

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

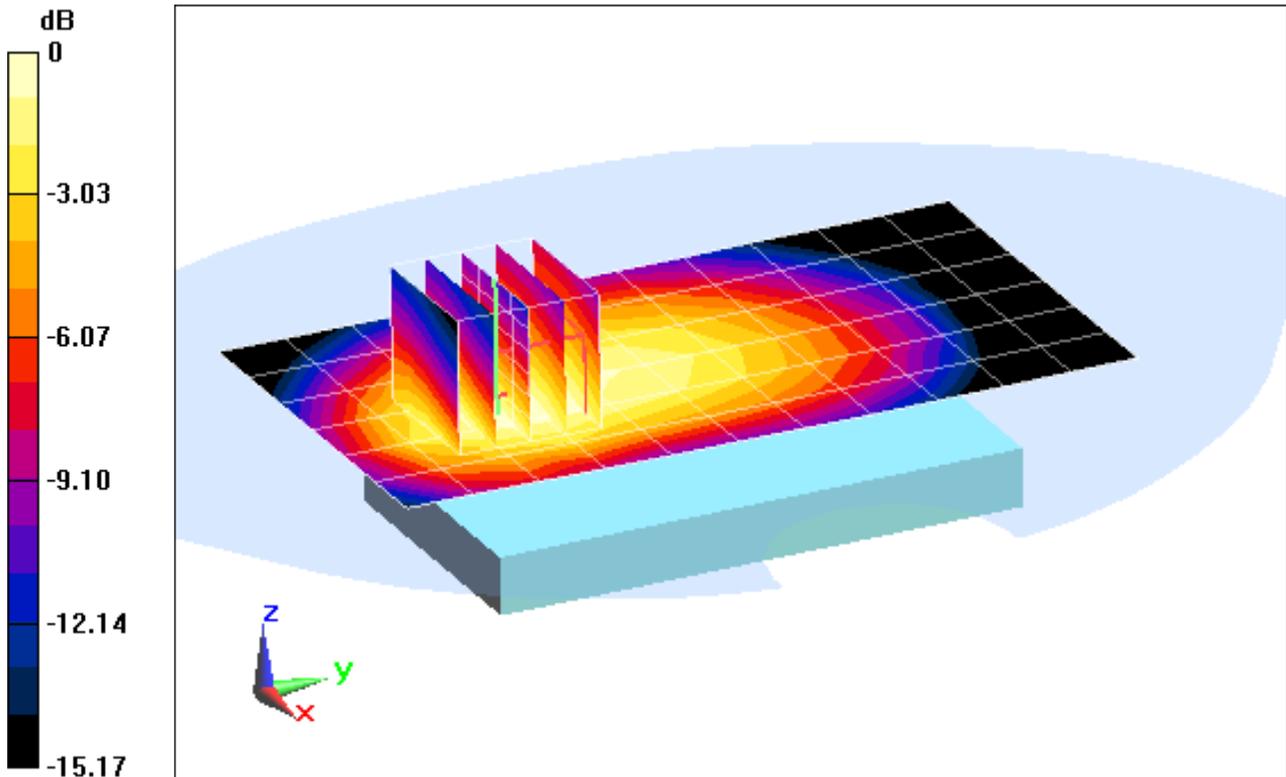
Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1  
Medium: 835 Body Medium parameters used (interpolated):  
 $f = 820.1 \text{ MHz}$ ;  $\sigma = 0.977 \text{ mho/m}$ ;  $\epsilon_r = 53.109$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2012; Ambient Temp: 23 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;  
Sensor-Surface: 4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012  
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406  
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cell. TDSO - FCC Rule Part 90S, Body SAR, Back side, Mid.ch**

**Area Scan (7x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$   
Reference Value = 27.822 V/m; Power Drift = 0.09 dB  
Peak SAR (extrapolated) = 1.167 mW/g  
**SAR(1 g) = 0.694 mW/g; SAR(10 g) = 0.462 mW/g**



0 dB = 0.744 mW/g = -2.57 dB mW/g

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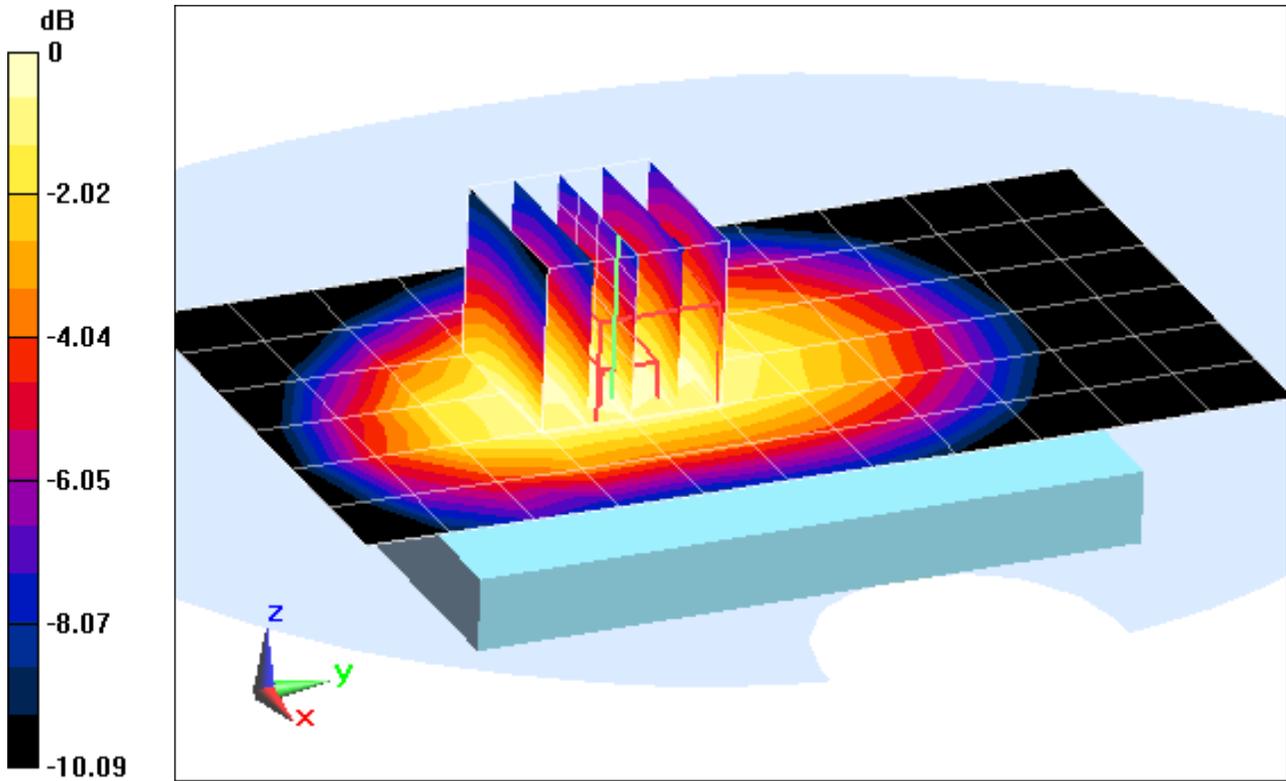
Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1  
Medium: 835 Body Medium parameters used (interpolated):  
 $f = 820.1 \text{ MHz}$ ;  $\sigma = 0.977 \text{ mho/m}$ ;  $\epsilon_r = 53.109$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2012; Ambient Temp: 23 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;  
Sensor-Surface: 4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012  
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406  
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO Rev. 0 - FCC Rule Part 90S, Body SAR, Back side, Mid.ch**

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm  
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 30.189 V/m; Power Drift = -0.12 dB  
Peak SAR (extrapolated) = 0.960 mW/g  
**SAR(1 g) = 0.733 mW/g; SAR(10 g) = 0.545 mW/g**



0 dB = 0.763 mW/g = -2.35 dB mW/g

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**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

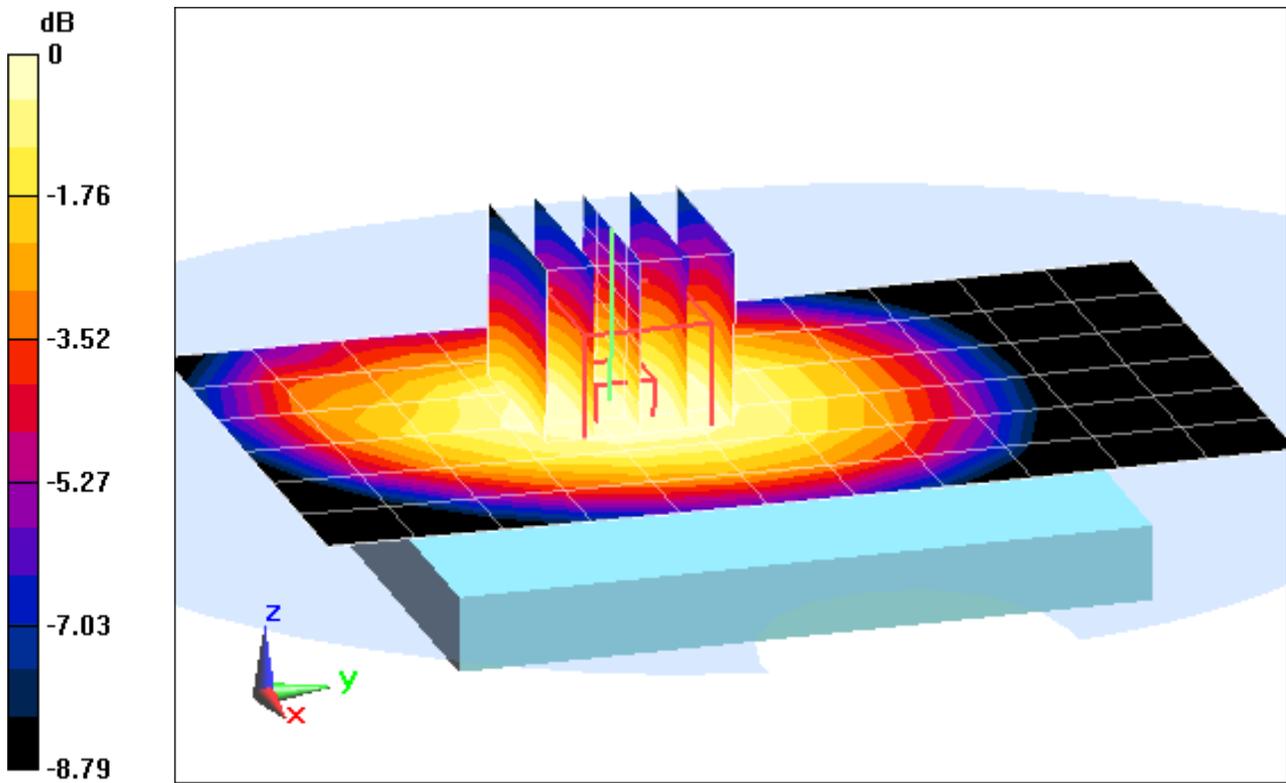
Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1  
Medium: 835 Body Medium parameters used (interpolated):  
 $f = 820.1 \text{ MHz}$ ;  $\sigma = 0.977 \text{ mho/m}$ ;  $\epsilon_r = 53.109$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2012; Ambient Temp: 23 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;  
Sensor-Surface: 4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012  
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406  
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO Rev. 0- FCC Rule Part 90S, Body SAR, Front side, Mid.ch**

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm  
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 21.411 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 0.476 mW/g  
**SAR(1 g) = 0.384 mW/g; SAR(10 g) = 0.295 mW/g**



0 dB = 0.402 mW/g = -7.92 dB mW/g

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**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

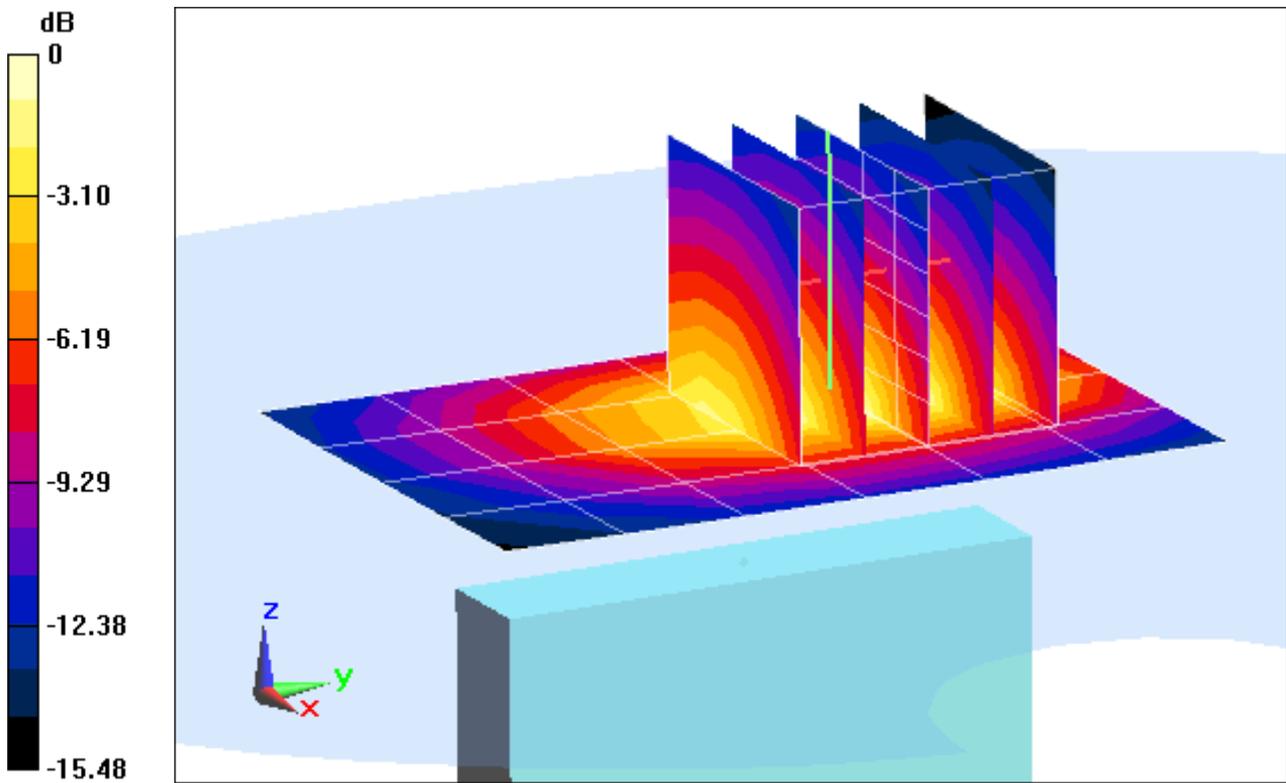
Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1  
Medium: 835 Body Medium parameters used (interpolated):  
 $f = 820.1 \text{ MHz}$ ;  $\sigma = 0.977 \text{ mho/m}$ ;  $\epsilon_r = 53.109$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2012; Ambient Temp: 23 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;  
Sensor-Surface: 4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012  
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406  
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO Rev. 0- FCC Rule Part 90S, Body SAR, Bottom Edge, Mid.ch**

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm  
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 21.033 V/m; Power Drift = 0.03 dB  
Peak SAR (extrapolated) = 0.749 mW/g  
**SAR(1 g) = 0.385 mW/g; SAR(10 g) = 0.205 mW/g**



0 dB = 0.428 mW/g = -7.37 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.977 \text{ mho/m}$ ;  $\epsilon_r = 53.109$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2012; Ambient Temp: 23 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO Rev. 0- FCC Rule Part 90S, Body SAR, Left Edge, Mid.ch**

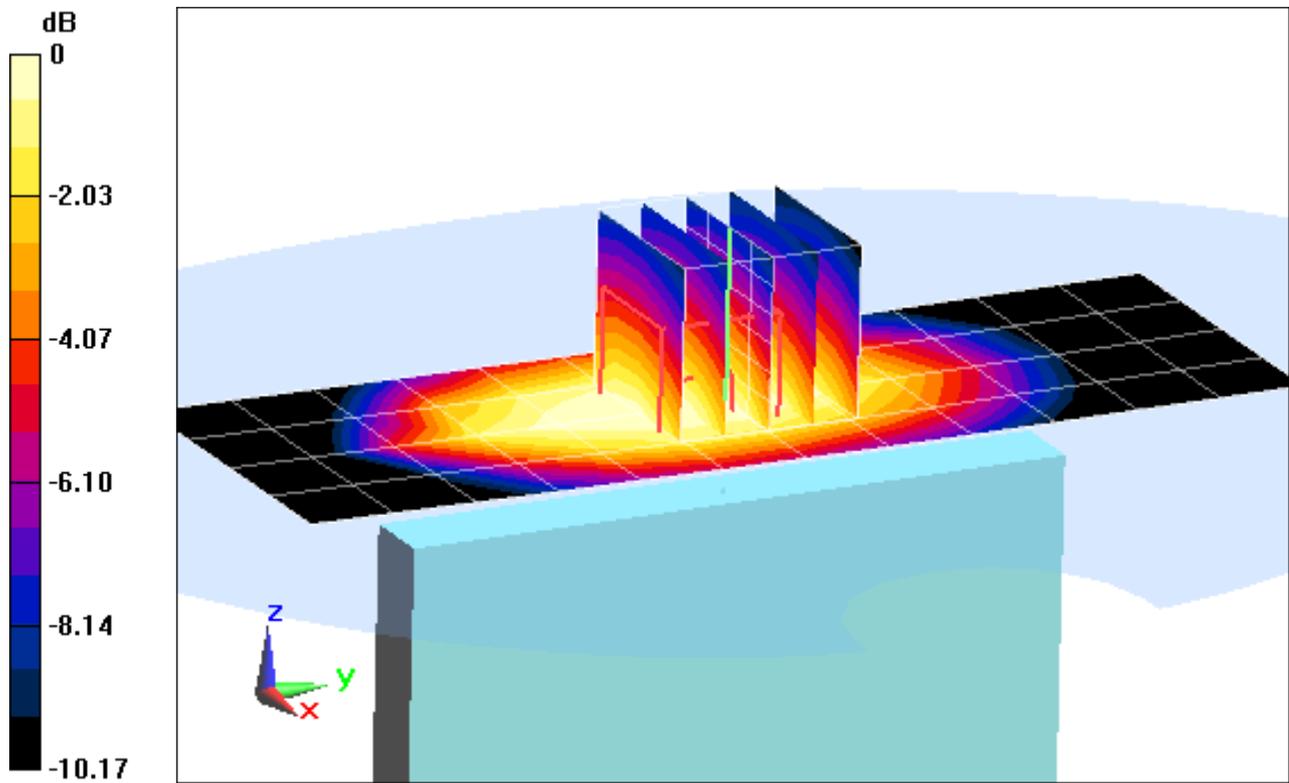
**Area Scan (5x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 29.237 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.953 mW/g

**SAR(1 g) = 0.689 mW/g; SAR(10 g) = 0.477 mW/g**



0 dB = 0.730 mW/g = -2.73 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.997 \text{ mho/m}$ ;  $\epsilon_r = 52.913$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2012; Ambient Temp: 23 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cell. TDSO - FCC Rule Part 22H, Body SAR, Back side, Mid.ch**

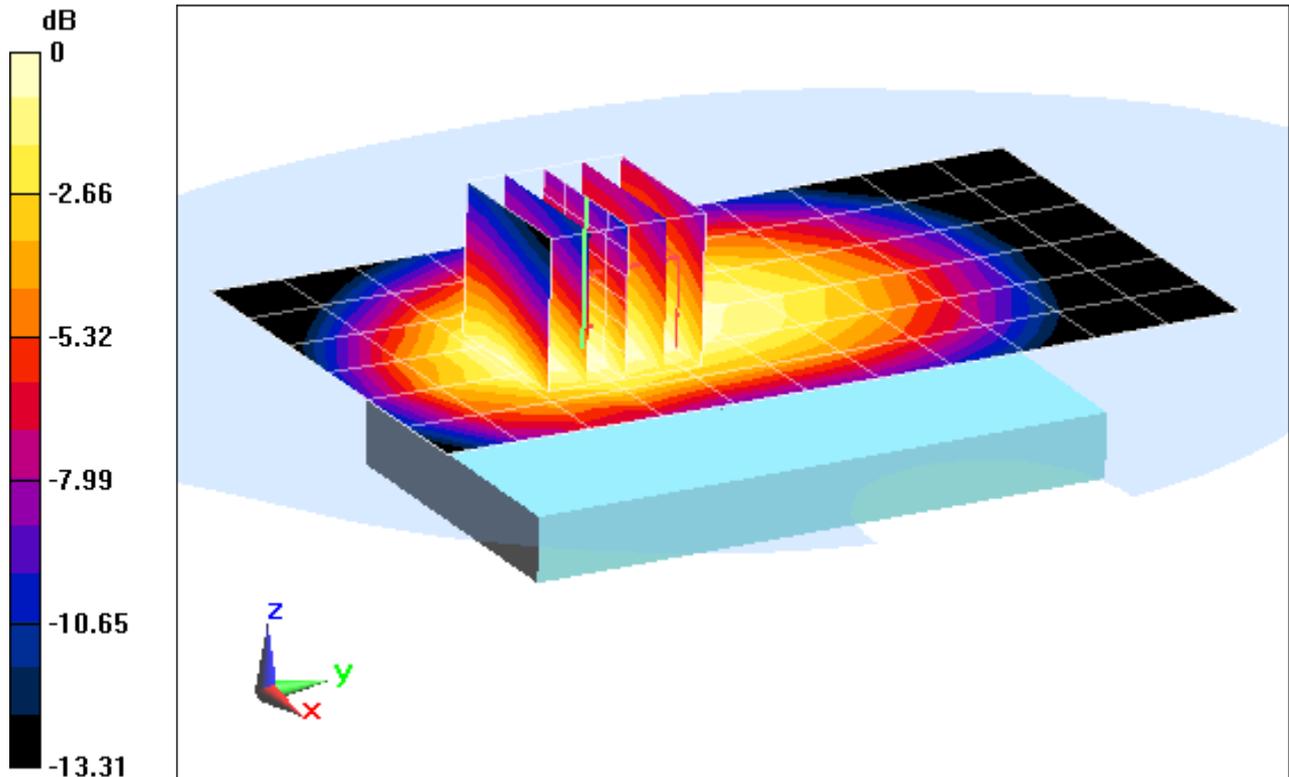
**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 25.942 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.907 mW/g

**SAR(1 g) = 0.569 mW/g; SAR(10 g) = 0.411 mW/g**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.997 \text{ mho/m}$ ;  $\epsilon_r = 52.913$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2012; Ambient Temp: 23 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO Rev. 0- FCC Rule Part 22H, Body SAR, Back side, Mid.ch**

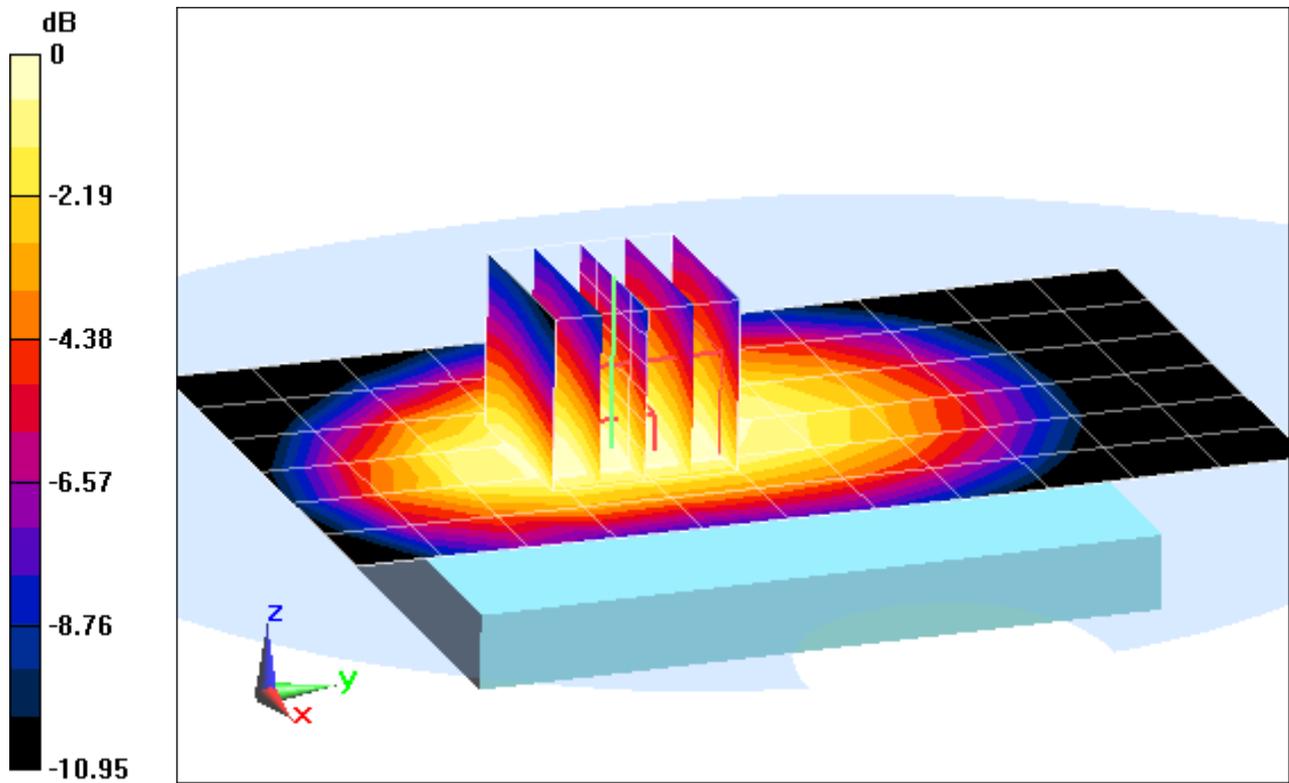
**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 28.471 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.921 mW/g

**SAR(1 g) = 0.671 mW/g; SAR(10 g) = 0.501 mW/g**



0 dB = 0.709 mW/g = -2.99 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.997 \text{ mho/m}$ ;  $\epsilon_r = 52.913$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2012; Ambient Temp: 23 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO Rev. 0- FCC Rule Part 22H, Body SAR, Front side, Mid.ch**

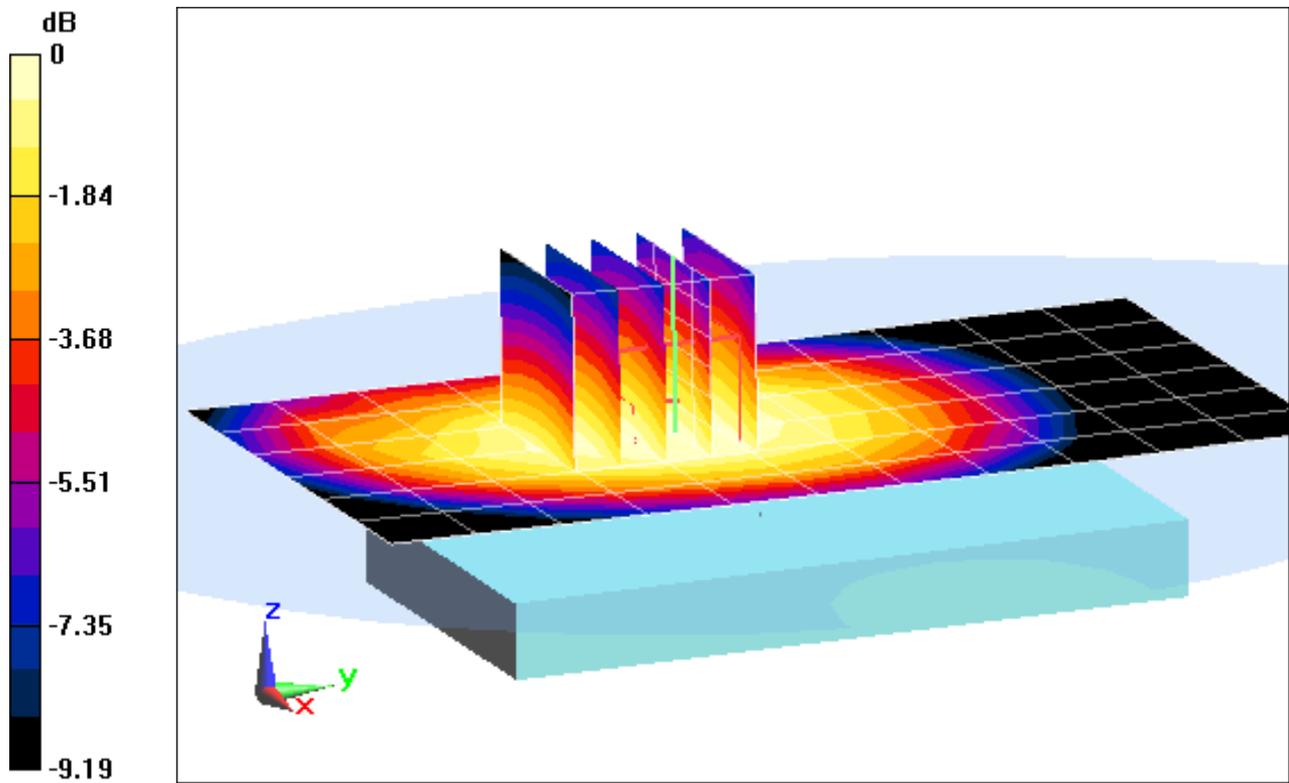
**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.728 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.464 mW/g

**SAR(1 g) = 0.376 mW/g; SAR(10 g) = 0.287 mW/g**



0 dB = 0.392 mW/g = -8.13 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.999 \text{ mho/m}$ ;  $\epsilon_r = 53.644$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-31-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular TDSO - FCC Rule Part 22H, Body SAR, Bottom Edge, Mid.ch**

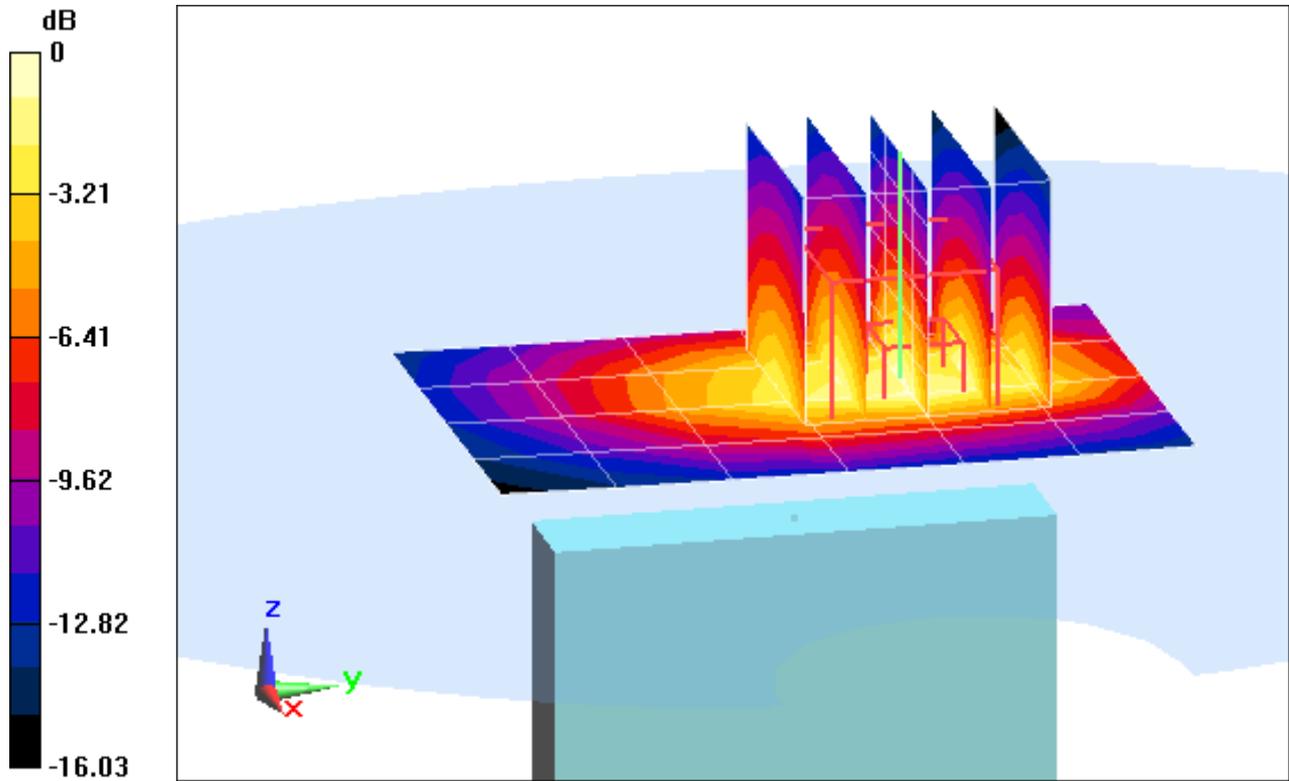
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.824 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.717 mW/g

