

Appendix 1

SAR distribution comparisons for System Accuracy Verifications

System Accuracy Verification Measurements for Head SAR Measurements

Date/Time: 11/23/2011 5:06:07 PM

Test Laboratory: Motorola Mobility - Nov-23-2011 835 MHz Head

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 420TR; FCC ID: IHDT56NA1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 420TR; Input Power = 200 mW

Sim.Temp@meas = 20.0°C; Sim.Temp@SPC = 19.7°C; Room Temp @ SPC = 21.3°C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue*

Medium parameters used: $f = 835$ MHz; $\sigma = 0.91$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(6.04, 6.04, 6.04); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - System Performance Check Template/Dipole Area Scan (5x15x1):

Measurement grid: dx=10mm, dy=15mm; Maximum value of SAR (measured) = 2.117 mW/g

DASY5, SAM - System Performance Check Template, 0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

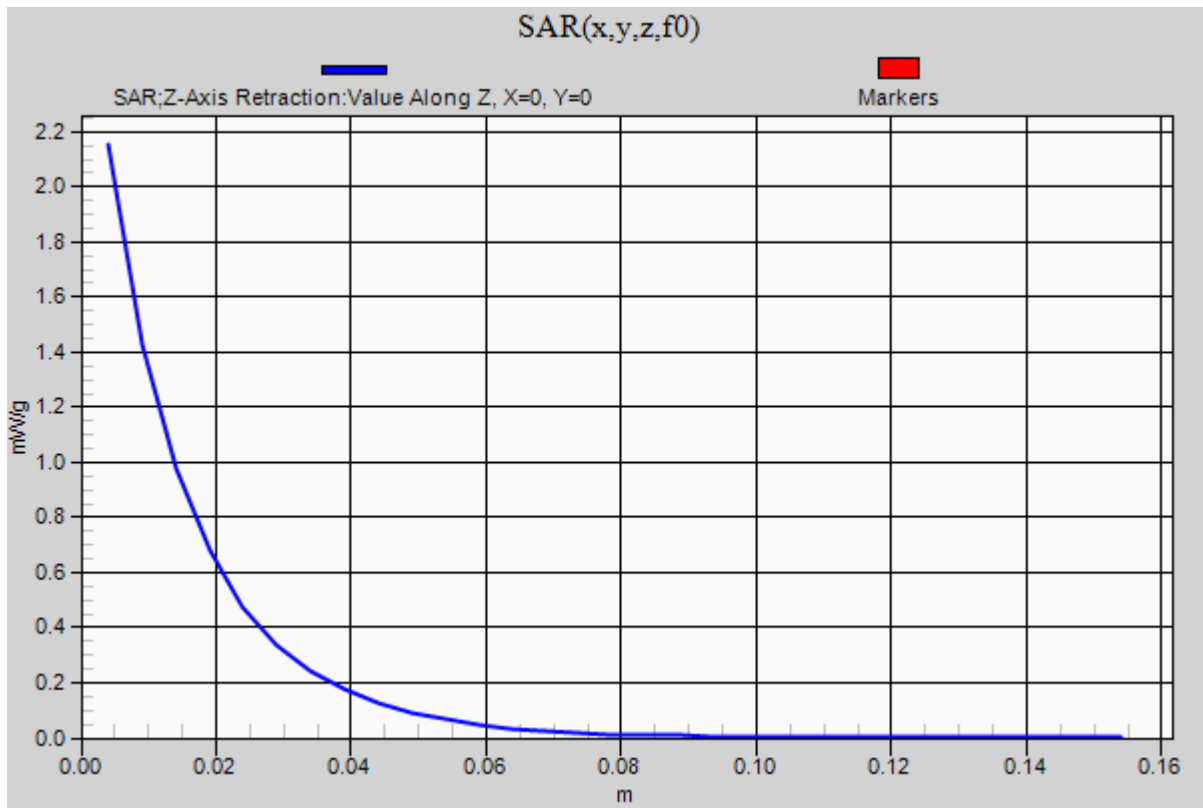
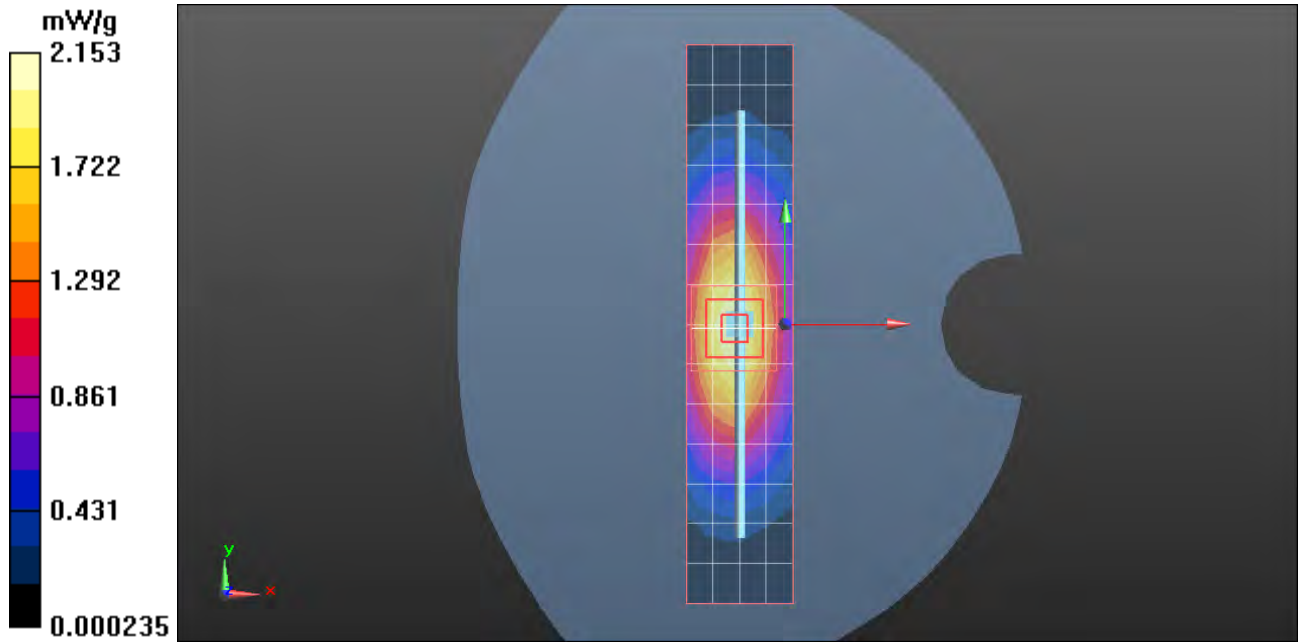
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 48.606 V/m; Power Drift = -0.0089 dB; Peak SAR (extrapolated) = 3.020 W/kg

SAR(1 g) = 1.99 mW/g; SAR(10 g) = 1.29 mW/g; Maximum value of SAR (measured) = 2.149 mW/g

DASY5, SAM - System Performance Check Template, Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.153 mW/g



Date/Time: 11/27/2011 1:28:08 PM

Test Laboratory: Motorola Mobility - Nov-27-2011 1800 MHz Head

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 272TR; FCC ID: IHDT56NA1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW

Sim.Temp@meas = 20.7 C; Sim.Temp@SPC = 20.2 C; Room Temp @ SPC = 21.3 C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue*

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.38$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(5.15, 5.15, 5.15); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Glycol SAM (extended range), Rev.1 (25-Mar-05)x; Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - System Performance Check Template, Dipole Area Scan (5x15x1):

Measurement grid: dx=10mm, dy=15mm; Maximum value of SAR (measured) = 8.252 mW/g

DASY5, SAM - System Performance Check Template, 0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

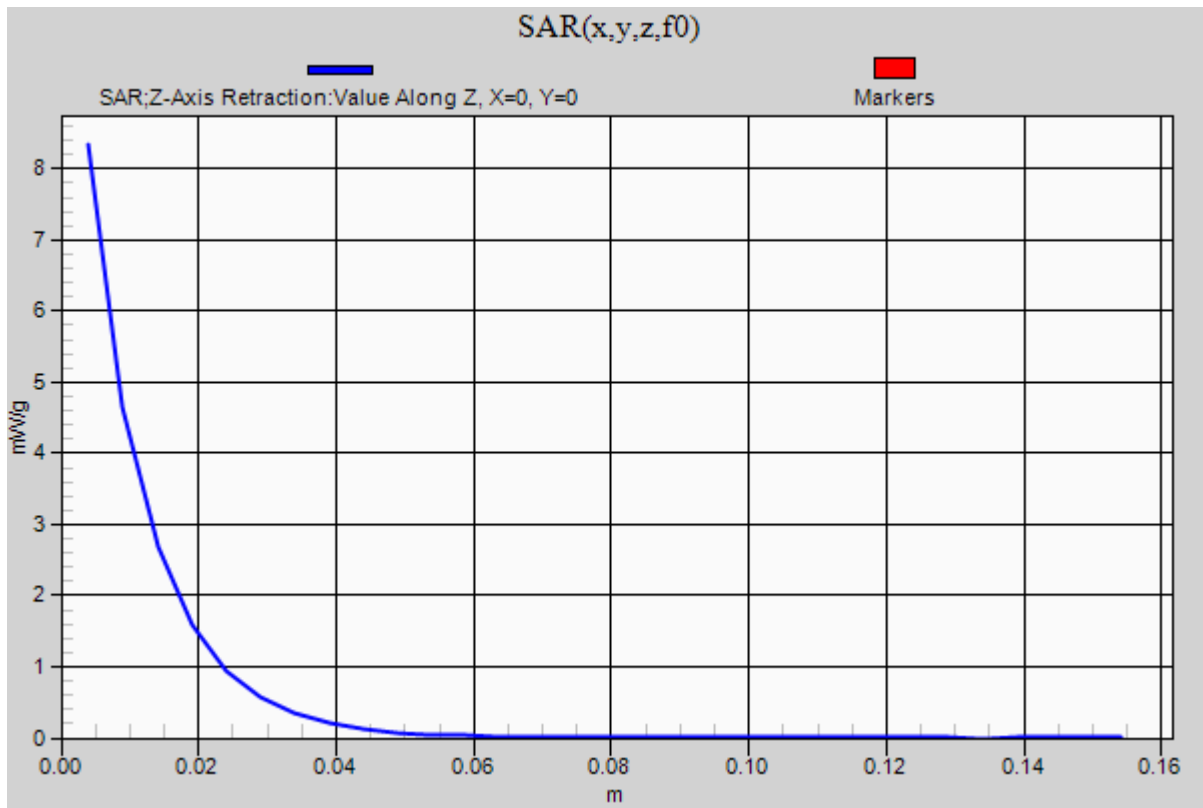
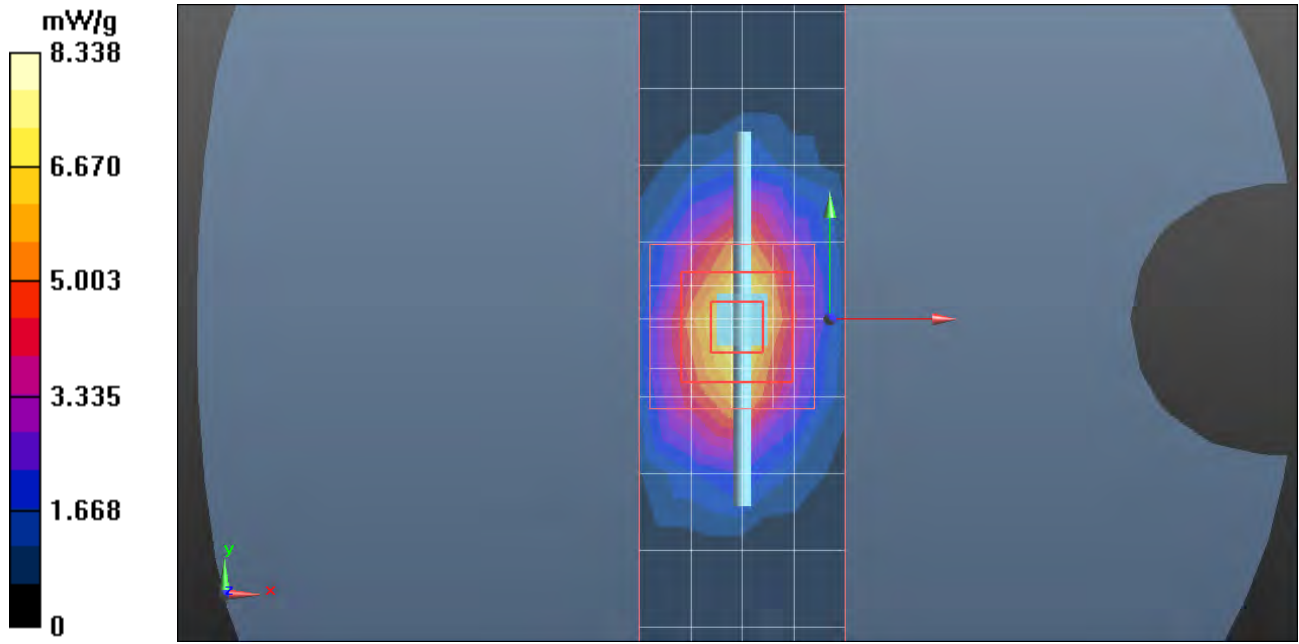
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 79.023 V/m; Power Drift = -0.01 dB; Peak SAR (extrapolated) = 13.327 W/kg

SAR(1 g) = 7.4 mW/g; SAR(10 g) = 3.91 mW/g; Maximum value of SAR (measured) = 8.304 mW/g

DASY5, SAM - System Performance Check Template, Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.338 mW/g



Date/Time: 11/28/2011 10:30:36 AM

Test Laboratory: Motorola Mobility - Nov-28-2011 1800 MHz Head

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 272TR; FCC ID: IHDT56NA1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW

Sim.Temp@meas = 20.6 C; Sim.Temp@SPC = 20.2 C; Room Temp @ SPC = 21.4 C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *1730 HEAD Tissue*

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(5.15, 5.15, 5.15); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Glycol SAM (extended range), Rev.1 (25-Mar-05)x; Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - System Performance Check Template, Dipole Area Scan (5x15x1):

Measurement grid: dx=10mm, dy=15mm; Maximum value of SAR (measured) = 8.167 mW/g

DASY5, SAM - System Performance Check Template, 0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

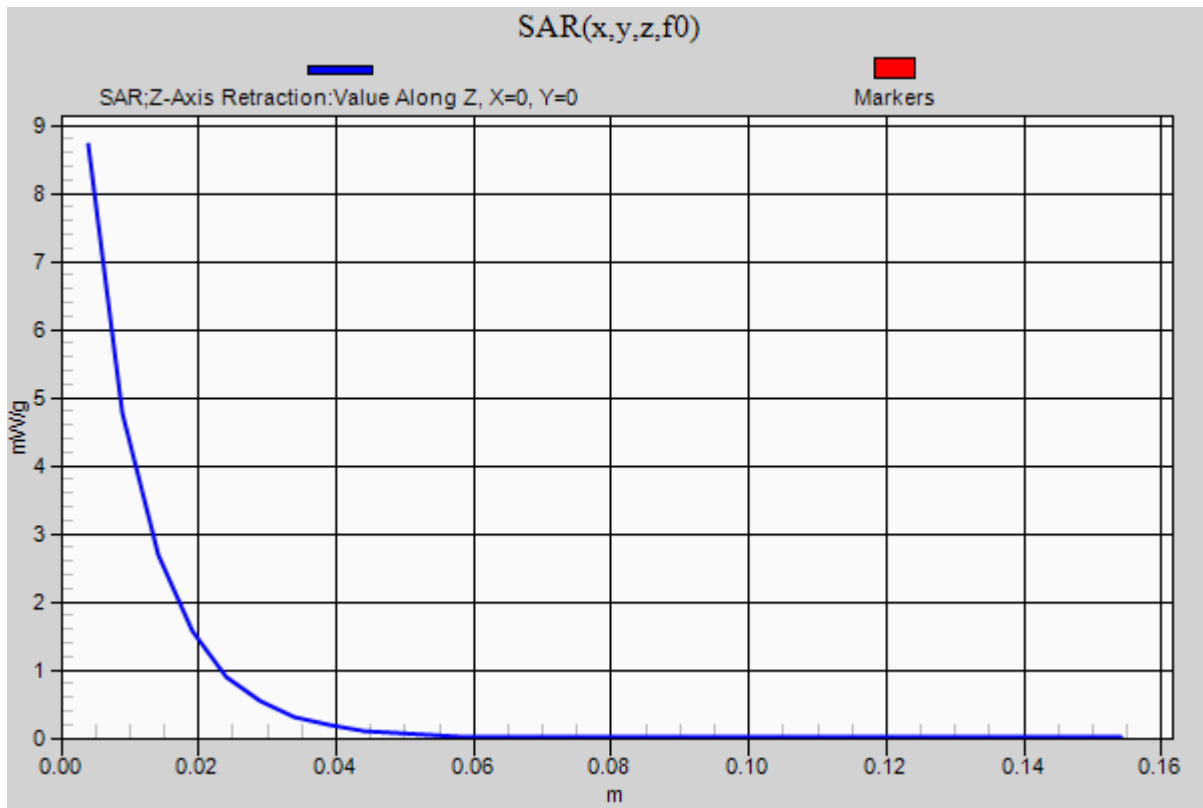
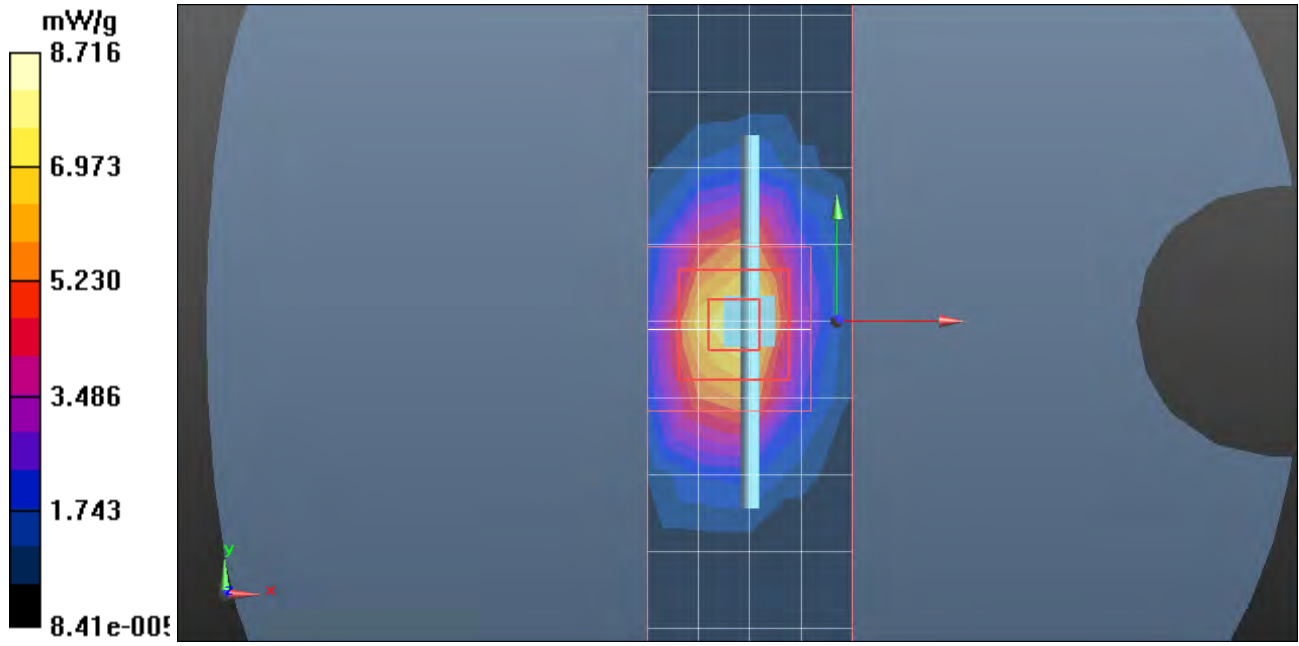
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 76.109 V/m; Power Drift = -0.02 dB; Peak SAR (extrapolated) = 14.264 W/kg

SAR(1 g) = 7.77 mW/g; SAR(10 g) = 4.06 mW/g; Maximum value of SAR (measured) = 8.736 mW/g

DASY5, SAM - System Performance Check Template, Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.716 mW/g



Date/Time: 11/29/2011 5:41:37 PM

Test Laboratory: Motorola Mobility - Nov-29-2011 2450 MHz Head

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:863; FCC ID: IHDT56NA1

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 863; Input Power = 200 mW

Sim.Temp@meas = 21.0°C; Sim.Temp@SPC = 20.5°C; Room Temp @ SPC = 21.5°C

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

Medium: 2450 Glycol Head

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 37.3$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.39, 4.39, 4.39); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1318;
- ; SEMCAD X Version 14.4.5 (3634)

Configuration/Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: dx=10mm, dy=15mm; Maximum value of SAR (measured) = 12.036 mW/g

Configuration/Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

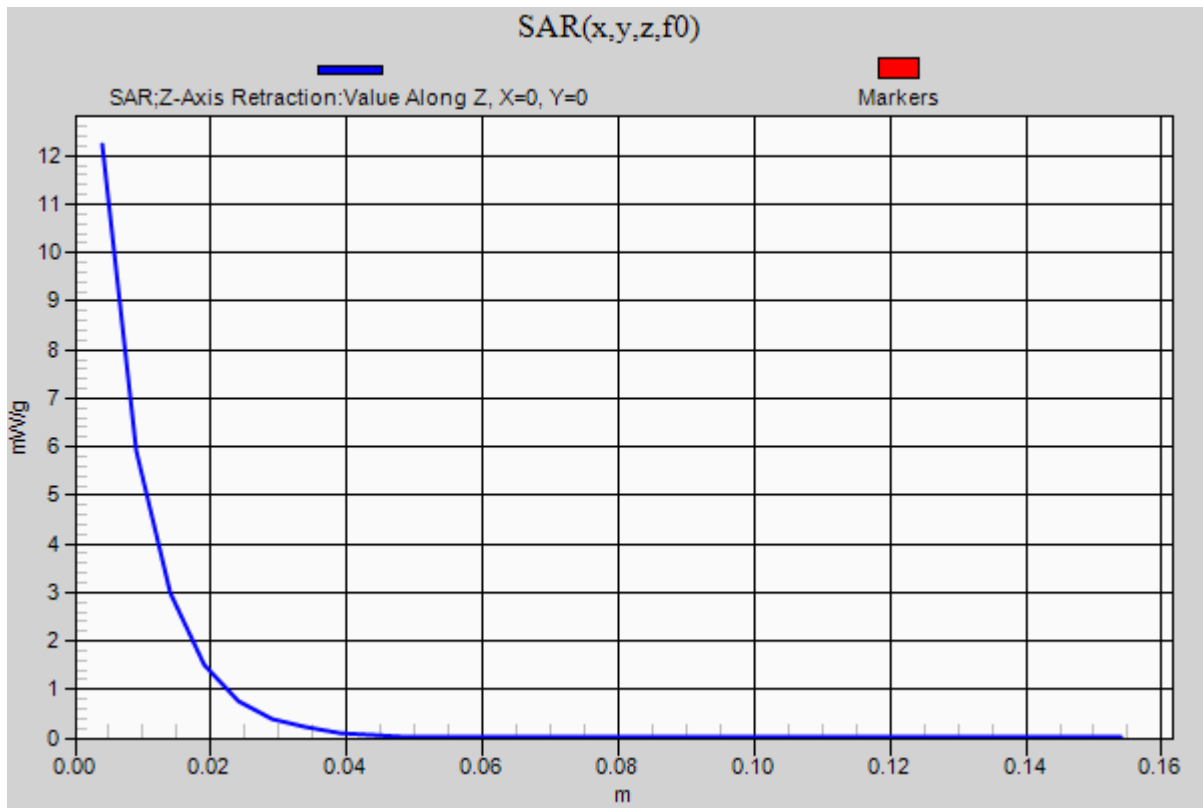
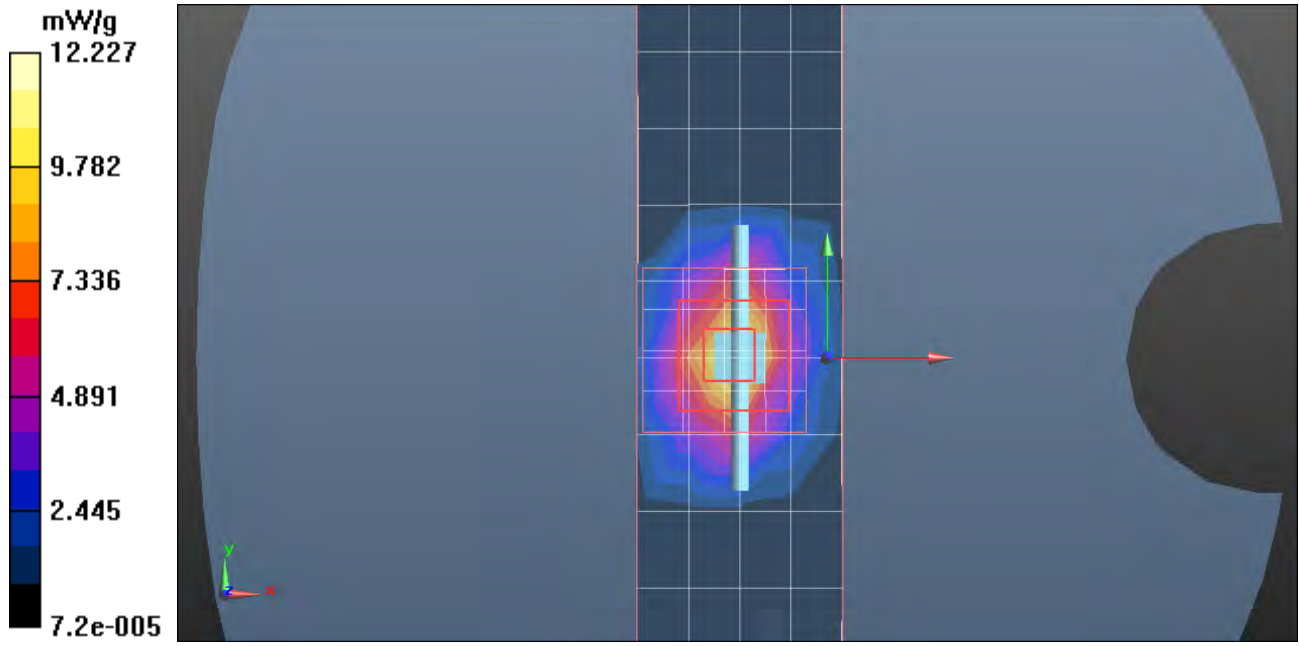
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 81.879 V/m; Power Drift = 0.01 dB; Peak SAR (extrapolated) = 23.558 W/kg

