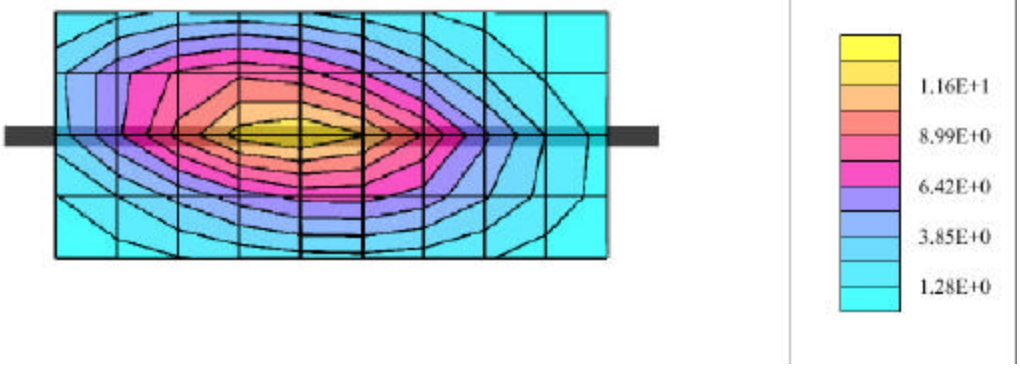
APPENDIX A: SAR DISTRIBUTION COMPARISON FOR THE ACCURACY VERIFICATION

07/10/03

Dipole 835

SAM 1; Flat
Probe: ET3DV6 - SN1642; ConvF(6.50,6.50,6.50); Crest factor: 1.0; Head 835 MHz: σ = 0.91 mho/m ε_r = 42.8 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 19.7 mW/g, SAR (1g): 11.8 mW/g, SAR (10g): 7.39 mW/g, (Worst-case extrapolation)
Penetration depth: 11.4 (9.7, 13.6) [mm]
Powerdrift: 0.01 dB

Date Tested: July 10, 2003
Ambient Temperature: 23.4 Deg. Cel.
Liquid Temperature: 21.7 Deg. Cel.

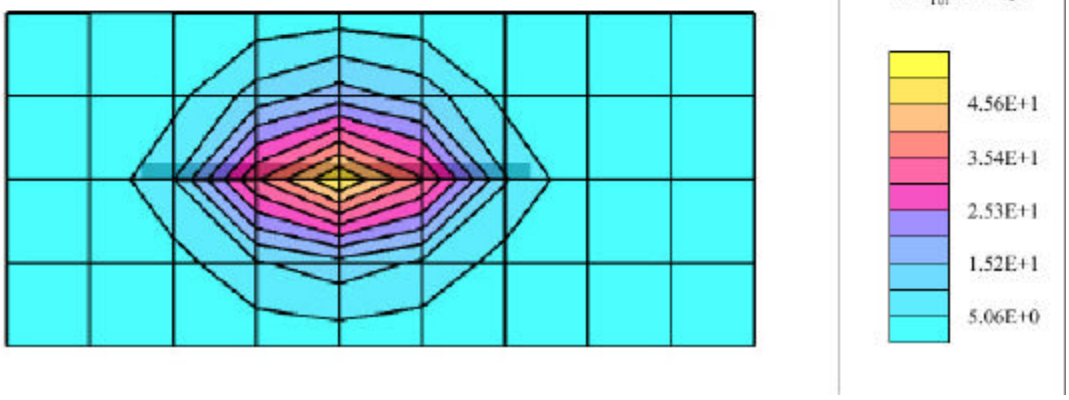


07/08/03

Dipole 1900 MHz

SAM 1; Flat
Probe: ET3DV6 - SN1642; ConvF(5.30,5.30,5.30); Crest factor: 1.0; Head 1900 MHz: σ = 1.46 mho/m ε_r = 40.1 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 84.0 mW/g, SAR (1g): 43.0 mW/g, SAR (10g): 21.7 mW/g, (Worst-case extrapolation)
Penetration depth: 7.7 (7.2, 9.0) [mm]
Powerdrift: 0.07 dB

Date tested: July 08, 2003
Ambient Temperature: 22.8 (°C)
Liquid Temperature: 21.8 (°C)



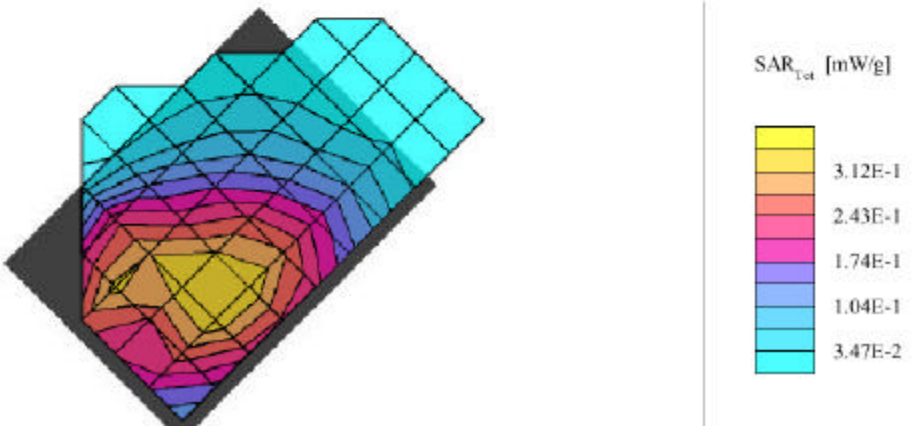
APPENDIX B: SAR DISTRIBUTION PLOTS FOR HEAD CONFIGURATION

07/10/03

BlackBerry Wireless Handheld Model R6030GN

SAM 1; Left Hand
Probe: ET3DV6 - SN1642; ConvF(6.50,6.50,6.50); Crest factor: 8.0; Head 835 MHz: σ = 0.91 mho/m ε_r = 42.8 ρ = 1.00 g/cm³
Cube 5x5x7: Peak: 0.537 mW/g, SAR (1g): 0.334 mW/g, SAR (10g): 0.237 mW/g * Max outside, (Worst-case extrapolation)
Penetration depth: 14.7 (11.8, 18.1) [mm]
Powerdrift: -0.08 dB

Date Tested: July 10, 2003
Ambient Temperature: 22.7 Deg. Cel.
Liquid Temperature: 21.4 Deg. Cel.
Band: GSM 850
Channel: 190
Configuration: Left side "Touch" position

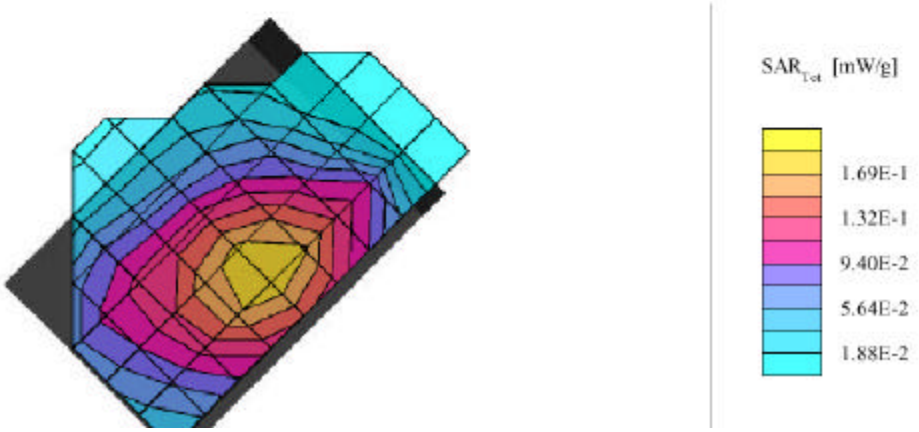


07/10/03

BlackBerry Wireless Handheld Model R6030GN

SAM 1; Left Hand
Probe: ET3DV6 - SN1642; ConvF(6.50,6.50,6.50); Crest factor: 8.0; Head 835 MHz: σ = 0.91 mho/m ε_r = 42.8 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.246 mW/g, SAR (1g): 0.175 mW/g, SAR (10g): 0.128 mW/g, (Worst-case extrapolation)
Penetration depth: 18.7 (15.4, 22.0) [mm]
Powerdrift: -0.04 dB

Date Tested: July 10, 2003
Ambient Temperature: 22.7 Deg. Cel.
Liquid Temperature: 21.4 Deg. Cel.
Band: GSM 850
Channel: 190
Configuration: Left side "Tilted" position

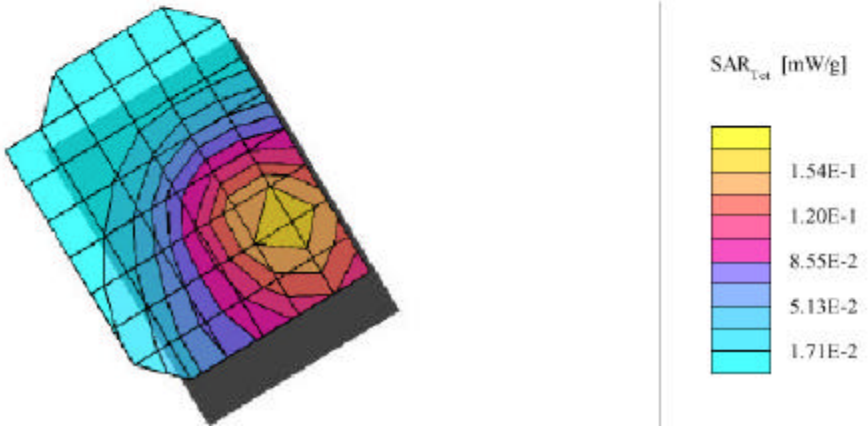


07/10/03

BlackBerry Wireless Handheld Model R6030GN

SAM 1; Right Hand
Probe: ET3DV6 - SN1642; ConvF(6.50,6.50,6.50); Crest factor: 8.0; Head 835 MHz: σ = 0.91 mho/m ε_r = 42.8 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.245 mW/g, SAR (1g): 0.165 mW/g, SAR (10g): 0.118 mW/g, (Worst-case extrapolation)
Penetration depth: 17.2 (13.4, 21.5) [mm]
Powerdrift: 0.08 dB

