

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date : 2007/12/25

Body_802.11n_Ch120_NB Bottom with 0cm Gap_Ant-3_BW 20M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5600$ MHz; $\sigma = 5.65$ mho/m; $\epsilon_r = 48$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.09, 4.09, 4.09); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch120/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.860 mW/g

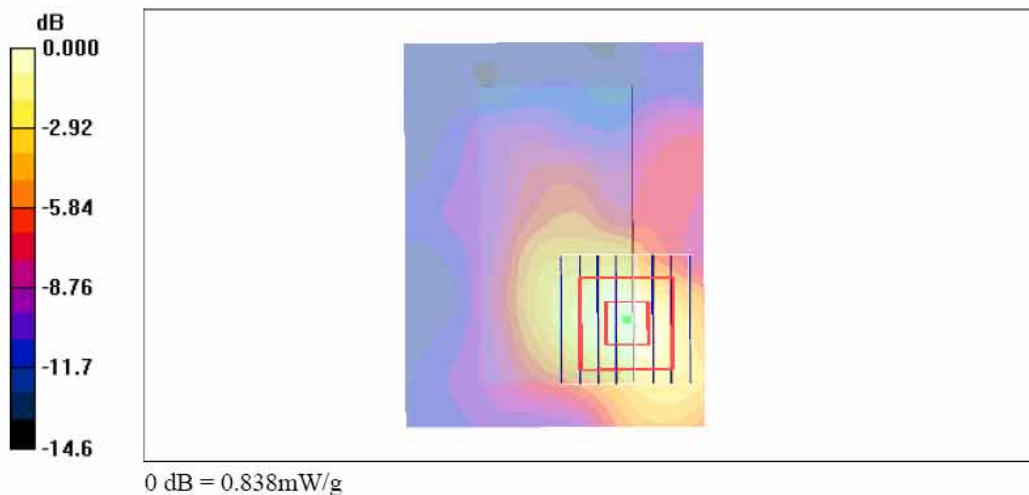
Ch120/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 4.67 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 0.475 mW/g; SAR(10 g) = 0.216 mW/g

Maximum value of SAR (measured) = 0.838 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n_Ch120_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 20M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5600$ MHz; $\sigma = 5.65$ mho/m; $\epsilon_r = 48$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.09, 4.09, 4.09); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch120/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.01 mW/g

Ch120/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.08 V/m; Power Drift = -0.135 dB

Peak SAR (extrapolated) = 1.94 W/kg

SAR(1 g) = 0.557 mW/g; SAR(10 g) = 0.248 mW/g

Maximum value of SAR (measured) = 0.981 mW/g

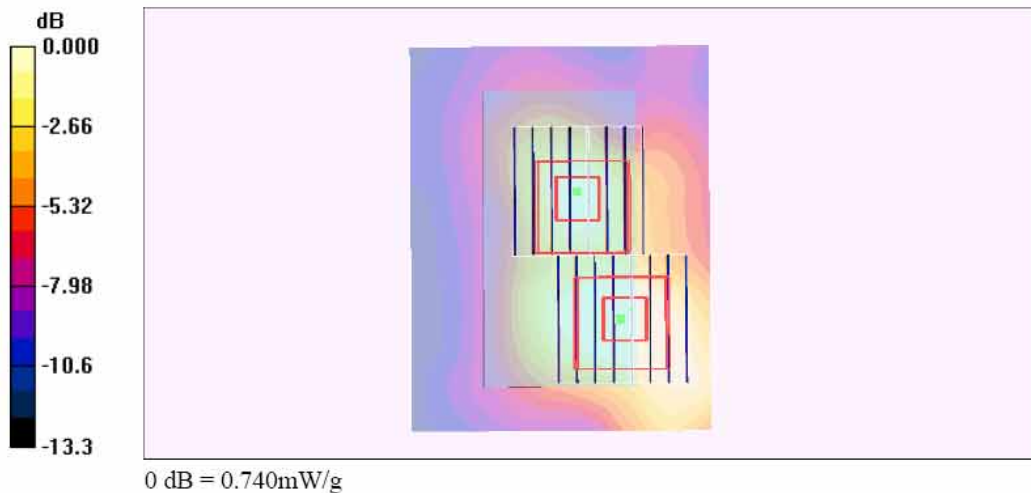
Ch120/Zoom Scan (8x8x8)/Cube 1: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.08 V/m; Power Drift = -0.135 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.189 mW/g

Maximum value of SAR (measured) = 0.740 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date : 2007/12/25

Body_802.11n_Ch118_NB Bottom with 0cm Gap_Ant-1_BW 40M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5590 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5600$ MHz; $\sigma = 5.65$ mho/m; $\epsilon_r = 48$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.09, 4.09, 4.09); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch118/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.762 mW/g

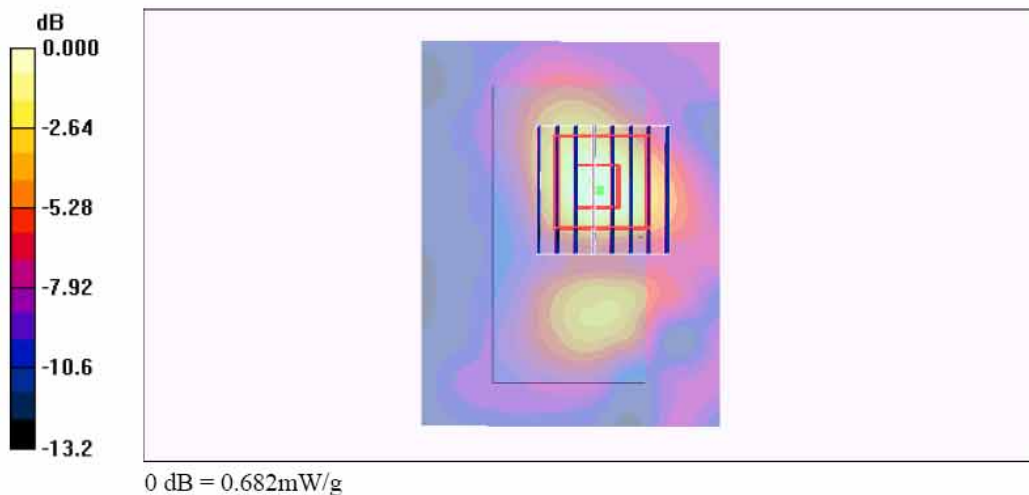
Ch118/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 5.11 V/m; Power Drift = 0.165 dB

Peak SAR (extrapolated) = 1.34 W/kg

SAR(1 g) = 0.385 mW/g; SAR(10 g) = 0.166 mW/g

Maximum value of SAR (measured) = 0.682 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date : 2007/12/25

Body_802.11n_Ch118_NB Bottom with 0cm Gap_Ant-3_BW 40M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5590 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5600$ MHz; $\sigma = 5.65$ mho/m; $\epsilon_r = 48$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.09, 4.09, 4.09); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch118/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.18 mW/g

