11/01/02

Itronix Corporation FCC ID: KBCIX260AC555

Probe: ET3DV6 - SN1387; ConvF(6.30,6.30,6.30); Crest factor: 1.0 SAM Phantom; Flat Section; Position: (270°,0°)

835 MHz Muscle: $\sigma=0.96$ mho/m $\epsilon_{r}=53.3~\rho=1.00~g/cm^{3}$

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Cube 5x5x7; Powerdrift: -0.15 dB

SAR (1g): 0.0157 mW/g, SAR (10g): 0.0102 mW/g

Body SAR - Bottom of Laptop PC (LCD Display Closed) - Antenna Perpendicular to Planar Phantom (Extended Position)

0.0 cm Separation Distance from Bottom of Laptop PC to Planar Phantom

Itronix IX260 Rugged Laptop PC

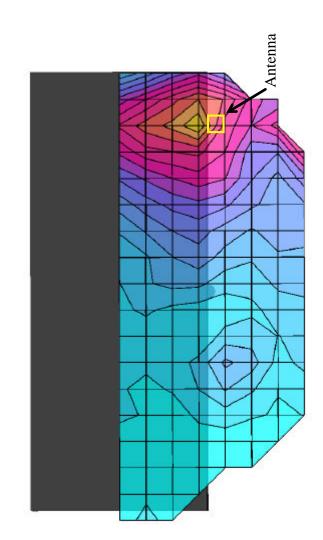
with Sierra Wireless AirCard 555 PCS/Cellular CDMA Modem Card

Cellular CDMA Mode

Channel 363 [835.89 MHz] Conducted Power: 23.0 dBm

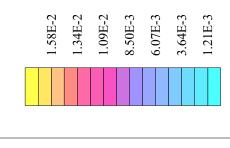
Ambient Temp: 22.2°C; Fluid Temp: 22.0°C

Date Tested: November 01, 2002



Celltech Labs Inc.

 $SAR_{Tot}\ [mW/g]$



02/19/03

Itronix Corporation FCC ID: KBCIX260AC555

Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0 SAM Phantom; Flat Section; Position: (0°,0°)

835 MHz Muscle: $\sigma=0.97$ mho/m $\epsilon_r=53.9~\rho=1.00~g/cm^3$

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Body SAR - Bottom of Laptop PC (LCD Display Closed) - Antenna Perpendicular to Planar Phantom (Extended Position) 0.0 cm Separation Distance from Bottom of Laptop PC to Planar Phantom

Itronix IX260 Rugged Laptop PC

with Sierra Wireless AirCard 555 PCS/Cellular CDMA Modem Card

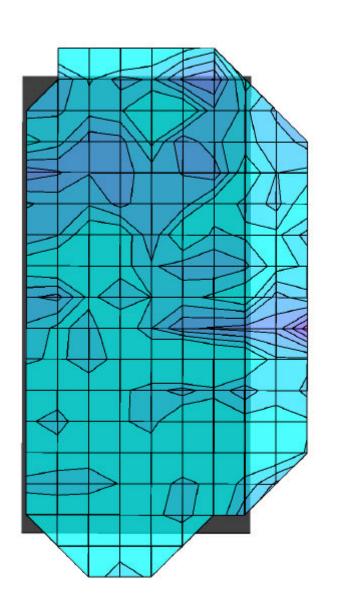
Cellular CDMA Mode

Channel 363 [835.89 MHz] Conducted Power: 23.0 dBm

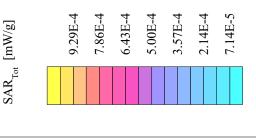
Ambient Temp: 23.2°C; Fluid Temp: 22.4°C

Date Tested: February 19, 2003

Coarse scan to show Left Half of Bottom Side



Celltech Labs Inc.



11/01/02

Itronix Corporation FCC ID: KBCIX260AC555

SAM Phantom; Flat Section; Position: (0°,0°)

Probe: ET3DV6 - SN1387; ConvF(6.30,6.30,6.30); Crest factor: 1.0

835 MHz Muscle: $\sigma=0.96$ mho/m $\epsilon_{r}=53.3~\rho=1.00~g/cm^{3}$

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0Cube 5x5x7; Powerdrift: -0.04 dB

SAR (1g): 0.119 mW/g, SAR (10g): 0.0748 mW/g

Body SAR - Right Side of LCD Display (Closed) - Antenna Parallel to Planar Phantom (Stowed Position) 1.5 cm Separation Distance from Antenna to Planar Phantom