Date Tested: July 10, 2003
Ambient Temperature: 23.0 Deg. Cel.
Liquid Temperature: 21.7 Deg. Cel.
Band: GSM 850
Channel: 190
Configuration: Right side "Touch" position

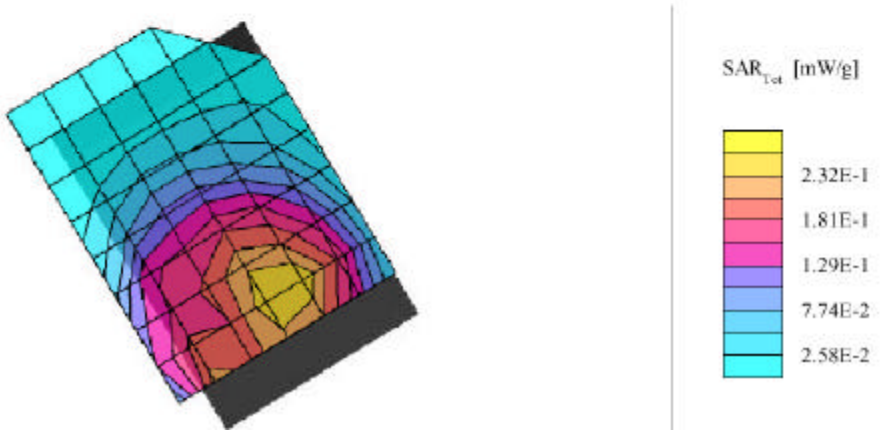


07/10/03

BlackBerry Wireless Handheld Model R6030GN

SAM 1; Right Hand
Probe: ET3DV6 - SN1642; ConvF(6.50,6.50,6.50); Crest factor: 8.0; Head 835 MHz: σ = 0.91 mho/m ε_r = 42.8 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.382 mW/g, SAR (1g): 0.244 mW/g, SAR (10g): 0.172 mW/g, (Worst-case extrapolation)
Penetration depth: 15.5 (11.8, 19.9) [mm]
Powerdrift: -0.12 dB

Date Tested: July 10, 2003
Ambient Temperature: 23.0 Deg. Cel.
Liquid Temperature: 21.7 Deg. Cel.
Band: GSM 850
Channel: 190
Configuration: Right side "Tilted" position

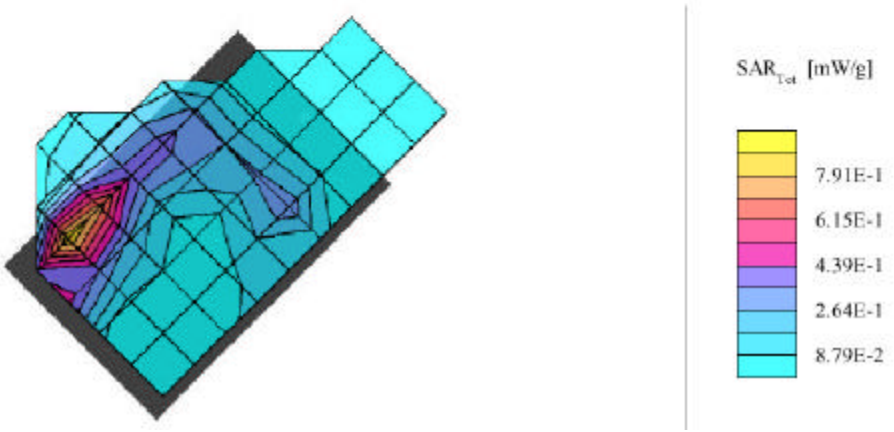


07/08/03

BlackBerry Wireless Handheld Model No. R6030GN

SAM 1; Left Hand
Probe: ET3DV6 - SN1642; ConvF(5.30,5.30,5.30); Crest factor: 8.0; Head 1900 MHz: σ = 1.46 mho/m ε_r = 40.1 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.94 mW/g, SAR (1g): 0.974 mW/g, SAR (10g): 0.461 mW/g, (Worst-case extrapolation)
Penetration depth: 7.8 (7.1, 9.3) [mm]
Powerdrift: -0.57 dB

Date tested: July 08, 2003
Ambient Temperature: 22.8 (°C)
Liquid Temperature: 21.4 (°C)
Band: GSM 1900
Channel: 810
Configuration: Left side "Touch" position

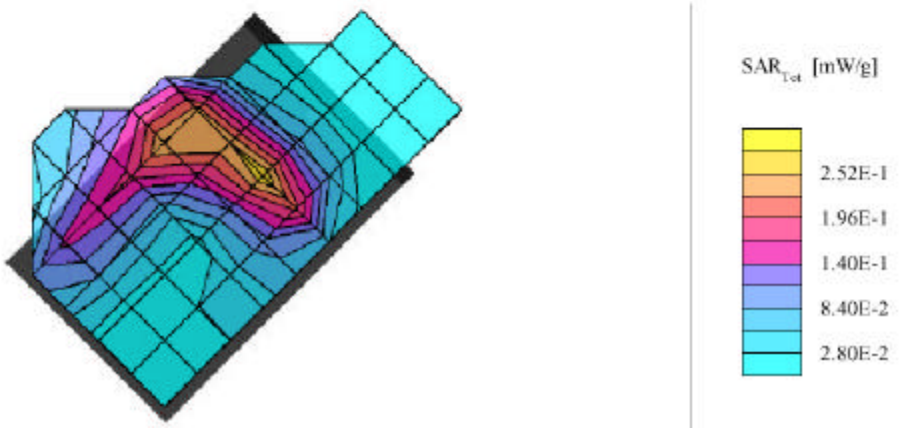


07/08/03

BlackBerry Wireless Handheld Model No. R6030GN

SAM 1; Left Hand
Probe: ET3DV6 - SN1642; ConvF(5.30,5.30,5.30); Crest factor: 8.0; Head 1900 MHz: σ = 1.46 mho/m ε_r = 40.1 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.483 mW/g, SAR (1g): 0.249 mW/g, SAR (10g): 0.134 mW/g, (Worst-case extrapolation)
Penetration depth: 8.4 (7.5, 10.0) [mm]
Powerdrift: 0.38 dB

Date Tested: July 08, 2003
Ambient Temperature: 22.8 Deg. Cel.
Liquid Temperature: 21.3 Deg. Cel.
Band: GSM 1900
Channel: 661
Configuration: Left side "Tilted" position

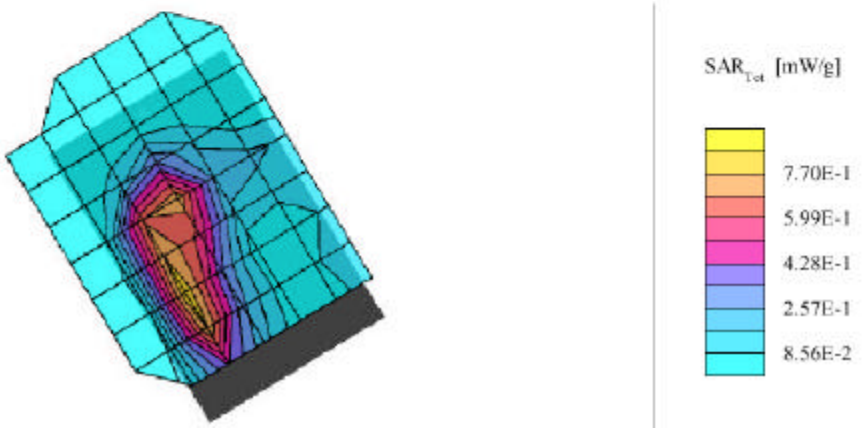


07/08/03

BlackBerry Wireless Handheld Model No. R6030GN

SAM 1; Right Hand
Probe: ET3DV6 - SN1642; ConvF(5.30,5.30,5.30); Crest factor: 8.0; Head 1900 MHz: σ = 1.46 mho/m ε_r = 40.1 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.81 mW/g, SAR (1g): 0.903 mW/g, SAR (10g): 0.442 mW/g, (Worst-case extrapolation)
Penetration depth: 7.7 (6.9, 9.6) [mm]
Powerdrift: -0.15 dB

Date tested: July 08, 2003
Ambient Temperature: 22.6 (°C)
Liquid Temperature: 21.0 (°C)
Band: GSM 1900
Channel: 810
Configuration: Right side "Touch" position