SAR(1 g) = 10.9 mW/g; SAR(10 g) = 5 mW/g; Maximum value of SAR (measured) = 12.232 mW/g

Configuration/Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 12.227 mW/g



System Accuracy Verification Measurements for Body SAR Measurements

Date/Time: 11/25/2011 10:19:35 AM

Test Laboratory: Motorola Mobility - Nov-25-2011 835 MHz Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 420TR; FCC ID: IHDT56NA1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 420TR; Input Power = 200 mW

Sim.Temp@meas = 19.6 C; Sim.Temp@SPC = 19.8 C; Room Temp @ SPC = 21.3 C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 835$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(6.05, 6.05, 6.05); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Section 2, Amy Twin, Rev1 (24-Aug-11); Type: DASY5 Amy Twin Flat; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin - System Performance Check Template, Dipole Area Scan (9x4x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.899 mW/g

DASY5, Amy Twin - System Performance Check Template, 0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

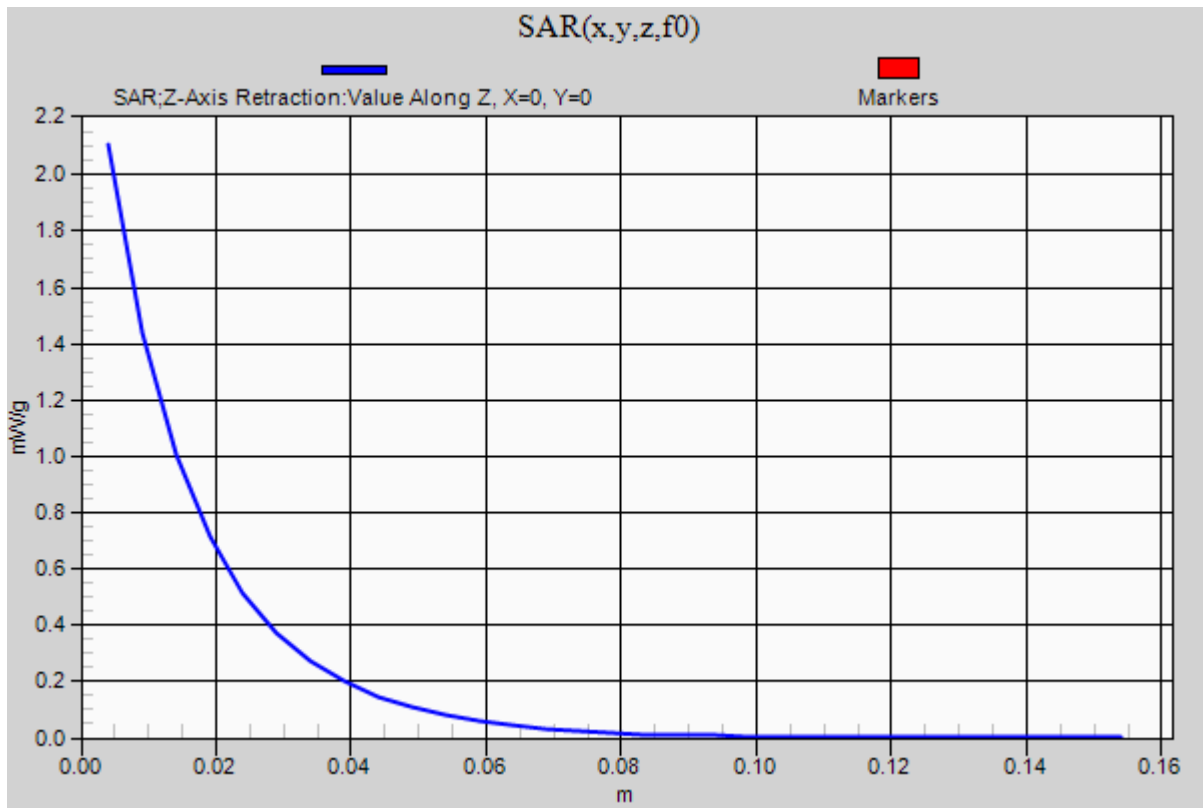
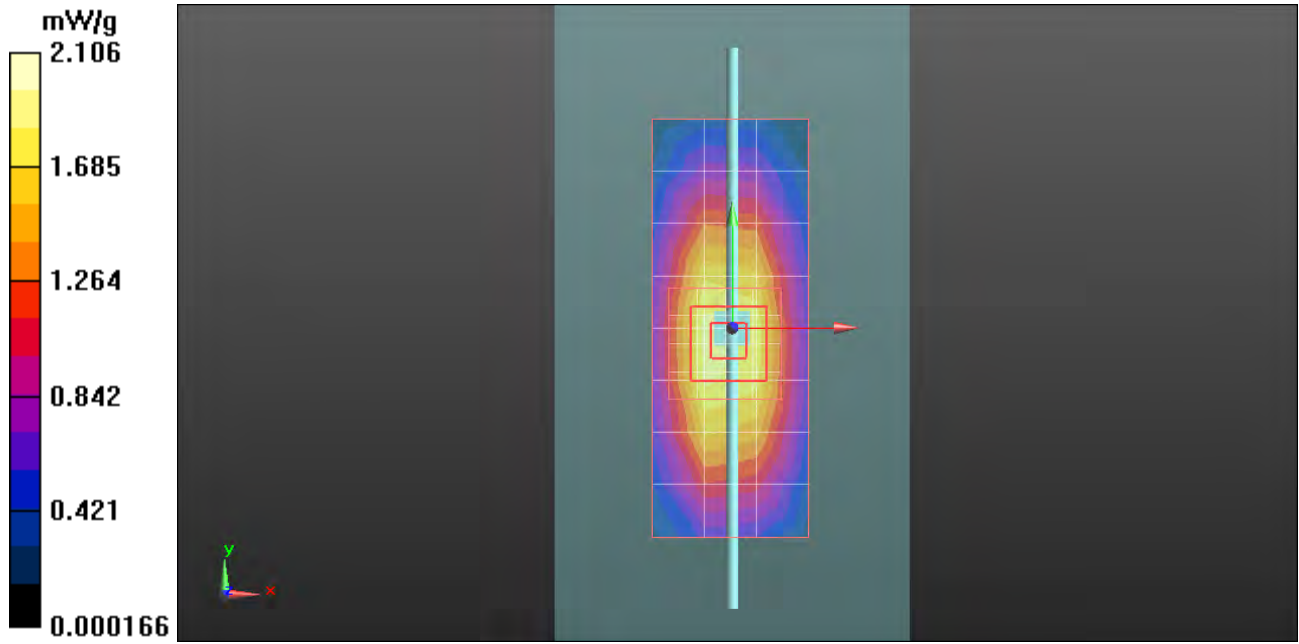
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 48.463 V/m; Power Drift = -0.16 dB; Peak SAR (extrapolated) = 2.834 W/kg

SAR(1 g) = 1.96 mW/g; SAR(10 g) = 1.3 mW/g; Maximum value of SAR (measured) = 2.123 mW/g

DASY5, Amy Twin - System Performance Check Template, Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.106 mW/g



Date/Time: 12/22/2011 7:10:37 AM

Test Laboratory: Motorola Mobility - Dec-22-2011 835 MHz Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDT56NA1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 19.3 C; Sim.Temp@SPC = 19.3 C; Room Temp @ SPC = 21.6 C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 55.8$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(6.05, 6.05, 6.05); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#_4 Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: 1-001;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin - System Performance Check Template, Dipole Area Scan (9x4x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 1.796 mW/g

DASY5, Amy Twin - System Performance Check Template, 0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

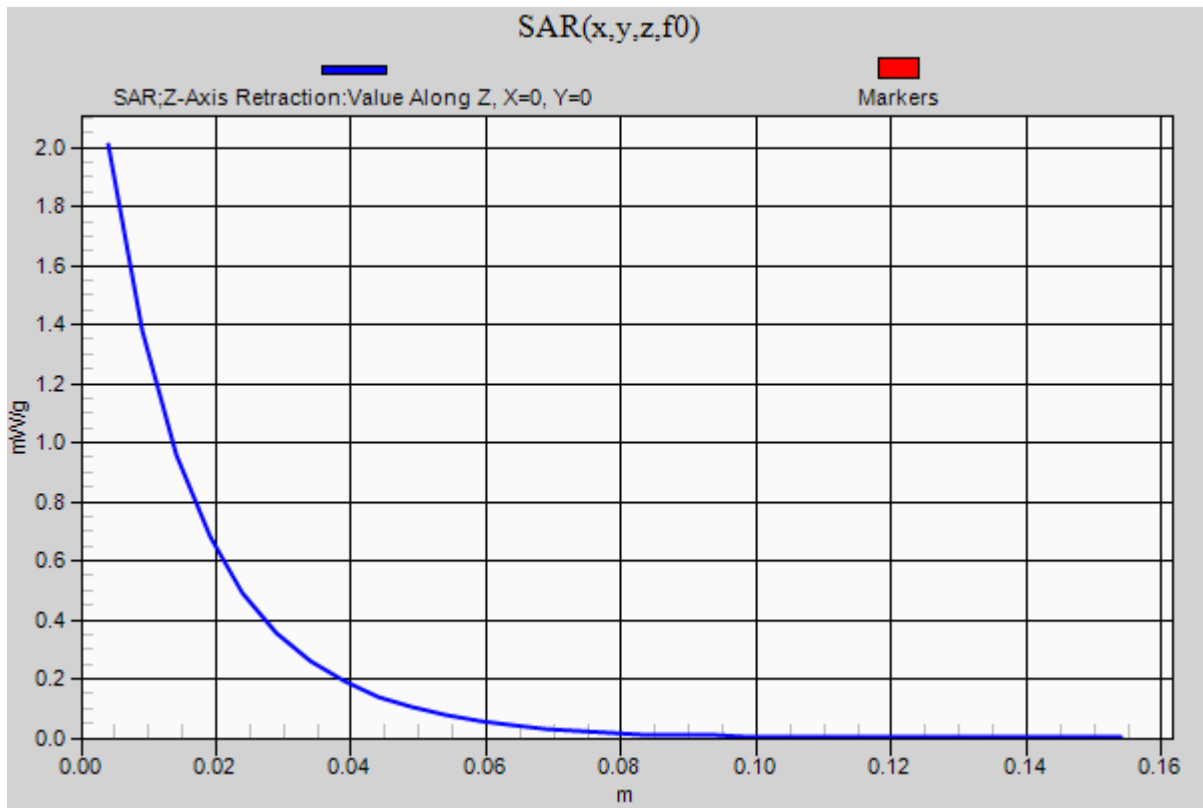
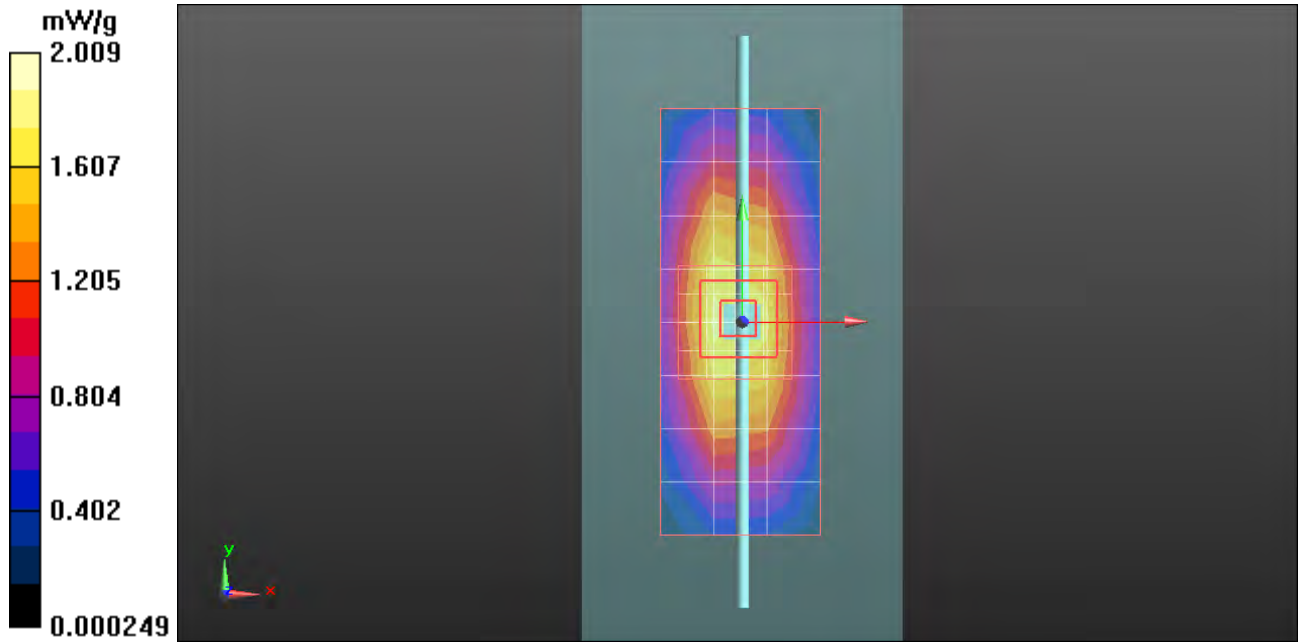
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 46.039 V/m; Power Drift = -0.01 dB; Peak SAR (extrapolated) = 2.677 W/kg

SAR(1 g) = 1.86 mW/g; SAR(10 g) = 1.23 mW/g; Maximum value of SAR (measured) = 2.007 mW/g

DASY5, Amy Twin - System Performance Check Template, Z-Axis Retraction (1x1x31):

Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$; Maximum value of SAR (measured) = 2.009 mW/g



Date/Time: 12/19/2011 9:09:45 AM

Test Laboratory: Motorola Mobility - Dec-19-2011 1800 MHz Body

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 259TR; FCC ID: IHDT56NA1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 259TR; Input Power = 200 mW

Sim.Temp@meas = 21.4°C; Sim.Temp@SPC = 21.3°C; Room Temp @ SPC = 21.7°C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* 1730 body

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 51.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.69, 4.69, 4.69); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat System Performance Check Template

- Dipole Area Scan (4x15x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.045 mW/g

DASY5, Triple Flat System Performance Check Template

- 0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

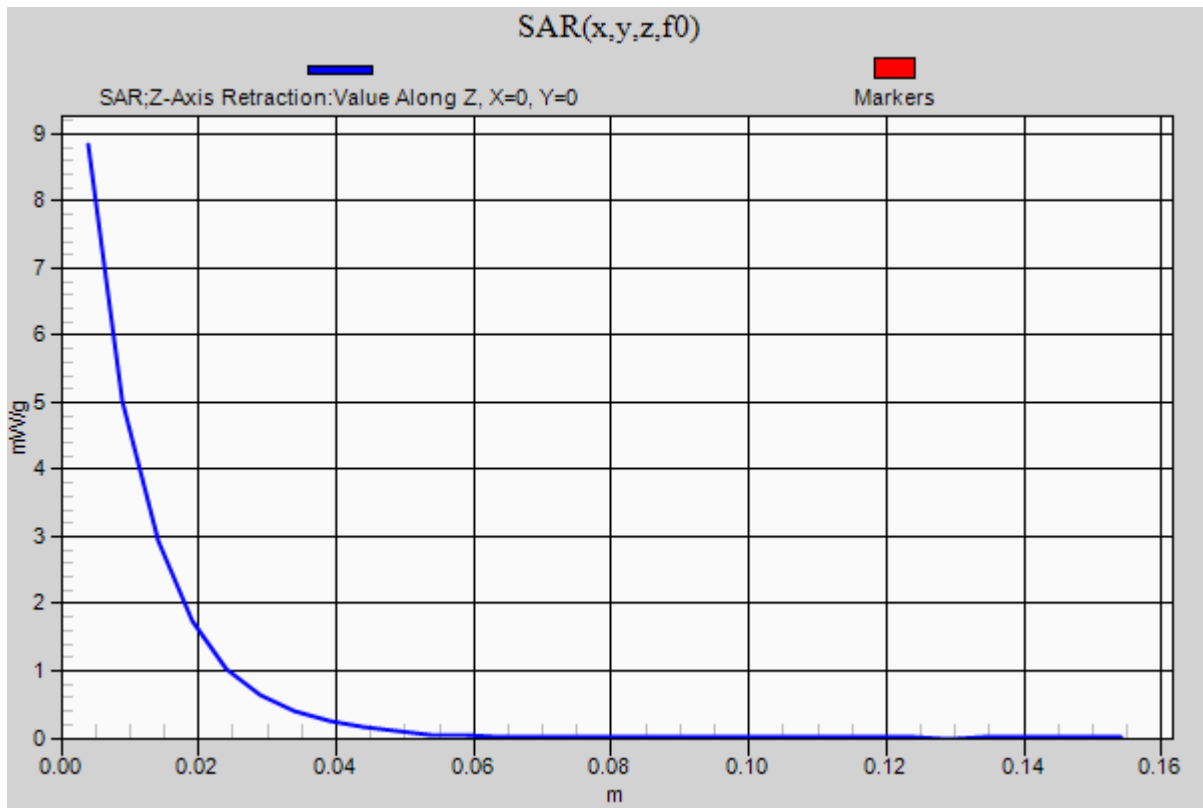
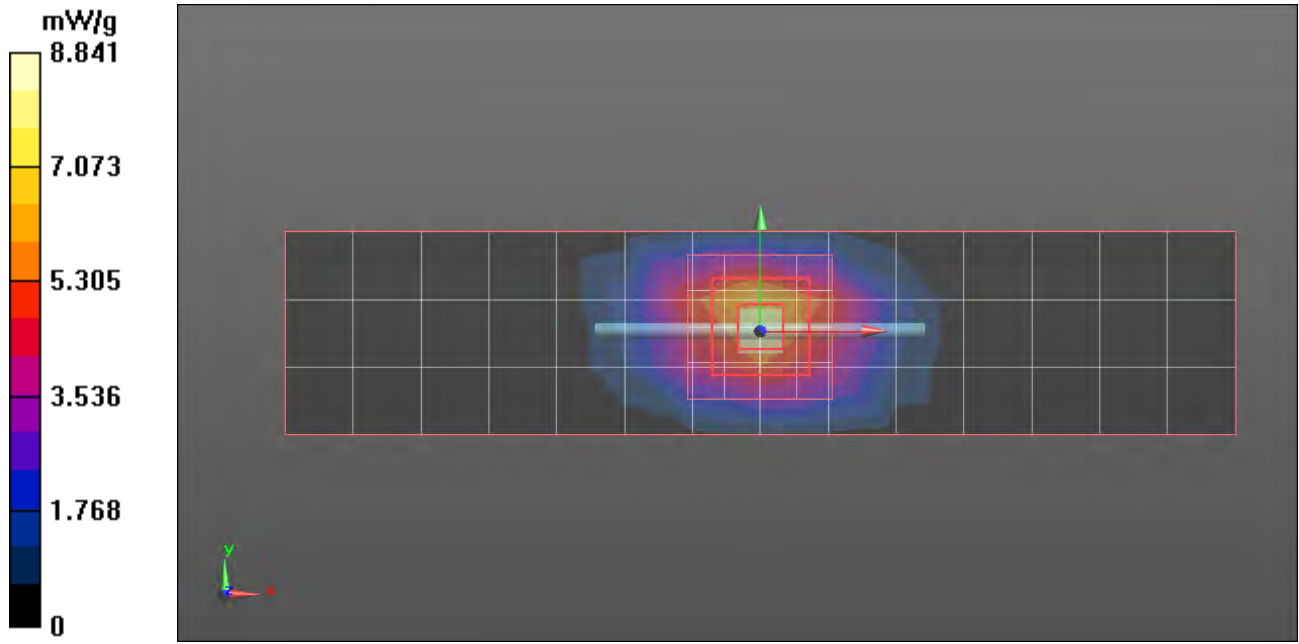
Reference Value = 76.149 V/m; Power Drift = -0.0064 dB; Peak SAR (extrapolated) = 14.291 W/kg

SAR(1 g) = 7.88 mW/g; SAR(10 g) = 4.14 mW/g; Maximum value of SAR (measured) = 8.858 mW/g

DASY5, Triple Flat System Performance Check Template

- Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.841 mW/g



Date/Time: 11/26/2011 9:22:24 AM

Test Laboratory: Motorola Mobility - Nov-26-2011 1800 MHz Body

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 272TR; FCC ID: IHDT56NA1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW

Sim.Temp@meas = 21.1 C; Sim.Temp@SPC = 20.5 C; Room Temp @ SPC = 21.3 C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 50.9$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(4.75, 4.75, 4.75); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Section 1, Amy Twin, Rev1 (24-Aug-11); Type: DASY5 Amy Twin Flat; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin - System Performance Check Template, Dipole Area Scan (9x4x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.533 mW/g

DASY5, Amy Twin - System Performance Check Template, 0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

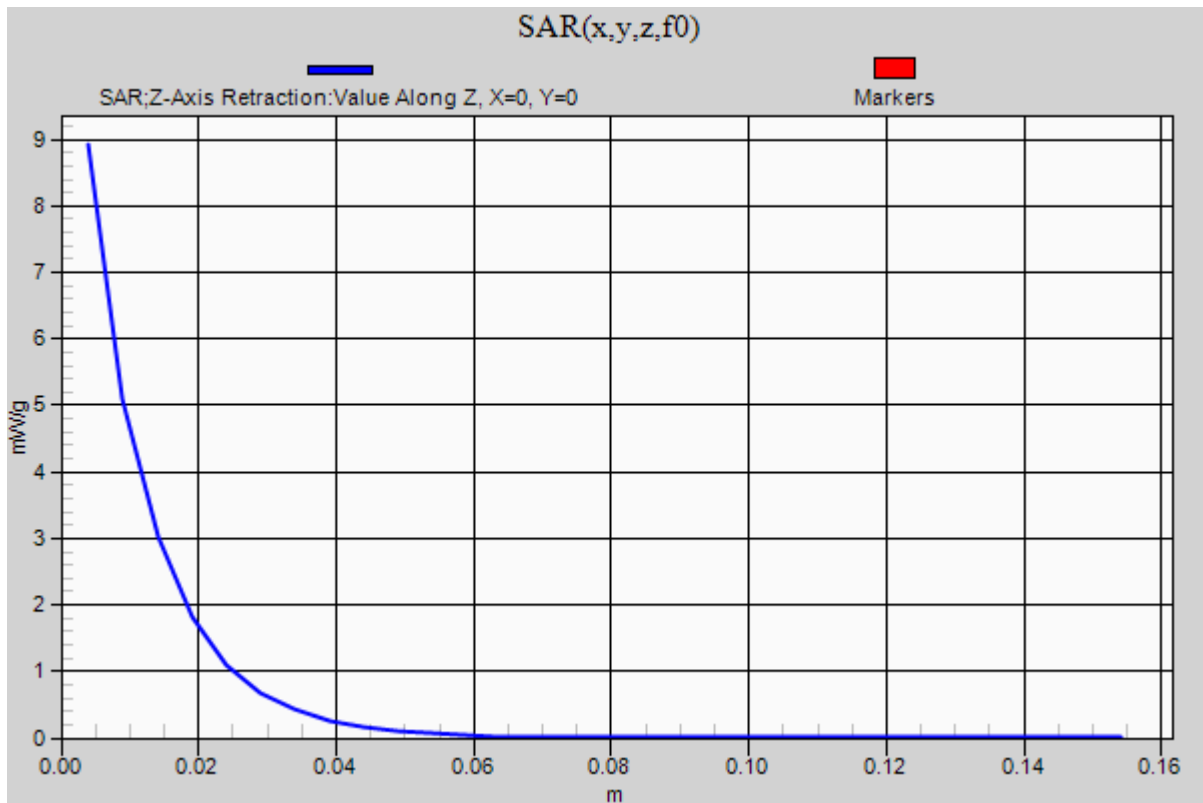
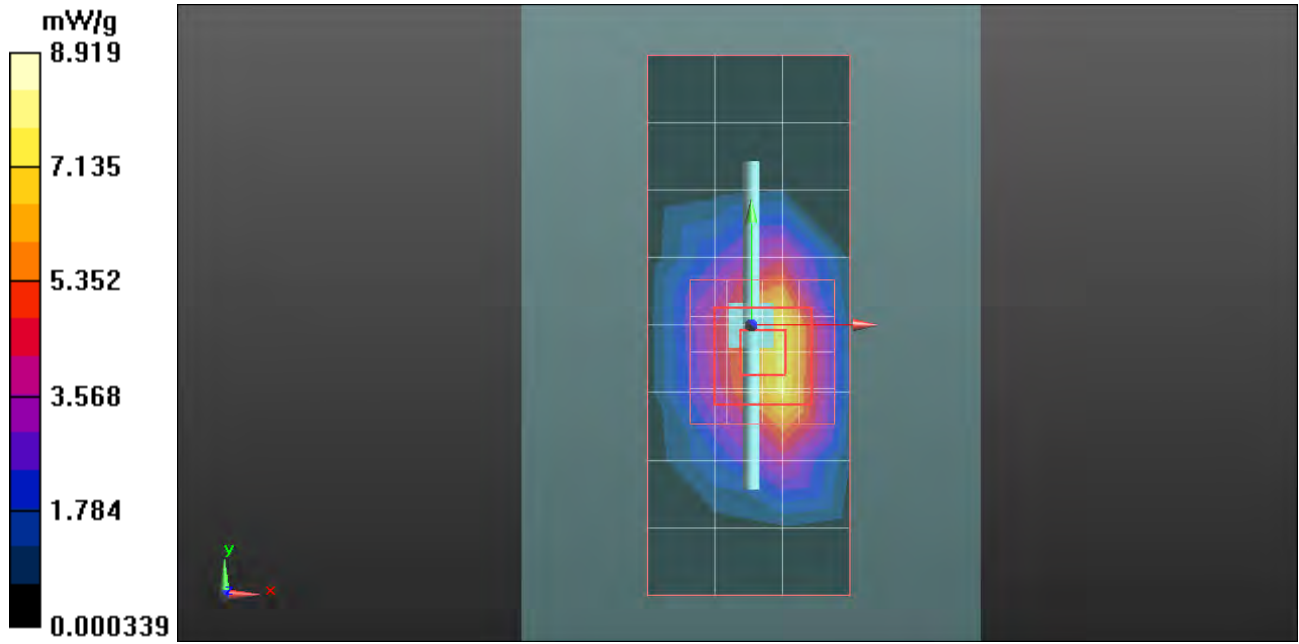
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 75.775 V/m; Power Drift = 0.0067 dB; Peak SAR (extrapolated) = 14.239 W/kg

