DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: WCDMA 1900; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.49 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
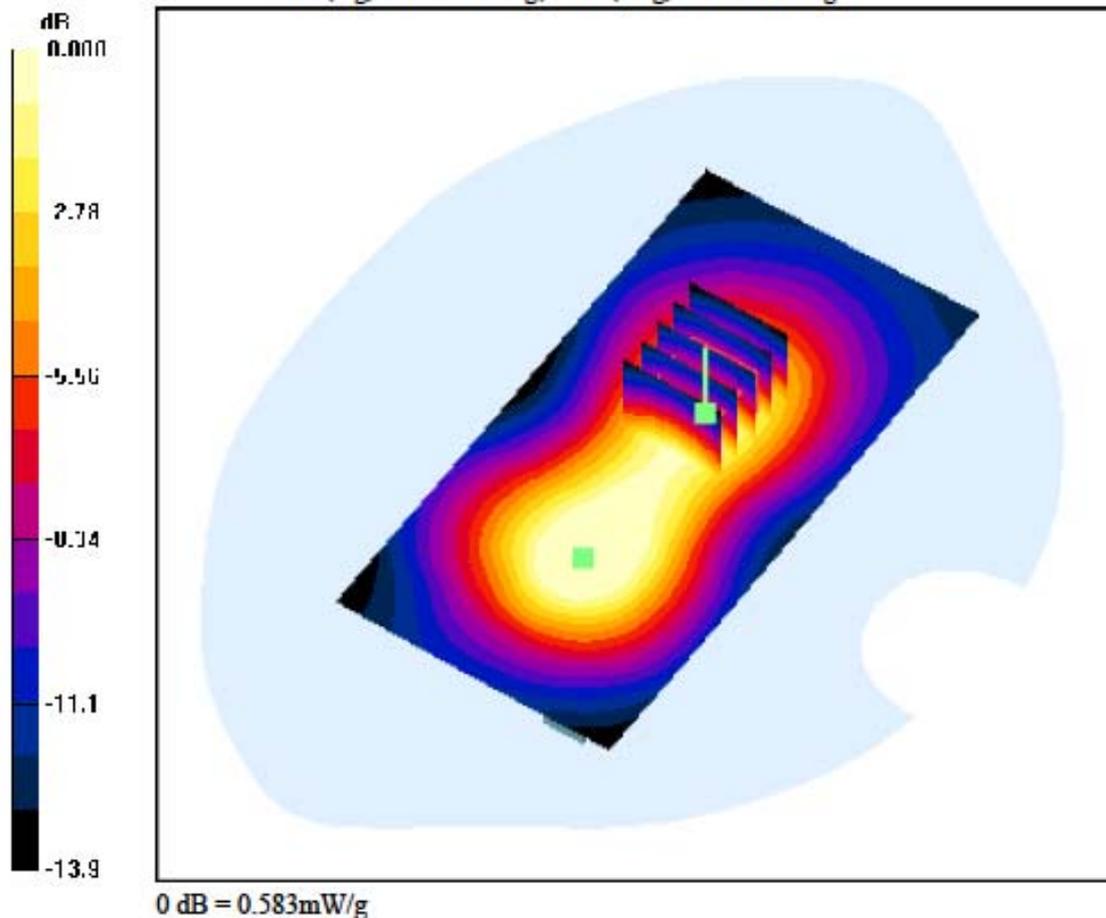Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.19, 7.19, 7.19); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-29; Ambient Temp: 22.4; Tissue Temp: 22.8

1cm space from Body, Left, WCDMA1900 Ch. 9400, Ant Internal

Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.092 dB
Peak SAR (extrapolated) = 0.741 W/kg
SAR(1 g) = 0.465 W/kg; SAR(10 g) = 0.281 W/kg

0 dB = 0.583mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.99 mho/m; $ε_r$ = 53.3; ρ = 1000 kg/m³
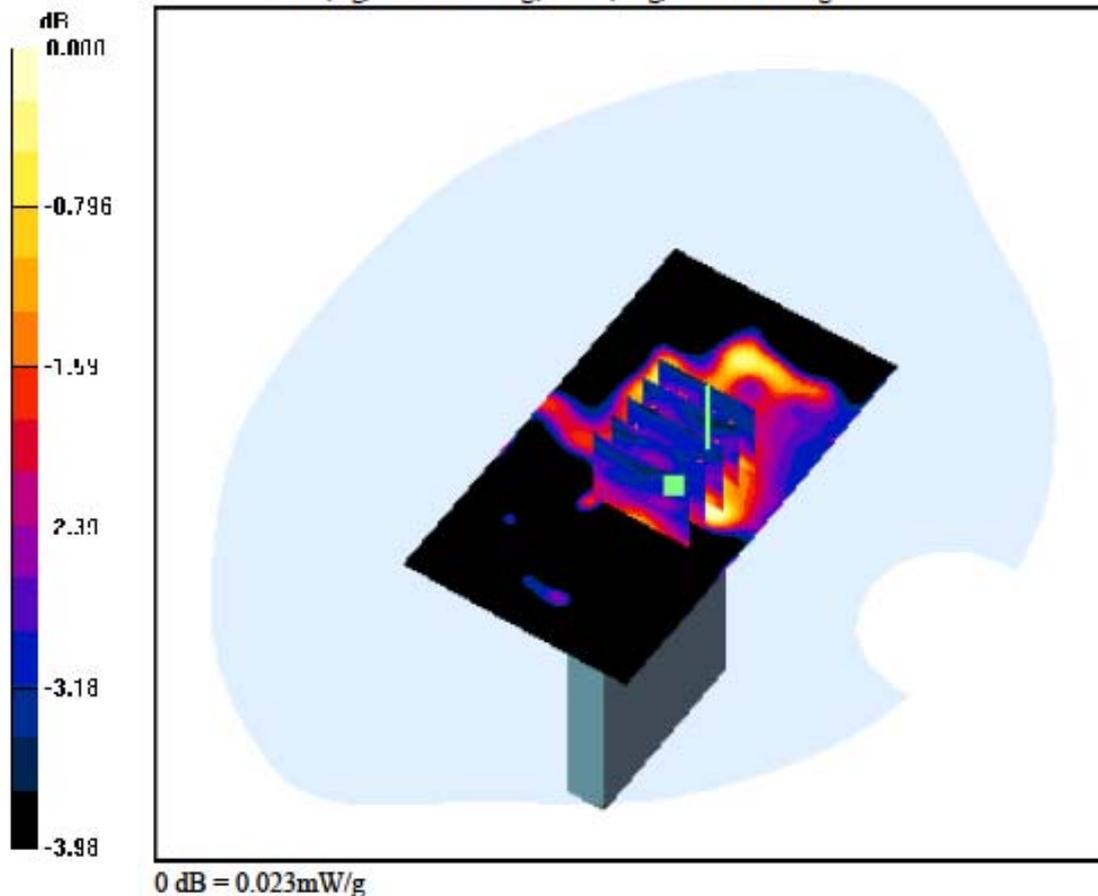Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-30; Ambient Temp: 22.2; Tissue Temp: 22.6

1cm space from Body, Top, W-LAN(802.11b) Ch. 11, Ant Internal

Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = -0.064 dB
Peak SAR (extrapolated) = 0.029 W/kg
SAR(1 g) = 0.021 W/kg; SAR(10 g) = 0.014 W/kg

0 dB = 0.023mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.99 mho/m; $ε_r$ = 53.3; ρ = 1000 kg/m³
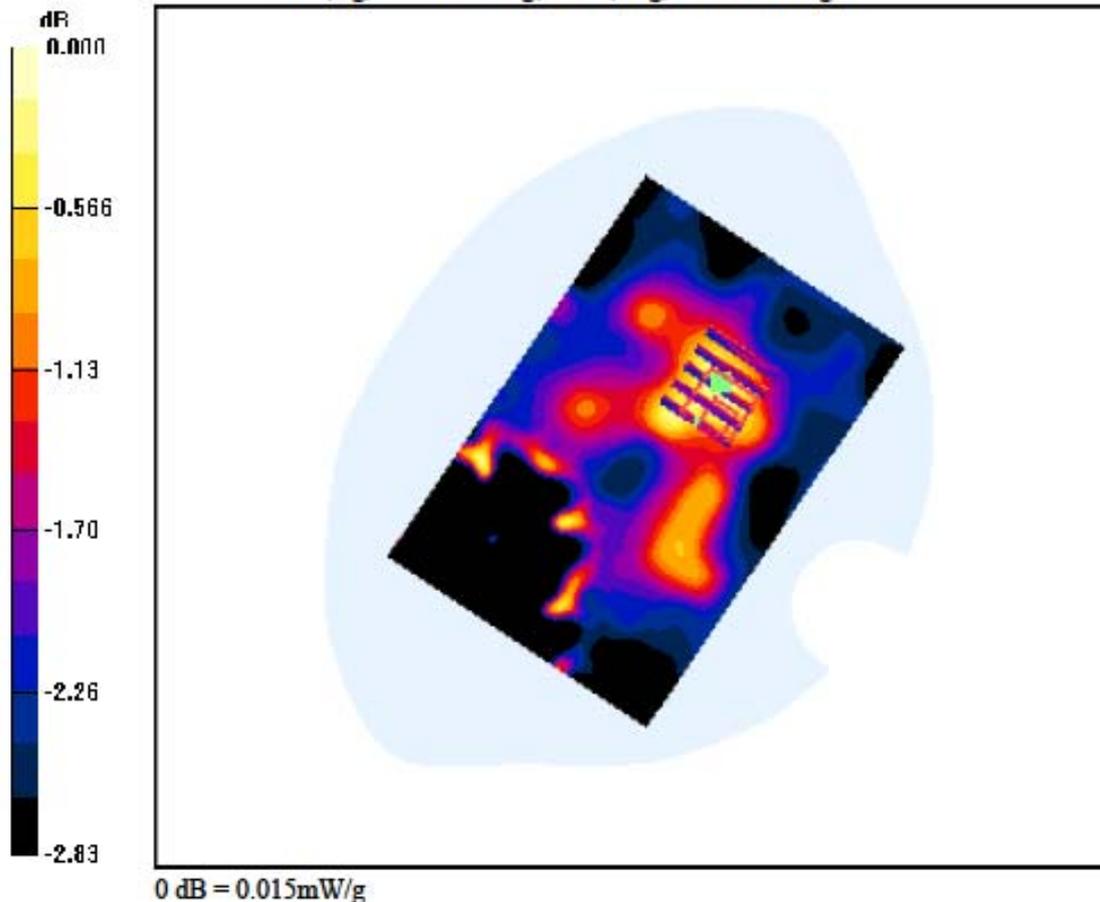Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-30; Ambient Temp: 22.2; Tissue Temp: 22.6

1cm space from Body, Front, W-LAN(802.11b) Ch. 11, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = -0.024 dB
Peak SAR (extrapolated) = 0.017 W/kg
SAR(1 g) = 0.013 W/kg; SAR(10 g) = 0.011 W/kg

0 dB = 0.015mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.92 mho/m; ε_r = 53; ρ = 1000 kg/m^3
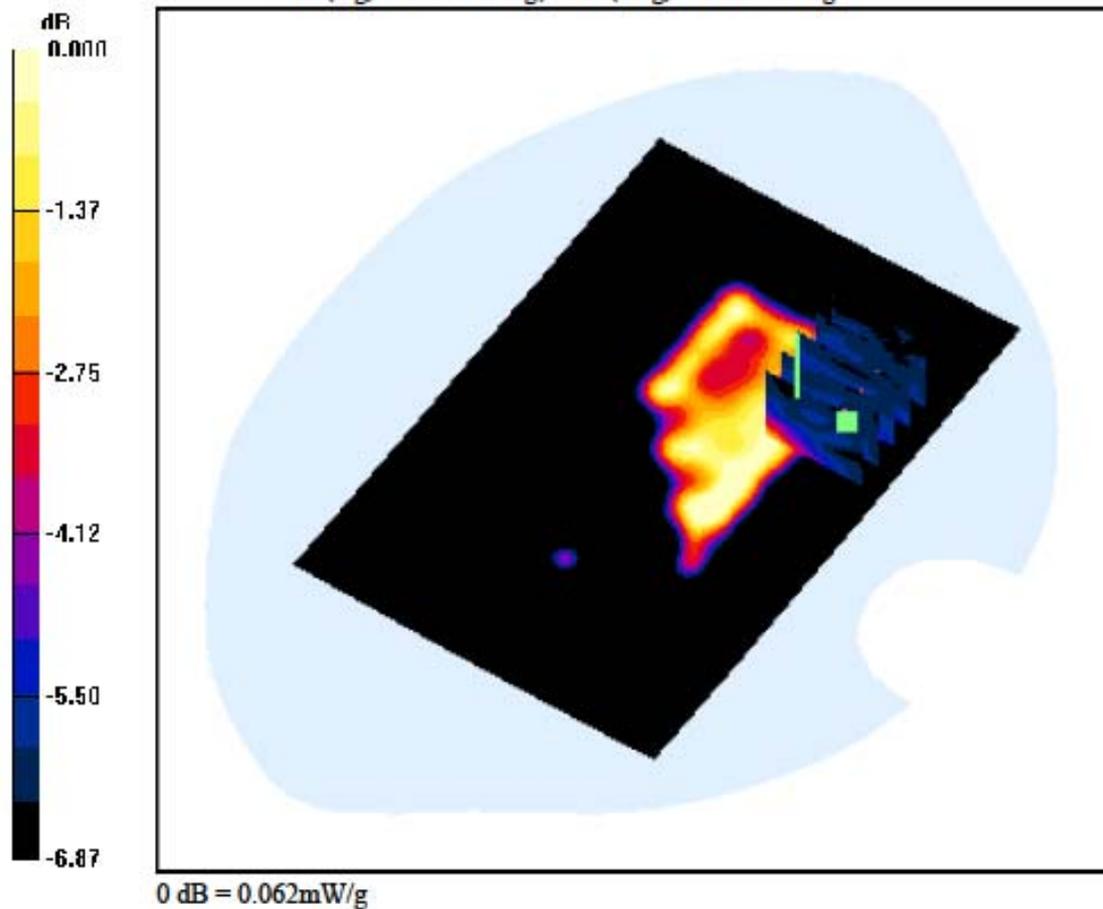Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-30; Ambient Temp: 22.2; Tissue Temp: 22.6

