Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/26

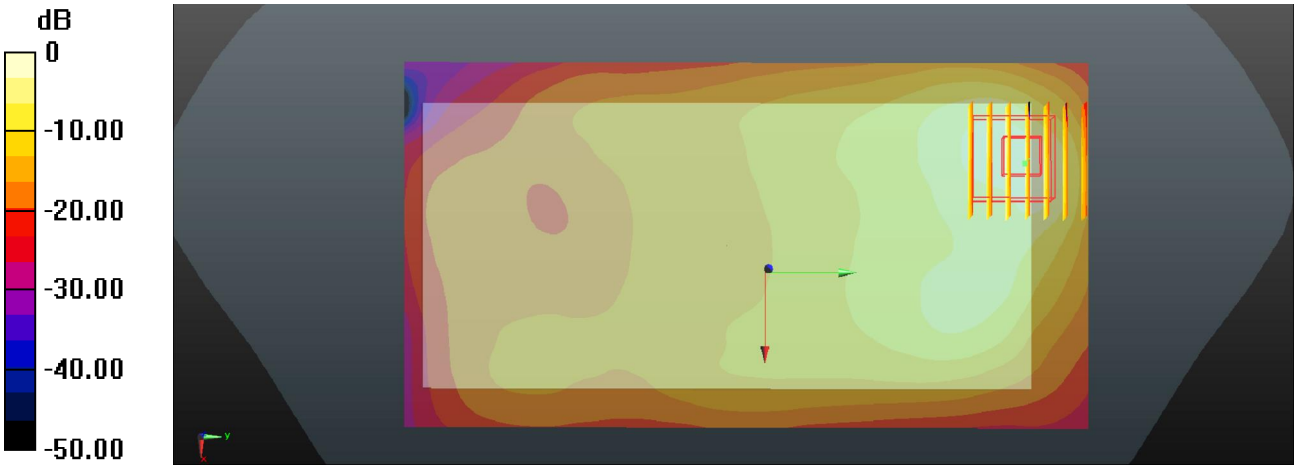
21_WLAN2.4GHz_802.11b 1Mbps_Front_5mm_Ch11

Communication System: UID 0, 802.11b (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: MSL_2450_Medium parameters used: f = 2462 MHz; σ = 1.99 S/m; ε_r = 54.065; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.99, 7.99, 7.99); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch11/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.25 W/kg

Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.168 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.710 W/kg; SAR(10 g) = 0.307 W/kg
Maximum value of SAR (measured) = 1.31 W/kg



0 dB = 1.31 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/27

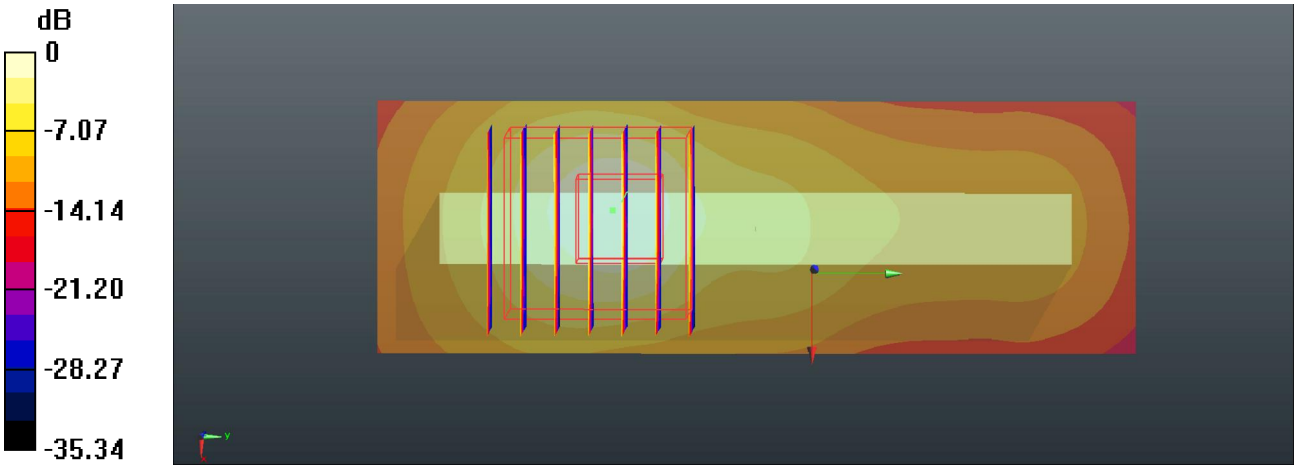
22_WLAN5.2GHz_802.11a 6Mbps_Top side_5mm_Ch48

Communication System: UID 0, 802.11a (0); Frequency: 5240 MHz;Duty Cycle: 1:1.047
Medium: MSL_5G_Medium parameters used: f = 5240 MHz; σ = 5.485 S/m; ε_r = 49.147; ρ = 1000kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(5.41, 5.41, 5.41); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch48/Area Scan (31x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.47 W/kg

Ch48/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 10.96 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 4.18 W/kg
SAR(1 g) = 0.984 W/kg; SAR(10 g) = 0.281 W/kg
Maximum value of SAR (measured) = 2.38 W/kg



0 dB = 2.38 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/27

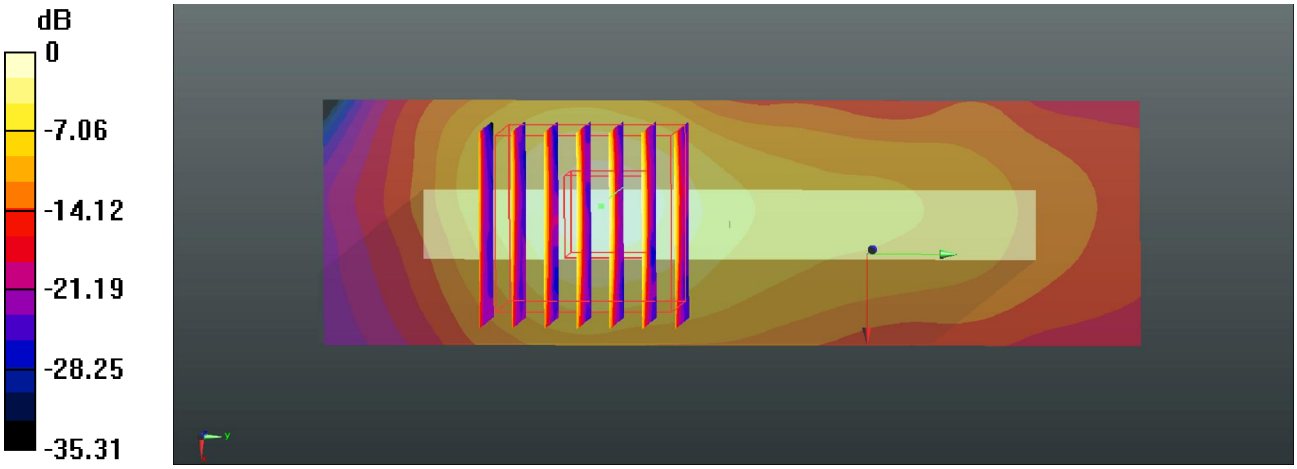
23_WLAN5.8GHz_802.11a 6Mbps_Top side_5mm_Ch149

Communication System: UID 0, 802.11a (0); Frequency: 5745 MHz;Duty Cycle: 1:1.047
Medium: MSL_5G_Medium parameters used: f = 5745 MHz; σ = 6.175 S/m; ε_r = 48.304; ρ = 1000kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(4.64, 4.64, 4.64); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch149/Area Scan (31x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.25 W/kg

Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 8.265 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.78 W/kg
SAR(1 g) = 0.577 W/kg; SAR(10 g) = 0.158 W/kg
Maximum value of SAR (measured) = 1.48 W/kg



0 dB = 1.48 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/26

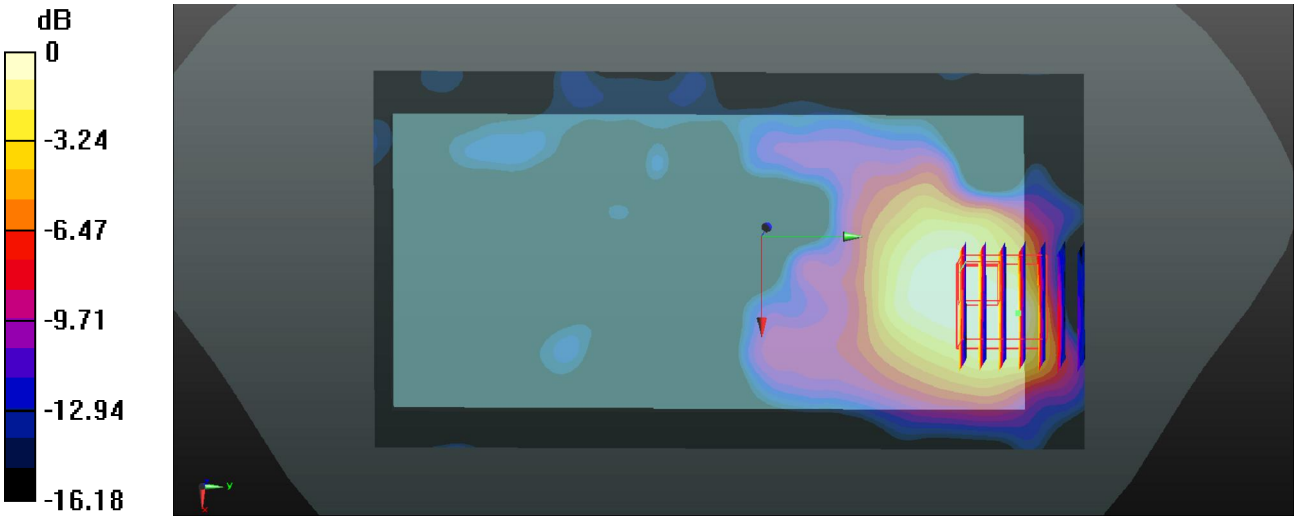
24_Bluetooth_1Mbps_Back_5mm_Ch0

Communication System: UID 0, Bluetooth (0); Frequency: 2402 MHz;Duty Cycle: 1:1.3
Medium: MSL_2450_Medium parameters used: f = 2402 MHz; σ = 1.906 S/m; ε_r = 54.296; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.99, 7.99, 7.99); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch0/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0425 W/kg

Ch0/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.6370 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.0550 W/kg
SAR(1 g) = 0.026 W/kg; SAR(10 g) = 0.014 W/kg
Maximum value of SAR (measured) = 0.0424 W/kg



0 dB = 0.0424 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/21

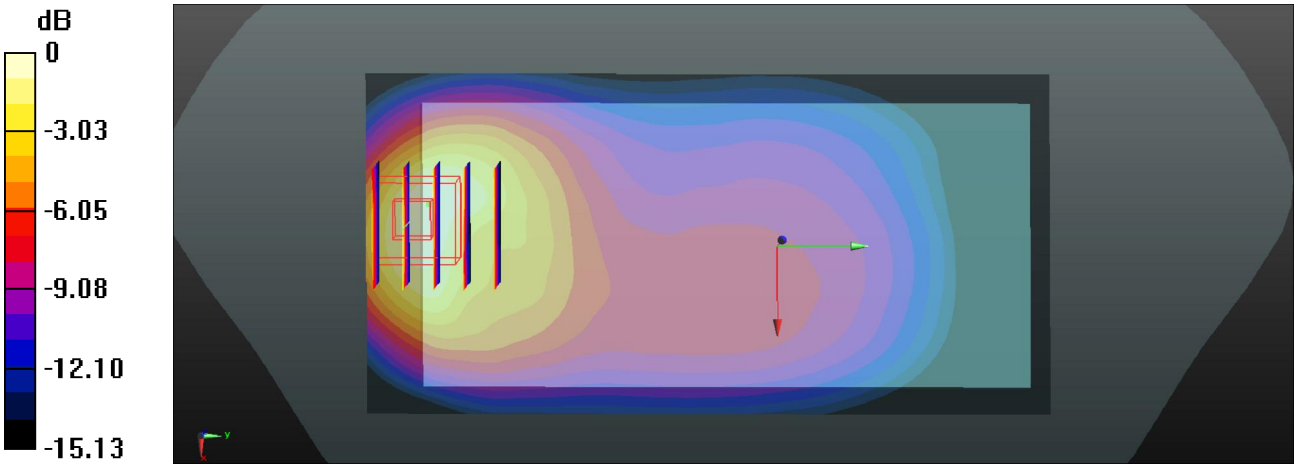
25_GSM850_GPRS (4 Tx slots)_Back_5mm_Ch189