SAR(1 g) = 7.95 mW/g; SAR(10 g) = 4.22 mW/g; Maximum value of SAR (measured) = 8.918 mW/g

DASY5, Amy Twin - System Performance Check Template, Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.919 mW/g



Date/Time: 12/2/2011 11:02:36 AM

Test Laboratory: Motorola Mobility - Dec-02-2011 1800 MHz Body

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 272TR; FCC ID: IHDT56NA1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW

Sim.Temp@meas = 20.4 C; Sim.Temp@SPC = 20.4 C; Room Temp @ SPC = 21.5 C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 51.6$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(4.75, 4.75, 4.75); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Section 1, Amy Twin, Rev1 (24-Aug-11); Type: DASY5 Amy Twin Flat; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin - System Performance Check Template, Dipole Area Scan (9x4x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 6.389 mW/g

DASY5, Amy Twin - System Performance Check Template, 0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

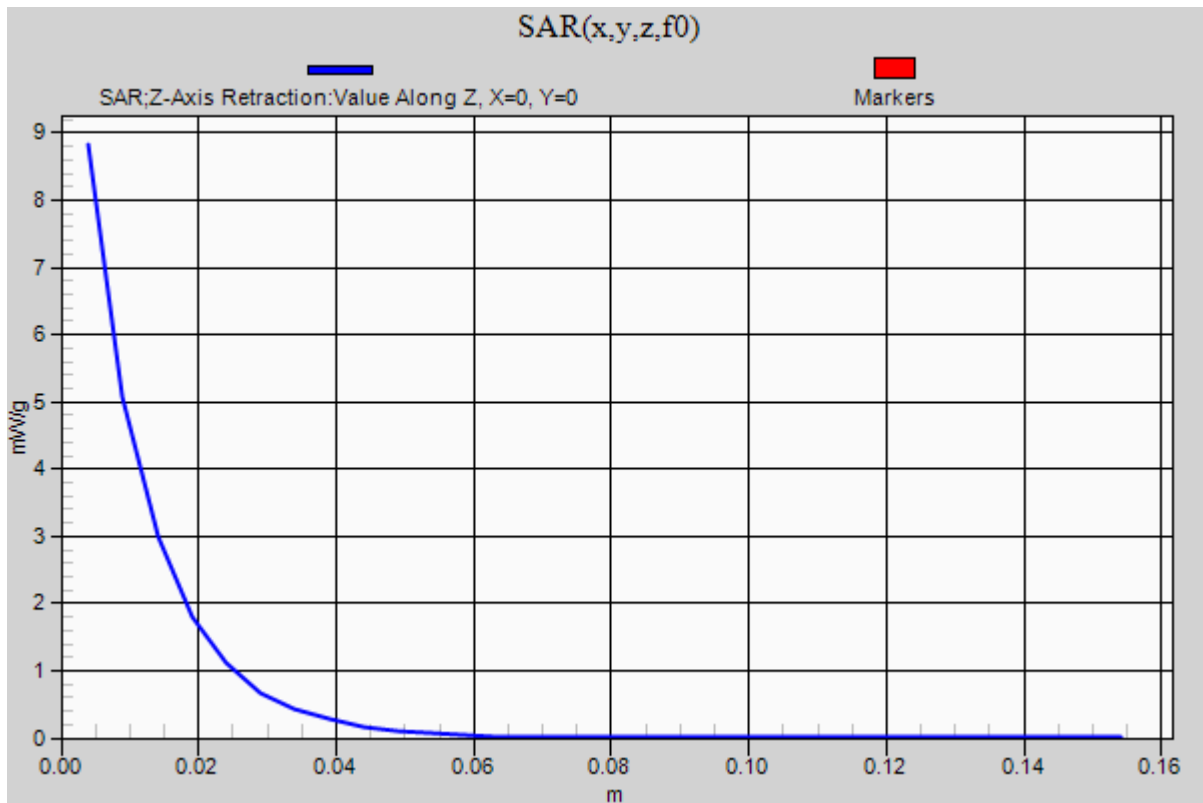
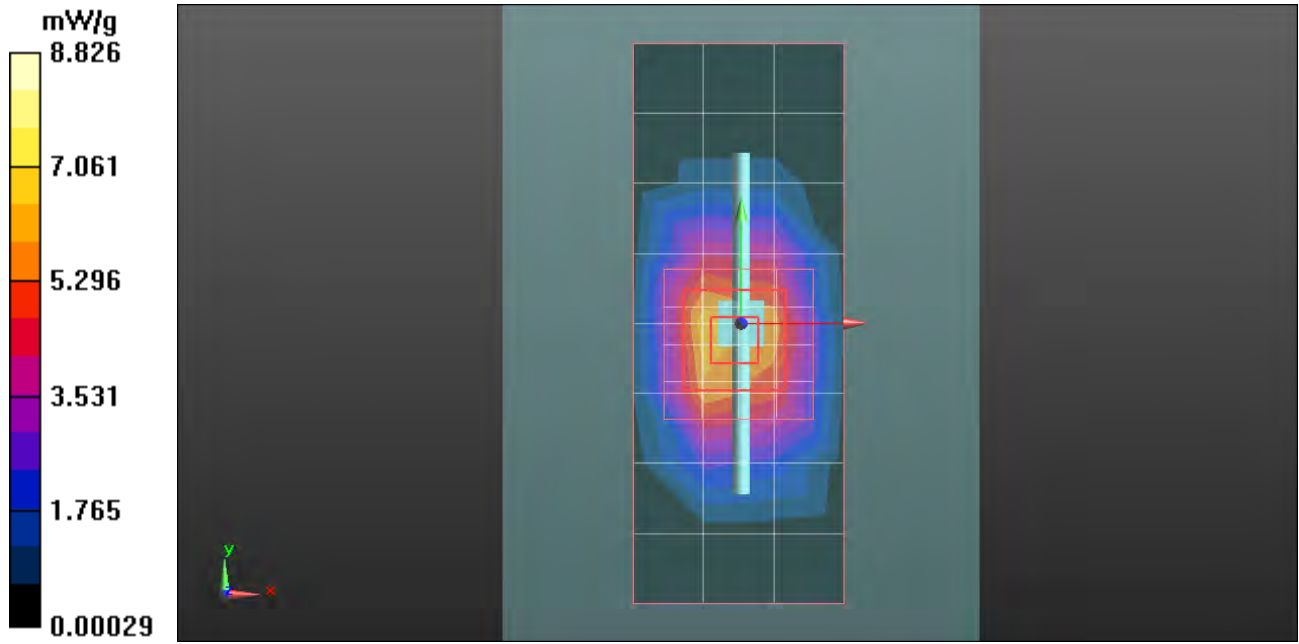
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 78.147 V/m; Power Drift = -0.02 dB; Peak SAR (extrapolated) = 14.094 W/kg

SAR(1 g) = 7.9 mW/g; SAR(10 g) = 4.21 mW/g; Maximum value of SAR (measured) = 8.819 mW/g

DASY5, Amy Twin - System Performance Check Template, Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.826 mW/g



Date/Time: 12/20/2011 3:59:04 PM

Test Laboratory: Motorola Mobility - Dec-20-2011 1800 MHz Body

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 250TR; FCC ID: IHDT56NA1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 250TR; Input Power = 200 mW

Sim.Temp@meas = 19.7 C; Sim.Temp@SPC = 20.6 C; Room Temp @ SPC = 21.3 C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(4.75, 4.75, 4.75); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#_4 Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: 1-001;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin - System Performance Check Template, Dipole Area Scan (9x4x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 6.262 mW/g

DASY5, Amy Twin - System Performance Check Template, 0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

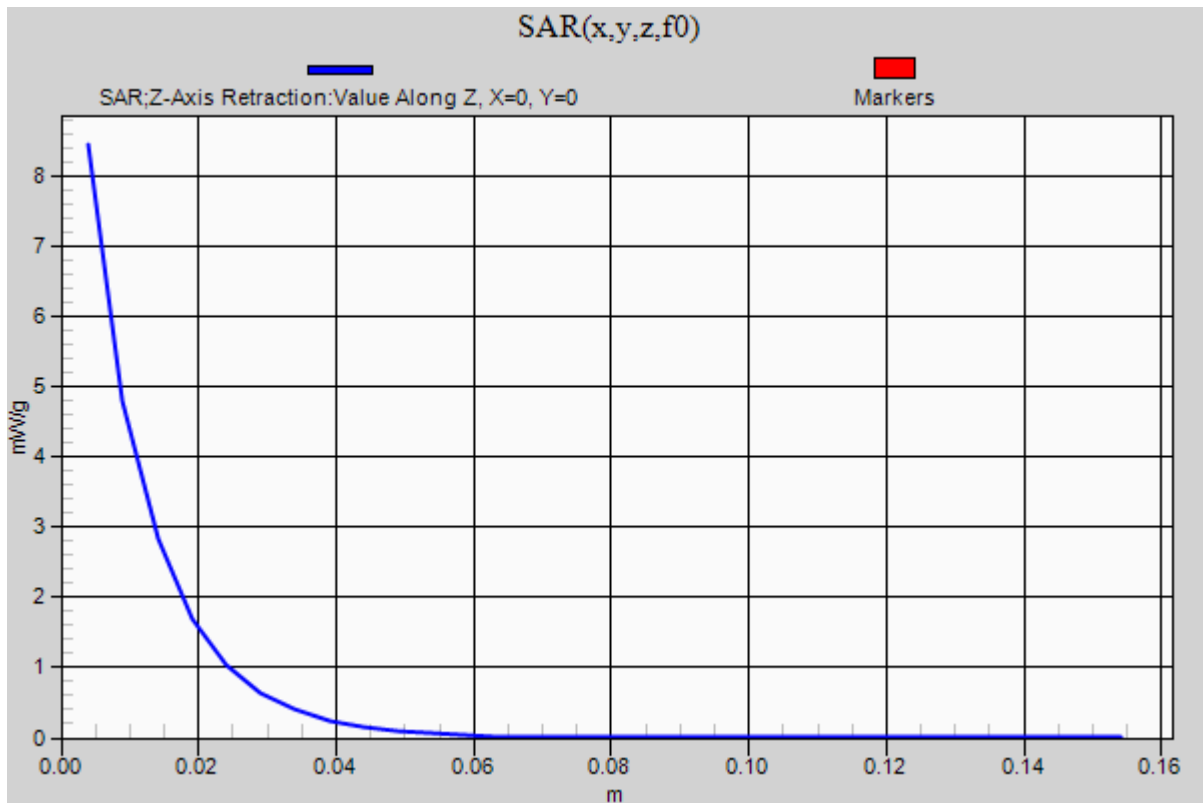
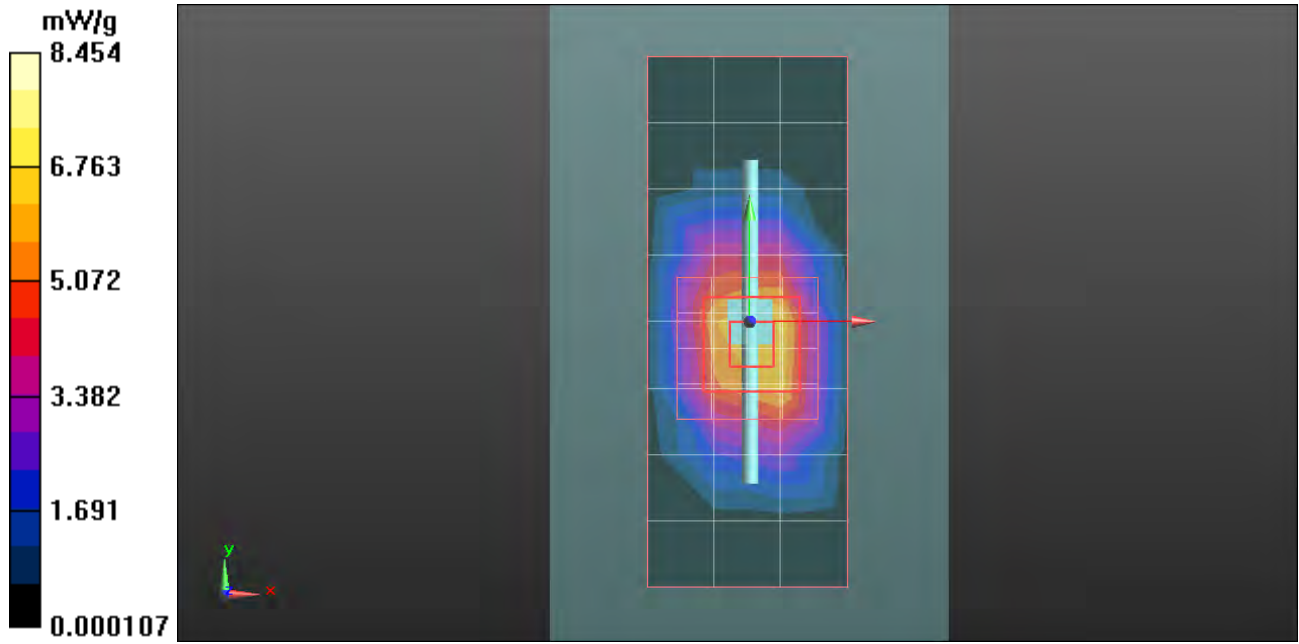
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 77.124 V/m; Power Drift = -0.02 dB; Peak SAR (extrapolated) = 13.790 W/kg

SAR(1 g) = 7.69 mW/g; SAR(10 g) = 4.13 mW/g; Maximum value of SAR (measured) = 8.527 mW/g

DASY5, Amy Twin - System Performance Check Template, Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.454 mW/g



Date/Time: 11/30/2011 7:20:50 PM

Test Laboratory: Motorola Mobility - Nov-30-2011 2450 MHz Body

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 863; FCC ID: IHDT56NA1

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 863; Input Power = 200 mW

Sim.Temp@meas = 20.8°C; Sim.Temp@SPC = 20.8°C; Room Temp @ SPC = 21.5°C

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

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.95$ mho/m; $\epsilon_r = 50.7$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#-6, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 12.7 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

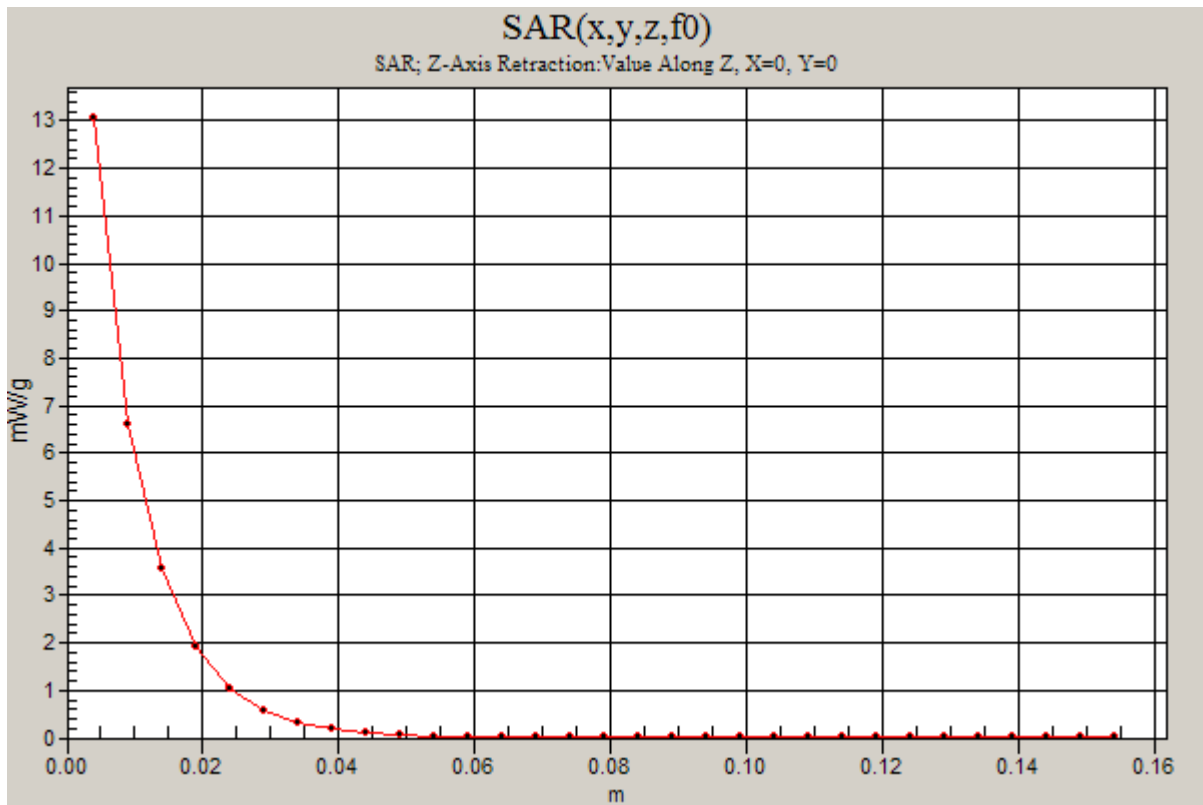
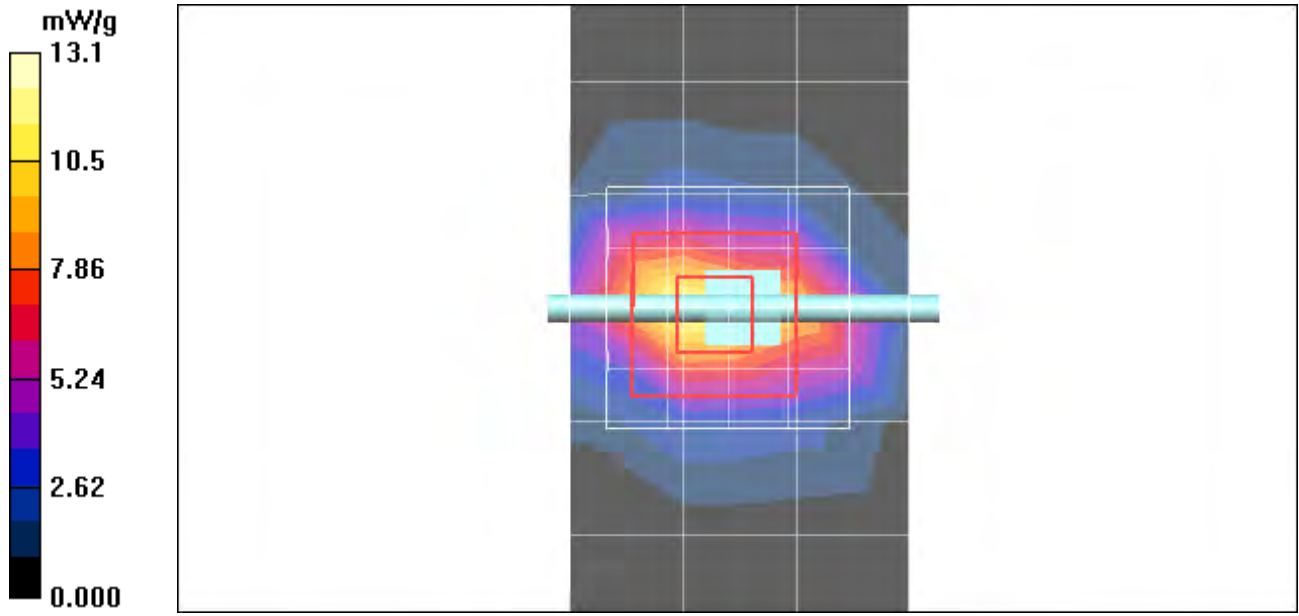
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.8 V/m; Power Drift = -0.015 dB; Peak SAR (extrapolated) = 24.9 W/kg

SAR(1 g) = 11.6 mW/g; SAR(10 g) = 5.36 mW/g; Maximum value of SAR (measured) = 13.1 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm



Date/Time: 12/1/2011 8:08:09 PM

Test Laboratory: Motorola Mobility - Dec-01-2011 2450 MHz Body

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 863; FCC ID: IHDT56NA1

Procedure Notes: 2450MHz System Performance Check; Dipole Sn# 863; Input Power = 200 mW

Sim.Temp@meas = 20.5°C; Sim.Temp@SPC = 19.3°C; Room Temp @ SPC = 21.4°C

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

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 50.2$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#-6, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

Configuration/Daily SPC Check/Dipole Area Scan (4x15x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 11.110 mW/g

Configuration/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

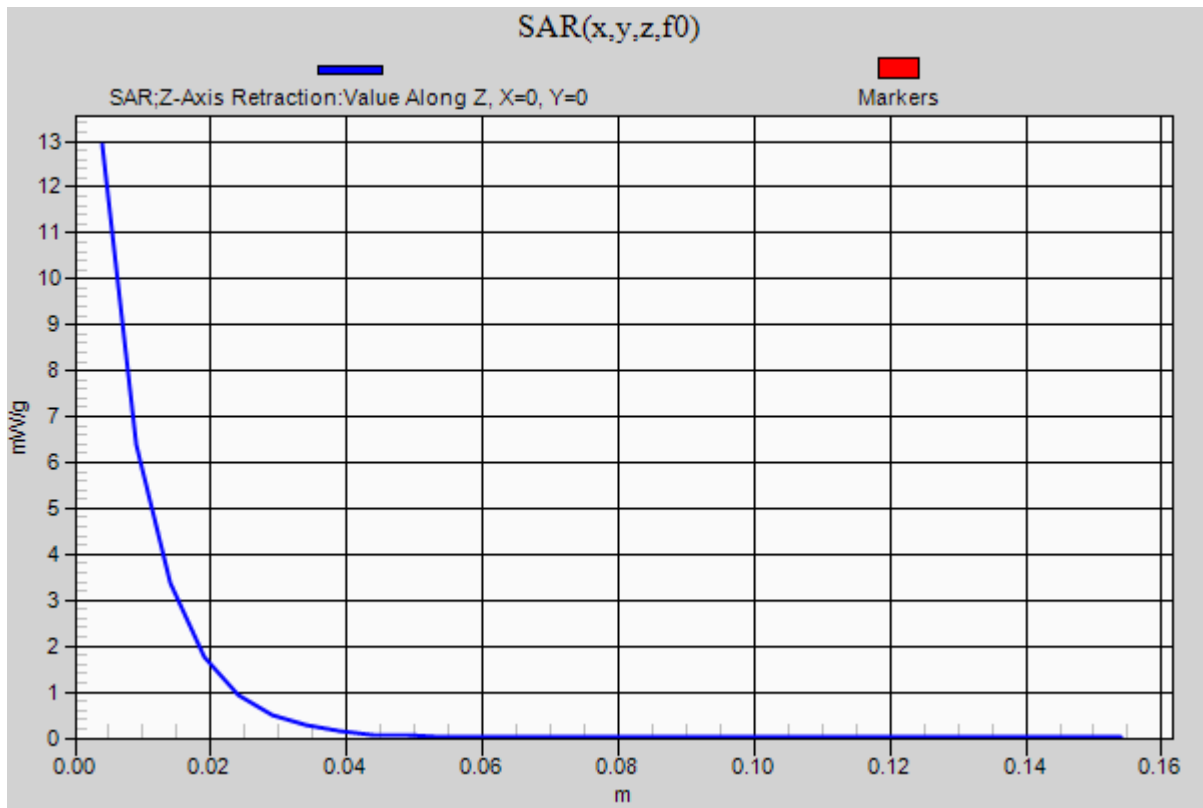
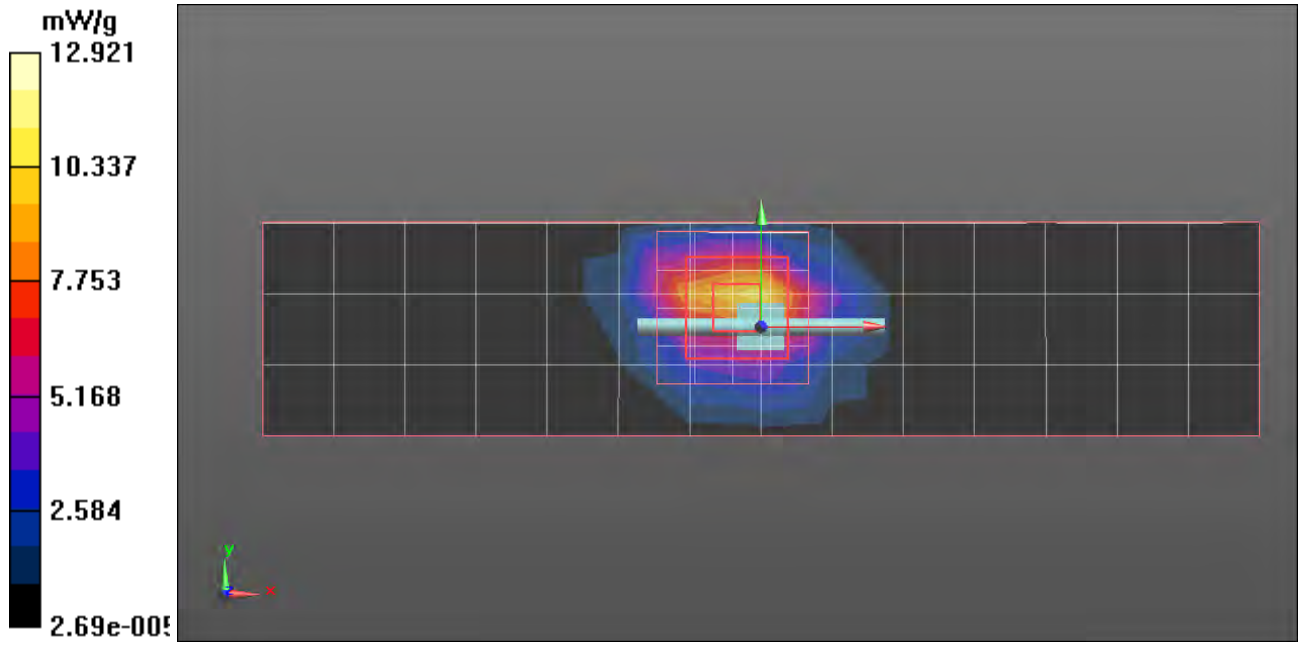
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 75.323 V/m; Power Drift = -0.02 dB; Peak SAR (extrapolated) = 25.019 W/kg