**SAR(1 g) = 0.380 mW/g; SAR(10 g) = 0.203 mW/g**



0 dB = 0.427 mW/g = -7.39 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.997 \text{ mho/m}$ ;  $\epsilon_r = 52.913$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2012; Ambient Temp: 23 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO Rev. 0- FCC Rule Part 22H, Body SAR, Left Edge, Mid.ch**

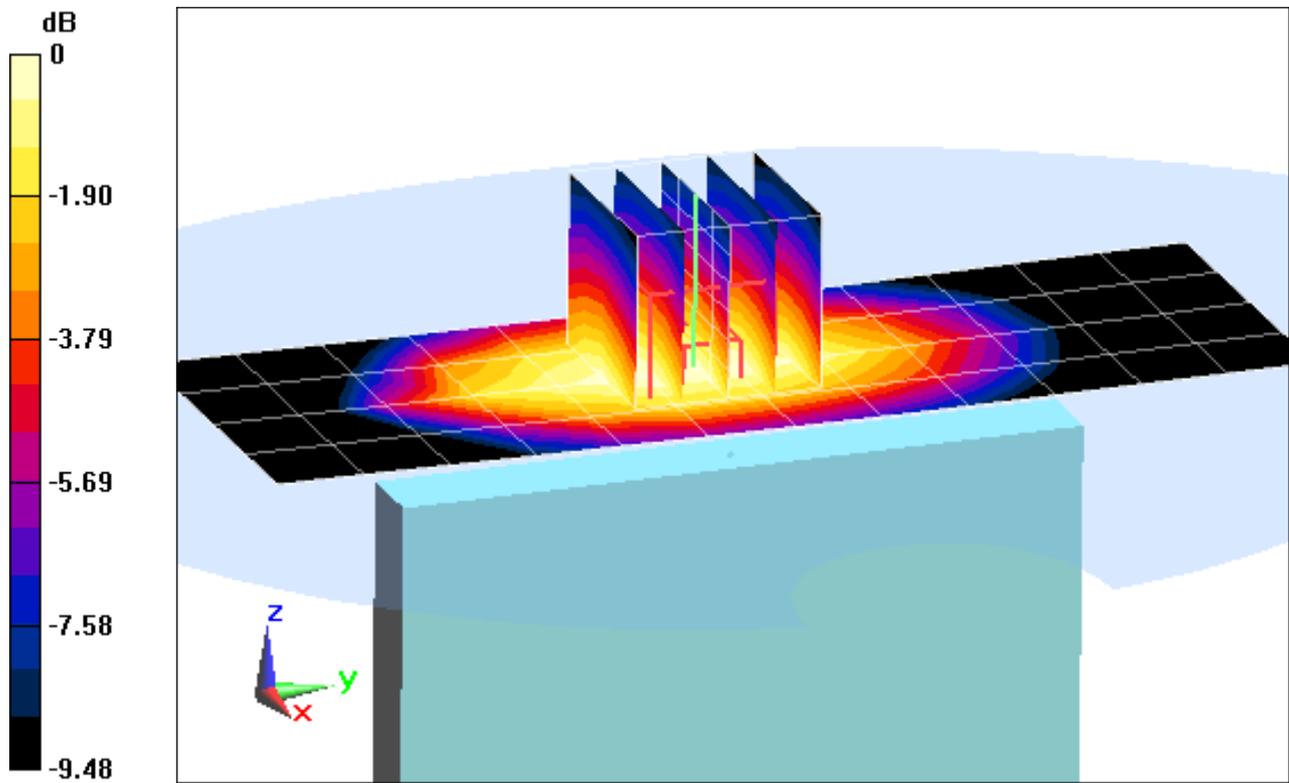
**Area Scan (5x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 31.447 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 1.074 mW/g

**SAR(1 g) = 0.772 mW/g; SAR(10 g) = 0.533 mW/g**



0 dB = 0.822 mW/g = -1.70 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: CDMA; Frequency: 1880 MHz, Frequency: 1908.75 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used (interpolated):

$f = 1908.75 \text{ MHz}$ ;  $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 52.422$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3288; ConvF(5.02, 5.02, 5.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Mode: PCS TDSO - FCC Rule Part 24E, Body SAR, Back side, High.ch**

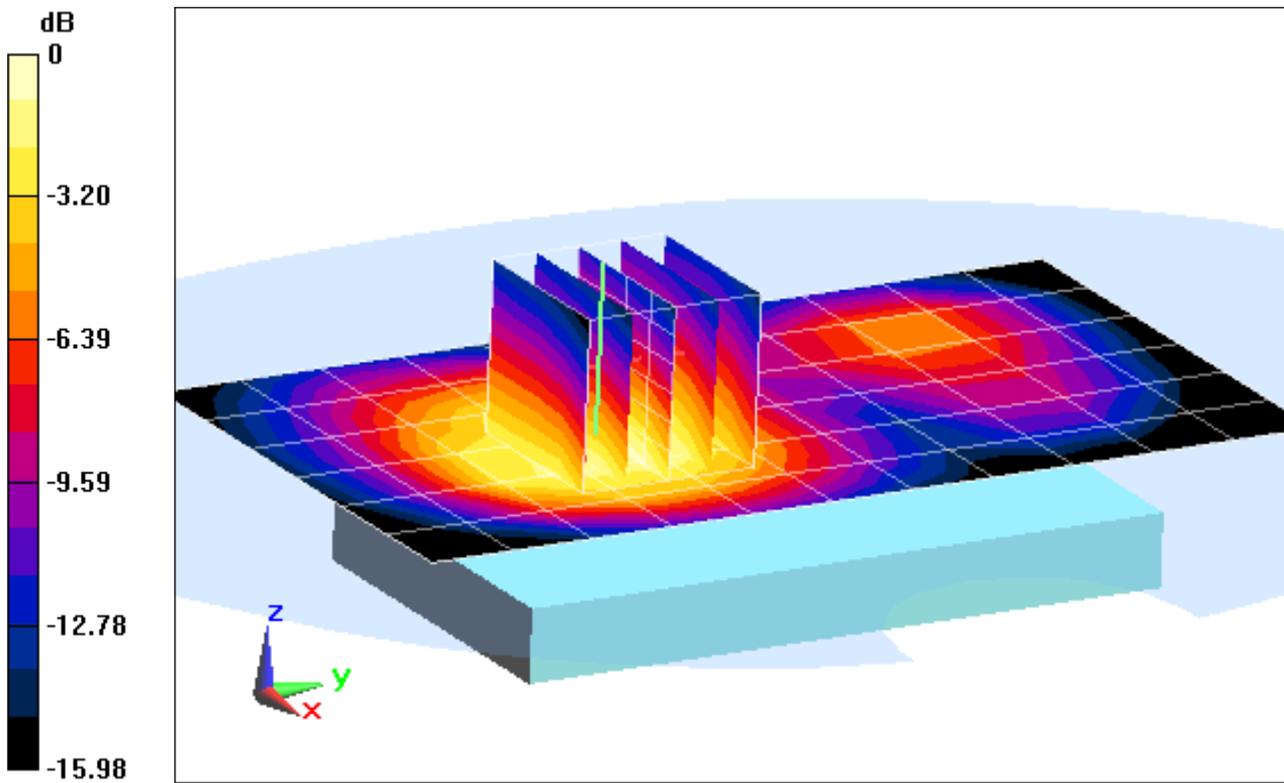
**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 26.246 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.545 mW/g

**SAR(1 g) = 0.959 mW/g; SAR(10 g) = 0.585 mW/g**



0 dB = 1.04 mW/g = 0.34 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: CDMA; Frequency: 1851.25 MHz; Duty Cycle: 1:1  
Medium: 1900 Body; Medium parameters used:

$f = 1851.25$  MHz;  $\sigma = 1.522$  mho/m;  $\epsilon_r = 52.277$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-08-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/20/2012

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Mode: PCS EVDO Rev. A - FCC Rule Part 24E, Body SAR, Back side, Low.ch**

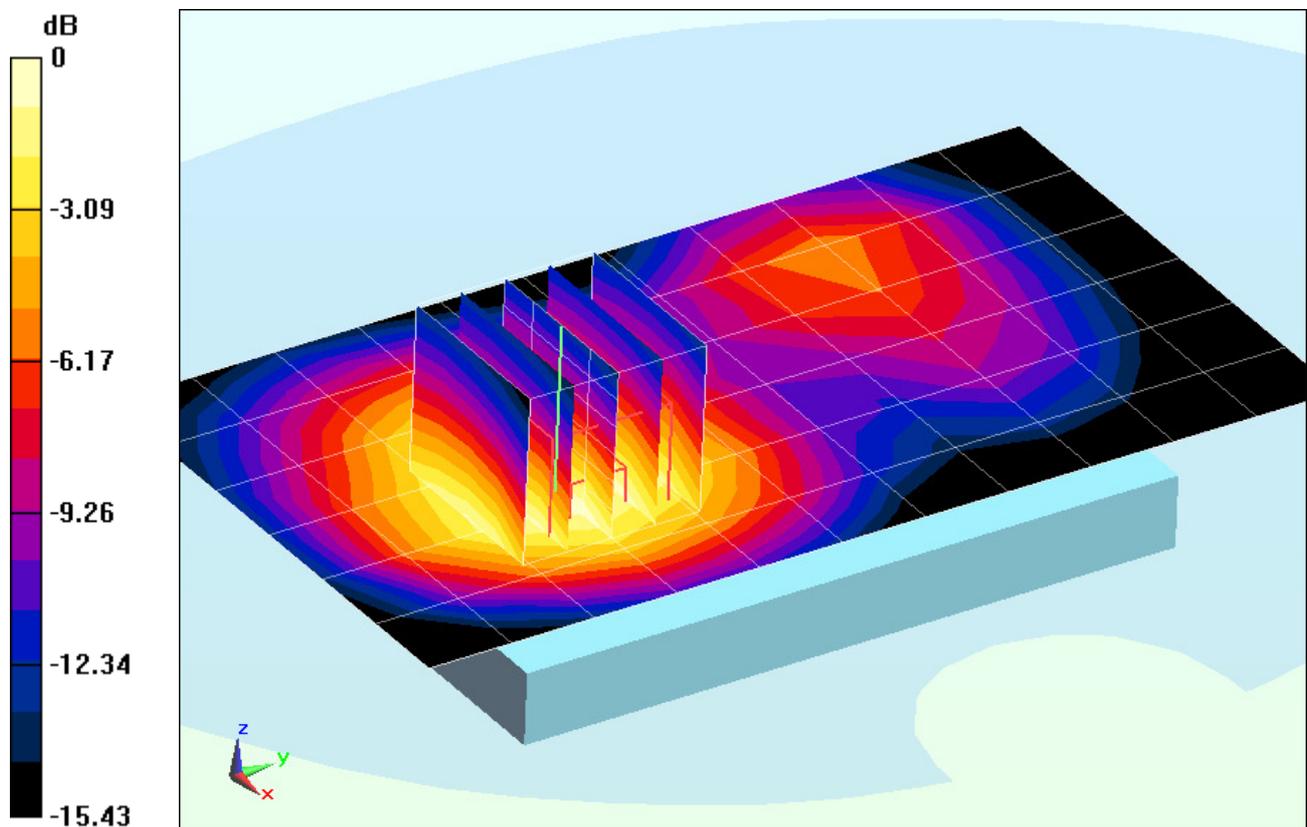
**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 28.737 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.833 mW/g

**SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.676 mW/g**



0 dB = 1.18 mW/g = 1.44 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.479 \text{ mho/m}$ ;  $\epsilon_r = 52.48$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3288; ConvF(5.02, 5.02, 5.02); Calibrated: 2/7/2012;  
Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Mode: PCS EVDO Rev. 0- FCC Rule Part 24E, Body SAR, Front side, Mid.ch**

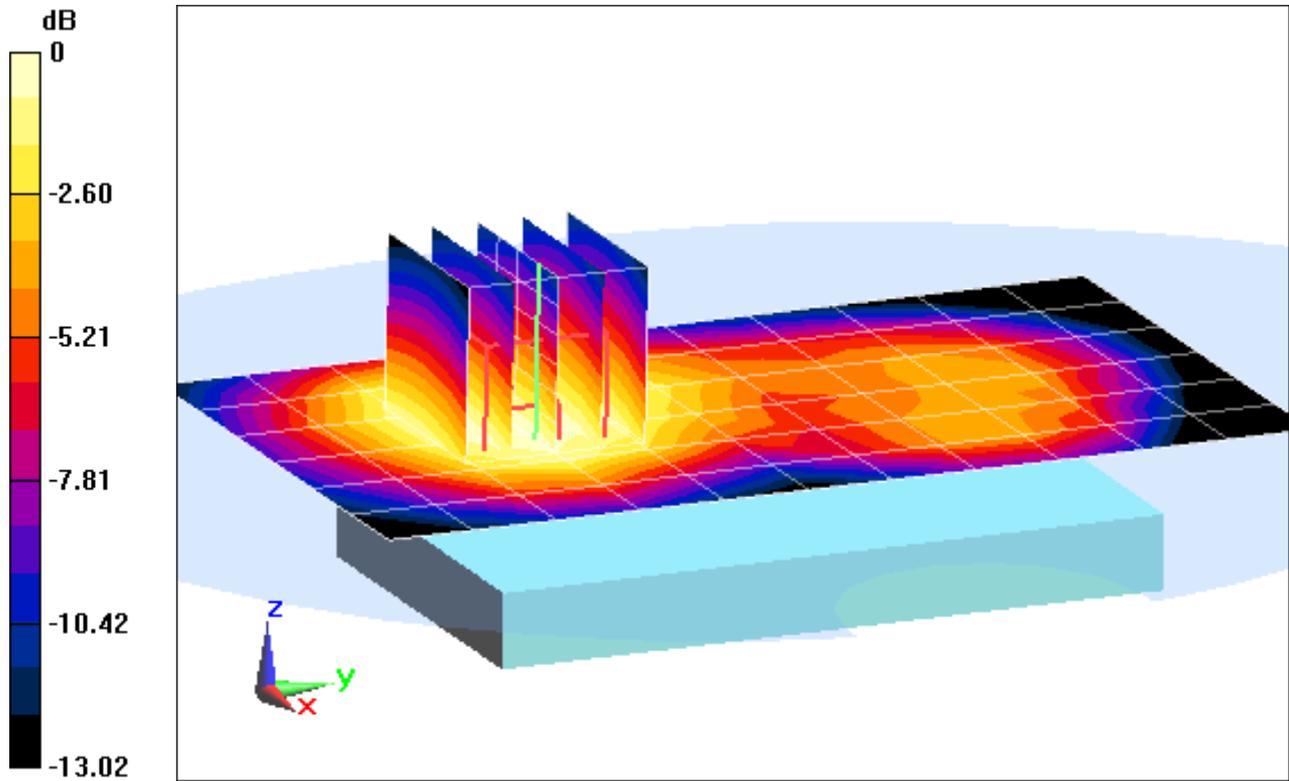
**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 21.022 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.853 mW/g

**SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.390 mW/g**



0 dB = 0.616 mW/g = -4.21 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: PCS CDMA; Frequency: 1851.25 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1851.25 \text{ MHz}$ ;  $\sigma = 1.463 \text{ mho/m}$ ;  $\epsilon_r = 51.946$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-09-2012; Ambient Temp: 23.7°C; Tissue Temp: 24.8°C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: PCS TDSO - FCC Rule Part 24E, Body SAR, Bottom Edge, Low.ch**

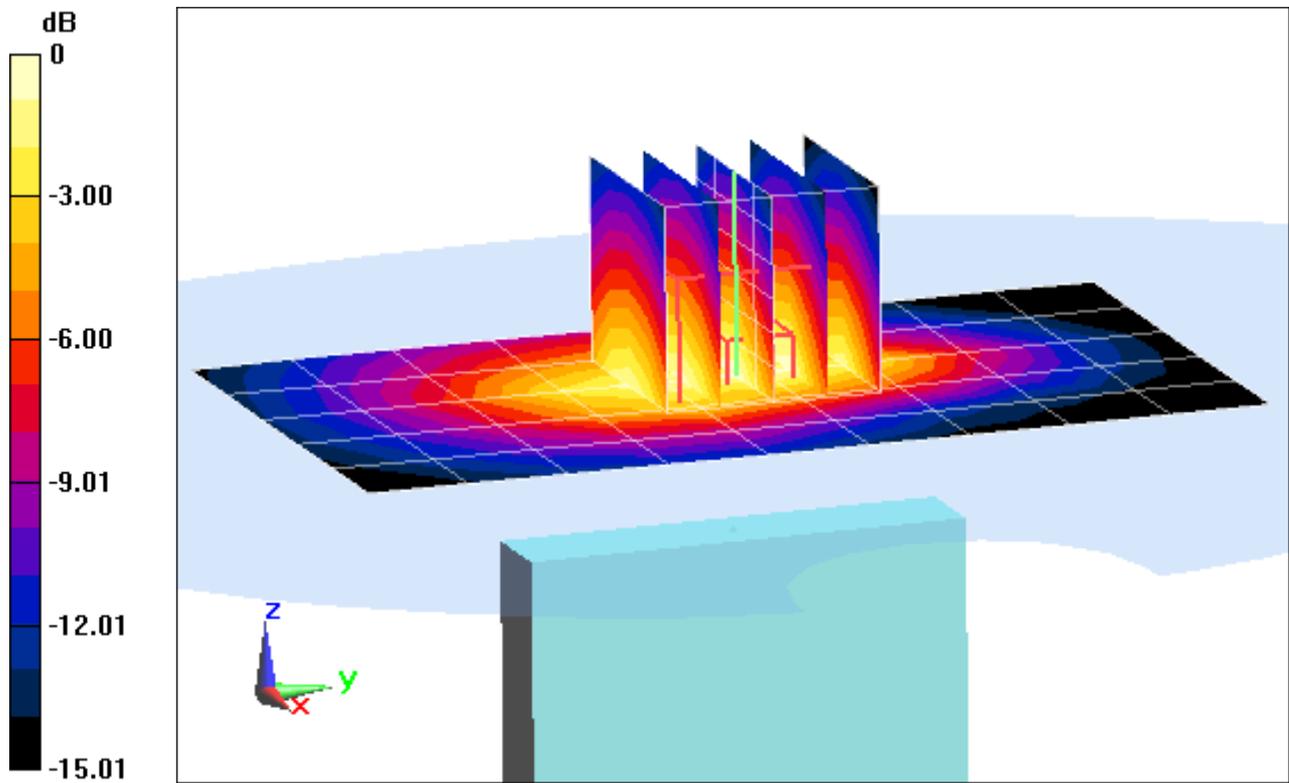
**Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 30.188 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.831 mW/g

**SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.612 mW/g**



0 dB = 1.17 mW/g = 1.36 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.479 \text{ mho/m}$ ;  $\epsilon_r = 52.48$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3288; ConvF(5.02, 5.02, 5.02); Calibrated: 2/7/2012;  
Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

**Mode: PCS TDSO - FCC Rule Part 24E, Body SAR, Left Edge, Mid.ch**

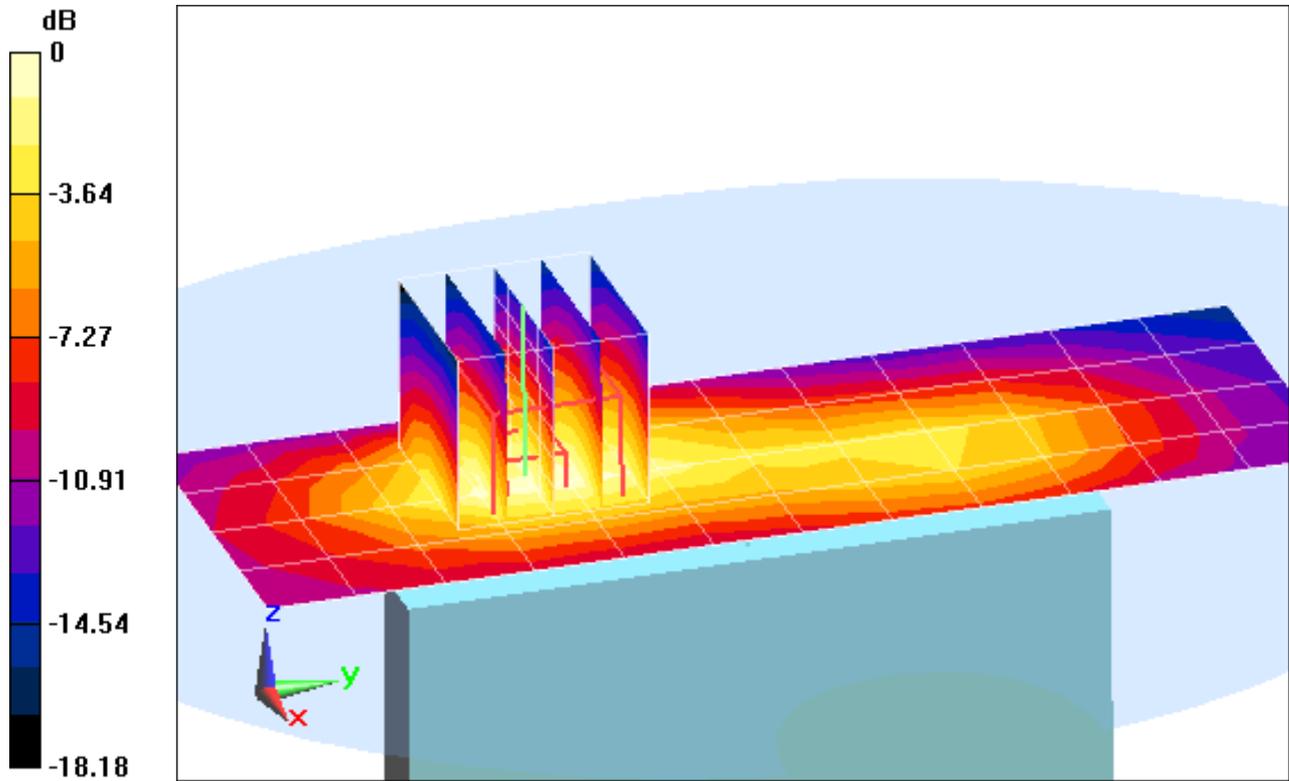
**Area Scan (5x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.700 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.452 mW/g

**SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.146 mW/g**



0 dB = 0.290 mW/g = -10.75 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: LTE BAND 25; Frequency: 1910 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$ ;  $\sigma = 1.542 \text{ mho/m}$ ;  $\epsilon_r = 51.57$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-03-2012; Ambient Temp: 24.2 °C; Tissue Temp: 23.6 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;  
Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE band 25 (PCS) - FCC Rule Part 24E, Body SAR, Back side, High.ch,  
10 MHz BW, QPSK, 1 RB, 0 RB Offset**

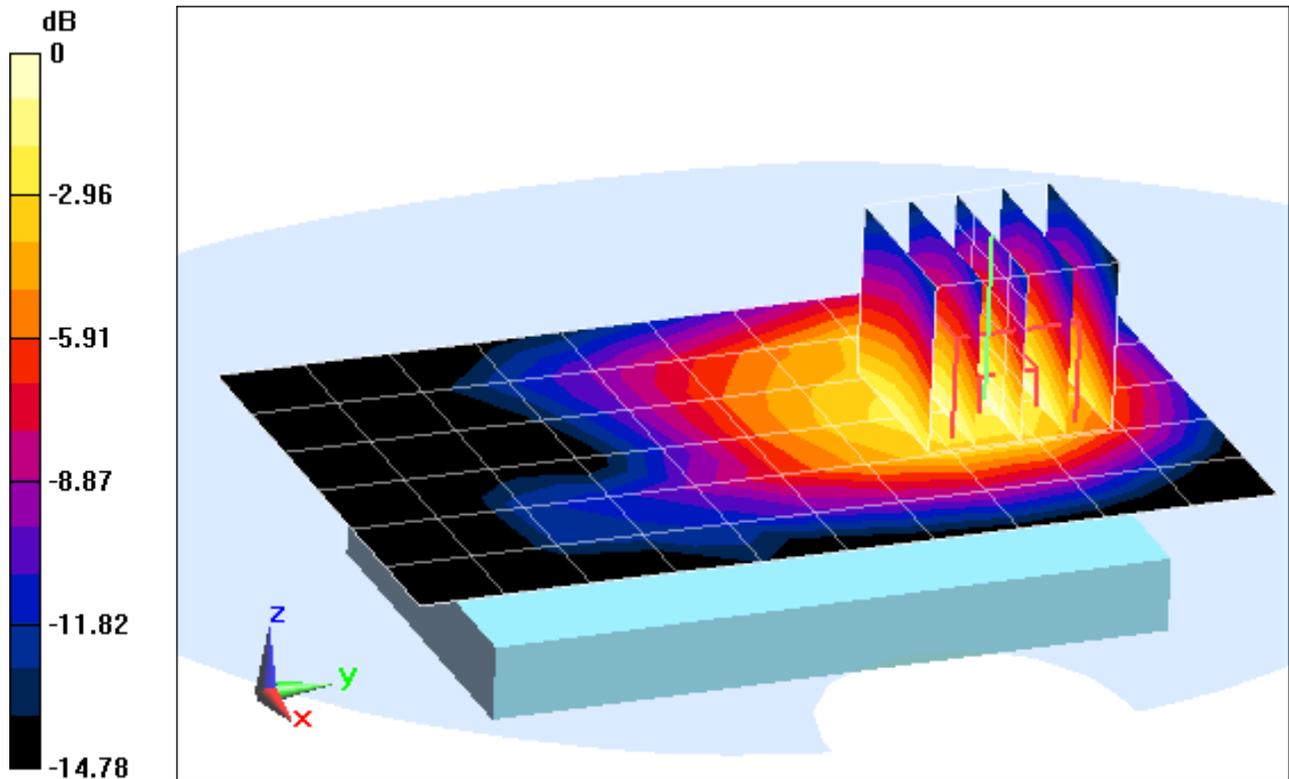
**Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 27.852 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 1.587 mW/g

**SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.661 mW/g**



0 dB = 1.11 mW/g = 0.91 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: LTE BAND 25; Frequency: 1910 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$ ;  $\sigma = 1.542 \text{ mho/m}$ ;  $\epsilon_r = 51.57$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-03-2012; Ambient Temp: 24.2 °C; Tissue Temp: 23.6 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;  
Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Body SAR, Front side, High.ch,  
10 MHz BW, QPSK, 1 RB, 0 RB Offset**

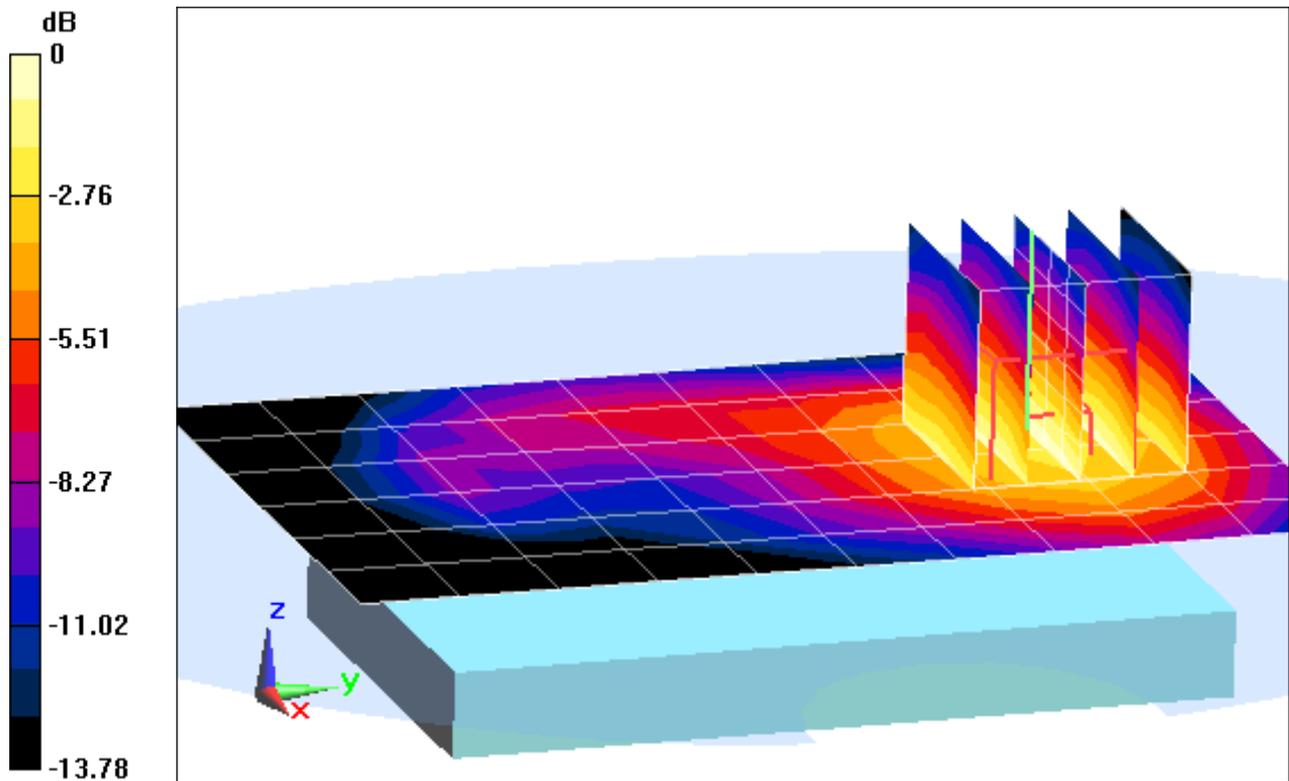
**Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.936 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.867 mW/g

**SAR(1 g) = 0.586 mW/g; SAR(10 g) = 0.378 mW/g**



0 dB = 0.626 mW/g = -4.07 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: LTE BAND 25; Frequency: 1910 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$ ;  $\sigma = 1.542 \text{ mho/m}$ ;  $\epsilon_r = 51.57$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-03-2012; Ambient Temp: 24.2 °C; Tissue Temp: 23.6 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;  
Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Body SAR, Top Edge, High.ch**  
**10 MHz BW, QPSK, 1 RB, 0 RB Offset**

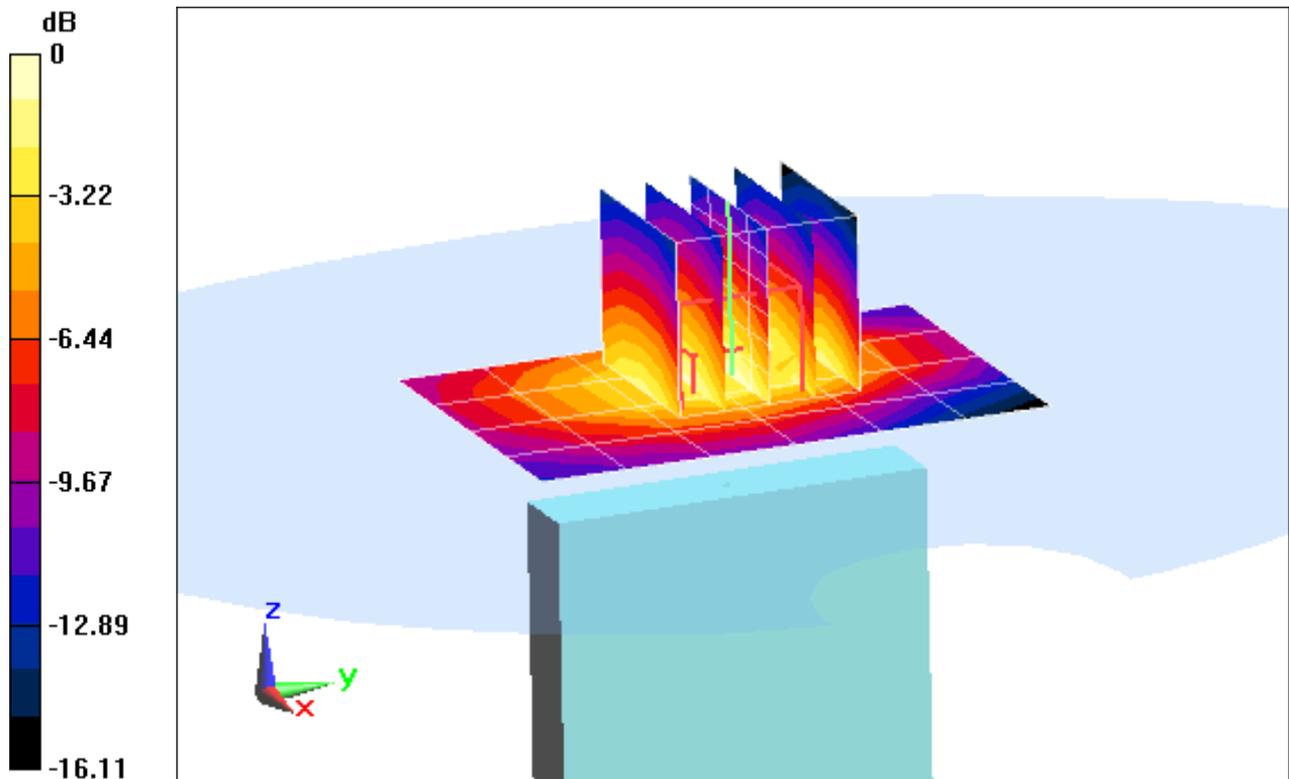
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.158 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.778 mW/g

