# Appendix A.    Plots of System Performance Check

The plots are shown as follows.

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Page Number            : A1 of A1
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Report Version         : Rev. 01

**System Check_Head_835MHz_110228**

**DUT: Dipole 835 MHz**

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL_835_110228 Medium parameters used: f = 835 MHz; $\sigma$ = 0.919 mho/m; $\varepsilon_r$ = 41.5; $\rho$ =

1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
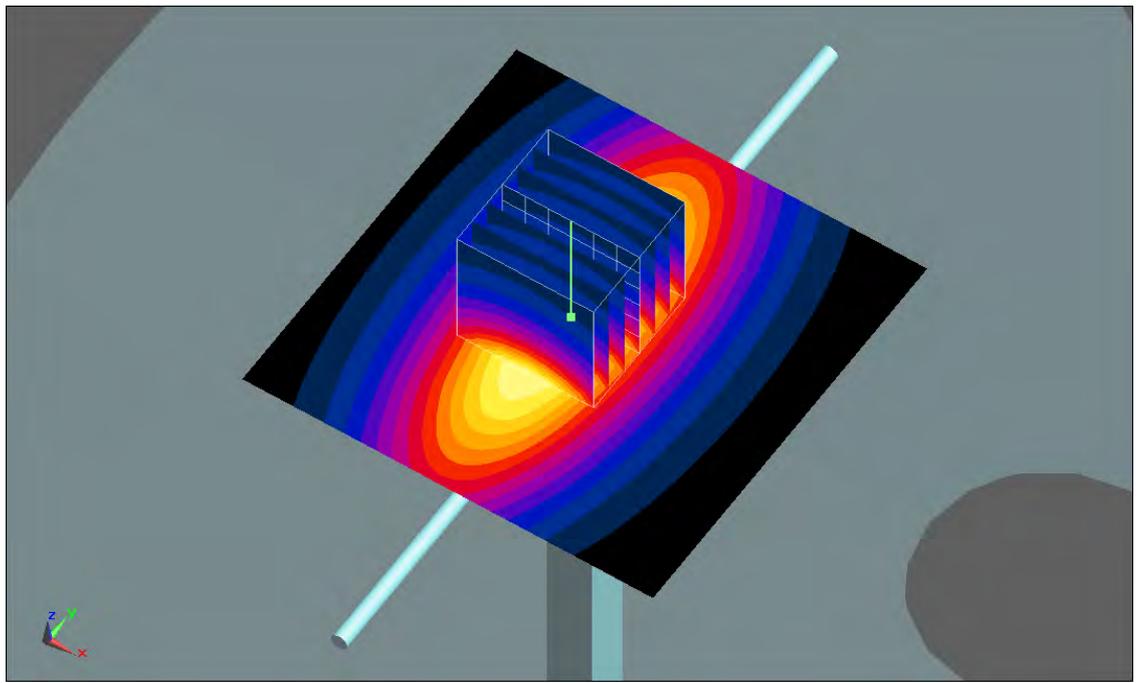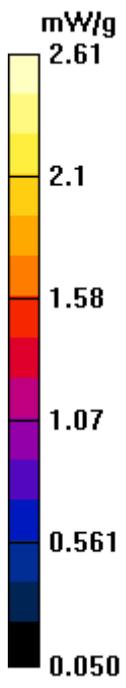Maximum value of SAR (interpolated) = 2.61 mW/g

**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.9 V/m; Power Drift = -0.00644 dB
Peak SAR (extrapolated) = 3.59 W/kg
**SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.6 mW/g**
Maximum value of SAR (measured) = 2.61 mW/g

**System Check_Head_835MHz_110304**

**DUT: Dipole 835 MHz**

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL_835_110304 Medium parameters used: f = 835 MHz; σ = 0.901 mho/m; $\varepsilon_r$ = 41.6; ρ = 1000 kg/m$^3$
Ambient Temperature：23.4 ℃；Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
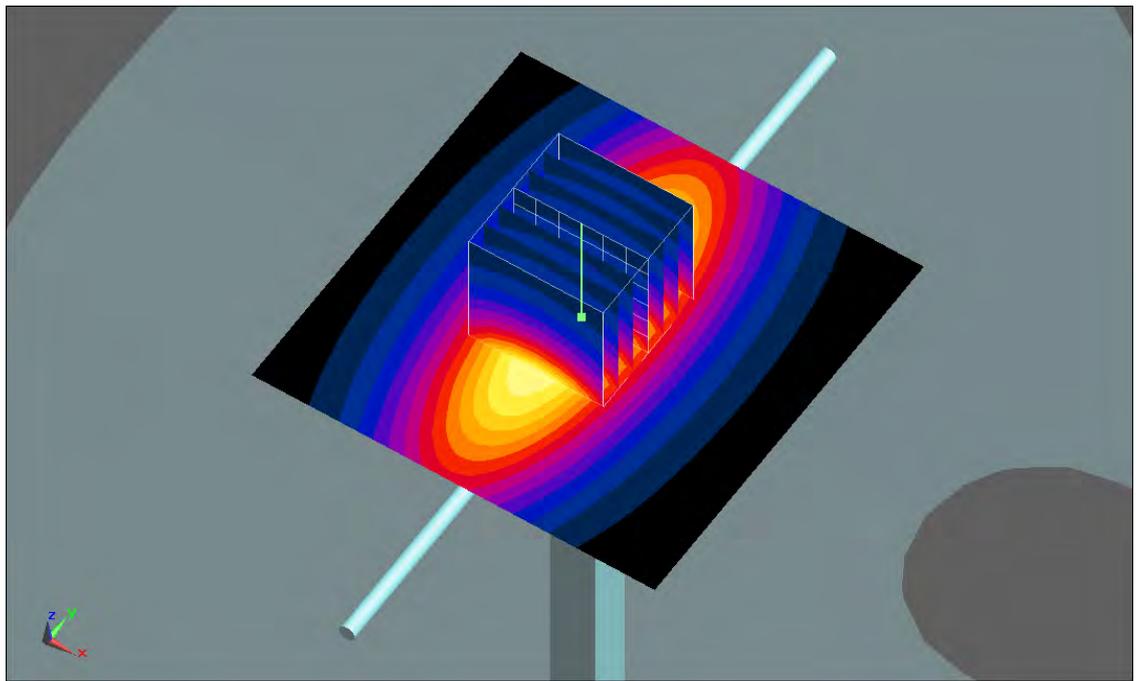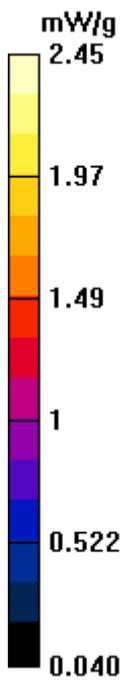Maximum value of SAR (interpolated) = 2.45 mW/g

**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.9 V/m; Power Drift = -0.00849 dB
Peak SAR (extrapolated) = 3.41 W/kg
**SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.48 mW/g**
Maximum value of SAR (measured) = 2.45 mW/g

**System Check_Body_835MHz_110301**

**DUT: Dipole 835 MHz**

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835_110301 Medium parameters used: f = 835 MHz; σ = 0.977 mho/m; $\varepsilon_r$ = 54.4; ρ =

1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
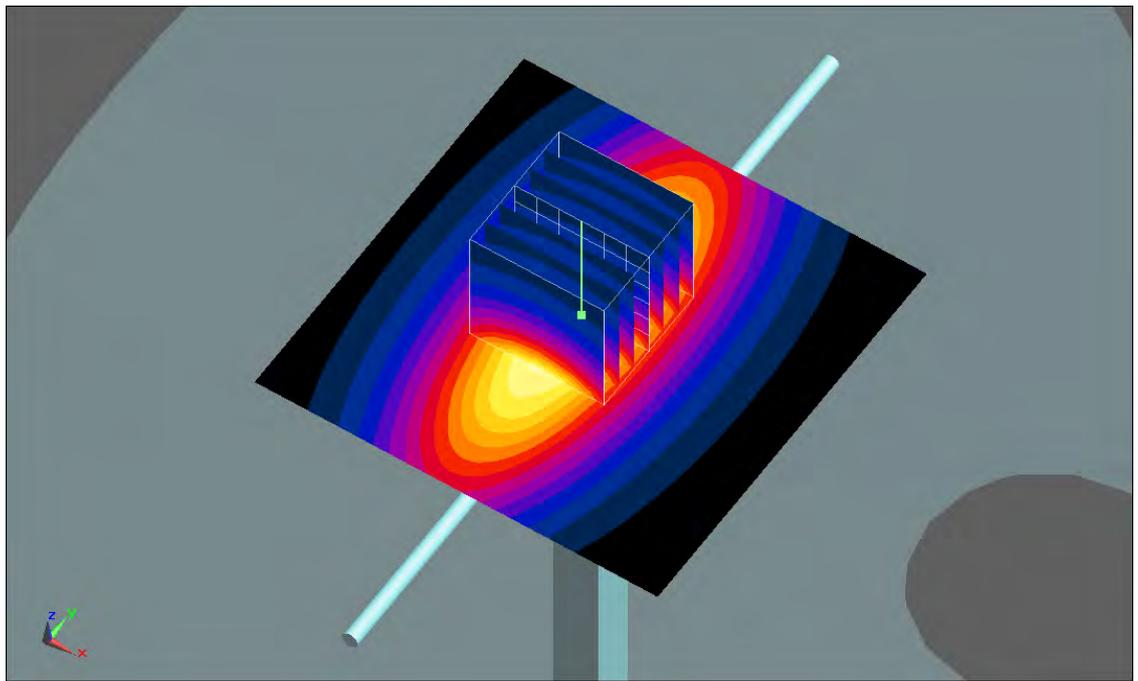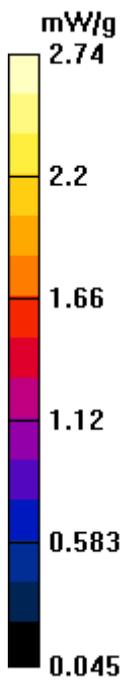Maximum value of SAR (interpolated) = 2.74 mW/g

**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.4 V/m; Power Drift = 0.00646 dB
Peak SAR (extrapolated) = 3.81 W/kg
**SAR(1 g) = 2.54 mW/g; SAR(10 g) = 1.67 mW/g**
Maximum value of SAR (measured) = 2.75 mW/g

**System Check_Body_835MHz_110302**

**DUT: Dipole 835 MHz**

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_850_110302 Medium parameters used: f = 835 MHz; σ = 0.963 mho/m; $\varepsilon_r$ = 54.6; ρ =

1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.12, 6.12, 6.12); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.64 mW/g

**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.6 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 3.44 W/kg
**SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.62 mW/g**
Maximum value of SAR (measured) = 2.64 mW/g
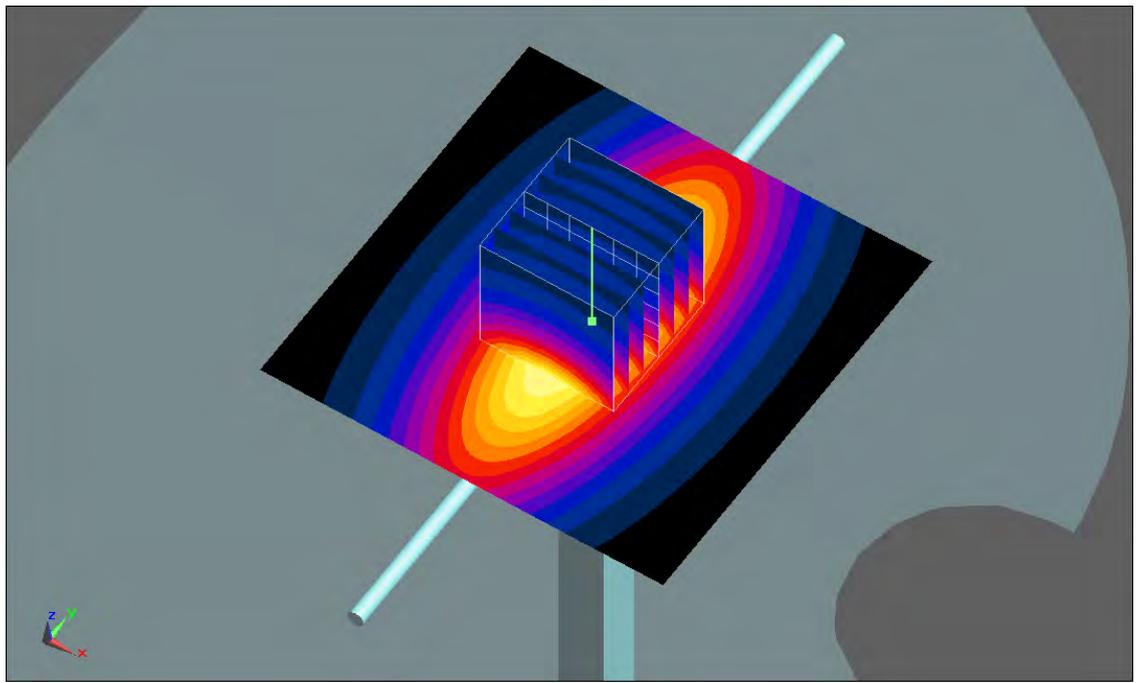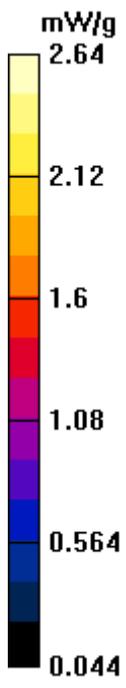
**System Check_Body_835MHz_110305**

**DUT: Dipole 835 MHz**

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835_110305 Medium parameters used: f = 835 MHz; $\sigma$ = 0.97 mho/m; $\varepsilon_r$ = 56.5; $\rho$ =

1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.51 mW/g

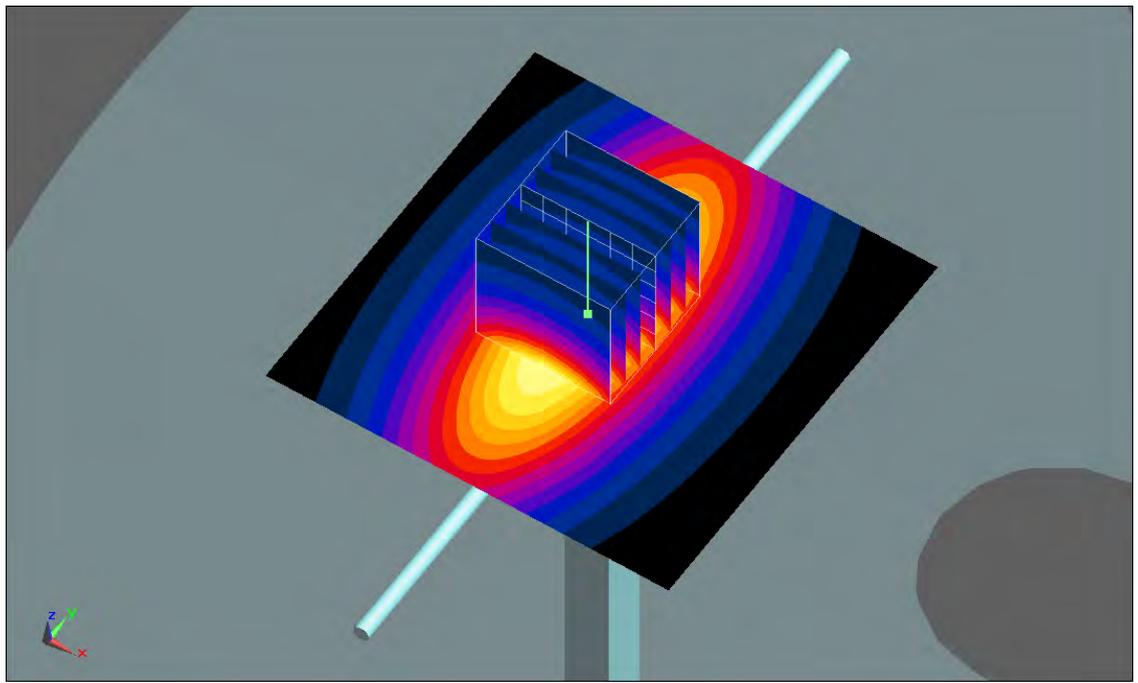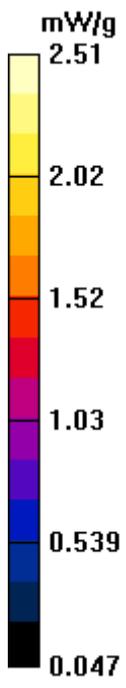**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 50.4 V/m; Power Drift = 0.00224 dB
Peak SAR (extrapolated) = 3.45 W/kg
**SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.54 mW/g**
Maximum value of SAR (measured) = 2.51 mW/g

# System Check_Body_835MHz_110324

## DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_850_110324 Medium parameters used: f = 835 MHz; $\sigma$ = 0.963 mho/m; $\varepsilon_r$ = 54.5; $\rho$ =

1000 kg/m$^3$
Ambient Temperature：22.6 ℃；Liquid Temperature：21. ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.99, 5.99, 5.99); Calibrated: 2010/9/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.80 mW/g

## Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.1 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 3.65 W/kg
**SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.71 mW/g**
Maximum value of SAR (measured) = 2.80 mW/g
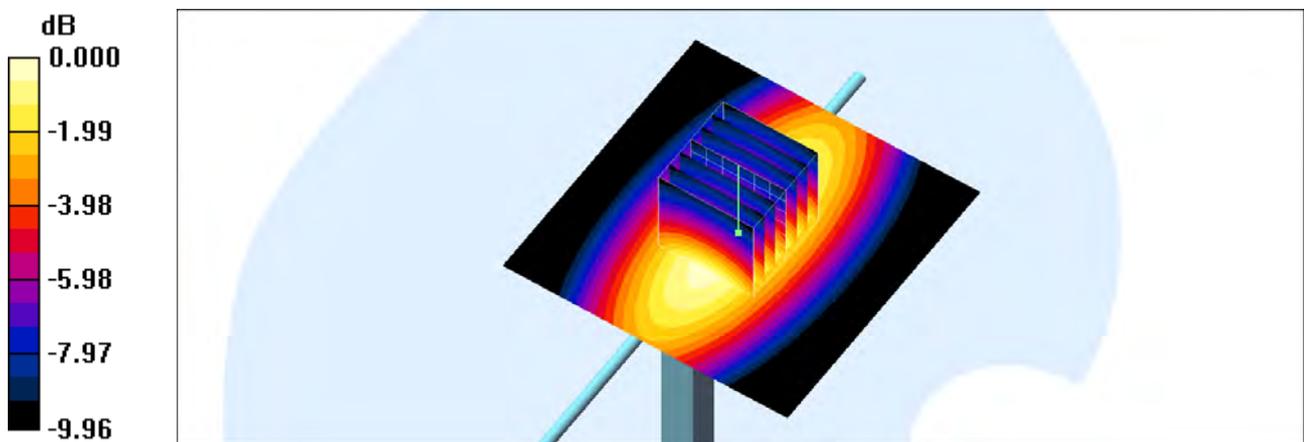


0 dB = 2.80mW/g

# System Check_Body_835MHz_110328

## DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_850_110328 Medium parameters used: f = 835 MHz; σ = 0.994

mho/m; $\varepsilon_r$ = 56; ρ = 1000 kg/m$^3$

Ambient Temperature：22.3 ℃; Liquid Temperature：21.4 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3731; ConvF(8.84, 8.84, 8.84); Calibrated: 2010/9/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2010/8/18
- Phantom: SAM_Right; Type: SAM; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.69 mW/g

## Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.0 V/m; Power Drift = 0.021 dB
Peak SAR (extrapolated) = 4.09 W/kg
**SAR(1 g) = 2.5 mW/g; SAR(10 g) = 1.59 mW/g**
Maximum value of SAR (measured) = 2.69 mW/g
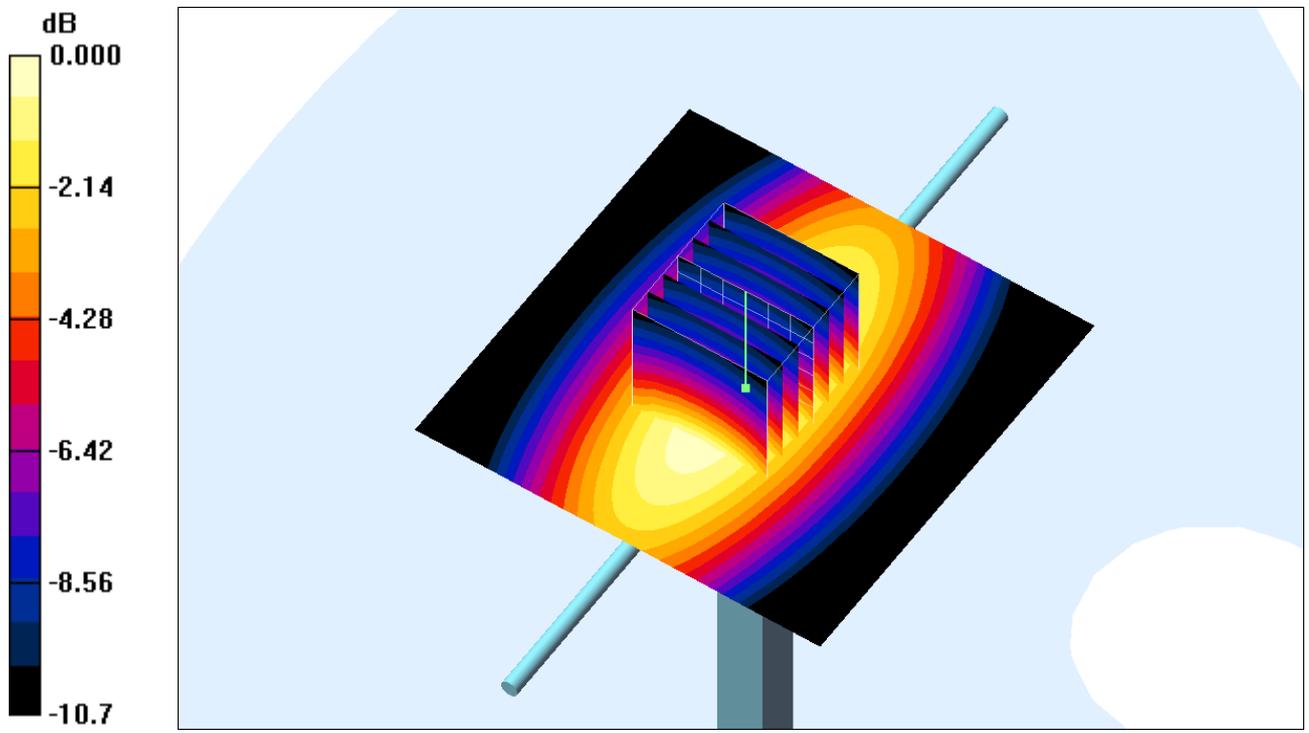
0 dB = 2.69mW/g

**System Check_Head_1900MHz_110304**

**DUT: Dipole 1900 MHz**

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL_1900_110304 Medium parameters used: f = 1900 MHz; σ = 1.44 mho/m; $\varepsilon_r$ = 39.7; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 10.8 mW/g

**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.2 V/m; Power Drift = 0.00293 dB
Peak SAR (extrapolated) = 18.6 W/kg
**SAR(1 g) = 9.49 mW/g; SAR(10 g) = 4.81 mW/g**
Maximum value of SAR (measured) = 10.6 mW/g
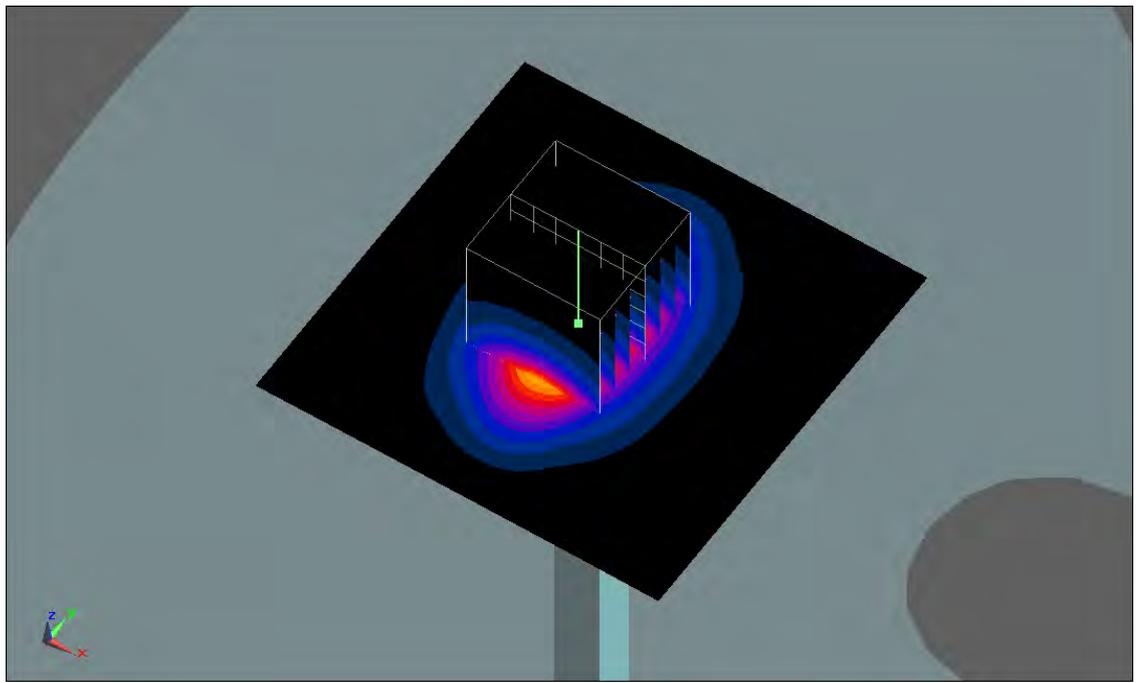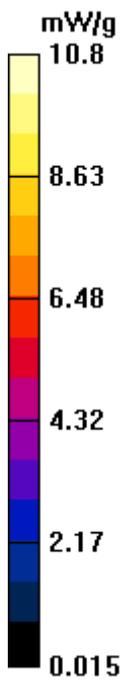
**System Check_Body_1900MHz_110302**

**DUT: Dipole 1900 MHz**

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110302 Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; $\varepsilon_r$ = 52.9; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.3 ℃; Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.47, 4.47, 4.47); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.7 mW/g

**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.7 V/m; Power Drift = 0.0021 dB
Peak SAR (extrapolated) = 16.6 W/kg
**SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.67 mW/g**
Maximum value of SAR (measured) = 12.1 mW/g
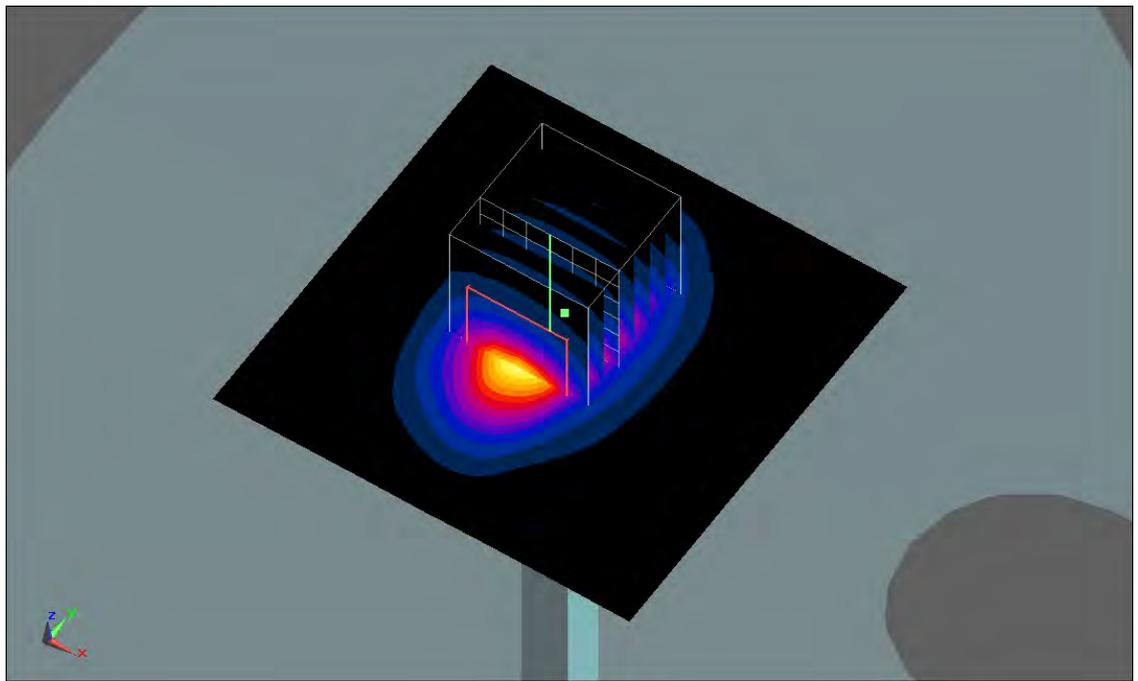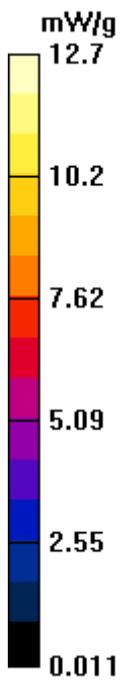
**System Check_Body_1900MHz_110303**

**DUT: Dipole 1900 MHz**

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110303 Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; $\varepsilon_r$ = 52.5; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.47, 4.47, 4.47); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.5 mW/g

**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.2 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 16.3 W/kg
**SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.58 mW/g**
Maximum value of SAR (measured) = 11.8 mW/g
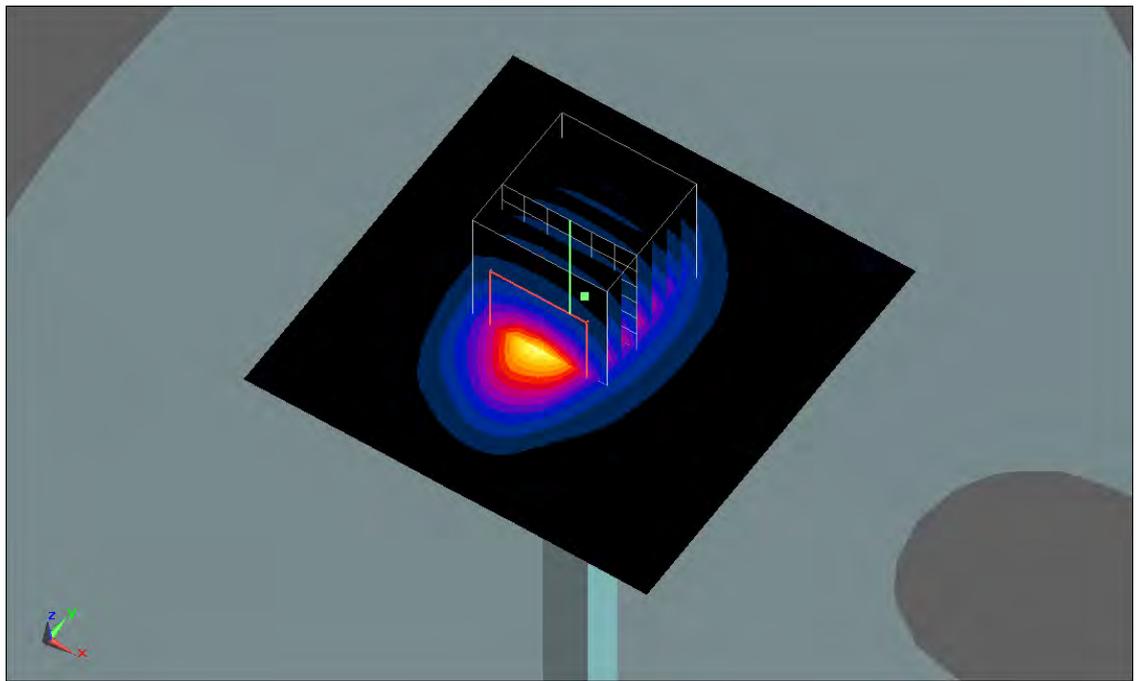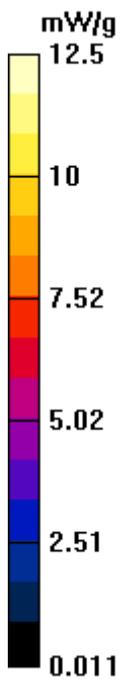
**System Check_Body_1900MHz_110305**

**DUT: Dipole 1900 MHz**

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110305 Medium parameters used: f = 1900 MHz; $\sigma$ = 1.54 mho/m; $\varepsilon_r$ = 54.6; $\rho$

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.26, 7.26, 7.26); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.3 mW/g

**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.2 V/m; Power Drift = -0.000404 dB
Peak SAR (extrapolated) = 21.1 W/kg
**SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.46 mW/g**
Maximum value of SAR (measured) = 12 mW/g
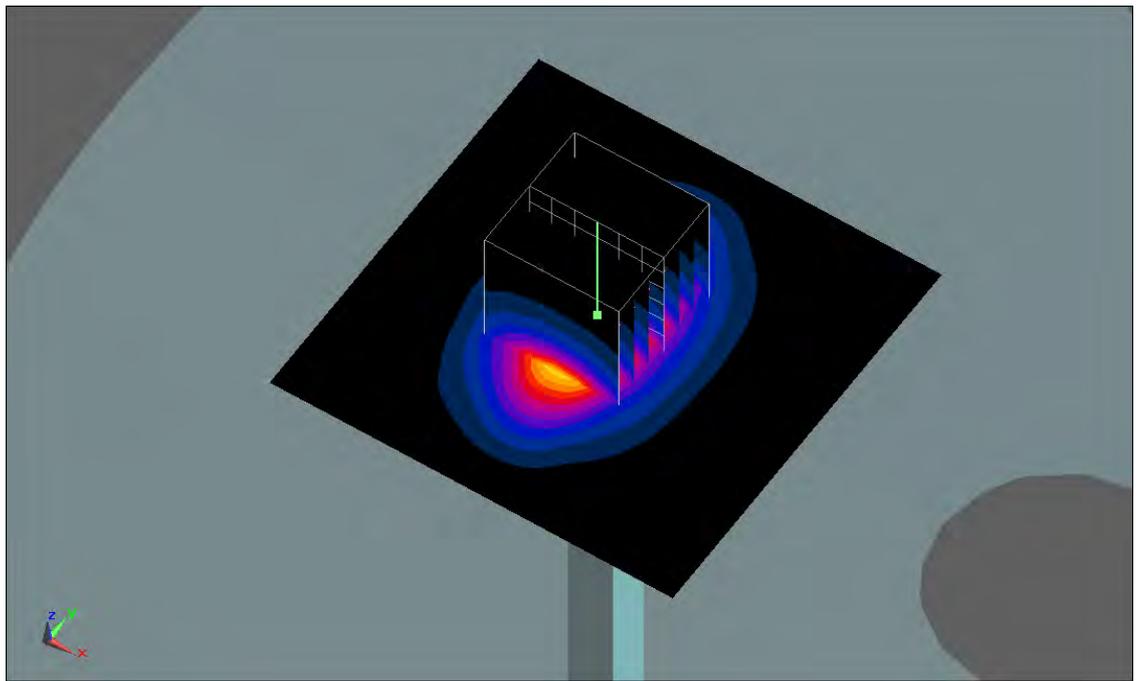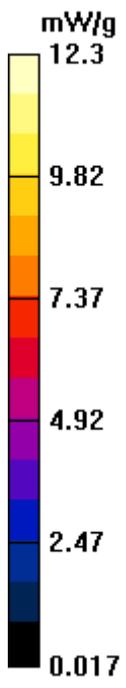
# System Check_Body_1900MHz_110324

**DUT: Dipole 1900 MHz**

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110324 Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; $\varepsilon_r$ = 52.9; ρ

= 1000 kg/m$^3$
Ambient Temperature：22.6 ℃；Liquid Temperature：21.6 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3731; ConvF(7.13, 7.13, 7.13); Calibrated: 2010/9/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2011/1/13
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.6 mW/g

**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 140.1 V/m; Power Drift = -0.005 dB
Peak SAR (extrapolated) = 64.6 W/kg
**SAR(1 g) = 10.7 mW/g; SAR(10 g) = 5.51 mW/g**
Maximum value of SAR (measured) = 11.9 mW/g
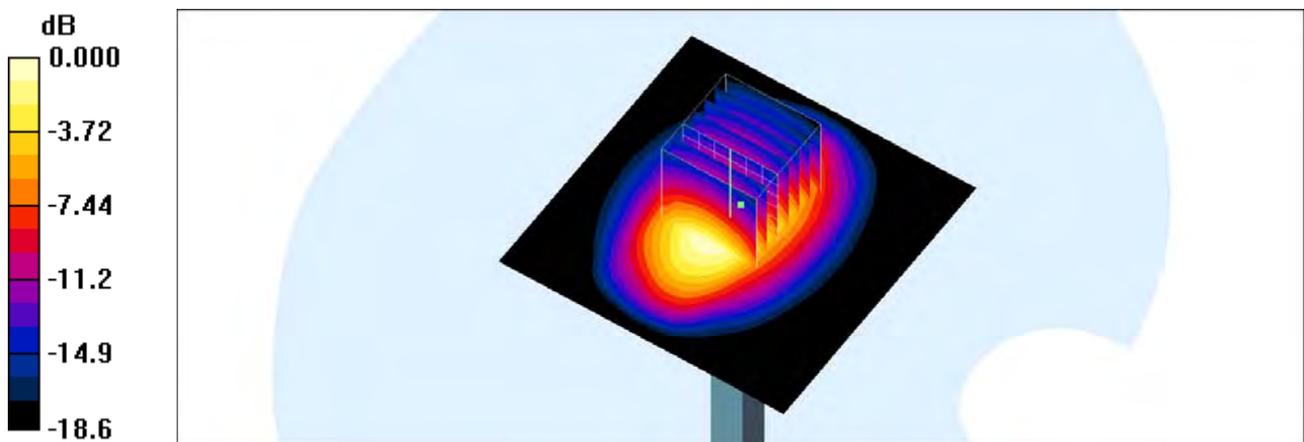


0 dB = 32.4mW/g

# System Check_Body_1900MHz_110329

## DUT: Dipole 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110329 Medium parameters used: f = 1900 MHz; $\sigma$ = 1.54 mho/m; $\varepsilon_r$ = 52.5; $\rho$ = 1000 kg/m$^3$
Ambient Temperature：22.0 ℃; Liquid Temperature：21.5 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.47, 4.47, 4.47); Calibrated: 2010/5/18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2010/8/18
- Phantom: SAM_Right; Type: SAM; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.3 mW/g

## Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.7 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 16.0 W/kg
**SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.48 mW/g**
Maximum value of SAR (measured) = 11.7 mW/g
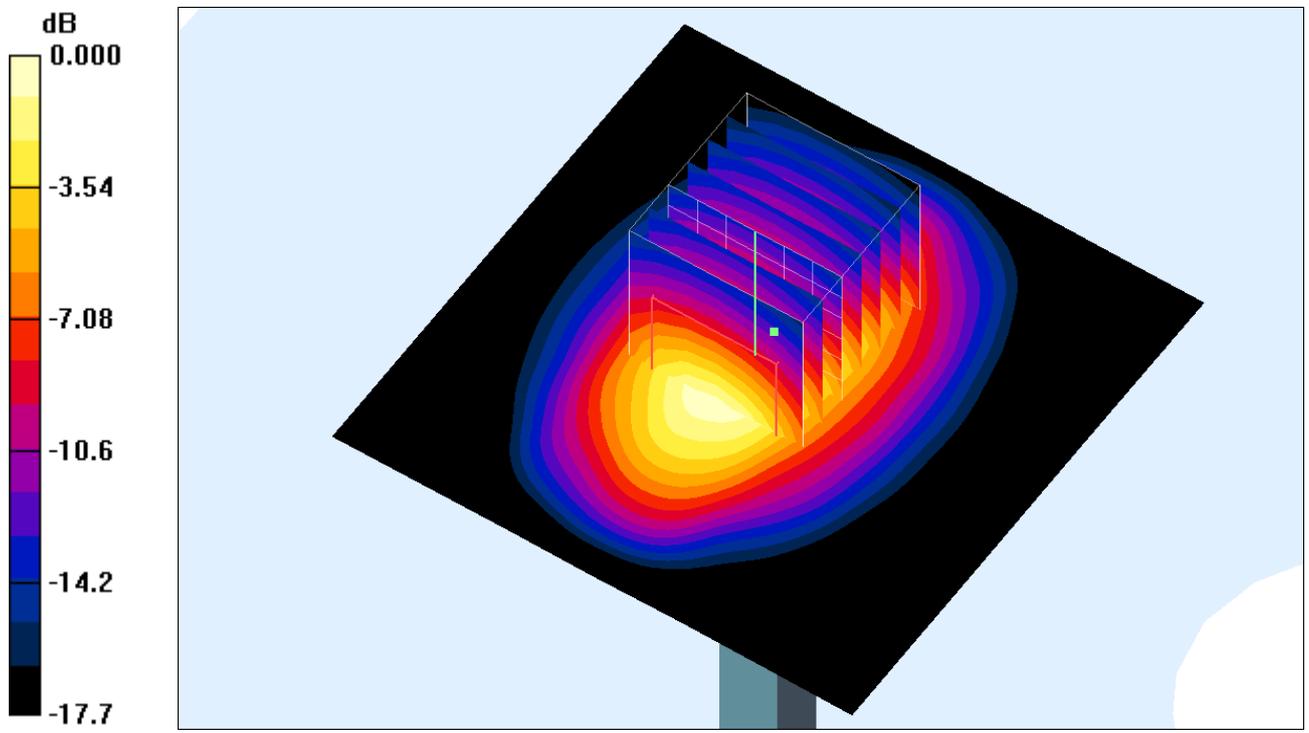
0 dB = 11.7mW/g

# *Appendix B.     Plots of SAR Measurement*

The plots are shown as follows.

