

53_CDMA2000 BC1_RC3 SO32 (F+SCH) _Back_5mm_Ch1175

Communication System: UID 0, CDMA (0); Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1909$ MHz; $\sigma = 1.431$ S/m; $\epsilon_r = 39.768$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(5.32, 5.32, 5.32); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch1175/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

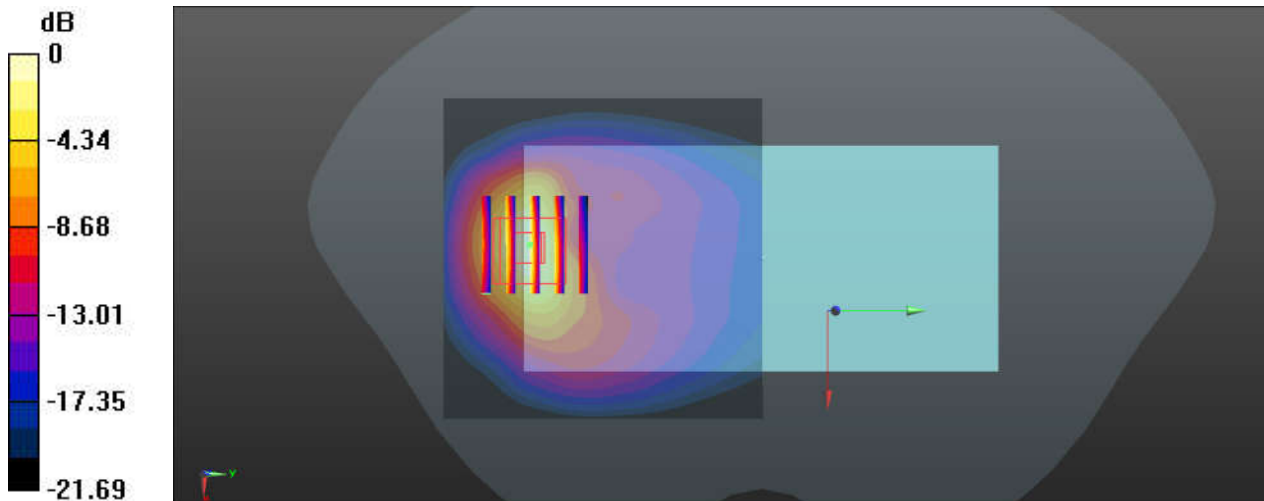
Ch1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.049 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 2.25 W/kg

SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.570 W/kg

Maximum value of SAR (measured) = 1.52 W/kg



0 dB = 1.52 W/kg = 1.82 dBW/kg

54_LTE Band 71_20M_QPSK_1RB_0Offset_Back_5mm_Ch133322

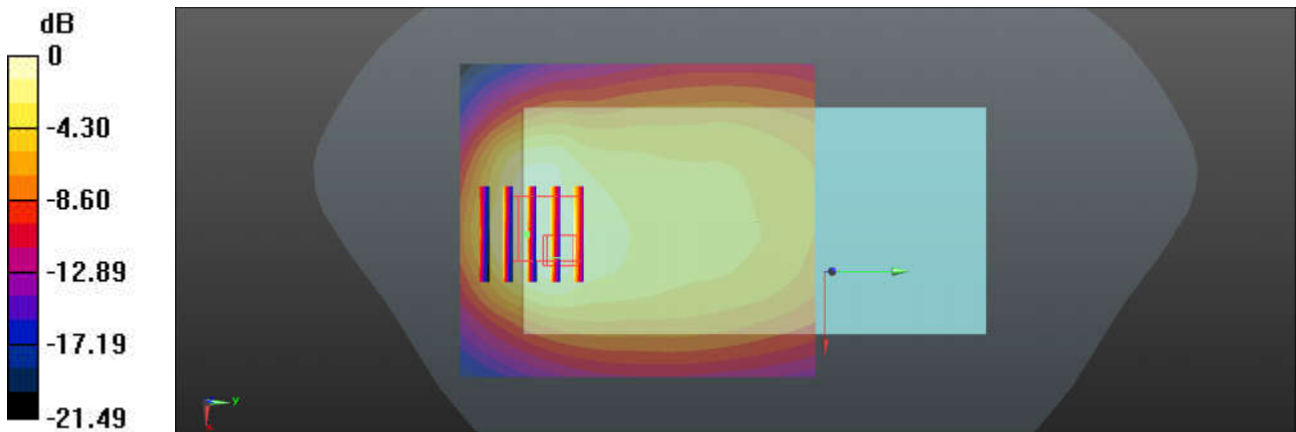
Communication System: UID 0, LTE-FDD (0); Frequency: 683 MHz; Duty Cycle: 1:1
 Medium: HSL_750 Medium parameters used: $f = 683 \text{ MHz}$; $\sigma = 0.855 \text{ S/m}$; $\epsilon_r = 43.846$; $\rho = 1000 \text{ kg/m}^3$
 Ambient Temperature : 23.1 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.56, 6.56, 6.56); Calibrated: 2019/11/25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019/6/27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch133322/Area Scan (71x81x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.920 W/kg

Ch133322/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 21.73 V/m; Power Drift = -0.04 dB
 Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 0.645 W/kg; SAR(10 g) = 0.343 W/kg
 Maximum value of SAR (measured) = 1.13 W/kg



0 dB = 0.920 W/kg = -0.36 dBW/kg

55_LTE Band 12_10M_QPSK_1RB_0Offset_Back_5mm_Ch23095

Communication System: UID 0, LTE-FDD (0); Frequency: 707.5 MHz; Duty Cycle: 1:1
 Medium: HSL_750 Medium parameters used : f = 707.5 MHz; $\sigma = 0.878$ S/m; $\epsilon_r = 43.528$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.1 °C; Liquid Temperature : 22.8 °C

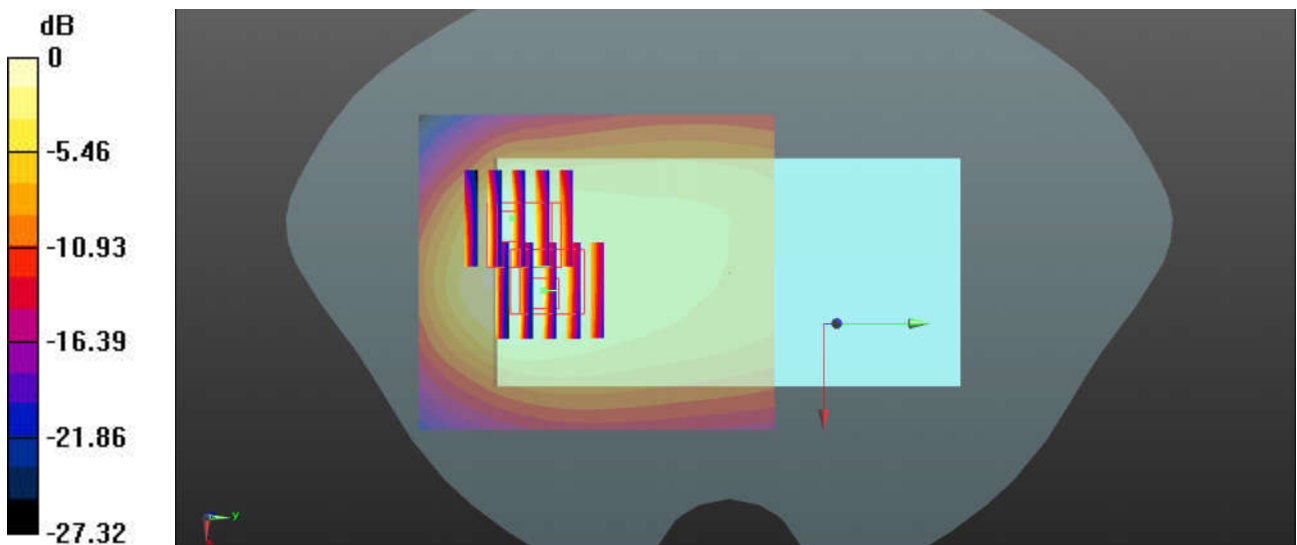
DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.56, 6.56, 6.56); Calibrated: 2019/11/25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019/6/27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch23095/Area Scan (71x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
 Maximum value of SAR (interpolated) = 1.33 W/kg

Ch23095/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 22.02 V/m; Power Drift = -0.01 dB
 Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 0.713 W/kg; SAR(10 g) = 0.416 W/kg
 Maximum value of SAR (measured) = 1.14 W/kg

Ch23095/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 22.02 V/m; Power Drift = -0.01 dB
 Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 0.759 W/kg; SAR(10 g) = 0.433 W/kg
 Maximum value of SAR (measured) = 1.30 W/kg



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

56_LTE Band 13_10M_QPSK_1RB_0Offset_Back_5mm_Ch23230

Communication System: UID 0, LTE-FDD (0); Frequency: 782 MHz; Duty Cycle: 1:1
Medium: HSL_750 Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.933 \text{ S/m}$; $\epsilon_r = 40.785$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : $23.2 \text{ }^\circ\text{C}$; Liquid Temperature : $22.9 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.56, 6.56, 6.56); Calibrated: 2019/11/25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019/6/27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch23230/Area Scan (71x81x1):

Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 1.56 W/kg

Ch23230/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 24.37 V/m ; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 2.12 W/kg

SAR(1 g) = 0.881 W/kg ; SAR(10 g) = 0.495 W/kg

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

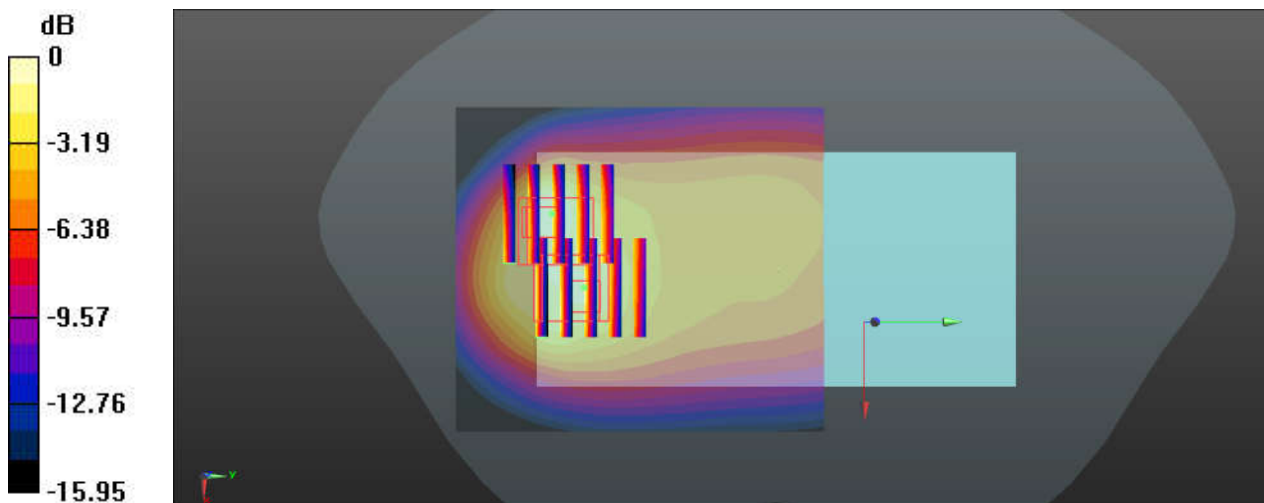
Ch23230/Zoom Scan (5x5x7)/Cube 1:

Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 24.37 V/m ; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 2.09 W/kg

SAR(1 g) = 0.818 W/kg ; SAR(10 g) = 0.473 W/kg

Maximum value of SAR (measured) = 1.50 W/kg



0 dB = 1.50 W/kg = 1.76 dBW/kg

57_LTE Band 14_10M_QPSK_1RB_0Offset_Back_5mm_Ch23330

Communication System: UID 0, LTE-FDD (0); Frequency: 793 MHz; Duty Cycle: 1:1
Medium: HSL_750 Medium parameters used: $f = 793 \text{ MHz}$; $\sigma = 0.943 \text{ S/m}$; $\epsilon_r = 40.643$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : $23.2 \text{ }^\circ\text{C}$; Liquid Temperature : $22.9 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.56, 6.56, 6.56); Calibrated: 2019/11/25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019/6/27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch23330/Area Scan (71x81x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 1.41 W/kg

Ch23330/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.97 V/m ; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.96 W/kg

SAR(1 g) = 0.810 W/kg ; SAR(10 g) = 0.451 W/kg

Maximum value of SAR (measured) = 1.33 W/kg

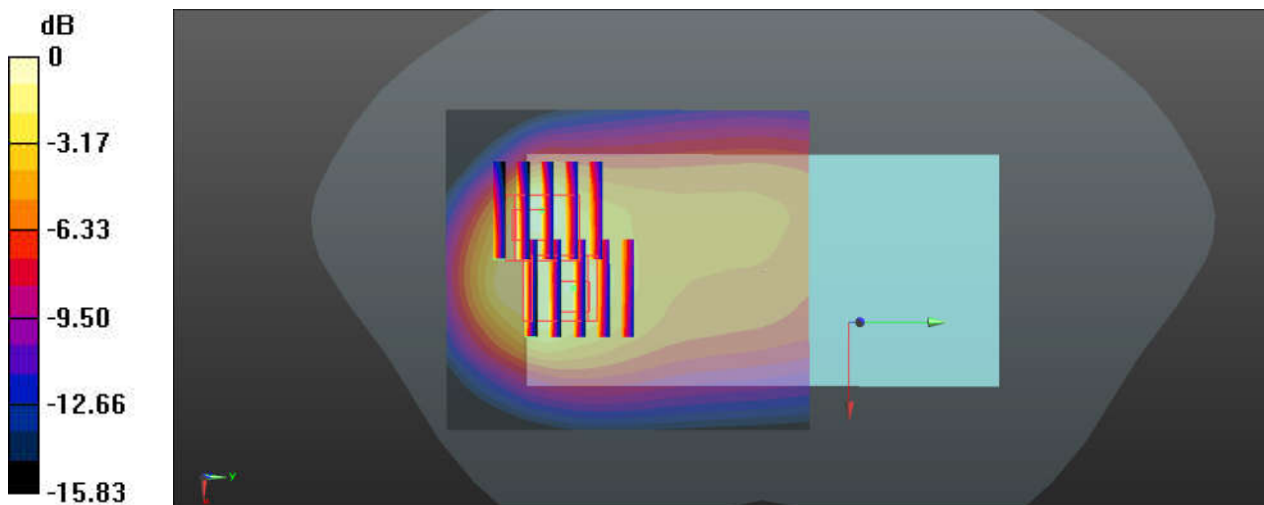
Ch23330/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.97 V/m ; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.92 W/kg

SAR(1 g) = 0.751 W/kg ; SAR(10 g) = 0.436 W/kg

Maximum value of SAR (measured) = 1.41 W/kg



0 dB = 1.41 W/kg = 1.49 dBW/kg

58_LTE Band 26_15M_QPSK_1RB_0Offset_Back_5mm_Ch26865

Communication System: UID 0, LTE-FDD (0); Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: HSL_850 Medium parameters used: $f = 831.5$ MHz; $\sigma = 0.926$ S/m; $\epsilon_r = 42.251$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C; Liquid Temperature : 22.4 °C

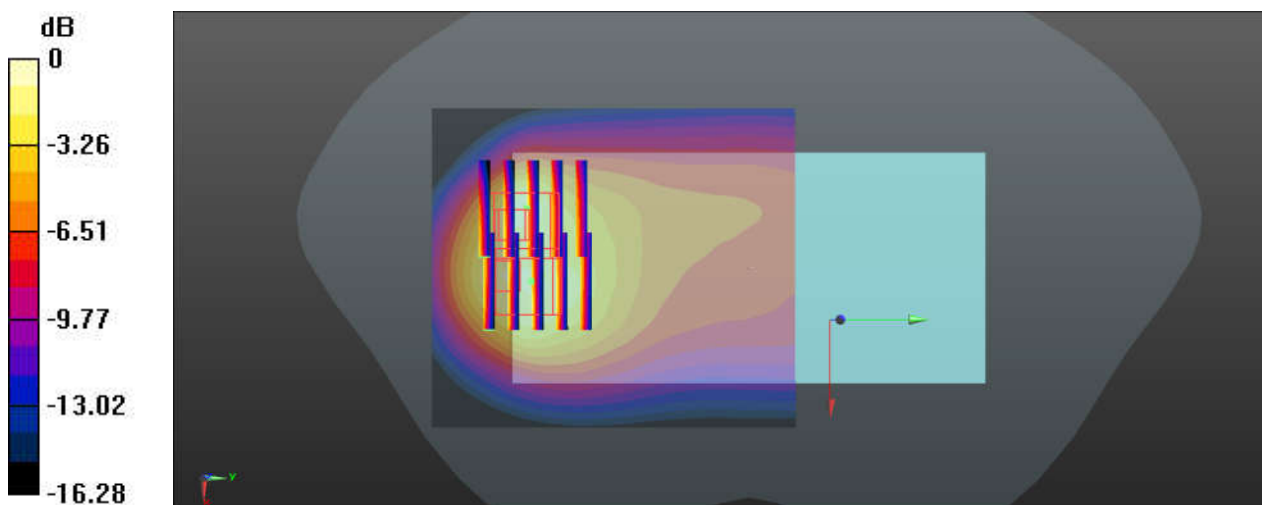
DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.39, 6.39, 6.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch26865/Area Scan (71x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.18 W/kg

