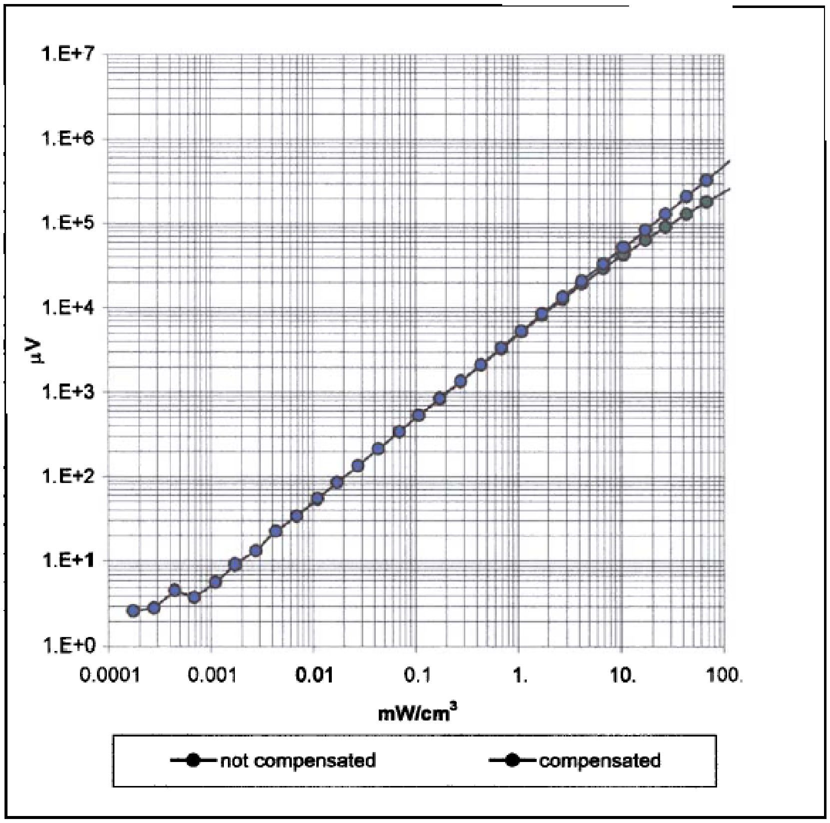
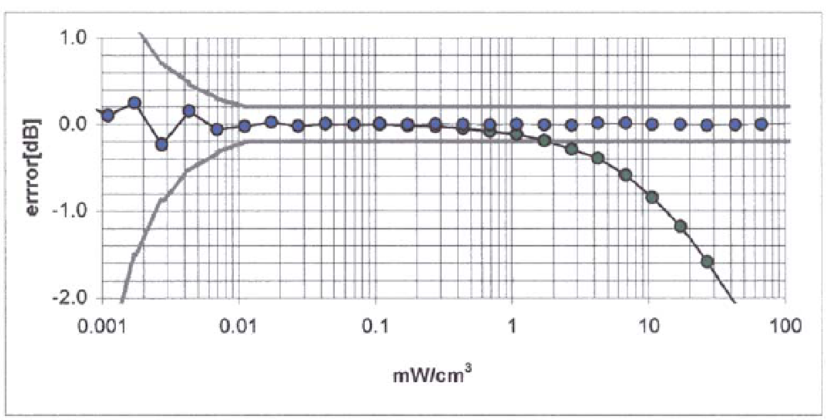
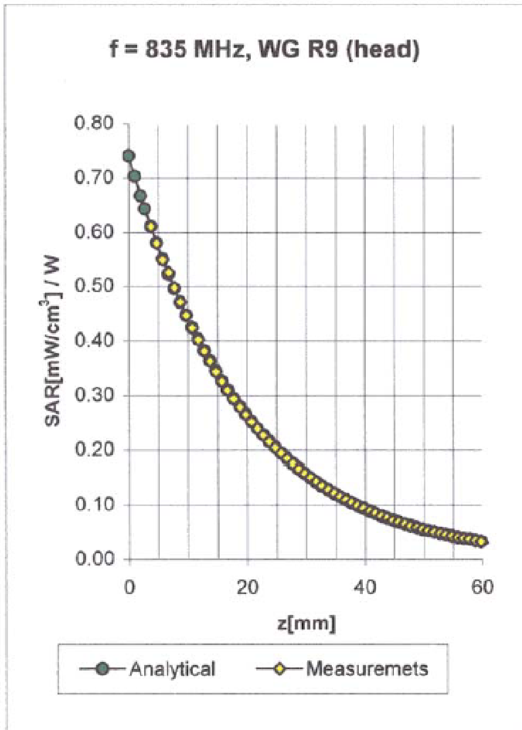
Dynamic Range f(SAR_{brain})