**#18 GSM850_Right Cheek_Slide Off_Ch251_Samsung**

**DUT: 121417**

Communication System: Generic GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: HSL_835_110228 Medium parameters used: f = 849 MHz; σ = 0.93 mho/m; $\varepsilon_r$ = 41.4; ρ =

1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


**Ch251/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.629 mW/g

**Ch251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.86 V/m; Power Drift = -0.103 dB
Peak SAR (extrapolated) = 0.732 W/kg
**SAR(1 g) = 0.591 mW/g; SAR(10 g) = 0.435 mW/g**
Maximum value of SAR (measured) = 0.625 mW/g

**#18 GSM850_Right Cheek_Slide Off_Ch251_Samsung_2D**

**DUT: 121417**

Communication System: Generic GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: HSL_835_110228 Medium parameters used: f = 849 MHz; σ = 0.93 mho/m; $\varepsilon_r$ = 41.4; ρ =

1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


**Ch251/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.629 mW/g

**Ch251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.86 V/m; Power Drift = -0.103 dB
Peak SAR (extrapolated) = 0.732 W/kg
**SAR(1 g) = 0.591 mW/g; SAR(10 g) = 0.435 mW/g**
Maximum value of SAR (measured) = 0.625 mW/g

1g/10g Averaged SAR
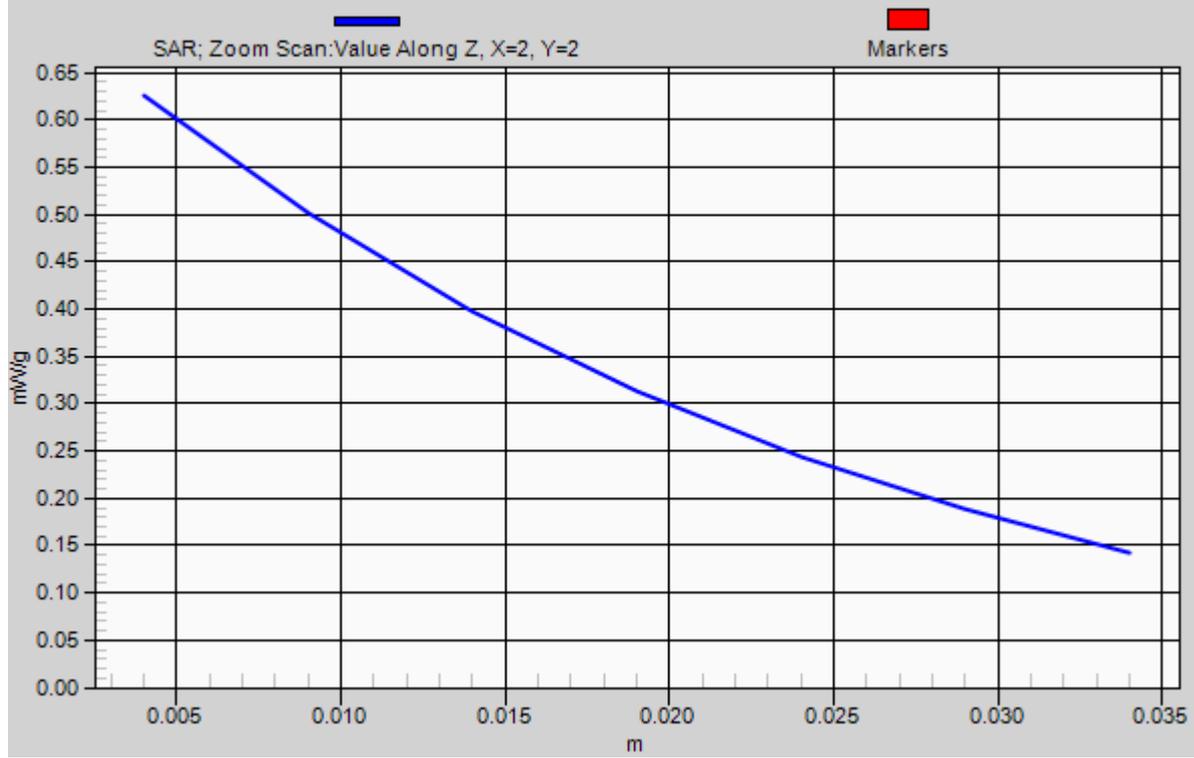
**#19 GSM850_Right Tilted_Slide Off_Ch251_Samsung**

**DUT: 121417**

Communication System: Generic GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: HSL_835_110228 Medium parameters used: f = 849 MHz; σ = 0.93 mho/m; $\varepsilon_r$ = 41.4; ρ = 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch251/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.433 mW/g

**Ch251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.5 V/m; Power Drift = 0.073 dB
Peak SAR (extrapolated) = 0.508 W/kg
**SAR(1 g) = 0.402 mW/g; SAR(10 g) = 0.302 mW/g**
Maximum value of SAR (measured) = 0.424 mW/g

**Ch251/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.5 V/m; Power Drift = 0.073 dB
Peak SAR (extrapolated) = 0.437 W/kg
**SAR(1 g) = 0.315 mW/g; SAR(10 g) = 0.210 mW/g**
Maximum value of SAR (measured) = 0.378 mW/g
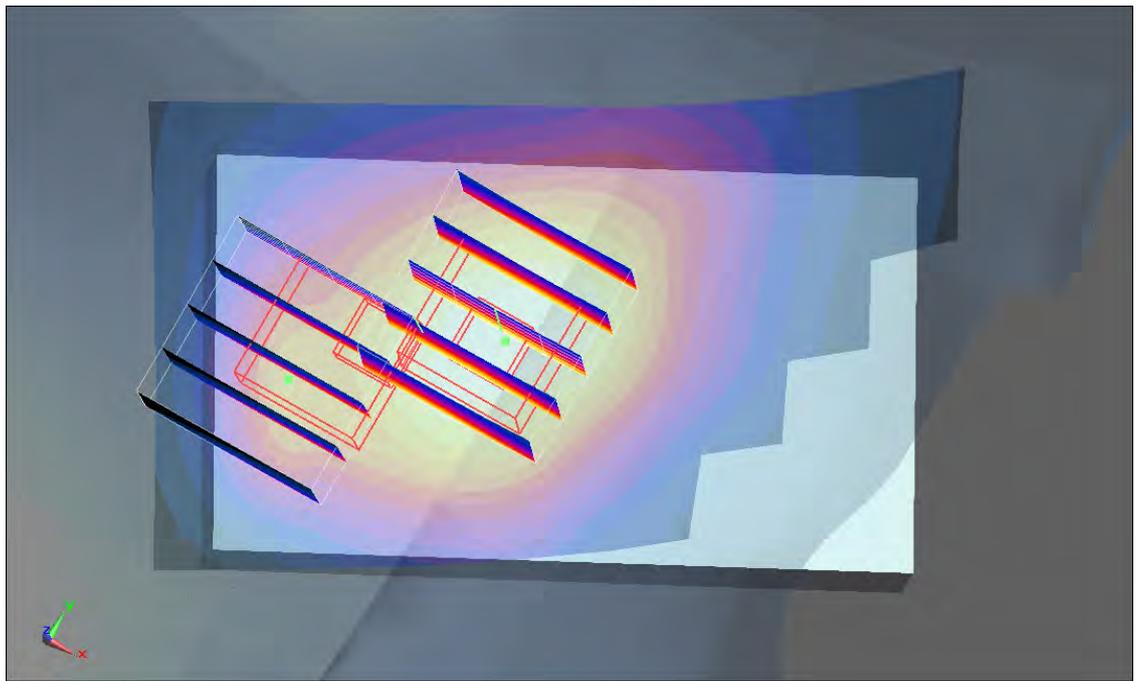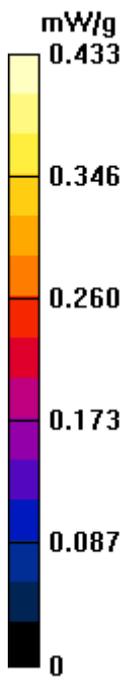
**#20 GSM850_Left Cheek_Slide Off_Ch251_Samsung**

**DUT: 121417**

Communication System: Generic GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: HSL_835_110228 Medium parameters used: f = 849 MHz; σ = 0.93 mho/m; $\varepsilon_r$ = 41.4; ρ =

1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


**Ch251/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
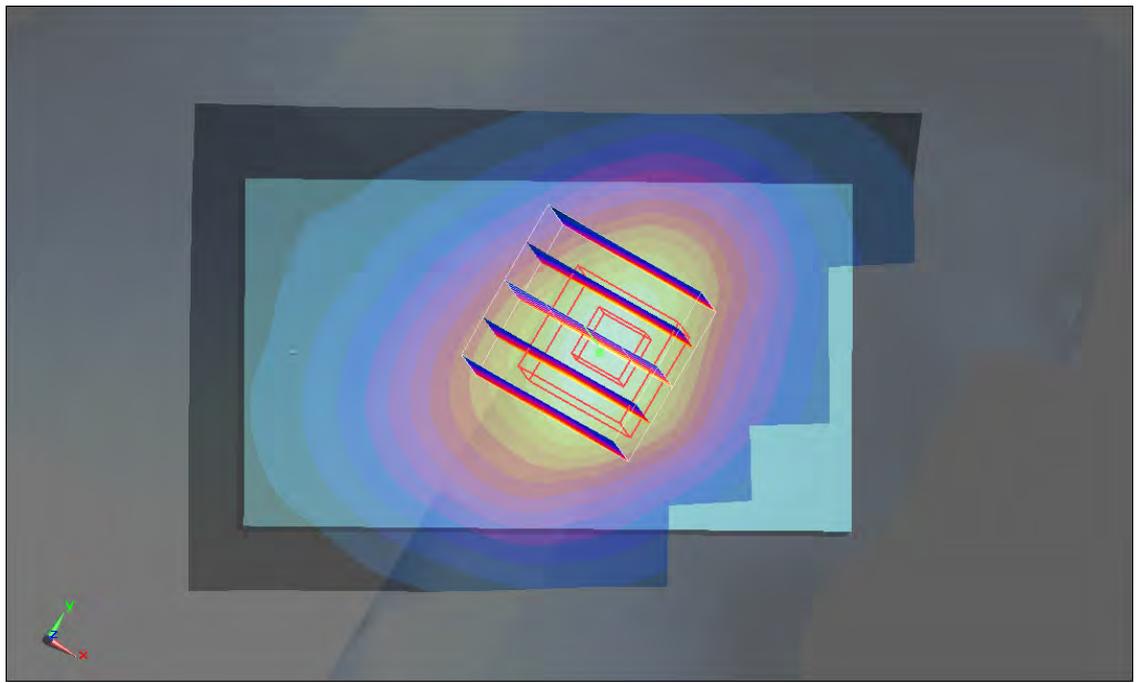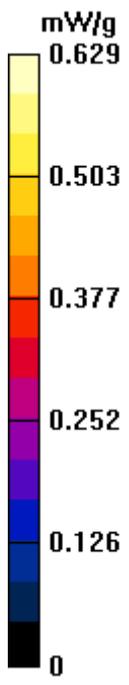Maximum value of SAR (interpolated) = 0.482 mW/g

**Ch251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.11 V/m; Power Drift = 0.080 dB
Peak SAR (extrapolated) = 0.617 W/kg
**SAR(1 g) = 0.488 mW/g; SAR(10 g) = 0.361 mW/g**
Maximum value of SAR (measured) = 0.512 mW/g

mW/g
0.482
0.386
0.289
0.193
0.096
0
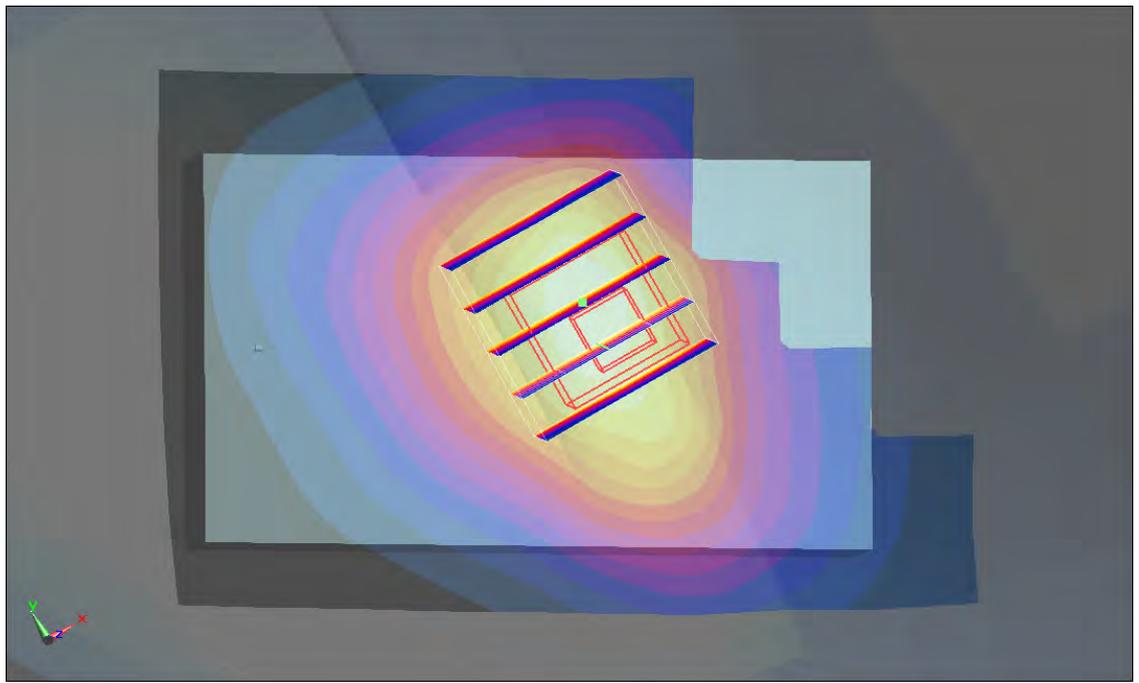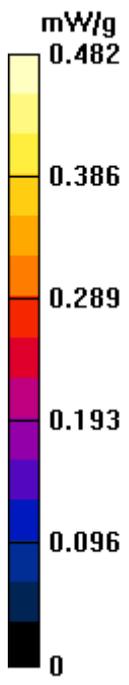
## #21 GSM850_Left Tilted_Slide Off_Ch251_Samsung

## DUT: 121417

Communication System: Generic GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: HSL_835_110228 Medium parameters used: f = 849 MHz; σ = 0.93 mho/m; ε$_r$ = 41.4; ρ =

1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

## Ch251/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.466 mW/g

## Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.4 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 0.557 W/kg
**SAR(1 g) = 0.433 mW/g; SAR(10 g) = 0.326 mW/g**
Maximum value of SAR (measured) = 0.452 mW/g

## Ch251/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.4 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 0.486 W/kg
**SAR(1 g) = 0.350 mW/g; SAR(10 g) = 0.229 mW/g**
Maximum value of SAR (measured) = 0.417 mW/g
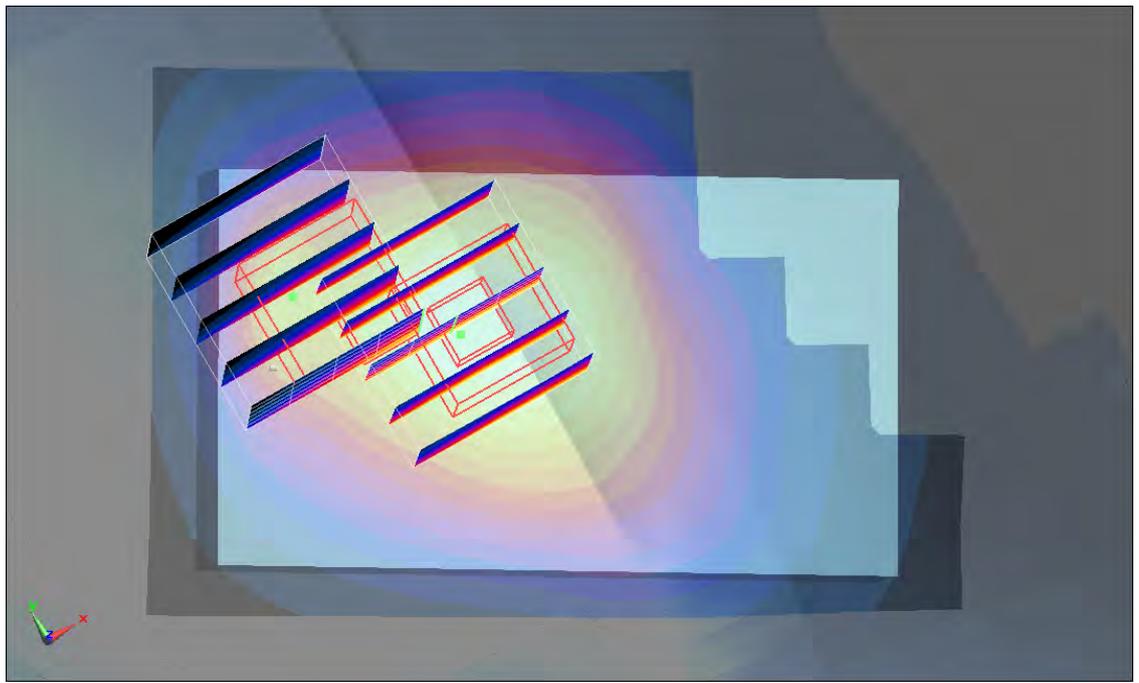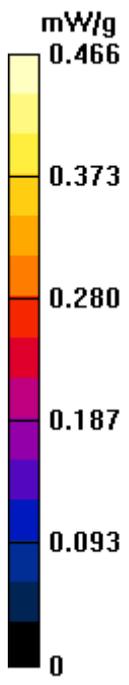
**#29 GSM1900_Right Cheek_Slide Off_Ch512_Samsung**

**DUT: 121417**

Communication System: Generic GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900_110304 Medium parameters used: f = 1850.2 MHz; σ = 1.4 mho/m; $\varepsilon_r$ = 39.9; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch512/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.216 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.38 V/m; Power Drift = 0.076 dB
Peak SAR (extrapolated) = 0.333 W/kg
**SAR(1 g) = 0.212 mW/g; SAR(10 g) = 0.132 mW/g**
Maximum value of SAR (measured) = 0.229 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.38 V/m; Power Drift = 0.076 dB
Peak SAR (extrapolated) = 0.283 W/kg
**SAR(1 g) = 0.196 mW/g; SAR(10 g) = 0.126 mW/g**
Maximum value of SAR (measured) = 0.209 mW/g
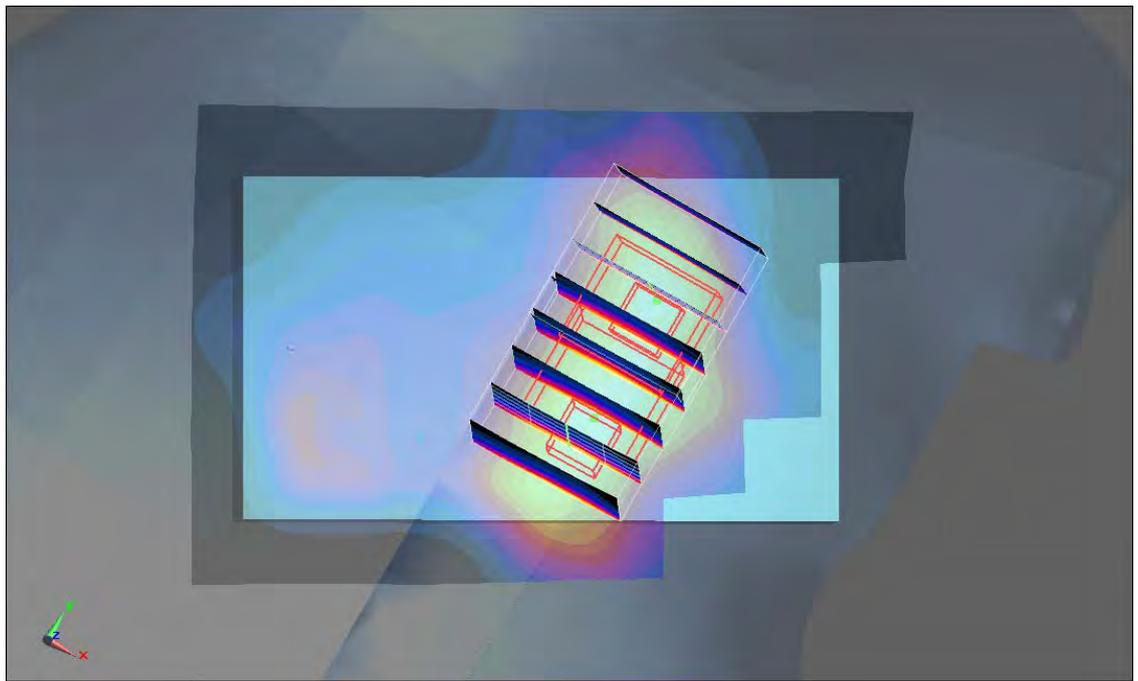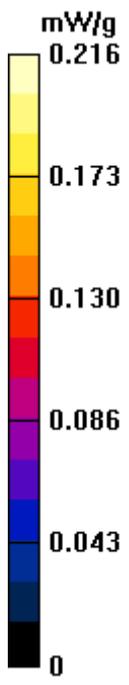
**#30 GSM1900_Right Tilted_Slide Off_Ch512_Samsung**

**DUT: 121417**

Communication System: Generic GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900_110304 Medium parameters used: f = 1850.2 MHz; σ = 1.4 mho/m; $\varepsilon_r$ = 39.9; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch512/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.237 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.5 V/m; Power Drift = -0.085 dB
Peak SAR (extrapolated) = 0.361 W/kg
**SAR(1 g) = 0.208 mW/g; SAR(10 g) = 0.110 mW/g**
Maximum value of SAR (measured) = 0.226 mW/g

## #31 GSM1900_Left Cheek_Slide Off_Ch512_Samsung

## DUT: 121417

Communication System: Generic GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900_110304 Medium parameters used: f = 1850.2 MHz; σ = 1.4 mho/m; $ε_r$ = 39.9; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


## Ch512/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.292 mW/g

## Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.48 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 0.406 W/kg
**SAR(1 g) = 0.267 mW/g; SAR(10 g) = 0.163 mW/g**
Maximum value of SAR (measured) = 0.292 mW/g

**#31 GSM1900_Left Cheek_Slide Off_Ch512_Samsung_2D**

**DUT: 121417**

Communication System: Generic GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900_110304 Medium parameters used: f = 1850.2 MHz; σ = 1.4 mho/m; $\varepsilon_r$ = 39.9;

ρ = 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch512/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.292 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.48 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 0.406 W/kg
**SAR(1 g) = 0.267 mW/g; SAR(10 g) = 0.163 mW/g**
Maximum value of SAR (measured) = 0.292 mW/g

1g/10g Averaged SAR
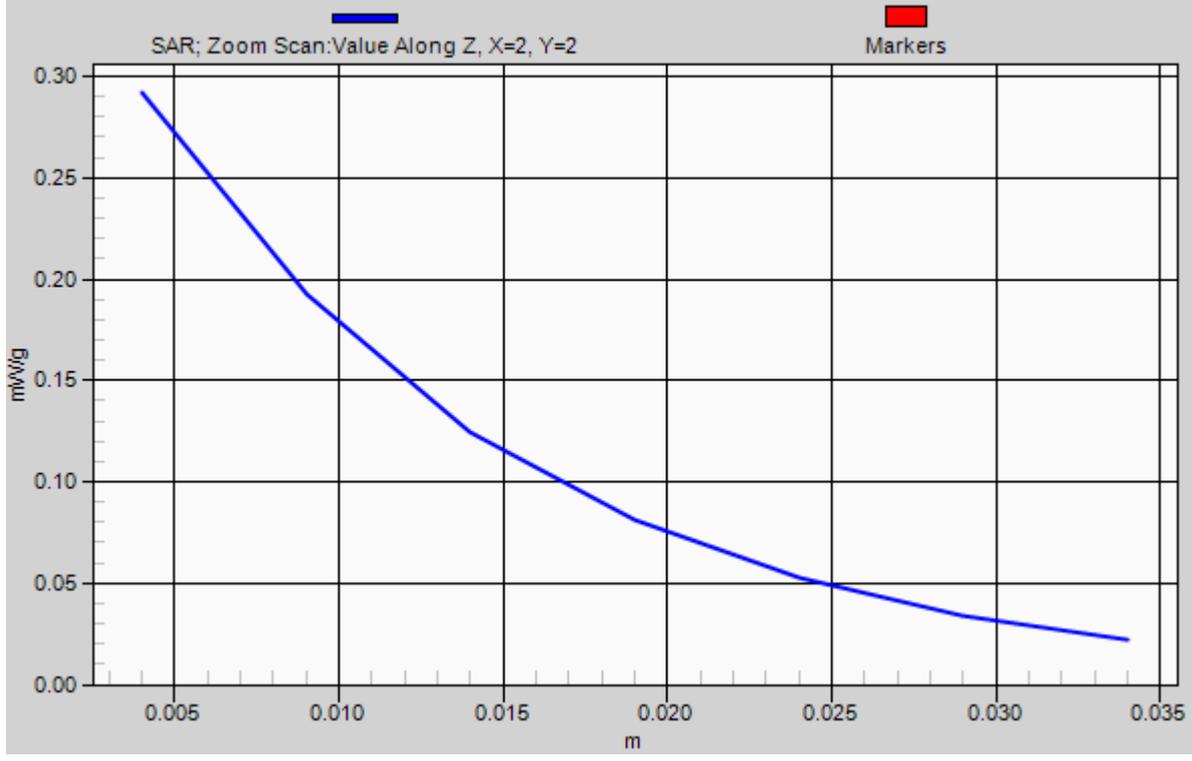
**#32 GSM1900_Left Tilted_Slide Off_Ch512_Samsung**

**DUT: 121417**

Communication System: Generic GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900_110304 Medium parameters used: f = 1850.2 MHz; σ = 1.4 mho/m; $ε_r$ = 39.9; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃; Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch512/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.194 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.3 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.278 W/kg
**SAR(1 g) = 0.167 mW/g; SAR(10 g) = 0.092 mW/g**
Maximum value of SAR (measured) = 0.187 mW/g
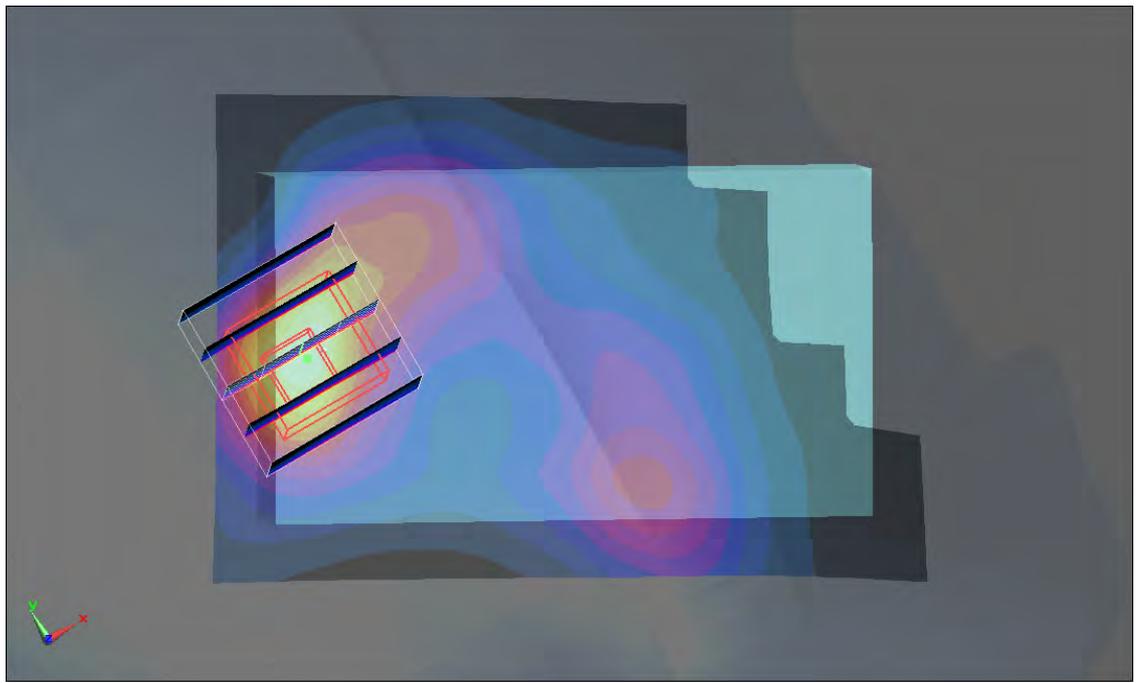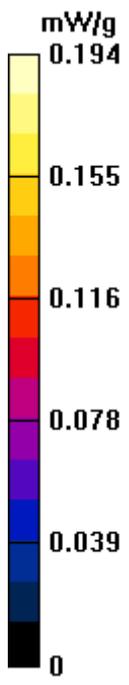
**#50 WCDMA V_RMC 12.2K_Right Cheek_Slide Off_Ch4182_LG**

**DUT: 121417**

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL_835_110304 Medium parameters used: f = 836.4 MHz; σ = 0.903 mho/m; $\varepsilon_r$ = 41.6; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.4 ℃；Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch4182/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
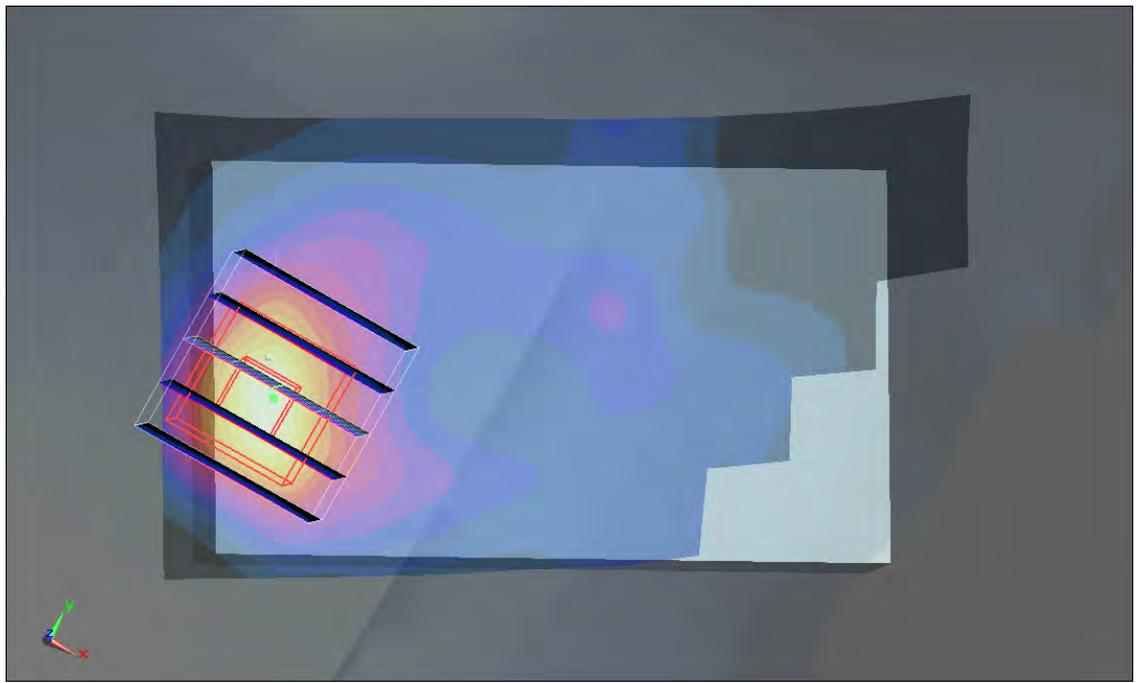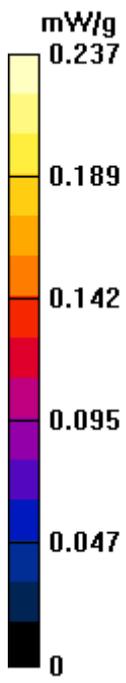Maximum value of SAR (interpolated) = 0.624 mW/g

**Ch4182/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = 0.0096 dB
Peak SAR (extrapolated) = 0.737 W/kg
**SAR(1 g) = 0.597 mW/g; SAR(10 g) = 0.447 mW/g**
Maximum value of SAR (measured) = 0.630 mW/g

## #50 WCDMA V_RMC 12.2K_Right Cheek_Slide Off_Ch4182_LG_2D

## DUT: 121417

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL_835_110304 Medium parameters used: f = 836.4 MHz; σ = 0.903 mho/m; $\varepsilon_r$ = 41.6;

$\rho$ = 1000 kg/m$^3$
Ambient Temperature：23.4 ℃；Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

## Ch4182/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.624 mW/g

## Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = 0.0096 dB
Peak SAR (extrapolated) = 0.737 W/kg
**SAR(1 g) = 0.597 mW/g; SAR(10 g) = 0.447 mW/g**
Maximum value of SAR (measured) = 0.630 mW/g

## #41 WCDMA V_RMC 12.2K_Right Tilted_Slide Off_Ch4182_Samsung

## DUT: 121417

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL_835_110304 Medium parameters used: f = 836.4 MHz; σ = 0.903 mho/m; $\varepsilon_r$ = 41.6; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.4 ℃；Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

## Ch4182/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
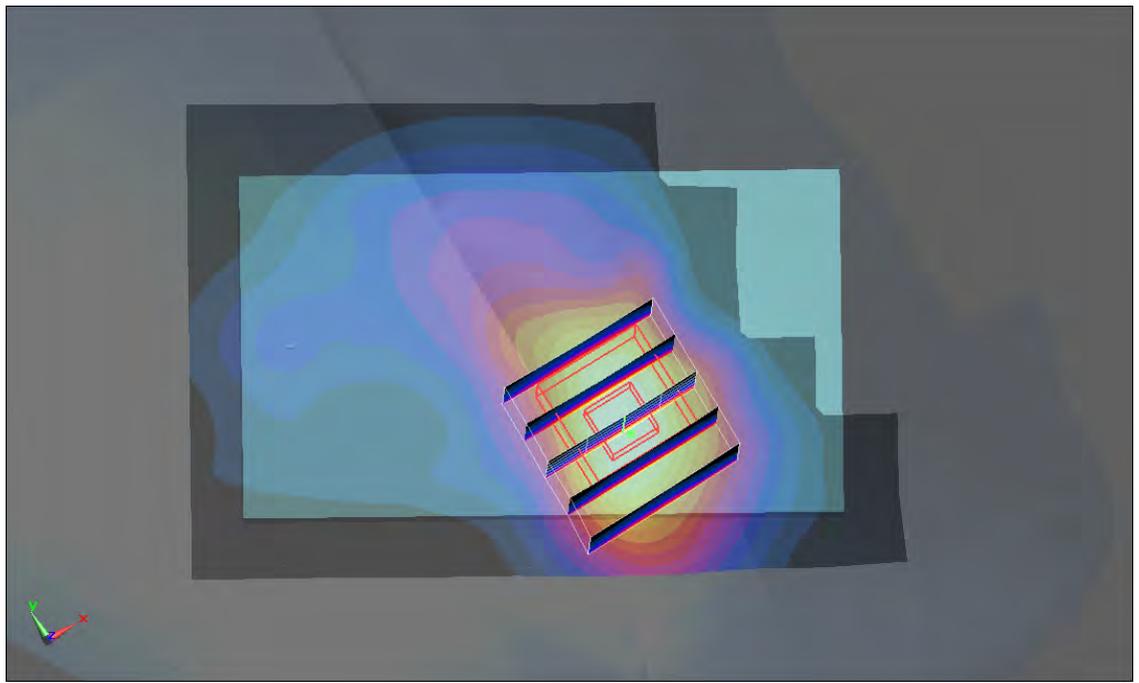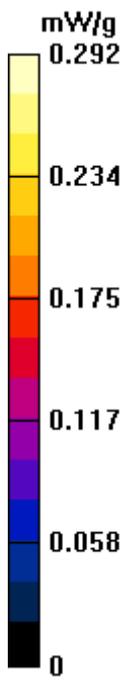Maximum value of SAR (interpolated) = 0.463 mW/g

## Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18 V/m; Power Drift = -0.111 dB
Peak SAR (extrapolated) = 0.552 W/kg
**SAR(1 g) = 0.440 mW/g; SAR(10 g) = 0.333 mW/g**
Maximum value of SAR (measured) = 0.462 mW/g
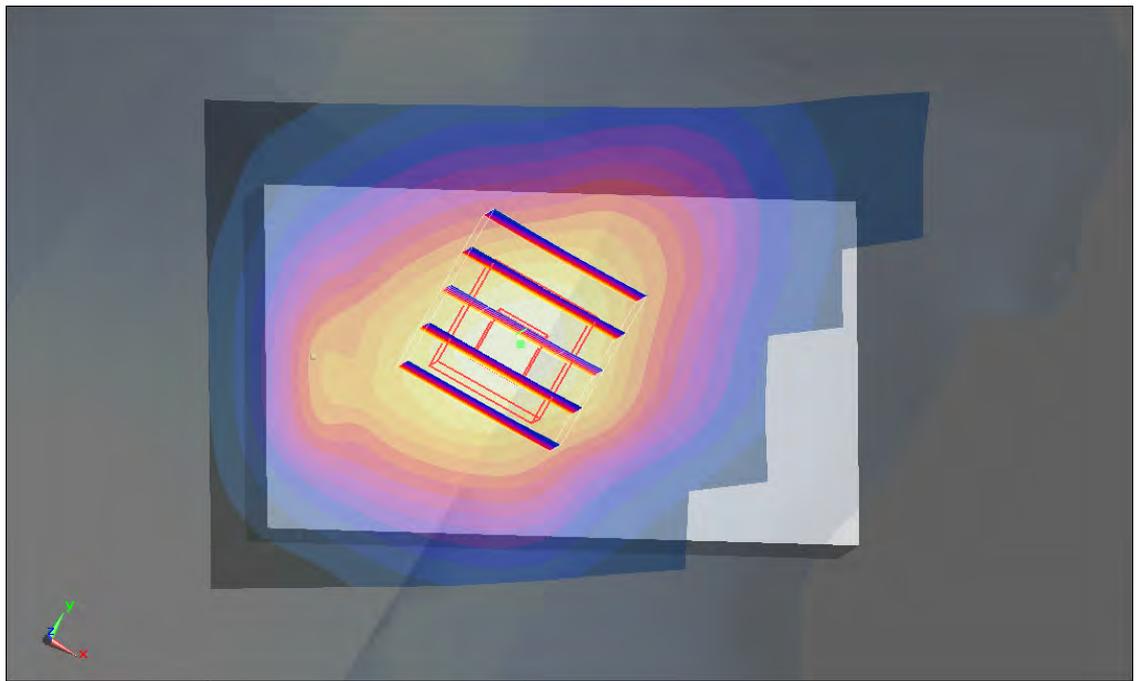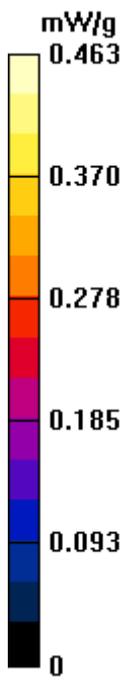
**#42 WCDMA V_RMC 12.2K_Left Cheek_Slide Off_Ch4182_Samsung**