Ch26865/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.40 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 2.88 W/kg
SAR(1 g) = 1.19 W/kg; SAR(10 g) = 0.651 W/kg
Maximum value of SAR (measured) = 2.10 W/kg

Ch26865/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.40 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 2.97 W/kg
SAR(1 g) = 1.22 W/kg; SAR(10 g) = 0.661 W/kg
Maximum value of SAR (measured) = 2.23 W/kg



0 dB = 2.23 W/kg = 3.48 dBW/kg

59_LTE Band 66_20M_QPSK_50RB_0Offset_Back_5mm_Ch132572

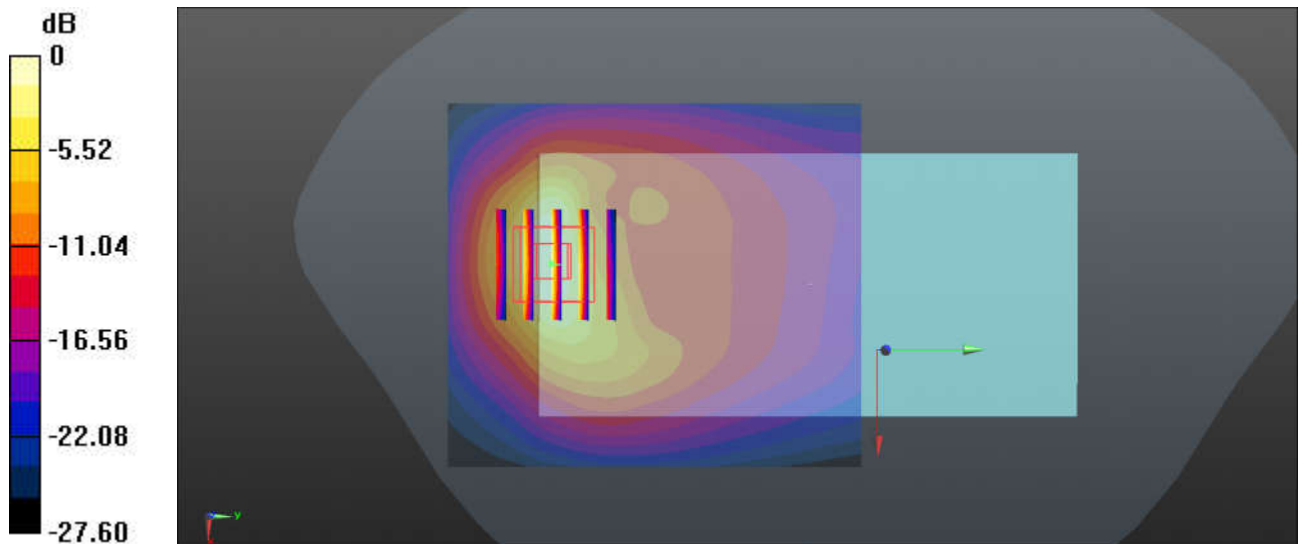
Communication System: UID 0, LTE-FDD (0); Frequency: 1770 MHz; Duty Cycle: 1:1
 Medium: HSL_1750 Medium parameters used: $f = 1770$ MHz; $\sigma = 1.401$ S/m; $\epsilon_r = 39.63$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(5.53, 5.53, 5.53); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch132572/Area Scan (71x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
 Maximum value of SAR (interpolated) = 1.56 W/kg

Ch132572/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 5.725 V/m; Power Drift = -0.01 dB
 Peak SAR (extrapolated) = 1.99 W/kg
SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.569 W/kg
 Maximum value of SAR (measured) = 1.41 W/kg



0 dB = 1.56 W/kg = 1.93 dBW/kg

60_LTE Band 25_20M_QPSK_50RB_0Offset_Back_5mm_Ch26590

Communication System: UID 0, LTE-FDD (0); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1905$ MHz; $\sigma = 1.427$ S/m; $\epsilon_r = 39.783$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(5.32, 5.32, 5.32); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch26590/Area Scan (71x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.25 W/kg

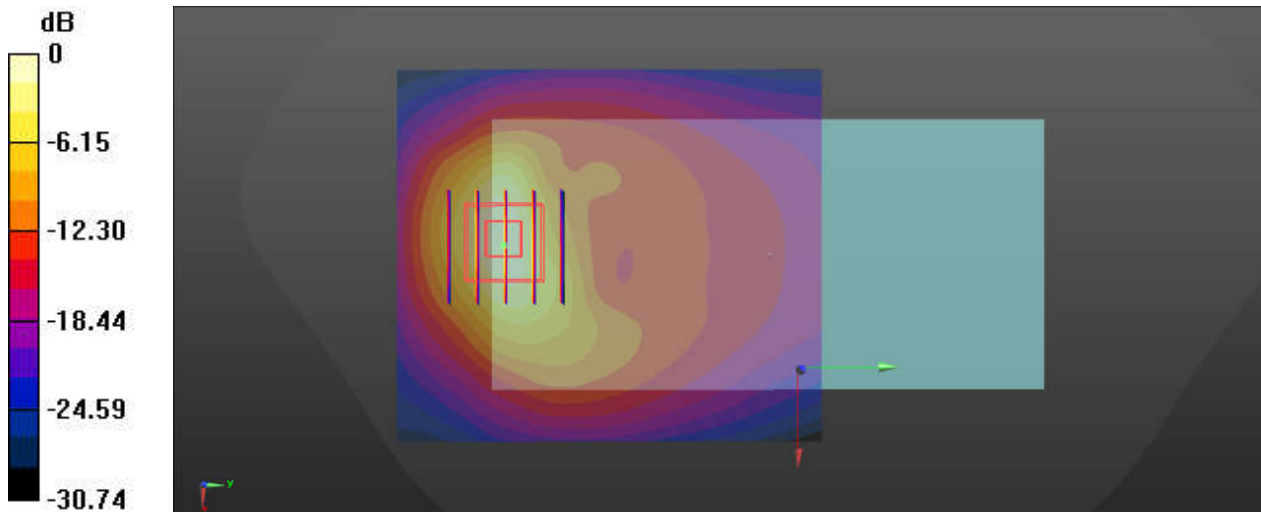
Ch26590/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.157 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.79 W/kg

SAR(1 g) = 0.948 W/kg; SAR(10 g) = 0.461 W/kg

Maximum value of SAR (measured) = 1.20 W/kg



0 dB = 1.25 W/kg = 0.97 dBW/kg

61_LTE Band 30_10M_QPSK_1RB_0Offset_Front_5mm_Ch27710

Communication System: UID 0, LTE-FDD (0); Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: HSL_2300 Medium parameters used: $f = 2310$ MHz; $\sigma = 1.699$ S/m; $\epsilon_r = 41.277$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.4 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(4.89, 4.89, 4.89); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch27710/Area Scan (91x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.47 W/kg

Ch27710/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.020 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 2.07 W/kg

SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.565 W/kg

Maximum value of SAR (measured) = 1.38 W/kg

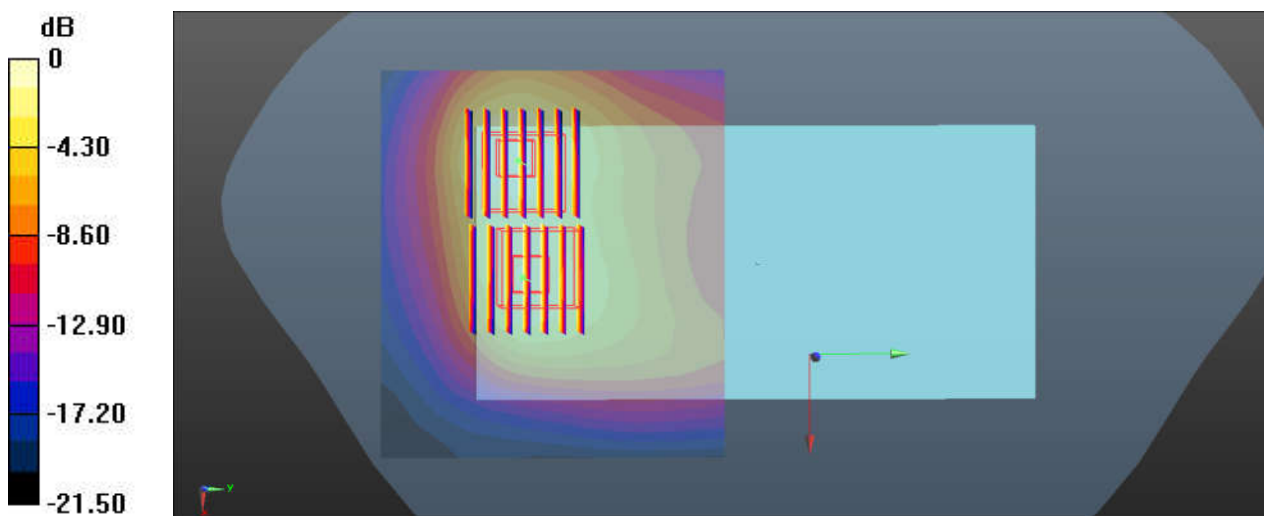
Ch27710/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.020 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.841 W/kg; SAR(10 g) = 0.479 W/kg

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



0 dB = 1.47 W/kg = 1.67 dBW/kg

62_LTE Band 7_20M_QPSK_50RB_0Offset_Back_5mm_Ch20850_Headset

Communication System: UID 0, LTE-FDD (0); Frequency: 2510 MHz; Duty Cycle: 1:1
Medium: HSL_2600 Medium parameters used: $f = 2510$ MHz; $\sigma = 1.859$ S/m; $\epsilon_r = 40.705$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(4.39, 4.39, 4.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch21850/Area Scan (91x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.61 W/kg

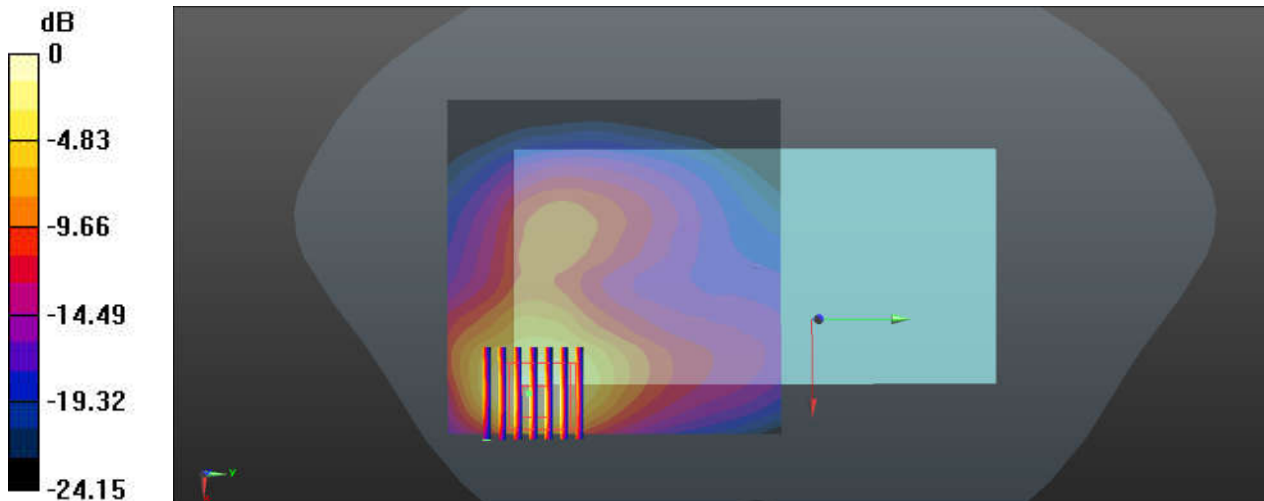
Ch21850/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.792 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 2.67 W/kg

SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.444 W/kg

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



0 dB = 1.36 W/kg = 1.34 dBW/kg

63_LTE Band 41_20M_QPSK_100RB_0Offset_Back_5mm_Ch41055

Communication System: UID 0, LTE-TDD (0); Frequency: 2636.5 MHz; Duty Cycle: 1:1.59
 Medium: HSL_2600 Medium parameters used: $f = 2637$ MHz; $\sigma = 2.003$ S/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(4.39, 4.39, 4.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch41055/Area Scan (91x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.47 W/kg

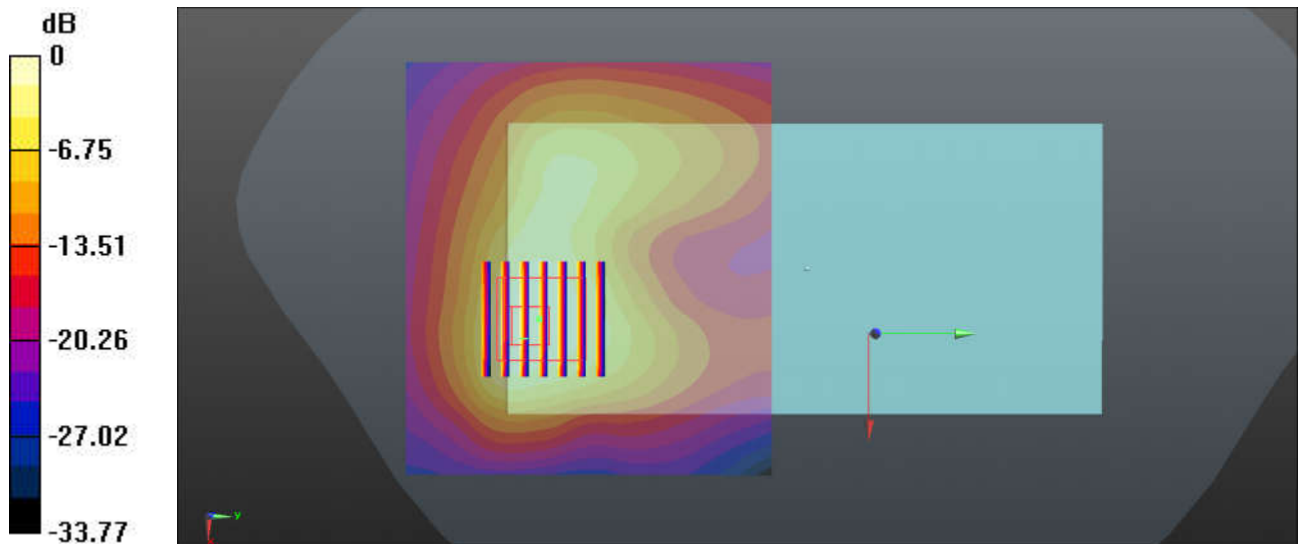
Ch41055/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.510 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 2.52 W/kg

SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.517 W/kg

Maximum value of SAR (measured) = 1.44 W/kg



0 dB = 1.47 W/kg = 1.67 dBW/kg

64_WLAN2.4GHz_802.11b 1Mbps_Back_5mm_Ch11

Communication System: UID 0, 802.11b (0); Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: HSL_2450 Medium parameters used: $f = 2462$ MHz; $\sigma = 1.868$ S/m; $\epsilon_r = 38.411$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.1 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(4.6, 4.6, 4.6); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch11/Area Scan (91x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

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

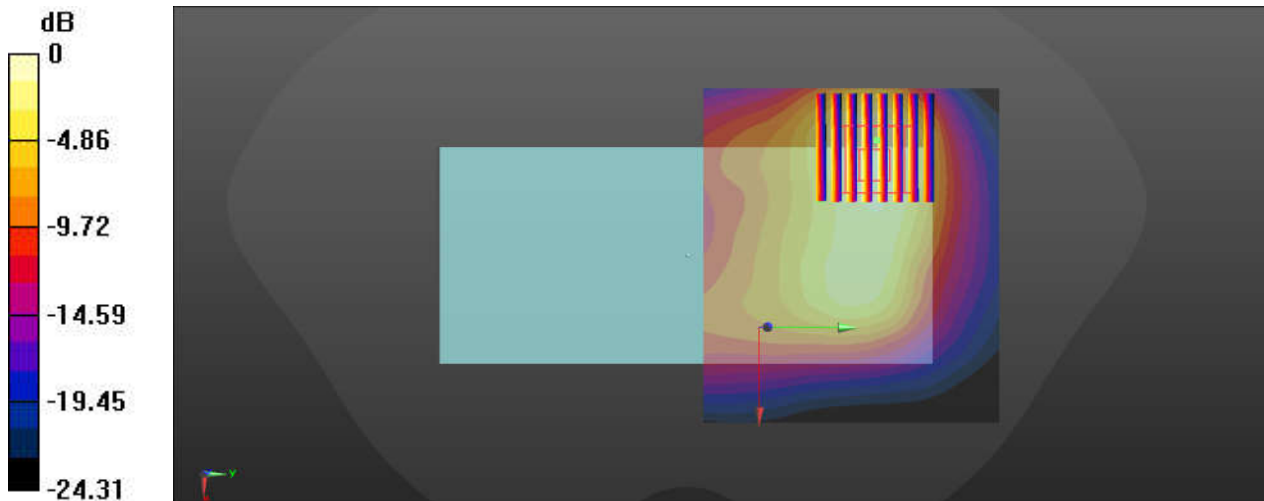
Ch11/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.081 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 2.08 W/kg