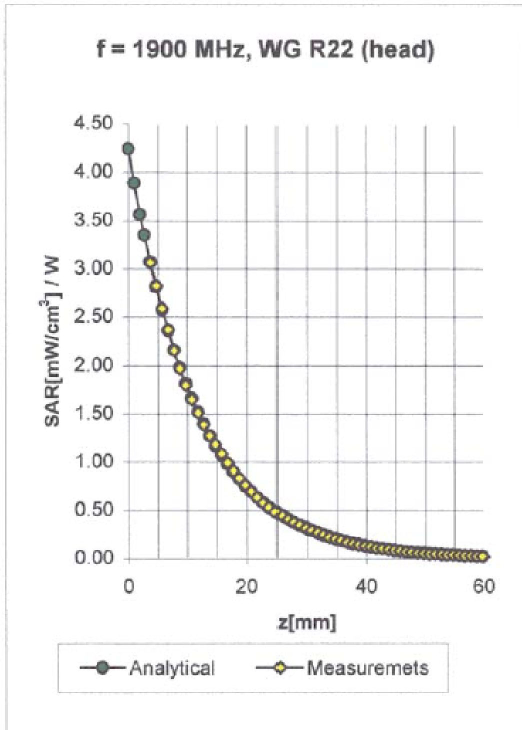
(Waveguide R22)