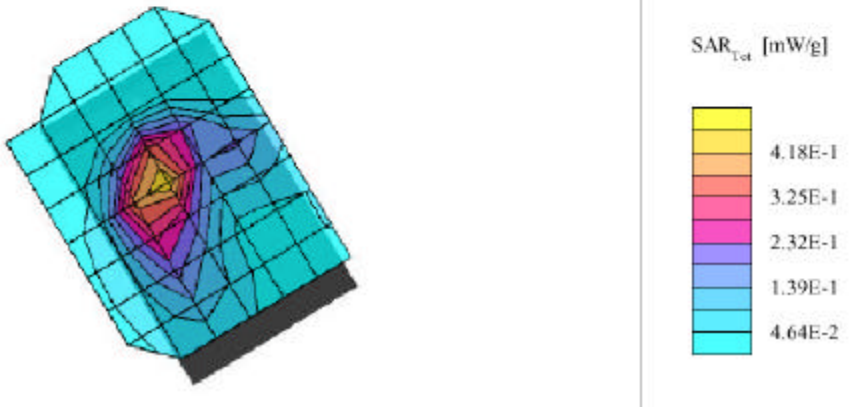


07/08/03

BlackBerry Wireless Handheld Model No. R6030GN

SAM 1; Right Hand
Probe: ET3DV6 - SN1642; ConvF(5.30,5.30,5.30); Crest factor: 8.0; Head 1900 MHz: σ = 1.46 mho/m ε_r = 40.1 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.980 mW/g, SAR (1g): 0.488 mW/g, SAR (10g): 0.251 mW/g, (Worst-case extrapolation)
Penetration depth: 8.1 (7.4, 9.4) [mm]
Powerdrift: -0.16 dB

Date tested: July 08, 2003
Ambient Temperature: 22.6 (°C)
Liquid Temperature: 21.1 (°C)
Band: GSM 1900
Channel: 661
Configuration: Right side "Tilted" position



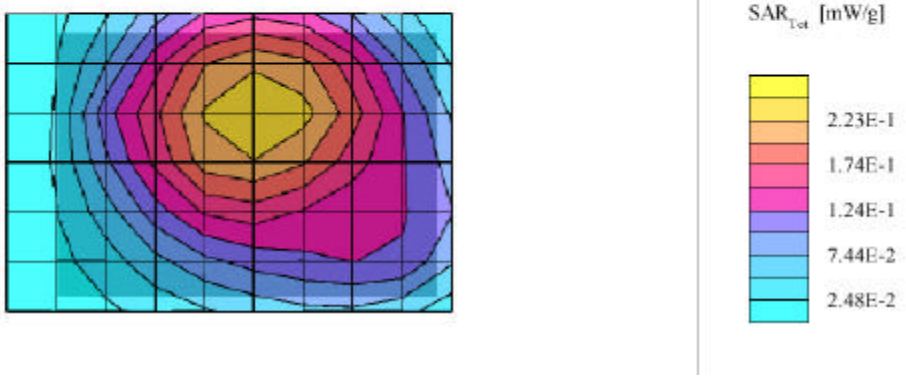
APPENDIX C: SAR DISTRIBUTION PLOTS FOR BODY-WORN CONFIGURATION

07/11/03

BlackBerry Wireless Handheld Model R6030GN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 8.0; Muscle 835 MHz: σ = 0.99 mho/m ε_r = 53.9 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.340 mW/g, SAR (1g): 0.233 mW/g, SAR (10g): 0.169 mW/g, (Worst-case extrapolation)
Penetration depth: 16.8 (14.2, 19.6) [mm]
Powerdrift: -0.10 dB

Date Tested: July 11, 2003
Ambient Temperature: 23.4 Deg. Cel.
Liquid Temperature: 22.6 Deg. Cel.
Band: GSM 850
Channel: 190
Configuration: Body worn with Holster

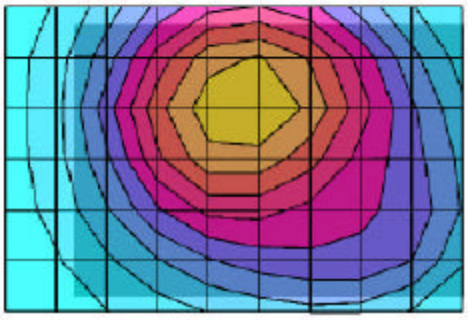


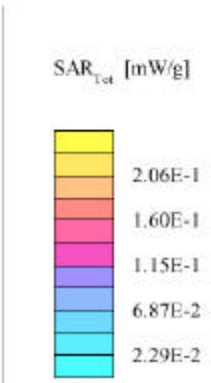
07/11/03

BlackBerry Wireless Handheld Model R6030GN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 8.0; Muscle 835 MHz: σ = 0.99 mho/m ε_r = 53.9 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.309 mW/g, SAR (1g): 0.216 mW/g, SAR (10g): 0.156 mW/g, (Worst-case extrapolation)
Penetration depth: 16.7 (14.2, 19.3) [mm]
Powerdrift: 0.00 dB

Date Tested: July 11, 2003
Ambient Temperature: 23.5 Deg. Cel.
Liquid Temperature: 22.6 Deg. Cel.
Band: GSM 850
Channel: 190
Configuration: Body worn with Leather Swivel Holster



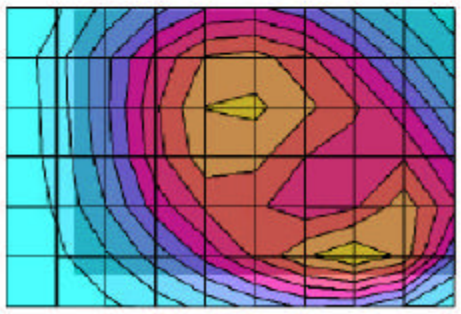


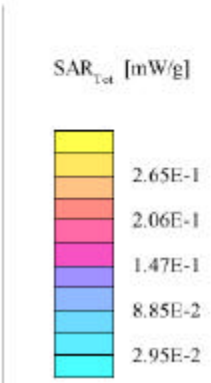
07/11/03

BlackBerry Wireless Handheld Model R6030GN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 8.0; Muscle 835 MHz: σ = 0.99 mho/m ε_r = 53.9 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.456 mW/g, SAR (1g): 0.274 mW/g, SAR (10g): 0.175 mW/g * Max outside, (Worst-case extrapolation)
Penetration depth: 13.4 (11.8, 15.3) [mm]
Powerdrift: -0.05 dB

Date Tested: July 11, 2003
Ambient Temperature: 23.5 Deg. Cel.
Liquid Temperature: 22.6 Deg. Cel.
Band: GSM 850
Channel: 190
Configuration: Body worn with Leather Swivel Holster for inside a shirt pocket, front side



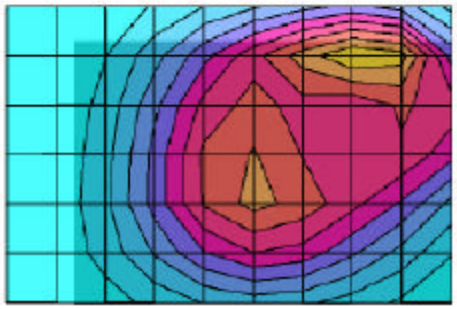


07/11/03

BlackBerry Wireless Handheld Model R6030GN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 8.0; Muscle 835 MHz: σ = 0.99 mho/m ε_r = 53.9 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.684 mW/g, SAR (1g): 0.398 mW/g, SAR (10g): 0.246 mW/g, (Worst-case extrapolation)
Penetration depth: 12.1 (10.4, 14.3) [mm]
Powerdrift: 0.01 dB

Date Tested: July 11, 2003
Ambient Temperature: 23.9 Deg. Cel.
Liquid Temperature: 22.5 Deg. Cel.
Band: GSM 850
Channel: 190
Configuration: Body worn with Leather Case for inside a shirt pocket, Back side



07/09/03

BlackBerry Wireless Handheld Model R6030GN

SAM 2; Flat

Probe: ET3DV6 - SN1642; ConvF(4.80,4.80,4.80); Crest factor: 8.0; Muscle 1900 MHz: σ = 1.57 mho/m ε_r = 52.4 ρ = 1.00 g/cm^3

Cube 5x5x7: Peak: 0.391 mW/g, SAR (1g): 0.225 mW/g, SAR (10g): 0.132 mW/g, (Worst-case extrapolation)

Penetration depth: 10.1 (9.0, 11.5) [mm]

Powerdrift: -0.14 dB

Date Tested: July 09, 2003

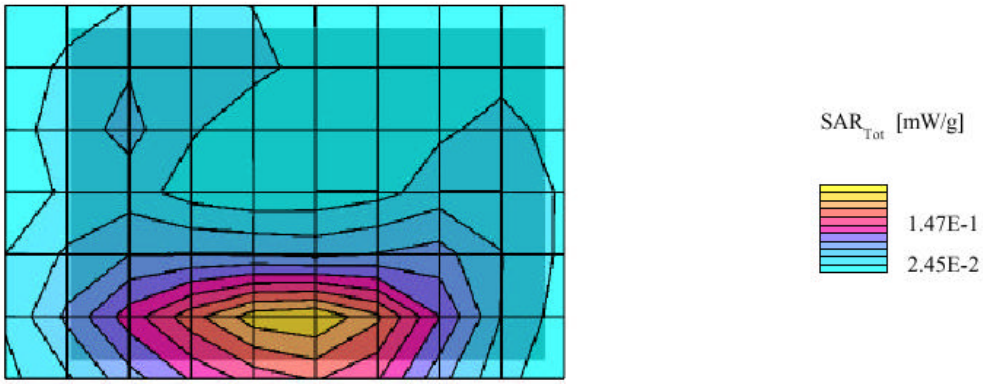
Ambient Temperature: 23.5 Deg. Cel.

Liquid Temperature: 21.4 Deg. Cel.