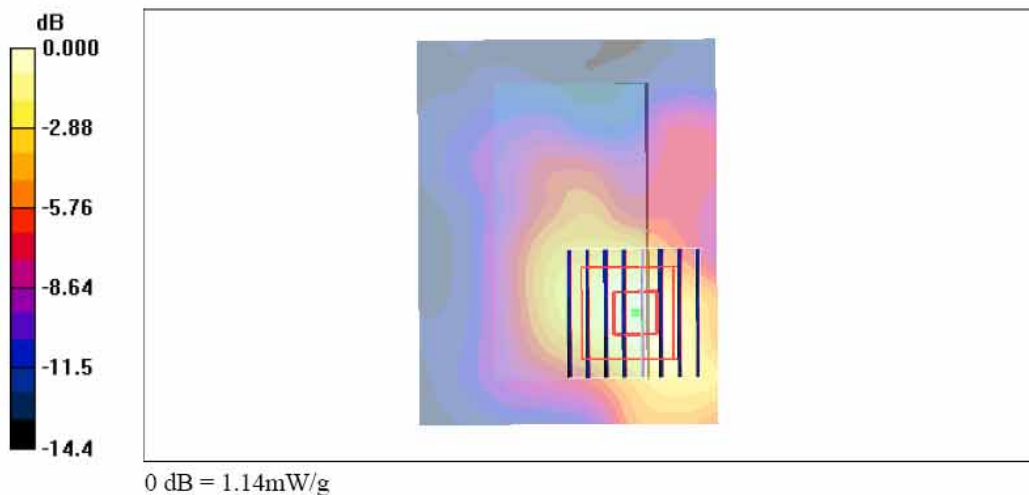
Ch118/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 5.67 V/m; Power Drift = 0.180 dB

Peak SAR (extrapolated) = 2.24 W/kg

SAR(1 g) = 0.640 mW/g; SAR(10 g) = 0.284 mW/g

Maximum value of SAR (measured) = 1.14 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n Ch102_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 40M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5510 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5500$ MHz; $\sigma = 5.54$ mho/m; $\epsilon_r = 48.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.09, 4.09, 4.09); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch102/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.51 mW/g

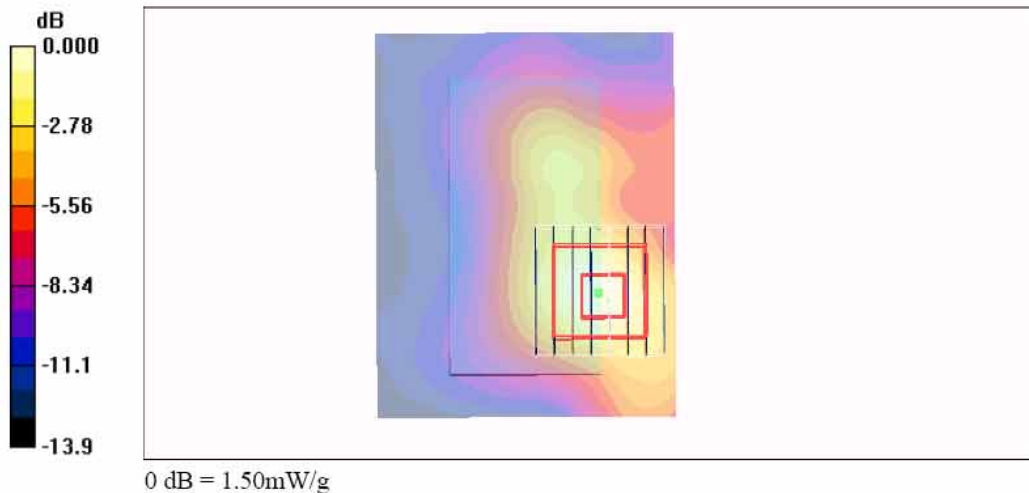
Ch102/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.52 V/m; Power Drift = 0.070 dB

Peak SAR (extrapolated) = 2.89 W/kg

SAR(1 g) = 0.852 mW/g; SAR(10 g) = 0.379 mW/g

Maximum value of SAR (measured) = 1.50 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n Ch118_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 40M_DELL M2300

DUT: 7D1410

Communication System: 802.11n; Frequency: 5590 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5600$ MHz; $\sigma = 5.65$ mho/m; $\epsilon_r = 48$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.09, 4.09, 4.09); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch118/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.911 mW/g

Ch118/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.92 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 2.05 W/kg

SAR(1 g) = 0.503 mW/g; SAR(10 g) = 0.222 mW/g

Maximum value of SAR (measured) = 0.946 mW/g

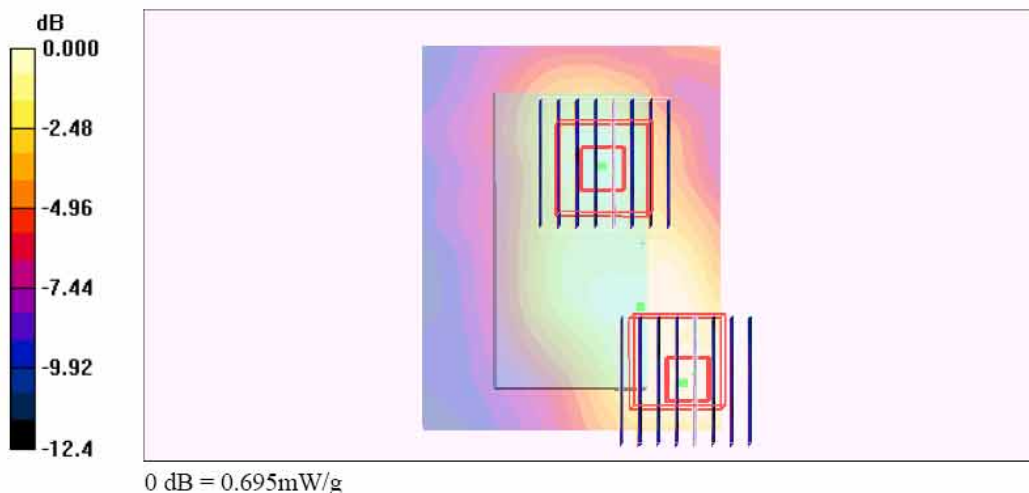
Ch118/Zoom Scan (8x8x8)/Cube 1: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.92 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 1.51 W/kg

SAR(1 g) = 0.410 mW/g; SAR(10 g) = 0.195 mW/g

Maximum value of SAR (measured) = 0.695 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n Ch118_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 40M_IBM 2653

DUT: 7D1410

Communication System: 802.11n; Frequency: 5590 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5600$ MHz; $\sigma = 5.65$ mho/m; $\epsilon_r = 48$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.09, 4.09, 4.09); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch118/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.587 mW/g

Ch118/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.18 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.351 mW/g; SAR(10 g) = 0.178 mW/g

Maximum value of SAR (measured) = 0.600 mW/g

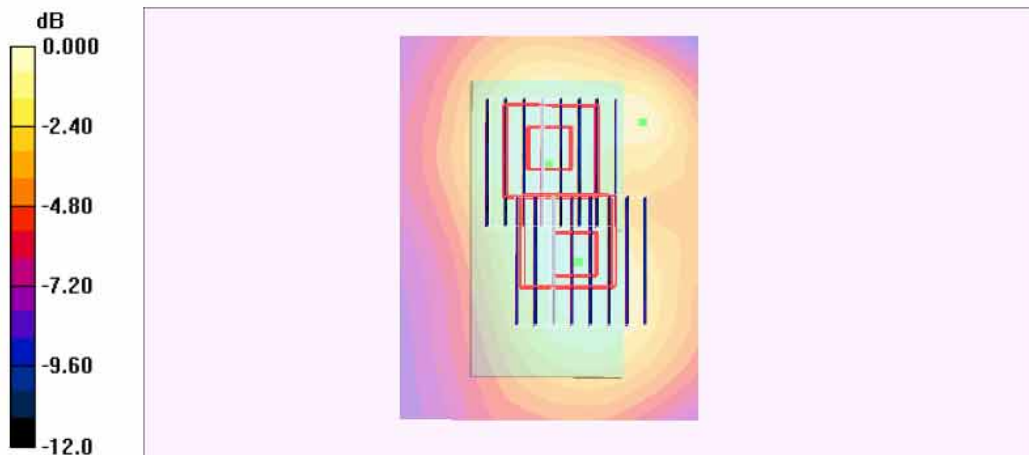
Ch118/Zoom Scan (8x8x8)/Cube 1: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.18 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.331 mW/g; SAR(10 g) = 0.173 mW/g