Conversion Factor Assessment

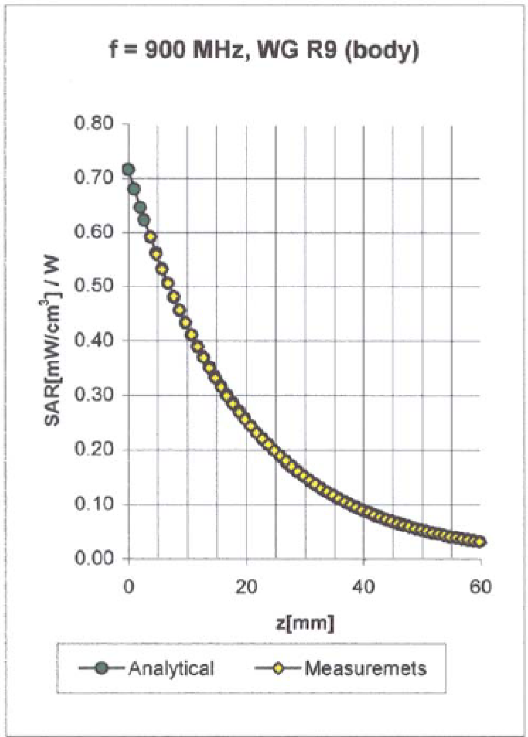


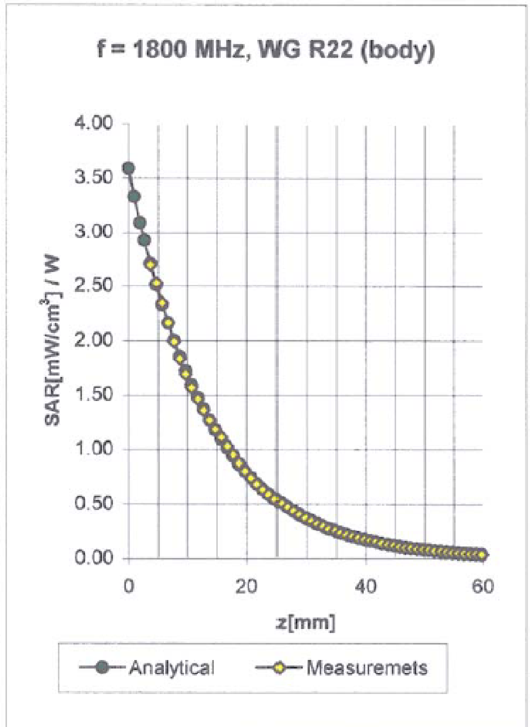


Head	**835 MHz**		**ε_r = 41.5 ± 5%**	**σ = 0.90 ± 5% mho/m**	
	900 MHz		**ε_r = 41.5 ± 5%**	**σ = 0.97 ± 5% mho/m**	
	ConvF X	**6.5**	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**6.5**	± 9.5% (k=2)	Alpha	**1.47**
	ConvF Z	**6.5**	± 9.5% (k=2)	Depth	**1.19**

	1900 MHz		**ε_r = 40.0 ± 5%**	**σ = 1.40 ± 5% mho/m**	
Head	**1800 MHz**		**ε_r = 40.0 ± 5%**	**σ = 1.40 ± 5% mho/m**	
	ConvF X	**5.2**	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**5.2**	± 9.5% (k=2)	Alpha	**0.63**
	ConvF Z	**5.2**	± 9.5% (k=2)	Depth	**2.21**

