

90_LTE Band 25_20M_QPSK_1RB_0Offset_Bottom Side_0mm_Ch26590

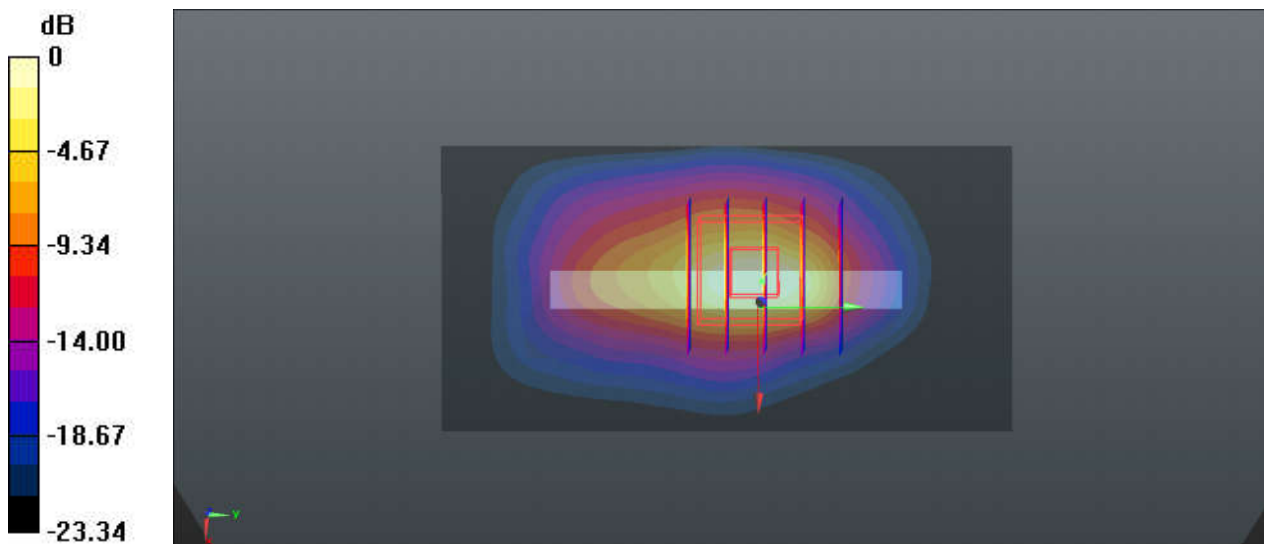
Communication System: UID 0, LTE (0); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: HSL_1900_211129 Medium parameters used: $f = 1905$ MHz; $\sigma = 1.423$ S/m; $\epsilon_r = 38.991$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.4 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(5.2, 5.2, 5.2); Calibrated: 2021/2/19
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn910; Calibrated: 2021/7/15
- Phantom: SAM (Front) with CRP v5.0; Type: QD000P40CD; Serial: TP:1795
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch26590/Area Scan (41x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.09 W/kg

Ch26590/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 61.42 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 11.5 W/kg
SAR(1 g) = 4.43 W/kg; SAR(10 g) = 1.7 W/kg
Maximum value of SAR (measured) = 6.57 W/kg



0 dB = 6.09 W/kg

91_LTE Band 30_10M_QPSK_50RB_0Offset_Bottom Side_0mm_Ch27710

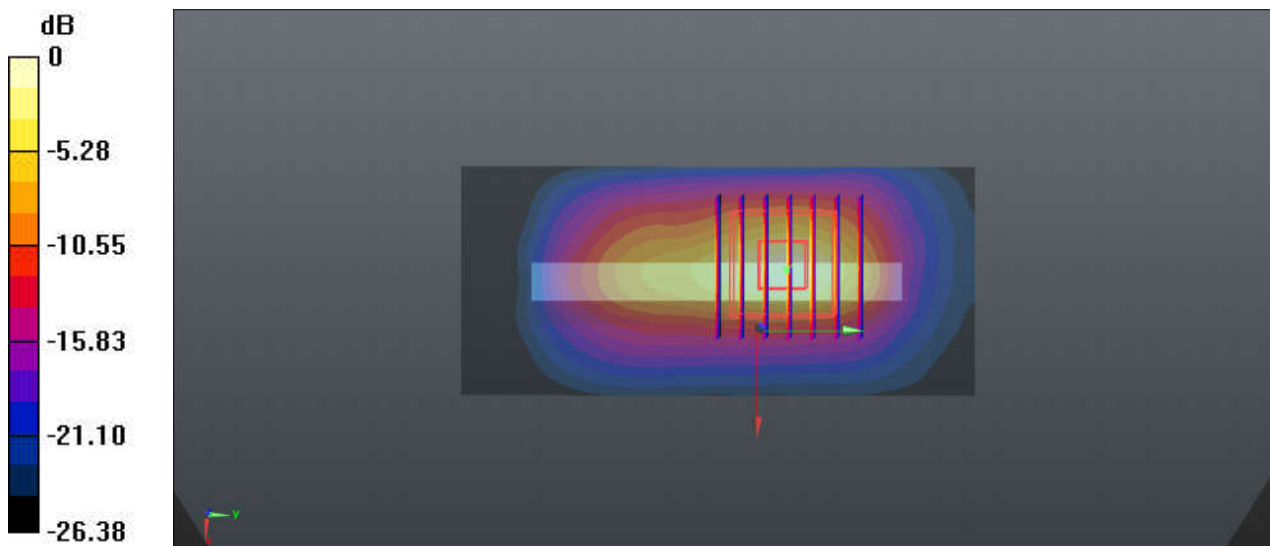
Communication System: UID 0, LTE (0); Frequency: 2310 MHz; Duty Cycle: 1:1
 Medium: HSL_2300_211122 Medium parameters used: $f = 2310$ MHz; $\sigma = 1.744$ S/m; $\epsilon_r = 38.522$;
 $\rho = 1000$ kg/m³
 Ambient Temperature : 23.4 °C; Liquid Temperature : 22.4 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(4.87, 4.87, 4.87); Calibrated: 2021/2/19
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn910; Calibrated: 2021/7/15
- Phantom: SAM (Front) with CRP v5.0; Type: QD000P40CD; Serial: TP:1795
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch27710/Area Scan (41x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
 Maximum value of SAR (interpolated) = 8.12 W/kg