Communication System: UID 0, GPRS (GMSK 4 Tx slot) (0); Frequency: 836.4 MHz;Duty Cycle:1:2.08
Medium: MSL_835_Medium parameters used: f = 836.4 MHz; σ = 1.001 S/m; ε_r = 54.817;
ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.33, 10.33, 10.33); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch189/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.27 W/kg

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.61 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 0.773 W/kg; SAR(10 g) = 0.410 W/kg
Maximum value of SAR (measured) = 1.26 W/kg



0 dB = 1.26 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/29

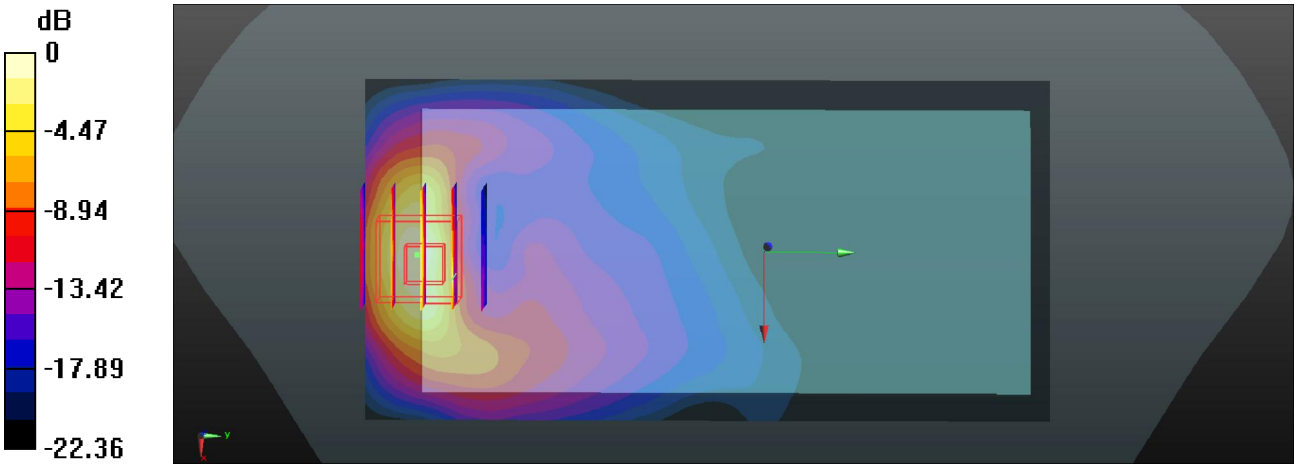
26_GSM1900_GPRS 4 Tx slots_Front_5mm_Ch512

Communication System: UID 0, GPRS (GMSK 4 Tx slot) (0); Frequency: 1850.2 MHz;Duty Cycle:1:2.08
Medium: MSL_1900_Medium parameters used: f = 1850.2 MHz; σ = 1.494 S/m; ε_r = 51.609;
ρ =1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.3, 8.3, 8.3); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch512/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.740 W/kg

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.148 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.901 W/kg
SAR(1 g) = 0.461 W/kg; SAR(10 g) = 0.222 W/kg
Maximum value of SAR (measured) = 0.815 W/kg



0 dB = 0.815 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/21

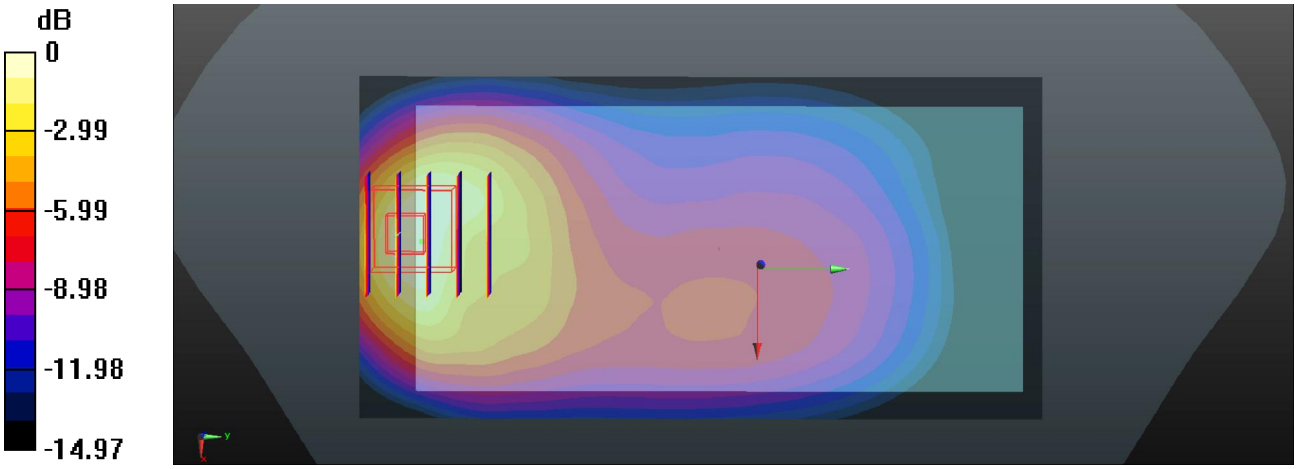
27_WCDMA Band V_RMC 12.2Kbps_Back_5mm_Ch4233

Communication System: UID 0, WCDMA (0); Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: MSL_835_Medium parameters used: f = 846.6 MHz; σ = 1.011 S/m; ε_r = 54.719; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.33, 10.33, 10.33); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch4233/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.45 W/kg

Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.66 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.88 W/kg
SAR(1 g) = 0.894 W/kg; SAR(10 g) = 0.476 W/kg
Maximum value of SAR (measured) = 1.42 W/kg



0 dB = 1.42 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/29

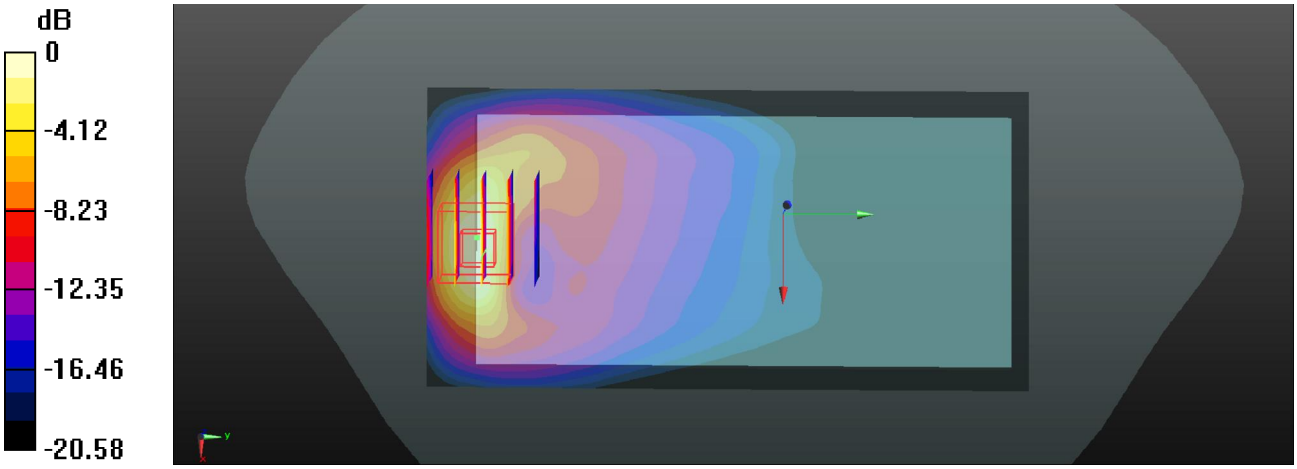
28_WCDMA Band II_RMC 12.2Kbps_Back_5mm_Ch9262

Communication System: UID 0, WCDMA (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_Medium parameters used: f = 1852.4 MHz; σ = 1.497 S/m; ε_r = 51.601; ρ =1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.3, 8.3, 8.3); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch9262/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.649 W/kg

Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.843 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.790 W/kg
SAR(1 g) = 0.408 W/kg; SAR(10 g) = 0.191 W/kg
Maximum value of SAR (measured) = 0.648 W/kg



0 dB = 0.648 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/21

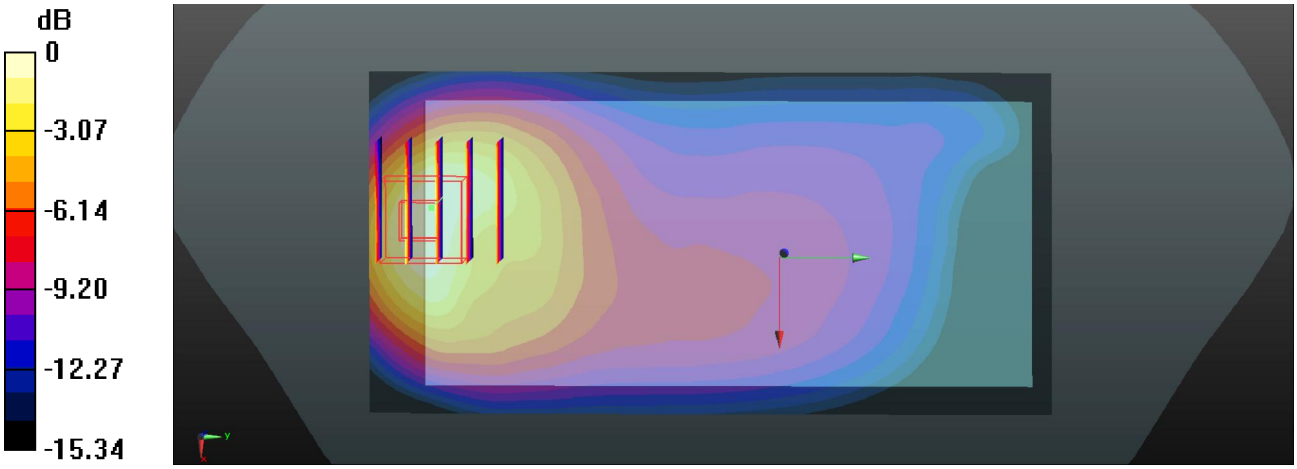
29_LTE Band 26_15M_QPSK_1RB_37offset_Back_5mm_Ch26865

Communication System: UID 0, FDD-LTE (0); Frequency: 831.5 MHz;Duty Cycle: 1:1
Medium: MSL_835_Medium parameters used: f = 831.5 MHz; σ = 0.996 S/m; ε_r = 54.864;
ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(10.33, 10.33, 10.33); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch26865/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.51 W/kg

Ch26865/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.78 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.95 W/kg
SAR(1 g) = 0.926 W/kg; SAR(10 g) = 0.493 W/kg
Maximum value of SAR (measured) = 1.47 W/kg



0 dB = 1.47 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/29

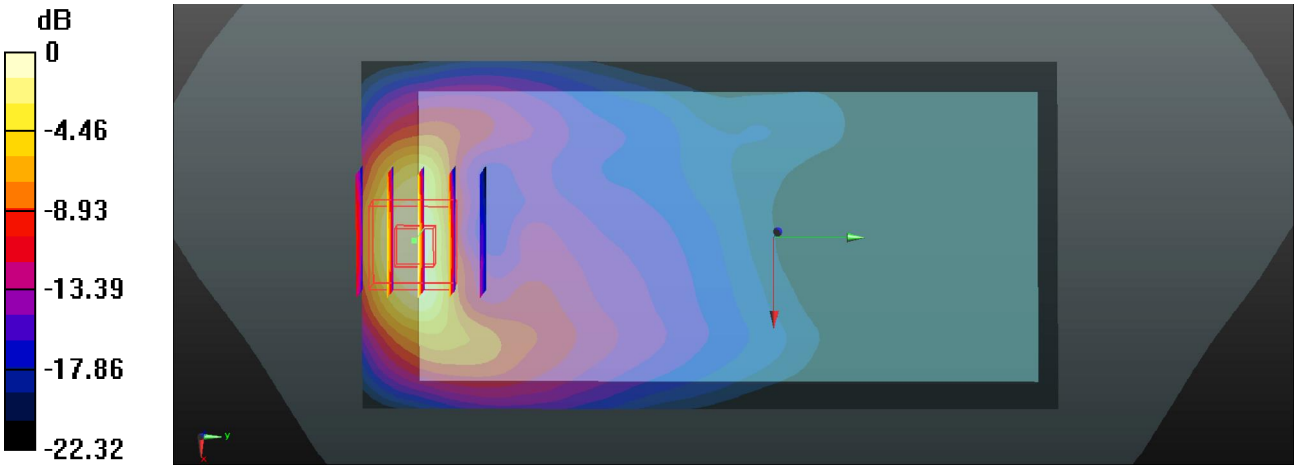
30_LTE Band 2_20M_QPSK_50RB_0offset_Front_5mm_Ch18900