Conversion Factor Assessment

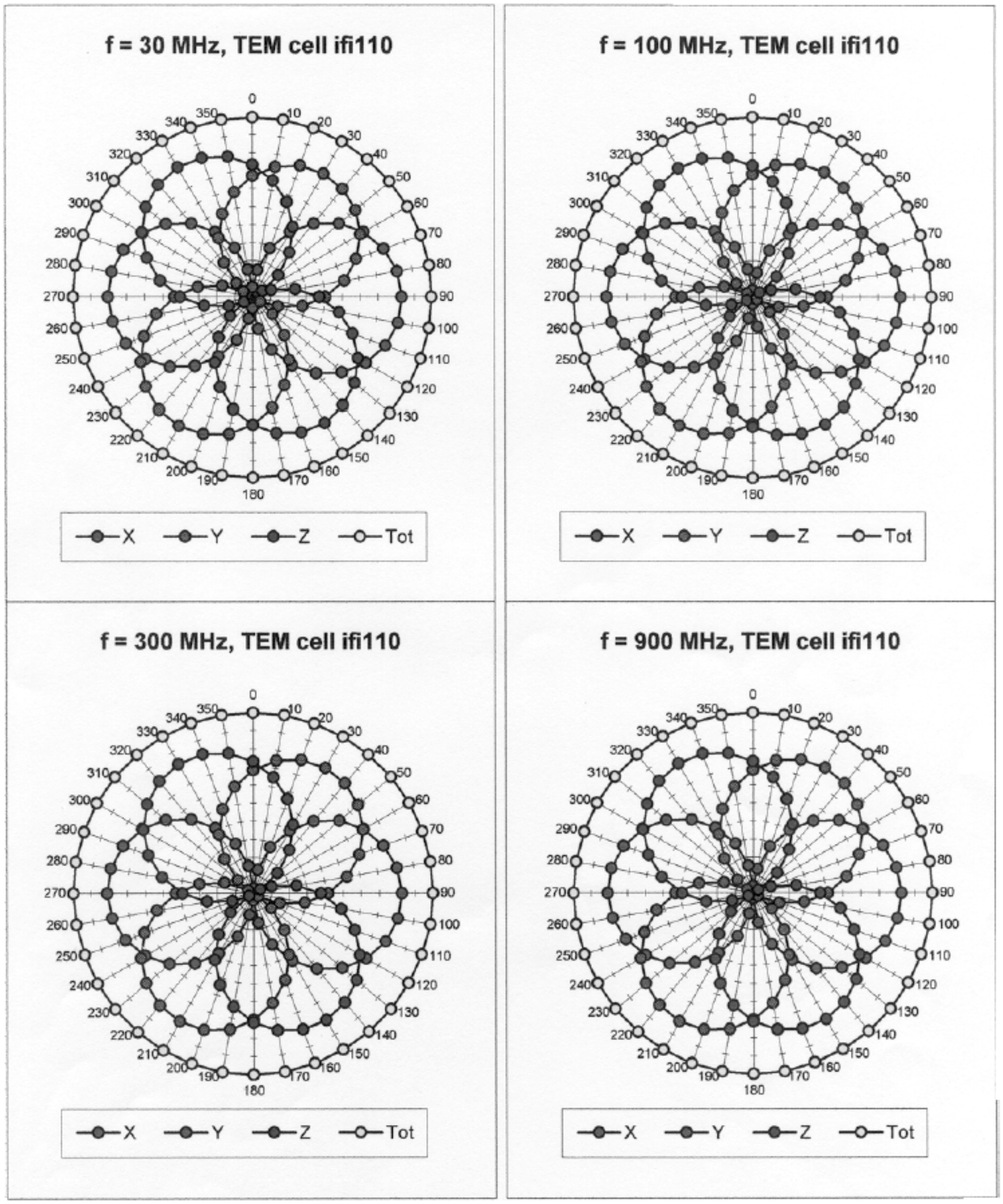


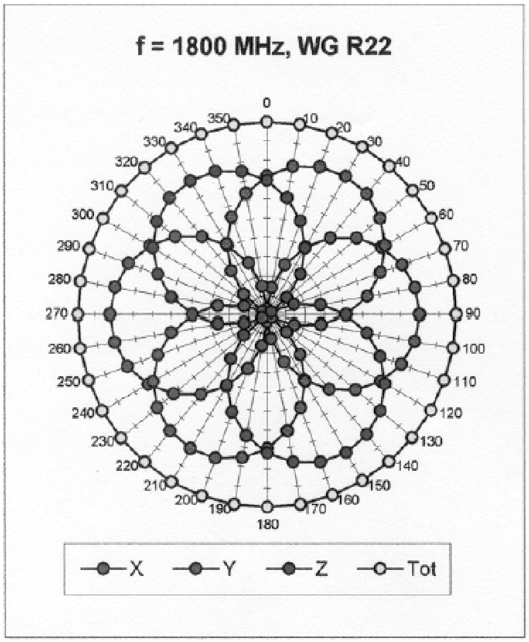


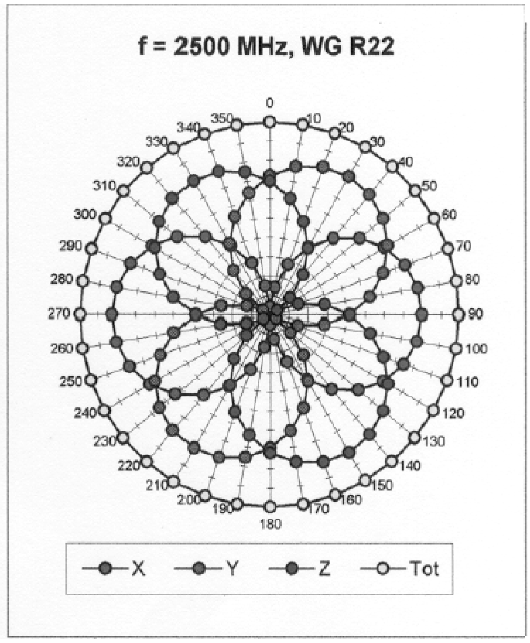
	900 MHz		**ε_r = 55.0 ± 5%**	**σ = 1.05 ± 5% mho/m**	
	835 MHz		**ε_r = 55.2 ± 5%**	**σ = 0.97 ± 5% mho/m**	
	ConvF X	**6.2** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.2** ± 9.5% (k=2)		Alpha	**0.46**
	ConvF Z	**6.2** ± 9.5% (k=2)		Depth	**2.34**

	1800 MHz		**ε_r = 53.3 ± 5%**	**σ = 1.52 ± 5% mho/m**	
Body	**1900 MHz**		**ε_r = 53.3 ± 5%**	**σ = 1.52 ± 5% mho/m**	
	ConvF X	**5.0** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**5.0** ± 9.5% (k=2)		Alpha	**0.67**
	ConvF Z	**5.0** ± 9.5% (k=2)		Depth	**2.24**