1cm space from Body, Rear, W-LAN(802.11b) Ch. 1, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = -0.070 dB
Peak SAR (extrapolated) = 0.077 W/kg
SAR(1 g) = 0.044 W/kg; SAR(10 g) = 0.018 W/kg

0 dB = 0.062mW/g

DIGITAL EMC CO., LTD

DUT: LG–E5l0g; Type: Bar

Communication System: W-LAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.94 mho/m; ε_r = 53.1; ρ = 1000 kg/m³
Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-30; Ambient Temp: 22.2; Tissue Temp: 22.6

1cm space from Body, Rear, W-LAN(802.11b) Ch. 6, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.375 dB
Peak SAR (extrapolated) = 0.100 W/kg
SAR(1 g) = 0.048 W/kg; SAR(10 g) = 0.027 W/kg

0 dB = 0.060mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ mho/m; $\varepsilon_r = 53.3$; $\rho = 1000$ kg/m^3
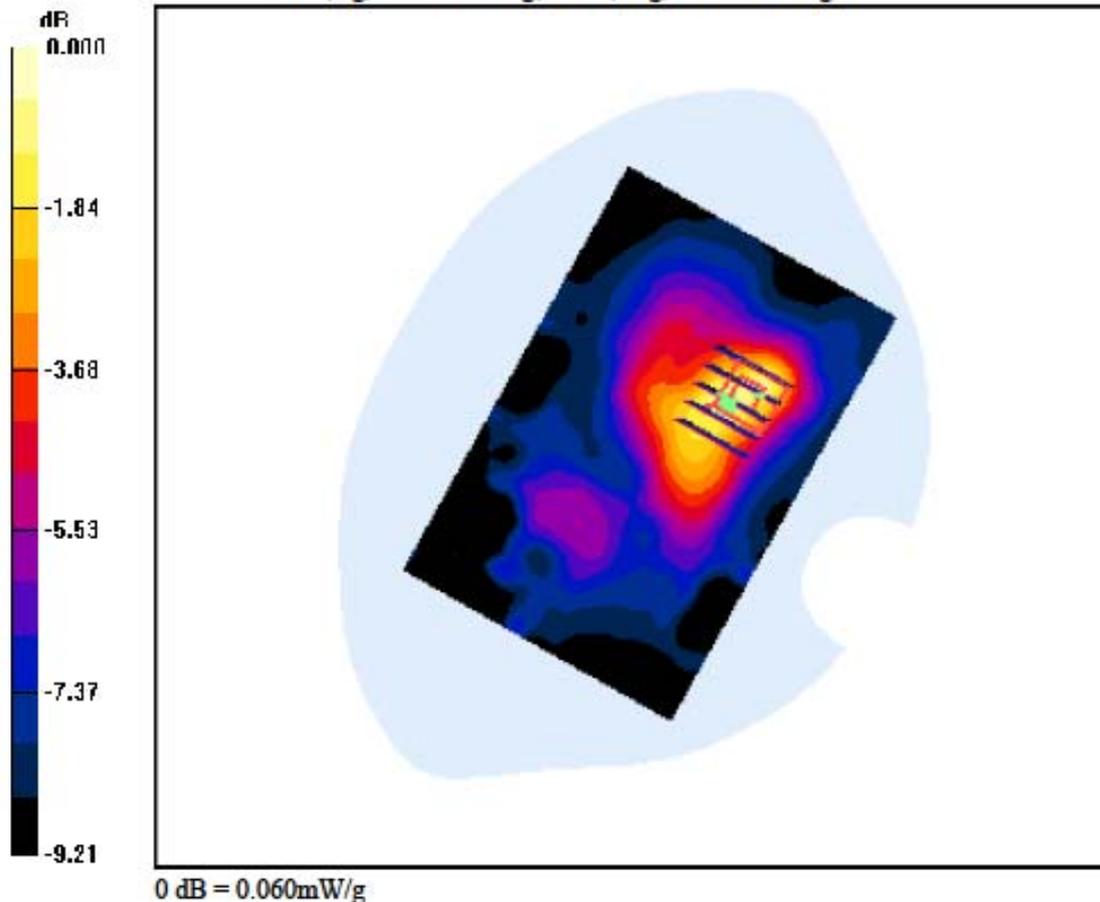Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-30; Ambient Temp: 22.2; Tissue Temp: 22.6

1cm space from Body, Rear, W-LAN(802.11b) Ch. 11, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = -0.049 dB
Peak SAR (extrapolated) = 0.087 W/kg
SAR(1 g) = 0.043 W/kg; SAR(10 g) = 0.025 W/kg

0 dB = 0.054mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.99 mho/m; ε_r = 53.3; ρ = 1000 kg/m³
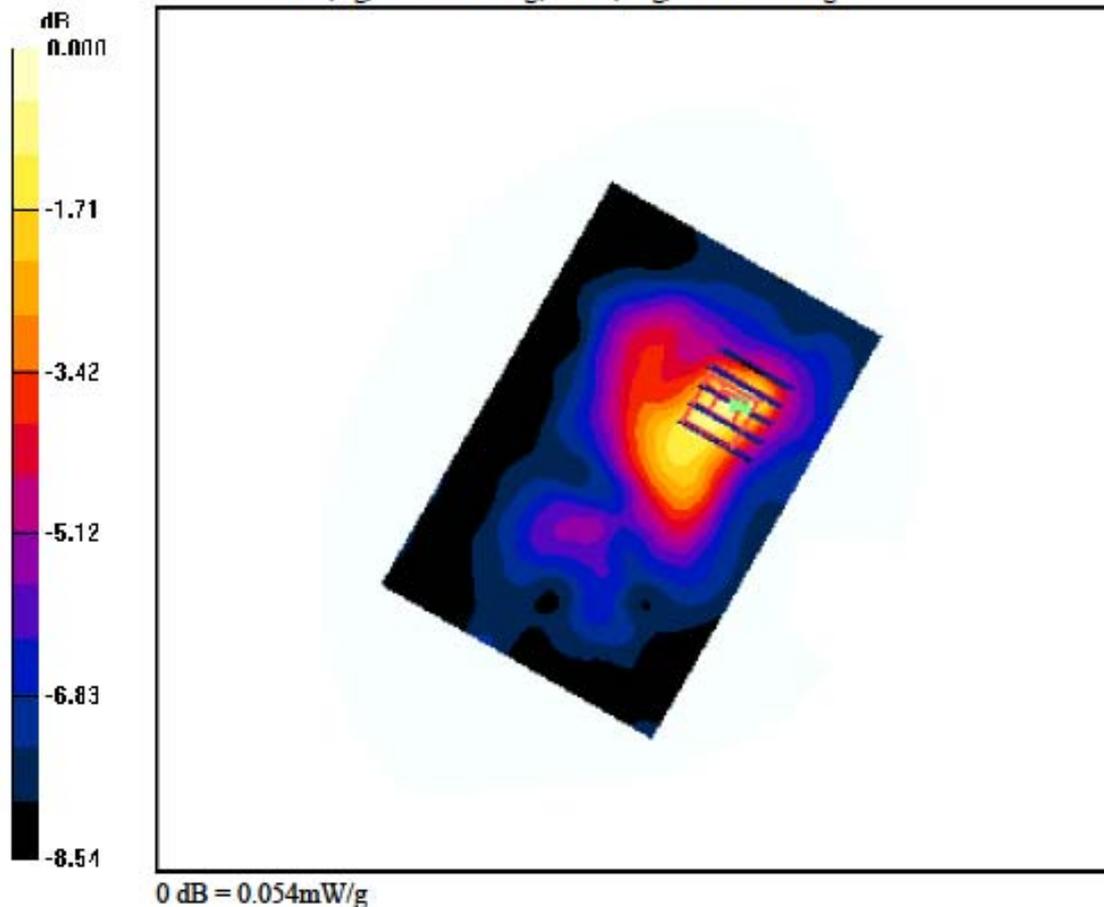Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-30; Ambient Temp: 22.2; Tissue Temp: 22.6

1cm space from Body, Left, W-LAN(802.11b) Ch. 11, Ant Internal

Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.221 dB
Peak SAR (extrapolated) = 0.047 W/kg
SAR(1 g) = 0.028 W/kg; SAR(10 g) = 0.018 W/kg

0 dB = 0.035mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.97 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
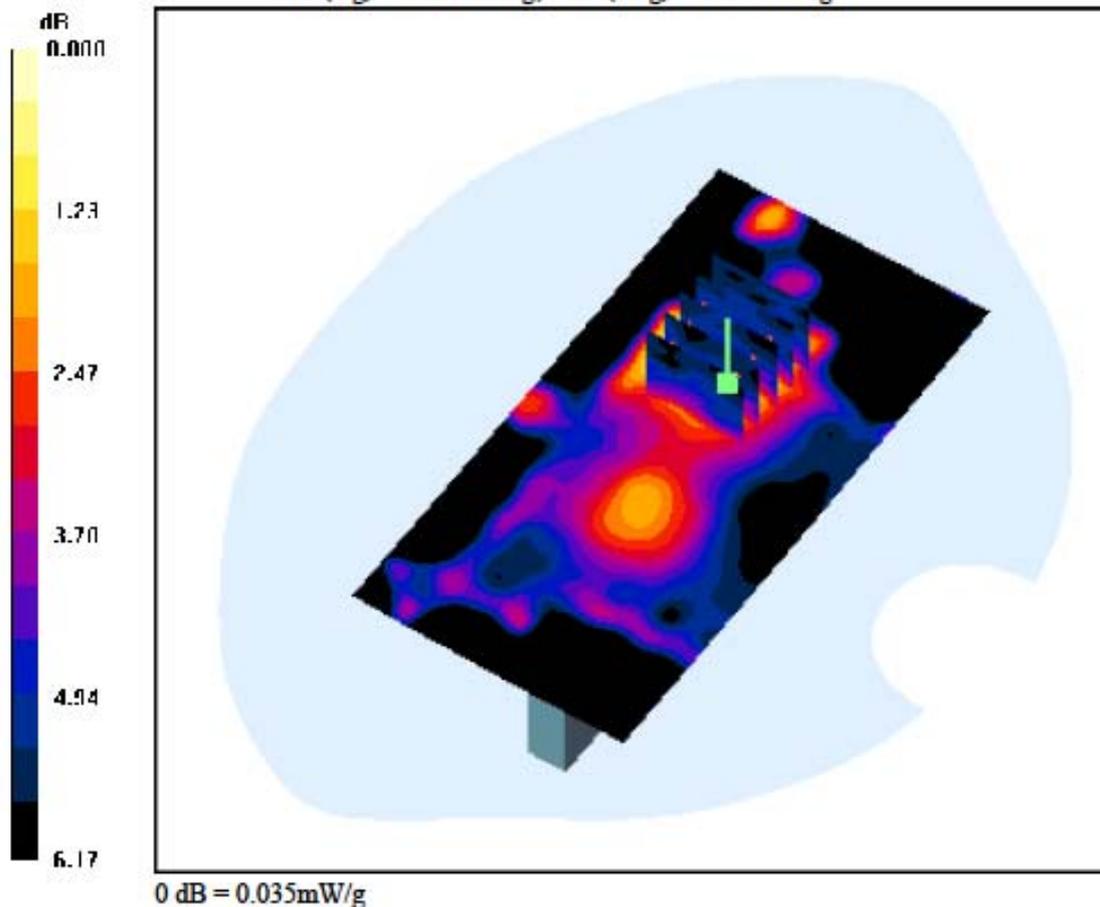Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-31; Ambient Temp: 22.4; Tissue Temp: 23.0