SAR(1 g) = 0.987 W/kg; SAR(10 g) = 0.499 W/kg

Maximum value of SAR (measured) = 1.28 W/kg



0 dB = 1.28 W/kg = 1.07 dBW/kg

65_Bluetooth_1Mbps_Back_5mm_Ch78

Communication System: UID 0, Bluetooth (0); Frequency: 2480 MHz; Duty Cycle: 1:1.292
Medium: HSL_2450 Medium parameters used: $f = 2480$ MHz; $\sigma = 1.887$ S/m; $\epsilon_r = 38.345$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.1 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(4.6, 4.6, 4.6); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch78/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.0593 W/kg

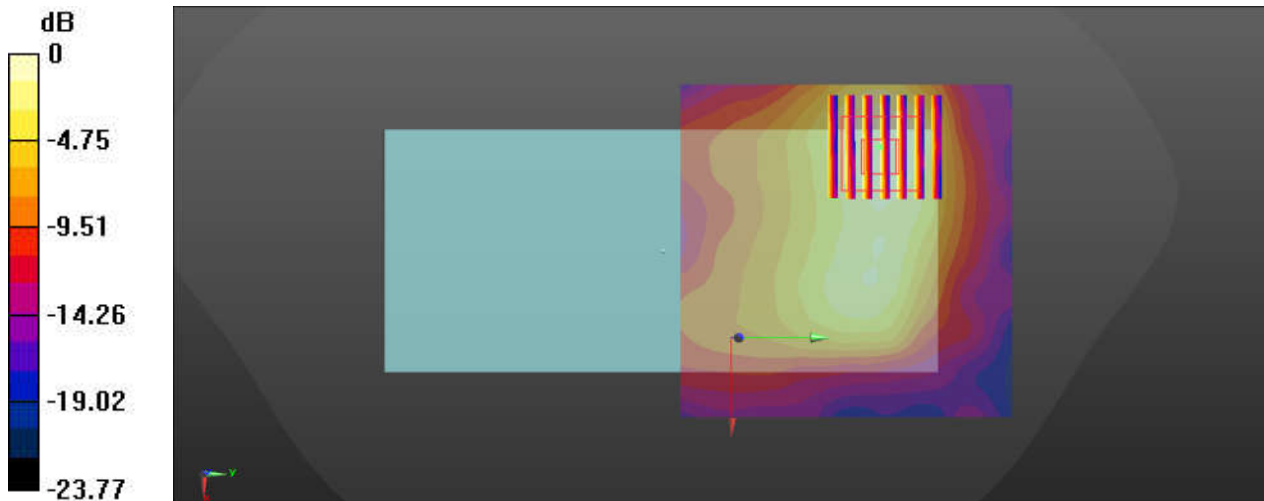
Ch78/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.210 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.0880 W/kg

SAR(1 g) = 0.043 W/kg; SAR(10 g) = 0.022 W/kg

Maximum value of SAR (measured) = 0.0547 W/kg



0 dB = 0.0547 W/kg = -12.62 dBW/kg

66_WLAN 5GHz_802.11n-HT40 MCS0_Back_5mm_Ch38

Communication System: UID 0, 802.11n (0); Frequency: 5190 MHz; Duty Cycle: 1:1.038
Medium: HSL_5000 Medium parameters used: $f = 5190$ MHz; $\sigma = 4.525$ S/m; $\epsilon_r = 36.505$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(5.19, 5.19, 5.19); Calibrated: 2019.5.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2019.7.23
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch38/Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.07 W/kg

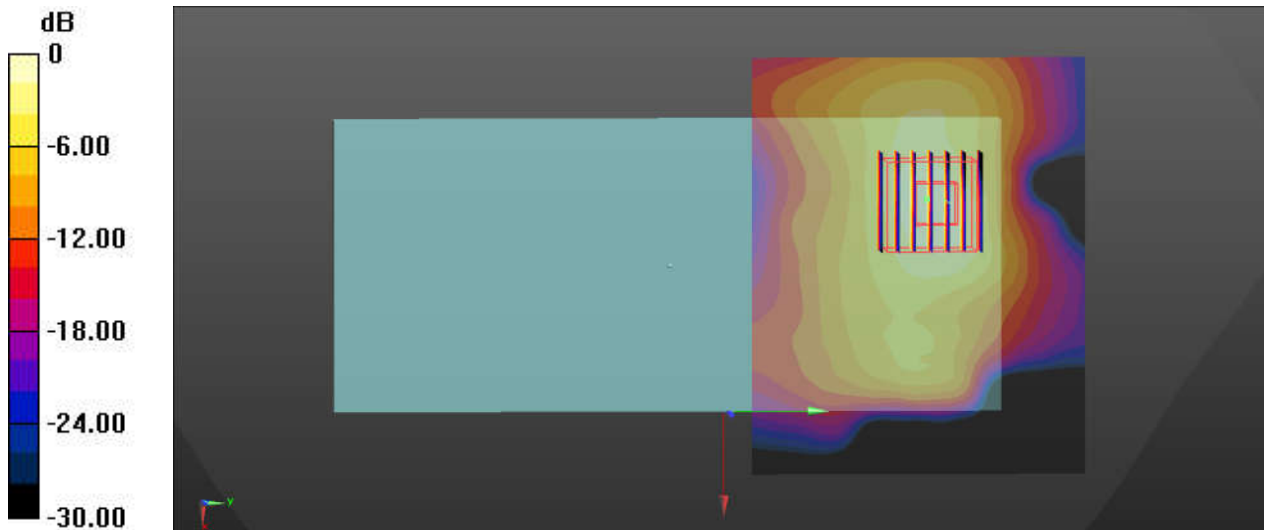
Ch38/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 0 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 3.81 W/kg

SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.368 W/kg

Maximum value of SAR (measured) = 2.46 W/kg



0 dB = 2.07 W/kg = 3.16 dBW/kg

67_WLAN 5GHz_802.11n-HT40 MCS0_Back_5mm_Ch62

Communication System: UID 0, 802.11n (0); Frequency: 5310 MHz; Duty Cycle: 1:1.038
Medium: HSL_5000 Medium parameters used: $f = 5310$ MHz; $\sigma = 4.667$ S/m; $\epsilon_r = 36.289$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(5.19, 5.19, 5.19); Calibrated: 2019.5.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2019.7.23
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch62/Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.41 W/kg

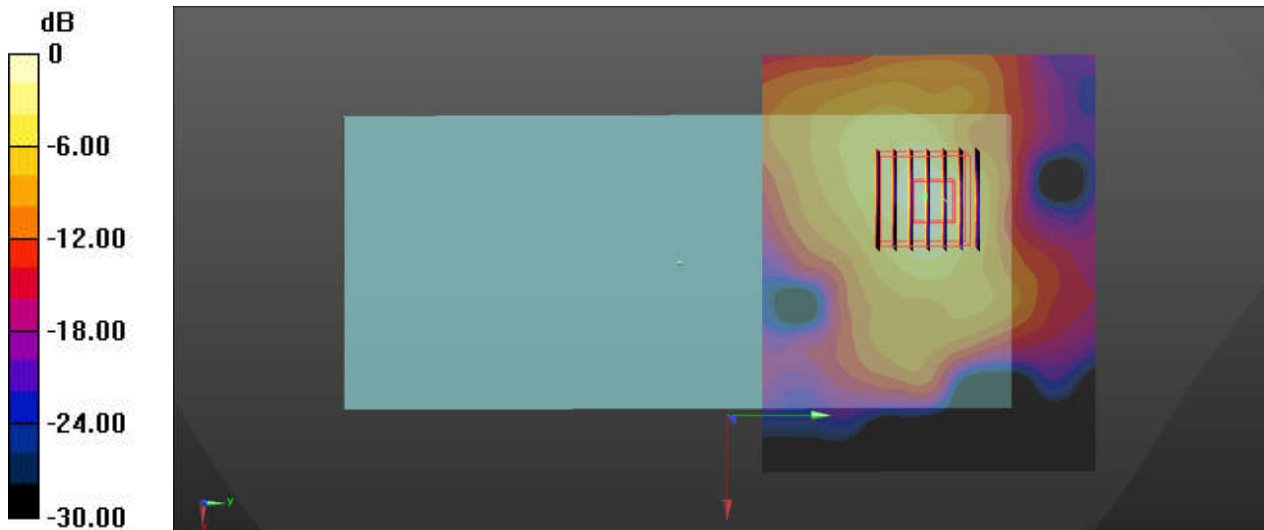
Ch62/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 0.6320 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 2.35 W/kg

SAR(1 g) = 0.679 W/kg; SAR(10 g) = 0.214 W/kg

Maximum value of SAR (measured) = 1.50 W/kg



0 dB = 1.41 W/kg = 1.49 dBW/kg

68_WLAN 5GHz_802.11n-HT40 MCS0_Back_5mm_Ch134

Communication System: UID 0, 802.11n (0); Frequency: 5670 MHz; Duty Cycle: 1:1.038
Medium: HSL_5000 Medium parameters used: $f = 5670$ MHz; $\sigma = 5.081$ S/m; $\epsilon_r = 35.707$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(4.92, 4.92, 4.92); Calibrated: 2019.5.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2019.7.23
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch134/Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.58 W/kg

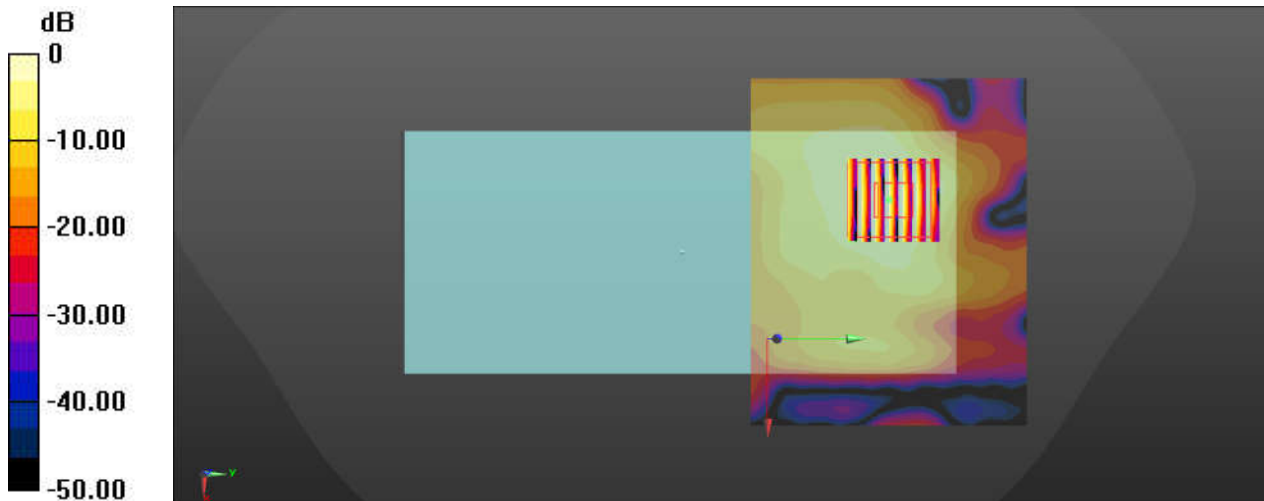
Ch134/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 2.560 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 4.19 W/kg

SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.341 W/kg

Maximum value of SAR (measured) = 2.49 W/kg



0 dB = 2.49 W/kg = 3.96 dBW/kg

69_WLAN 5GHz_802.11a 6Mbps_Back_5mm_Ch165

Communication System: UID 0, 802.11a (0); Frequency: 5825 MHz; Duty Cycle: 1:1.018
Medium: HSL_5000 Medium parameters used: $f = 5825$ MHz; $\sigma = 5.25$ S/m; $\epsilon_r = 35.438$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(5.17, 5.17, 5.17); Calibrated: 2019.5.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2019.7.23
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch165/Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.74 W/kg

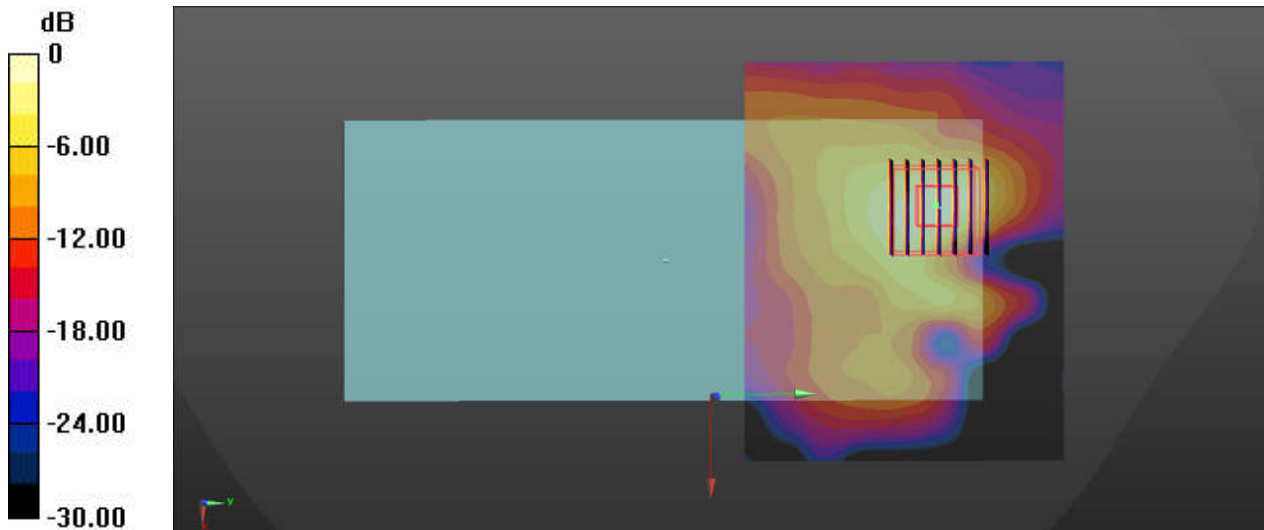
Ch165/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 1.327 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 4.90 W/kg

SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.357 W/kg

Maximum value of SAR (measured) = 2.98 W/kg



0 dB = 2.74 W/kg = 4.38 dBW/kg

70_GSM850_GPRS 3 Tx slots_Front_0mm_Ch128

Communication System: UID 0, GSM850-3UP (0); Frequency: 824.2 MHz; Duty Cycle: 1:2.77
 Medium: HSL_850 Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.918$ S/m; $\epsilon_r = 42.334$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.2 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.39, 6.39, 6.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch128/Area Scan (71x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 3.82 W/kg

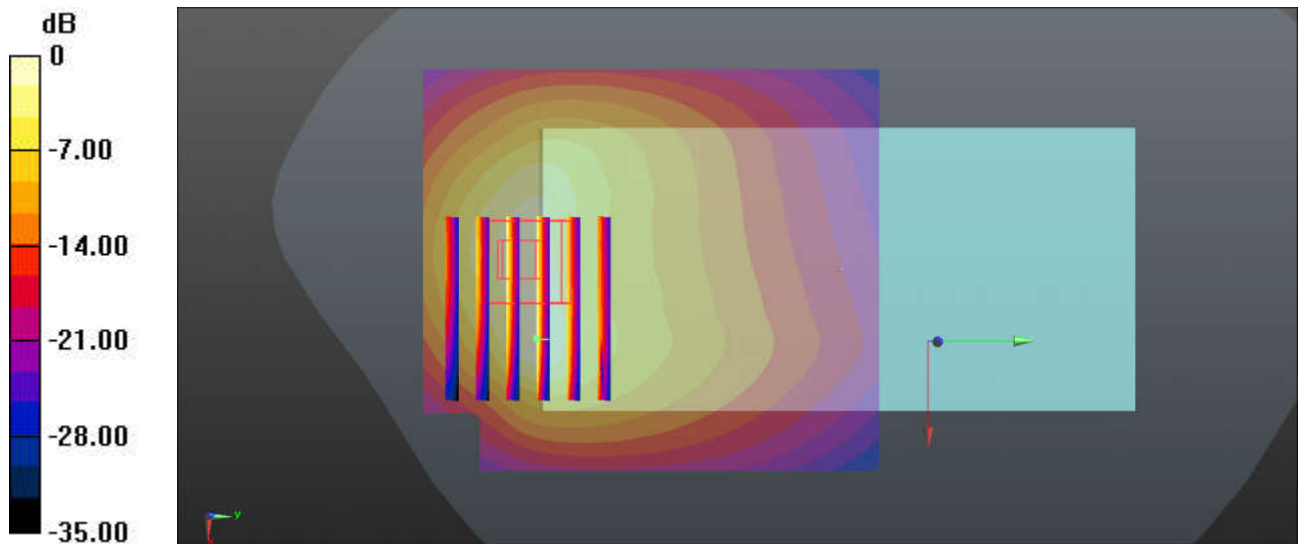
Ch128/Zoom Scan (7x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.828 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 7.56 W/kg

