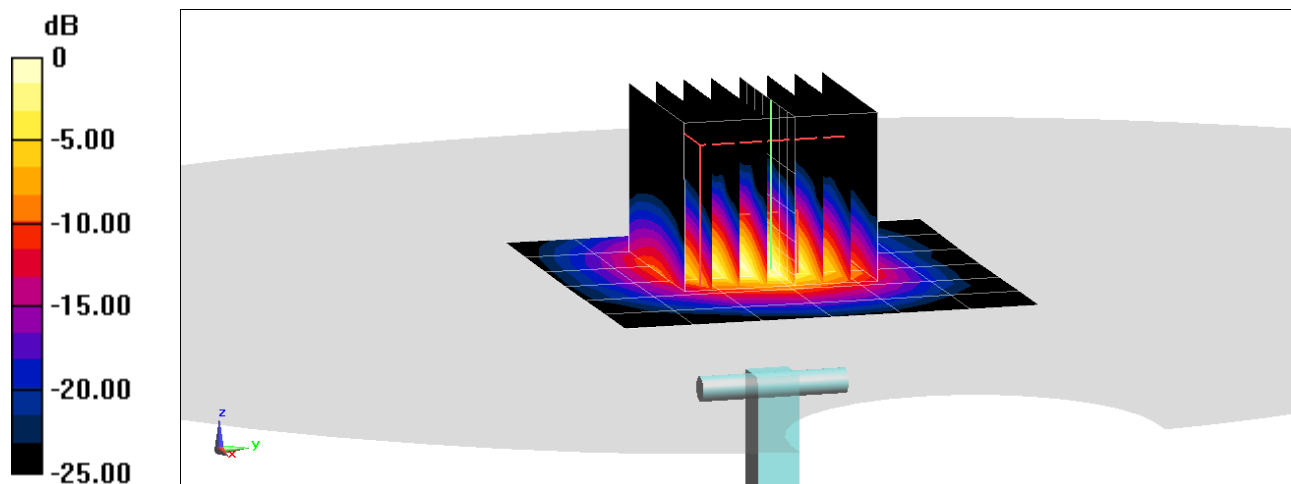
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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%



0 dB = 9.96 W/kg = 9.98 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:

$f = 5750$ 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)

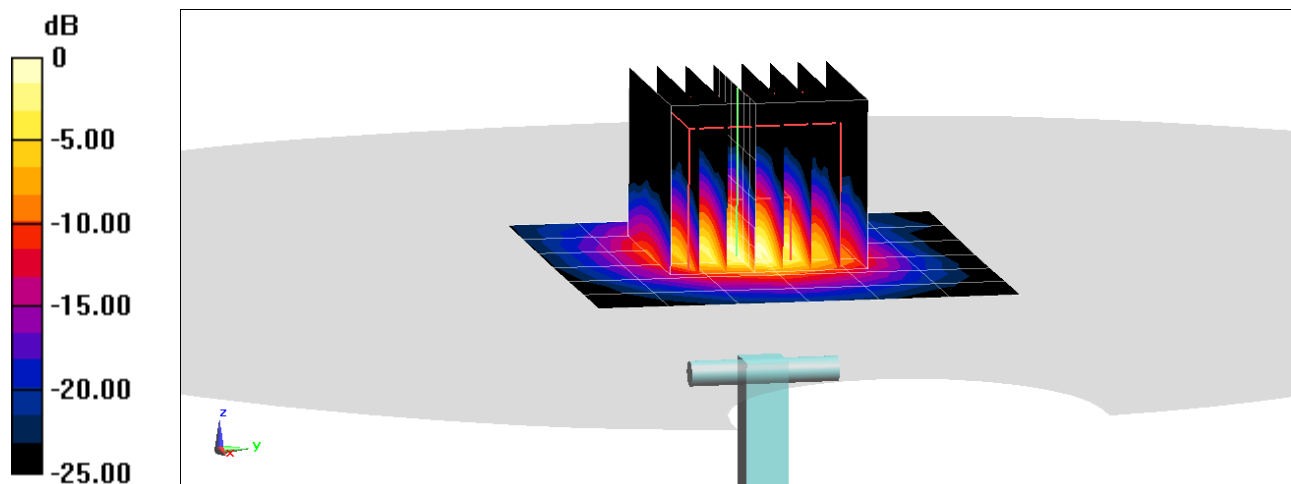
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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)

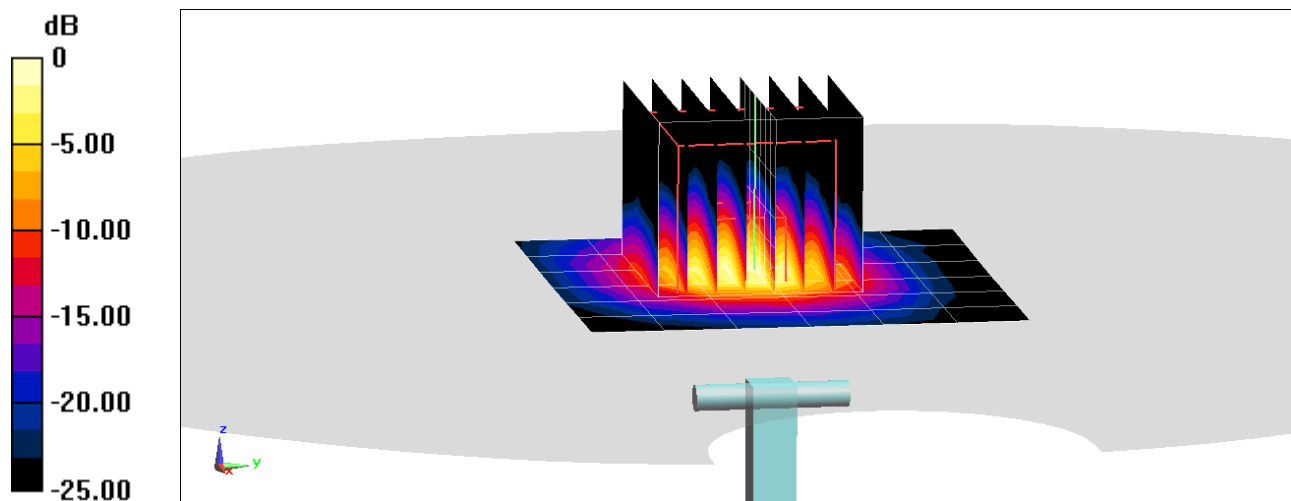
Area Scan (7x7x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Peak SAR (extrapolated) = 17.7 W/kg

SAR(1 g) = 3.81 W/kg

Deviation(1 g) = -0.91%



0 dB = 9.27 W/kg = 9.67 dBW/kg

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, > C₁₈ 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

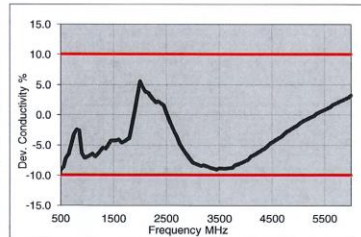
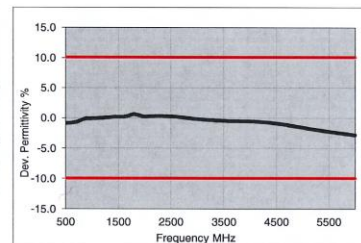
Ambient Condition 22°C ; 30% humidity
 TSL Temperature 22°C
 Test Date 30-Oct-18
 Operator CL

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

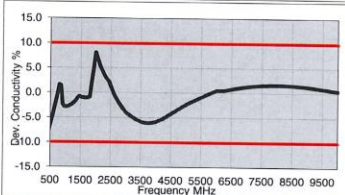
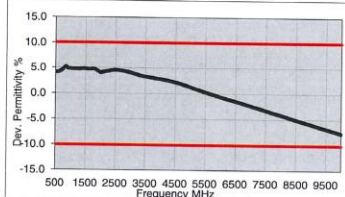
Ambient Condition 22°C ; 30% humidity
TSL Temperature 22°C
Test Date 31-Oct-18
Operator CL

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
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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

