Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/4/1

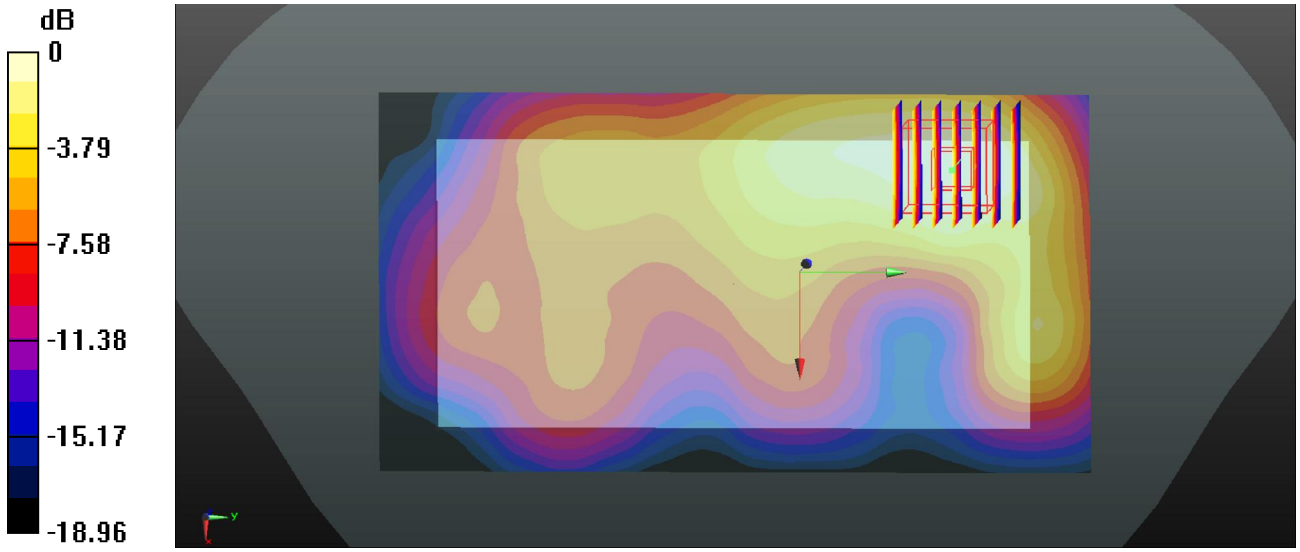
25_WLAN2.4GHz_802.11b 1Mbps_Front_10mm_Ch1

Communication System: UID 0, 802.11b (0); Frequency: 2412 MHz;Duty Cycle: 1:1.025
Medium: MSL_2450_2017/04/01 Medium parameters used: f = 2412 MHz; σ = 1.897 S/m; ε_r = 51.267; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.89, 7.89, 7.89); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch1/Area Scan (81x151x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.227 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.035 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.243 W/kg
SAR(1 g) = 0.129 W/kg; SAR(10 g) = 0.070 W/kg
Maximum value of SAR (measured) = 0.199 W/kg



0 dB = 0.199 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/4/7

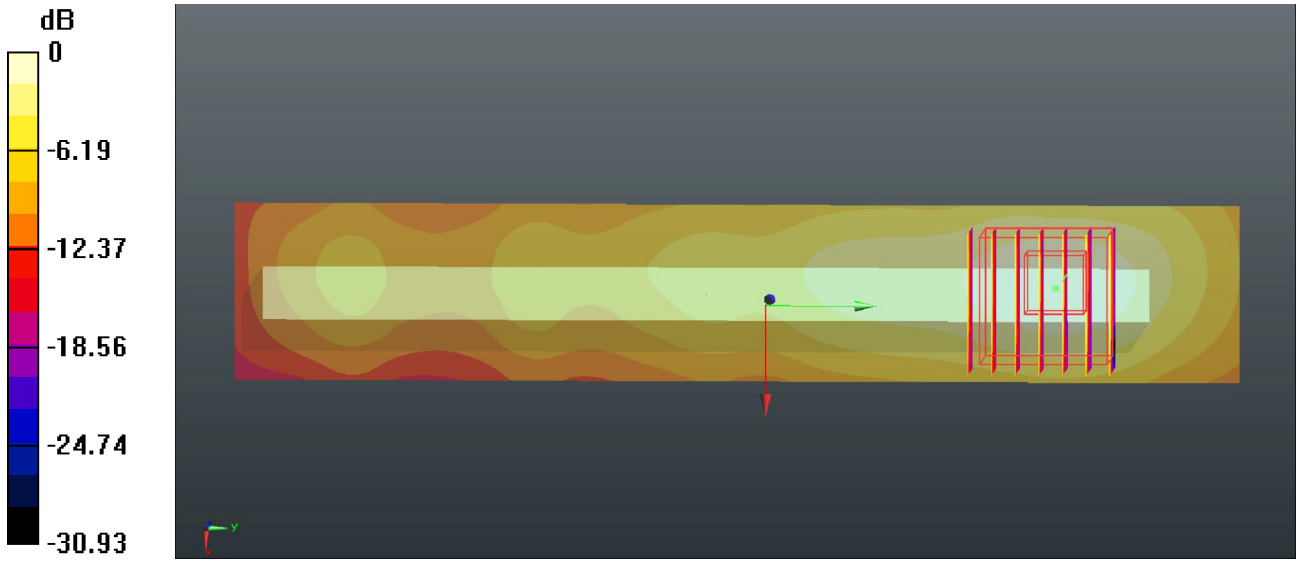
26_WLAN5.2GHz_802.11a 6Mbps_Left side_10mm_Ch40_OFF_#2

Communication System: UID 0, 802.11a (0); Frequency: 5200 MHz;Duty Cycle: 1:1.145
Medium: MSL_5G_2017/04/07 Medium parameters used: f = 5200 MHz; σ = 5.246 S/m; ε_r = 47.41; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(4.84, 4.84, 4.84); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch40/Area Scan (31x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.437 W/kg

Ch40/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 3.585 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.742 W/kg
SAR(1 g) = 0.195 W/kg; SAR(10 g) = 0.074 W/kg
Maximum value of SAR (measured) = 0.437 W/kg



