

RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report		Page 1(49)
Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11	FCC ID: L6ARBH40GW

APPENDIX A: SAR DISTRIBUTION COMPARISON FOR ACCURACY VERIFICATION

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Date/Time: 22/06/2006 11:19:51 PM

Test Laboratory: RTS

File Name: [835MHz Validation Ambient Temp 23.5 C Liquid Temp 22.0 C 06_22_06.da4](#)

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:446
Program Name: Unnamed Program

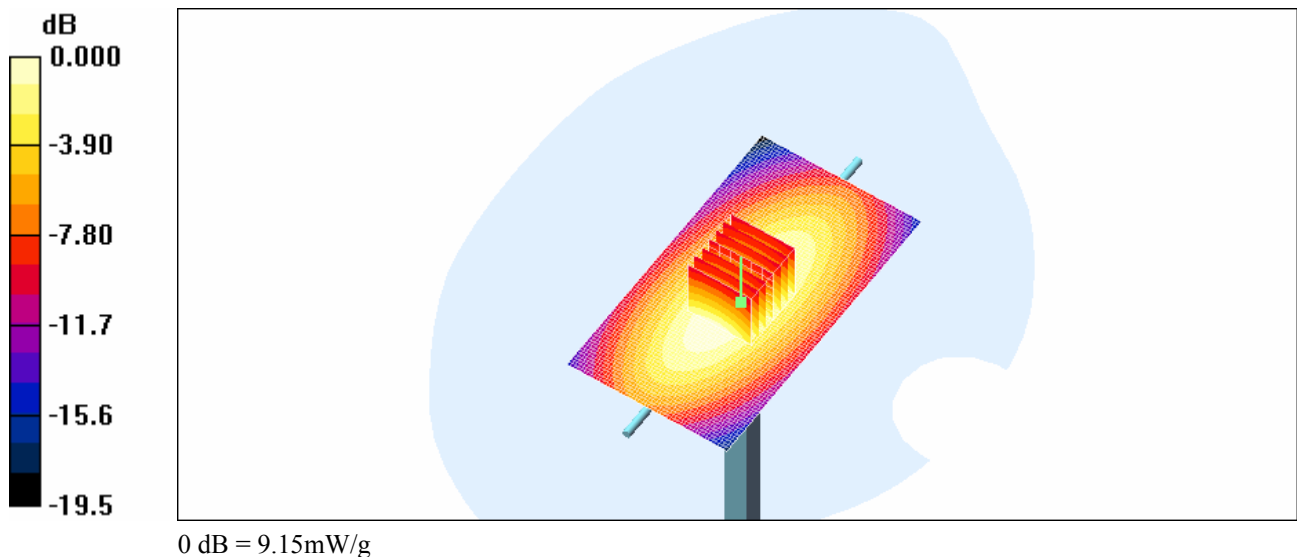
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(6.36, 6.36, 6.36); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 25/04/2006
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1076
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Dipole Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 104.1 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 11.7 W/kg
SAR(1 g) = 8.38 mW/g; SAR(10 g) = 5.59 mW/g
Maximum value of SAR (measured) = 9.05 mW/g

Dipole Validation/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 9.15 mW/g



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Date/Time: 19/07/2006 1:00:28 AM

Test Laboratory: RTS

File Name: [835MHz_Validation_Ambient_Temp_24_3_C_Liquid_Temp_23_1_C_07_19_06.da4](#)

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:446
Program Name: Unnamed Program

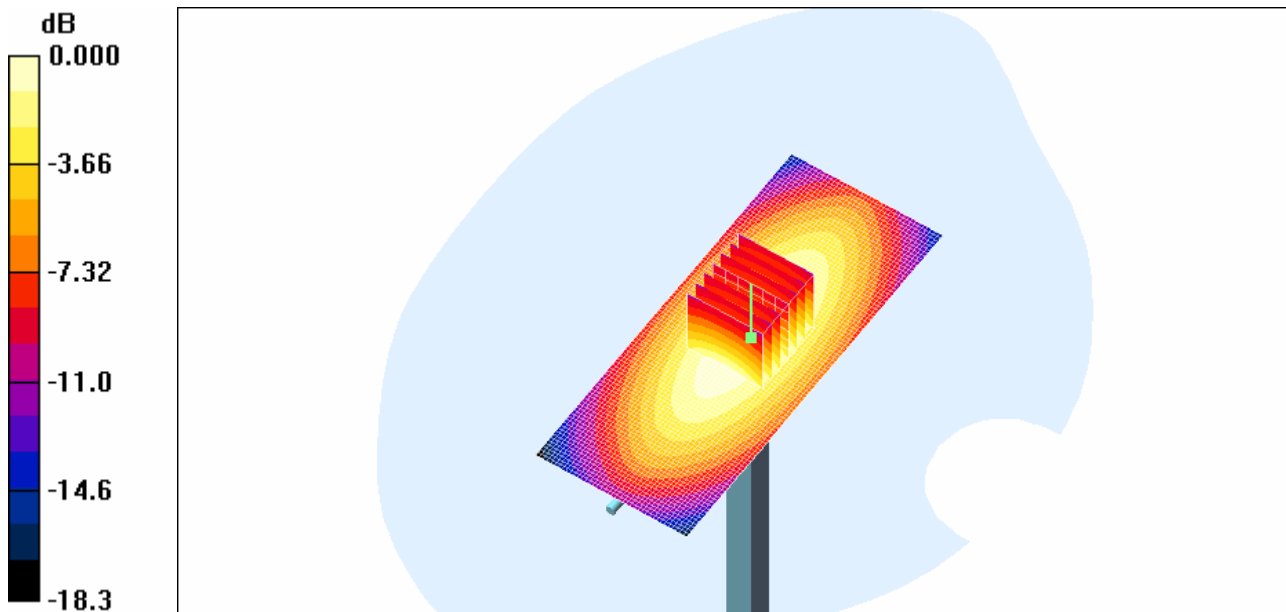
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 42.9$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(6.36, 6.36, 6.36); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 25/04/2006
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1076
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Dipole Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 109.7 V/m; Power Drift = -0.017 dB
Peak SAR (extrapolated) = 14.0 W/kg
SAR(1 g) = 9.43 mW/g; SAR(10 g) = 6.15 mW/g
Maximum value of SAR (measured) = 10.2 mW/g

Dipole Validation/Area Scan (41x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 10.1 mW/g



0 dB = 10.1mW/g

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Date/Time: 22/06/2006 6:05:30 PM

Test Laboratory: RTS

File Name: [1900MHz Validation Ambient Temp 23.8 C Liquid Temp 22.3 C 06_22_06.da4](#)

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:545

Program Name: Unnamed Program

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(5.18, 5.18, 5.18); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 25/04/2006
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1076
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

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

Reference Value = 190.9 V/m; Power Drift = 0.023 dB

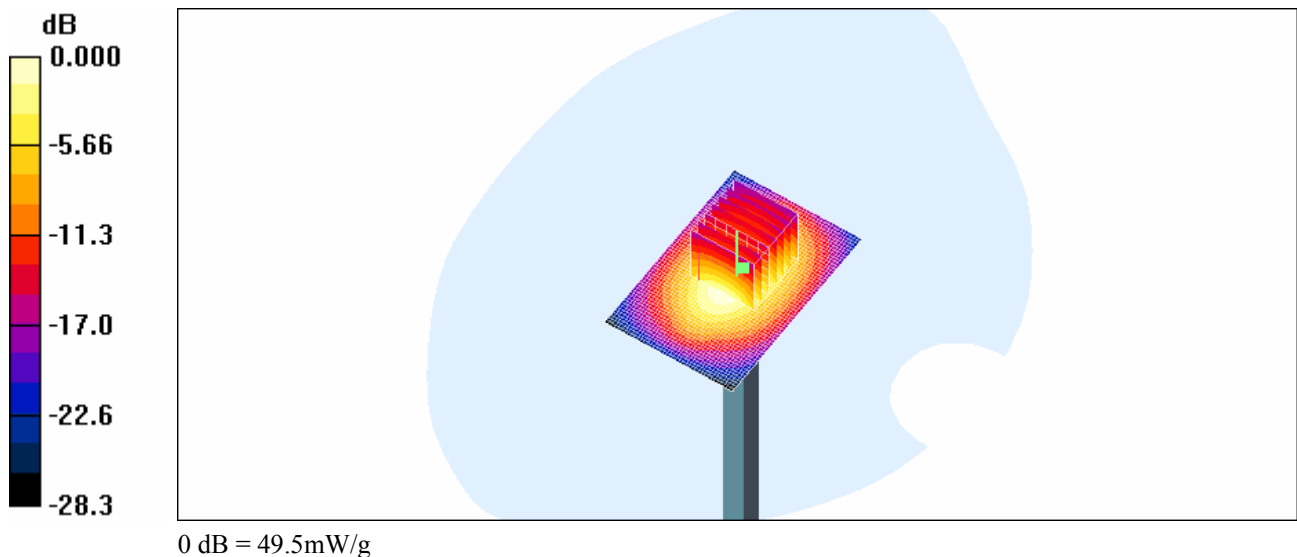
Peak SAR (extrapolated) = 73.3 W/kg

SAR(1 g) = 41.5 mW/g; SAR(10 g) = 21.7 mW/g

Maximum value of SAR (measured) = 47.1 mW/g

Dipole Validation/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 49.5 mW/g



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Date/Time: 18/07/2006 4:32:38 PM

Test Laboratory: RTS

File Name: [1900MHz_Validation_Ambient_Temp_24_2_C_Liquid_Temp_23_1_C_07_18_06.da4](#)

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:545
Program Name: Unnamed Program