Table 1: AEC Projects										Table 2: AEC Projects									
Index	AEC	Approved Contract Document (S/N)	Revision	Completely Covered by Measurement System	Index	AEC	Approved Contract Document (S/N)	Revision	Completely Covered by Measurement System	Index	AEC	Approved Contract Document (S/N)	Revision	Completely Covered by Measurement System					
EC-41	CA-24	CA-24-24-004	1.00, 1.01, 1.02	EC-44	CA-24-24-004	1.00, 1.01, 1.02	1.03, 1.04, 1.05, 1.06, 1.07, 1.08, 1.09, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.25, 1.26, 1.27, 1.28, 1.29, 1.30, 1.31, 1.32, 1.33, 1.34, 1.35, 1.36, 1.37, 1.38, 1.39, 1.40, 1.41, 1.42, 1.43, 1.44, 1.45, 1.46, 1.47, 1.48, 1.49, 1.50, 1.51, 1.52, 1.53, 1.54, 1.55, 1.56, 1.57, 1.58, 1.59, 1.60, 1.61, 1.62, 1.63, 1.64, 1.65, 1.66, 1.67, 1.68, 1.69, 1.70, 1.71, 1.72, 1.73, 1.74, 1.75, 1.76, 1.77, 1.78, 1.79, 1.80, 1.81, 1.82, 1.83, 1.84, 1.85, 1.86, 1.87, 1.88, 1.89, 1.90, 1.91, 1.92, 1.93, 1.94, 1.95, 1.96, 1.97, 1.98, 1.99, 2.00, 2.01, 2.02, 2.03, 2.04, 2.05, 2.06, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16, 2.17, 2.18, 2.19, 2.20, 2.21, 2.22, 2.23, 2.24, 2.25, 2.26, 2.27, 2.28, 2.29, 2.30, 2.31, 2.32, 2.33, 2.34, 2.35, 2.36, 2.37, 2.38, 2.39, 2.40, 2.41, 2.42, 2.43, 2.44, 2.45, 2.46, 2.47, 2.48, 2.49, 2.50, 2.51, 2.52, 2.53, 2.54, 2.55, 2.56, 2.57, 2.58, 2.59, 2.60, 2.61, 2.62, 2.63, 2.64, 2.65, 2.66, 2.67, 2.68, 2.69, 2.70, 2.71, 2.72, 2.73, 2.74, 2.75, 2.76, 2.77, 2.78, 2.79, 2.80, 2.81, 2.82, 2.83, 2.84, 2.85, 2.86, 2.87, 2.88, 2.89, 2.90, 2.91, 2.92, 2.93, 2.94, 2.95, 2.96, 2.97, 2.98, 2.99, 3.00, 3.01, 3.02, 3.03, 3.04, 3.05, 3.06, 3.07, 3.08, 3.09, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20, 3.21, 3.22, 3.23, 3.24, 3.25, 3.26, 3.27, 3.28, 3.29, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 3.40, 3.41, 3.42, 3.43, 3.44, 3.45, 3.46, 3.47, 3.48, 3.49, 3.50, 3.51, 3.52, 3.53, 3.54, 3.55, 3.56, 3.57, 3.58, 3.59, 3.60, 3.61, 3.62, 3.63, 3.64, 3.65, 3.66, 3.67, 3.68, 3.69, 3.70, 3.71, 3.72, 3.73, 3.74, 3.75, 3.76, 3.77, 3.78, 3.79, 3.80, 3.81, 3.82, 3.83, 3.84, 3.85, 3.86, 3.87, 3.88, 3.89, 3.90, 3.91, 3.92, 3.93, 3.94, 3.95, 3.96, 3.97, 3.98, 3.99, 4.00, 4.01, 4.02, 4.03, 4.04, 4.05, 4.06, 4.07, 4.08, 4.09, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19, 4.20, 4.21, 4.22, 4.23, 4.24, 4.25, 4.26, 4.27, 4.28, 4.29, 4.30, 4.31, 4.32, 4.33, 4.34, 4.35, 4.36, 4.37, 4.38, 4.39, 4.40, 4.41, 4.42, 4.43, 4.44, 4.45, 4.46, 4.47, 4.48, 4.49, 4.50, 4.51, 4.52, 4.53, 4.54, 4.55, 4.56, 4.57, 4.58, 4.59, 4.60, 4.61, 4.62, 4.63, 4.64, 4.65, 4.66, 4.67, 4.68, 4.69, 4.70, 4.71, 4.72, 4.73, 4.74, 4.75, 4.76, 4.77, 4.78, 4.79, 4.80, 4.81, 4.82, 4.83, 4.84, 4.85, 4.86, 4.87, 4.88, 4.89, 4.90, 4.91, 4.92, 4.93, 4.94, 4.95, 4.96, 4.97, 4.98, 4.99, 5.00, 5.01, 5.02, 5.03, 5.04, 5.05, 5.06, 5.07, 5.08, 5.09, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.20, 5.21, 5.22, 5.23, 5.24, 5.25, 5.26, 5.27, 5.28, 5.29, 5.30, 5.31, 5.32, 5.33, 5.34, 5.35, 5.36, 5.37, 5.38, 5.39, 5.40, 5.41, 5.42, 5.43, 5.44, 5.45, 5.46, 5.47, 5.48, 5.49, 5.50, 5.51, 5.52, 5.53, 5.54, 5.55, 5.56, 5.57, 5.58, 5.59, 5.60, 5.61, 5.62, 5.63, 5.64, 5.65, 5.66, 5.67, 5.68, 5.69, 5.70, 5.71, 5.72, 5.73, 5.74, 5.75, 5.76, 5.77, 5.78, 5.79, 5.80, 5.81, 5.82, 5.83, 5.84, 5.85, 5.86, 5.87, 5.88, 5.89, 5.90, 5.91, 5.92, 5.93, 5.94, 5.95, 5.96, 5.97, 5.98, 5.99, 6.00, 6.01, 6.02, 6.03, 6.04, 6.05, 6.06, 6.07, 6.08, 6.09, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28, 6.29, 6.30, 6.31, 6.32, 6.33, 6.34, 6.35, 6.36, 6.37, 6.38, 6.39, 6.40, 6.41, 6.42, 6.43, 6.44, 6.45, 6.46, 6.47, 6.48, 6.49, 6.50, 6.51, 6.52, 6.53, 6.54, 6.55, 6.56, 6.57, 6.58, 6.59, 6.60, 6.61, 6.62, 6.63, 6.64, 6.65, 6.66, 6.67, 6.68, 6.69, 6.70, 6.71, 6.72, 6.73, 6.74, 6.75, 6.76, 6.77, 6.78, 6.79, 6.80, 6.81, 6.82, 6.83, 6.84, 6.85, 6.86, 6.87, 6.88, 6.89, 6.90, 6.91, 6.92, 6.93, 6.94, 6.95, 6.96, 6.97, 6.98, 6.99, 7.00, 7.01, 7.02, 7.03, 7.04, 7.05, 7.06, 7.07, 7.08, 7.09, 7.10, 7.11, 7.12, 7.13, 7.14, 7.15, 7.16, 7.17, 7.18, 7.19, 7.20, 7.21, 7.22, 7.23, 7.24, 7.25, 7.26, 7.27, 7.28, 7.29, 7.30, 7.31, 7.32, 7.33												

Table 2 – Example of Exclusion Table for 4x4 Downlink MIMO Configurations

Table 2: Example 1: Table 2: Example 1					
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Note: [CC] indicates component carrier with 4x4 DL MIMO antenna configuration

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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.

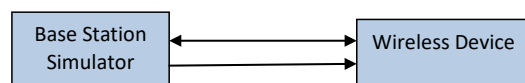


Figure 1
DL CA Power Measurement Setup

FCC ID: ZNFV600VM	 PCTEST	SAR EVALUATION REPORT	 LG	Reviewed by: Quality Manager
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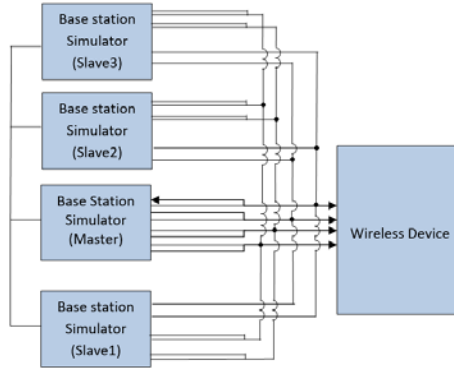


Figure 2
DL CA with DL 4x4 MIMO Power Measurement Setup

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) Ch.	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	23095	707.5	QPSK	5	48	8095	737.5	LTE B2	20	800	1960	-	-	-	-	-	-	-	-	-	-	-	-	-	26.28	25.20
CA 13A-66A (1)	LTE B12	10	23095	707.5	QPSK	1	48	8095	737.5	LTE B66	20	66786	2345	-	-	-	-	-	-	-	-	-	-	-	-	-	25.23	25.20
CA 13A-66A (2)	LTE B12	10	23095	707.5	QPSK	1	48	8095	737.5	LTE B66	20	66786	2345	-	-	-	-	-	-	-	-	-	-	-	-	-	25.23	25.20
CA 4A-12A (1)	LTE B12	10	23095	707.5	QPSK	5	48	8095	737.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	-	25.26	25.20
CA 4A-12A (2)	LTE B12	10	23095	707.5	QPSK	1	48	8095	737.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	-	25.26	25.20
CA 2A-4A-12A-30A	LTE B12	10	23095	707.5	QPSK	1	48	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	23095	707.5	QPSK	1	48	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	23095	707.5	QPSK	1	48	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	23095	707.5	QPSK	1	48	8095	737.5	LTE B2	20	800	1960	LTE B30	10	9620	2355	LTE B66	20	67236	2190	25.25	-	-	-	-	25.25	25.20
CA 2A-12A-12A-30A-66A	LTE B12	10	23095	707.5	QPSK	1	48	8095	737.5	LTE B2	20	800	1960	LTE B2	20	700	1940	LTE B30	10	9620	2345	LTE B66	20	66786	2145	25.27	25.20	
CA 2A-2A-12A-66A-66A	LTE B12	10	23095	707.5	QPSK	1	48	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 (DL) 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-66A-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-66A-13A	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	LTE B66	20	66884	2344	-	-	-	-	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-66A-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 B66	20	66786	2345	-	-	-	-	25.02	25.00		
CA 13A-46A-46C	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B46	20	53460	5537.5	LTE B66	20	53786	5537.5	-	-	-	-	25.03	25.00		
CA 13A-46C-66B	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B46	20	50960	5537.5	LTE B66	20	56188	5644.8	LTE B66	20	53460	5537.5	-	-	-	-	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	56186	5644.8	LTE B46	20	56184	5644.8	25.01	25.00		
CA 2A-13A-46A-46A-66A	LTE B13	5	23230	782	QPSK	1	12	5230	751	LTE B2	20	800	1960	LTE B46	20	50960	5537.5	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-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	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 B66	20	66786	2345	LTE B66	20	67236	2190	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 B66	20	66786	2345	LTE B66	20	67236	2190	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 B66	20	66786	2345	-	-	-	-	25.09	25.00		
CA 13A-46C-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 B66	20	66786	2345	LTE B66	20	67236	2190	25.05	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	50467	5537.5	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 B66	20	66786	2345	LTE B66	20	67236	2190	25.03	25.00		
CA 2A-13A-46A	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	LTE B66	20	66786	2345	25.03	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		

1.4 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

LTE CA Capabilities																																									
PCC															SCC 1				SCC 2				SCC 3				SCC 4				Power										
Combination	PCC Band	PCC BW [MHz]	PCC [UL] Ch.	PCC [DU] Freq. [MHz]	Mod.	PCC US RB	PCC UL sub carrier	PCC CC	PCC [DU] Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DU] Ch.	SCC [DU] Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DU] Ch.	SCC [DU] Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DU] Ch.	SCC [DU] Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DU] Ch.	SCC [DU] Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DU] Ch.	SCC [DU] Freq. [MHz]	DL Ant. Config.	LTE Tx Power with DL CA Freq. [dBm]	LTE Single Carrier Tx Power [dBm]				
CA_12A-12A (1)	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
CA_16A-12A (1)	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B4	20	800	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CA_12A-12A (2)	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B4	20	2175	2123.5	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CA_16A-12A (2)	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B4	20	2175	2123.5	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CA_12A-16A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CA_12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B4	20	2175	2123.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CA_12A-16A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B4	20	2175	2123.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CA_16A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B4	20	2175	2123.5	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CA_16A-12A-16A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B4	20	2175	2123.5	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CA_12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B4	20	2175	2123.5	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CA_12A-20A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	4x4	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-30A-66A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	67738	2190	2x2	-	-	-	-	-	-	-	-	-	-	-
CA_12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	LTE B12	1	23095	707.5	QPSK	1	49	5095	737.5	2x2	LTE B2	20	800	1960	4x4	LTE B2	20	700	1940	2x2	LTE B06	20	66786	2145	4x4	LTE B06	20	677													

1.4.3 LTE Band 13 as PCC

Table 11
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 6 of 8		

1.4.4 LTE Band 5 as PCC

Table 12
Maximum Output Powers

Combination	PCC Band	PCC					SCC 1				SCC 2				SCC 3				SCC 4				Power			
		PCC BW [MHz]	PCC [UL Ch. Freq. [MHz]	Mod.	PCC RB	PCC RB Offset	PCC [DL Ch. Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DL Ch. Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DL Ch. Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DL Ch. Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [DL Ch. Freq. [MHz]	DL Ant. Config.	LTE Tx Power with dC Carrier Tx Power (dBm)	LTE Single Carrier Tx Power (dBm)
CA SA-4A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	2x2	LTE B4	20	2175	2132.5	4x4	-	-	-	-	25.14	25.12
CA SA-4A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B4	20	2175	2132.5	4x4	-	-	-	-	25.14	25.12
CA SA-4A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B4	20	2175	2132.5	4x4	-	-	-	-	25.14	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	2x2	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.11	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	2x2	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.15	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.17	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.15	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.17	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	881.5	2x2	LTE B2	20	800	1960	4x4	LTE B6	20	6678.6	2145	2x2	-	-	-	-	25.13	25.12
CA SA-5A-SA	LTE B5	10	20525	836.5	QPSK	1	49	2525	8																	

