



SUPPLEMENTARY TEST REPORT FROM RADIO FREQUENCY INVESTIGATION LTD.

Test of: Sendo Ltd.
Z100 Tri-Band Mobile Phone

To: OET Bulletin 65 Supplement C (2001-01)

Supplementary Test Report Serial No:
RFI/SARB1/SUP43987JD05A

This Supplementary Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director: 	Checked By: 
Tested By: 	Release Version No: PDF01
Issue Date: 26 March 2003	Test Dates: 19 March 2003

Note: This supplementary test report is issued as an addendum to RFI Test Report Serial No: RFI/SARB2/RP43987JD02C. It has been issued to include additional measurements requested by the FCC.

It should be noted that the standard, OET Bulletin 65 Supplement C: (2001-01) is not listed on RFIs current UKAS schedule and is therefore "not UKAS accredited".

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The results in this Supplementary Test Report apply only to the sample(s) tested.

RADIO FREQUENCY INVESTIGATION LTD.

Operations Department

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Z100 Tri-Band Mobile Phone

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TEST REPORT

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Test Of: Sendo Ltd.**Z100 Tri-Band Mobile Phone****To: OET Bulletin 65 Supplement C (2001-01)**

1. Client Information**1.1. Client Details**

Company Name:	Sendo Ltd.
Address:	Hatchford Brook Hatchford Way Sheldon Birmingham B26 3QA
Contact Name:	Mr M Roper

1.2. Test Laboratory

Company Name:	Radio Frequency Investigation Ltd.
Address:	Ewhurst Park Ramsdell Basingstoke Hampshire RG26 5RQ.
Contact Name:	Mr G Taylor

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2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification Of Equipment Under Test (EUT)

Brand Name	Sendo
Model Name or Number	Z100
FCC ID.	P6PSND100
Unique Type Identification	SND 100
IMEI Number	00 44 000 420 504 8200
Battery Serial Number	8D48-07180-00000 040921
Country Of Manufacture	UK
Date Of Receipt	19 March 2003

2.2. Modifications Incorporated In EUT

The client stated that the EUT has not been modified from what is described by the Model Name and Unique Type Identification stated above.

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2.3. Additional Information Related to the EUT

Equipment Class:	Handheld Mobile Telephone
FCC Rule Part(s):	OET Bulletin 65 Supplement C
Application Type:	Certification
Transmitter Frequency Range (MHz):	1850 - 1910
Receiver Frequency Range (MHz):	1930 - 1990
Transmit Frequency Allocation Of EUT When Under Test (Channels):	Bottom Channel – 512 Centre Channel – 660 Top Channel - 810
Modulation(s):	GSM 1900
Modulation Scheme (Crest Factor)	GSM (Crest Factor 8)
Maximum RF Output Power:	1900 MHz – 28.97 dBm
Battery Type(s):	Lithium Ion
Antenna Length and Type:	Fixed Integral (Internal)
Number Of Antenna Positions:	1 (Fixed Antenna)
Intended Operating Environment:	Mobile
Weight:	Approx. 115 g
Dimensions (without Antenna) mm:	Approx. 120 x 50 x 20 mm
Power Supply Requirement:	
DC Supply (Volts/Amps)	Not applicable
AC Supply (Volts/Amps)	Not applicable
Internal Battery (Volts/Amps)	3.7 V
Port(s):	Enclosure Accessory Connector

2.4. Support Equipment

Description:	Wavetek
Model Name or Number:	4201S
Unique Type Identification:	Not applicable
Serial Number:	0313605
Cable Length And Type:	N/A (Air Link)
Connected to Port:	Antenna

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3. Test Results For Specific Absorption Rate - 1900 MHz

3.1. Specific Absorption Rate - 1900 MHz Band

Environmental Conditions:

Temperature Variation in Lab (°C):	21.5 to 22.0
Temperature Variation in Liquid (°C):	20.3 to 20.4

Results:

Position	Side of Head	Frequency Channel No	Distance from antenna to phantom (mm)	SAR Level (W/kg) 1g	SAR Limit (W/kg) 1g	Margin (W/kg) 1g	Result
Cheek	Left	660	10	0.366	1.6	1.234	Complied
Tilted	Left	660	8	0.452	1.6	1.148	Complied
Cheek	Right	660	10	0.400	1.6	1.200	Complied
Tilted	Right	660	8	0.507	1.6	1.093	Complied
Tilted	Right	512	8	0.426	1.6	1.174	Complied
Tilted	Right	810	8	0.633	1.6	0.967	Complied

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4. Validation results – 1900 MHz HEAD

4.1. System Validation

4.1.1. Validation of the system test configuration was carried out prior to testing.

Validation Dipole Type and Serial No.	Calibrated Value of SAR in 1g volume (W/kg) at 1900 MHz	Measured Value of SAR in 1g volume (W/kg) at 1900 MHz	Percentage Difference (<6%)
D1900V2/540	42.4	41.6	Yes

4.2. Liquid Properties - Brain

4.2.1. Properties of the tissue simulating liquid were measured prior to testing.

Property	Target Value (1900 MHz)	Measured/Calculated Value (1900 MHz)	Percentage Difference ($\leq 5.0\%$)
Relative Permittivity	40.0	38.57	Yes
Conductivity	1.4	1.47	Yes

4.3. Temperature Variation

4.3.1. The temperature of the laboratory and within the tissue simulating liquid for this test shall not exceed the range +15°C to +25°C.

4.3.2. The actual temperature measured at the beginning and end of each test was recorded and the maximum range is shown below:

Measurement	Maximum Temperature	Minimum Temperature
Laboratory	22.0	21.5
Tissue Simulating Liquid	20.4	20.3

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Appendix 1. Conducted Power Measurement

Conducted Output Power.

Before and after testing, the EUT was mounted in a test jig. The conducted output power was then measured.

The conducted power output of the EUT is as follow: -

Frequency Channel	Tx Power Before test	Tx Power After test
660	28.25	28.24
512	28.48	28.45
810	28.97	28.97

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Appendix 2. Test Equipment Used

Instrument	Manufacturer	Model Number	RFI No.
Dielectric Probe Kit	Agilent Technologies	85070C	A1174
Probe	Schmid & Partners	ET3 DV6	A1186
Low noise Amplifier	Mini Circuits	ZHL-42	A1225
1900MHz Validation Dipole	Schmid & Partners	D1900V2	A1237
SAM Phantom	Schmid & Partners	001	A1238
20 dB Attenuator	Narda	766-20	A215
Cable	RFI	None	C055
Cable	Utiflex	FA210A0030M3030	C1052
Cable	Utiflex	FA210A0003M3030	C1053
Cable	Utiflex	FA210A0001M3050A	C1054
Signal Generator	Gigatronics	7100/.01-20	G046
Robot Power Supply	Schmid & Partner	Dasy3	G0528
PSU	Thurlby Thandar	CPX200	G088
Wavetek	Willtek	4201S	L0672
RF Power Meter	Rohde & Schwarz	URY	M037
URY Power Meter	Rohde & Schwarz	URY	M094
Network Analyser	Agilent Technologies	8753ES	M1015
Robot Arm	Staubli	RX908 L	M1047
Diode Power Sensor	Rohde & Schwarz	NRV-Z2	M1069
Will tek	Will tek	4202S	M1093
Baro/Hygro/Thermo meter	Oregon Scientific	BA888	M292
Thermometer	Testo	110	M509
Site	RFI	N/A	S256

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

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Appendix 3. SAR Distribution Scans

This appendix contains the SAR Distribution Scans.

These scans are not included in the total number of pages for this report.