**DUT: 121417**

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL_835_110304 Medium parameters used: f = 836.4 MHz; σ = 0.903 mho/m; $\varepsilon_r$ = 41.6; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.4 ℃；Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


**Ch4182/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.539 mW/g


**Ch4182/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.2 V/m; Power Drift = 0.060 dB
Peak SAR (extrapolated) = 0.626 W/kg
**SAR(1 g) = 0.510 mW/g; SAR(10 g) = 0.385 mW/g**
Maximum value of SAR (measured) = 0.536 mW/g

## #43 WCDMA V_RMC 12.2K_Left Tilted_Slide Off_Ch4182_Samsung

## DUT: 121417

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL_835_110304 Medium parameters used: f = 836.4 MHz; σ = 0.903 mho/m; $\varepsilon_r$ = 41.6; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.4 ℃；Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.67, 8.67, 8.67); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

## Ch4182/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.470 mW/g

## Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.3 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.561 W/kg
**SAR(1 g) = 0.448 mW/g; SAR(10 g) = 0.339 mW/g**
Maximum value of SAR (measured) = 0.465 mW/g

## Ch4182/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.3 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.520 W/kg
**SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.261 mW/g**
Maximum value of SAR (measured) = 0.449 mW/g
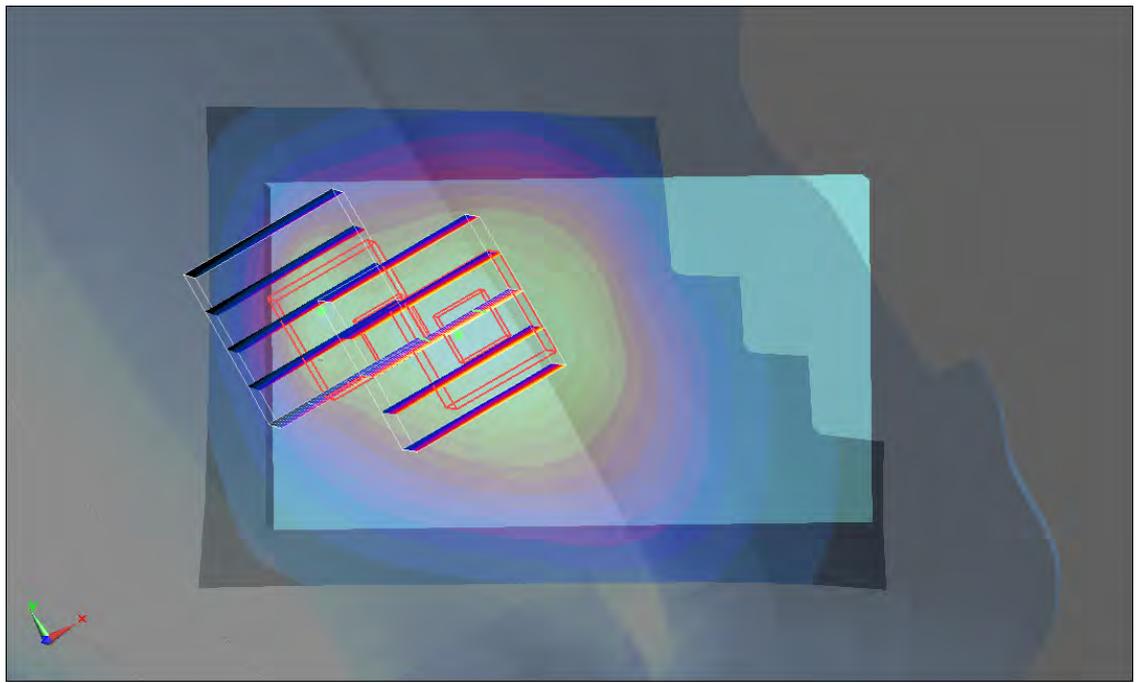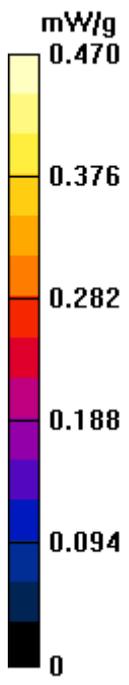
## #51 WCDMA II_RMC 12.2K_Right Cheek_Slide Off_Ch9400_Samsung

## DUT: 121417

Communication System: UMTS; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900_110304 Medium parameters used: f = 1880 MHz; $\sigma$ = 1.43 mho/m; $\varepsilon_r$ = 39.8; $\rho$ = 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


**Ch9400/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
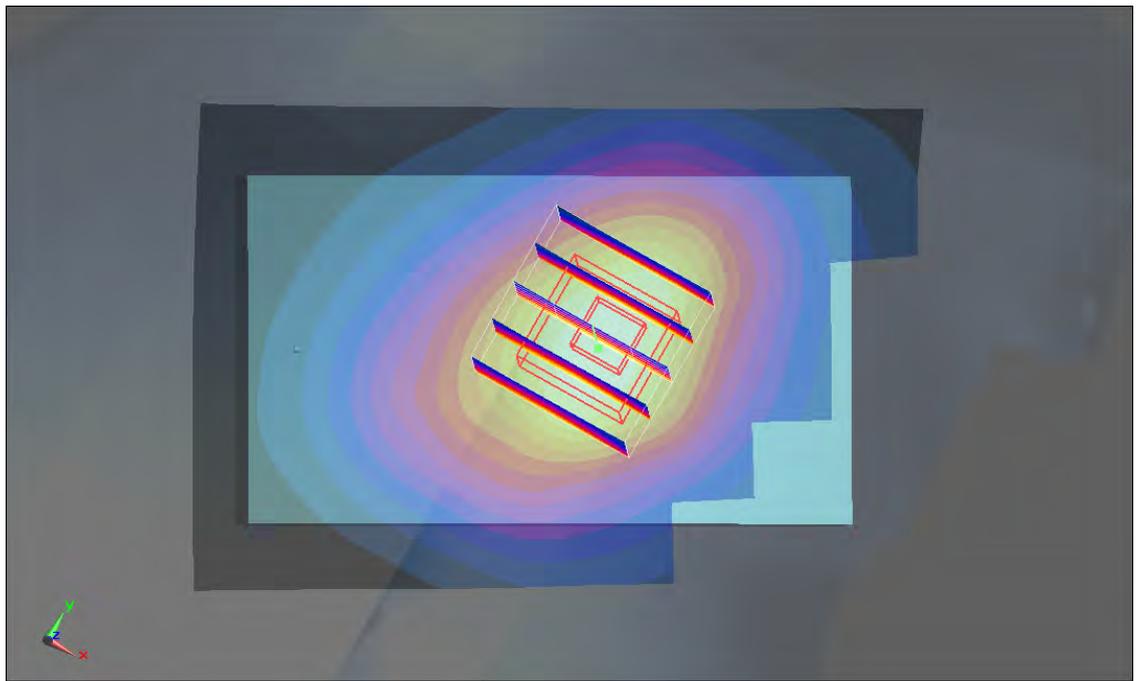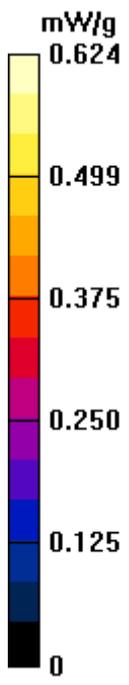Maximum value of SAR (interpolated) = 0.352 mW/g

**Ch9400/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10 V/m; Power Drift = 0.038 dB
Peak SAR (extrapolated) = 0.465 W/kg
**SAR(1 g) = 0.301 mW/g; SAR(10 g) = 0.194 mW/g**
Maximum value of SAR (measured) = 0.330 mW/g

**Ch9400/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10 V/m; Power Drift = 0.038 dB
Peak SAR (extrapolated) = 0.427 W/kg
**SAR(1 g) = 0.298 mW/g; SAR(10 g) = 0.193 mW/g**
Maximum value of SAR (measured) = 0.312 mW/g

**#52 WCDMA II_RMC 12.2K_Right Tilted_Slide Off_Ch9400_Samsung**

**DUT: 121417**

Communication System: UMTS; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900_110304 Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε$_r$ = 39.8; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch9400/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.369 mW/g

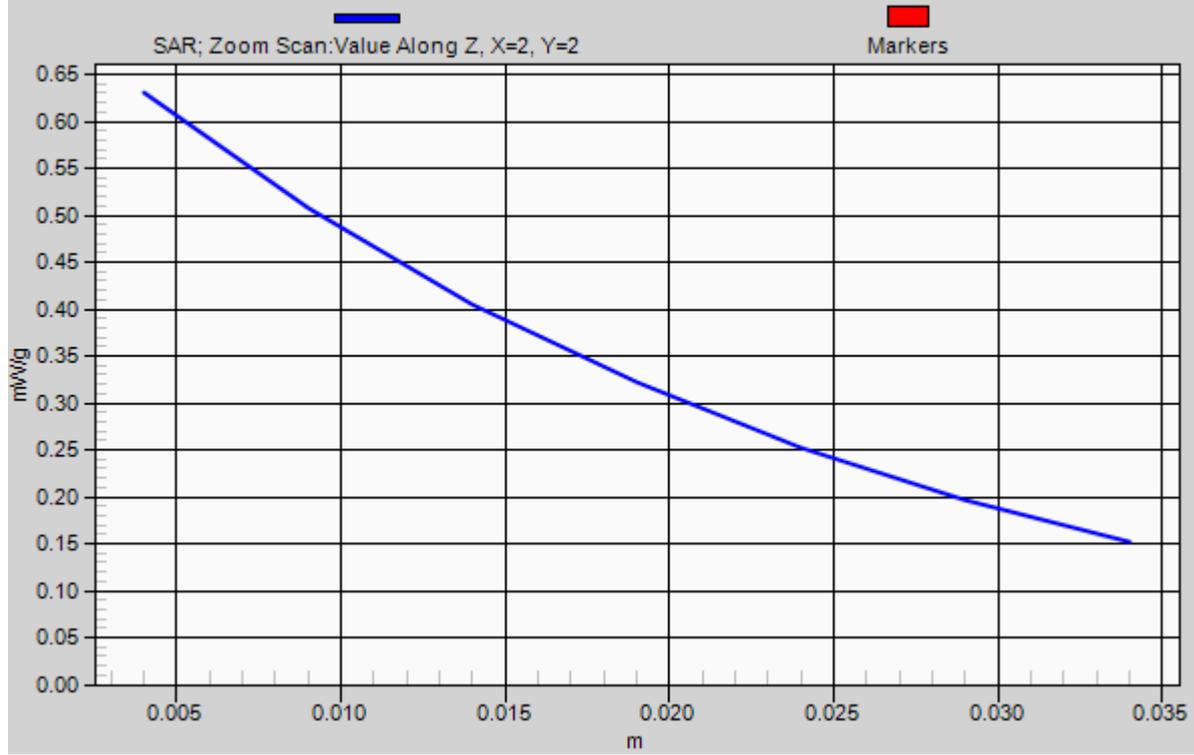**Ch9400/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.9 V/m; Power Drift = -0.101 dB
Peak SAR (extrapolated) = 1.09 W/kg
**SAR(1 g) = 0.427 mW/g; SAR(10 g) = 0.199 mW/g**
Maximum value of SAR (measured) = 0.366 mW/g

**#52 WCDMA II_RMC 12.2K_Right Tilted_Slide Off_Ch9400_Samsung_2D**

**DUT: 121417**

Communication System: UMTS; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900_110304 Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; $\varepsilon_r$ = 39.8; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


**Ch9400/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.369 mW/g


**Ch9400/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.9 V/m; Power Drift = -0.101 dB
Peak SAR (extrapolated) = 1.09 W/kg
**SAR(1 g) = 0.427 mW/g; SAR(10 g) = 0.199 mW/g**
Maximum value of SAR (measured) = 0.366 mW/g

1g/10g Averaged SAR

## #53 WCDMA II_RMC 12.2K_Left Cheek_Slide Off_Ch9400_Samsung

## DUT: 121417

Communication System: UMTS; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900_110304 Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; $\varepsilon_r$ = 39.8; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

## Ch9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
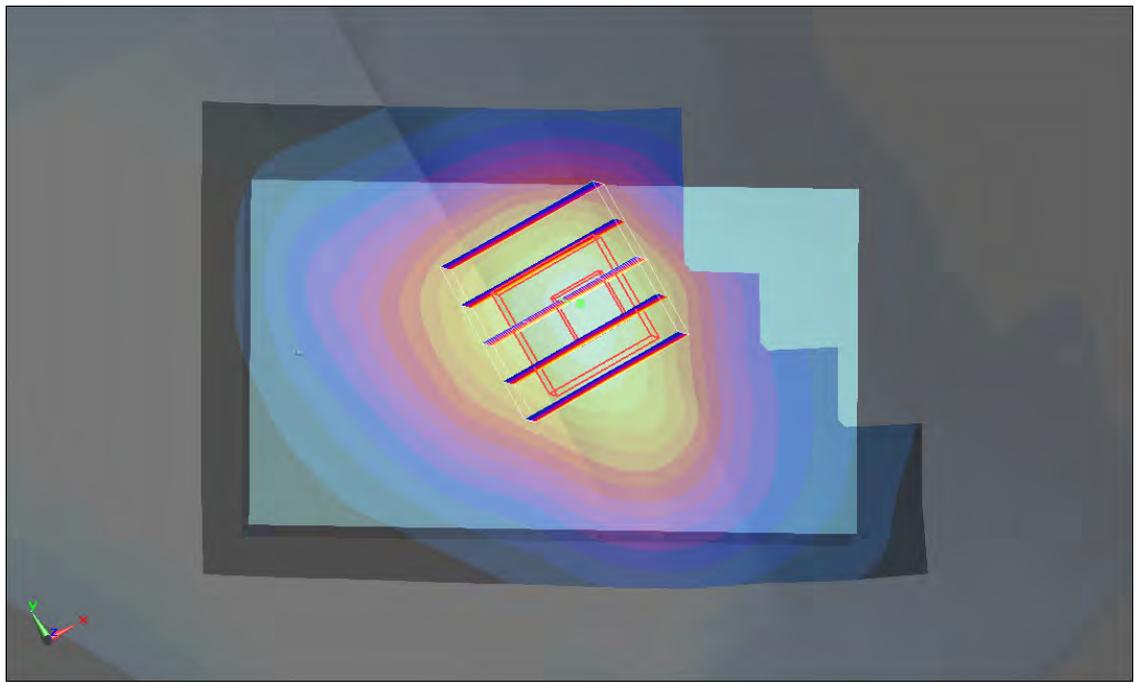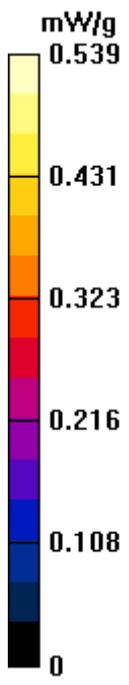Maximum value of SAR (interpolated) = 0.451 mW/g

## Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.48 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 0.629 W/kg
**SAR(1 g) = 0.408 mW/g; SAR(10 g) = 0.248 mW/g**
Maximum value of SAR (measured) = 0.447 mW/g

## #54 WCDMA II_RMC 12.2K_Left Tilted_Slide Off_Ch9400_Samsung

## DUT: 121417

Communication System: UMTS; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900_110304 Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; $\varepsilon_r$ = 39.8; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.39, 7.39, 7.39); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

## Ch9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.332 mW/g

## Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.4 V/m; Power Drift = 0.137 dB
Peak SAR (extrapolated) = 0.481 W/kg
**SAR(1 g) = 0.284 mW/g; SAR(10 g) = 0.155 mW/g**
Maximum value of SAR (measured) = 0.319 mW/g
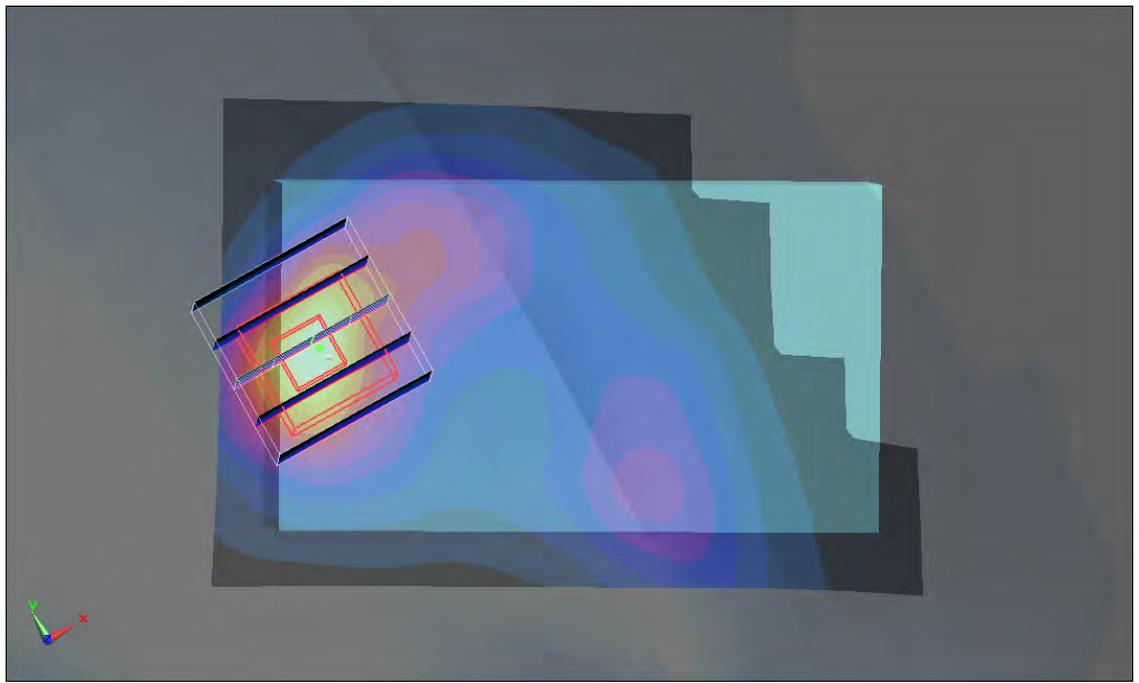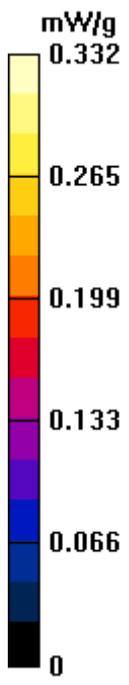
**#16 GSM850_GPRS10_Face_1.0cm_Ch251_Slide Off_Samsung**

**DUT: 121417**

Communication System: GPRS/EDGE 10; Frequency: 848.8 MHz;Duty Cycle: 1:4
Medium: MSL_835_110301 Medium parameters used: f = 849 MHz; σ = 0.989 mho/m; $ε_r$ = 54.3; ρ =

1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch251/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.380 mW/g

**Ch251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 0.461 W/kg
**SAR(1 g) = 0.355 mW/g; SAR(10 g) = 0.261 mW/g**
Maximum value of SAR (measured) = 0.378 mW/g

**#67 GSM850_GPRS10_Bottom_1.0cm_Ch189_Slide Off_LG**

**DUT: 121417**

Communication System: GPRS/EDGE 10; Frequency: 836.4 MHz;Duty Cycle: 1:4
Medium: MSL_835_110305 Medium parameters used: f = 836.4 MHz; σ = 0.972 mho/m; $\varepsilon_r$ = 56.5; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch189/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
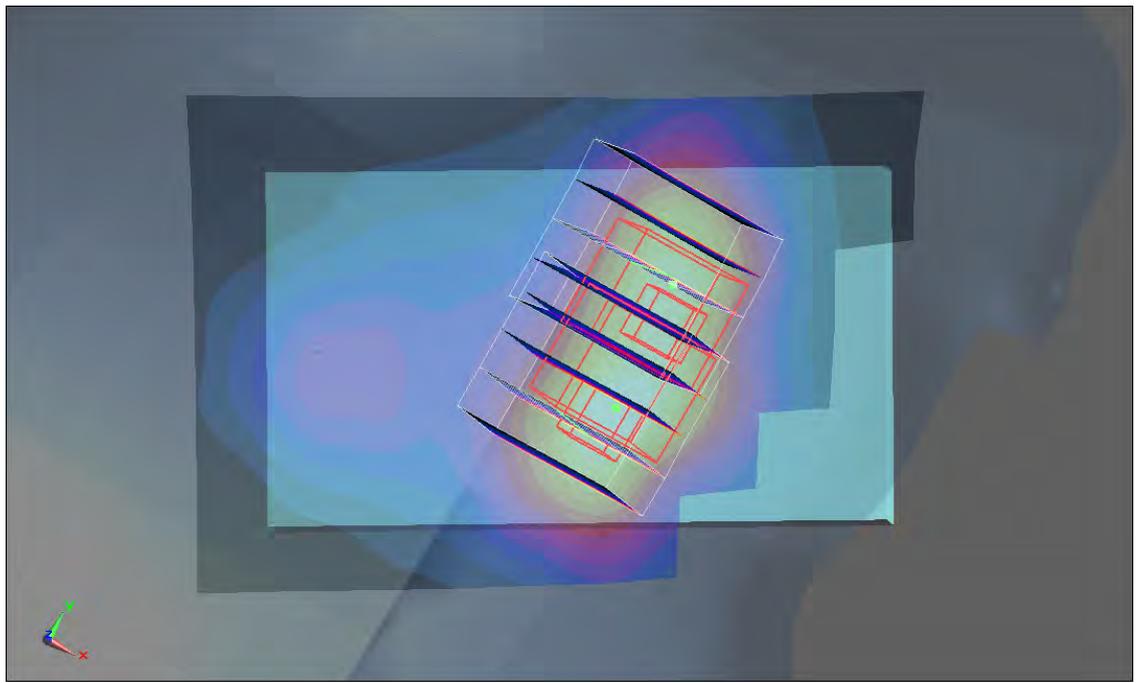Maximum value of SAR (interpolated) = 1.12 mW/g

**Ch189/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.6 V/m; Power Drift = -0.119 dB
Peak SAR (extrapolated) = 1.45 W/kg
**SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.744 mW/g**
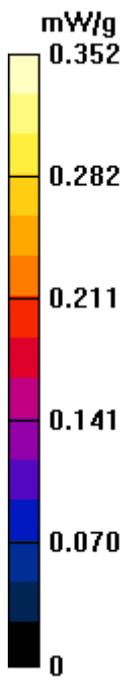Maximum value of SAR (measured) = 1.18 mW/g

**Ch189/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.6 V/m; Power Drift = -0.119 dB
Peak SAR (extrapolated) = 1.33 W/kg
**SAR(1 g) = 0.842 mW/g; SAR(10 g) = 0.576 mW/g**
Maximum value of SAR (measured) = 1.01 mW/g

**#67 GSM850_GPRS10_Bottom_1.0cm_Ch189_Slide Off_LG_2D**

**DUT: 121417**

Communication System: GPRS/EDGE 10; Frequency: 836.4 MHz;Duty Cycle: 1:4
Medium: MSL_835_110305 Medium parameters used: f = 836.4 MHz; σ = 0.972 mho/m; $\varepsilon_r$ = 56.5;

ρ = 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch189/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
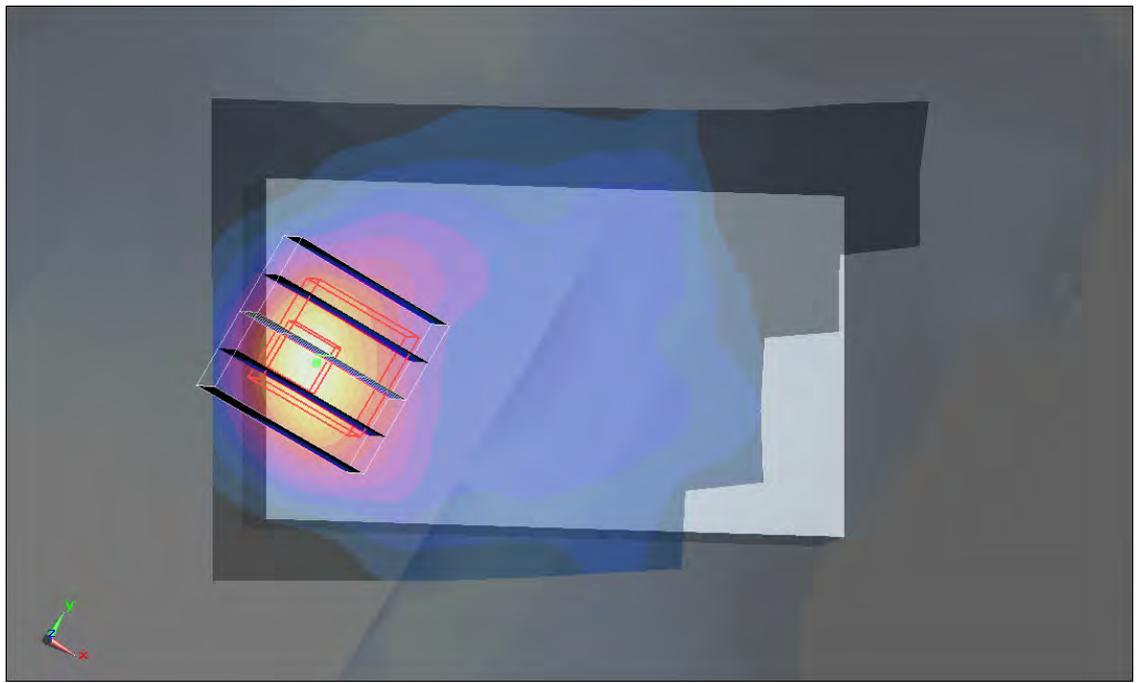Maximum value of SAR (interpolated) = 1.12 mW/g

**Ch189/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.6 V/m; Power Drift = -0.119 dB
Peak SAR (extrapolated) = 1.45 W/kg
**SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.744 mW/g**
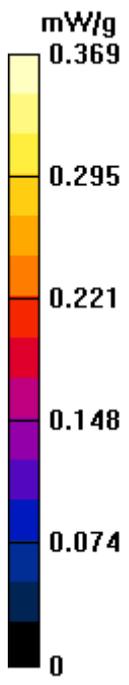Maximum value of SAR (measured) = 1.18 mW/g

**Ch189/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.6 V/m; Power Drift = -0.119 dB
Peak SAR (extrapolated) = 1.33 W/kg
**SAR(1 g) = 0.842 mW/g; SAR(10 g) = 0.576 mW/g**
Maximum value of SAR (measured) = 1.01 mW/g

1g/10g Averaged SAR

## #60 GSM850_GPRS10_Left Side_1.0cm_Ch251_Slide Off_Samsung

## DUT: 121417

Communication System: GPRS/EDGE 10; Frequency: 848.8 MHz; Duty Cycle: 1:4
Medium: MSL_835_110305 Medium parameters used: f = 849 MHz; σ = 0.983 mho/m; $\varepsilon_r$ = 56.4; ρ =

1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


## Ch251/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm
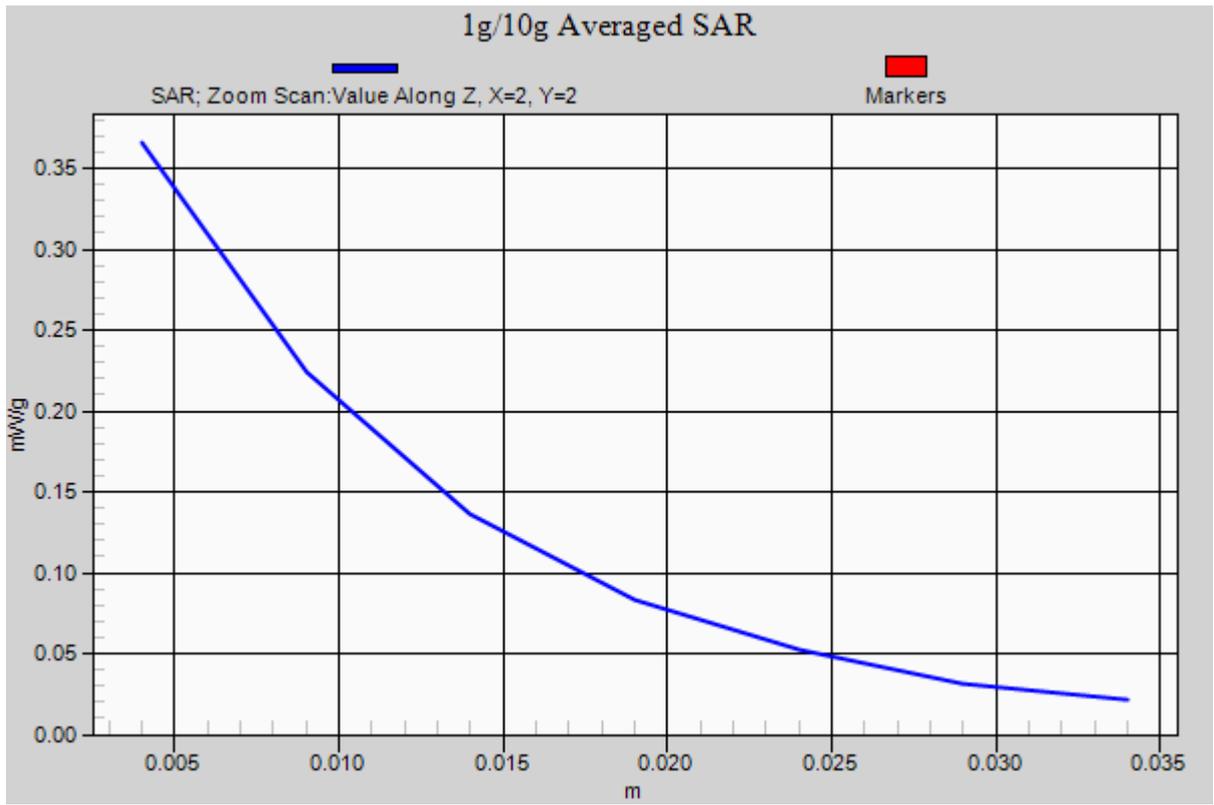Maximum value of SAR (interpolated) = 0.595 mW/g

## Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.4 V/m; Power Drift = -0.091 dB
Peak SAR (extrapolated) = 0.795 W/kg
**SAR(1 g) = 0.563 mW/g; SAR(10 g) = 0.386 mW/g**
Maximum value of SAR (measured) = 0.606 mW/g
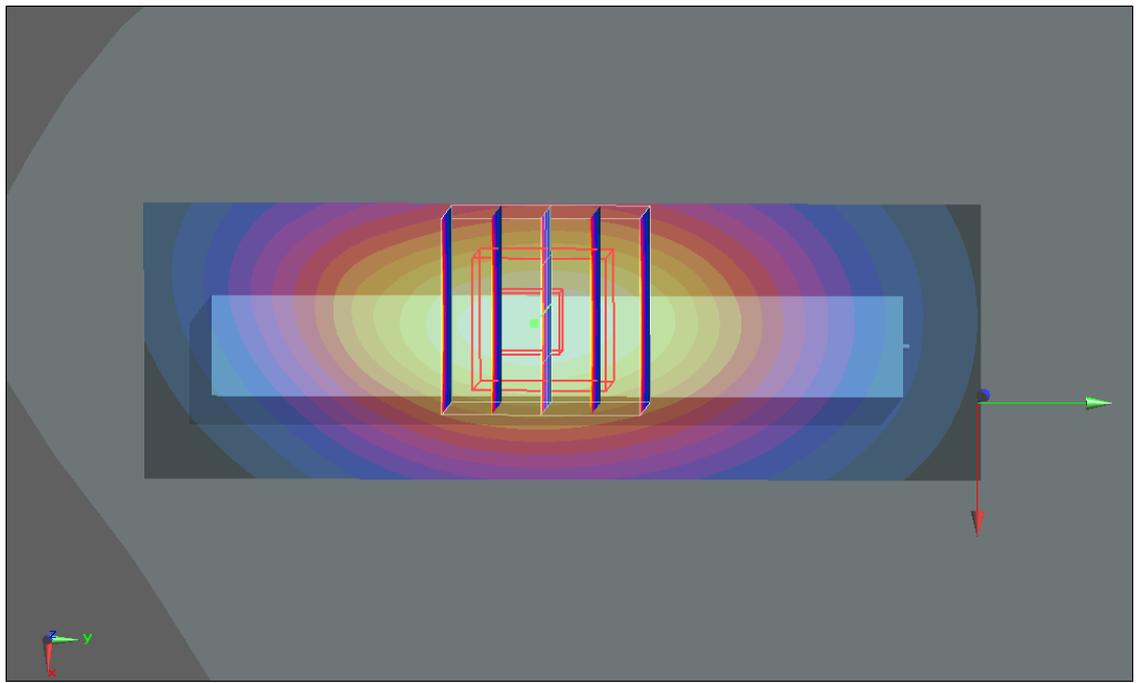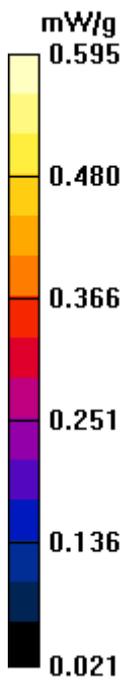
**#61 GSM850_GPRS10_Right Side_1.0cm_Ch251_Slide Off_Samsung**

**DUT: 121417**

Communication System: GPRS/EDGE 10; Frequency: 848.8 MHz;Duty Cycle: 1:4
Medium: MSL_835_110305 Medium parameters used: f = 849 MHz; σ = 0.983 mho/m; $\varepsilon_r$ = 56.4; ρ =

1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch251/Area Scan (31x91x1):** Measurement grid: dx=15mm, dy=15mm
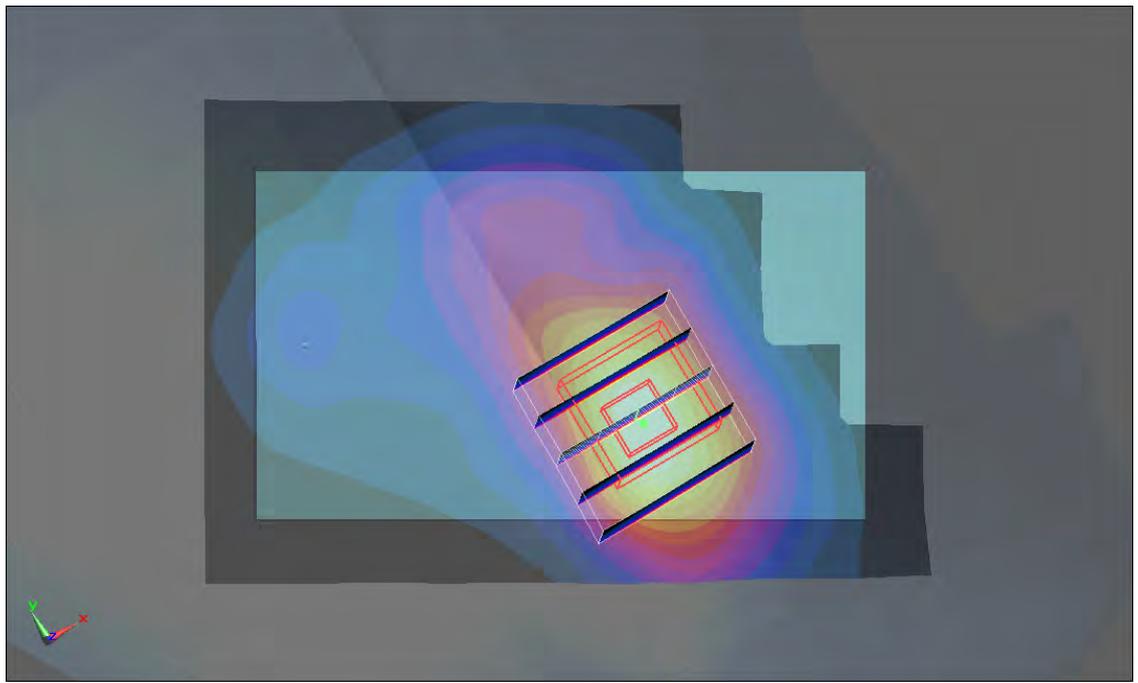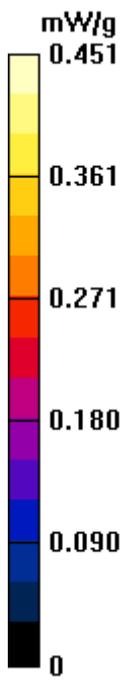Maximum value of SAR (interpolated) = 0.644 mW/g

**Ch251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.81 V/m; Power Drift = 0.112 dB
Peak SAR (extrapolated) = 0.824 W/kg
**SAR(1 g) = 0.603 mW/g; SAR(10 g) = 0.419 mW/g**
Maximum value of SAR (measured) = 0.631 mW/g
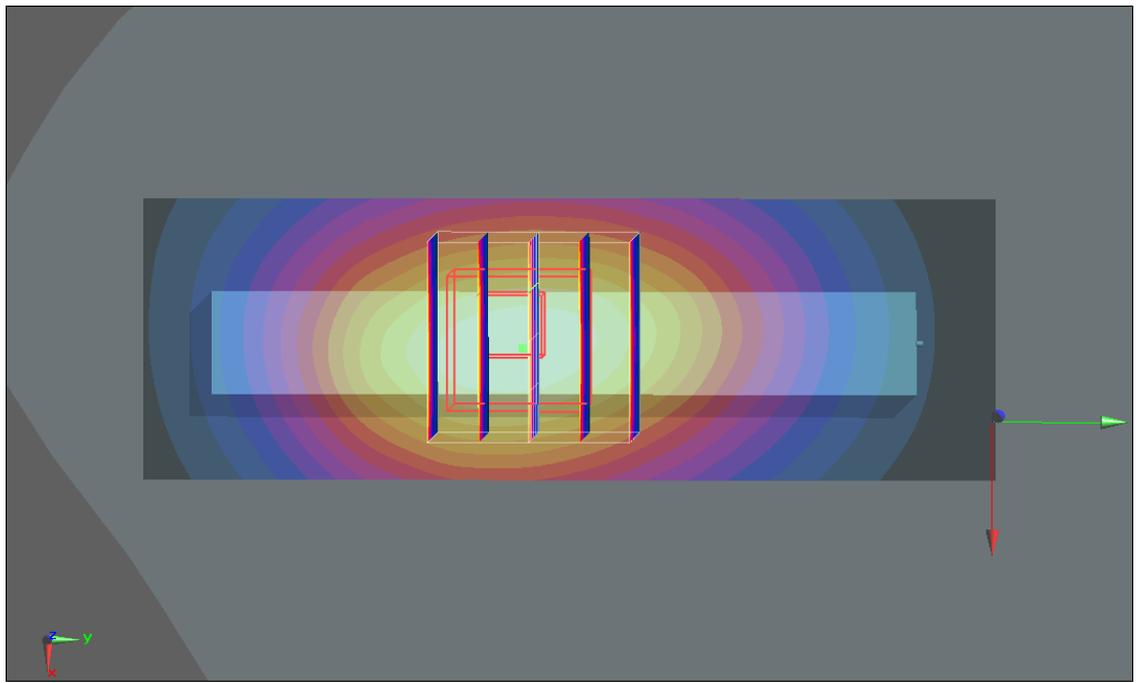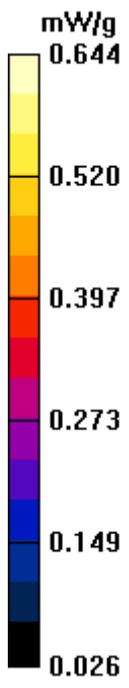
**#63 GSM850_GPRS10_Down Side_1.0cm_Ch251_Slide Off_Samsung**

**DUT: 121417**

Communication System: GPRS/EDGE 10; Frequency: 848.8 MHz;Duty Cycle: 1:4
Medium: MSL_835_110305 Medium parameters used: f = 849 MHz; $\sigma$ = 0.983 mho/m; $\varepsilon_r$ = 56.4; $\rho$ =