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]	MCC	PCC SA	PCC UL BWP	PCC DL BWP	DL Ann. Config.	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 737	SCC 738	SCC 739	SCC 740	SCC 741	SCC 742	SCC 743	SCC 744	SCC 745	SCC 746	SCC 747	SCC 748	SCC 749	SCC 750	SCC 751	SCC 752	SCC 753	SCC 754	SCC 755	SCC 756	SCC 757	SCC 758	SCC 759	SCC 760	SCC 761	SCC 762	SCC 763	SCC 764	SCC 765	SCC 766	SCC 767	SCC 768	SCC 769	SCC 770	SCC 771	SCC 772	SCC 773	SCC 774	SCC 775	SCC 776	SCC 777	SCC 778	SCC 779	SCC 780	SCC 781	SCC 782	SCC 783	SCC 784	SCC 785	SCC 786	SCC 787	SCC 788	SCC 789	SCC 790	SCC 791	SCC 792	SCC 793	SCC 794	SCC 795	SCC 796	SCC 797	SCC 798	SCC 799	SCC 800	SCC 801	SCC 802	SCC 803	SCC 804	SCC 805	SCC 806	SCC 807	SCC 808	SCC 809	SCC 810	SCC 811	SCC 812	SCC 813	SCC 814	SCC 815	SCC 816	SCC 817	SCC 818	SCC 819	SCC 820	SCC 821	SCC 822	SCC 823	SCC 824	SCC 825	SCC 826	SCC 827	SCC 828	SCC 829	SCC 830	SCC 831	SCC 832	SCC 833	SCC 834	SCC 835	SCC 836	SCC 837	SCC 838	SCC 839	SCC 840	SCC 841	SCC 842	SCC 843	SCC 844	SCC 845	SCC 846	SCC 847	SCC 848	SCC 849	SCC 850	SCC 851	SCC 852	SCC 853	SCC 854	SCC 855	SCC 856	SCC 857	SCC 858	SCC 859	SCC 860	SCC 861	SCC 862	SCC 863	SCC 864	SCC 865	SCC 866	SCC 867	SCC 868	SCC 869	SCC 870	SCC 871	SCC 872	SCC 873	SCC 874	SCC 875	SCC 876	SCC 877	SCC 878	SCC 879	SCC 880	SCC 881	SCC 882	SCC 883	
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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.

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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

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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)	
1st		Un-triggered (Max)	Mechanism #1 (Reduced)
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)	
1st		Un-triggered (Max)	Mechanism #1 (Reduced)
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.

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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.

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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

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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

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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

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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		

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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		

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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		

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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		

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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		

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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		

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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 $(22 \pm 3)^{\circ}\text{C}$ 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

	Name	Function	Signature
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 cm ³ (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 cm ³ (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 cm ³ (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 cm ³ (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
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 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:

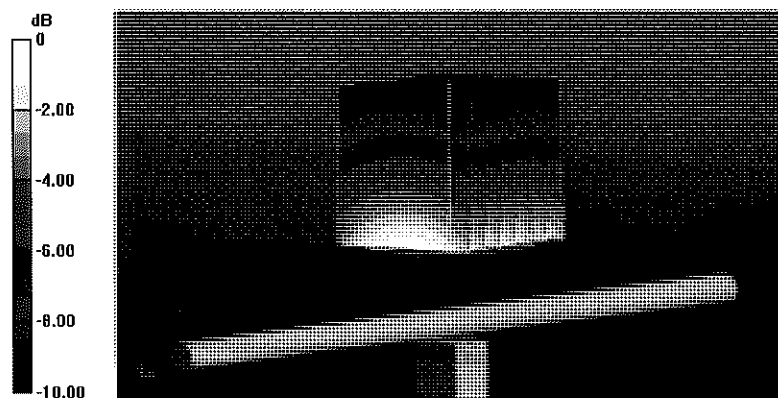
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 58.51 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.04 W/kg

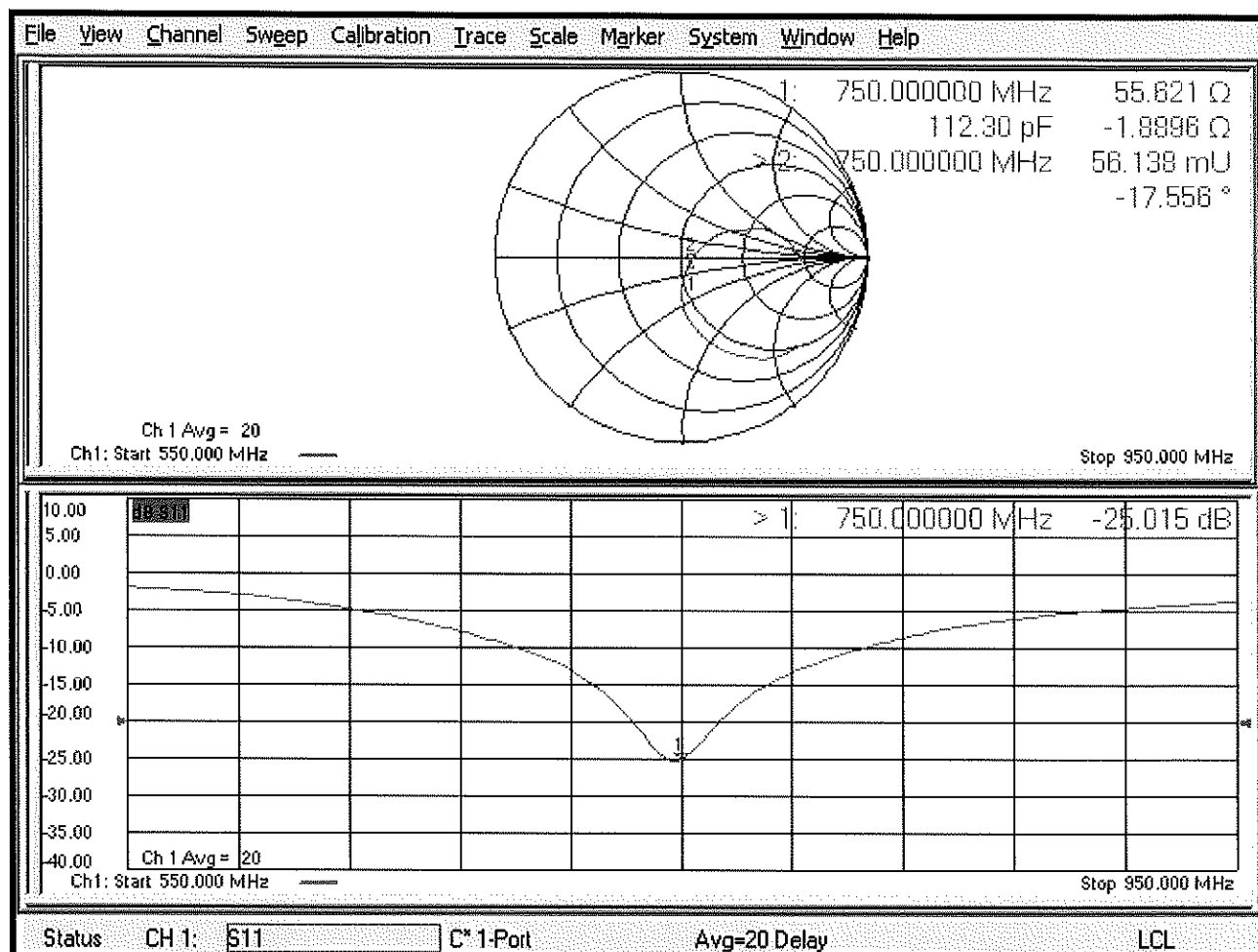
SAR(1 g) = 2.02 W/kg; SAR(10 g) = 1.32 W/kg

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:

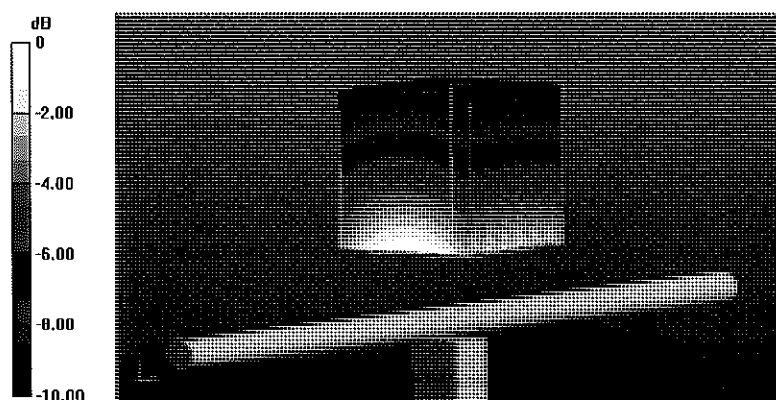
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 57.57 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.18 W/kg