**SAR(1 g) = 0.506 mW/g; SAR(10 g) = 0.300 mW/g**



0 dB = 0.573 mW/g = -4.84 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: LTE BAND 25, Frequency: 1910 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$ ;  $\sigma = 1.542 \text{ mho/m}$ ;  $\epsilon_r = 50.68$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-03-2012; Ambient Temp: 24.2 °C; Tissue Temp: 23.6 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Body SAR, Right Edge, High.ch,  
10 MHz BW, QPSK, 1 RB, 0 RB Offset**

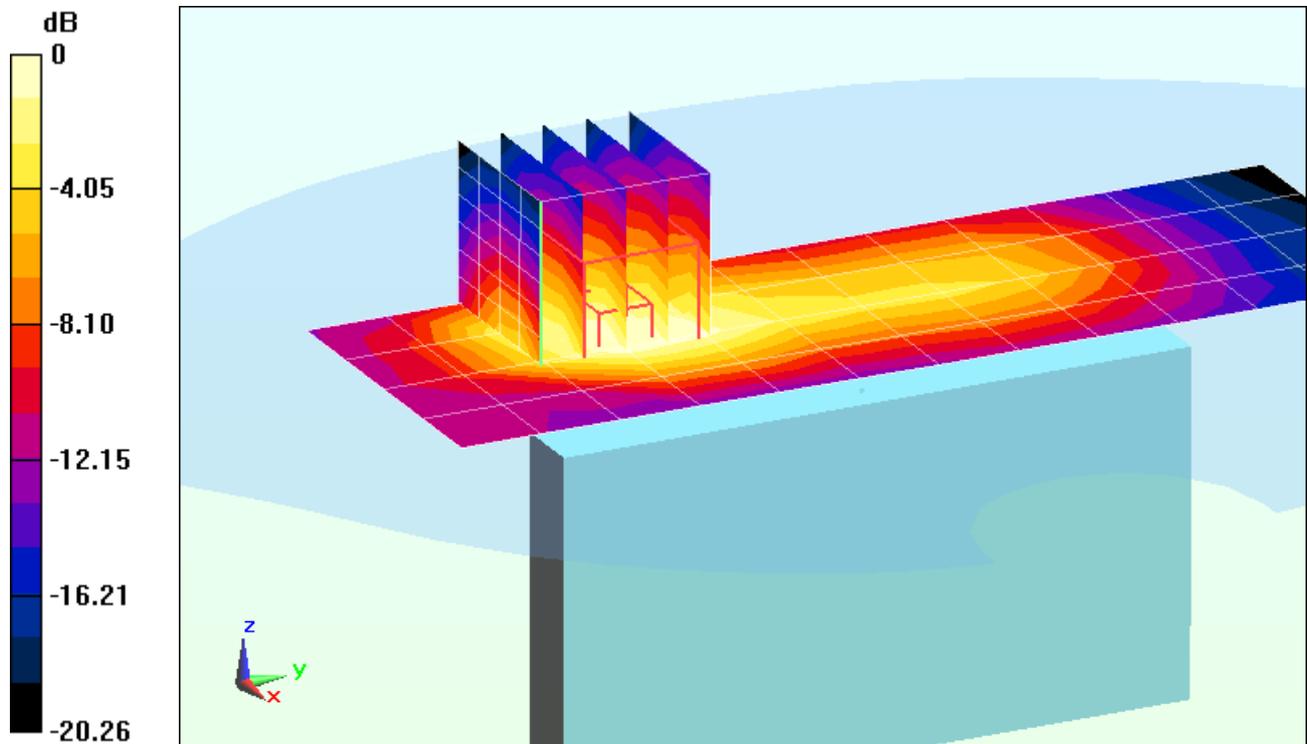
**Area Scan (5x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.049 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.888 mW/g

**SAR(1 g) = 0.509 mW/g; SAR(10 g) = 0.270 mW/g**



0 dB = 0.304 mW/g = -10.33 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#4**

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$ ;  $\sigma = 2.013 \text{ mho/m}$ ;  $\epsilon_r = 54.871$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.8°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

**Mode: IEEE 802.11b - FCC Rule Parts 15C, Body SAR, Ch 11, 1 Mbps, Back Side**

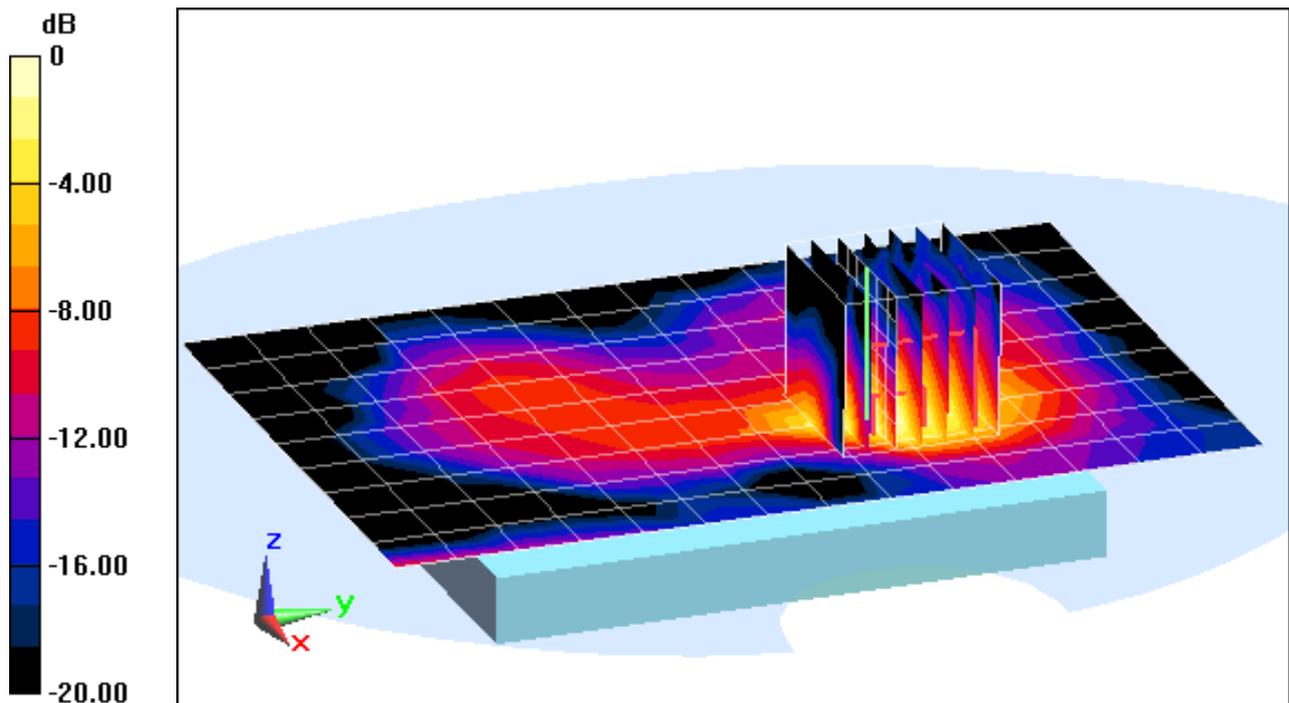
**Area Scan (10x15x1):** Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 7.052 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.2040

**SAR(1 g) = 0.089 mW/g; SAR(10 g) = 0.041 mW/g**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#4**

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$ ;  $\sigma = 2.013 \text{ mho/m}$ ;  $\epsilon_r = 54.871$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.8°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 11, 1 Mbps, Front Side**

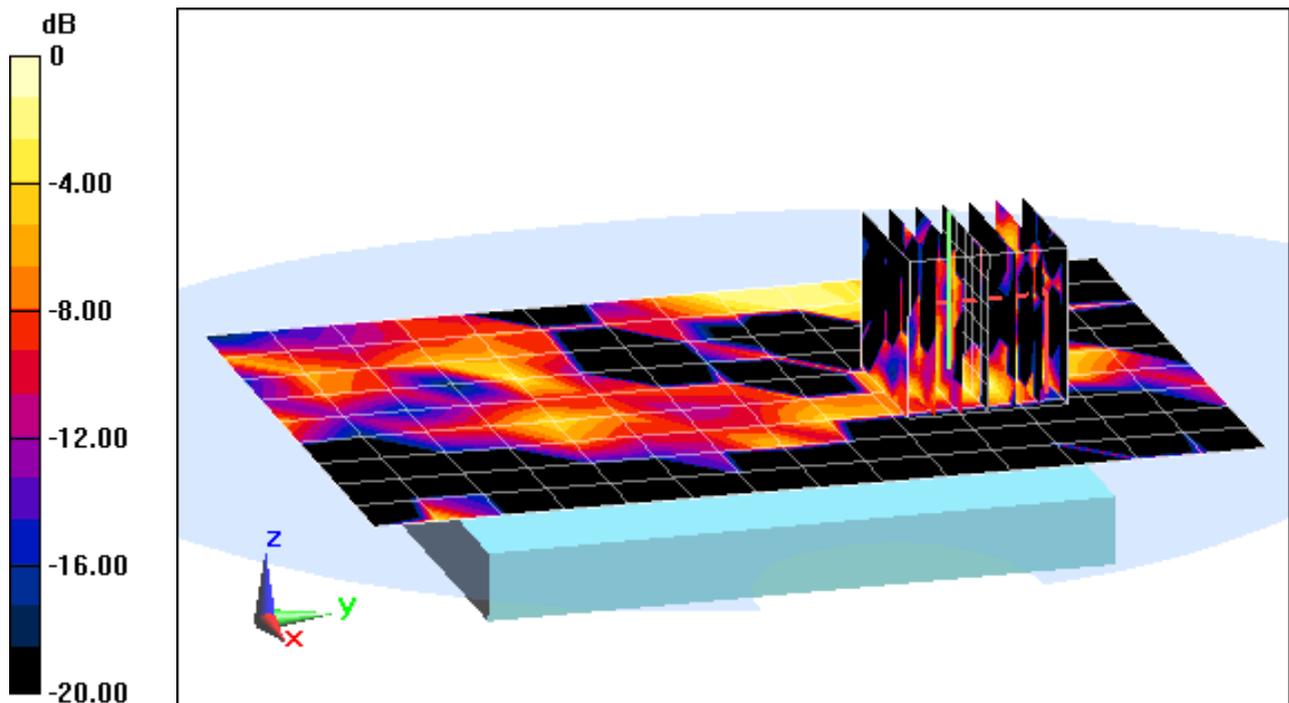
**Area Scan (10x15x1):** Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 1.014 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.009270

**SAR(1 g) = 0.0011 mW/g; SAR(10 g) = 0.000122 mW/g**



0 dB = 0.0035mW/g = -49.12 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#4**

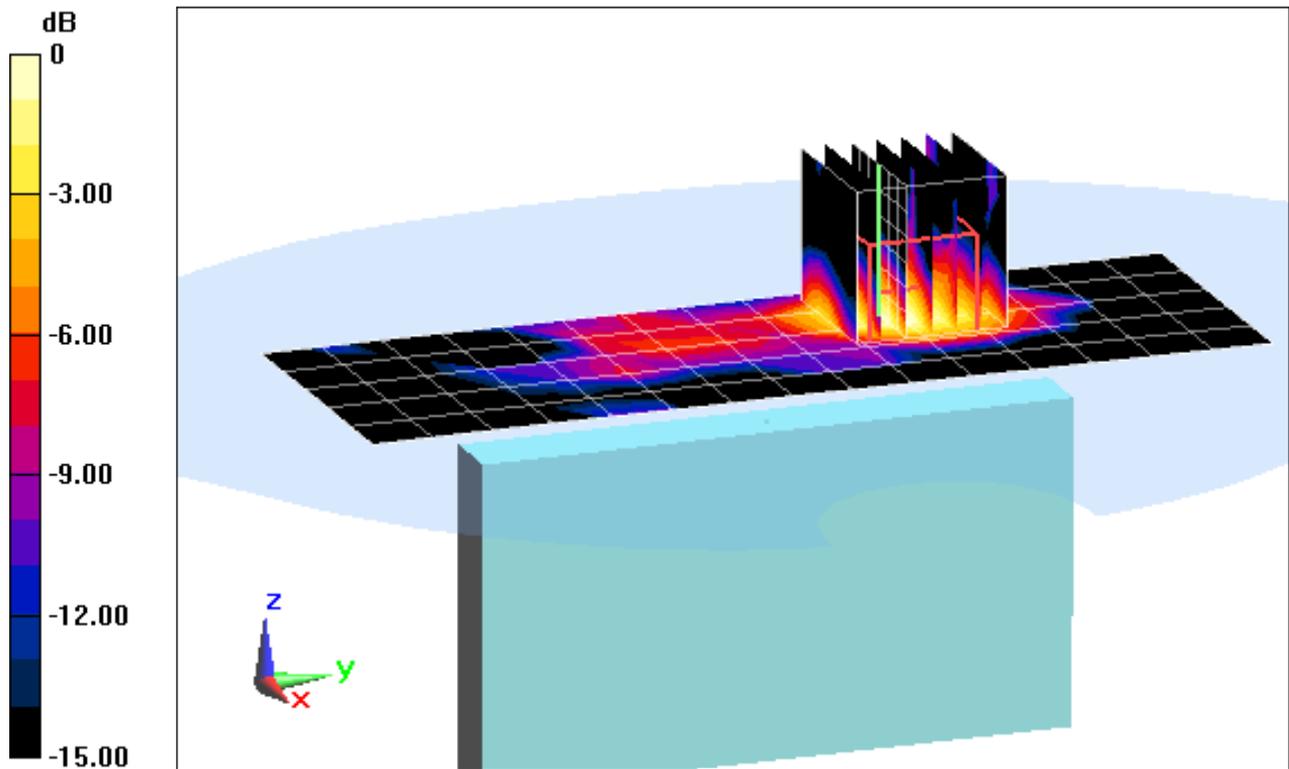
Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1  
Medium: 2450 Body Medium parameters used (interpolated):  
 $f = 2462 \text{ MHz}$ ;  $\sigma = 2.013 \text{ mho/m}$ ;  $\epsilon_r = 54.871$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.8 ° C; Tissue Temp: 23.4 ° C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn665; Calibrated: 4/19/2012  
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1162  
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 11, 1 Mbps, Left Edge**

**Area Scan (6x16x1):** Measurement grid: dx=12mm, dy=12mm  
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 4.637 V/m; Power Drift = 0.10 dB  
Peak SAR (extrapolated) = 0.160 mW/g  
**SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.015 mW/g**



0 dB = 0.0482 mW/g = -26.34 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 820.1$  MHz;  $\sigma = 0.983$  mho/m;  $\epsilon_r = 54.077$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-12-2012; Ambient Temp: 23.3°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3287; ConvF(6.02, 6.02, 6.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/20/2012

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASYS2, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

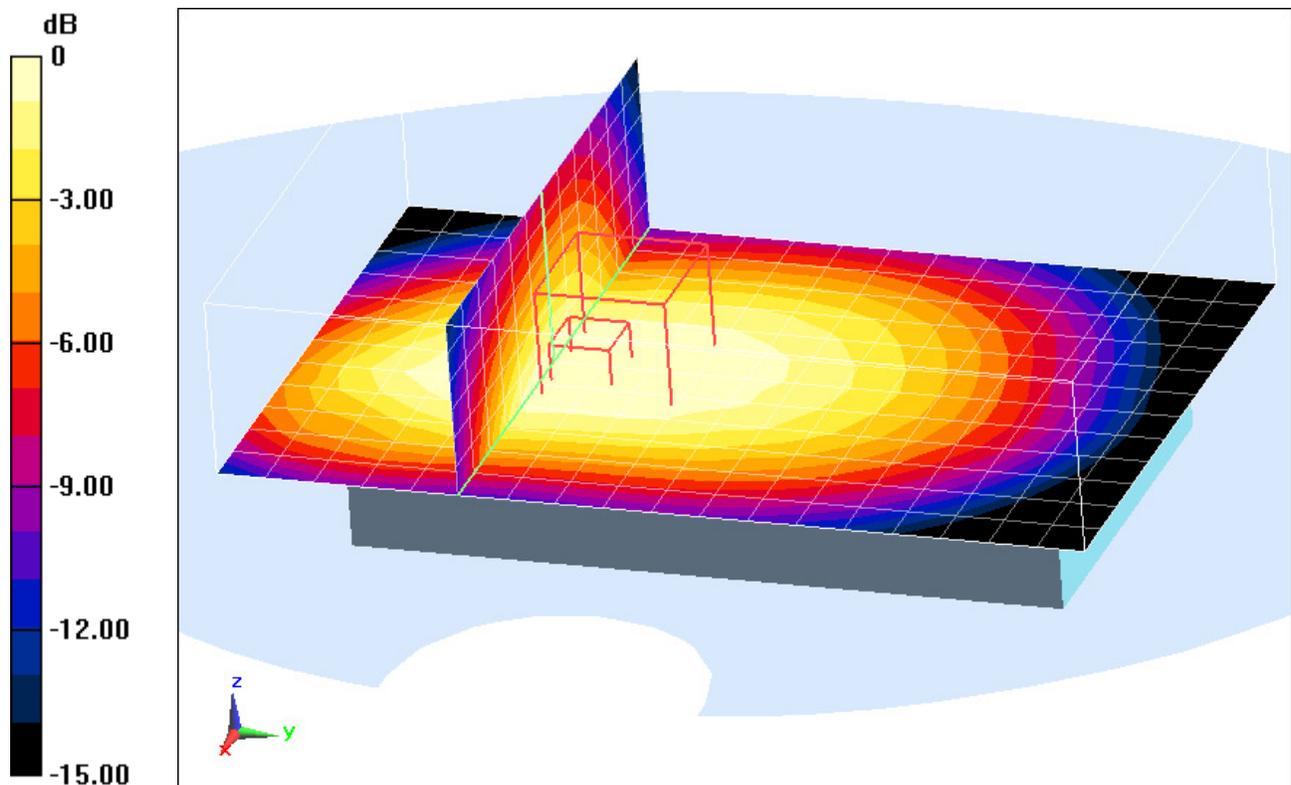
**Mode: Cell. CDMA - FCC Rule Part 90S, Body SAR, Back Side, Mid.ch**

**Zoom Scan (13x19x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.334 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.117 mW/g

**SAR(1 g) = 0.753 mW/g; SAR(10 g) = 0.567 mW/g**



0 dB = 0.786 mW/g = -2.09 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.989 \text{ mho/m}$ ;  $\epsilon_r = 53.635$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-12-2012; Ambient Temp: 23.3°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3287; ConvF(6.02, 6.02, 6.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/20/2012

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

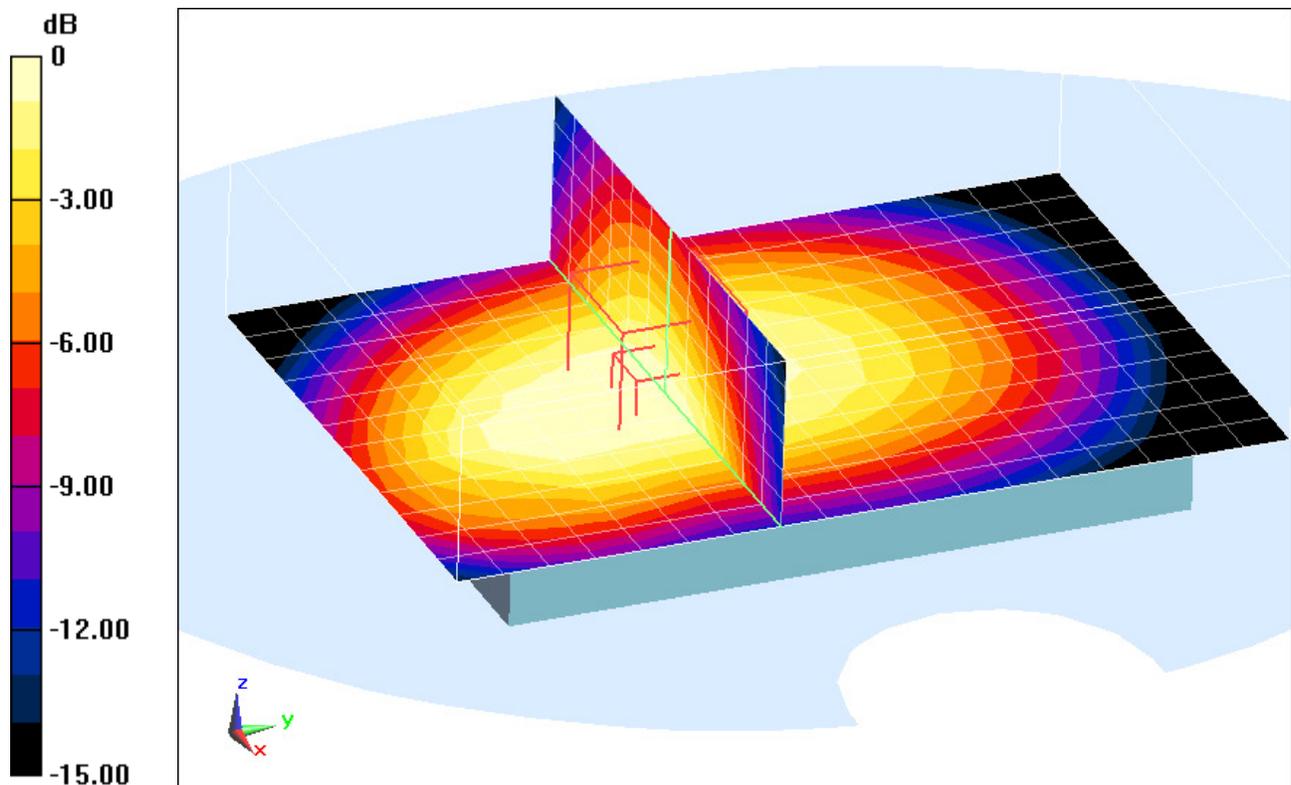
**Mode: Cell. CDMA - FCC Rule Part 22H, Body SAR, Back Side, Mid.ch**

**Zoom Scan (13x19x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.198 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 1.032 mW/g

**SAR(1 g) = 0.688 mW/g; SAR(10 g) = 0.510 mW/g**



0 dB = 0.725 mW/g = -2.79 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1908.75 \text{ MHz}$ ;  $\sigma = 1.527 \text{ mho/m}$ ;  $\epsilon_r = 52.114$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-12-2012; Ambient Temp: 23.0°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3288; ConvF(5.02, 5.02, 5.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

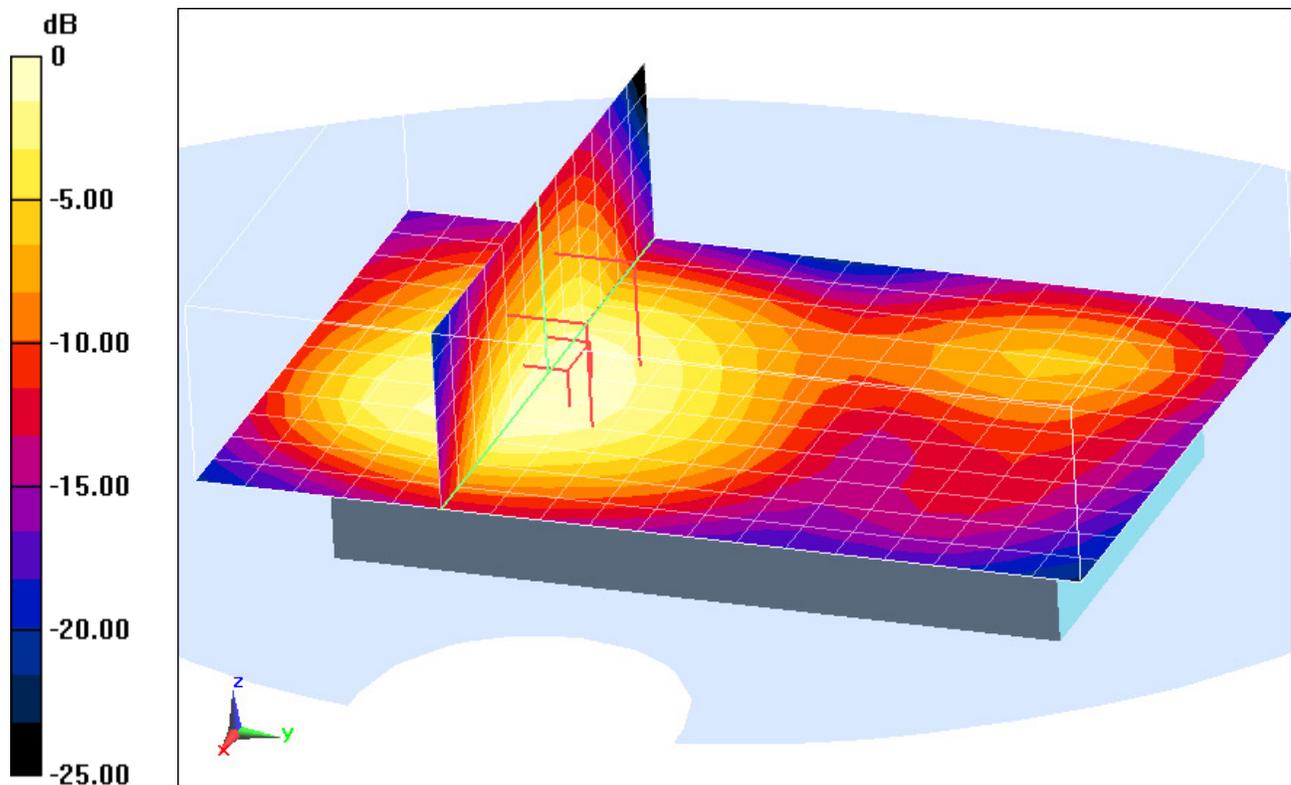
**Mode: PCS CDMA - FCC Rule Part 24E, Body SAR, Back side, High.Ch**

**Zoom Scan (13x19x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.993 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.752 mW/g

**SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.650 mW/g**



0 dB = 1.15 mW/g = 1.21 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#2**

Communication System: LTE Band 25; Frequency: 1910 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used:

$f = 1910 \text{ MHz}$ ;  $\sigma = 1.528 \text{ mho/m}$ ;  $\epsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-12-2012; Ambient Temp: 23.0°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3288; ConvF(5.02, 5.02, 5.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

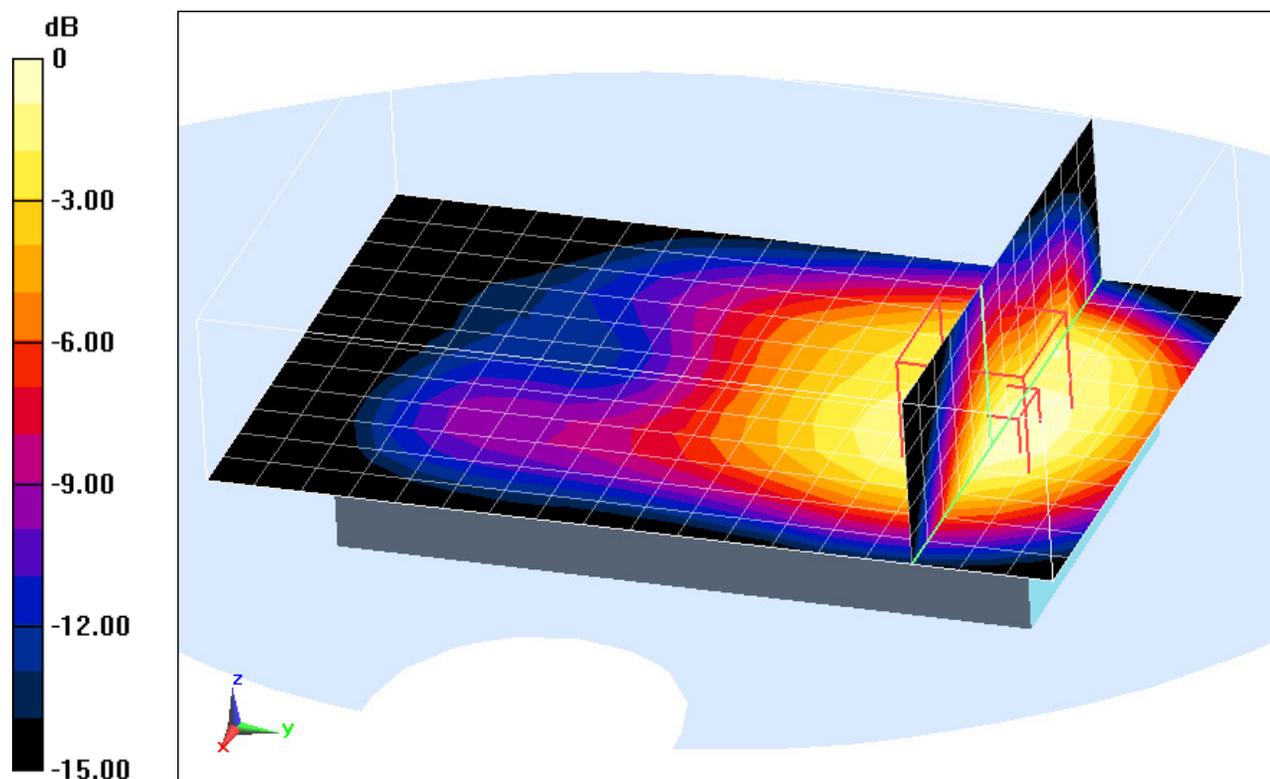
**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Body SAR, Back side, High.Ch,  
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

**Zoom Scan (13x19x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.610 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.414 mW/g

**SAR(1 g) = 0.869 mW/g; SAR(10 g) = 0.547 mW/g**



0 dB = 0.928 mW/g = -0.65 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS860; Type: Portable Handset; Serial: SAR#4**

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$ ;  $\sigma = 2.008 \text{ mho/m}$ ;  $\epsilon_r = 51.632$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-12-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3213; ConvF(4.11, 4.11, 4.11); Calibrated: 4/24/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 5/7/2012

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

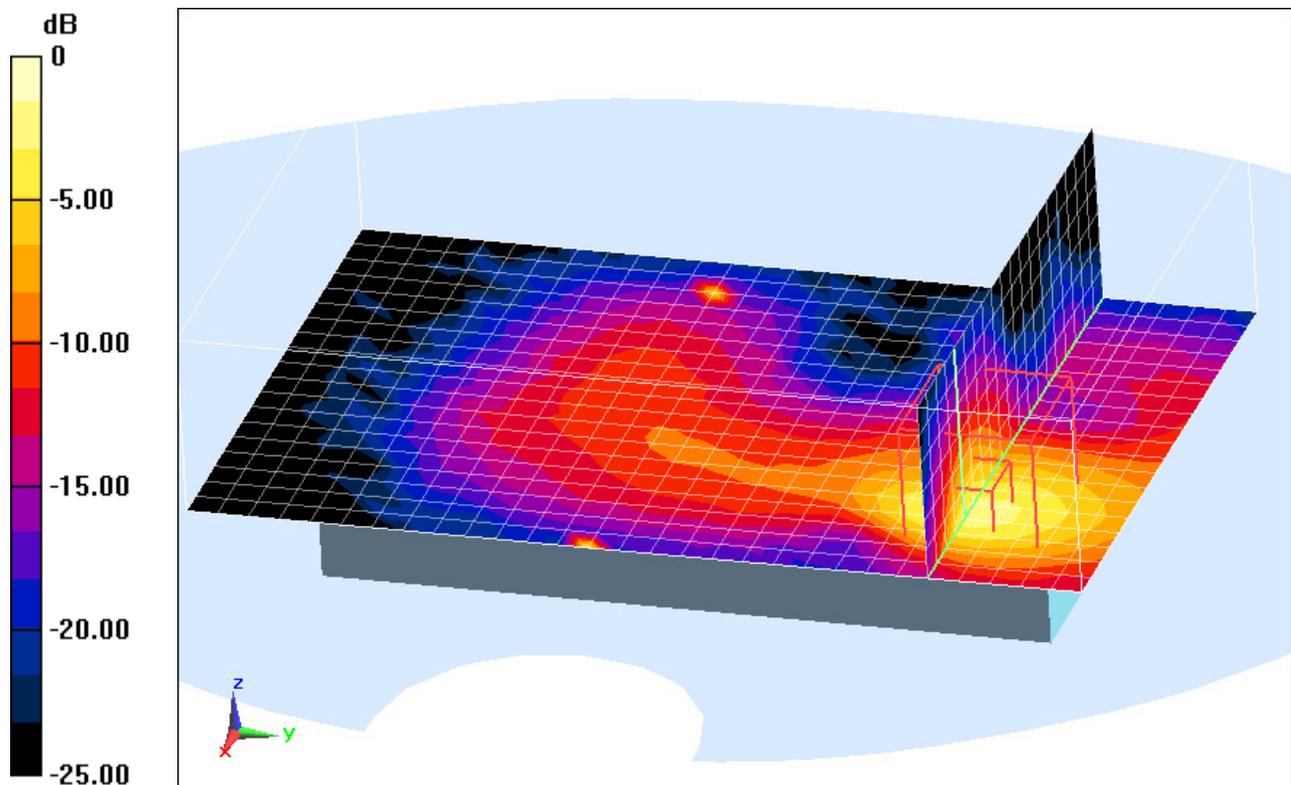
**Mode: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Back Side, Ch 11, 1 Mbps**