Ch27710/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 46.16 V/m; Power Drift = 0.06 dB
 Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 5.51 W/kg; SAR(10 g) = 1.86 W/kg
 Maximum value of SAR (measured) = 8.71 W/kg



0 dB = 8.71 W/kg

92_LTE Band 7_20M_QPSK_1RB_0Offset_Top Side_0mm_Ch20850

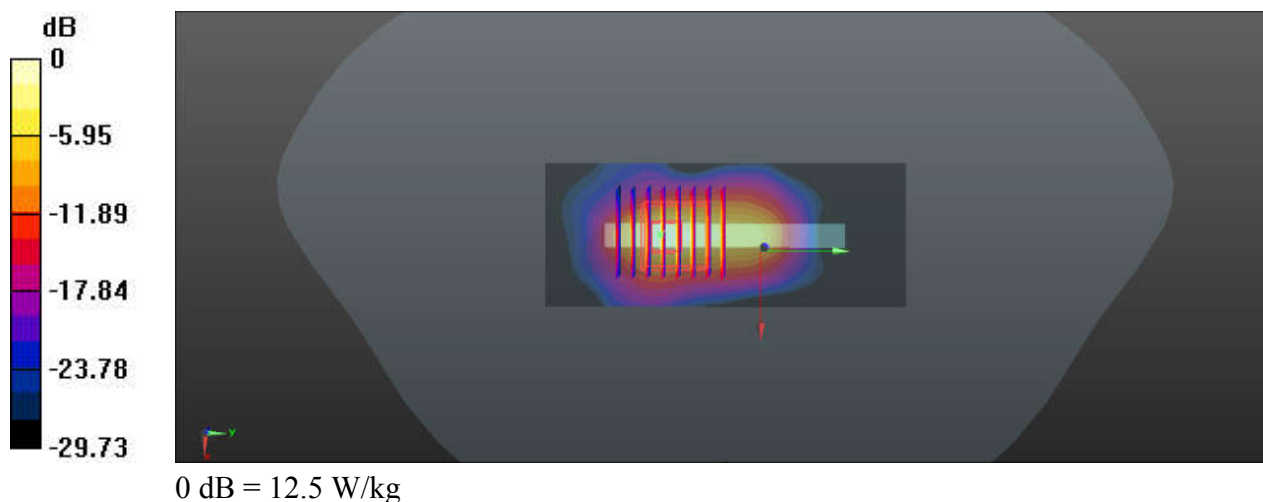
Communication System: UID 0, Generic LTE (0); Frequency: 2510 MHz; Duty Cycle: 1:1
 Medium: HSL_2600_211119 Medium parameters used: $f = 2510$ MHz; $\sigma = 1.948$ S/m; $\epsilon_r = 38.667$;
 $\rho = 1000$ kg/m³
 Ambient Temperature : 23.5 °C; Liquid Temperature : 22.3 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.33, 7.33, 7.33); Calibrated: 2021/4/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2021/1/13
- Phantom: SAM (30deg probe tilt) with CRP v4.0; Type: QD000P40CC; Serial: TP: 1500
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch20850/Area Scan (41x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
 Maximum value of SAR (interpolated) = 14.2 W/kg

Ch20850/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 51.23 V/m; Power Drift = -0.18 dB
 Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 5.69 W/kg; SAR(10 g) = 1.91 W/kg
 Maximum value of SAR (measured) = 12.5 W/kg



93_LTE Band 41_20M_QPSK_50RB_0Offset_Left Side_0mm_Ch40620

Communication System: UID 0, LTE (0); Frequency: 2593 MHz; Duty Cycle: 1:2.331

Medium: HSL_2600_211201 Medium parameters used: $f = 2593$ MHz; $\sigma = 1.929$ S/m; $\epsilon_r = 37.663$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(7.47, 7.47, 7.47); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch40620/Area Scan (41x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 9.42 W/kg

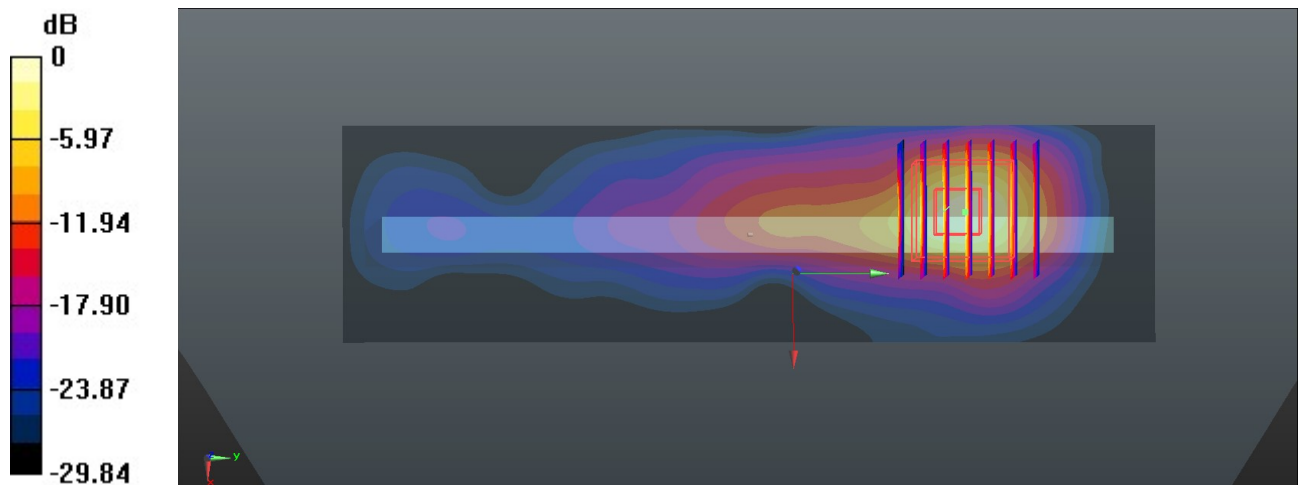
Ch40620/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.37 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 19.9 W/kg