Itronix IX260 Rugged Laptop PC

with Sierra Wireless AirCard 555 PCS/Cellular CDMA Modem Card

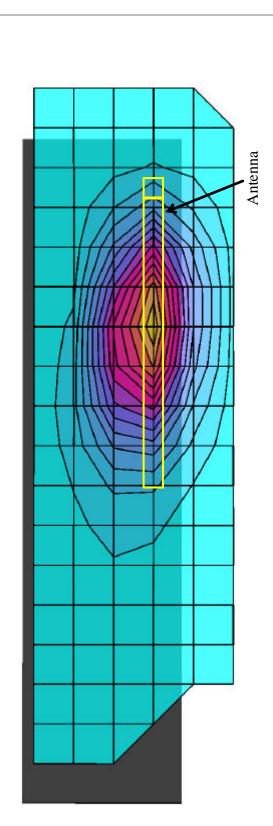
Cellular CDMA Mode

Channel 363 [835.89 MHz]

Conducted Power: 23.0 dBm

Ambient Temp: 22.2°C; Fluid Temp: 22.0°C

Date Tested: November 01, 2002



6.15E-2 4.39E-2 2.64E-2 8.79E-3

9.66E-2 7.91E-2

1.14E-1

 SAR_{Tot} [mW/g]

11/01/02

Itronix Corporation FCC ID: KBCIX260AC555

SAM Phantom; Flat Section; Position: (0°,0°)

Probe: ET3DV6 - SN1387; ConvF(6.30,6.30,6.30); Crest factor: 1.0 835 MHz Muscle: $\sigma=0.96$ mho/m $\epsilon_{r}=53.3~\rho=1.00~g/cm^{3}$

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Cube 5x5x7; Powerdrift: -0.16 dB

SAR (1g): 0.275 mW/g, SAR (10g): 0.180 mW/g

Body SAR - Right Side of LCD Display (Closed) - Antenna Parallel to Planar Phantom (Extended Position) 1.5 cm Separation Distance from Antenna to Planar Phantom Itronix IX260 Rugged Laptop PC

with Sierra Wireless AirCard 555 PCS/Cellular CDMA Modem Card

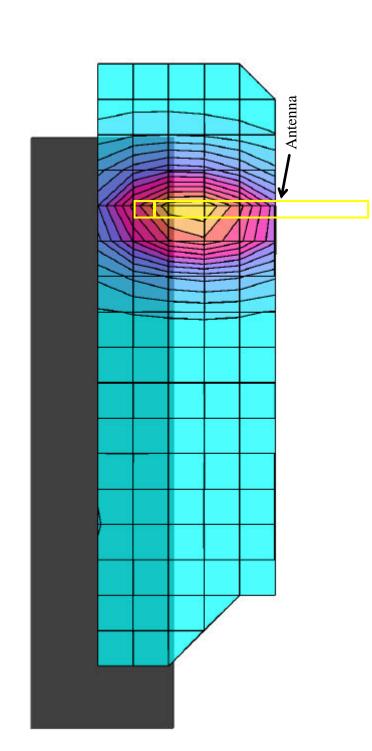
Cellular CDMA Mode

Channel 363 [835.89 MHz]

Conducted Power: 23.0 dBm

Ambient Temp: 22.2°C; Fluid Temp: 22.0°C

Date Tested: November 01, 2002



9.93E-2 5.96E-2 1.99E-2

1.39E-1

 $SAR_{Tot}\ [mW/g]$

2.58E-1

2.18E-1 1.79E-1





APPENDIX B - SYSTEM CHECK DATA

System Performance Check - 1800MHz Dipole

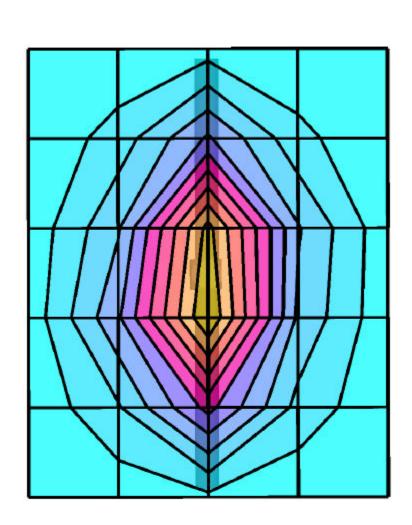
SAM Phantom; Flat Section

Probe: ET3DV6 - SN1387; ConvF(5.40,5.40); Crest factor: 1.0; 1800 MHz Brain: $\sigma = 1.35$ mho/m $\epsilon_r = 40.9$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 18.2 mW/g, SAR (1g): 9.61 mW/g, SAR (10g): 5.00 mW/g, (Worst-case extrapolation) Penetration depth: 8.3 (7.7, 9.5) [mm]; Powerdrift: 0.04 dB

