

08_WCDMA II_RMC 12.2Kbps_Left Cheek_0mm_Ch9400

Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: HSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.415$ S/m; $\epsilon_r = 38.749$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.1 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(8.13, 8.13, 8.13); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.779 W/kg

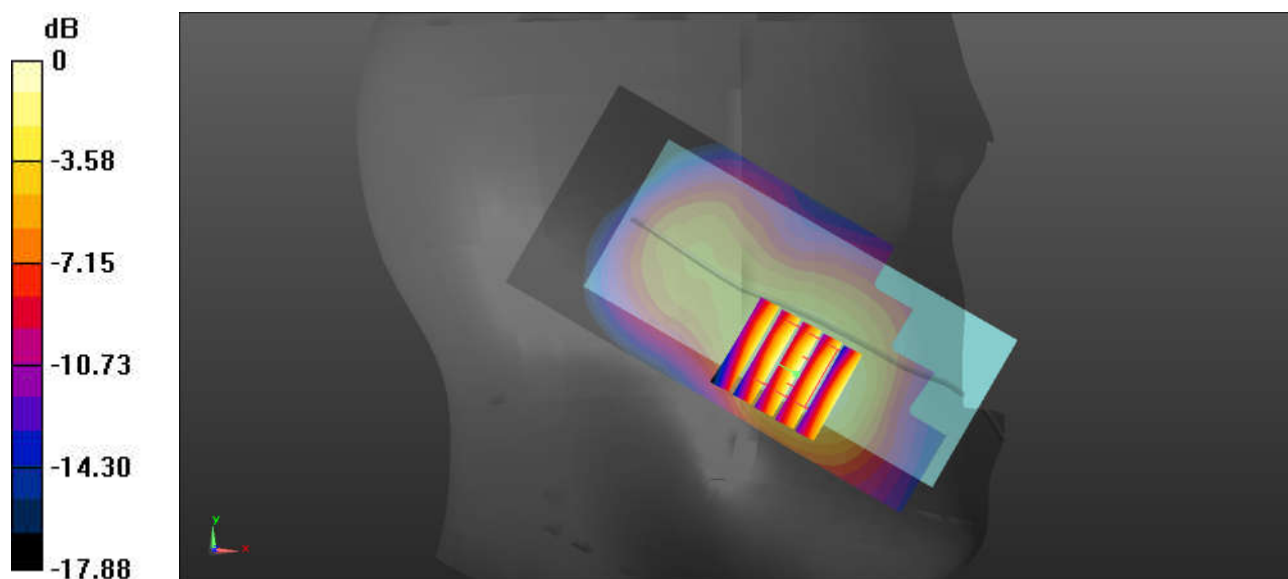
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.596 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.990 W/kg

SAR(1 g) = 0.662 W/kg; SAR(10 g) = 0.412 W/kg

Maximum value of SAR (measured) = 0.783 W/kg



0 dB = 0.783 W/kg = -1.06 dBW/kg

09_LTE Band 2_20M_QPSK_1RB_0Offset_Left Cheek_0mm_Ch18900

Communication System: UID 0, LTE-FDD (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: HSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.415$ S/m; $\epsilon_r = 38.749$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.1 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(8.13, 8.13, 8.13); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (51x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.960 W/kg

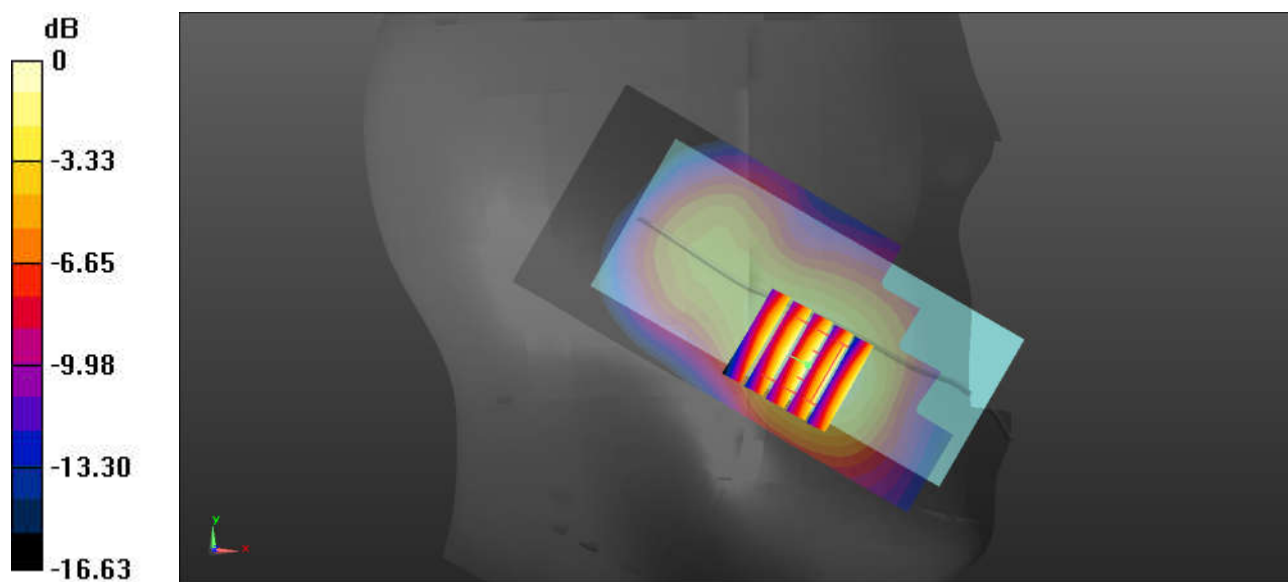
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.528 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.811 W/kg; SAR(10 g) = 0.504 W/kg

Maximum value of SAR (measured) = 0.960 W/kg



0 dB = 0.960 W/kg = -0.18 dBW/kg

10_LTE Band 7_20M_QPSK_1RB_0Offset_Right Cheek_0mm_Ch21350

Communication System: UID 0, LTE-FDD (0); Frequency: 2560 MHz; Duty Cycle: 1:1

Medium: HSL_2600 Medium parameters used: $f = 2560$ MHz; $\sigma = 1.903$ S/m; $\epsilon_r = 39.086$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(7.26, 7.26, 7.26); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (71x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