1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch251/Area Scan (31x61x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.109 mW/g

**Ch251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.39 V/m; Power Drift = 0.077 dB
Peak SAR (extrapolated) = 0.177 W/kg
**SAR(1 g) = 0.106 mW/g; SAR(10 g) = 0.063 mW/g**
Maximum value of SAR (measured) = 0.115 mW/g
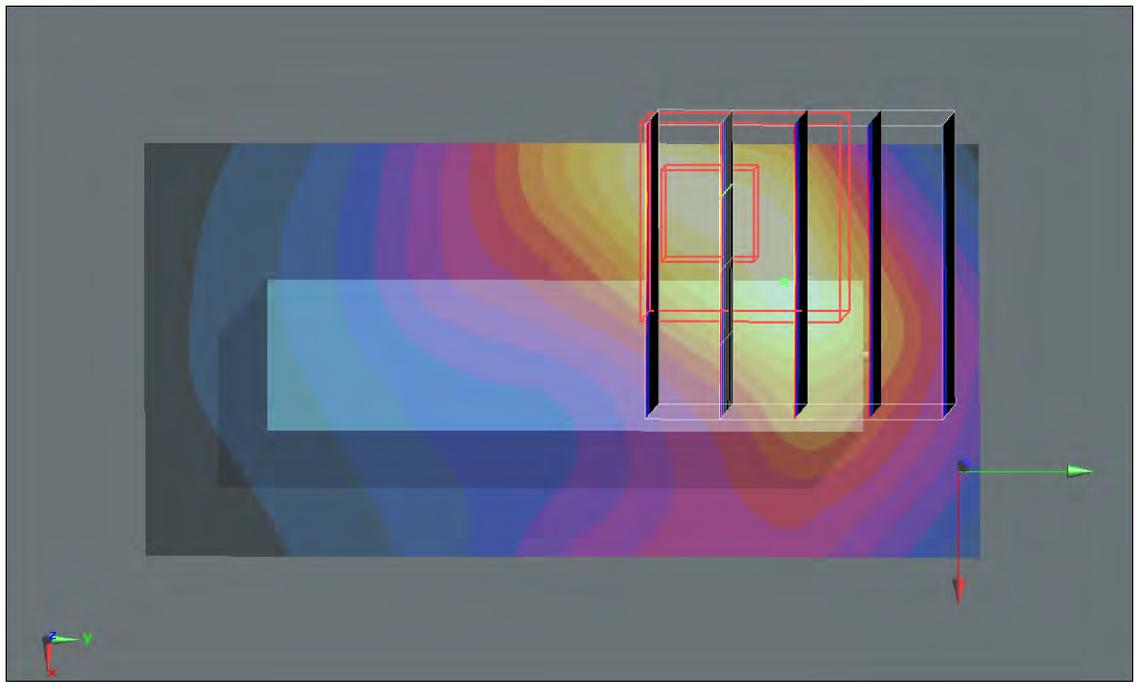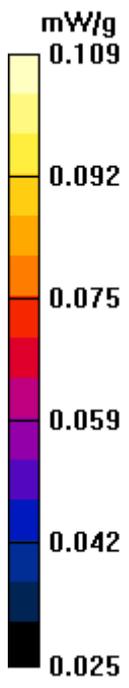
**#05 GSM1900_GPRS10_Face_1cm_Ch512_Samsung**

**DUT: 121417**

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_110302 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; $\varepsilon_r$ = 53; ρ =

1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.47, 4.47, 4.47); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

**Ch512/Area Scan (41x71x1):** Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.218 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.3 V/m; Power Drift = -0.00705 dB
Peak SAR (extrapolated) = 0.273 W/kg
**SAR(1 g) = 0.189 mW/g; SAR(10 g) = 0.120 mW/g**
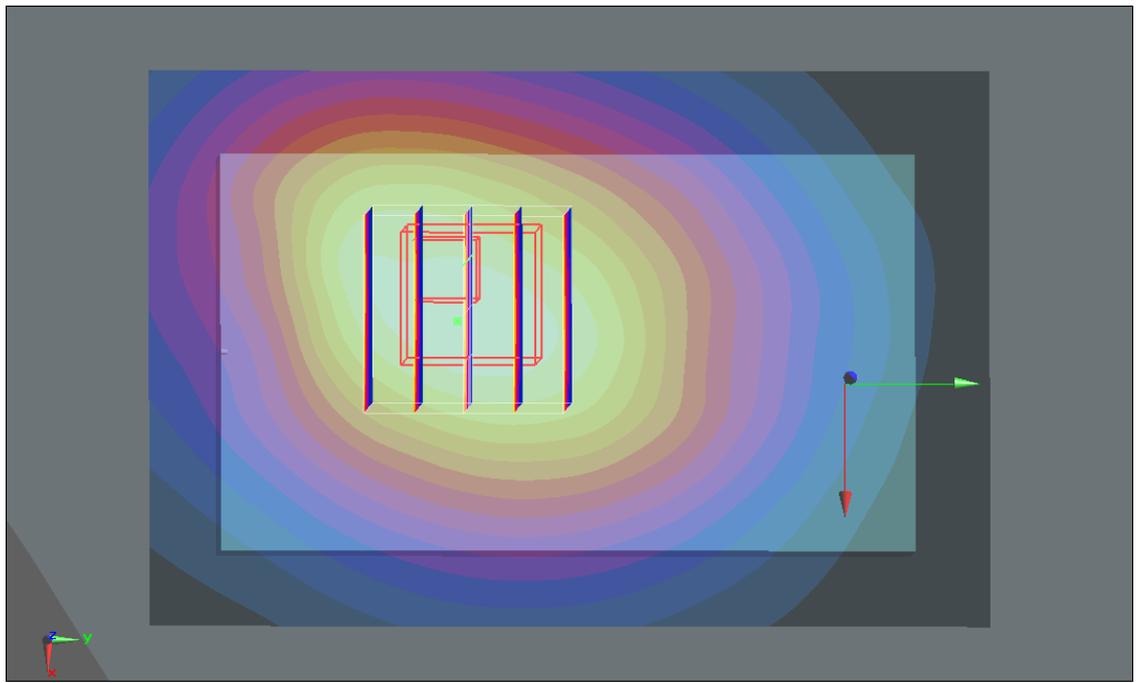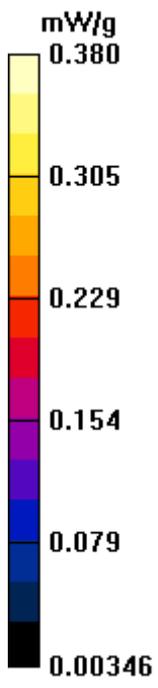Maximum value of SAR (measured) = 0.205 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.3 V/m; Power Drift = -0.00705 dB
Peak SAR (extrapolated) = 0.224 W/kg
**SAR(1 g) = 0.168 mW/g; SAR(10 g) = 0.111 mW/g**
Maximum value of SAR (measured) = 0.177 mW/g

## #06 GSM1900_GPRS10_Bottom_1cm_Ch512_Samsung

## DUT: 121417

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_110302 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; $\varepsilon_r$ = 53; ρ =

1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.47, 4.47, 4.47); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

## Ch512/Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.22 mW/g

## Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = -0.115 dB
Peak SAR (extrapolated) = 1.59 W/kg
**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.586 mW/g**
Maximum value of SAR (measured) = 1.13 mW/g

**#06 GSM1900_GPRS10_Bottom_1cm_Ch512_Samsung_2D**

**DUT: 121417**

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_110302 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; $\varepsilon_r$ = 53; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.47, 4.47, 4.47); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

**Ch512/Area Scan (41x71x1):** Measurement grid: dx=20mm, dy=20mm
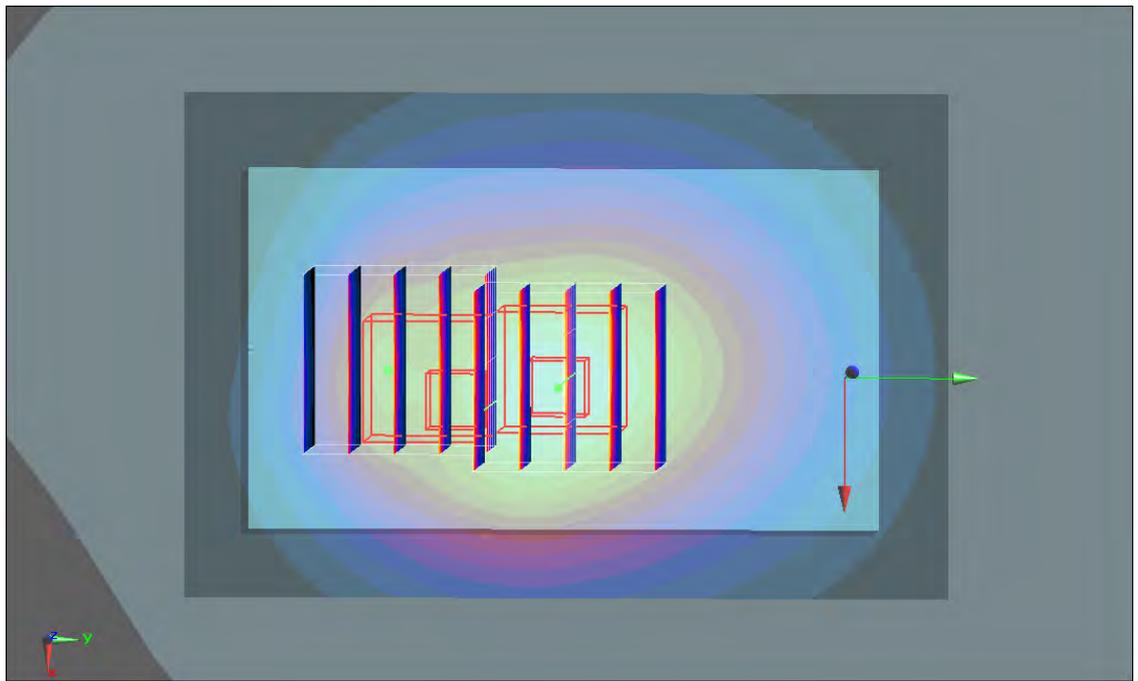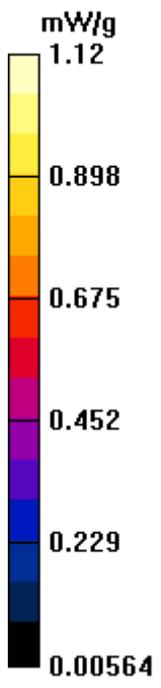Maximum value of SAR (interpolated) = 1.22 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = -0.115 dB
Peak SAR (extrapolated) = 1.59 W/kg
**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.586 mW/g**
Maximum value of SAR (measured) = 1.13 mW/g

**#73 GSM1900_GPRS10_Left Side_1.0cm_Ch512_Slide Off_Samsung**

**DUT: 121417**

Communication System: GPRS/EDGE 10; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_110305 Medium parameters used: f = 1850.2 MHz; $\sigma$ = 1.47 mho/m; $\varepsilon_r$ = 54.7;

$\rho$ = 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.26, 7.26, 7.26); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch512/Area Scan (31x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.290 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
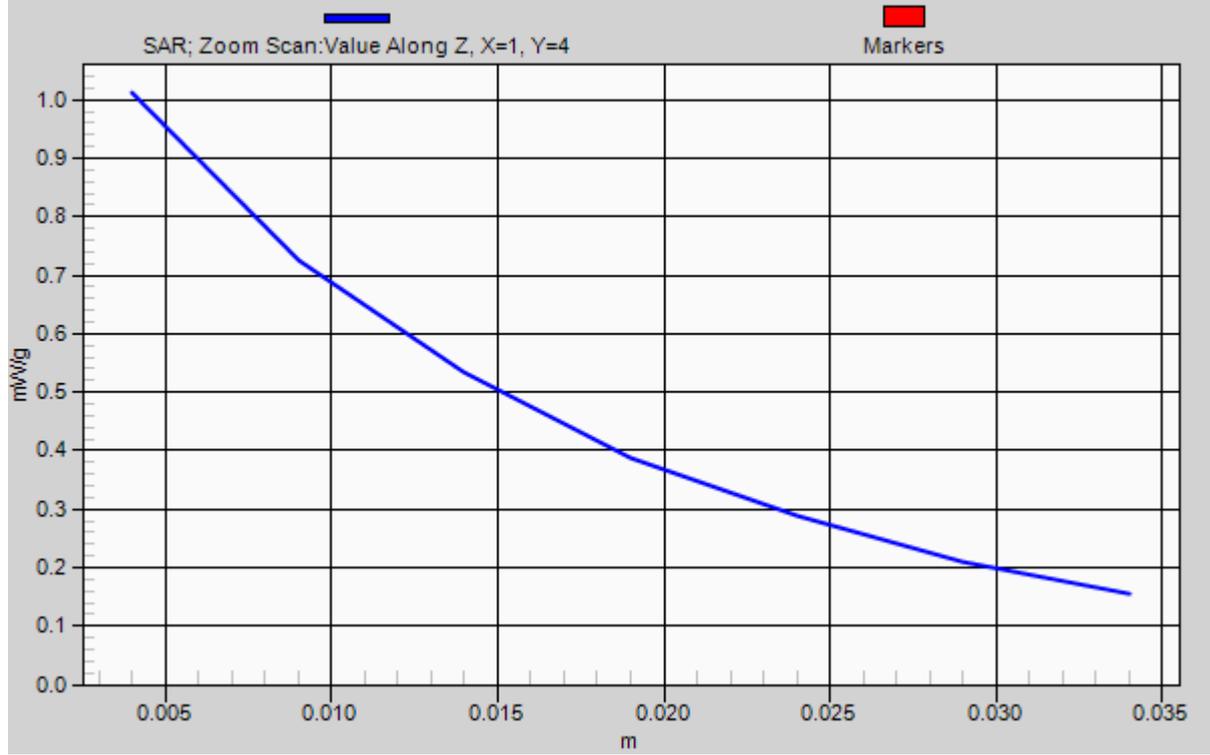Reference Value = 6.18 V/m; Power Drift = -0.109 dB
Peak SAR (extrapolated) = 0.440 W/kg
**SAR(1 g) = 0.258 mW/g; SAR(10 g) = 0.141 mW/g**
Maximum value of SAR (measured) = 0.293 mW/g
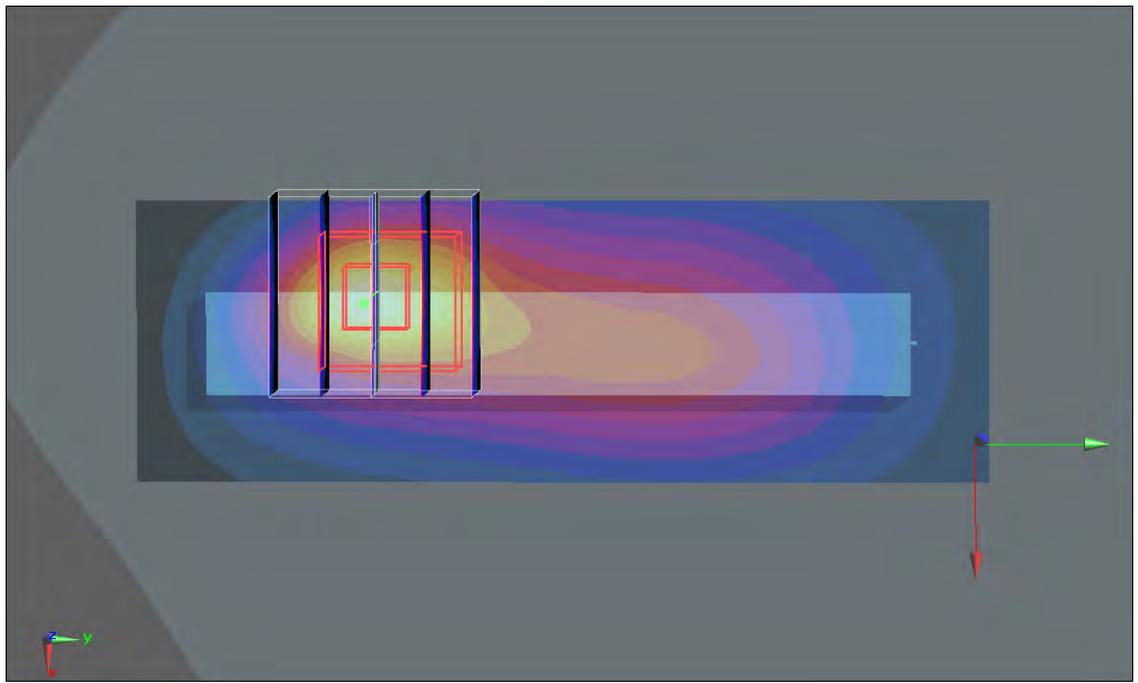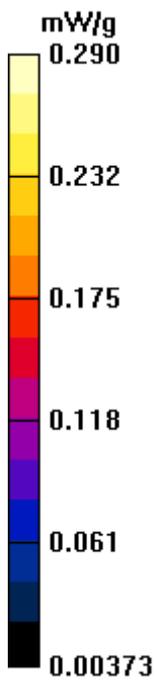
**#74 GSM1900_GPRS10_Right Side_1.0cm_Ch512_Slide Off_Samsung**

**DUT: 121417**

Communication System: GPRS/EDGE 10; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_110305 Medium parameters used: f = 1850.2 MHz; σ = 1.47 mho/m; $\varepsilon_r$ = 54.7;

ρ = 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.26, 7.26, 7.26); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch512/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.070 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.82 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 0.099 W/kg
**SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.039 mW/g**
Maximum value of SAR (measured) = 0.068 mW/g
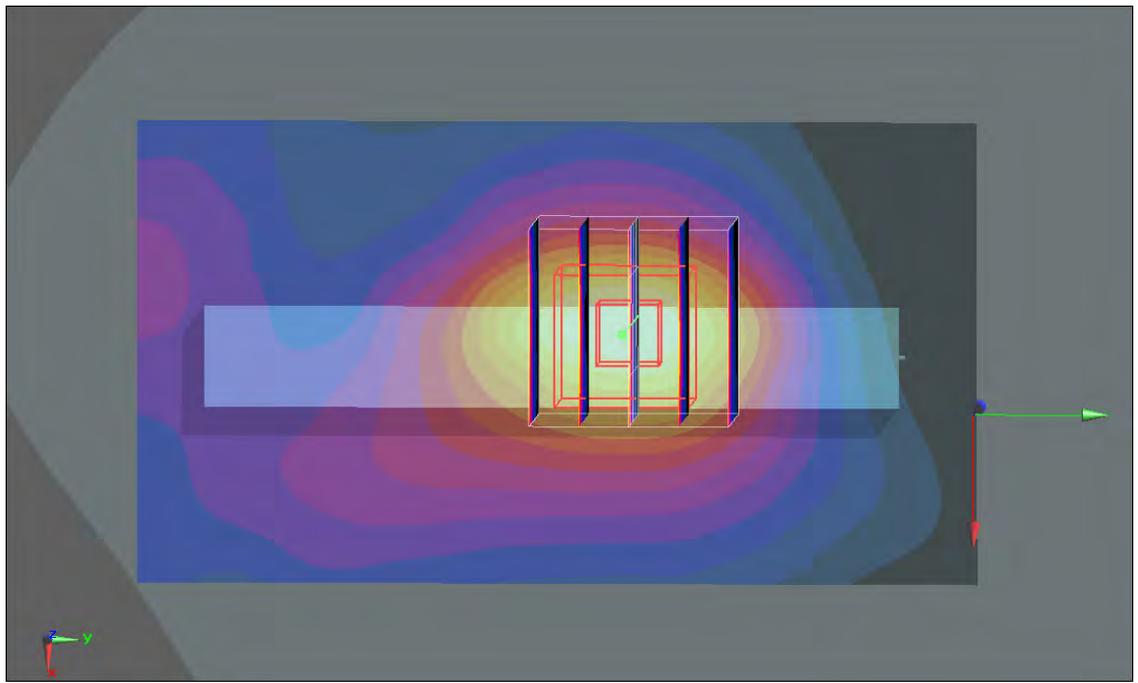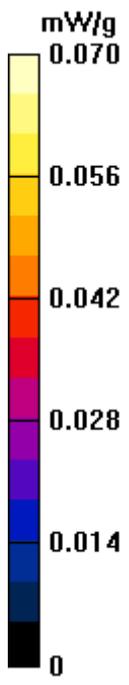
**#15 GSM1900_GPRS10_Down Side_1cm_Ch512_Samsung**

**DUT: 121417**

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_110303 Medium parameters used: f = 1850.2 MHz; σ = 1.49 mho/m; $\varepsilon_r$ = 52.7;

ρ = 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.47, 4.47, 4.47); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

**Ch512/Area Scan (31x51x1):** Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.256 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.4 V/m; Power Drift = -0.093 dB
Peak SAR (extrapolated) = 0.338 W/kg
**SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.137 mW/g**
Maximum value of SAR (measured) = 0.248 mW/g
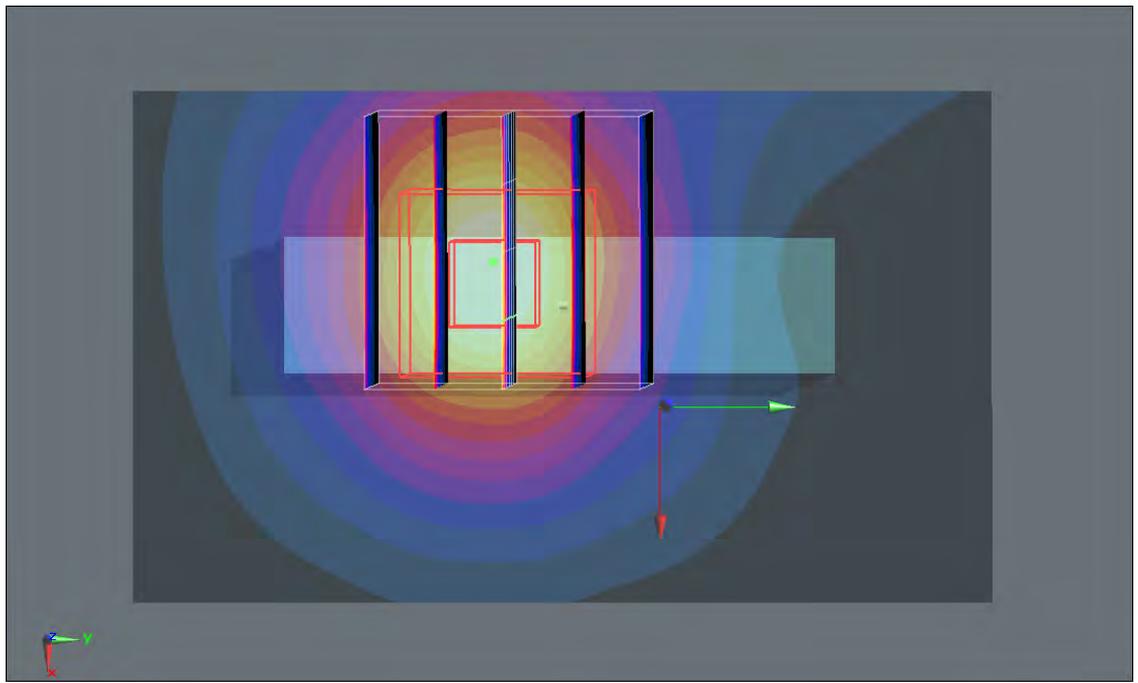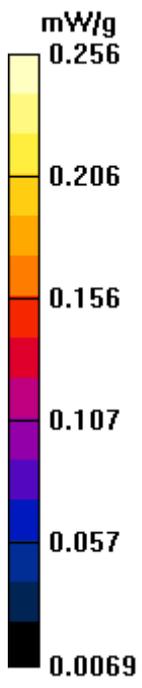
**#09 WCDMA V_RMC12.2K_Face_1cm_Ch4183_Samsung**

**DUT: 121417**

Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: MSL_850_110302 Medium parameters used: f = 837 MHz; σ = 0.965 mho/m; $\varepsilon_r$ = 54.5; ρ =

1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.12, 6.12, 6.12); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

**Ch4183/Area Scan (41x71x1):** Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.486 mW/g

**Ch4183/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = -0.099 dB
Peak SAR (extrapolated) = 0.558 W/kg
**SAR(1 g) = 0.463 mW/g; SAR(10 g) = 0.351 mW/g**
Maximum value of SAR (measured) = 0.482 mW/g

**#72 WCDMA V_RMC 12.2K_Bottom_1.0cm_Ch4182_Slide Off_LG**

**DUT: 121417**

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL_835_110305 Medium parameters used: f = 836.4 MHz; σ = 0.972 mho/m; $\varepsilon_r$ = 56.5; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

**Ch4182/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.18 mW/g

**Ch4182/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.7 V/m; Power Drift = -0.107 dB
Peak SAR (extrapolated) = 1.51 W/kg
**SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.802 mW/g**
Maximum value of SAR (measured) = 1.18 mW/g

## #72 WCDMA V_RMC 12.2K_Bottom_1.0cm_Ch4182_Slide Off_LG_2D

## DUT: 121417

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL_835_110305 Medium parameters used: f = 836.4 MHz; σ = 0.972 mho/m; $\varepsilon_r$ = 56.5;

$\rho$ = 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

## Ch4182/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
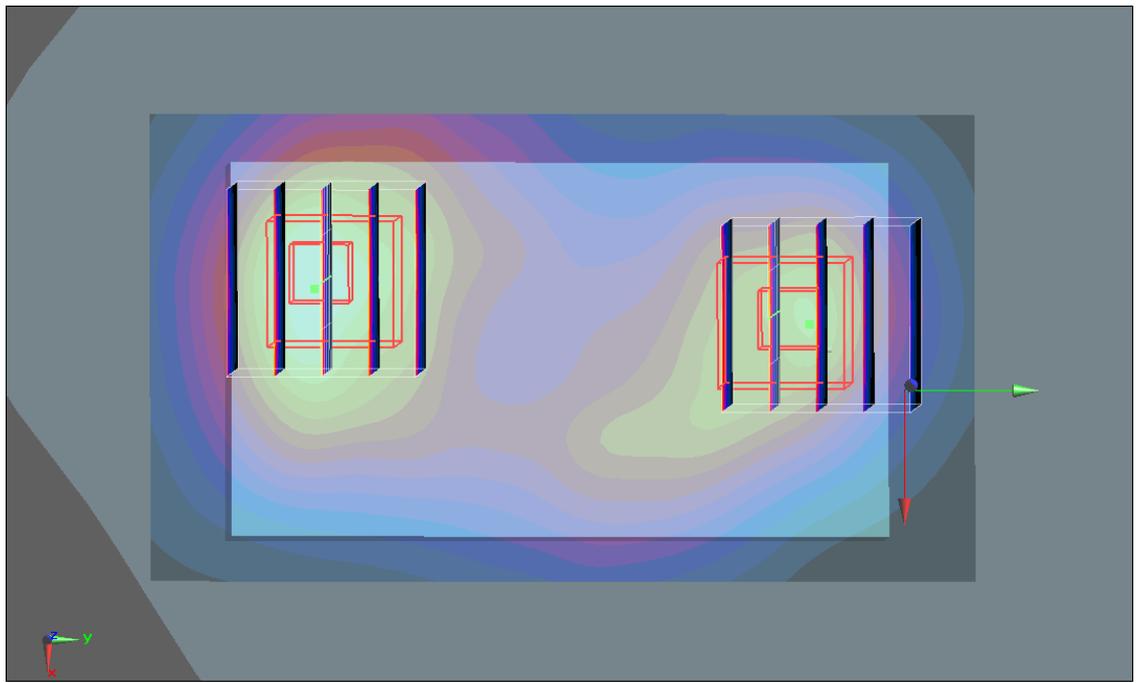Maximum value of SAR (interpolated) = 1.18 mW/g

## Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.7 V/m; Power Drift = -0.107 dB
Peak SAR (extrapolated) = 1.51 W/kg
**SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.802 mW/g**
Maximum value of SAR (measured) = 1.18 mW/g

1g/10g Averaged SAR
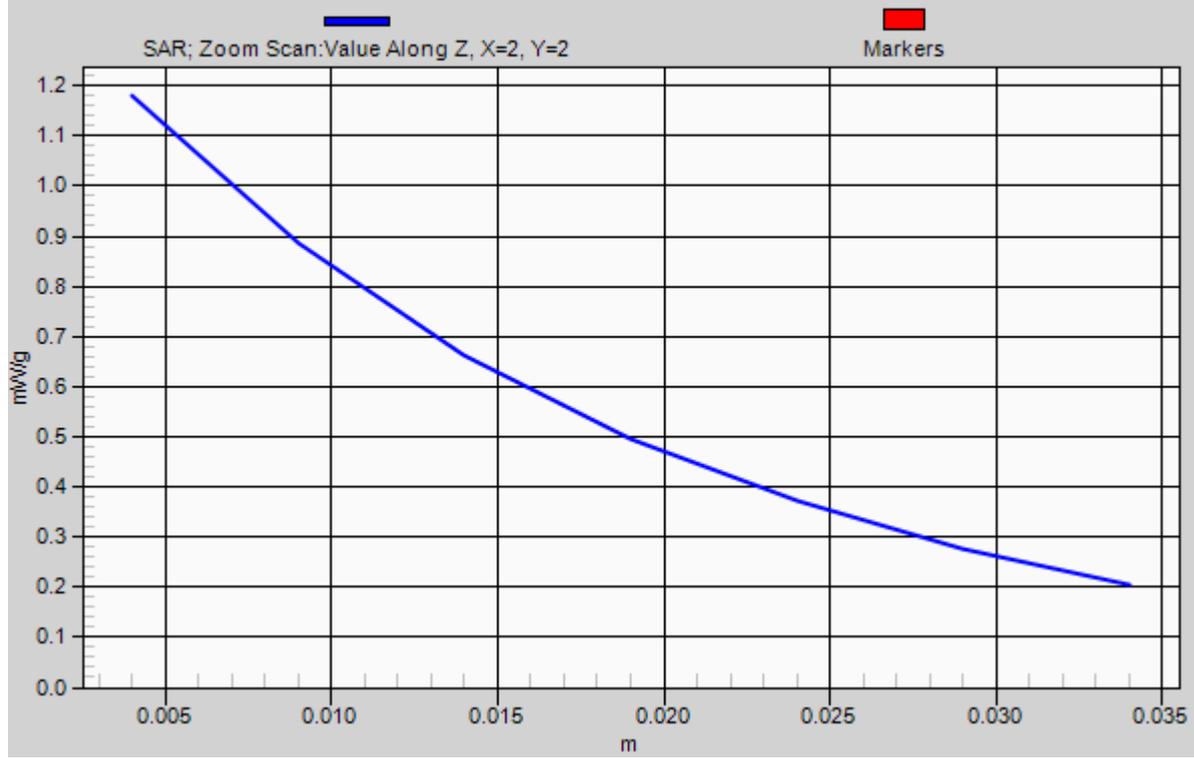
**#68 WCDMA V_RMC 12.2K_Left Side_1.0cm_Ch4182_Slide Off_Samsung**

**DUT: 121417**

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL_835_110305 Medium parameters used: f = 836.4 MHz; σ = 0.972 mho/m; $\varepsilon_r$ = 56.5; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch4182/Area Scan (31x91x1):** Measurement grid: dx=15mm, dy=15mm
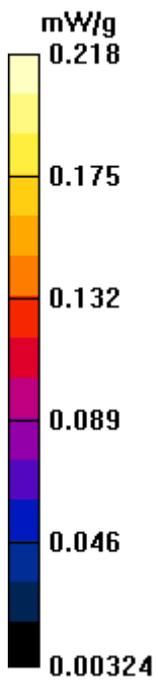Maximum value of SAR (interpolated) = 0.529 mW/g

**Ch4182/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.79 V/m; Power Drift = 0.057 dB
Peak SAR (extrapolated) = 0.690 W/kg
**SAR(1 g) = 0.490 mW/g; SAR(10 g) = 0.336 mW/g**
Maximum value of SAR (measured) = 0.523 mW/g
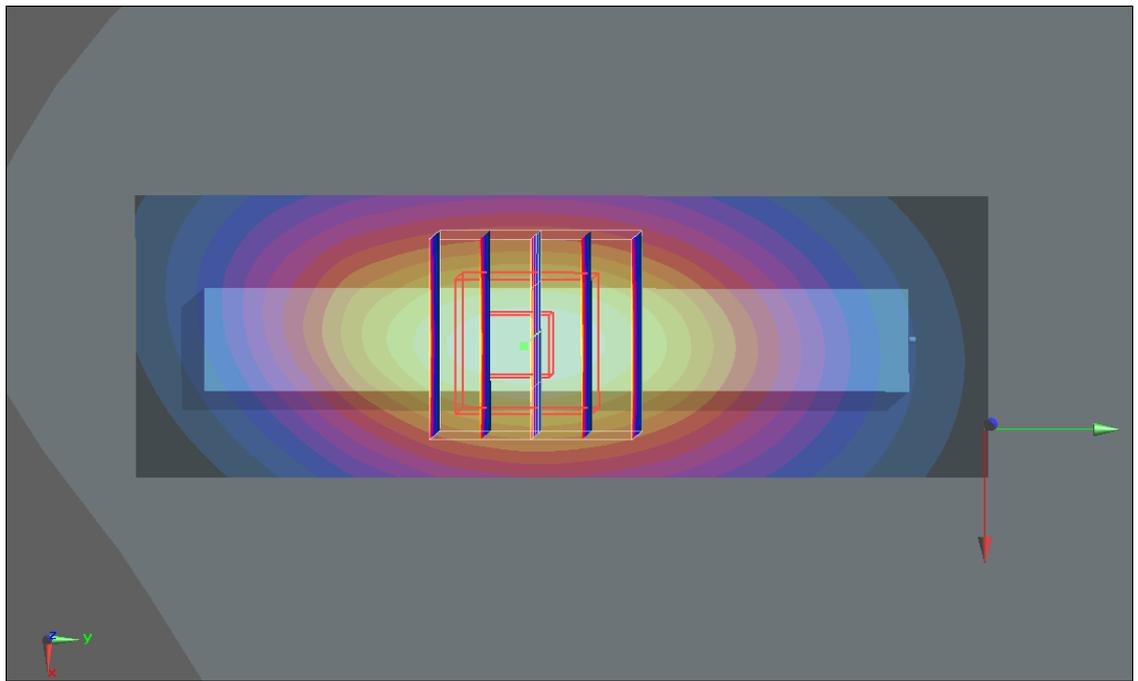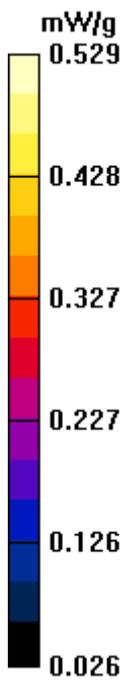
**#69 WCDMA V_RMC 12.2K_Right Side_1.0cm_Ch4182_Slide Off_Samsung**

**DUT: 121417**

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL_835_110305 Medium parameters used: f = 836.4 MHz; σ = 0.972 mho/m; $\varepsilon_r$ = 56.5; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：22.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(8.65, 8.65, 8.65); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


**Ch4182/Area Scan (31x91x1):** Measurement grid: dx=15mm, dy=15mm
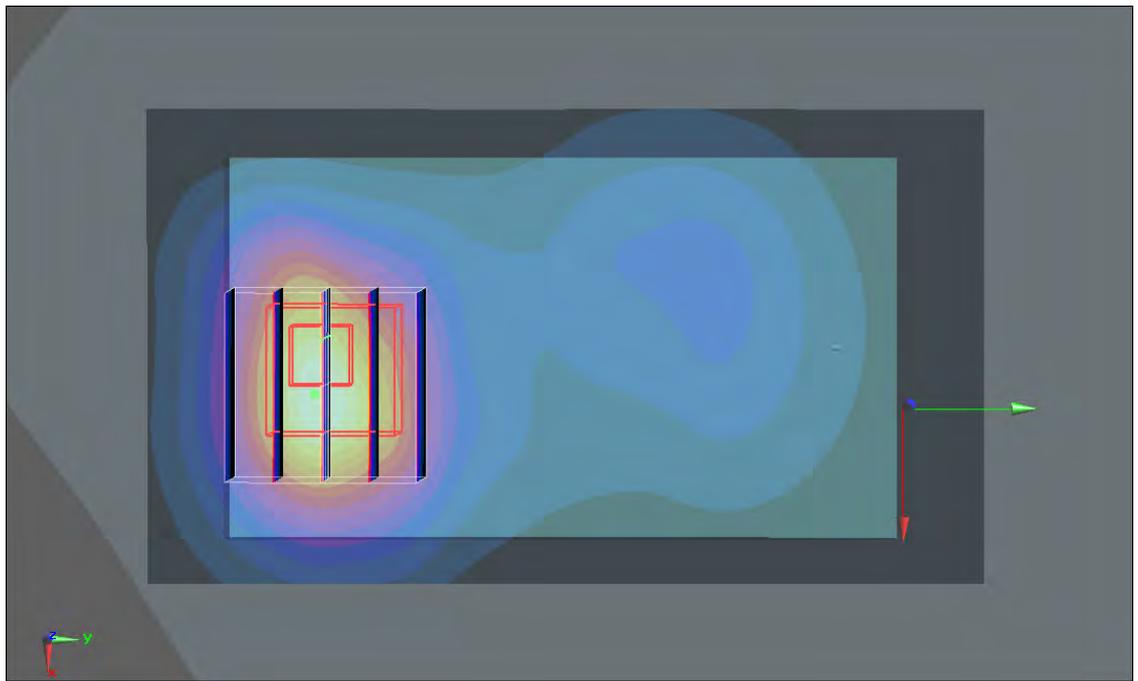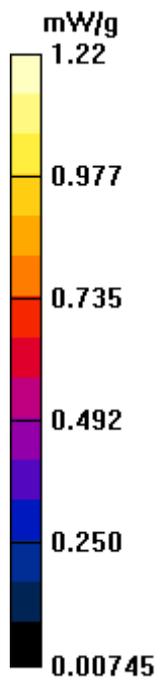Maximum value of SAR (interpolated) = 0.635 mW/g

**Ch4182/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.51 V/m; Power Drift = -0.057 dB
Peak SAR (extrapolated) = 0.835 W/kg
**SAR(1 g) = 0.600 mW/g; SAR(10 g) = 0.419 mW/g**
Maximum value of SAR (measured) = 0.639 mW/g
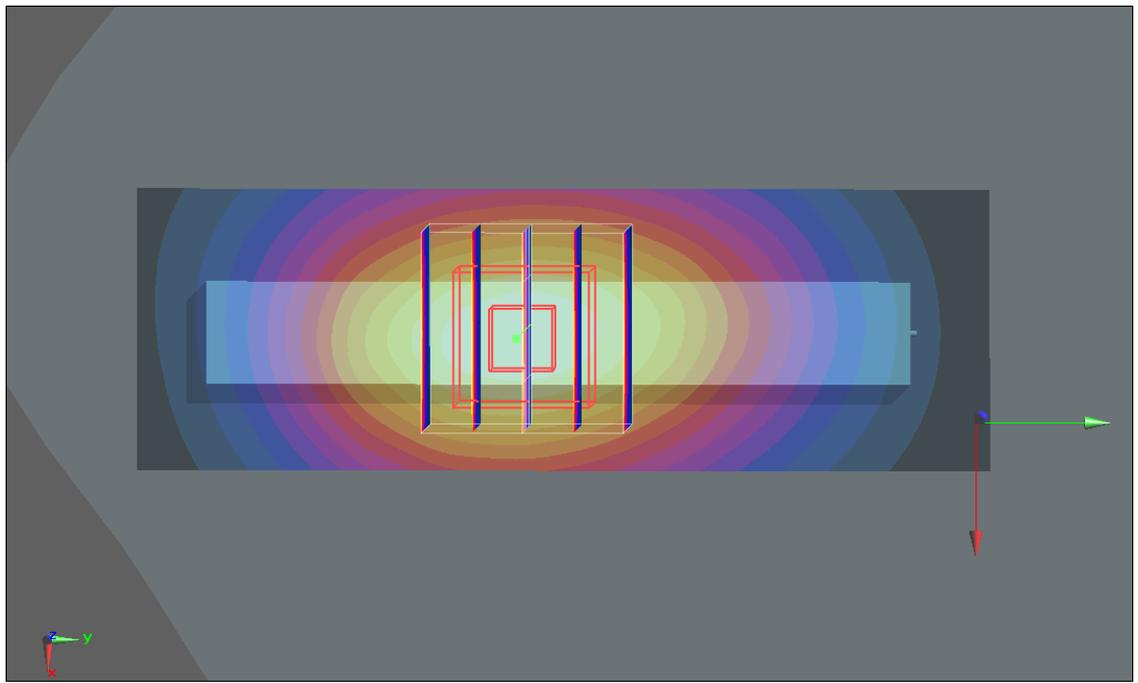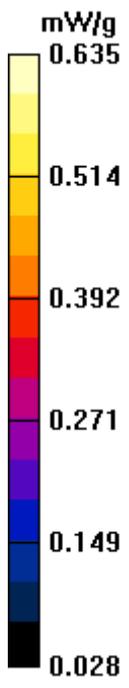
## #13 WCDMA V_RMC12.2K_Down Side_1cm_Ch4183_Samsung