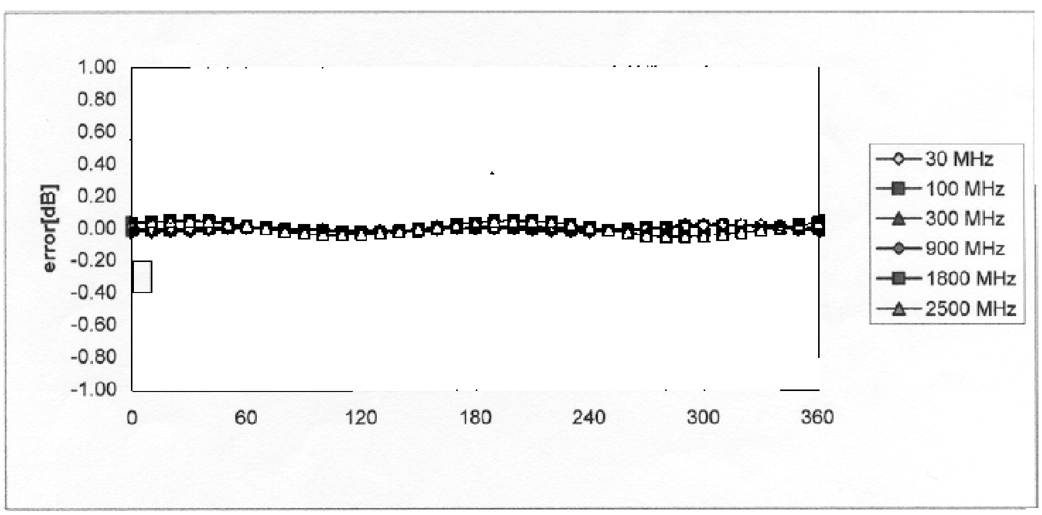
Receiving Pattern (ϕ), $\theta = 0°$







Isotropy Error (ϕ), θ = 0°



Schmid & Partner
Engineering AG

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

Calibration Certificate

900 MHz System Validation Dipole

Type:	**D900V2**
Serial Number:	**084**
Place of Calibration:	**Zurich**
Date of Calibration:	**February 11, 2002**
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: Katja

Approved by: N. Kuster

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with head simulating solution of the following electrical parameters at 900 MHz:

Relative Dielectricity	**41.1**	± 5%
Conductivity	**0.95 mho/m**	± 5%

The DASY3 System (Software version 3.1d) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.5) 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:	**11.2 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**7.12 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:	**1.389 ns**	(one direction)
Transmission factor:	**0.997**	(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 900 MHz:	Re{Z} = **52.1 Ω**
	Im {Z} = **-4.3 Ω**
Return Loss at 900 MHz	**-26.5 dB**

4. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with body simulating solution of the following electrical parameters at 900 MHz:

Relative Dielectricity	**54.8**	± 5%
Conductivity	**1.03 mho/m**	± 5%

The DASY3 System (Software version 3.1d) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.2) 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.

5. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 4. 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:	**11.8 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**7.52 mW/g**

6. Dipole Impedance and Return Loss

The dipole was positioned at the flat phantom sections according to section 4 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 900 MHz:	Re{Z} = **47.6 Ω**
	Im {Z} = **-6.0 Ω**
Return Loss at 900 MHz	**-23.6 dB**

7. 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.

8. 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.