SAR(1 g) = 11.4 mW/g; SAR(10 g) = 5.22 mW/g; Maximum value of SAR (measured) = 12.951 mW/g

Configuration/Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 12.921 mW/g



Appendix 2

SAR distribution plots for Head Adjacent Test Results

Date/Time: 11/23/2011 9:48:41 PM, Date/Time: 11/23/2011 9:57:58 PM

Test Laboratory: Motorola Mobility - GSM 850 Cheek

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5875A; DEVICE POSITION (cheek or rotated): Cheek

Communication System: GSM; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8.30042

Medium: Low Freq Head

Medium parameters used: $f = 835$ MHz; $\sigma = 0.91$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(6.04, 6.04, 6.04); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - RIGHT head template - Area Scan - Normal Extended (15mm) (7x17x1):

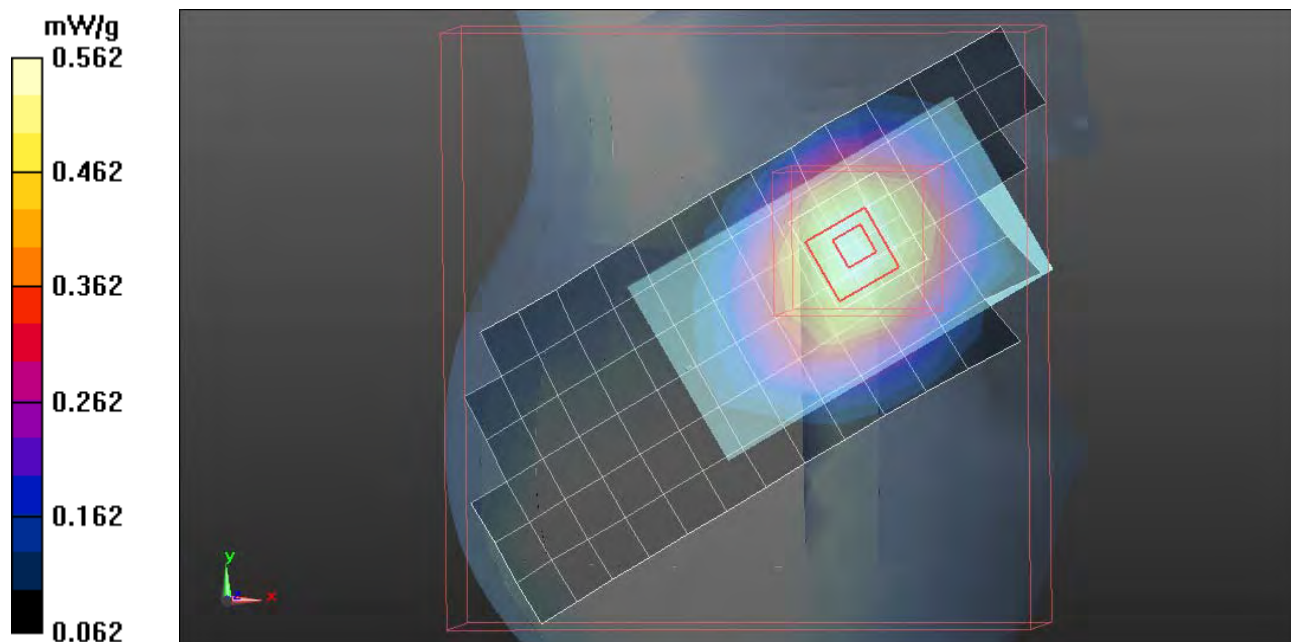
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.557 mW/g

DASY5, SAM - RIGHT head template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.085 V/m; Power Drift = -0.08 dB; Peak SAR (extrapolated) = 0.672 W/kg

SAR(1 g) = 0.534 mW/g; SAR(10 g) = 0.406 mW/g; Maximum value of SAR (measured) = 0.562 mW/g



Date/Time: 11/28/2011 3:38:28 PM, Date/Time: 11/28/2011 3:46:50 PM

Test Laboratory: Motorola Mobility - WCDMA 1700 Cheek

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5891A; DEVICE POSITION: Cheek

Communication System: WCDMA; Frequency: 1732 MHz; Channel Number: 1413; Duty Cycle: 1:1

Medium: 1730 Glycol Head

Medium parameters used: $f = 1730$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(5.15, 5.15, 5.15); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_Glycol SAM (extended range), Rev.1 (25-Mar-05)x; Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - Left Head Template, Area Scan - Normal (15mm) (7x17x1):

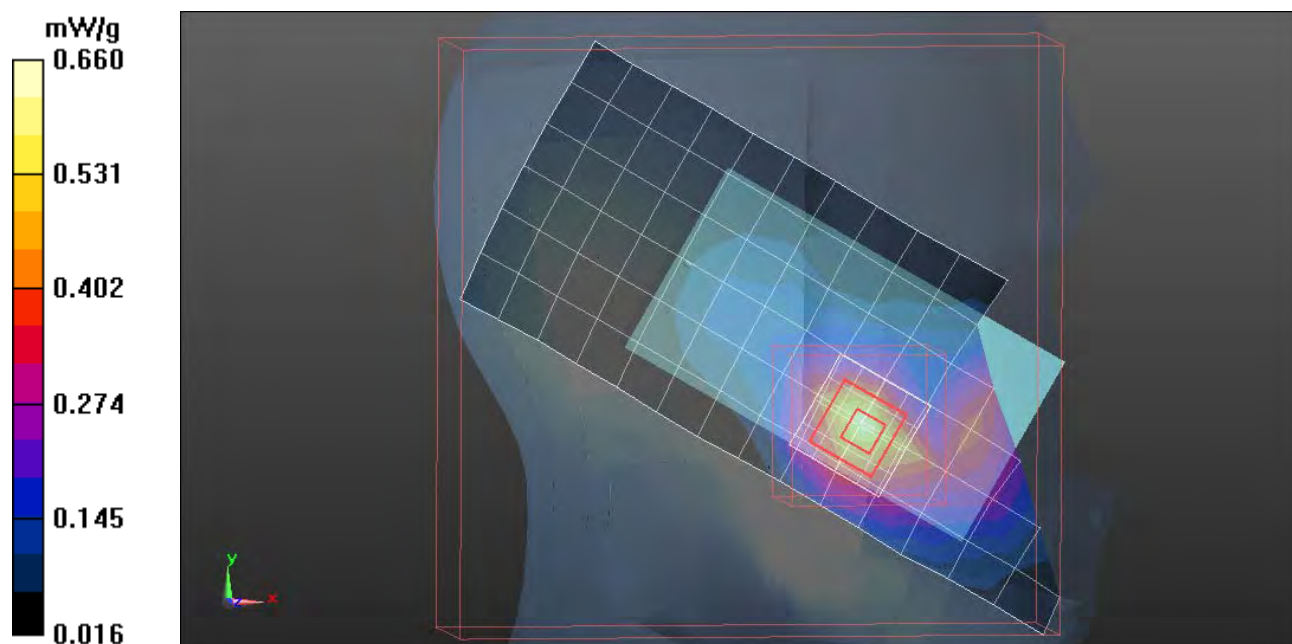
Measurement grid: $dx=15$ mm, $dy=15$ mm; Maximum value of SAR (measured) = 0.624 mW/g

DASY5, SAM - Left Head Template, 5x5x7 Zoom Scan (≤ 3 GHz) (5x5x7)/Cube 0:

Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 18.176 V/m; Power Drift = 0.08 dB; Peak SAR (extrapolated) = 0.896 W/kg

SAR(1 g) = 0.600 mW/g; SAR(10 g) = 0.357 mW/g; Maximum value of SAR (measured) = 0.660 mW/g



Date/Time: 11/27/2011 2:08:43 PM, Date/Time: 11/27/2011 2:17:05 PM

Test Laboratory: Motorola Mobility - GSM 1900 Cheek

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5875A; DEVICE POSITION: Cheek

Communication System: GSM; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8.30042

Medium: Regular Glycol Head 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(5.15, 5.15, 5.15); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_Glycol SAM (extended range), Rev.1 (25-Mar-05)x; Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - Left Head Template, Area Scan - Normal (15mm) (7x17x1):

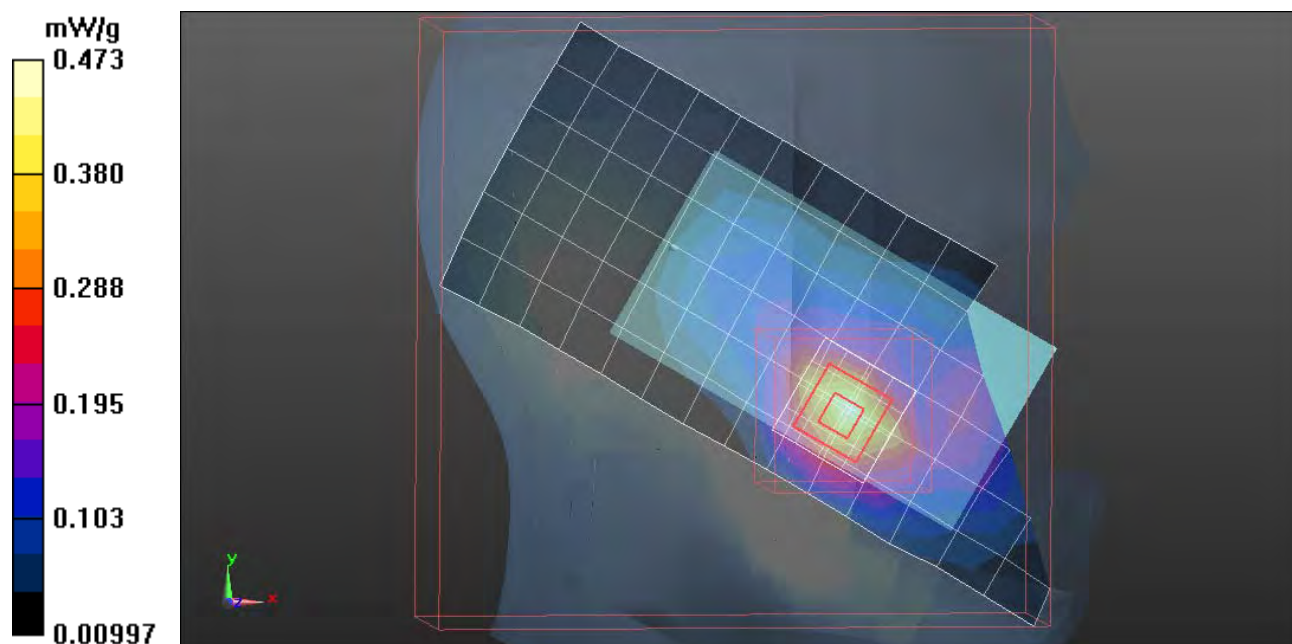
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.464 mW/g

DASY5, SAM - Left Head Template, 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.565 V/m; Power Drift = -0.13 dB; Peak SAR (extrapolated) = 0.671 W/kg

SAR(1 g) = 0.433 mW/g; SAR(10 g) = 0.253 mW/g; Maximum value of SAR (measured) = 0.473 mW/g



Date/Time: 11/28/2011 8:09:27 PM, Date/Time: 11/28/2011 8:17:50 PM

Test Laboratory: Motorola Mobility - WCDMA 1900 Cheek

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal

Accessory Model #: N/A; Battery Model #: SNN5843A

Communication System: _WCDMA; Frequency: 1907.6 MHz; Channel Number: 9538; Duty Cycle: 1:1

Medium: 1950 Glycol Head

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(5.15, 5.15, 5.15); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_Glycol SAM (extended range), Rev.1 (25-Mar-05)x; Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - Left Head Template/Area Scan - Normal (15mm) (7x17x1):

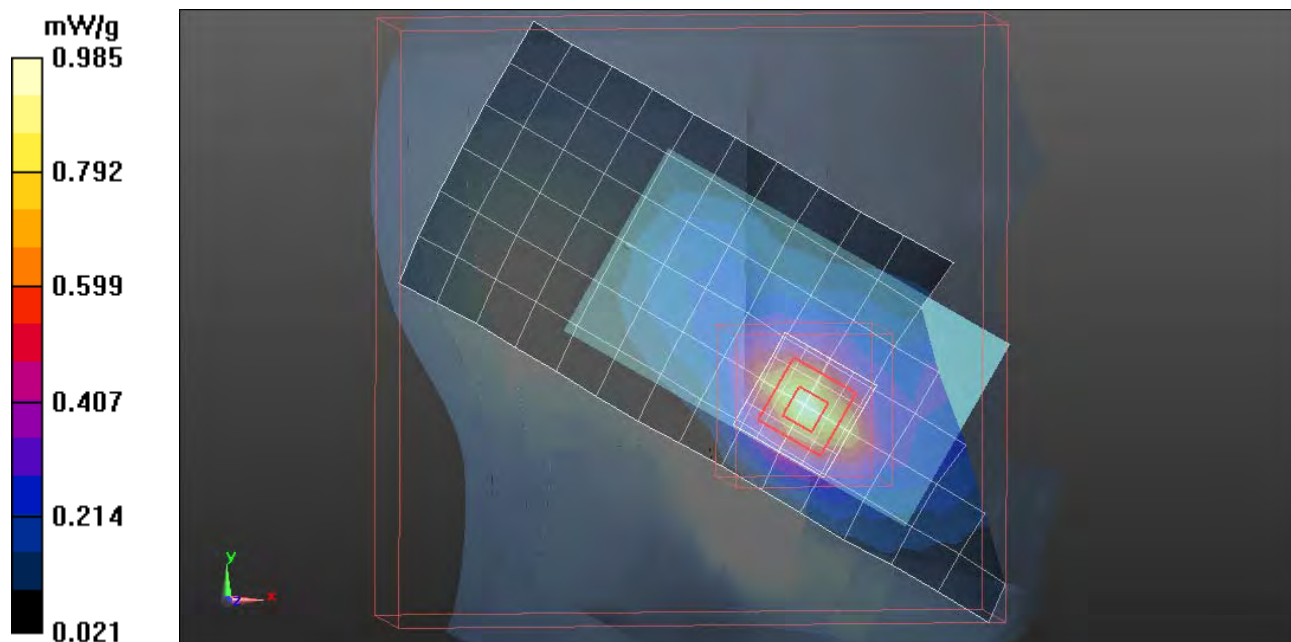
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.986 mW/g

DASY5, SAM - Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.666 V/m; Power Drift = -0.008 dB; Peak SAR (extrapolated) = 1.408 W/kg

SAR(1 g) = 0.893 mW/g; SAR(10 g) = 0.518 mW/g; Maximum value of SAR (measured) = 0.985 mW/g



Date/Time: 11/29/2011 11:22:28 PM, Date/Time: 11/29/2011 11:38:00 PM

Test Laboratory: Motorola Mobility - Wi-Fi 2450 Cheek

Serial: LJRL280111; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5875A; DEVICE POSITION (cheek or rotated): Cheek

Device Mode: 802.11b mode, 1 Mbps data rate

Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Channel Number: 11; Duty Cycle: 1:1

Medium: 2450 Glycol Head

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 37.3$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.39, 4.39, 4.39); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1318;
- ; SEMCAD X Version 14.4.5 (3634)

Configuration/Right Head Template/Area Scan - Normal (15mm) (7x17x1):

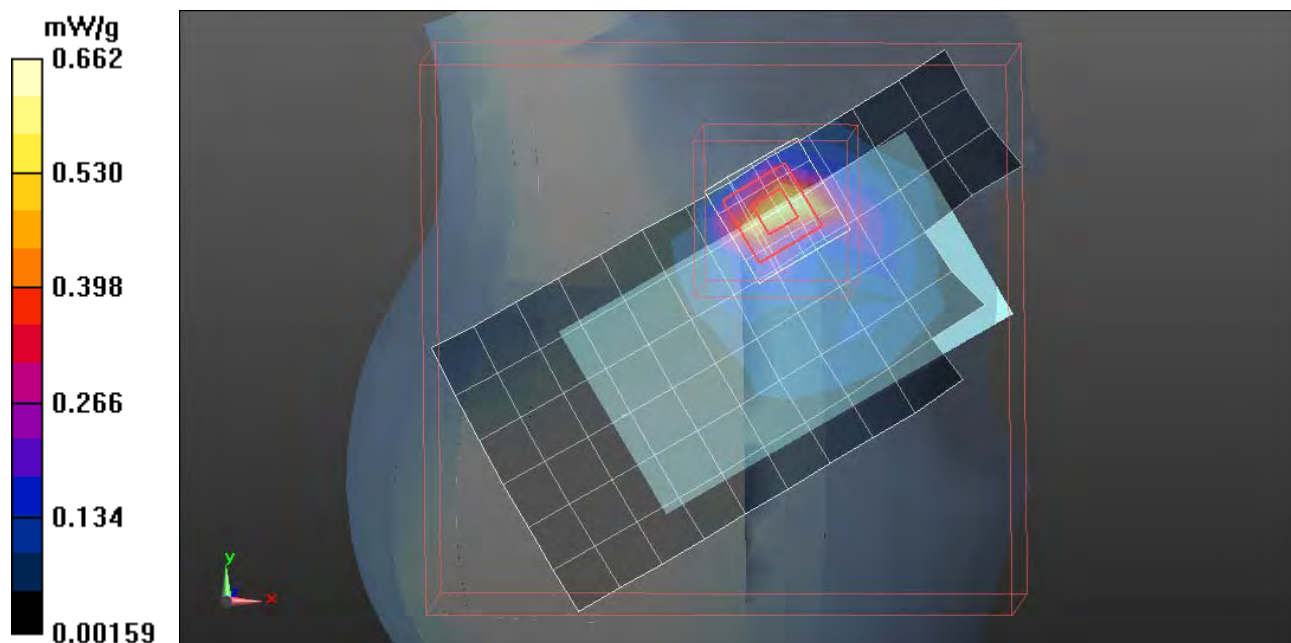
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.592 mW/g

Configuration/Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.910 V/m; Power Drift = 0.07 dB; Peak SAR (extrapolated) = 1.286 W/kg

SAR(1 g) = 0.565 mW/g; SAR(10 g) = 0.247 mW/g; Maximum value of SAR (measured) = 0.662 mW/g



Date/Time: 11/23/2011 10:57:00 PM, Date/Time: 11/23/2011 11:06:18 PM

Test Laboratory: Motorola Mobility - GSM 850 Tilt

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5875A; DEVICE POSITION (check or rotated): Rotated

Communication System: GSM; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8.30042

Medium: Low Freq Head

Medium parameters used: $f = 835$ MHz; $\sigma = 0.91$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(6.04, 6.04, 6.04); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - RIGHT head template - Area Scan - Normal Extended (15mm) (7x17x1):

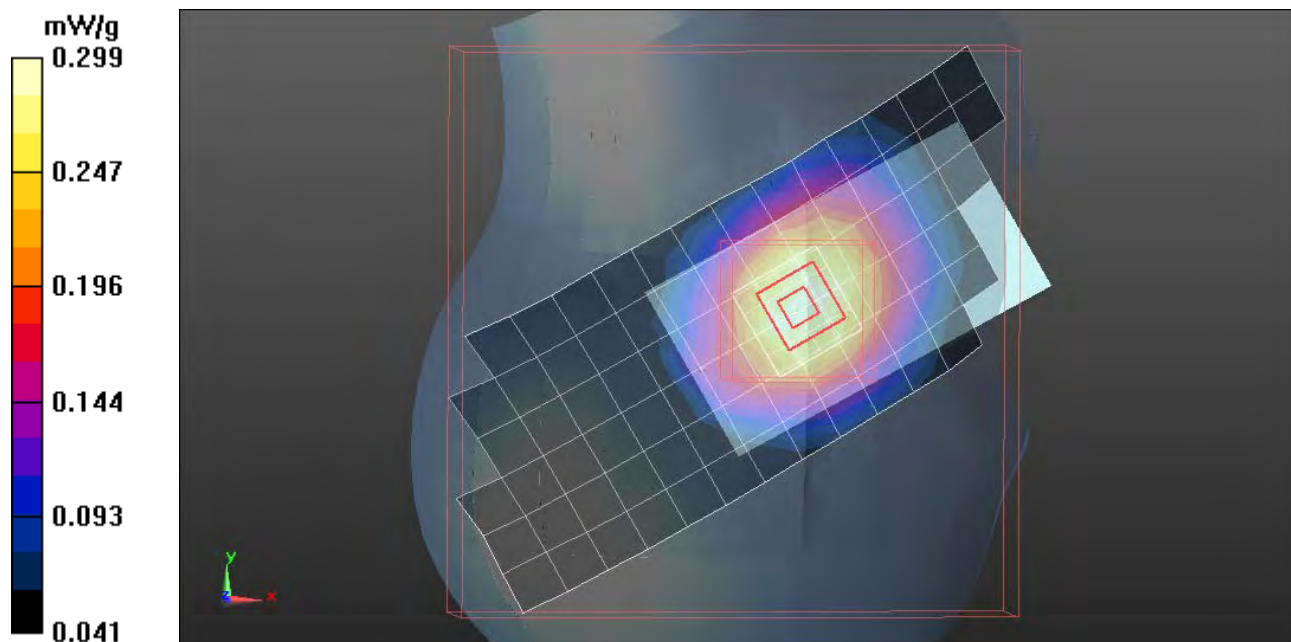
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.297 mW/g

DASY5, SAM - RIGHT head template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.561 V/m; Power Drift = -0.09 dB; Peak SAR (extrapolated) = 0.353 W/kg

SAR(1 g) = 0.284 mW/g; SAR(10 g) = 0.216 mW/g; Maximum value of SAR (measured) = 0.299 mW/g



Date/Time: 11/28/2011 2:37:55 PM, Date/Time: 11/28/2011 2:47:12 PM

Test Laboratory: Motorola Mobility - WCDMA 1700 Tilt

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5875A; DEVICE POSITION: Tilt

Communication System: WCDMA; Frequency: 1732 MHz; Channel Number: 1413; Duty Cycle: 1:1

Medium: 1730 Glycol Head

Medium parameters used: $f = 1730$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(5.15, 5.15, 5.15); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Glycol SAM (extended range), Rev.1 (25-Mar-05)x; Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - RIGHT head template - Area Scan - Normal (15mm) (7x17x1):

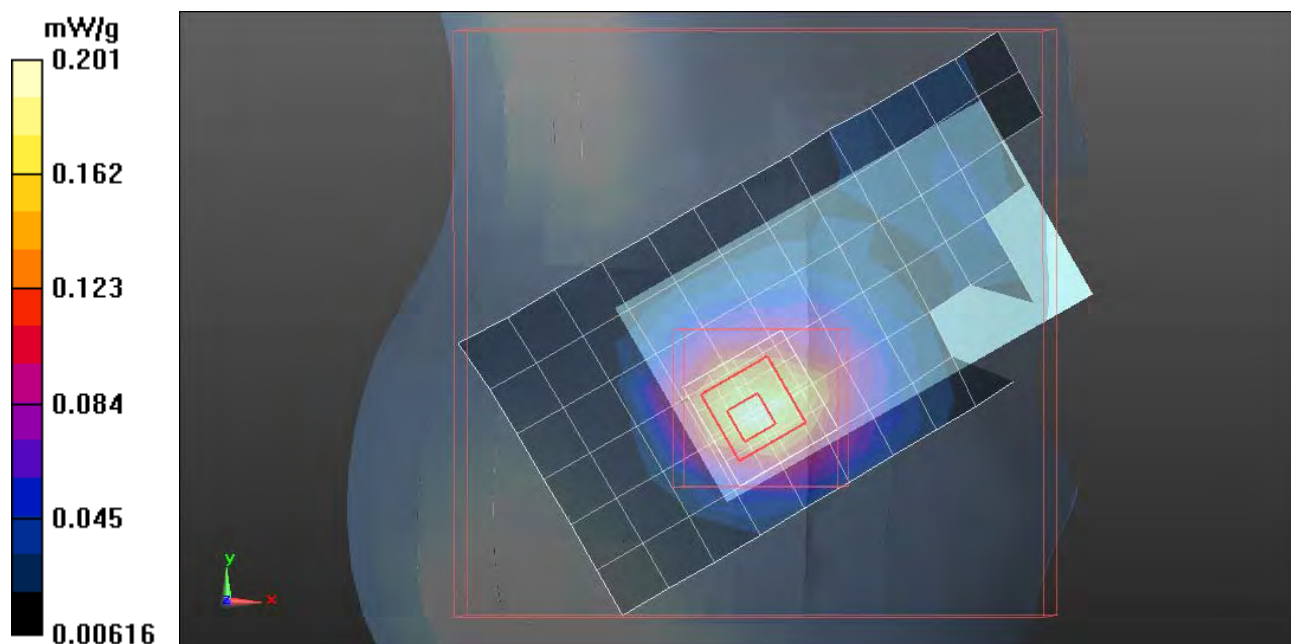
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.201 mW/g

DASY5, SAM - RIGHT head template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.859 V/m; Power Drift = 0.12 dB; Peak SAR (extrapolated) = 0.284 W/kg

SAR(1 g) = 0.190 mW/g; SAR(10 g) = 0.119 mW/g;



Date/Time: 11/27/2011 3:00:15 PM, Date/Time: 11/27/2011 3:07:56 PM

Test Laboratory: Motorola Mobility - GSM 1900 Tilt

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5875A; DEVICE POSITION: Tilt