1cm space from Body, Top, W-LAN(802.11g) Ch. 11, Ant Internal

Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.026 dB
Peak SAR (extrapolated) = 0.072 W/kg
SAR(1 g) = 0.042 W/kg; SAR(10 g) = 0.027 W/kg

0 dB = 0.055mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.97 mho/m; $ε_r$ = 52.4; ρ = 1000 kg/m³
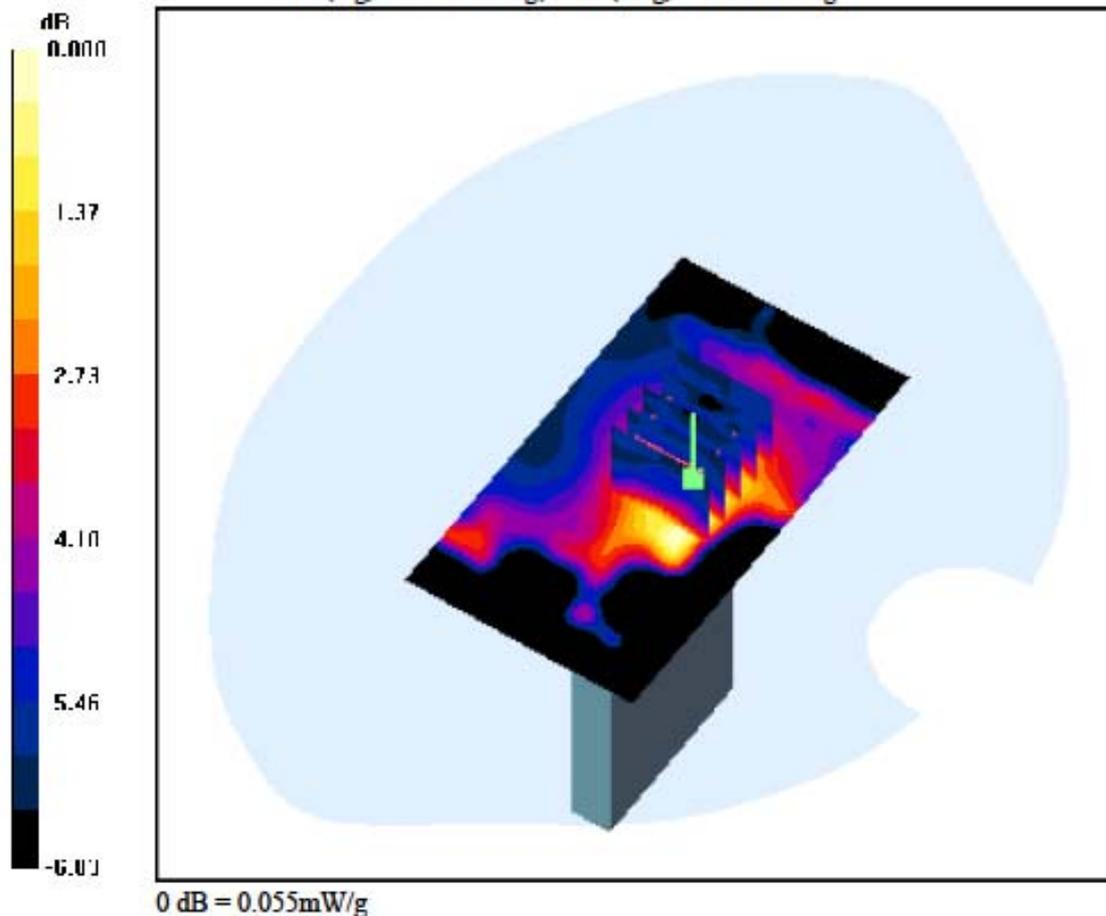Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-31; Ambient Temp: 22.4; Tissue Temp: 23.0

1cm space from Body, Front, W-LAN(802.11g) Ch. 11, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.142 dB
Peak SAR (extrapolated) = 0.067 W/kg
SAR(1 g) = 0.032 W/kg; SAR(10 g) = 0.023 W/kg
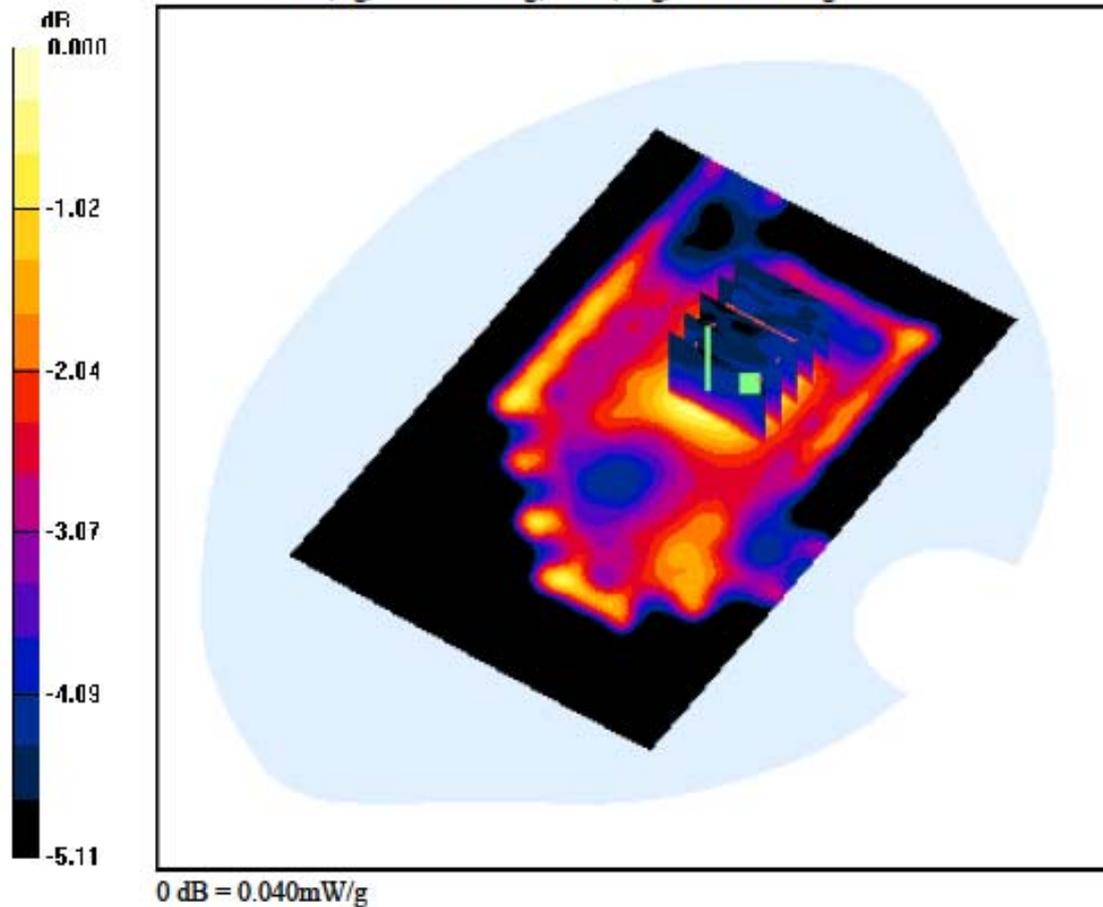
0 dB = 0.040mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.88 mho/m; ε_r = 52.2; ρ = 1000 kg/m³
Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-31; Ambient Temp: 22.4; Tissue Temp: 23.0

## 1cm space from Body, Rear, W-LAN(802.11g) Ch. 1, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.071 dB
Peak SAR (extrapolated) = 0.211 W/kg
SAR(1 g) = 0.100 W/kg; SAR(10 g) = 0.053 W/kg

0 dB = 0.128mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.91 mho/m; $ε_r$ = 52.2; ρ = 1000 kg/m³
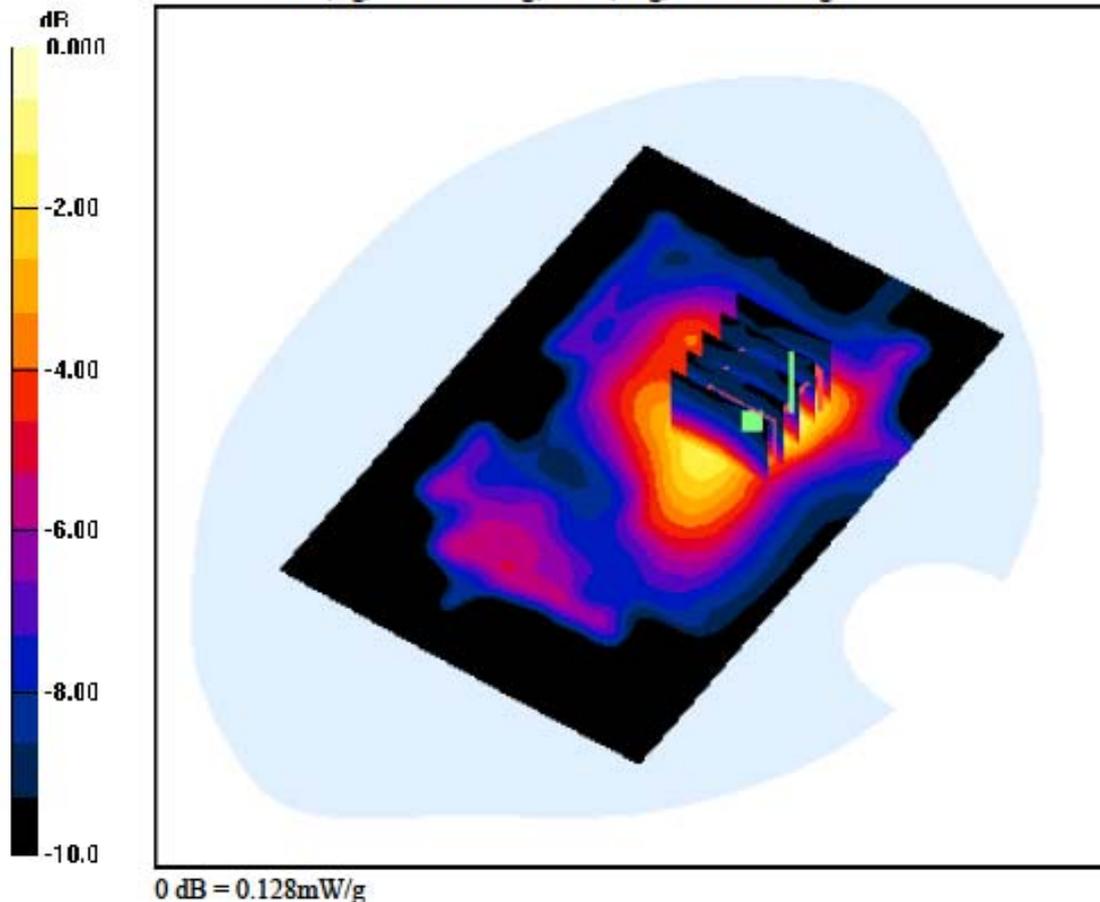Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-31; Ambient Temp: 22.4; Tissue Temp: 23.0

1cm space from Body, Rear, W-LAN(802.11g) Ch. 6, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.197 dB
Peak SAR (extrapolated) = 0.236 W/kg
SAR(1 g) = 0.110 W/kg; SAR(10 g) = 0.058 W/kg

0 dB = 0.142mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.97 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-31; Ambient Temp: 22.4; Tissue Temp: 23.0

1cm space from Body, Rear, W-LAN(802.11g) Ch. 11, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.331 dB
Peak SAR (extrapolated) = 0.228 W/kg
SAR(1 g) = 0.108 W/kg; SAR(10 g) = 0.056 W/kg