Ambient Temp: 22.2°C; Fluid Temp: 21.4°C

Forward Conducted Power: 250 mW Date Tested: October 31, 2002



 $SAR_{Tot}\ [mW/g]$

9.09E+0

1.01E+1

8.08E+0

7.07E+0

6.06E+0

5.05E+0

4.04E+0

3.03E+0

2.02E+0

1.01E+0

System Performance Check - 900MHz Dipole

SAM Phantom; Flat Section

Probe: ET3DV6 - SN1387; ConvF(6.60,6.60,6.60); Crest factor: 1.0; 900 MHz Brain: $\sigma = 0.96$ mho/m $\epsilon_r = 40.1$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 4.32 mW/g, SAR (1g): 2.64 mW/g, SAR (10g): 1.65 mW/g, (Worst-case extrapolation) Penetration depth: 11.0 (10.1, 12.6) [mm]; Powerdrift: -0.01 dB

Ambient Temp: 22.2°C; Fluid Temp: 22.0°C

Forward Conducted Power: 250 mW Date Tested: November 01, 2002

 $SAR_{Tot}\ [mW/g]$

2.49E+0

2.21E+0

2.77E+0

1.94E+0

1.66E+0 1.38E+01.11E+08.30E-1 5.53E-1 2.77E-1





APPENDIX C - SYSTEM VALIDATION

Schmid & Partner Engineering AG

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

Calibration Certificate

1800 MHz System Validation Dipole

Type:	D1800V2
Serial Number:	247
Place of Calibration:	Zurich
Date of Calibration:	June 20, 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: D1800V2

Serial: 247

Manufactured: August 25, 1999

Calibrated:

June 20, 2001

1. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom filled with head simulating glycol solution of the following electrical parameters at 1800 MHz:

Relative Dielectricity 40.0 $\pm 5\%$ Conductivity 1.36 mho/m $\pm 5\%$

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.57 at 1800 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 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 15mm 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 $250 \text{mW} \pm 3 \%$. The results are normalized to 1 W 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 cm³ (1 g) of tissue: 38.64 mW/g

averaged over 10 cm³ (10 g) of tissue: 20.08 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:

1.208 ns (one direction)

Transmission factor:

0.995

(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 1800 MHz:

 $Re{Z} = 52.4 \Omega$

 $Im \{Z\} = 0.7 \Omega$

Return Loss at 1800 MHz

-32.1 dB

4. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom filled with brain sugar-water solution of the following electrical parameters at 1800 MHz:

Relative Dielectricity

40.1

± 5%

Conductivity

1.71 mho/m $\pm 5\%$

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.63 at 1800 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 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 15mm 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 $250 \text{mW} \pm 3 \%$. The results are normalized to 1 W 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 cm³ (1 g) of tissue:

43.6 mW/g

averaged over 10 cm³ (10 g) of tissue:

21.6 mW/g

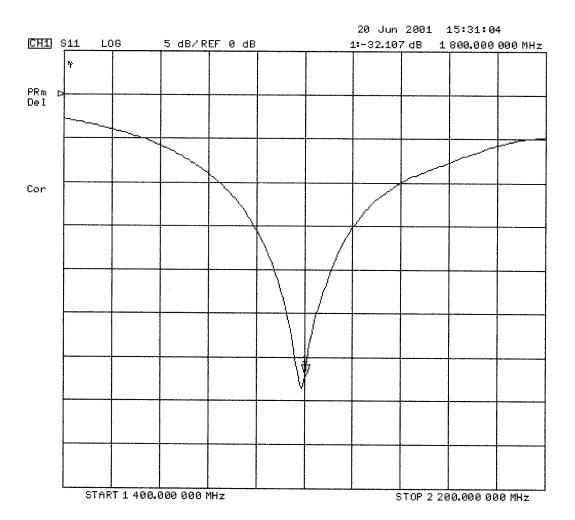
Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well. The estimated sensitivities of SAR-values and penetration depths to the liquid parameters are listed in the DASY Application Note 4: 'SAR Sensitivities'.

6. Handling

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.

Do not apply excessive force to the dipole arms, because they might bend. If the dipole arms have to be bent back, take care to release stress to the soldered connections near the feedpoint; they might come off.