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

Zoom Scan (9x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.307 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.715 W/kg; SAR(10 g) = 0.428 W/kg

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

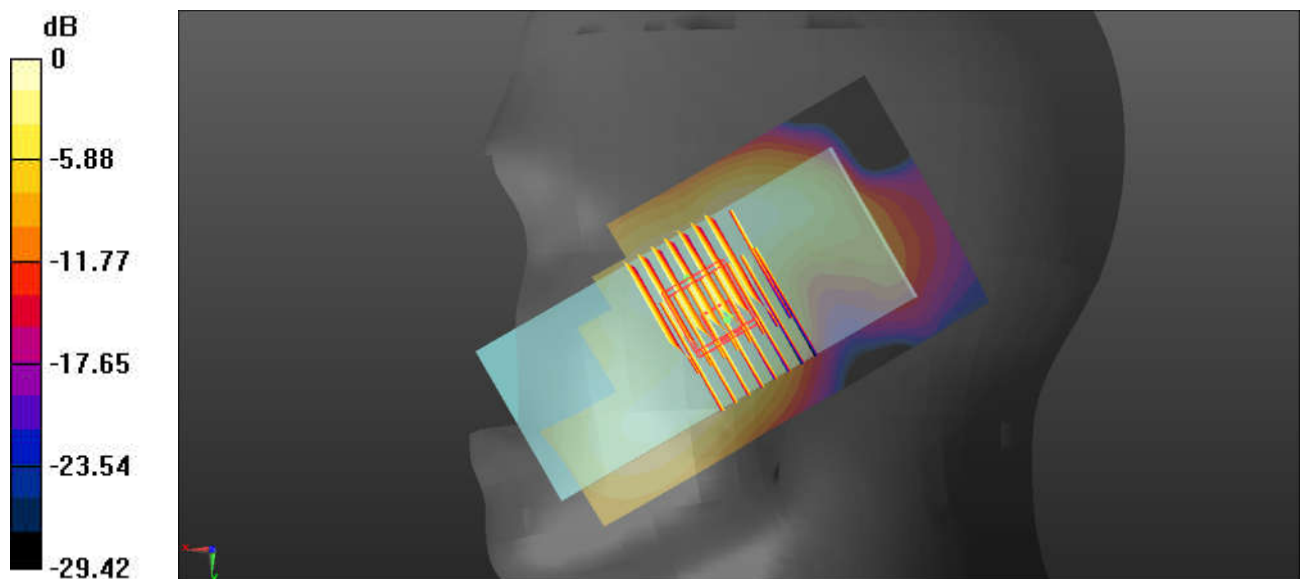
Zoom Scan (9x8x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.307 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.717 W/kg; SAR(10 g) = 0.432 W/kg

Maximum value of SAR (measured) = 1.00 W/kg



0 dB = 1.00 W/kg = 0.00 dBW/kg

11_Bluetooth_1Mbps_Right Cheek_0mm_Ch39

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:1.288

Medium: HSL_2450 Medium parameters used: $f = 2441$ MHz; $\sigma = 1.799$ S/m; $\epsilon_r = 38.599$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(7.53, 7.53, 7.53); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.0867 W/kg

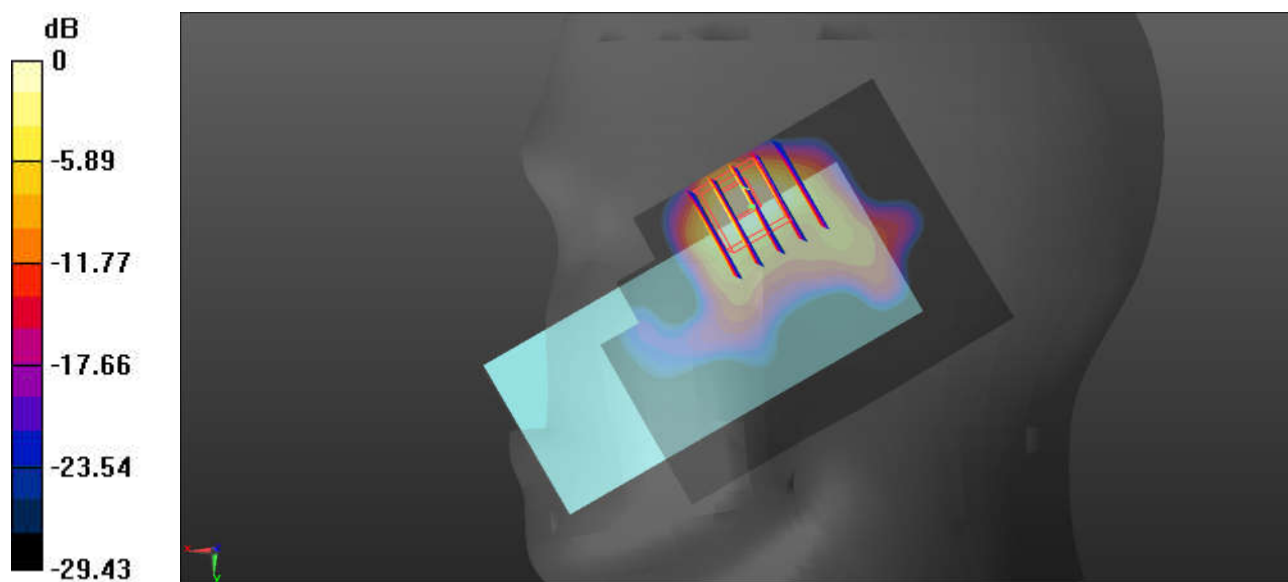
Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.192 W/kg

SAR(1 g) = 0.076 W/kg; SAR(10 g) = 0.030 W/kg

Maximum value of SAR (measured) = 0.104 W/kg



0 dB = 0.104 W/kg = -9.83 dBW/kg

13_GSM850_GPRS (2 Tx slots)_Back_15mm_Ch251

Communication System: UID 0, GSM850 (0); Frequency: 848.8 MHz; Duty Cycle: 1:4.15

Medium: HSL_835 Medium parameters used: $f = 849$ MHz; $\sigma = 0.942$ S/m; $\epsilon_r = 42.495$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(9.98, 9.98, 9.98); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 1.23 W/kg