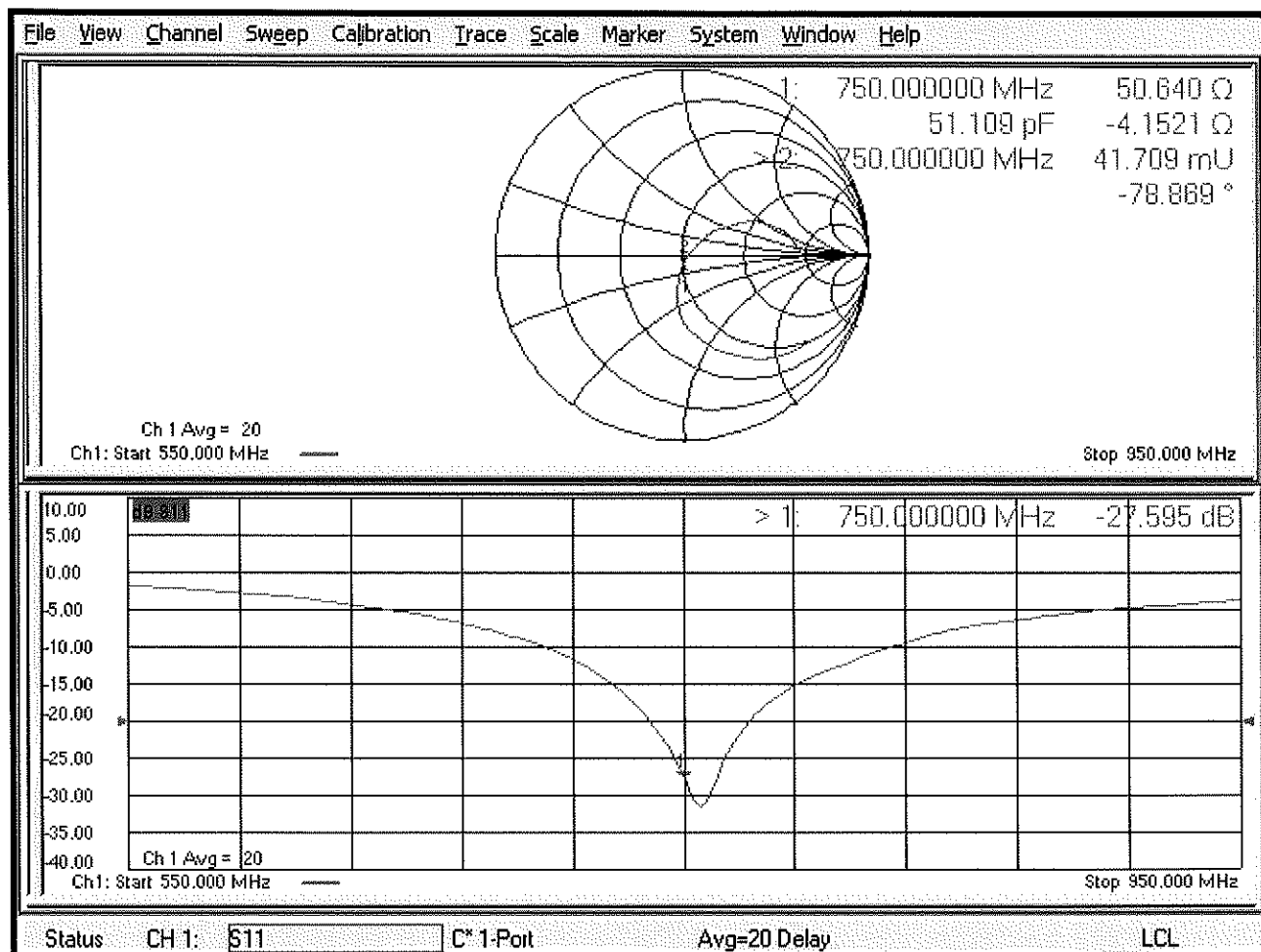
SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.39 W/kg

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

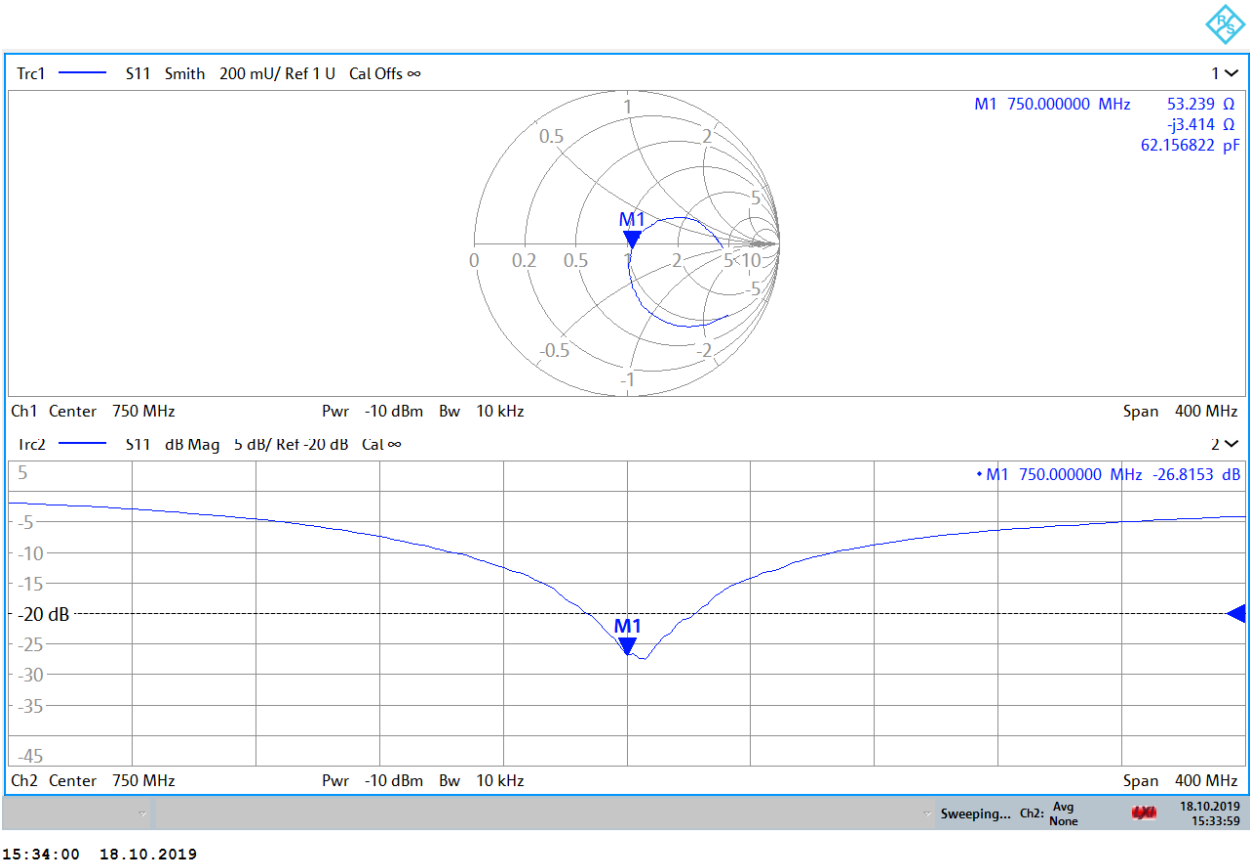
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

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.

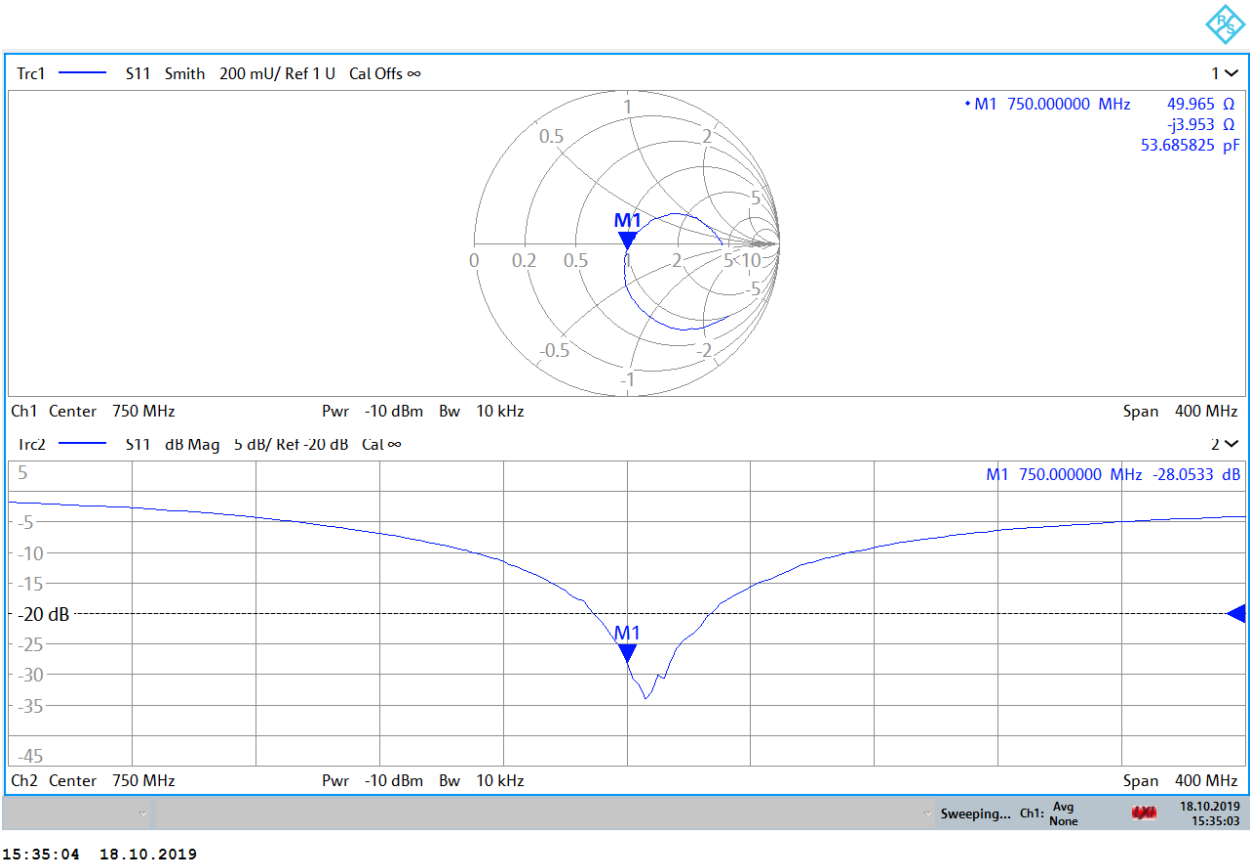
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

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)
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: **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: **Manu Seitz** **Laboratory Technician**

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

Signature

Issued: March 13, 2019

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	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:

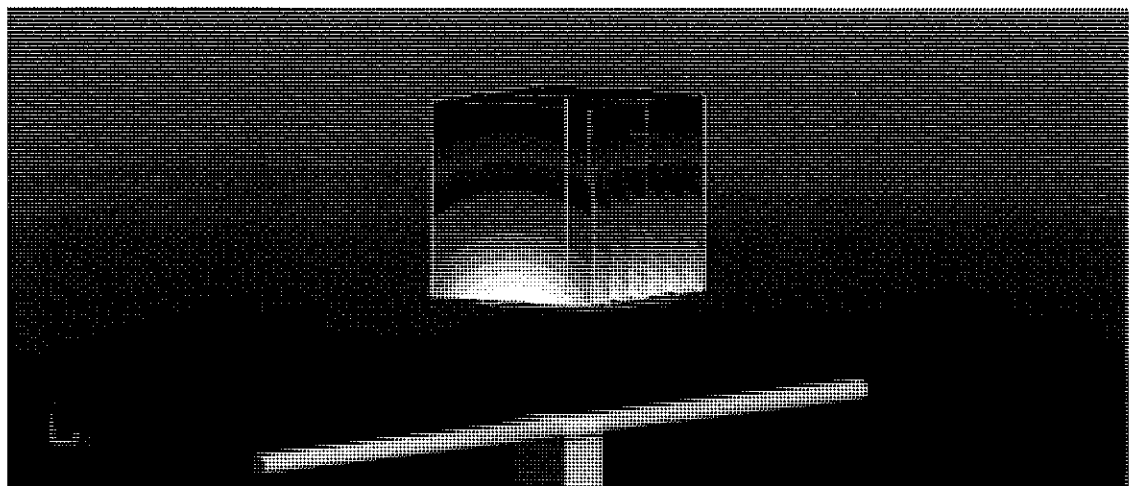
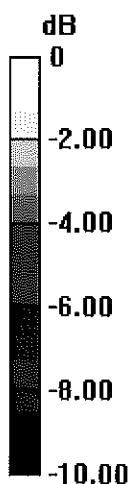
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 62.48 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 3.60 W/kg