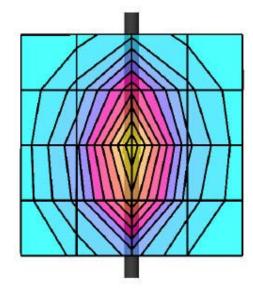
After prolonged use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.



Validation Dipole D1800V2 SN:247, d = 10 mm

Frequency: 1800 MHz; Antenna Input Power: 250 [mW]

Generic Twin Phantom; Flat Section; Grid Spacing: Dx = 15.0, Dy = 15.0, Dz = 10.0Probe: ET3DV6 - SN1507; ConvF(5.57,5.57); Crest factor: 1.0; IEEE1528 1800 MHz: $\sigma = 1.36$ mho/m $\epsilon_r = 40.0$ $\rho = 1.00$ g/cm³ Cubes (2): Peak: 18.2 mW/g ± 0.04 dB, SAR (1g): 9.66 mW/g ± 0.03 dB, SAR (10g): 5.02 mW/g ± 0.03 dB, (Worst-case extrapolation) Penetration depth: 8.2 (7.6, 9.4) [mm]



5.00E+0

4.00E+0

3.00E+0

7.00E+0

6.00E+0

8.00E+0

9.00E+0

1.00E+1

2.00E+0

1.00E+0

 $SAR_{Tot}\ [mW/g]$

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:	054
Place of Calibration:	Zurich
Date of Calibration:	June 20, 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.

planie Kaja

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: D900V2

Serial: 054

Manufactured:

August 25, 1999

Calibrated: June 20, 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 900 MHz:

Relative Dielectricity 42.4 $\pm 5\%$ Conductivity 0.97 mho/m $\pm 5\%$

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 15mm 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 $250 \text{mW} \pm 3 \%$. 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 cm³ (1 g) of tissue: 11.12 mW/g

averaged over 10 cm³ (10 g) of tissue: 7.04 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: 1.413 ns (one direction)

Transmission factor: 0.989 (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: $Re\{Z\} = 51.3 \Omega$

Im $\{Z\} = -0.5 \Omega$

Return Loss at 900 MHz -36.9 dB

4. Measurement Conditions

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

Relative Dielectricity 41.0 $\pm 5\%$ Conductivity 0.86 mho/m $\pm 5\%$

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.22 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 15mm 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 $250 \text{mW} \pm 3 \%$. 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 cm³ (1 g) of tissue: 10.12 mW/g

averaged over 10 cm³ (10 g) of tissue: 6.52 mW/g

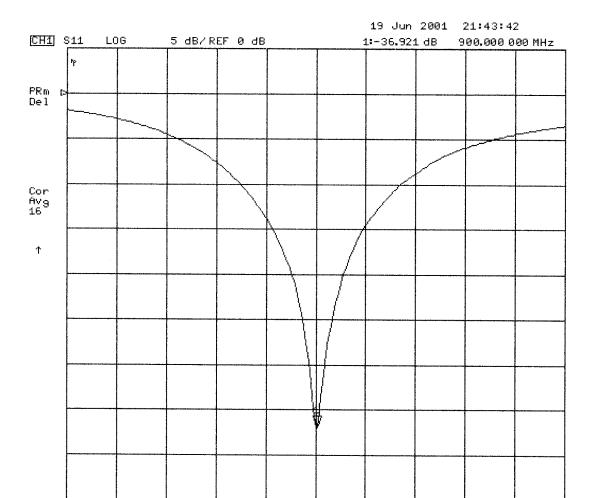
Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well.

6. Handling

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.

Do not apply excessive force to the dipole arms, because they might bend. If the dipole arms have to be bent back, take care to release stress to the soldered connections near the feedpoint; they might come off.

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



STOP 1 100.000 000 MHz

START 700.000 000 MHz

Validation Dipole D900V2 SN:054, d = 15 mm

Frequency: 900 MHz; Antenna Input Power: 250 [mW]

Generic Twin Phantom; Flat Section; Grid Spacing:Dx = 15.0, Dy = 15.0, Dz = 10.0Probe: ET3DV6 - SN1507; ConvF(6.27,6.27); Crest factor: 1.0; IEEE1528 900 MHz: $\sigma = 0.97$ mho/m $\epsilon_r = 42.4$ $\rho = 1.00$ g/cm³ Cubes (2): Peak: 4.47 mW/g \pm 0.05 dB, SAR (1g): 2.78 mW/g \pm 0.04 dB, SAR (10g): 1.76 mW/g \pm 0.02 dB, (Worst-case extrapolation) Penetration depth: 11.5 (10.3, 13.2) [mm]