SAR(1 g) = 2.52 W/kg; SAR(10 g) = 1.27 W/kg

Maximum value of SAR (measured) = 3.49 W/kg



0 dB = 3.82 W/kg = 5.82 dBW/kg

71_GSM1900_GPRS 3 Tx slots_Bottom Side_0mm_Ch512

Communication System: UID 0, PCS-3UP (0); Frequency: 1850.2 MHz; Duty Cycle: 1:2.77
 Medium: HSL_1900 Medium parameters used : $f = 1850.2$ MHz; $\sigma = 1.367$ S/m; $\epsilon_r = 40.028$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(5.32, 5.32, 5.32); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch512/Area Scan (41x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 10.5 W/kg

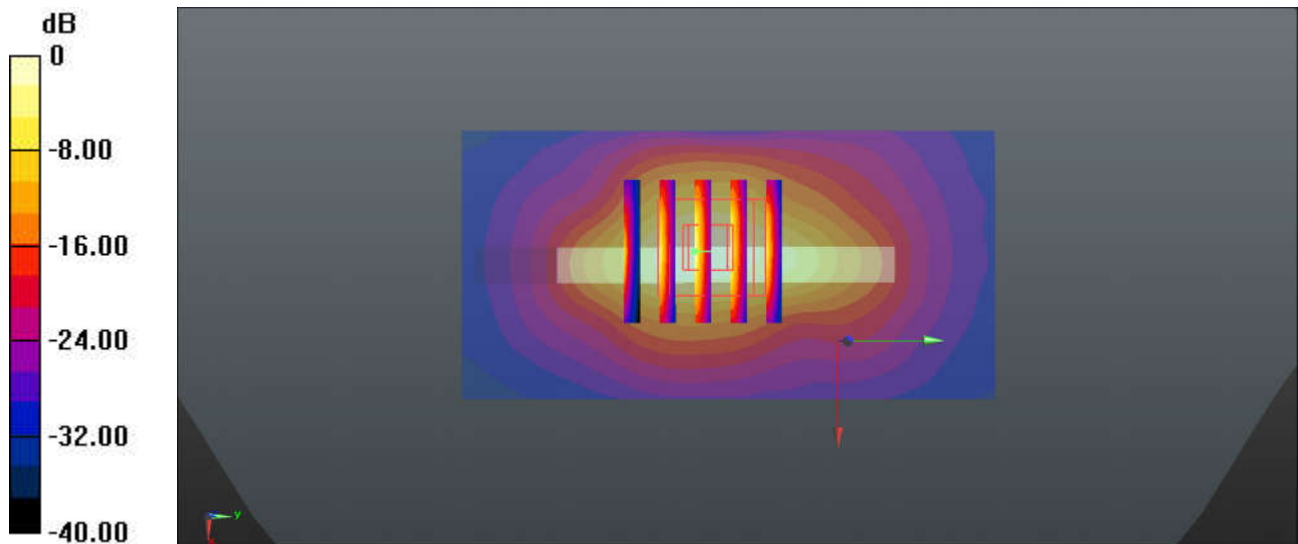
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 76.51 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 15.0 W/kg

SAR(1 g) = 6.8 W/kg; SAR(10 g) = 2.8 W/kg

Maximum value of SAR (measured) = 10.1 W/kg



0 dB = 10.5 W/kg = 10.21 dBW/kg

72_WCDMA V_RMC 12.2Kbps_Back_0mm_Ch4132

Communication System: UID 0, WCDMA (0); Frequency: 826.4 MHz; Duty Cycle: 1:1
 Medium: HSL_850 Medium parameters used: $f = 826.4 \text{ MHz}$; $\sigma = 0.92 \text{ S/m}$; $\epsilon_r = 42.31$; $\rho = 1000 \text{ kg/m}^3$
 Ambient Temperature : $23.2 \text{ }^\circ\text{C}$; Liquid Temperature : $22.7 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.39, 6.39, 6.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch4132/Area Scan (81x71x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 5.54 W/kg

Ch4132/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.20 V/m ; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 14.0 W/kg

SAR(1 g) = 3.93 W/kg ; SAR(10 g) = 1.79 W/kg

Maximum value of SAR (measured) = 7.54 W/kg

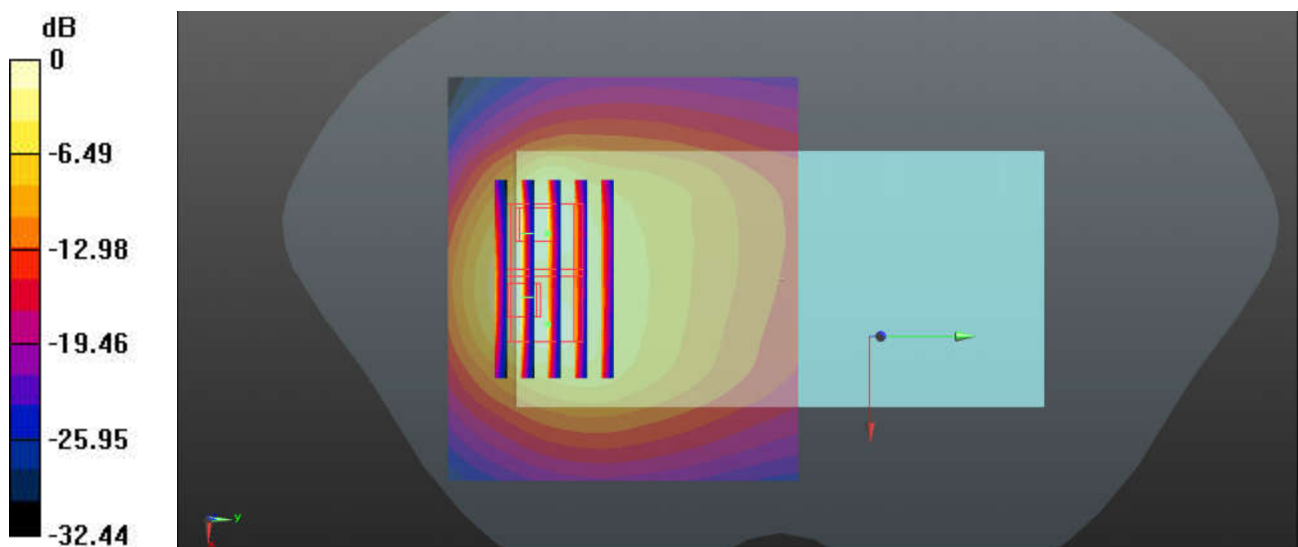
Ch4132/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.20 V/m ; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 10.1 W/kg

SAR(1 g) = 3.18 W/kg ; SAR(10 g) = 1.52 W/kg

Maximum value of SAR (measured) = 7.06 W/kg



0 dB = $5.54 \text{ W/kg} = 7.44 \text{ dBW/kg}$

73_WCDMA II_RMC 12.2Kbps_Bottom Side_0mm_Ch9538

Communication System: UID 0, WCDMA (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1908$ MHz; $\sigma = 1.43$ S/m; $\epsilon_r = 39.771$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(5.32, 5.32, 5.32); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch9538/Area Scan (41x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 8.24 W/kg

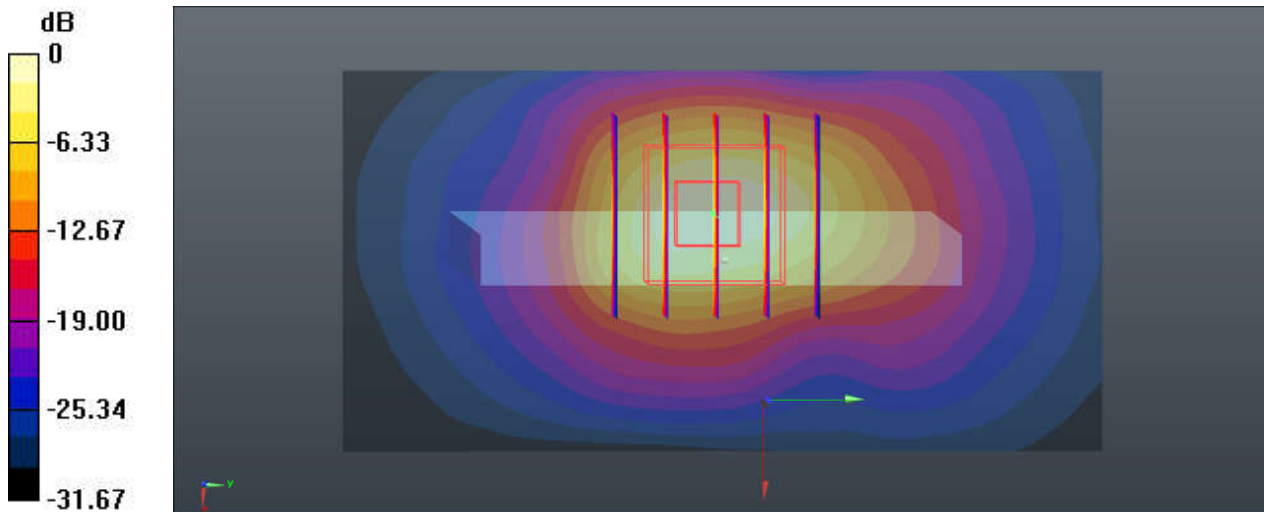
Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 54.83 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 16.5 W/kg

SAR(1 g) = 6.93 W/kg; SAR(10 g) = 2.8 W/kg

Maximum value of SAR (measured) = 10.4 W/kg



0 dB = 8.24 W/kg = 9.16 dBW/kg

74_WCDMA IV_RMC 12.2Kbps_Bottom Side_0mm_Ch1413

Communication System: UID 0, WCDMA (0); Frequency: 1732.6 MHz; Duty Cycle: 1:1
 Medium: HSL_1750 Medium parameters used: $f = 1733 \text{ MHz}$; $\sigma = 1.363 \text{ S/m}$; $\epsilon_r = 39.779$; $\rho = 1000 \text{ kg/m}^3$
 Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(5.53, 5.53, 5.53); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch1413/Area Scan (31x81x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 7.15 W/kg

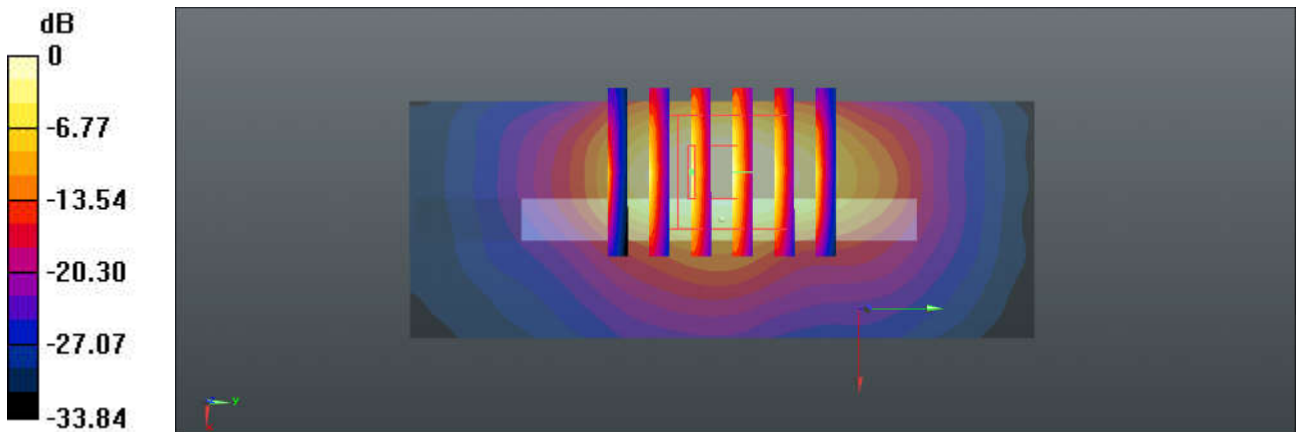
Ch1413/Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 40.56 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 10.4 W/kg

SAR(1 g) = 4.58 W/kg; SAR(10 g) = 1.93 W/kg

Maximum value of SAR (measured) = 6.50 W/kg



0 dB = 7.15 W/kg = 8.54 dBW/kg

75_CDMA2000 BC10_RTAP 153.6Kbps_Back_0mm_Ch684

Communication System: UID 0, CDMA (0); Frequency: 823.1 MHz; Duty Cycle: 1:1
 Medium: HSL_850 Medium parameters used: $f = 823.1$ MHz; $\sigma = 0.917$ S/m; $\epsilon_r = 42.35$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.2 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.39, 6.39, 6.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch684/Area Scan (71x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 8.17 W/kg

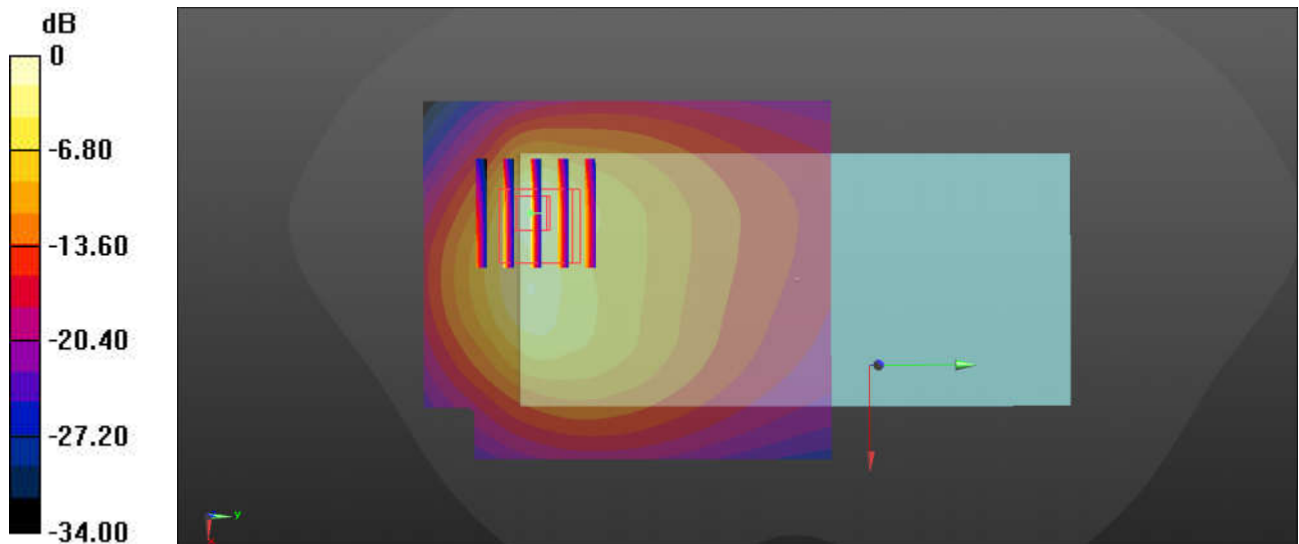
Ch684/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.19 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 14.8 W/kg

SAR(1 g) = 4.53 W/kg; SAR(10 g) = 1.98 W/kg

Maximum value of SAR (measured) = 6.73 W/kg



0 dB = 8.17 W/kg = 9.12 dBW/kg

76_CDMA2000 BC0_RTAP 153.6Kbps _Back_0mm_Ch1013

Communication System: UID 0, CDMA (0); Frequency: 824.7 MHz; Duty Cycle: 1:1
 Medium: HSL_850 Medium parameters used: $f = 825$ MHz; $\sigma = 0.919$ S/m; $\epsilon_r = 42.325$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.2 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.39, 6.39, 6.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch1013/Area Scan (81x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 3.83 W/kg