Communication System: UID 0, FDD-LTE (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 51.523; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.3, 8.3, 8.3); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch18900/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.973 W/kg

Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.673 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.583 W/kg; SAR(10 g) = 0.274 W/kg
Maximum value of SAR (measured) = 0.936 W/kg



0 dB = 0.936 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/26

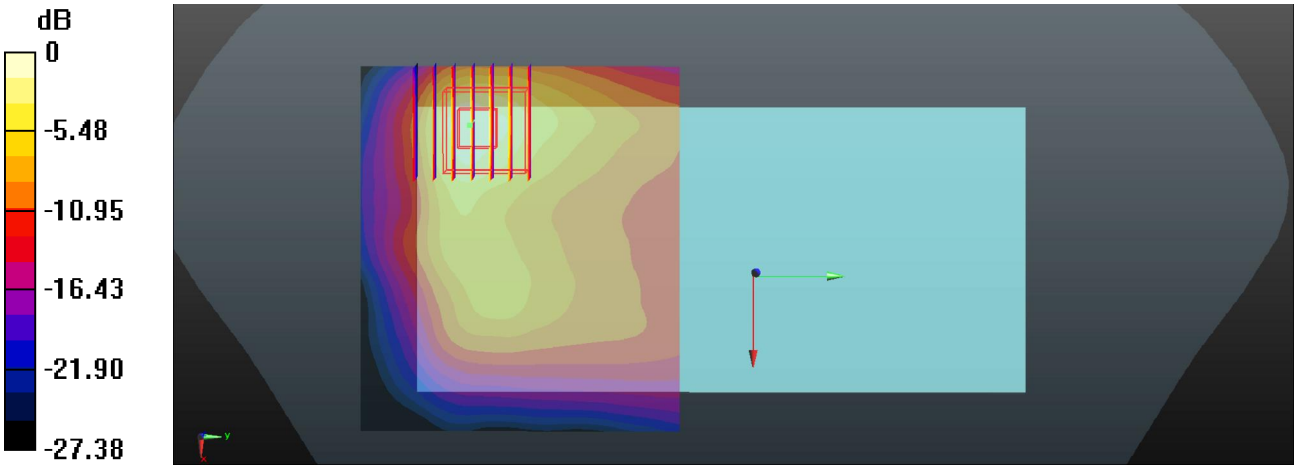
31_LTE Band 7_20M_QPSK_50RB_0offset_Front_5mm_Ch20850

Communication System: UID 0, FDD-LTE (0); Frequency: 2510 MHz;Duty Cycle: 1:1
Medium: MSL_2600_Medium parameters used: f = 2510 MHz; σ = 2.056 S/m; ε_r = 53.884; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.71, 7.71, 7.71); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch20850/Area Scan (81x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.18 W/kg

Ch20850/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.295 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.627 W/kg; SAR(10 g) = 0.269 W/kg
Maximum value of SAR (measured) = 1.08 W/kg



0 dB = 1.08 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/26

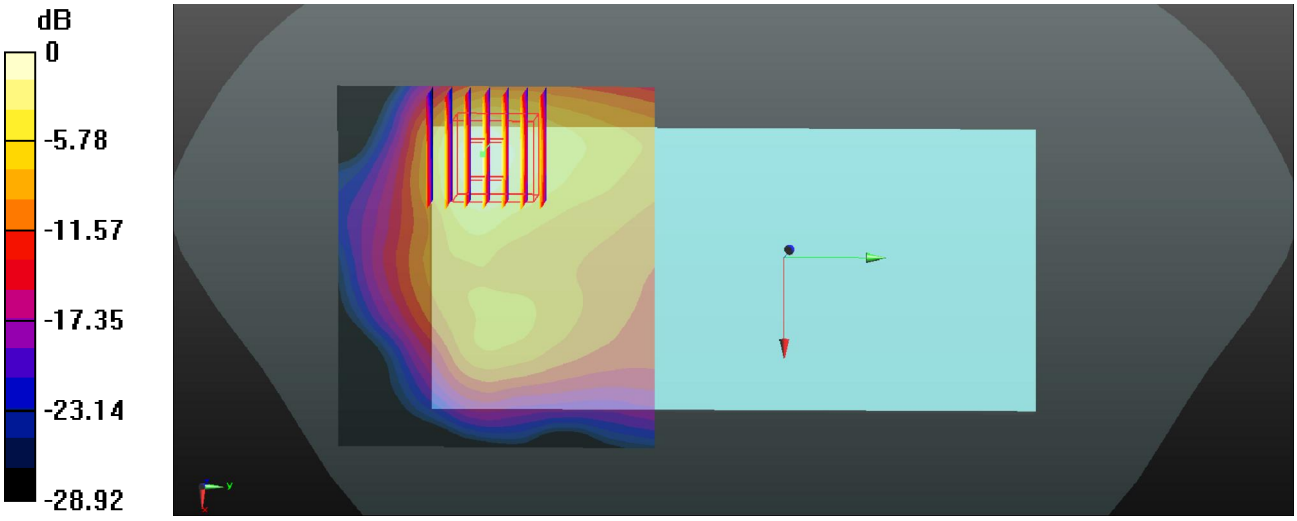
32_LTE Band 38_20M_QPSK_50RB_24offset_Front_5mm_Ch38150

Communication System: UID 0, TDD-LTE (0); Frequency: 2610 MHz;Duty Cycle: 1:1.59
Medium: MSL_2600_Medium parameters used: f = 2610 MHz; σ = 2.197 S/m; ε_r = 53.51;
ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.71, 7.71, 7.71); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch38150/Area Scan (81x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.13 W/kg

Ch38150/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.400 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.622 W/kg; SAR(10 g) = 0.269 W/kg
Maximum value of SAR (measured) = 1.08 W/kg



0 dB = 1.08 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/26

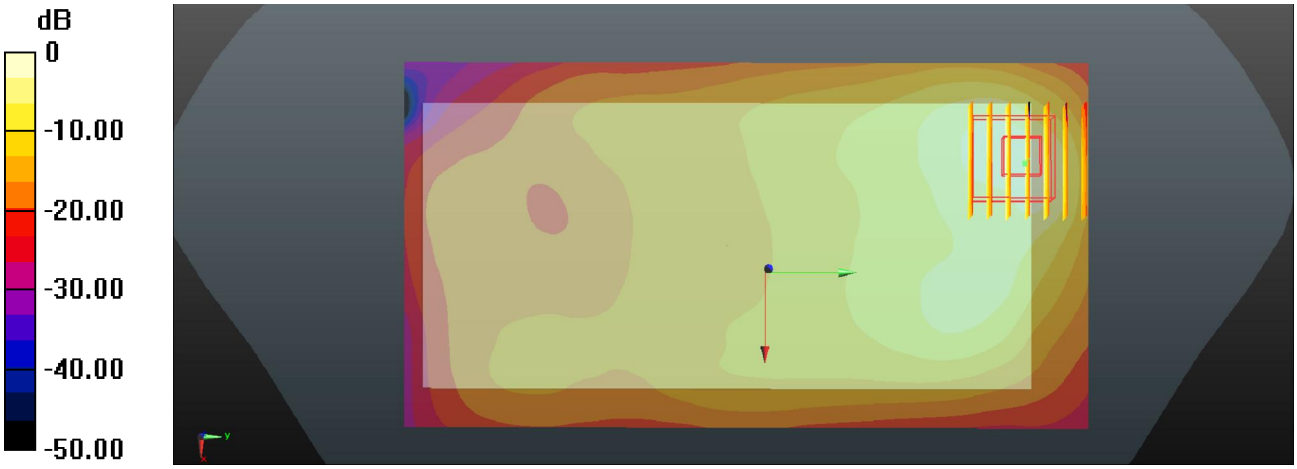
33_WLAN2.4GHz_802.11b 1Mbps_Front_5mm_Ch11

Communication System: UID 0, 802.11b (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: MSL_2450_Medium parameters used: f = 2462 MHz; σ = 1.99 S/m; ε_r = 54.065; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.99, 7.99, 7.99); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch11/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.25 W/kg

Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.168 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.710 W/kg; SAR(10 g) = 0.307 W/kg
Maximum value of SAR (measured) = 1.31 W/kg



0 dB = 1.31 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/27

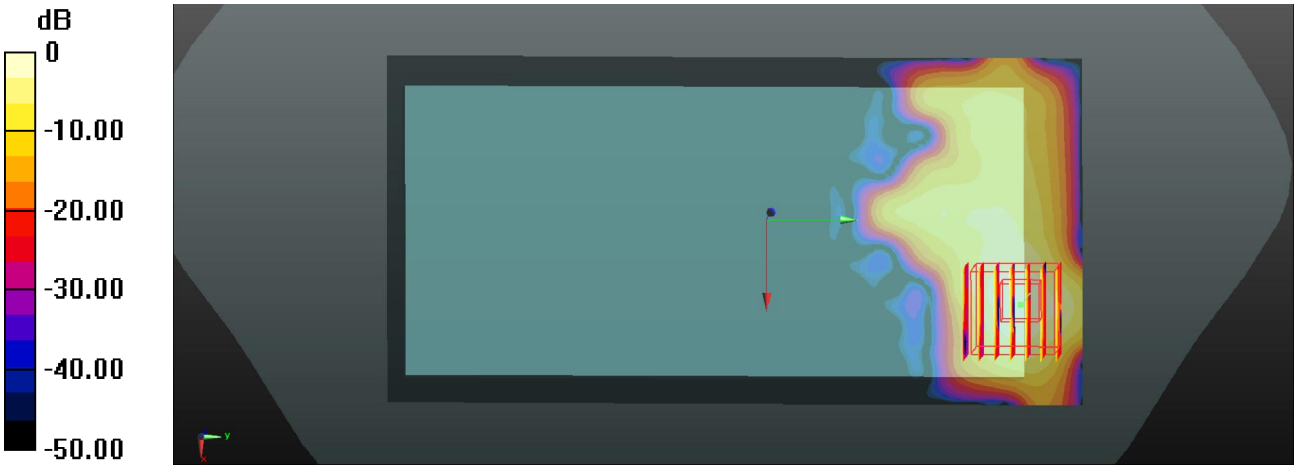
34_WLAN5.3GHz_802.11a 6Mbps_Back_5mm_Ch52

Communication System: UID 0, 802.11a (0); Frequency: 5260 MHz;Duty Cycle: 1:1.047
Medium: MSL_5G_Medium parameters used: f = 5260 MHz; σ = 5.516 S/m; ε_r = 49.116; ρ = 1000kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(5.2, 5.2, 5.2); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch52/Area Scan (91x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.70 W/kg

Ch52/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0.3400 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.83 W/kg
SAR(1 g) = 0.686 W/kg; SAR(10 g) = 0.189 W/kg
Maximum value of SAR (measured) = 1.67 W/kg



0 dB = 1.67 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/27

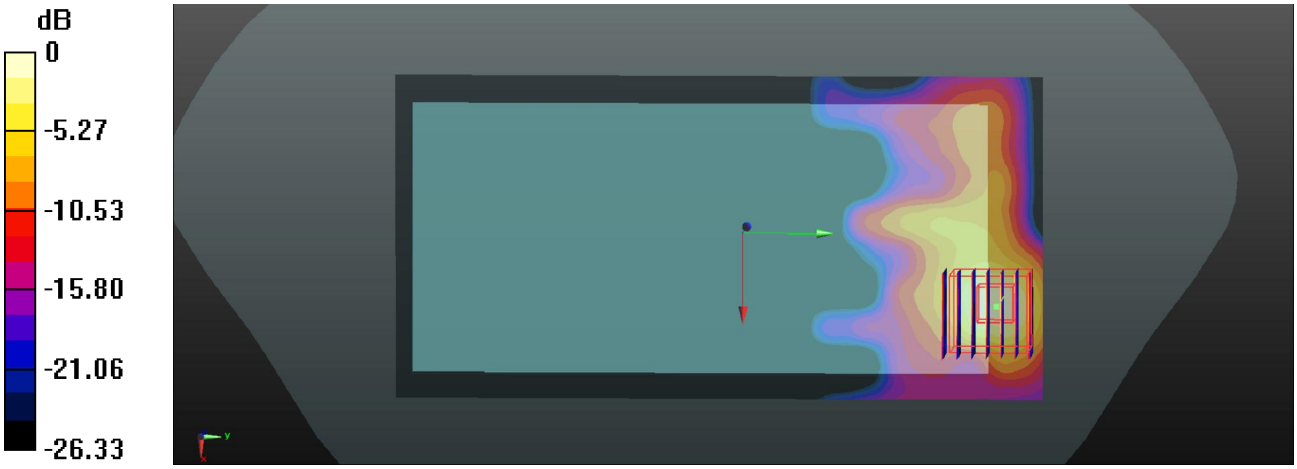
35_WLAN5.5GHz_802.11a 6Mbps_Back_5mm_Ch100