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Dipole 1900 MHz

Validation

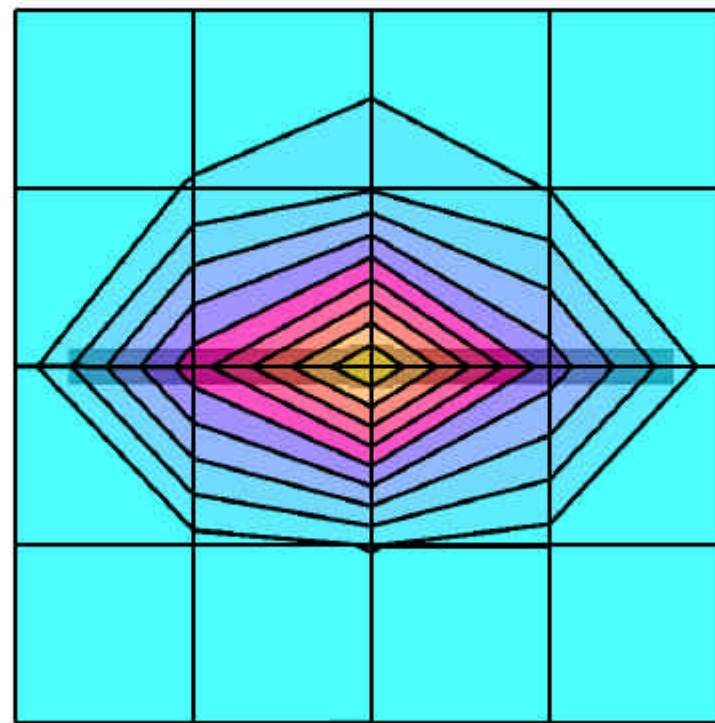
SAM Phantom; Flat

Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

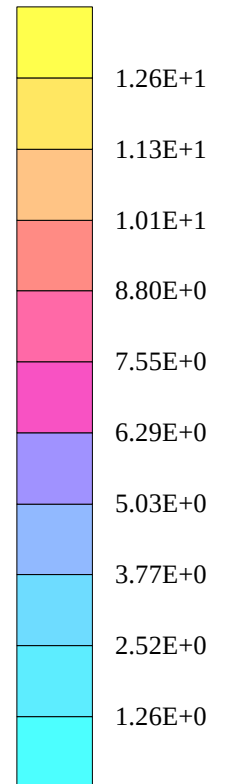
Crest factor: 1.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

03/19/03



SAR_{Tot} [mW/g]



Dipole 1900 MHz

Validation

SAM Phantom; Flat

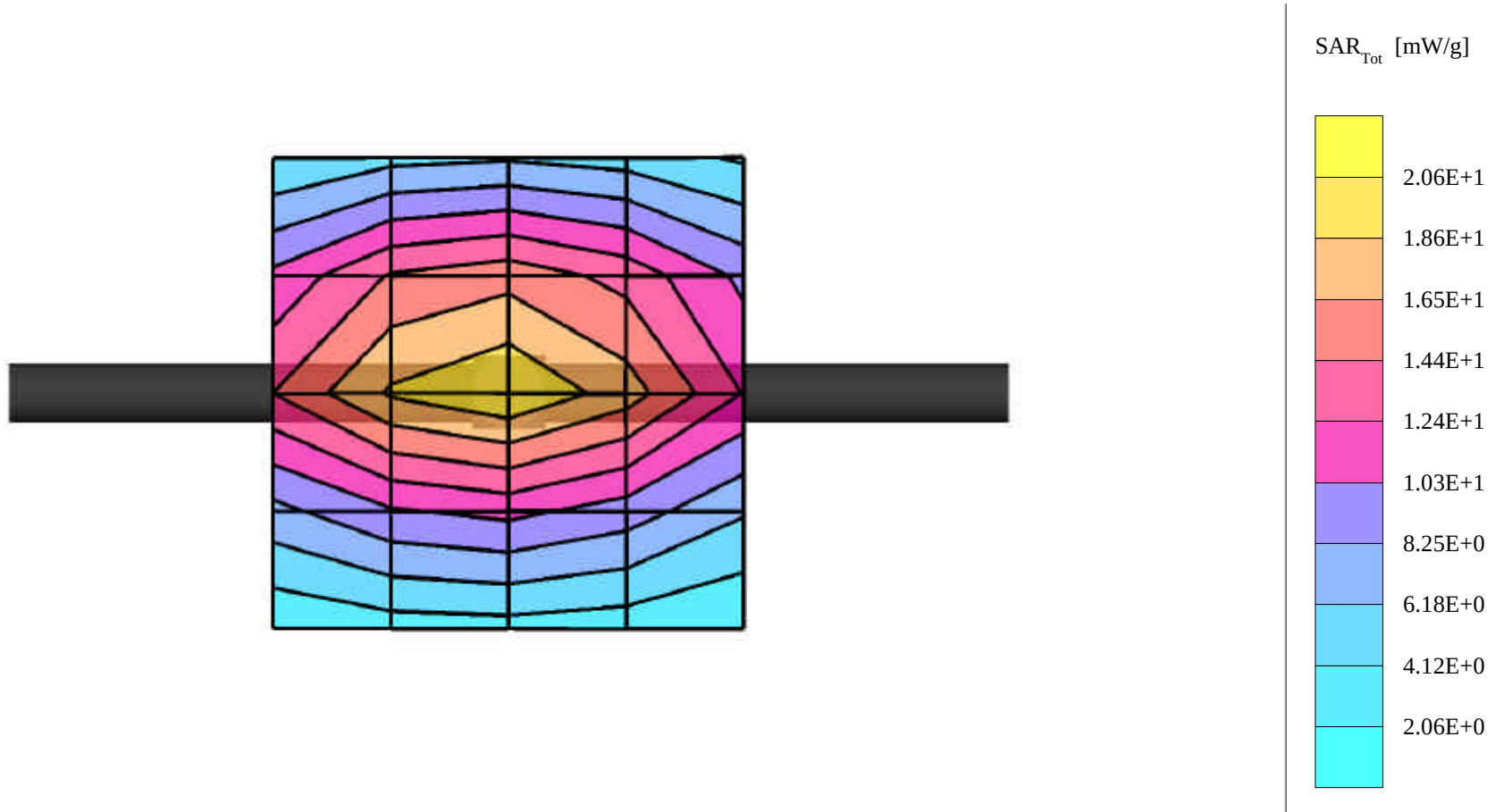
Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