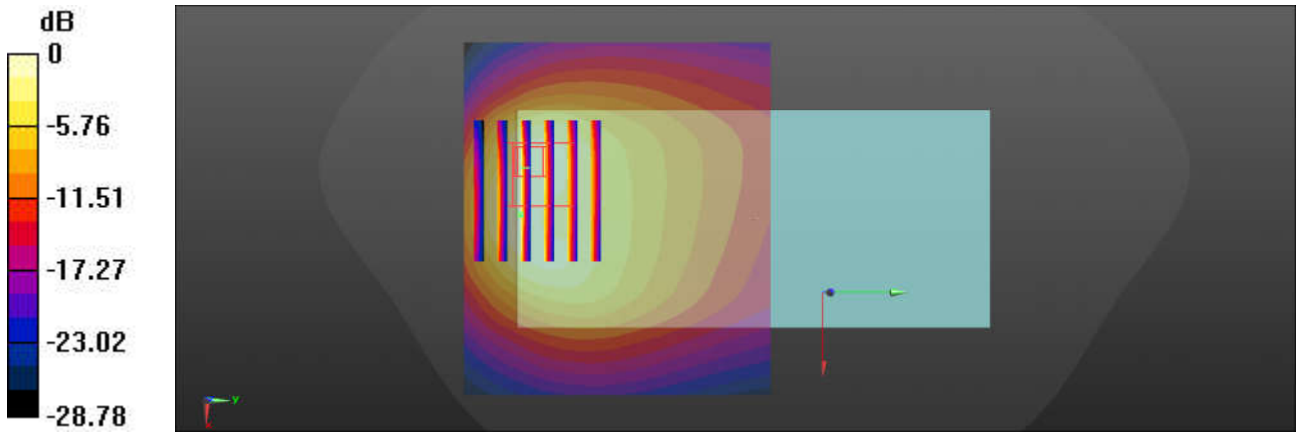
Ch1013/Zoom Scan (7x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.80 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 12.2 W/kg

SAR(1 g) = 3.86 W/kg; SAR(10 g) = 1.76 W/kg

Maximum value of SAR (measured) = 5.09 W/kg



0 dB = 3.83 W/kg = 5.83 dBW/kg

77_CDMA2000 BC1_RTAP 153.6Kbps_Bottom Side_0mm_Ch1175

Communication System: UID 0, CDMA (0); Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1909$ MHz; $\sigma = 1.431$ S/m; $\epsilon_r = 39.768$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(5.32, 5.32, 5.32); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch1175/Area Scan (41x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

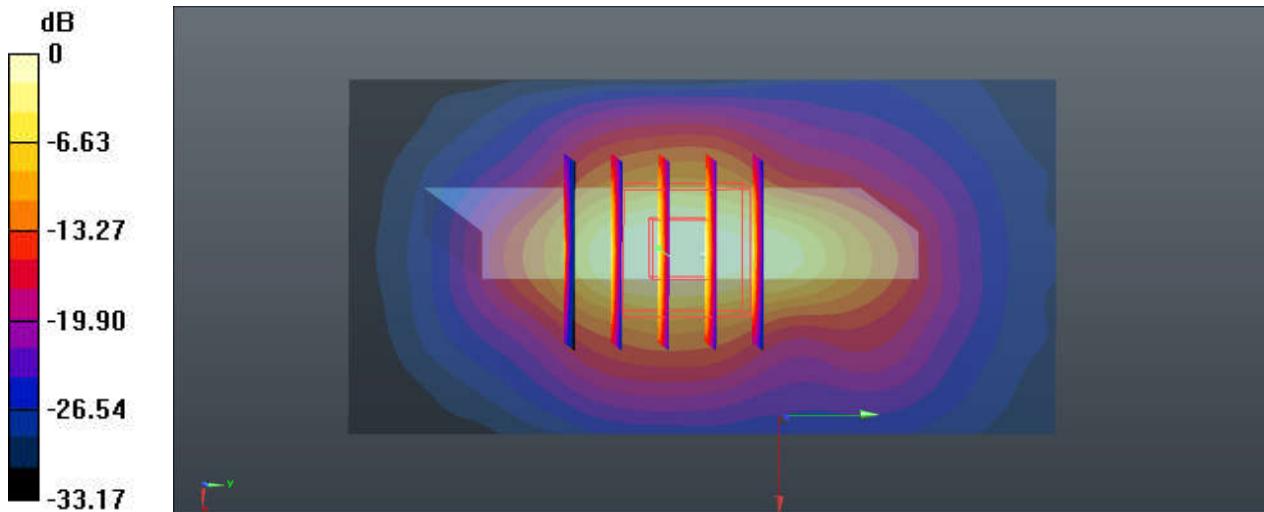
Ch1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 88.30 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 7.35 W/kg; SAR(10 g) = 2.95 W/kg

Maximum value of SAR (measured) = 10.9 W/kg



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

78_LTE Band 26_15M_QPSK_1RB_0Offset_Back_0mm_Ch26865

Communication System: UID 0, LTE-FDD (0); Frequency: 831.5 MHz; Duty Cycle: 1:1
 Medium: HSL_850 Medium parameters used: $f = 831.5 \text{ MHz}$; $\sigma = 0.926 \text{ S/m}$; $\epsilon_r = 42.251$; $\rho = 1000 \text{ kg/m}^3$
 Ambient Temperature : $23.2 \text{ }^\circ\text{C}$; Liquid Temperature : $22.7 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(6.39, 6.39, 6.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch26865/Area Scan (71x81x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 8.94 W/kg

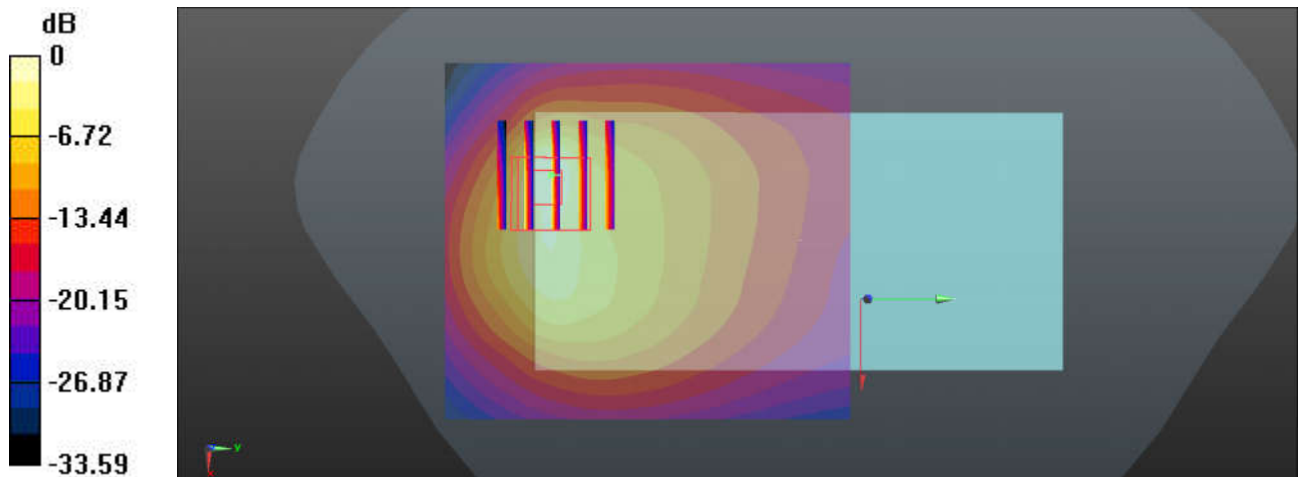
Ch26865/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.98 V/m ; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 11.1 W/kg

SAR(1 g) = 3.53 W/kg ; SAR(10 g) = 1.65 W/kg

Maximum value of SAR (measured) = 6.55 W/kg



$0 \text{ dB} = 8.94 \text{ W/kg} = 9.51 \text{ dBW/kg}$

79_LTE Band 66_20M_QPSK_50RB_0Offset_Bottom Side_0mm_Ch132572

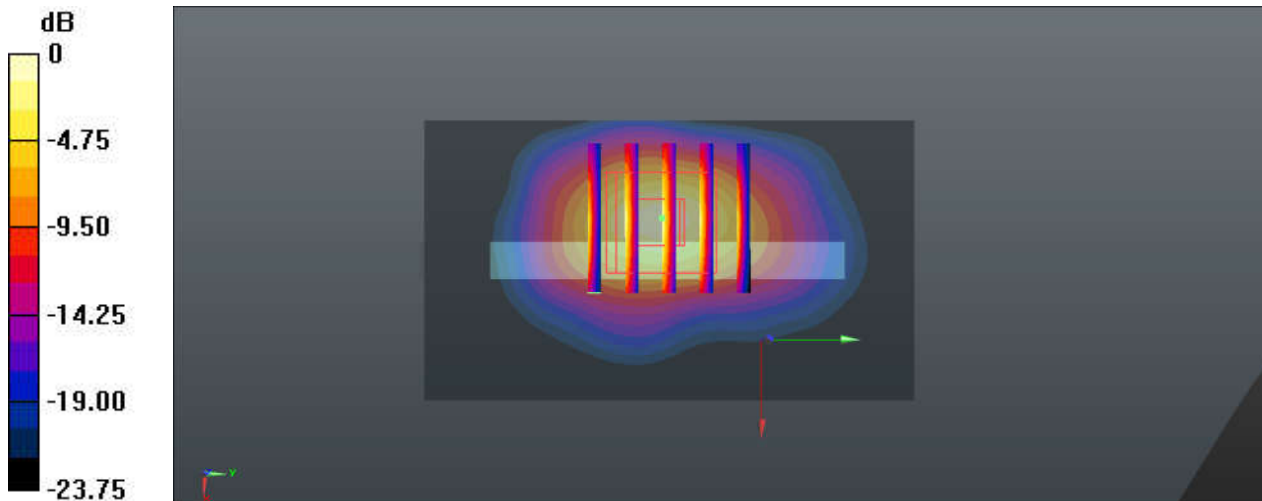
Communication System: UID 0, LTE-FDD (0); Frequency: 1770 MHz; Duty Cycle: 1:1
Medium: HSL_1750 Medium parameters used: $f = 1770$ MHz; $\sigma = 1.401$ S/m; $\epsilon_r = 39.63$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(5.53, 5.53, 5.53); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch132572/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 8.84 W/kg

Ch132572/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.44 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 6.92 W/kg; SAR(10 g) = 2.9 W/kg
Maximum value of SAR (measured) = 9.91 W/kg



0 dB = 9.91 W/kg = 9.96 dBW/kg

80_LTE Band 25_20M_QPSK_100RB_0Offset_Bottom Side_0mm_Ch26140

Communication System: UID 0, LTE-FDD (0); Frequency: 1860 MHz; Duty Cycle: 1:1
 Medium: HSL_1900 Medium parameters used: $f = 1860$ MHz; $\sigma = 1.378$ S/m; $\epsilon_r = 39.984$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(5.32, 5.32, 5.32); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch26140/Area Scan (41x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 8.99 W/kg

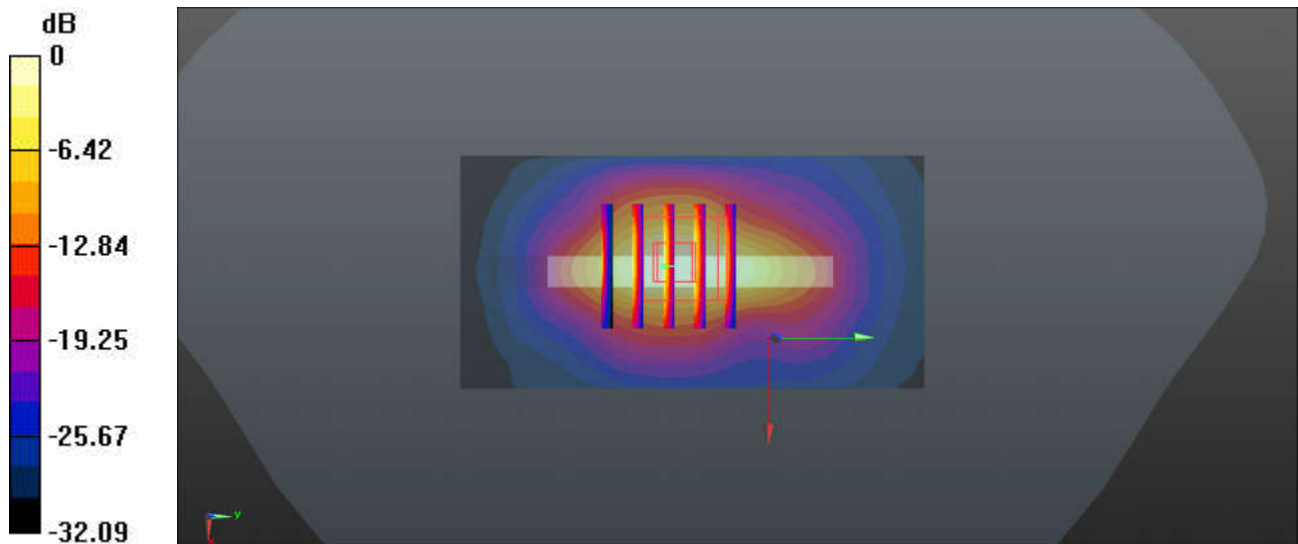
Ch26140/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 74.86 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 13.5 W/kg

SAR(1 g) = 5.68 W/kg; SAR(10 g) = 2.31 W/kg

Maximum value of SAR (measured) = 8.32 W/kg



0 dB = 8.99 W/kg = 9.54 dBW/kg

81_LTE Band 30_10M_QPSK_1RB_0Offset_Back_0mm_Ch27710

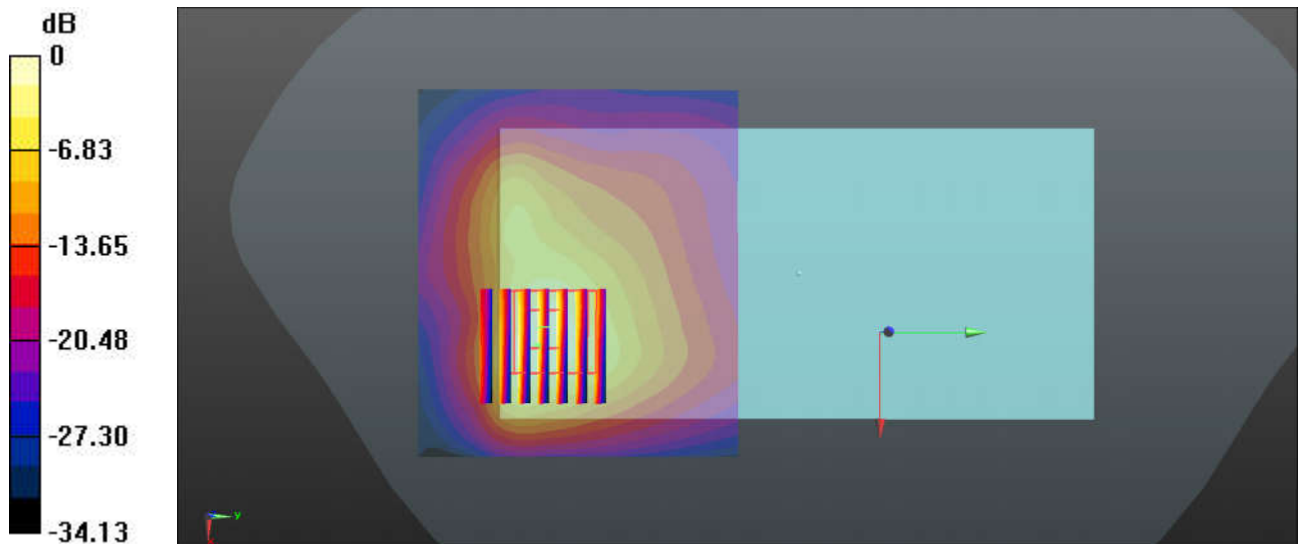
Communication System: UID 0, LTE-FDD (0); Frequency: 2310 MHz; Duty Cycle: 1:1
 Medium: HSL_2300 Medium parameters used: $f = 2310$ MHz; $\sigma = 1.699$ S/m; $\epsilon_r = 41.277$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.4 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(4.89, 4.89, 4.89); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM1; Type: SAM; Serial: TP-1753
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch27710/Area Scan (81x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
 Maximum value of SAR (interpolated) = 8.21 W/kg

Ch27710/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 4.405 V/m; Power Drift = 0.05 dB
 Peak SAR (extrapolated) = 13.5 W/kg
SAR(1 g) = 5.35 W/kg; SAR(10 g) = 2.3 W/kg
 Maximum value of SAR (measured) = 7.54 W/kg