Communication System: GSM; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8.30042

Medium: Regular Glycol Head 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(5.15, 5.15, 5.15); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_Glycol SAM (extended range), Rev.1 (25-Mar-05)x; Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - RIGHT head template - Area Scan - Normal (15mm) (7x17x1):

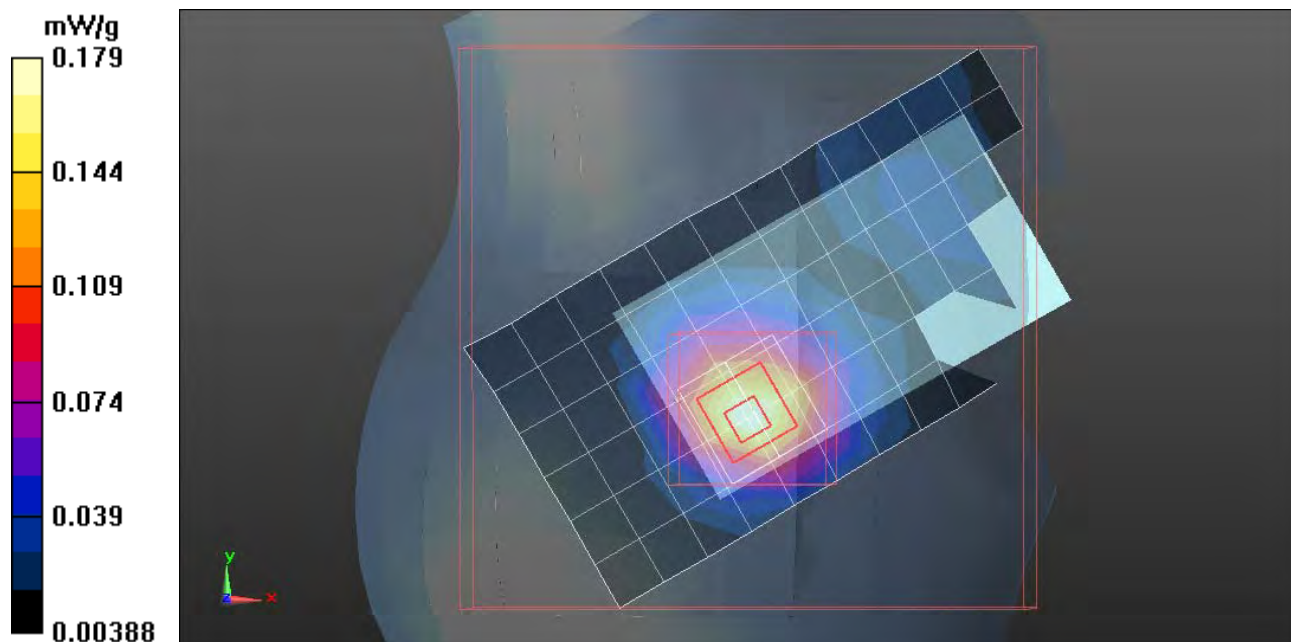
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.188 mW/g

DASY5, SAM - RIGHT head template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.915 V/m; Power Drift = 0.04 dB; Peak SAR (extrapolated) = 0.264 W/kg

SAR(1 g) = 0.170 mW/g; SAR(10 g) = 0.103 mW/g; Maximum value of SAR (measured) = 0.179 mW/g



Date/Time: 11/28/2011 6:53:04 PM, Date/Time: 11/28/2011 7:00:46 PM

Test Laboratory: Motorola Mobility - WCDMA 1900 Tilt

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal

Accessory Model #: N/A; Battery Model #: SNN5875A

Communication System: _WCDMA; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: 1950 Glycol Head

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(5.15, 5.15, 5.15); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_Glycol SAM (extended range), Rev.1 (25-Mar-05)x; Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, SAM - Right Head Template/Area Scan - Normal (15mm) (7x17x1):

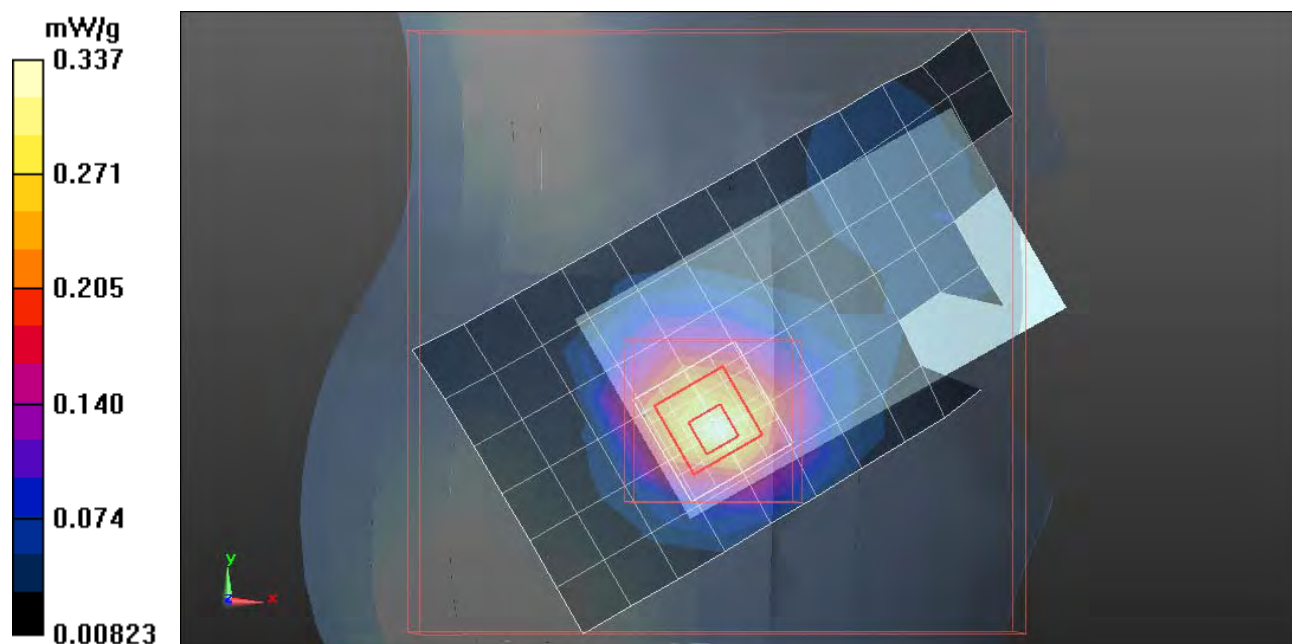
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.343 mW/g

DASY5, SAM - Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.720 V/m; Power Drift = -0.06 dB; Peak SAR (extrapolated) = 0.476 W/kg

SAR(1 g) = 0.314 mW/g; SAR(10 g) = 0.195 mW/g; Maximum value of SAR (measured) = 0.337 mW/g



Date/Time: 11/29/2011 7:36:55 PM, Date/Time: 11/29/2011 7:46:02 PM

Test Laboratory: Motorola Mobility - Wi-Fi 2450 Tilt

Serial: LJRL280111; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5875A; DEVICE POSITION (cheek or rotated): Tilt

Device Mode: 802.11b mode, 1 Mbps data rate

Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Channel Number: 6; Duty Cycle: 1:1

Medium: 2450 Glycol Head

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 37.3$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.39, 4.39, 4.39); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1318;
- ; SEMCAD X Version 14.4.5 (3634)

Configuration/Left Head Template/Area Scan - Normal (15mm) (7x17x1):

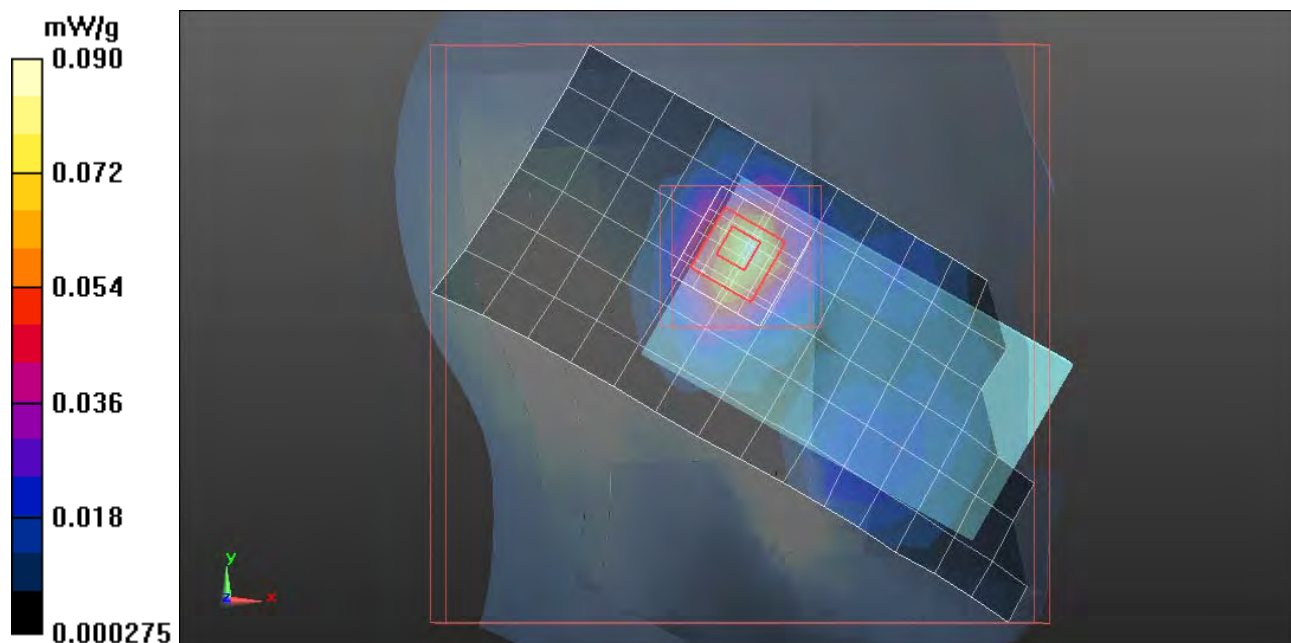
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.090 mW/g

Configuration/Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.720 V/m; Power Drift = 0.02 dB; Peak SAR (extrapolated) = 0.159 W/kg

SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.045 mW/g;



Appendix 3

SAR distribution plots for Body Worn Test Results

Date/Time: 11/25/2011 1:17:17 PM, Date/Time: 11/25/2011 1:26:31 PM

Test Laboratory: Motorola Mobility - GSM 850 Body-Worn

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Battery Model #: SNN5875A

Device Position: Body Worn, Front of Phone 25 mm from Phantom

Communication System: GPRS Cl 12; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:2.07491

Medium: Low Freq Body

Medium parameters used: $f = 835$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(6.05, 6.05, 6.05); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Section 2, Amy Twin, Rev1 (24-Aug-11); Type: DASY5 Amy Twin Flat; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin Phone Template - Area Scan - Normal Extended Body (15mm) (16x7x1):

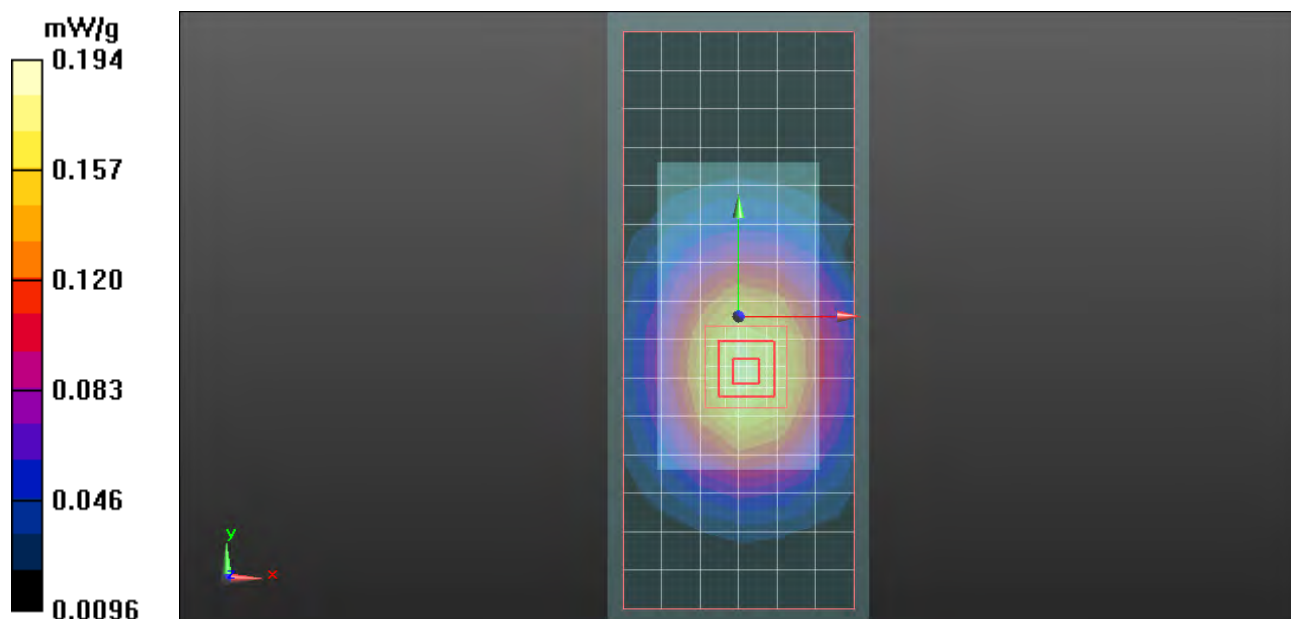
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.177 mW/g

DASY5, Amy Twin Phone Template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.013 V/m; Power Drift = 0.14 dB; Peak SAR (extrapolated) = 0.234 W/kg

SAR(1 g) = 0.184 mW/g; SAR(10 g) = 0.138 mW/g; Maximum value of SAR (measured) = 0.194 mW/g



Date/Time: 11/26/2011 3:37:03 PM, Date/Time: 11/26/2011 3:46:12 PM

Test Laboratory: Motorola Mobility - WCDMA 1700 Body-Worn

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 25 mm from Phantom

Communication System: WCDMA; Frequency: 1732 MHz; Channel Number: 1413; Duty Cycle: 1:1

Medium: 1730 Glycol Body

Medium parameters used: $f = 1730$ MHz; $\sigma = 1.49$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(4.75, 4.75, 4.75); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Section 1, Amy Twin, Rev1 (24-Aug-11); Type: DASY5 Amy Twin Flat; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin Phone Template - Area Scan - Normal Extended Body (15mm) (16x7x1):

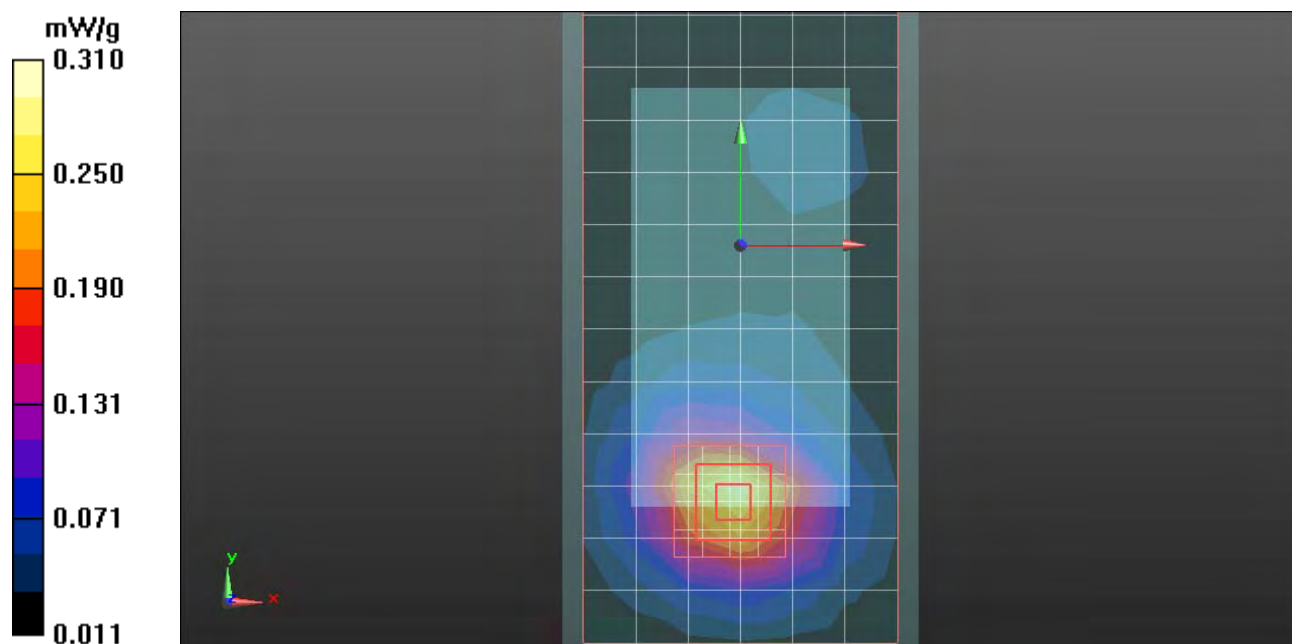
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.288 mW/g

DASY5, Amy Twin Phone Template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.719 V/m; Power Drift = 0.06 dB; Peak SAR (extrapolated) = 0.437 W/kg

SAR(1 g) = 0.285 mW/g; SAR(10 g) = 0.176 mW/g; Maximum value of SAR (measured) = 0.310 mW/g



Date/Time: 11/26/2011 11:51:02 AM, Date/Time: 11/26/2011 12:00:13 PM

Test Laboratory: Motorola Mobility - GSM 1900 Body-Worn

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body-Worn, Back of Phone 25 mm from Phantom

Communication System: GSM; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8.30042

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 50.7$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(4.75, 4.75, 4.75); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Section 1, Amy Twin, Rev1 (24-Aug-11); Type: DASY5 Amy Twin Flat; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin Phone Template - Area Scan - Normal Extended Body (15mm) (16x7x1):

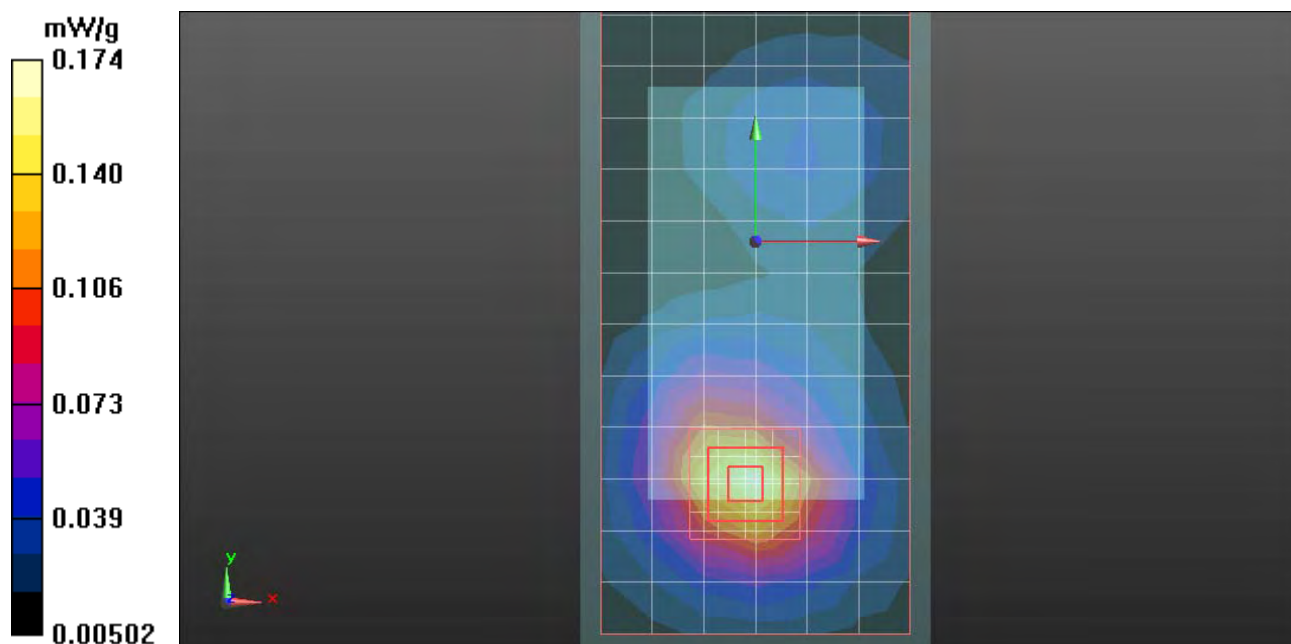
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.172 mW/g

DASY5, Amy Twin Phone Template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.786 V/m; Power Drift = 0.03 dB; Peak SAR (extrapolated) = 0.254 W/kg

SAR(1 g) = 0.160 mW/g; SAR(10 g) = 0.098 mW/g; Maximum value of SAR (measured) = 0.174 mW/g



Date/Time: 11/26/2011 2:14:05 PM, Date/Time: 11/26/2011 2:23:15 PM

Test Laboratory: Motorola Mobility - WCDMA 1900 Body-Worn

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 25 mm from Phantom

Communication System: WCDMA; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 50.7$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(4.75, 4.75, 4.75); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Section 1, Amy Twin, Rev1 (24-Aug-11); Type: DASY5 Amy Twin Flat; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin Phone Template - Area Scan - Normal Extended Body (15mm) (16x7x1):

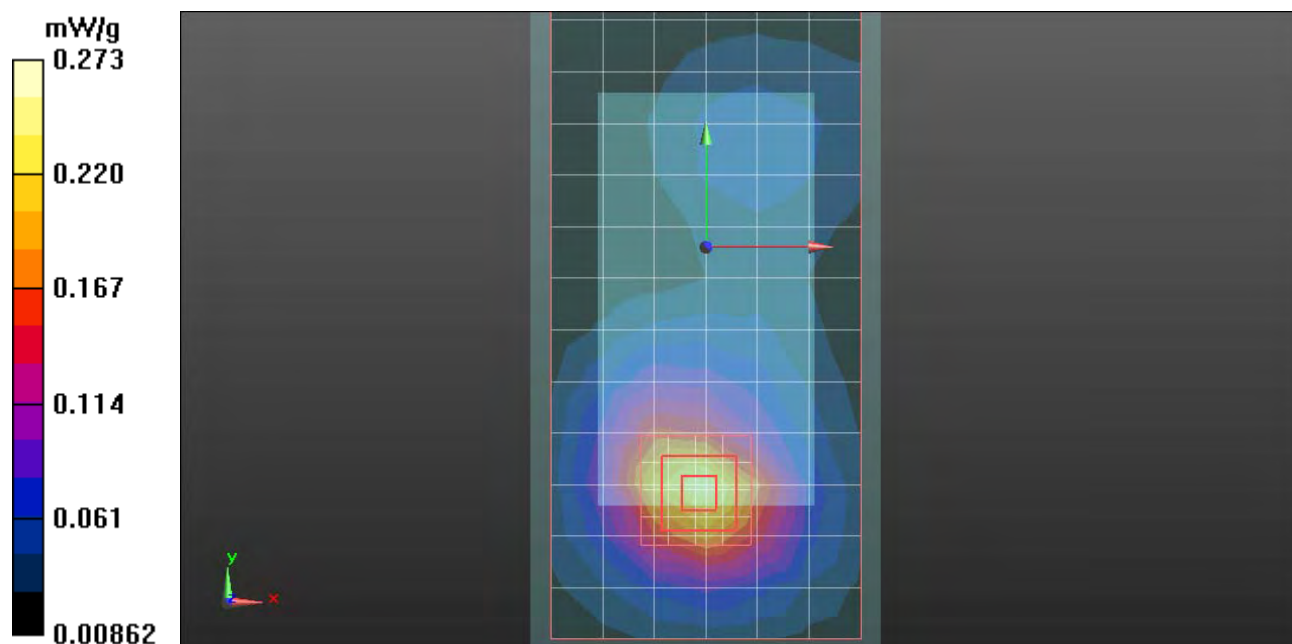
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.260 mW/g

DASY5, Amy Twin Phone Template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.127 V/m; Power Drift = 0.17 dB; Peak SAR (extrapolated) = 0.400 W/kg

SAR(1 g) = 0.251 mW/g; SAR(10 g) = 0.152 mW/g; Maximum value of SAR (measured) = 0.273 mW/g



Date/Time: 11/30/2011 10:56:05 PM, Date/Time: 11/30/2011 11:03:50 PM

Test Laboratory: Motorola Mobility - Wi-Fi 2450 Body-Worn

Serial: LJRL280111; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Front of Phone 25 mm from Phantom

Device Mode: 802.11b mode, 1 Mbps data rate

Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Channel Number: 11; Duty Cycle: 1:1

Medium: 2450 Glycol Body

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.95$ mho/m; $\epsilon_r = 50.7$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#-6, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

Configuration/Area Scan - Normal Body (15mm) (12x8x1):