Powerdrift: -0.00 dB



2.25E+0 2.50E+0

 $SAR_{Tot}\ [mW/g]$

2.00E+0

1.75E+0

1.50E+0

1.25E+0

1.00E+0

7.50E-1

5.00E-1

2.50E-1

Schmid & Partner Engineering AG, Zurich, Switzerland





APPENDIX D - PROBE CALIBRATION

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:	1387
Place of Calibration:	Zurich
Date of Calibration:	February 22, 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:

Approved by:

Probe ET3DV6

SN:1387

Manufactured: September 21, 1999
Last calibration: September 22, 1999
Recalibrated: February 22, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1387

Sensitivity in Free Space

Diode Compression

NormX	1.58 μV/(V/m) ²	DCP X	97	mV
NormY	1.67 μV/(V/m) ²	DCP Y	97	mV
NormZ	1.67 μV/(V/m) ²	DCP Z	97	mV

Sensitivity in Tissue Simulating Liquid

Head Head	900 MHz 835 MHz		$\varepsilon_r = 41.5 \pm 5\%$ $\varepsilon_r = 41.5 \pm 5\%$	0.97 ± 5% m 0.90 ± 5% m	
	ConvF X	6.6	± 9.5% (k=2)	Boundary eff	ect:
	ConvF Y	6.6	± 9.5% (k=2)	Alpha	0.40
	ConvF Z	6.6	± 9.5% (k=2)	Depth	2.38
Head Head	1800 MHz 1900 MHz		$\varepsilon_r = 40.0 \pm 5\%$ $\varepsilon_r = 40.0 \pm 5\%$	1.40 ± 5% m 1.40 ± 5% m	
	ConvF X	5.4	± 9.5% (k=2)	Boundary eff	ect:
	ConvF Y	5.4	± 9.5% (k=2)	Alpha	0.57

Boundary Effect

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

Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%]	Without Correction Algorithm	9.7	5.4
SAR _{be} [%]	With Correction Algorithm	0.3	0.6

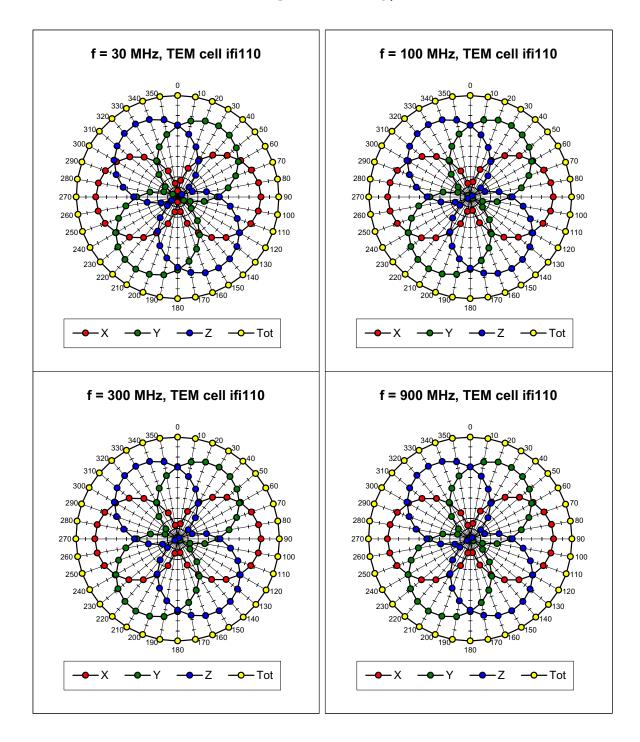
Head 1800 MHz Typical SAR gradient: 10 % per mm

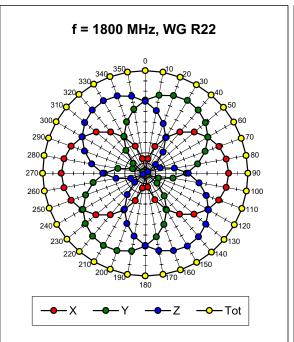
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%]	Without Correction Algorithm	11.5	7.3
SAR _{be} [%]	With Correction Algorithm	0.1	0.3

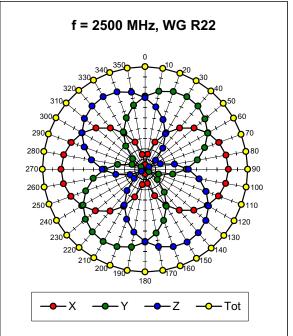
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.3 ± 0.2	mm

Receiving Pattern (ϕ), θ = 0°







Isotropy Error (ϕ), $\theta = 0^{\circ}$