0 dB = 8.21 W/kg = 9.14 dBW/kg

82_LTE Band 7_20M_QPSK_1RB_0Offset_Bottom Side_0mm_Ch21350

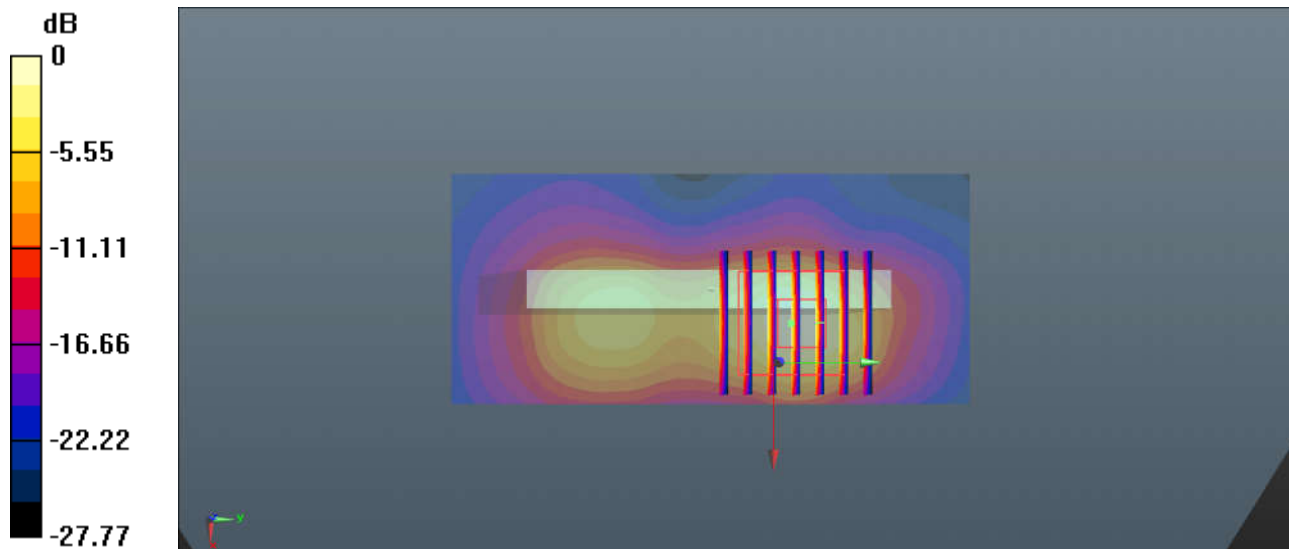
Communication System: UID 0, LTE-FDD (0); Frequency: 2560 MHz; Duty Cycle: 1:1
Medium: HSL_2600 Medium parameters used: $f = 2560$ MHz; $\sigma = 1.918$ S/m; $\epsilon_r = 40.507$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(4.39, 4.39, 4.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch21350/Area Scan (41x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 9.14 W/kg

Ch21350/Zoom Scan (7x7x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.23 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 22.1 W/kg
SAR(1 g) = 6.82 W/kg; SAR(10 g) = 2.39 W/kg
Maximum value of SAR (measured) = 9.94 W/kg



0 dB = 9.94 W/kg = 9.97 dBW/kg

83_LTE Band 41_20M_QPSK_1RB_0Offset_Bottom Side_0mm_Ch40620_HPUE

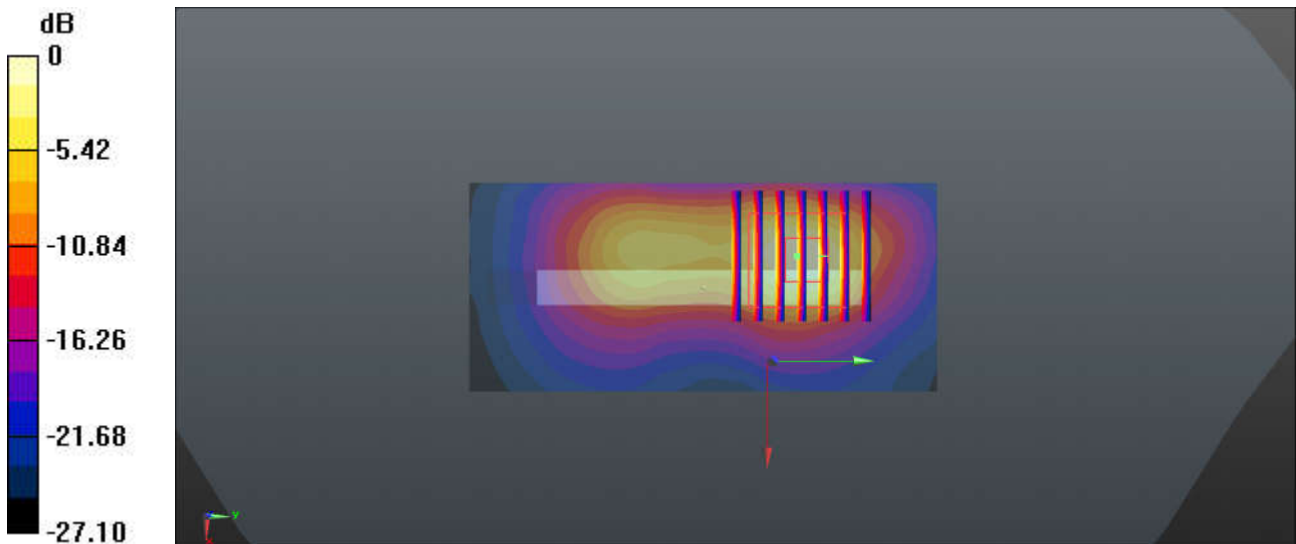
Communication System: UID 0, LTE-TDD (0); Frequency: 2593 MHz; Duty Cycle: 1:2.33
 Medium: HSL_2600 Medium parameters used: $f = 2593$ MHz; $\sigma = 1.953$ S/m; $\epsilon_r = 40.382$; $\rho = 1000$ kg/m³
 Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(4.39, 4.39, 4.39); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch40620/Area Scan (41x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
 Maximum value of SAR (interpolated) = 8.69 W/kg

Ch40620/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 24.39 V/m; Power Drift = 0.05 dB
 Peak SAR (extrapolated) = 20.5 W/kg
SAR(1 g) = 6.47 W/kg; SAR(10 g) = 2.15 W/kg
 Maximum value of SAR (measured) = 10.1 W/kg



0 dB = 8.69 W/kg = 9.39 dBW/kg

84_WLAN2.4GHz_802.11b 1Mbps_Front_0mm_Ch11

Communication System: UID 0, 802.11b (0); Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: HSL_2450 Medium parameters used: $f = 2462$ MHz; $\sigma = 1.868$ S/m; $\epsilon_r = 38.411$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.1 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: ES3DV3 - SN3293; ConvF(4.6, 4.6, 4.6); Calibrated: 2019.11.25
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn871; Calibrated: 2019.6.27
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

Ch11/Area Scan (91x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 7.79 W/kg

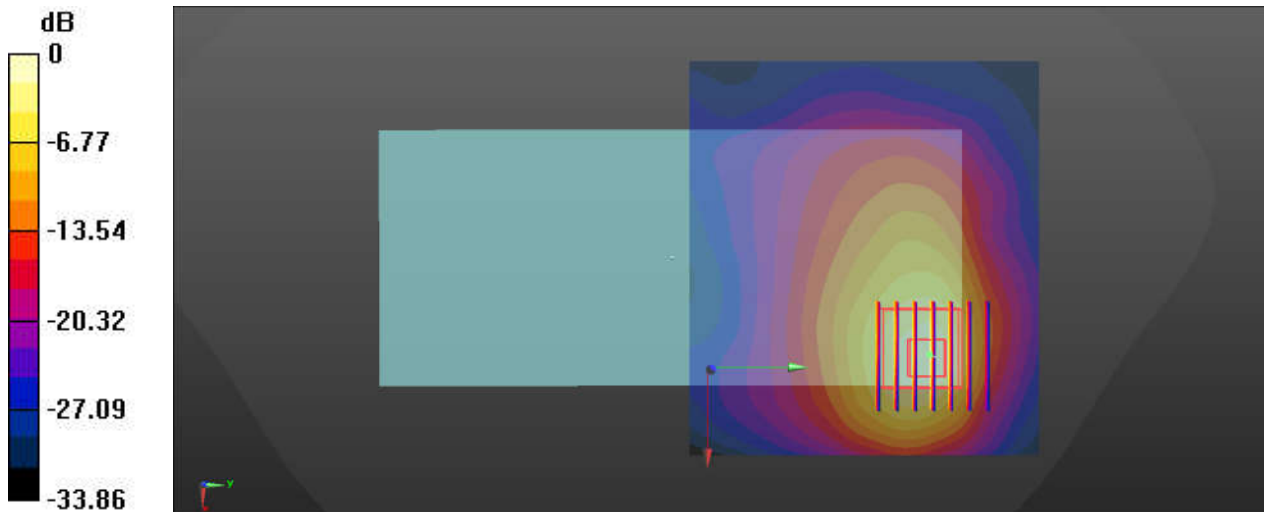
Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.034 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 14.8 W/kg

SAR(1 g) = 5.5 W/kg; SAR(10 g) = 2.17 W/kg

Maximum value of SAR (measured) = 7.68 W/kg



0 dB = 7.79 W/kg = 8.92 dBW/kg

85_WLAN 5GHz_802.11n-HT40 MCS0_Back_0mm_Ch38

Communication System: UID 0, 802.11n (0); Frequency: 5190 MHz; Duty Cycle: 1:1.038
Medium: HSL_5000 Medium parameters used: $f = 5190$ MHz; $\sigma = 4.525$ S/m; $\epsilon_r = 36.505$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(5.19, 5.19, 5.19); Calibrated: 2019.5.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2019.7.23
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch38/Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

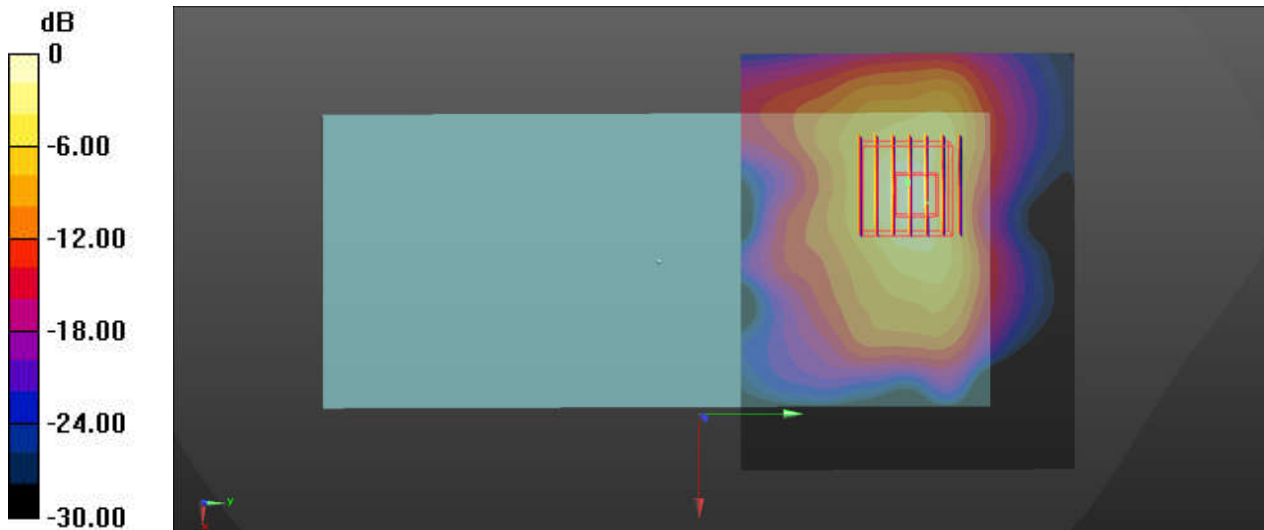
Ch38/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 0 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 25.0 W/kg

SAR(1 g) = 6.25 W/kg; SAR(10 g) = 1.79 W/kg

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



0 dB = 12.1 W/kg = 10.83 dBW/kg

86_WLAN 5GHz_802.11n-HT40 MCS0_Back_0mm_Ch54

Communication System: UID 0, 802.11n (0); Frequency: 5270 MHz; Duty Cycle: 1:1.038
Medium: HSL_5000 Medium parameters used: $f = 5270$ MHz; $\sigma = 4.627$ S/m; $\epsilon_r = 36.374$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(5.19, 5.19, 5.19); Calibrated: 2019.5.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2019.7.23
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch54/Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 17.3 W/kg

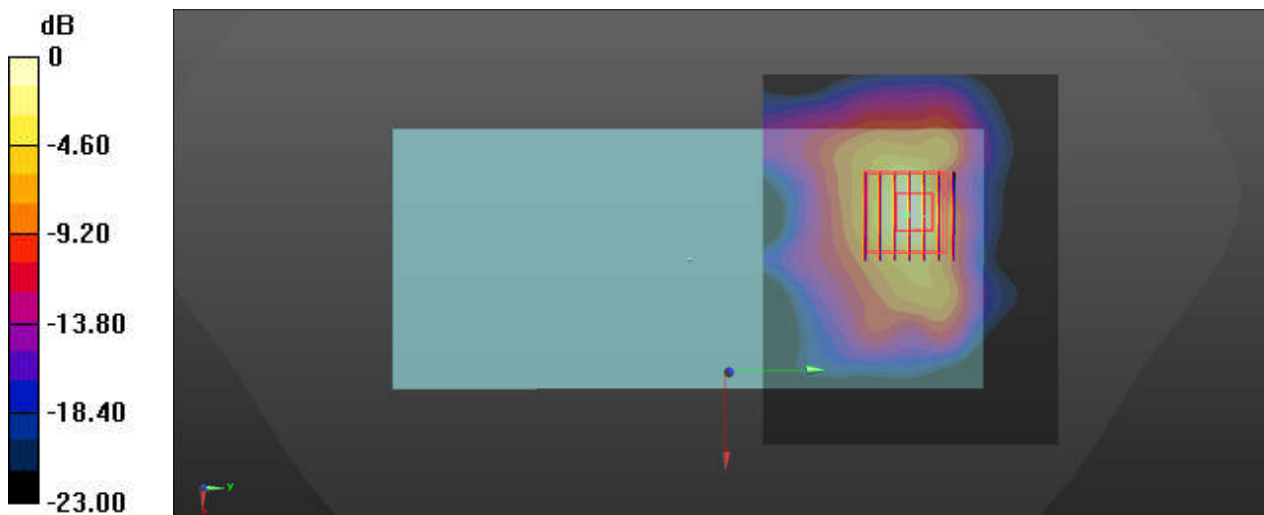
Ch54/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 32.3 W/kg

SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.33 W/kg

Maximum value of SAR (measured) = 19.7 W/kg



0 dB = 17.3 W/kg = 12.38 dBW/kg

87_WLAN 5GHz_802.11n-HT40 MCS0_0mm_Back_Ch134

Communication System: UID 0, 802.11n (0); Frequency: 5670 MHz; Duty Cycle: 1:1.038
Medium: HSL_5000 Medium parameters used: $f = 5670$ MHz; $\sigma = 5.081$ S/m; $\epsilon_r = 35.707$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(4.92, 4.92, 4.92); Calibrated: 2019.5.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2019.7.23
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch134/Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 18.4 W/kg

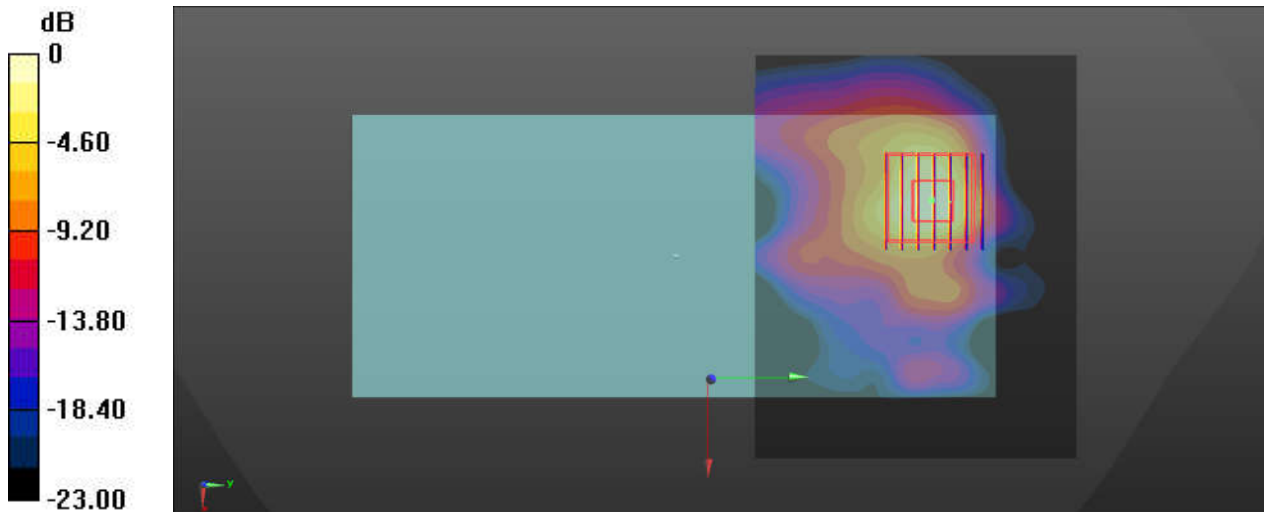
Ch134/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