Crest factor: 1.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

Peak: 20.8 mW/g ± 0.01 dB, SAR (1g): 10.4 mW/g ± 0.03 dB

Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

03/19/03



Z100

Cheek Left Centre Channel (660)

SAM Phantom; Left Hand

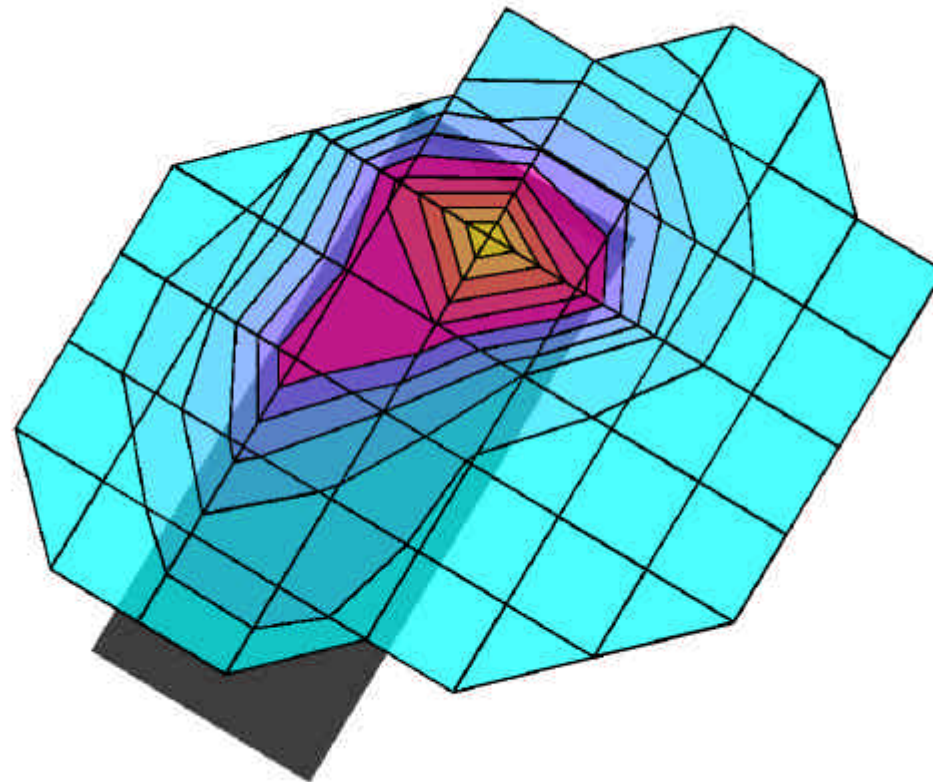
Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