Band: GSM 1900

Channel: 661

Configuration: Body worn with Holster



07/09/03

BlackBerry Wireless Handheld Model R6030GN

SAM 2; Flat

Probe: ET3DV6 - SN1642; ConvF(4.80,4.80,4.80); Crest factor: 8.0; Muscle 1900 MHz: σ = 1.57 mho/m ε_r = 52.4 ρ = 1.00 g/cm^3

Cube 5x5x7: Peak: 0.324 mW/g, SAR (1g): 0.190 mW/g, SAR (10g): 0.113 mW/g, (Worst-case extrapolation)

Penetration depth: 10.2 (9.3, 11.5) [mm]

Powerdrift: 0.02 dB

Date Tested: July 09, 2003

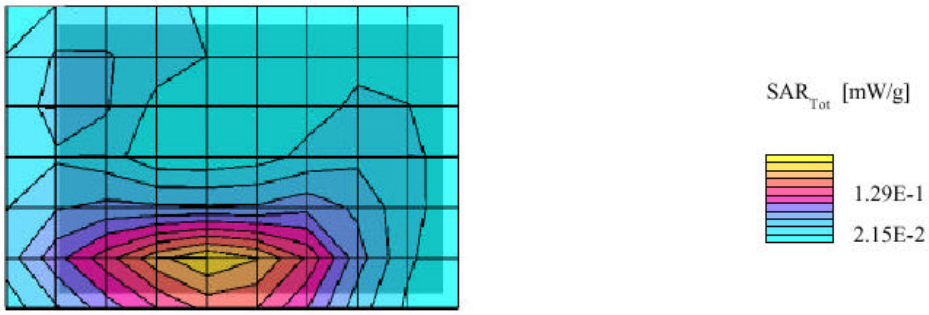
Ambient Temperature: 23.5 Deg. Cel.

Liquid Temperature: 21.4 Deg. Cel.

Band: GSM 1900

Channel: 661

Configuration: Body worn with Leather Swivel Holster



07/09/03

BlackBerry Wireless Handheld Model R6030GN

SAM 2; Flat

Probe: ET3DV6 - SN1642; ConvF(4.80,4.80,4.80); Crest factor: 8.0; Muscle 1900 MHz: σ = 1.57 mho/m ε_r = 52.4 ρ = 1.00 g/cm^3

Cube 5x5x7: Peak: 1.07 mW/g, SAR (1g): 0.549 mW/g, SAR (10g): 0.286 mW/g * Max outside, (Worst-case extrapolation)

Penetration depth: 10.0 (9.2, 11.1) [mm]

Powerdrift: -0.03 dB

Date Tested: July 09, 2003

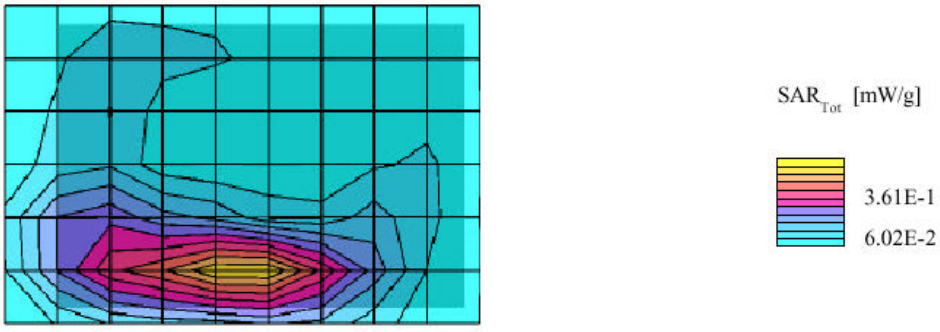
Ambient Temperature: 23.7 Deg. Cel.

Liquid Temperature: 21.5 Deg. Cel.

Band: GSM 1900

Channel: 661

Configuration: Body worn with Leather Case for inside a shirt pocket, front side

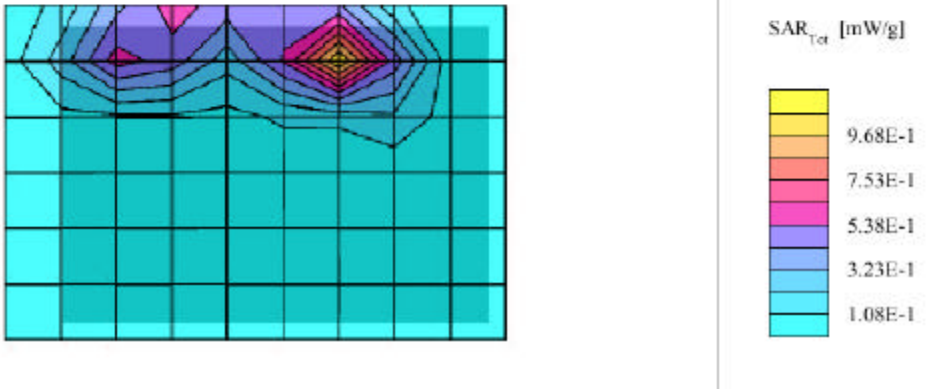


07/09/03

BlackBerry Wireless Handheld Model R6030GN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(4.80,4.80,4.80); Crest factor: 8.0; Muscle 1900 MHz: σ = 1.57 mho/m ε_r = 52.4 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.90 mW/g, SAR (1g): 0.936 mW/g, SAR (10g): 0.445 mW/g, (Worst-case extrapolation)
Penetration depth: 7.7 (7.2, 8.8) [mm]
Powerdrift: 0.35 dB

Date Tested: July 09, 2003
Ambient Temperature: 23.5 Deg. Cel.
Liquid Temperature: 21.4 Deg. Cel.
Band: GSM 1900
Channel: 661
Configuration: Body worn with Leather Case for inside a shirt pocket, back side



APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Calibration Certificate

Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1642**
Place of Calibration:	**Zurich**
Date of Calibration:	**July 26, 2002**
Calibration Interval:	**12 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:	U. Kellei
Approved by:	

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Telephone +41 1 245 97 00, Fax +41 1 245 97 79

Probe ET3DV6

SN:1642

Manufactured: November 7, 2001
Last calibration: November 26, 2001
Recalibrated: July 26, 2002

Calibrated for System DASY3

ET3DV6 SN:1642 **July 26, 2002**

DASY3 - Parameters of Probe: ET3DV6 SN:1642

Sensitivity in Free Space

Diode Compression

NormX	**1.62** $\mu V/(V/m)^2$	DCP X	**96**	mV
NormY	**1.85** $\mu V/(V/m)^2$	DCP Y	**96**	mV
NormZ	**1.61** $\mu V/(V/m)^2$	DCP Z	**96**	mV

Sensitivity in Tissue Simulating Liquid

Head **900 MHz** ε_r **= 41.5 ± 5%** σ **= 0.97 ± 5% mho/m**

ConvF X	**6.5** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.5** ± 8.9% (k=2)	Alpha	**0.34**
ConvF Z	**6.5** ± 8.9% (k=2)	Depth	**2.68**

Head **1800 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

ConvF X	**5.4** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.4** ± 8.9% (k=2)	Alpha	**0.53**
ConvF Z	**5.4** ± 8.9% (k=2)	Depth	**2.33**

Boundary Effect

Head **900 MHz** **Typical SAR gradient: 5 % per mm**

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	9.9	5.7
SAR_{be} [%]	With Correction Algorithm	0.4	0.5

Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

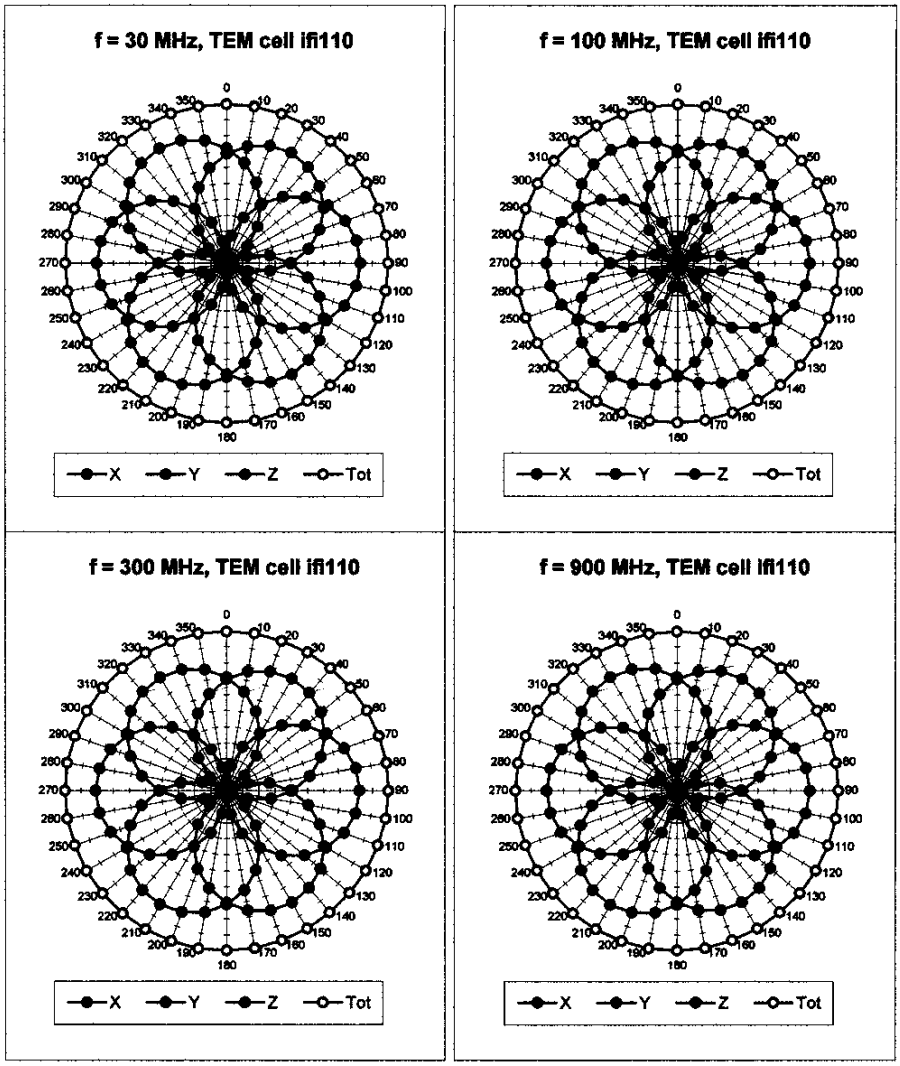
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	12.0	7.8
SAR_{be} [%]	With Correction Algorithm	0.2	0.2