0 dB = 0.141mW/g

DIGITAL EMC CO., LTD

DUT: LG–E510g; Type: Bar

Communication System: W-LAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.97 mho/m; $ε_r$ = 52.4; ρ = 1000 kg/m³
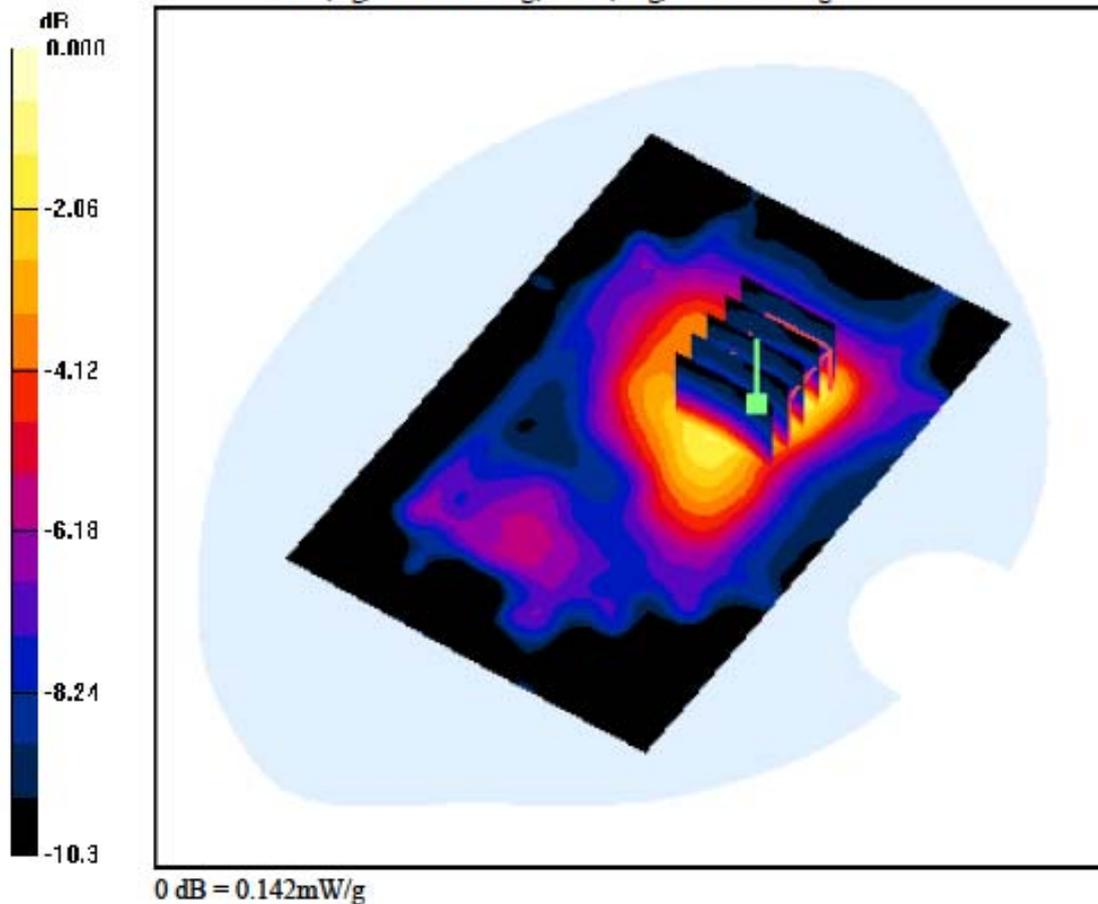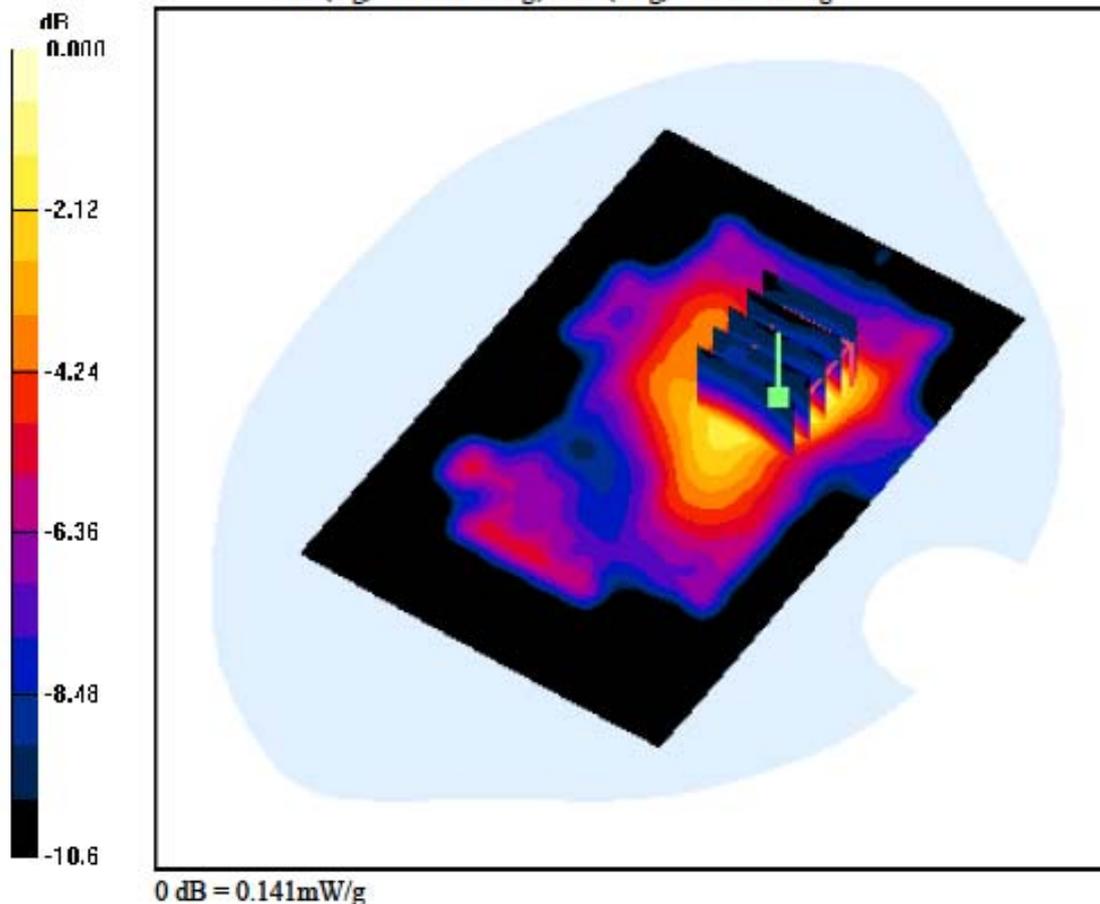Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-31; Ambient Temp: 22.4; Tissue Temp: 23.0

1cm space from Body, Left, W-LAN(802.11g) Ch. 11, Ant Internal

Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.235 dB
Peak SAR (extrapolated) = 0.169 W/kg
SAR(1 g) = 0.077 W/kg; SAR(10 g) = 0.043 W/kg

0 dB = 0.106mW/g

DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 848.8 MHz; σ = 0.924 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(8.96, 8.96, 8.96); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM with 835MHz; Type: SAM; Serial: TP-1223
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Date: 2011-08-25; Ambient Temp: 22.2; Tissue Temp:22.4

Left Touch, GSM850 Ch. 251, Ant Internal, Standard Battery

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.036 dB
Peak SAR (extrapolated) = 0.658 W/kg
SAR(1 g) = 0.518 W/kg; SAR(10 g) = 0.384 W/kg

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DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:2.075
Medium parameters used: f = 848.8 MHz; σ = 0.986 mho/m; ε_r = 54.9; ρ = 1000 kg/m³
Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(8.97, 8.97, 8.97); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM with 835MHz; Type: SAM; Serial: TP-1223
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-25; Ambient Temp: 22.2; Tissue Temp: 22.4

1cm space from Body, Rear, GSM850 GPRS Class 12 Ch. 251, Ant Internal

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.005 dB
Peak SAR (extrapolated) = 1.58 W/kg
SAR(1 g) = 1.19 W/kg; SAR(10 g) = 0.860 W/kg
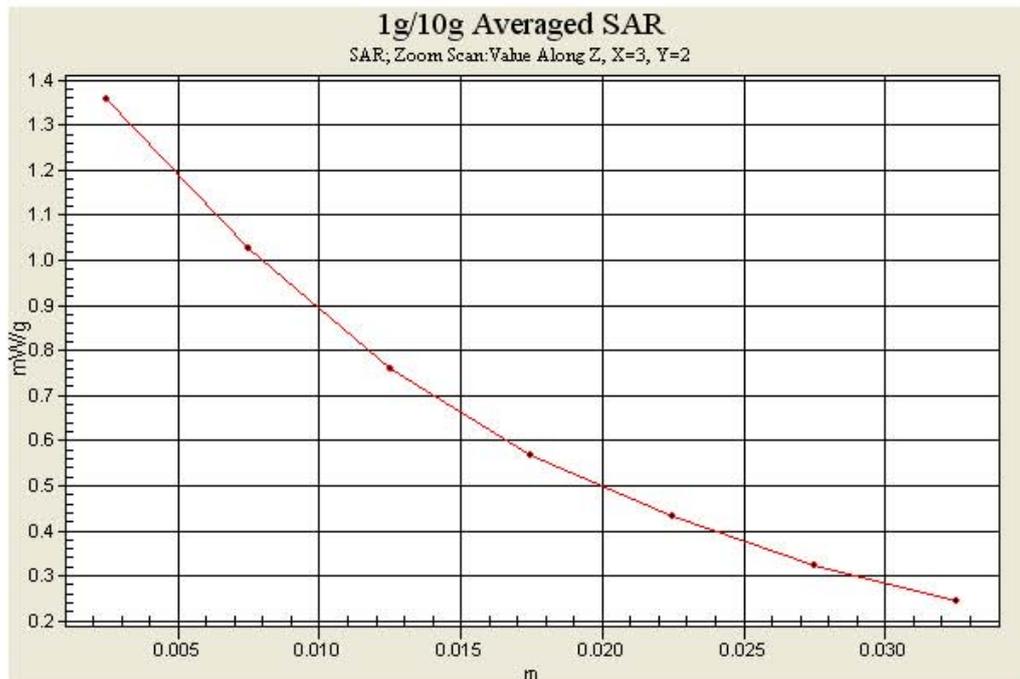
1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=2

DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: PCS1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
Medium parameters used: f = 1909.8 MHz; σ = 1.44 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
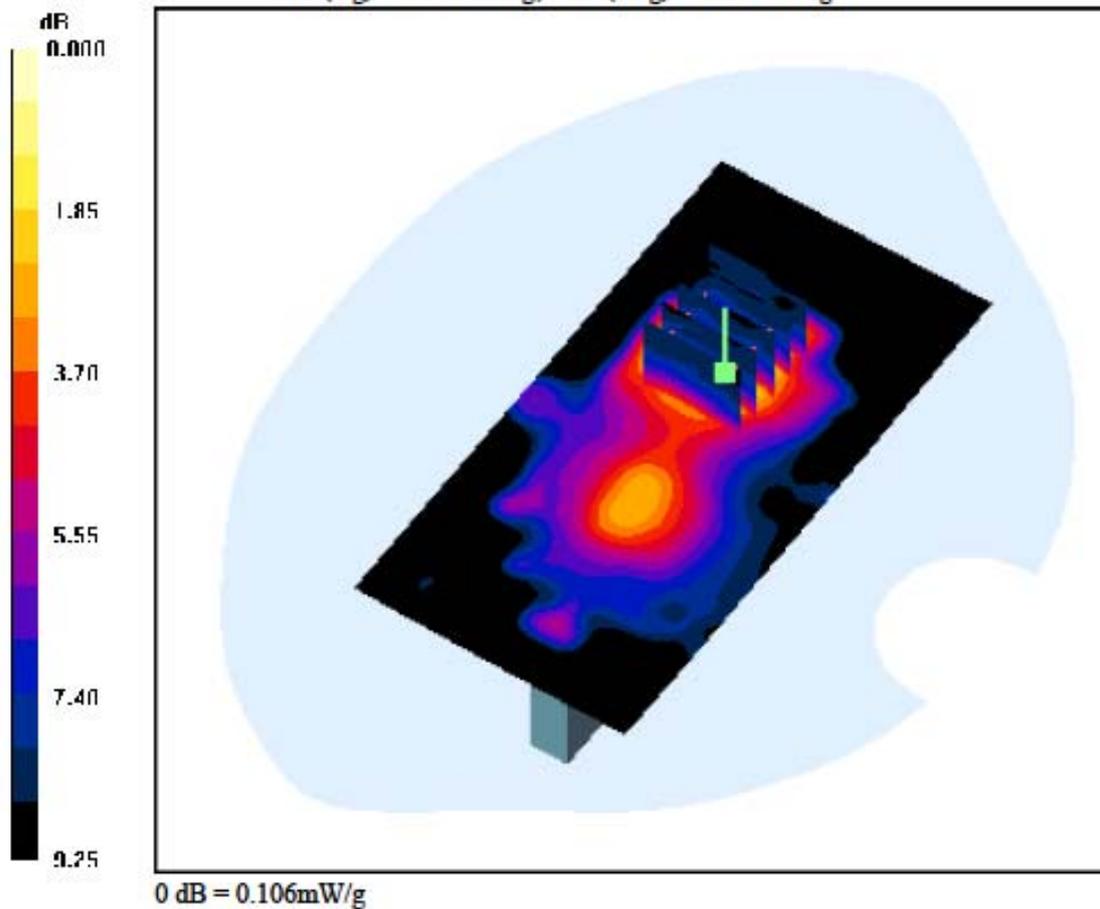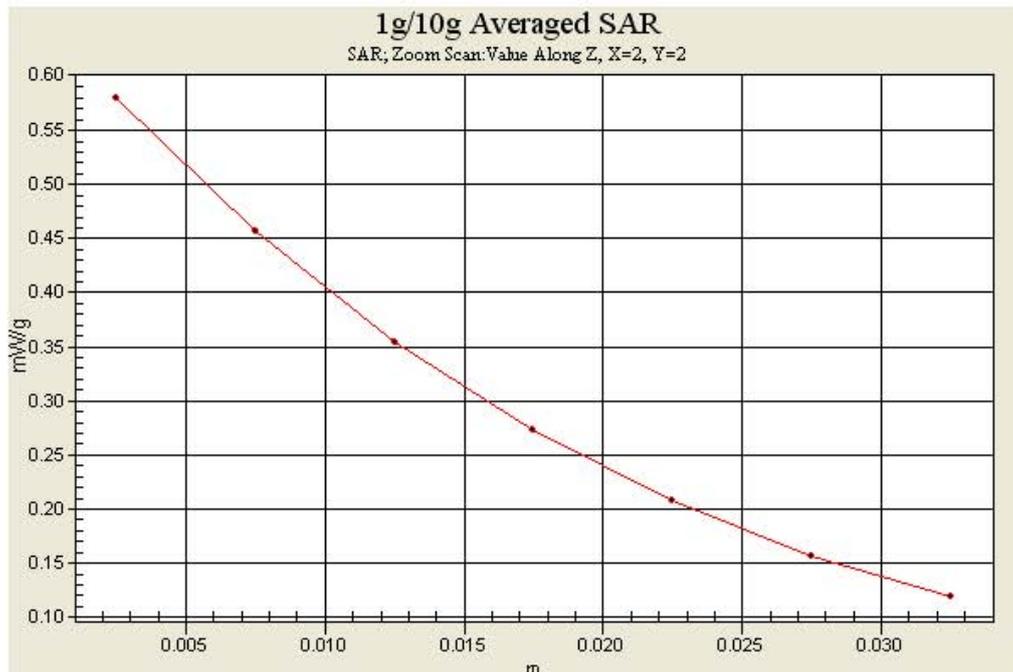Phantom section: Left Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(8.26, 8.26, 8.26); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Date: 2011-08-27; Ambient Temp: 22.1; Tissue Temp:22.3