0 dB = 0.437 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/4/7

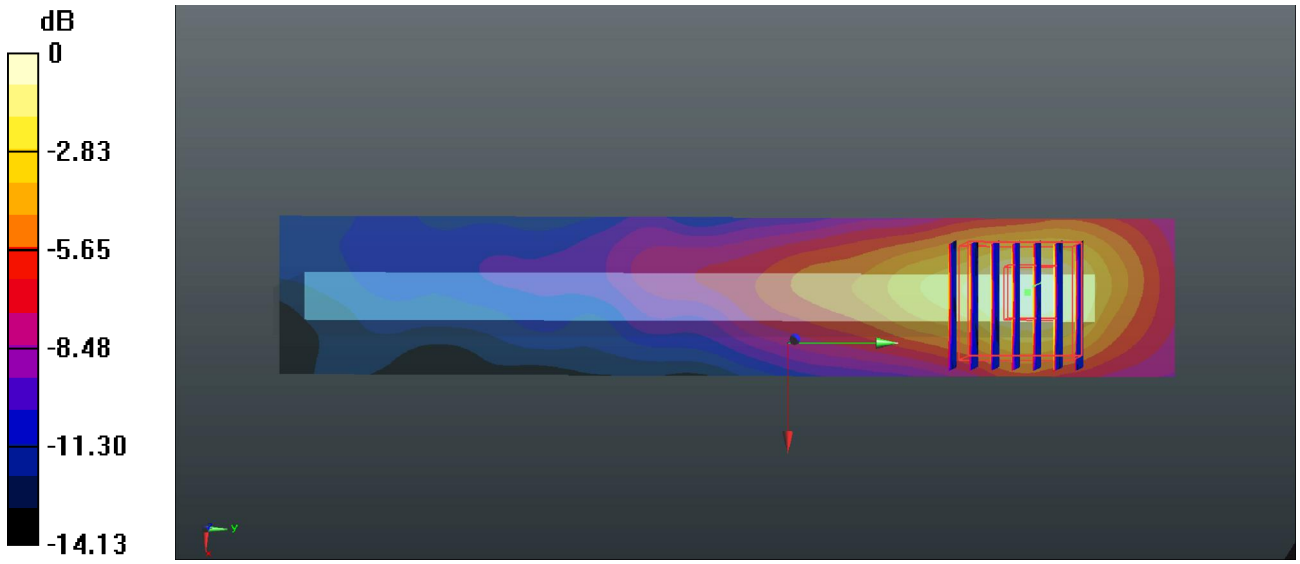
27_WLAN5.8GHz_802.11a 6Mbps_Left side_10mm_Ch149_OFF

Communication System: UID 0, 802.11a (0); Frequency: 5745 MHz;Duty Cycle: 1:1.145
Medium: MSL_5G_2017/04/07 Medium parameters used: f = 5745 MHz; σ = 5.993 S/m; ε_r = 46.687; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(4.23, 4.23, 4.23); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch149/Area Scan (31x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.175 W/kg

Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.746 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.326 W/kg
SAR(1 g) = 0.083 W/kg; SAR(10 g) = 0.036 W/kg
Maximum value of SAR (measured) = 0.185 W/kg



0 dB = 0.185 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/3/15

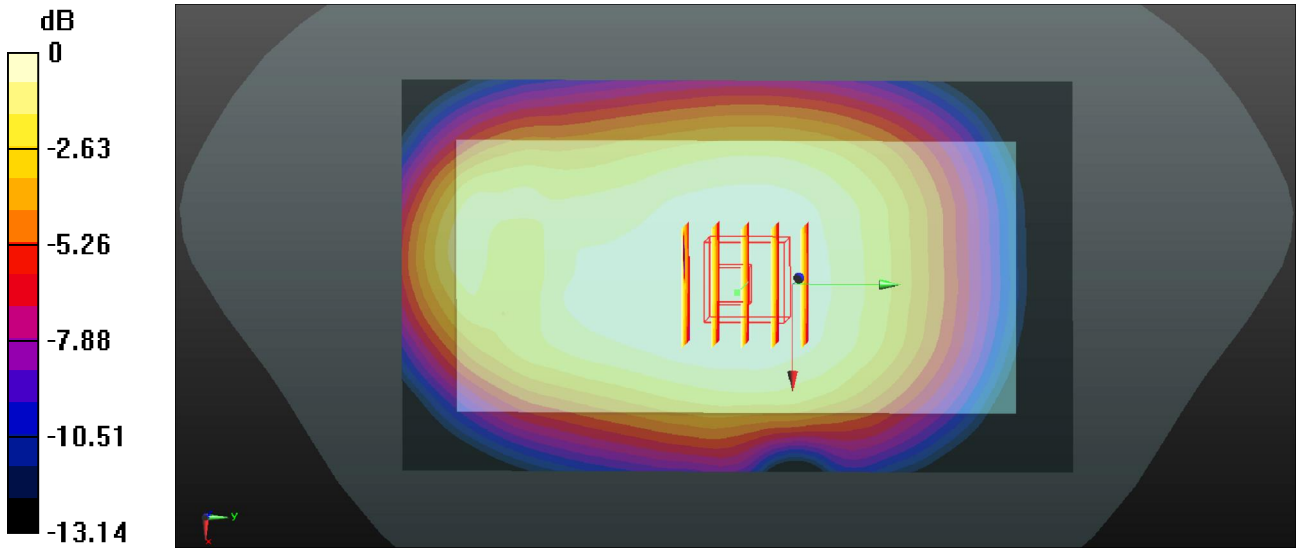
28_GSM850_GPRS(4 Tx slots)_Back_10mm_Ch251_OFF

Communication System: UID 0, GPRS (GMSK 4 Tx slot) (0); Frequency: 848.8 MHz;Duty Cycle: 1:2.08
Medium: MSL_835_2017/03/15 Medium parameters used: f = 848.8 MHz; σ = 0.997 S/m; ε_r = 56.471;ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.48, 10.48, 10.48); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.555 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.52 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.597 W/kg
SAR(1 g) = 0.457 W/kg; SAR(10 g) = 0.348 W/kg
Maximum value of SAR (measured) = 0.547 W/kg



0 dB = 0.547 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/3/25

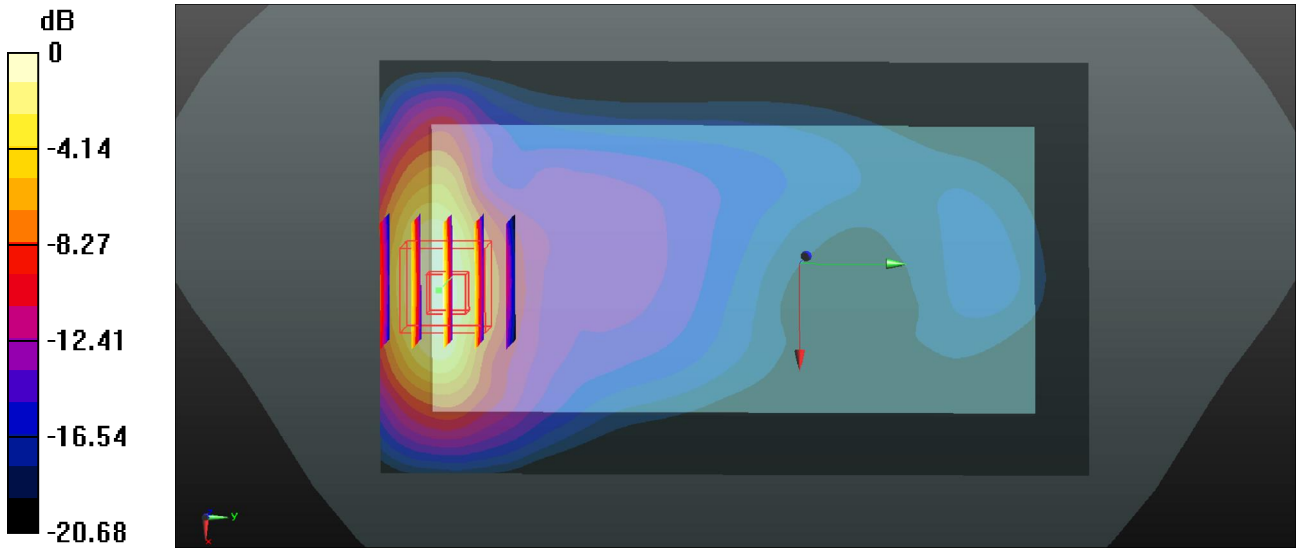
29_GSM1900_GPRS(1 Tx slot)_Back_10mm_Ch810_ON