## DUT: 121417

Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: MSL_850_110303 Medium parameters used: f = 837 MHz; σ = 0.965 mho/m; $\varepsilon_r$ = 54.5; ρ =

1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.12, 6.12, 6.12); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

## Ch4183/Area Scan (31x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.124 mW/g

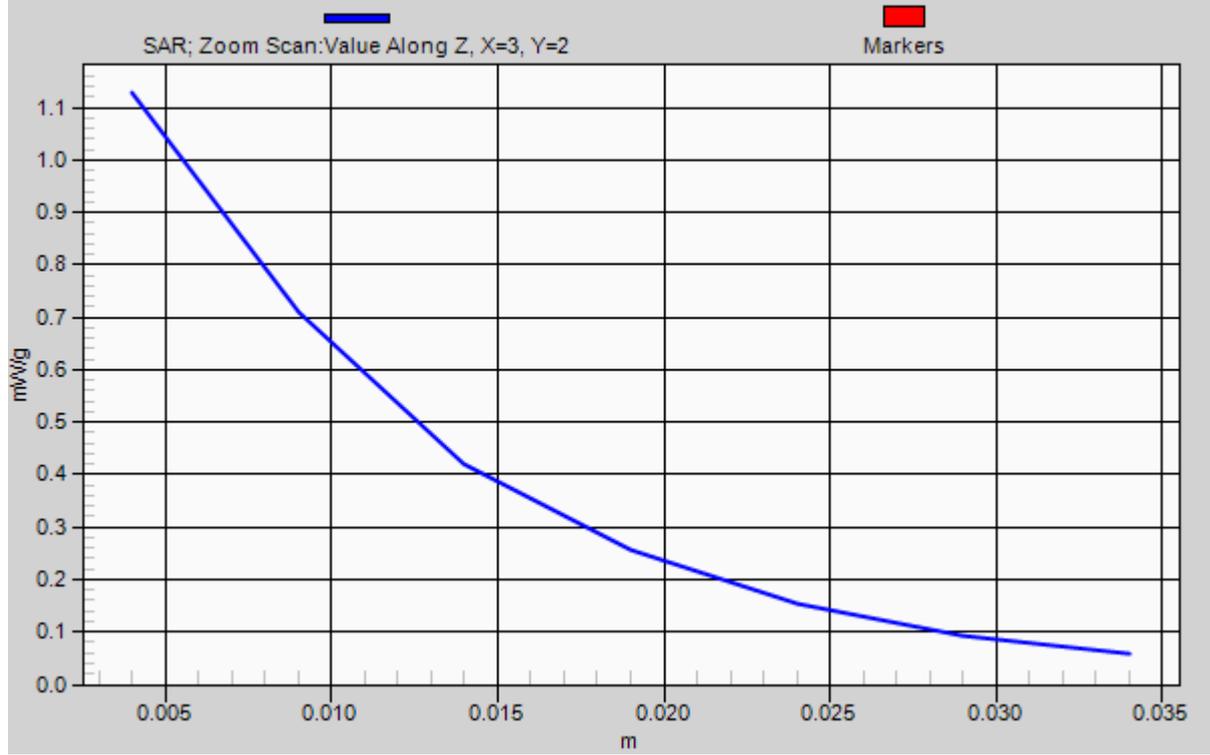## Ch4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.81 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 0.218 W/kg
**SAR(1 g) = 0.128 mW/g; SAR(10 g) = 0.076 mW/g**
Maximum value of SAR (measured) = 0.135 mW/g
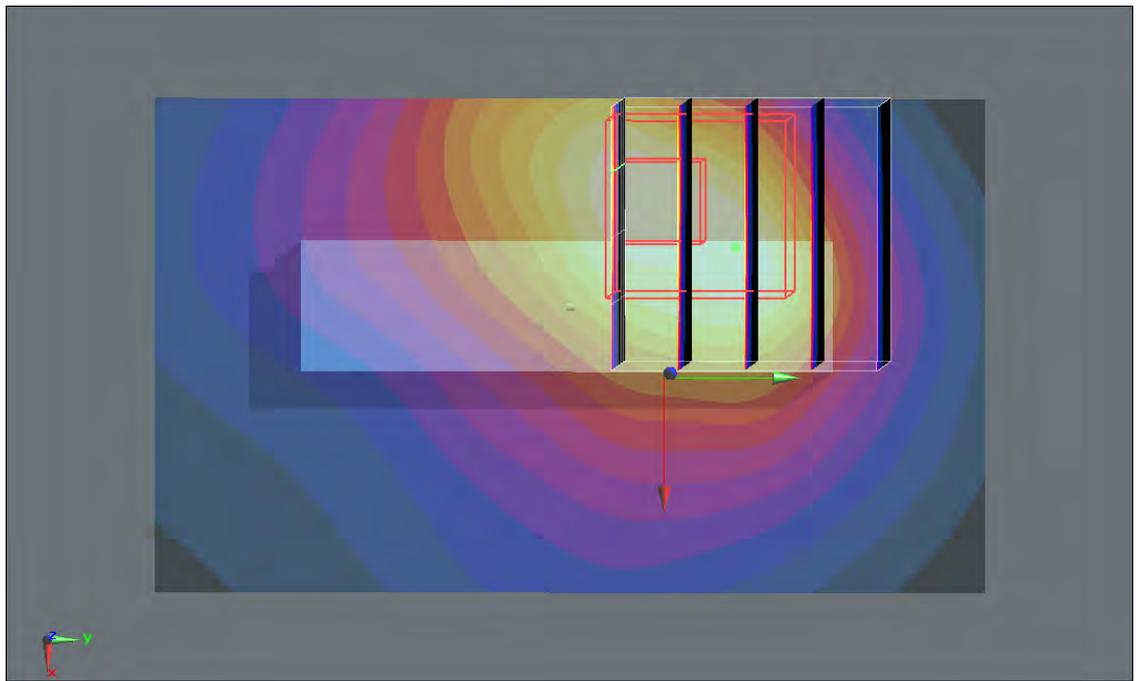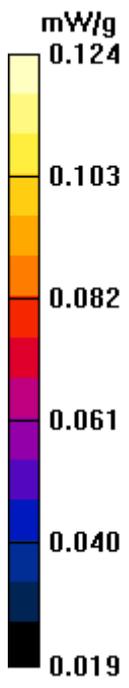
**#01 WCDMA II_RMC12.2K_Face_1cm_Ch9400_Samsung**

**DUT: 121417**

Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110302 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; $\varepsilon_r$ = 52.9; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.47, 4.47, 4.47); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57


**Ch9400/Area Scan (41x71x1):** Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.328 mW/g

**Ch9400/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.2 V/m; Power Drift = -0.124 dB
Peak SAR (extrapolated) = 0.396 W/kg
**SAR(1 g) = 0.273 mW/g; SAR(10 g) = 0.176 mW/g**
Maximum value of SAR (measured) = 0.294 mW/g

**Ch9400/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.2 V/m; Power Drift = -0.124 dB
Peak SAR (extrapolated) = 0.276 W/kg
**SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.136 mW/g**
Maximum value of SAR (measured) = 0.221 mW/g
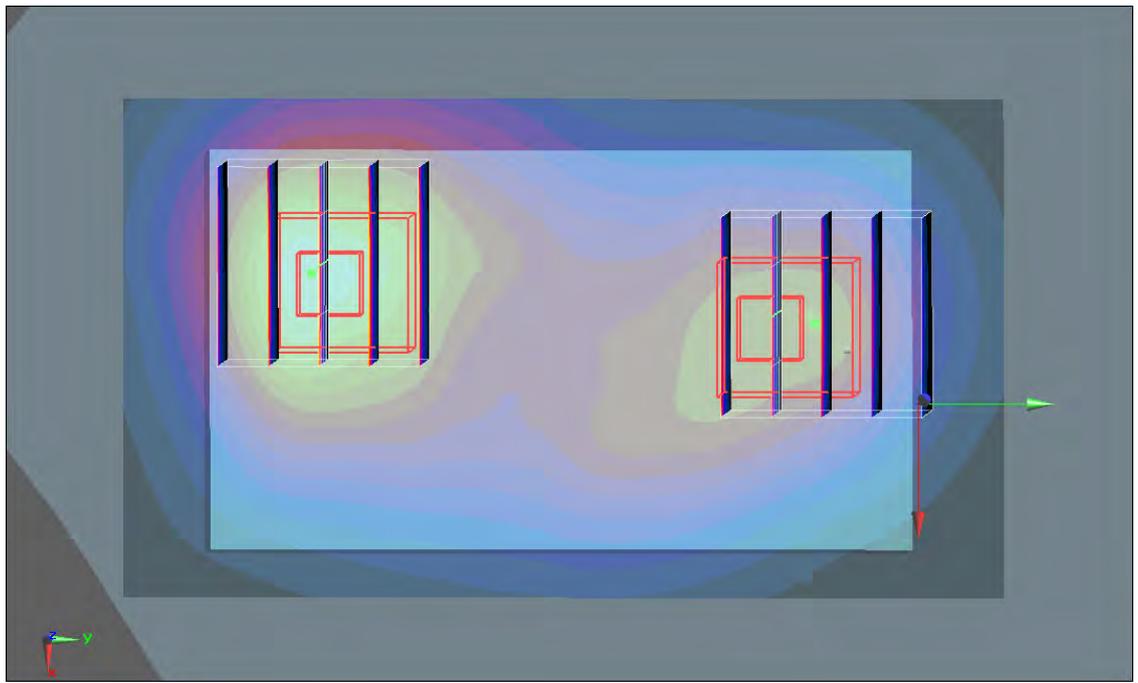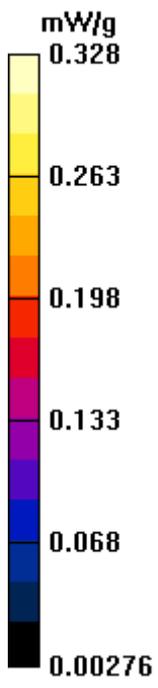
## #82 WCDMA II_RMC 12.2K_Bottom_1.0cm_Ch9538_Slide Off_Samsung_Earphone

## DUT: 121417

Communication System: UMTS; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110305 Medium parameters used: f = 1908 MHz; σ = 1.54 mho/m; $ε_r$ = 54.6; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.26, 7.26, 7.26); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

## Ch9538/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.26 mW/g

## Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.07 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 1.91 W/kg
**SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.624 mW/g**
Maximum value of SAR (measured) = 1.19 mW/g

**#82 WCDMA II_RMC 12.2K_Bottom_1.0cm_Ch9538_Slide Off_Samsung_Earphone_2D**

**DUT: 121417**

Communication System: UMTS; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110305 Medium parameters used: f = 1908 MHz; σ = 1.54 mho/m; $\varepsilon_r$ = 54.6;

$\rho$ = 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.26, 7.26, 7.26); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

**Ch9538/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.26 mW/g

**Ch9538/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.07 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 1.91 W/kg
**SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.624 mW/g**
Maximum value of SAR (measured) = 1.19 mW/g

1g/10g Averaged SAR

SAR; Zoom Scan:Value Along Z, X=0, Y=2     Markers
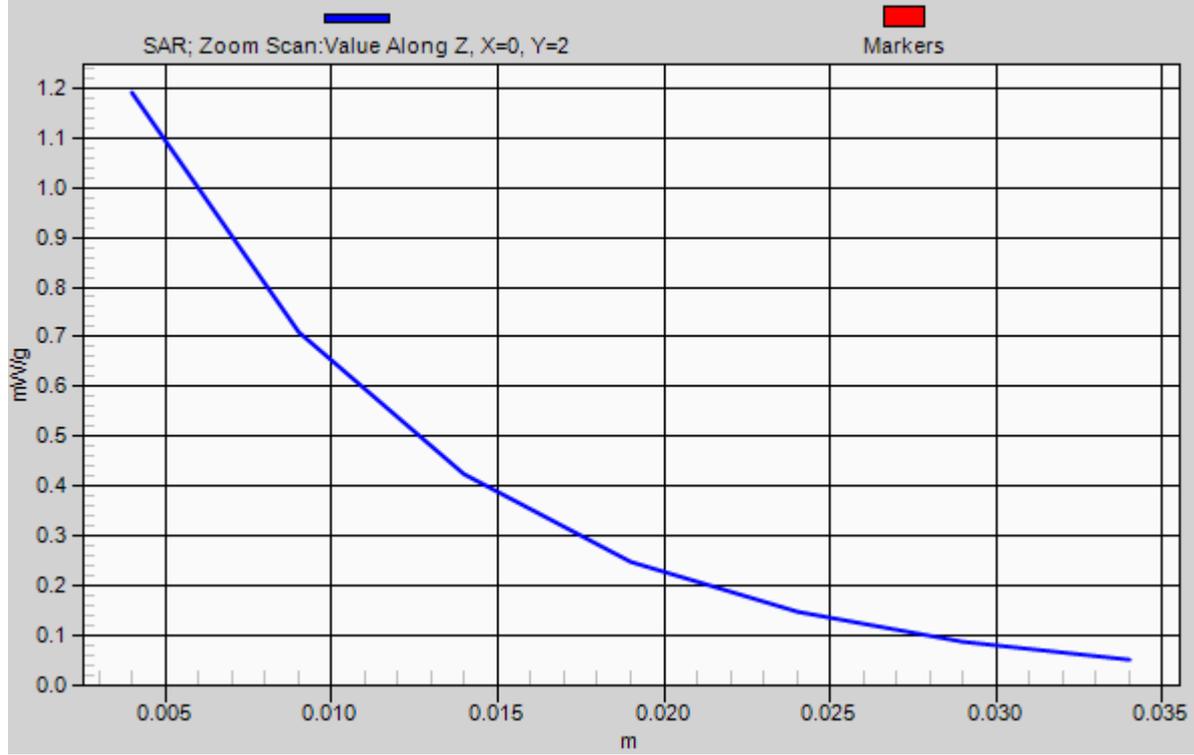
**#79 WCDMA II_RMC 12.2K_Left Side_1.0cm_Ch9400_Slide Off_Samsung**

**DUT: 121417**

Communication System: UMTS; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110305 Medium parameters used: f = 1880 MHz; $\sigma$ = 1.51 mho/m; $\varepsilon_r$ = 54.6; $\rho$

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.26, 7.26, 7.26); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Ch9400/Area Scan (31x91x1):** Measurement grid: dx=15mm, dy=15mm
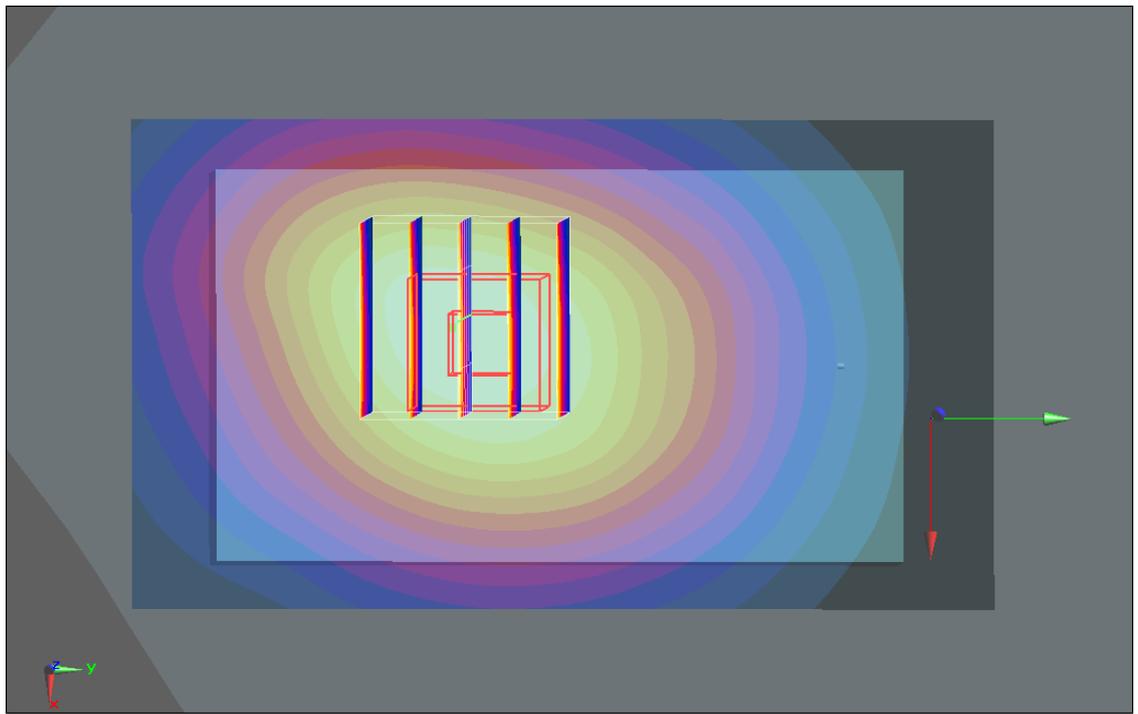Maximum value of SAR (interpolated) = 0.455 mW/g

**Ch9400/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.69 V/m; Power Drift = 0.071 dB
Peak SAR (extrapolated) = 0.678 W/kg
**SAR(1 g) = 0.394 mW/g; SAR(10 g) = 0.213 mW/g**
Maximum value of SAR (measured) = 0.439 mW/g
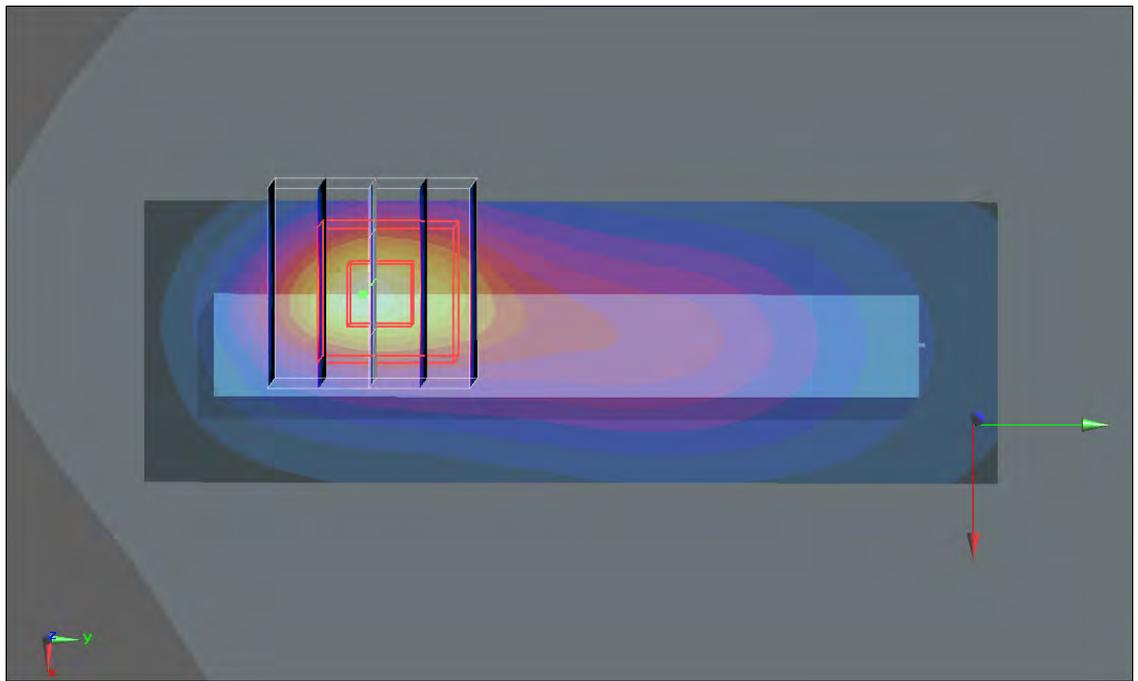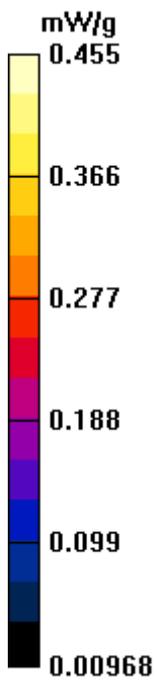
**#80 WCDMA II_RMC 12.2K_Right Side_1.0cm_Ch9400_Slide Off_Samsung**

**DUT: 121417**

Communication System: UMTS; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110305 Medium parameters used: f = 1880 MHz; $\sigma$ = 1.51 mho/m; $\varepsilon_r$ = 54.6; $\rho$

= 1000 kg/m$^3$
Ambient Temperature：23.2 ℃；Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(7.26, 7.26, 7.26); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2010-11-18
- Phantom: SAM3; Type: SAM; Serial: TP-1477
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57


**Ch9400/Area Scan (31x91x1):** Measurement grid: dx=15mm, dy=15mm
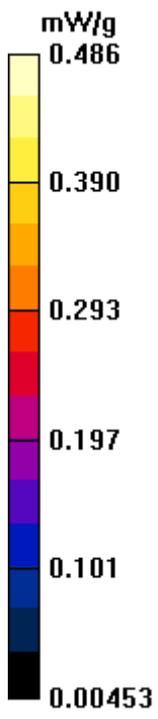Maximum value of SAR (interpolated) = 0.114 mW/g


**Ch9400/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.96 V/m; Power Drift = 0.104 dB
Peak SAR (extrapolated) = 0.163 W/kg
**SAR(1 g) = 0.105 mW/g; SAR(10 g) = 0.064 mW/g**
Maximum value of SAR (measured) = 0.113 mW/g
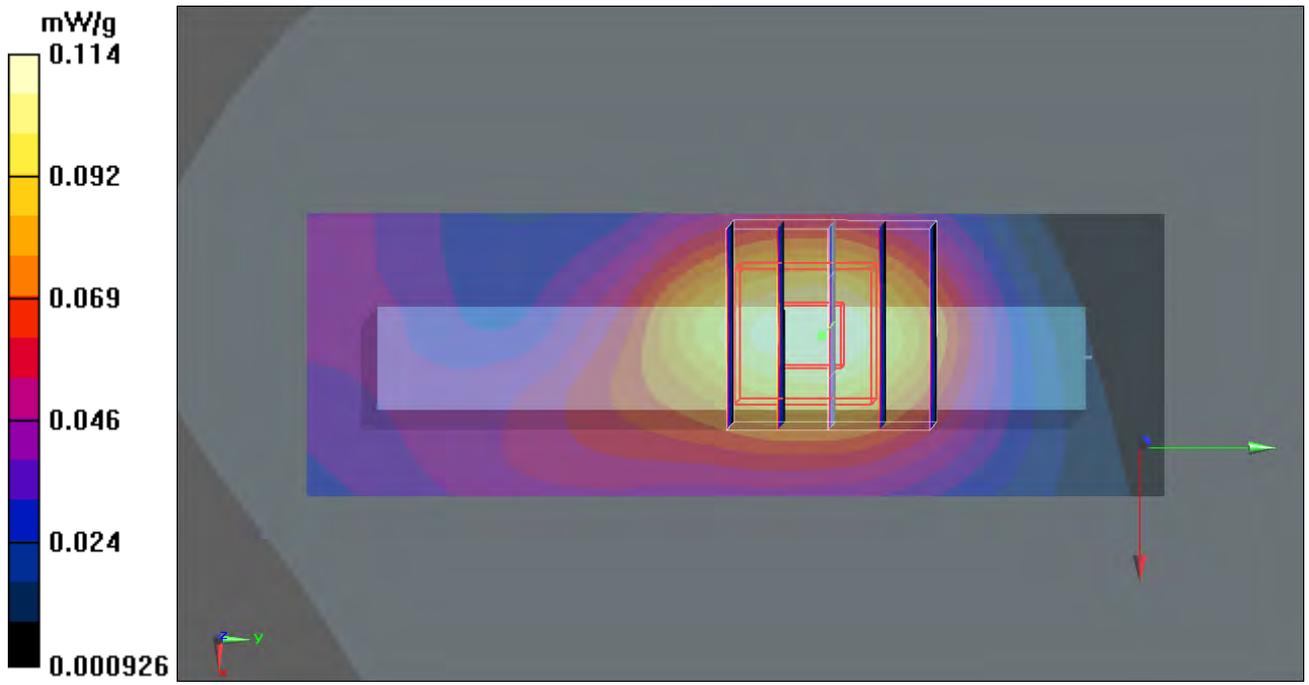
**#14 WCDMA II_RMC12.2K_Down Side_1cm_Ch9400_Samsung**

**DUT: 121417**

Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110303 Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; $\varepsilon_r$ = 52.6; ρ

= 1000 kg/m$^3$
Ambient Temperature：23.3 ℃；Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.47, 4.47, 4.47); Calibrated: 2010-5-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010-10-22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.0 Build 57

**Ch9400/Area Scan (31x51x1):** Measurement grid: dx=20mm, dy=20mm
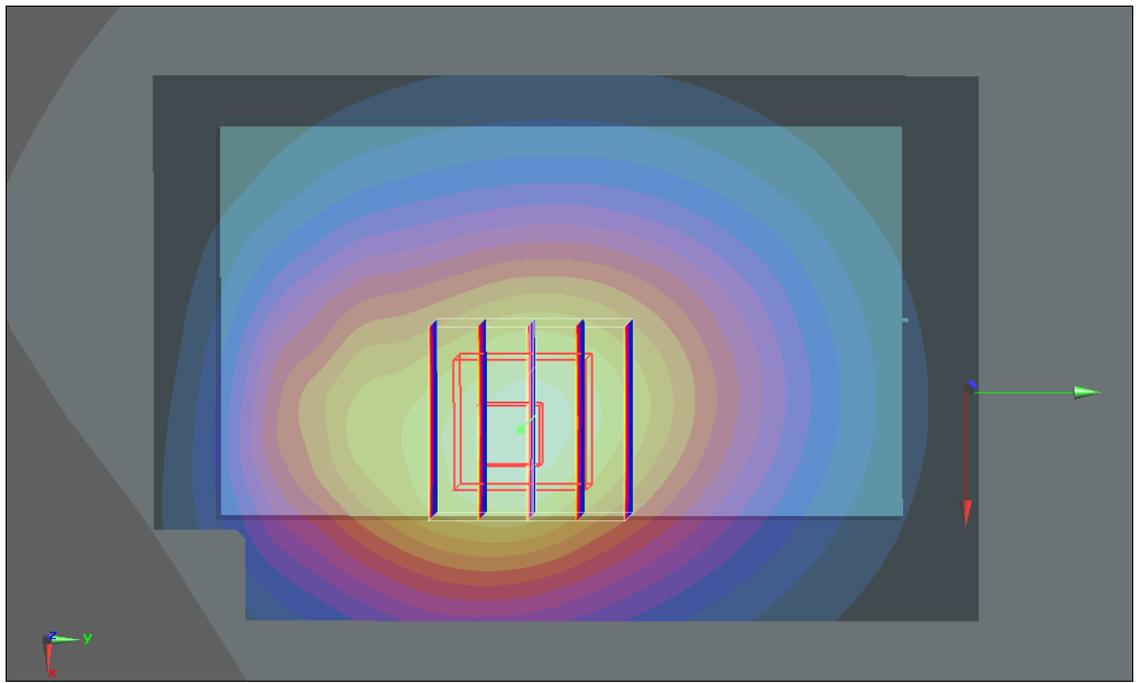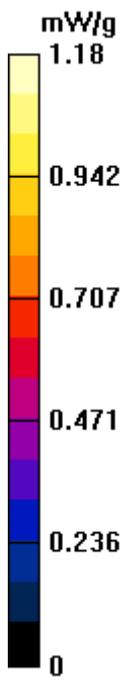Maximum value of SAR (interpolated) = 0.270 mW/g

**Ch9400/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = -0.085 dB
Peak SAR (extrapolated) = 0.371 W/kg
**SAR(1 g) = 0.250 mW/g; SAR(10 g) = 0.147 mW/g**
Maximum value of SAR (measured) = 0.279 mW/g
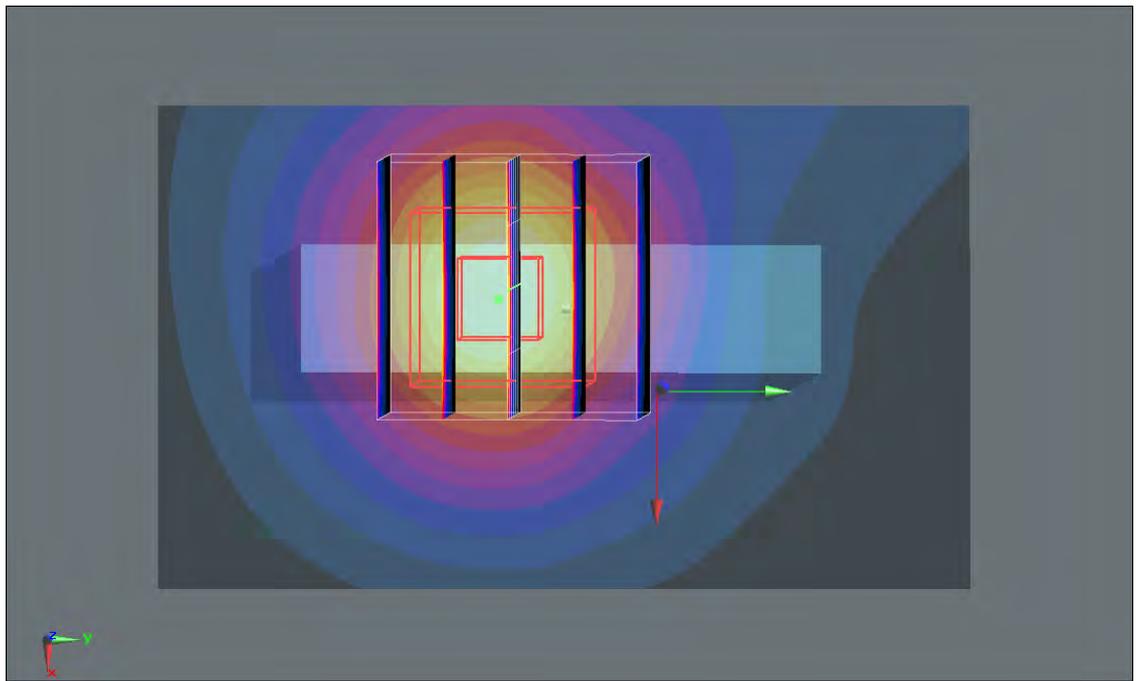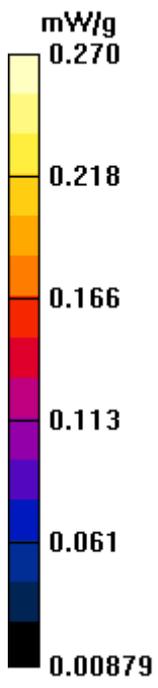
## #67 GSM850_GPRS10_Bottom_1.5cm_Ch189_Battery2

### DUT: 121417

Communication System: GSM850; Frequency: 836.4 MHz;Duty Cycle: 1:4
Medium: MSL_850_110324 Medium parameters used : f = 836.4 MHz; σ = 0.965 mho/m; $ε_r$ = 54.5;

$ρ$ = 1000 kg/m$^3$
Ambient Temperature：22.6 ℃；Liquid Temperature：21.6 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.99, 5.99, 5.99); Calibrated: 2010/9/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Ch189/Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.645 mW/g

### Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.3 V/m; Power Drift = 0.146 dB
Peak SAR (extrapolated) = 0.755 W/kg
**SAR(1 g) = 0.613 mW/g; SAR(10 g) = 0.455 mW/g**
Maximum value of SAR (measured) = 0.659 mW/g
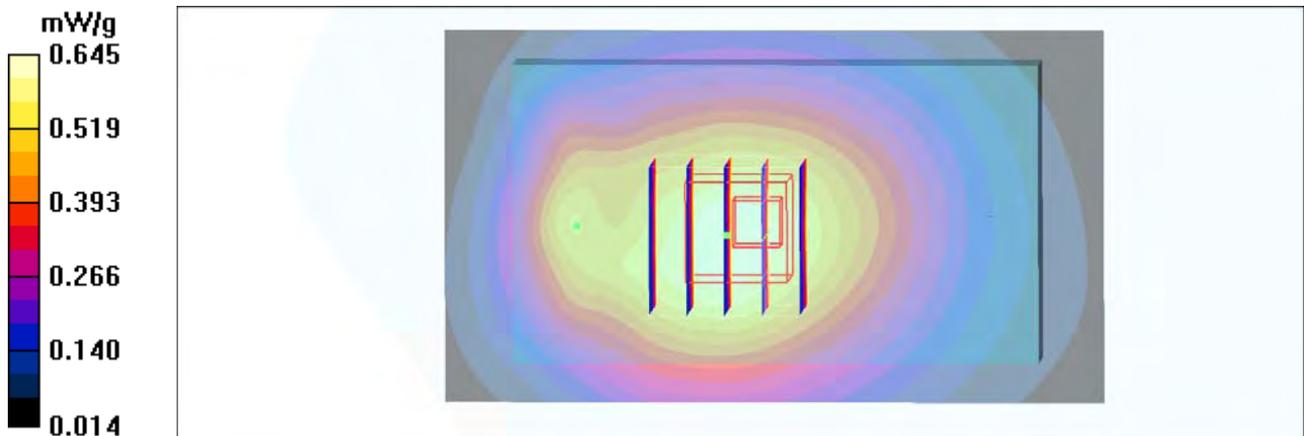
**#67 GSM850_GPRS10_Bottom_1.5cm_Ch189_Battery2_2D**

**DUT: 121417**

Communication System: GSM850; Frequency: 836.4 MHz;Duty Cycle: 1:4
Medium: MSL_850 Medium parameters used: f = 836.4 MHz; σ = 0.965 mho/m; $\varepsilon_r$ = 54.5; ρ = 1000 kg/m$^3$
Ambient Temperature：22.6 ℃；Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.99, 5.99, 5.99); Calibrated: 2010/9/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: SAM-Back; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**Ch189/Area Scan (41x71x1):** Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.645 mW/g

**Ch189/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.3 V/m; Power Drift = 0.146 dB
Peak SAR (extrapolated) = 0.755 W/kg
**SAR(1 g) = 0.613 mW/g; SAR(10 g) = 0.455 mW/g**
Maximum value of SAR (measured) = 0.659 mW/g
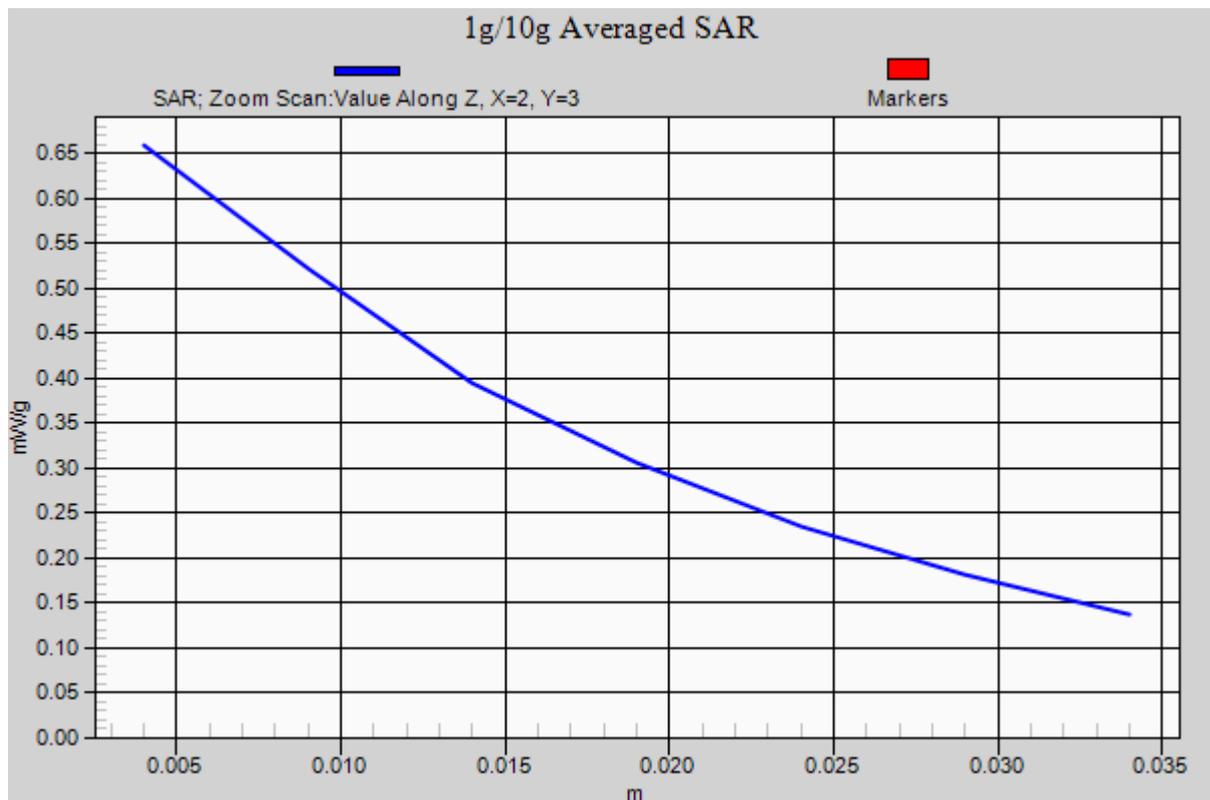
## #06 GSM1900_GPRS10_Bottom_1.5cm_Ch512_Battery1

**DUT: 121417**

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_110324 Medium parameters used : f = 1850.2 MHz; $\sigma$ = 1.49 mho/m; $\varepsilon_r$ = 53.1;

$\rho$ = 1000 kg/m$^3$
Ambient Temperature：22.6 ℃；Liquid Temperature：21.6 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3731; ConvF(7.13, 7.13, 7.13); Calibrated: 2010/9/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2011/1/13
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186


**Ch512/Area Scan (41x71x1):** Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.695 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.49 V/m; Power Drift = -0.301 dB
Peak SAR (extrapolated) = 1.00 W/kg
**SAR(1 g) = 0.602 mW/g; SAR(10 g) = 0.357 mW/g**
Maximum value of SAR (measured) = 0.645 mW/g
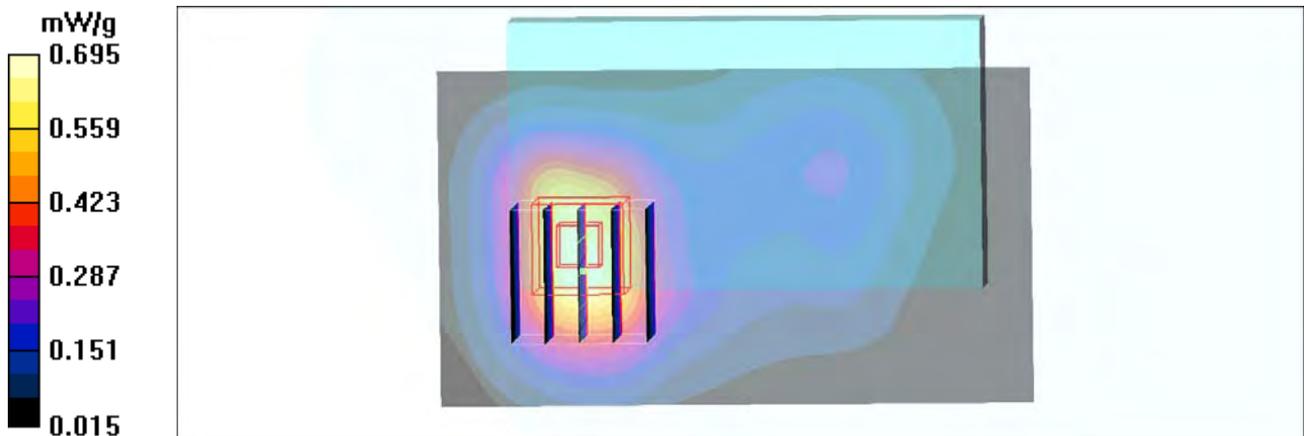
## #06 GSM1900_GPRS10_Bottom_1.5cm_Ch512_Battery1_2D