Left Touch, PCS1900 Ch. 810, Ant Internal, Standard Battery

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.000 dB
Peak SAR (extrapolated) = 0.855 W/kg
SAR(1 g) = 0.531 W/kg; SAR(10 g) = 0.304 W/kg
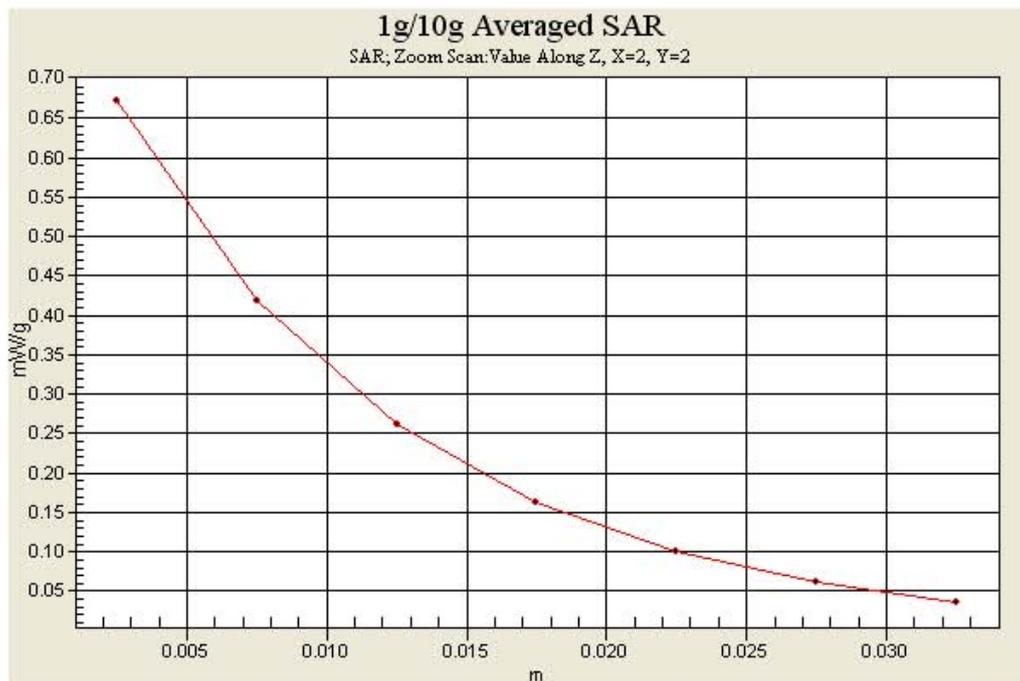
DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: PCS1900; Frequency: 1909.8 MHz;Duty Cycle: 1:2.075
Medium parameters used: f = 1909.8 MHz; σ = 1.56 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.19, 7.19, 7.19); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-27; Ambient Temp: 22.1; Tissue Temp: 22.3

## 1cm space from Body, Rear, PCS1900 GPRS Class 12 Ch. 810, Ant Internal

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = -0.001 dB
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 1.14 W/kg; SAR(10 g) = 0.630 W/kg
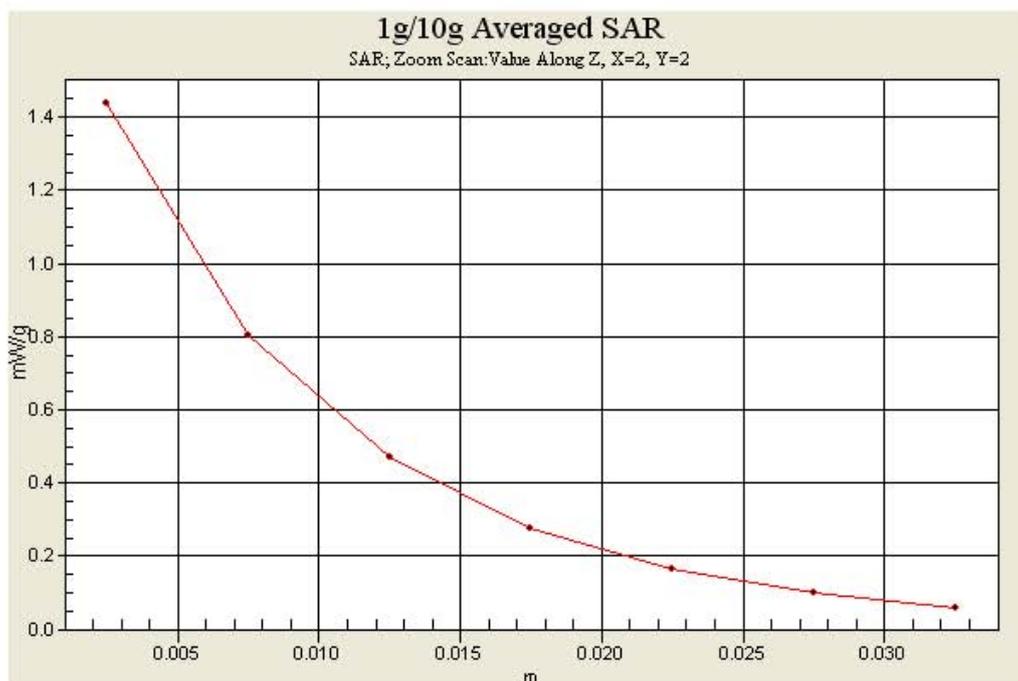
DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: WCDMA 850 ; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.911 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(8.96, 8.96, 8.96); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM with 835MHz; Type: SAM; Serial: TP-1223
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Date: 2011-08-26; Ambient Temp: 22.0; Tissue Temp:22.5

## Left Touch, WCDMA850 Ch. 4183, Ant Internal, Standard Battery

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = -0.050 dB
Peak SAR (extrapolated) = 0.512 W/kg
SAR(1 g) = 0.399 W/kg; SAR(10 g) = 0.295 W/kg

1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2

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DUT: LG-E510g; Type: Bar

Communication System: WCDMA 850 ; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 846.6 MHz; σ = 0.991 mho/m; ε_r = 55.5; ρ = 1000 kg/m³
Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(8.97, 8.97, 8.97); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM with 835MHz; Type: SAM; Serial: TP-1223
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-26; Ambient Temp: 22.0; Tissue Temp: 22.5

1cm space from Body, Rear, WCDMA850 Ch. 4233, Ant Internal

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = -0.049 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.914 W/kg; SAR(10 g) = 0.662 W/kg

1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2

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DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: WCDMA 1900; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1907.6 MHz; σ = 1.43 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

Probe: EX3DV4 - SN3643; ConvF(8.26, 8.26, 8.26); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Date: 2011-08-29; Ambient Temp: 22.4; Tissue Temp:22.8

Left Touch, WCDMA1900 Ch. 9538, Ant Internal, Standard Battery

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.017 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 0.976 W/kg; SAR(10 g) = 0.558 W/kg
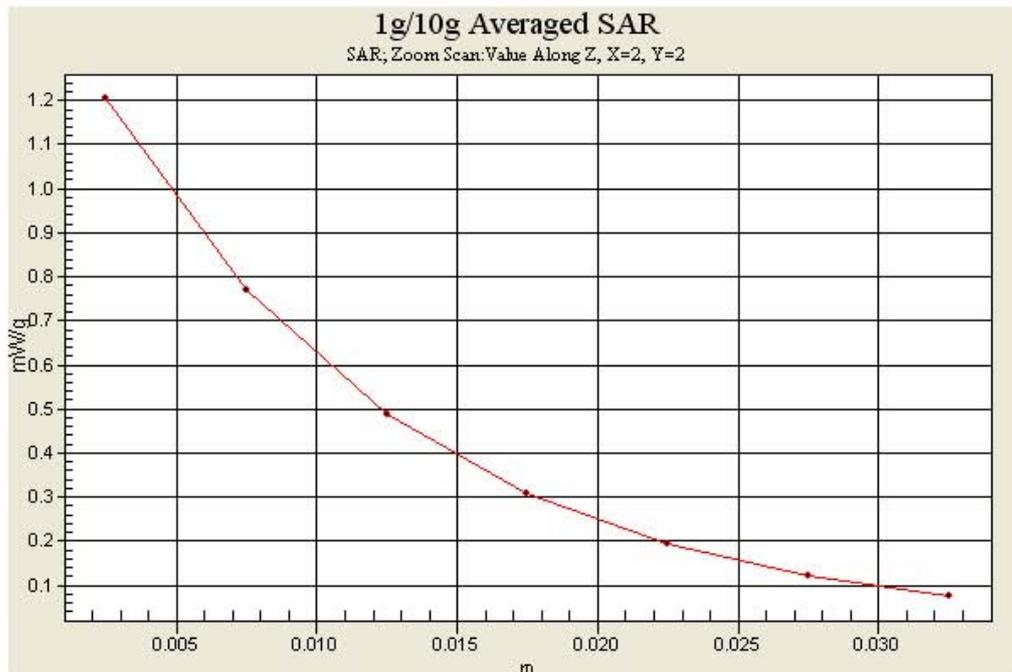
DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: WCDMA 1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1907.6 MHz; σ = 1.57 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
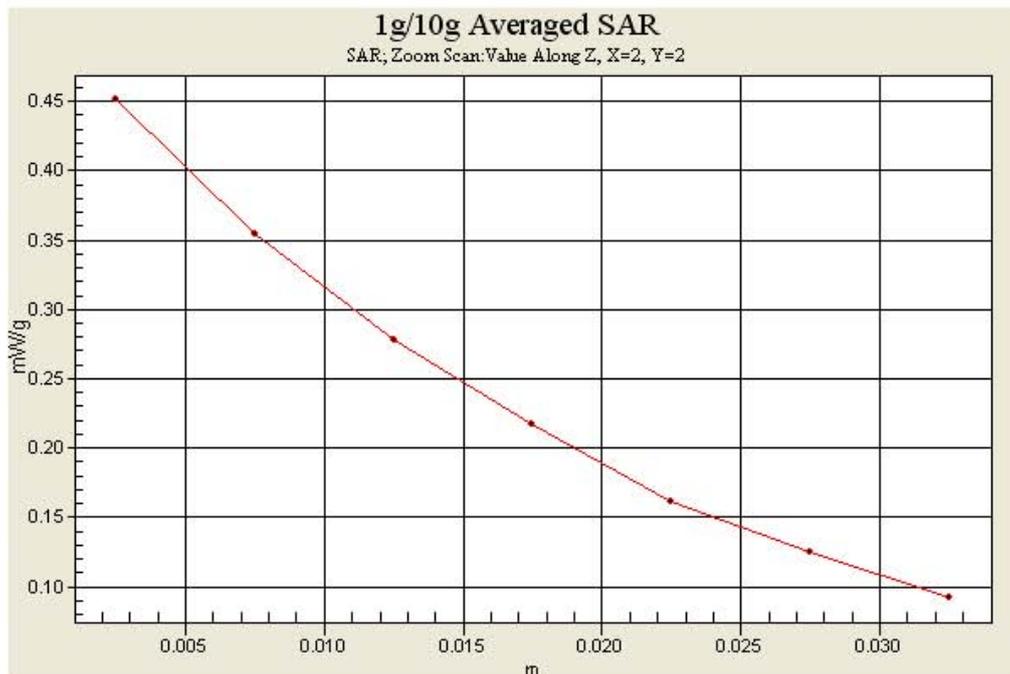Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.19, 7.19, 7.19); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-29; Ambient Temp: 22.4; Tissue Temp: 22.8