SAR(1 g) = 6.07 W/kg; SAR(10 g) = 2.01 W/kg

Maximum value of SAR (measured) = 9.85 W/kg



0 dB = 9.85 W/kg

94_LTE Band 48_20M_QPSK_50RB_0Offset_Back_0mm_Ch56150

Communication System: UID 0, LTE (0); Frequency: 3641 MHz; Duty Cycle: 1:1.59

Medium: HSL_3700_211129 Medium parameters used: $f = 3641$ MHz; $\sigma = 2.92$ S/m; $\epsilon_r = 39.594$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(6.59, 6.59, 6.59); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch56150/Area Scan (81x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
 Maximum value of SAR (interpolated) = 14.7 W/kg

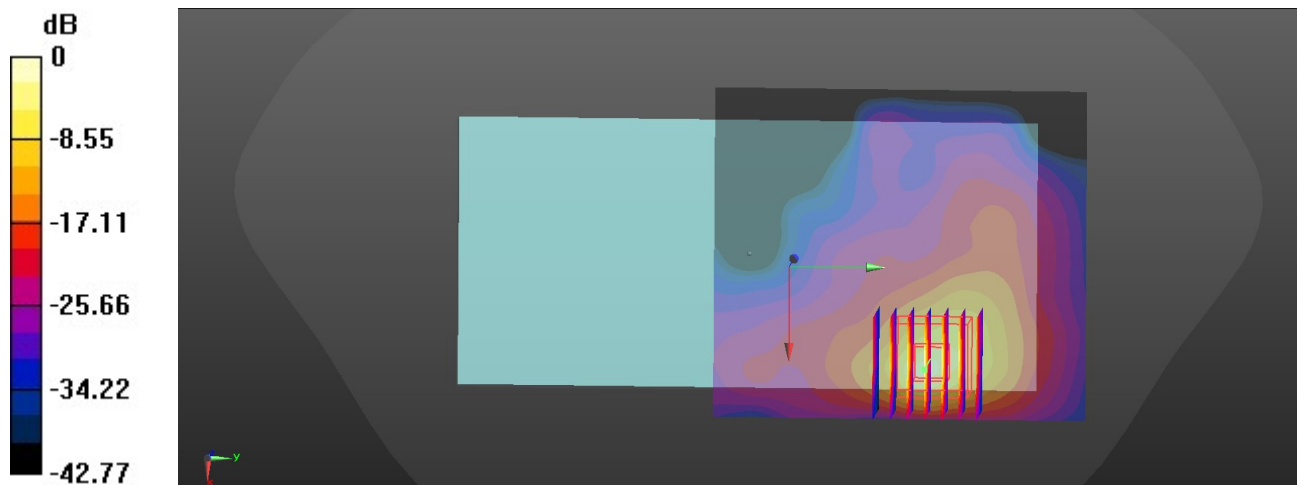
Ch56150/Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=1.4mm

Reference Value = 0.8000 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 42.7 W/kg

SAR(1 g) = 9.87 W/kg; SAR(10 g) = 2.36 W/kg

Maximum value of SAR (measured) = 21.0 W/kg



0 dB = 21.0 W/kg

95_N66_40M_QPSK_1RB_1Offset_DFT-15_Bottom Side_0mm_Ch349000

Communication System: UID 0, 5G NR (0); Frequency: 1745 MHz; Duty Cycle: 1:1

Medium: HSL_1750_211120 Medium parameters used: $f = 1745$ MHz; $\sigma = 1.386$ S/m; $\epsilon_r = 40.553$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(8.73, 8.73, 8.73); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch349000/Area Scan (41x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

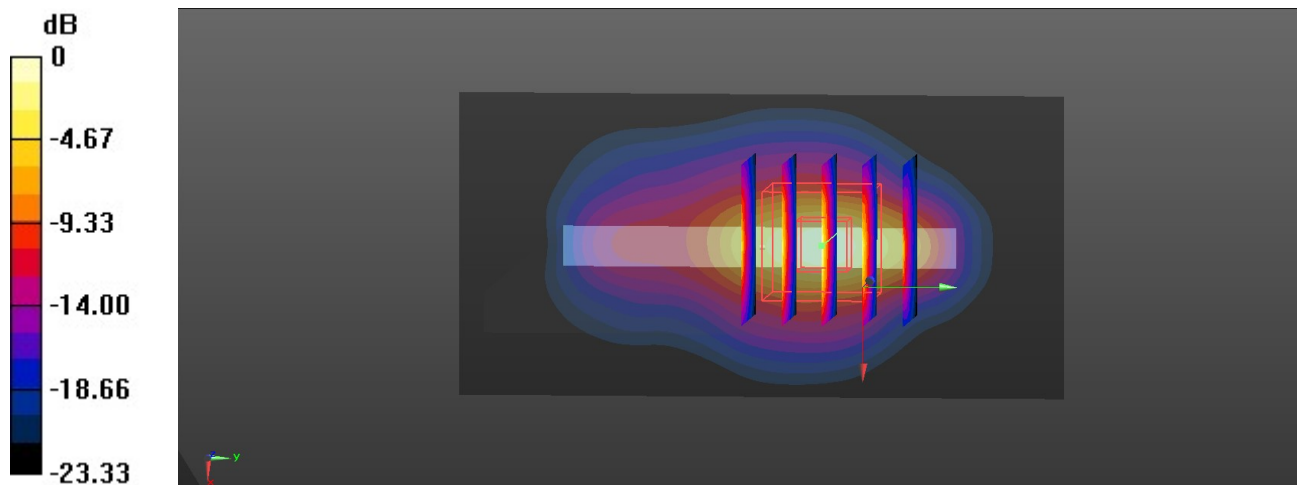
Ch349000/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.43 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 17.0 W/kg