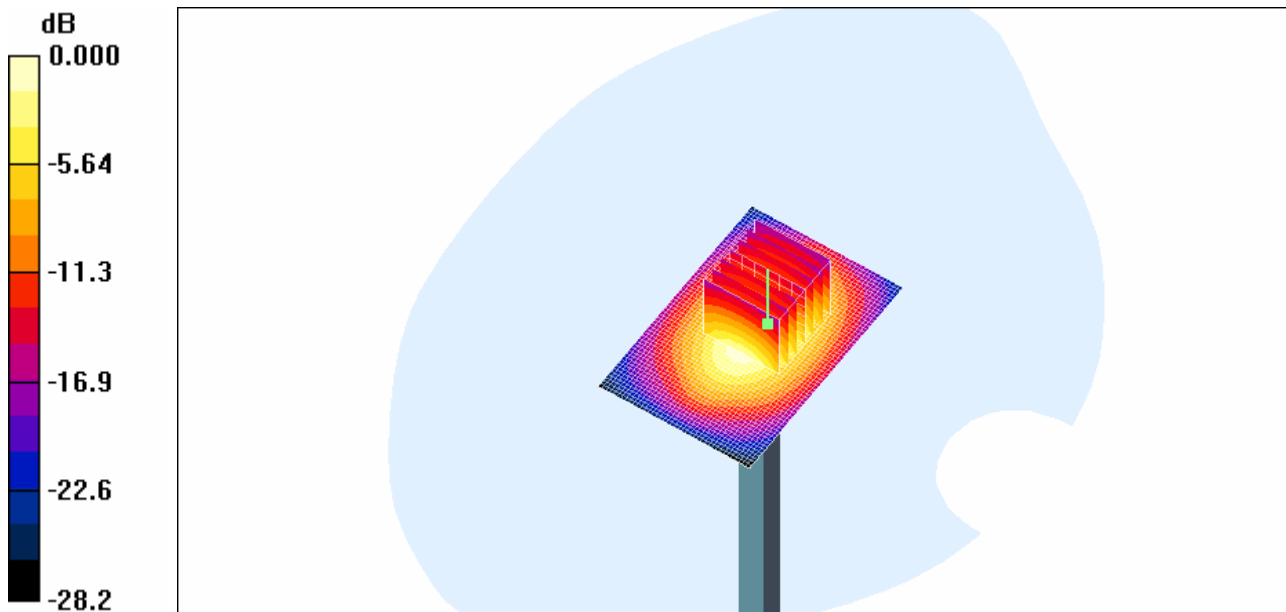
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_r = 39$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(5.18, 5.18, 5.18); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 25/04/2006
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1076
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Dipole Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 190.9 V/m ; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 69.2 W/kg
SAR(1 g) = 39.8 mW/g ; SAR(10 g) = 21 mW/g
Maximum value of SAR (measured) = 45.0 mW/g

Dipole Validation/Area Scan (41x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 48.5 mW/g



0 dB = 48.5 mW/g

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Date/Time: 20/07/2006 5:31:04 PM

Test Laboratory: RTS

File Name: [1900MHz_Validation_Ambient_Temp_23_1_C_Liquid_Temp_22_0_C_07_20_06.da4](#)

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:545
Program Name: Unnamed Program

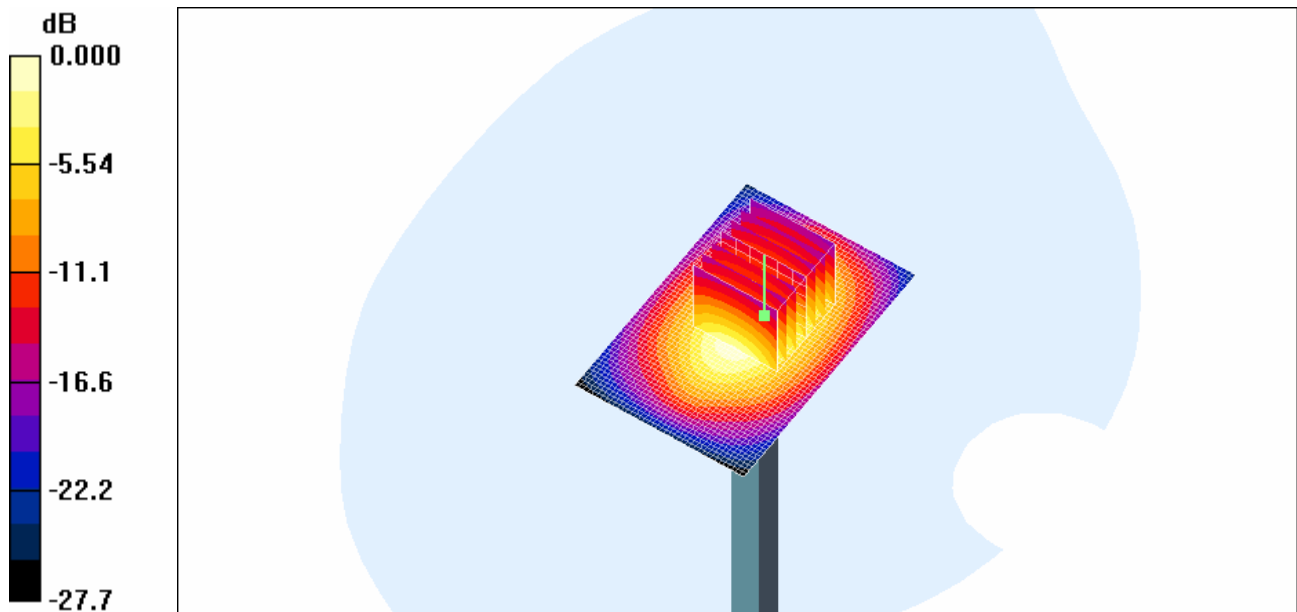
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_r = 39$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(5.18, 5.18, 5.18); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 25/04/2006
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1076
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Dipole Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 189.0 V/m; Power Drift = -0.105 dB
Peak SAR (extrapolated) = 71.3 W/kg
SAR(1 g) = 40.4 mW/g; SAR(10 g) = 21.1 mW/g
Maximum value of SAR (measured) = 45.7 mW/g

Dipole Validation/Area Scan (41x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 49.1 mW/g



0 dB = 49.1mW/g

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APPENDIX B: SAR DISTRIBUTION PLOTS FOR HEAD CONFIGURATION

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Date/Time: 23/06/2006 6:02:08 PM

Test Laboratory: RTS

File Name: [Right Touch GSM850 Mid Chan Ambient Temp 23 5 C Liquid Temp 22 1 C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified
Program Name: Compliance Testing: P1528 Protocol (Right-Hand Side)

Communication System: GSM 850; Frequency: 836.8 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 836.8 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(6.36, 6.36, 6.36); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 25/04/2006
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1076
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Touch position - Middle/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.805 mW/g

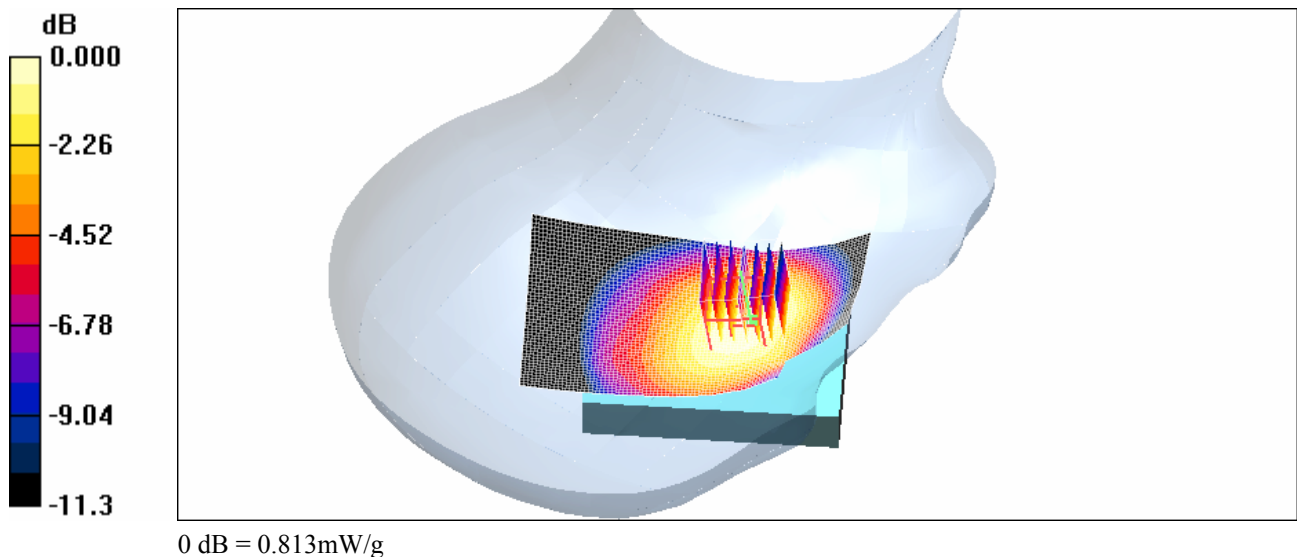
Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.8 V/m ; Power Drift = -0.086 dB

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.764 mW/g ; SAR(10 g) = 0.540 mW/g

Maximum value of SAR (measured) = 0.813 mW/g



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			FCC ID: L6ARBH40GW

Date/Time: 22/06/2006 7:08:48 PM

Test Laboratory: RTS

File Name: [Right Touch GSM1900 Mid Chan Ambient Temp 23.8 C Liquid Temp 22.5 C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: P1528 Protocol (Right-Hand Side)

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 38.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(5.18, 5.18, 5.18); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 25/04/2006
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1076
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Touch position - Middle/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.517 mW/g

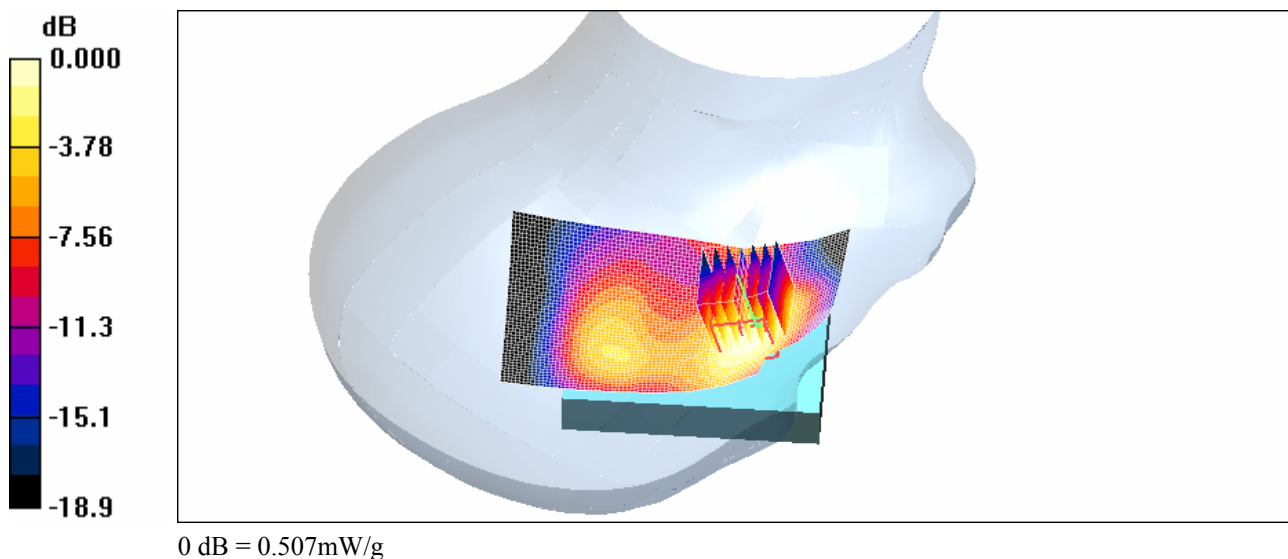
Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 9.03 V/m ; Power Drift = 0.468 dB