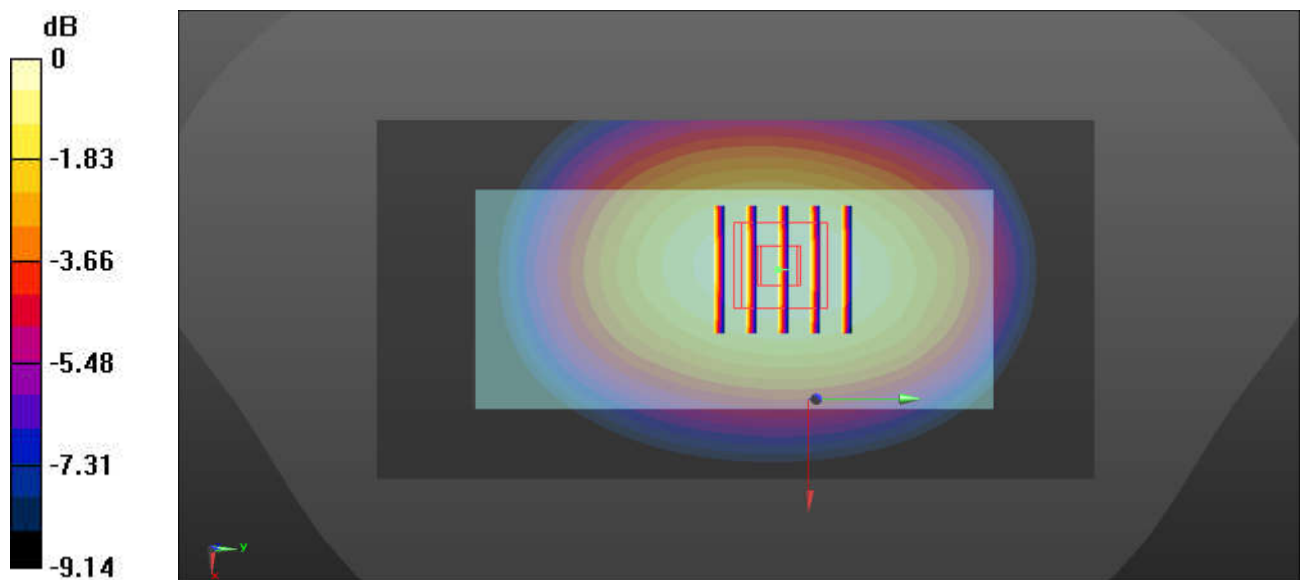
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 3.216 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 1 W/kg; SAR(10 g) = 0.730 W/kg

Maximum value of SAR (measured) = 1.22 W/kg



0 dB = 1.22 W/kg = 0.86 dBW/kg

14_WCDMA V_RMC 12.2Kbps_Back_15mm_Ch4182

Communication System: UID 0, WCDMA (0); Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium: HSL_835 Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.936$ S/m; $\epsilon_r = 42.517$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(9.98, 9.98, 9.98); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.815 W/kg

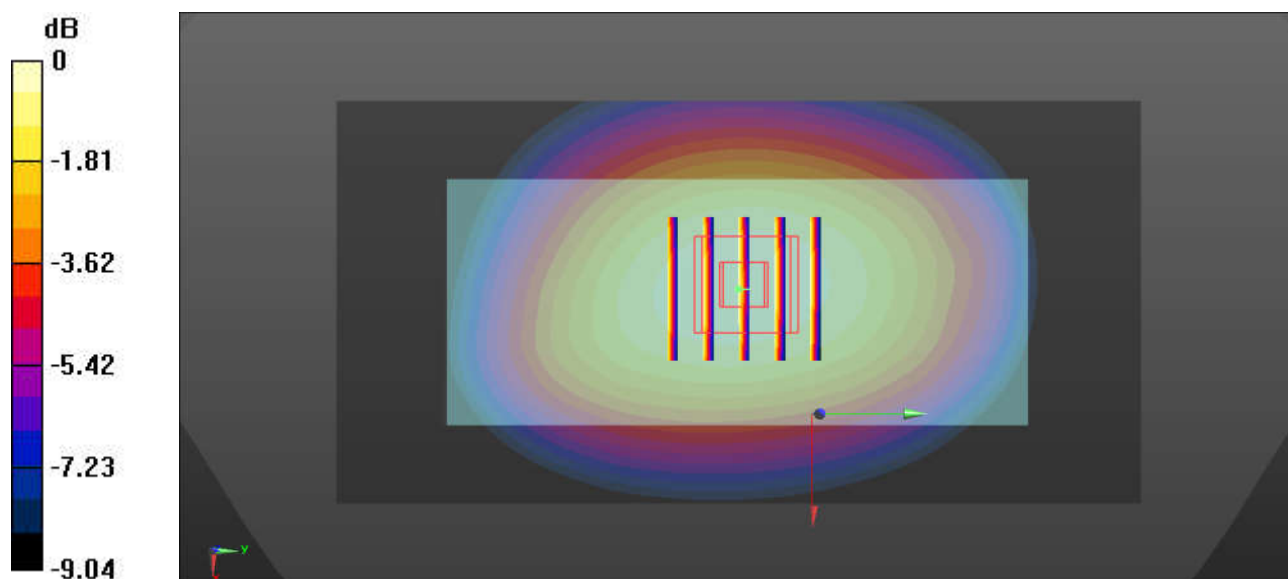
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.885 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.887 W/kg

SAR(1 g) = 0.664 W/kg; SAR(10 g) = 0.484 W/kg

Maximum value of SAR (measured) = 0.815 W/kg



0 dB = 0.815 W/kg = -0.89 dBW/kg

15_LTE Band 5_10M_QPSK_1RB_0Offset_Back_15mm_Ch20525

Communication System: UID 0, LTE-FDD (0); Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: HSL_835 Medium parameters used: $f = 836.5$ MHz; $\sigma = 0.936$ S/m; $\epsilon_r = 42.516$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(9.98, 9.98, 9.98); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