**Zoom Scan (20x30x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.420 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.334 mW/g

**SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.044 mW/g**



0 dB = 0.215 mW/g = -13.35 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

## DUT: ZNFLS860; Type: Portable Handset

Communication System: CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.983 \text{ mho/m}$ ;  $\epsilon_r = 54.077$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Communication System: LTE Band 25; Frequency: 1910 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1910 \text{ MHz}$ ;  $\sigma = 1.528 \text{ mho/m}$ ;  $\epsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

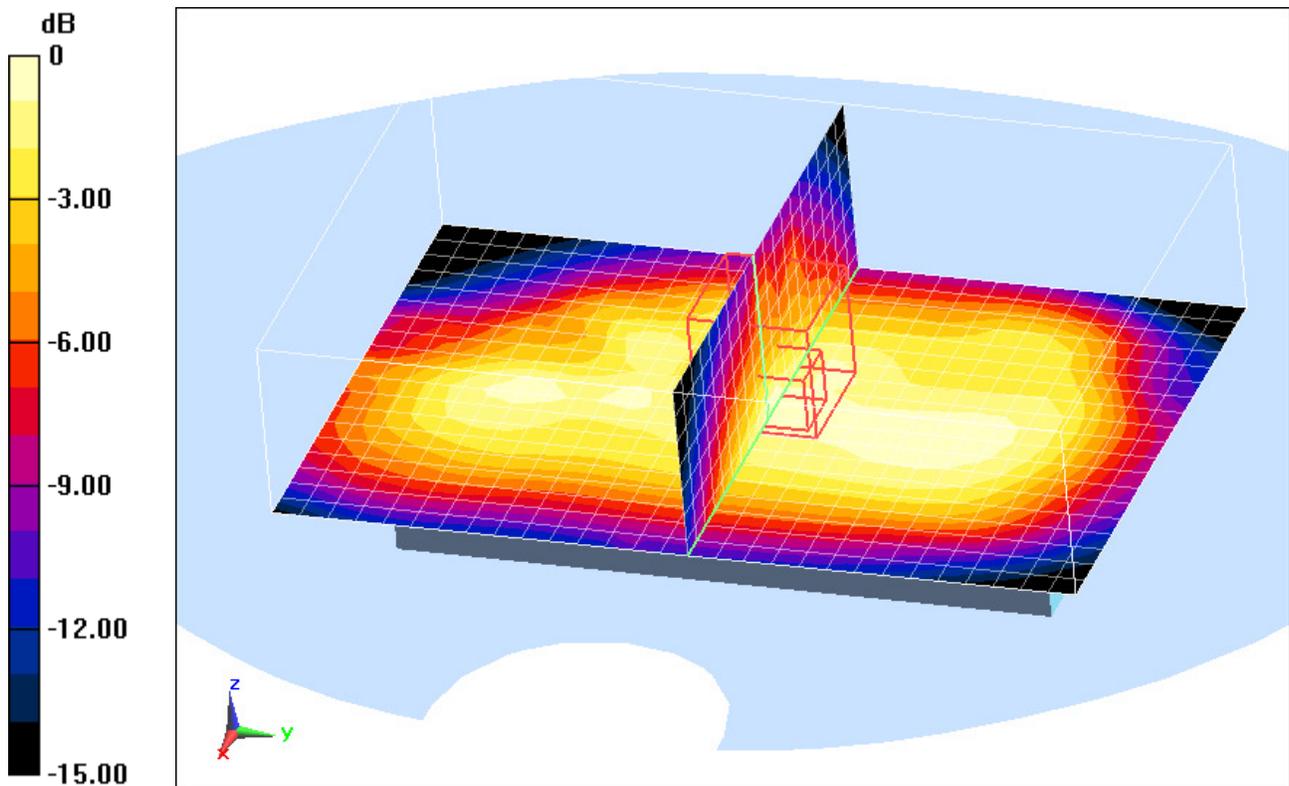
Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$ ;  $\sigma = 2.008 \text{ mho/m}$ ;  $\epsilon_r = 51.632$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

### Multi Band Result:

**SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.802 mW/g**



0 dB = 1.76 mW/g = 4.91 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

## DUT: ZNFLS860; Type: Portable Handset

Communication System: CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.989 \text{ mho/m}$ ;  $\epsilon_r = 53.635$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Communication System: LTE Band 25; Frequency: 1910 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1910 \text{ MHz}$ ;  $\sigma = 1.528 \text{ mho/m}$ ;  $\epsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

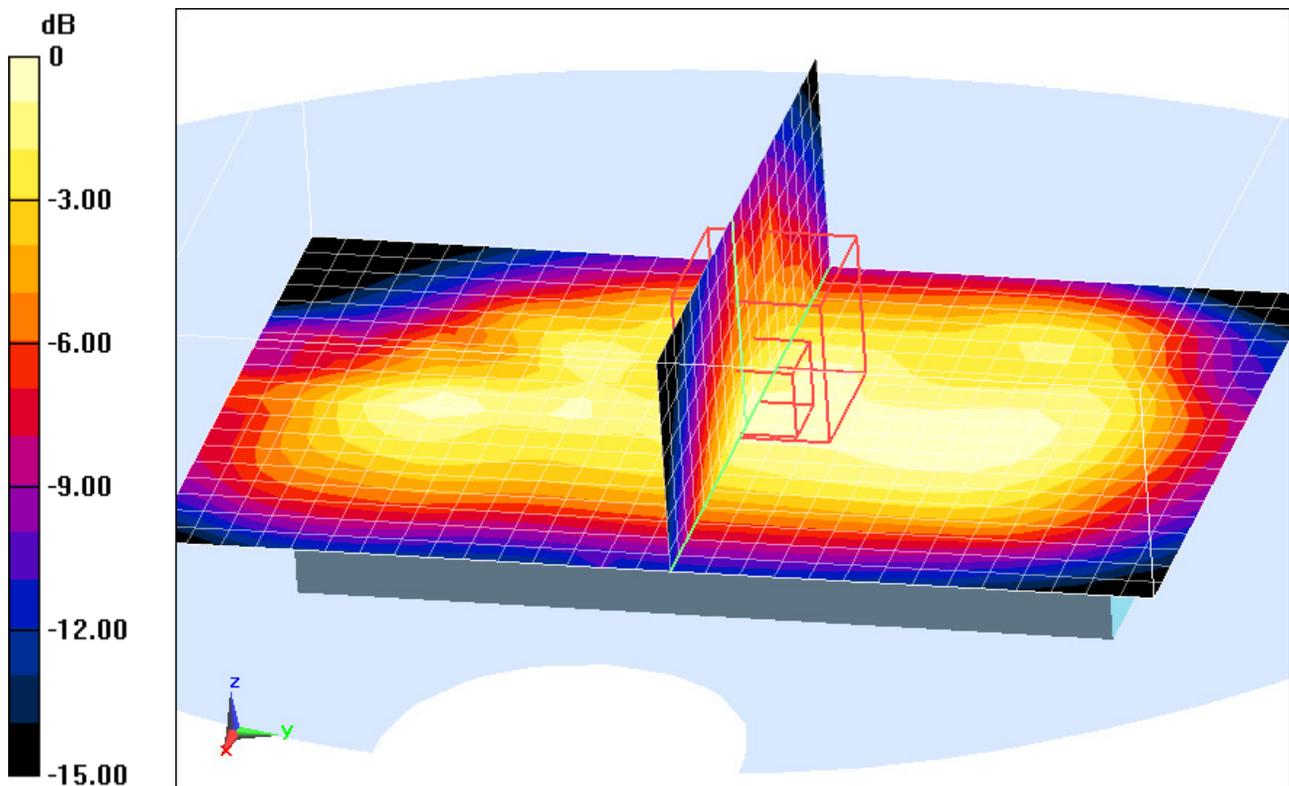
Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$ ;  $\sigma = 2.008 \text{ mho/m}$ ;  $\epsilon_r = 51.632$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

### Multi Band Result:

**SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.774 mW/g**



0 dB = 1.72 mW/g = 4.71 dB mW/g

# PCTEST ENGINEERING LABORATORY INC.

## DUT: ZNFLS860; Type: Portable Handset

Communication System: CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1908.75 \text{ MHz}$ ;  $\sigma = 1.527 \text{ mho/m}$ ;  $\epsilon_r = 52.114$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Communication System: LTE Band 25; Frequency: 1910 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1910 \text{ MHz}$ ;  $\sigma = 1.528 \text{ mho/m}$ ;  $\epsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

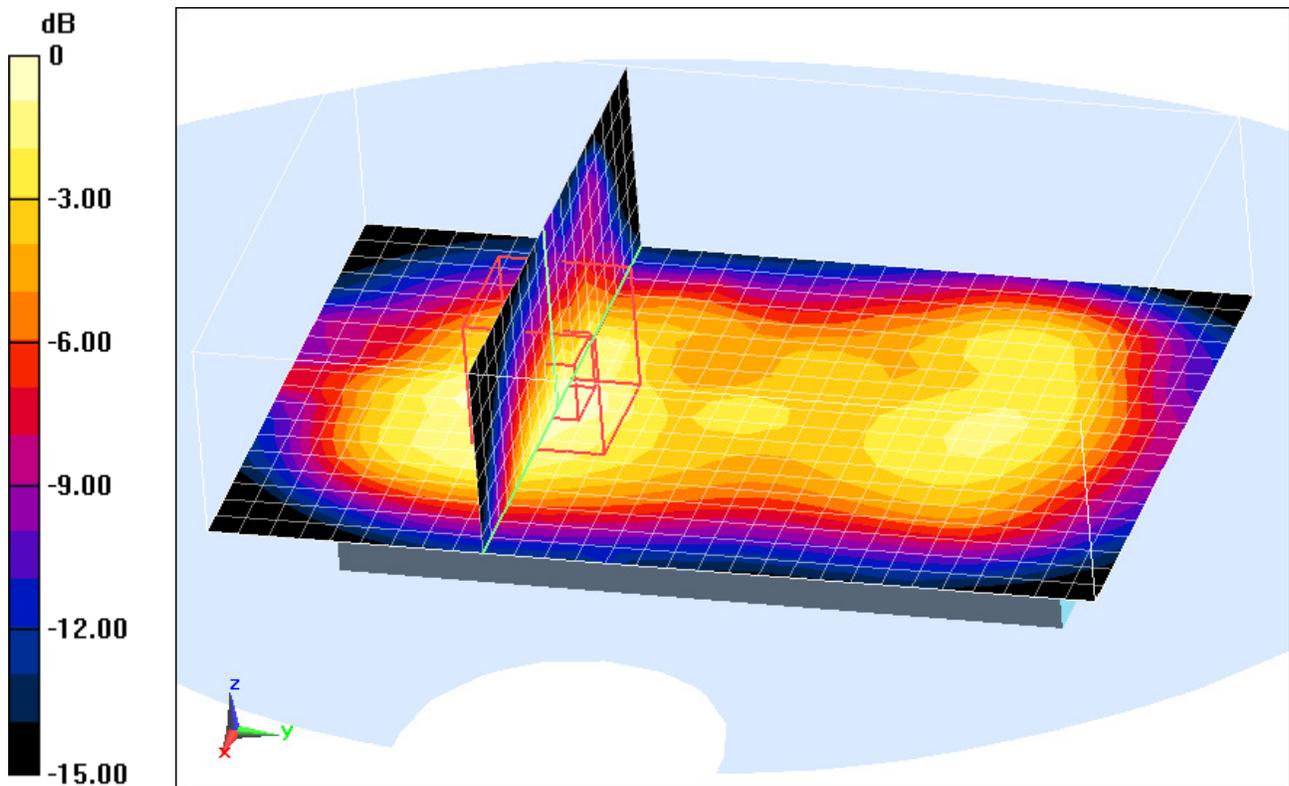
Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$ ;  $\sigma = 2.008 \text{ mho/m}$ ;  $\epsilon_r = 51.632$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

### Multi Band Result:

**SAR(1 g) = 1.41 mW/g; SAR(10 g) = 0.796 mW/g**



0 dB = 2.13 mW/g = 6.57 dB mW/g

## APPENDIX B: SYSTEM VERIFICATION

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.925 \text{ mho/m}$ ;  $\epsilon_r = 42$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-29-2012; Ambient Temp: 21.8 °C; Tissue Temp: 21.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

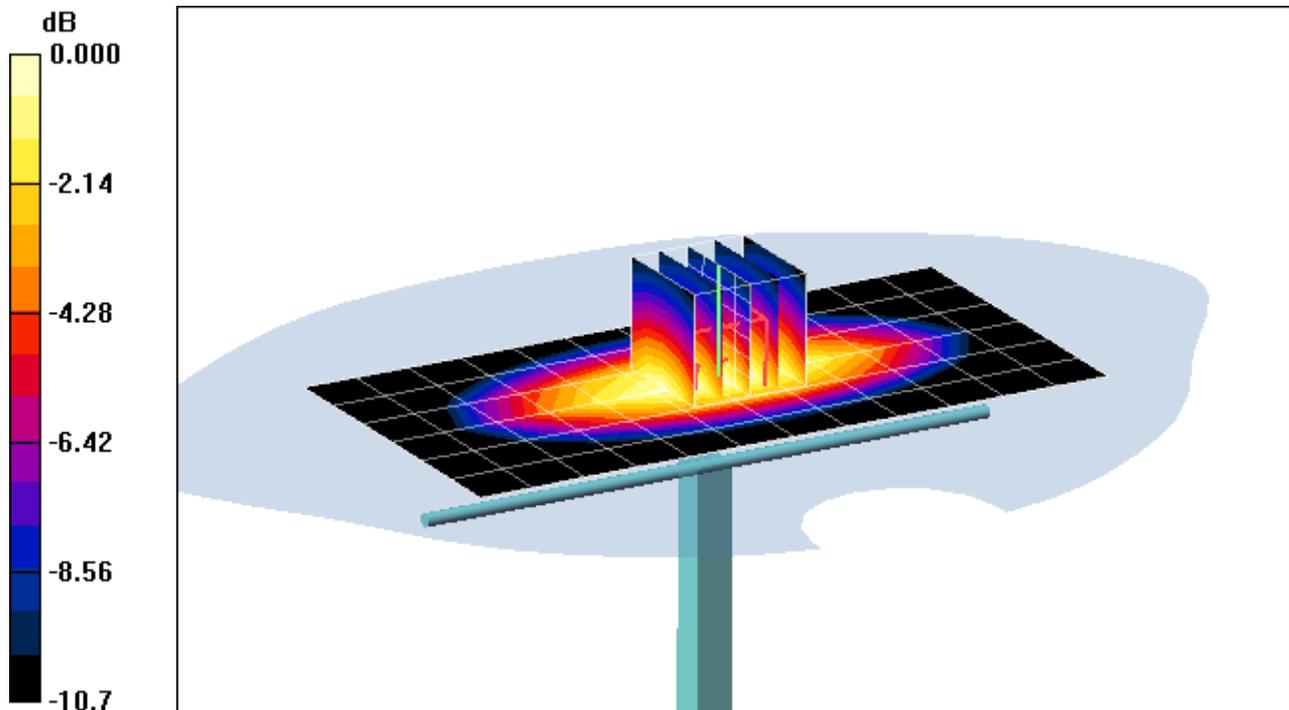
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.50 W/kg

**SAR(1 g) = 1 mW/g; SAR(10 g) = 0.652 mW/g**

Deviation = 6.16 %



0 dB = 1.08mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.925 \text{ mho/m}$ ;  $\epsilon_r = 42$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-29-2012; Ambient Temp: 21.8 °C; Tissue Temp: 21.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

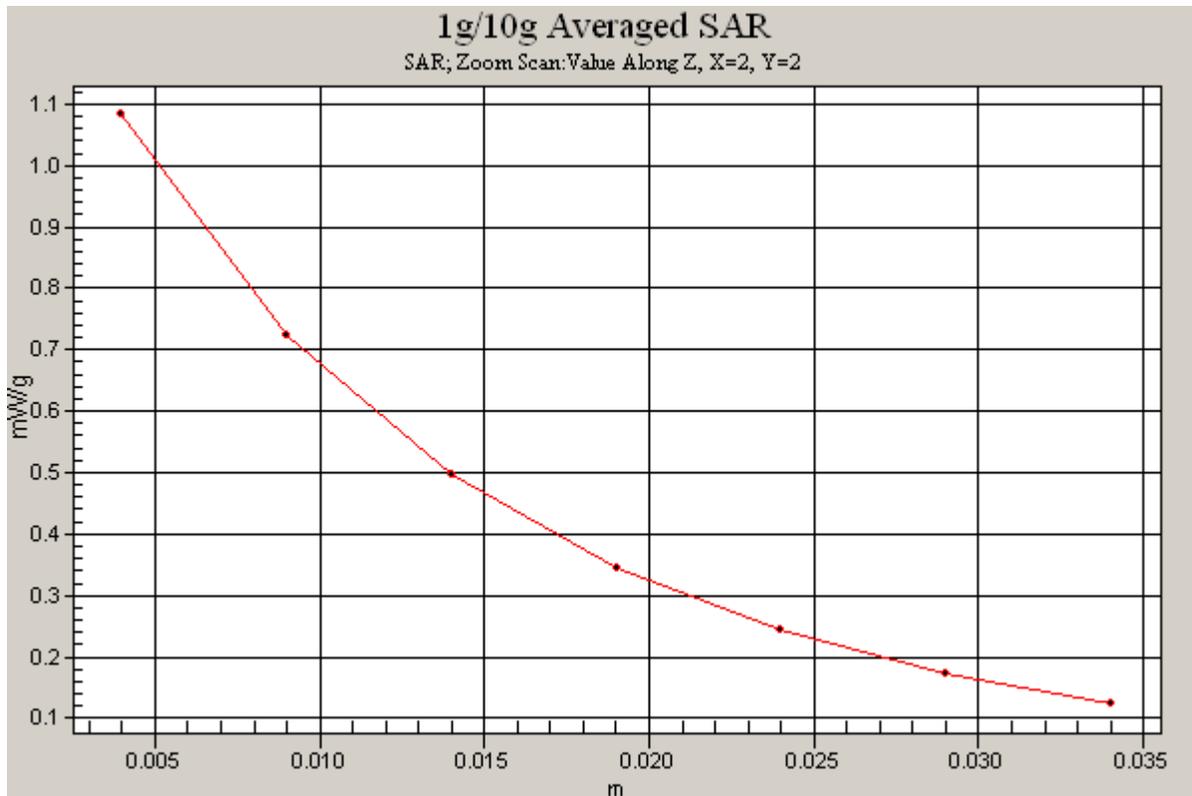
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.50 W/kg

**SAR(1 g) = 1 mW/g; SAR(10 g) = 0.652 mW/g**

Deviation = 6.16 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head; Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.906 \text{ mho/m}$ ;  $\epsilon_r = 40.07$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 08-07-2012; Ambient Temp: 24.2°C; Tissue Temp: 23.8°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

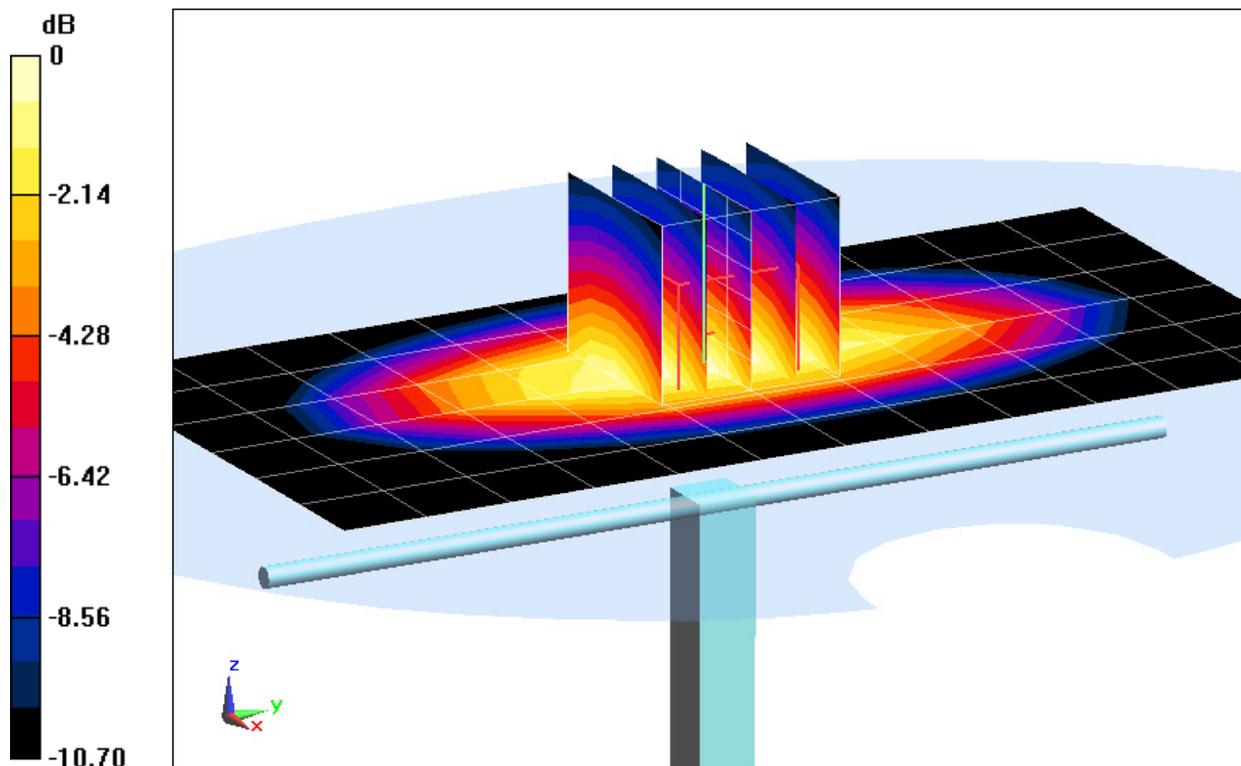
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.441 mW/g

**SAR(1 g) = 0.970 mW/g; SAR(10 g) = 0.632 mW/g**

Deviation = 2.97%



0 dB = 1.04 mW/g = 0.34 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head; Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.906 \text{ mho/m}$ ;  $\epsilon_r = 40.07$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 08-07-2012; Ambient Temp: 24.2°C; Tissue Temp: 23.8°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

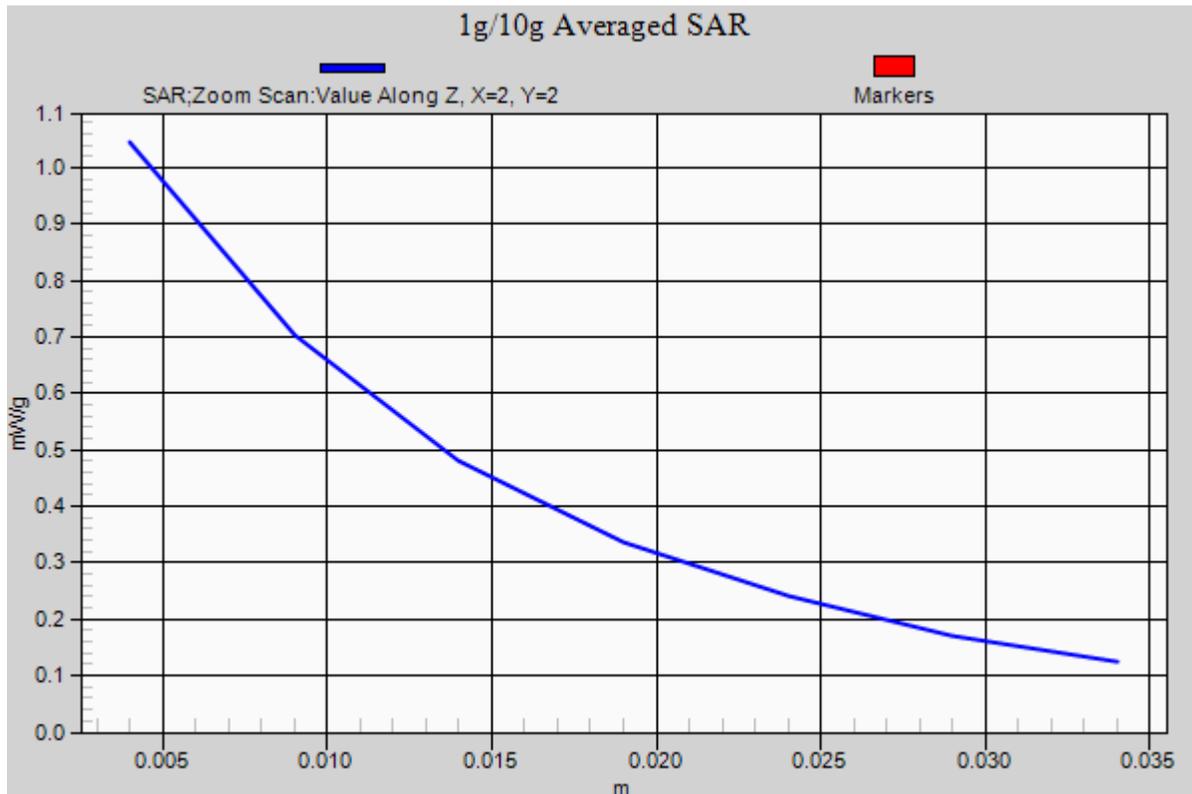
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.441 mW/g

**SAR(1 g) = 0.970 mW/g; SAR(10 g) = 0.632 mW/g**

Deviation = 2.97%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.41 \text{ mho/m}$ ;  $\epsilon_r = 38.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-01-2012; Ambient Temp: 23.0 °C; Tissue Temp: 21.4 °C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

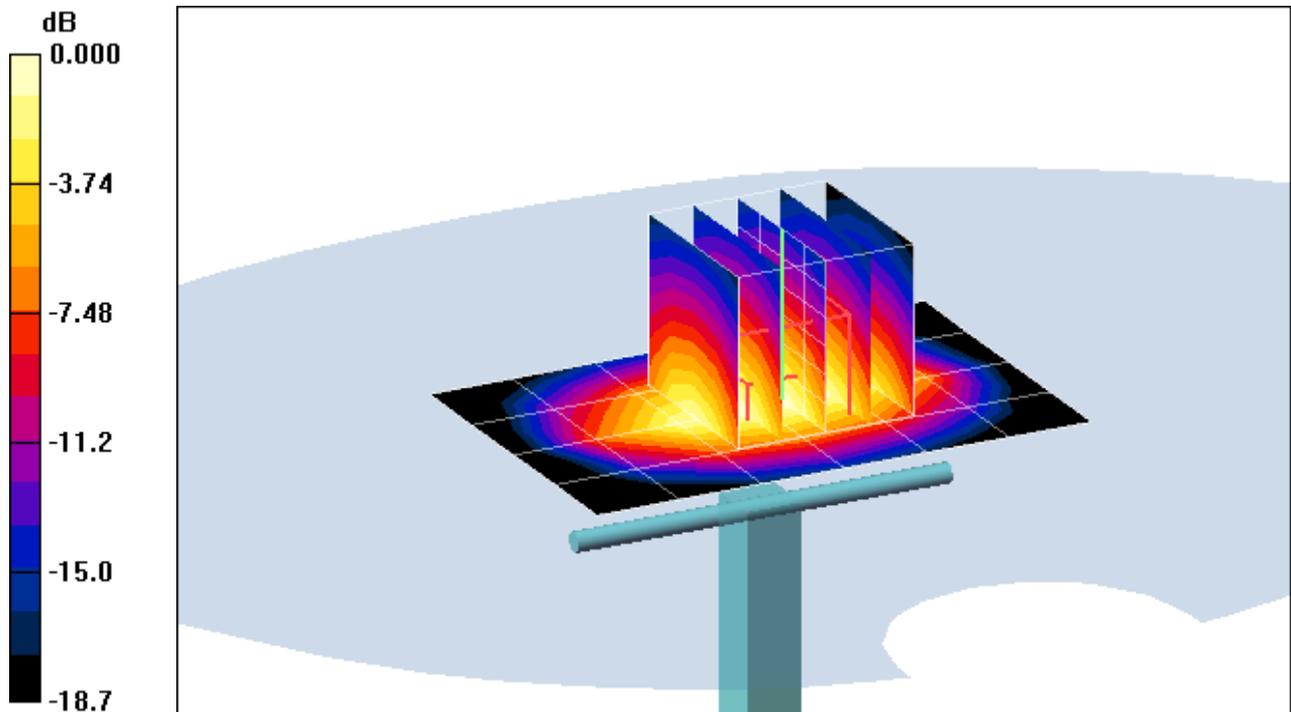
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.54 W/kg

**SAR(1 g) = 4.07 mW/g; SAR(10 g) = 2.11 mW/g**

Deviation = 2.01 %



0 dB = 4.49mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.41 \text{ mho/m}$ ;  $\epsilon_r = 38.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-01-2012; Ambient Temp: 23.0 °C; Tissue Temp: 21.4 °C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

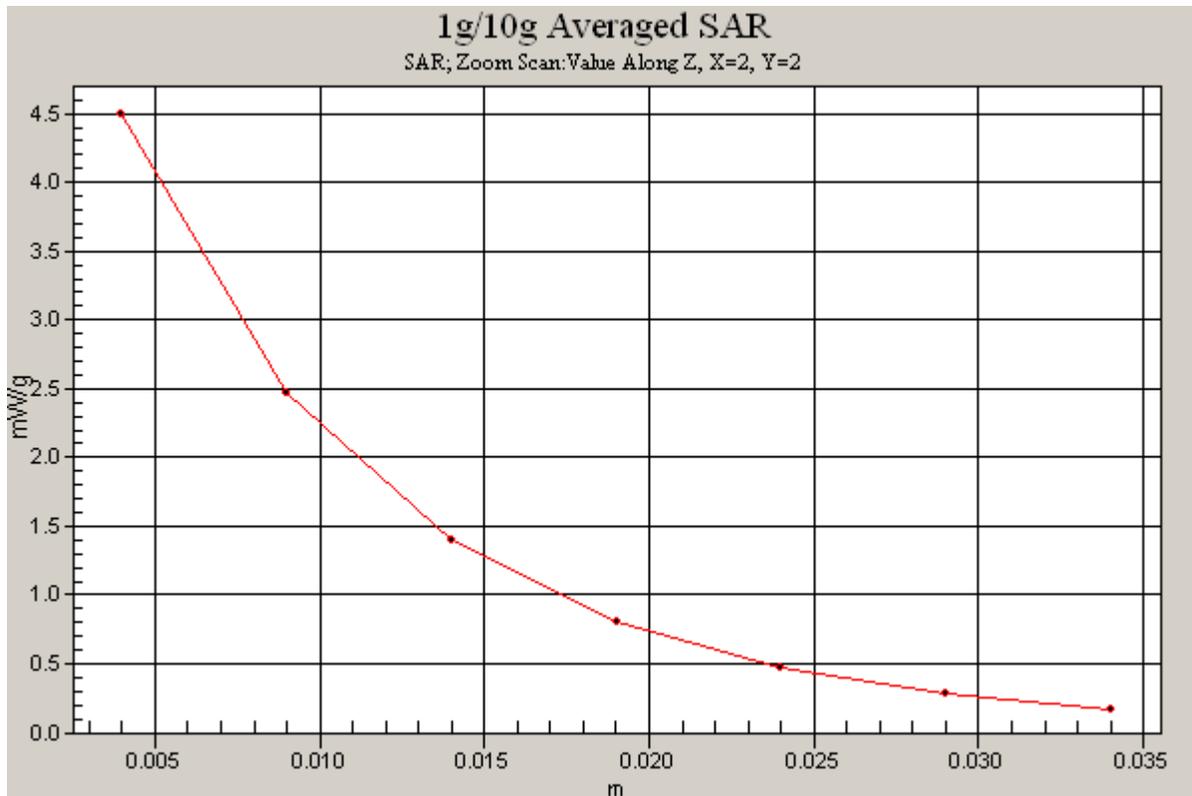
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.54 W/kg

**SAR(1 g) = 4.07 mW/g; SAR(10 g) = 2.11 mW/g**

Deviation = 2.01 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.448 \text{ mho/m}$ ;  $\epsilon_r = 38.52$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