Communication System: UID 0, GPRS (GMSK 1 Tx slot) (0); Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: MSL_1900_2017/03/25 Medium parameters used: f = 1909.8 MHz; σ = 1.591 S/m; ε_r = 53.81; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃; Liquid Temperature ：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.18, 8.18, 8.18); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch810/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.713 W/kg

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.097 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.947 W/kg
SAR(1 g) = 0.510 W/kg; SAR(10 g) = 0.254 W/kg
Maximum value of SAR (measured) = 0.742 W/kg



0 dB = 0.742 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/3/15

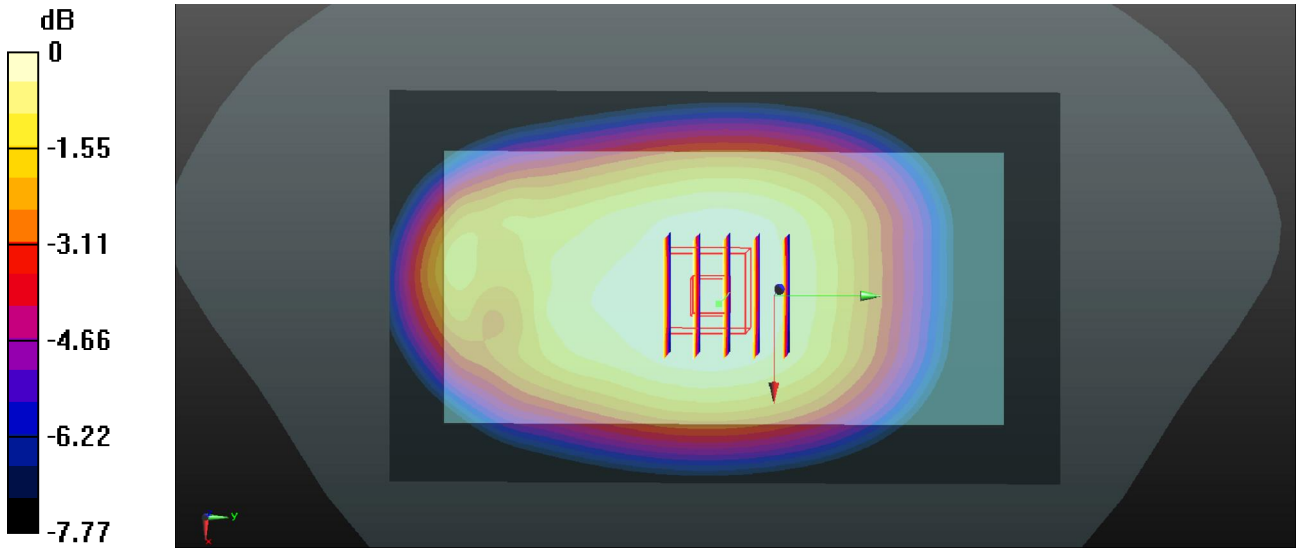
30_WCDMA Band V_RMC 12.2Kbps_Back_10mm_Ch4132_OFF

Communication System: UID 0, WCDMA (0); Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: MSL_835_2017/03/15 Medium parameters used: f = 826.4 MHz; σ = 0.974 S/m; ε_r = 56.616; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.48, 10.48, 10.48); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch4132/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.771 W/kg

Ch4132/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.90 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.840 W/kg
SAR(1 g) = 0.641 W/kg; SAR(10 g) = 0.500 W/kg
Maximum value of SAR (measured) = 0.768 W/kg



0 dB = 0.768 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/3/27

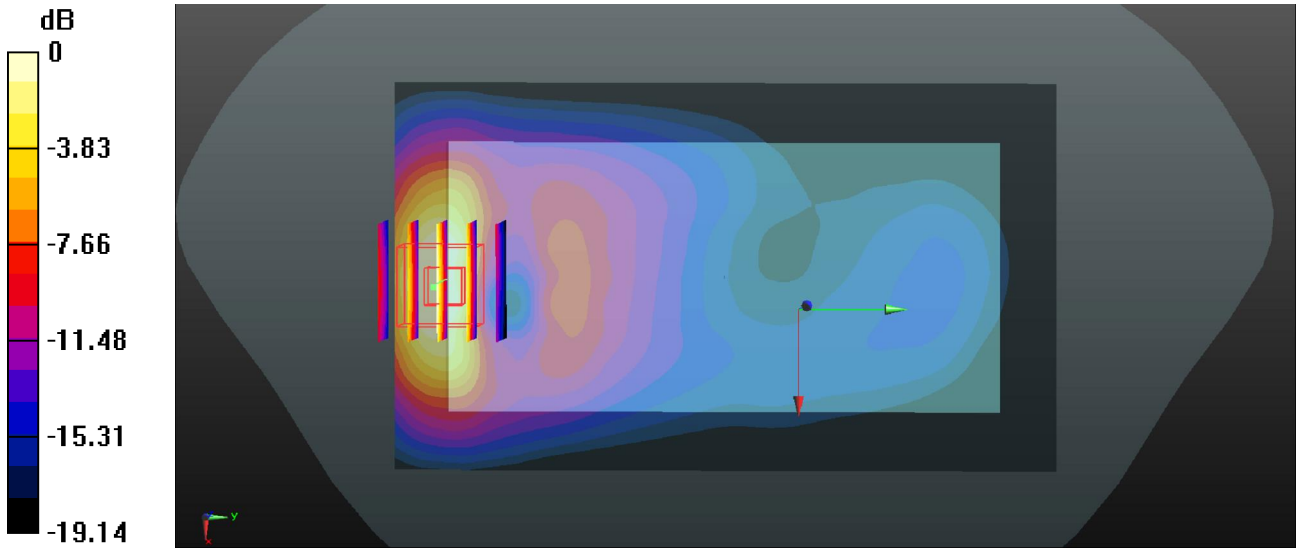
31_WCDMA Band IV_RMC 12.2Kbps_Back_10mm_Ch1312_ON

Communication System: UID 0, WCDMA (0); Frequency: 1712.4 MHz;Duty Cycle: 1:1
Medium: MSL_1750_2017/03/27 Medium parameters used: f = 1712.4 MHz; σ = 1.452 S/m; ε_r = 53.496; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃; Liquid Temperature ：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.46, 8.46, 8.46); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch1312/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.990 W/kg

Ch1312/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.274 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.593 W/kg; SAR(10 g) = 0.293 W/kg
Maximum value of SAR (measured) = 0.806 W/kg