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

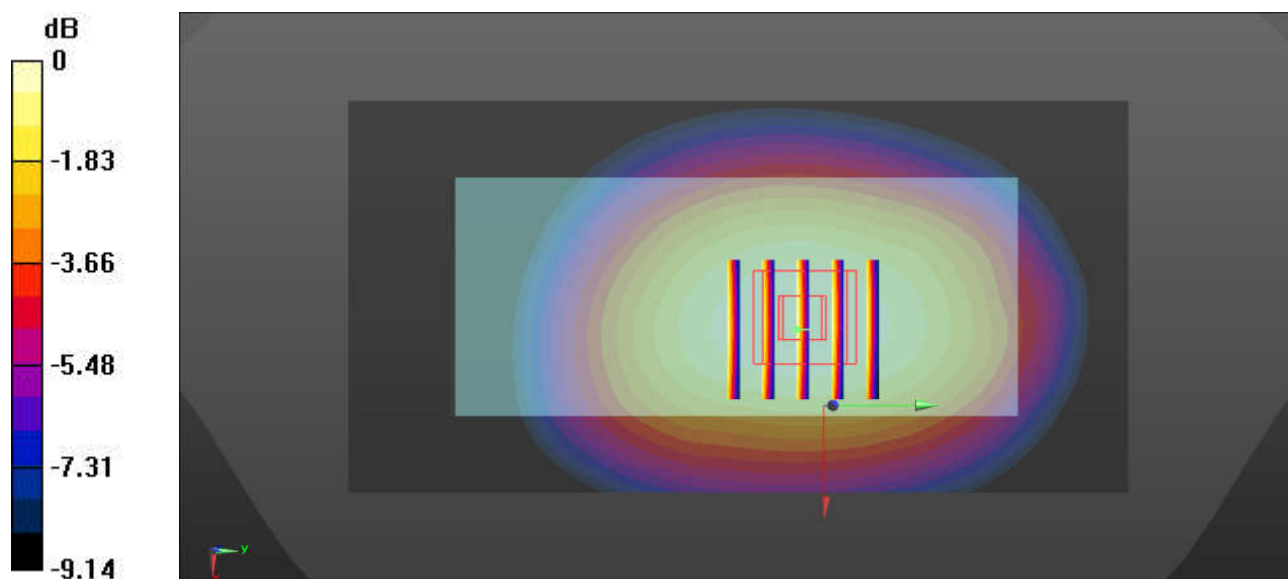
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 33.79 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.864 W/kg; SAR(10 g) = 0.629 W/kg

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



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

16_WCDMA IV_RMC 12.2Kbps_Back_15mm_Ch1312

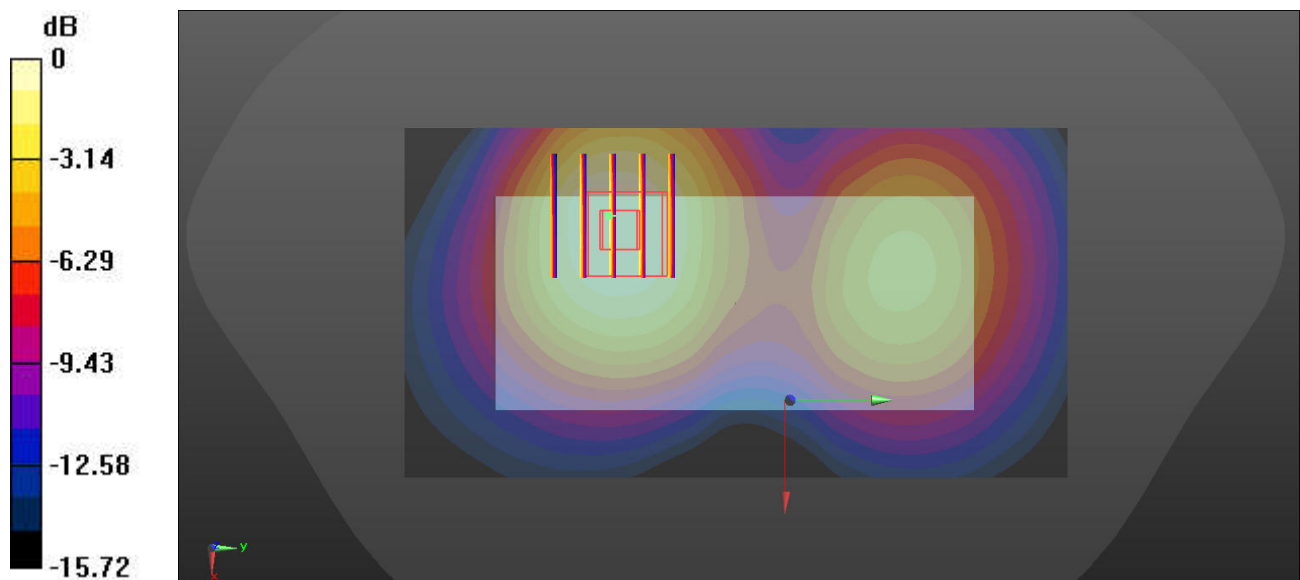
Communication System: UID 0, WCDMA (0); Frequency: 1712.4 MHz; Duty Cycle: 1:1
Medium: HSL_1750 Medium parameters used: $f = 1712.4$ MHz; $\sigma = 1.345$ S/m; $\epsilon_r = 41.378$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(8.45, 8.45, 8.45); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.11 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.128 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.787 W/kg; SAR(10 g) = 0.495 W/kg
Maximum value of SAR (measured) = 1.08 W/kg



0 dB = 1.08 W/kg = 0.33 dBW/kg

17_LTE Band 4_20M_QPSK_1RB_0Offset_Back_15mm_Ch20050

Communication System: UID 0, LTE-FDD (0); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: HSL_1750 Medium parameters used: $f = 1720$ MHz; $\sigma = 1.35$ S/m; $\epsilon_r = 41.355$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(8.45, 8.45, 8.45); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.51 W/kg