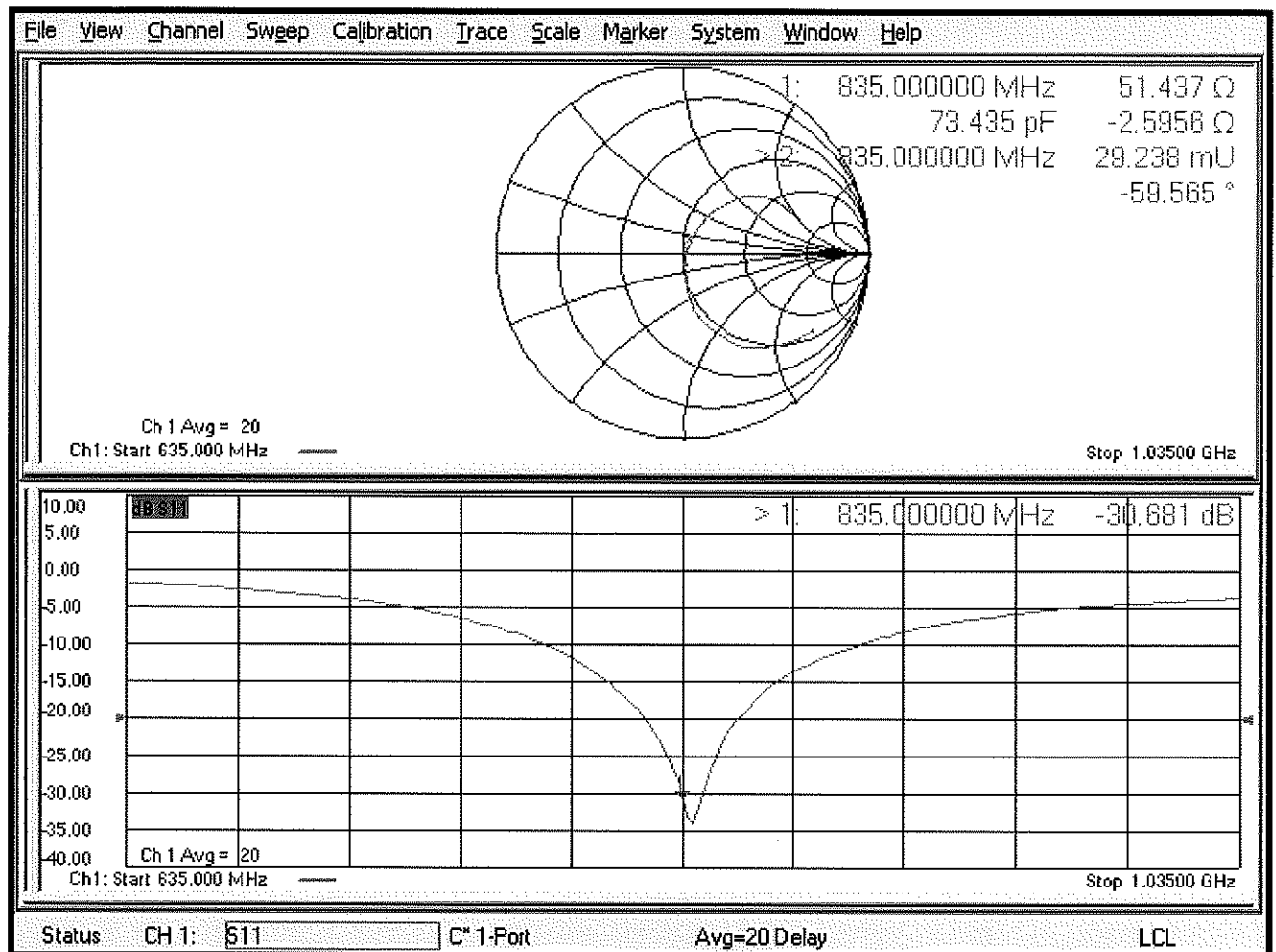
SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.54 W/kg

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:

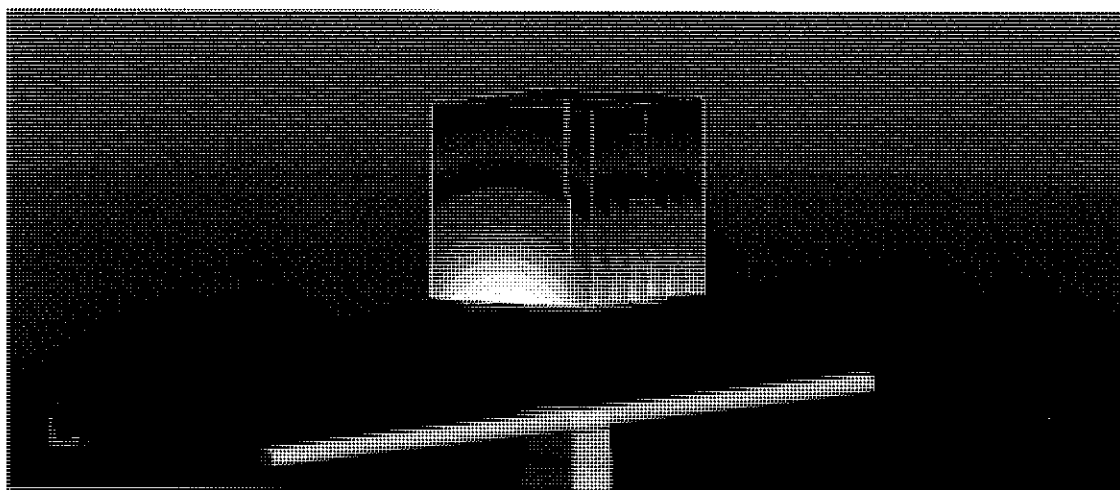
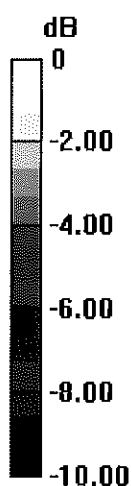
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 60.49 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.58 W/kg

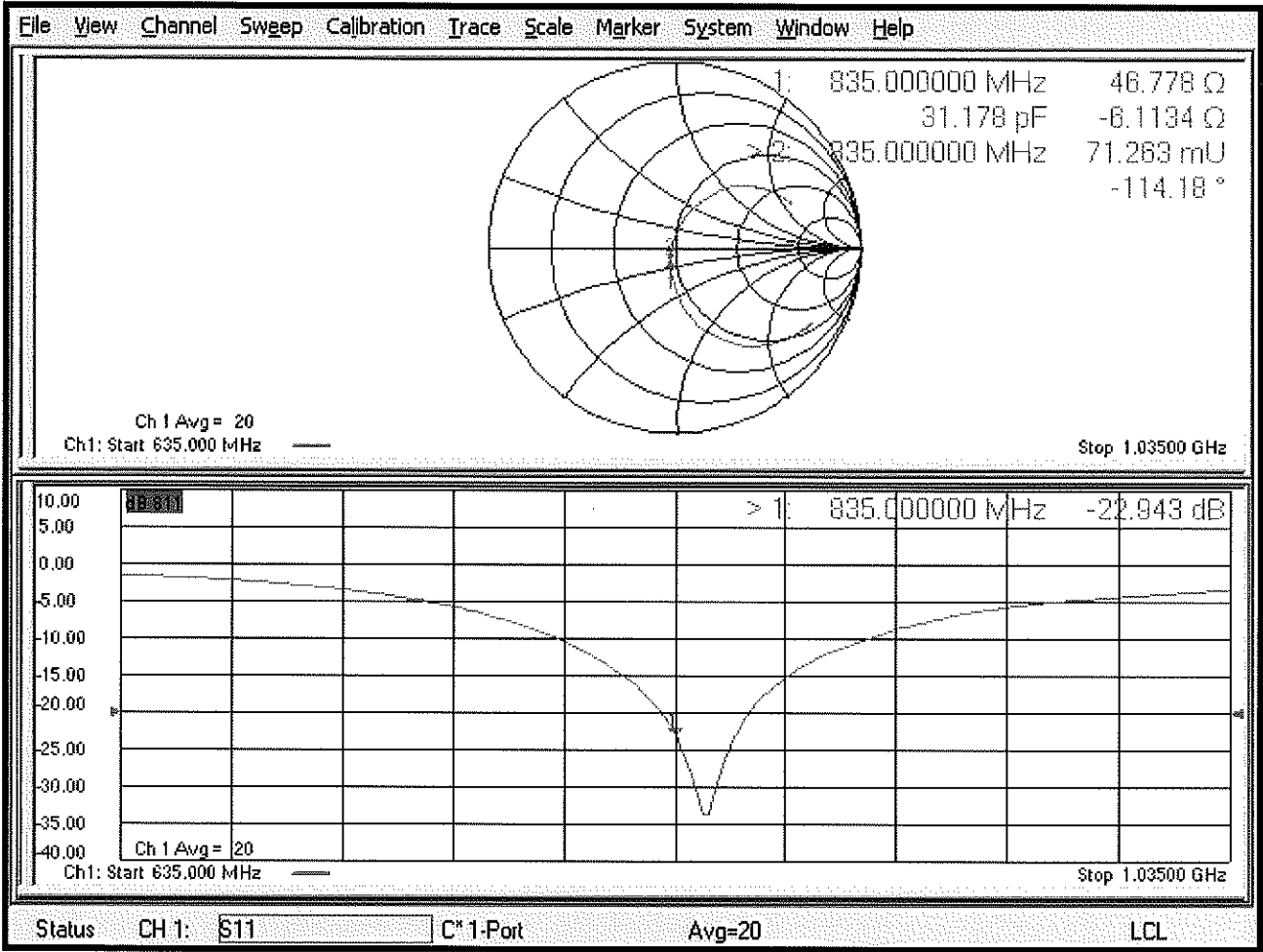
SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.61 W/kg

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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 Multilateral Agreement for the recognition of calibration certificates

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

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 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
----------------------------------	----------

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:

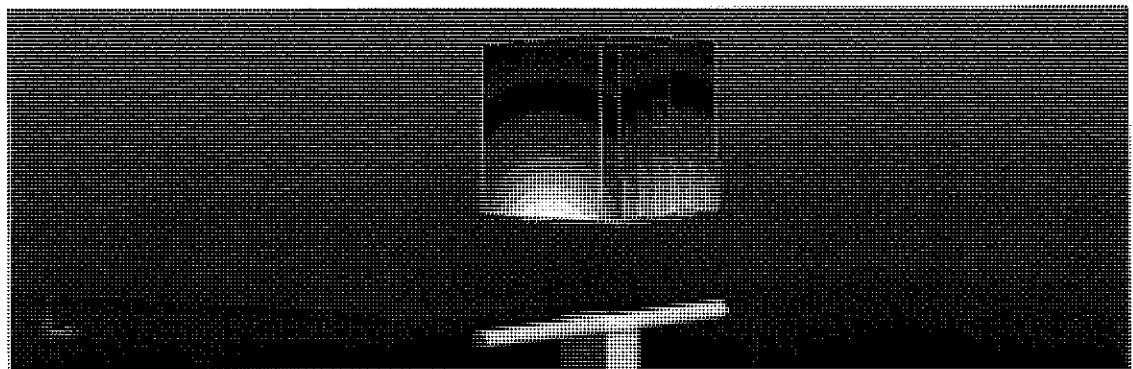
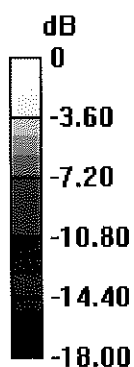
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 108.1 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 16.7 W/kg

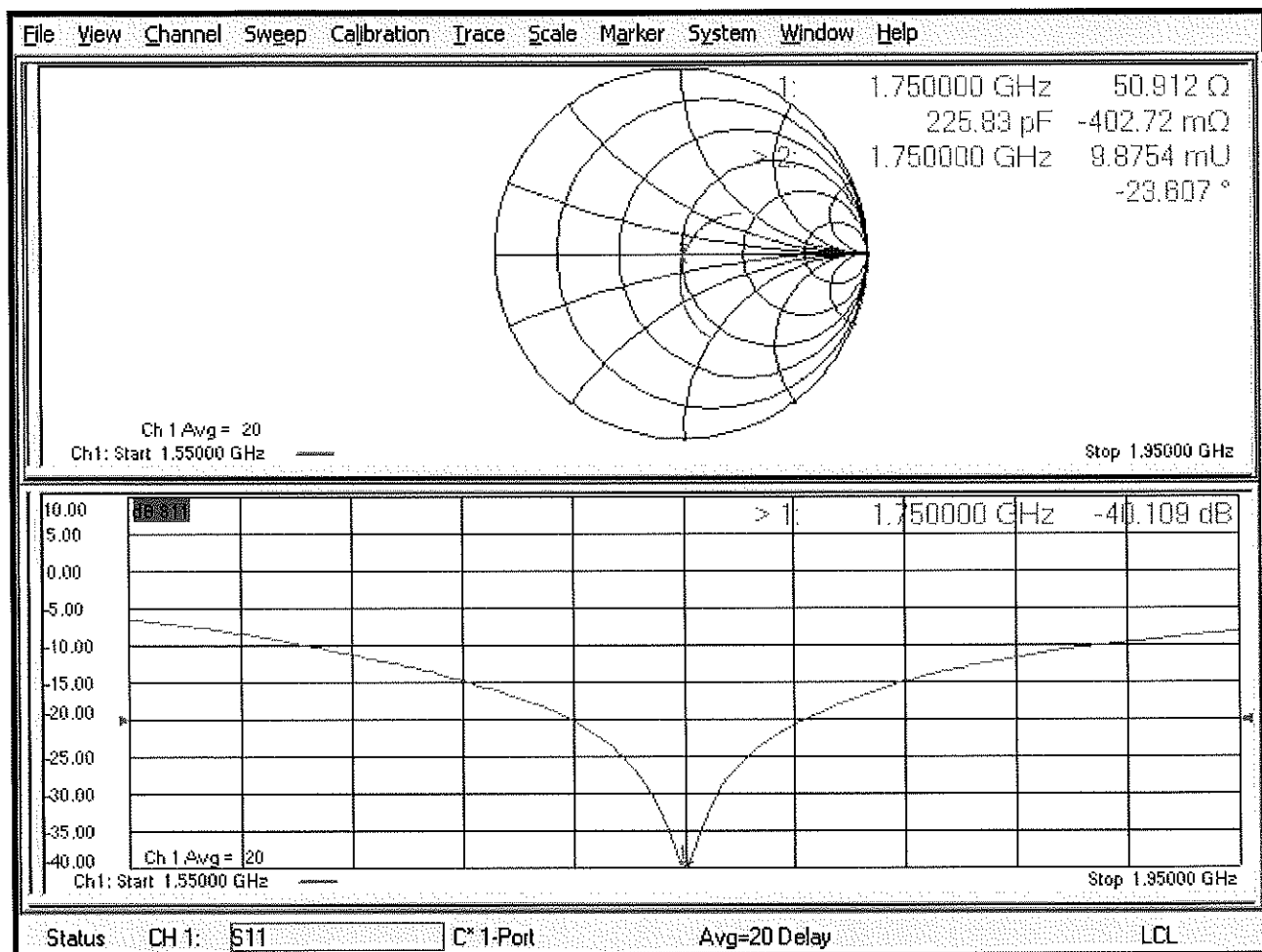
SAR(1 g) = 9.02 W/kg; SAR(10 g) = 4.76 W/kg

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:

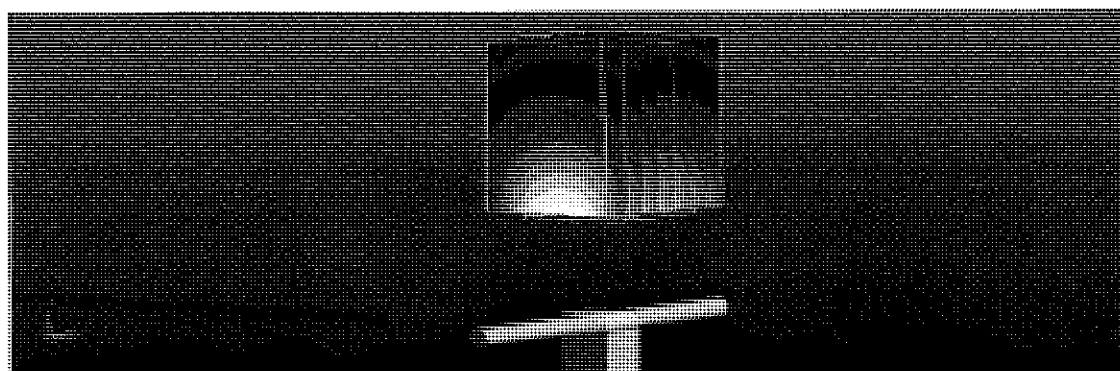
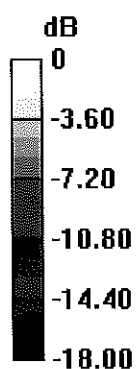
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.1 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 16.0 W/kg

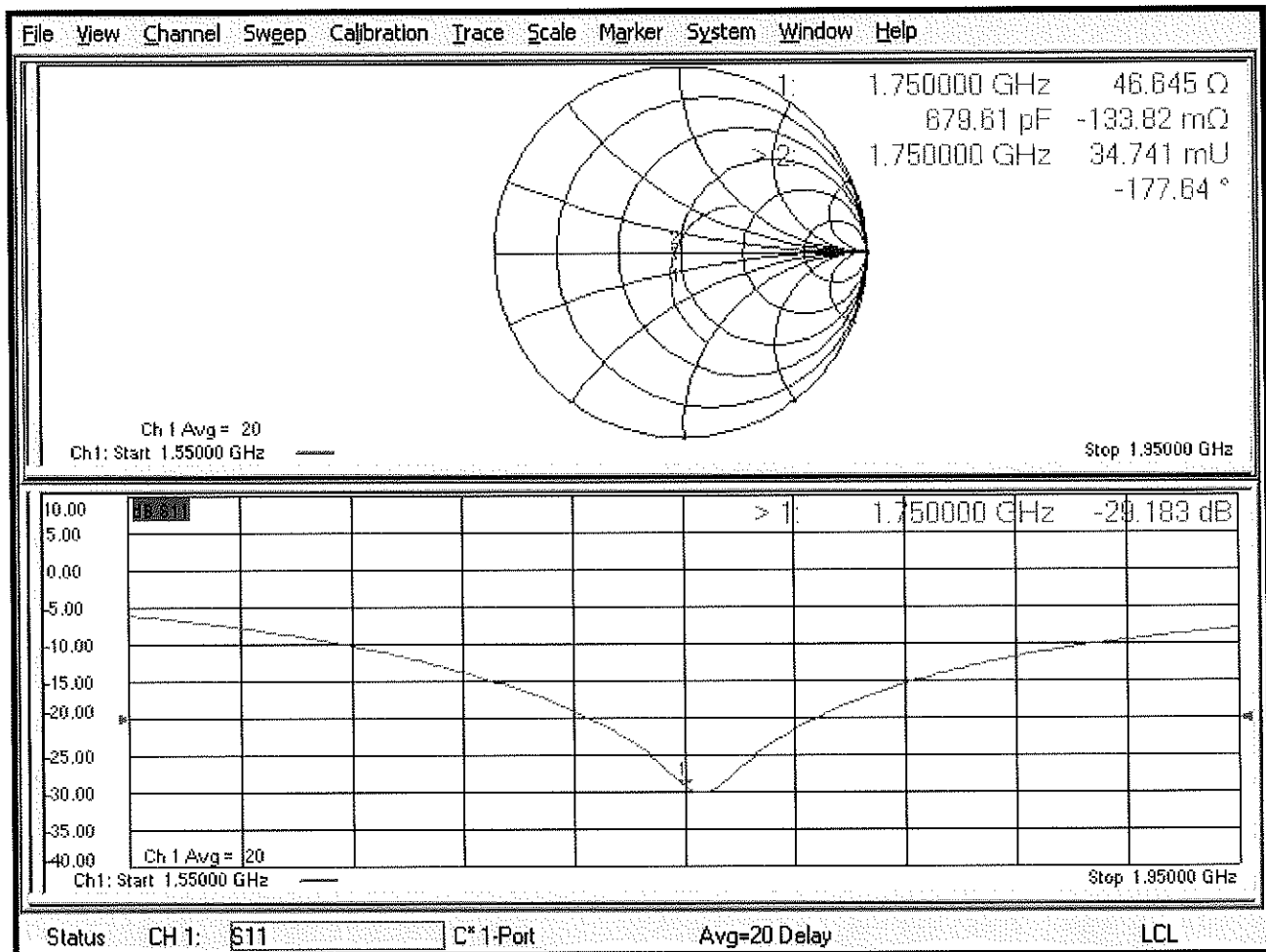
SAR(1 g) = 9.04 W/kg; SAR(10 g) = 4.82 W/kg