SAR(1 g) = 5.71 W/kg; SAR(10 g) = 2.14 W/kg

Maximum value of SAR (measured) = 13.1 W/kg



0 dB = 13.1 W/kg

96_N25_40M_QPSK_1RB_1Offset_DFT-15_Left Side_0mm_Ch376500

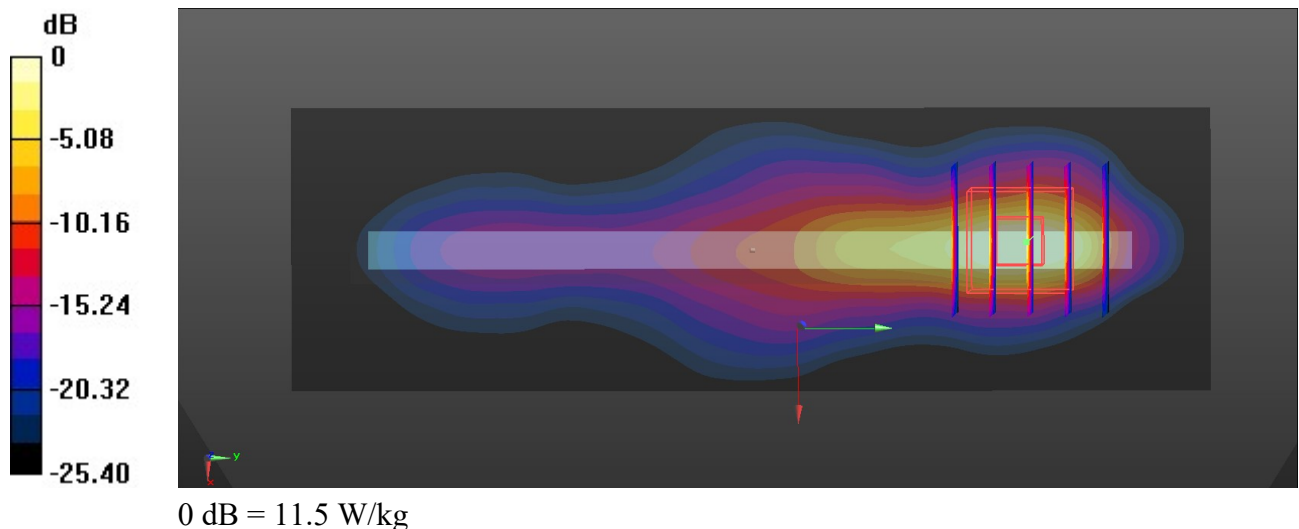
Communication System: UID 0, 5G NR (0); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: HSL_1900_211119 Medium parameters used: $f = 1882.5$ MHz; $\sigma = 1.391$ S/m; $\epsilon_r = 39.307$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.5 °C; Liquid Temperature : 22.4 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(8.33, 8.33, 8.33); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch376500/Area Scan (41x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.1 W/kg

Ch376500/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.547 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 5.92 W/kg; SAR(10 g) = 2.07 W/kg
Maximum value of SAR (measured) = 11.5 W/kg



97_N30_10M_QPSK_1RB_1Offset_DFT-15_Bottom Side_0mm_Ch462000

Communication System: UID 0, 5GNR (0); Frequency: 2310 MHz; Duty Cycle: 1:1

Medium: HSL_2300_211116 Medium parameters used: $f = 2310$ MHz; $\sigma = 1.739$ S/m; $\epsilon_r = 40.283$; $\rho = 1000$ kg/m³

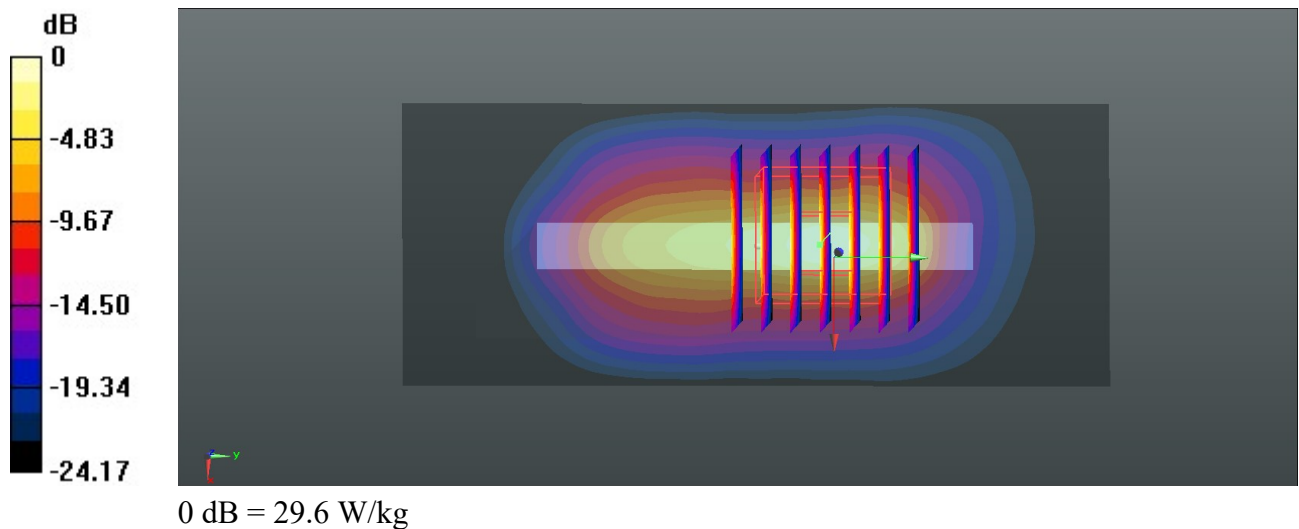
Ambient Temperature : 23.5 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(7.91, 7.91, 7.91); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch462000/Area Scan (41x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
 Maximum value of SAR (interpolated) = 28.0 W/kg