Maximum value of SAR (measured) = 0.565 mW/g



0 dB = 0.565mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11a Ch157_NB Bottom with 0cm Gap_Ant-1_DELL D500

DUT: 7D1410

Communication System: 802.11a; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch157/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.787 mW/g

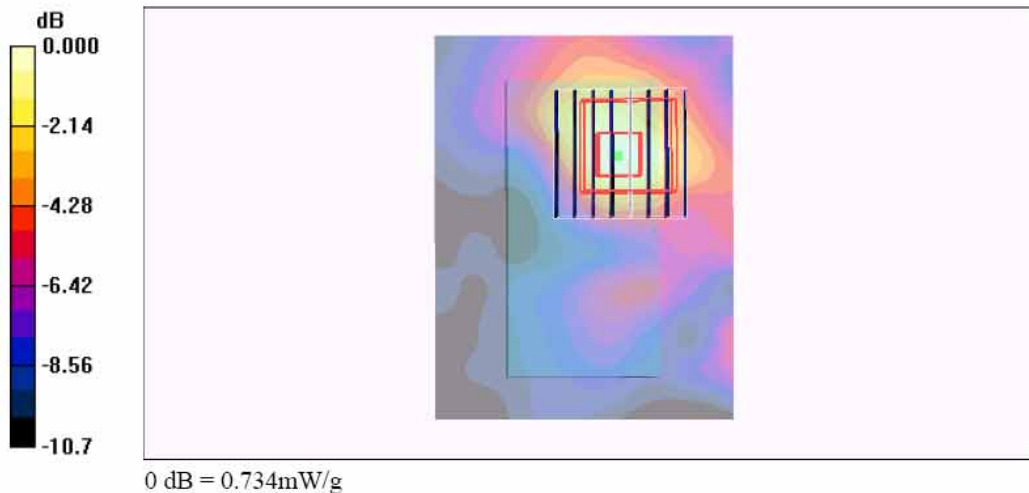
Ch157/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 4.49 V/m; Power Drift = -0.144 dB

Peak SAR (extrapolated) = 1.68 W/kg

SAR(1 g) = 0.430 mW/g; SAR(10 g) = 0.207 mW/g

Maximum value of SAR (measured) = 0.734 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11a_Ch157_NB Bottom with 0cm Gap_Ant-3_DELL D500

DUT: 7D1410

Communication System: 802.11a; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch157/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.23 mW/g

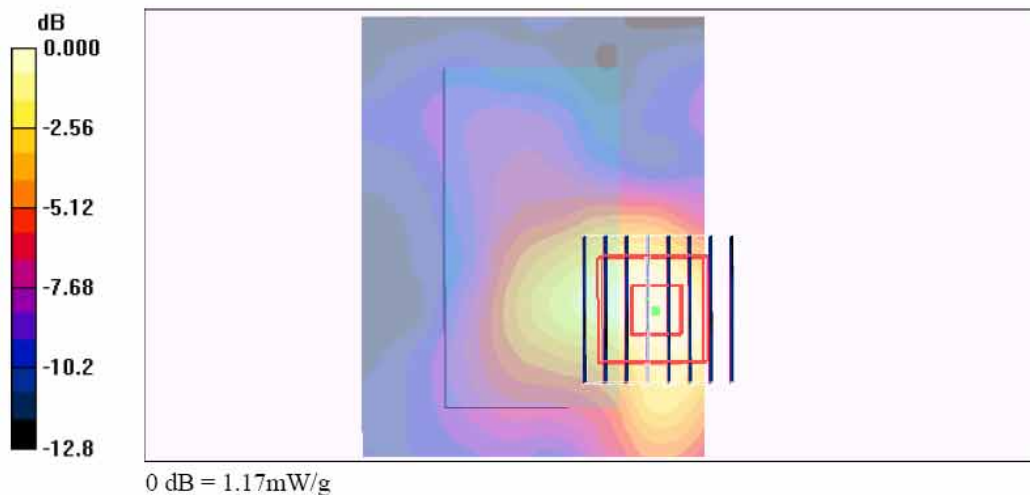
Ch157/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.83 V/m; Power Drift = -0.152 dB

Peak SAR (extrapolated) = 2.52 W/kg

SAR(1 g) = 0.663 mW/g; SAR(10 g) = 0.312 mW/g

Maximum value of SAR (measured) = 1.17 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n_Ch157_NB Bottom with 0cm Gap_Ant-1_BW 20M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch157/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.509 mW/g

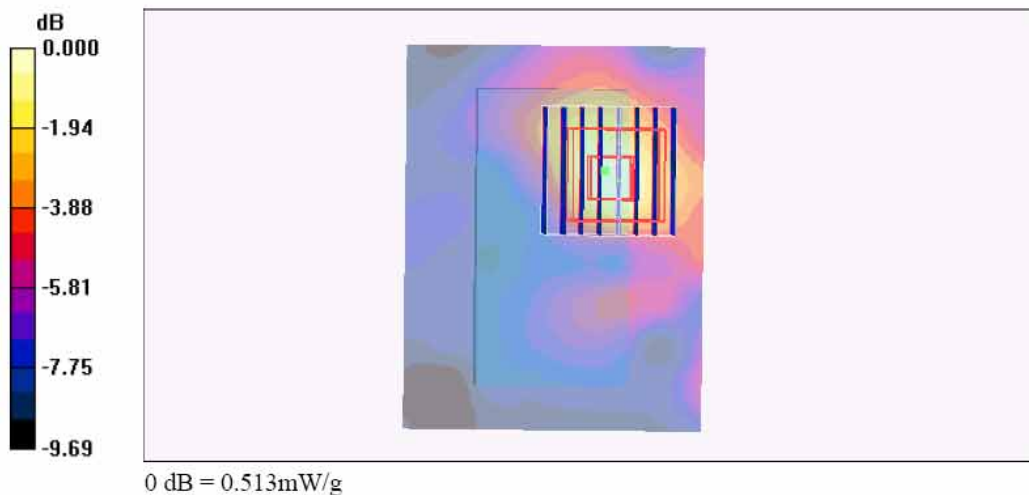
Ch157/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 4.77 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.312 mW/g; SAR(10 g) = 0.164 mW/g

Maximum value of SAR (measured) = 0.513 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n_Ch157_NB Bottom with 0cm Gap_Ant-3_BW 20M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.88 \text{ mho/m}$; $\epsilon_r = 47.7$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch157/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.843 mW/g