1cm space from Body, Rear, WCDMA1900 Ch. 9538, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.021 dB
Peak SAR (extrapolated) = 2.12 W/kg
SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.655 W/kg

1g/10g Averaged SAR
SAR; Zoom Scan: Value Along Z, X=2, Y=1

DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: W-LAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.85 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
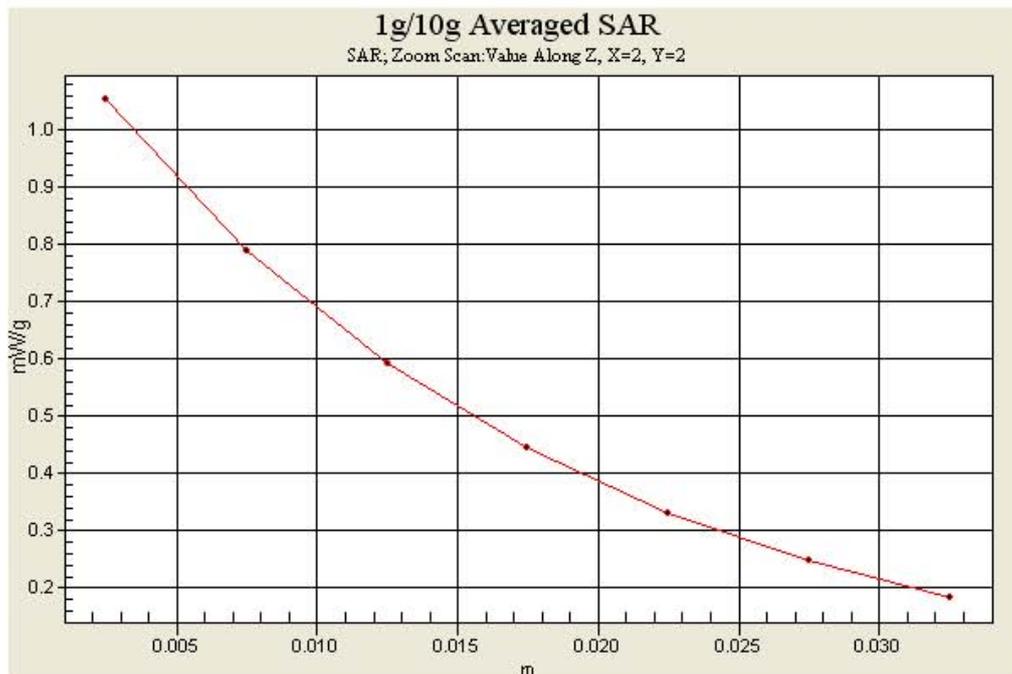Phantom section: Left Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.4, 7.4, 7.4); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Date: 2011-08-30; Ambient Temp: 22.2; Tissue Temp:22.6

Left Tilt, W-LAN(802.11b) Ch. 11, Ant Internal, Standard Battery

Area Scan (101x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.194 dB
Peak SAR (extrapolated) = 0.607 W/kg
SAR(1 g) = 0.150 W/kg; SAR(10 g) = 0.038 W/kg

DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: W-LAN; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.94 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-30; Ambient Temp: 22.2; Tissue Temp: 22.6

### 1cm space from Body, Rear, W-LAN(802.11b) Ch. 6, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.375 dB
Peak SAR (extrapolated) = 0.100 W/kg
SAR(1 g) = 0.048 W/kg; SAR(10 g) = 0.027 W/kg

DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: W-LAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.78 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
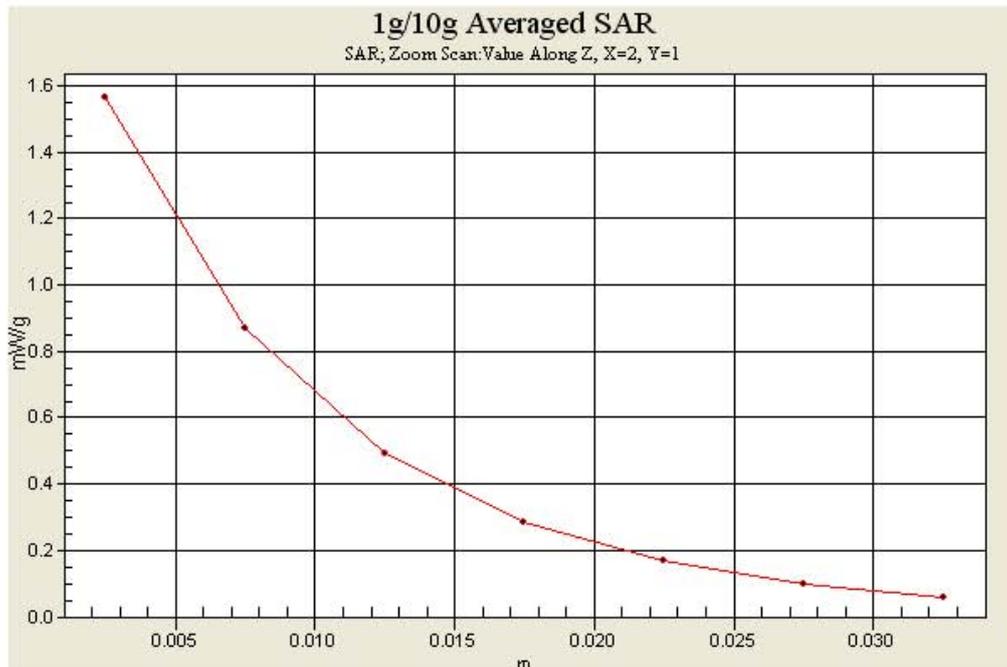Phantom section: Right Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.4, 7.4, 7.4); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Date: 2011-08-31; Ambient Temp: 22.4; Tissue Temp:23.0

Right Touch, W-LAN(802.11g) Ch. 6, Ant Internal, Standard Battery

Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.176 dB
Peak SAR (extrapolated) = 0.329 W/kg
SAR(1 g) = 0.135 W/kg; SAR(10 g) = 0.063 W/kg

1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2

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DIGITAL EMC CO., LTD

DUT: LG-E510g; Type: Bar

Communication System: W-LAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.91 mho/m; ε_r = 52.2; ρ = 1000 kg/m³
Phantom section: Flat Section

DASY4 Configuration:
Probe: EX3DV4 - SN3643; ConvF(7.03, 7.03, 7.03); Calibrated: 2011-01-24; Electronics: DAE3 Sn519
Phantom: SAM 1800/1900 MHz; Type: SAM; Serial: TP-1224
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Test Date: 2011-08-31; Ambient Temp: 22.4; Tissue Temp: 23.0

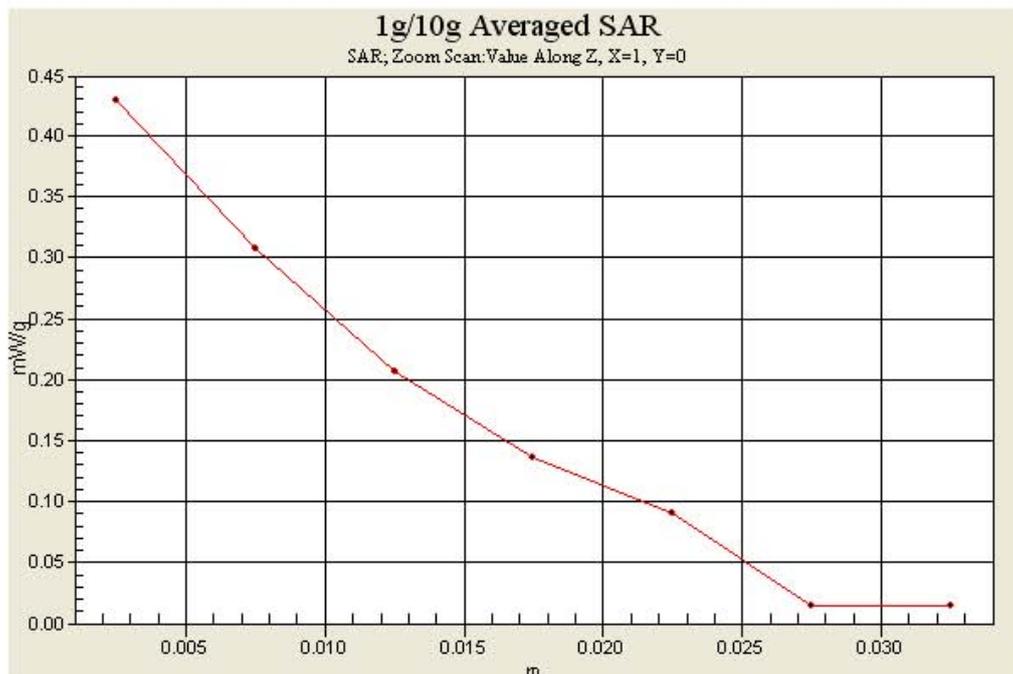## 1cm space from Body, Rear, W-LAN(802.11g) Ch. 6, Ant Internal

Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Power Drift = 0.197 dB
Peak SAR (extrapolated) = 0.236 W/kg
SAR(1 g) = 0.110 W/kg; SAR(10 g) = 0.058 W/kg

1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2

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Attachment 3. – Probe Calibration Data

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

ilac-MRA

SWISS
CALIBRATION

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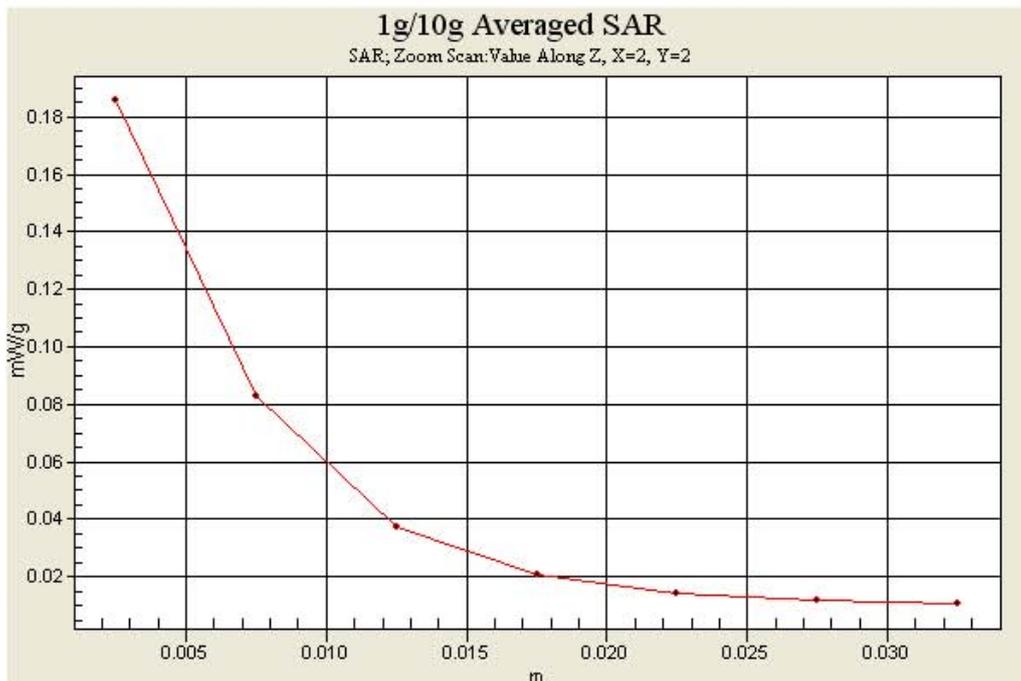   Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Client   **Digital EMC (Dymstec)**

Certificate No: **EX3-3643_Jan11**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3643
Calibration procedure(s)	QA CAL-01.v7, QA CAL-12.v6, QA CAL-14.v3, QA CAL-23.v4 and QA CAL-25.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	January 24, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5066 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11

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

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

Issued: January 26, 2011

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

Certificate No: EX3-3643_Jan11   Page 1 of 11

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

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

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

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

Methods Applied and Interpretation of Parameters:

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

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

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

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

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

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

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

Certificate No: EX3-3643_Jan11   Page 2 of 11

EX3DV4 SN:3643　　　　　　　　　　　　　　　　　　　　January 24, 2011

Probe　EX3DV4

SN:3643

Manufactured:　　　　January 8, 2008
Last calibrated:　　　 January 26, 2010
Recalibrated:　　　　 January 24, 2011

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: EX3-3643_Jan11　　　　　　Page 3 of 11

EX3DV4 SN:3643   January 24, 2011

DASY/EASY - Parameters of Probe: EX3DV4 SN:3643

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm $(\mu V/(V/m)^2)^A$	0.39	0.42	0.46	± 10.1%
DCP $(mV)^B$	96.6	95.4	95.0	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	134.8	± 2.4 %
			Y	0.00	0.00	1.00	128.8	
			Z	0.00	0.00	1.00	145.3	

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

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

^{B} Numerical linearization parameter: uncertainty not required.