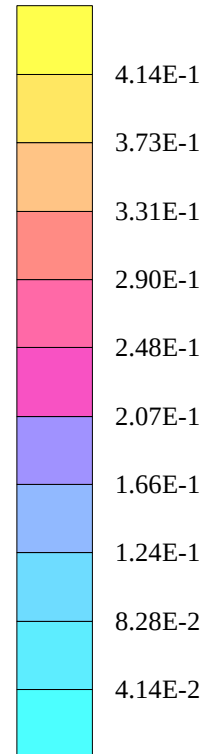
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 0.69%

03/19/03



SAR_{Tot} [mW/g]



Z100

Cheek Left Centre Channel (660)

SAM Phantom; Left Hand

Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

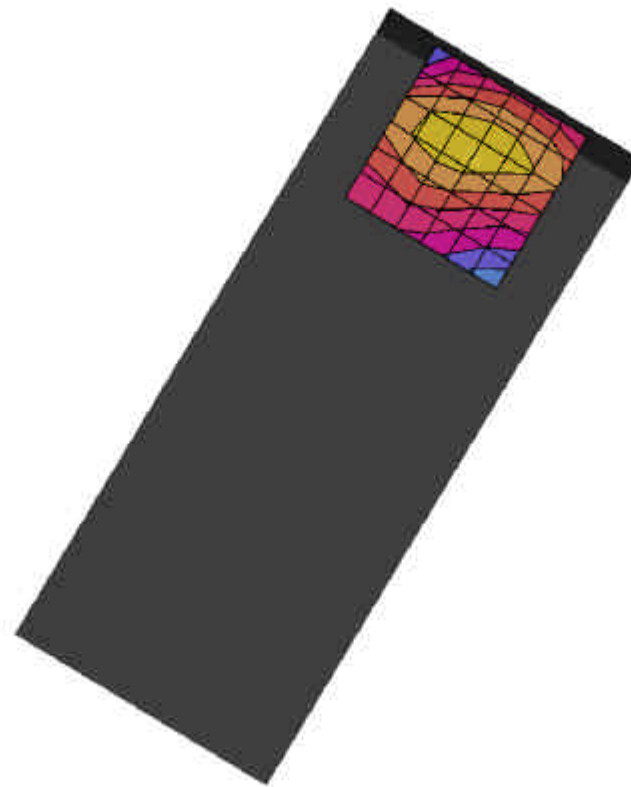
Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

Peak: 0.647 mW/g, SAR (1g): 0.366 mW/g

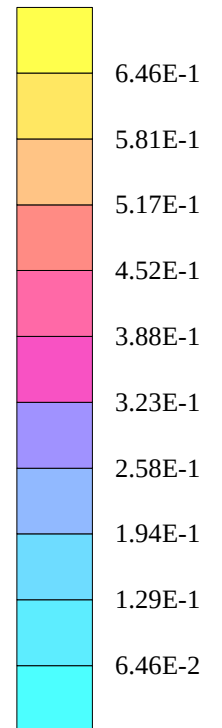
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 0.69%

03/19/03



SAR_{Tot} [mW/g]



Z100

Tilted Left Centre Channel (660)