### DUT: 121417

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_110223 Medium parameters used : f = 1850.2 MHz; σ = 1.49 mho/m; $\varepsilon_r$ =

53.1; ρ = 1000 kg/m$^3$
Ambient Temperature：22.6 ℃；Liquid Temperature：21.6 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3731; ConvF(7.13, 7.13, 7.13); Calibrated: 2010/9/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2011/1/13
- Phantom: ELI 4.0_Front; Type: QDOVA001BB; Serial: 1026
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Ch512/Area Scan (41x71x1):** Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.695 mW/g

**Ch512/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.49 V/m; Power Drift = -0.101 dB
Peak SAR (extrapolated) = 1.00 W/kg
**SAR(1 g) = 0.602 mW/g; SAR(10 g) = 0.357 mW/g**
Maximum value of SAR (measured) = 0.645 mW/g

## #72 WCDMA V_RMC12.2k_Bottom_1.5cm_Ch4182_Battery1

### DUT: 121417

Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL_850_110324 Medium parameters used : f = 836.4 MHz; σ = 0.965 mho/m; $\varepsilon_r$ = 54.5;

$\rho$ = 1000 kg/m$^3$
Ambient Temperature：22.6 ℃；Liquid Temperature：21.6 ℃

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.99, 5.99, 5.99); Calibrated: 2010/9/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Ch41852/Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.640 mW/g

### Ch41852/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.6 V/m; Power Drift = -0.156 dB
Peak SAR (extrapolated) = 0.768 W/kg
**SAR(1 g) = 0.615 mW/g; SAR(10 g) = 0.449 mW/g**
Maximum value of SAR (measured) = 0.643 mW/g
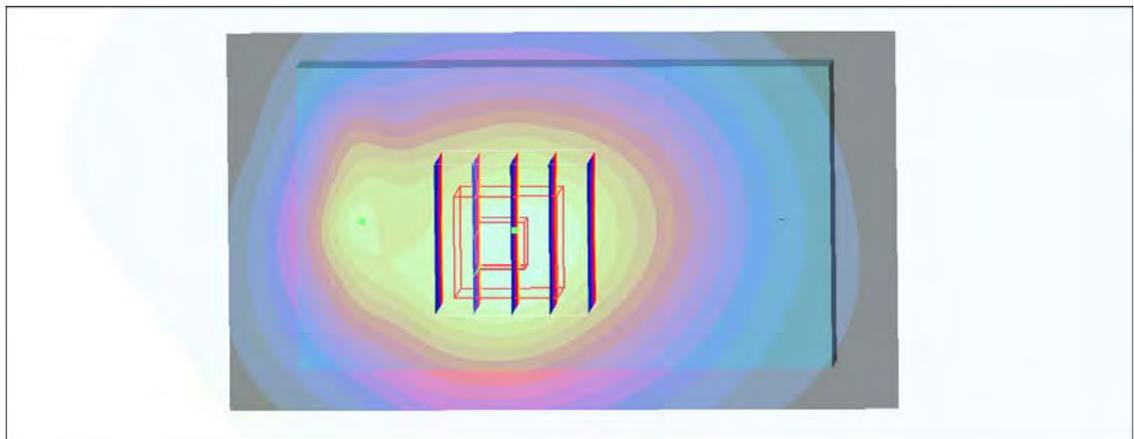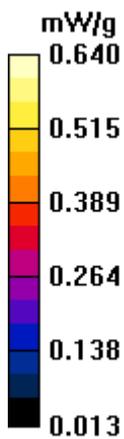
**#72 WCDMA V_RMC12.2k_Bottom_1.5cm_Ch4182_Battery1_2D**

**DUT: 121417**

Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1

Medium: MSL_850 Medium parameters used: f = 836.4 MHz; σ = 0.965 mho/m; $\varepsilon_r$ = 54.5; ρ = 1000 kg/m$^3$

Ambient Temperature：22.6 ℃；Liquid Temperature：21.6 ℃

DASY6 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.99, 5.99, 5.99); Calibrated: 2010/9/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: SAM-Back; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW<FCU[ 6."X60"Dwkf": 2="Rquvtqeguukpi"UY<UGOECF."X30 "Dwkf "3:8

**Ch41852/Area Scan (41x71x1):** Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.640 mW/g

**Ch41852/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.6 V/m; Power Drift = -0.156 dB
Peak SAR (extrapolated) = 0.768 W/kg
**SAR(1 g) = 0.615 mW/g; SAR(10 g) = 0.449 mW/g**
Maximum value of SAR (measured) = 0.643 mW/g
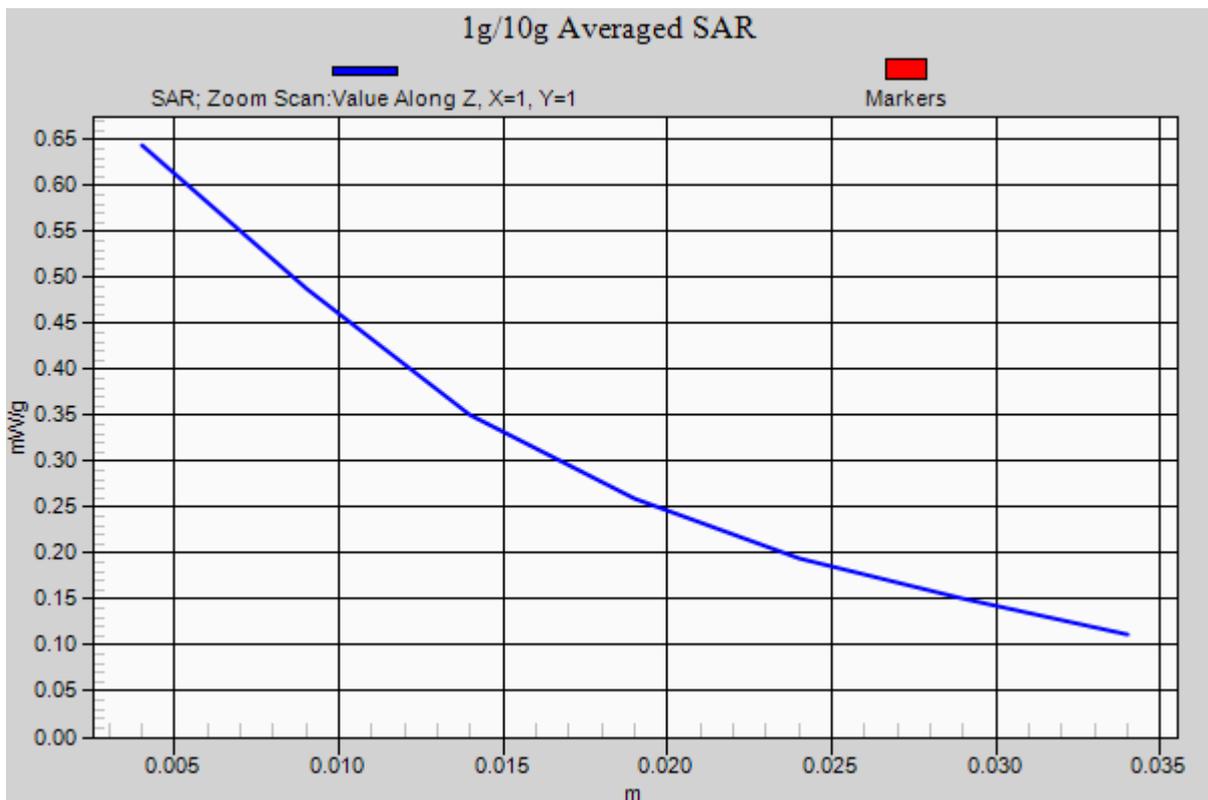
## #82 WCDMA II_RMC12.2k_Bottom_1.5cm_Ch9538_Battery1

### DUT: 121417

Communication System: WCDMA; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110324 Medium parameters used: f = 1908 MHz; σ = 1.54 mho/m; $\varepsilon_r$ = 52.8; ρ

= 1000 kg/m$^3$
Ambient Temperature：22.6 ℃；Liquid Temperature：21.6 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3731; ConvF(7.13, 7.13, 7.13); Calibrated: 2010/9/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2011/1/13
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186


### Ch9538/Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm
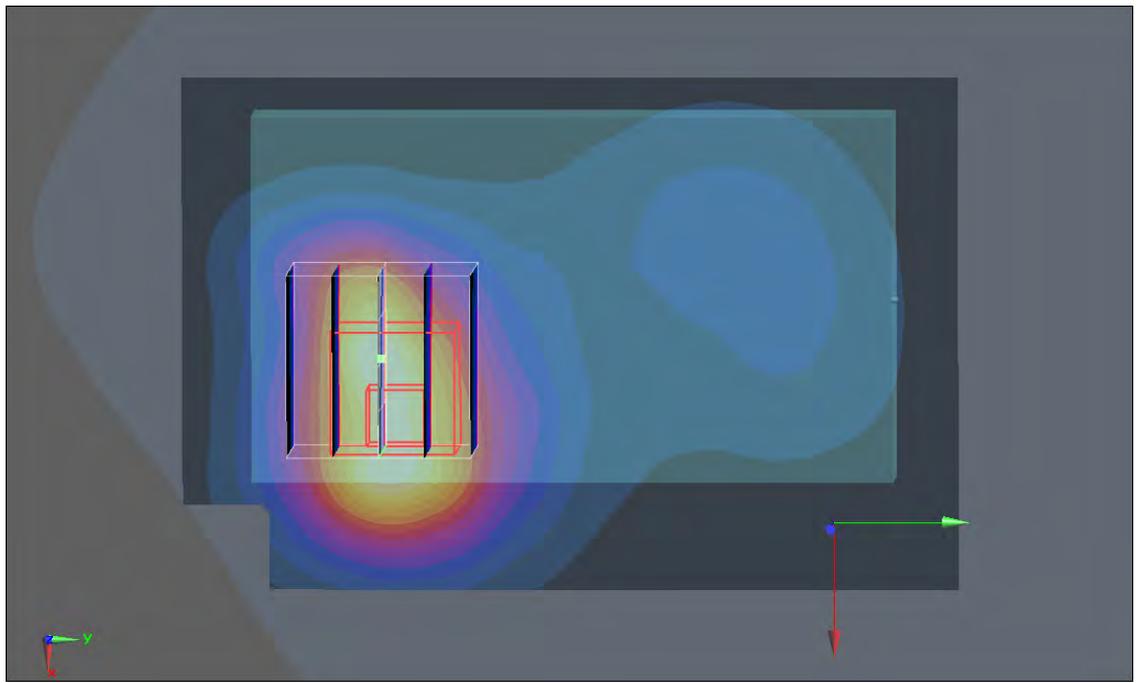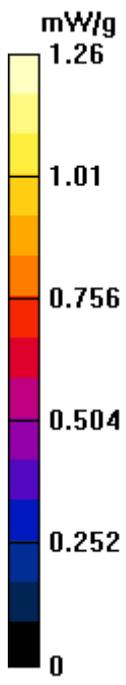Maximum value of SAR (interpolated) = 0.775 mW/g

### Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.96 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 1.07 W/kg
**SAR(1 g) = 0.659 mW/g; SAR(10 g) = 0.395 mW/g**
Maximum value of SAR (measured) = 0.711 mW/g

**#82 WCDMA II_RMC12.2k_Bottom_1.5cm_Ch9538_Battery1_2D**

**DUT: 121417**

Communication System: WCDMA; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL_1900_110223 Medium parameters used: f = 1908 MHz; σ = 1.54 mho/m; $\varepsilon_r$ = 52.8; ρ = 1000

kg/m$^3$
Ambient Temperature：22.6 ℃；Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3731; ConvF(7.13, 7.13, 7.13); Calibrated: 2010/9/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2011/1/13
- Phantom: ELI 4.0_Front; Type: QDOVA001BB; Serial: 1026
- Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 13.4 Build 125

**Ch9538/Area Scan (41x71x1):** Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.775 mW/g

**Ch9538/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.96 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 1.07 W/kg
**SAR(1 g) = 0.659 mW/g; SAR(10 g) = 0.395 mW/g**
Maximum value of SAR (measured) = 0.711 mW/g
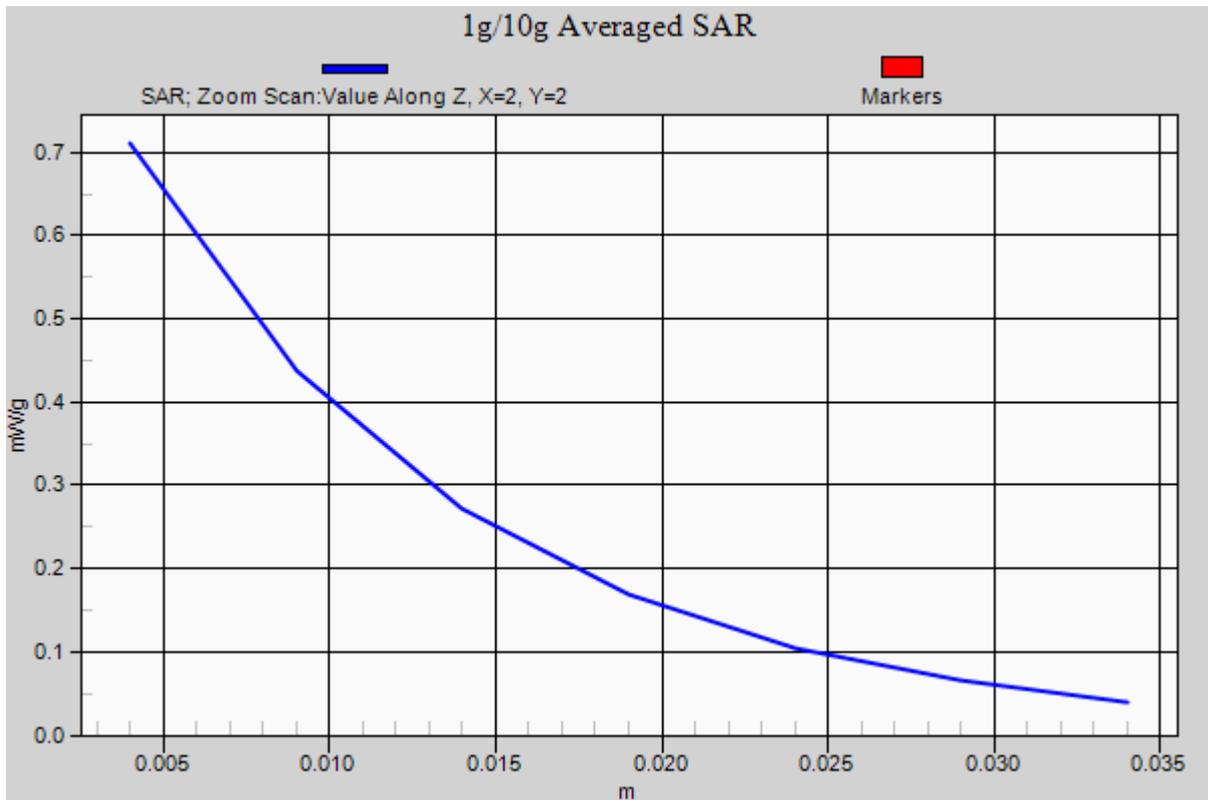
# Appendix C.    DASY Calibration Certificate

The DASY calibration certificates are shown as follows.

**SPORTON INTERNATIONAL INC.**
TEL : 886-3-327-3456
FAX : 886-3-328-4978
FCC ID : B94HHF30CN

Page Number        : C1 of C1
Report Issued Date  : Apr. 22, 2011
Report Version      : Rev. 01

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

ilac-MRA

SWISS CALIBRATION

| S | Schweizerischer Kalibrierdienst |
|---|---|
| C | Service suisse d'étalonnage |
| S | Servizio svizzero di taratura |
|   | 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 108**

Client   **ATL (Auden)**                                     Certificate No: **D835V2-4d082_Jul10**

# CALIBRATION CERTIFICATE

| Object | D835V2 - SN: 4d082 |
|---|---|
| Calibration procedure(s) | QA CAL-05.v7<br>Calibration procedure for dipole validation kits |
| Calibration date: | July 20, 2010 |

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter EPM-442A | GB37480704 | 06-Oct-09 (No. 217-01086) | Oct-10 |
| Power sensor HP 8481A | US37292783 | 06-Oct-09 (No. 217-01086) | Oct-10 |
| Reference 20 dB Attenuator | SN: 5086 (20g) | 30-Mar-10 (No. 217-01158) | Mar-11 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 30-Mar-10 (No. 217-01162) | Mar-11 |
| Reference Probe ES3DV3 | SN: 3205 | 30-Apr-10 (No. ES3-3205_Apr10) | Apr-11 |
| DAE4 | SN: 601 | 10-Jun-10 (No. DAE4-601_Jun10) | Jun-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06 | 100005 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-09) | In house check: Oct-10 |

|  | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Dimce Iliev | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: July 20, 2010

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Accreditation No.: **SCS 108**

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Multilateral Agreement for the recognition of calibration certificates

**Glossary:**

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

**Calibration is Performed According to the Following Standards:**

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

d) DASY4/5 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.

## Measurement Conditions

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

| DASY Version | DASY5 | V52.2 |
|---|---|---|
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom V4.9 | |
| Distance Dipole Center - TSL | 15 mm | with Spacer |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 835 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| Nominal Head TSL parameters | 22.0 °C | 41.5 | 0.90 mho/m |
| Measured Head TSL parameters | (22.0 ± 0.2) °C | 42.0 ± 6 % | 0.90 mho/m ± 6 % |
| Head TSL temperature during test | (23.1 ± 0.2) °C | ---- | ---- |

## SAR result with Head TSL

| SAR averaged over 1 cm³ (1 g) of Head TSL | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 2.40 mW / g |
| SAR normalized | normalized to 1W | 9.60 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | 9.65 mW /g ± 17.0 % (k=2) |

| SAR averaged over 10 cm³ (10 g) of Head TSL | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 1.56 mW / g |
| SAR normalized | normalized to 1W | 6.24 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | 6.26 mW /g ± 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 | 55.0 ± 6 % | 1.01 mho/m ± 6 % |
| Body TSL temperature during test | (22.0 ± 0.2) °C | ----- | ---- |

## SAR result with Body TSL

| SAR averaged over 1 cm³ (1 g) of Body TSL | Condition |  |
|---|---|---|
| SAR measured | 250 mW input power | 2.58 mW / g |
| SAR normalized | normalized to 1W | 10.3 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **10.0 mW / g ± 17.0 % (k=2)** |

| SAR averaged over 10 cm³ (10 g) of Body TSL | condition |  |
|---|---|---|
| SAR measured | 250 mW input power | 1.69 mW / g |
| SAR normalized | normalized to 1W | 6.76 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **6.60 mW / g ± 16.5 % (k=2)** |

## Appendix

### Antenna Parameters with Head TSL

| Impedance, transformed to feed point | 51.7 Ω - 3.2 jΩ |
|---|---|
| Return Loss | - 29.0 dB |

### Antenna Parameters with Body TSL

| Impedance, transformed to feed point | 48.3 Ω - 4.6 jΩ |
|---|---|
| Return Loss | - 26.0 dB |

### General Antenna Parameters and Design

| Electrical Delay (one direction) | 1.389ns |
|---|---|

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

| Manufactured by | SPEAG |
|---|---|
| Manufactured on | October 17, 2008 |

**DASY5 Validation Report for Head TSL**

Date/Time: 20.07.2010 15:48:57

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; $\sigma$ = 0.9 mho/m; $\varepsilon_r$ = 42.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 – SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010

- Sensor-Surface: 3mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn601; Calibrated: 10.06.2010

- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001

- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)

- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

**Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0:** Measurement
grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.1 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 3.63 W/kg
**SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.56 mW/g**
Maximum value of SAR (measured) = 2.8 mW/g



0 dB = 2.8mW/g
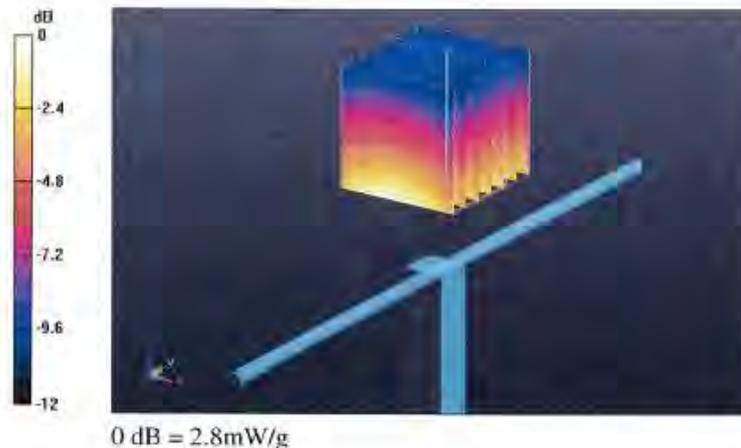
## Impedance Measurement Plot for Head TSL
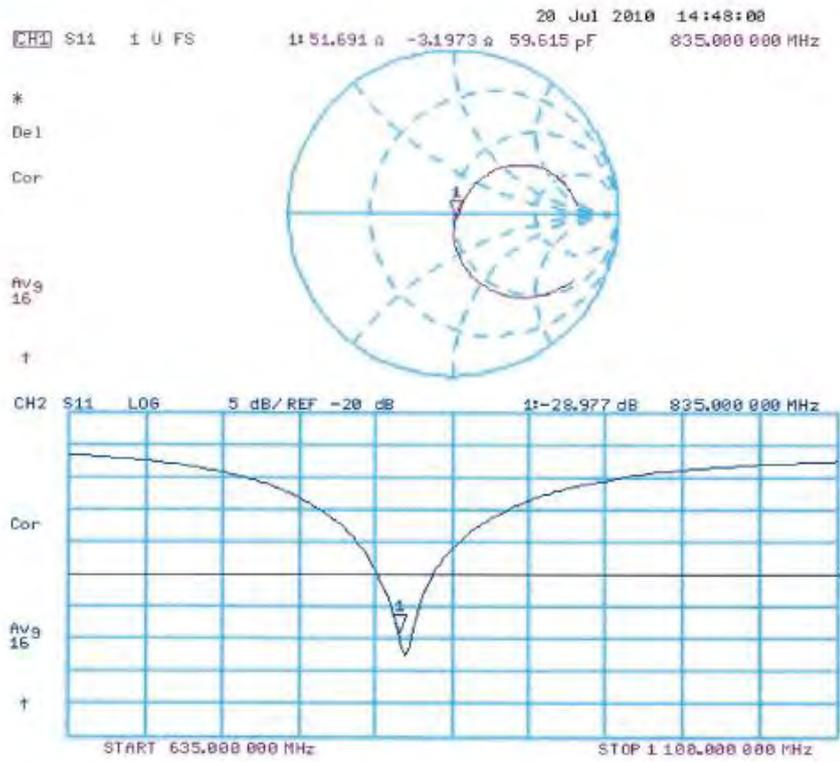
## DASY5 Validation Report for Body

Date/Time: 20.07.2010 12:03:13

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; $\sigma$ = 1.01 mho/m; $\varepsilon_r$ = 55; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010

- Sensor-Surface: 3mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn601; Calibrated: 10.06.2010

- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001

- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)

- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

**Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0:** Measurement
grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.1 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 3.81 W/kg
**SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.69 mW/g**
Maximum value of SAR (measured) = 2.98 mW/g
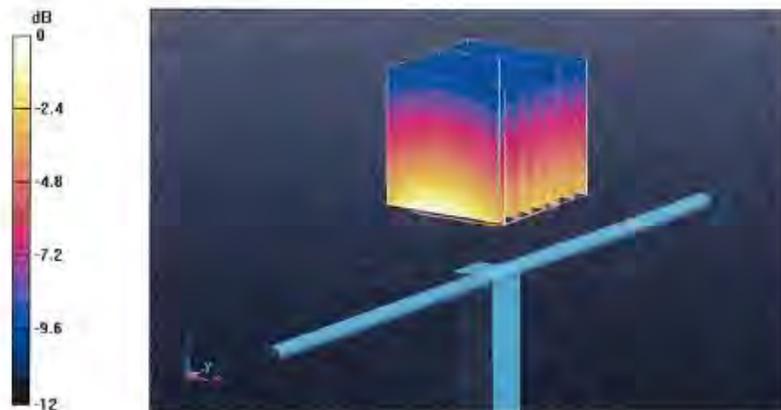


0 dB = 2.98mW/g

## Impedance Measurement Plot for Body TSL
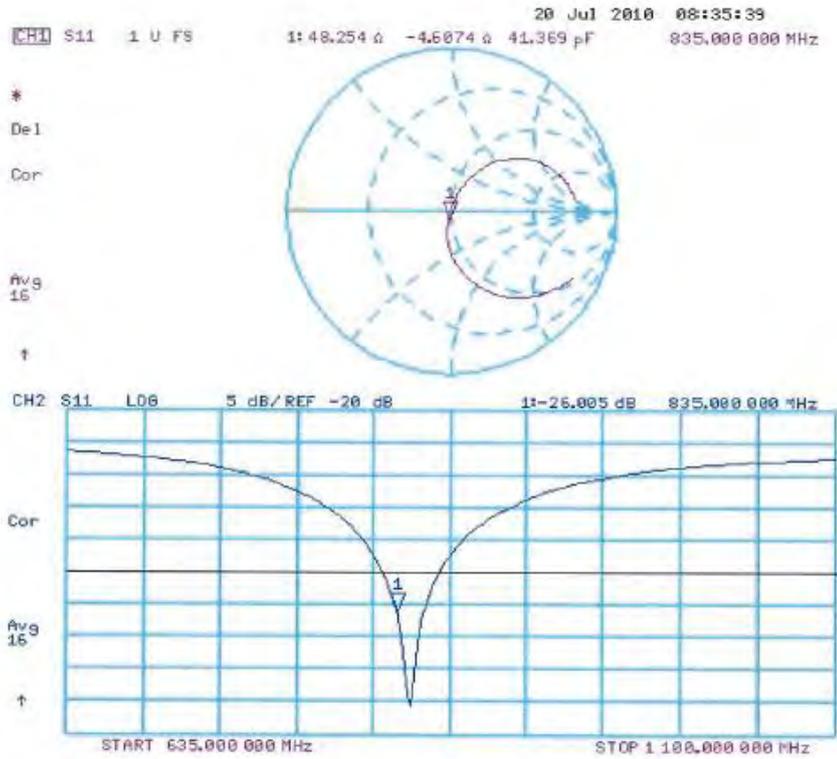
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Accreditation No.: **SCS 108**

Client   **Auden**

Certificate No: **D1900V2-5d018_Jun10**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D1900V2 - SN: 5d018 |
| Calibration procedure(s) | QA CAL-05.v7 Calibration procedure for dipole validation kits |
| Calibration date: | June 15, 2010 |

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 EPM-442A | GB37480704 | 06-Oct-09 (No. 217-01086) | Oct-10 |
| Power sensor HP 8481A | US37292783 | 06-Oct-09 (No. 217-01086) | Oct-10 |
| Reference 20 dB Attenuator | SN: 5086 (20g) | 30-Mar-10 (No. 217-01158) | Mar-11 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 30-Mar-10 (No. 217-01162) | Mar-11 |
| Reference Probe ES3DV3 | SN: 3205 | 30-Apr-10 (No. ES3-3205_Apr10) | Apr-11 |
| DAE4 | SN: 601 | 10-Jun-10 (No. DAE4-601_Jun10) | Jun-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06 | 100005 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-09) | In house check: Oct-10 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Dimce Iliev | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: June 17, 2010

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## Glossary:
| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | not applicable or not measured |

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

## Additional Documentation:
d) DASY4/5 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.

## Measurement Conditions

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

| DASY Version | DASY5 | V52.2 |
|---|---|---|
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom V5.0 | |
| Distance Dipole Center - TSL | 10 mm | with Spacer |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 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 | 39.6 ± 6 % | 1.44 mho/m ± 6 % |
| Head TSL temperature during test | (22.5 ± 0.2) °C | ---- | ---- |

## SAR result with Head TSL

| SAR averaged over 1 cm³ (1 g) of Head TSL | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 10.0 mW / g |
| SAR normalized | normalized to 1W | 40.0 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | **39.2 mW /g ± 17.0 % (k=2)** |

| SAR averaged over 10 cm³ (10 g) of Head TSL | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 5.22 mW / g |
| SAR normalized | normalized to 1W | 20.9 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | **20.7 mW /g ± 16.5 % (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 | 53.4 ± 6 % | 1.54 mho/m ± 6 % |
| Body TSL temperature during test | (21.7 ± 0.2) °C | ----- | ----- |

## SAR result with Body TSL

| SAR averaged over 1 cm³ (1 g) of Body TSL | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 10.3 mW / g |
| SAR normalized | normalized to 1W | 41.2 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **40.9 mW / g ± 17.0 % (k=2)** |

| SAR averaged over 10 cm³ (10 g) of Body TSL | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 5.52 mW / g |
| SAR normalized | normalized to 1W | 22.1 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **22.0 mW / g ± 16.5 % (k=2)** |

## Appendix

## Antenna Parameters with Head TSL

| Impedance, transformed to feed point | 52.1 Ω + 2.6 jΩ |
|---|---|
| Return Loss | - 29.7 dB |

## Antenna Parameters with Body TSL

| Impedance, transformed to feed point | 47.4 Ω + 3.2 jΩ |
|---|---|
| Return Loss | - 27.6 dB |

## General Antenna Parameters and Design

| Electrical Delay (one direction) | 1.94 ns |
|---|---|

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

## Additional EUT Data

| Manufactured by | SPEAG |
|---|---|
| Manufactured on | June 04, 2002 |

**DASY5 Validation Report for Head TSL**

Date/Time: 15.06.2010 10:40:45

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d018**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL U11 BB
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.44 mho/m; $\varepsilon_r$ = 39.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010

- Sensor-Surface: 3mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn601; Calibrated: 10.06.2010

- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001

- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)

- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

**Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0:** Measurement
grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.7 V/m; Power Drift = 0.022 dB
Peak SAR (extrapolated) = 18.4 W/kg
**SAR(1 g) = 10 mW/g; SAR(10 g) = 5.22 mW/g**
Maximum value of SAR (measured) = 12.6 mW/g
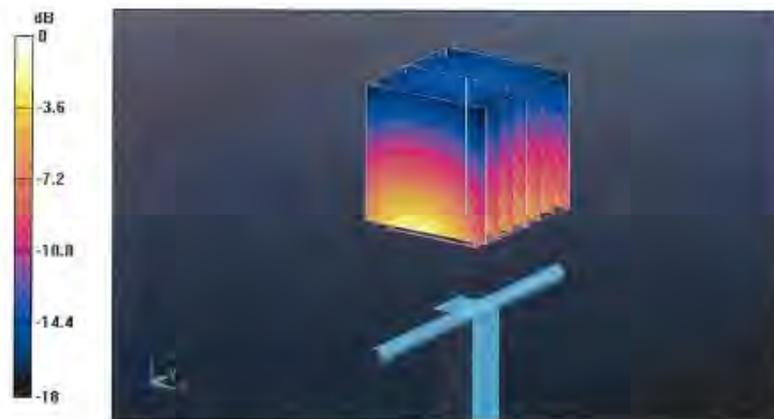


0 dB = 12.6mW/g

## Impedance Measurement Plot for Head TSL

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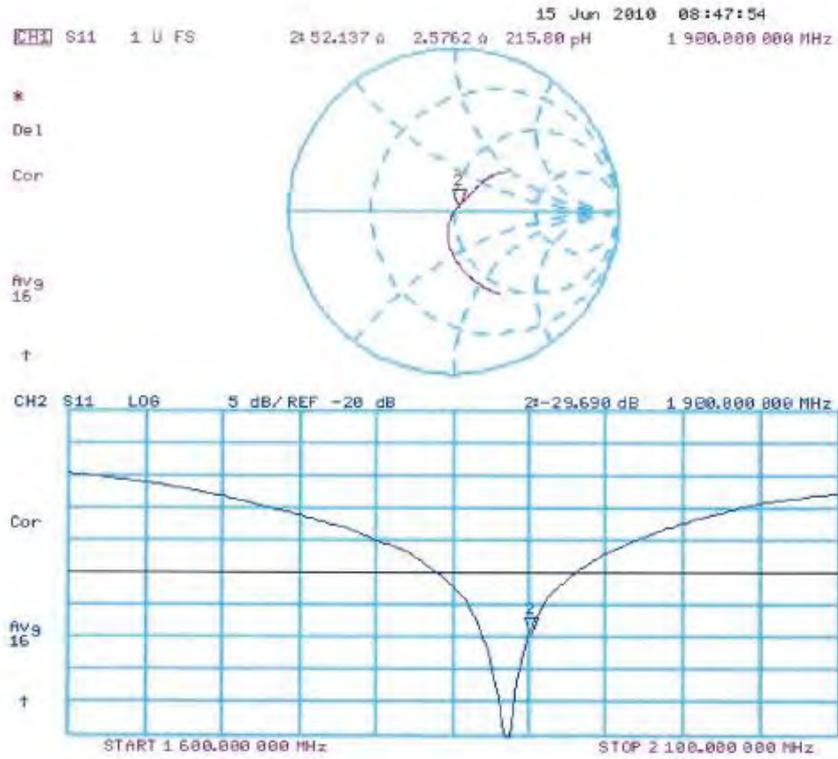
**DASY5 Validation Report for Body**

Date/Time: 15.06.2010 14:14:27

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d018**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL U11 BB
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.54 mho/m; $\varepsilon_r$ = 53.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010

- Sensor-Surface: 3mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn601; Calibrated: 10.06.2010

- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002

- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)

- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

**Pin250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0:** Measurement
grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.1 V/m; Power Drift = 0.055 dB
Peak SAR (extrapolated) = 17.3 W/kg
**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.52 mW/g**
Maximum value of SAR (measured) = 12.8 mW/g



0 dB = 12.8mW/g
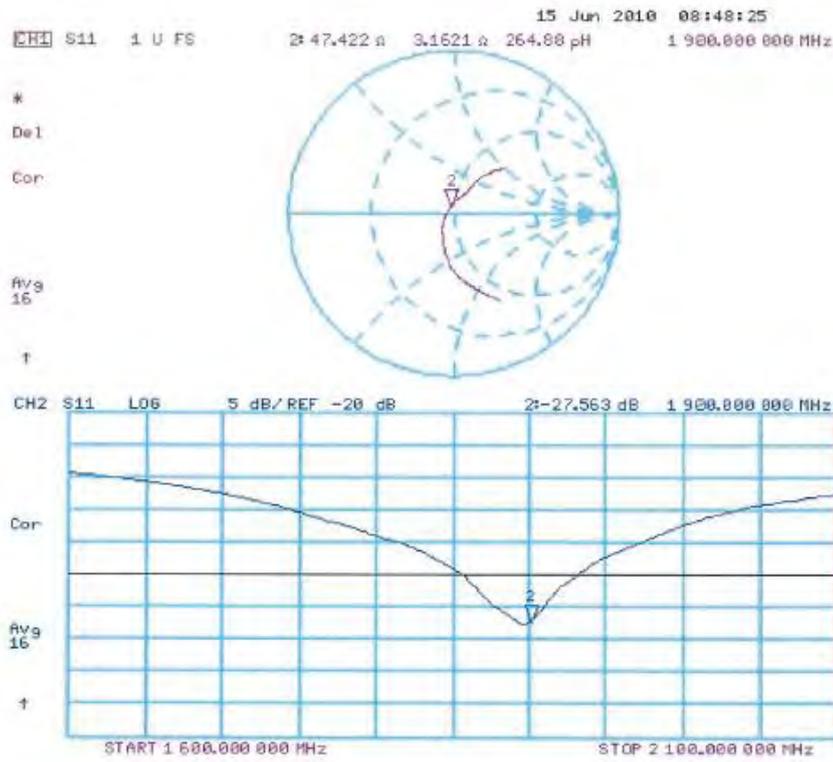
Certificate No: D1900V2-5d018_Jun10          Page 8 of 9

## Impedance Measurement Plot for Body TSL

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Accreditation No.: **SCS 108**

Client  **Sporton (Auden)**

Certificate No: **DAE3-577_Jan11**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | DAE3 - SD 000 D03 AA - SN: 577 |
| Calibration procedure(s) | QA CAL-06.v22<br>Calibration procedure for the data acquisition electronics (DAE) |
| Calibration date: | January 13, 2011 |

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Keithley Multimeter Type 2001 | SN: 0810278 | 28-Sep-10 (No:10376) | Sep-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Calibrator Box V1.1 | SE UMS 006 AB 1004 | 07-Jun-10 (in house check) | In house check: Jun-11 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Andrea Guntli | Technician | |
| Approved by: | Fin Bomholt | R&D Director | |

Issued: January 13, 2011

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Accreditation No.: **SCS 108**

## Glossary

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

## Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by
  comparison with a calibrated instrument traceable to national standards. The figure given
  corresponds to the full scale range of the voltmeter in the respective range.

- *Connector angle:* The angle of the connector is assessed measuring the angle
  mechanically by a tool inserted. Uncertainty is not required.

- The following parameters as documented in the Appendix contain technical information as a
  result from the performance test and require no uncertainty.

  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of
    the nominal calibration voltage. Influence of offset voltage is included in this
    measurement.

  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on
    the differential measurement.

  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an
    input voltage.

  - *AD Converter Values with inputs shorted:* Values on the internal AD converter
    corresponding to zero input voltage

  - *Input Offset Measurement:* Output voltage and statistical results over a large number of
    zero voltage measurements.

  - *Input Offset Current:* Typical value for information; Maximum channel input offset
    current, not considering the input resistance.

  - *Input resistance:* Typical value for information; DAE input resistance at the connector,
    during internal auto-zeroing and during measurement.

  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery
    alarm signal is generated.

  - *Power consumption:* Typical value for information. Supply currents in various operating
    modes.