Peak SAR (extrapolated) = 0.716 W/kg

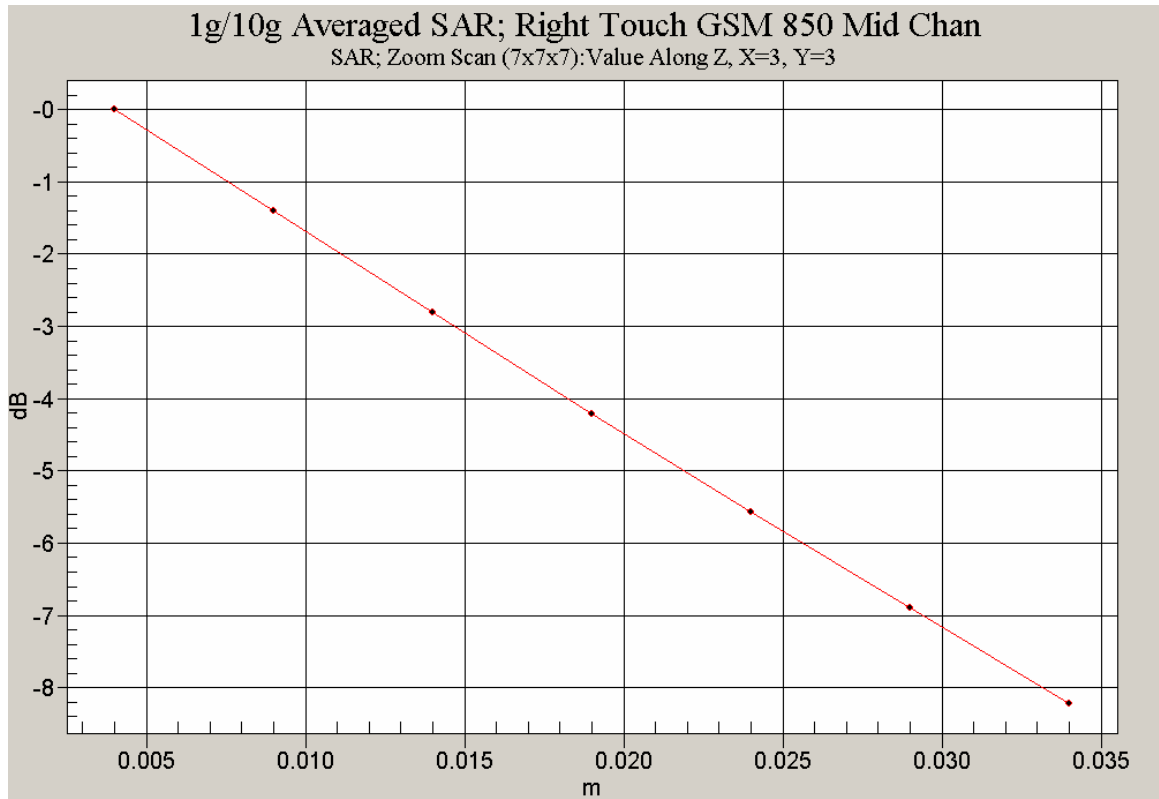
SAR(1 g) = 0.468 mW/g ; SAR(10 g) = 0.296 mW/g

Maximum value of SAR (measured) = 0.507 mW/g



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Z axis plot for the worst case head configuration:



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APPENDIX C: SAR DISTRIBUTION PLOTS FOR BODY-WORN CONFIGURATION

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			FCC ID: L6ARBH40GW

Date/Time: 19/07/2006 5:11:15 PM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS850_PlasticHolster_Front_Batt.1_Low_Chan_Amb_Temp_24.0_C_Liq_Temp_22.6_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn with holster

Communication System: GPRS 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.2

Medium parameters used (interpolated): $f = 824.2 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(6.13, 6.13, 6.13); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 31.8 V/m ; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.996 mW/g ; SAR(10 g) = 0.734 mW/g

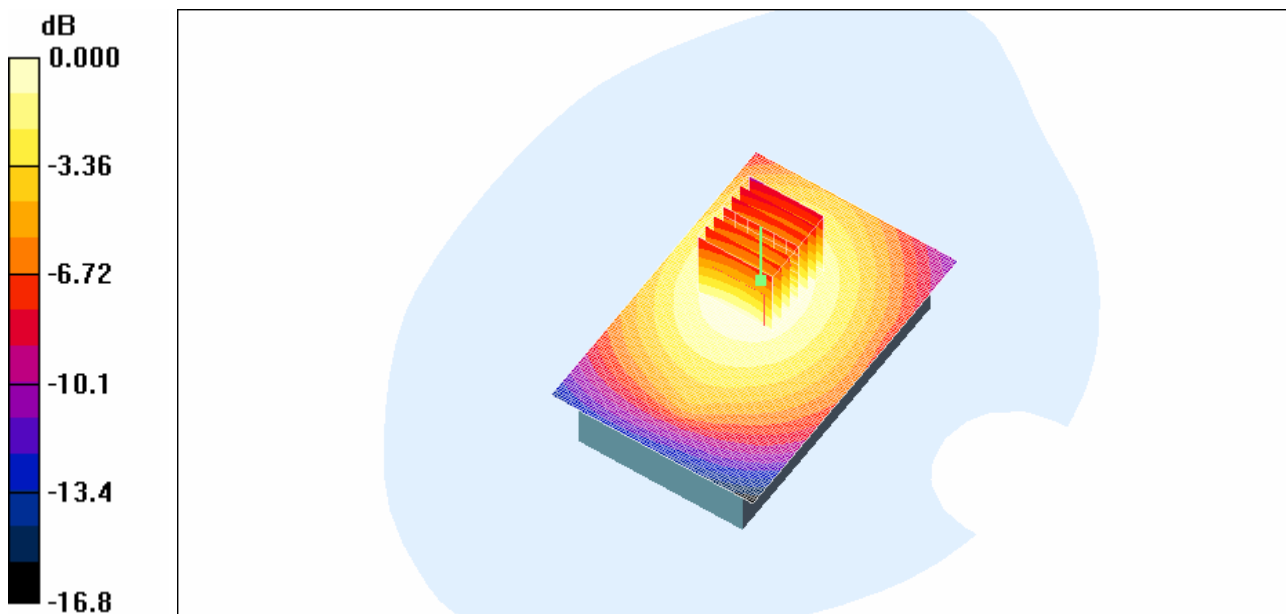
[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.05 mW/g

Unnamed procedure/Area Scan (81x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 1.06 mW/g



0 dB = 1.06 mW/g

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			FCC ID: L6ARBH40GW

Date/Time: 19/07/2006 4:45:54 PM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS850_PlasticHolster_Front_Batt.1_Mid_Chan_Amb_Temp_23.5_C_Liq_Temp_22.2_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn with holster

Communication System: GPRS 850; Frequency: 836.8 MHz; Duty Cycle: 1:4.2

Medium parameters used: $f = 836.8 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(6.13, 6.13, 6.13); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 30.7 V/m ; Power Drift = -0.101 dB

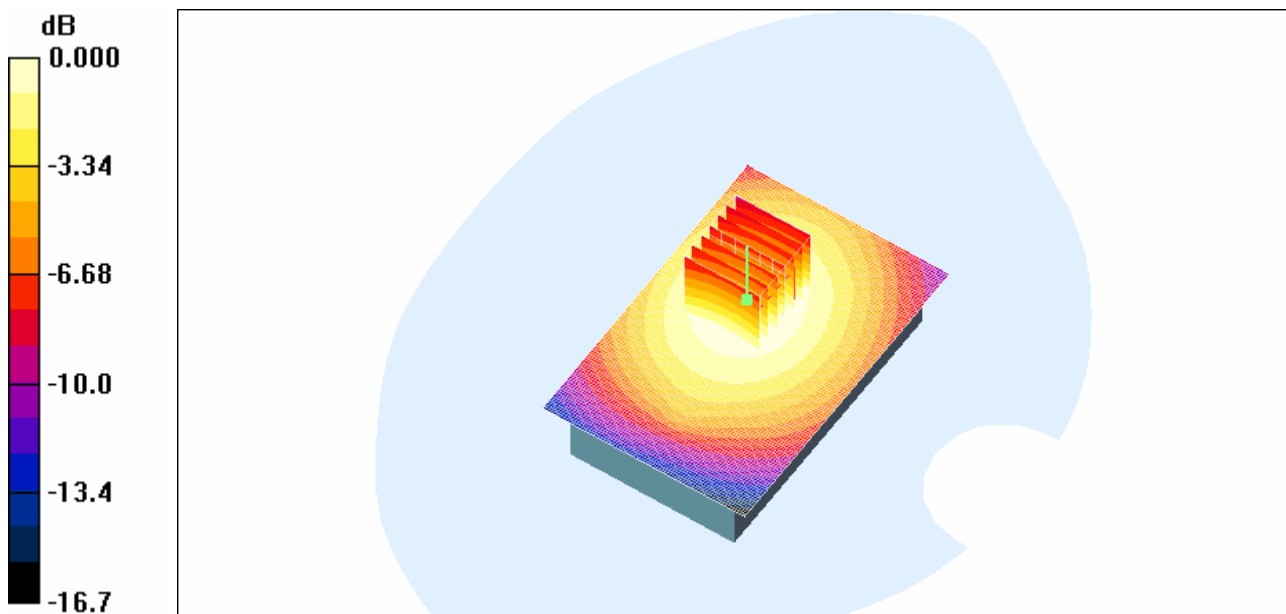
Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.875 mW/g ; SAR(10 g) = 0.651 mW/g

Maximum value of SAR (measured) = 0.925 mW/g

Unnamed procedure/Area Scan (81x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.937 mW/g