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

Peak SAR (extrapolated) = 44.1 W/kg

SAR(1 g) = 8.58 W/kg; SAR(10 g) = 2.46 W/kg

Maximum value of SAR (measured) = 23.1 W/kg



0 dB = 18.4 W/kg = 12.65 dBW/kg

88_WLAN 5GHz_802.11a 6Mbps_Back_0mm_Back_Ch165

Communication System: UID 0, 802.11a (0); Frequency: 5825 MHz; Duty Cycle: 1:1.018
Medium: HSL_5000 Medium parameters used: $f = 5825$ MHz; $\sigma = 5.25$ S/m; $\epsilon_r = 35.438$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(5.17, 5.17, 5.17); Calibrated: 2019.5.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2019.7.23
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch165/Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

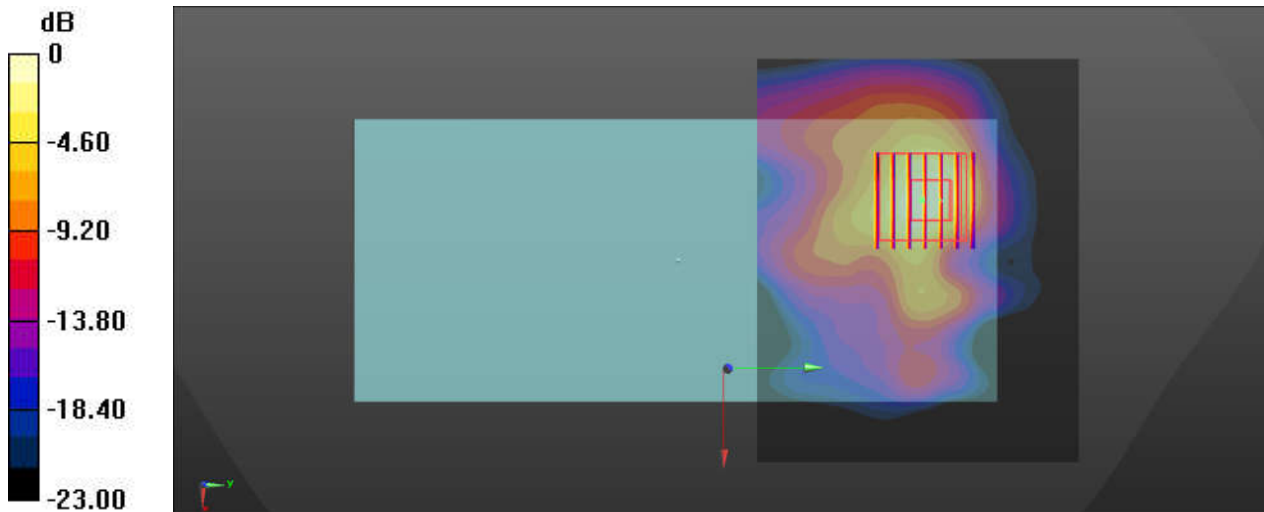
Ch165/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 0 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 50.0 W/kg

SAR(1 g) = 8.56 W/kg; SAR(10 g) = 2.38 W/kg

Maximum value of SAR (measured) = 27.4 W/kg



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



Appendix C. DASYS Calibration Certificate

The DASYS calibration certificates are shown as follows



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中国认可
国际互认
校准
CALIBRATION
CNAS L0570

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E-mail: cttl@chinattl.com http://www.chinattl.cn

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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CALIBRATION LABORATORY

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http://www.chinattl.cn

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 \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	43.0 \pm 6 %	0.90 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	2.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.36 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	1.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.65 W/kg \pm 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 \pm 0.2) °C	56.9 \pm 6 %	0.94 mho/m \pm 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 \pm 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 \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	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
----------------------------------	----------

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: 03.26.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1087

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750$ MHz; $\sigma = 0.903$ S/m; $\epsilon_r = 43.01$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(10.03, 10.03, 10.03) @ 750 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2/6/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

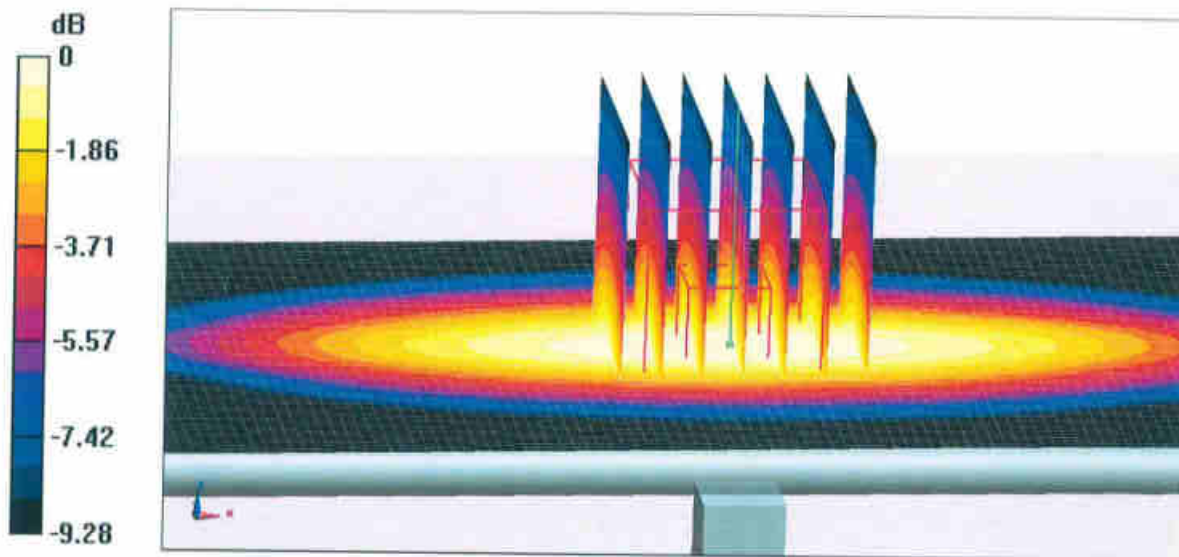
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.05 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.00 W/kg

SAR(1 g) = 2.1 W/kg; SAR(10 g) = 1.42 W/kg

Maximum value of SAR (measured) = 2.72 W/kg

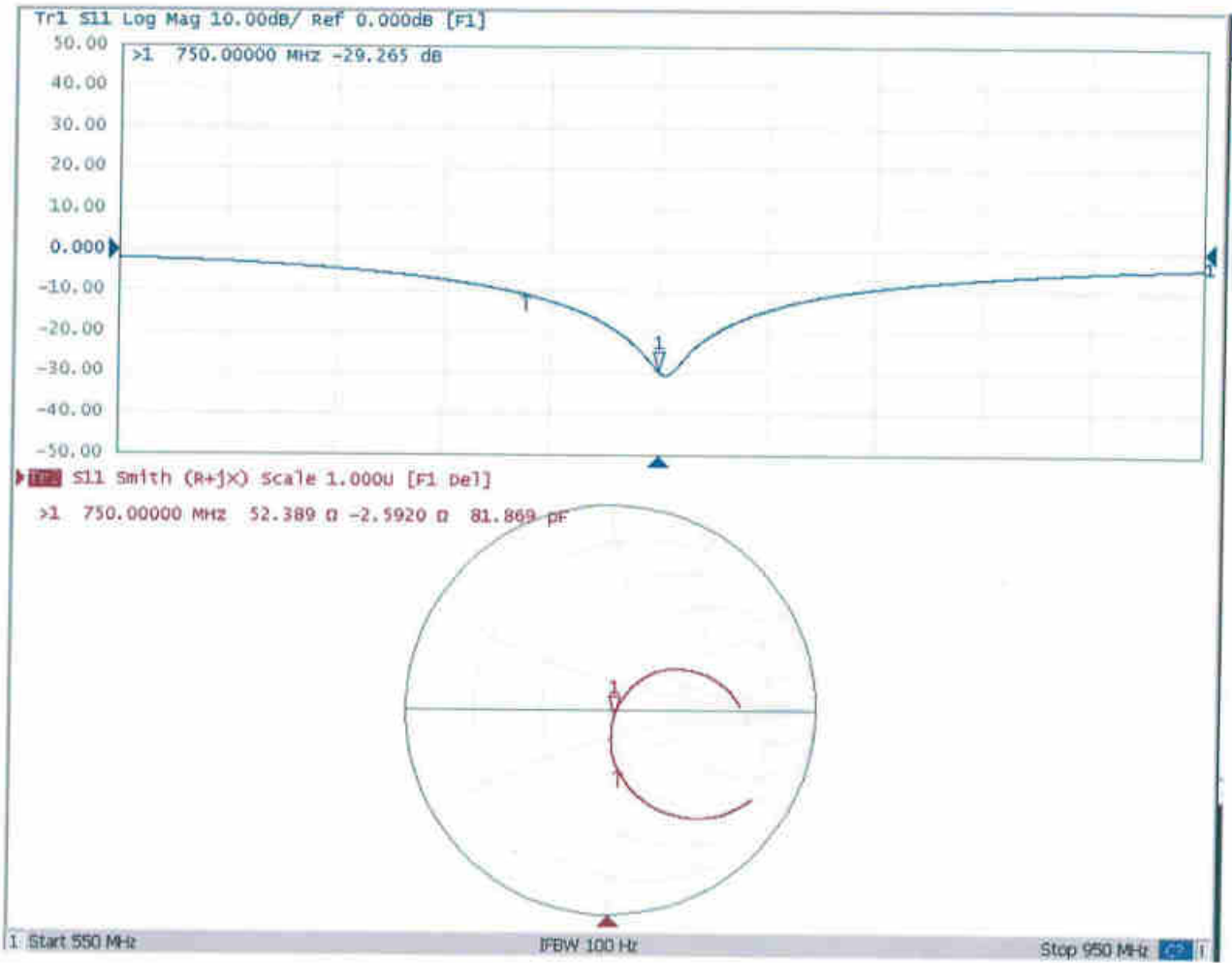


0 dB = 2.72 W/kg = 4.35 dBW/kg



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Impedance Measurement Plot for Head TSL





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DASY5 Validation Report for Body TSL

Date: 03.26.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1087

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750$ MHz; $\sigma = 0.935$ S/m; $\epsilon_r = 56.85$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(9.85, 9.85, 9.85) @ 750 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2/6/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

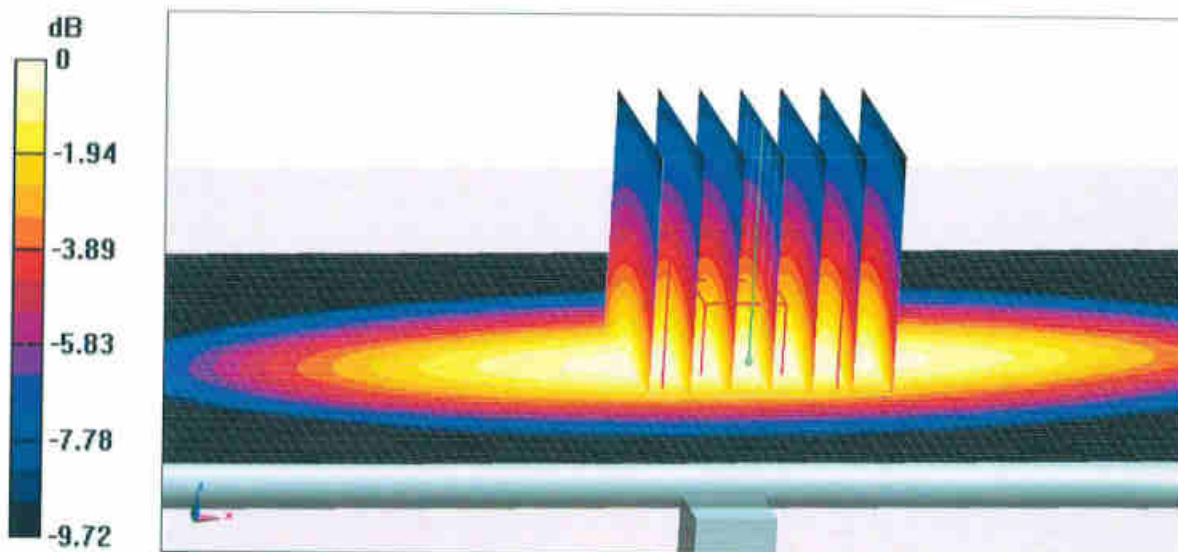
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.71 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.08 W/kg

SAR(1 g) = 2.09 W/kg; SAR(10 g) = 1.41 W/kg

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

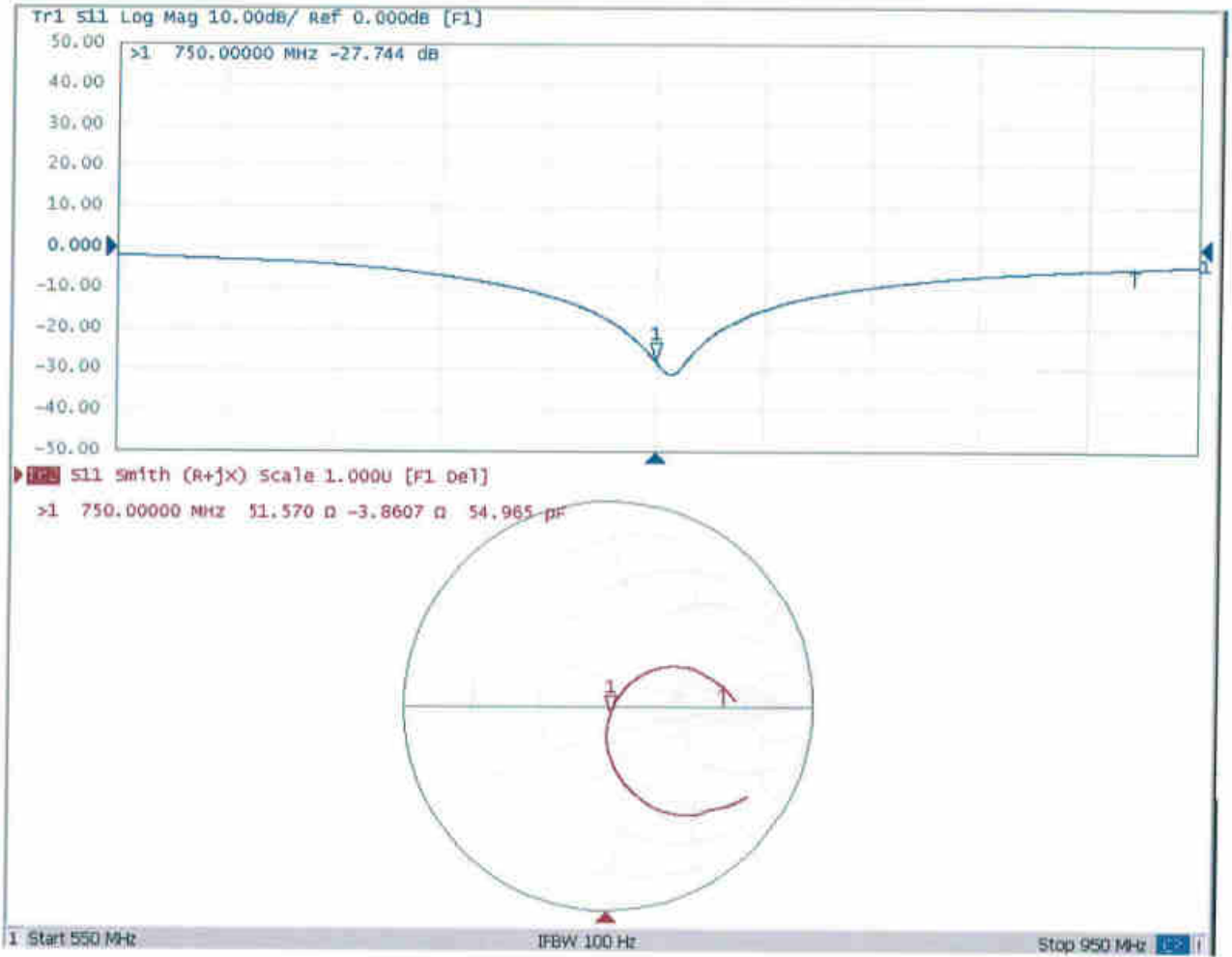


0 dB = 2.75 W/kg = 4.39 dBW/kg



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Impedance Measurement Plot for Body TSL





D750V3, Serial No. 1087 Extended Dipole Calibrations

Referring to KDB 865664 D01 v01r02, if dipoles are verified in return loss ($< -20\text{dB}$, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