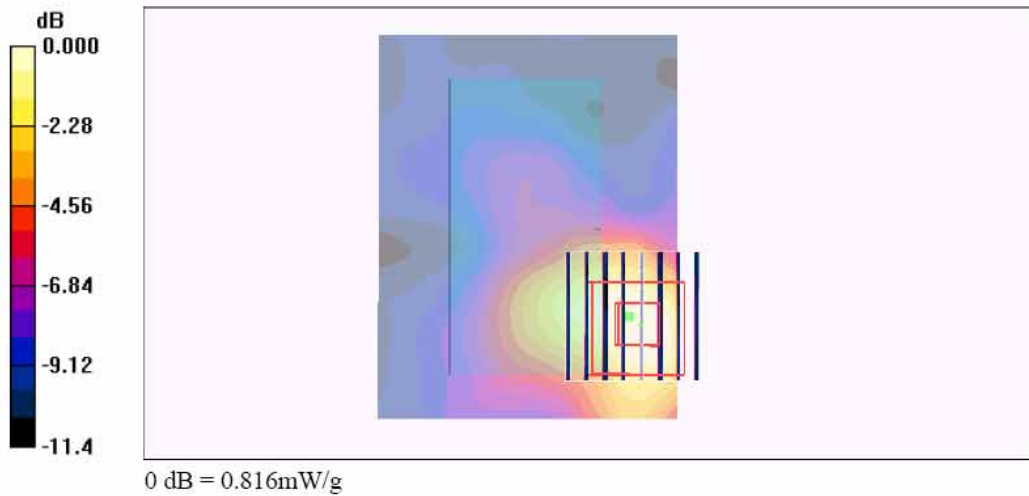
Ch157/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 5.35 V/m; Power Drift = -0.149 dB

Peak SAR (extrapolated) = 1.76 W/kg

SAR(1 g) = 0.479 mW/g; SAR(10 g) = 0.235 mW/g

Maximum value of SAR (measured) = 0.816 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date/Time: 2007/12/25

Body_802.11n Ch157_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 20M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.3 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch157/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.897 mW/g

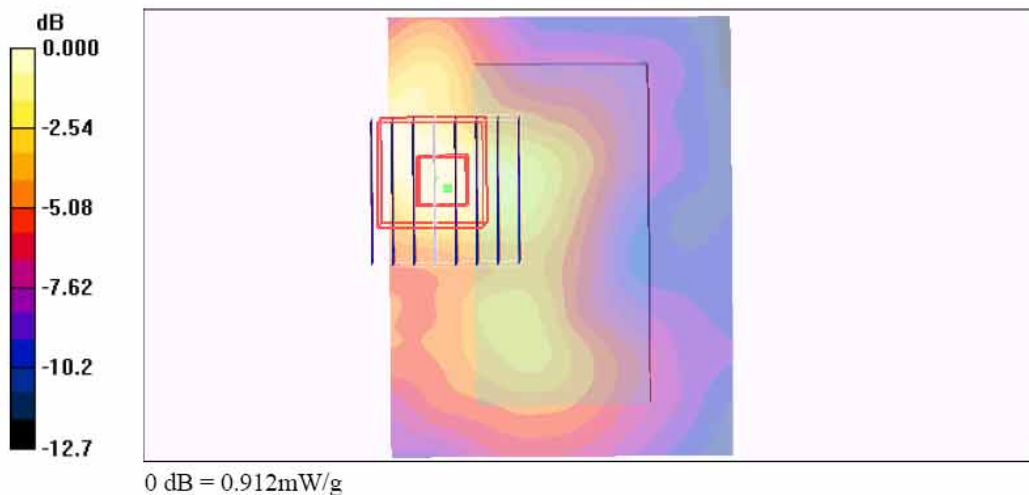
Ch157/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.15 V/m; Power Drift = 0.056 dB

Peak SAR (extrapolated) = 1.93 W/kg

SAR(1 g) = 0.520 mW/g; SAR(10 g) = 0.252 mW/g

Maximum value of SAR (measured) = 0.912 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n_Ch151_NB Bottom with 0cm Gap_Ant-1_BW 40M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5755 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.2 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch151/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.739 mW/g

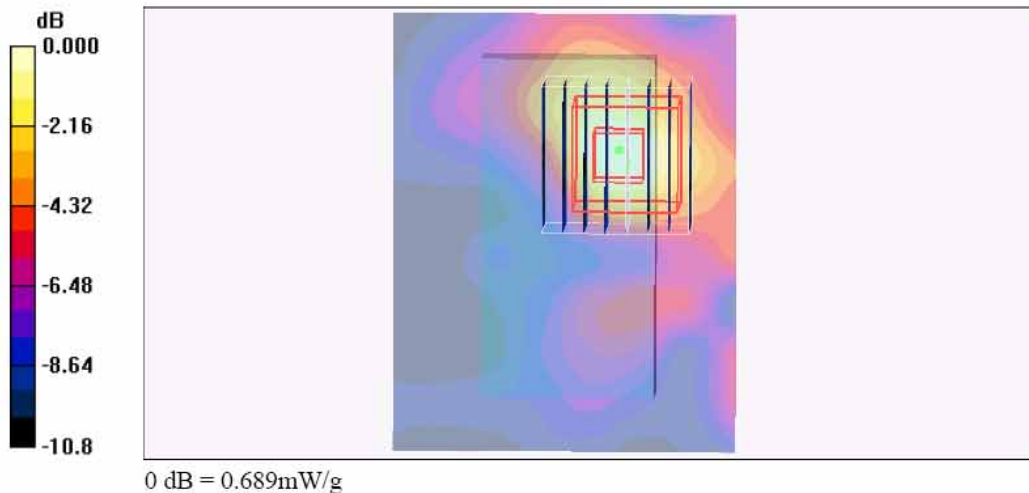
Ch151/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 4.76 V/m; Power Drift = 0.132 dB

Peak SAR (extrapolated) = 1.59 W/kg

SAR(1 g) = 0.404 mW/g; SAR(10 g) = 0.192 mW/g

Maximum value of SAR (measured) = 0.689 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n_Ch151_NB Bottom with 0cm Gap_Ant-3_BW 40M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5755 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch151/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.42 mW/g

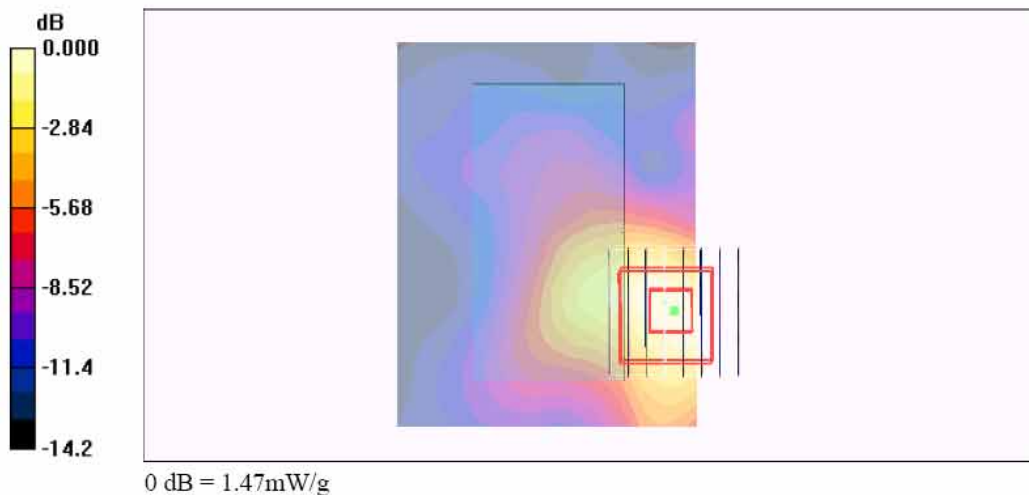
Ch151/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.21 V/m; Power Drift = -0.140 dB

Peak SAR (extrapolated) = 3.13 W/kg

SAR(1 g) = 0.823 mW/g; SAR(10 g) = 0.371 mW/g

Maximum value of SAR (measured) = 1.47 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n Ch151_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 40M_DELL D500

DUT: 7D1410

Communication System: 802.11n; Frequency: 5755 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch151/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.50 mW/g