Ch462000/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 104.7 V/m; Power Drift = 0.06 dB
 Peak SAR (extrapolated) = 41.9 W/kg
SAR(1 g) = 6.22 W/kg; SAR(10 g) = 2.0 W/kg
 Maximum value of SAR (measured) = 29.6 W/kg



98_N7_20M_QPSK_1RB_1Offset_DFT-15_Left Side_0mm_Ch507000

Communication System: UID 0, 5G NR (0); Frequency: 2535 MHz; Duty Cycle: 1:1

Medium: HSL_2600_211201 Medium parameters used: $f = 2535$ MHz; $\sigma = 1.982$ S/m; $\epsilon_r = 37.854$; $\rho = 1000$ kg/m³

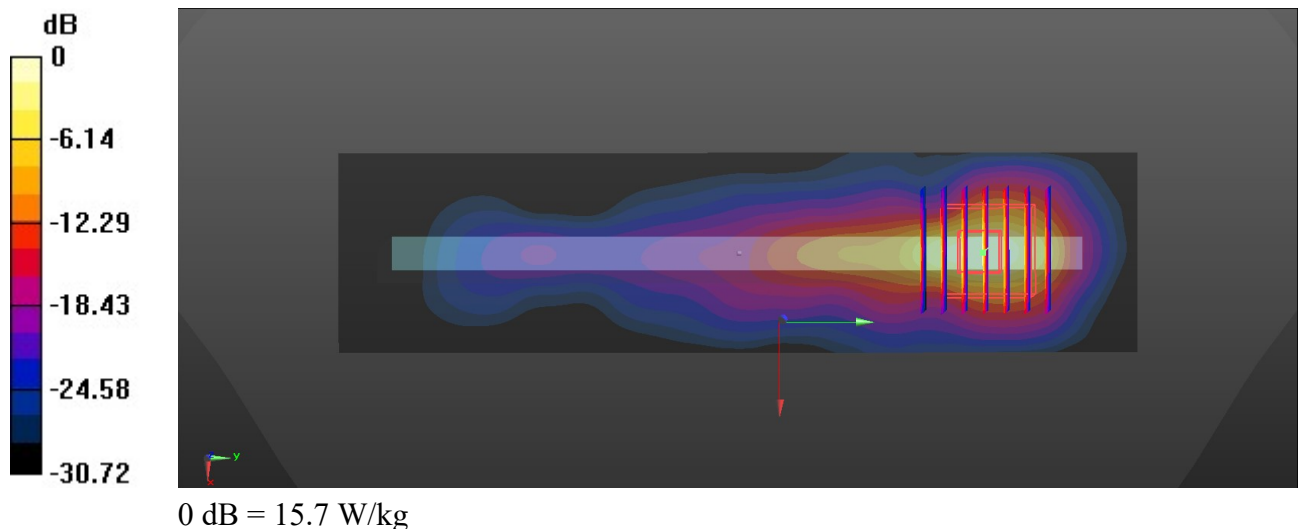
Ambient Temperature : 23.4 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(7.47, 7.47, 7.47); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch507000/Area Scan (41x161x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 15.0 W/kg

Ch507000/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.68 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 23.6 W/kg
SAR(1 g) = 6.13 W/kg; SAR(10 g) = 2 W/kg
Maximum value of SAR (measured) = 15.7 W/kg



99_N41_100M_QPSK_135RB_69Offset_DFT-30_Left Side_0mm_Ch518598

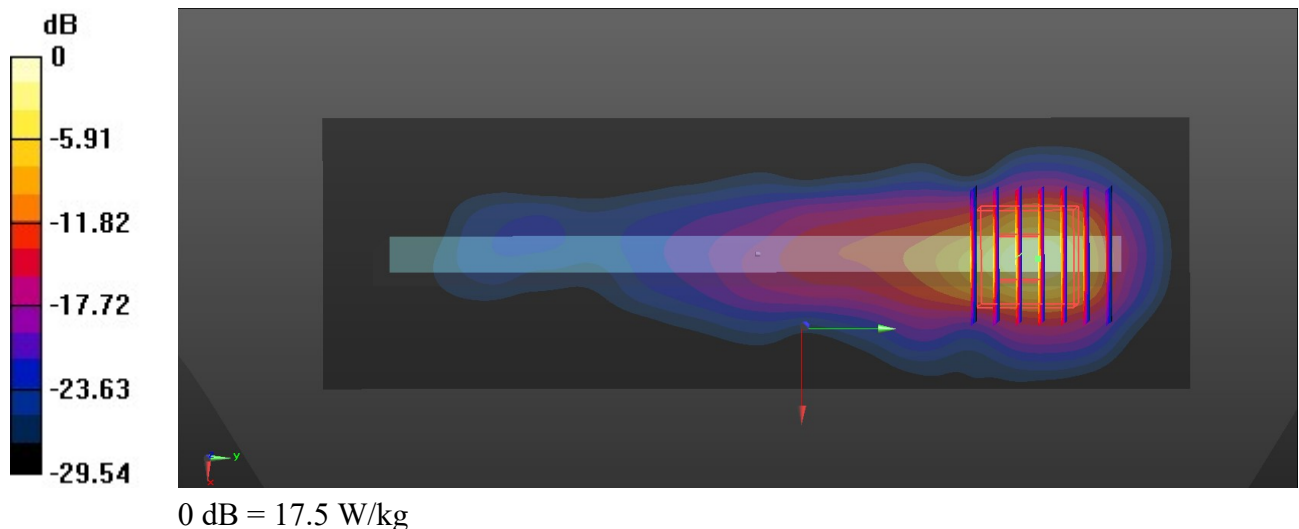
Communication System: UID 0, 5G NR (0); Frequency: 2592.99 MHz; Duty Cycle: 1:1
Medium: HSL_2600_211201 Medium parameters used: $f = 2593$ MHz; $\sigma = 2.047$ S/m; $\epsilon_r = 37.615$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.4 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(7.47, 7.47, 7.47); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch518598/Area Scan (51x161x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 10.7 W/kg