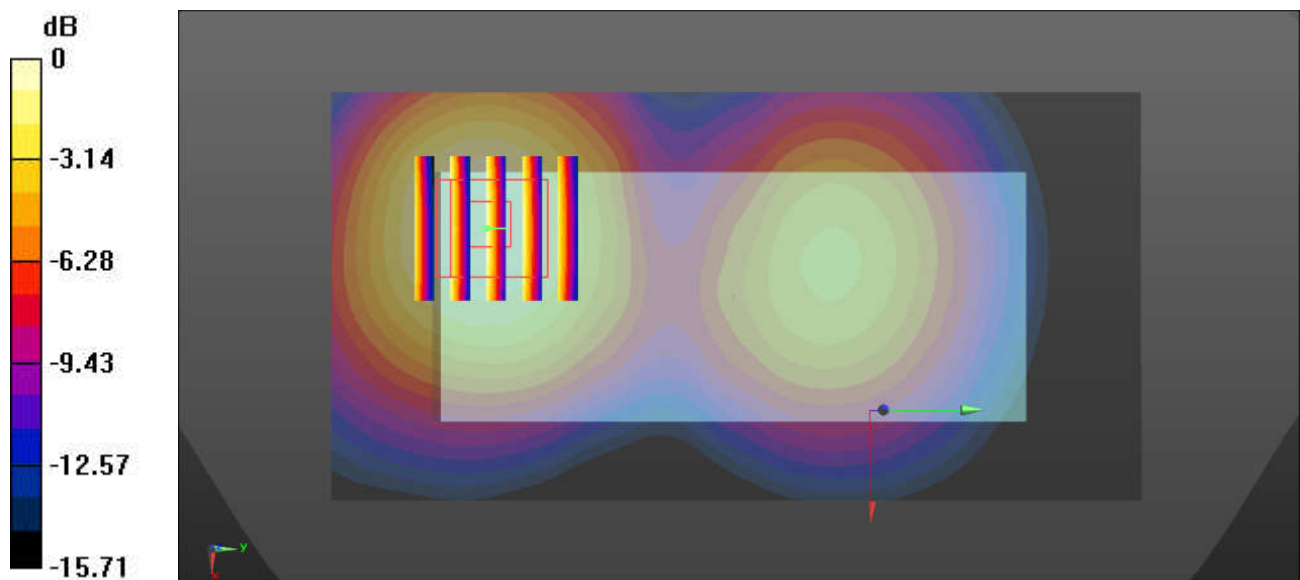
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.830 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.73 W/kg

SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.679 W/kg

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



0 dB = 1.49 W/kg = 1.73 dBW/kg

18_GSM1900_GPRS (3 Tx slots)_Back_15mm_Ch661

Communication System: UID 0, PCS (0); Frequency: 1880 MHz; Duty Cycle: 1:2.77

Medium: HSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.415$ S/m; $\epsilon_r = 38.749$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.1 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(8.13, 8.13, 8.13); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.542 W/kg

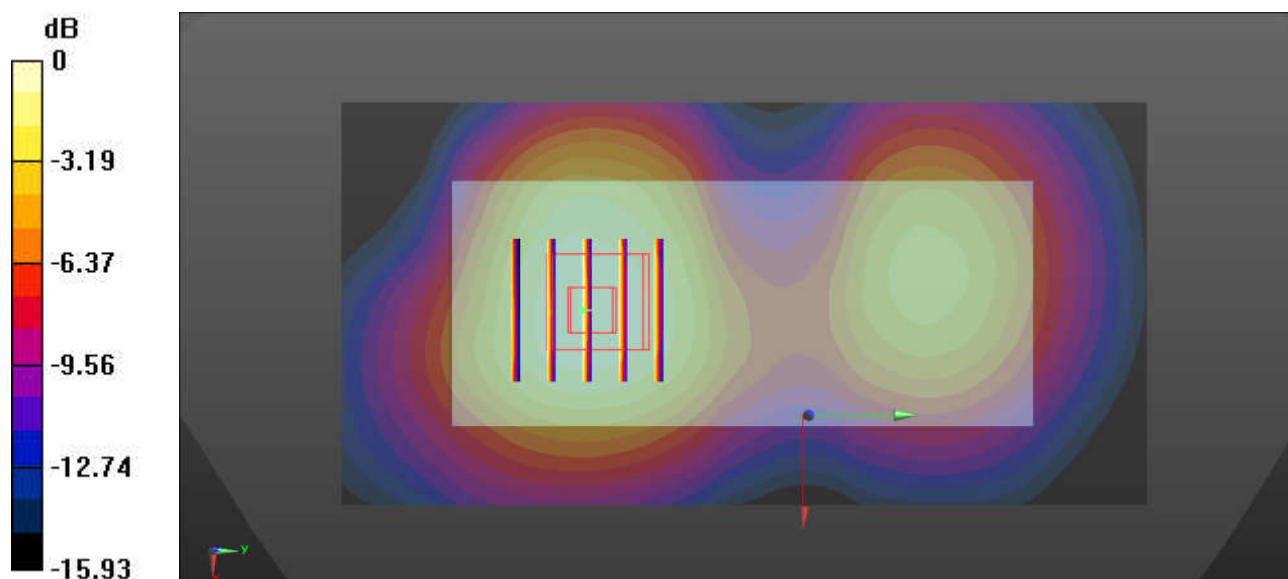
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.641 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.645 W/kg

SAR(1 g) = 0.401 W/kg; SAR(10 g) = 0.246 W/kg

Maximum value of SAR (measured) = 0.556 W/kg



0 dB = 0.556 W/kg = -2.55 dBW/kg

19_WCDMA II_RMC 12.2Kbps_Back_15mm_Ch9400

Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: HSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.415$ S/m; $\epsilon_r = 38.749$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.1 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(8.13, 8.13, 8.13); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.842 W/kg