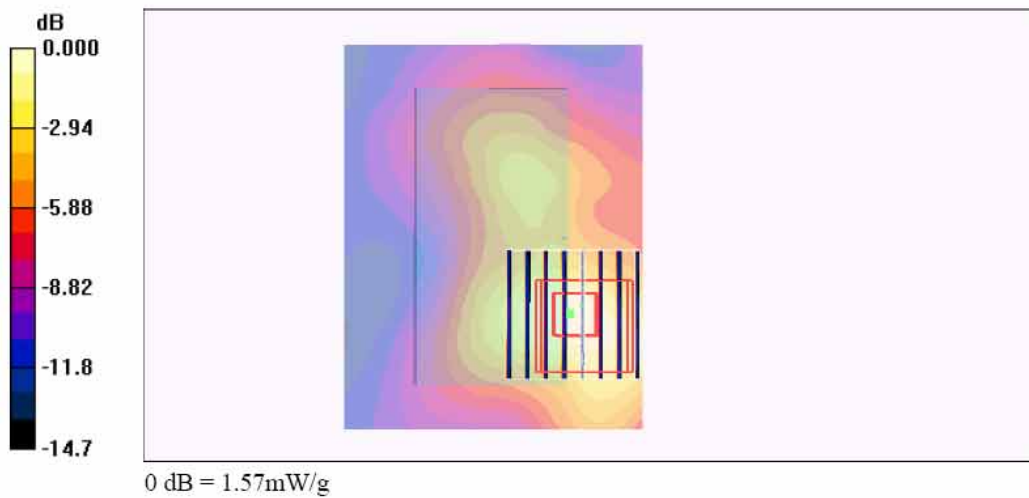
Ch151/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.34 V/m; Power Drift = -0.101 dB

Peak SAR (extrapolated) = 3.28 W/kg

SAR(1 g) = 0.881 mW/g; SAR(10 g) = 0.387 mW/g

Maximum value of SAR (measured) = 1.57 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n Ch151_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 40M_DELL M2300

DUT: 7D1410

Communication System: 802.11n; Frequency: 5755 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch151/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.895 mW/g

Ch151/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.76 V/m; Power Drift = 0.176 dB

Peak SAR (extrapolated) = 1.98 W/kg

SAR(1 g) = 0.480 mW/g; SAR(10 g) = 0.235 mW/g

Maximum value of SAR (measured) = 0.827 mW/g

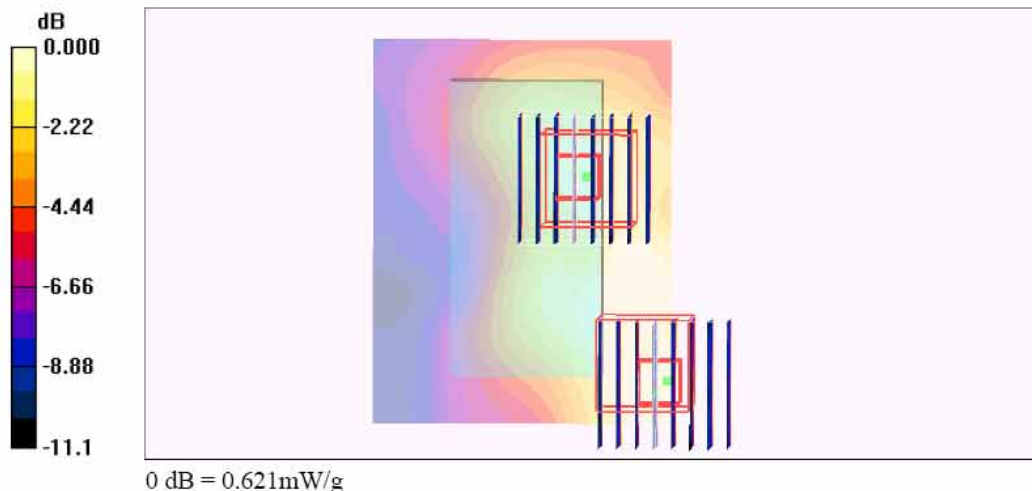
Ch151/Zoom Scan (8x8x8)/Cube 1: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.76 V/m; Power Drift = 0.176 dB

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.364 mW/g; SAR(10 g) = 0.188 mW/g

Maximum value of SAR (measured) = 0.621 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n Ch151_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 40M_IBM 2653

DUT: 7D1410

Communication System: 802.11n; Frequency: 5755 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch151/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.614 mW/g

Ch151/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.25 V/m; Power Drift = 0.167 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.363 mW/g; SAR(10 g) = 0.184 mW/g

Maximum value of SAR (measured) = 0.628 mW/g

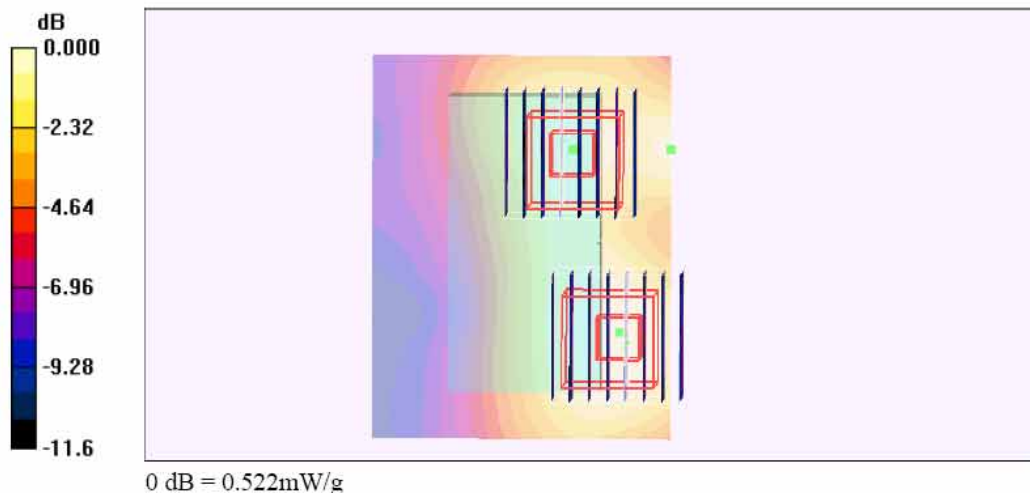
Ch151/Zoom Scan (8x8x8)/Cube 1: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.25 V/m; Power Drift = 0.167 dB

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.304 mW/g; SAR(10 g) = 0.156 mW/g

Maximum value of SAR (measured) = 0.522 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/26

Body_802.11b Ch6_NB Bottom with 0cm Gap_Ant-3_DELL D500_2D

DUT: 7D1410

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

Medium: MSL_2450 Medium parameters used: $f = 2437$ MHz; $\sigma = 1.95$ mho/m; $\epsilon_r = 53.4$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.9 °C ; Liquid Temperature : 21.5 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.02, 4.02, 4.02); Calibrated: 2007/8/28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch6/Area Scan (61x51x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.343 mW/g