0 dB = 0.937 mW/g

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			FCC ID: L6ARBH40GW

Date/Time: 19/07/2006 5:36:45 PM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS850_PlasticHolster_Front_Batt.1_High_Chan_Amb_Temp_23.5_C_Liq_Temp_22.5_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn with holster

Communication System: GPRS 850; Frequency: 848.8 MHz; Duty Cycle: 1:4.2

Medium parameters used: $f = 848.8 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(6.13, 6.13, 6.13); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 31.1 V/m ; Power Drift = -0.017 dB

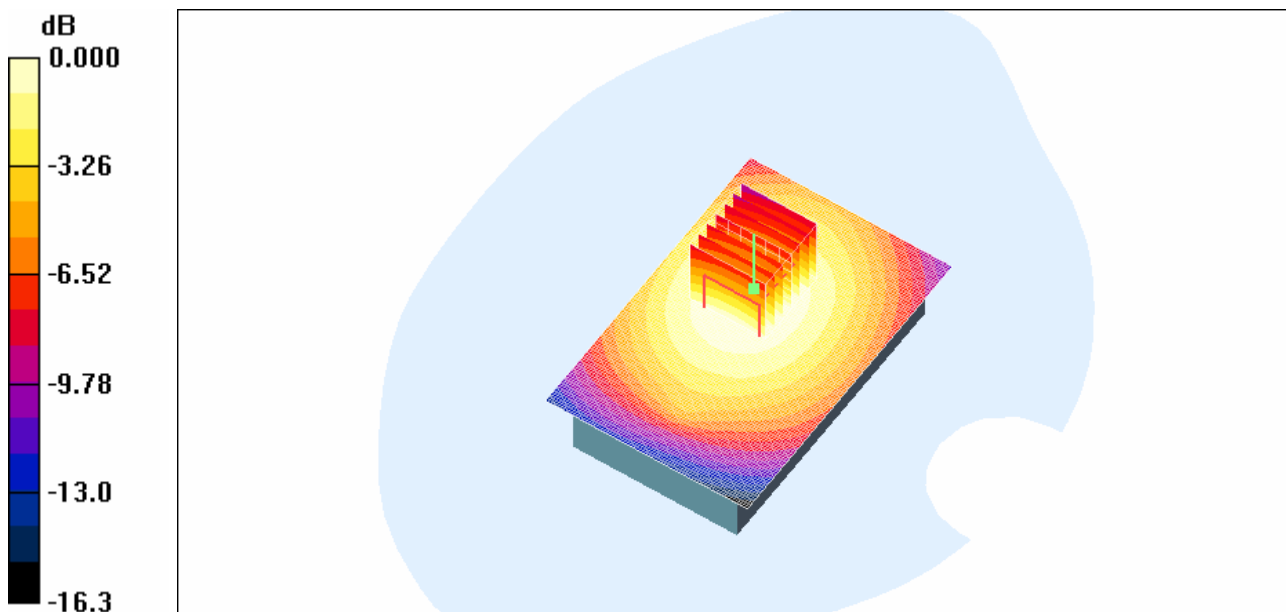
Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.912 mW/g ; SAR(10 g) = 0.670 mW/g

Maximum value of SAR (measured) = 0.960 mW/g

Unnamed procedure/Area Scan (81x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.957 mW/g



0 dB = 0.957 mW/g

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			FCC ID: L6ARBH40GW

Date/Time: 20/07/2006 4:42:40 PM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS850_25mm_away_Back_Batt.1_Mid_Chan_Amb_Temp_23.5_C_Liq_Temp_23.0_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn no holster

Communication System: GPRS 850; Frequency: 836.8 MHz; Duty Cycle: 1:4.2

Medium parameters used: $f = 836.8 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(6.13, 6.13, 6.13); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 24.7 V/m ; Power Drift = -0.107 dB

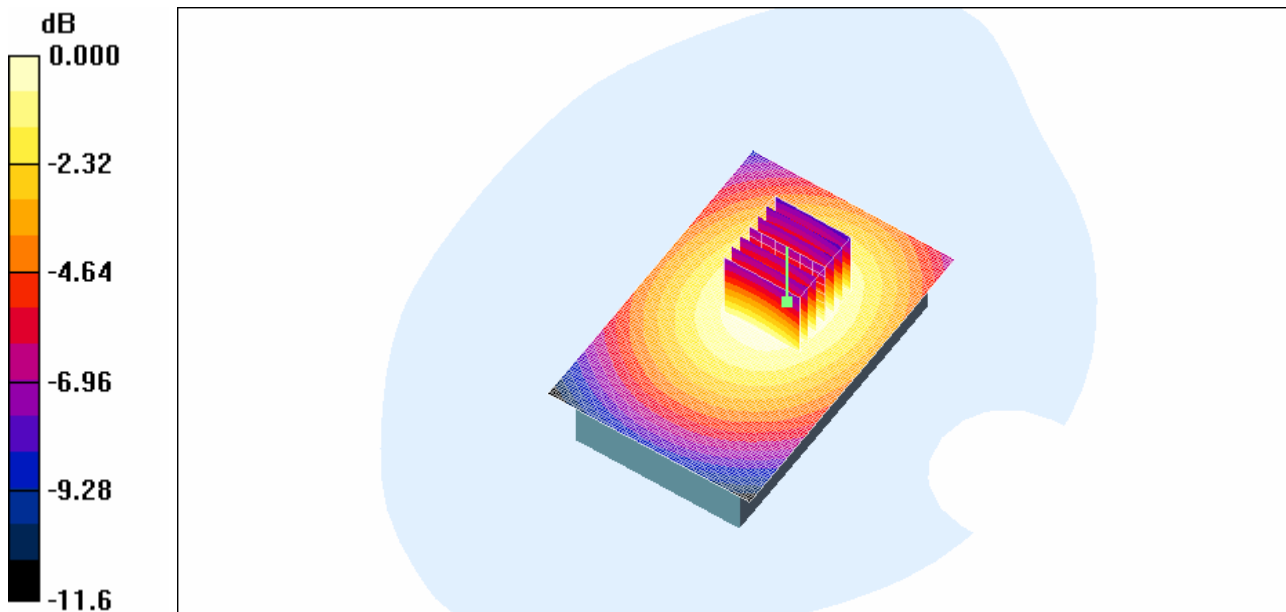
Peak SAR (extrapolated) = 0.714 W/kg

SAR(1 g) = 0.552 mW/g ; SAR(10 g) = 0.409 mW/g

Maximum value of SAR (measured) = 0.584 mW/g

Unnamed procedure/Area Scan (81x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.588 mW/g



0 dB = 0.588 mW/g

RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report		Page 16(49)
	Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11
			FCC ID: L6ARBH40GW

Date/Time: 19/07/2006 6:05:04 PM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS850_PlasticHolster_withHeadsetBT_Front_Batt.1_Low_Chan_Amb_Temp_23.8_C_Liq_Temp_22.7_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn no holster

Communication System: GPRS 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.2

Medium parameters used (interpolated): $f = 824.2 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(6.13, 6.13, 6.13); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 27.1 V/m ; Power Drift = -0.153 dB

Peak SAR (extrapolated) = 0.913 W/kg

SAR(1 g) = 0.702 mW/g ; SAR(10 g) = 0.518 mW/g

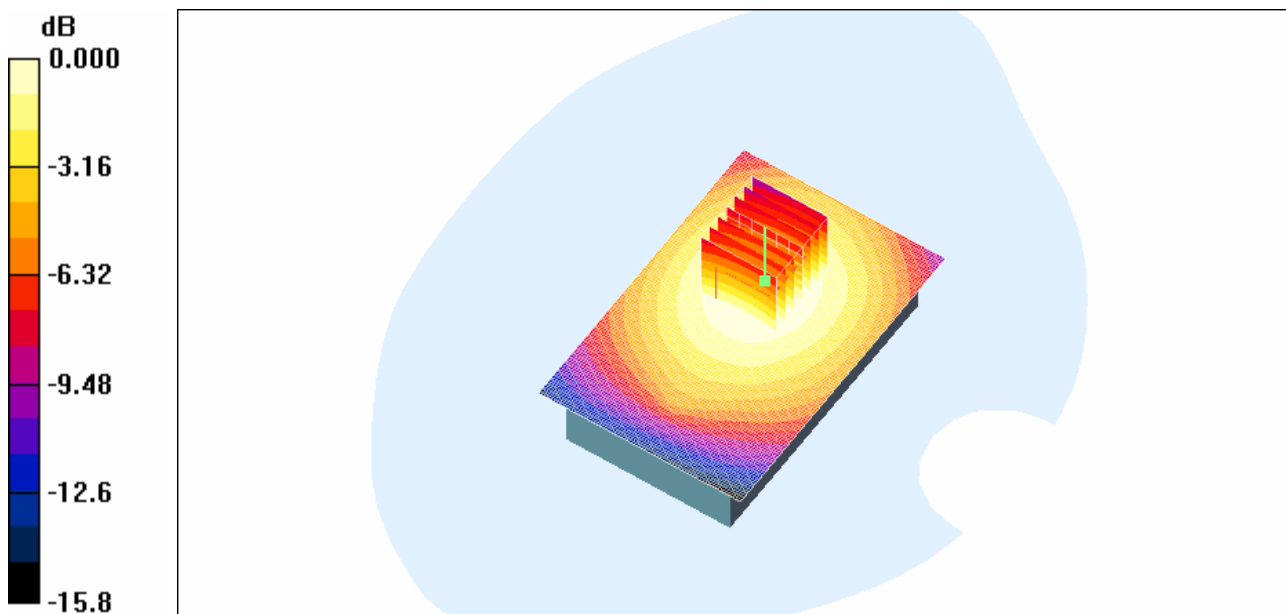
Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.743 mW/g

Unnamed procedure/Area Scan (81x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.749 mW/g



0 dB = 0.749 mW/g

RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report		Page 17(49)
	Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11
			FCC ID: L6ARBH40GW

Date/Time: 18/07/2006 5:05:51 PM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS1900_PlasticHolster_Front_Batt.1_Mid_Chan_Amb_Temp_24.3_C_Liq_Temp_23.1_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn with holster

Communication System: GPRS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.59 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(4.72, 4.72, 4.72); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 5.09 V/m ; Power Drift = -0.355 dB