Ch518598/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.44 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 6.56 W/kg; SAR(10 g) = 2.13 W/kg
Maximum value of SAR (measured) = 17.5 W/kg



101_N77_100M_QPSK_135RB_69Offset_DFT-30_Top Side_0mm_Ch633334

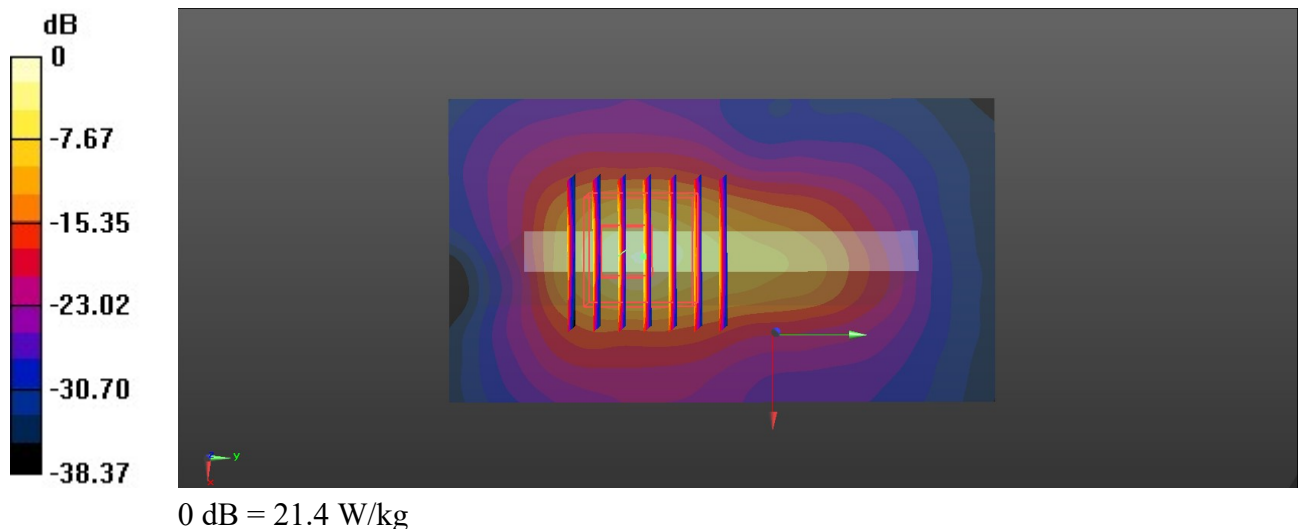
Communication System: UID 0, 5G NR (0); Frequency: 3500.01 MHz; Duty Cycle: 1:1
 Medium: HSL_3500_211118 Medium parameters used: $f = 3500.01$ MHz; $\sigma = 2.905$ S/m; $\epsilon_r = 39.576$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.5 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(6.62, 6.62, 6.62); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch633334/Area Scan (51x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
 Maximum value of SAR (interpolated) = 12.3 W/kg

Ch633334/Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=1.4mm
 Reference Value = 40.00 V/m; Power Drift = -0.05 dB
 Peak SAR (extrapolated) = 36.6 W/kg
SAR(1 g) = 7.45 W/kg; SAR(10 g) = 2.17 W/kg
 Maximum value of SAR (measured) = 21.4 W/kg



102_WLAN2.4GHz_802.11b_1Mbps_Right Side_0mm_Ch6

Communication System: UID 0, WIFI (0); Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: HSL_2450_211206 Medium parameters used: $f = 2437$ MHz; $\sigma = 1.793$ S/m; $\epsilon_r = 37.991$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(7.67, 7.67, 7.67); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch6/Area Scan (41x161x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 7.98 W/kg