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

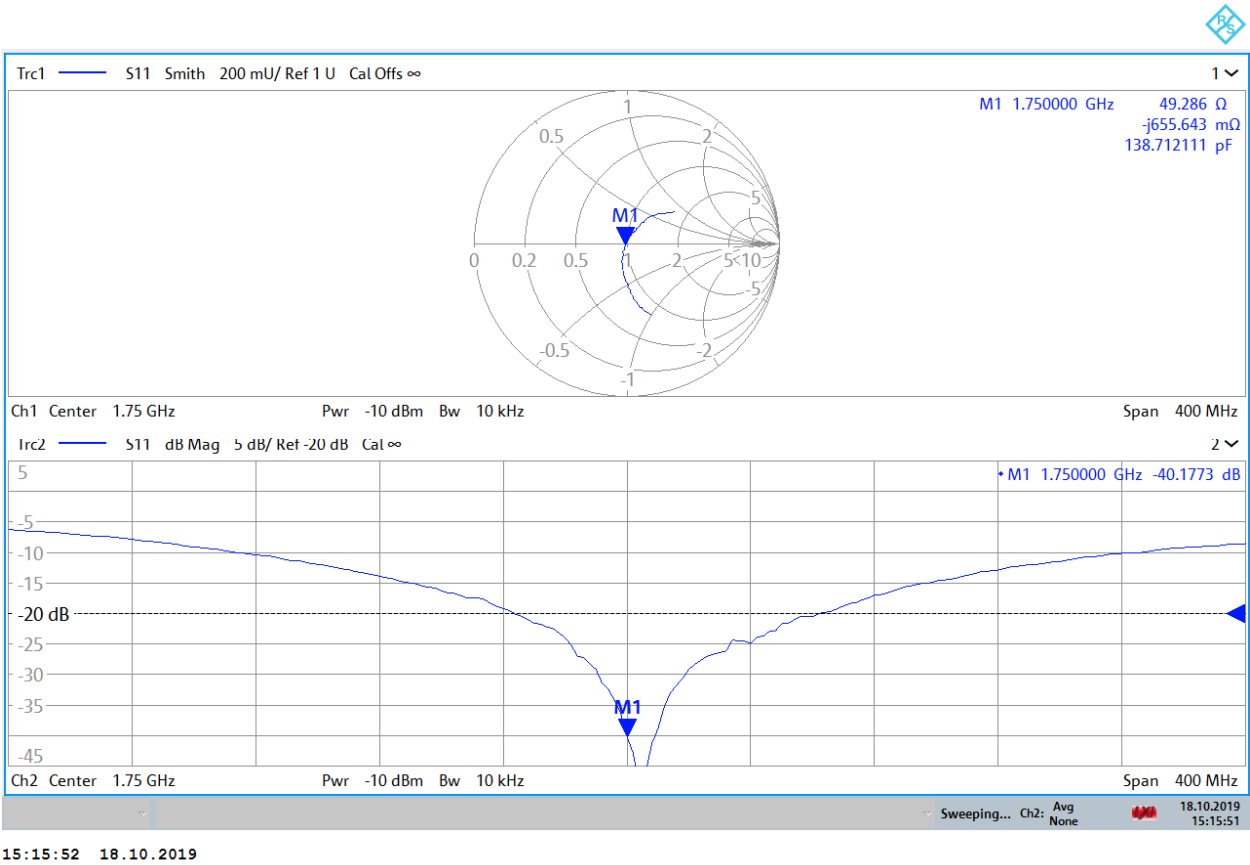
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

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.

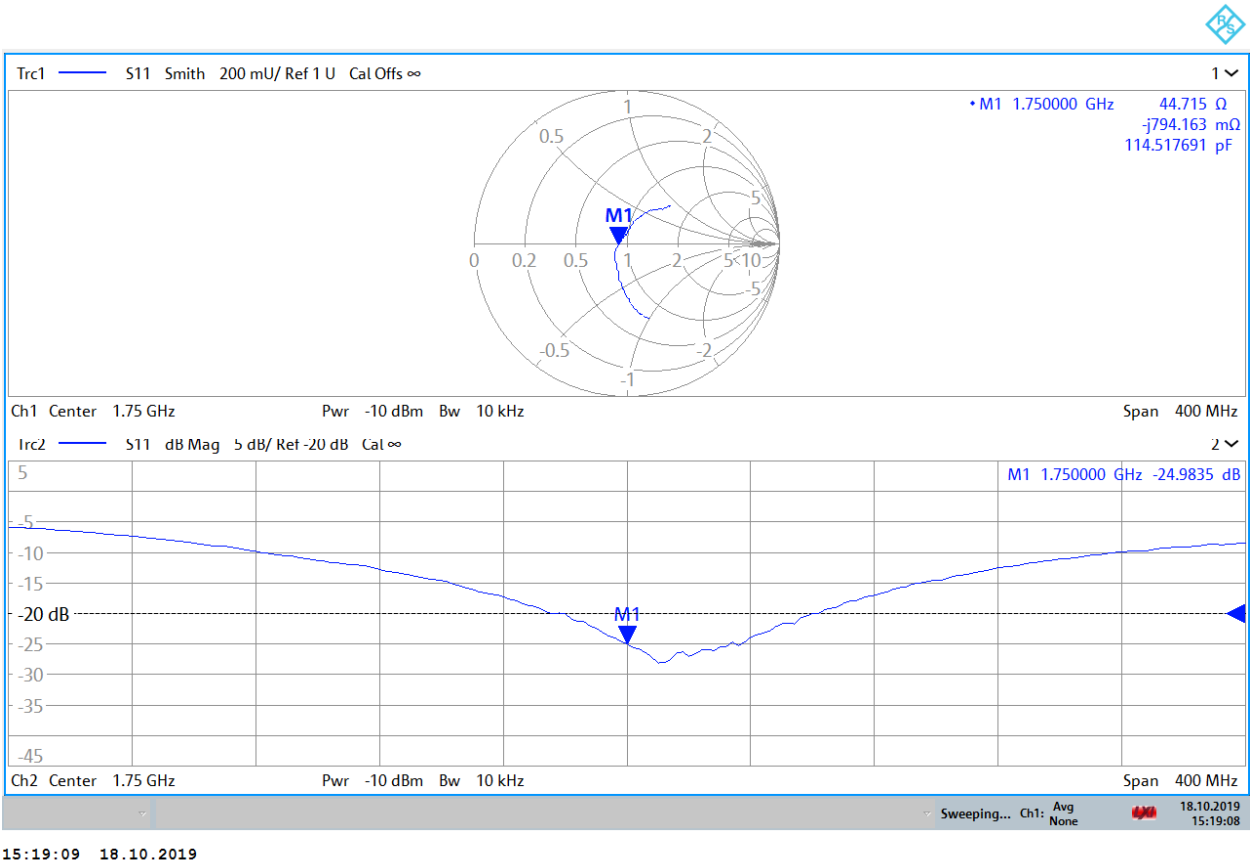
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

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





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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
----------------------------------	----------

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:

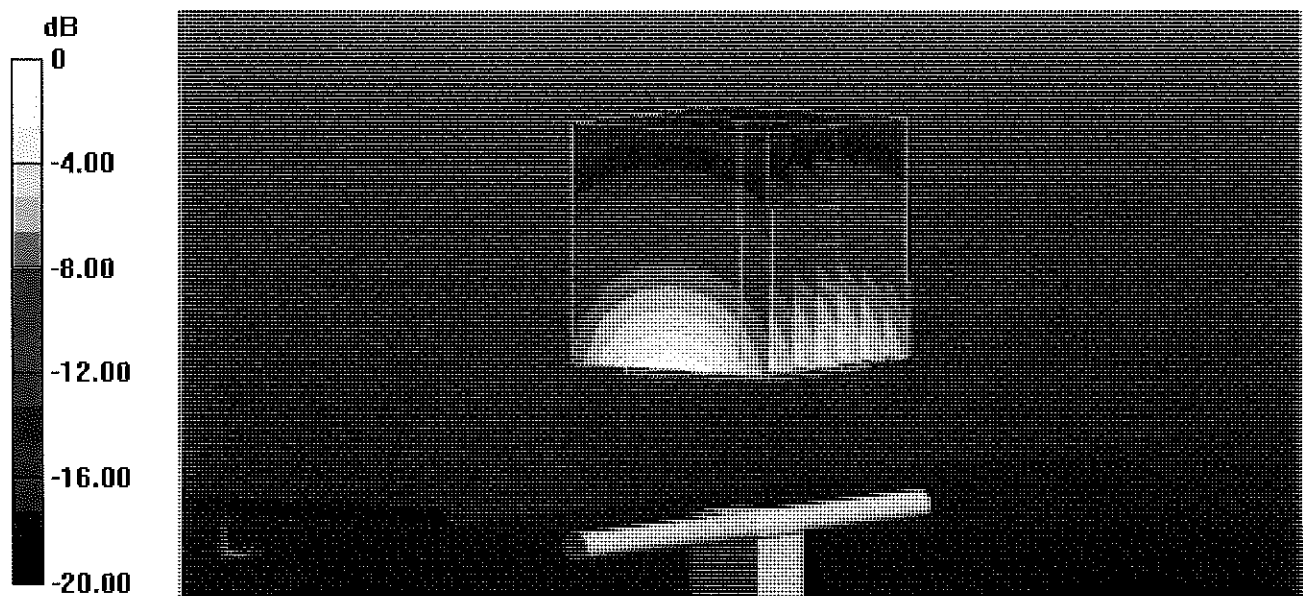
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 107.8 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 16.7 W/kg