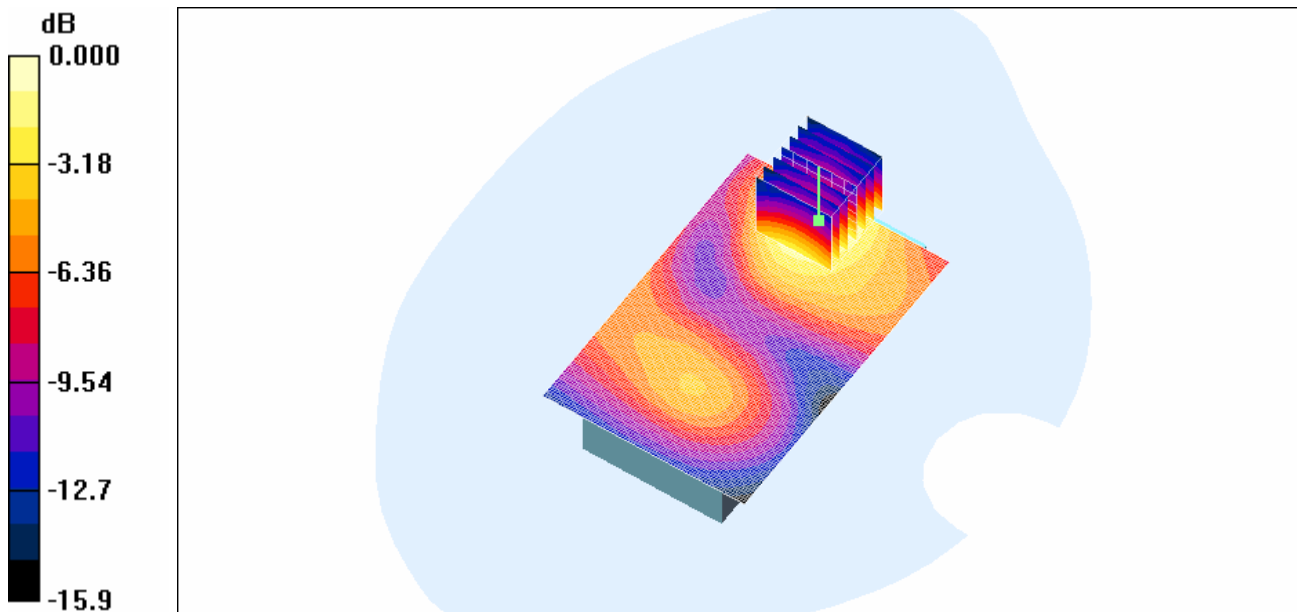
Peak SAR (extrapolated) = 0.494 W/kg

SAR(1 g) = 0.308 mW/g ; SAR(10 g) = 0.182 mW/g

Maximum value of SAR (measured) = 0.339 mW/g

Unnamed procedure/Area Scan (81x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.344 mW/g



0 dB = 0.344 mW/g

RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report		Page 18(49)
	Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11
			FCC ID: L6ARBH40GW

Date/Time: 20/07/2006 7:23:13 PM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS1900_25mm_away_Back_Batt.1_Low_Chan_Amb_Temp_23.7_C_Liq_Temp_22.3_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn no holster

Communication System: GPRS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4.2

Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.59 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(4.72, 4.72, 4.72); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.1 V/m; Power Drift = 0.123 dB

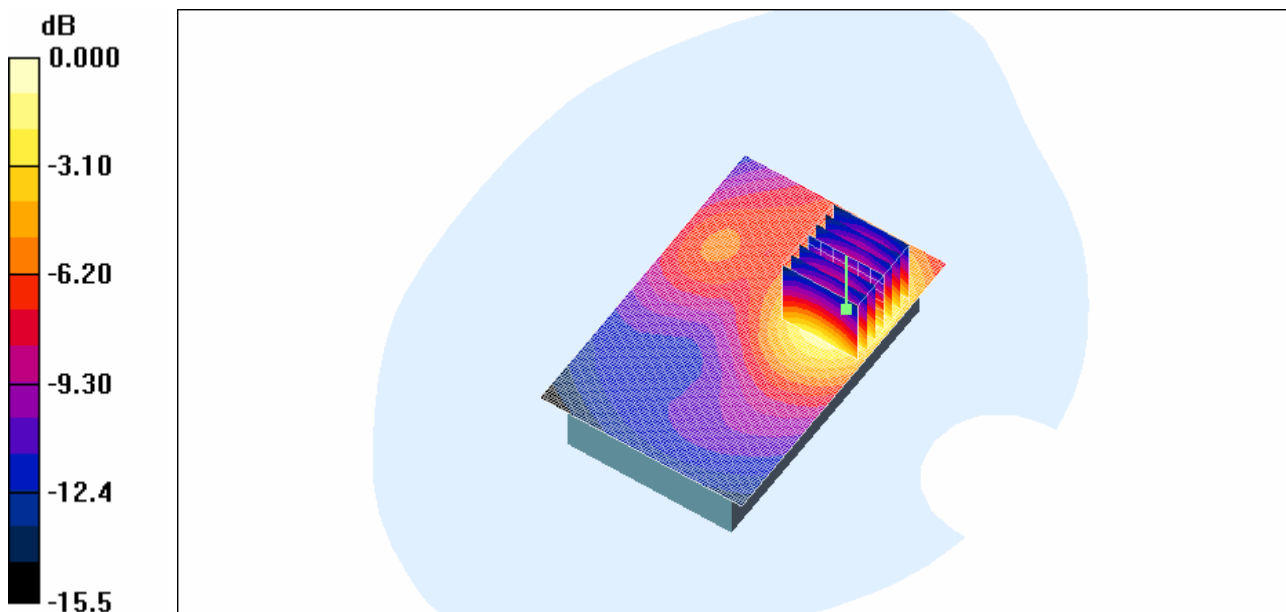
Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.801 mW/g; SAR(10 g) = 0.482 mW/g

Maximum value of SAR (measured) = 0.885 mW/g

Unnamed procedure/Area Scan (81x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.875 mW/g



0 dB = 0.875mW/g

RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report		Page 19(49)
	Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11
			FCC ID: L6ARBH40GW

Date/Time: 20/07/2006 6:58:21 PM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS1900_25mm_away_Back_Batt.1_Mid_Chan_Amb_Temp_22.9_C_Liq_Temp_22.0_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn no holster

Communication System: GPRS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.59 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(4.72, 4.72, 4.72); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.4 V/m ; Power Drift = 0.005 dB

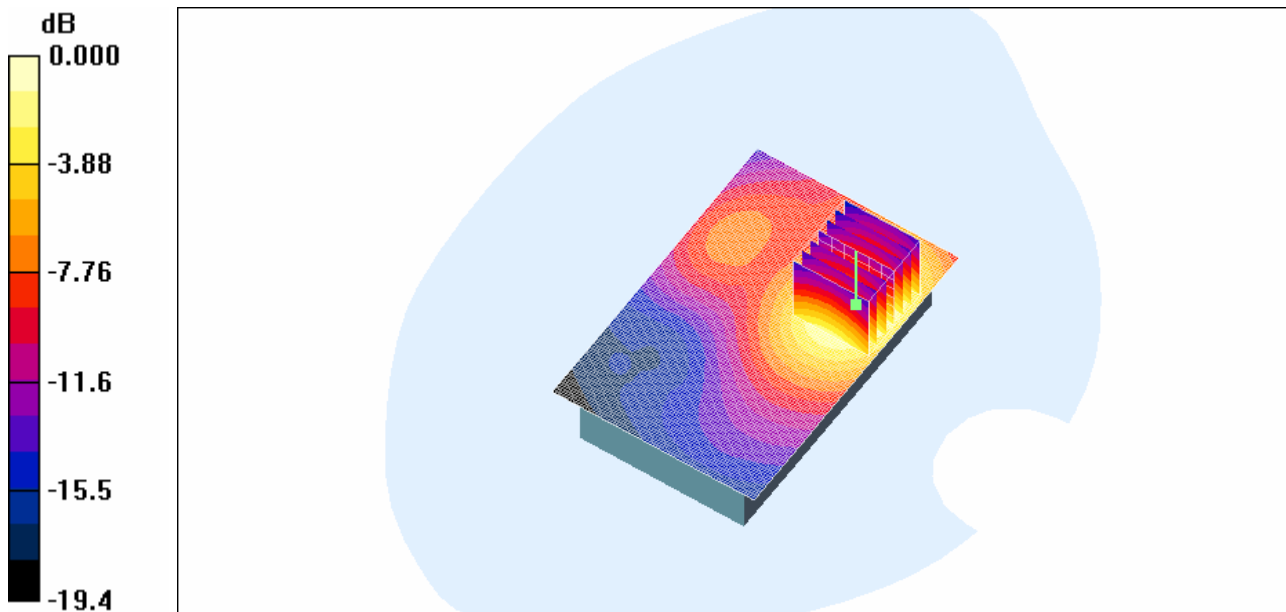
Peak SAR (extrapolated) = 1.90 W/kg

SAR(1 g) = 1.2 mW/g ; SAR(10 g) = 0.713 mW/g

Maximum value of SAR (measured) = 1.33 mW/g

Unnamed procedure/Area Scan (81x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.32 mW/g



0 dB = 1.32mW/g

RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report		Page 20(49)
	Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11
			FCC ID: L6ARBH40GW

Date/Time: 20/07/2006 2:17:31 AM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS1900_25mm_away_Back_Batt.1_High_Chan_Amb_Temp_23.7_C_Liq_Temp_22.7_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn no holster

Communication System: GPRS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.2

Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.59 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(4.72, 4.72, 4.72); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1076
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.7 V/m ; Power Drift = 0.028 dB