Communication System: UID 0, 802.11a (0); Frequency: 5500 MHz;Duty Cycle: 1:1.047
Medium: MSL_5G_Medium parameters used: f = 5500 MHz; σ = 5.827 S/m; ε_r = 48.715; ρ = 1000kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(4.62, 4.62, 4.62); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch100/Area Scan (91x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.16 W/kg

Ch100/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) = 2.05 W/kg
SAR(1 g) = 0.471 W/kg; SAR(10 g) = 0.131 W/kg
Maximum value of SAR (measured) = 1.18 W/kg



0 dB = 1.18 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/27

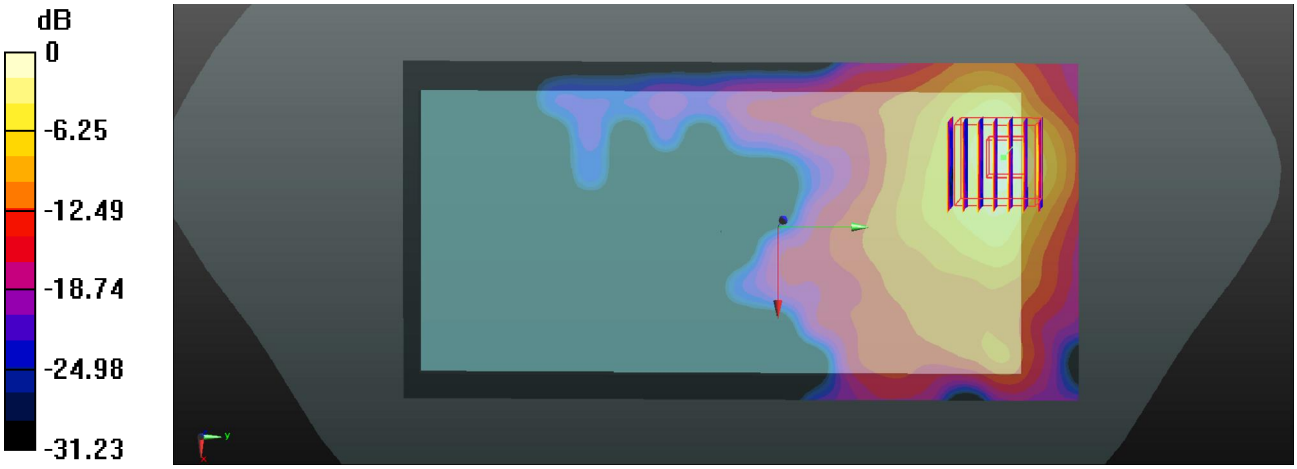
36_WLAN5.8GHz_802.11a 6Mbps_Front_5mm_Ch149

Communication System: UID 0, 802.11a (0); Frequency: 5745 MHz;Duty Cycle: 1:1.047
Medium: MSL_5G_Medium parameters used: f = 5745 MHz; σ = 6.175 S/m; ε_r = 48.304; ρ = 1000kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(4.64, 4.64, 4.64); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch149/Area Scan (91x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.923 W/kg

Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.235 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 2.02 W/kg
SAR(1 g) = 0.409 W/kg; SAR(10 g) = 0.122 W/kg
Maximum value of SAR (measured) = 1.10 W/kg



0 dB = 1.10 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/26

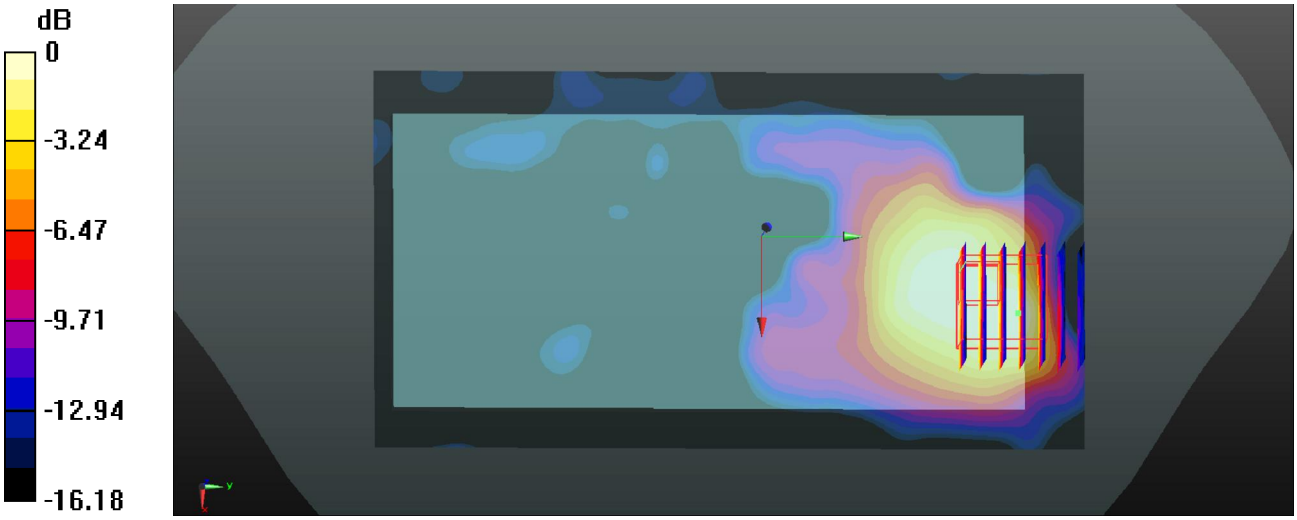
37_Bluetooth_1Mbps_Back_5mm_Ch0

Communication System: UID 0, Bluetooth (0); Frequency: 2402 MHz;Duty Cycle: 1:1.3
Medium: MSL_2450_Medium parameters used: f = 2402 MHz; σ = 1.906 S/m; ε_r = 54.296; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.99, 7.99, 7.99); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch0/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0425 W/kg

Ch0/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.6370 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.0550 W/kg
SAR(1 g) = 0.026 W/kg; SAR(10 g) = 0.014 W/kg
Maximum value of SAR (measured) = 0.0424 W/kg



0 dB = 0.0424 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/29

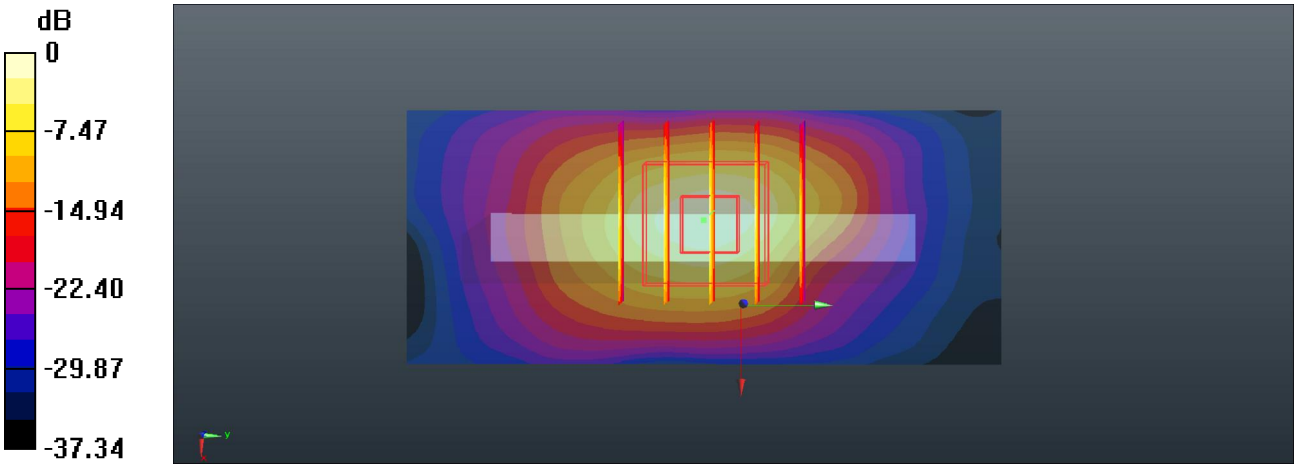
38_GSM1900_GPRS (4 Tx slots)_Bottm side_0mm_Ch810

Communication System: UID 0, GPRS (GMSK 4 Tx slot) (0); Frequency: 1909.8 MHz;Duty Cycle:1:2.08
Medium: MSL_1900_Medium parameters used: f = 1909.8 MHz; σ = 1.562 S/m; ε_r = 51.438;
ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.3, 8.3, 8.3); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch810/Area Scan (31x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 7.80 W/kg

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.94 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 10.4 W/kg
SAR(1 g) = 4.46 W/kg; SAR(10 g) = 1.8 W/kg
Maximum value of SAR (measured) = 8.03 W/kg



0 dB = 8.03 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/29

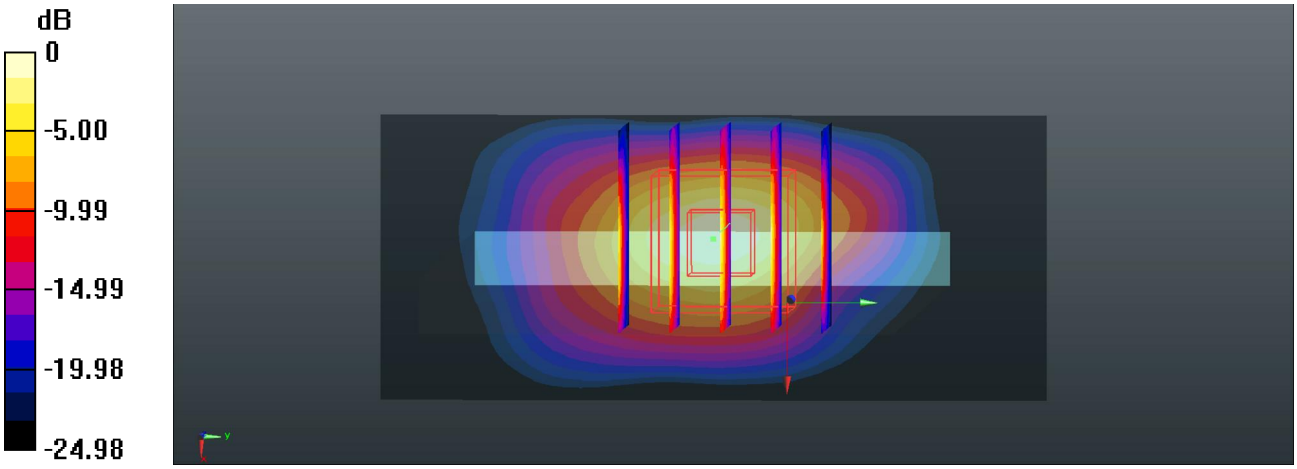
39_WCDMA Band II_RMC 12.2Kbps_Bottm side_0mm_Ch9400

Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 51.523; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.3, 8.3, 8.3); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch9400/Area Scan (31x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 8.18 W/kg

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.65 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 10.9 W/kg
SAR(1 g) = 4.65 W/kg; SAR(10 g) = 1.87 W/kg
Maximum value of SAR (measured) = 8.35 W/kg