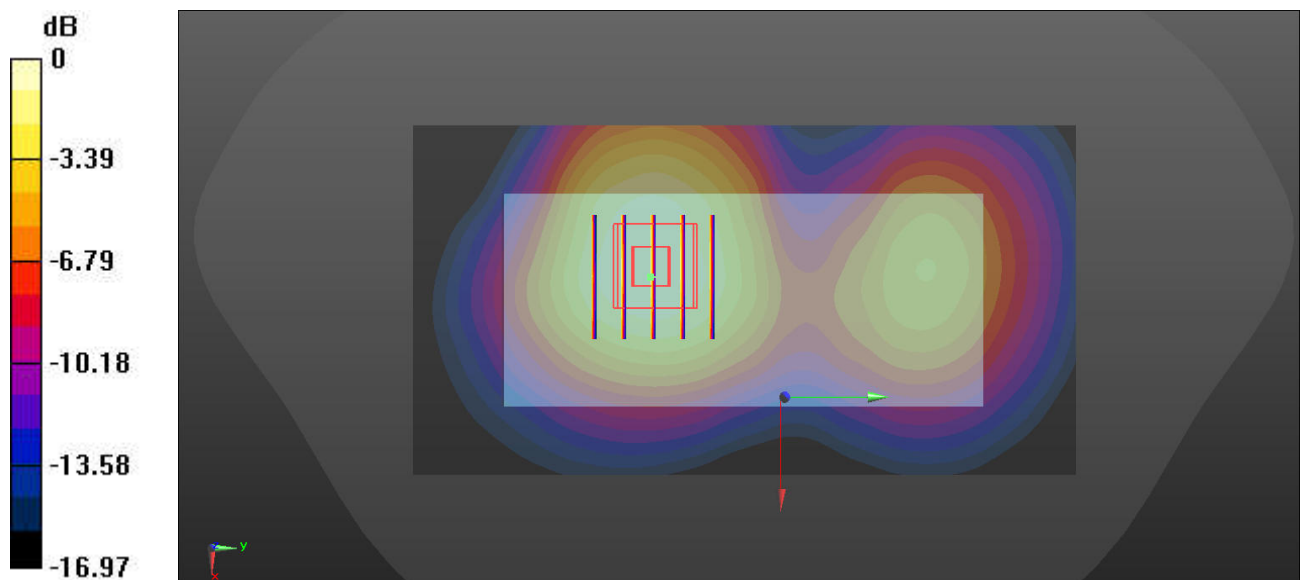
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.86 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.964 W/kg

SAR(1 g) = 0.605 W/kg; SAR(10 g) = 0.377 W/kg

Maximum value of SAR (measured) = 0.834 W/kg



0 dB = 0.834 W/kg = -0.79 dBW/kg

20_LTE Band 2_20M_QPSK_1RB_0Offset_Back_15mm_Ch18700

Communication System: UID 0, LTE-FDD (0); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: HSL_1900 Medium parameters used: $f = 1860$ MHz; $\sigma = 1.405$ S/m; $\epsilon_r = 38.786$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.1 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(8.13, 8.13, 8.13); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

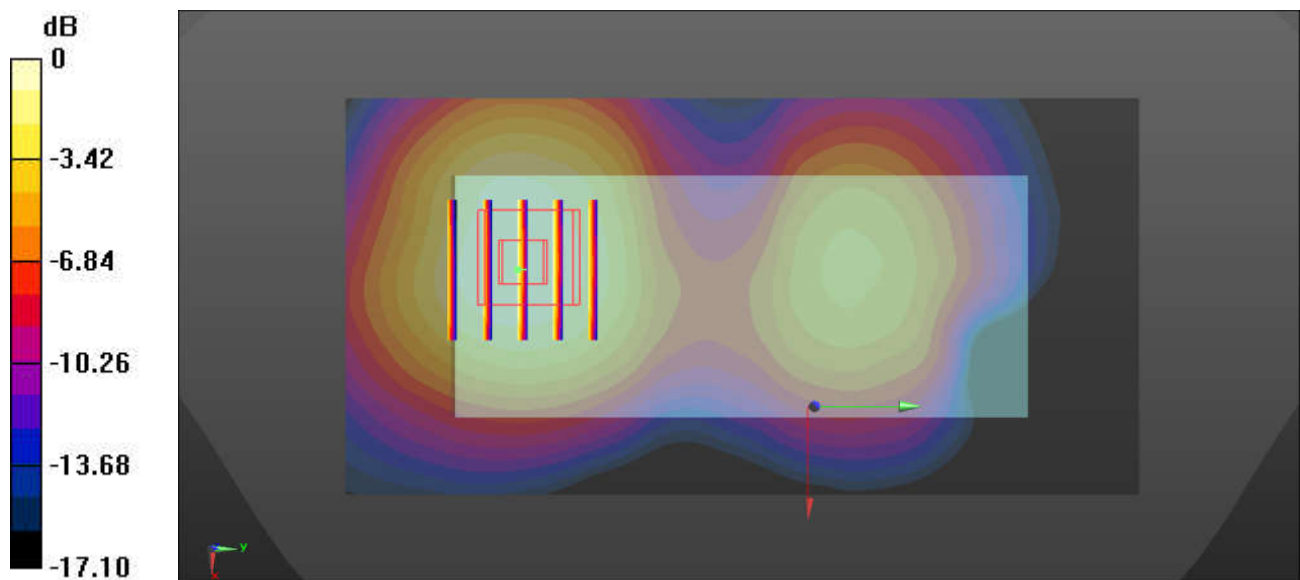
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.808 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.789 W/kg; SAR(10 g) = 0.492 W/kg

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



0 dB = 1.09 W/kg = 0.37 dBW/kg

21_LTE Band 7_20M_QPSK_1RB_0Offset_Back_15mm_Ch20850

Communication System: UID 0, LTE-FDD (0); Frequency: 2510 MHz; Duty Cycle: 1:1
Medium: HSL_2600 Medium parameters used: $f = 2510$ MHz; $\sigma = 1.863$ S/m; $\epsilon_r = 39.219$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(7.26, 7.26, 7.26); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (71x161x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

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

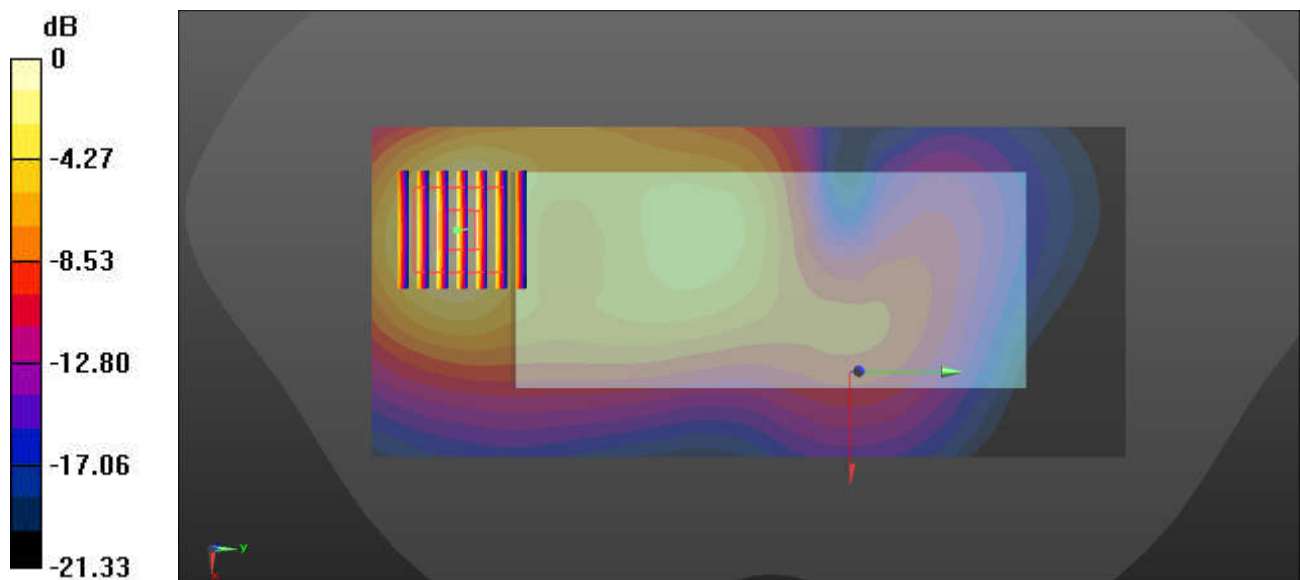
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 2.045 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.80 W/kg