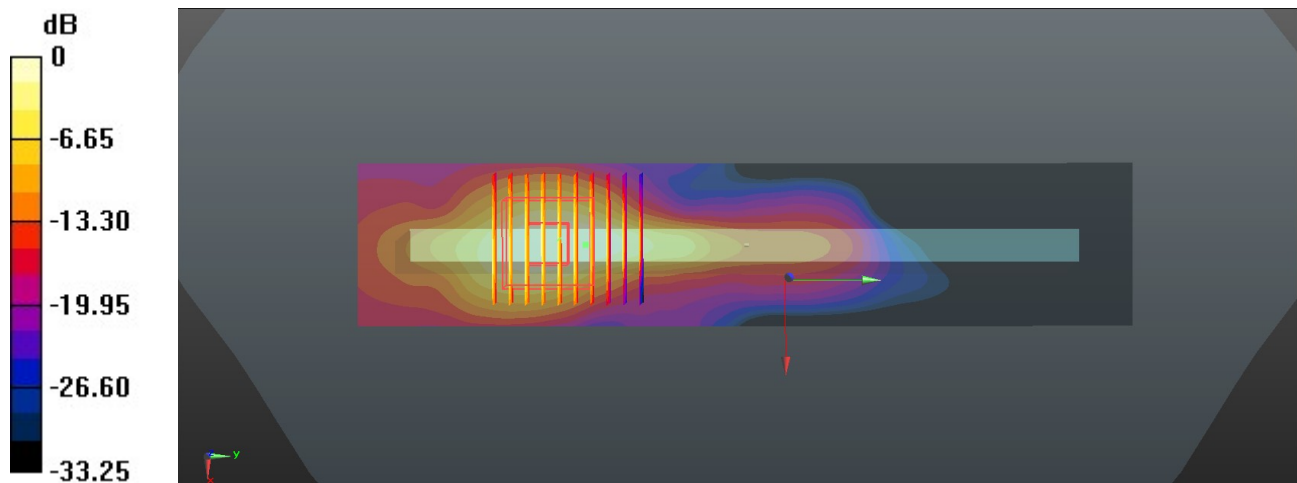
Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.24 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 11.7 W/kg

SAR(1 g) = 3.68 W/kg; SAR(10 g) = 1.58 W/kg

Maximum value of SAR (measured) = 6.93 W/kg



0 dB = 6.93 W/kg

103_WLAN5GHz_802.11ac-VHT80 MCS0_Back_0mm_Ch42

Communication System: UID 0, WIFI (0); Frequency: 5210 MHz; Duty Cycle: 1:1

Medium: HSL_5250_211123 Medium parameters used: $f = 5210$ MHz; $\sigma = 4.681$ S/m; $\epsilon_r = 36.549$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(5.17, 5.17, 5.17); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch42/Area Scan (101x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 5.31 W/kg

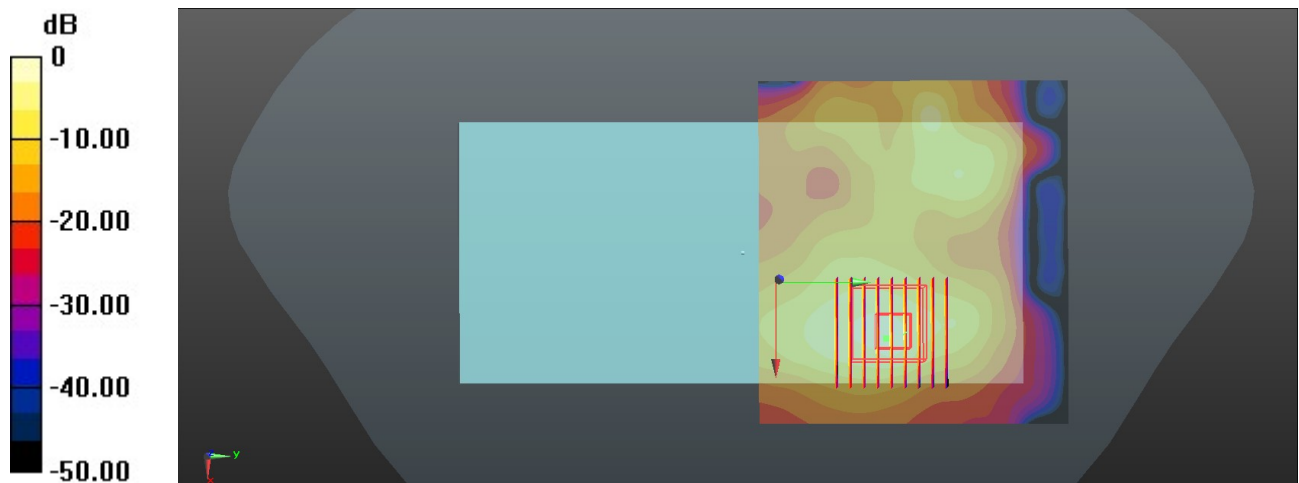
Ch42/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 5.349 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 14.9 W/kg

SAR(1 g) = 3 W/kg; SAR(10 g) = 0.826 W/kg

Maximum value of SAR (measured) = 8.00 W/kg



0 dB = 8.00 W/kg

104_WLAN5GHz_802.11n-HT40 MCS0_Back_0mm_Ch62

Communication System: UID 0, WIFI (0); Frequency: 5310 MHz; Duty Cycle: 1:1

Medium: HSL_5250_211123 Medium parameters used: $f = 5310$ MHz; $\sigma = 4.799$ S/m; $\epsilon_r = 36.394$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(5.17, 5.17, 5.17); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch62/Area Scan (101x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 6.65 W/kg