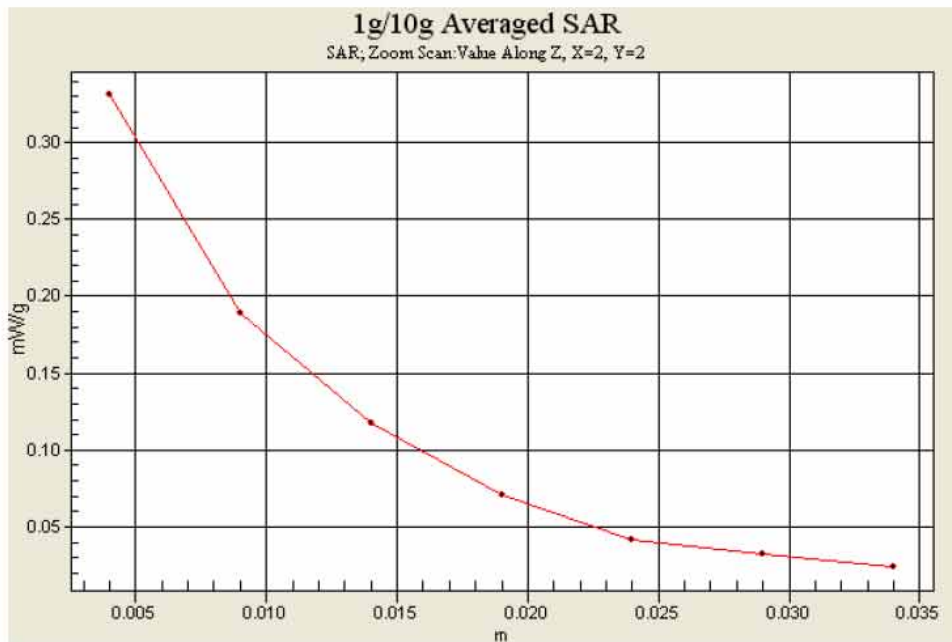
Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.2 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.595 W/kg

SAR(1 g) = 0.309 mW/g; SAR(10 g) = 0.168 mW/g

Maximum value of SAR (measured) = 0.331 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date : 2007/12/25

Body_802.11n Ch52_NB Bottom with 0cm Gap_Ant-1&3 2Tx_DELL D500_BW 20M_2D

DUT: 7D1410

Communication System: 802.11n; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5300$ MHz; $\sigma = 5.31$ mho/m; $\epsilon_r = 48.4$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.31, 4.31, 4.31); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch52/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.59 mW/g

Ch52/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 9.52 V/m; Power Drift = -0.037 dB

Peak SAR (extrapolated) = 2.79 W/kg

SAR(1 g) = 0.877 mW/g; SAR(10 g) = 0.392 mW/g

Maximum value of SAR (measured) = 1.51 mW/g

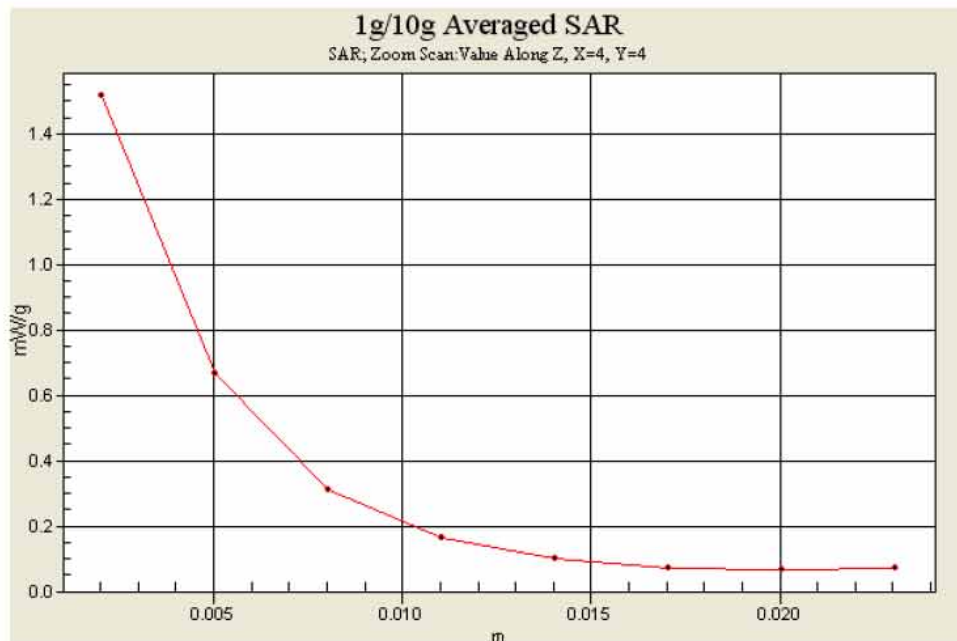
Ch52/Zoom Scan (8x8x8)/Cube 1: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 9.52 V/m; Power Drift = -0.037 dB

Peak SAR (extrapolated) = 2.78 W/kg

SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.296 mW/g

Maximum value of SAR (measured) = 1.46 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n Ch102_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 40M_DELL D500_2D

DUT: 7D1410

Communication System: 802.11n; Frequency: 5510 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5500$ MHz; $\sigma = 5.54$ mho/m; $\epsilon_r = 48.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.09, 4.09, 4.09); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch102/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.51 mW/g

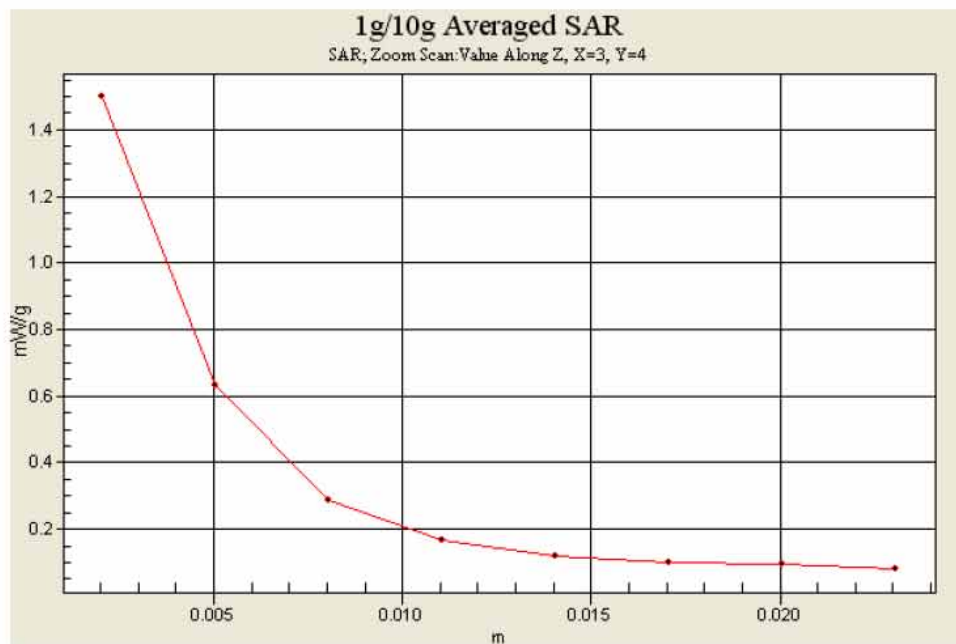
Ch102/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.52 V/m; Power Drift = 0.070 dB

Peak SAR (extrapolated) = 2.89 W/kg

SAR(1 g) = 0.852 mW/g; SAR(10 g) = 0.379 mW/g

Maximum value of SAR (measured) = 1.50 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2007/12/25

Body_802.11n Ch151_NB Bottom with 0cm Gap_Ant-1&3 2Tx_BW 40M_DELL D500_2D

DUT: 7D1410

Communication System: 802.11n; Frequency: 5755 MHz; Duty Cycle: 1:1

Medium: MSL_5G Medium parameters used: $f = 5800$ MHz; $\sigma = 5.88$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: EX3DV3 - SN3514; ConvF(4.16, 4.16, 4.16); Calibrated: 2007/2/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Ch151/Area Scan (91x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.50 mW/g