SAM Phantom; Left Hand

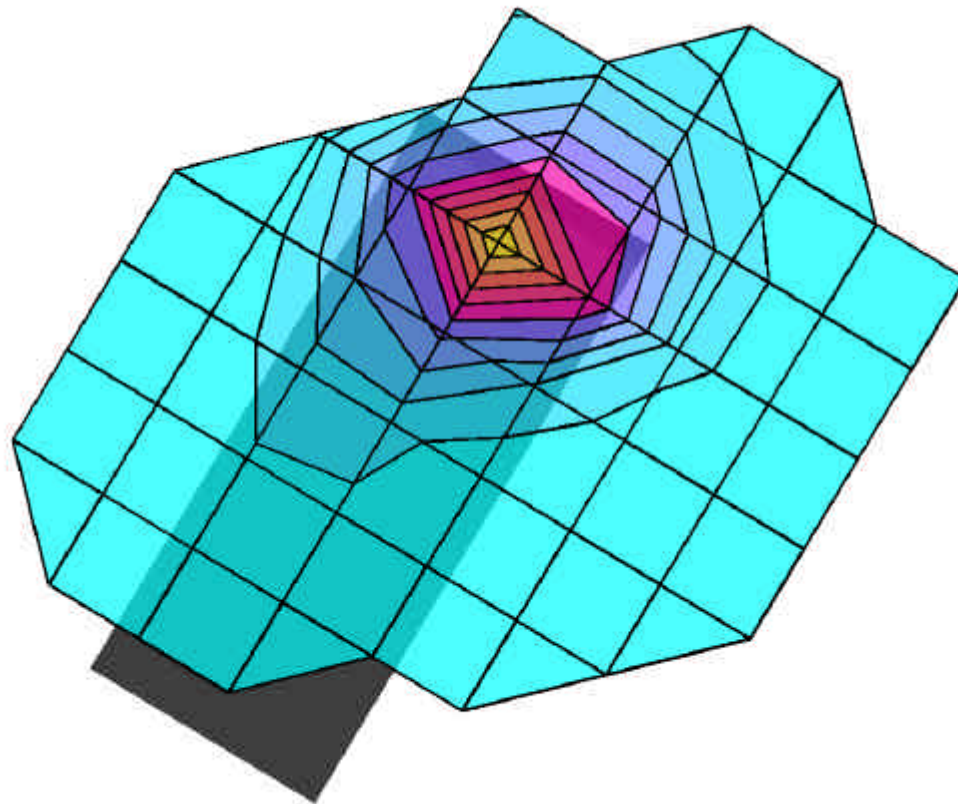
Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

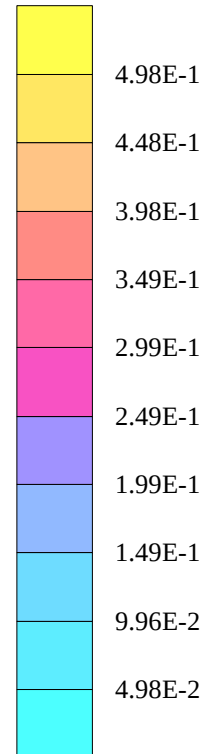
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 0.28%

03/19/03



SAR_{Tot} [mW/g]



Z100

Tilted Left Centre Channel (660)

SAM Phantom; Left Hand

Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

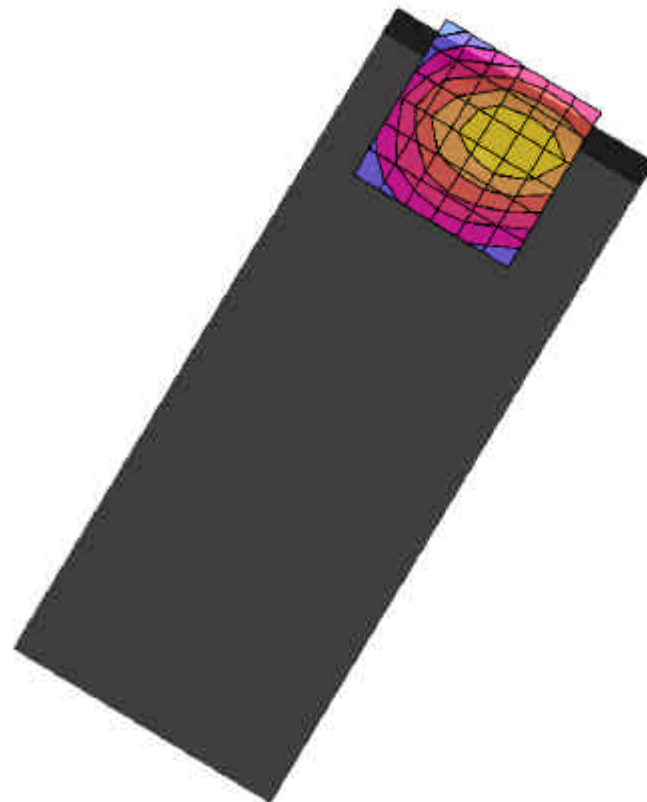
Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