Sensor Offset

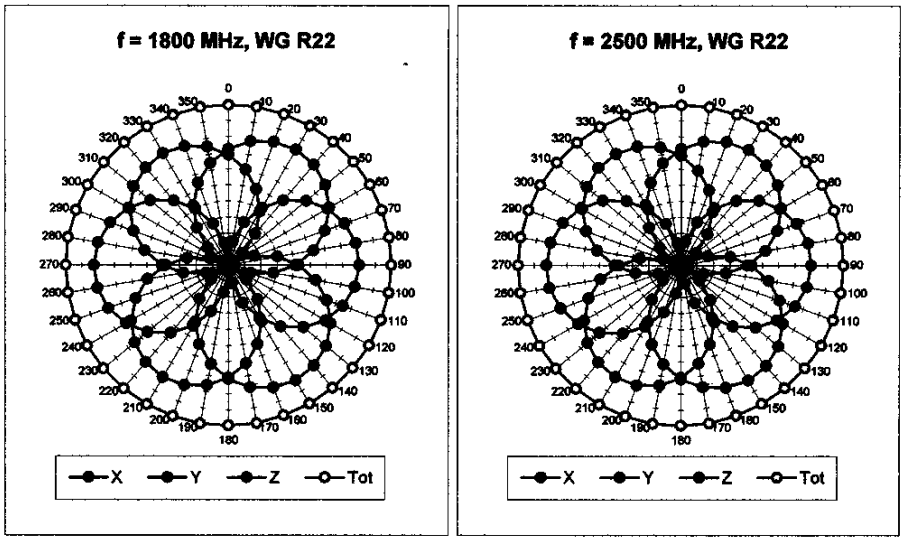
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.1 ± 0.2**	mm

ET3DV6 SN:1642 **July 26, 2002**

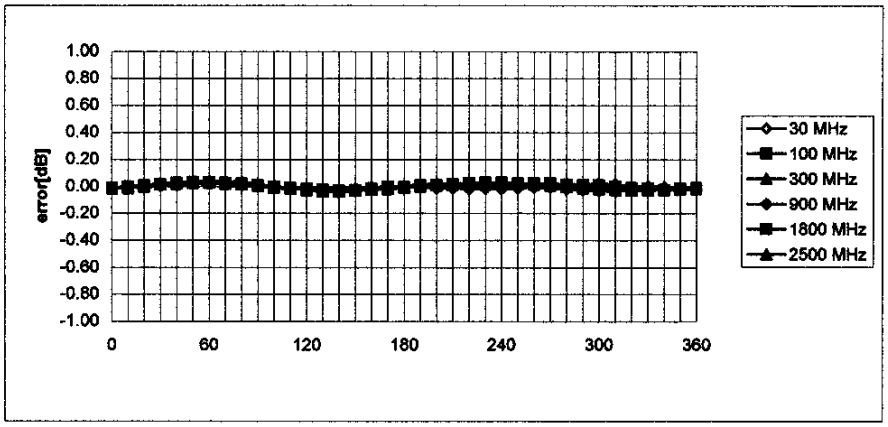
Receiving Pattern (ϕ), θ = 0°



ET3DV6 SN:1642 **July 26, 2002**



Isotropy Error (ϕ), θ = 0°



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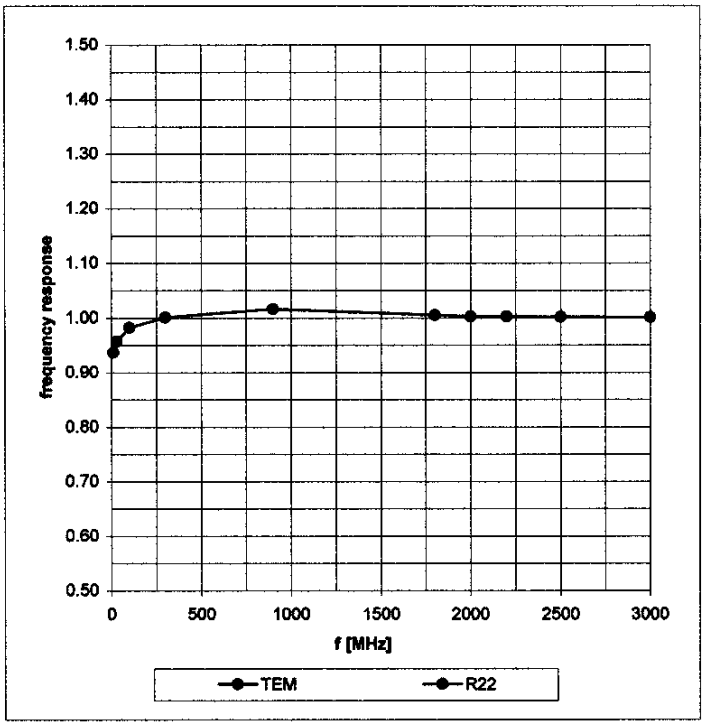
Frequency Response of E-Field

(TEM-Cell:ifi110, Waveguide R22)



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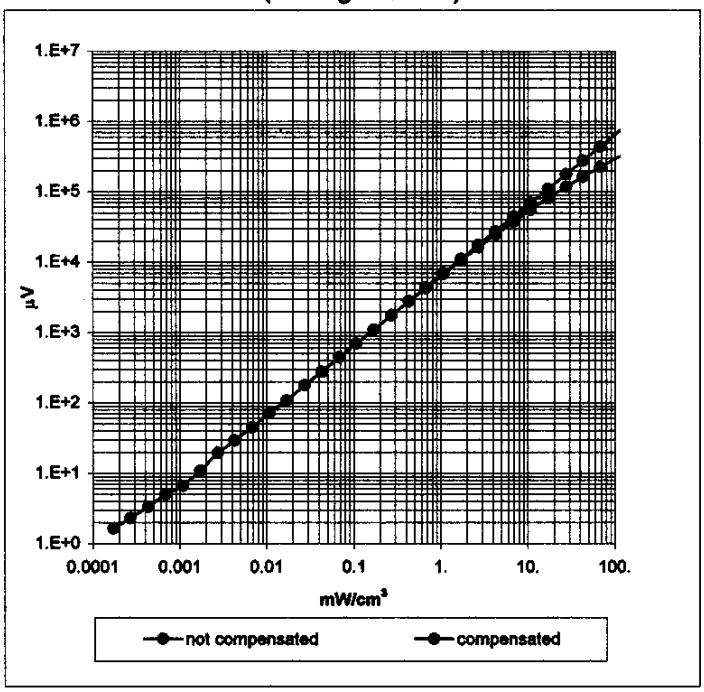
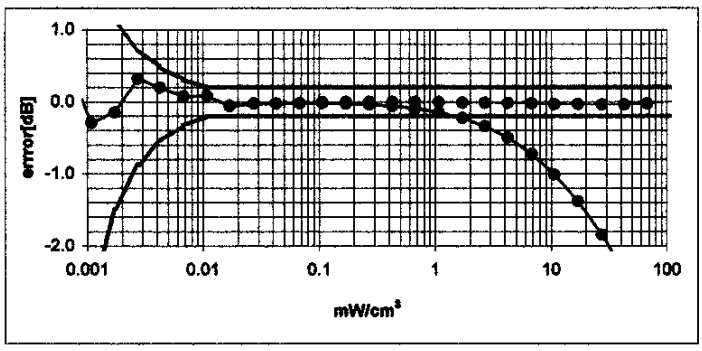
Dynamic Range f(SAR_{brain})

(Waveguide R22)





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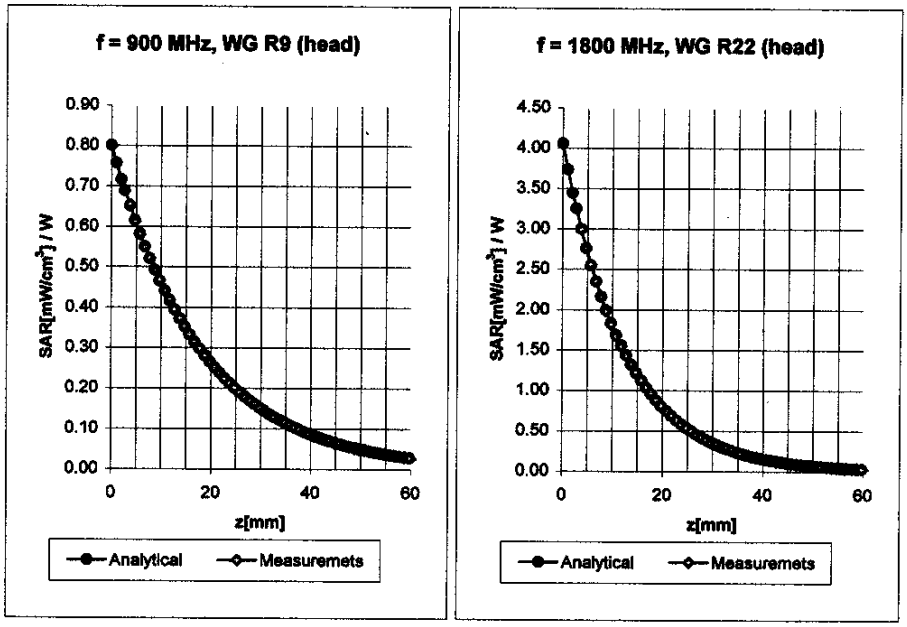
Conversion Factor Assessment