## DC Voltage Measurement

A/D - Converter Resolution nominal

| | | | | |
|---|---|---|---|---|
| High Range: | 1LSB = | 6.1μV , | full range = | -100...+300 mV |
| Low Range: | 1LSB = | 61nV , | full range = | -1........+3mV |

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

| Calibration Factors | X | Y | Z |
|---|---|---|---|
| High Range | 404.389 ± 0.1% (k=2) | 403.857 ± 0.1% (k=2) | 404.295 ± 0.1% (k=2) |
| Low Range | 3.93277 ± 0.7% (k=2) | 3.93544 ± 0.7% (k=2) | 3.95803 ± 0.7% (k=2) |

## Connector Angle

| Connector Angle to be used in DASY system | 102.0 ° ± 1 ° |
|---|---|

## Appendix

### 1. DC Voltage Linearity

| High Range | | Reading (μV) | Difference (μV) | Error (%) |
|---|---|---|---|---|
| Channel X | + Input | 200005.8 | 1.57 | 0.00 |
| Channel X | + Input | 20004.13 | 3.33 | 0.02 |
| Channel X | - Input | -19995.53 | 4.67 | -0.02 |
| Channel Y | + Input | 200003.4 | 0.31 | 0.00 |
| Channel Y | + Input | 19999.89 | 0.09 | 0.00 |
| Channel Y | - Input | -20000.18 | -0.28 | 0.00 |
| Channel Z | + Input | 200002.7 | 0.22 | 0.00 |
| Channel Z | + Input | 19999.37 | -0.63 | -0.00 |
| Channel Z | - Input | -19999.27 | 0.43 | -0.00 |

| Low Range | | Reading (μV) | Difference (μV) | Error (%) |
|---|---|---|---|---|
| Channel X | + Input | 2000.0 | -0.14 | -0.01 |
| Channel X | + Input | 199.95 | -0.05 | -0.03 |
| Channel X | - Input | -200.10 | -0.10 | 0.05 |
| Channel Y | + Input | 2000.0 | -0.12 | -0.01 |
| Channel Y | + Input | 199.43 | -0.57 | -0.29 |
| Channel Y | - Input | -201.05 | -1.25 | 0.63 |
| Channel Z | + Input | 1999.5 | -0.28 | -0.01 |
| Channel Z | + Input | 198.64 | -1.56 | -0.78 |
| Channel Z | - Input | -200.91 | -0.87 | 0.40 |

### 2. Common mode sensitivity

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

| | Common mode Input Voltage (mV) | High Range Average Reading (μV) | Low Range Average Reading (μV) |
|---|---|---|---|
| Channel X | 200 | 14.61 | 12.98 |
| | - 200 | -11.87 | -13.38 |
| Channel Y | 200 | -6.98 | -7.04 |
| | - 200 | 5.39 | 5.42 |
| Channel Z | 200 | -1.74 | -1.94 |
| | - 200 | 0.61 | 0.35 |

### 3. Channel separation

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

| | Input Voltage (mV) | Channel X (μV) | Channel Y (μV) | Channel Z (μV) |
|---|---|---|---|---|
| Channel X | 200 | — | 3.35 | 0.10 |
| Channel Y | 200 | 2.66 | - | 2.41 |
| Channel Z | 200 | 2.57 | 0.13 | - |

## 4. AD-Converter Values with inputs shorted

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

|  | High Range (LSB) | Low Range (LSB) |
|---|---|---|
| Channel X | 15969 | 16221 |
| Channel Y | 15855 | 15246 |
| Channel Z | 16222 | 17974 |

## 5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

|  | Average (µV) | min. Offset (µV) | max. Offset (µV) | Std. Deviation (µV) |
|---|---|---|---|---|
| Channel X | -1.07 | -4.93 | 0.31 | 0.67 |
| Channel Y | -0.69 | -1.59 | 0.48 | 0.40 |
| Channel Z | -1.47 | -2.56 | -0.81 | 0.32 |

## 6. Input Offset Current

Nominal input circuitry offset current on all channels. <25fA

## 7. Input Resistance (Typical values for information)

|  | Zeroing (kOhm) | Measuring (MOhm) |
|---|---|---|
| Channel X | 200 | 200 |
| Channel Y | 200 | 200 |
| Channel Z | 200 | 200 |

## 8. Low Battery Alarm Voltage (Typical values for information)

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

## 9. Power Consumption (Typical values for information)

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

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

| Client | **Sporton (Auden)** | Certificate No: **DAE4-778_Oct10** |
|---|---|---|

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | DAE4 - SD 000 D04 BJ - SN: 778 |
| Calibration procedure(s) | QA CAL-06.v22<br>Calibration procedure for the data acquisition electronics (DAE) |
| Calibration date: | October 22, 2010 |

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 |
|---|---|---|---|
| Keithley Multimeter Type 2001 | SN: 0810278 | 28-Sep-10 (No:10376) | Sep-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Calibrator Box V1.1 | SE UMS 006 AB 1004 | 07-Jun-10 (in house check) | In house check: Jun-11 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Eric Hainfeld | Technician | |
| Approved by: | Fin Bomholt | R&D Director | |

Issued: October 22, 2010

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Certificate No: DAE4-778_Oct10        Page 1 of 5

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Accredited by the Swiss Accreditation Service (SAS)        Accreditation No.: **SCS 108**
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

## Glossary

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

## Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.

- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.

- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.

  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.

  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.

  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.

  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage

  - *Input Offset Measurement:* Output voltage and statistical results over a large number of zero voltage measurements.

  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.

  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.

  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.

  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

## DC Voltage Measurement

A/D - Converter Resolution nominal

| | | | | |
|---|---|---|---|---|
| High Range: | 1LSB = | 6.1µV , | full range = | -100...+300 mV |
| Low Range: | 1LSB = | 61nV , | full range = | -1.......+3mV |

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

| Calibration Factors | X | Y | Z |
|---|---|---|---|
| High Range | 404.679 ± 0.1% (k=2) | 403.480 ± 0.1% (k=2) | 405.025 ± 0.1% (k=2) |
| Low Range | 3.98633 ± 0.7% (k=2) | 3.96375 ± 0.7% (k=2) | 3.99940 ± 0.7% (k=2) |

## Connector Angle

| Connector Angle to be used in DASY system | 64.5 ° ± 1 ° |
|---|---|

## Appendix

### 1. DC Voltage Linearity

| High Range | | Reading (µV) | Difference (µV) | Error (%) |
|---|---|---|---|---|
| Channel X | + Input | 200004.4 | 1.89 | 0.00 |
| Channel X | + Input | 20001.11 | 1.41 | 0.01 |
| Channel X | - Input | -19998.36 | 1.54 | -0.01 |
| Channel Y | + Input | 199996.1 | 3.42 | 0.00 |
| Channel Y | + Input | 19999.75 | 0.35 | 0.00 |
| Channel Y | - Input | -19999.92 | -0.12 | 0.00 |
| Channel Z | + Input | 200002.7 | 1.29 | 0.00 |
| Channel Z | + Input | 19996.85 | -2.55 | -0.01 |
| Channel Z | - Input | -20004.31 | -4.61 | 0.02 |

| Low Range | | Reading (µV) | Difference (µV) | Error (%) |
|---|---|---|---|---|
| Channel X | + Input | 2000.0 | 0.09 | 0.00 |
| Channel X | + Input | 200.02 | 0.02 | 0.01 |
| Channel X | - Input | -198.62 | 1.48 | -0.74 |
| Channel Y | + Input | 1999.6 | -0.58 | -0.03 |
| Channel Y | + Input | 199.13 | -0.57 | -0.29 |
| Channel Y | - Input | -200.71 | -0.61 | 0.31 |
| Channel Z | + Input | 2000.1 | -0.01 | -0.00 |
| Channel Z | + Input | 198.96 | -1.14 | -0.57 |
| Channel Z | - Input | -200.98 | -0.98 | 0.49 |

### 2. Common mode sensitivity

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

| | Common mode Input Voltage (mV) | High Range Average Reading (µV) | Low Range Average Reading (µV) |
|---|---|---|---|
| Channel X | 200 | -5.28 | -6.07 |
| | - 200 | 6.79 | 6.12 |
| Channel Y | 200 | -1.80 | -1.60 |
| | - 200 | 0.97 | 0.35 |
| Channel Z | 200 | -9.76 | -9.86 |
| | - 200 | 7.56 | 7.61 |

### 3. Channel separation

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

| | Input Voltage (mV) | Channel X (µV) | Channel Y (µV) | Channel Z (µV) |
|---|---|---|---|---|
| Channel X | 200 | - | 1.86 | -0.66 |
| Channel Y | 200 | 2.28 | - | 2.89 |
| Channel Z | 200 | 1.68 | -0.15 | - |

### 4. AD-Converter Values with inputs shorted

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

|  | High Range (LSB) | Low Range (LSB) |
|---|---|---|
| Channel X | 16056 | 16950 |
| Channel Y | 16153 | 13741 |
| Channel Z | 16441 | 16086 |

### 5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

|  | Average (μV) | min. Offset (μV) | max. Offset (μV) | Std. Deviation (μV) |
|---|---|---|---|---|
| Channel X | 0.32 | -2.35 | 2.08 | 0.55 |
| Channel Y | -1.83 | -2.96 | -0.72 | 0.47 |
| Channel Z | -1.93 | -3.00 | -0.90 | 0.45 |

### 6. Input Offset Current

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

### 7. Input Resistance (Typical values for information)

|  | Zeroing (kOhm) | Measuring (MOhm) |
|---|---|---|
| Channel X | 200 | 200 |
| Channel Y | 200 | 200 |
| Channel Z | 200 | 200 |

### 8. Low Battery Alarm Voltage (Typical values for information)

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

### 9. Power Consumption (Typical values for information)

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

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Sporton (Auden)**

Certificate No: **DAE4-1210_Nov10**

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | DAE4 - SD 000 D04 BJ - SN: 1210 |
| Calibration procedure(s) | QA CAL-06.v22<br>Calibration procedure for the data acquisition electronics (DAE) |
| Calibration date: | November 18, 2010 |

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 |
|---|---|---|---|
| Keithley Multimeter Type 2001 | SN: 0810278 | 28-Sep-10 (No: 10376) | Sep-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Calibrator Box V1.1 | SE UMS 006 AB 1004 | 07-Jun-10 (in house check) | in house check: Jun-11 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Andrea Guntli | Technician | |
| Approved by: | Fin Bomholt | R&D Director | |

Issued: November 18, 2010

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Certificate No: DAE4-1210_Nov10

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

## Glossary

DAE                data acquisition electronics

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

## Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.

- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.

- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.

  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.

  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.

  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.

  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage

  - *Input Offset Measurement:* Output voltage and statistical results over a large number of zero voltage measurements.

  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.

  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.

  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.

  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

## DC Voltage Measurement

A/D - Converter Resolution nominal

| | | | | |
|---|---|---|---|---|
| High Range: | 1LSB = | 6.1µV , | full range = | -100...+300 mV |
| Low Range: | 1LSB = | 61nV , | full range = | -1.......+3mV |

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

| Calibration Factors | X | Y | Z |
|---|---|---|---|
| High Range | 404.092 ± 0.1% (k=2) | 404.921 ± 0.1% (k=2) | 405.027 ± 0.1% (k=2) |
| Low Range | 3.99932 ± 0.7% (k=2) | 3.98397 ± 0.7% (k=2) | 3.99953 ± 0.7% (k=2) |

## Connector Angle

| Connector Angle to be used in DASY system | 68.0 ° ± 1 ° |
|---|---|

Appendix

## 1. DC Voltage Linearity

| High Range | | Reading (μV) | Difference (μV) | Error (%) |
|---|---|---|---|---|
| Channel X | + Input | 200001.5 | -1.32 | -0.00 |
| Channel X | + Input | 20000.95 | 0.95 | 0.00 |
| Channel X | - Input | -19998.31 | 1.39 | -0.01 |
| Channel Y | + Input | 200000.7 | -1.08 | -0.00 |
| Channel Y | + Input | 20000.03 | 0.23 | 0.00 |
| Channel Y | - Input | -19999.95 | -0.35 | 0.00 |
| Channel Z | + Input | 200010.3 | -0.33 | -0.00 |
| Channel Z | + Input | 19997.81 | -2.89 | -0.01 |
| Channel Z | - Input | -20001.02 | -1.32 | 0.01 |

| Low Range | | Reading (μV) | Difference (μV) | Error (%) |
|---|---|---|---|---|
| Channel X | + Input | 1999.6 | -0.26 | -0.01 |
| Channel X | + Input | 199.98 | -0.02 | -0.01 |
| Channel X | - Input | -200.01 | -0.01 | 0.00 |
| Channel Y | + Input | 2000.6 | 0.54 | 0.03 |
| Channel Y | + Input | 199.17 | -1.03 | -0.51 |
| Channel Y | - Input | -200.54 | -0.84 | 0.42 |
| Channel Z | + Input | 1999.9 | -0.05 | -0.00 |
| Channel Z | + Input | 199.17 | -0.93 | -0.47 |
| Channel Z | - Input | -201.25 | -1.15 | 0.58 |

## 2. Common mode sensitivity

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

| | Common mode Input Voltage (mV) | High Range Average Reading (μV) | Low Range Average Reading (μV) |
|---|---|---|---|
| Channel X | 200 | -6.04 | -7.77 |
| | - 200 | 8.97 | 7.28 |
| Channel Y | 200 | -8.99 | -8.75 |
| | - 200 | 7.60 | 7.00 |
| Channel Z | 200 | 12.34 | 11.86 |
| | - 200 | -14.01 | -14.18 |

## 3. Channel separation

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

| | Input Voltage (mV) | Channel X (μV) | Channel Y (μV) | Channel Z (μV) |
|---|---|---|---|---|
| Channel X | 200 | - | 3.24 | 0.60 |
| Channel Y | 200 | 1.78 | - | 3.29 |
| Channel Z | 200 | 1.92 | -0.13 | - |

## 4. AD-Converter Values with inputs shorted

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

|  | High Range (LSB) | Low Range (LSD) |
|---|---|---|
| Channel X | 15945 | 17239 |
| Channel Y | 15959 | 16297 |
| Channel Z | 15874 | 17186 |

## 5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

|  | Average (μV) | min. Offset (μV) | max. Offset (μV) | Std. Deviation (μV) |
|---|---|---|---|---|
| Channel X | 0.14 | -1.10 | 1.73 | 0.40 |
| Channel Y | -0.64 | -1.49 | 0.23 | 0.33 |
| Channel Z | -1.30 | -2.71 | 0.16 | 0.44 |

## 6. Input Offset Current

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

## 7. Input Resistance (Typical values for information)

|  | Zeroing (kOhm) | Measuring (MOhm) |
|---|---|---|
| Channel X | 200 | 200 |
| Channel Y | 200 | 200 |
| Channel Z | 200 | 200 |

## 8. Low Battery Alarm Voltage (Typical values for information)

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

## 9. Power Consumption (Typical values for information)

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

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

| Client | **Sporton (Auden)** | Certificate No: **ET3-1787_May10** |
| --- | --- | --- |

# CALIBRATION CERTIFICATE

| | |
| --- | --- |
| Object | ET3DV6 - SN:1787 |
| Calibration procedure(s) | QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2<br>Calibration procedure for dosimetric E-field probes |
| Calibration date: | May 18, 2010 |

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 E4419B | GB41293874 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41495277 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41498087 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 30-Mar-10 (No. 217-01159) | Mar-11 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 30-Mar-10 (No. 217-01161) | Mar-11 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 30-Mar-10 (No. 217-01160) | Mar-11 |
| Reference Probe ES3DV2 | SN: 3013 | 30-Dec-09 (No. ES3-3013_Dec09) | Dec-10 |
| DAE4 | SN: 660 | 20-Apr-10 (No. DAE4-660_Apr10) | Apr-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
| --- | --- | --- | --- |
| RF generator HP 8648C | US3642U01700 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (in house check Oct-09) | In house check: Oct10 |

| | Name | Function | Signature |
| --- | --- | --- | --- |
| Calibrated by: | Jeton Kastrati | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: May 22, 2010

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Accreditation No.: **SCS 108**

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

## Glossary:

| | |
|---|---|
| TSL | tissue simulating liquid |
| NORMx,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A, B, C | modulation dependent linearization parameters |
| Polarization $\varphi$ | $\varphi$ rotation around probe axis |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta$ = 0 is normal to probe axis |

## Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

## Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization $\vartheta$ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the $E^2$-field uncertainty inside TSL (see below *ConvF*).

- *NORM(f)x,y,z = NORMx,y,z \* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.

- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.

- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.

- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z \* ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.

- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.

- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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ET3DV6 SN:1787                                    May 18, 2010

# Probe ET3DV6

# SN:1787

Manufactured:        May 28, 2003
Last calibrated:     May 26, 2009
Recalibrated:        May 18, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

## DASY/EASY - Parameters of Probe: ET3DV6 SN:1787

### Basic Calibration Parameters

|  | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm $(\mu V/(V/m)^2)^A$ | 1.60 | 1.79 | 2.10 | ± 10.1% |
| DCP $(mV)^B$ | 92.4 | 95.5 | 91.0 | |

### Modulation Calibration Parameters

| UID | Communication System Name | PAR | | A dB | B dBuV | C | VR mV | Unc$^E$ (k=2) |
|---|---|---|---|---|---|---|---|---|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 300.0 | ± 1.5% |
| | | | Y | 0.00 | 0.00 | 1.00 | 300.0 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 300.0 | |

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%.

$^A$ The uncertainties of NormX,Y,Z do not affect the E$^2$-field uncertainty inside TSL (see Pages 5 and 6).

$^B$ Numerical linearization parameter: uncertainty not required.

$^E$ Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

## DASY/EASY - Parameters of Probe: ET3DV6 SN:1787

### Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] | Validity [MHz]$^C$ | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---------|---------------------|--------------|--------------|---------|---------|---------|-------|-----------------|
| 750 | ± 50 / ± 100 | 41.5 ± 5% | 0.90 ± 5% | 6.56 | 6.56 | 6.56 | 0.52 | 1.96 ± 11.0% |
| 835 | ± 50 / ± 100 | 41.9 ± 5% | 0.89 ± 5% | 6.21 | 6.21 | 6.21 | 0.42 | 2.23 ± 11.0% |
| 1750 | ± 50 / ± 100 | 40.1 ± 5% | 1.37 ± 5% | 5.36 | 5.36 | 5.36 | 0.49 | 1.18 ± 11.0% |
| 1900 | ± 50 / ± 100 | 40.0 ± 5% | 1.40 ± 5% | 5.09 | 5.09 | 5.09 | 0.66 | 2.20 ± 11.0% |
| 2450 | ± 50 / ± 100 | 39.2 ± 5% | 1.80 ± 5% | 4.50 | 4.50 | 4.50 | 0.99 | 1.63 ± 11.0% |

$^C$ The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency

and the uncertainty for the indicated frequency band.

ET3DV6 SN:1787

May 18, 2010

## DASY/EASY - Parameters of Probe: ET3DV6 SN:1787

### Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz] | Validity [MHz]$^c$ | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---|---|---|---|---|---|---|---|---|
| 750 | ± 50 / ± 100 | 55.5 ± 5% | 0.96 ± 5% | 6.22 | 6.22 | 6.22 | 0.48 | 2.20 ± 11.0% |
| 835 | ± 50 / ± 100 | 55.2 ± 5% | 0.97 ± 5% | 6.12 | 6.12 | 6.12 | 0.39 | 2.45 ± 11.0% |
| 1750 | ± 50 / ± 100 | 53.4 ± 5% | 1.49 ± 5% | 4.72 | 4.72 | 4.72 | 0.63 | 2.90 ± 11.0% |
| 1900 | ± 50 / ± 100 | 53.3 ± 5% | 1.52 ± 5% | 4.47 | 4.47 | 4.47 | 0.88 | 2.39 ± 11.0% |
| 2450 | ± 50 / ± 100 | 52.7 ± 5% | 1.95 ± 5% | 4.03 | 4.03 | 4.03 | 0.99 | 1.35 ± 11.0% |

$^c$ The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

# Frequency Response of E-Field

## (TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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ET3DV6 SN:1787                                                                    May 18, 2010

# Receiving Pattern (φ), ϑ = 0°



f = 600 MHz, TEM  ifi110EXX                                    f = 1800 MHz, WG R22



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Certificate No: ET3-1787_May10                    Page 8 of 11

ET3DV6 SN:1787                                                    May 18, 2010

# Dynamic Range f(SAR$_{head}$)
## (Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: ET3-1787_May10                    Page 9 of 11

ET3DV6 SN:1787

May 18, 2010

# Conversion Factor Assessment
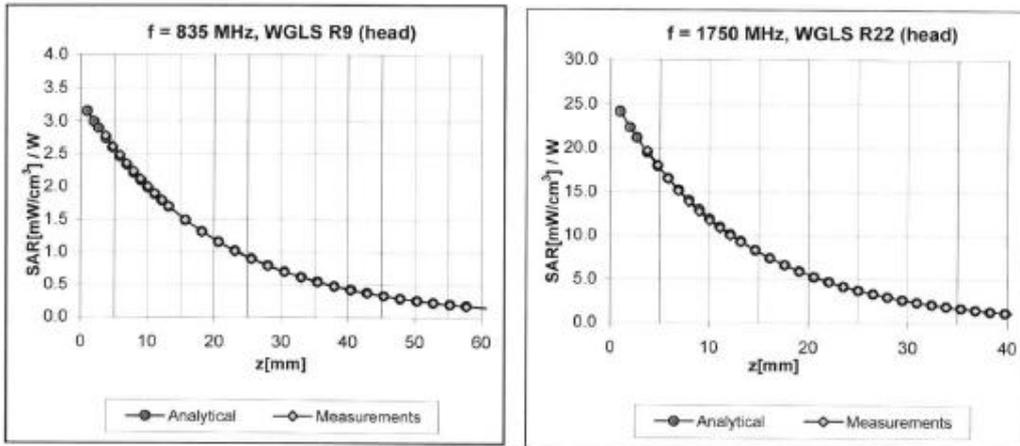


f = 835 MHz, WGLS R9 (head)



f = 1750 MHz, WGLS R22 (head)

# Deviation from Isotropy in HSL
## Error ($\phi$, $\vartheta$), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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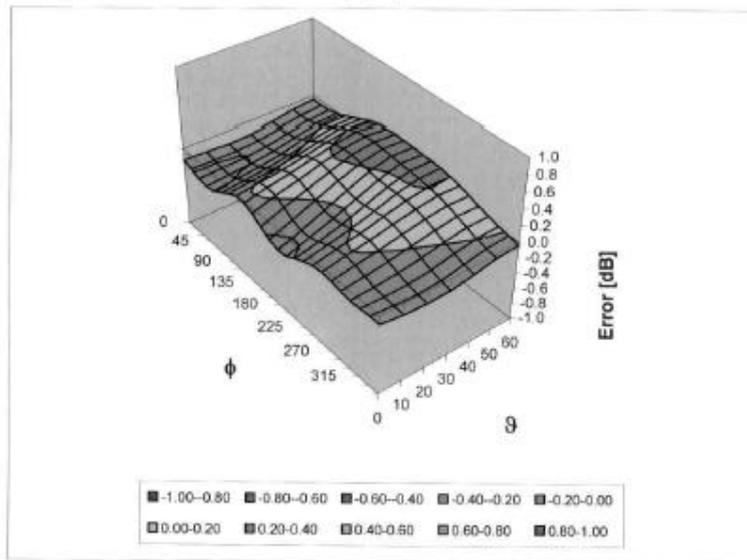
ET3DV6 SN:1787

May 18, 2010

## Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | Not applicable |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 10 mm |
| Tip Diameter | 6.8 mm |
| Probe Tip to Sensor X Calibration Point | 2.7 mm |
| Probe Tip to Sensor Y Calibration Point | 2.7 mm |
| Probe Tip to Sensor Z Calibration Point | 2.7 mm |
| Recommended Measurement Distance from Surface | 4 mm |

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**Accreditation No.: SCS 108**

Client     **Sporton (Auden)**                                    Certificate No: **ET3-1788_Sep10**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | ET3DV6 - SN:1788 |
| Calibration procedure(s) | QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2 Calibration procedure for dosimetric E-field probes |
| Calibration date: | September 21, 2010 |

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 E4419B | GB41293874 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41495277 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41498087 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 30-Mar-10 (No. 217-01159) | Mar-11 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 30-Mar-10 (No. 217-01161) | Mar-11 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 30-Mar-10 (No. 217-01160) | Mar-11 |
| Reference Probe ES3DV2 | SN: 3013 | 30-Dec-09 (No. ES3-3013_Dec09) | Dec-10 |
| DAE4 | SN: 660 | 20-Apr-10 (No. DAE4-660_Apr10) | Apr-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| RF generator HP 8648C | US3642U01700 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (in house check Oct-09) | In house check: Oct10 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeton Kastrati | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: September 22, 2010

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

# Calibration Certificate of DASY

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

Accreditation No.: **SCS 108**

## Glossary:

| | |
|---|---|
| TSL | tissue simulating liquid |
| NORMx,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A, B, C | modulation dependent linearization parameters |
| Polarization $\varphi$ | $\varphi$ rotation around probe axis |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis |

## Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

## Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the $E^2$-field uncertainty inside TSL (see below *ConvF*).

- *NORM(f)x,y,z = NORMx,y,z \* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.

- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.

- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.

- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z \* ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from $\pm 50$ MHz to $\pm 100$ MHz.

- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.

- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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**SPORTON INTERNATIONAL INC.**

# Probe ET3DV6

## SN:1788

| | |
|---|---|
| Manufactured: | May 28, 2003 |
| Last calibrated: | September 23, 2009 |
| Recalibrated: | September 21, 2010 |

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

## DASY/EASY - Parameters of Probe: ET3DV6 SN:1788

### Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm $(\mu V/(V/m)^2)^A$ | 1.76 | 1.69 | 1.76 | ± 10.1% |
| DCP $(mV)^B$ | 91.6 | 91.0 | 95.1 | |

### Modulation Calibration Parameters

| UID | Communication System Name | PAR | | A dB | B dBuV | C | VR mV | Unc$^E$ (k=2) |
|---|---|---|---|---|---|---|---|---|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 300.0 | ± 1.5% |
| | | | Y | 0.00 | 0.00 | 1.00 | 300.0 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 300.0 | |

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%.

$^A$ The uncertainties of NormX,Y,Z do not affect the $E^2$-field uncertainty inside TSL. (see Pages 5 and 6).

$^B$ Numerical linearization parameter: uncertainty not required.

$^E$ Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

## DASY/EASY - Parameters of Probe: ET3DV6 SN:1788

### Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] | Validity [MHz]$^c$ | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---------|-------------------|--------------|--------------|---------|---------|---------|-------|-----------------|
| 835 | ± 50 / ± 100 | 41.5 ± 5% | 0.90 ± 5% | 6.23 | 6.23 | 6.23 | 0.41 | 2.32 ± 11.0% |
| 900 | ± 50 / ± 100 | 41.5 ± 5% | 0.97 ± 5% | 6.11 | 6.11 | 6.11 | 0.29 | 2.85 ± 11.0% |
| 1750 | ± 50 / ± 100 | 40.1 ± 5% | 1.37 ± 5% | 5.29 | 5.29 | 5.29 | 0.51 | 2.51 ± 11.0% |
| 1900 | ± 50 / ± 100 | 40.0 ± 5% | 1.40 ± 5% | 5.03 | 5.03 | 5.03 | 0.66 | 2.25 ± 11.0% |
| 2450 | ± 50 / ± 100 | 39.2 ± 5% | 1.80 ± 5% | 4.35 | 4.35 | 4.35 | 0.99 | 1.69 ± 11.0% |

$^c$ The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency

and the uncertainty for the indicated frequency band.

September 21, 2010

## DASY/EASY - Parameters of Probe: ET3DV6 SN:1788

### Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz] | Validity [MHz]$^c$ | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---|---|---|---|---|---|---|---|---|
| 835 | ± 50 / ± 100 | 55.2 ± 5% | 0.97 ± 5% | 5.99 | 5.99 | 5.99 | 0.35 | 2.62 ± 11.0% |
| 900 | ± 50 / ± 100 | 55.0 ± 5% | 1.05 ± 5% | 6.07 | 6.07 | 6.07 | 0.32 | 2.87 ± 11.0% |
| 1750 | ± 50 / ± 100 | 53.4 ± 5% | 1.49 ± 5% | 4.67 | 4.67 | 4.67 | 0.61 | 3.09 ± 11.0% |
| 1900 | ± 50 / ± 100 | 53.3 ± 5% | 1.52 ± 5% | 4.39 | 4.39 | 4.39 | 0.83 | 2.56 ± 11.0% |
| 2450 | ± 50 / ± 100 | 52.7 ± 5% | 1.95 ± 5% | 4.04 | 4.04 | 4.04 | 0.99 | 1.40 ± 11.0% |

$^c$ The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency

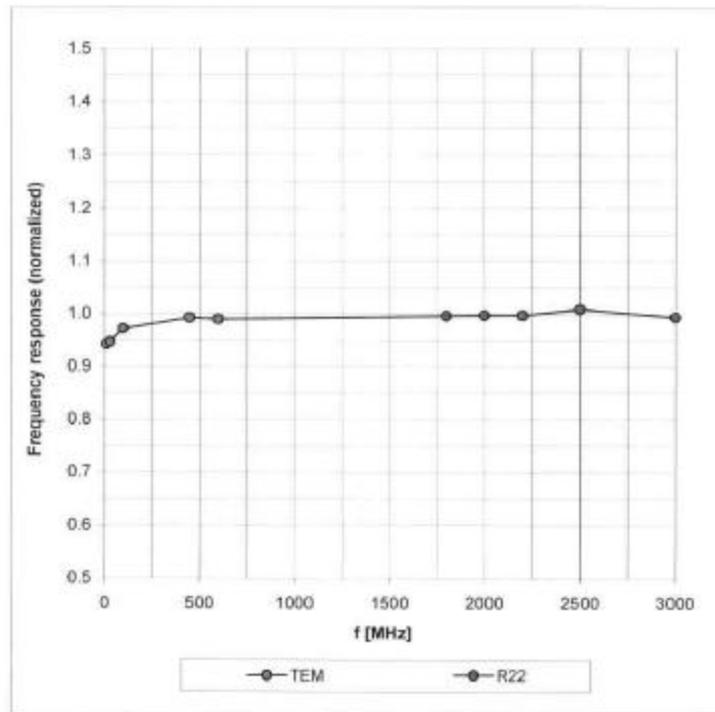and the uncertainty for the indicated frequency band.

# Frequency Response of E-Field

## (TEM-Cell:ifi110 EXX, Waveguide: R22)
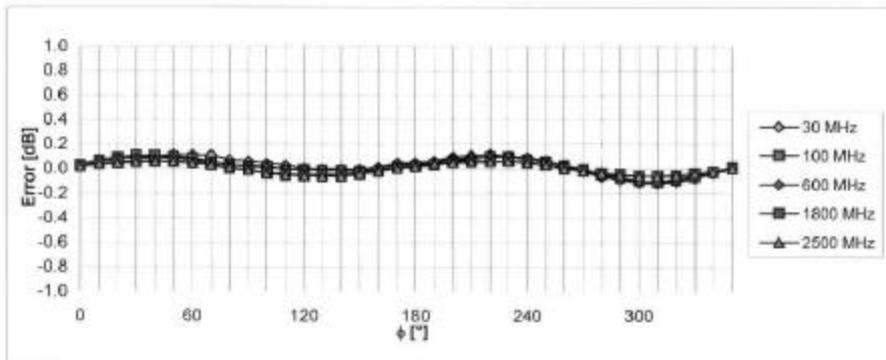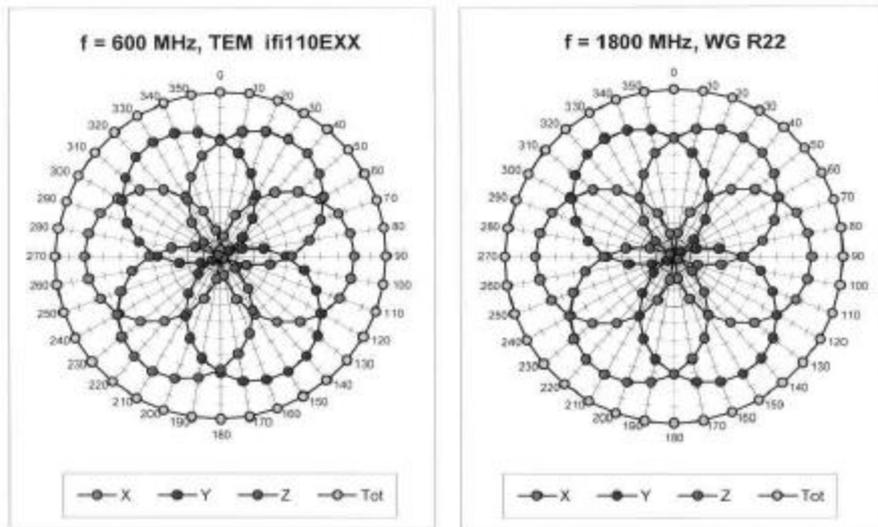


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN:1788

September 21, 2010

# Receiving Pattern (φ), ϑ = 0°

f = 600 MHz, TEM ifi110EXX



f = 1800 MHz, WG R22





Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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# Dynamic Range f(SAR$_{head}$)
## (Waveguide R22, f = 1800 MHz)
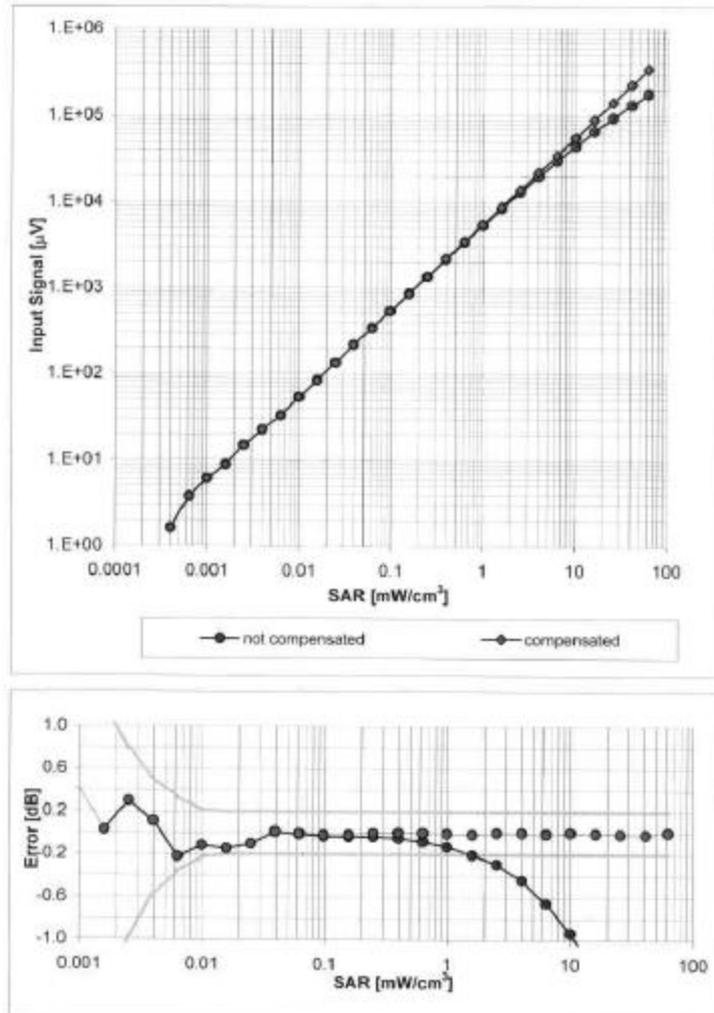


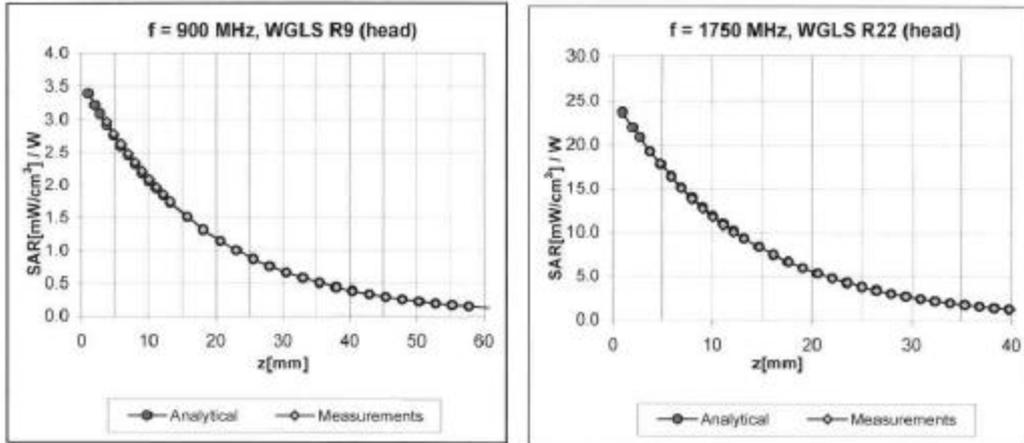Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ET3DV6 SN:1788                                                    September 21, 2010

# Conversion Factor Assessment



f = 900 MHz, WGLS R9 (head)



f = 1750 MHz, WGLS R22 (head)

# Deviation from Isotropy in HSL
## Error (φ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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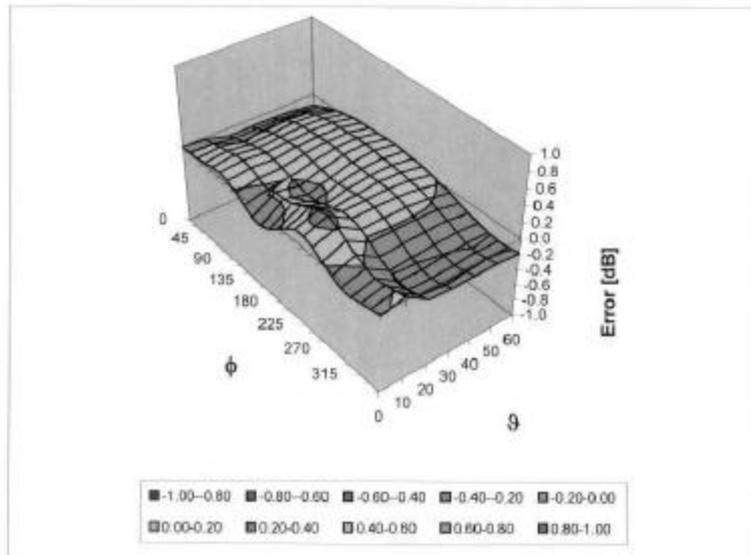
ET3DV6 SN:1788                                                    September 21, 2010

## Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | Not applicable |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 10 mm |
| Tip Diameter | 6.8 mm |
| Probe Tip to Sensor X Calibration Point | 2.7 mm |
| Probe Tip to Sensor Y Calibration Point | 2.7 mm |
| Probe Tip to Sensor Z Calibration Point | 2.7 mm |
| Recommended Measurement Distance from Surface | 4 mm |

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Accreditation No.: **SCS 108**

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Client **Sporton CN (Auden)**

Certificate No: **EX3-3697_Nov10**

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | EX3DV4 - SN:3697 |
| Calibration procedure(s) | QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2 Calibration procedure for dosimetric E-field probes |
| Calibration date | November 23, 2010 |

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 E4419B | GB41293874 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41495277 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41498087 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Reference 3 dB Attenuator | SN S5054 (3c) | 30-Mar-10 (No. 217-01159) | Mar-11 |
| Reference 20 dB Attenuator | SN S5086 (20b) | 30-Mar-10 (No. 217-01161) | Mar-11 |
| Reference 30 dB Attenuator | SN S5129 (30b) | 30-Mar-10 (No. 217-01160) | Mar-11 |
| Reference Probe ES3DV2 | SN 3013 | 30-Dec-09 (No. ES3-3013_Dec09) | Dec-10 |
| DAE4 | SN 660 | 20-Apr-10 (No. DAE4-660_Apr10) | Apr-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| RF generator HP 8648C | US3642U01700 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeton Kastrati | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: November 23, 2010

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Accreditation No.: **SCS 108**

## Glossary:

| | |
|---|---|
| TSL | tissue simulating liquid |
| NORMx,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A, B, C | modulation dependent linearization parameters |
| Polarization φ | φ rotation around probe axis |
| Polarization ϑ | ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis |

## Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

## Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the $E^2$-field uncertainty inside TSL (see below ConvF).

- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.

- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.

- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z*: A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.

- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.

- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.

- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe EX3DV4

## SN:3697

| | |
|---|---|
| Manufactured: | April 22, 2009 |
| Last calibrated: | November 23, 2009 |
| Recalibrated: | November 23, 2010 |

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

EX3DV4 SN:3697

November 23, 2010

## DASY/EASY - Parameters of Probe: EX3DV4 SN:3697

### Basic Calibration Parameters

|  | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm $(\mu V/(V/m)^2)^A$ | 0.42 | 0.45 | 0.47 | ± 10.1% |
| DCP $(mV)^B$ | 92.3 | 94.5 | 94.0 |  |

### Modulation Calibration Parameters

| UID | Communication System Name | PAR |  | A dB | B dBuV | C | VR mV | Unc$^E$ (k=2) |
|---|---|---|---|---|---|---|---|---|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 120.0 | ± 3.4 % |
|  |  |  | Y | 0.00 | 0.00 | 1.00 | 140.0 |  |
|  |  |  | Z | 0.00 | 0.00 | 1.00 | 110.0 |  |

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%.