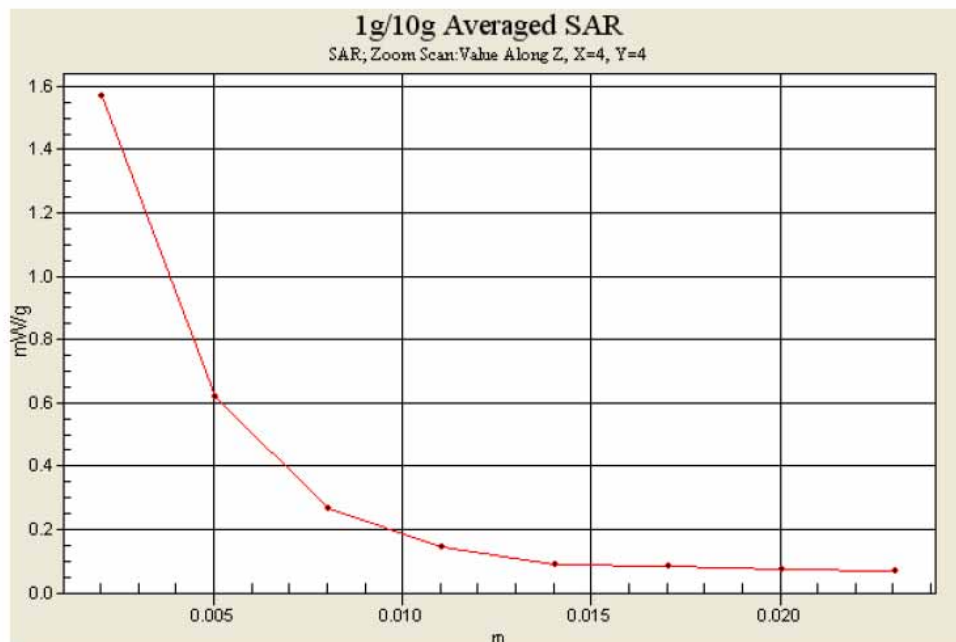
Ch151/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.34 V/m; Power Drift = -0.101 dB

Peak SAR (extrapolated) = 3.28 W/kg

SAR(1 g) = 0.881 mW/g; SAR(10 g) = 0.387 mW/g

Maximum value of SAR (measured) = 1.57 mW/g





Appendix C – Calibration Data

Calibration Laboratory of Schmid & Partner Engineering AG



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C Service suisse d'etalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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

Accreditation No.: SCS 108

Client Sporton (Auden)

Certificate No: D2450V2-736_Jul07

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 736
Calibration procedure(s): QA CAL-05.v6
Calibration procedure for dipole validation kits
Calibration date: July 12, 2007
Condition of the calibrated item: In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
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)

Table with 4 columns: Primary Standards, ID #, Cal Date (Calibrated by, Certificate No.), Scheduled Calibration. Includes items like Power meter EPM-442A, Power sensor HP 8431A, Reference 20 dB Attenuator, etc.

Calibrated by: Mike Mell, Laboratory Technician
Approved by: Katja Pokovic, Technical Manager

Issued: July 12, 2007

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

**Calibration Laboratory of
Schmid & Partner
Engineering AG**
Zeughausstrasse 43, 8004 Zurich, Switzerland



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

Accreditation No.: **SCS 108**

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) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4 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.

Measurement Conditions

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

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.6 ± 6 %	1.81 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	-----	-----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	13.3 mW / g
SAR normalized	normalized to 1W	53.2 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	52.7 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.17 mW / g
SAR normalized	normalized to 1W	24.7 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	24.5 mW / g ± 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.5 ± 8 %	1.94 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	-----	-----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR normalized	normalized to 1W	52.0 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	52.5 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	6.05 mW / g
SAR normalized	normalized to 1W	24.2 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	24.4 mW / g ± 16.5 % (k=2)

² Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	53.1 Ω + 3.0 j Ω
Return Loss	- 27.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω + 4.6 j Ω
Return Loss	- 26.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 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.

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 26, 2003

DASY4 Validation Report for Head TSL

Date/Time: 12.07.2007 11:00:03

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN736

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.81$ mho/m; $\epsilon_r = 38.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025 (HF); ConvP(4.5, 4.5, 4.5); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (float); Type: QD00P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

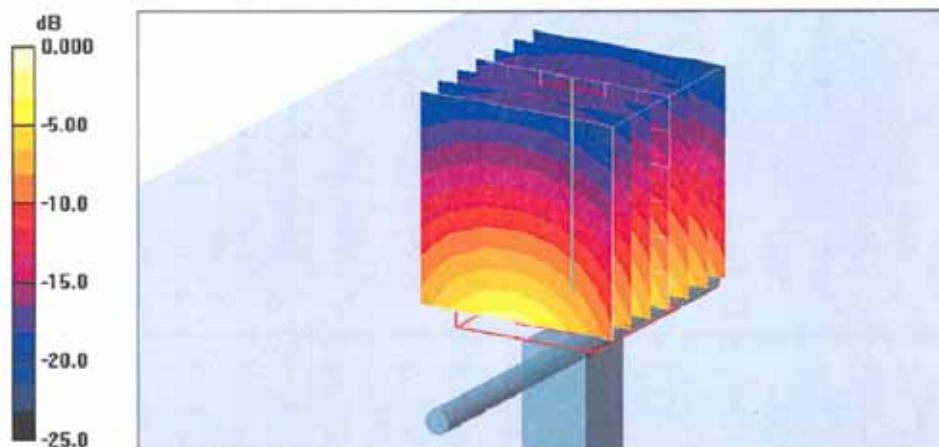
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.0 V/m; Power Drift = -0.004 dB

Peak SAR (extrapolated) = 28.1 W/kg

SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.17 mW/g

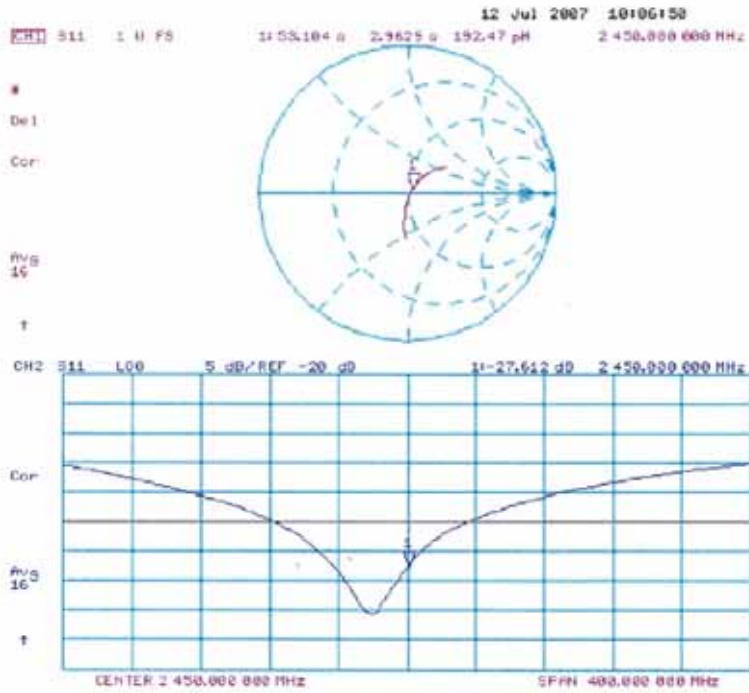
Maximum value of SAR (measured) = 15.0 mW/g



0 dB = 15.0mW/g



Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 12.07.2007 12:28:49

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN736

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: MSL U10 BB;

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.94$ mho/m; $\epsilon_r = 53.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025 (HF); ConvF(4.16, 4.16, 4.16); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