Head **900 MHz** ε_r = 41.5 ± 5% σ = 0.97 ± 5% mho/m

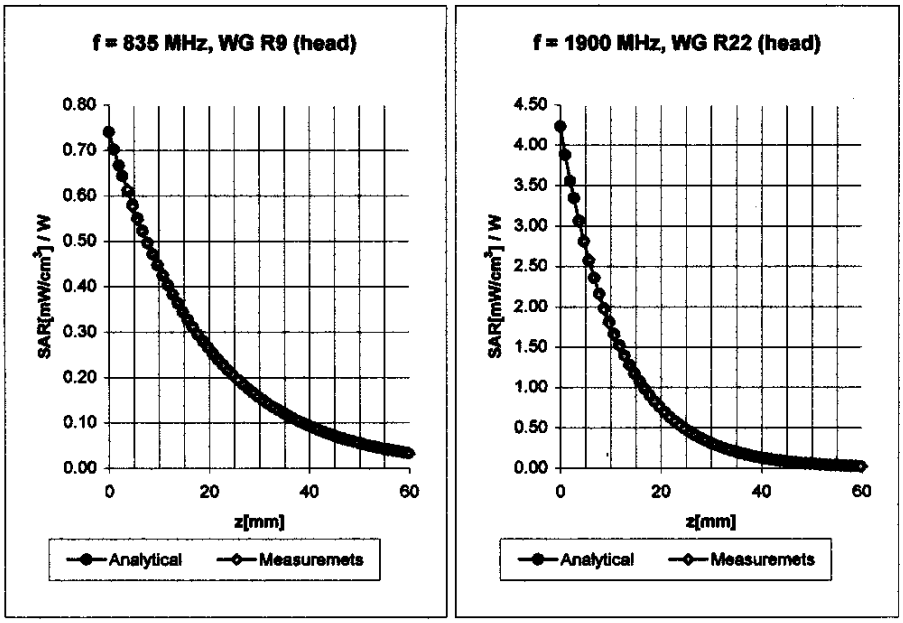
ConvF X	6.5 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.5 ± 8.9% (k=2)	Alpha	0.34
ConvF Z	6.5 ± 8.9% (k=2)	Depth	2.68

Head **1800 MHz** ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

ConvF X	5.4 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	5.4 ± 8.9% (k=2)	Alpha	0.53
ConvF Z	5.4 ± 8.9% (k=2)	Depth	2.33

ET3DV6 SN:1642 **July 26, 2002**

Conversion Factor Assessment



Head **835 MHz** **ε_r = 41.5 ± 5%** **σ = 0.90 ± 5% mho/m**

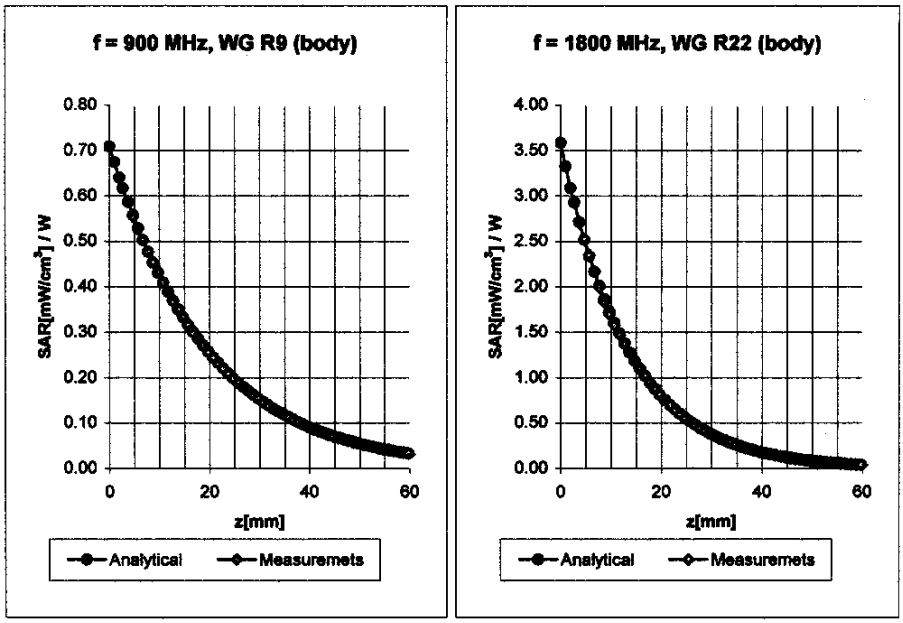
ConvF X	**6.5** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.5** ± 8.9% (k=2)	Alpha	**0.34**
ConvF Z	**6.5** ± 8.9% (k=2)	Depth	**2.65**

Head **1900 MHz** **ε_r = 40.0 ± 5%** **σ = 1.40 ± 5% mho/m**

ConvF X	**5.3** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.3** ± 8.9% (k=2)	Alpha	**0.57**
ConvF Z	**5.3** ± 8.9% (k=2)	Depth	**2.28**

ET3DV6 SN:1642 **July 26, 2002**

Conversion Factor Assessment



Body **900 MHz** ε_r = **55.2 ± 5%** σ = **0.97 ± 5% mho/m**

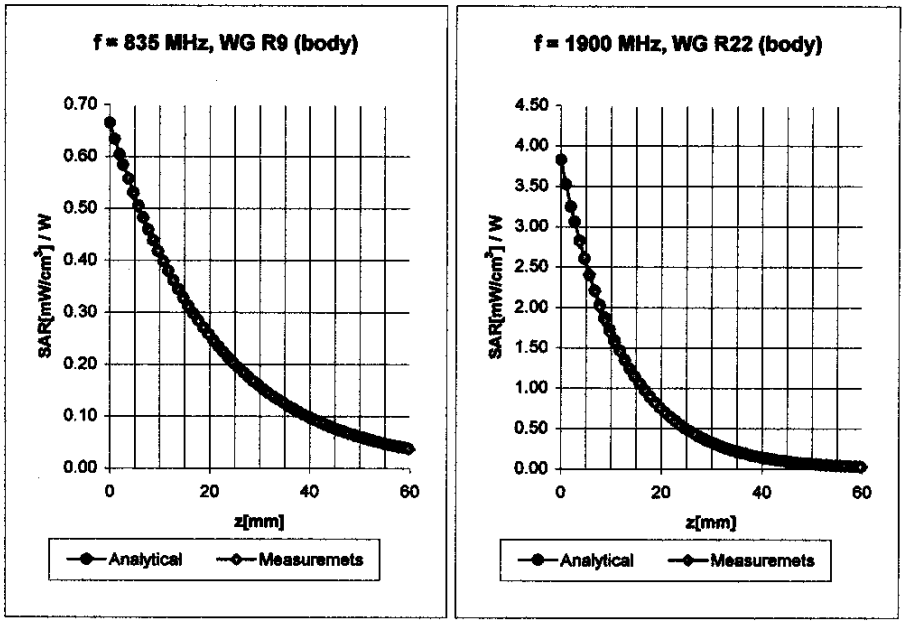
ConvF X	**6.3** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.3** ± 8.9% (k=2)	Alpha	**0.36**
ConvF Z	**6.3** ± 8.9% (k=2)	Depth	**2.63**

Body **1800 MHz** ε_r = **53.3 ± 5%** σ = **1.52 ± 5% mho/m**

ConvF X	**5.2** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.2** ± 8.9% (k=2)	Alpha	**0.61**
ConvF Z	**5.2** ± 8.9% (k=2)	Depth	**2.30**

ET3DV6 SN:1642 **July 26, 2002**

Conversion Factor Assessment



Body **835 MHz** ε_r = 55.0 ± 5% σ = 1.05 ± 5% mho/m

ConvF X	**6.4** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.4** ± 8.9% (k=2)	Alpha	**0.36**
ConvF Z	**6.4** ± 8.9% (k=2)	Depth	**2.66**

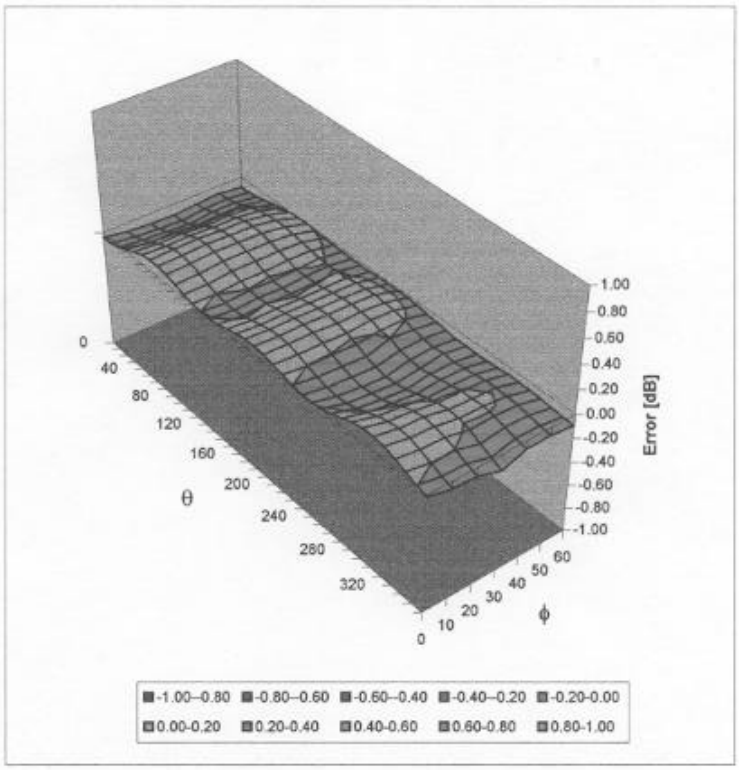
Body **1900 MHz** ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m

ConvF X	**4.8** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.8** ± 8.9% (k=2)	Alpha	**0.74**
ConvF Z	**4.8** ± 8.9% (k=2)	Depth	**2.07**

ET3DV6 SN:1642 July 26, 2002

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Calibration Certificate

835 MHz System Validation Dipole

Type:	D835V2
Serial Number:	446
Place of Calibration:	Zurich
Date of Calibration:	November 12, 2001
Calibration Interval:	24 months

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:

Approved by:

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

DASY

Dipole Validation Kit

Type: D835V2

Serial: 446

Manufactured: October 24, 2001
Calibrated: November 12, 2001

1. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom filled with head simulating solution of the following electrical parameters at 835 MHz:

Relative Dielectricity	42.3	± 5%
Conductivity	0.91 mho/m	± 5%

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.27 at 900 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 20mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 1. The results have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm^3 (1 g) of tissue:	10.7 mW/g
averaged over 10 cm^3 (10 g) of tissue:	6.84 mW/g

Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well.