0 dB = 0.806 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/3/25

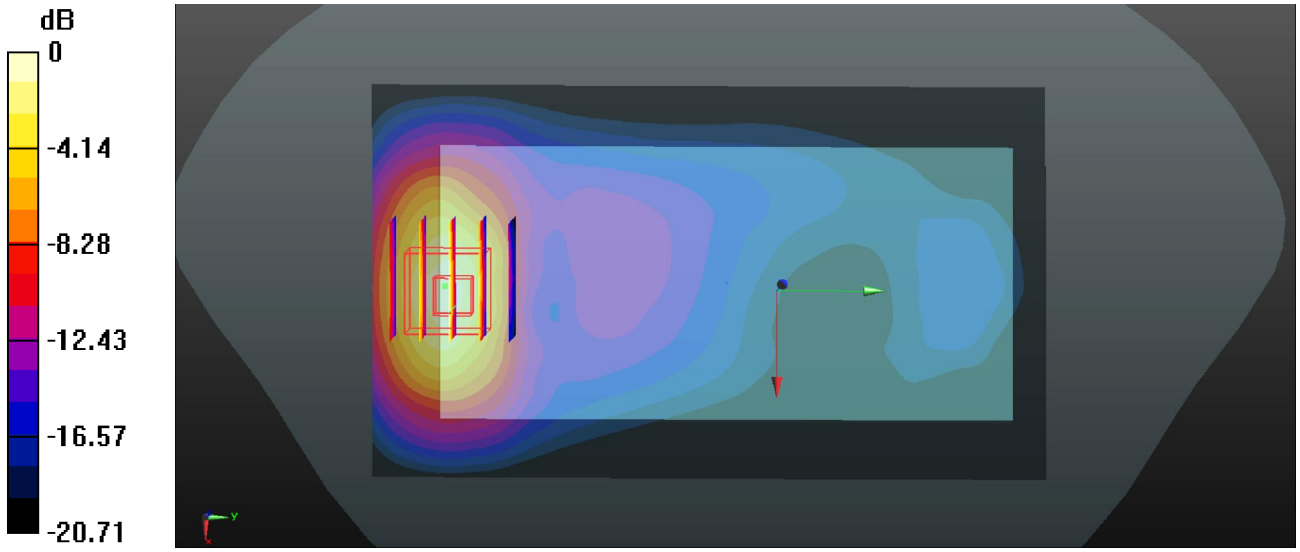
32_WCDMA Band II_RMC 12.2Kbps_Back_10mm_Ch9538_ON

Communication System: UID 0, WCDMA (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL_1900_2017/03/25 Medium parameters used: f = 1907.6 MHz; σ = 1.589 S/m; ε_r =53.818; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃; Liquid Temperature ：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.18, 8.18, 8.18); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch9538/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.848 W/kg

Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.430 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.652 W/kg; SAR(10 g) = 0.328 W/kg
Maximum value of SAR (measured) = 0.955 W/kg



0 dB = 0.955 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/3/15

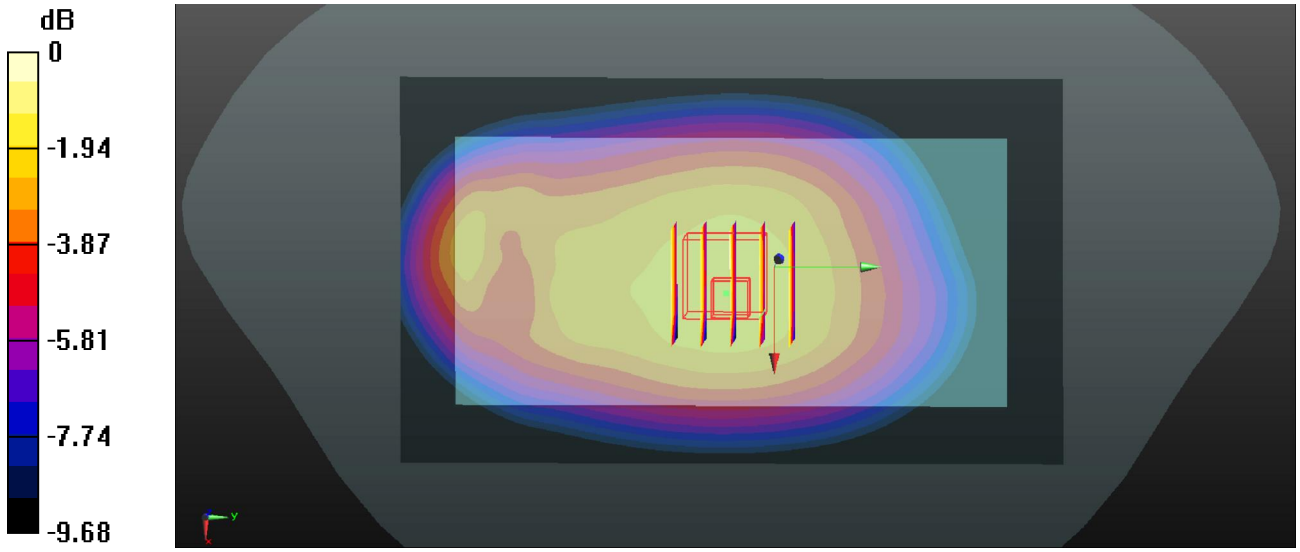
33_LTE Band 5_10M_QPSK_1RB_25offset_Back_10mm_Ch20525_OFF

Communication System: UID 0, FDD-LTE (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: MSL_835_2017/03/15 Medium parameters used: f = 836.5 MHz; σ = 0.984 S/m; ε_r = 56.549; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.48, 10.48, 10.48); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20525/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.602 W/kg

Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.26 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.754 W/kg
SAR(1 g) = 0.542 W/kg; SAR(10 g) = 0.413 W/kg
Maximum value of SAR (measured) = 0.659 W/kg



0 dB = 0.659 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/3/27

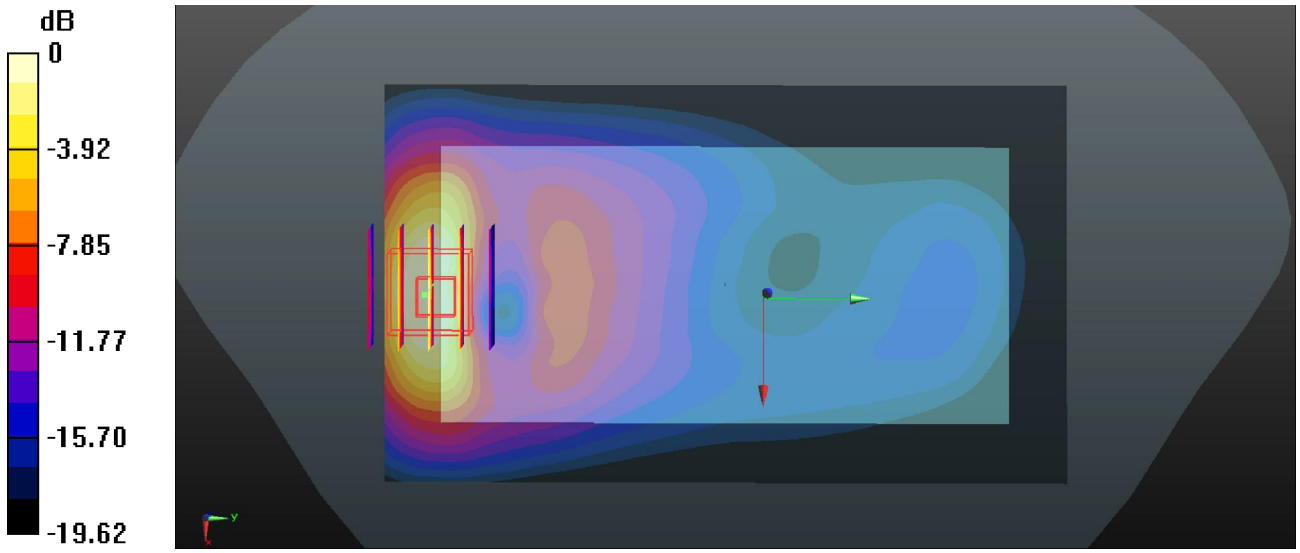
34_LTE Band 4_20M_QPSK_1RB_49offset_Back_10mm_Ch20175_ON