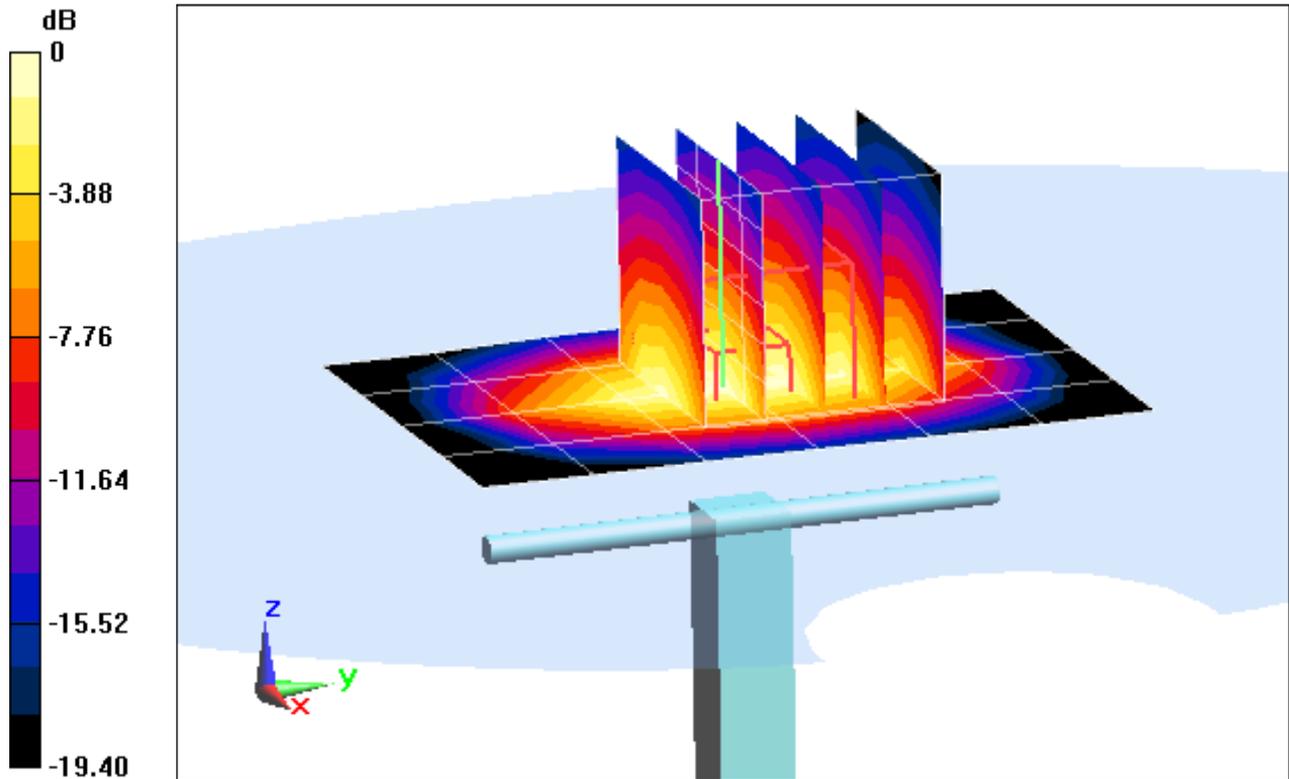
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 7.583 mW/g

**SAR(1 g) = 4.1 mW/g; SAR(10 g) = 2.13 mW/g**

Deviation = 2.76%



0 dB = 4.51 mW/g = 13.08 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.448 \text{ mho/m}$ ;  $\epsilon_r = 38.52$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

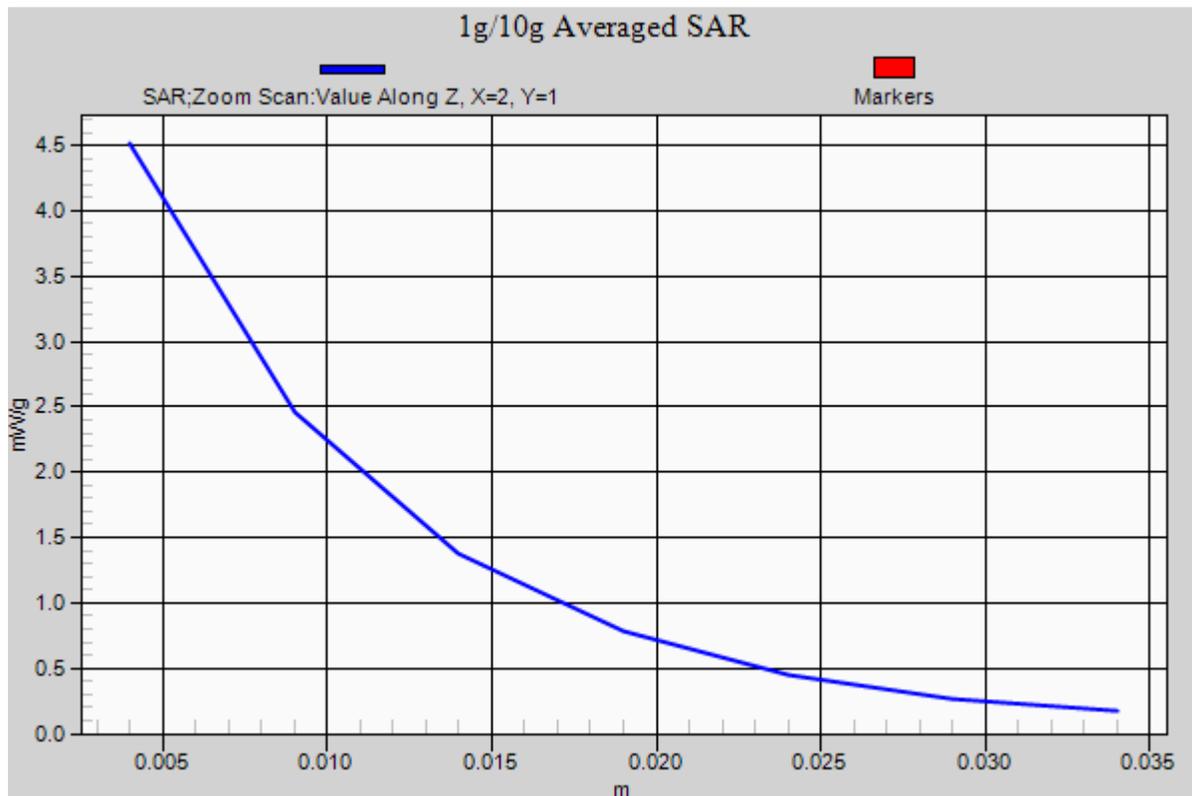
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 7.583 mW/g

**SAR(1 g) = 4.1 mW/g; SAR(10 g) = 2.13 mW/g**

Deviation = 2.76%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d149**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used (interpolated):

$f = 1900$  MHz;  $\sigma = 1.424$  mho/m;  $\epsilon_r = 39.223$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-07-2012; Ambient Temp: 23.8°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3287; ConvF(5.06, 5.06, 5.06); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/20/2012

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

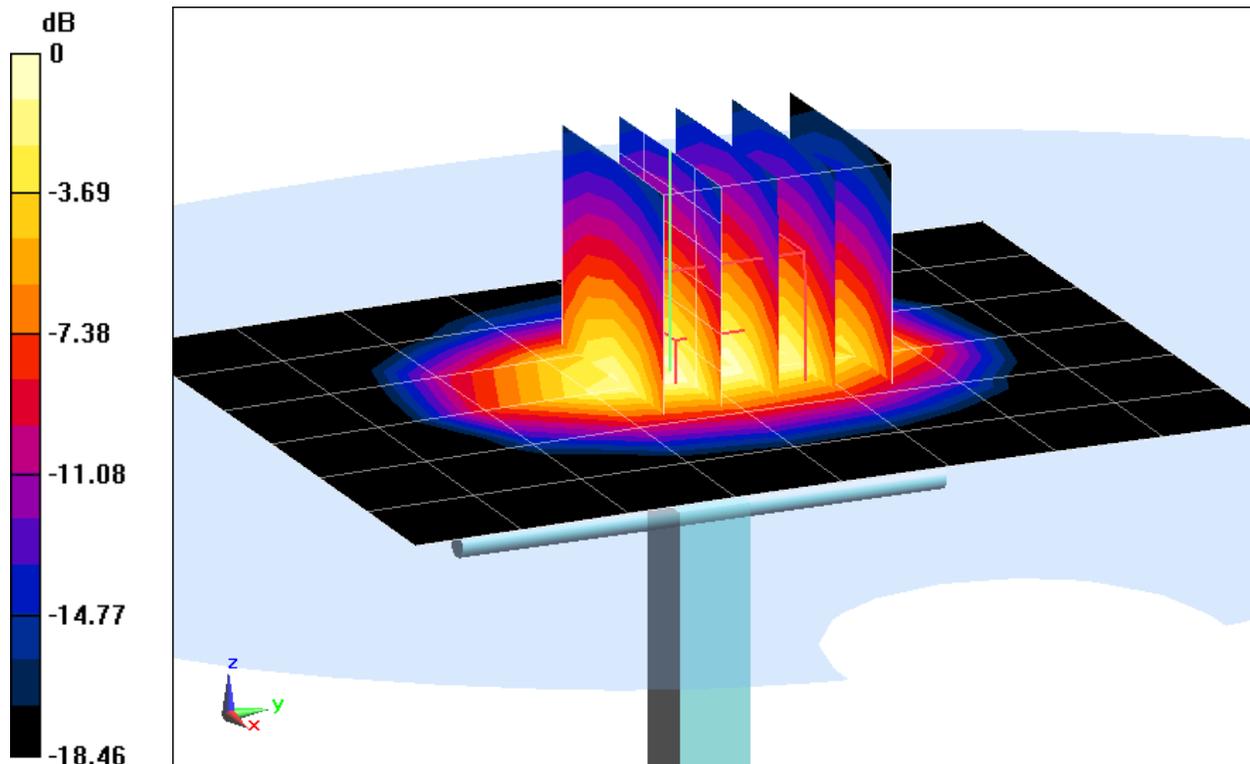
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.500 mW/g

**SAR(1 g) = 4.05 mW/g; SAR(10 g) = 2.11 mW/g**

Deviation = 3.05%



0 dB = 4.47 mW/g = 13.01 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d149**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.424 \text{ mho/m}$ ;  $\epsilon_r = 39.223$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-07-2012; Ambient Temp: 23.8°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3287; ConvF(5.06, 5.06, 5.06); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/20/2012

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

Measurement SW: DASYS2, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

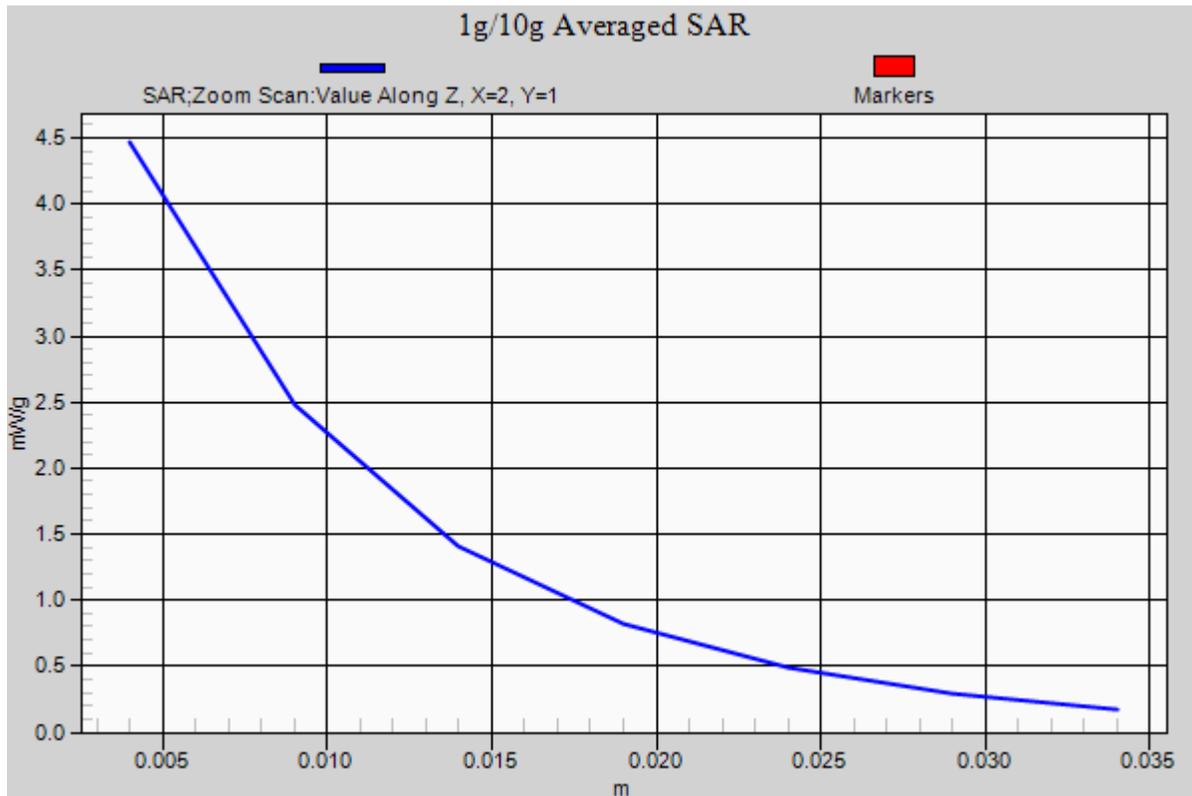
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.500 mW/g

**SAR(1 g) = 4.05 mW/g; SAR(10 g) = 2.11 mW/g**

Deviation = 3.05%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719**

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

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.85 \text{ mho/m}$ ;  $\epsilon_r = 38.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.9 °C; Tissue Temp: 24.2 °C

Probe: ES3DV2 - SN3022; ConvF(4.3, 4.3, 4.3); Calibrated: 8/25/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD X Version 14.6.4 (4989)

## 2450MHz System Verification

**Area Scan (6x8x1):** Measurement grid: dx=12mm, dy=12mm

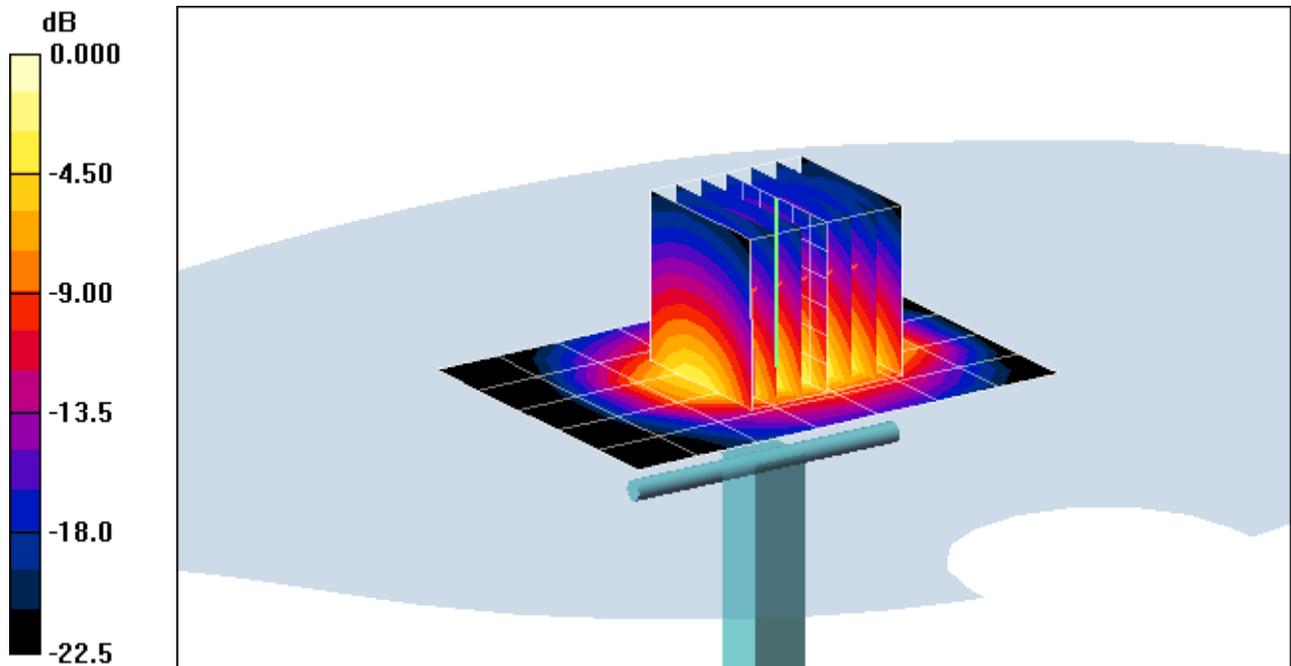
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Input Power = 16.0 dBm (40 mW)

Peak SAR (extrapolated) = 4.17 W/kg

**SAR(1 g) = 2.02 mW/g; SAR(10 g) = 0.935 mW/g**

Deviation = -6.13 %



0 dB = 2.66mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719**

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

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.85 \text{ mho/m}$ ;  $\epsilon_r = 38.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.9 °C; Tissue Temp: 24.2 °C

Probe: ES3DV2 - SN3022; ConvF(4.3, 4.3, 4.3); Calibrated: 8/25/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD X Version 14.6.4 (4989)

## 2450MHz System Verification

**Area Scan (6x8x1):** Measurement grid: dx=12mm, dy=12mm

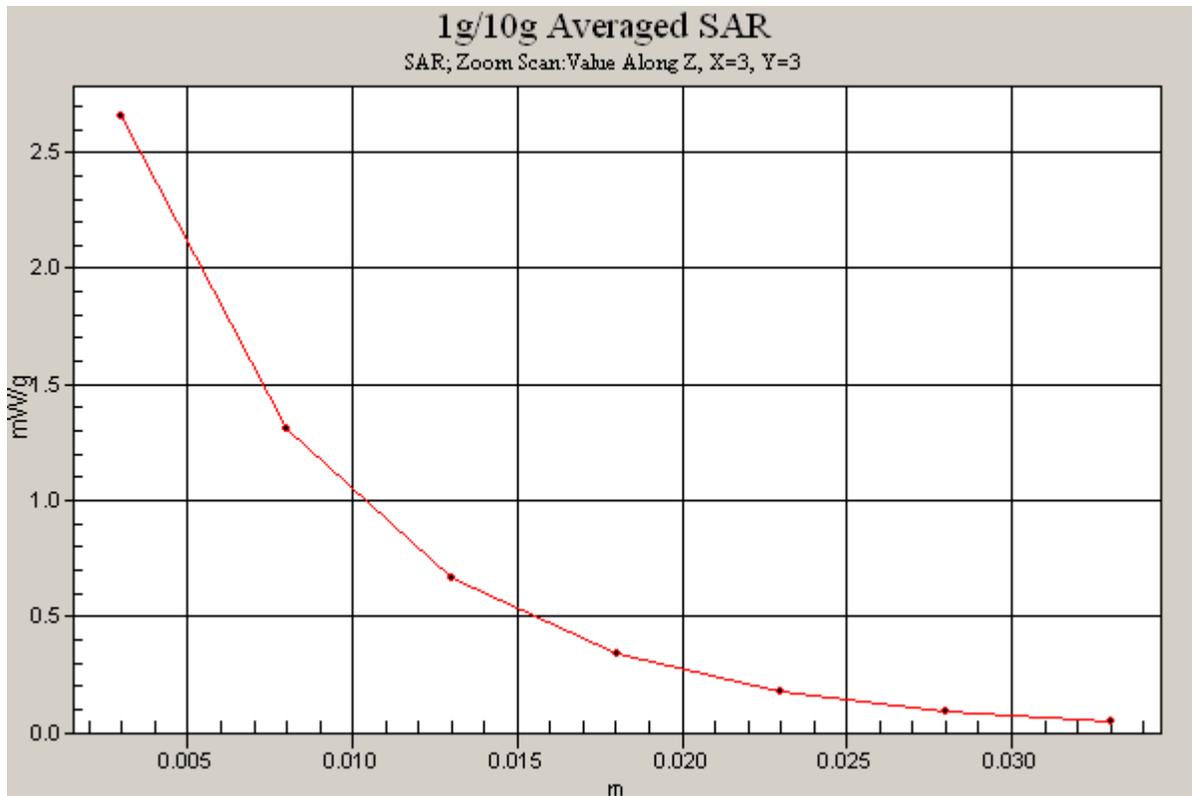
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Input Power = 16.0 dBm (40 mW)

Peak SAR (extrapolated) = 4.17 W/kg

**SAR(1 g) = 2.02 mW/g; SAR(10 g) = 0.935 mW/g**

Deviation = -6.13 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.995 \text{ mho/m}$ ;  $\epsilon_r = 53$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-28-2012; Ambient Temp: 23.0 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

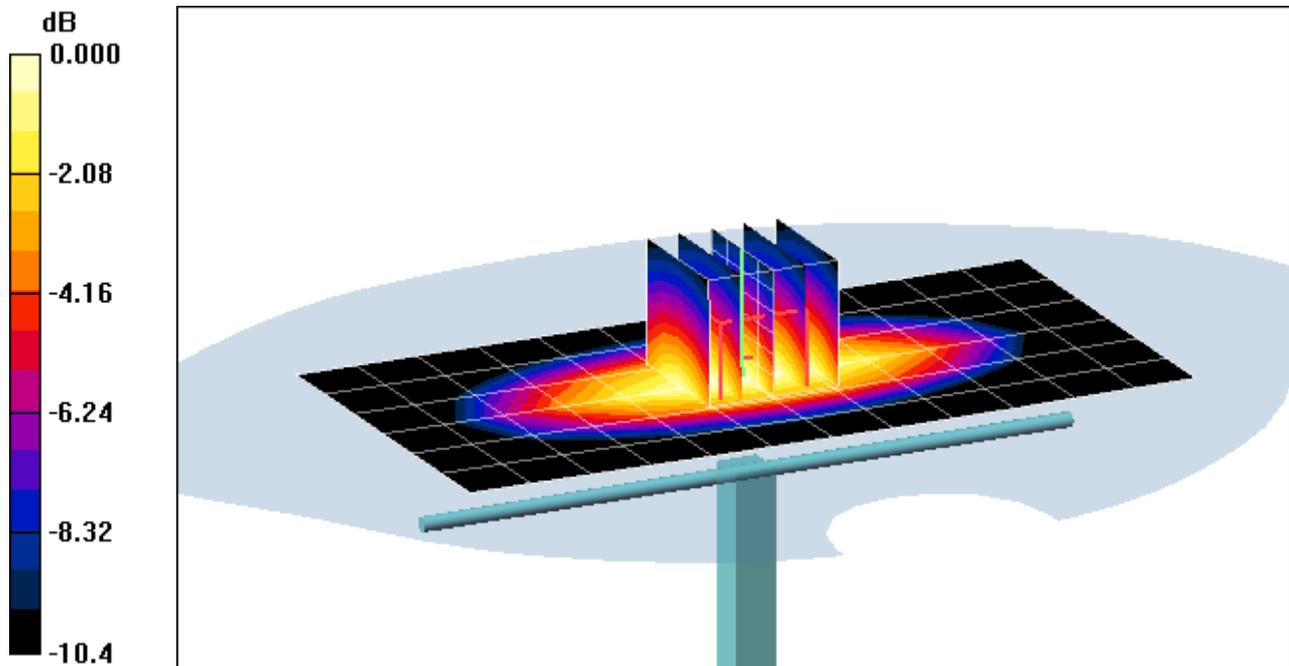
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.50 W/kg

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.664 mW/g**

Deviation = 6.69 %



0 dB = 1.11mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.995 \text{ mho/m}$ ;  $\epsilon_r = 53$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-28-2012; Ambient Temp: 23.0 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

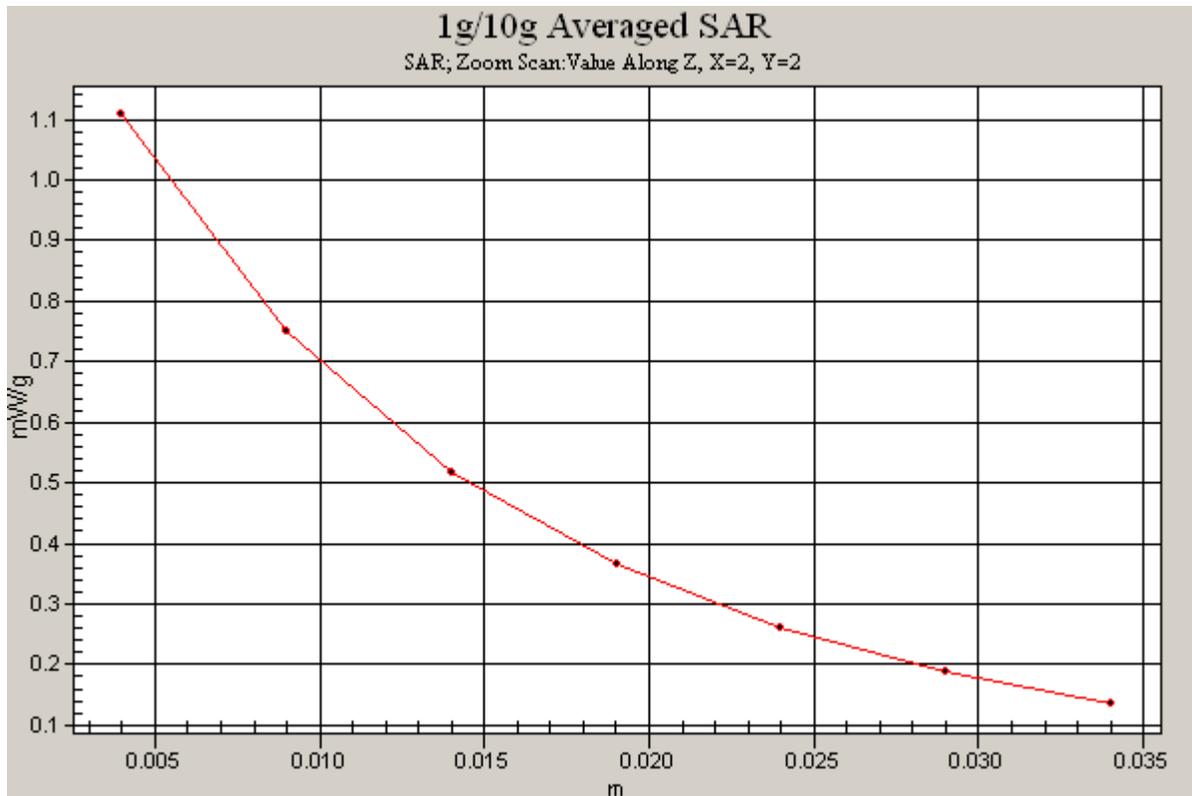
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.50 W/kg

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.664 mW/g**

Deviation = 6.69 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.997 \text{ mho/m}$ ;  $\epsilon_r = 53.66$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-31-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

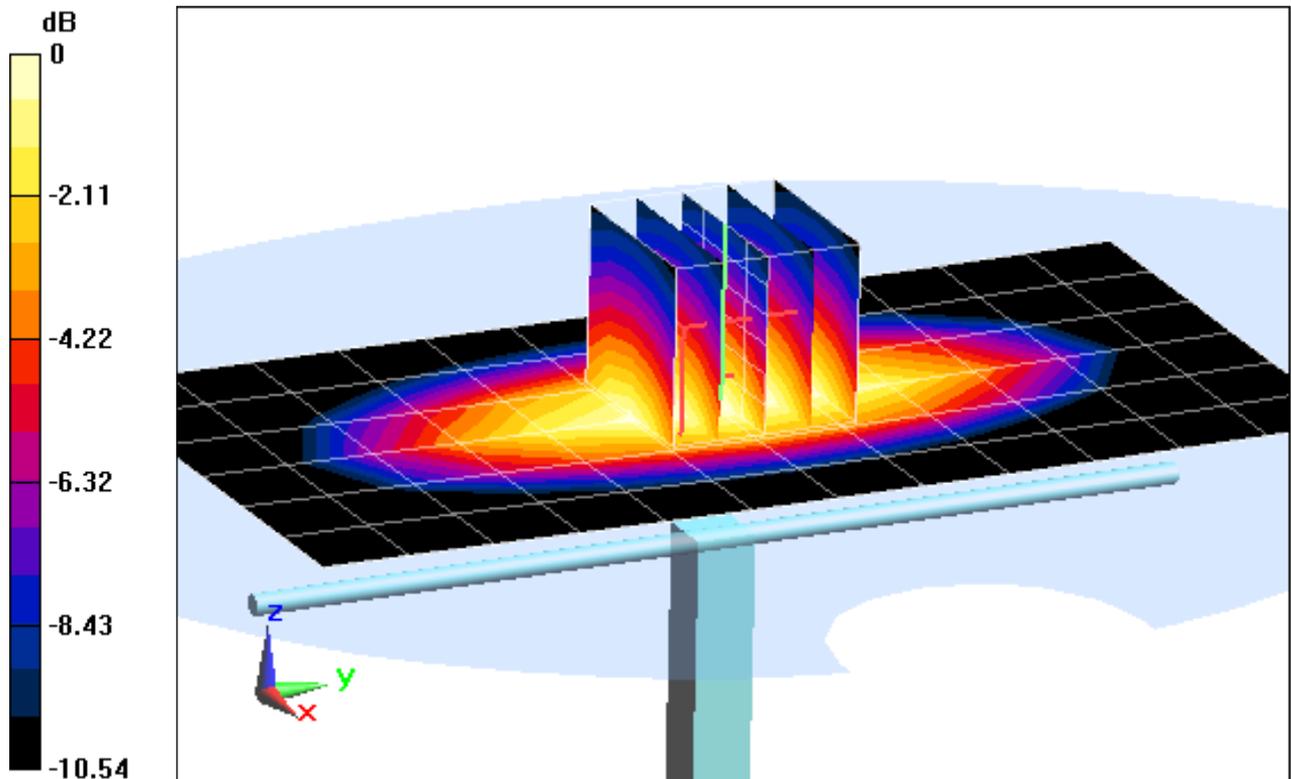
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 1.505 mW/g

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.668 mW/g**

Deviation = 6.69%



0 dB = 1.11 mW/g = 0.91 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.997 \text{ mho/m}$ ;  $\epsilon_r = 53.66$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-31-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

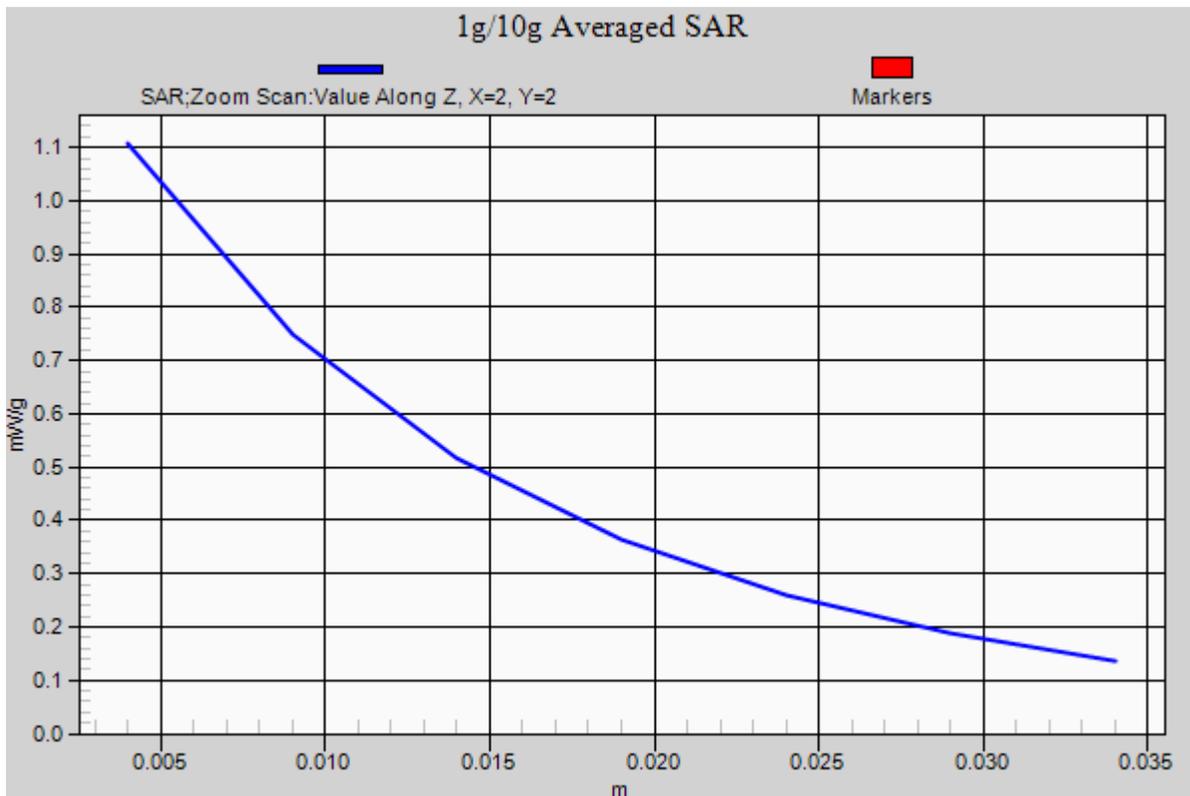
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 1.505 mW/g