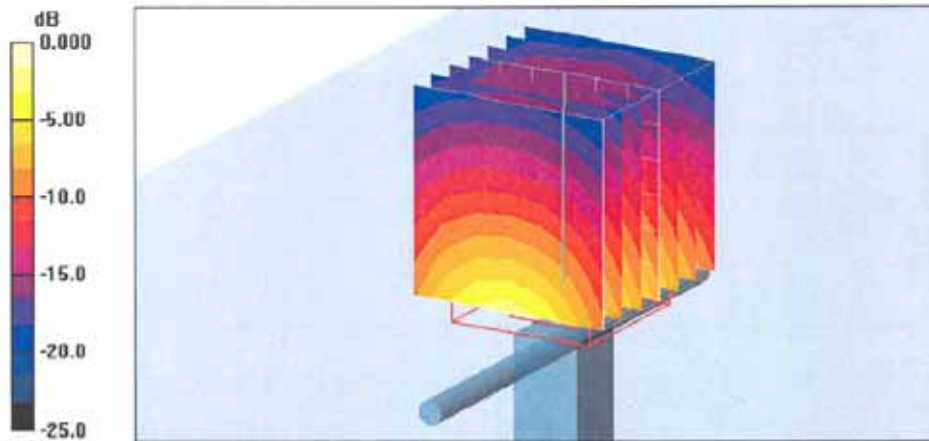
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.6 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 27.0 W/kg

SAR(1 g) = 13 mW/g; SAR(10 g) = 6.05 mW/g

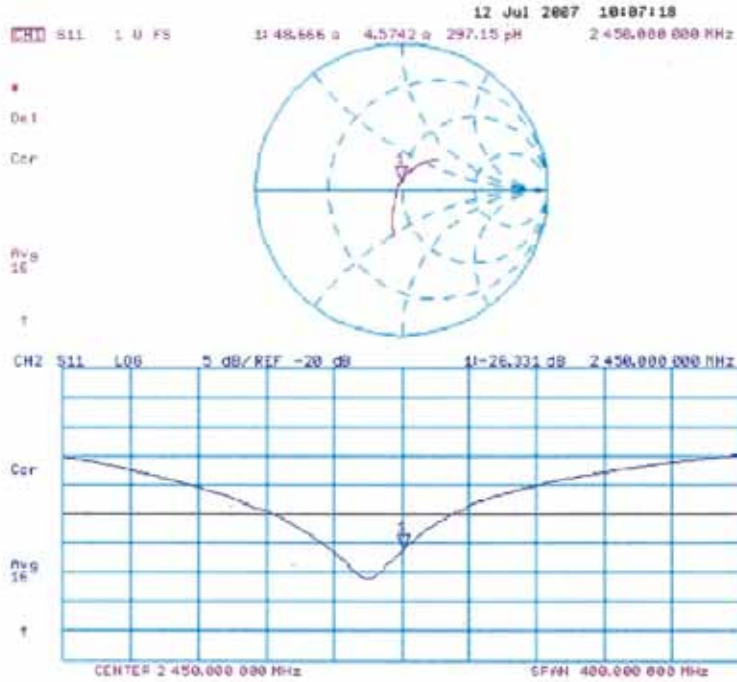
Maximum value of SAR (measured) = 14.8 mW/g



0 dB = 14.8mW/g



Impedance Measurement Plot for Body TSL





Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: SCS 108

Client Sporton (Autoren)

Certificate No: DAE4-778_Sep07

CALIBRATION CERTIFICATE

Object: DAE4 - SD 000 D04 BG - SN: 778
Calibration procedure(s): QA CAL-06.v12 Calibration procedure for the data acquisition electronics (DAE)
Calibration date: September 17, 2007
Condition of the calibrated item: In Tolerance

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)

Table with 4 columns: Primary Standards, ID #, Cal Date (Calibrated by, Certificate No.), Scheduled Calibration. Includes entries for Fluke Process Calibrator Type 702 and Keithley Multimeter Type 2001.

Table with 4 columns: Secondary Standards, ID #, Check Date (in house), Scheduled Check. Includes entry for Calibrator Box V1.1.

Calibrated by: Dominique Steffen, Technician
Approved by: Fin Bornholt, R&D Director

Signatures of Dominique Steffen and Fin Bornholt

Issued: September 17, 2007

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

**Calibration Laboratory of
Schmid & Partner
Engineering AG**
Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: **SCS 108**

Glossary

DAE data acquisition electronics
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- **DC Voltage Measurement:** Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- **Connector angle:** The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters contain technical information as a result from the performance test and require no uncertainty.
- **DC Voltage Measurement Linearity:** Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
- **Common mode sensitivity:** Influence of a positive or negative common mode voltage on the differential measurement.
- **Channel separation:** Influence of a voltage on the neighbor channels not subject to an input voltage.
- **AD Converter Values with inputs shorted:** Values on the internal AD converter corresponding to zero input voltage
- **Input Offset Measurement:** Output voltage and statistical results over a large number of zero voltage measurements.
- **Input Offset Current:** Typical value for information; Maximum channel input offset current, not considering the input resistance.
- **Input resistance:** DAE input resistance at the connector, during internal auto-zeroing and during measurement.
- **Low Battery Alarm Voltage:** Typical value for information. Below this voltage, a battery alarm signal is generated.
- **Power consumption:** Typical value for information. Supply currents in various operating modes.



DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1µV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.715 ± 0.1% (k=2)	403.520 ± 0.1% (k=2)	405.065 ± 0.1% (k=2)
Low Range	3.99539 ± 0.7% (k=2)	3.96323 ± 0.7% (k=2)	3.97102 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	309 ° ± 1 °
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Appendix
1. DC Voltage Linearity

High Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	200000	199999.5	0.00
Channel X + Input	20000	20004.41	0.02
Channel X - Input	20000	-20002.56	0.01
Channel Y + Input	200000	200000.3	0.00
Channel Y + Input	20000	20003.67	0.02
Channel Y - Input	20000	-20003.41	0.02
Channel Z + Input	200000	200000.3	0.00
Channel Z + Input	20000	20002.49	0.01
Channel Z - Input	20000	-20006.25	0.03

Low Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	2000	1999.9	0.00
Channel X + Input	200	199.47	-0.26
Channel X - Input	200	-200.56	0.28
Channel Y + Input	2000	2000.1	0.00
Channel Y + Input	200	199.15	-0.43
Channel Y - Input	200	-200.77	0.39
Channel Z + Input	2000	2000	0.00
Channel Z + Input	200	199.22	-0.39
Channel Z - Input	200	-201.39	0.69

2. Common mode sensitivity

DASYS measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-6.00	-6.42
	- 200	7.17	6.60
Channel Y	200	-2.49	-2.64
	- 200	2.04	1.25
Channel Z	200	-10.83	-10.80
	- 200	9.19	8.80

3. Channel separation

DASYS measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.57	0.15
Channel Y	200	0.11	-	4.08
Channel Z	200	-1.80	1.03	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16068	16321
Channel Y	16180	16239
Channel Z	16405	16167

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

 Input 10M Ω

	Average (μ V)	min. Offset (μ V)	max. Offset (μ V)	Std. Deviation (μ V)
Channel X	-0.14	-1.23	0.61	0.34
Channel Y	-0.85	-2.24	0.48	0.49
Channel Z	-1.24	-2.43	0.38	0.51

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2000	201.7
Channel Y	0.2000	201.7
Channel Z	0.1999	202.5

8. Low Battery Alarm Voltage (verified during pre test)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	-0.01	-8	-9