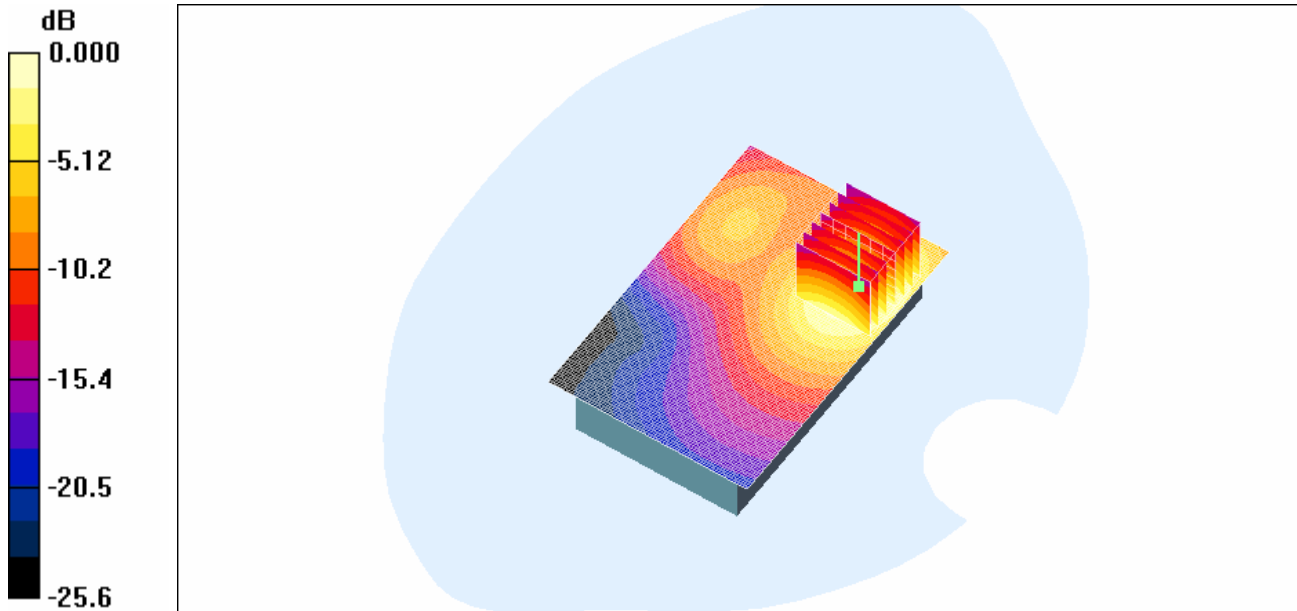
Peak SAR (extrapolated) = 2.49 W/kg

SAR(1 g) = 1.55 mW/g ; SAR(10 g) = 0.898 mW/g

Maximum value of SAR (measured) = 1.70 mW/g

Unnamed procedure/Area Scan (81x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.73 mW/g



0 dB = 1.73 mW/g

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	Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11
			FCC ID: L6ARBH40GW

Date/Time: 18/07/2006 8:31:10 PM

Test Laboratory: RTS

File Name:

[Body_Worn_GPRS1900_PlasticHolster_Front_withHeadsetBT_Batt.1_Mid_Chan_Amb_Temp_24.3_C_Liq_Temp_23.1_C.da4](#)

DUT: BlackBerry Wireless Handheld ; Type: Sample ; Serial: Not Specified

Program Name: Compliance Testing: Body-worn with holster

Communication System: GPRS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.59$ mho/m; $\epsilon_r = 50.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(4.72, 4.72, 4.72); Calibrated: 19/01/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 12/01/2006
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

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

Reference Value = 4.85 V/m; Power Drift = 0.094 dB

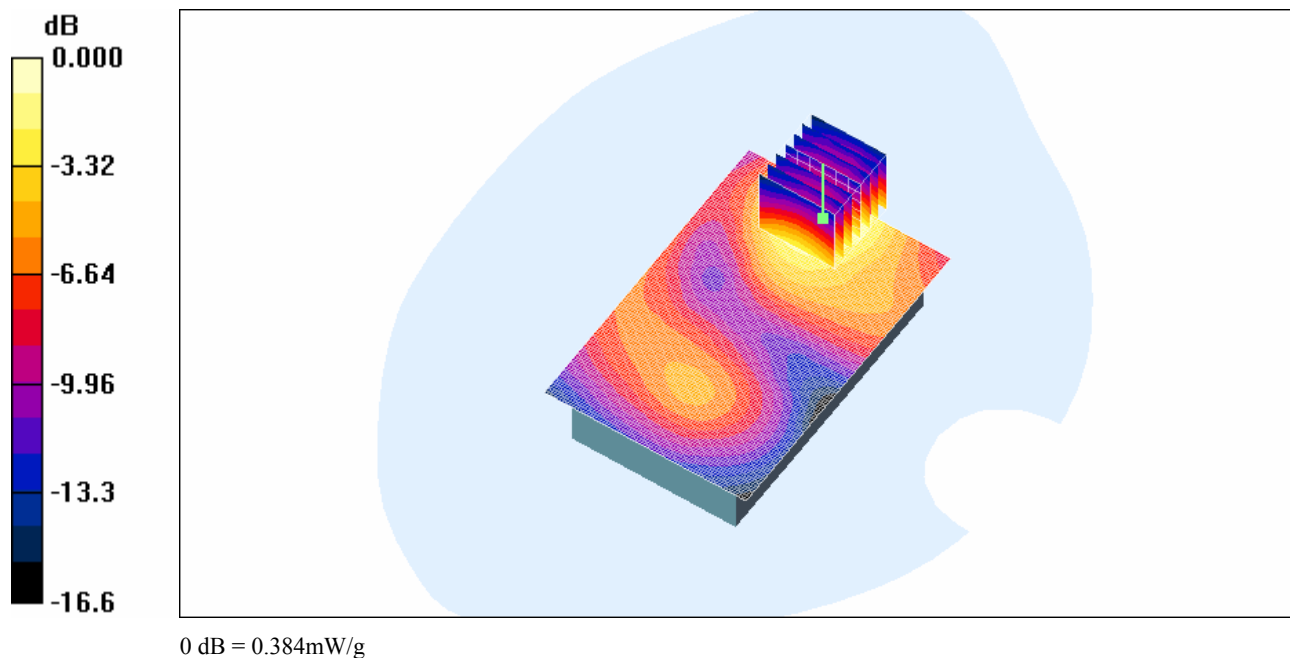
Peak SAR (extrapolated) = 0.557 W/kg

SAR(1 g) = 0.346 mW/g; SAR(10 g) = 0.203 mW/g

Maximum value of SAR (measured) = 0.383 mW/g

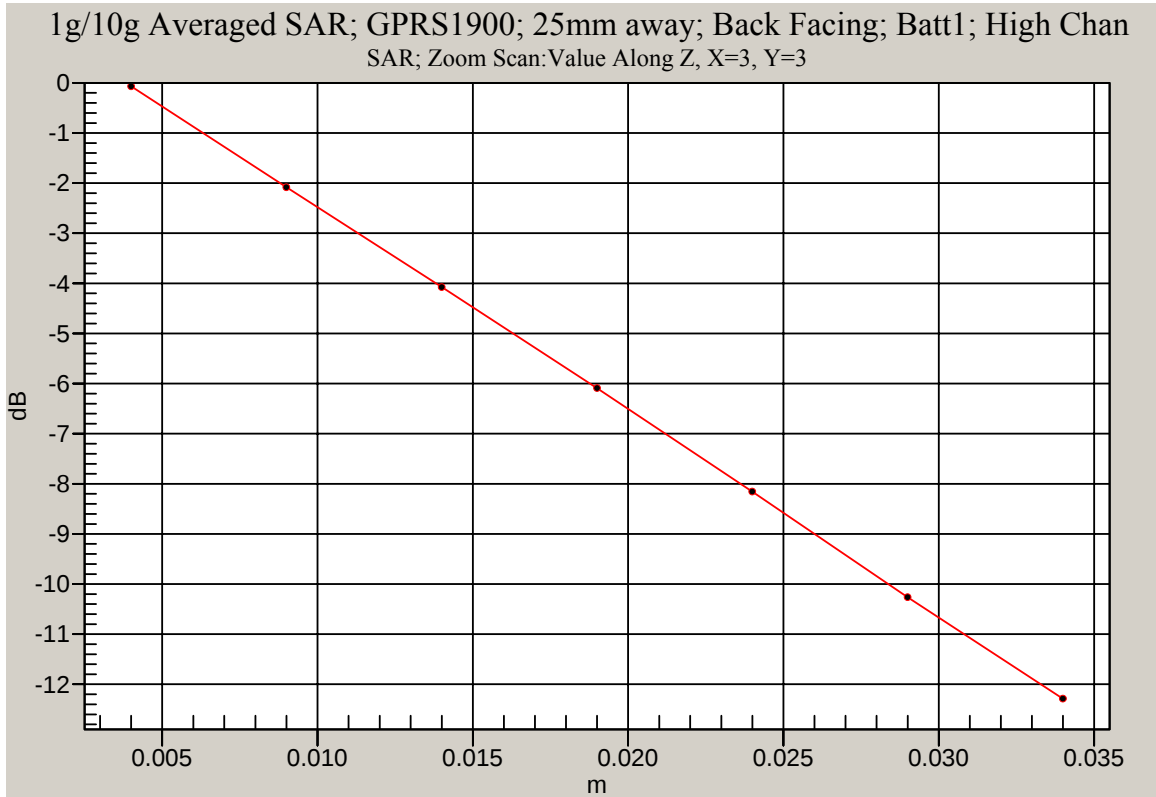
Unnamed procedure/Area Scan (81x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.384 mW/g



RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report	Page 22(49)
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		FCC ID: L6ARBH40GW

Z axis plot for the worst case body worn configuration:



RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report		Page 23(49)
	Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11
		FCC ID: L6ARBH40GW	

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report	Page 24(49)
Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11 FCC ID: L6ARBH40GW

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 Federal Office of Metrology and Accreditation
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 **RIM**

Certificate No: **ET3-1642_Jan06**

CALIBRATION CERTIFICATE

Object: **ET3DV6 - SN:1642**

Calibration procedure(s): **QA CAL-01.v5**
Calibration procedure for dosimetric E-field probes

Calibration date: **January 19, 2006**

Condition of the calibrated item: **In Tolerance**

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41496067	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
DAE4	SN: 654	27-Oct-05 (SPEAG, No. DAE4-654_Oct05)	Oct-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov-06

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

Issued: January 20, 2006

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

Certificate No: ET3-1642_Jan06

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Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11 FCC ID: L6ARBH40GW

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zaughausstrasse 42, 8004 Zurich, Switzerland



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

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
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., $\theta = 0$ 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
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11
		FCC ID: L6ARBH40GW

ET3DV6 SN:1642

January 19, 2006

Probe ET3DV6

SN:1642

Manufactured:	November 7, 2001
Last calibrated:	January 7, 2005
Recalibrated:	January 19, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

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		FCC ID: L6ARBH40GW

ET3DV6 SN:1642

January 19, 2006

DASY - Parameters of Probe: ET3DV6 SN:1642

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.86 ± 10.1%	$\mu V/(V/m)^2$	DCP X	94 mV
NormY	1.91 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	94 mV
NormZ	1.64 ± 10.1%	$\mu V/(V/m)^2$	DCP Z	94 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL 900 MHz Typical SAR gradient: 5 % per mm