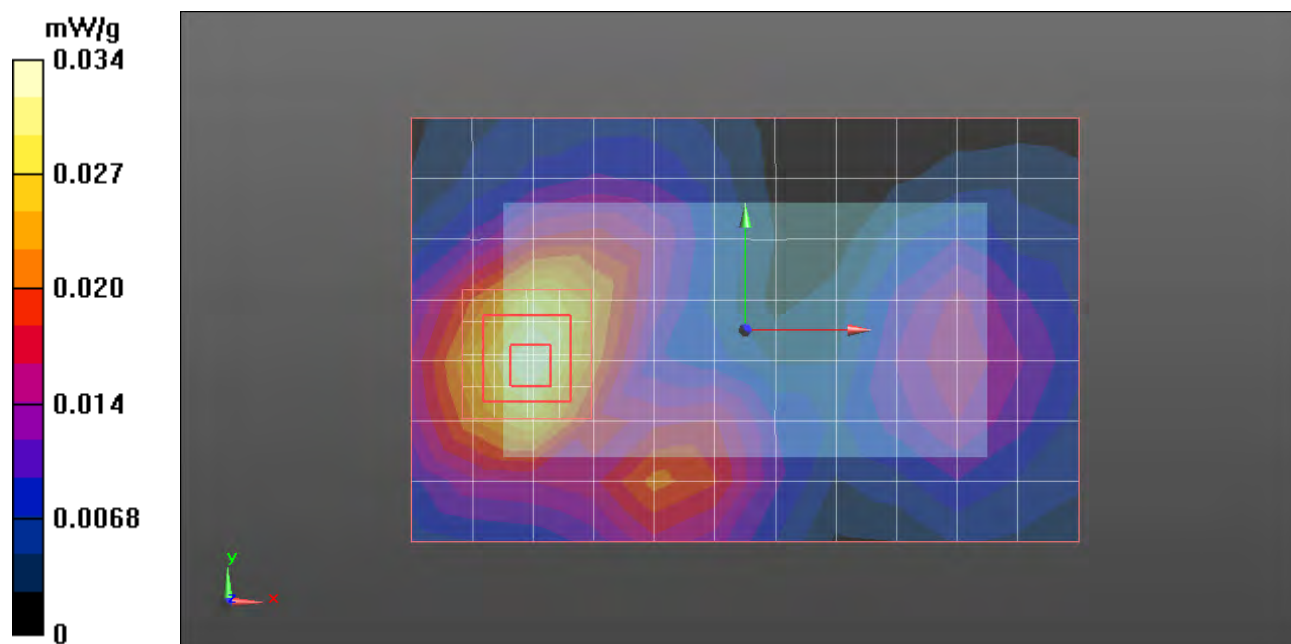
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.035 mW/g

Configuration/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.975 V/m; Power Drift = 0.11 dB; Peak SAR (extrapolated) = 0.059 W/kg

SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.019 mW/g; Maximum value of SAR (measured) = 0.034 mW/g



Appendix 4

SAR distribution plots for Mobile Hotspot Test Results

Date/Time: 12/22/2011 8:24:57 AM, Date/Time: 12/22/2011 8:31:42 AM

Test Laboratory: Motorola Mobility - GSM 850 Mobile Hotspot

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Battery Model #: SNN5875A

Device Position: Mobile Hotspot position, Back of Phone 10 mm from Phantom

Communication System: GPRS Cl 12; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:2.07491

Medium: Low Freq Body

Medium parameters used: $f = 835$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(6.05, 6.05, 6.05); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#_4 Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: 1-001;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin Phone Template - Area Scan - Normal Extended Body (15mm) (16x7x1):

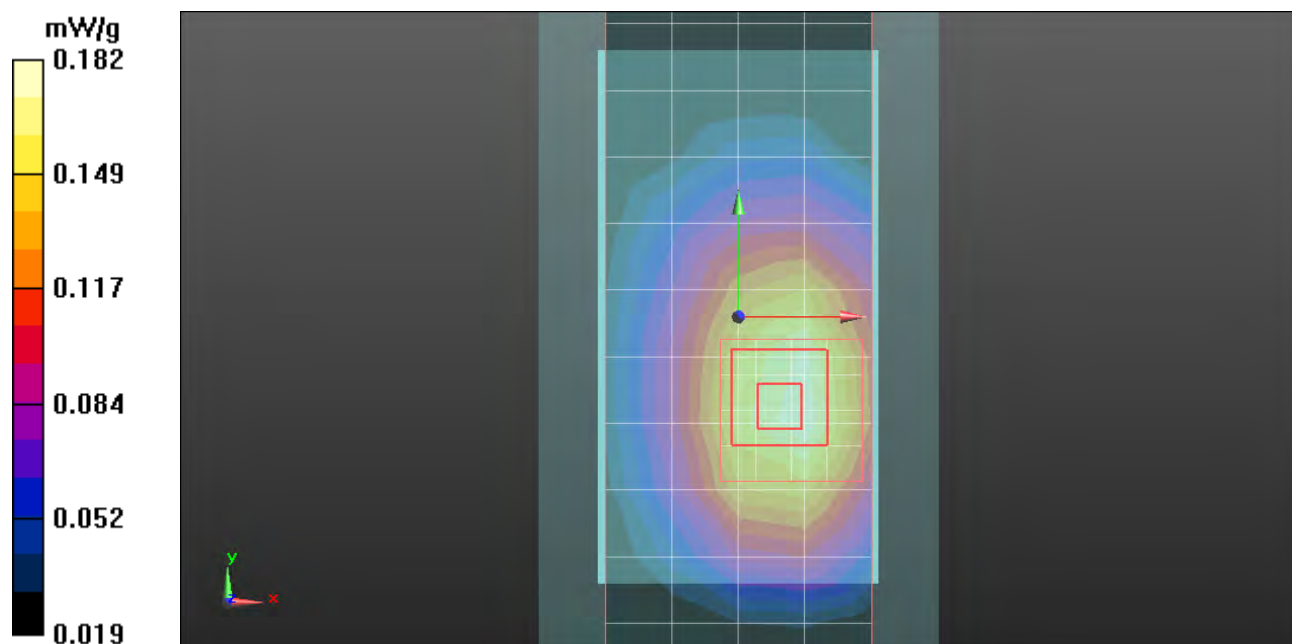
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.182 mW/g

DASY5, Amy Twin Phone Template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.890 V/m; Power Drift = 0.26 dB; Peak SAR (extrapolated) = 0.215 W/kg

SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.130 mW/g;



Date/Time: 12/19/2011 11:13:42 AM, Date/Time: 12/19/2011 11:21:45 AM

Test Laboratory: Motorola Mobility - WCDMA 1700 Mobile Hotspot

Serial: LJRL280111; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5875A

Device Position: Mobile Hotspot position, Bottom Edge of Phone 10 mm from Phantom

Communication System: WCDMA; Frequency: 1732 MHz; Channel Number: 1413; Duty Cycle: 1:1

Medium: 1730 Glycol Body

Medium parameters used: $f = 1730$ MHz; $\sigma = 1.49$ mho/m; $\epsilon_r = 51.6$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.69, 4.69, 4.69); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat Phone Template - Area Scan - Normal Body (15mm) (12x8x1):

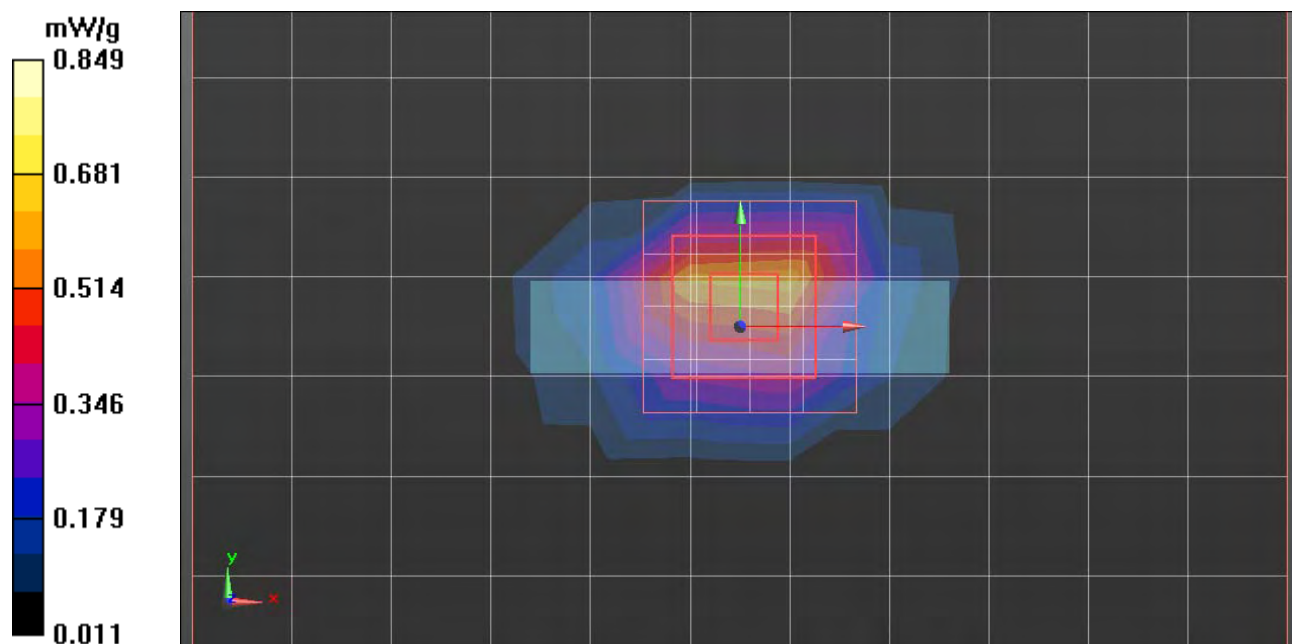
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.613 mW/g

DASY5, Triple Flat Phone Template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.382 V/m; Power Drift = 0.17 dB; Peak SAR (extrapolated) = 1.334 W/kg

SAR(1 g) = 0.746 mW/g; SAR(10 g) = 0.371 mW/g; Maximum value of SAR (measured) = 0.849 mW/g



Date/Time: 12/21/2011 1:38:04 AM, Date/Time: 12/21/2011 1:44:44 AM

Test Laboratory: Motorola Mobility - GSM 1900 Mobile Hotspot

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #: SNN5875A

Device Position: Mobile Hotspot position, Bottom Edge of Phone 10 mm from Phantom

Communication System: GPRS Cl 12; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:2.07491

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 51.5$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(4.75, 4.75, 4.75); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#_4 Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: 1-001;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin Phone Template - Area Scan - Normal Extended Body (15mm) (16x7x1):

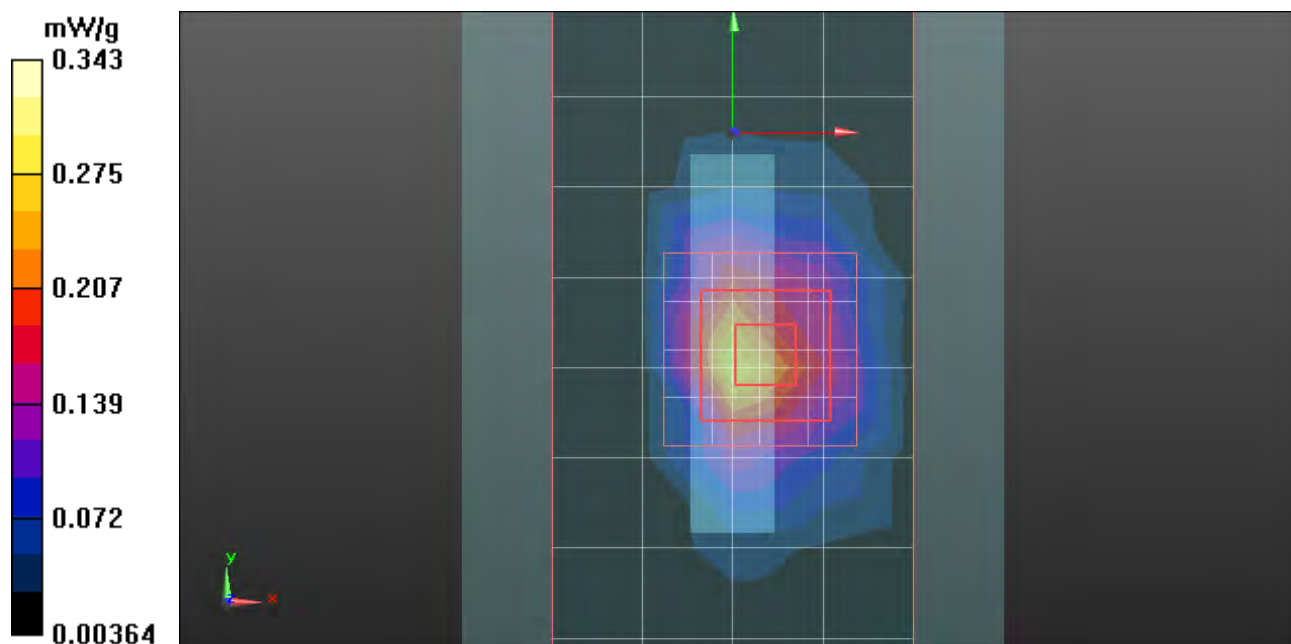
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.279 mW/g

DASY5, Amy Twin Phone Template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.937 V/m; Power Drift = -0.18 dB; Peak SAR (extrapolated) = 0.558 W/kg

SAR(1 g) = 0.301 mW/g; SAR(10 g) = 0.148 mW/g; Maximum value of SAR (measured) = 0.343 mW/g



Date/Time: 12/2/2011 5:34:24 PM, Date/Time: 12/2/2011 5:42:16 PM

Test Laboratory: Motorola Mobility - WCDMA 1900 Mobile Hotspot

Serial: LJRL280167; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Mobile Hotspot position, Back of Phone 10 mm from Phantom

Communication System: _WCDMA; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.58$ mho/m; $\epsilon_r = 51.2$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3183; ConvF(4.75, 4.75, 4.75); Calibrated: 9/22/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 6/20/2011
- Phantom: R#4_ Section 1, Amy Twin, Rev1 (24-Aug-11); Type: DASY5 Amy Twin Flat; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Amy Twin Phone Template - Area Scan - Full Body (15mm) (18x8x1):

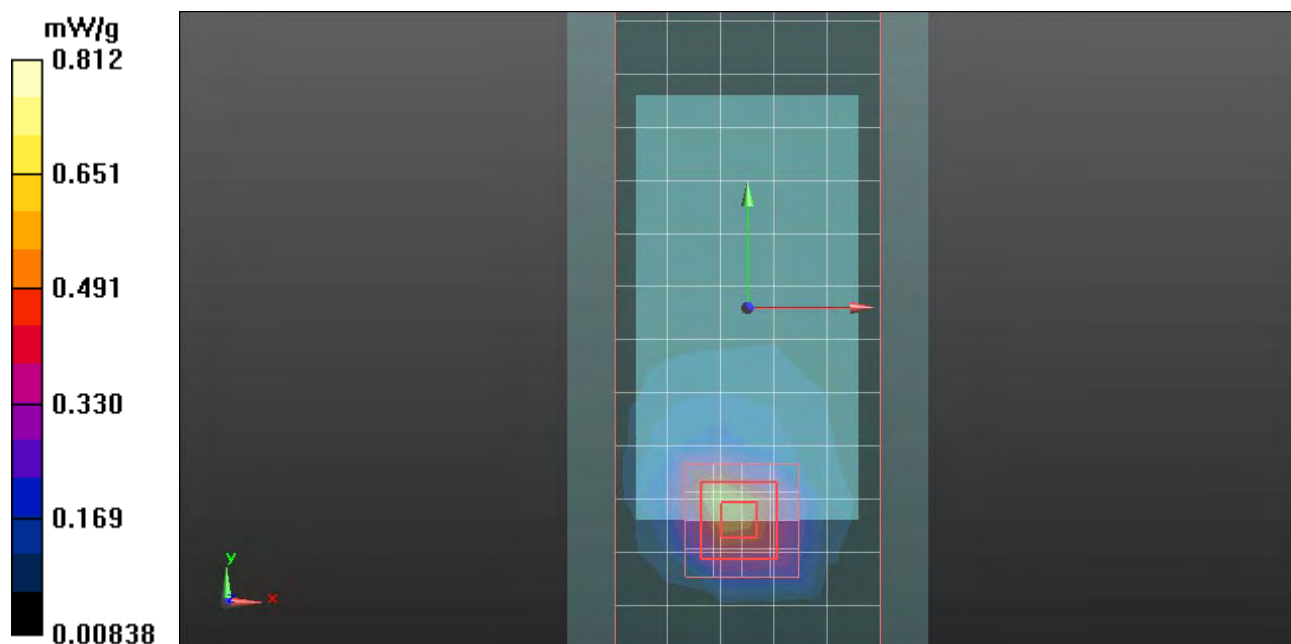
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.631 mW/g

DASY5, Amy Twin Phone Template - 5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.583 V/m; Power Drift = 0.06 dB; Peak SAR (extrapolated) = 1.314 W/kg

SAR(1 g) = 0.700 mW/g; SAR(10 g) = 0.347 mW/g; Maximum value of SAR (measured) = 0.812 mW/g



Date/Time: 12/1/2011 2:14:39 PM, Date/Time: 12/1/2011 2:21:58 PM

Test Laboratory: Motorola Mobility - Wi-Fi 2450 Mobile Hotspot

Serial: LJRL280111; FCC ID: IHDT56NA1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5875A

Device Position: Mobile Hotspot Position, Right Edge of Phone 10 mm from Phantom

Device Mode: 802.11b mode, 1 Mbps data rate

Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Channel Number: 11; Duty Cycle: 1:1

Medium: 2450 Glycol Body

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 50.2$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#-6, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

Configuration/Short Edge Area Scan - Body (15mm) (15x6x1):

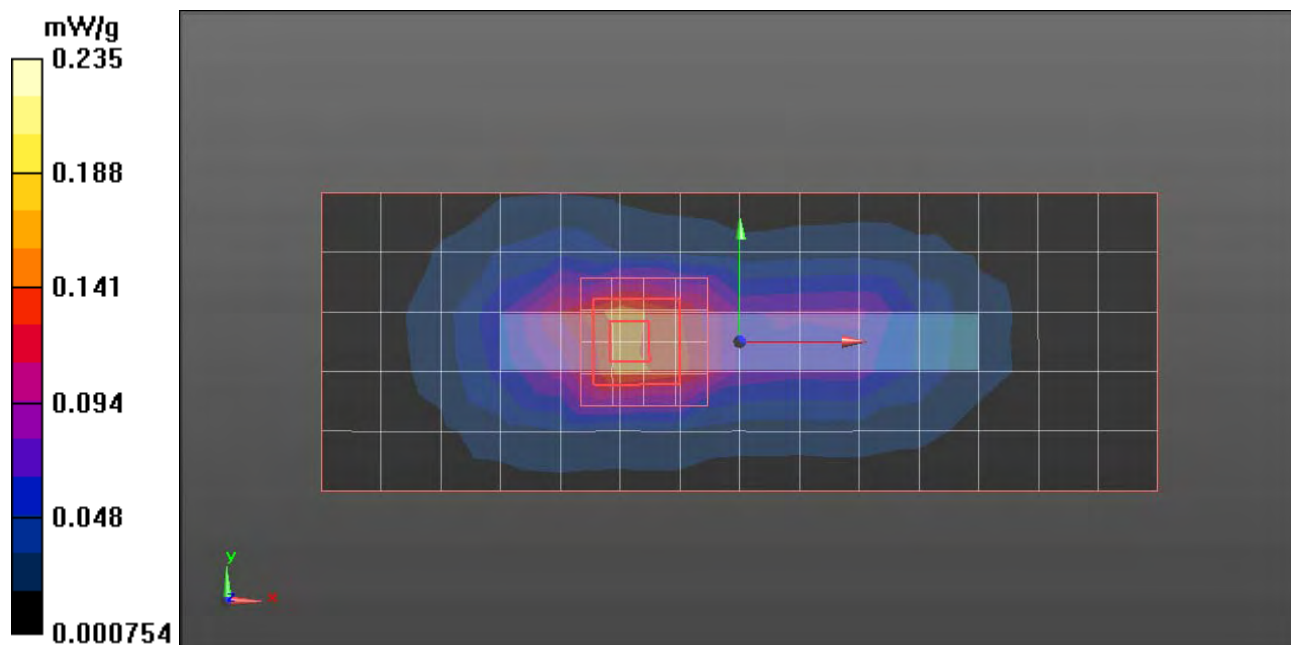
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.153 mW/g

Configuration/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.525 V/m; Power Drift = 0.05 dB; Peak SAR (extrapolated) = 0.425 W/kg

SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.102 mW/g; Maximum value of SAR (measured) = 0.235 mW/g



Appendix 5

Measurement Uncertainty Budget

Uncertainty Budget for Device Under Test, for 735 MHz to 3 GHz

| <i>a</i> | <i>b</i> | <i>c</i> | <i>d</i> | <i>e = f(d,k)</i> | <i>f</i> | <i>g</i> | <i>h = c x f / e</i> | <i>i = c x g / e</i> | <i>k</i> |
|--|---|------------------|--------------|-----------------------|-------------------------------|--------------------------------|-------------------------------------|--------------------------------------|----------------------|
| Uncertainty Component | Description IEEE1528(2003) / IEC62209-1(2005) | Tol. (± %) | Prob Dist | Div. | <i>c_i</i> (1 g) | <i>c_i</i> (10 g) | 1 g <i>u_i</i> (±%) | 10 g <i>u_i</i> (±%) | <i>v_i</i> |
| Measurement System | | | | | | | | | |
| Probe Calibration [ES3DV3] | E.2.1 / 7.2.1 | 6.0 | N | 1.00 | 1 | 1 | 6.0 | 6.0 | ∞ |
| Axial Isotropy | E.2.2 / 7.2.1.2 | 4.7 | R | 1.73 | 0.707 | 0.707 | 1.9 | 1.9 | ∞ |
| Hemispherical Isotropy | E.2.2 / 7.2.1.2 | 9.6 | R | 1.73 | 0.707 | 0.707 | 3.9 | 3.9 | ∞ |
| Boundary Effect | E.2.3 / 7.2.1.5 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Linearity | E.2.4 / 7.2.1.3 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| System Detection Limits | E.2.5 / 7.2.1.4 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | E.2.6 / 7.2.1.6 | 0.3 | N | 1.00 | 1 | 1 | 0.3 | 0.3 | ∞ |
| Response Time | E.2.7 / 7.2.1.7 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Integration Time | E.2.8 / 7.2.1.8 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| RF Ambient Conditions - Noise | E.6.1 / 7.2.3.6 | 3.0 | R | 1.73 | 1 | 1 | 1.7 | 1.7 | ∞ |
| RF Ambient Conditions - Reflections | E.6.1 / 7.2.3.6 | 3.0 | R | 1.73 | 1 | 1 | 1.7 | 1.7 | ∞ |
| Probe Positioner Mech. Tolerance | E.6.2 / 7.2.2.1 | 0.4 | R | 1.73 | 1 | 1 | 0.2 | 0.2 | ∞ |
| Probe Positioning w.r.t Phantom | E.6.3 / 7.2.2.3 | 1.4 | R | 1.73 | 1 | 1 | 0.8 | 0.8 | ∞ |
| Max. SAR Evaluation (ext., int., avg.) | E.5 / 7.2.4 | 3.4 | R | 1.73 | 1 | 1 | 2.0 | 2.0 | ∞ |
| Test sample Related | | | | | | | | | |
| Test Sample Positioning | E.4.2 / 7.2.2.4 | 3.4 | N | 1.00 | 1 | 1 | 3.4 | 3.4 | 79 |
| Device Holder Uncertainty | E.4.1 / 7.2.2.4.2 | 4.5 | N | 1.00 | 1 | 1 | 4.5 | 4.5 | 11 |
| SAR drift | 6.6.2 / 7.2.3.5 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| Phantom and Tissue Parameters | | | | | | | | | |
| Phantom Uncertainty | E.3.1 / 7.2.2.2 | 4.0 | R | 1.73 | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid Conductivity (target) | E.3.2 / 7.2.3.3 | 5.0 | R | 1.73 | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| Liquid Conductivity (measurement) | E.3.3 / 7.2.3.3 | 2.5 | N | 1.00 | 0.64 | 0.43 | 1.6 | 1.1 | 6 |
| Liquid Permittivity (target) | E.3.2 / 7.2.3.4 | 5.0 | R | 1.73 | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| Liquid Permittivity (measurement) | E.3.2 / 7.2.3.4 | 2.3 | N | 1.00 | 0.6 | 0.49 | 1.4 | 1.1 | 6 |
| Combined Standard Uncertainty | | | RSS | | | | 11 | 11 | 372 |
| Expanded Uncertainty (95% CONFIDENCE LEVEL) | | | <i>k</i> =2 | | | | 22 | 22 | |

Appendix 6

Probe Calibration Certificate



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 **Motorola MDb**

Certificate No: **ES3-3183_Sep11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3183**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes**

Calibration date: **September 22, 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 ± 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 | 31-Mar-11 (No. 217-01372) | Apr-12 |
| Power sensor E4412A | MY41498087 | 31-Mar-11 (No. 217-01372) | Apr-12 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 29-Mar-11 (No. 217-01369) | Apr-12 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 29-Mar-11 (No. 217-01367) | Apr-12 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 29-Mar-11 (No. 217-01370) | Apr-12 |
| Reference Probe ES3DV2 | SN: 3013 | 29-Dec-10 (No. ES3-3013 Dec10) | Dec-11 |
| DAE4 | SN: 654 | 3-May-11 (No. DAE4-654_May11) | May-12 |
| Secondary Standards | ID | Check Date (in house) | Scheduled Check |
| RF generator HP 8648C | US3842U01700 | 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 Kastrali | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |
| | | | Issued: September 23, 2011 |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory. | | | |



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

Glossary:

| | |
|--------------------------|---|
| TSL | tissue simulating liquid |
| NORM _{x,y,z} | sensitivity in free space |
| ConvF | sensitivity in TSL / NORM _{x,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., $\vartheta = 0$ is normal to probe axis |

Calibration is Performed According to the Following Standards:

- 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
- 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:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,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.
- DCP_{x,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.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 NORM_{x,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 ES3DV3

SN:3183

Manufactured: March 25, 2008
Calibrated: September 22, 2011

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3183

Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|----------|----------|----------|---------------|
| Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A | 1.20 | 1.13 | 1.08 | $\pm 10.1 \%$ |
| DCP (mV) ^B | 96.5 | 94.5 | 96.6 | |

Modulation Calibration Parameters

| UID | Communication System Name | PAR | | A dB | B dB | C dB | VR mV | Unc ^C (k=2) |
|-------|---------------------------|------|---|---------|---------|---------|----------|---------------------------|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 108.9 | $\pm 2.5 \%$ |
| | | | Y | 0.00 | 0.00 | 1.00 | 102.1 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 100.8 | |

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.