Communication System: UID 0, FDD-LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: MSL_1750_2017/03/27 Medium parameters used: f = 1732.5 MHz; σ = 1.473 S/m; ε_r = 53.437; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃; Liquid Temperature ：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.46, 8.46, 8.46); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch20175/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.09 W/kg

Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.298 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.653 W/kg; SAR(10 g) = 0.323 W/kg
Maximum value of SAR (measured) = 0.884 W/kg



0 dB = 0.884 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/3/25

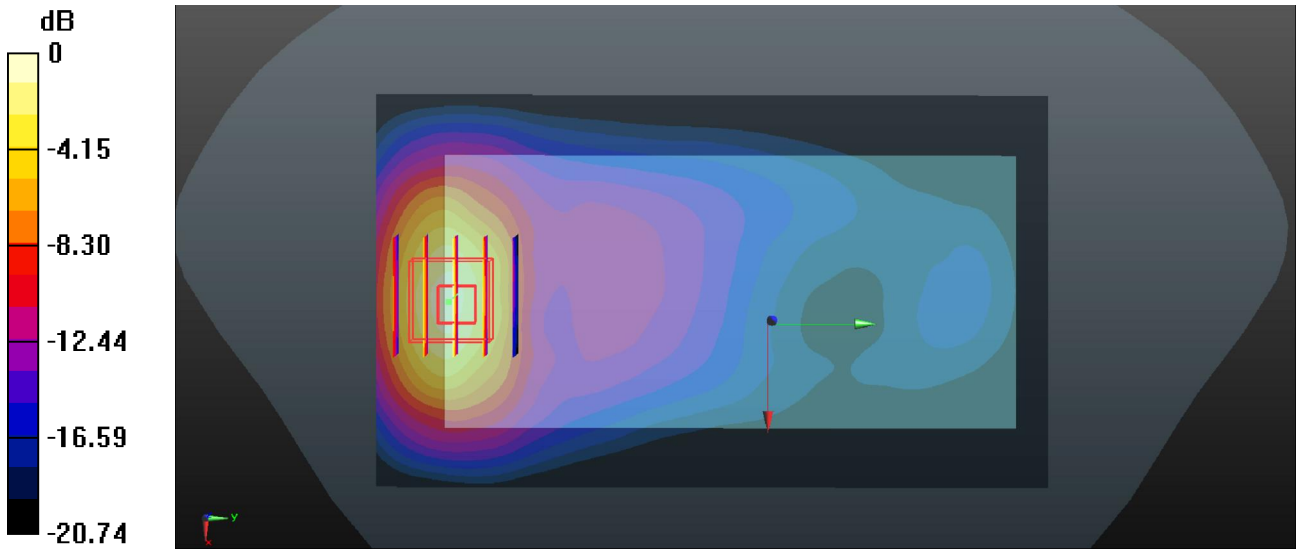
35_LTE Band 2_20M_QPSK_50RB_0offset_Back_10mm_Ch18900_ON

Communication System: UID 0, FDD-LTE (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_2017/03/25 Medium parameters used: f = 1880 MHz; σ = 1.557 S/m; ε_r = 53.912; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃; Liquid Temperature ：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.18, 8.18, 8.18); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch18900/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.749 W/kg

Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.731 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.597 W/kg; SAR(10 g) = 0.301 W/kg
Maximum value of SAR (measured) = 0.880 W/kg



0 dB = 0.880 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/3/27

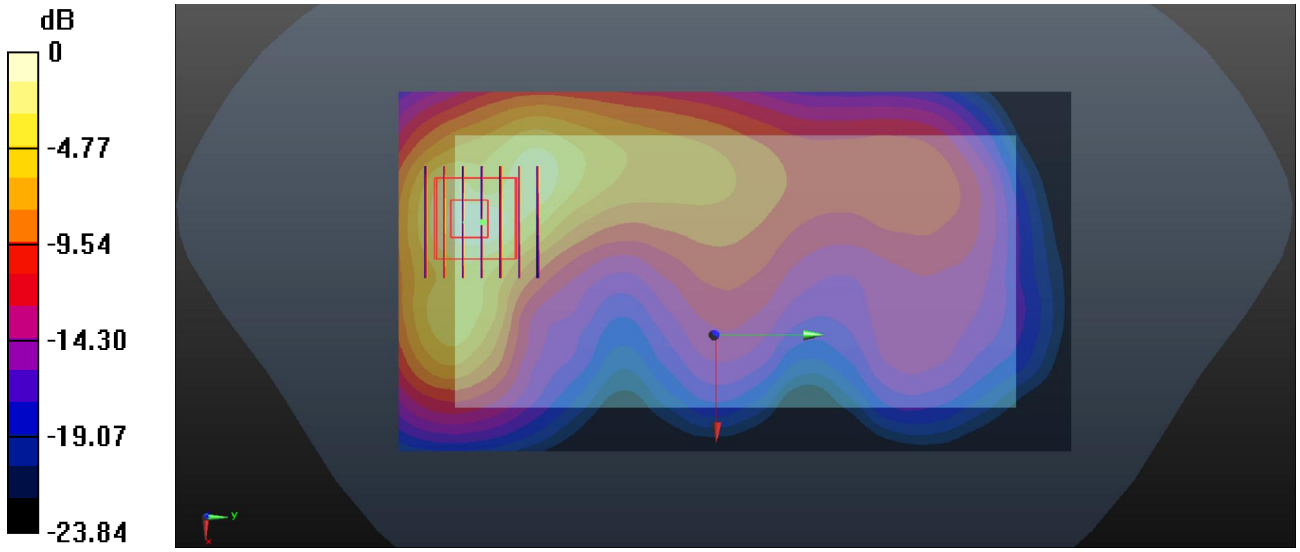
36_LTE Band 7_20M_QPSK_1RB_49offset_Back_10mm_Ch21350_ON

Communication System: UID 0, FDD-LTE (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium: MSL_2600_2017/03/27 Medium parameters used: f = 2560 MHz; σ = 2.16 S/m; ε_r = 53.416; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.67, 7.67, 7.67); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch21350/Area Scan (81x151x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.30 W/kg

Ch21350/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.315 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.90 W/kg
SAR(1 g) = 0.796 W/kg; SAR(10 g) = 0.348 W/kg
Maximum value of SAR (measured) = 1.40 W/kg