SAR(1 g) = 0.982 W/kg; SAR(10 g) = 0.506 W/kg

Maximum value of SAR (measured) = 1.51 W/kg



0 dB = 1.51 W/kg = 1.79 dBW/kg

22_Bluetooth_1Mbps_Front_15mm_Ch39

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:1.288

Medium: HSL_2450 Medium parameters used: $f = 2441$ MHz; $\sigma = 1.815$ S/m; $\epsilon_r = 39.273$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7592; ConvF(7.53, 7.53, 7.53); Calibrated: 2021/6/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1650; Calibrated: 2021/6/9
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-1644
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (81x151x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 0.0149 W/kg

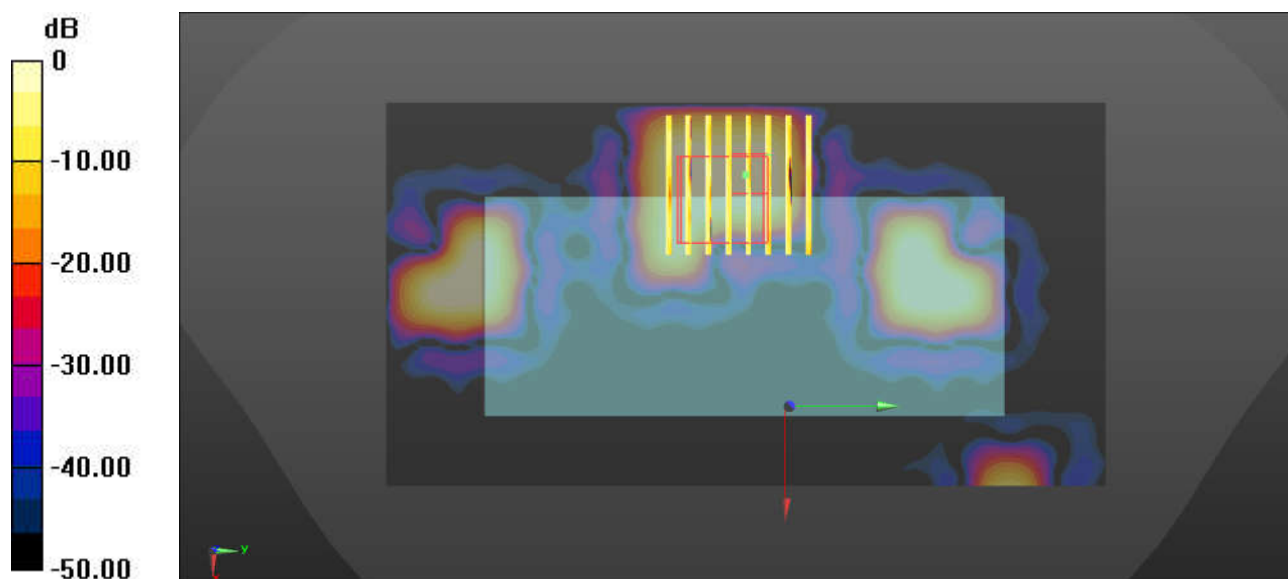
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 0.8130 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.0110 W/kg

SAR(1 g) = 0.002 W/kg; SAR(10 g) = 0.001 W/kg

Maximum value of SAR (measured) = 0.00492 W/kg



0 dB = 0.00492 W/kg = -23.08 dBW/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.52 HuaYuanBei Road, Haidian District, Beijing, 100191, Chi
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Client

Sporton

Certificate No: **Z21-60551**

CALIBRATION CERTIFICATE

Object

D835V2 - SN: 4d162

Calibration Procedure(s)

FF-Z11-003-01

Calibration Procedures for dipole validation kits

Calibration date:

December 17, 2021

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7307	26-May-21(SPEAG,No.EX3-7307_May21)	May-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	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: December 24, 2021

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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	V52.10.4
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	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	40.8 $\pm$ 6 %	0.91 mho/m $\pm$ 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	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.64 W/kg $\pm$ 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.26 W/kg $\pm$ 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	53.7Ω- 2.20jΩ
Return Loss	- 27.7dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.346 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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DASY5 Validation Report for Head TSL

Date: 2021-12-17

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d162

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.91 \text{ S/m}$; $\epsilon_r = 40.77$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7307; ConvF(10.13, 10.13, 10.13) @ 835 MHz; Calibrated: 2021-05-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