0 dB = 8.35 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/29

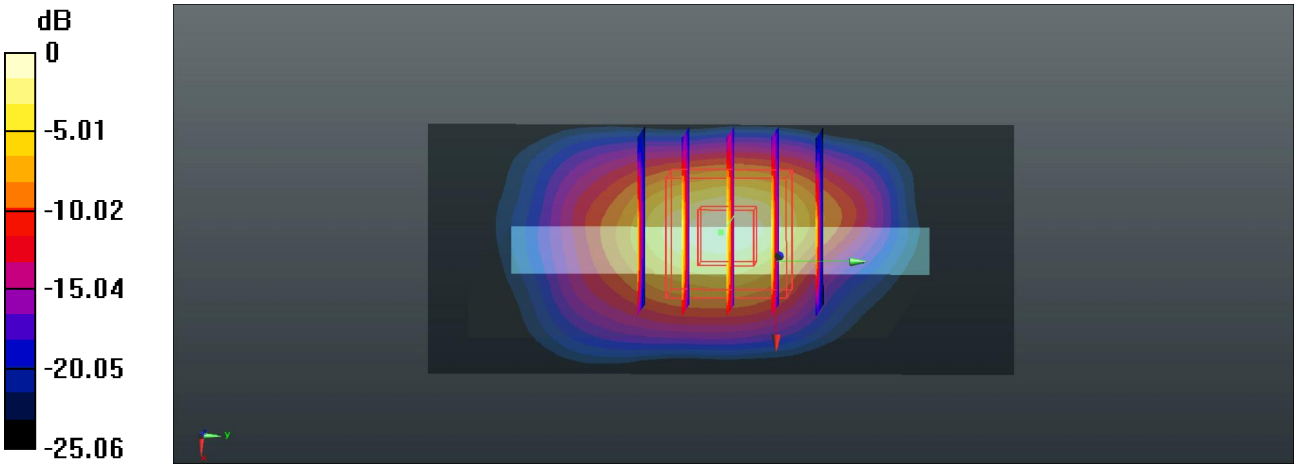
40_LTE Band 2_20M_QPSK_50RB_0offset_Bottom side_0mm_Ch19100

Communication System: UID 0, FDD-LTE (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_Medium parameters used: f = 1900 MHz; σ = 1.55 S/m; ε_r = 51.465;
ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.3, 8.3, 8.3); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch19100/Area Scan (31x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 10.1 W/kg

Ch19100/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 62.79 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 13.4 W/kg
SAR(1 g) = 5.64 W/kg; SAR(10 g) = 2.26 W/kg
Maximum value of SAR (measured) = 10.3 W/kg



0 dB = 10.3 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/26

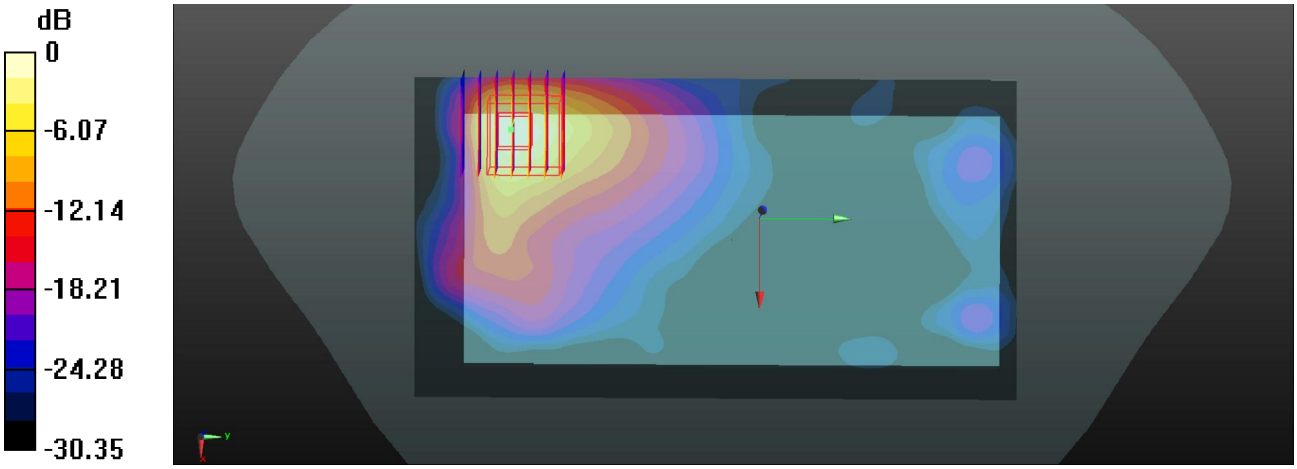
41_LTE Band 7_20M_QPSK_50RB_0offset_Front_0mm_Ch21350

Communication System: UID 0, FDD-LTE (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium: MSL_2600_Medium parameters used: f = 2560 MHz; σ = 2.128 S/m; ε_r = 53.693; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.71, 7.71, 7.71); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- 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=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 14.5 W/kg

Ch21350/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.735 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 6.19 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 12.5 W/kg



0 dB = 12.5 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/26

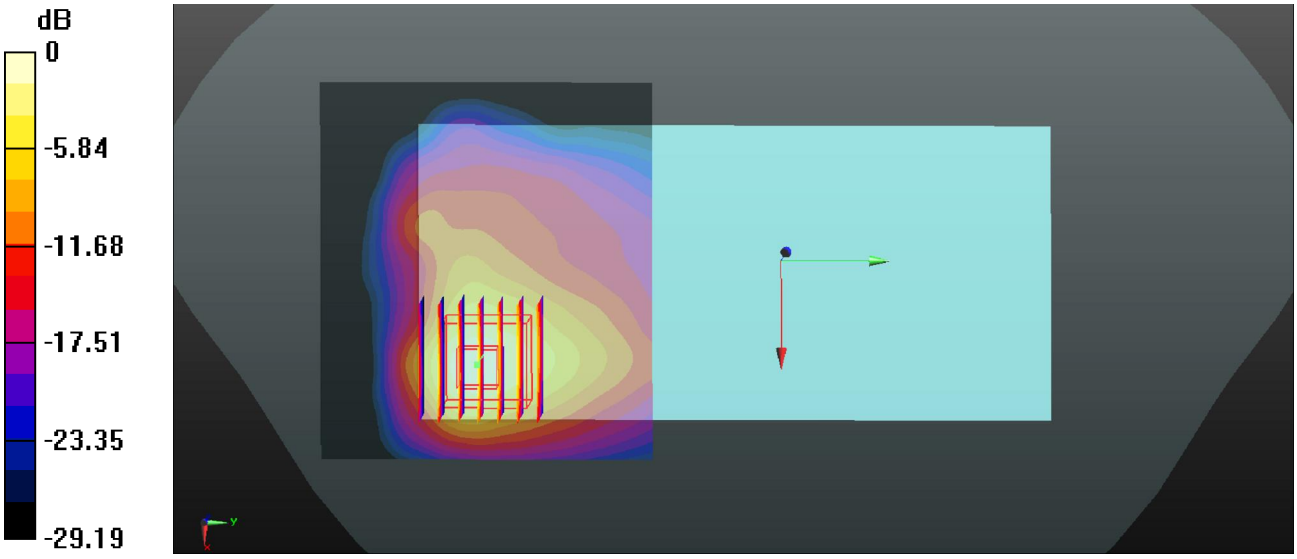
42_LTE Band 38_20M_QPSK_1RB_0offset_Back_0mm_Ch38000

Communication System: UID 0, TDD-LTE (0); Frequency: 2595 MHz;Duty Cycle: 1:1.59
Medium: MSL_2600_Medium parameters used: f = 2595 MHz; σ = 2.176 S/m; ε_r = 53.564; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(7.71, 7.71, 7.71); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch38000/Area Scan (81x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 12.5 W/kg

Ch38000/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.110 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 15.5 W/kg
SAR(1 g) = 6.46 W/kg; SAR(10 g) = 2.66 W/kg
Maximum value of SAR (measured) = 11.6 W/kg



0 dB = 11.6 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/27

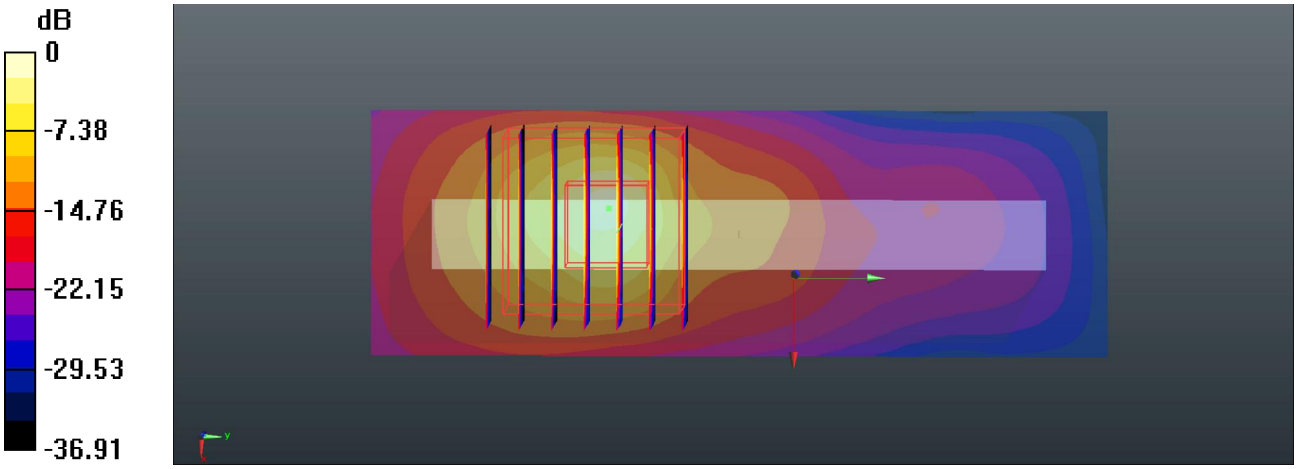
43_WLAN5.3GHz_802.11a 6Mbps_Top side_0mm_Ch52

Communication System: UID 0, 802.11a (0); Frequency: 5260 MHz;Duty Cycle: 1:1.047
Medium: MSL_5G_Medium parameters used: f = 5260 MHz; σ = 5.516 S/m; ε_r = 49.116; ρ = 1000kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(5.2, 5.2, 5.2); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch52/Area Scan (31x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 10.3 W/kg

Ch52/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 12.64 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 28.5 W/kg
SAR(1 g) = 4.68 W/kg; SAR(10 g) = 0.921 W/kg
Maximum value of SAR (measured) = 14.4 W/kg



0 dB = 14.4 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018/1/27

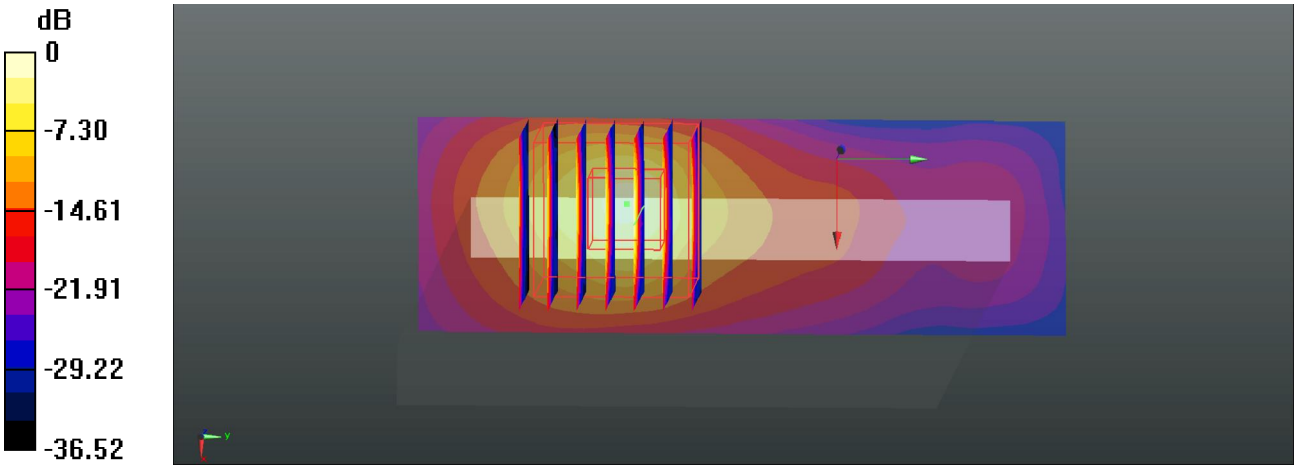
44_WLAN5.5GHz_802.11a 6Mbps_Top side_0mm_Ch100

Communication System: UID 0, 802.11a (0); Frequency: 5500 MHz;Duty Cycle: 1:1.047
Medium: MSL_5G_Medium parameters used: f = 5500 MHz; σ = 5.827 S/m; ε_r = 48.715;
ρ = 1000kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(4.62, 4.62, 4.62); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch100/Area Scan (31x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 6.75 W/kg

Ch100/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 9.692 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 18.4 W/kg
SAR(1 g) = 2.88 W/kg; SAR(10 g) = 0.574 W/kg
Maximum value of SAR (measured) = 8.90 W/kg



0 dB = 8.90 W/kg

Appendix C. Supplemental Tuner Head & Body SAR Results

The results are shown as follows.