0 dB = 1.40 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/4/7

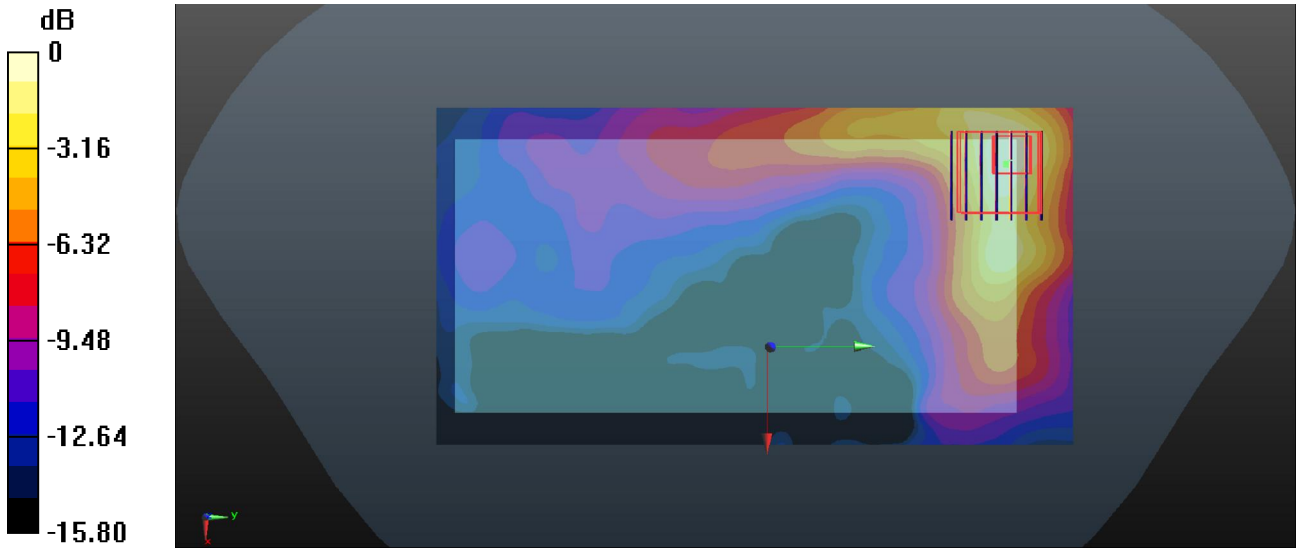
37_WLAN5.3GHz_802.11a 6Mbps_Front_10mm_Ch64_OFF

Communication System: UID 0, 802.11a (0); Frequency: 5320 MHz;Duty Cycle: 1:1.145
Medium: MSL_5G_2017/04/07 Medium parameters used: f = 5320 MHz; σ = 5.426 S/m; ε_r = 47.226; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(4.84, 4.84, 4.84); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch64/Area Scan (91x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.256 W/kg

Ch64/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.234 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.513 W/kg
SAR(1 g) = 0.117 W/kg; SAR(10 g) = 0.047 W/kg
Maximum value of SAR (measured) = 0.273 W/kg



0 dB = 0.273 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/4/7

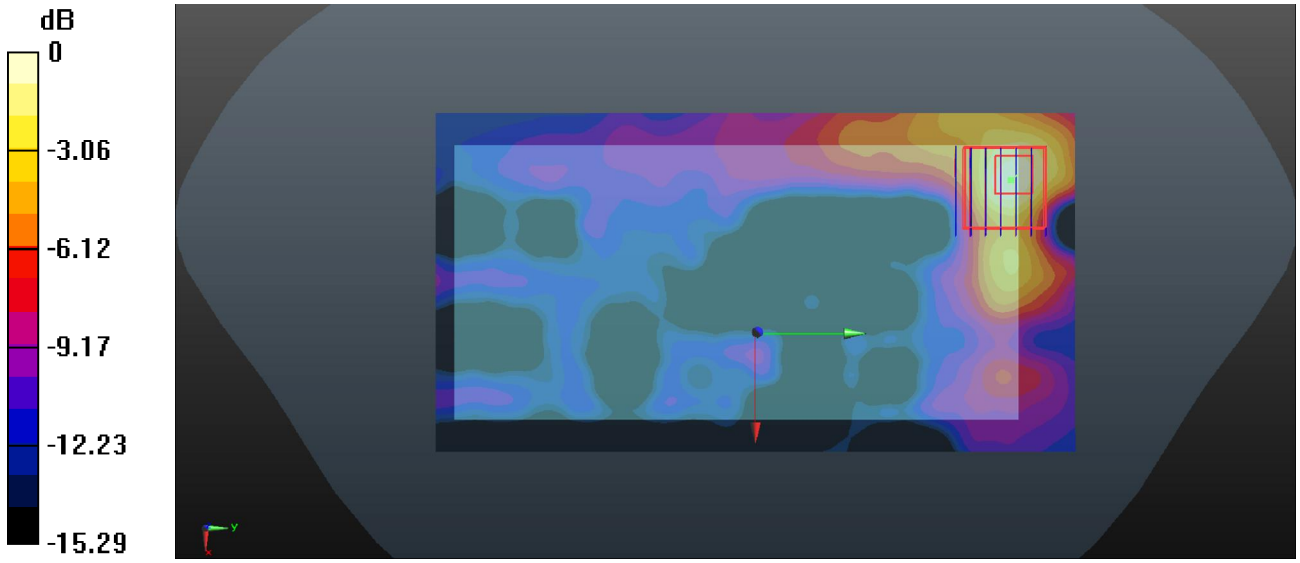
38_WLAN5.5GHz_802.11a 6Mbps_Front_10mm_Ch124_OFF

Communication System: UID 0, 802.11a (0); Frequency: 5620 MHz;Duty Cycle: 1:1.145
Medium: MSL_5G_2017/04/07 Medium parameters used: f = 5620 MHz; σ = 5.799 S/m; ε_r = 46.784; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(4, 4, 4); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch124/Area Scan (91x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.182 W/kg

Ch124/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.424 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.336 W/kg
SAR(1 g) = 0.079 W/kg; SAR(10 g) = 0.030 W/kg
Maximum value of SAR (measured) = 0.183 W/kg



0 dB = 0.183 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/4/7

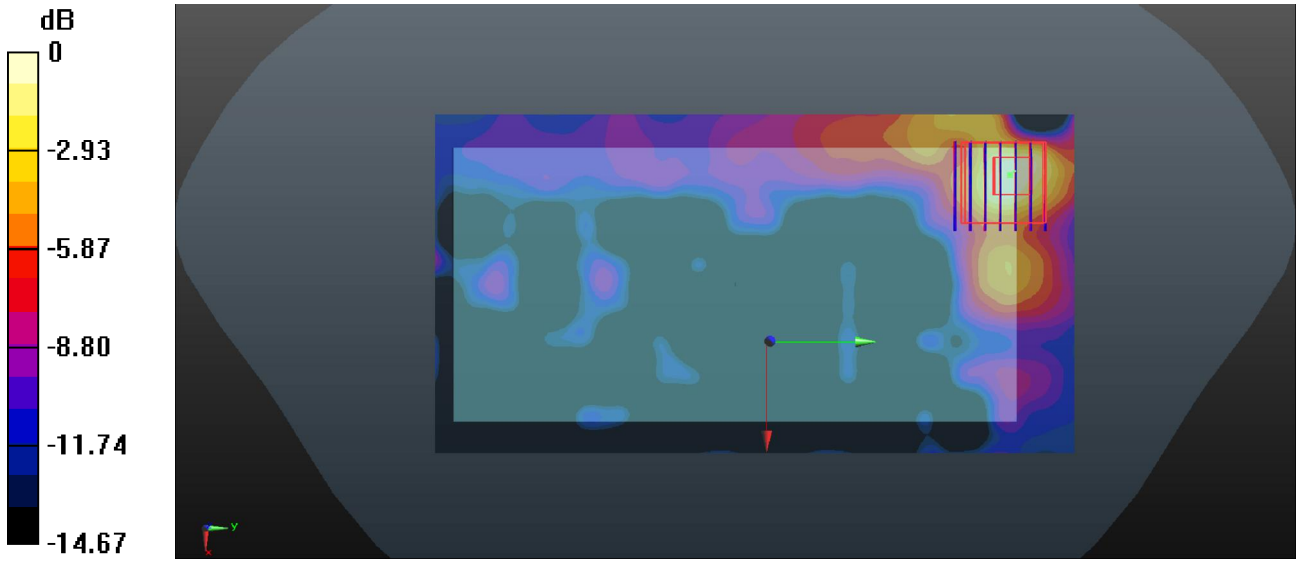
39_WLAN5.8GHz_802.11a 6Mbps_Front_10mm_Ch149_OFF