Sensor Center to Phantom Surface Distance	3.7 mm	4.7 mm
SAR _{iso} [%] Without Correction Algorithm	8.5	4.6
SAR _{iso} [%] With Correction Algorithm	0.1	0.1

TSL 1510 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance	3.7 mm	4.7 mm
SAR _{iso} [%] Without Correction Algorithm	12.3	8.1
SAR _{iso} [%] With Correction Algorithm	0.6	0.3

Sensor Offset

Probe Tip to Sensor Center 2.7 mm

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

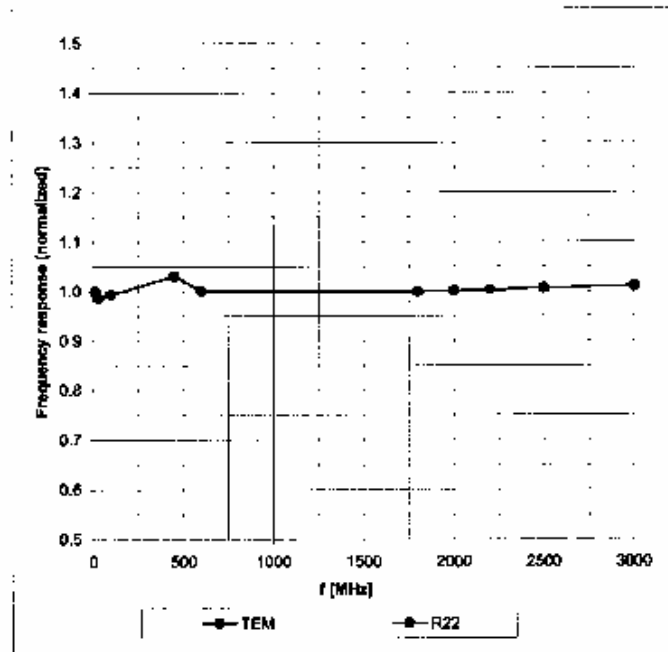
RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report	Page 28(49)
Author Data Kevin Chow	Dates of Test Jun. 22 – Jul. 20, 2006	Test Report No RTS-0447-0607-11
		FCC ID: L6ARBH40GW

ET3DV6 SN:1642

January 19, 2006

Frequency Response of E-Field

(TEM-Cell: If110 EXX, Waveguide: R22)



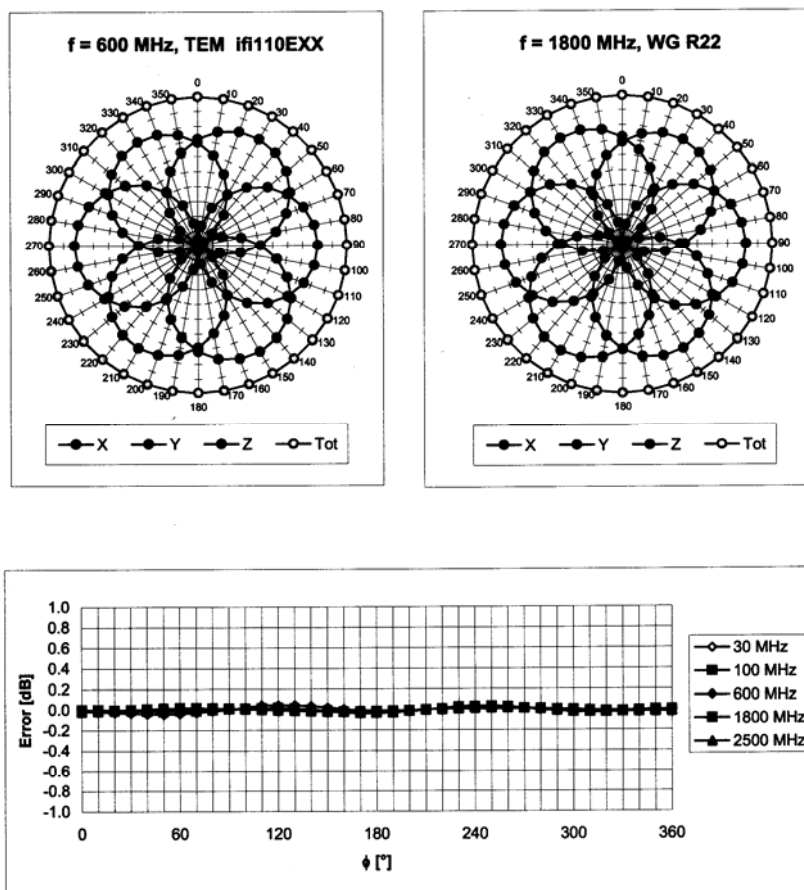
Uncertainty of Frequency Response of E-field: $\pm 8.3\%$ ($k=2$)

RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report	Page 29(49)
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		FCC ID: L6ARBH40GW

ET3DV6 SN:1642

January 19, 2006

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



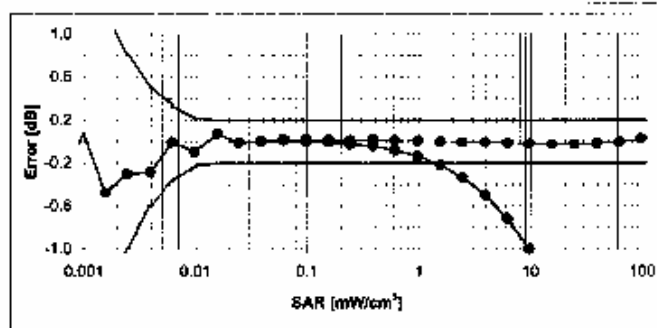
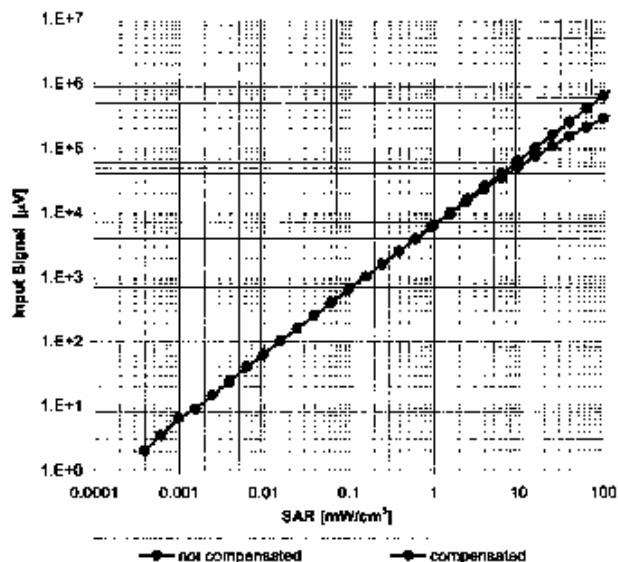
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

RTS RIM Testing Services	Document Appendices for the BlackBerry Wireless Handheld Model RBH42GW / RBH44GW Partial SAR Report		Page 30(49)
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			FCC ID: L6ARBH40GW

ET3DV6 SN:1642

January 19, 2006

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



Certificate No: ET3-1642_Jan06

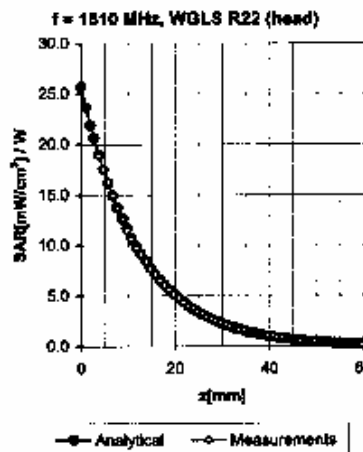
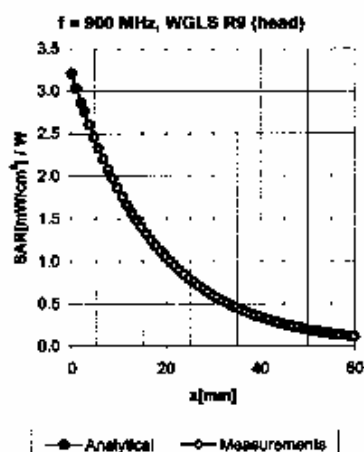
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			FCC ID: L6ARBH40GW

ET3DV6 SN:1642

January 19, 2006

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.57	1.88	6.38 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.66	2.12	5.18 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.73	1.55	5.02 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.50	2.06	6.13 ± 11.0% (k=2)
1810	± 60 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.67	2.05	4.72 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.64	2.44	4.38 ± 11.0% (k=2)

^c The validity of ± 100 MHz only applies for DAS1 v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

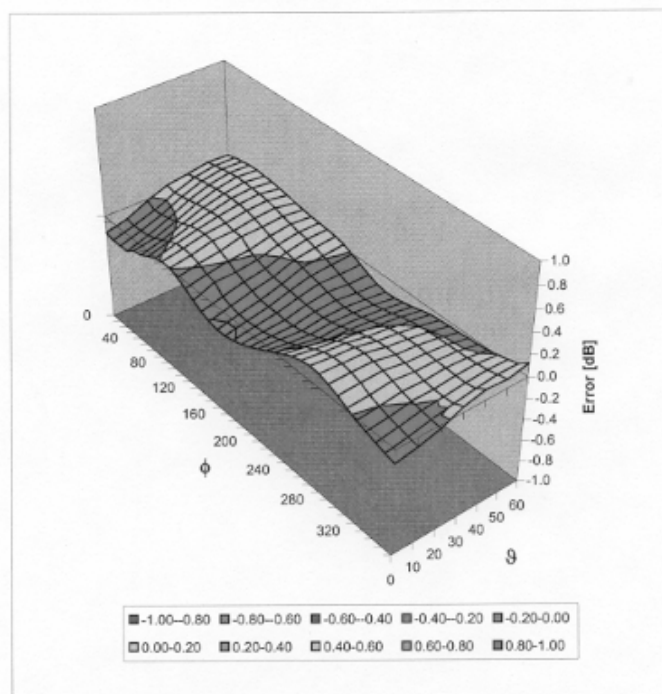
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		FCC ID: L6ARBH40GW

ET3DV6 SN:1642

January 19, 2006

Deviation from Isotropy in HSL

Error (ϕ , θ), $f = 900$ MHz



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

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **RIM**

Certificate No: **D835V2-446_Jan05**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 446**

Calibration procedure(s) **QA CAL-05.v6**
Calibration procedure for dipole validation kits