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	1.401 ns	(one direction)
Transmission factor:	0.993	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 835 MHz:	Re{Z} = 49.8 Ω
	Im {Z} = -4.8 Ω
Return Loss at 835 MHz	-26.4 dB

4. Handling

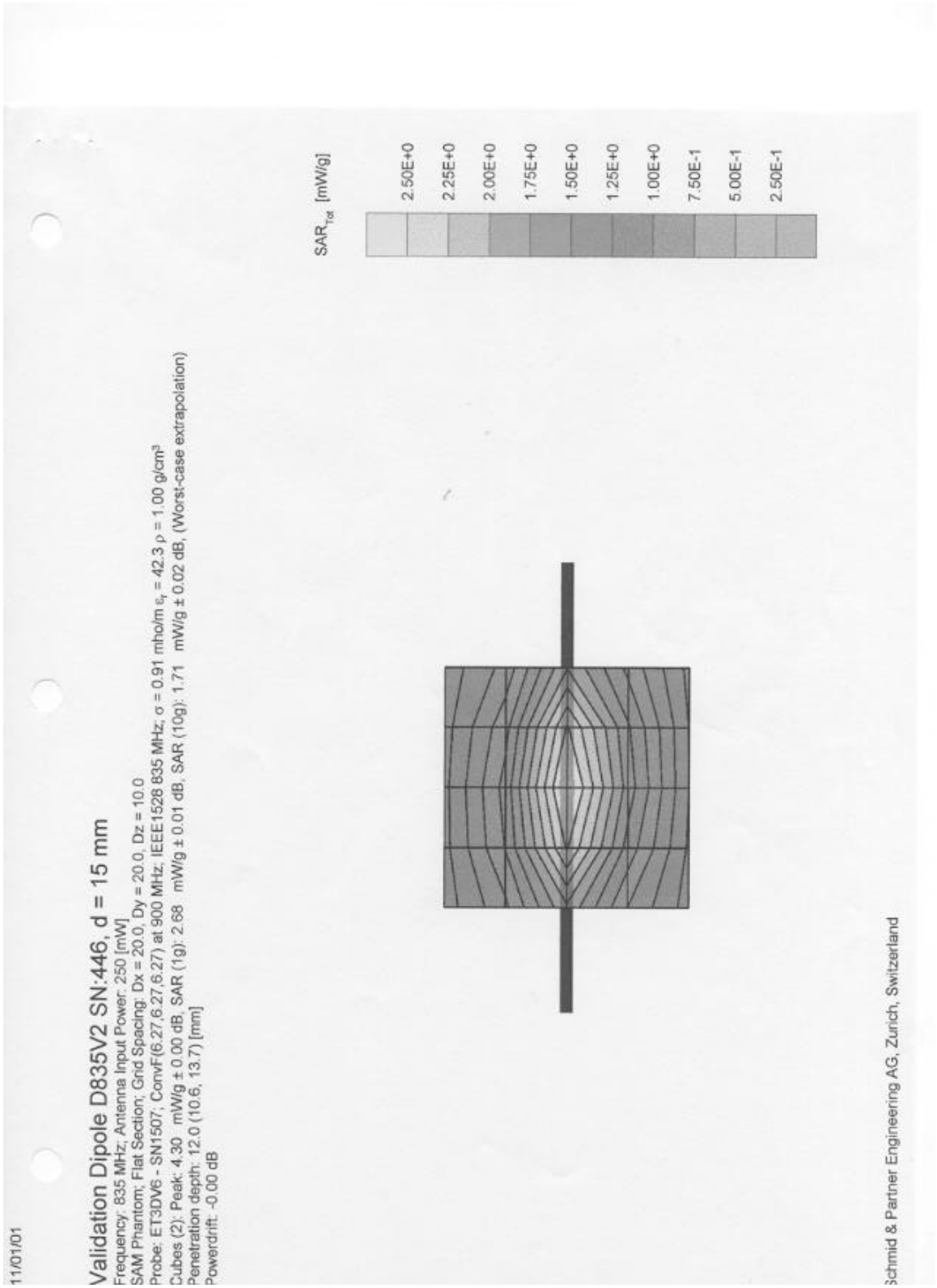
Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

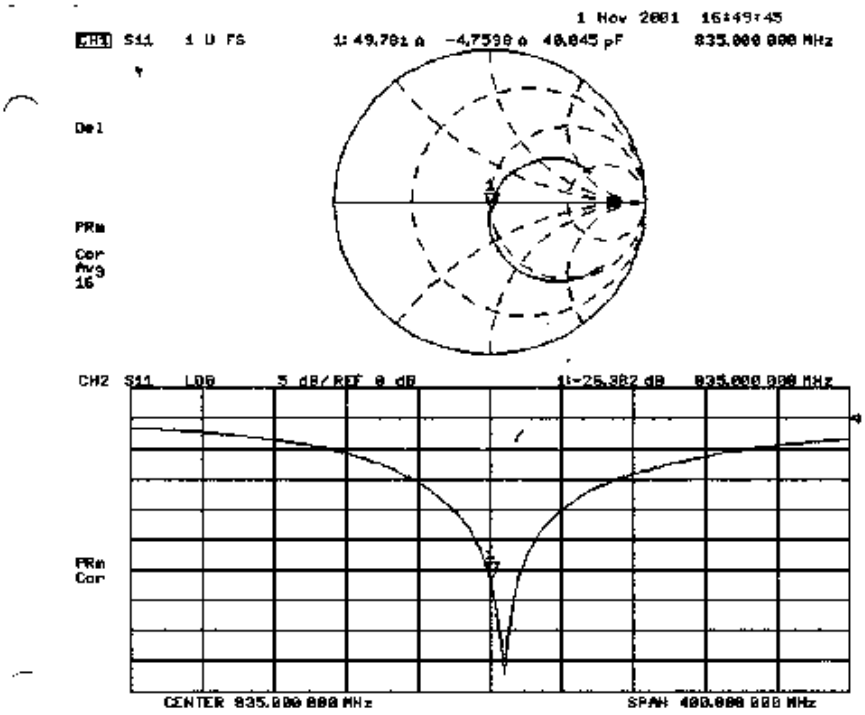
5. Design

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.

6. Power Test

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





Schmid & Partner Engineering AG

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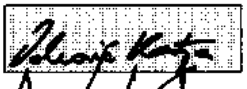
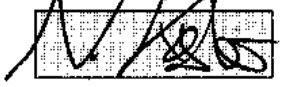
Calibration Certificate

1900 MHz System Validation Dipole

Type:	D1900V2
Serial Number:	545
Place of Calibration:	Zurich
Date of Calibration:	November 26, 2001
Calibration Interval:	24 months

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:	
Approved by:	

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

DASY3

Dipole Validation Kit

Type: D1900V2

Serial: 545

Manufactured: November 15, 2001
Calibrated: November 26, 2001

1. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom filled with brain simulating sugar solution of the following electrical parameters at 1900 MHz:

Relative permitivity	**40.0**	± 5%
Conductivity	**1.45 mho/m**	± 10%

The DASY3 System (Software version 3.1d) with a dosimetric E-field probe ET3DV6 (SN:1507, conversion factor 5.31 at 1800 MHz) was used for the measurements.

The dipole feedpoint was positioned below the center marking and oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 20mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement

Standard SAR-measurements were performed with the head phantom according to the measurement conditions described in section 1. The results (see figure) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm^3 (1 g) of tissue:	**43.2 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**22.0 mW/g**

Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well. The estimated sensitivities of SAR-values and penetration depths to the liquid parameters are listed in the DASY Application Note 4: 'SAR Sensitivities'.