Communication System: UID 0, 802.11a (0); Frequency: 5745 MHz;Duty Cycle: 1:1.145
Medium: MSL_5G_2017/04/07 Medium parameters used: f = 5745 MHz; σ = 5.993 S/m; ε_r = 46.687; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(4.23, 4.23, 4.23); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch149/Area Scan (91x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.151 W/kg

Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.165 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.060 W/kg; SAR(10 g) = 0.025 W/kg
Maximum value of SAR (measured) = 0.137 W/kg



0 dB = 0.137 W/kg

Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **Auden**

Certificate No: D750V3-1078_Jun16

CALIBRATION CERTIFICATE

Object	D750V3 - SN:1078
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	June 22, 2016

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 27, 2016

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

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 1528-2013, "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
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) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.3 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.18 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.39 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.6 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.20 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.63 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.67 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.5 Ω - 0.7 jΩ
Return Loss	- 27.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.9 Ω - 2.9 jΩ
Return Loss	- 30.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.034 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 15, 2012

DASY5 Validation Report for Head TSL

Date: 22.06.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1078

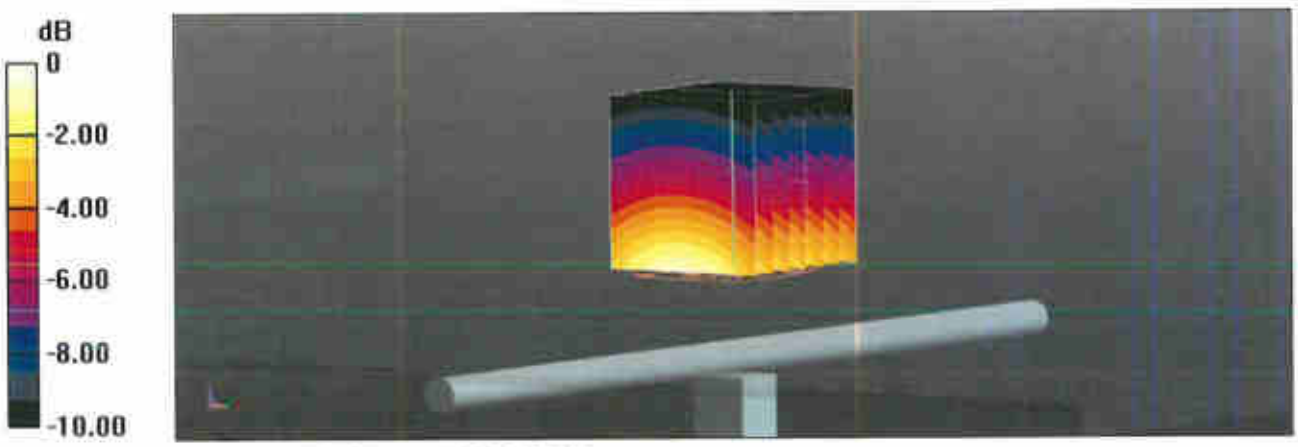
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.9 S/m; ε_r = 41.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.17, 10.17, 10.17); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

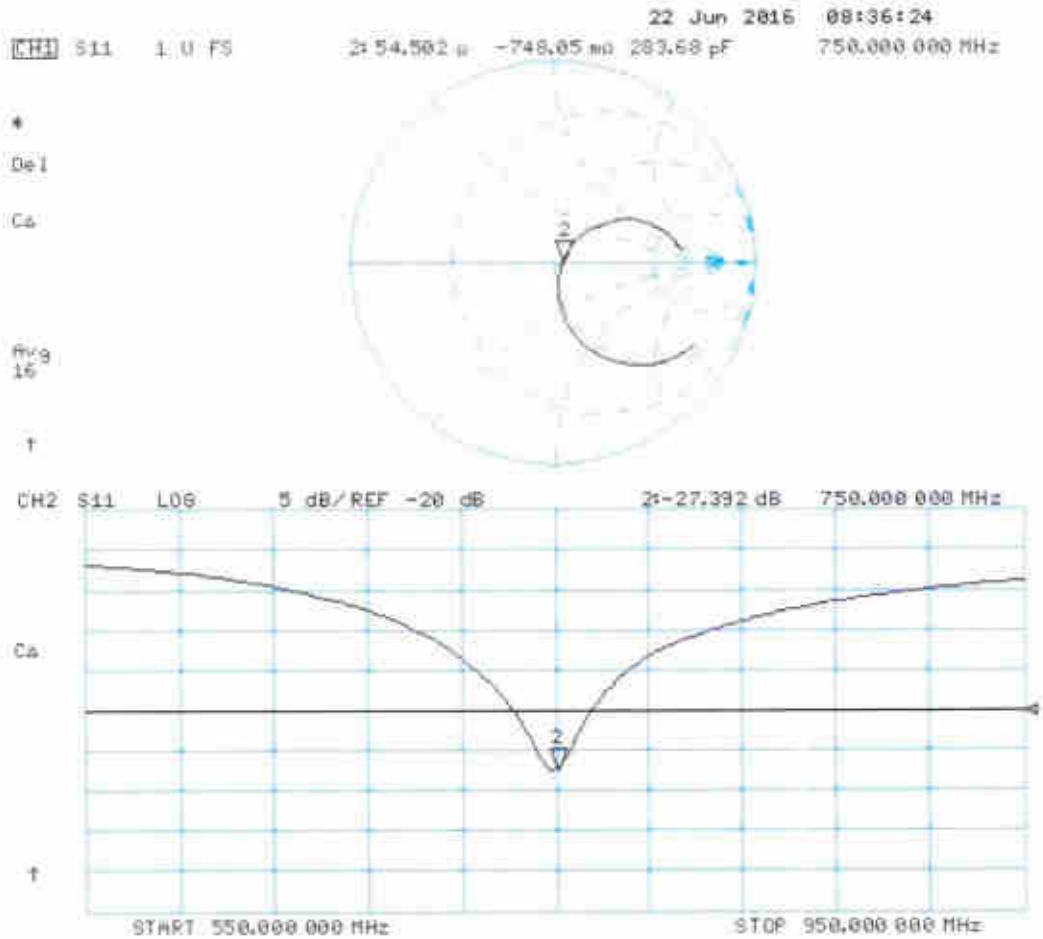
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.85 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.07 W/kg
SAR(1 g) = 2.07 W/kg; SAR(10 g) = 1.36 W/kg
Maximum value of SAR (measured) = 2.73 W/kg



0 dB = 2.73 W/kg = 4.36 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.06.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1078