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

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EX3DV4 SN:3643

January 24, 2011

DASY/EASY - Parameters of Probe: EX3DV4 SN:3643

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz]^c	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
450	± 50 / ± 100	43.5 ± 5%	0.87 ± 5%	9.69	9.69	9.69	0.12	1.00 ± 13.3%
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	8.96	8.96	8.96	0.69	0.64 ± 11.0%
1750	± 50 / ± 100	40.1 ± 5%	1.37 ± 5%	8.58	8.58	8.58	0.63	0.72 ± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	8.26	8.26	8.26	0.64	0.72 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	7.40	7.40	7.40	0.52	0.77 ± 11.0%

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

and the uncertainty for the indicated frequency band.

Certificate No: EX3-3643_Jan11 Page 5 of 11

EX3DV4 SN:3643   January 24, 2011

DASY/EASY - Parameters of Probe: EX3DV4 SN:3643

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz]^c	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
450	± 50 / ± 100	56.7 ± 5%	0.94 ± 5%	10.31	10.31	10.31	0.05	1.05 ± 13.3%
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	8.97	8.97	8.97	0.52	0.77 ± 11.0%
1750	± 50 / ± 100	53.4 ± 5%	1.49 ± 5%	7.48	7.48	7.48	0.69	0.65 ± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	7.19	7.19	7.19	0.44	0.83 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	7.03	7.03	7.03	0.51	0.74 ± 11.0%
2600	± 50 / ± 100	52.5 ± 5%	2.16 ± 5%	6.96	6.96	6.96	0.26	1.07 ± 11.0%
3500	± 50 / ± 100	51.3 ± 5%	3.31 ± 5%	6.15	6.15	6.15	0.33	1.30 ± 13.1%
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	4.32	4.32	4.32	0.45	1.90 ± 13.1%
5300	± 50 / ± 100	48.9 ± 5%	5.42 ± 5%	4.15	4.15	4.15	0.50	1.90 ± 13.1%
5600	± 50 / ± 100	48.5 ± 5%	5.77 ± 5%	3.72	3.72	3.72	0.50	1.90 ± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	3.86	3.86	3.86	0.60	1.90 ± 13.1%

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

Certificate No: EX3-3643_Jan11   Page 6 of 11

EX3DV4 SN:3643　　　　　　　　　　　　　　　　January 24, 2011

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)
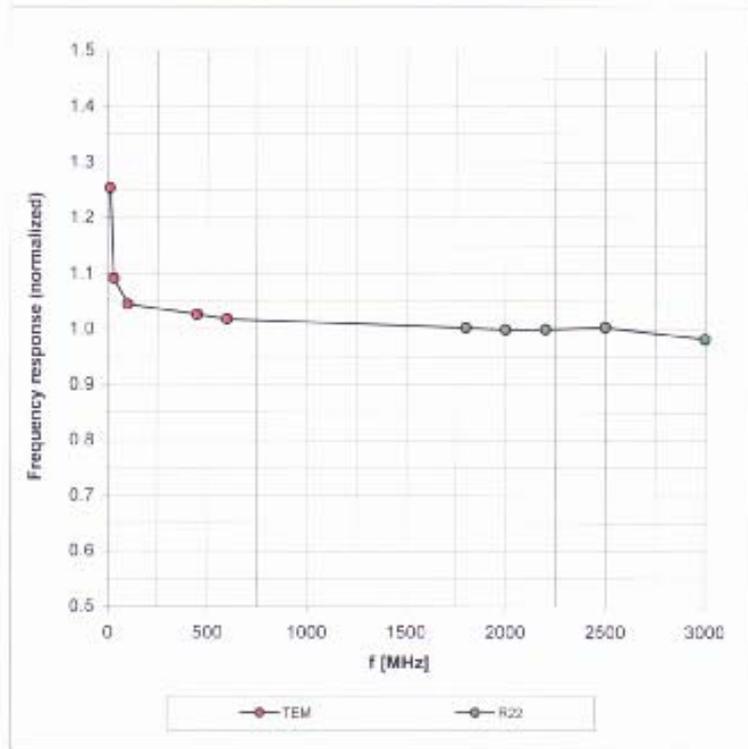
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Certificate No: EX3-3643_Jan11　　　　　　Page 7 of 11

EX3DV4 SN:3643   January 24, 2011

Receiving Pattern (φ), ϑ = 0°

f = 600 MHz, TEM ifi110EXX

f = 1800 MHz, WG R22
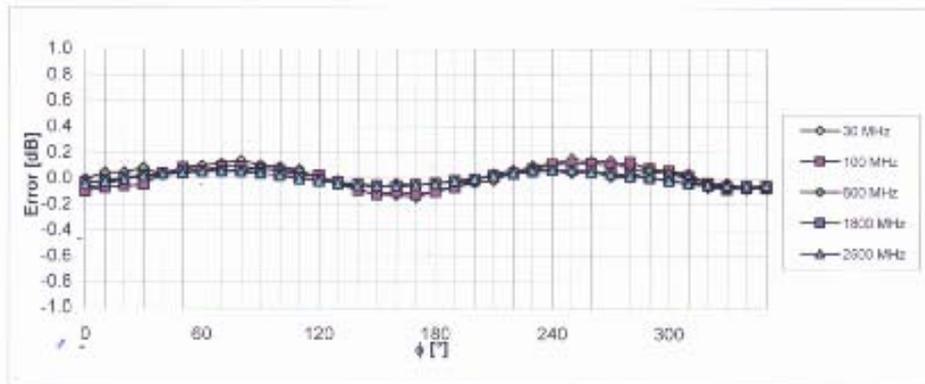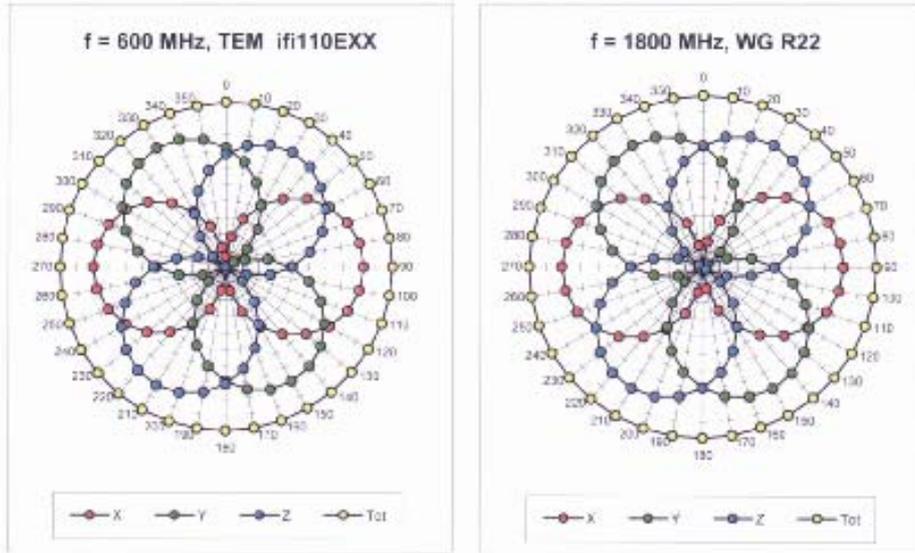
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Certificate No: EX3-3643_Jan11   Page 8 of 11

EX3DV4 SN:3643

January 24, 2011

Dynamic Range f(SAR$_{head}$)
(TEM cell, f = 900 MHz)
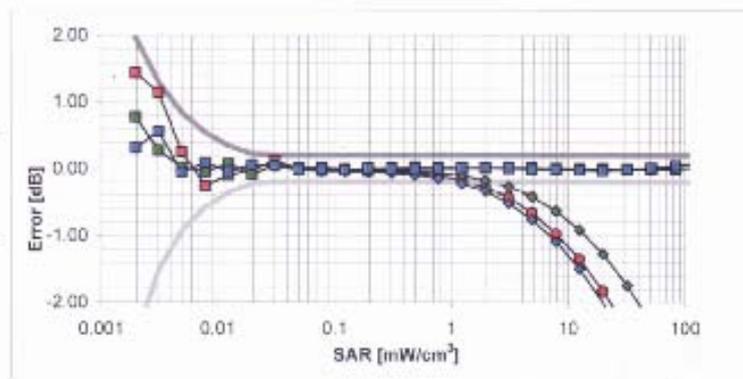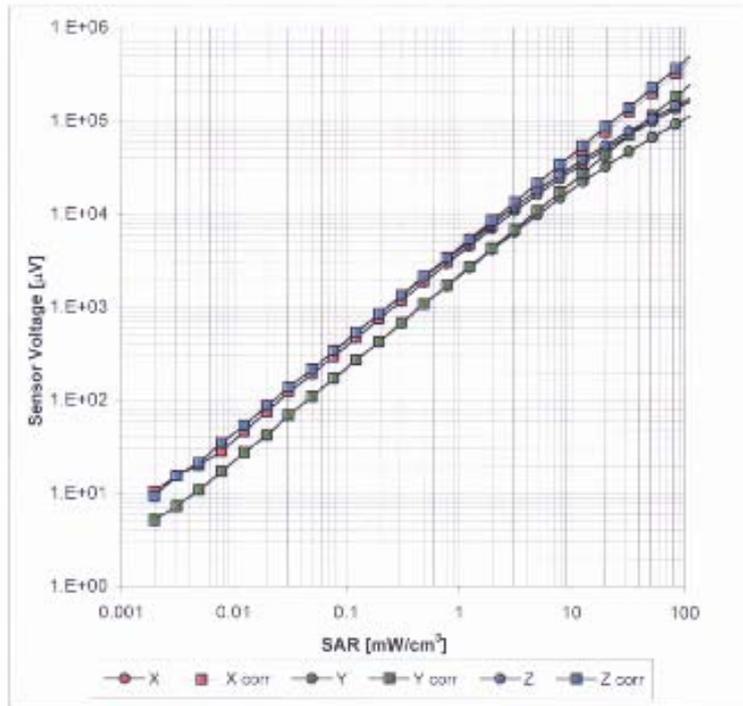
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: EX3-3643_Jan11　　　　　　Page 9 of 11

EX3DV4 SN:3643　　　　　　　　　　　　　　　　　　January 24, 2011

Conversion Factor Assessment

f = 835 MHz, WGLS R9 (head)

f = 1750 MHz, WGLS R22 (head)
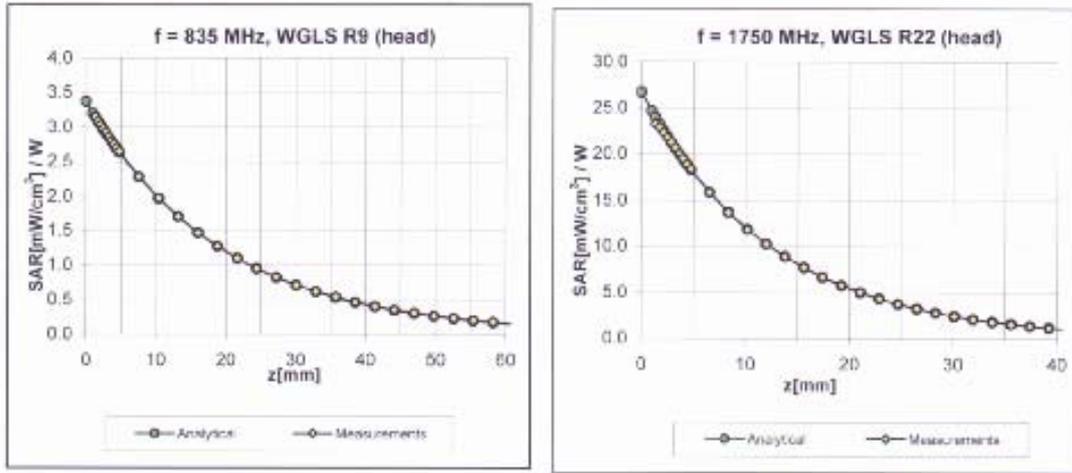
Deviation from Isotropy in HSL