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.216 ns**	(one direction)
Transmission factor:	**0.992**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 1900 MHz:	Re{Z} = **50.4 Ω**
	Im {Z} = **1.9 Ω**
Return Loss at 1900 MHz	**- 34.3 dB**

4. Handling

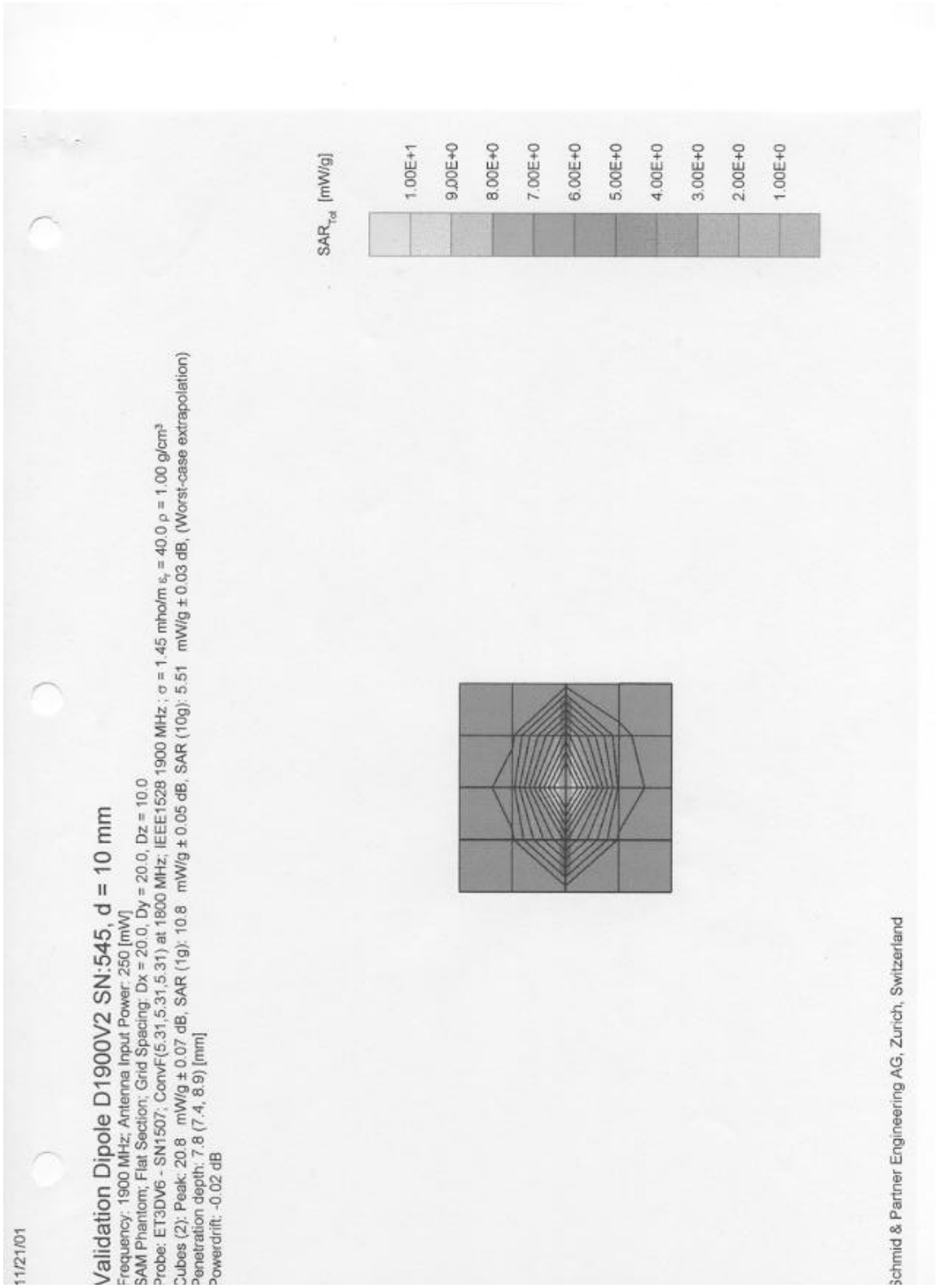
Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

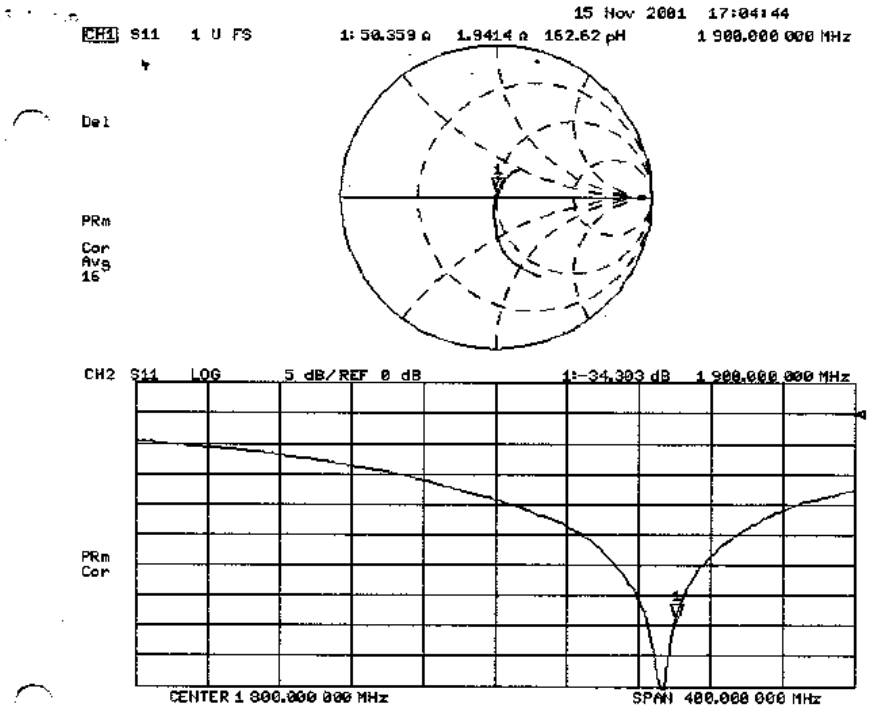
5. Design

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.

6. Power Test

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.





APPENDIX E: SAR SET UP PHOTOS

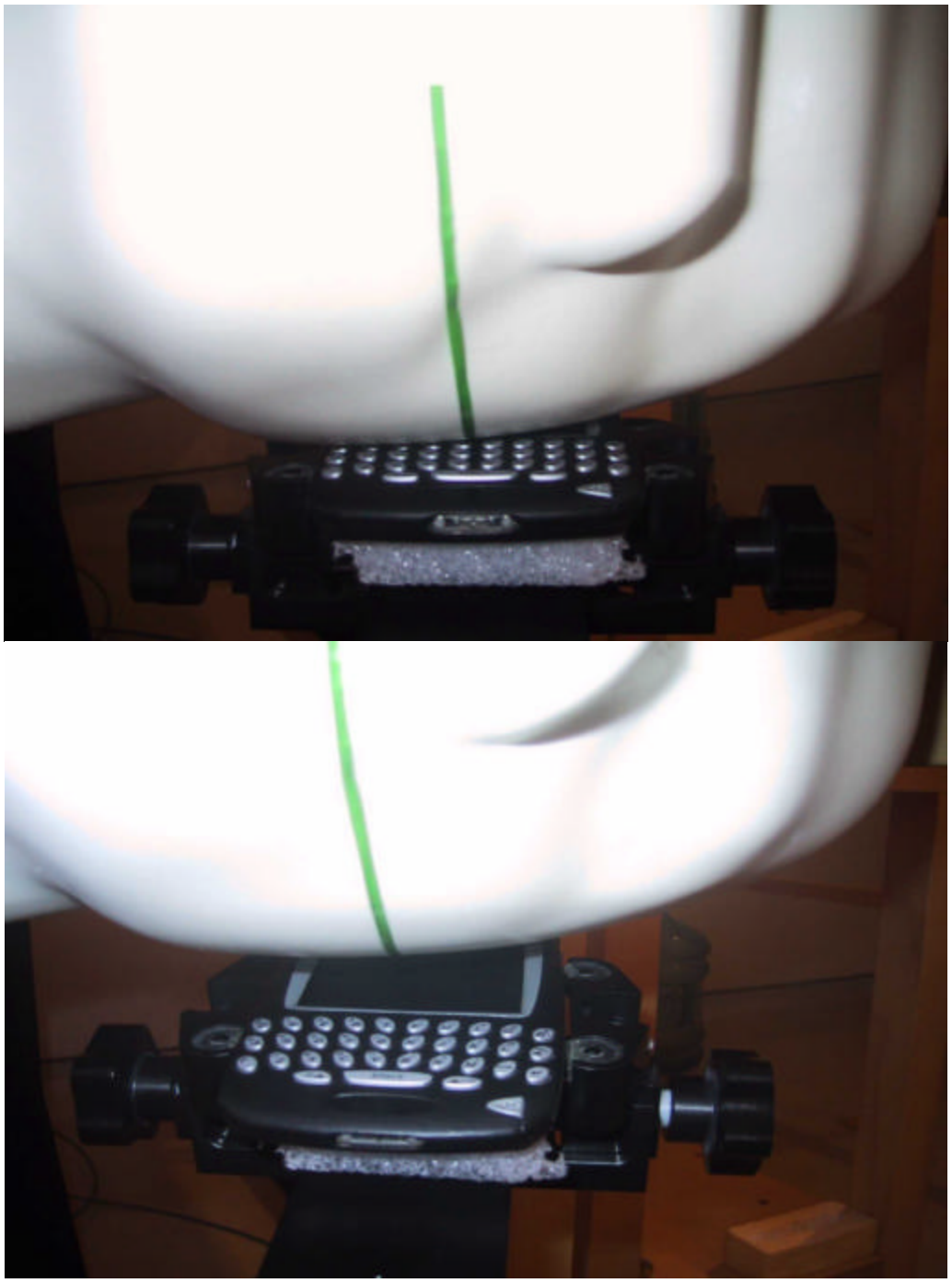


Figure E1. Left ear configuration

Figure E2. Right ear configuration

Figure E3. Body worn configuration with Plastic Holster ASY-0399-001 and headset

Figure E4. Body worn configuration with Leather Swivel Holster HDW-04890-001 and headset

Figure E5. Body worn with Folding Leather Case HDW-04889-001 for inside a shirt pocket configuration front and back side