Head

Average Value of Time Sweep (W/kg)

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)	0	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294
GSM850	GPRS(4Tx slots)	836.4	189	N/A	N/A	Left Cheek	0 mm	Ant 1	0.243	0.141	0.045	0.134	0.129	0.109	0.074	0.047	0	0.085	0.12	0.086	0.051	0	0	0.047	0.139	0.136	0.092	0.069	0	0	0.079	0.135	0.107	0.076	0	0	0.082	0.129	0.098	0.044	0	0	0	0.082	0.11	0.046	0	0	0	0.132	0.137	0.102	0	0	0	0	0.132	0.12	0.047	0

Average Value of Time Sweep (W/kg)

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)	1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91	97	103	109	115	121	127	133	139	145	151	157	163	169	175	181	187	193	199	205	211	217	223	229	235	241	247	253	259	265	271	277	283	289	295
GSM1900	GPRS(4Tx slots)	1850.2	512	N/A	N/A	Right Cheek	0 mm	Ant 1	0.153	0.135	0.051	0.07	0.045	0.092	0.103	0.097	0.064	0.084	0.077	0.086	0.12	0.072	0.075	0.078	0.084	0.103	0.091	0.072	0.07	0.099	0.086	0.101	0.11	0	0.02	0.125	0.023	0.08	0.09	0	0.012	0.063	0.129	0.013	0.127	0.12	0.124	0.1	0.106	0.007	0.008	0.128	0.005	0.05	0.099	0.01	0.05	0.133	0.06	0.011

Average Value of Time Sweep (W/kg)

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)	2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92	98	104	110	116	122	128	134	140	146	152	158	164	170	176	182	188	194	200	206	212	218	224	230	236	242	248	254	260	266	272	278	284	290	
WCDMA Band V	RMC12.2Kbps	846.6	4233	N/A	N/A	Left Cheek	0 mm	Ant 1	0.259	0.17	0.098	0.132	0.144	0.117	0.091	0.031	0	0.057	0.071	0.073	0.063	0.054	0	0.104	0.15	0.136	0.097	0.071	0	0	0.082	0.098	0.079	0.062	0	0.043	0.114	0.143	0.106	0.077	0.052	0	0.056	0.116	0.1	0.092	0	0	0.08	0.166	0.136	0.066	0.051	0	0	0.065	0.104	0.077	0.051	

Average Value of Time Sweep (W/kg)

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)	3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93	99	105	111	117	123	129	135	141	147	153	159	165	171	177	183	189	195	201	207	213	219	225	231	237	243	249	255	261	267	273	279	285	291	
WCDMA Band II	RMC12.2Kbps	1852.4	9262	N/A	N/A	Right Cheek	0 mm	Ant 1	0.194	0.166	0.08	0.099	0.109	0.111	0.141	0.15	0.092	0.128	0.138	0.143	0.149	0.15	0.077	0.106	0.125	0.134	0.137	0.147	0.096	0.117	0.125	0.067	0.136	0.16	0.152	0.084	0.11	0.123	0.137	0.158	0.162	0.072	0.139	0.146	0.156	0.153	0.15	0.089	0.104	0.124	0.127	0.14	0.142	0.095	0.11	0.162	0.138	0.148	0.155	

Average Value of Time Sweep (W/kg)

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)	4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94	100	106	112	118	124	130	136	142	148	154	160	166	172	178	184	190	196	202	208	214	220	226	232	238	244	250	256	262	268	274	280	286	292	
LTE Band 26	15M_QPSK	831.5	26865	1	37Offset	Left Cheek	0 mm	Ant 1	0.254	0.148	0.07	0.118	0.105	0.098	0.06	0.069	0	0.058	0.068	0.065	0.136	0.047	0	0.097	0.09	0.126	0.082	0.05	0.012	0.035	0.029	0.042	0.07	0.016	0	0.054	0.129	0.137	0.043	0.031	0	0	0.05	0.108	0.068	0.034	0.045	0	0.074	0.113	0.116	0.097	0.05	0	0	0.081	0.112	0.107	0.045	

Average Value of Time Sweep (W/kg)

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)	5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95	101	107	113	119	125	131	137	143	149	155	161	167	173	179	185	191	197	203	209	215	221	227	233	239	245	251	257	263	269	275	281	287	293	
LTE Band 2	20M_QPSK	1880	18900	1RB	49Offset	Right Cheek	0 mm	Ant 1	0.185	0.175	0.125	0.127	0.122	0.138	0.147	0.115	0.117	0.141	0.146	0.15	0.119	0.166	0.097	0.121	0.139	0.102	0.149	0.158	0.111	0.137	0.106	0.151	0.161	0.165	0.084	0.087	0.131	0.139	0.148	0.154	0.075	0.132	0.147	0.153	0.155	0.125	0.154	0.113	0.133	0.141	0.056	0.16	0.158	0.123	0.063	0.114	0.154	0.162	0.172	

Head

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)
GSM850	GPRS(4Tx slots)	836.4	189	N/A	N/A	Back	5 mm	Ant 1	0.773	0.719

Average Value of Time Sweep (W/kg)

Mode	0	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144
GSM850	0.267	0.65	0.625	0.434	0.293	0.237	0.101	0.445	0.625	0.407	0.291	0.214	0.144	0.321	0.705	0.702	0.416	0.35	0.197	0.087	0.5	0.705	0.545	0.363	0.156

Mode	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294
GSM850	0.094	0.57	0.47	0.27	0.155	0.181	0	0.15	0.714	0.701	0.468	0.288	0	0.19	0.706	0.704	0.338	0.187	0	0	0.196	0.698	0.535	0.338	0.167

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)
GSM1900	GPRS(4Tx slots)	1850.2	512	N/A	N/A	Bottom side	5 mm	Ant 1	0.665	0.63

Average Value of Time Sweep (W/kg)

Mode	1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91	97	103	109	115	121	127	133	139	145
GSM1900	0.308	0.407	0.456	0.51	0.595	0.572	0.48	0.551	0.35	0.606	0.39	0.605	0.46	0.57	0.487	0.38	0.378	0.581	0.456	0.56	0.328	0.44	0.613	0.34	0.356

Mode	151	157	163	169	175	181	187	193	199	205	211	217	223	229	235	241	247	253	259	265	271	277	283	289	295
GSM1900	0.413	0.552	0.574	0.382	0.614	0.52	0.417	0.43	0.508	0.46	0.603	0.52	0.341	0.25	0.543	0.32	0.612	0.52	0.425	0.51	0.558	0.563	0.586	0.592	0.601

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)
WCDMA Band V	RMC12.2Kbps	846.6	4233	N/A	N/A	Back	5 mm	Ant 1	0.894	0.848

Average Value of Time Sweep (W/kg)

Mode	2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92	98	104	110	116	122	128	134	140	146
WCDMA Band V	0.468	0.702	0.716	0.684	0.521	0.254	0.127	0.34	0.436	0.437	0.365	0.299	0.145	0.61	0.842	0.686	0.478	0.385	0.115	0.194	0.481	0.573	0.437	0.321	0.225

Mode	152	158	164	170	176	182	188	194	200	206	212	218	224	230	236	242	248	254	260	266	272	278	284	290	
WCDMA Band V	0.278	0.693	0.679	0.563	0.399	0.285	0.083	0.292	0.566	0.558	0.435	0.24	0.114	0.423	0.775	0.613	0.353	0.254	0	0.133	0.389	0.578	0.419	0.29	

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)
WCDMA Band II	RMC12.2Kbps	1852.4	9262	N/A	N/A	Bottom side	5 mm	Ant 1	0.567	0.669

Average Value of Time Sweep (W/kg)

Mode	3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93	99	105	111	117	123	129	135	141	147
WCDMA Band II	0.35	0.21	0.535	0.218	0.569	0.36	0.476	0.44	0.591	0.581	0.45	0.659	0.58	0.446	0.617	0.47	0.582	0.39	0.44	0.597	0.63	0.656	0.39	0.36	0.628

Mode	153	159	165	171	177	183	189	195	201	207	213	219	225	231	237	243	249	255	261	267	273	279	285	291	
WCDMA Band II	0.5	0.478	0.413	0.619	0.63	0.467	0.485	0.378	0.396	0.616	0.45	0.656	0.414	0.348	0.554	0.61	0.654	0.349	0.218	0.601	0.45	0.541	0.425	0.614	

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)
LTE Band 26	15M_QPSK	831.5	26865	1	37Offset	Back	5 mm	Ant 1	0.926	0.817

Average Value of Time Sweep (W/kg)

Mode	4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94	100	106	112	118	124	130	136	142	148
LTE Band 26	0.391	0.624	0.444	0.523	0.357	0.404	0.169	0.324	0.395	0.373	0.359	0.288	0.613	0.587	0.608	0.677	0.496	0.389	0.59	0.415	0.516	0.429	0.249	0.328	0.08

Mode	154	160	166	172	178	184	190	196	202	208	214	220	226	232	238	244	250	256	262	268	274	280	286	292	
LTE Band 26	0.369	0.714	0.747	0.516	0.41	0.094	0.118	0.342	0.567	0.537	0.416	0.242	0.147	0.439	0.568	0.578	0.477	0.278	0.044	0.11	0.48	0.63	0.557	0.269	

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Ant	Measured 1g SAR (W/kg)	Auto-Tune (State)
LTE Band 2	20M_QPSK	1880	18900	50RB	0Offset	Bottom side	5 mm	Ant 1	0.893	0.848

Average Value of Time Sweep (W/kg)

Mode	5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95	101	107	113	119	125	131	137	143	149
LTE Band 2	0.464	0.5	0.677	0.345	0.812	0.478	0.595	0.722	0.677	0.733	0.612	0.435	0.509	0.523	0.612	0.684	0.625	0.843	0.53	0.666	0.463	0.787	0.813	0.496	0.401

Mode	155	161	167	173	179	185	191	197	203	209	215	221	227	233	239	245	251	257	263	269	275	281	287	293	
LTE Band 2	0.512	0.636	0.698	0.612	0.38	0.471	0.467	0.684	0.613	0.779	0.55	0.841	0.522	0.456	0.731	0.34	0.213	0.84	0.418	0.658	0.379	0.766	0.38	0.773	

Appendix D. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.

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校准
CALIBRATION
CNAS L0570

Client Sporton_XA Certificate No: Z17-97038

CALIBRATION CERTIFICATE

Object D835V2 - SN: 4d151

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

Calibration date: March 20, 2017

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)℃ 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	101919	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101547	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Reference Probe EX3DV4	SN 3617	23-Jan-17(SPEAG,No.EX3-3617_Jan17)	Jan-18
DAE4	SN 777	22-Aug-16(CTTL-SPEAG,No.Z16-97138)	Aug-17
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: March 24, 2017

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 / NORMx,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 300MHz to 3GHz)", February 2005
c) 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
d) KDB865664, 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%.