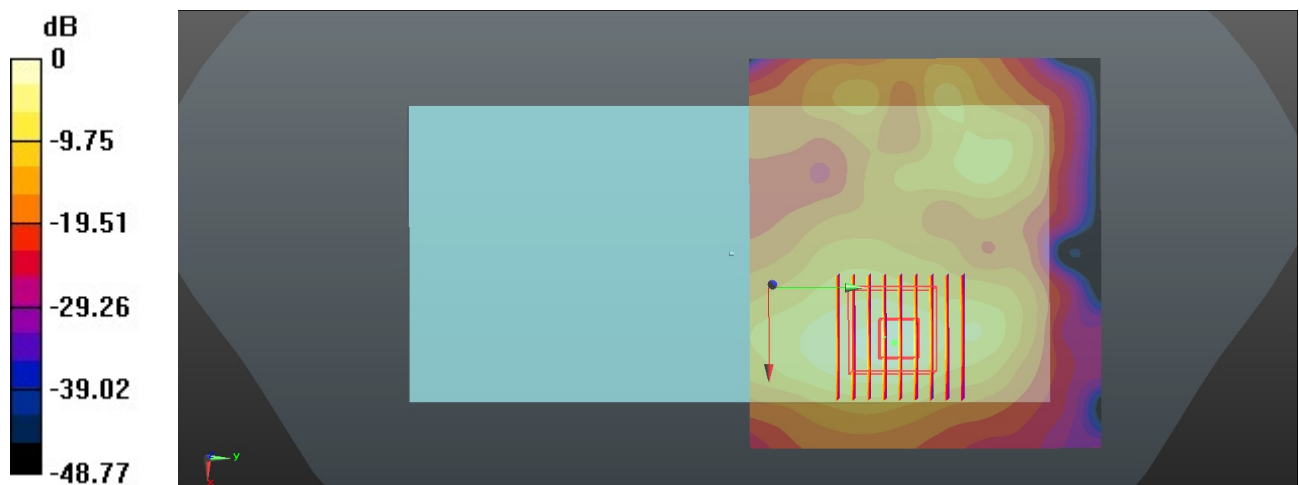
Ch62/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 5.917 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 16.8 W/kg

SAR(1 g) = 3.25 W/kg; SAR(10 g) = 0.909 W/kg

Maximum value of SAR (measured) = 8.68 W/kg



0 dB = 8.68 W/kg

105_WLAN5GHz_802.11ac-VHT80 MCS0_Back_0mm_Ch122

Communication System: UID 0, WIFI (0); Frequency: 5610 MHz; Duty Cycle: 1:1

Medium: HSL_5600_211127 Medium parameters used: $f = 5610$ MHz; $\sigma = 5.166$ S/m; $\epsilon_r = 35.858$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7576; ConvF(4.6, 4.6, 4.6); Calibrated: 2021/4/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2021/8/25
- Phantom: Twin-SAM V8.0 (Left); Type: QD 000 P41 AA; Serial: 2035
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Ch122/Area Scan (101x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 6.94 W/kg

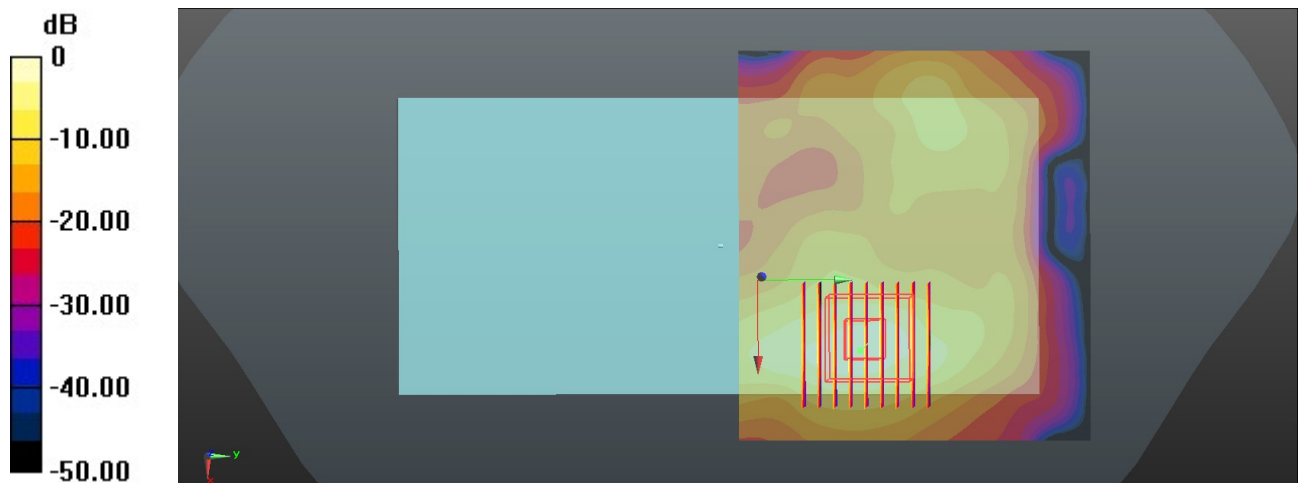
Ch122/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 3.773 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 18.1 W/kg

SAR(1 g) = 3.13 W/kg; SAR(10 g) = 1.04 W/kg

Maximum value of SAR (measured) = 8.84 W/kg



0 dB = 8.84 W/kg



Appendix C. DASYS Calibration Certificate

The DASYS calibration certificates are shown as follows.



In Collaboration with
s p e a g
CALIBRATION LABORATORY



中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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Client **Sporton**

Certificate No: **Z19-60081**

CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1087**

Calibration Procedure(s) **FF-Z11-003-01**
Calibration Procedures for dipole validation kits

Calibration date: **March 27, 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(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Power sensor NRP8S	104291	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Reference Probe EX3DV4	SN 3617	31-Jan-19(SPEAG,No.EX3-3617_Jan19)	Jan-20
DAE4	SN 1331	06-Feb-19(SPEAG,No.DAE4-1331_Feb19)	Feb-20
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	23-Jan-19 (CTTL, No.J19X00336)	Jan-20
NetworkAnalyzer E5071C	MY46110673	24-Jan-19 (CTTL, No.J19X00547)	Jan-20

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: March 29, 2019

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



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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 assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- KDB865664, 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%.



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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.2.1495
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 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 ± 0.2) °C	43.0 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.36 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.65 W/kg ± 18.7 % (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 ± 0.2) °C	56.9 ± 6 %	0.94 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.58 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.75 W/kg ± 18.7 % (k=2)



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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.4Ω- 2.59jΩ
Return Loss	- 29.3dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.6Ω- 3.86jΩ
Return Loss	- 27.7dB

General Antenna Parameters and Design

Electrical Delay (one direction)	0.898 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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