750V3 – serial no. 1087

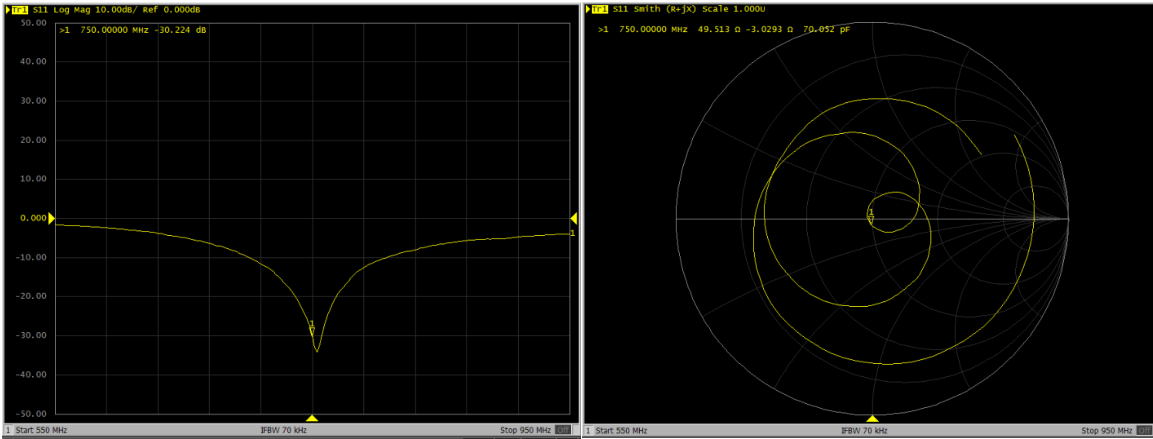
750V3 – serial no. 1087												
	750 Head						750 Body					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2019.3.27	-29.3		52.4		-2.6		-27.7		51.6		-3.9	
2020.3.26	-30.2	-0.03	49.5	2.88	-3.0	0.44	26.6	1.96	54.896	-3.33	0.45	-4.31

<Justification of the extended calibration>

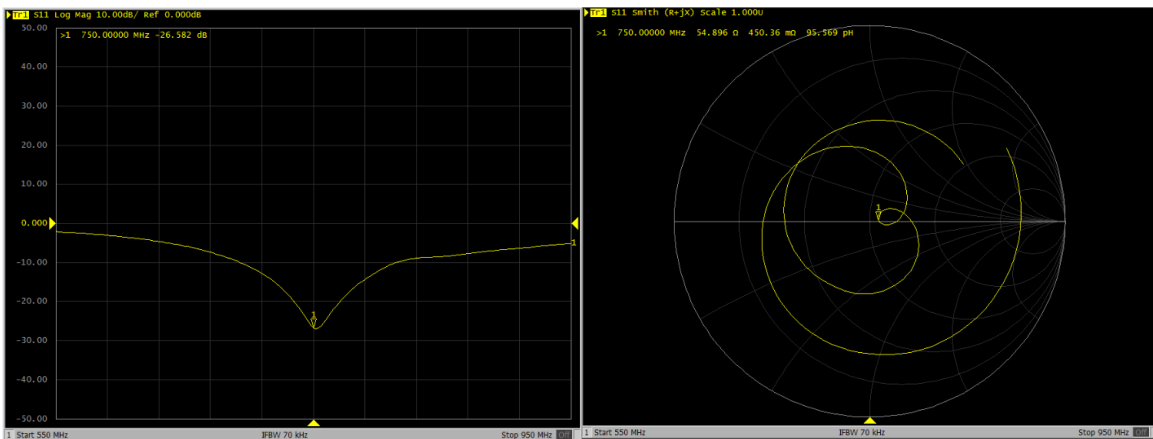
The return loss is $< -20\text{dB}$, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data > D750V3, serial no. 1087

750MHz – Head



750MHz – Body





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Client **Sporton**

Certificate No: **Z19-60082**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d151**

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 30, 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	835 MHz ± 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 ± 0.2) °C	42.7 ± 6 %	0.93 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	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.30 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.56 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.16 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	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	56.7 ± 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	2.32 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.53 W /kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.52 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.20 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	50.8Ω- 3.28jΩ
Return Loss	- 29.5dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.7Ω- 3.98jΩ
Return Loss	- 25.5dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.253 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: 03.26.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d151

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

Medium parameters used: $f = 835$ MHz; $\sigma = 0.925$ S/m; $\epsilon_r = 42.68$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(9.75, 9.75, 9.75) @ 835 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2/6/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

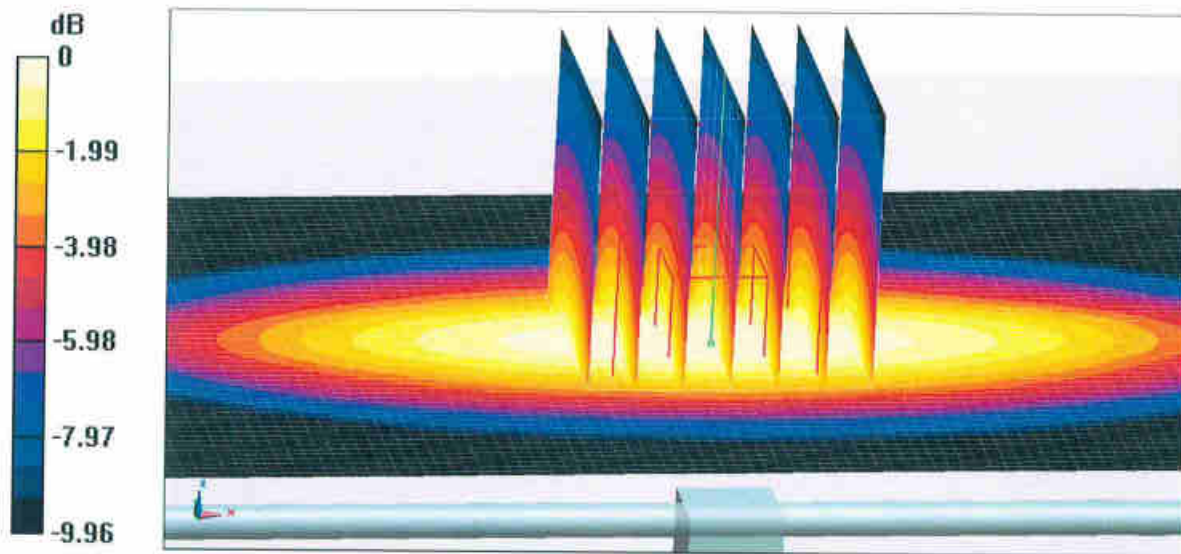
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.34 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 3.55 W/kg

SAR(1 g) = 2.36 W/kg; SAR(10 g) = 1.56 W/kg

Maximum value of SAR (measured) = 3.14 W/kg

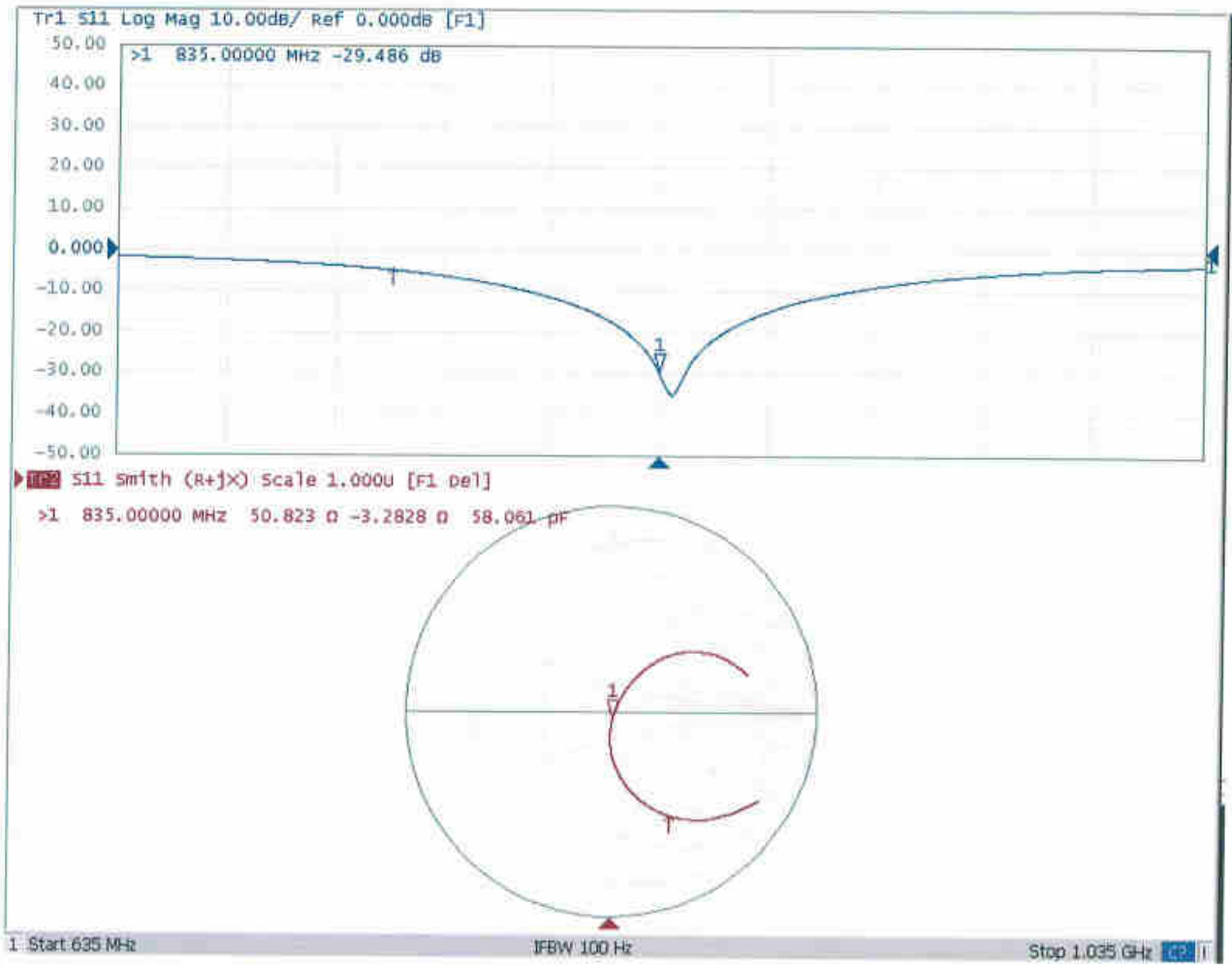


0 dB = 3.14 W/kg = 4.97 dBW/kg



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Impedance Measurement Plot for Head TSL





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DASY5 Validation Report for Body TSL

Date: 03.26.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d151

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

Medium parameters used: $f = 835$ MHz; $\sigma = 0.944$ S/m; $\epsilon_r = 56.66$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(9.61, 9.61, 9.61) @ 835 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2/6/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

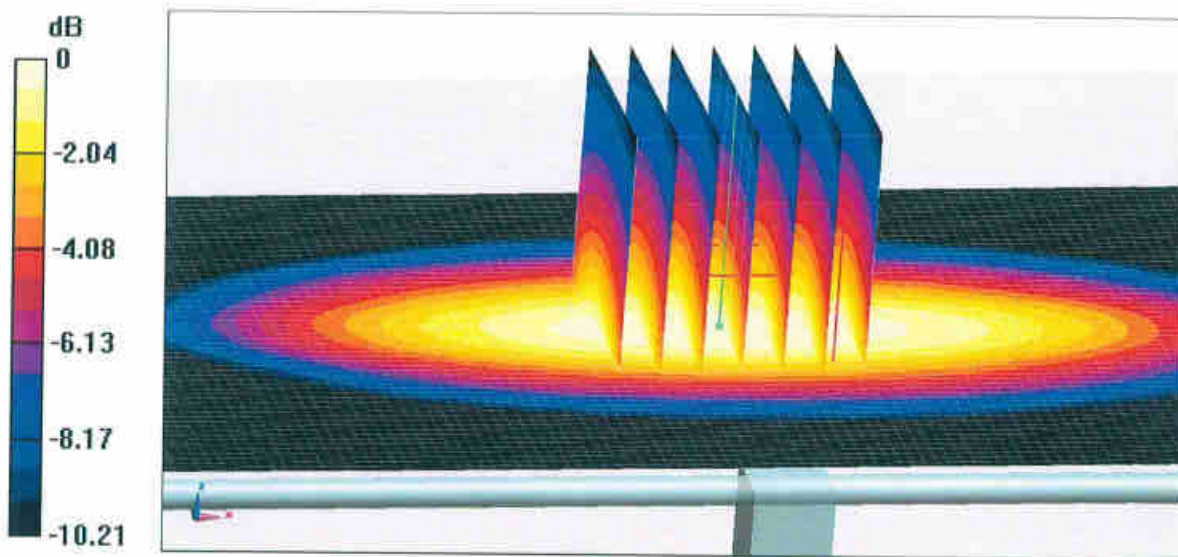
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.03 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 3.53 W/kg

SAR(1 g) = 2.32 W/kg; SAR(10 g) = 1.52 W/kg

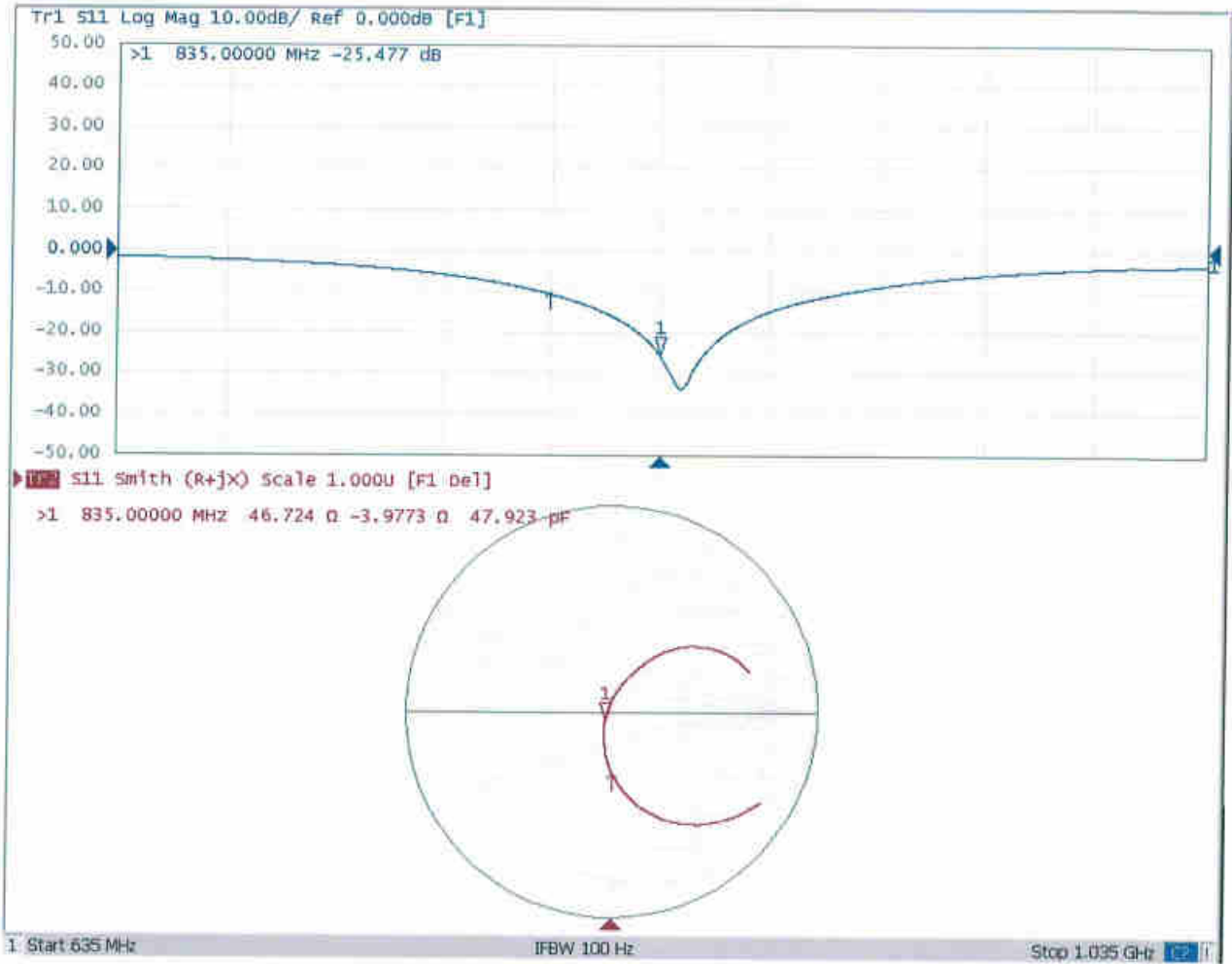
Maximum value of SAR (measured) = 3.12 W/kg





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Impedance Measurement Plot for Body TSL





D835V2, Serial No. 4d151 Extended Dipole Calibrations

Referring to KDB 865664 D01 v01r02, if dipoles are verified in return loss ($< -20\text{dB}$, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

835V2 – serial no. 4d151

835V2 – serial no. 4d151												
	835 Head						835 Body					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2019.3.27	-29.3		52.4		-2.6		-27.7		51.6		-3.9	
2020.3.26	-30.7	-0.05	49.0	3.44	-2.7	0.10	-24.9	0.10	50.6	0.94	-5.7	1.84

<Justification of the extended calibration>

The return loss is $< -20\text{dB}$, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.