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.668 mW/g**

Deviation = 6.69%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 835 MHz; Type: D835V2; Serial: 4d047**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1  
Medium: 835 Body; Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.988 \text{ mho/m}$ ;  $\epsilon_r = 53.62$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-12-2012; Ambient Temp: 23.3°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3287; ConvF(6.02, 6.02, 6.02); Calibrated: 2/7/2012;  
Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/20/2012

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 835 MHz System Verification

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm

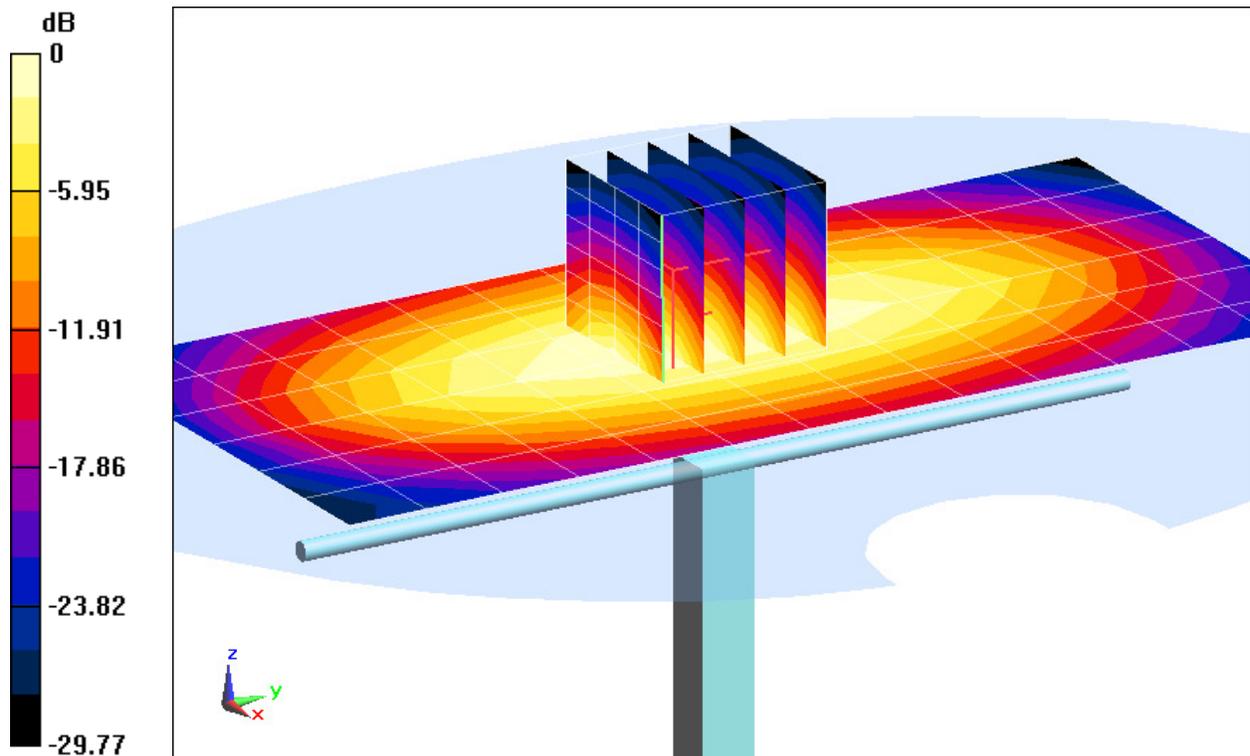
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.399 mW/g

**SAR(1 g) = 0.969 mW/g; SAR(10 g) = 0.637 mW/g**

Deviation = 2.98%



0 dB = 1.02 mW/g = 0.17 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 835 MHz; Type: D835V2; Serial: 4d047**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.988 \text{ mho/m}$ ;  $\epsilon_r = 53.62$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-12-2012; Ambient Temp: 23.3°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3287; ConvF(6.02, 6.02, 6.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/20/2012

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

## 835 MHz System Verification

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm

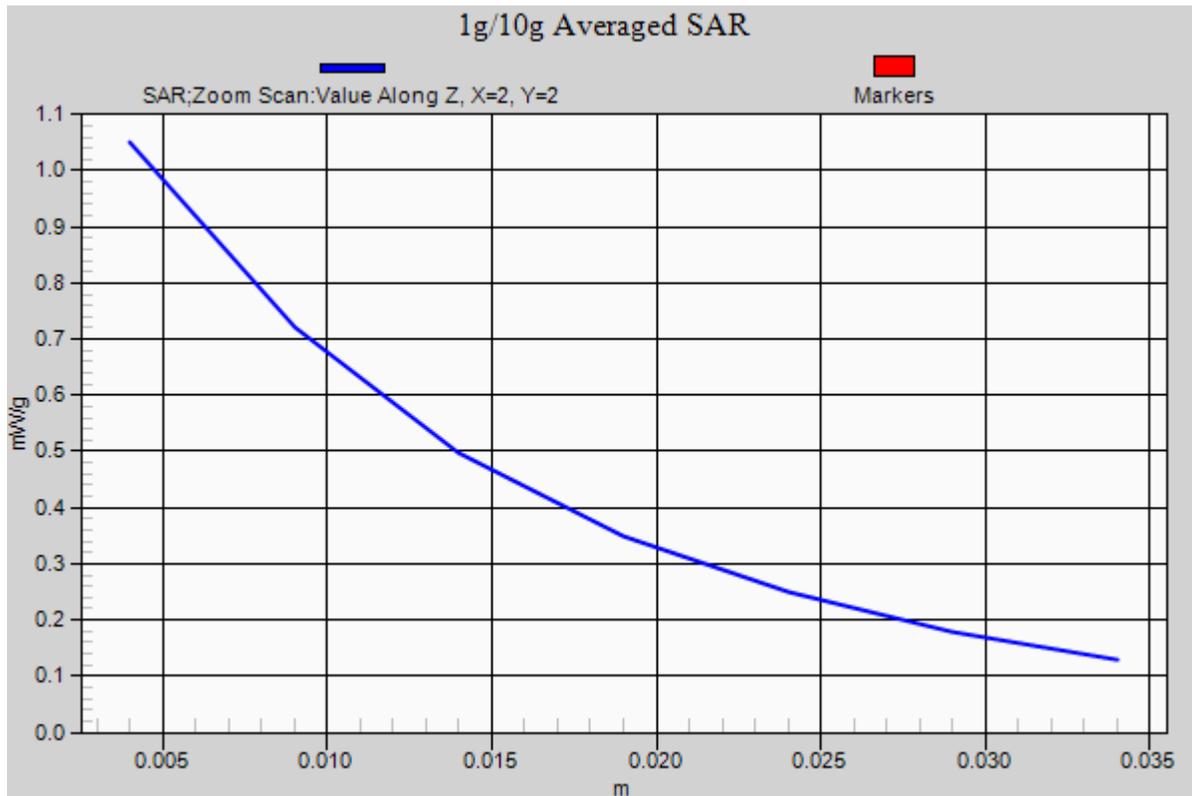
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.399 mW/g

**SAR(1 g) = 0.969 mW/g; SAR(10 g) = 0.637 mW/g**

Deviation = 2.98%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body; Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.988 \text{ mho/m}$ ;  $\epsilon_r = 52.84$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 08-07-2012; Ambient Temp: 24.8°C; Tissue Temp: 24.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

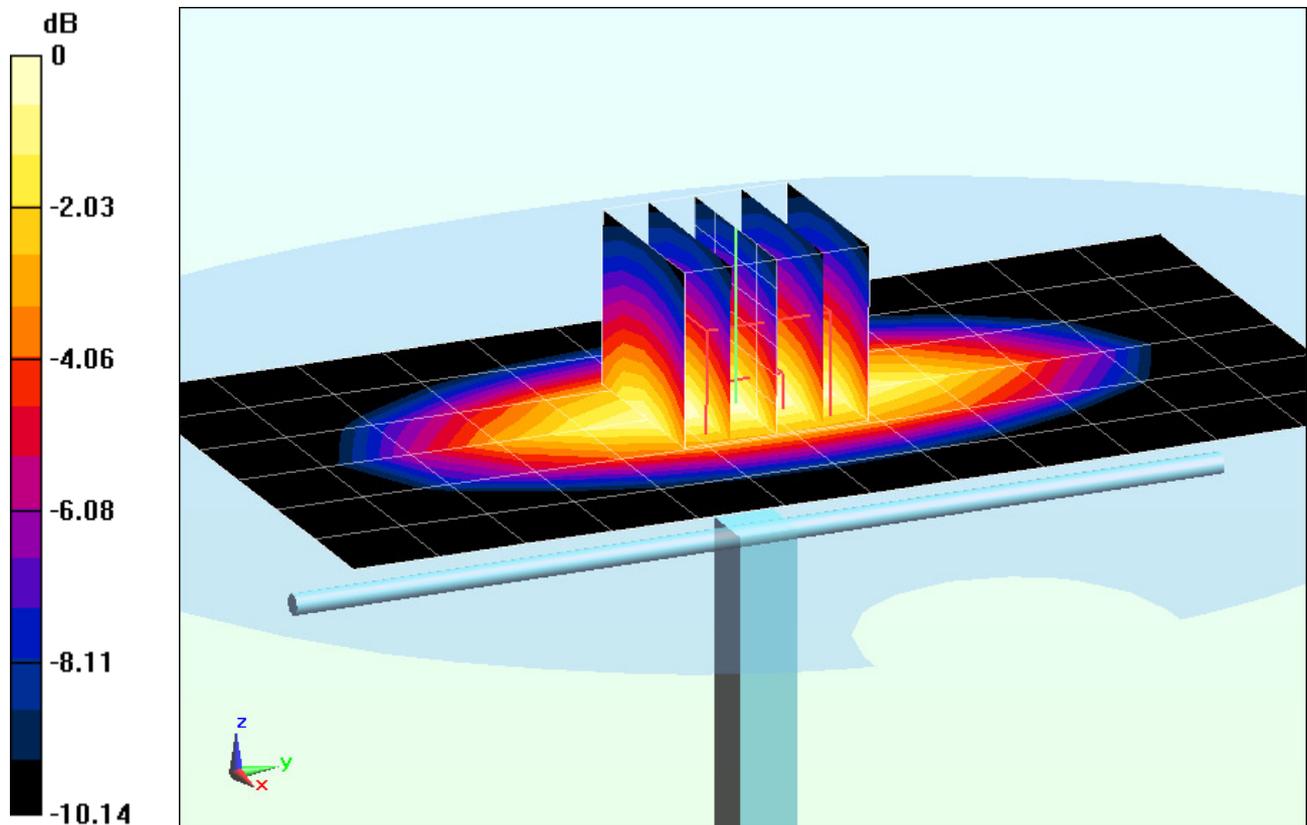
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.433 mW/g

**SAR(1 g) = 0.985 mW/g; SAR(10 g) = 0.650 mW/g**

Deviation = 3.03%



0 dB = 1.07 mW/g = 0.59 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1  
Medium: 835 Body; Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.988 \text{ mho/m}$ ;  $\epsilon_r = 52.84$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 08-07-2012; Ambient Temp: 24.8°C; Tissue Temp: 24.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

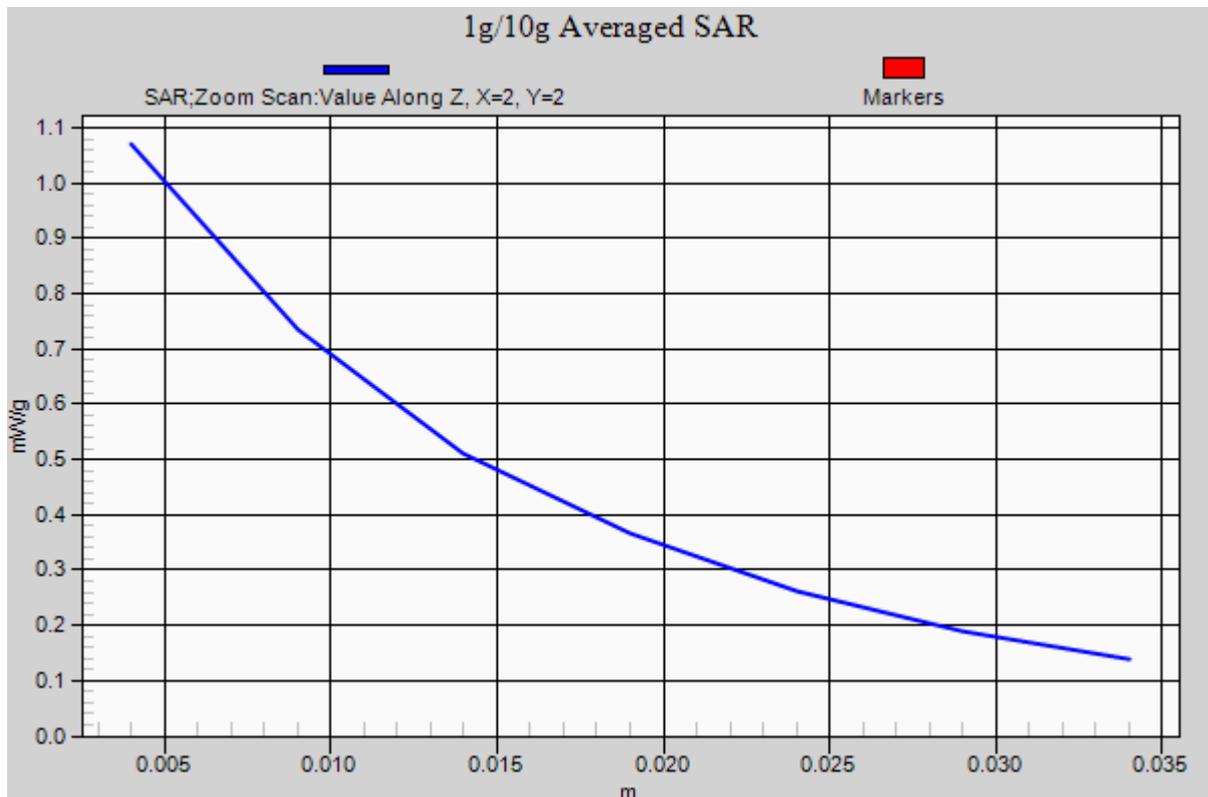
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.433 mW/g

**SAR(1 g) = 0.985 mW/g; SAR(10 g) = 0.650 mW/g**

Deviation = 3.03%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d149**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.5 \text{ mho/m}$ ;  $\epsilon_r = 52.44$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3288; ConvF(5.02, 5.02, 5.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

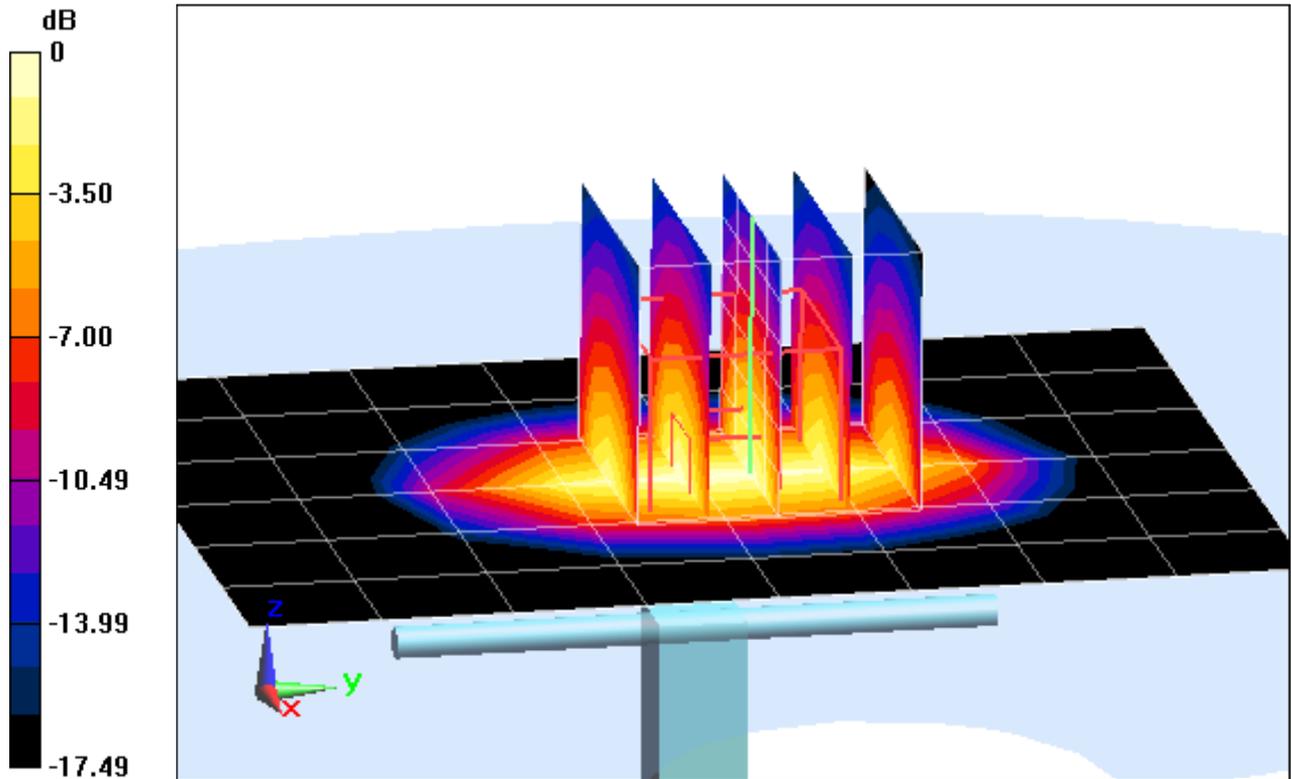
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 6.939 mW/g

**SAR(1 g) = 3.93 mW/g; SAR(10 g) = 2.08 mW/g**

Deviation = 0.00%



0 dB = 4.40 mW/g = 12.87 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d149**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.5 \text{ mho/m}$ ;  $\epsilon_r = 52.44$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3288; ConvF(5.02, 5.02, 5.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

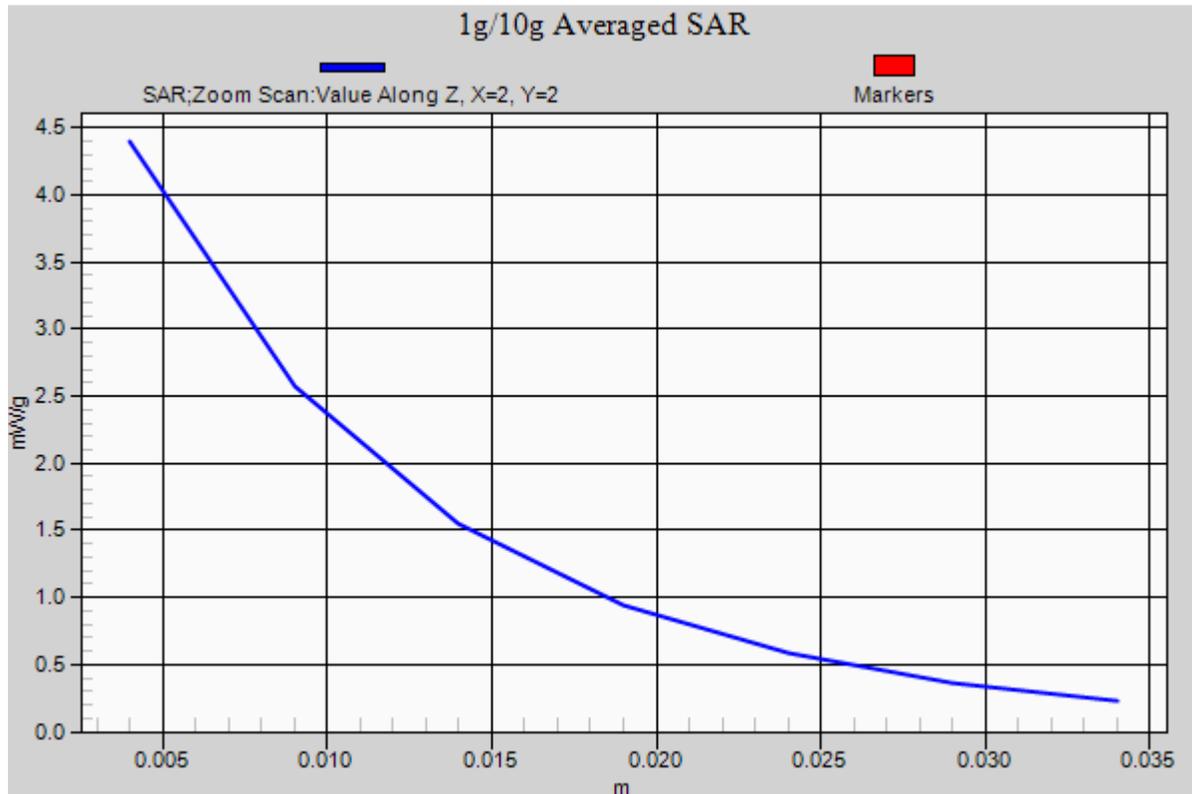
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 6.939 mW/g

**SAR(1 g) = 3.93 mW/g; SAR(10 g) = 2.08 mW/g**

Deviation = 0.00%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.53 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-03-2012; Ambient Temp: 24.2 °C; Tissue Temp: 23.6 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

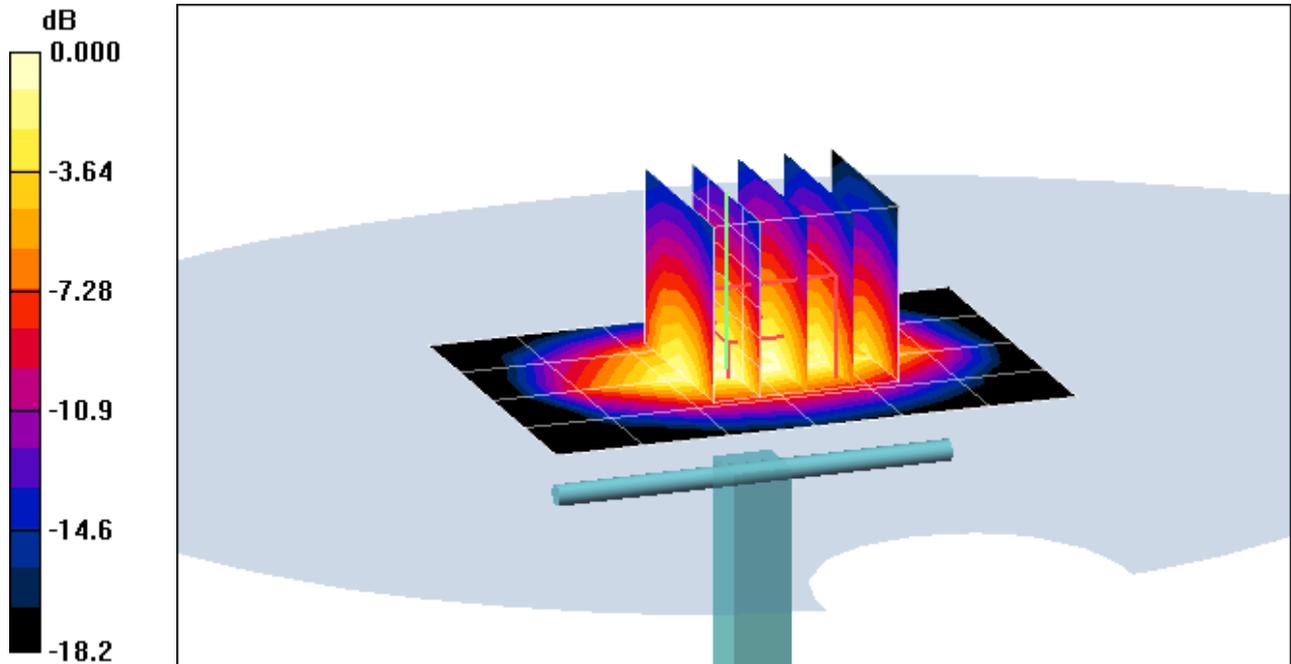
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.47 W/kg

**SAR(1 g) = 4.2 mW/g; SAR(10 g) = 2.21 mW/g**

Deviation = 2.69 %



0 dB = 4.67mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.53 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-03-2012; Ambient Temp: 24.2 °C; Tissue Temp: 23.6 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, V4.7 Build 80; SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

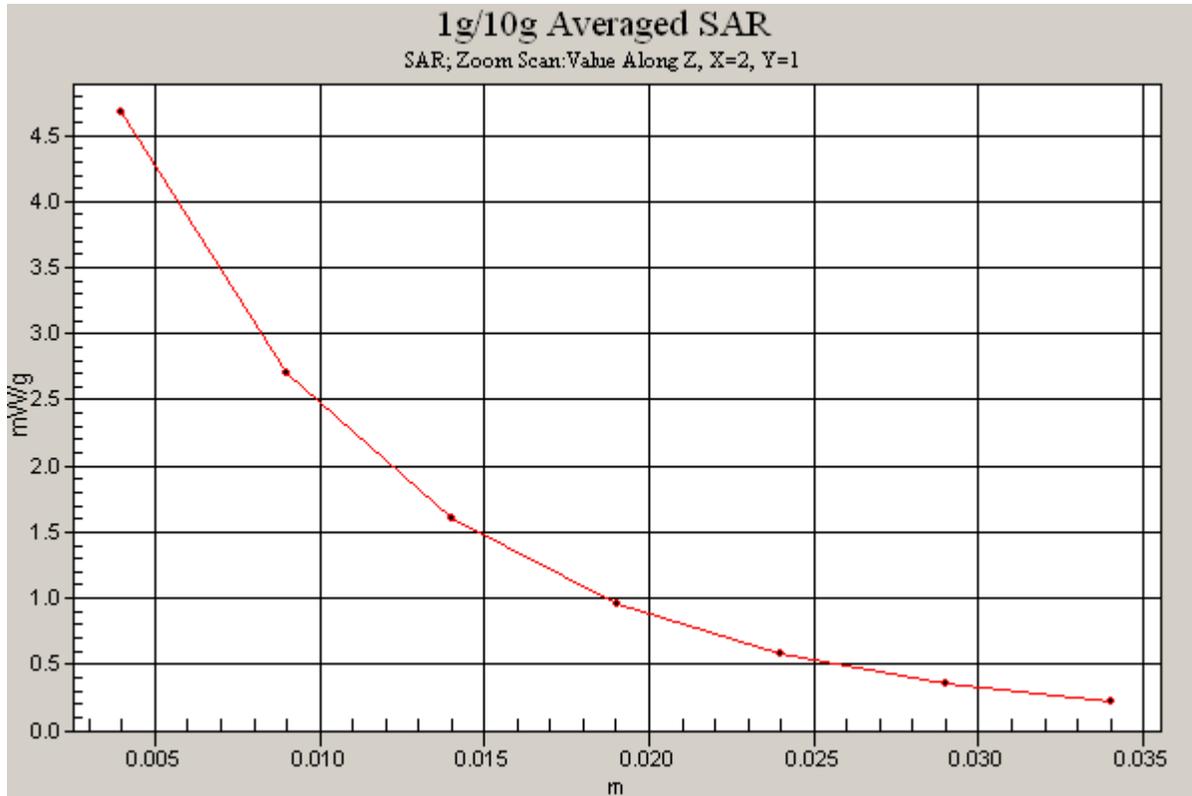
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.47 W/kg

**SAR(1 g) = 4.2 mW/g; SAR(10 g) = 2.21 mW/g**

Deviation = 2.69 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 51.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-09-2012; Ambient Temp: 23.7°C; Tissue Temp: 24.8°C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

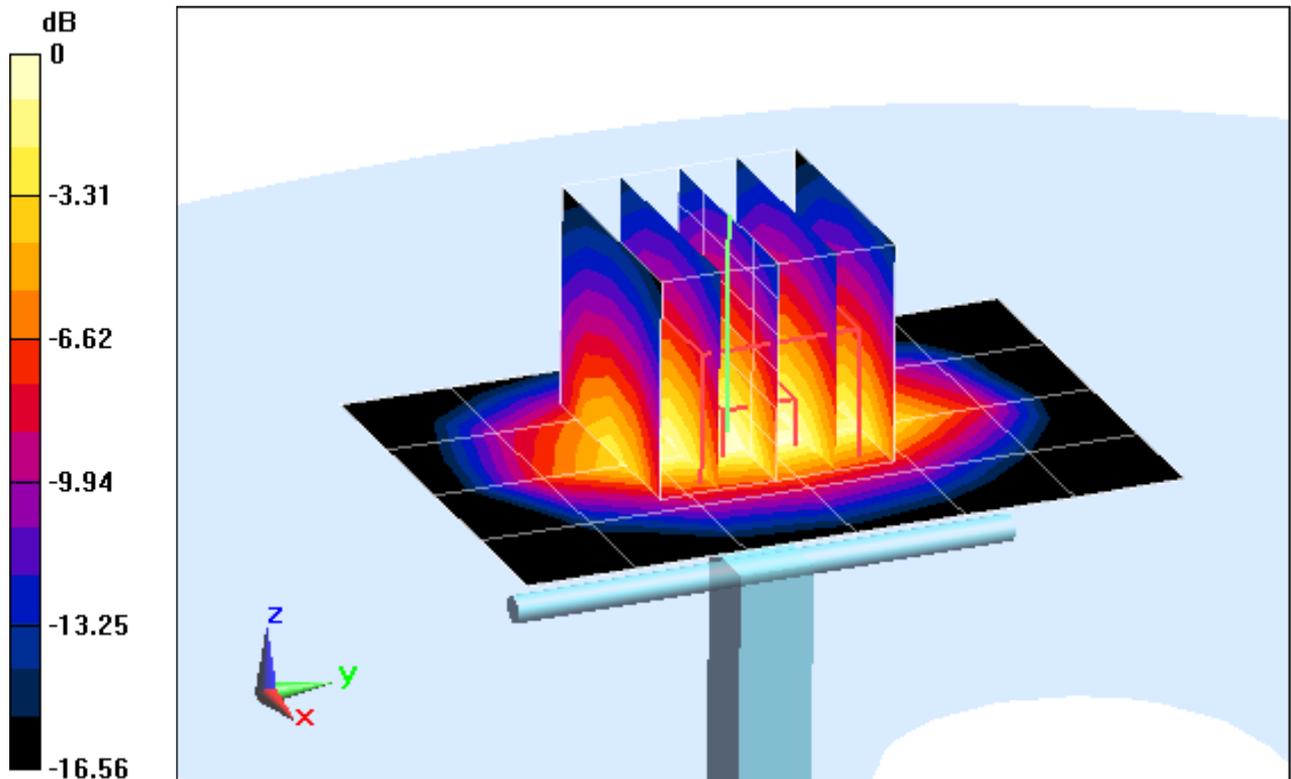
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 7.222 mW/g

**SAR(1 g) = 4.23 mW/g; SAR(10 g) = 2.29 mW/g**

Deviation = 3.42%



0 dB = 4.72 mW/g = 13.48 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 51.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-09-2012; Ambient Temp: 23.7°C; Tissue Temp: 24.8°C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