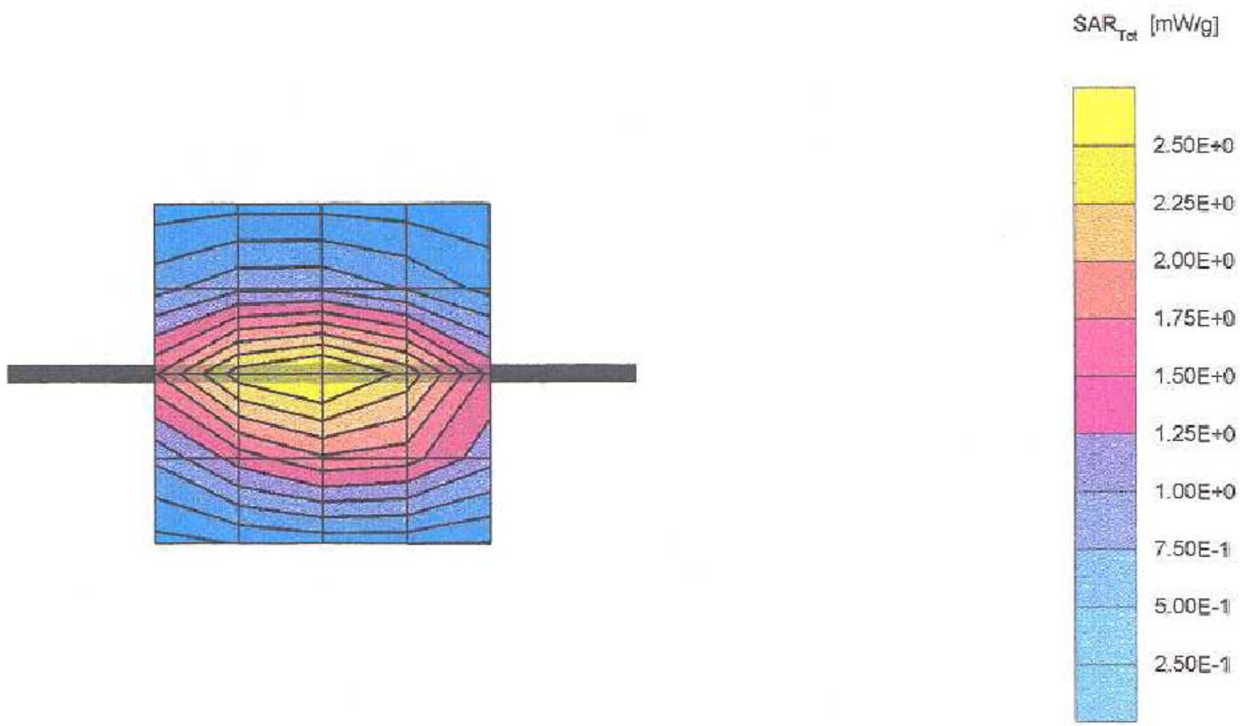
9. Power Test

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

02/11/02

Validation Dipole D900V2 SN:084, d = 15 mm

Frequency: 900 MHz; Antenna Input Power: 250 [mW]
SAM Phantom; Flat Section; Grid Spacing: Dx = 20.0, Dy = 20.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(6.50,6.50,6.50) at 900 MHz; IEEE1528 900 MHz; σ = 0.95 mho/m ε_r = 41.1 ρ = 1.00 g/cm^3
Cubes (2): Peak: 4.54 mW/g ± 0.03 dB, SAR (1g): 2.81 mW/g ± 0.02 dB, SAR (10g): 1.78 mW/g ± 0.02 dB, (Worst-case extrapolation)
Penetration depth: 11.5 (10.3, 13.2) [mm]
Powerdrift: -0.01 dB