Calibration date: **January 7, 2005**

Condition of the calibrated item **In Tolerance**

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference Probe ET3DV6	SN 1507	26-Oct-04 (SPEAG, No. ET3-1507_Oct04)	Oct-05
DAE4	SN 907	03-May-04 (SPEAG, No. DAE4-907_May04)	May-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-03)	In house check: Oct-05
RF generator R&S SML-03	100698	27-Mar-02 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585 S4206	Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov-05

	Name	Function	Signature
Calibrated by:	Judith Müller	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 13, 2005

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

Certificate No: **D835V2-446_Jan05**

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

Accreditation No.: **SCS 108**

Glossary:

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

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
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- 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:

- DASY4 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	DASY4	V4.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 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 $\pm$ 0.2) °C	42.2 $\pm$ 6 %	0.91 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 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	2.27 mW / g
SAR normalized	normalized to 1W	9.08 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	9.10 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.48 mW / g
SAR normalized	normalized to 1W	5.92 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	5.93 mW / g $\pm$ 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.1 Ω - 7.1 j Ω
Return Loss	- 22.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.385 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	October 24, 2001

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DASY4 Validation Report for Head TSL

Date/Time: 01/07/05 15:08:43

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN446

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

Medium: HSL 900 MHz;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 42.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.24, 6.24, 6.24); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 03.05.2004
- Phantom: Flat Phantom 4.9L; Type: QD000P50AA; Serial: SN:1001;
- Measurement SW: DASY4, V4.4 Build 10; Postprocessing SW: SEMCAD, V1.8 Build 133

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 2.44 mW/g

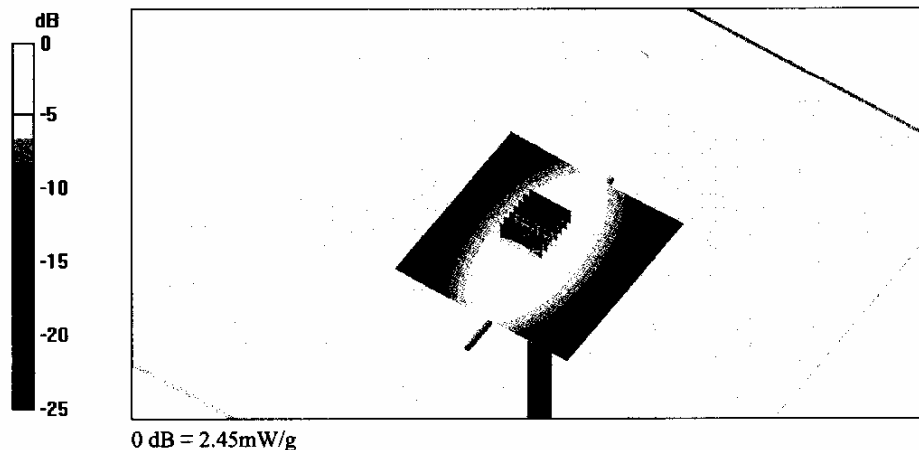
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 54.2 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 3.36 W/kg

SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.48 mW/g

Maximum value of SAR (measured) = 2.45 mW/g

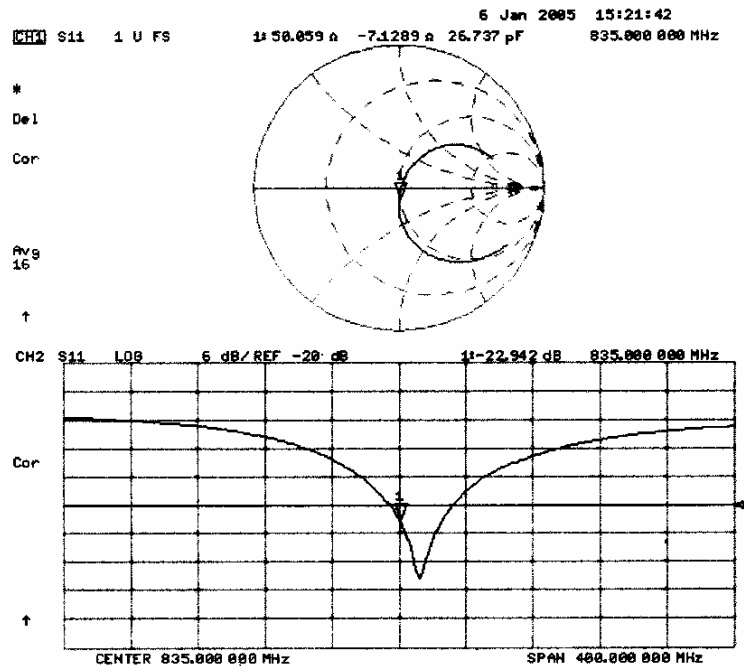


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FCC ID:

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Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 108**

Client **RIM**

Certificate No: **D1900V2-545_Jan05**

CALIBRATION CERTIFICATE																																															
Object	D1900V2 - SN: 545																																														
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits																																														
Calibration date:	January 06, 2005																																														
Condition of the calibrated item	In Tolerance																																														
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) <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Calibrated by, Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter EPM E442</td> <td>GB37480704</td> <td>12-Oct-04 (METAS, No. 251-00412)</td> <td>Oct-05</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>US37292783</td> <td>12-Oct-04 (METAS, No. 251-00412)</td> <td>Oct-05</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: 5086 (20g)</td> <td>10-Aug-04 (METAS, No 251-00402)</td> <td>Aug-05</td> </tr> <tr> <td>Reference 10 dB Attenuator</td> <td>SN: 5047.2 (10r)</td> <td>10-Aug-04 (METAS, No 251-00402)</td> <td>Aug-05</td> </tr> <tr> <td>Reference Probe ET3DVG</td> <td>SN 1507</td> <td>26-Oct-04 (SPEAG, No. ET3-1507_Oct04)</td> <td>Oct-05</td> </tr> <tr> <td>DAE4</td> <td>SN 907</td> <td>03-May-04 (SPEAG, No. DAE4-907_May04)</td> <td>May-05</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power sensor HP 8481A</td> <td>MY41092317</td> <td>18-Oct-02 (SPEAG, in house check Oct-03)</td> <td>In house check: Oct-05</td> </tr> <tr> <td>RF generator R&S SML-03</td> <td>100698</td> <td>27-Mar-02 (SPEAG, in house check Dec-03)</td> <td>In house check: Dec-05</td> </tr> <tr> <td>Network Analyzer HP 8753E</td> <td>US37390585 54206</td> <td>18-Oct-01 (SPEAG, in house check Nov-04)</td> <td>In house check: Nov 05</td> </tr> </tbody> </table>				Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration	Power meter EPM E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05	Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05	Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-04 (METAS, No 251-00402)	Aug-05	Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-04 (METAS, No 251-00402)	Aug-05	Reference Probe ET3DVG	SN 1507	26-Oct-04 (SPEAG, No. ET3-1507_Oct04)	Oct-05	DAE4	SN 907	03-May-04 (SPEAG, No. DAE4-907_May04)	May-05	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-03)	In house check: Oct-05	RF generator R&S SML-03	100698	27-Mar-02 (SPEAG, in house check Dec-03)	In house check: Dec-05	Network Analyzer HP 8753E	US37390585 54206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05
Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration																																												
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Network Analyzer HP 8753E	US37390585 54206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05																																												
Calibrated by:	Name Judith Müller	Function Laboratory Technician	Signature 																																												
Approved by:	Katja Pokovic	Technical Manager																																													
Issued: January 13, 2005 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.																																															

Certificate No: D1900V2-545_Jan05

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Zeughausstrasse 43, 8004 Zurich, Switzerland



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

Accreditation No.: **SCS 108**

Glossary:

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

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
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- 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:

- DASY4 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	DASY4	V4.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.9 $\pm$ 6 %	1.45 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 0.2) °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	10.2 mW / g
SAR normalized	normalized to 1W	40.8 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	39.5 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.34 mW / g
SAR normalized	normalized to 1W	21.4 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	20.7 mW / g $\pm$ 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω + 2.1 j Ω
Return Loss	- 31.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 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	November 15, 2001

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			FCC ID: L6ARBH40GW

DASY4 Validation Report for Head TSL

Date/Time: 01/06/05 18:30:23

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN545

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

Medium: HSL 1900 MHz;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.96, 4.96, 4.96); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 03.05.2004
- Phantom: Flat Phantom quarter size; Type: QD000P50AA; Serial: SN:1001;
- Measurement SW: DASY4, V4.4 Build 10; Postprocessing SW: SEMCAD, V1.8 Build 133

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.6 mW/g

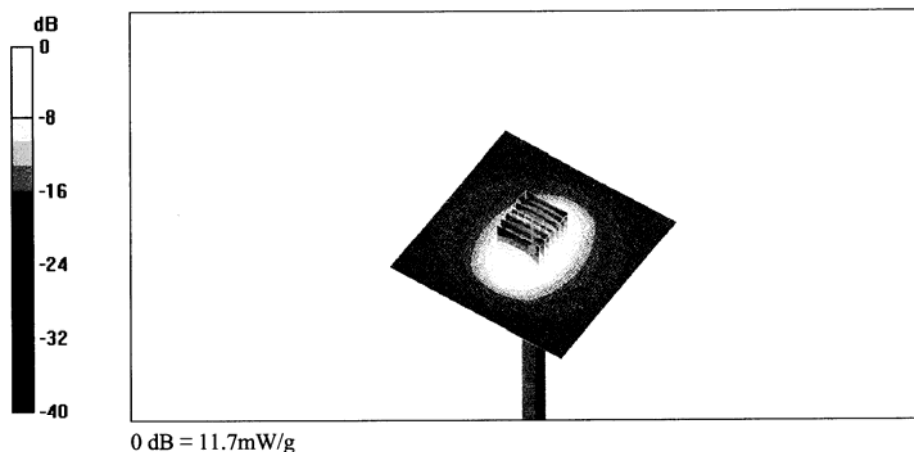
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.2 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 18 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.34 mW/g

Maximum value of SAR (measured) = 11.7 mW/g



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APPENDIX E: PHOTOGRAPHS

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Figure E1. Head configuration (Right Touch)

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Figure E2. Body worn configuration (Plastic Holster; Front side facing phantom)

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Figure E3. Body worn configuration (No Holster; 25 mm away; Back side facing phantom)

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Figure E4. Body worn configuration (Plastic Holster; Headset and Bluetooth connected; Front side facing phantom)