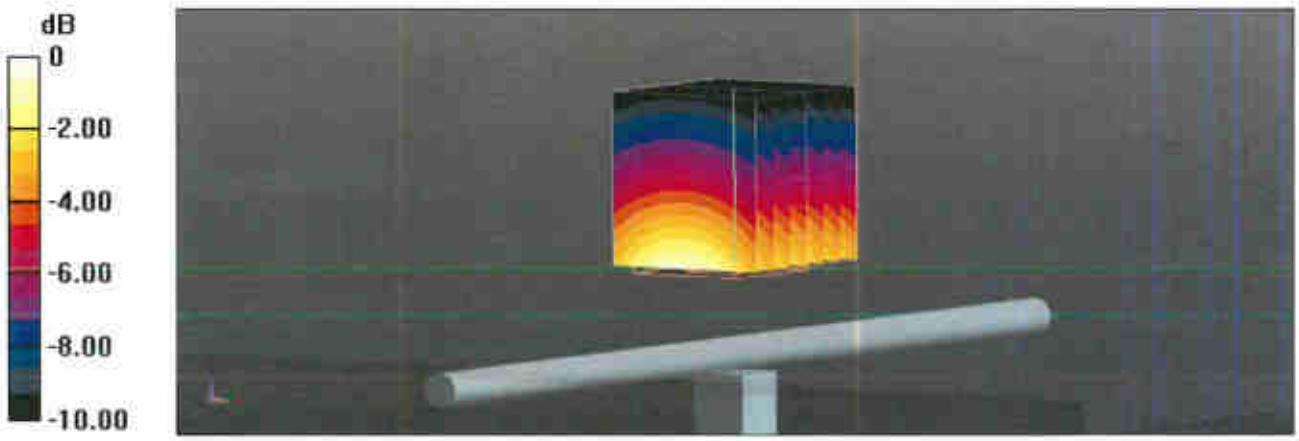
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.98 S/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

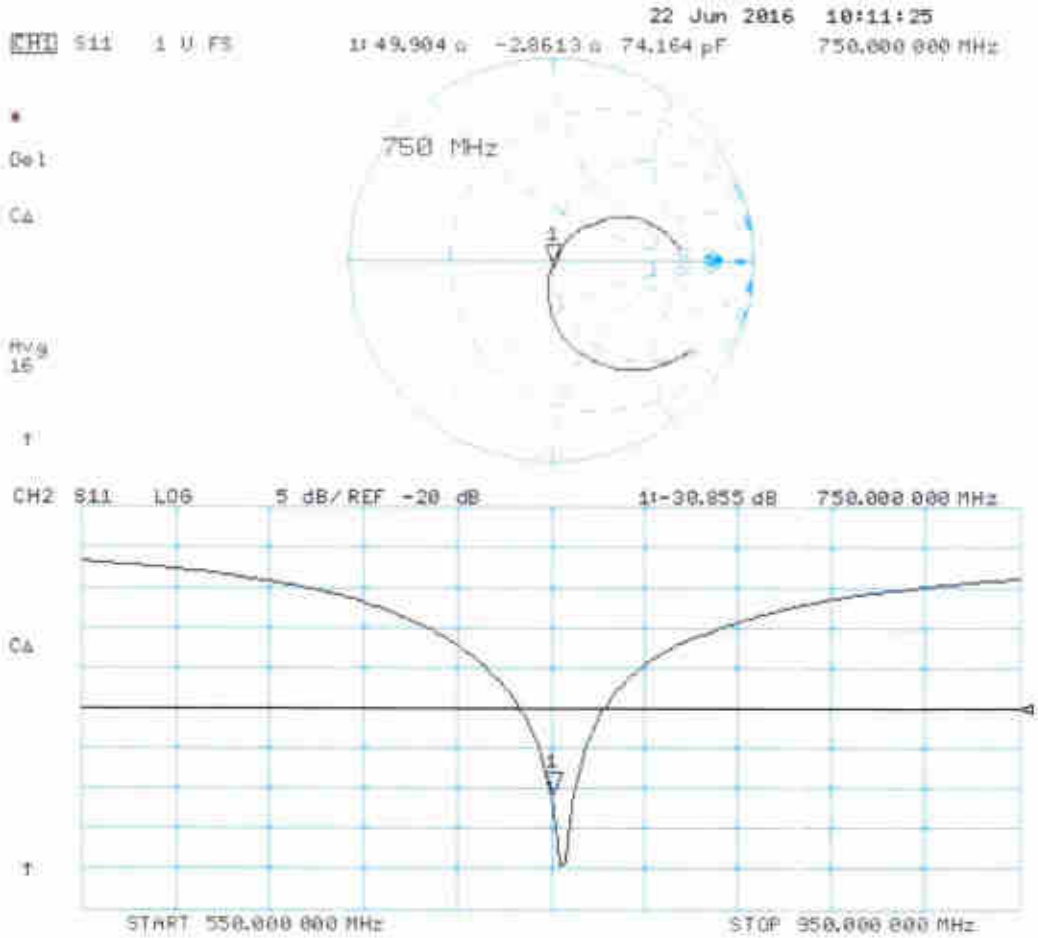
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.86 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.26 W/kg
SAR(1 g) = 2.2 W/kg; SAR(10 g) = 1.44 W/kg
Maximum value of SAR (measured) = 2.91 W/kg



0 dB = 2.91 W/kg = 4.64 dBW/kg

Impedance Measurement Plot for Body TSL



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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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 0108

Client **Auden**

Certificate No: D835V2-4d120_Jun16

CALIBRATION CERTIFICATE

Object	D835V2 - SN:4d120
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	June 22, 2016

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 27, 2016

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

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 1528-2013, "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
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) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 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	41.0 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.42 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.11 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.4 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.52 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.23 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω - 4.1 jΩ
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6 Ω - 6.5 jΩ
Return Loss	- 22.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.397 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 29, 2010

DASY5 Validation Report for Head TSL

Date: 22.06.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d120

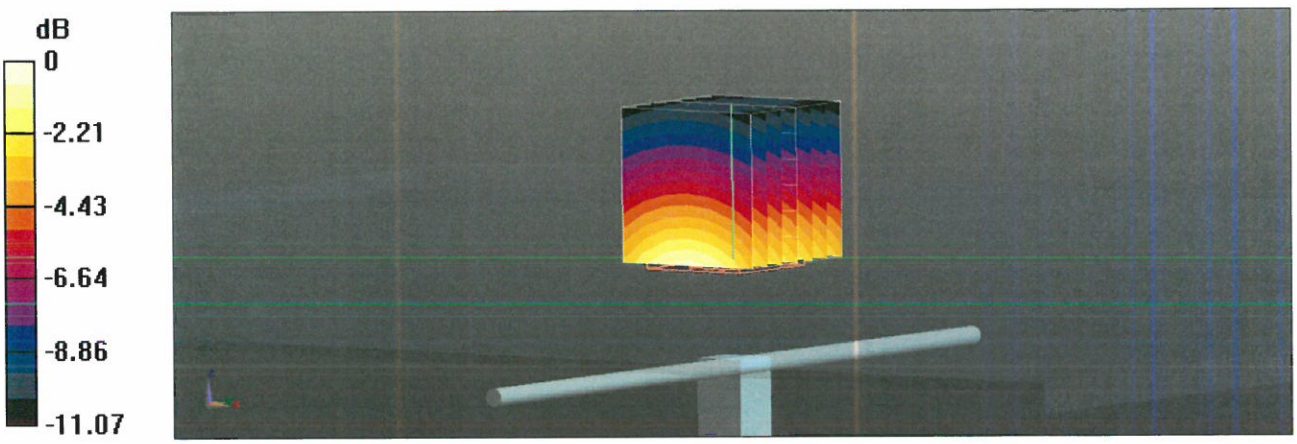
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 S/m; ε_r = 41; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.88 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.60 W/kg
SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.21 W/kg = 5.07 dBW/kg