^C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3183

Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) ^c | Relative Permittivity ^f | Conductivity (S/m) ^f | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750 | 41.9 | 0.89 | 6.27 | 6.27 | 6.27 | 0.80 | 1.00 | ± 12.0 % |
| 835 | 41.5 | 0.90 | 6.04 | 6.04 | 6.04 | 0.80 | 1.00 | ± 12.0 % |
| 1810 | 40.0 | 1.40 | 5.15 | 5.15 | 5.15 | 0.80 | 1.26 | ± 12.0 % |
| 1950 | 40.0 | 1.40 | 4.95 | 4.95 | 4.95 | 0.80 | 1.26 | ± 12.0 % |
| 2450 | 39.2 | 1.80 | 4.45 | 4.45 | 4.45 | 0.78 | 1.28 | ± 12.0 % |

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ES3DV3- SN:3183

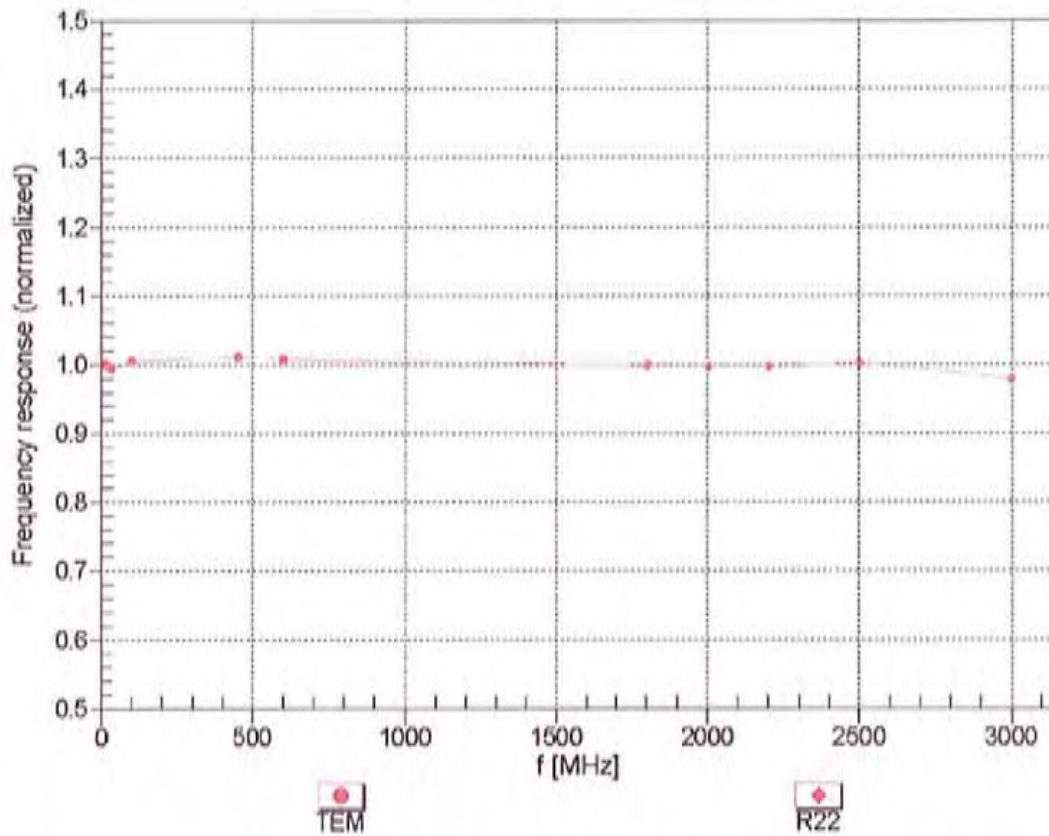
Calibration Parameter Determined in Body Tissue Simulating Media

| f (MHz) ^c | Relative Permittivity ^f | Conductivity (S/m) ^f | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750 | 55.5 | 0.96 | 6.09 | 6.09 | 6.09 | 0.80 | 1.31 | ± 12.0 % |
| 835 | 55.2 | 0.97 | 6.05 | 6.05 | 6.05 | 0.80 | 1.28 | ± 12.0 % |
| 1810 | 53.3 | 1.52 | 4.75 | 4.75 | 4.75 | 0.80 | 1.29 | ± 12.0 % |
| 1950 | 53.3 | 1.52 | 4.80 | 4.80 | 4.80 | 0.80 | 1.34 | ± 12.0 % |
| 2450 | 52.7 | 1.95 | 4.31 | 4.31 | 4.31 | 0.80 | 1.00 | ± 12.0 % |

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

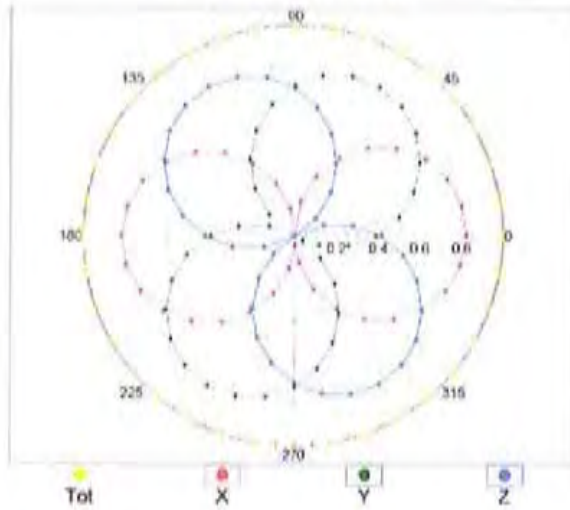
Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



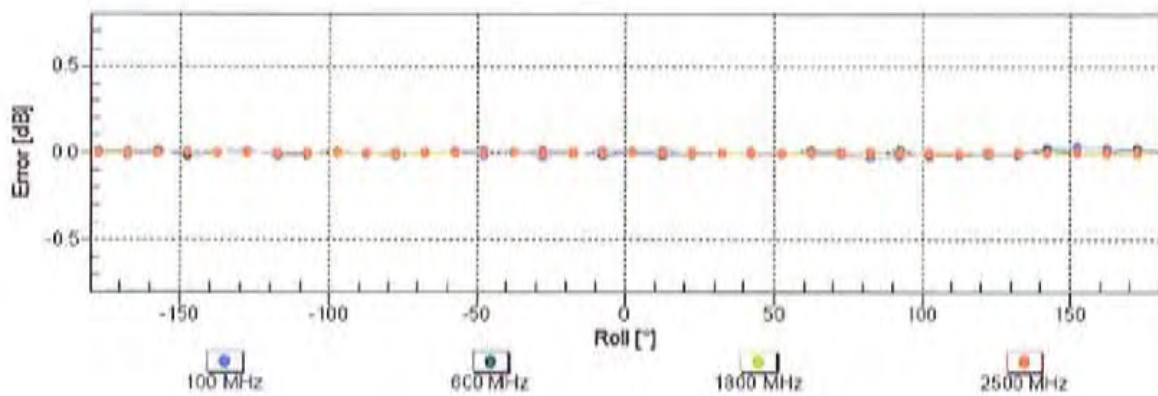
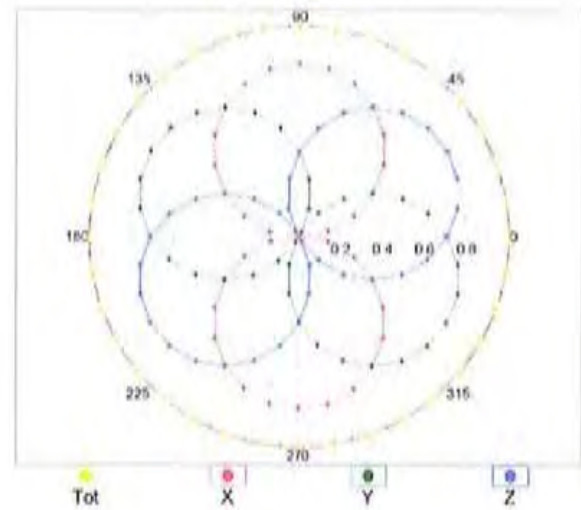
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$

f=600 MHz, TEM

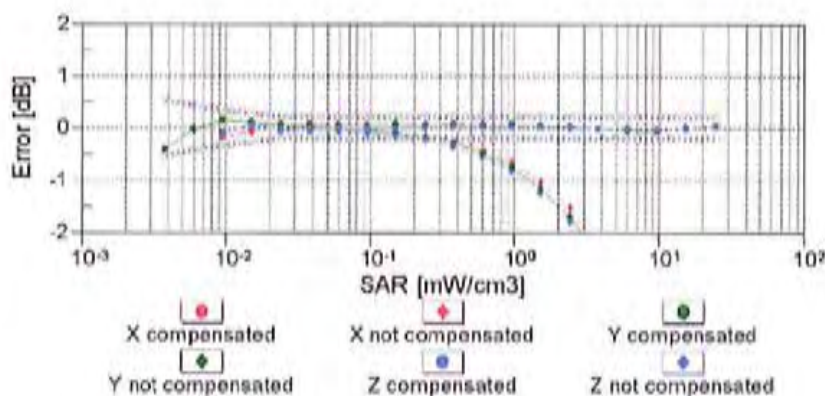
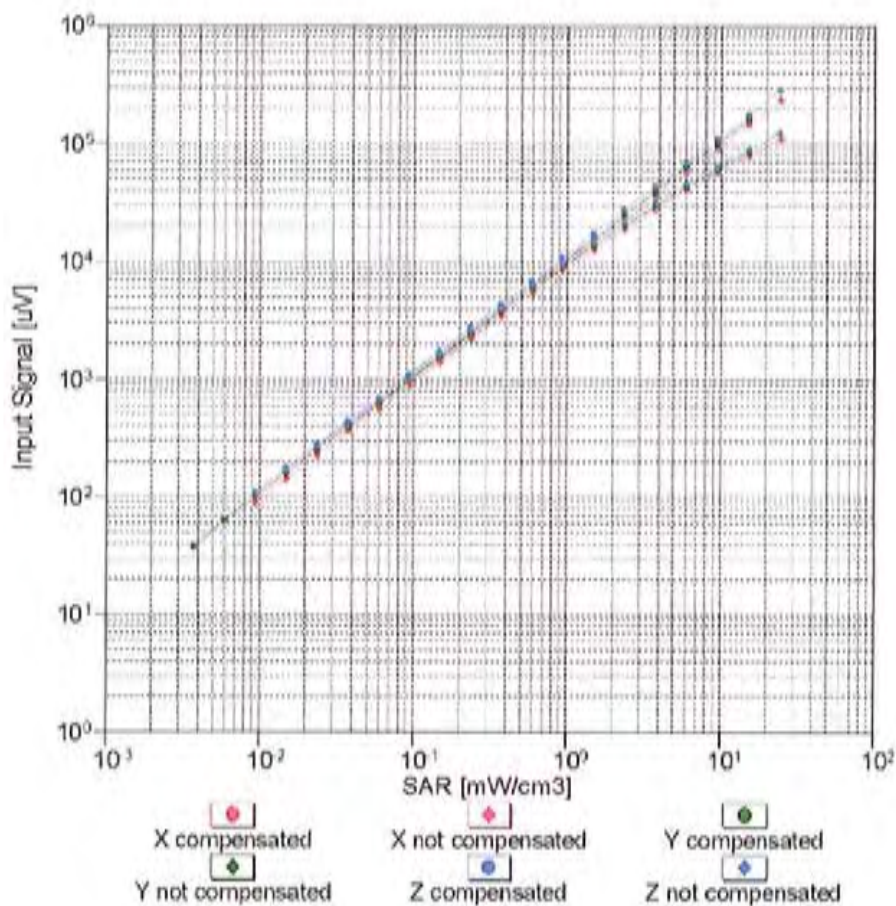


f=1800 MHz, R22



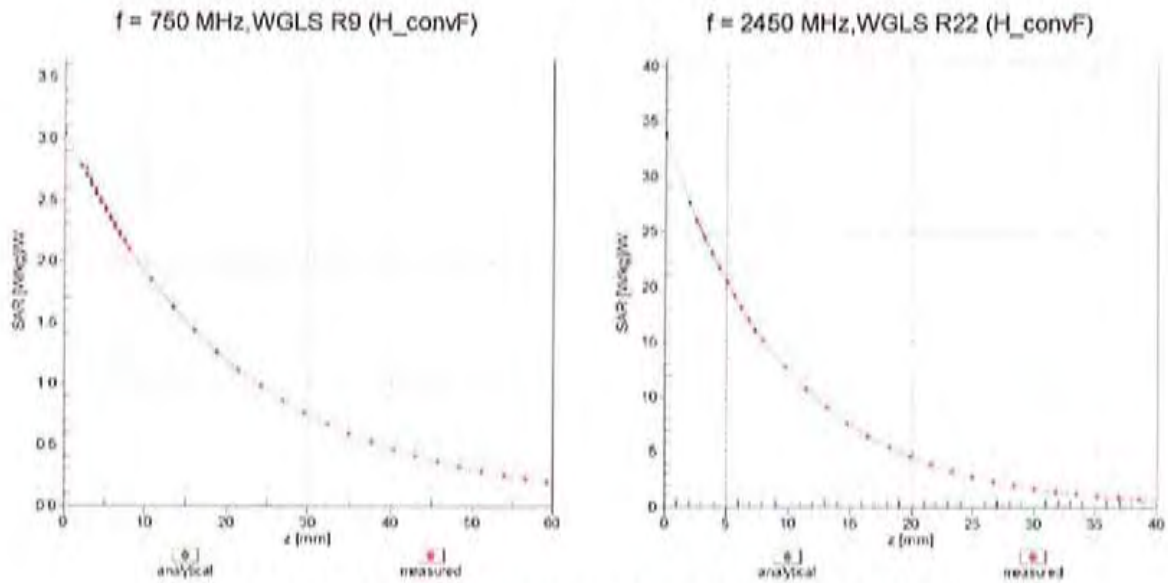
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

Dynamic Range f(SAR_{head}) (TEM cell , f = 900 MHz)



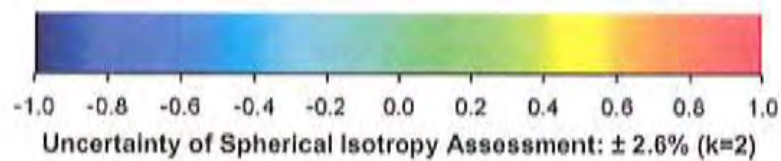
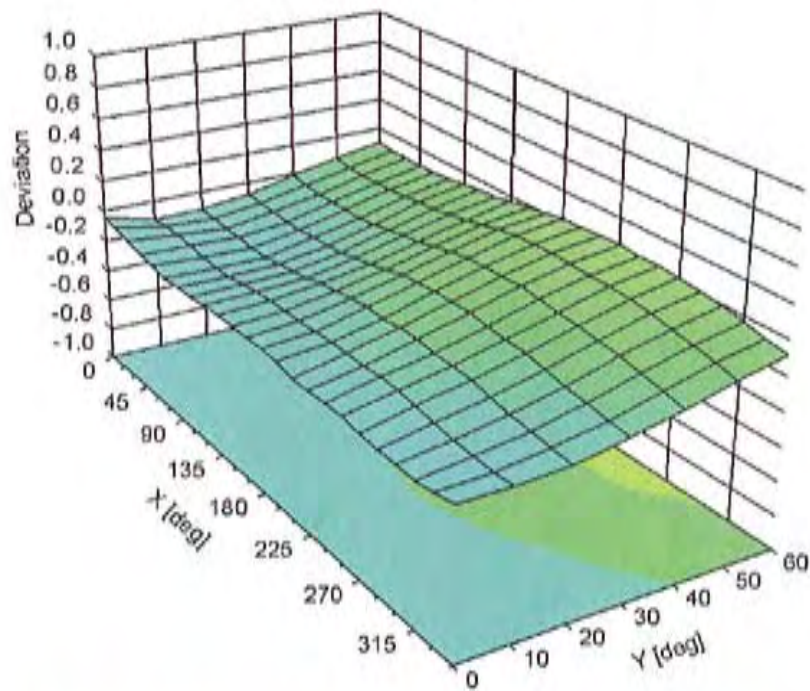
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ (k=2)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3183

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 | 4 mm |
| Probe Tip to Sensor X Calibration Point | 2 mm |
| Probe Tip to Sensor Y Calibration Point | 2 mm |
| Probe Tip to Sensor Z Calibration Point | 2 mm |
| Recommended Measurement Distance from Surface | 3 mm |



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Accreditation No.: **SCS 108**

Client **Motorola MDb**

Certificate No: **ES3-3115_Jan11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3115**

Calibration procedure(s) **QA CAL-01.v7, QA CAL-23.v4 and QA CAL-25.v3
Calibration procedure for dosimetric E-field probes**

Calibration date: **January 12, 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 ± 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 | 29-Dec-10 (No. ES3-3013_Dec10) | Dec-11 |
| 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 |

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

Issued: January 13, 2011

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



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Accreditation No.: **SCS 108**

Glossary:

| | |
|--------------------------|---|
| TSL | tissue simulating liquid |
| NORM _{x,y,z} | sensitivity in free space |
| ConvF | sensitivity in TSL / NORM _{x,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., $\vartheta = 0$ is normal to probe axis |

Calibration is Performed According to the Following Standards:

- 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
- 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:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E^2 -field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,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.
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 NORM_{x,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 ES3DV3

SN:3115

| | |
|------------------|------------------|
| Manufactured: | March 6, 2006 |
| Last calibrated: | January 19, 2010 |
| Recalibrated: | January 12, 2011 |

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 SN:3115**Basic Calibration Parameters**

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|----------|----------|----------|-----------|
| Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A | 1.29 | 1.30 | 1.18 | ± 10.1% |
| DCP (mV) ^B | 100.2 | 102.3 | 101.3 | |

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 | 113.4 | ± 2.4 % |
| | | | Y | 0.00 | 0.00 | 1.00 | 150.5 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 142.6 | |

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 recatangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 SN:3115

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% | 5.87 | 5.87 | 5.87 | 0.34 | 1.74 ± 11.0% |
| 1810 | ± 50 / ± 100 | 40.0 ± 5% | 1.40 ± 5% | 5.02 | 5.02 | 5.02 | 0.43 | 1.62 ± 11.0% |
| 1950 | ± 50 / ± 100 | 40.0 ± 5% | 1.40 ± 5% | 4.80 | 4.80 | 4.80 | 0.62 | 1.36 ± 11.0% |
| 2450 | ± 50 / ± 100 | 39.2 ± 5% | 1.80 ± 5% | 4.39 | 4.39 | 4.39 | 0.94 | 1.13 ± 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.

DASY/EASY - Parameters of Probe: ES3DV3 SN:3115

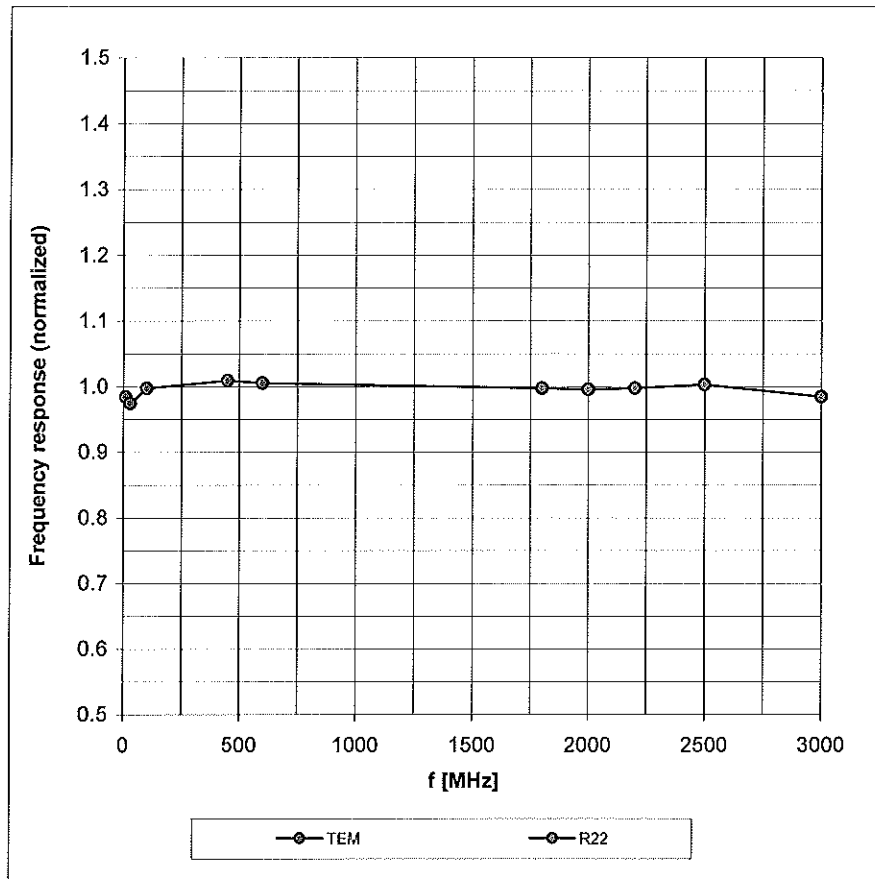
Calibration Parameter Determined in Body Tissue Simulating Media

| 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% | 5.88 | 5.88 | 5.88 | 0.57 | 1.41 ± 11.0% |
| 1810 | ± 50 / ± 100 | 53.3 ± 5% | 1.52 ± 5% | 4.61 | 4.61 | 4.61 | 0.33 | 2.26 ± 11.0% |
| 1950 | ± 50 / ± 100 | 53.3 ± 5% | 1.52 ± 5% | 4.57 | 4.57 | 4.57 | 0.36 | 2.19 ± 11.0% |
| 2450 | ± 50 / ± 100 | 52.7 ± 5% | 1.95 ± 5% | 4.12 | 4.12 | 4.12 | 0.99 | 0.75 ± 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.

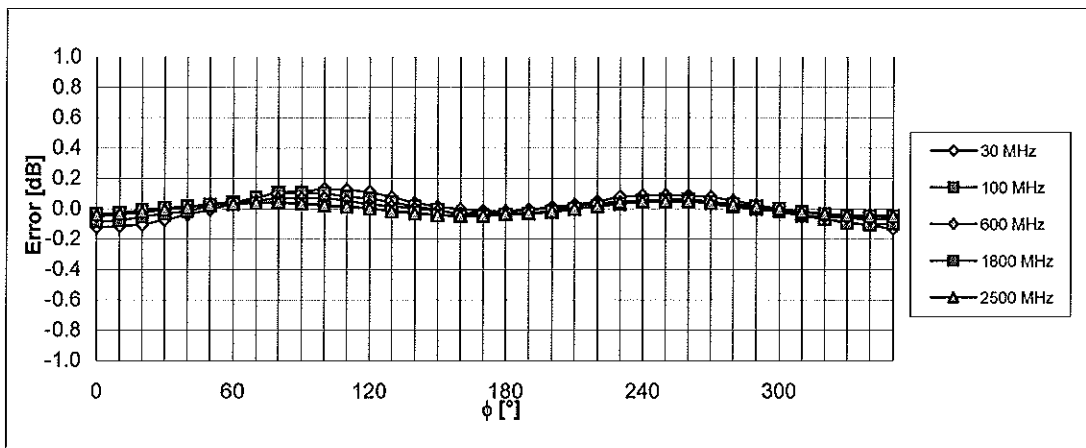
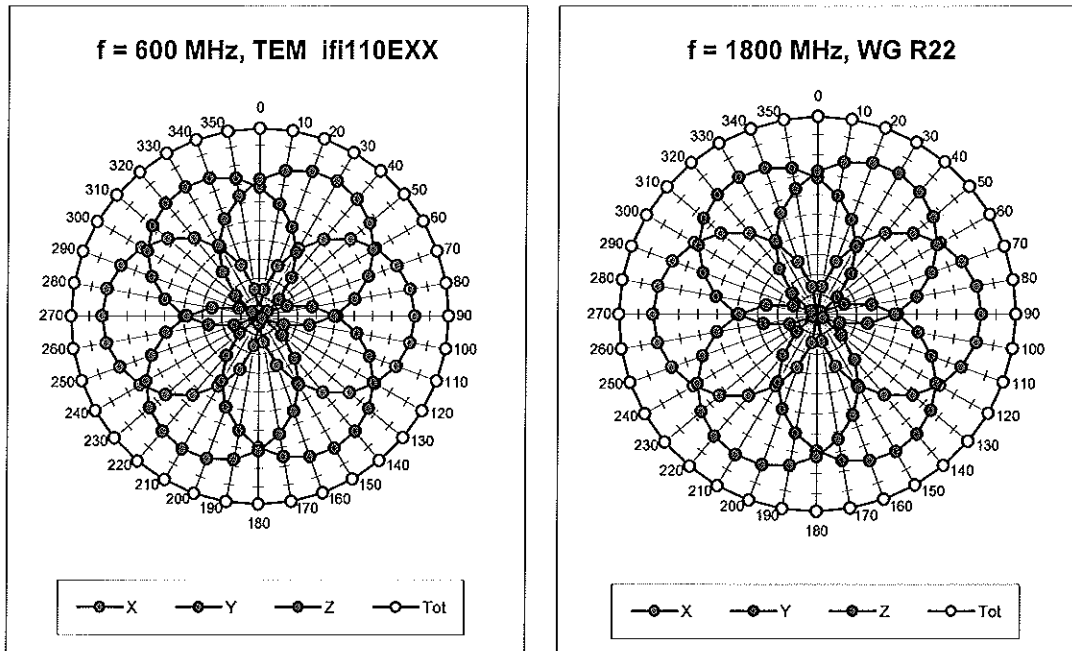
Frequency Response of E-Field