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

Reference Value = 59.81 V/m; Power Drift = -0.01 dB

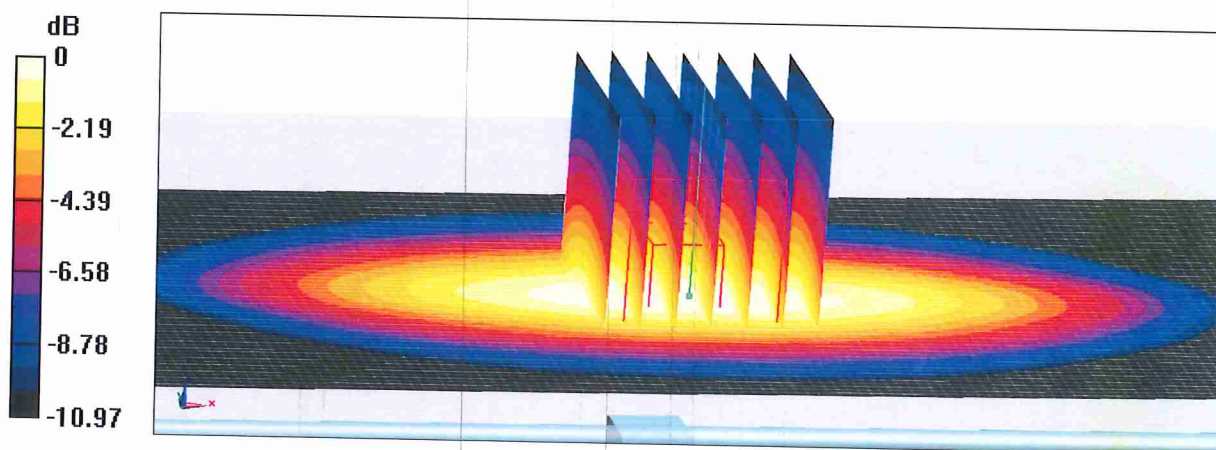
Peak SAR (extrapolated) = 3.70 W/kg

SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.58 W/kg

Smallest distance from peaks to all points 3 dB below = 20.5 mm

Ratio of SAR at M2 to SAR at M1 = 65.7%

Maximum value of SAR (measured) = 3.28 W/kg



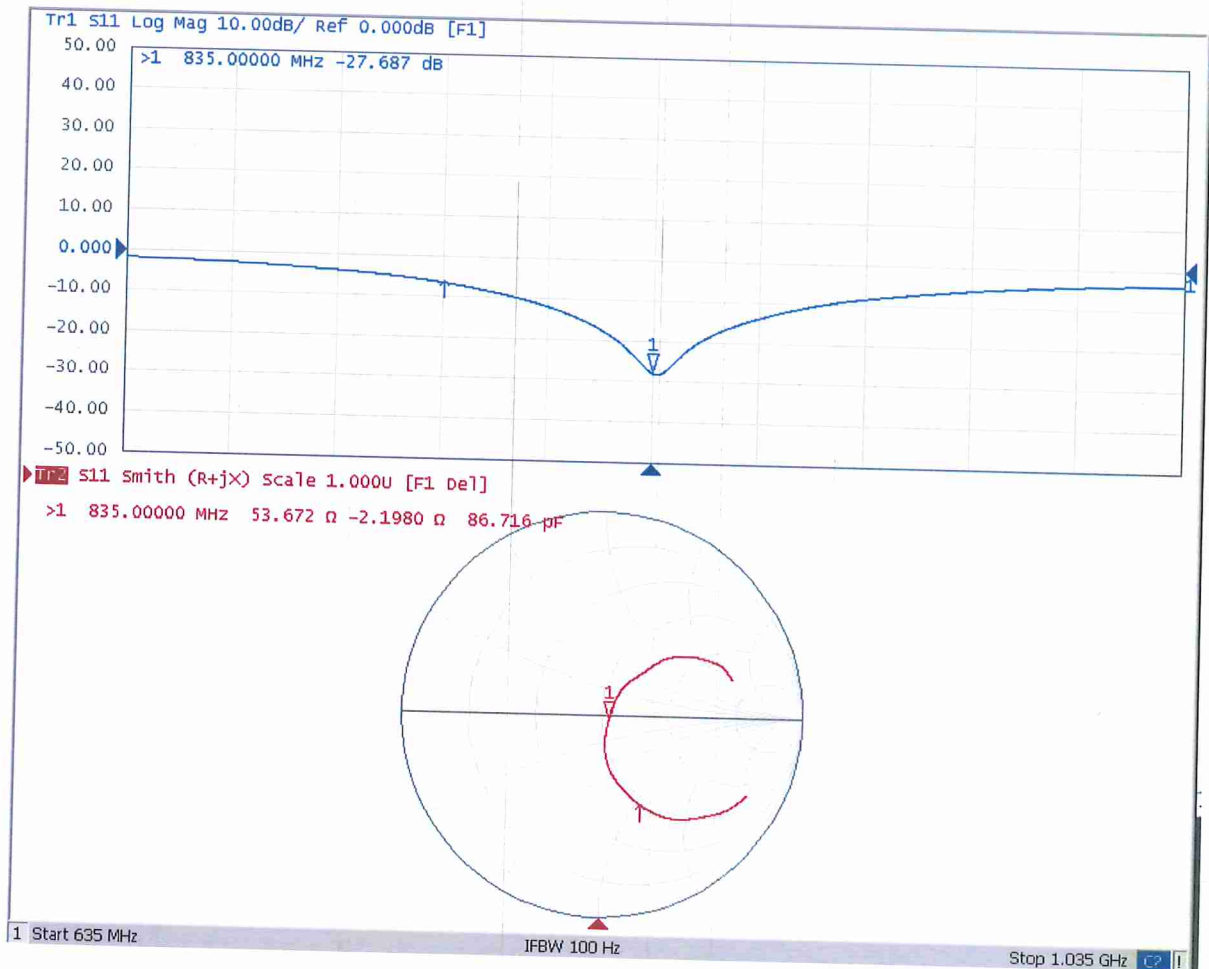
0 dB = 3.28 W/kg = 5.16 dBW/kg



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Impedance Measurement Plot for Head TSL





Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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

Client **Sporton**

Certificate No: **D1750V2-1090_Feb22**

CALIBRATION CERTIFICATE

Object **D1750V2 - SN:1090**

Calibration procedure(s) **QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz**

Calibration date: **February 24, 2022**

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	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: BH9394 (20k)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 06327	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	01-Nov-21 (No. DAE4-601_Nov21)	Nov-22

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by: **Joanna Lleshaj** Name **Joanna Lleshaj** Function **Laboratory Technician**

Approved by: **Niels Kuster** Name **Niels Kuster** Function **Quality Manager**

Signature

Issued: March 3, 2022

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
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	40.4 $\pm$ 6 %	1.35 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	9.14 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	4.84 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.5 W/kg $\pm$ 16.5 % (k=2)