Error (φ, ϑ), f = 900 MHz
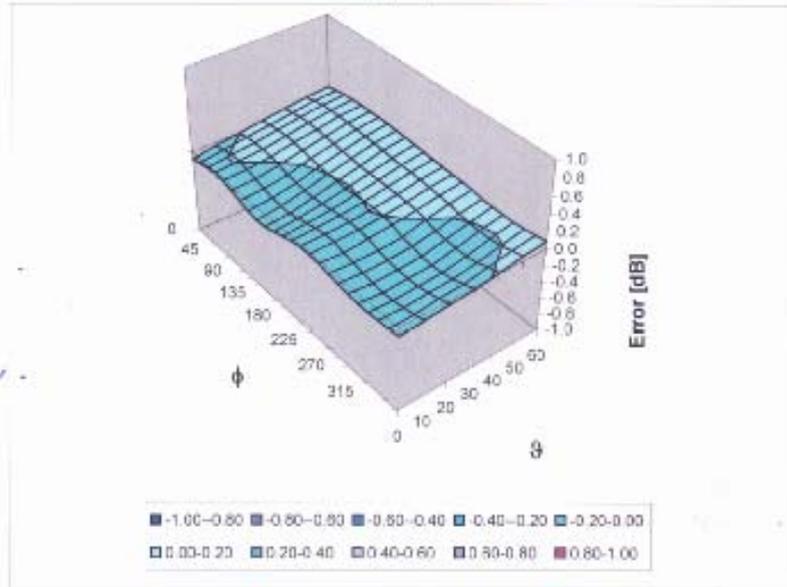
Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: EX3-3643_Jan11　　　　　　　Page 10 of 11

EX3DV4 SN:3643　　　　　　　　　　　　　　　　　　January 24, 2011

Other Probe Parameters

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

Certificate No: EX3-3643_Jan11　　　　　Page 11 of 11

Attachment 4. – Dipole Calibration Data

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

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

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

Accreditation No.: **SCS 108**

Client **Digital EMC (Dymstec)**

Certificate No: **D835V2-464_Mar10**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 464
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	March 22, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV3	SN: 3205	26-Jun-09 (No. ES3-3205_Jun09)	Jun-10
DAE4	SN: 601	02-Mar-10 (No. DAE4-601_Mar10)	Mar-11

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

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

Issued: March 22, 2010

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Certificate No: D835V2-464_Mar10 Page 1 of 9

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S Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

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

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.

- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.

- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.

- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.

- *SAR measured:* SAR measured at the stated antenna input power.

- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.

- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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Measurement Conditions

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

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.9 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.44 mW / g
SAR normalized	normalized to 1W	9.76 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.75 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.59 mW / g
SAR normalized	normalized to 1W	6.36 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.35 mW /g ± 16.5 % (k=2)**

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Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.3 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature during test	(22.1 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.55 mW / g
SAR normalized	normalized to 1W	10.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.90 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.67 mW / g
SAR normalized	normalized to 1W	6.68 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.53 mW / g ± 16.5 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.1 Ω - 2.6 jΩ
Return Loss	- 31.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.6 Ω - 5.7 jΩ
Return Loss	- 24.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.382 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 27, 2002

DASY5 Validation Report for Head TSL

Date/Time: 22.03.2010 09:52:40

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:464

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 42.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.04, 6.04, 6.04); Calibrated: 26.06.2009

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

- Electronics: DAE4 Sn601; Calibrated: 02.03.2010

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

- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57
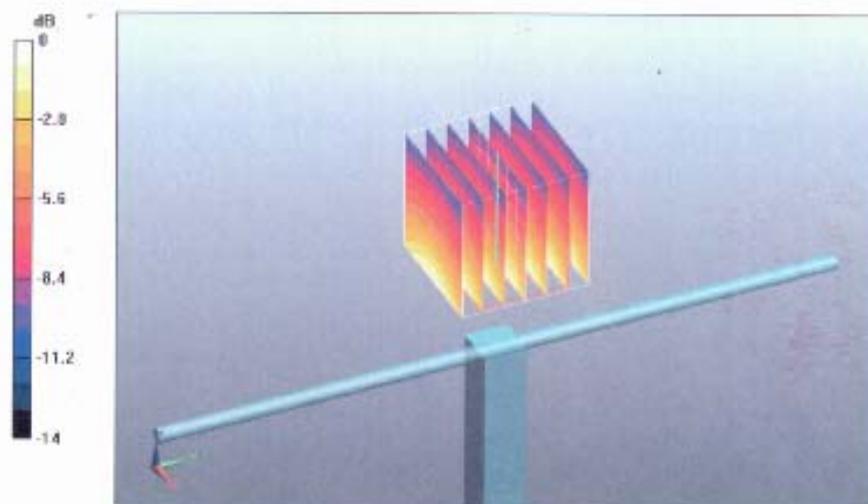
Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.6 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 3.66 W/kg
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.59 mW/g
Maximum value of SAR (measured) = 2.85 mW/g

0 dB = 2.85mW/g

Certificate No: D835V2-464_Mar10   Page 6 of 9

Impedance Measurement Plot for Head TSL

22 Mar 2010 09:39:03

CH1 S11   1 U FS   1: 50.115 Ω   -2.5547 Ω 74.610 pF   835.000 000 MHz

Del

Cor

Avg
16

CH2 S11   LOG   5 dB/ REF -20 dB   1:-31.889 dB   835.000 000 MHz

Cor

Avg
16

START 635.000 000 MHz   STOP 1 100.000 000 MHz

Certificate No: D835V2-464_Mar10   Page 7 of 9

DASY5 Validation Report for Body

Date/Time: 22.03.2010 13:46:23

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:464

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.97, 5.97, 5.97); Calibrated: 26.06.2009

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

- Electronics: DAE4 Sn601; Calibrated: 02.03.2010

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

- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Pin250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.8 V/m; Power Drift = 0.034 dB
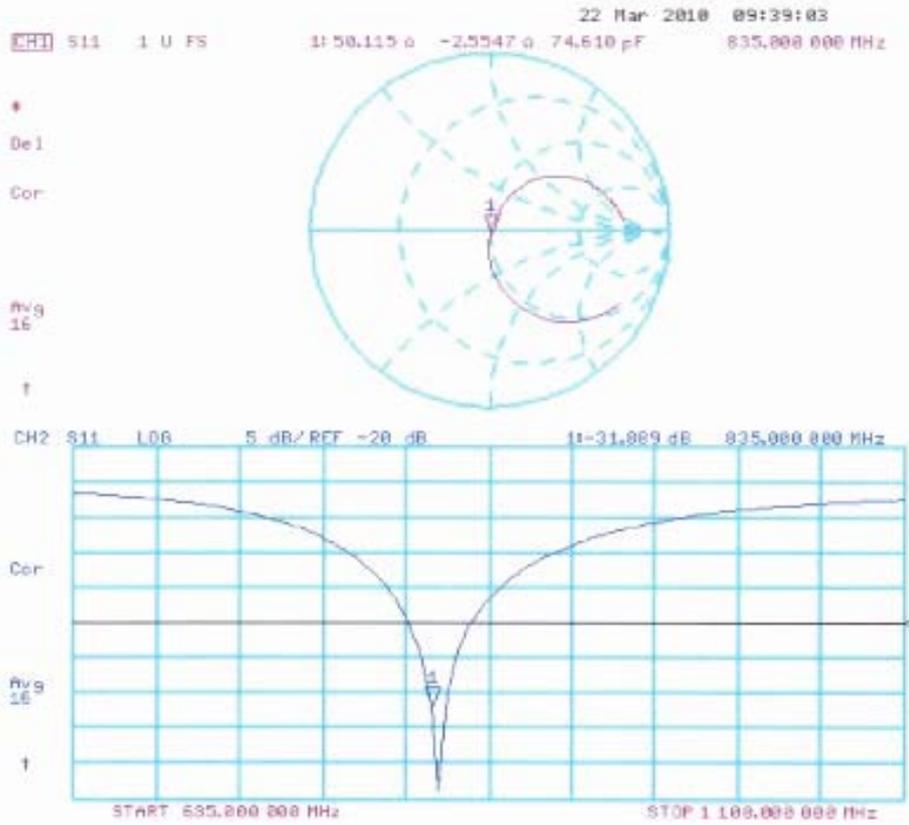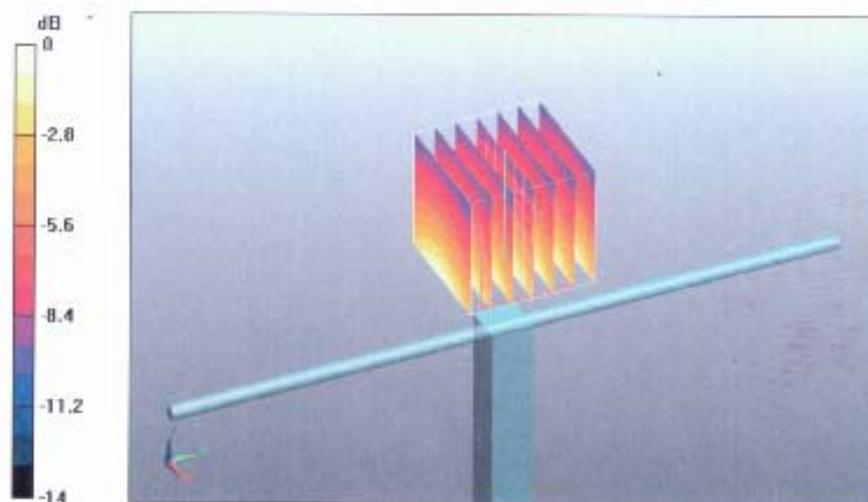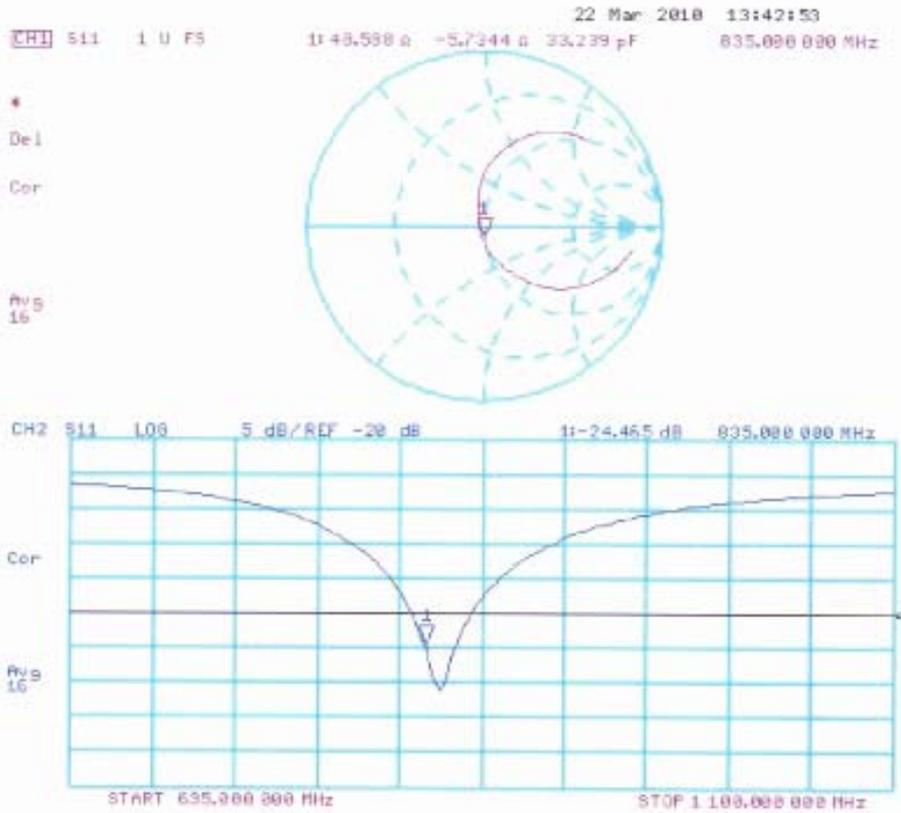Peak SAR (extrapolated) = 3.78 W/kg
SAR(1 g) = 2.55 mW/g; SAR(10 g) = 1.67 mW/g
Maximum value of SAR (measured) = 2.98 mW/g

0 dB = 2.98mW/g

Certificate No: D835V2-464_Mar10   Page 8 of 9

Impedance Measurement Plot for Body TSL

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   Servizio svizzero di taratura
S Swiss Calibration Service

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client   **Digital EMC (Dymstec)**   Certificate No: **D1900V2-5d029_Mar10**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d029
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	March 23, 2010

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

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DAE4	SN: 601	02-Mar-10 (No. DAE4-601_Mar10)	Mar-11

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

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

Issued: March 23, 2010

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Certificate No: D1900V2-5d029_Mar10   Page 1 of 9

Calibration Laboratory of
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　Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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

Accredited by the Swiss Accreditation Service (SAS)　　　　　　　　Accreditation No.: **SCS 108**
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Additional Documentation:

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Certificate No: D1900V2-5d029_Mar10　　　　　　　Page 2 of 9