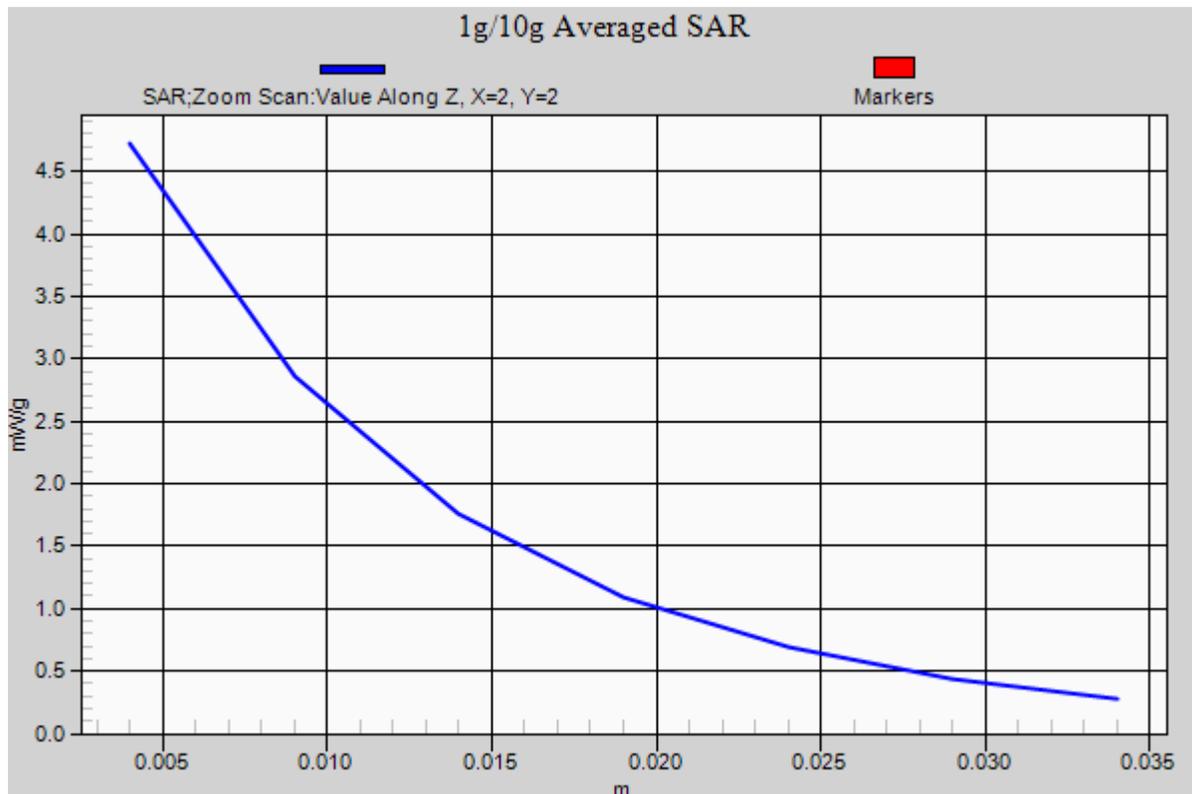
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20 dBm (100 mW)

Peak SAR (extrapolated) = 7.222 mW/g

**SAR(1 g) = 4.23 mW/g; SAR(10 g) = 2.29 mW/g**

Deviation = 3.42%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d149**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.519 \text{ mho/m}$ ;  $\epsilon_r = 52.21$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-12-2012; Ambient Temp: 23.0 °C; Tissue Temp: 22.7 °C

Probe: ES3DV3 - SN3288; ConvF(5.02, 5.02, 5.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

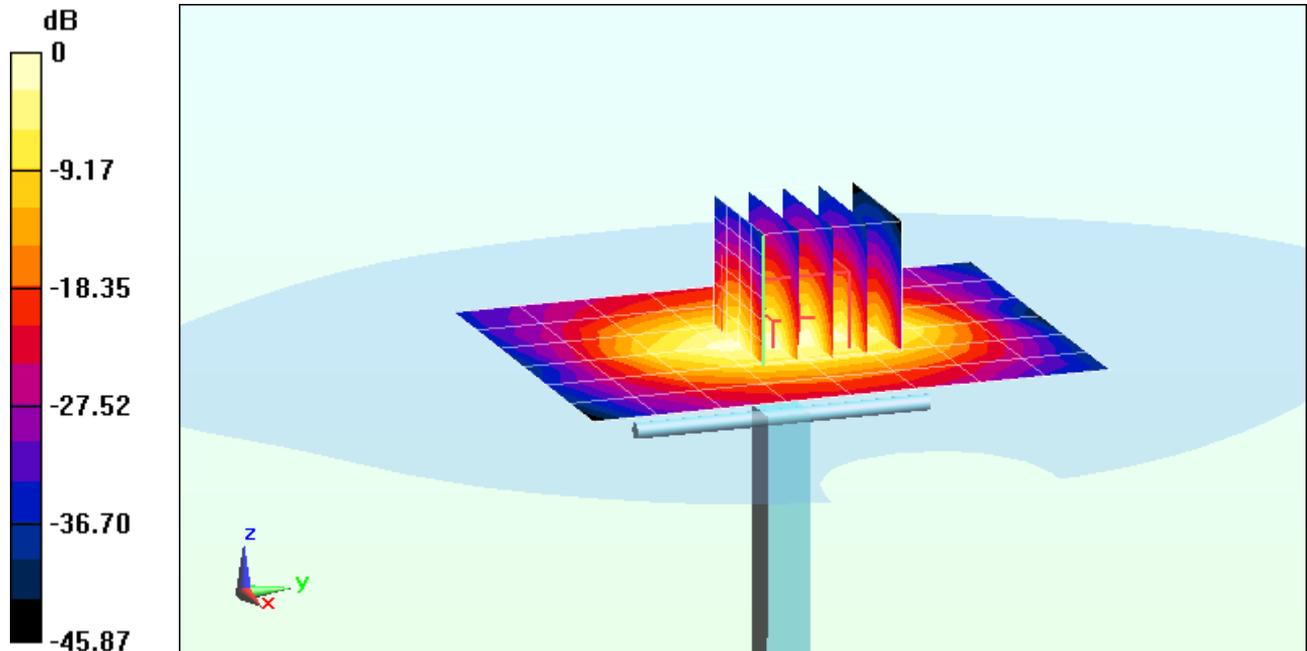
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.030 mW/g

**SAR(1 g) = 3.91 mW/g; SAR(10 g) = 2.04 mW/g**

Deviation = -0.51 %



0 dB = 4.41 mW/g = 12.88 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d149**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900$  MHz;  $\sigma = 1.519$  mho/m;  $\epsilon_r = 52.21$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-12-2012; Ambient Temp: 23.0°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3288; ConvF(5.02, 5.02, 5.02); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

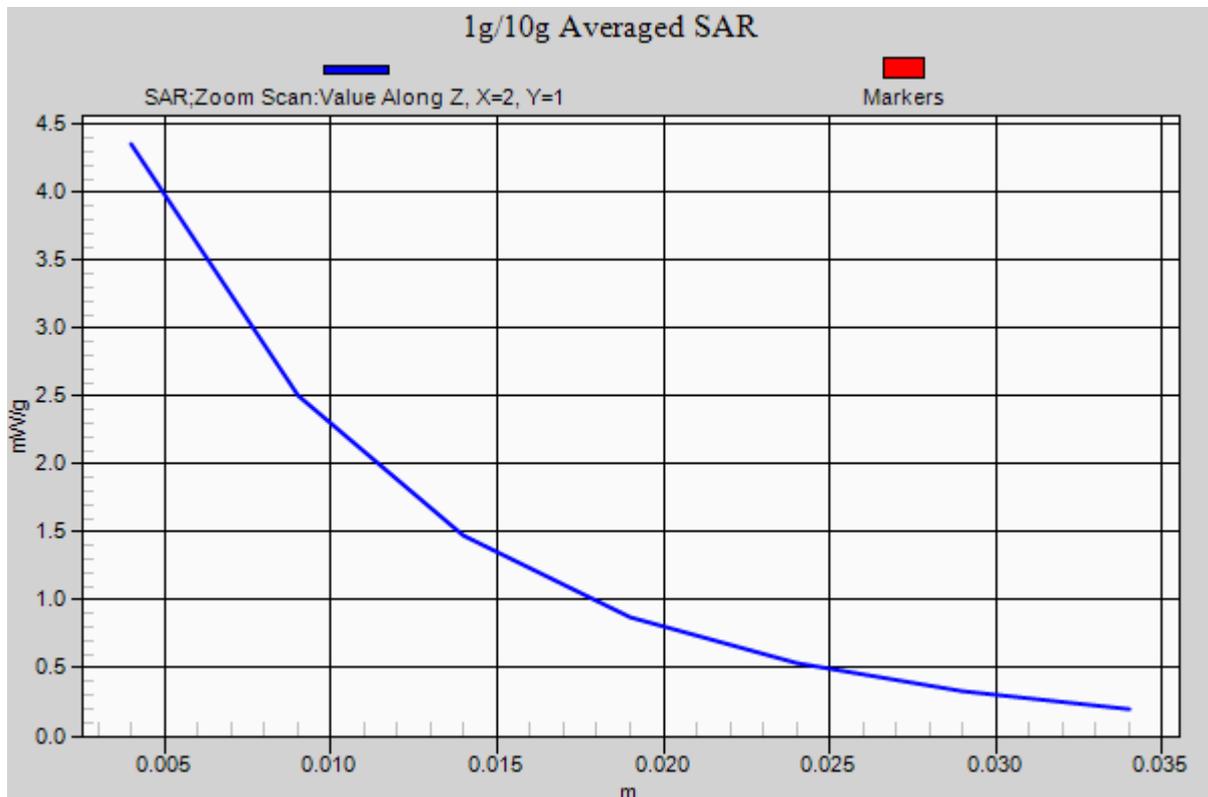
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.030 mW/g

**SAR(1 g) = 3.91 mW/g; SAR(10 g) = 2.04 mW/g**

Deviation = -0.51 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d149**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1900$  MHz;  $\sigma = 1.549$  mho/m;  $\epsilon_r = 52.003$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-08-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/20/2012

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

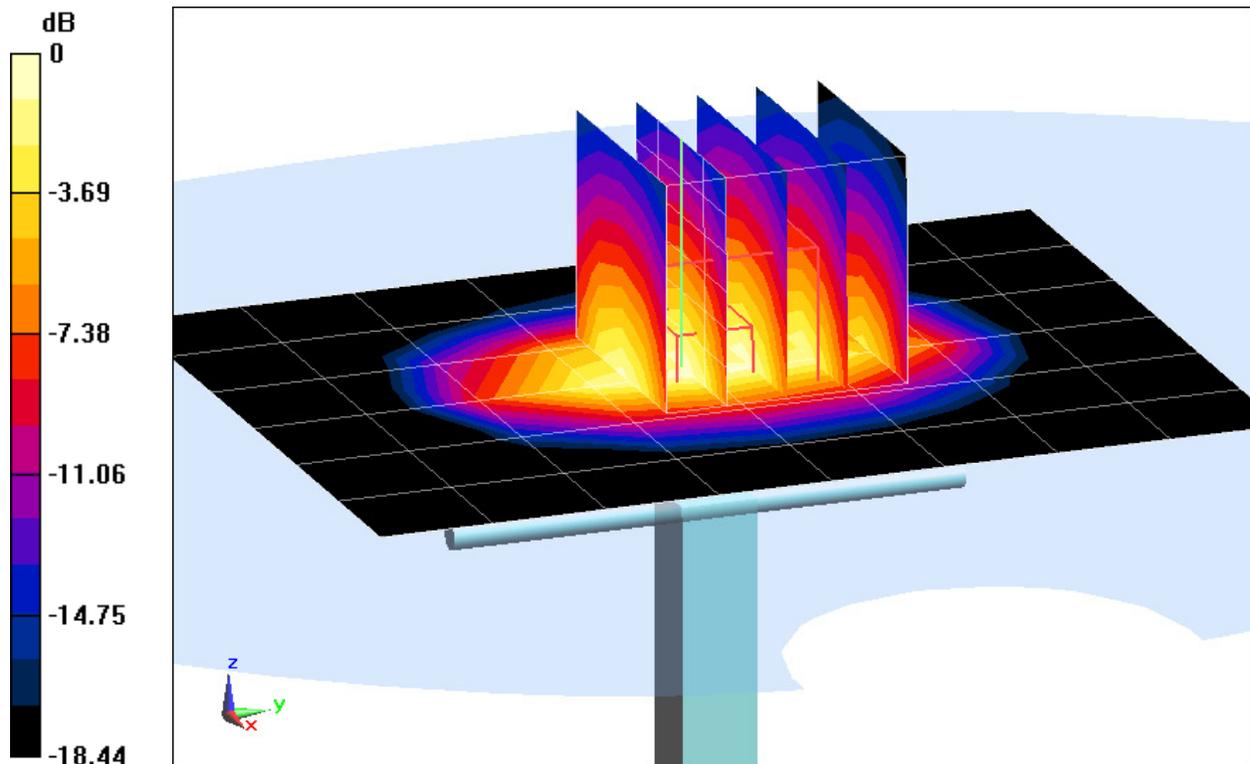
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.389 mW/g

**SAR(1 g) = 4.11 mW/g; SAR(10 g) = 2.14 mW/g**

Deviation = 4.58%



0 dB = 4.59 mW/g = 13.24 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d149**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.549 \text{ mho/m}$ ;  $\epsilon_r = 52.003$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-08-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/20/2012

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

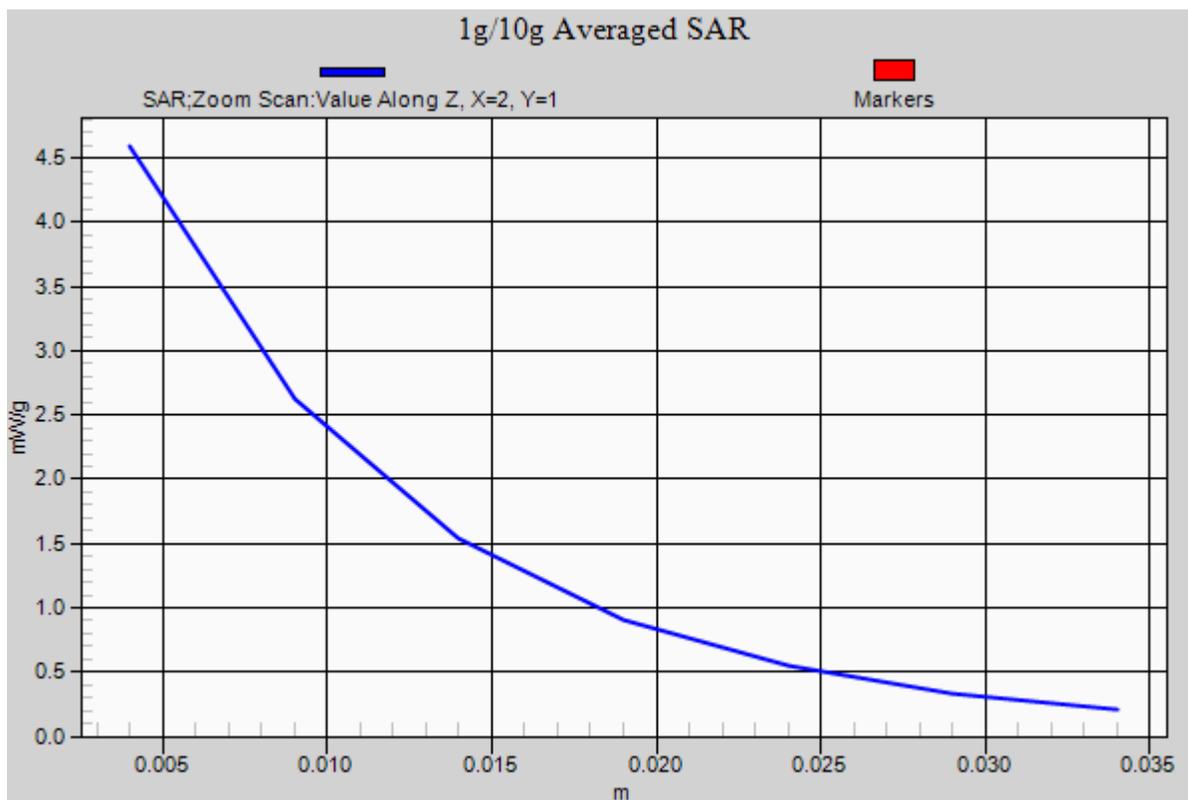
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.389 mW/g

**SAR(1 g) = 4.11 mW/g; SAR(10 g) = 2.14 mW/g**

Deviation = 4.58%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719**

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1  
Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.997 \text{ mho/m}$ ;  $\epsilon_r = 54.92$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.8 °C; Tissue Temp: 23.4 °C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 2450MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

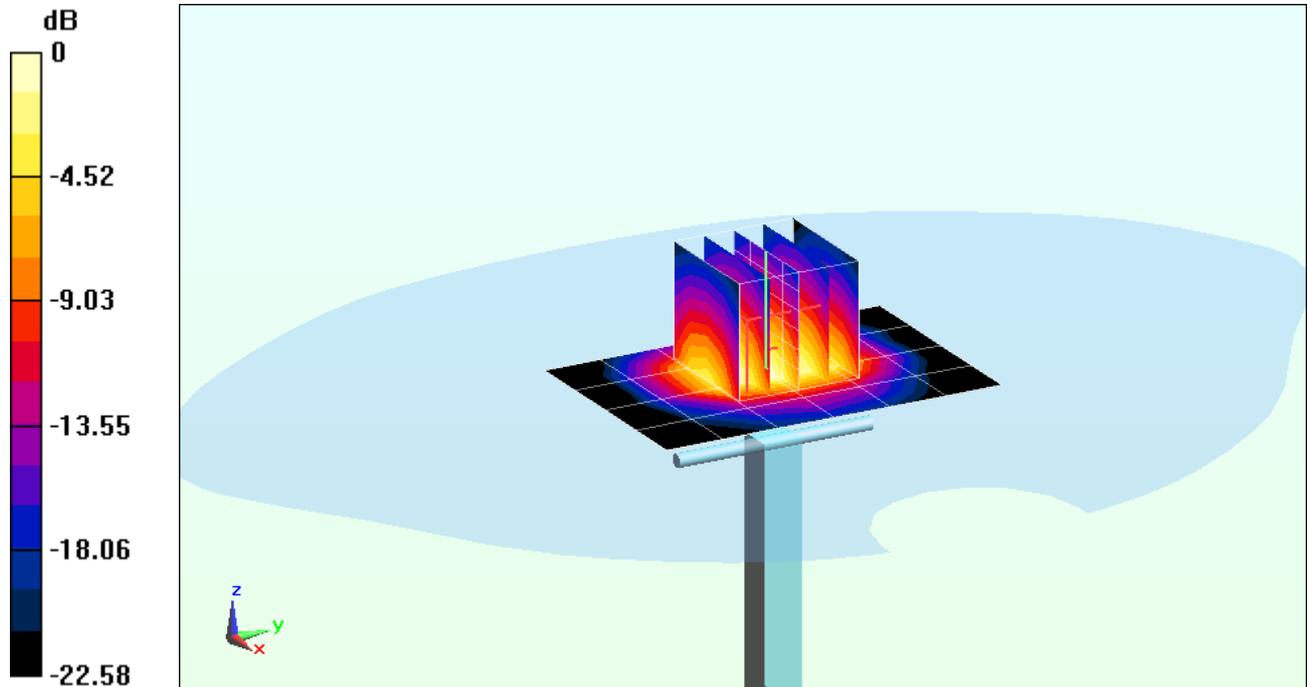
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 16.0 dBm (40 mW)

Peak SAR (extrapolated) = 3.908 mW/g

**SAR(1 g) = 1.91 mW/g; SAR(10 g) = 0.891 mW/g**

Deviation = -6.92 %



0 dB = 2.53 mW/g = 8.06 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719**

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1  
Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.997 \text{ mho/m}$ ;  $\epsilon_r = 54.92$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2012; Ambient Temp: 24.8 °C; Tissue Temp: 23.4 °C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 2450MHz System Verification

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

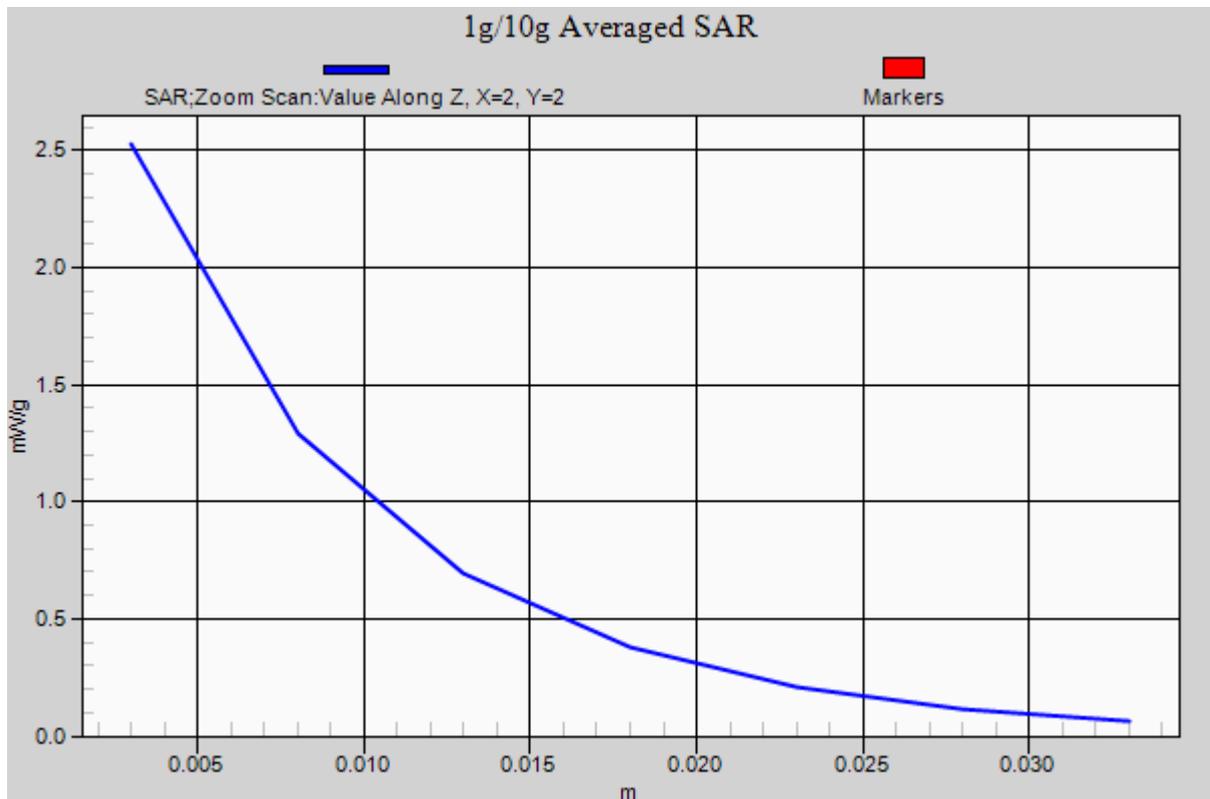
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 16.0 dBm (40 mW)

Peak SAR (extrapolated) = 3.908 mW/g

**SAR(1 g) = 1.91 mW/g; SAR(10 g) = 0.891 mW/g**

Deviation = -6.92 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 797**

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.989 \text{ mho/m}$ ;  $\epsilon_r = 51.73$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-12-2012; Ambient Temp: 23.1 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3213; ConvF(4.11, 4.11, 4.11); Calibrated: 4/24/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 5/7/2012

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 2450 MHz System Verification

**Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm

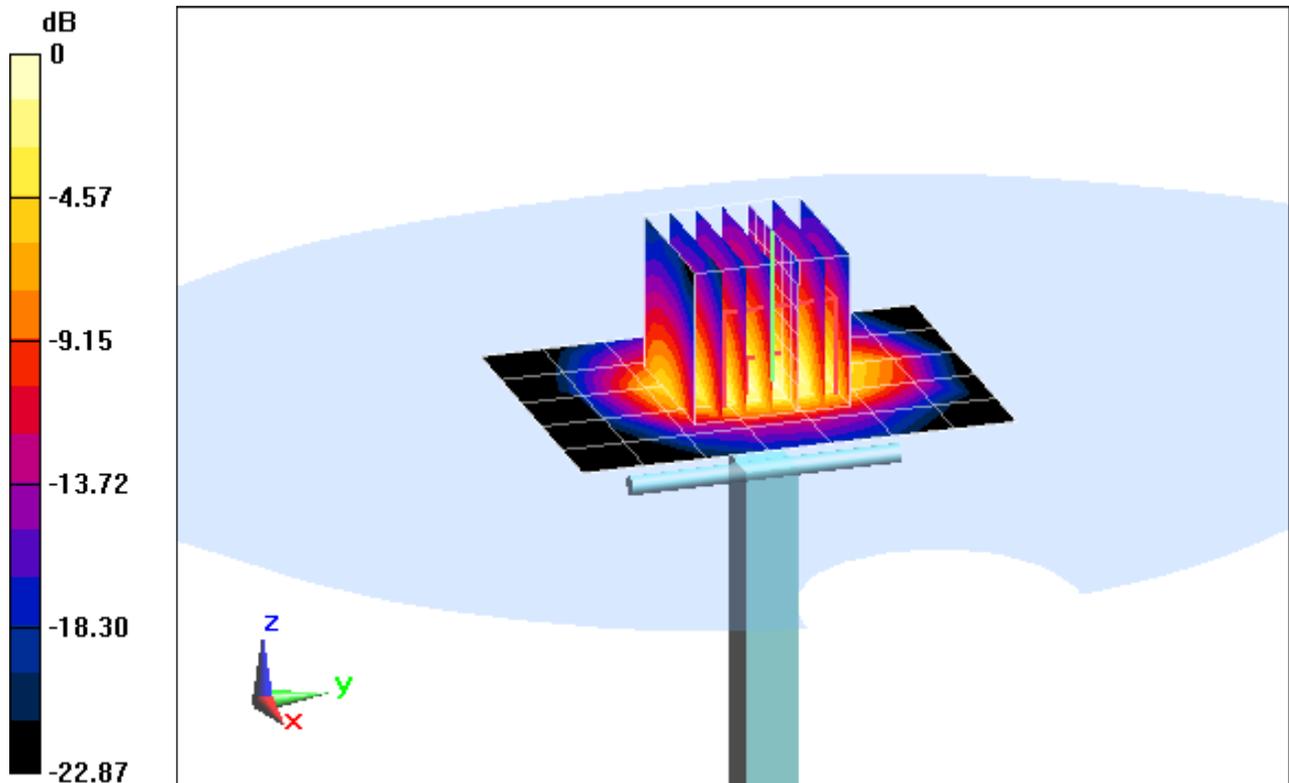
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 11.680 mW/g

**SAR(1 g) = 5.39 mW/g; SAR(10 g) = 2.47 mW/g**

Deviation = 7.16 %



0 dB = 6.65 mW/g = 16.46 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:882**

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1  
Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.989 \text{ mho/m}$ ;  $\epsilon_r = 51.73$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-12-2012; Ambient Temp: 23.1 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3213; ConvF(4.11, 4.11, 4.11); Calibrated: 4/24/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 5/7/2012

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 2450 MHz System Verification

**Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm

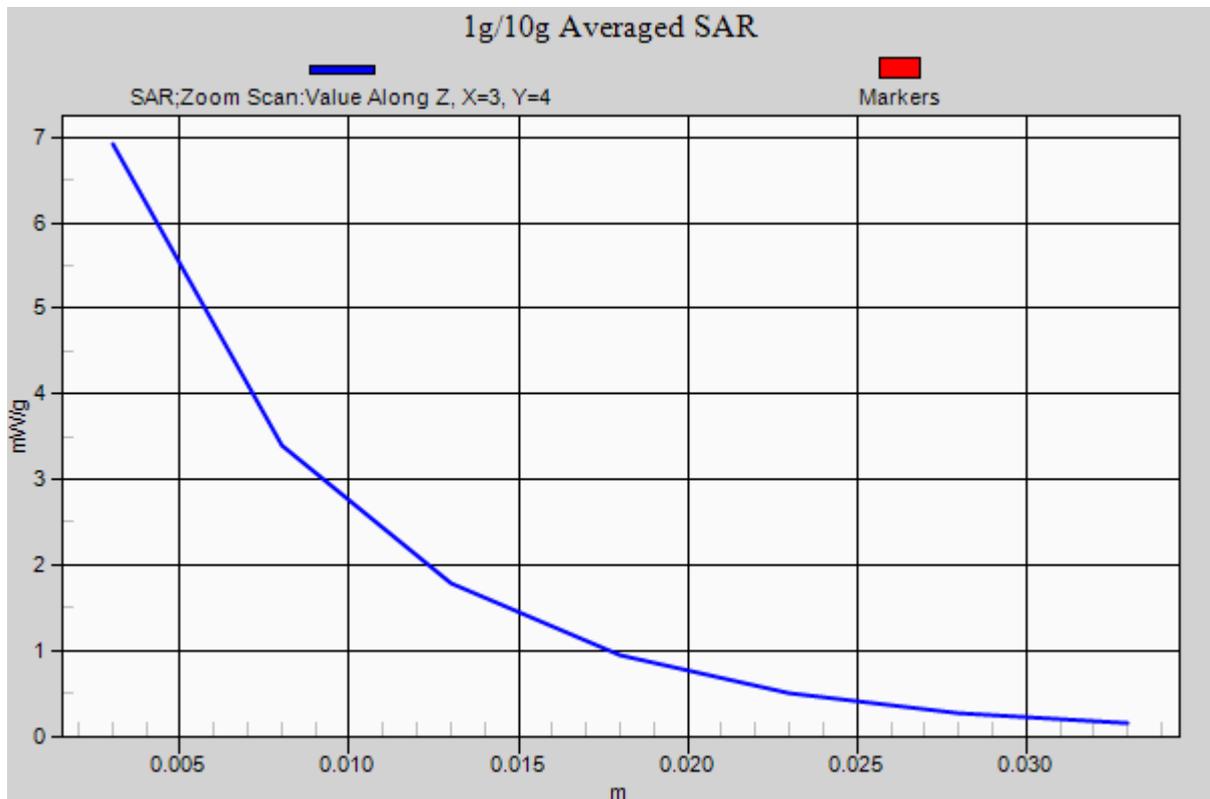
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 11.680 mW/g

**SAR(1 g) = 5.39 mW/g; SAR(10 g) = 2.47 mW/g**

Deviation = 7.16 %



## APPENDIX C: PROBE CALIBRATION



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 **PC Test**

Certificate No: **ES3-3022\_Aug11**

## CALIBRATION CERTIFICATE

Object **ES3DV2 - SN:3022**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4  
Calibration procedure for dosimetric E-field probes**

Calibration date: **August 25, 2011**

*✓KOK  
9/6/11*

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 <b>Claudio Leubler</b>	Function <b>Laboratory Technician</b>	Signature 
Approved by:	<b>Katja Pokovic</b>	<b>Technical Manager</b>	

Issued: August 27, 2011

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

### Glossary:

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

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

- 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<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* 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<sub>x,y,z</sub>**: 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<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; VR<sub>x,y,z</sub>; 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<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe ES3DV2

## SN:3022

Manufactured: April 15, 2003  
Calibrated: August 25, 2011

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

## DASY/EASY - Parameters of Probe: ES3DV2 - SN:3022

### Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup>	1.00	1.04	0.99	$\pm 10.1 \%$
DCP (mV) <sup>B</sup>	99.5	97.7	99.2	

### Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc <sup>E</sup> (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	133.2	$\pm 2.7 \%$
			Y	0.00	0.00	1.00	130.0	
			Z	0.00	0.00	1.00	133.9	

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%.