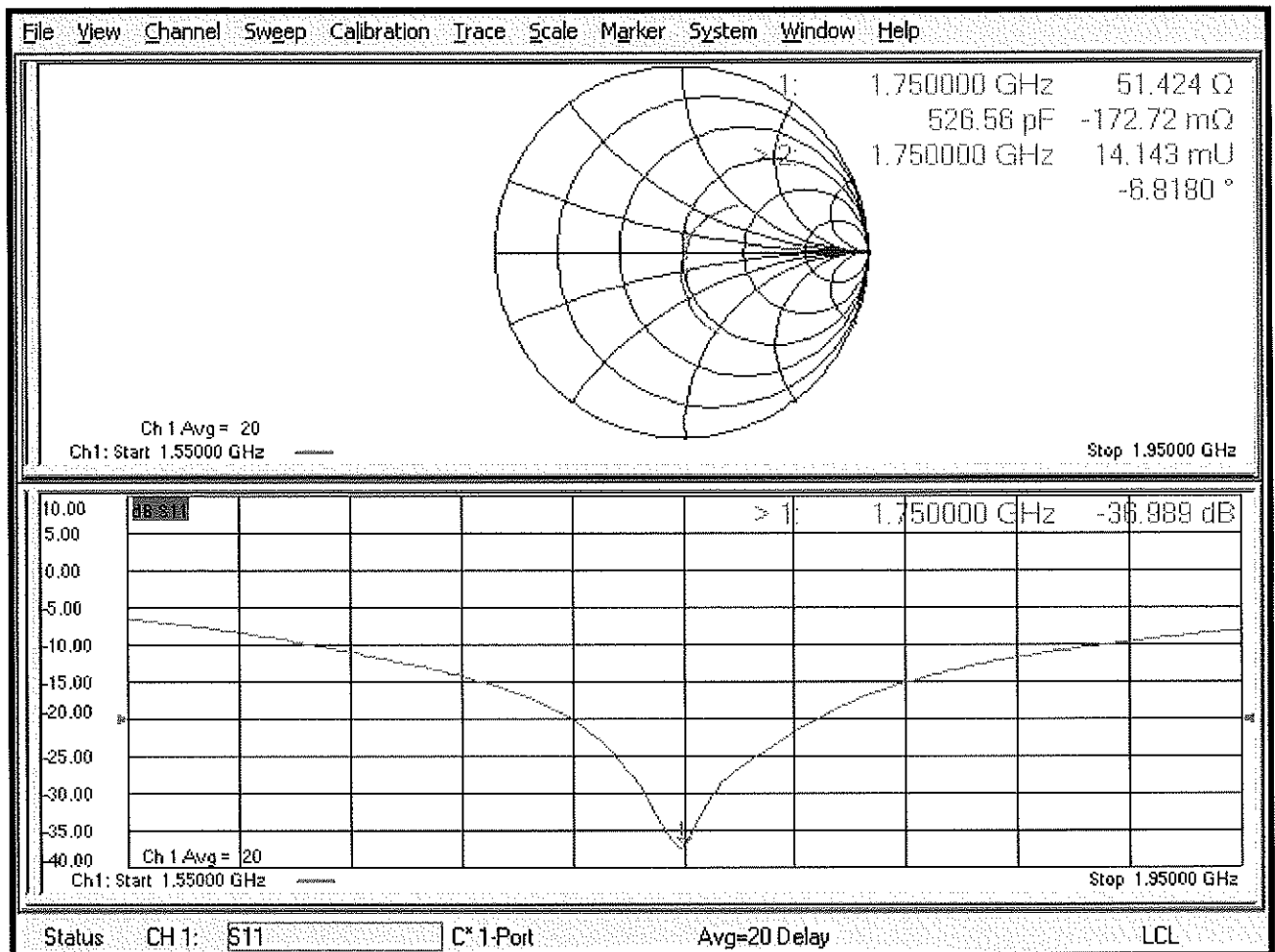
SAR(1 g) = 9.13 W/kg; SAR(10 g) = 4.83 W/kg

Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/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:

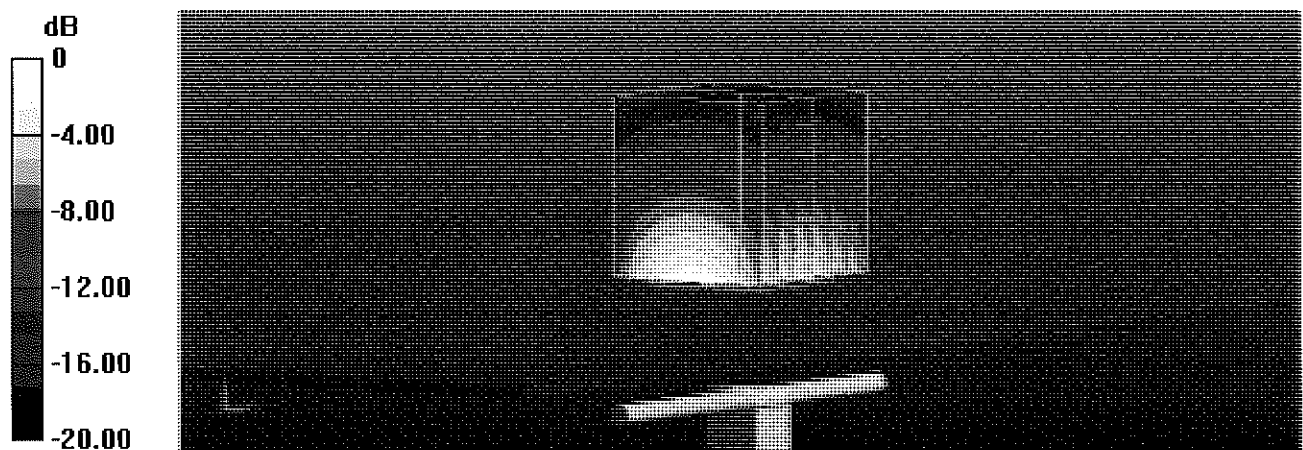
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.1 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 17.2 W/kg

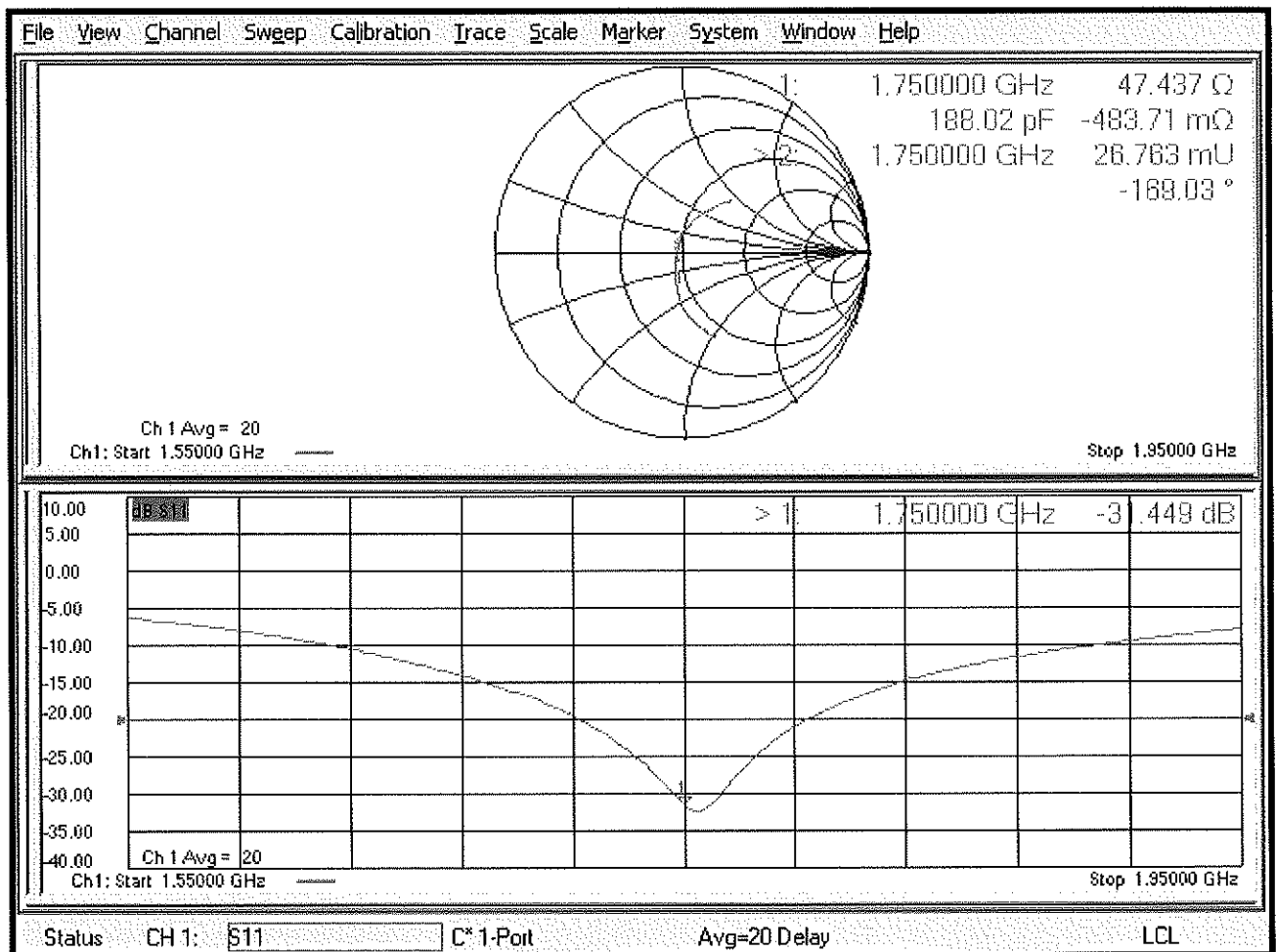
SAR(1 g) = 9.35 W/kg; SAR(10 g) = 4.93 W/kg

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

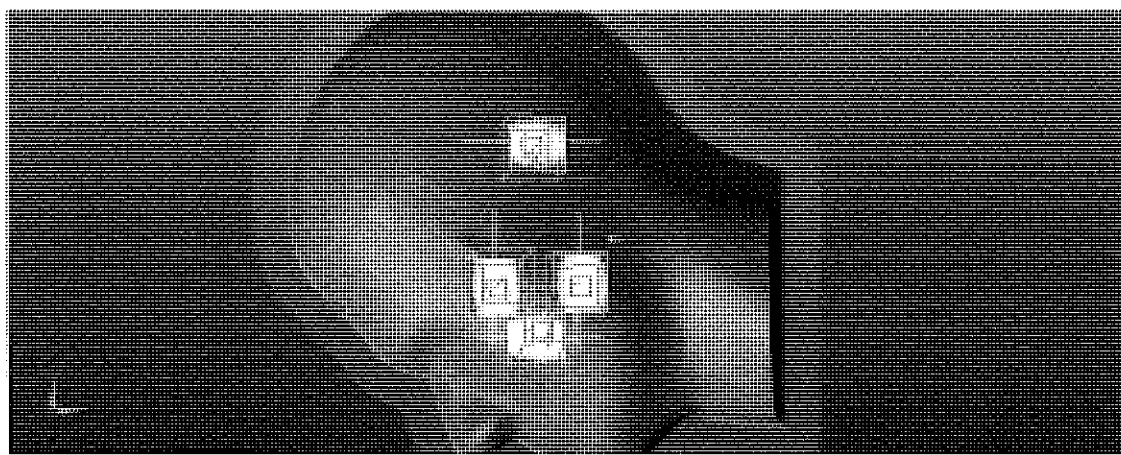
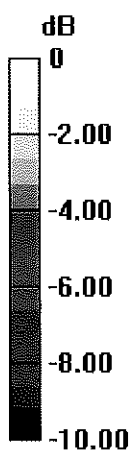
SAM Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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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 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: **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

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



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

Accreditation No.: **SCS 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	V52.10.1
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 cm³ (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 cm³ (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 cm³ (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 cm³ (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)