$^A$ The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6)

$^B$ Numerical linearization parameter: uncertainty not required

$^E$ Uncertainty is determined using the maximum deviation from linear response applying rectangular distribution and is expressed for the square of the field value

EX3DV4 SN:3697

November 23, 2010

## DASY/EASY - Parameters of Probe: EX3DV4 SN:3697

### Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] | Validity [MHz][C] | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---------|------------------|--------------|--------------|---------|---------|---------|-------|-----------------|
| 835 | ± 50 / ± 100 | 41.5 ± 5% | 0.90 ± 5% | 8.67 | 8.67 | 8.67 | 0.71 | 0.62 ± 11.0% |
| 900 | ± 50 / ± 100 | 41.5 ± 5% | 0.97 ± 5% | 8.51 | 8.51 | 8.51 | 0.60 | 0.69 ± 11.0% |
| 1750 | ± 50 / ± 100 | 40.1 ± 5% | 1.37 ± 5% | 7.47 | 7.47 | 7.47 | 0.38 | 0.81 ± 11.0% |
| 1900 | ± 50 / ± 100 | 40.0 ± 5% | 1.40 ± 5% | 7.39 | 7.39 | 7.39 | 0.68 | 0.59 ± 11.0% |
| 2300 | ± 50 / ± 100 | 39.5 ± 5% | 1.67 ± 5% | 7.06 | 7.06 | 7.06 | 0.56 | 0.66 ± 11.0% |
| 2450 | ± 50 / ± 100 | 39.2 ± 5% | 1.80 ± 5% | 6.77 | 6.77 | 6.77 | 0.38 | 0.82 ± 11.0% |
| 2600 | ± 50 / ± 100 | 39.0 ± 5% | 1.96 ± 5% | 6.72 | 6.72 | 6.72 | 0.25 | 1.12 ± 11.0% |

The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

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EX3DV4 SN:3697

November 23, 2010

# DASY/EASY - Parameters of Probe: EX3DV4 SN:3697

## Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz] | Validity [MHz] | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---------|----------------|--------------|--------------|---------|---------|---------|-------|-----------------|
| 835 | ± 50 / ± 100 | 55.2 ± 5% | 0.97 ± 5% | 8.65 | 8.65 | 8.65 | 0.58 | 0.71 ± 11.0% |
| 900 | ± 50 / ± 100 | 55.0 ± 5% | 1.05 ± 5% | 8.54 | 8.54 | 8.54 | 0.40 | 0.86 ± 11.0% |
| 1750 | ± 50 / ± 100 | 53.4 ± 5% | 1.49 ± 5% | 7.41 | 7.41 | 7.41 | 0.54 | 0.77 ± 11.0% |
| 1900 | ± 50 / ± 100 | 53.3 ± 5% | 1.52 ± 5% | 7.26 | 7.26 | 7.26 | 0.41 | 0.84 ± 11.0% |
| 2300 | ± 50 / ± 100 | 52.8 ± 5% | 1.85 ± 5% | 7.13 | 7.13 | 7.13 | 0.27 | 0.89 ± 11.0% |
| 2450 | ± 50 / ± 100 | 52.7 ± 5% | 1.95 ± 5% | 7.02 | 7.02 | 7.02 | 0.45 | 0.76 ± 11.0% |
| 2600 | ± 50 / ± 100 | 52.5 ± 5% | 2.16 ± 5% | 6.93 | 6.93 | 6.93 | 0.32 | 1.02 ± 11.0% |

The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

## Frequency Response of E-Field

### (TEM-Cell:ifi110 EXX, Waveguide: R22)
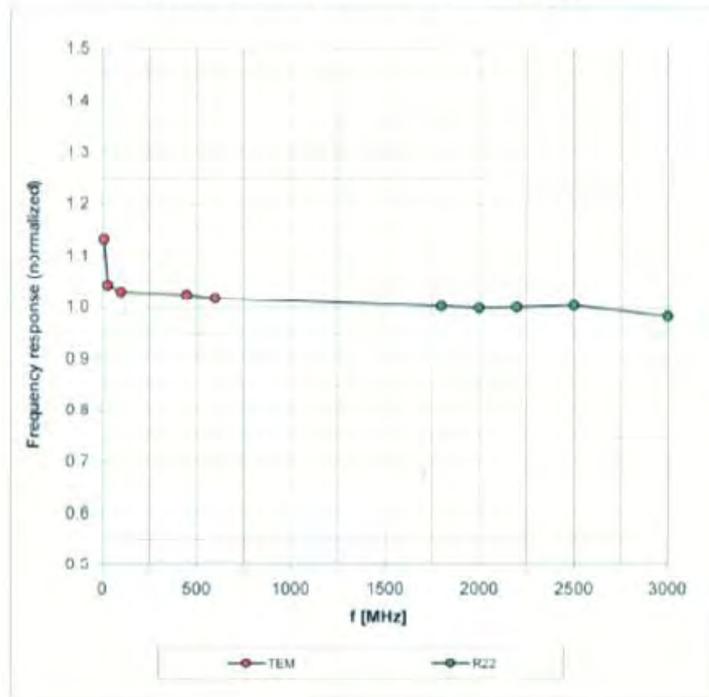


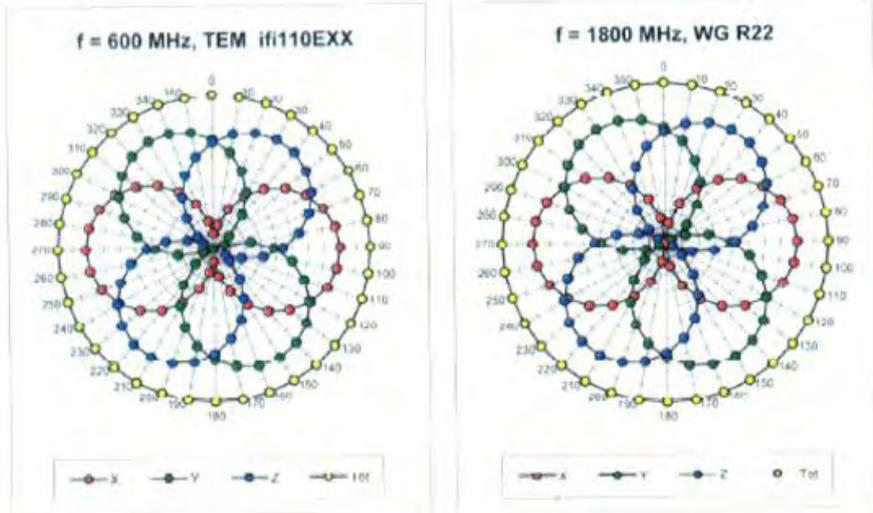Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

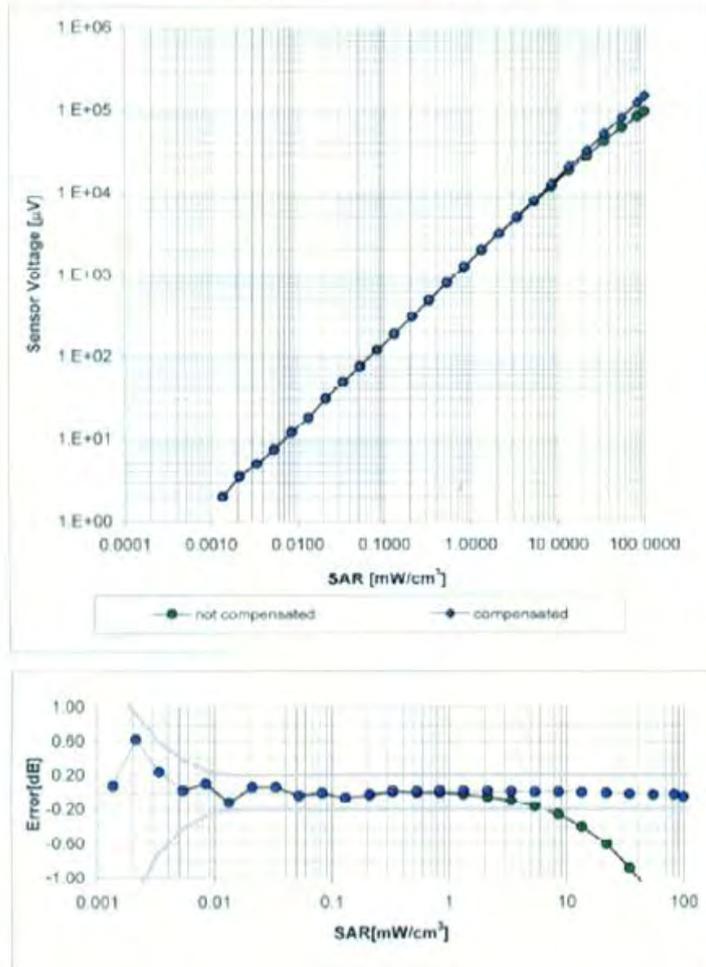EX3DV4 SN:3697

November 23, 2010

# Receiving Pattern (φ), ϑ = 0°
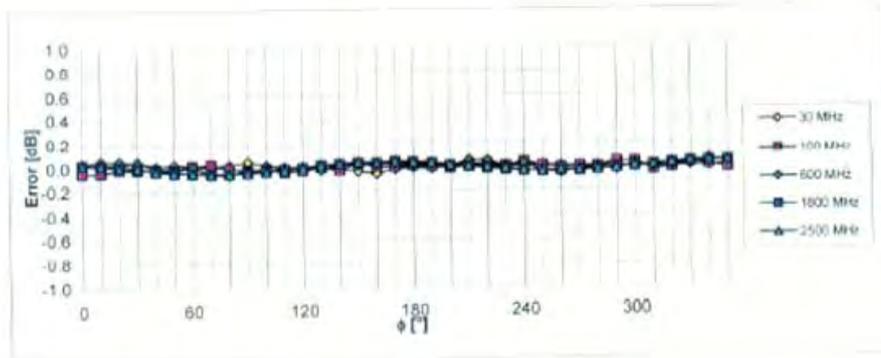


f = 600 MHz, TEM  ifi110EXX



f = 1800 MHz, WG R22



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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# Dynamic Range f(SAR$_{head}$)
## (Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment: ± 0.6% (k=2)

EX3DV4 SN:3697

November 23, 2010

## Conversion Factor Assessment
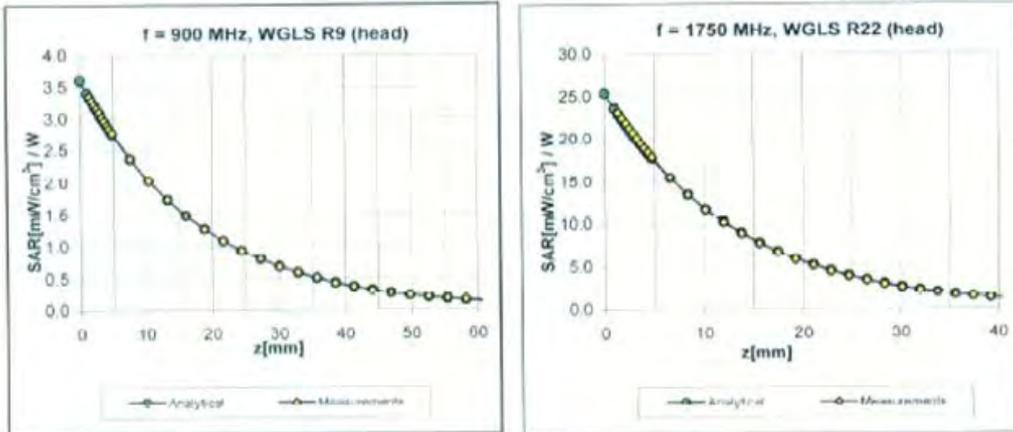


f = 900 MHz, WGLS R9 (head)



f = 1750 MHz, WGLS R22 (head)

## Deviation from Isotropy in HSL

### Error (φ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

**SPORTON INTERNATIONAL INC.**
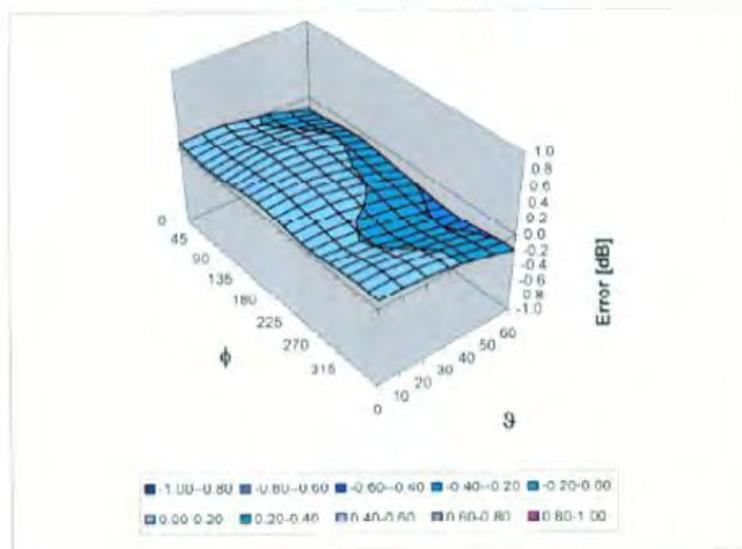
EX3DV4 SN:3697                                                        November 23, 2010

## Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | Not applicable |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 9 mm |
| Tip Diameter | 2.5 mm |
| Probe Tip to Sensor X Calibration Point | 1 mm |
| Probe Tip to Sensor Y Calibration Point | 1 mm |
| Probe Tip to Sensor Z Calibration Point | 1 mm |
| Recommended Measurement Distance from Surface | 2 mm |

**_SPORTON INTERNATIONAL INC._**

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

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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 108**

Client    **Sporton (Auden)**

Certificate No: **EX3-3731_Sep10**

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | EX3DV4 - SN:3731 |
| Calibration procedure(s) | QA CAL-01.v6, QA CAL-14.v3, QA CAL-23.v3 and QA CAL-25.v2<br>Calibration procedure for dosimetric E-field probes |
| Calibration date: | September 20, 2010 |

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 E4419B | GB41293874 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41495277 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41498087 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 30-Mar-10 (No. 217-01159) | Mar-11 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 30-Mar-10 (No. 217-01161) | Mar-11 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 30-Mar-10 (No. 217-01160) | Mar-11 |
| Reference Probe ES3DV2 | SN: 3013 | 30-Dec-09 (No. ES3-3013_Dec09) | Dec-10 |
| DAE4 | SN: 660 | 20-Apr-10 (No. DAE4-660_Apr10) | Apr-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| RF generator HP 8648C | US3642U01700 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (in house check Oct-09) | In house check: Oct10 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Katja Pokovic | Technical Manager | |
| Approved by: | Fin Bomholt | R&D Director | |

Issued: September 22, 2010

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

# Calibration Certificate of DASY

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

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SWISS CALIBRATION

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  Servizio svizzero di taratura
S  Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

**Accreditation No.: SCS 108**

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

## Glossary:

| | |
|---|---|
| TSL | tissue simulating liquid |
| NORMx,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A, B, C | modulation dependent linearization parameters |
| Polarization $\varphi$ | $\varphi$ rotation around probe axis |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis |

## Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

## Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization $\vartheta = 0$ (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the $E^2$-field uncertainty inside TSL (see below *ConvF*).

- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.

- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.

- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z*: A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.

- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.

- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.

- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe EX3DV4

# SN:3731

| | |
|---|---|
| Manufactured: | October 19, 2009 |
| Last calibrated: | July 16, 2010 |
| Repaired: | September 8, 2010 |
| Recalibrated: | September 20, 2010 |

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

## DASY/EASY - Parameters of Probe: EX3DV4 SN:3731

### Basic Calibration Parameters

|  | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm ($\mu V/(V/m)^2$)[A] | 0.51 | 0.53 | 0.56 | ± 10.1% |
| DCP (mV)[B] | 87.1 | 87.4 | 87.7 |  |

### Modulation Calibration Parameters

| UID | Communication System Name | PAR |  | A dB | B dBuV | C | VR mV | Unc[E] (k=2) |
|---|---|---|---|---|---|---|---|---|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 300 | ± 1.5% |
|  |  |  | Y | 0.00 | 0.00 | 1.00 | 300 |  |
|  |  |  | Z | 0.00 | 0.00 | 1.00 | 300 |  |

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%.

[A] The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the maximum deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4 SN:3731

September 20, 2010

# DASY/EASY - Parameters of Probe: EX3DV4 SN:3731

## Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] | Validity [MHz][c] | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---|---|---|---|---|---|---|---|---|
| 835 | ± 50 / ± 100 | 41.5 ± 5% | 0.90 ± 5% | 8.85 | 8.85 | 8.85 | 0.60 | 0.69 ± 11.0% |
| 1900 | ± 50 / ± 100 | 40.0 ± 5% | 1.40 ± 5% | 7.46 | 7.46 | 7.46 | 0.75 | 0.60 ± 11.0% |
| 2300 | ± 50 / ± 100 | 39.5 ± 5% | 1.67 ± 5% | 7.16 | 7.16 | 7.16 | 0.47 | 0.71 ± 11.0% |
| 2600 | ± 50 / ± 100 | 39.0 ± 5% | 1.96 ± 5% | 6.88 | 6.88 | 6.88 | 0.31 | 0.95 ± 11.0% |
| 3500 | ± 50 / ± 100 | 37.9 ± 5% | 2.91 ± 5% | 6.60 | 6.60 | 6.60 | 0.20 | 1.50 ± 13.1% |
| 5200 | ± 50 / ± 100 | 36.0 ± 5% | 4.66 ± 5% | 4.83 | 4.83 | 4.83 | 0.35 | 1.90 ± 13.1% |
| 5300 | ± 50 / ± 100 | 35.9 ± 5% | 4.76 ± 5% | 4.46 | 4.46 | 4.46 | 0.38 | 1.90 ± 13.1% |
| 5500 | ± 50 / ± 100 | 35.6 ± 5% | 4.96 ± 5% | 4.46 | 4.46 | 4.46 | 0.42 | 1.90 ± 13.1% |
| 5600 | ± 50 / ± 100 | 35.5 ± 5% | 5.07 ± 5% | 4.07 | 4.07 | 4.07 | 0.48 | 1.90 ± 13.1% |
| 5800 | ± 50 / ± 100 | 35.3 ± 5% | 5.27 ± 5% | 4.22 | 4.22 | 4.22 | 0.50 | 1.90 ± 13.1% |

[c] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

## DASY/EASY - Parameters of Probe: EX3DV4 SN:3731

Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz] | Validity [MHz][C] | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---|---|---|---|---|---|---|---|---|
| 835 | ± 50 / ± 100 | 55.2 ± 5% | 0.97 ± 5% | 8.84 | 8.84 | 8.84 | 0.49 | 0.79 ± 11.0% |
| 1900 | ± 50 / ± 100 | 53.3 ± 5% | 1.52 ± 5% | 7.13 | 7.13 | 7.13 | 0.65 | 0.66 ± 11.0% |
| 2300 | ± 50 / ± 100 | 52.8 ± 5% | 1.85 ± 5% | 7.12 | 7.12 | 7.12 | 0.37 | 0.88 ± 11.0% |
| 2600 | ± 50 / ± 100 | 52.5 ± 5% | 2.16 ± 5% | 6.85 | 6.85 | 6.85 | 0.32 | 0.97 ± 11.0% |
| 3500 | ± 50 / ± 100 | 51.3 ± 5% | 3.31 ± 5% | 6.02 | 6.02 | 6.02 | 0.30 | 1.43 ± 13.1% |
| 5200 | ± 50 / ± 100 | 49.0 ± 5% | 5.30 ± 5% | 3.87 | 3.87 | 3.87 | 0.60 | 1.95 ± 13.1% |
| 5300 | ± 50 / ± 100 | 48.9 ± 5% | 5.42 ± 5% | 3.63 | 3.63 | 3.63 | 0.60 | 1.95 ± 13.1% |
| 5500 | ± 50 / ± 100 | 48.6 ± 5% | 5.65 ± 5% | 3.44 | 3.44 | 3.44 | 0.63 | 1.95 ± 13.1% |
| 5600 | ± 50 / ± 100 | 48.5 ± 5% | 5.77 ± 5% | 3.20 | 3.20 | 3.20 | 0.65 | 1.95 ± 13.1% |
| 5800 | ± 50 / ± 100 | 48.2 ± 5% | 6.00 ± 5% | 3.55 | 3.55 | 3.55 | 0.60 | 1.95 ± 13.1% |

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

**Calibration Certificate of DASY**

# Frequency Response of E-Field

## (TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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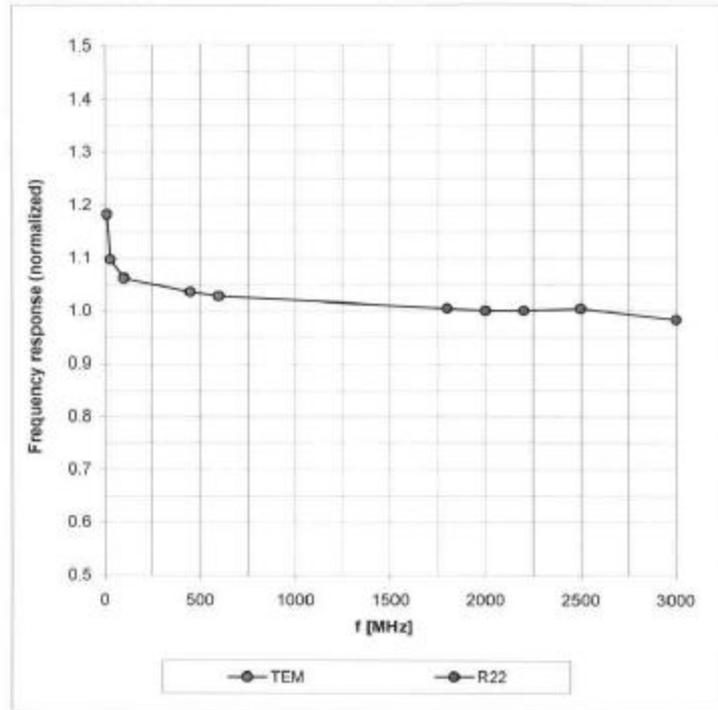
EX3DV4 SN:3731

September 20, 2010

# Receiving Pattern (φ), ϑ = 0°
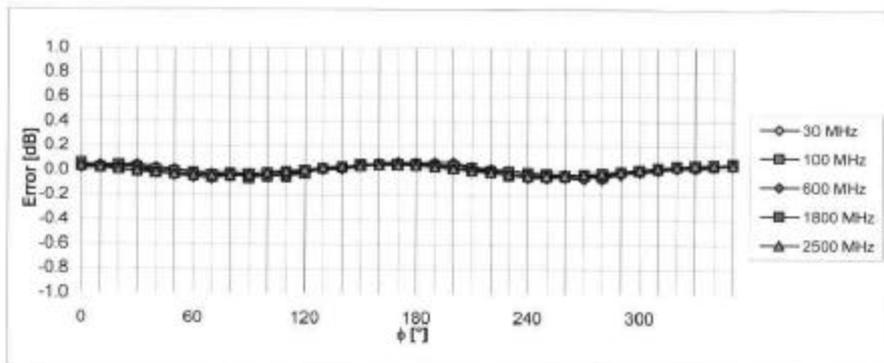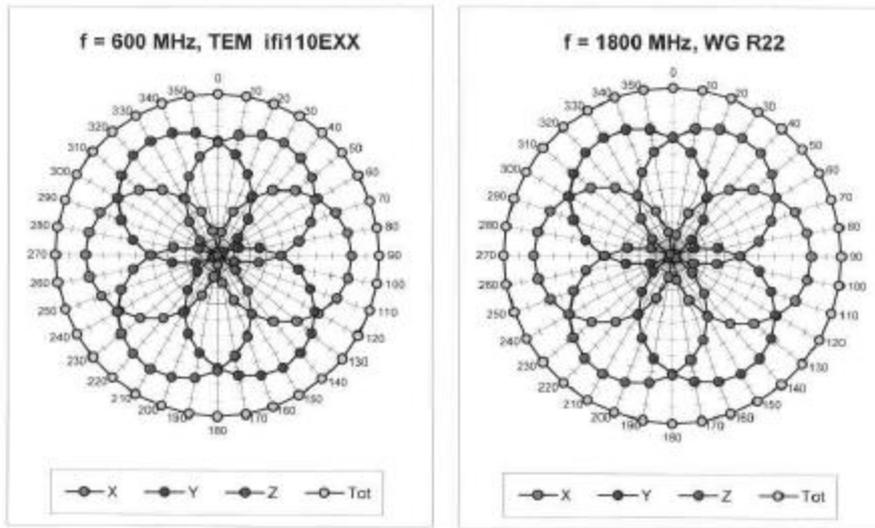


f = 600 MHz, TEM ifi110EXX

f = 1800 MHz, WG R22

— X    — Y    — Z    — Tot

— X    — Y    — Z    — Tot



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

**SPORTON INTERNATIONAL INC.**

# Dynamic Range f(SAR_head)
## (Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment: ± 0.6% (k=2)

*SPORTON INTERNATIONAL INC.*
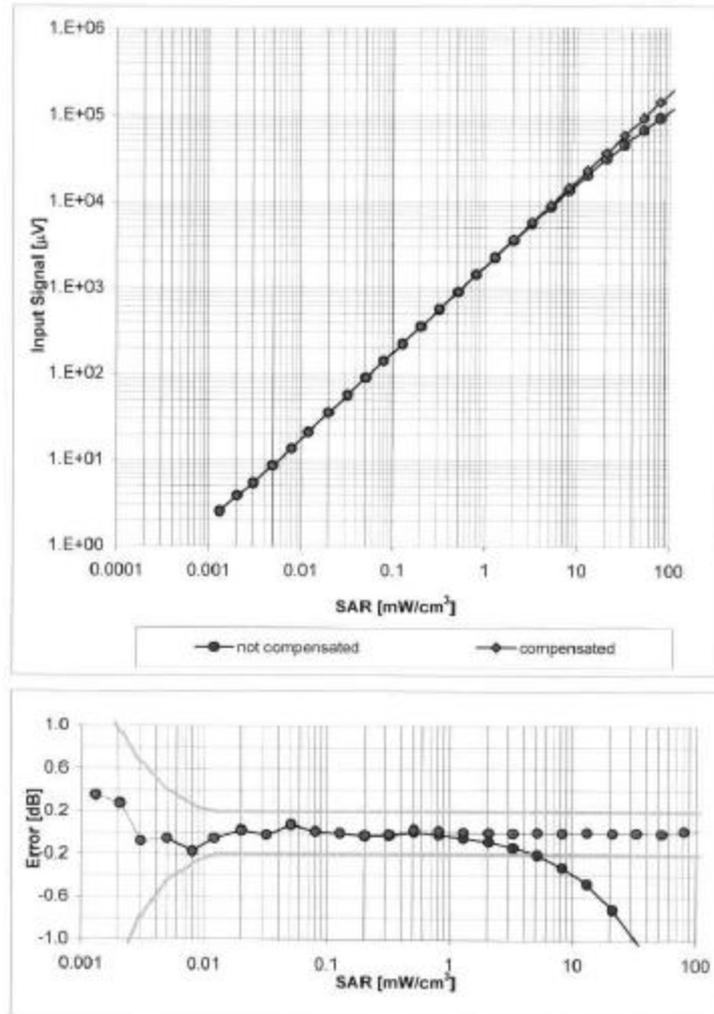
# Conversion Factor Assessment



# Deviation from Isotropy in HSL
## Error ($\phi$, $\vartheta$), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

*SPORTON INTERNATIONAL INC.*

## Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | Not applicable |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 9 mm |
| Tip Diameter | 2.5 mm |
| Probe Tip to Sensor X Calibration Point | 1 mm |
| Probe Tip to Sensor Y Calibration Point | 1 mm |
| Probe Tip to Sensor Z Calibration Point | 1 mm |
| Recommended Measurement Distance from Surface | 2 mm |

## *Appendix D.   FCC 3G SAR Measurement Procedures*

### Conducted Output Power:

The EUT was tested according to the requirements of the FCC 3G procedures and the TS 34.121. The EUT's WCDMA and HSPA function is Release 6 version supporting HSDPA Category 10, and HSUPA Category 6. A detailed analysis of the output power for all WCDMA, HSPDA, and HSPA (HSUPA & HSDPA) modes is provided in the tables below. According to the FCC 3G procedures, handsets with both HSDPA and HSUPA should be tested according to Release 6 HSPA test procedures, and the function. Device was tested according to procedure KDB941225 - section Release 6 HSPA Data Devices as documented/evaluated in the following table. Power values for HSPA are configurations in WCDMA.

| WCDMA SAR Test mode - Conducted Power | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Mode** | **Setup** | **Cell band (850)** | | | **PCS band (1900)** | | |
| | | **CH4132** | **CH4182** | **CH4233** | **CH9262** | **CH9400** | **CH9538** |
| | | **826.4 (MHz)** | **836.4 (MHz)** | **846.6 (MHz)** | **1852.4 (MHz)** | **1880.0 (MHz)** | **1907.6 (MHz)** |
| **WCDMA** | **RMC 12.2Kbps** | 23.14 | 23.56 | 23.45 | 22.42 | 22.52 | 22.31 |
| **HSDPA** | **Subtest 1** | 22.72 | 22.94 | 22.91 | 21.72 | 22.06 | 21.91 |
| | **Subtest 2** | 22.59 | 22.96 | 22.98 | 21.63 | 22.03 | 21.95 |
| | **Subtest 3** | 22.19 | 22.45 | 22.48 | 21.20 | 21.61 | 21.44 |
| | **Subtest 4** | 22.16 | 22.45 | 22.45 | 21.16 | 21.56 | 21.41 |
| **HSUPA** | **Subtest 1** | 22.48 | 22.54 | 22.86 | 21.04 | 21.28 | 21.44 |
| | **Subtest 2** | 21.08 | 21.14 | 21.38 | 20.03 | 20.25 | 20.45 |
| | **Subtest 3** | 21.15 | 21.62 | 21.51 | 20.07 | 20.60 | 20.83 |
| | **Subtest 4** | 21.27 | 21.63 | 21.61 | 20.52 | 20.72 | 20.77 |
| | **Subtest 5** | 22.07 | 22.53 | 22.45 | 21.55 | 21.09 | 21.73 |

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## WCDMA Setup Configuration:

- a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting
    - i. Data rates: Varied from RMC 12.2Kbps
    - ii. RMC Test Loop = Loop Mode 1
    - iii. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.
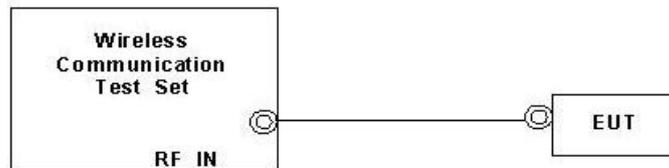


**Setup Configuration**

## HSDPA Setup Configuration:

a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.

b. The RF path losses were compensated into the measurements.

c. A call was established between EUT and Base Station with following setting:

   i. Set Gain Factors ($\beta_c$ and $\beta_d$) and parameters were set according to each

   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121

   iii. Set RMC12.2Kbps + HSDPA mode.

   iv. Set Cell Power = -86 dBm

   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)

   vi. Select HSDPA Uplink Parameters

   vii. Set DeltaACK, DeltaNACK and DeltaCQI = 8

   viii. Set Ack-Nack Repetition Factor to 3

   ix. Set CQI Feedback Cycle (k) to 4 ms

   x. Set CQI Repetition Factor to 2

   xi. Power Ctrl Mode = All Up bits

d. The transmitted maximum output power was recorded.

### Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

| Sub-test | $\beta_c$ | $\beta_d$ | $\beta_d$ (SF) | $\beta_c/\beta_d$ | $\beta_{HS}$ (Note1, Note 2) | CM (dB) (Note 3) | MPR (dB) (Note 3) |
|---|---|---|---|---|---|---|---|
| 1 | 2/15 | 15/15 | 64 | 2/15 | 4/15 | 0.0 | 0.0 |
| 2 | 12/15 (Note 4) | 15/15 (Note 4) | 64 | 12/15 (Note 4) | 24/15 | 1.0 | 0.0 |
| 3 | 15/15 | 8/15 | 64 | 15/8 | 30/15 | 1.5 | 0.5 |
| 4 | 15/15 | 4/15 | 64 | 15/4 | 30/15 | 1.5 | 0.5 |

Note 1: $\Delta_{ACK}$, $\Delta_{NACK}$ and $\Delta_{CQI}$ = 30/15 with $\beta_{hs}$ = 30/15 * $\beta_c$ .

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, $\Delta_{ACK}$ and $\Delta_{NACK}$ = 30/15 with $\beta_{hs}$ = 30/15 * $\beta_c$ , and $\Delta_{CQI}$ = 24/15 with $\beta_{hs}$ = 24/15 * $\beta_c$ .

Note 3: CM = 1 for $\beta_c/\beta_d$ =12/15, $\beta_{hs}/\beta_c$=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the $\beta_c/\beta_d$ ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c$ = 11/15 and $\beta_d$ = 15/15.

## Setup Configuration

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## HSPA (HSUPA & HSPDA) Setup Configuration:

a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.

b. The RF path losses were compensated into the measurements.

c. A call was established between EUT and Base Station with following setting * :

   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK

   ii. Set the Gain Factors ($\beta_c$ and $\beta_d$) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121

   iii. Set Cell Power = -86 dBm

   iv. Set Channel Type = 12.2k + HSPA

   v. Set UE Target Power

   vi. Power Ctrl Mode= Alternating bits

   vii. Set and observe the E-TFCI

   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI

d. The transmitted maximum output power was recorded.

**Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH**

| Sub-test | $\beta_c$ | $\beta_d$ | $\beta_d$ (SF) | $\beta_c/\beta_d$ | $\beta_{HS}$ (Note1) | $\beta_{ec}$ | $\beta_{ed}$ (Note 5) (Note 6) | $\beta_{ed}$ (SF) | $\beta_{ed}$ (Codes) | CM (dB) (Note 2) | MPR (dB) (Note 2) | AG Index (Note 6) | E-TFCI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11/15 (Note 3) | 15/15 (Note 3) | 64 | 11/15 (Note 3) | 22/15 | 209/225 | 1309/225 | 4 | 1 | 1.0 | 0.0 | 20 | 75 |
| 2 | 6/15 | 15/15 | 64 | 6/15 | 12/15 | 12/15 | 94/75 | 4 | 1 | 3.0 | 2.0 | 12 | 67 |
| 3 | 15/15 | 9/15 | 64 | 15/9 | 30/15 | 30/15 | $\beta_{ed}$1: 47/15 $\beta_{ed}$2: 47/15 | 4 4 | 2 | 2.0 | 1.0 | 15 | 92 |
| 4 | 2/15 | 15/15 | 64 | 2/15 | 4/15 | 2/15 | 56/75 | 4 | 1 | 3.0 | 2.0 | 17 | 71 |
| 5 | 15/15 (Note 4) | 15/15 (Note 4) | 64 | 15/15 (Note 4) | 30/15 | 24/15 | 134/15 | 4 | 1 | 1.0 | 0.0 | 21 | 81 |

Note 1: $\Delta_{ACK}$, $\Delta_{NACK}$ and $\Delta_{CQI}$ = 30/15 with $\beta_{hs}$ = 30/15 * $\beta_c$ .

Note 2: CM = 1 for $\beta_c/\beta_d$ =12/15, $\beta_{hs}/\beta_c$=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the $\beta_c/\beta_d$ ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c$ = 10/15 and $\beta_d$ = 15/15.

Note 4: For subtest 5 the $\beta_c/\beta_d$ ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c$ = 14/15 and $\beta_d$ = 15/15.

Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 6: $\beta_{ed}$ can not be set directly, it is set by Absolute Grant Value.

## Setup Configuration

**Note:** For details settings in the Agilent 8960 test equipment, please refer to the user guide " HSUPA Measurement Guide with 8960 V7.5.0 Release 7 (2007-06) Ver.: v.02.18"

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```
                    Call Setup Screen
Call Control    |   Active Cell Operating Mode   |  Call Parms
                |                                 | Cell Power
Channel         |        UE Information           |   -86.00
(UARFCN) Info   | IMSI:                           | dBm/3.84 MHz
                | IMEI:                           | Channel Type
Cell            | Power Class:                    | 12.2k + HSPA
Parameters   ▽  |                                 |
                |  UE Expected Open Loop Transmit Power |
                | Initial PRACH TX Power:  -11.70 dBm | Paging Service
Generator       | Initial DPCCH TX Power:   -0.56 dBm | RB Test Mode
Info            |
                |  Uplink Parameters      | Value |
                | PRACH Preambles         |  64   |
Uplink          | PRACH Ramping Cycles(MMAX) | 2  |   HSPA
Parameters   ▽  | Available Subchannels (Bit Mask) | 000000000001 | Parameters
                | Uplink DPCH Scrambling Code | 0 |
UE Rep          | Uplink DPCH Bc/Bd Control | Manual | 34.121 Preset
Meas            | Manual Uplink DPCH Bc    |  11   | Call Configs ▽
                | Manual Uplink DPCH Bd    |  15   |
Close           | Maximum Uplink Transmit Power Level | 21 dBm | Channel
Menu            |                                 | (UARFCN) Parms
                | | Active Cell | Sys Type: UTRA FDD |
                | |   Idle      |                    |
  2 of 4        | | IntRef Offset |                 |   1 of 3
```

**Example for HSPA Subtest 1, and other subtests following table, C11.1.3**

**(Gain Factors ($\beta_c = 11$ and $\beta_d = 15$))**

```
                    Call Setup Screen
Call Control    |   Active Cell Operating Mode   | Serving Grant
                |                                 | AG Mode
Additional      |        UE Information           |  Single Shot
Screens         | IMSI:                           |
                | IMEI:                           | Single Shot AG
                | Power Class:                    |  20: (119/15)^2
Cell            |                                 |
Parameters   ▽  |  UE Expected Open Loop Transmit Power |
                | Initial PRACH TX Power:  -11.70 dBm |
Generator       | Initial DPCCH TX Power:   -0.56 dBm | Send Single Shot
Info            |                                 | Absolute Grant
                |     Call Processing Status      |
                | Current Service Type:   None    |
Uplink          | MM Status:        Abs Single Shot AG | Send Relative
Parameters   ▽  | GMM State:    | Index 15: (67/15)^2 ↑ | Grant Up
                | Current DPCH  | Index 16: (75/15)^2 |
                |   HSUPA In    | Index 17: (84/15)^2 a Information |
UE Rep          | UE Rep E-DCH  | Index 18: (95/15)^2 DSCH Cat: ---- | Send Relative
Meas            | Last Received | Index 19: (106/15)^2  Ratio: ---- % | Grant Down
Trig Output Setup| Throughput:  | Index 20: (119/15)^2 ---- kbps |
Sys Frame Clock | ACKs Transmitt              smitted: ---- | Return
                | | Active Cell | Sys Type: UTRA FDD |
                | |   Idle      |                    |
  2 of 4        | | IntRef Offset |                 |   1 of 2
```

**Example: AG – Index = 20 for HSPA subtest 1**

```
                        Call Setup Screen
┌─────────────┬──────────────────────────────────┬──────────────┐
│ Screen Ctrl │   Recorded E-TFCI Information     │ E-TFCI Record│
│             │                                  ├──────────────┤
│             │                                  │E-TFCI Rec Count│
│   Channel   │   ┌──────────────────────────┐   ├──────────────┤
│(UARFCN) Info│   │  E-TFCI Recording State  │   │      15      │
│             │   │          Idle            │   │              │
│             │   └──────────────────────────┘   ├──────────────┤
│    HSPA     │                                  │Start Recording│
│ Information │   ┌──────────────────────────┐   │ E-TFCI Values │
│             │   │  Recorded E-TFCI Values  │   │              │
│             │   │ 1: 75 11: 75 21: ---- 31: ---- 41: ----│
│E-TFCI Recording  │ 2: 75 12: 75 22: ---- 32: ---- 42: ----│
│ Information │   │ 3: 75 13: 75 23: ---- 33: ---- 43: ----│
│             │   │ 4: 75 14: 75 24: ---- 34: ---- 44: ----│
│             │   │ 5: 75 15: 75 25: ---- 35: ---- 45: ----│
│             │   │ 6: 75 16: ---- 26: ---- 36: ---- 46: ----│
│             │   │ 7: 75 17: ---- 27: ---- 37: ---- 47: ----│
│             │   │ 8: 75 18: ---- 28: ---- 38: ---- 48: ----│
│             │   │ 9: 75 19: ---- 29: ---- 39: ---- 49: ----│ Send Step Up
│    Clear    │   │10: 75 20: ---- 30: ---- 40: ---- 50: ----│ TPC Bit Pattern
│   UE Info   │   │                          │   │              │
│             │   │         15/15            │   │Send Step Down│
│             │   │                          │   │TPC Bit Pattern│
│   Return    │   └──────────────────────────┘   │   Return     │
├─────────────┼──────────────────────────────────┼──────────────┤
│             │ Background │ Active Cell │ Sys Type: UTRA FDD │
│             │            │ Connected   │                    │
│             │            │ IntRef Offset│                   │
└─────────────┴──────────────────────────────────┴──────────────┘
```

**Example: Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1**

## Reference:

[1]     941225 D01 SAR test for 3G devices v02, SAR Measurement Procedures for 3G Devices CDMA 2000/Ev-Do/WCDMA/HSDPA/HSPA Oct. 2007 Laboratory Division Office of Engineering and Technology Federal Communications Commission

[2.]    TS 34.121 Universal Mobile Telecommunications System (UMTS); Terminal Conformance Specification, Radio Transmission and Reception (FDD)

[3.]    HSUPA Measurement Guide with 8960 V7.5.0 Release 7 (2007-06) Ver.: v.02.18