Peak: 0.803 mW/g, SAR (1g): 0.452 mW/g

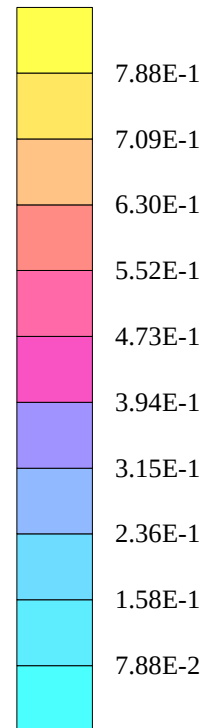
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 0.28%

03/19/03



SAR_{Tot} [mW/g]



Z100

Cheek Right Centre Channel (660)

SAM Phantom; Righ Hand

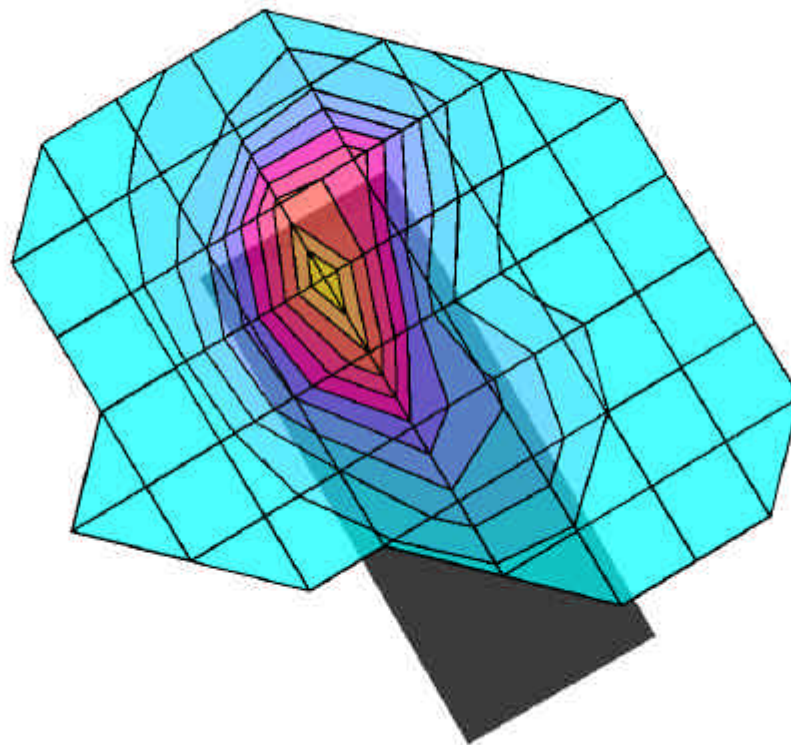
Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

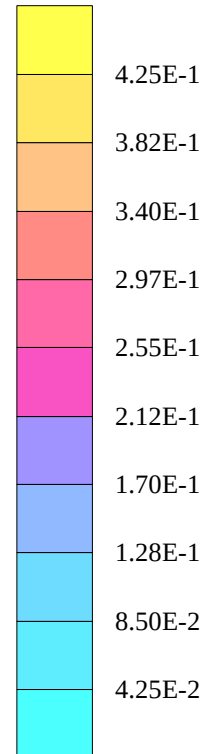
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 4.58%

03/19/03



SAR_{Tot} [mW/g]



Z100

Cheek Right Centre Channel (660)

SAM Phantom; Righ Hand

Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

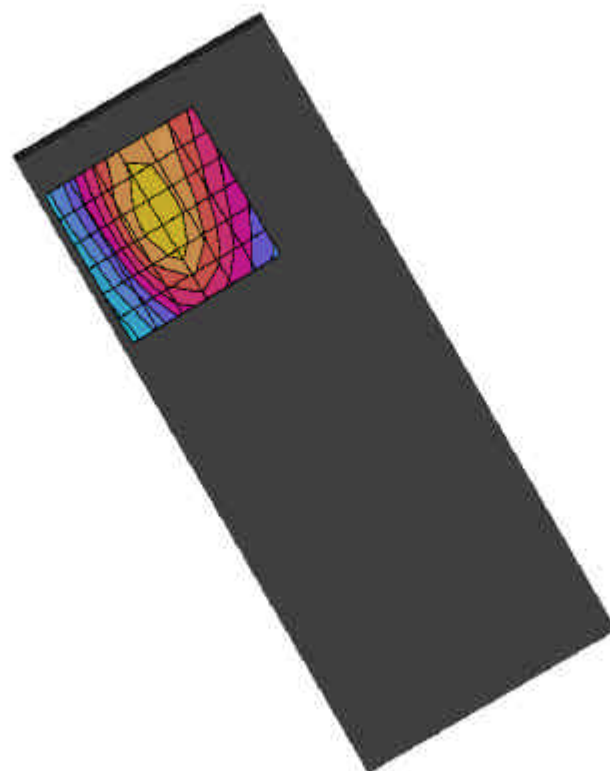
Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