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



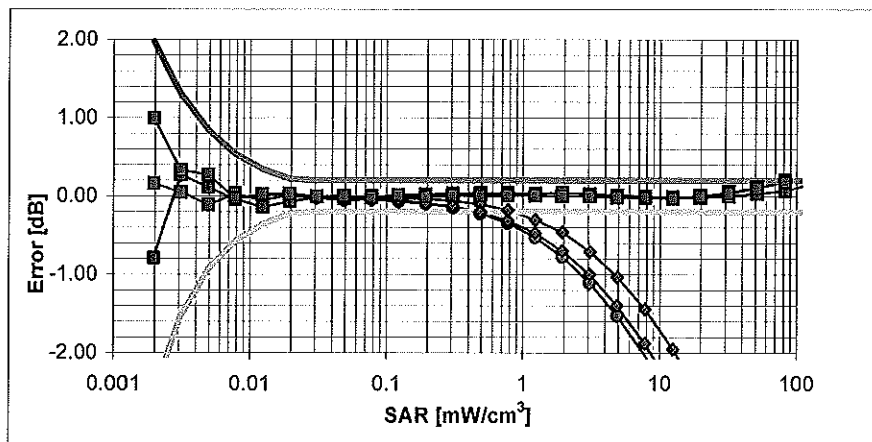
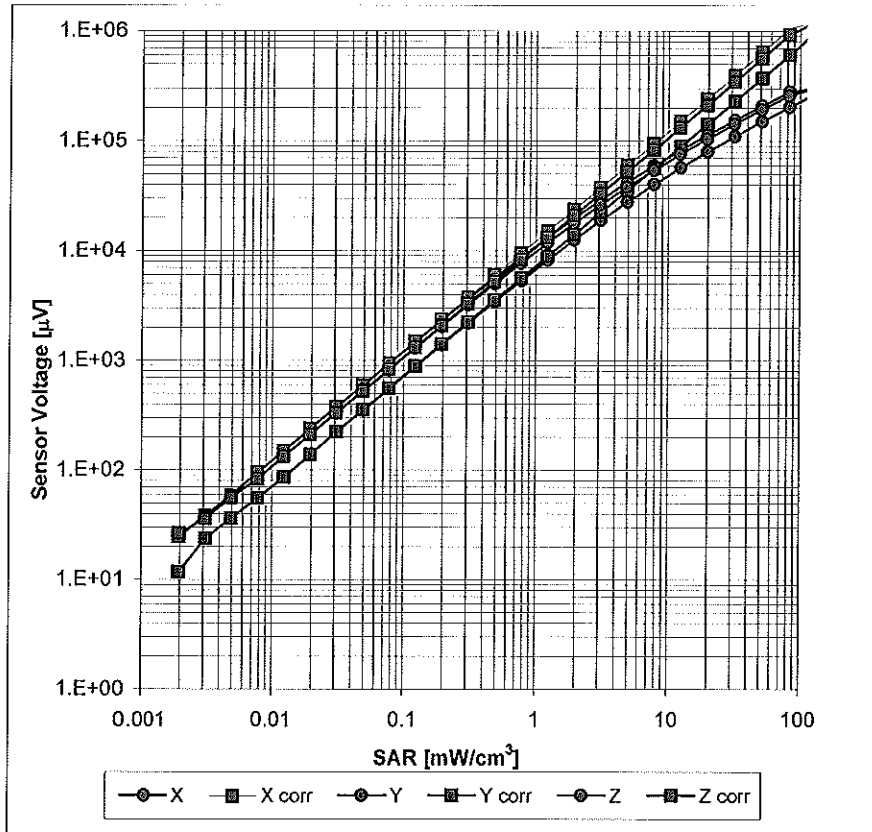
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$



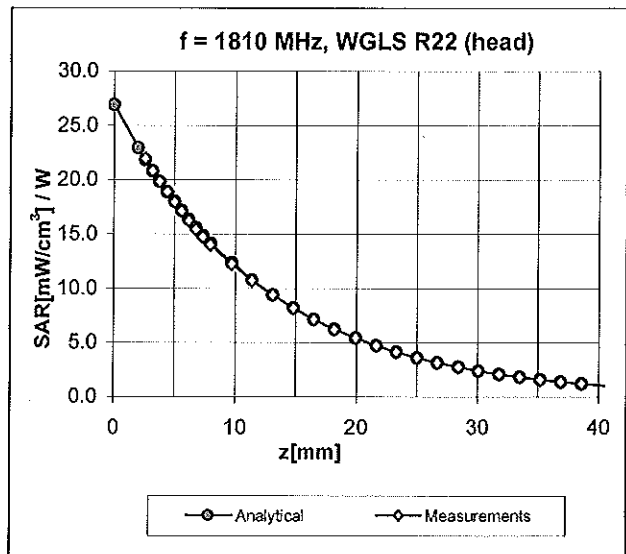
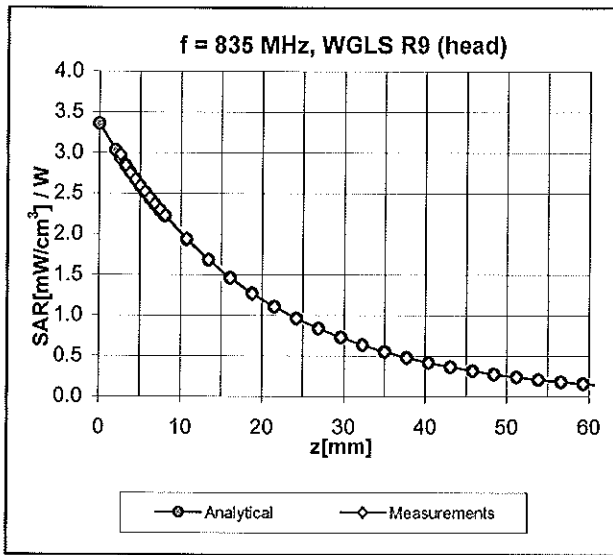
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range f(SAR_{head}) (TEM cell, f = 900 MHz)



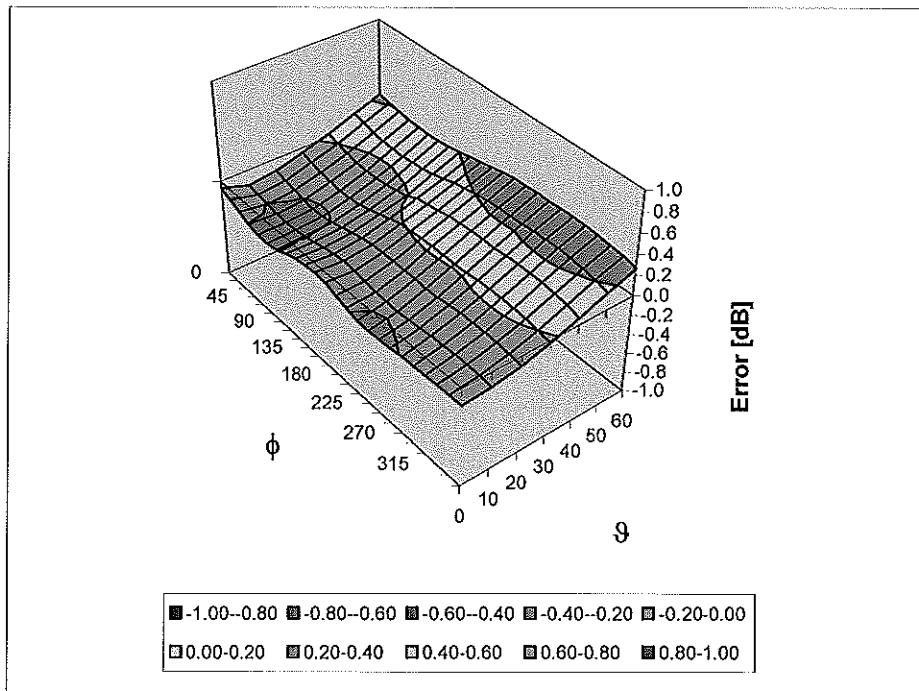
Uncertainty of Linearity Assessment: $\pm 0.6\%$ (k=2)

Conversion Factor Assessment



Deviation from Isotropy in HSL

Error (ϕ , θ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ (k=2)

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 | 4 mm |
| Probe Tip to Sensor X Calibration Point | 2 mm |
| Probe Tip to Sensor Y Calibration Point | 2 mm |
| Probe Tip to Sensor Z Calibration Point | 2 mm |
| Recommended Measurement Distance from Surface | 3 mm |



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Accreditation No.: **SCS 108**

Client **Motorola MDB**

Certificate No: **ES3-3124_Aug11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3124**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes**

Calibration date: **August 23, 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 ± 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 | 31-Mar-11 (No. 217-01372) | Apr-12 |
| Power sensor E4412A | MY41498087 | 31-Mar-11 (No. 217-01372) | Apr-12 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 29-Mar-11 (No. 217-01369) | Apr-12 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 29-Mar-11 (No. 217-01367) | Apr-12 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 29-Mar-11 (No. 217-01370) | Apr-12 |
| Reference Probe ES3DV2 | SN: 3013 | 29-Dec-10 (No. ES3-3013_Dec10) | Dec-11 |
| DAE4 | SN: 654 | 3-May-11 (No. DAE4-654_May11) | May-12 |
| | | | |
| 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 |

| | | | |
|----------------|------------------------------|-------------------------------|---------------|
| Calibrated by: | Name Kalja Pokovic | Function Technical Manager | Signature |
| Approved by: | Name Niels Kuster | Function Quality Manager | |

Issued: August 23, 2011

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Accreditation No.: **SCS 108**

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Glossary:

| | |
|--------------------------|---|
| TSL | tissue simulating liquid |
| NORM _{x,y,z} | sensitivity in free space |
| ConvF | sensitivity in TSL / NORM _{x,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., $\vartheta = 0$ is normal to probe axis |

Calibration is Performed According to the Following Standards:

- 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
- 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:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,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.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 NORM_{x,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 ES3DV3

SN:3124

Manufactured: July 11, 2006
Calibrated: August 23, 2011

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3124

Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|--|----------|----------|----------|---------------|
| Norm ($\mu\text{V}/(\text{V/m})^2$) ^A | 1.26 | 1.30 | 1.30 | $\pm 10.1 \%$ |
| DCP (mV) ^B | 100.9 | 98.2 | 100.9 | |

Modulation Calibration Parameters

| UID | Communication System Name | PAR | | A dB | B dB | C dB | VR mV | Unc ^E (k=2) |
|-------|---------------------------|------|---|---------|---------|---------|----------|---------------------------|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 116.0 | $\pm 2.7 \%$ |
| | | | Y | 0.00 | 0.00 | 1.00 | 109.7 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 115.4 | |

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 max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3124

Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) ^c | Relative Permittivity ^f | Conductivity (S/m) ^f | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750 | 41.9 | 0.89 | 6.26 | 6.26 | 6.26 | 1.00 | 1.00 | ± 12.0 % |
| 835 | 41.5 | 0.90 | 6.08 | 6.08 | 6.08 | 1.00 | 1.00 | ± 12.0 % |
| 1810 | 40.0 | 1.40 | 5.03 | 5.03 | 5.03 | 1.00 | 1.12 | ± 12.0 % |
| 1950 | 40.0 | 1.40 | 4.83 | 4.83 | 4.83 | 1.00 | 1.12 | ± 12.0 % |
| 2450 | 39.2 | 1.80 | 4.40 | 4.40 | 4.40 | 1.00 | 1.12 | ± 12.0 % |

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ES3DV3- SN:3124

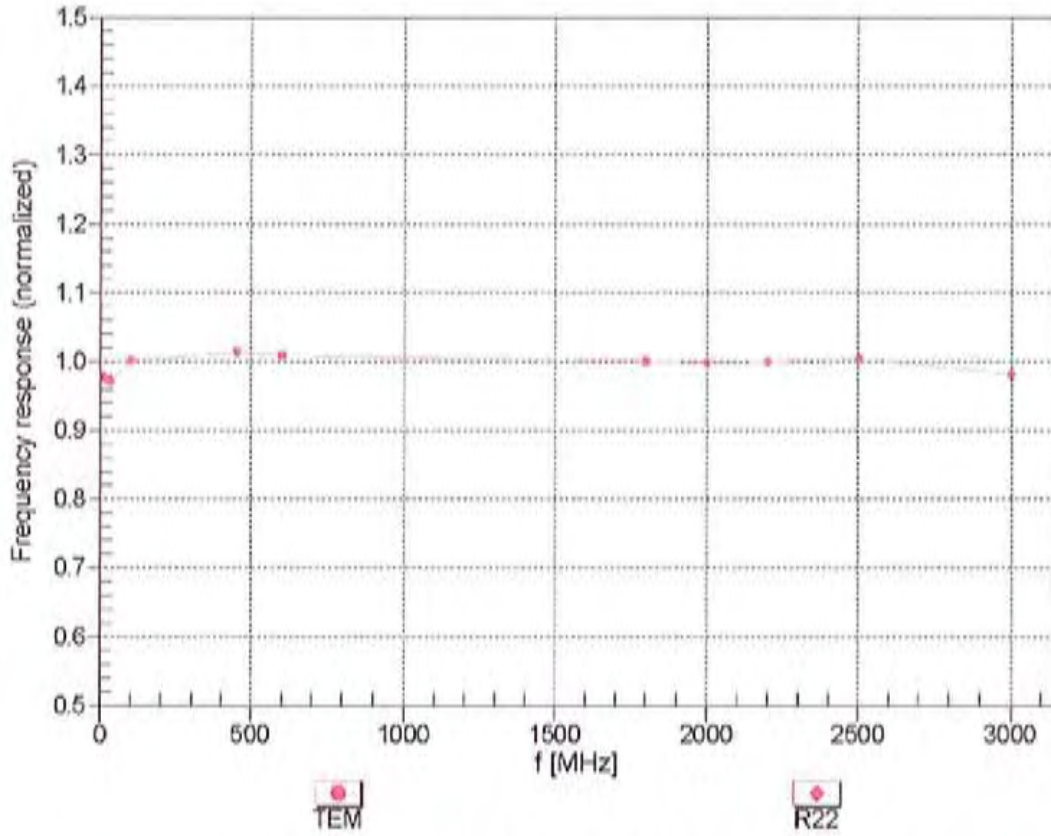
Calibration Parameter Determined in Body Tissue Simulating Media

| f (MHz) ^c | Relative Permittivity ^f | Conductivity (S/m) ^f | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750 | 55.5 | 0.96 | 6.09 | 6.09 | 6.09 | 1.00 | 1.00 | ± 12.0 % |
| 835 | 55.2 | 0.97 | 6.04 | 6.04 | 6.04 | 1.00 | 1.00 | ± 12.0 % |
| 1810 | 53.3 | 1.52 | 4.69 | 4.69 | 4.69 | 1.00 | 1.18 | ± 12.0 % |
| 1950 | 53.3 | 1.52 | 4.70 | 4.70 | 4.70 | 1.00 | 1.16 | ± 12.0 % |
| 2450 | 52.7 | 1.95 | 4.21 | 4.21 | 4.21 | 1.00 | 1.00 | ± 12.0 % |

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

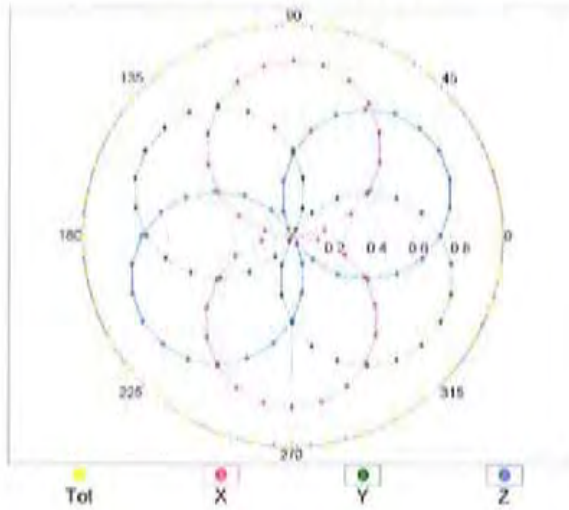
Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



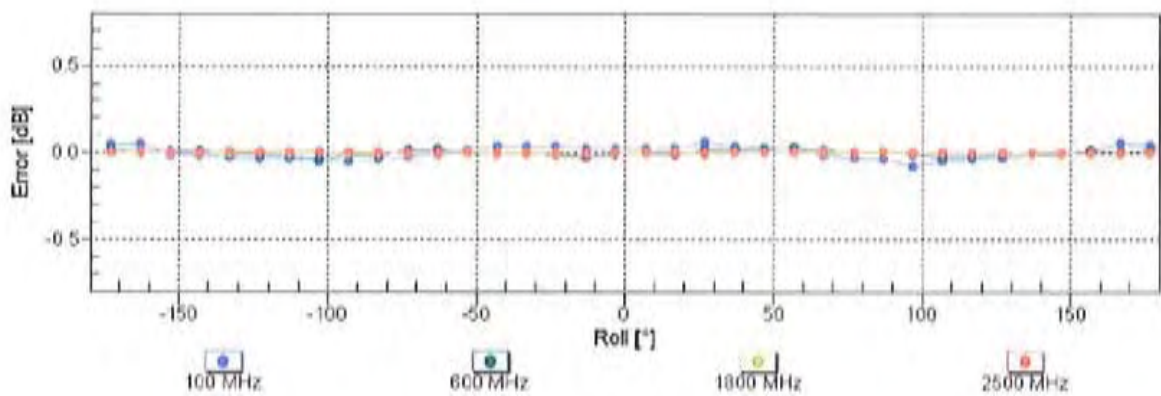
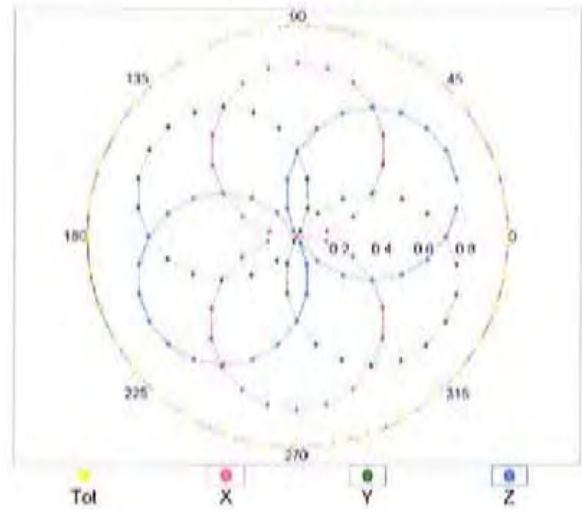
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$

f=600 MHz, TEM

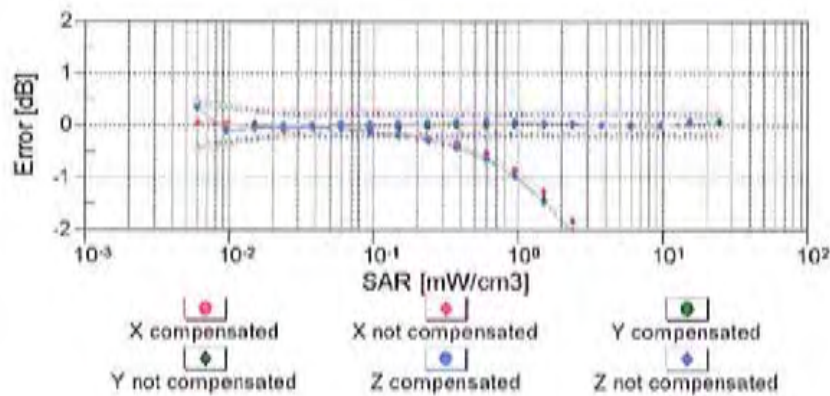
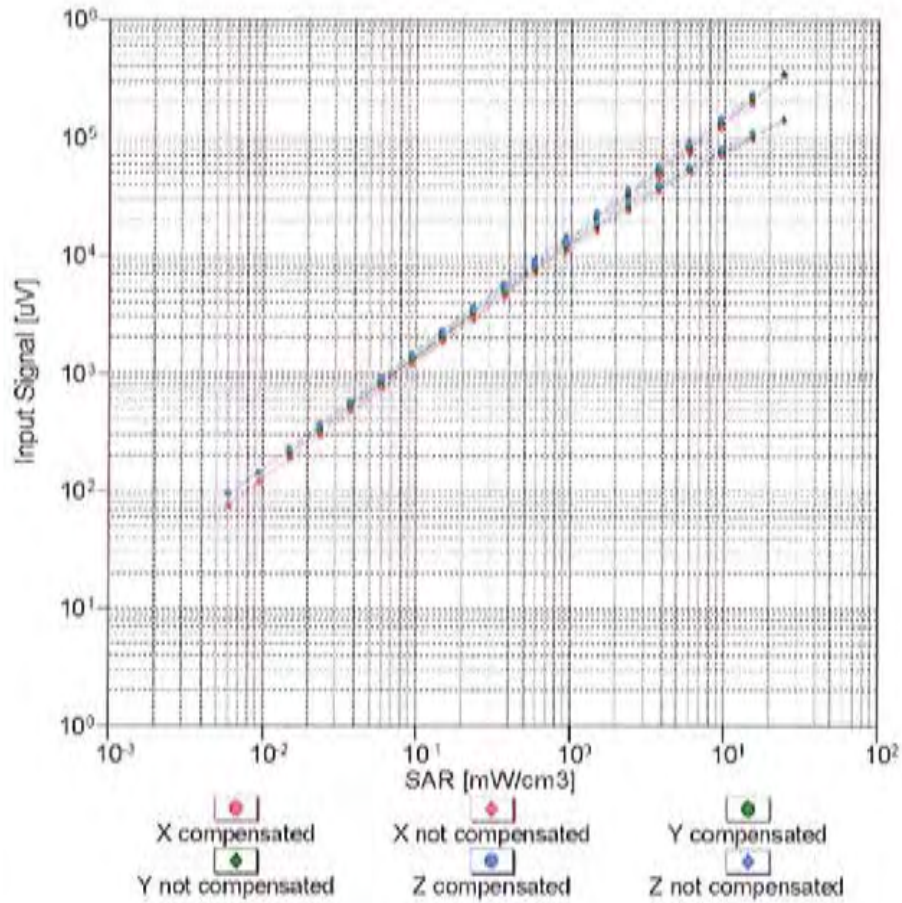


f=1800 MHz, R22



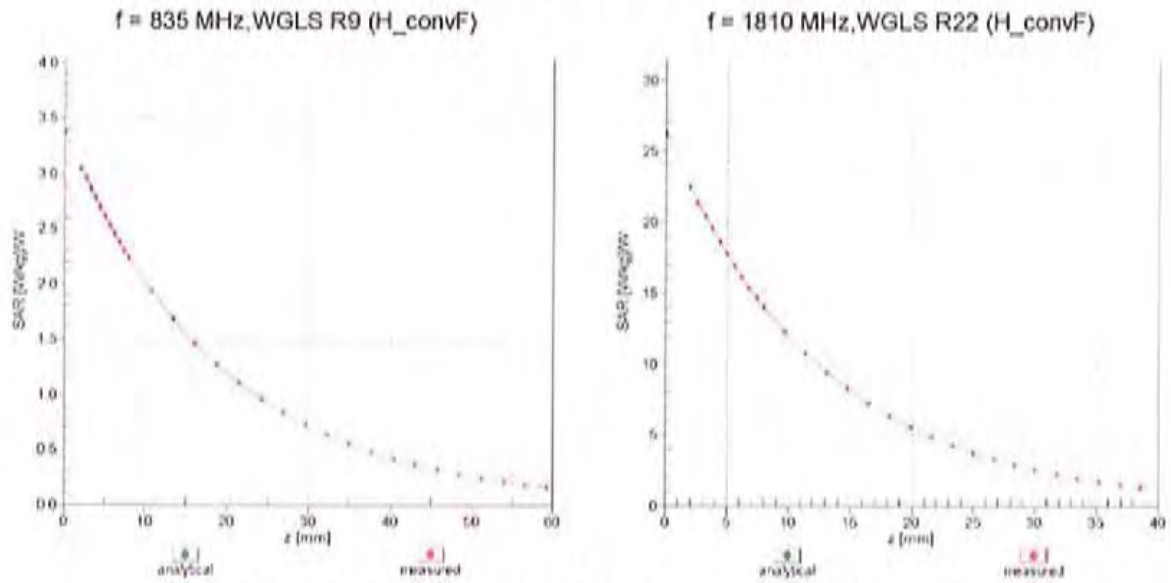
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

Dynamic Range f(SAR_{head}) (TEM cell , f = 900 MHz)



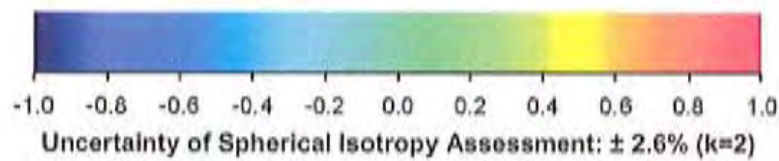
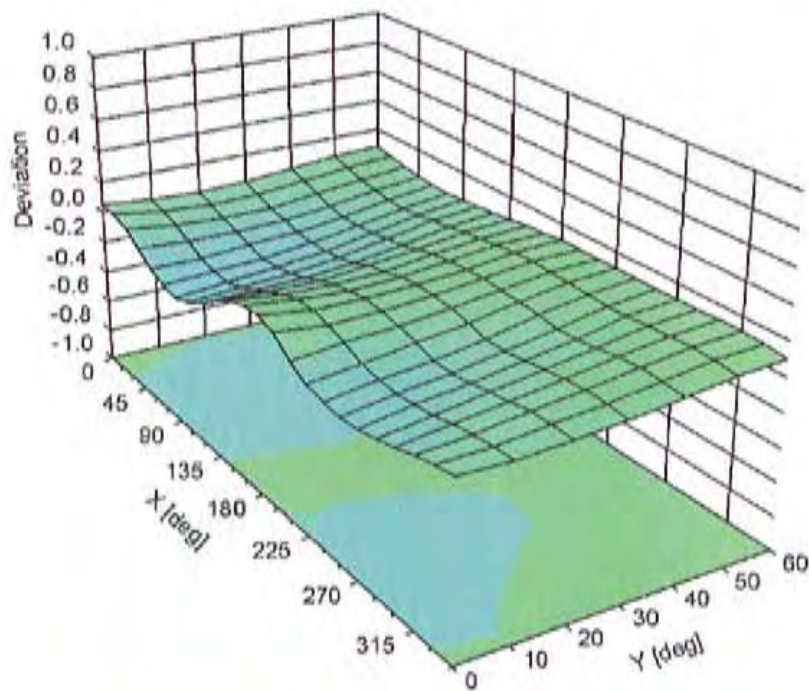
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz



DASY/EASY - Parameters of Probe: ES3DV3 - SN:3124

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 | 4 mm |
| Probe Tip to Sensor X Calibration Point | 2 mm |
| Probe Tip to Sensor Y Calibration Point | 2 mm |
| Probe Tip to Sensor Z Calibration Point | 2 mm |
| Recommended Measurement Distance from Surface | 3 mm |