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Measurement Conditions

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

DASY Version	DASY52	52.8.8.1258
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	41.0 ± 6 %	0.89 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	2.41 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.73 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.57 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.33 mW /g ± 20.4 % (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	55.6 ± 6 %	0.96 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	2.41 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.72 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.44 mW /g ± 20.4 % (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	48.2Ω- 3.30jΩ
Return Loss	- 28.3dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.0Ω- 3.06jΩ
Return Loss	- 25.6dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.474 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

Test Laboratory: CTTL, Beijing, China Date: 03.20.2017

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; σ = 0.886 S/m; ε_r = 40.96; ρ = 1000 kg/m^3

Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(9.73, 9.73, 9.73); Calibrated: 1/23/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn777; Calibrated: 8/22/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

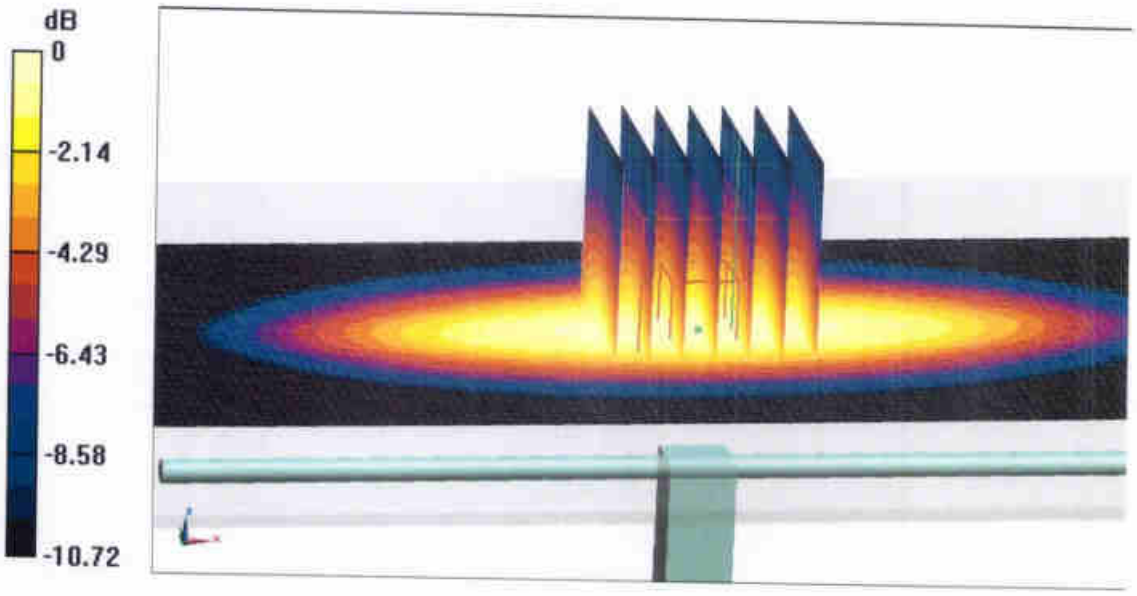
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 59.22V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 3.68 W/kg

SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.57 W/kg

Maximum value of SAR (measured) = 3.24 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

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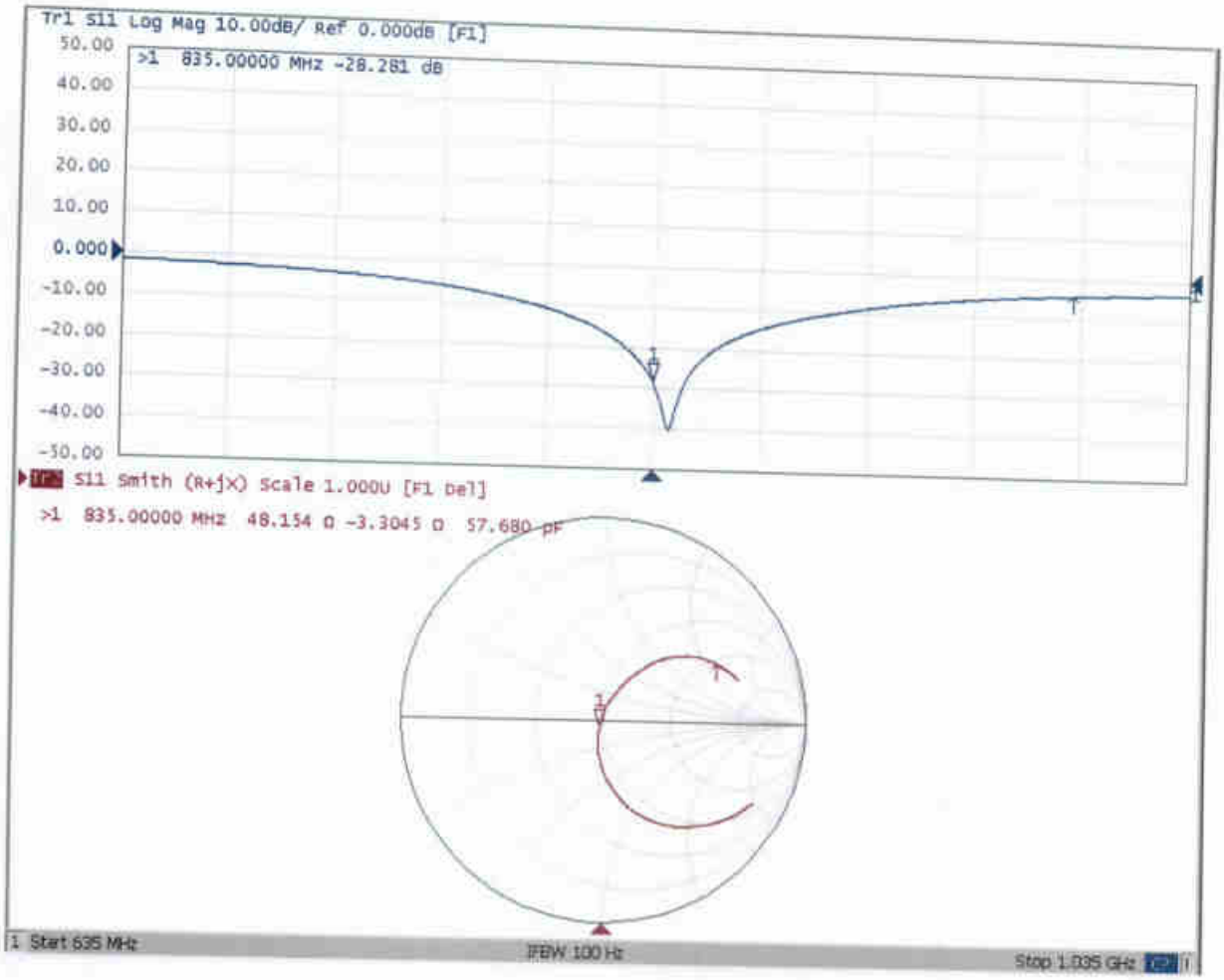
Impedance Measurement Plot for Head TSL



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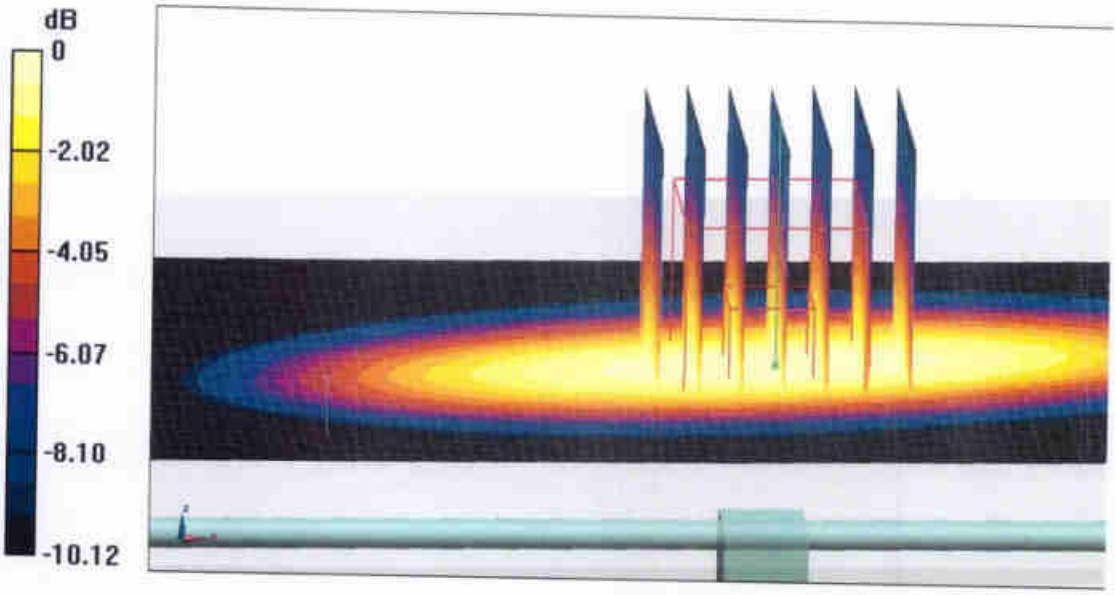
DASY5 Validation Report for Body TSL
Test Laboratory: CTTL, Beijing, China Date: 03.20.2017
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d151
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.962 S/m; ε_r = 55.58; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(9.64,9.64, 9.64); Calibrated: 1/23/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn777; Calibrated: 8/22/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.67 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.50 W/kg
SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 3.03 W/kg



0 dB = 3.03 W/kg = 4.81 dBW/kg

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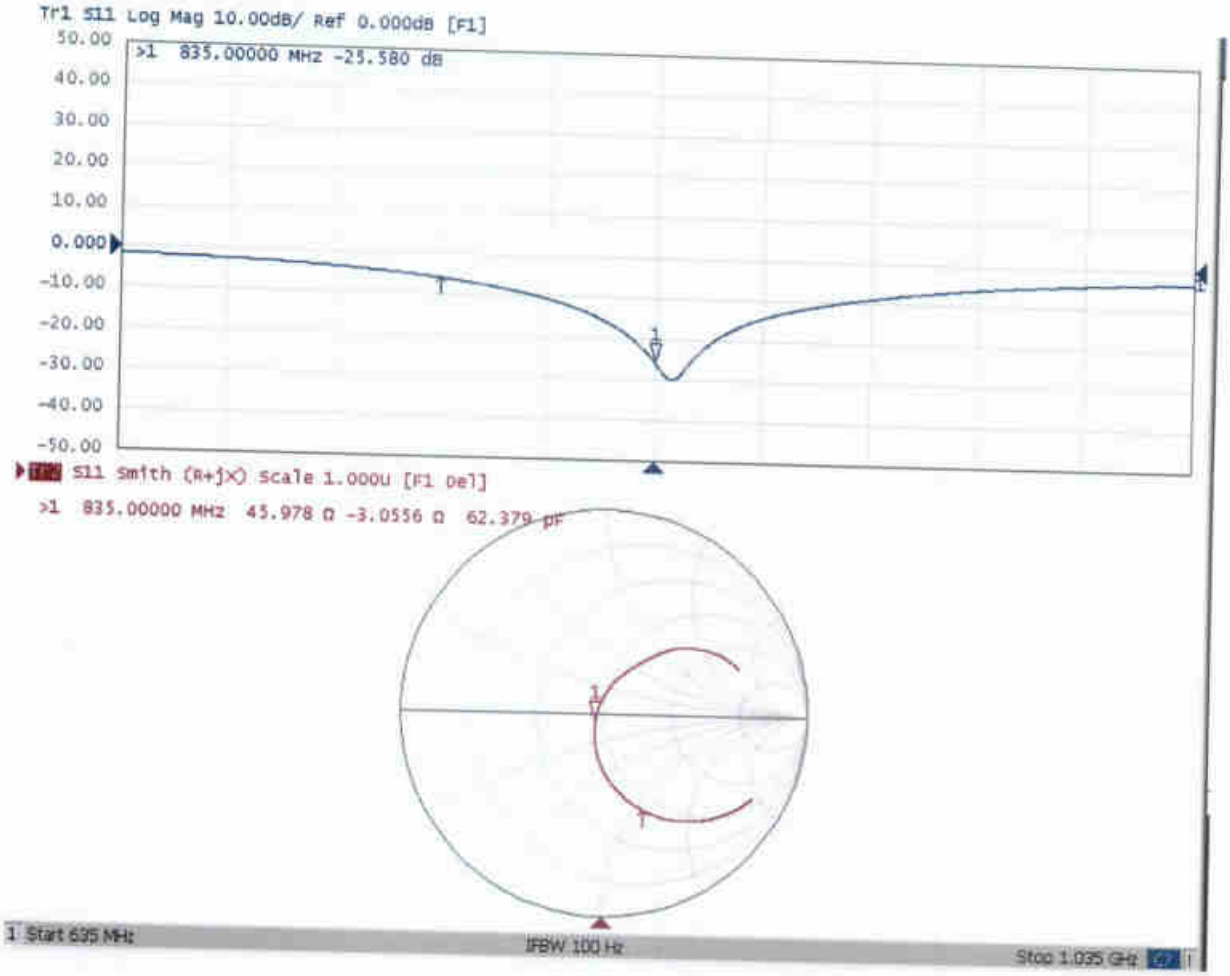
Impedance Measurement Plot for Body TSL



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CALIBRATION
CNAS L0570

Client Sporton_XA Certificate No: Z17-97041

CALIBRATION CERTIFICATE

Object D1900V2 - SN: 5d170

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

Calibration date: March 22, 2017

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)℃ 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	101919	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101547	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Reference Probe EX3DV4	SN 3617	23-Jan-17(SPEAG,No.EX3-3617_Jan17)	Jan-18
DAE4	SN 777	22-Aug-16(CTTL-SPEAG,No.Z16-97138)	Aug-17
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: March 25, 2017

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 / NORMx,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 300MHz to 3GHz)", February 2005
c) 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
d) KDB865664, 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%.