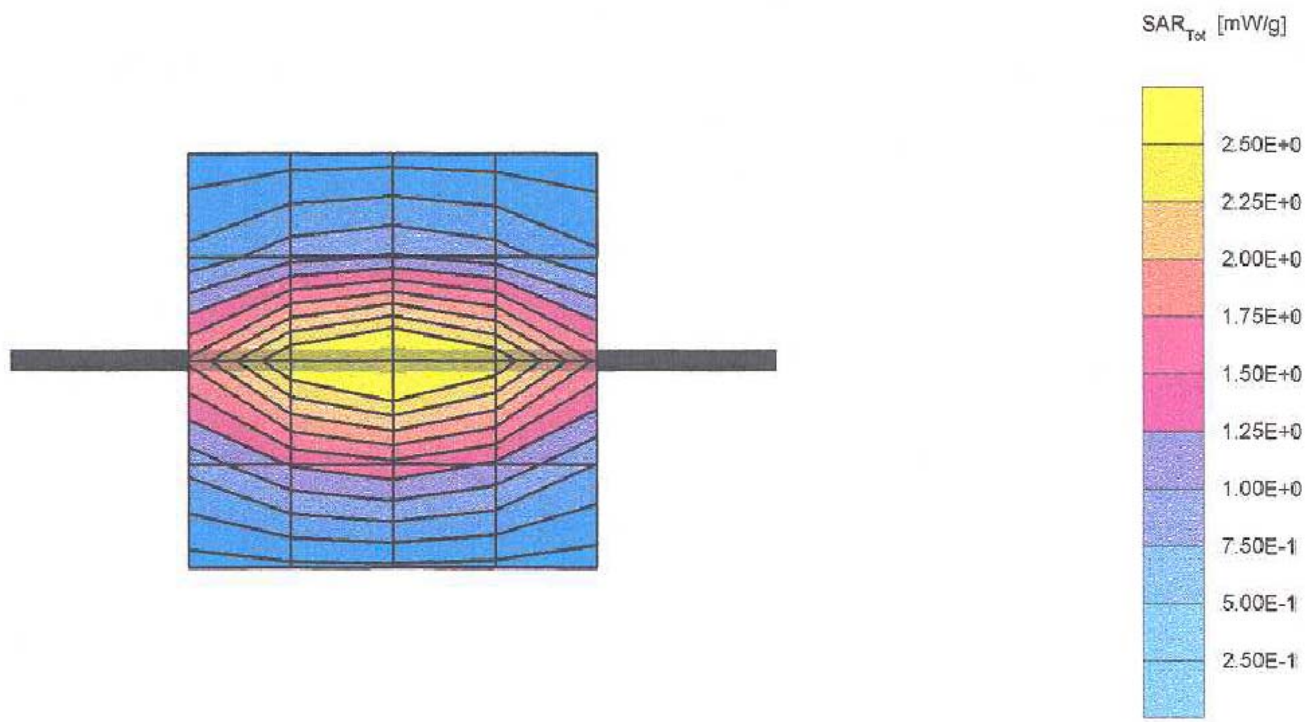


Schmid & Partner Engineering AG, Zurich, Switzerland

02/11/02

Validation Dipole D900V2 SN:084, d = 15 mm

Frequency: 900 MHz; Antenna Input Power: 250 [mW]
SAM Phantom; Flat Section; Grid Spacing: Dx = 20.0, Dy = 20.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(6.20,6.20,6.20) at 900 MHz; Muscle 900 MHz; σ = 1.03 mho/m ε_r = 54.8 ρ = 1.00 g/cm^3
Cubes (2): Peak: 4.72 mW/g ± 0.02 dB, SAR (1g): 2.95 mW/g ± 0.01 dB, SAR (10g): 1.88 mW/g ± 0.00 dB, (Worst-case extrapolation)
Penetration depth: 12.0 (10.7, 13.7) [mm]
Powerdrift: -0.01 dB



Schmid & Partner Engineering AG, Zurich, Switzerland

APPENDIX E
Illustration of Body-Worn Accessories

The purpose of this appendix is to illustrate the body-worn carry accessories for FCC ID: AZ489FT5822. The sample that was used in the following photos represents the product used to obtain the results presented herein and was used in this section to demonstrate the different body-worn accessories.

Photo 1.
Model NNTN4755A
Front View

Photo 2.
Model NNTN4755A
Back View

Photo 3.
Model NNTN4681A
Side View

Appendix F
Accessories and options test status and separation distances

The following table summarizes the test status and separation distance provided by each of the body-worn accessories:

Carry Case Models	Tested ?	Separation distances between DUT antenna and phantom surface. (mm)	Comments
NNTN4755A	Yes	36-40	NA

Audio Acc. Models	Tested ?	Separation distances between DUT antenna and phantom surface. (mm)	Comments
SYN8390B	Yes	NA	NA
NNTN4033A	Yes	NA	NA
NSN6066A	Yes	NA	NA

Data cables Models	Tested ?	Separation distances between DUT antenna and phantom surface. (mm)	Comments
NKN6560A	Yes	NA	NA
NKN6559A	Yes	NA	NA

Other attachments Models	Tested ?	Separation distances between DUT antenna and phantom surface. (mm)	Comments
NNTN4917A	Yes	NA	NA