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

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> 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: ES3DV2 - SN:3022

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	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	1.13	± 12.0 %
835	41.5	0.90	6.05	6.05	6.05	0.80	1.14	± 12.0 %
1750	40.1	1.37	5.20	5.20	5.20	0.59	1.39	± 12.0 %
1900	40.0	1.40	4.98	4.98	4.98	0.66	1.30	± 12.0 %
2450	39.2	1.80	4.30	4.30	4.30	0.58	1.41	± 12.0 %
2600	39.0	1.96	4.20	4.20	4.20	0.58	1.43	± 12.0 %

<sup>C</sup> 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

## DASY/EASY - Parameters of Probe: ES3DV2- SN:3022

### Calibration Parameter Determined in Body Tissue Simulating Media

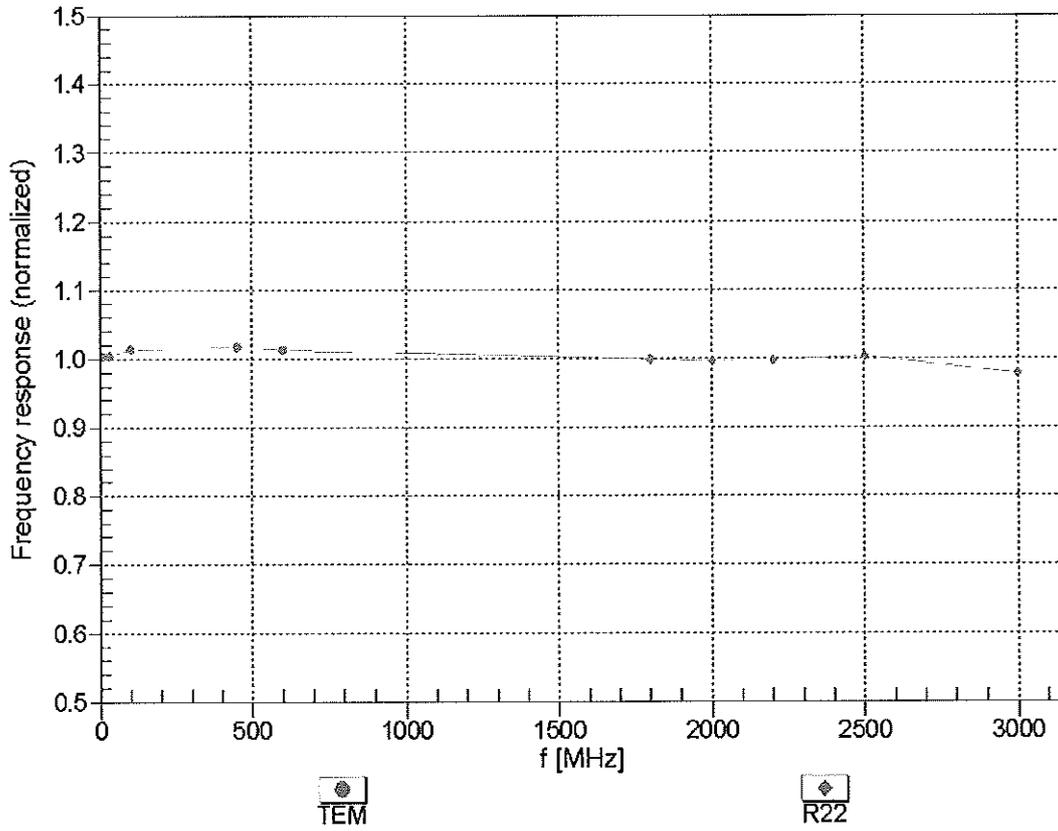
f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	6.93	6.93	6.93	0.07	1.00	± 13.4 %
750	55.5	0.96	6.11	6.11	6.11	0.80	1.18	± 12.0 %
835	55.2	0.97	6.06	6.06	6.06	0.80	1.20	± 12.0 %
1640	53.8	1.40	5.07	5.07	5.07	0.70	1.32	± 12.0 %
1750	53.4	1.49	4.64	4.64	4.64	0.67	1.35	± 12.0 %
1900	53.3	1.52	4.41	4.41	4.41	0.54	1.56	± 12.0 %
2450	52.7	1.95	4.01	4.01	4.01	0.66	1.19	± 12.0 %
2600	52.5	2.16	3.90	3.90	3.90	0.54	1.45	± 12.0 %

<sup>C</sup> 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

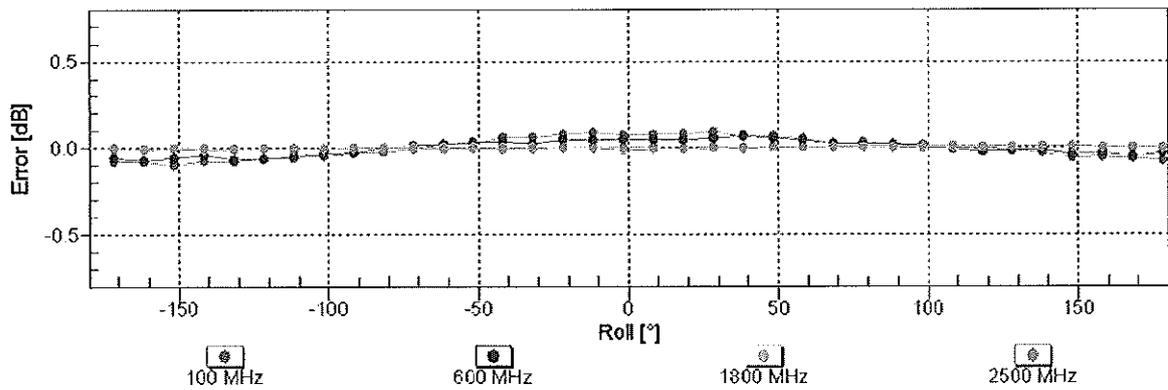
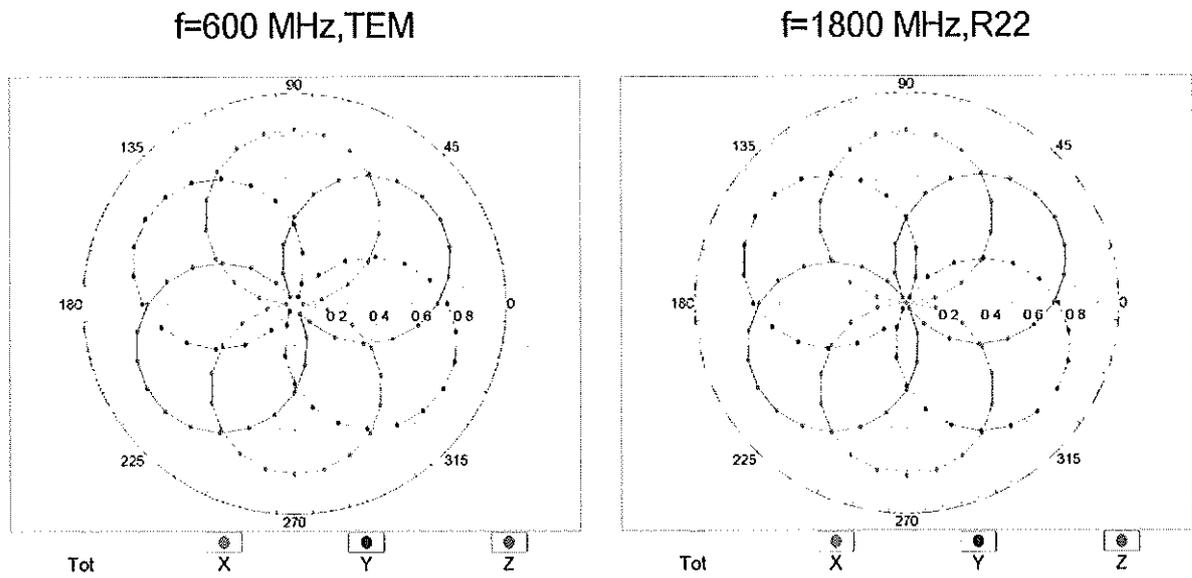
# Frequency Response of E-Field

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



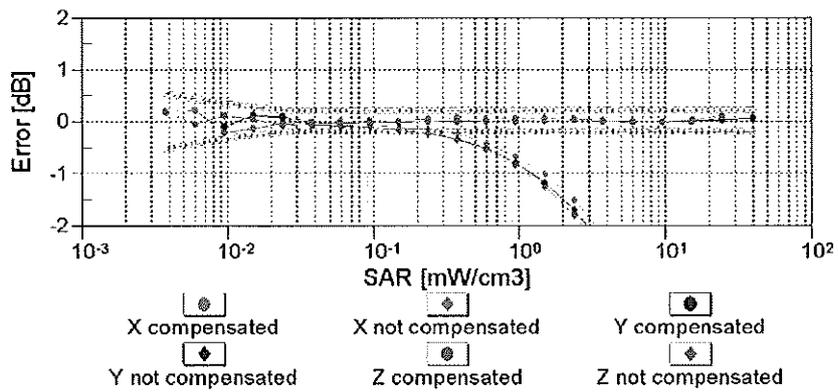
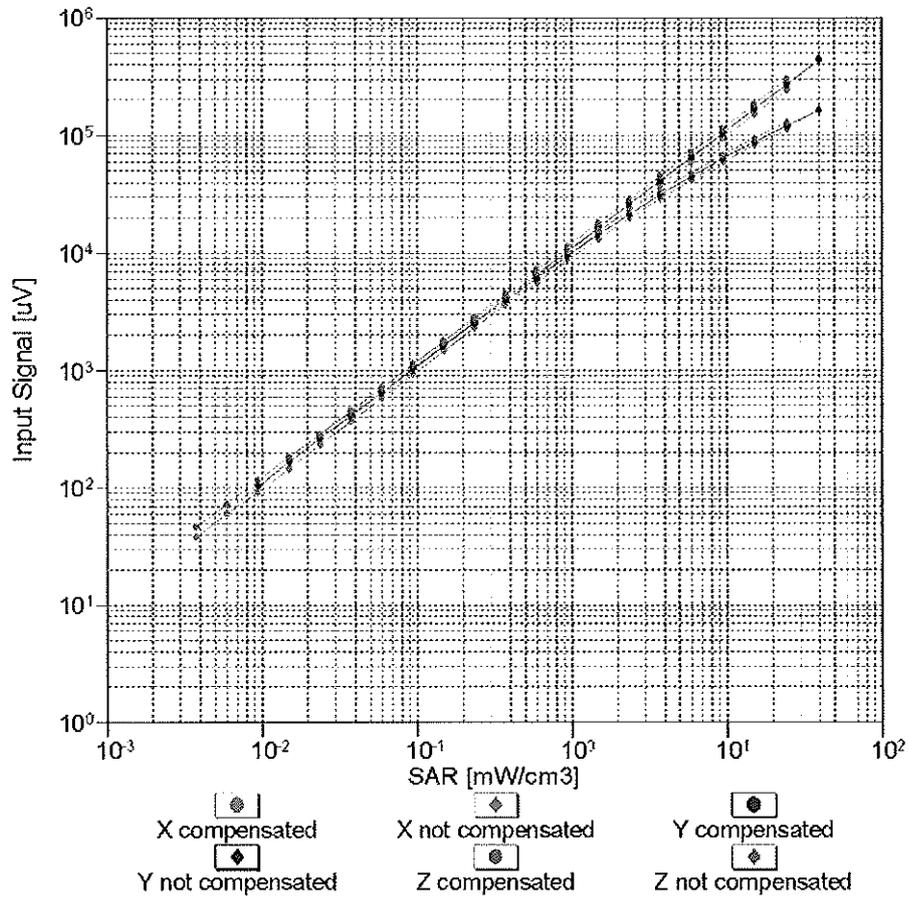
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

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



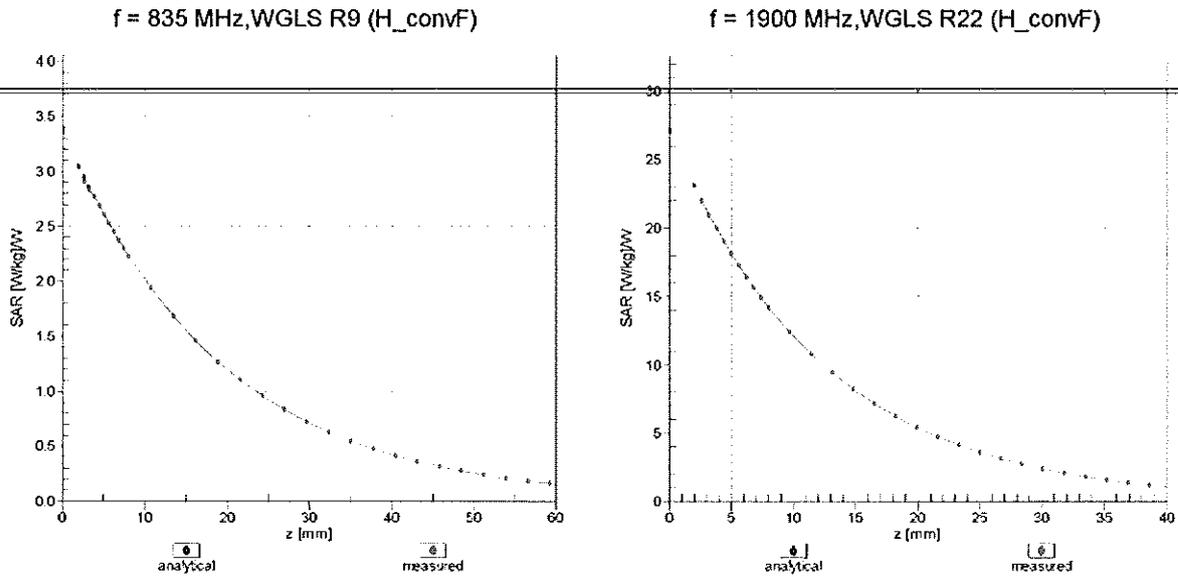
**Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )**

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

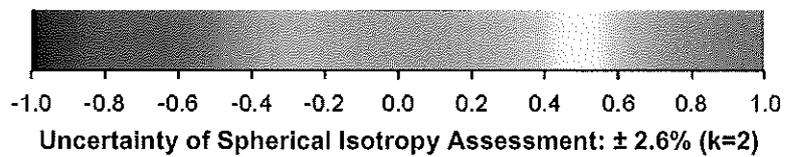
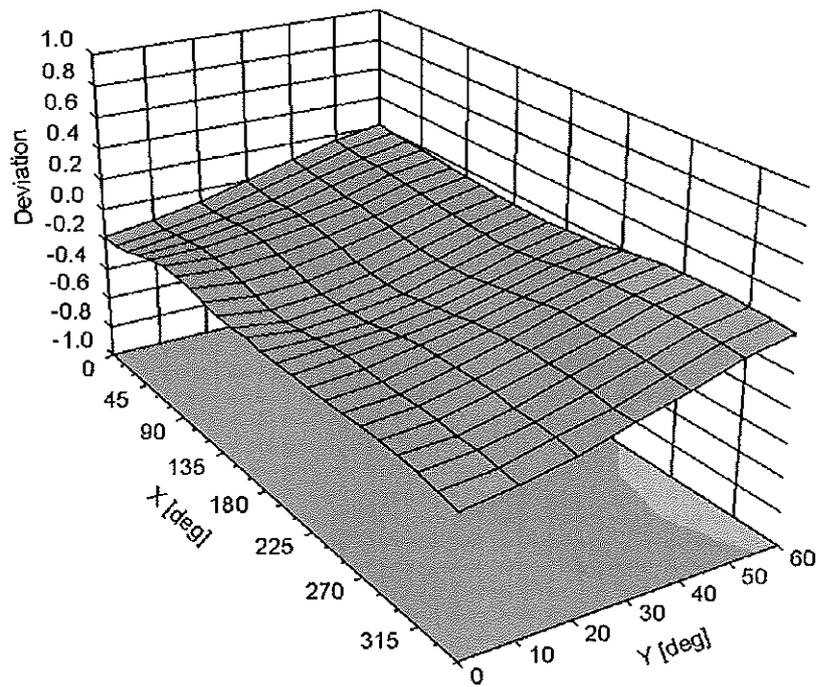


**Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )**

# Conversion Factor Assessment



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



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

## DASY/EASY - Parameters of Probe: ES3DV2 - SN:3022

### 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

## Additional Conversion Factors

for Dosimetric E-Field Probe

Type:

**ES3DV2**

Serial Number:

**3022**

Place of Assessment:

**Zurich**

Date of Assessment:

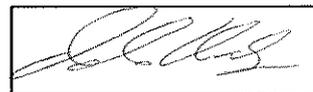
**August 29, 2011**

Probe Calibration Date:

**August 25, 2011**

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. The evaluation is coupled with measured conversion factors (probe calibration date indicated above). The uncertainty of the numerical assessment is based on the extrapolation from measured value at 835 MHz or at 1750 MHz.

Assessed by:



**Dosimetric E-Field Probe ES3DV2 SN:3022**Conversion factor ( $\pm$  standard deviation)550  $\pm$  50 MHz      *ConvF*      6.57  $\pm$  7% $\epsilon_r = 56.3 \pm 5\%$   
 $\sigma = 0.95 \pm 5\%$  mho/m  
(body tissue)650  $\pm$  50 MHz      *ConvF*      6.16  $\pm$  7% $\epsilon_r = 55.9 \pm 5\%$   
 $\sigma = 0.95 \pm 5\%$  mho/m  
(body tissue)**Important Note:**

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

**Please see also DASY Manual.**



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 **PC Test**

Certificate No: **ES3-3209\_Mar12**

**CALIBRATION CERTIFICATE**

Object **ES3DV3 - SN:3209**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4  
 Calibration procedure for dosimetric E-field probes**

Calibration date: **March 16, 2012**

*KOK  
4/15/12*

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-11 (No. ES3-3013_Dec11)	Dec-12
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 Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Calibrated by:	Name <b>Jeton Kastrati</b>	Function <b>Laboratory Technician</b>	Signature 
Approved by:	Name <b>Katja Pokovic</b>	Function <b>Technical Manager</b>	Signature 

Issued: March 19, 2012

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

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

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

**Methods Applied and Interpretation of Parameters:**

- *NORM<sub>x,y,z</sub>*: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). *NORM<sub>x,y,z</sub>* are only intermediate values, i.e., the uncertainties of *NORM<sub>x,y,z</sub>* does not affect the  $E^2$ -field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* 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<sub>x,y,z</sub>*: 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<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; VR<sub>x,y,z</sub>; 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<sub>x,y,z</sub> \* ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe ES3DV3

## SN:3209

Manufactured: October 14, 2008  
Calibrated: March 16, 2012

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

# DASY/EASY - Parameters of Probe: ES3DV3 - SN:3209

## Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu V/(V/m)^2$ ) <sup>A</sup>	1.36	1.34	1.15	± 10.1 %
DCP (mV) <sup>B</sup>	98.2	97.4	98.7	

## Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc <sup>E</sup> (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	119.2	±3.5 %
			Y	0.00	0.00	1.00	89.3	
			Z	0.00	0.00	1.00	111.5	

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%.

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

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> 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:3209

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.47	6.47	6.47	0.37	1.61	± 12.0 %
835	41.5	0.90	6.22	6.22	6.22	0.24	2.24	± 12.0 %
1640	40.3	1.29	5.38	5.38	5.38	0.41	1.56	± 12.0 %
1750	40.1	1.37	5.26	5.26	5.26	0.41	1.60	± 12.0 %
1900	40.0	1.40	5.15	5.15	5.15	0.80	1.16	± 12.0 %
2450	39.2	1.80	4.46	4.46	4.46	0.64	1.39	± 12.0 %
2600	39.0	1.96	4.30	4.30	4.30	0.69	1.42	± 12.0 %

<sup>C</sup> 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) 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:3209

### Calibration Parameter Determined in Body Tissue Simulating Media

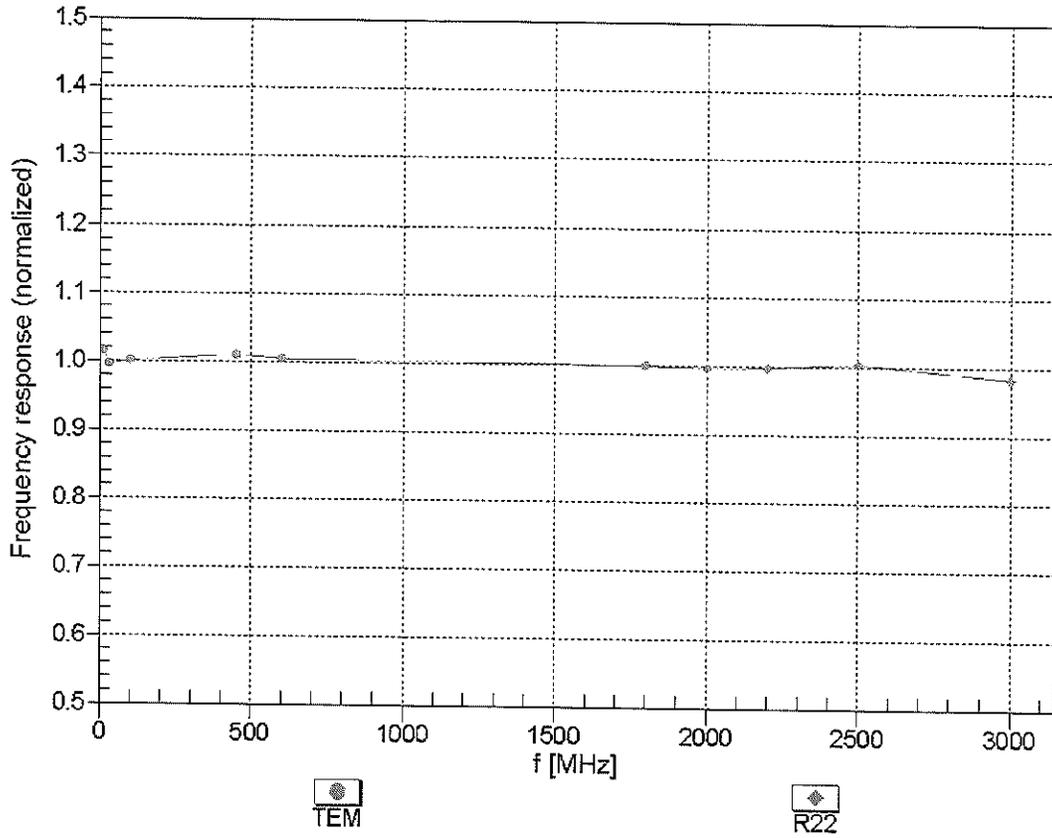
f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.11	7.11	7.11	0.07	1.00	± 13.4 %
750	55.5	0.96	6.23	6.23	6.23	0.54	1.40	± 12.0 %
835	55.2	0.97	6.13	6.13	6.13	0.24	2.27	± 12.0 %
1640	53.8	1.40	5.21	5.21	5.21	0.72	1.29	± 12.0 %
1750	53.4	1.49	4.83	4.83	4.83	0.59	1.44	± 12.0 %
1900	53.3	1.52	4.63	4.63	4.63	0.57	1.50	± 12.0 %
2450	52.7	1.95	4.23	4.23	4.23	0.80	1.00	± 12.0 %
2600	52.5	2.16	4.02	4.02	4.02	0.62	0.90	± 12.0 %

<sup>C</sup> 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

# Frequency Response of E-Field

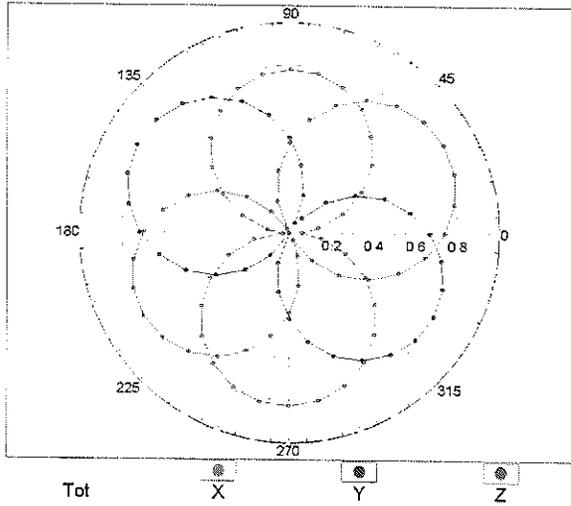
(TEM-Cell:ifi110 EXX, Waveguide: R22)



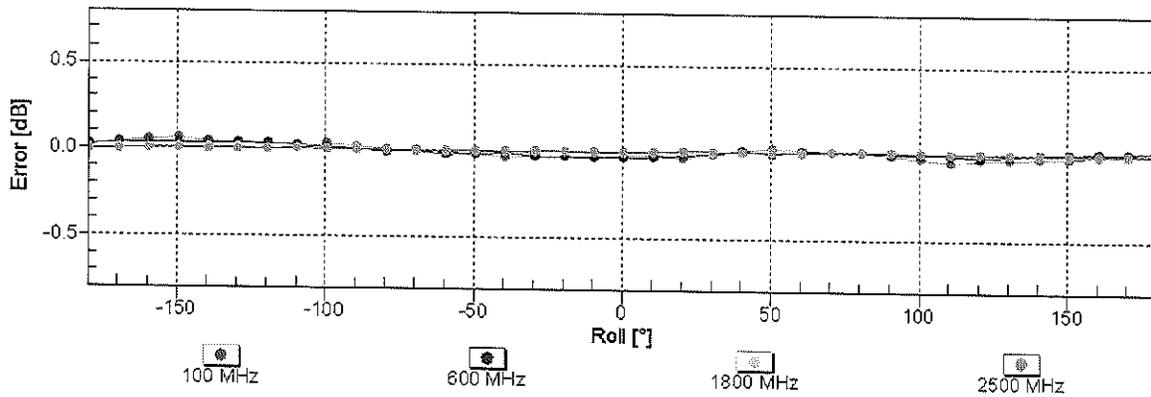
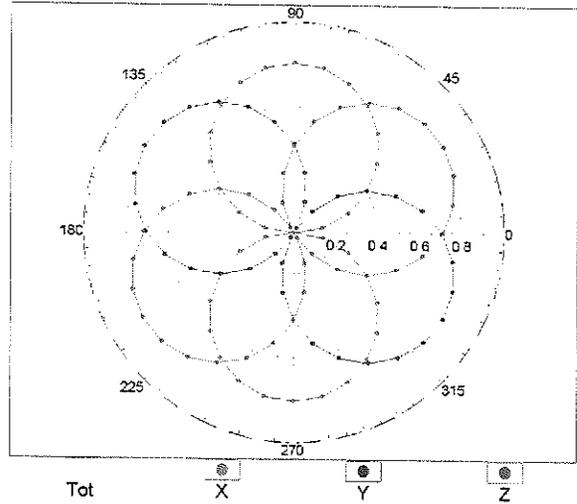
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

## Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$

f=600 MHz, TEM

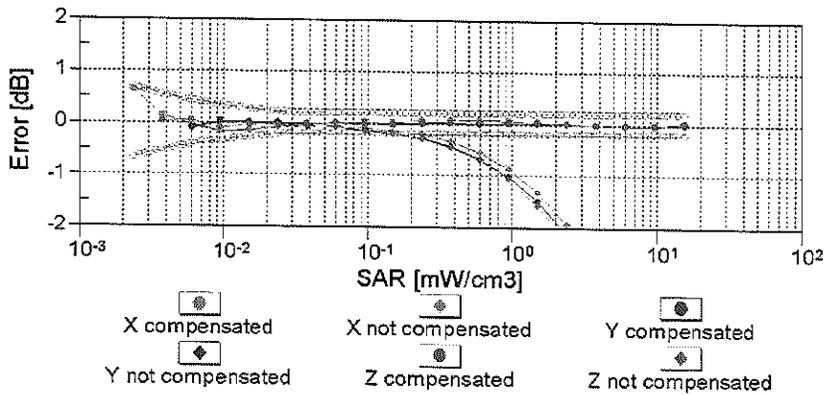
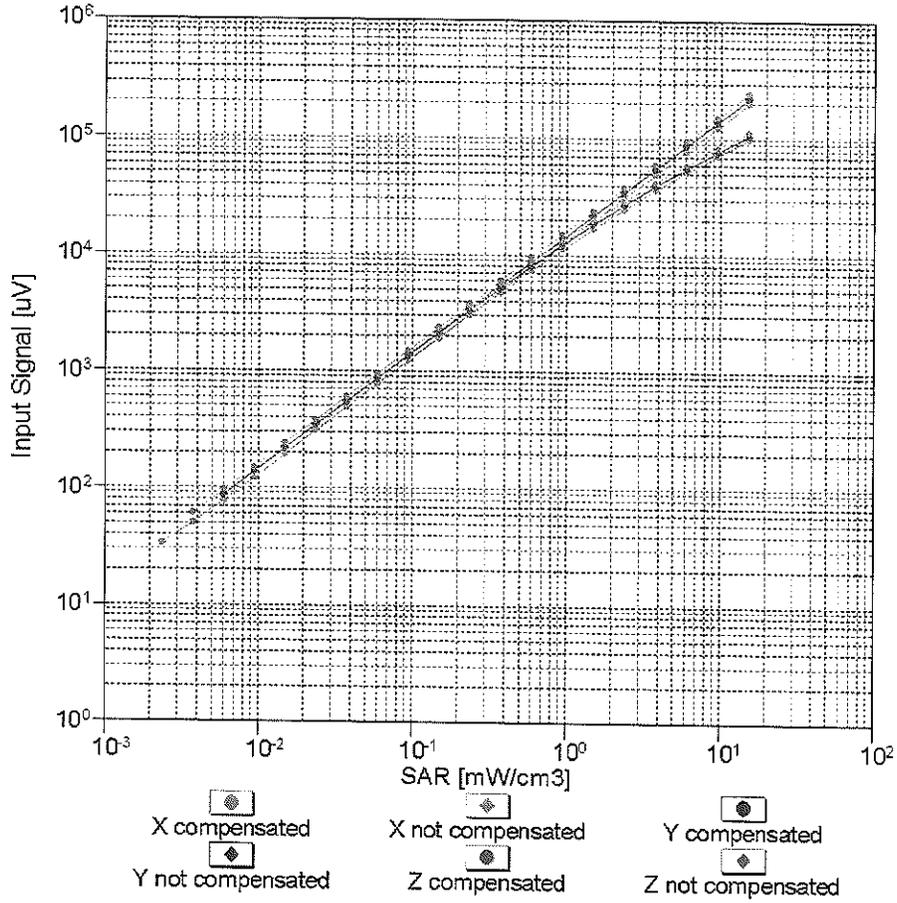


f=1800 MHz, R22



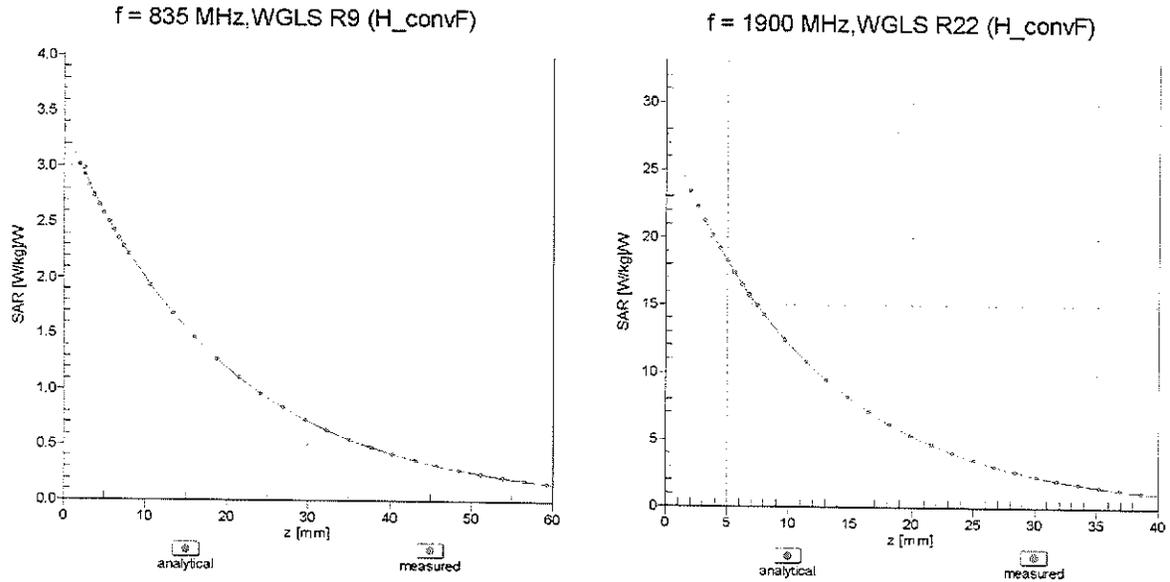
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

## Dynamic Range f(SAR<sub>head</sub>) (TEM cell , f = 900 MHz)

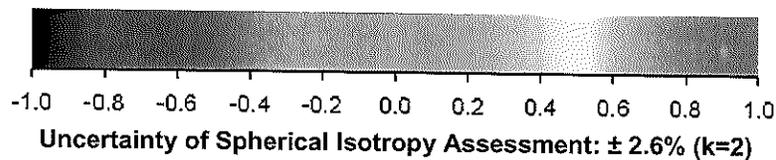
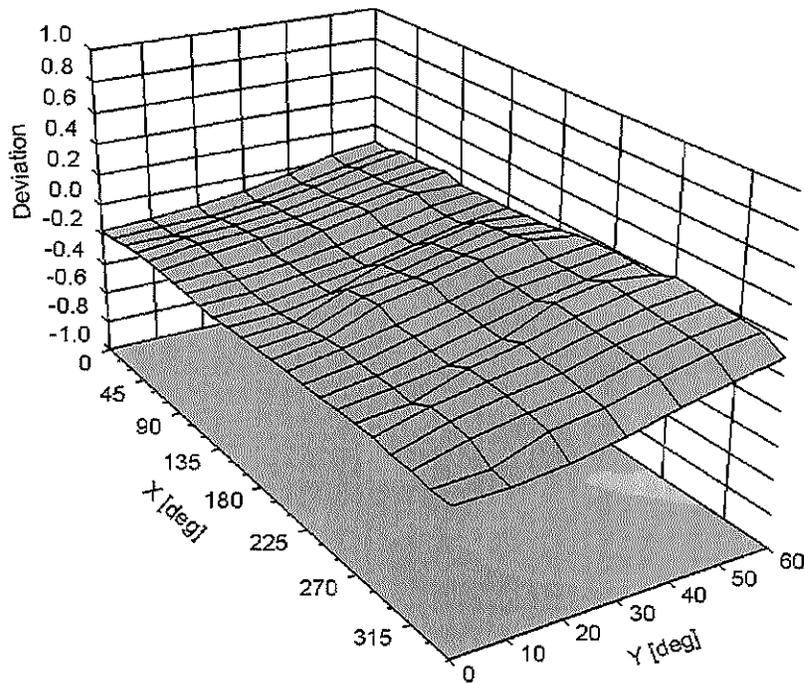


**Uncertainty of Linearity Assessment: ± 0.6% (k=2)**

# Conversion Factor Assessment



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



## DASY/EASY - Parameters of Probe: ES3DV3 - SN:3209

### 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