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Measurement Conditions

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

DASY Version	DASY52	52.8.8.1258
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	1.38 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	9.89mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**40.0 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.15 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.7 mW /g ± 20.4 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.6 ± 6 %	1.53 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	10.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**40.7 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.37 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.4 mW /g ± 20.4 % (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	51.5Ω+ 5.31jΩ
Return Loss	- 25.3dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.2Ω+ 5.61jΩ
Return Loss	- 24.9dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.307 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: 03.22.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d170

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.376 S/m; εr = 39.92; ρ = 1000 kg/m3

Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(8.26, 8.26, 8.26); Calibrated: 1/23/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn777; Calibrated: 8/22/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

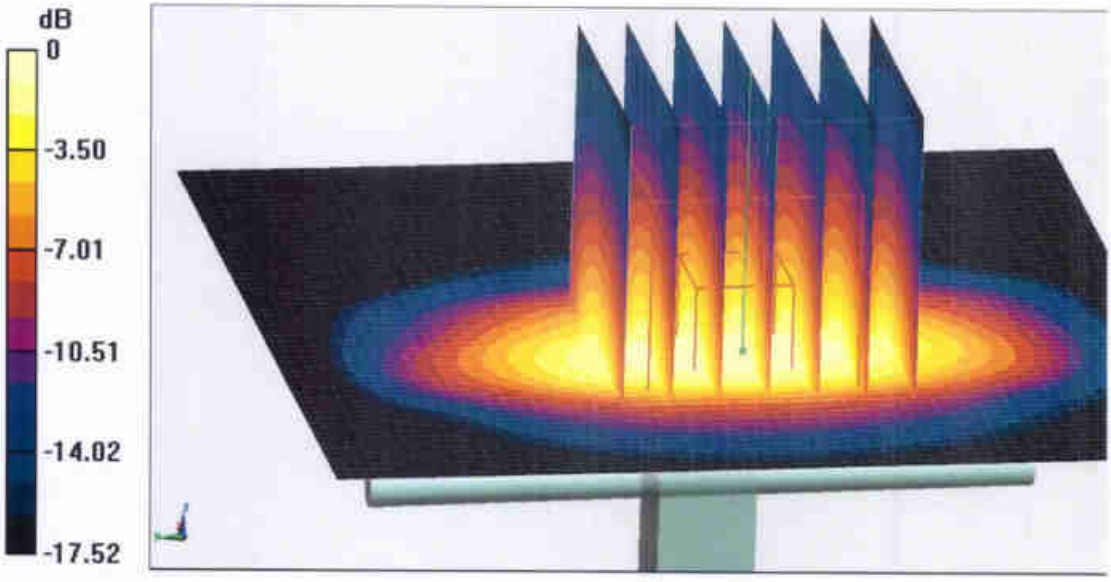
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.60 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 18.7 W/kg

SAR(1 g) = 9.89 W/kg; SAR(10 g) = 5.15 W/kg

Maximum value of SAR (measured) = 15.5 W/kg



0 dB = 15.5 W/kg = 11.90 dBW/kg

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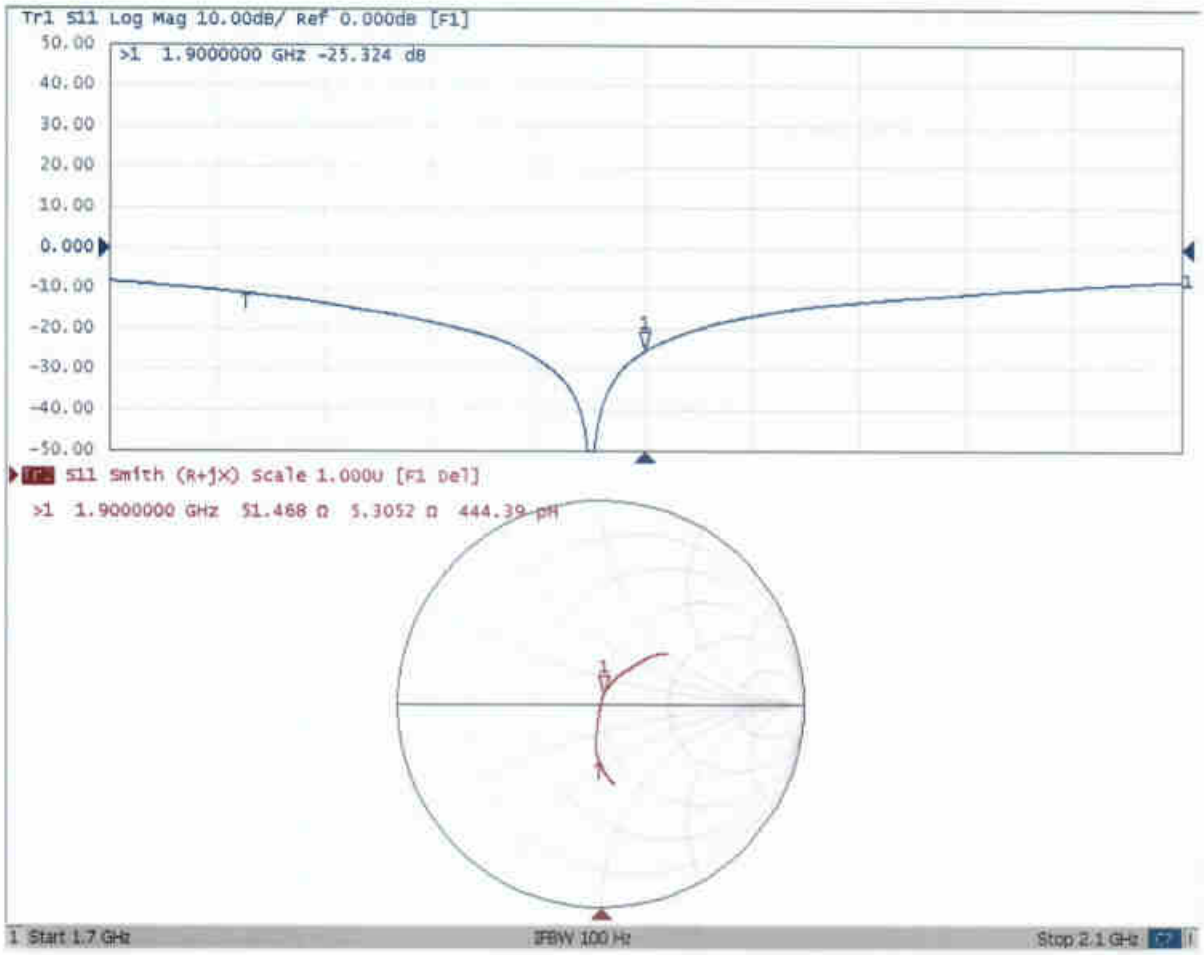
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 03.22.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d170

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.532 S/m; ε_r = 53.62; ρ = 1000 kg/m^3

Phantom section: Center Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(7.95, 7.95, 7.95); Calibrated: 1/23/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn777; Calibrated: 8/22/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

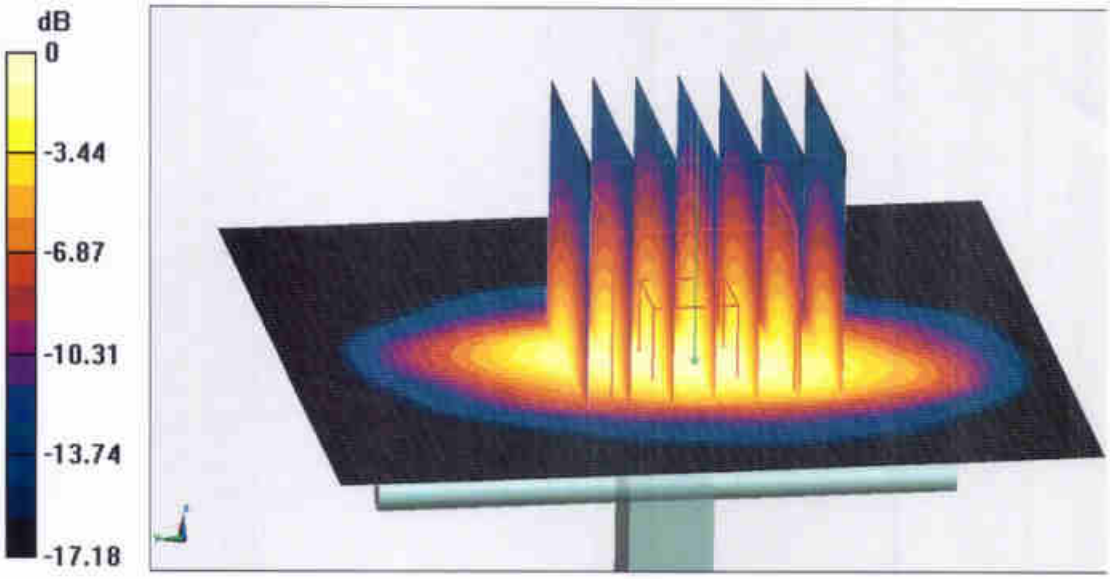
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.75 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.37 W/kg

Maximum value of SAR (measured) = 15.5 W/kg



0 dB = 15.5 W/kg = 11.90 dBW/kg

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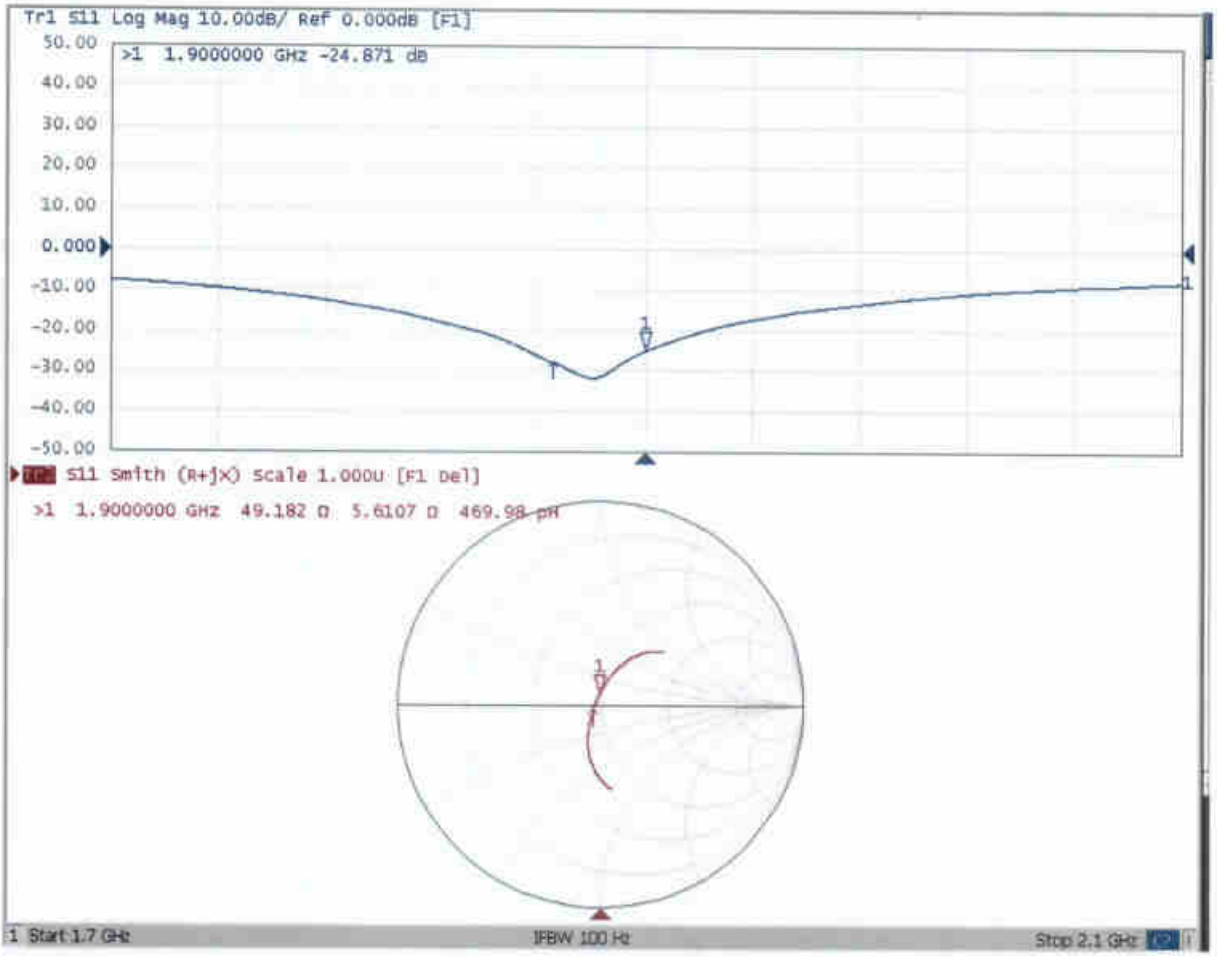
Impedance Measurement Plot for Body TSL