Peak: 0.753 mW/g, SAR (1g): 0.400 mW/g

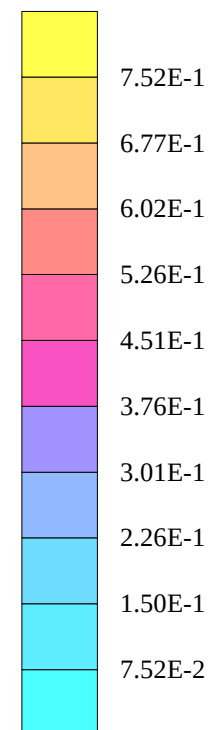
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 4.58%

03/19/03



SAR_{Tot} [mW/g]



Z100

Tilted Right Centre Channel (660)

SAM Phantom; Righ Hand

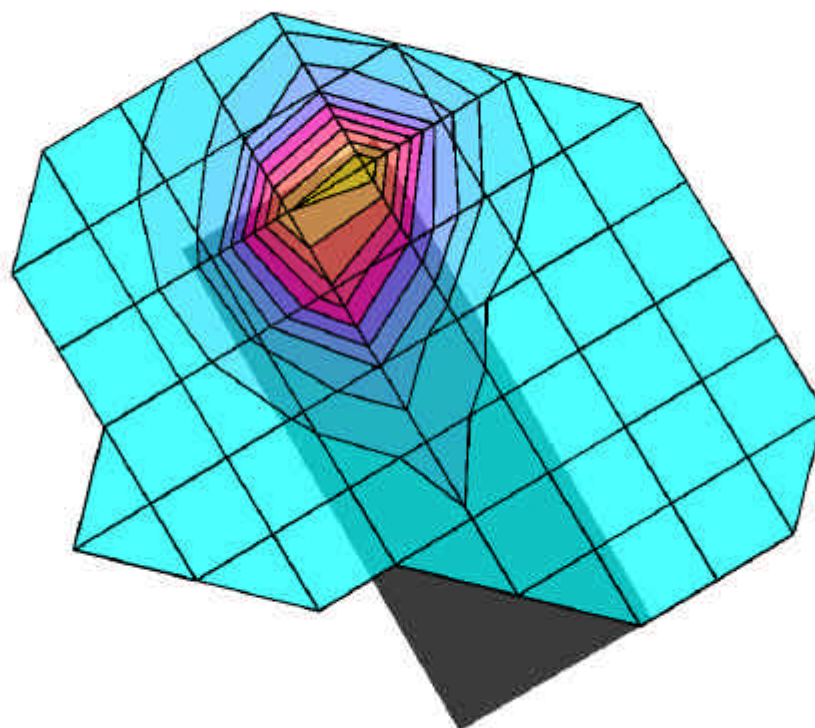
Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

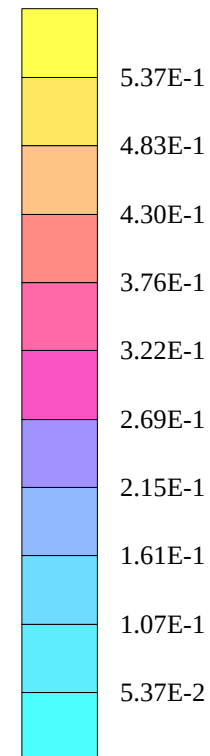
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 5.00%

03/19/03



SAR_{Tot} [mW/g]



Z100

Tilted Right Centre Channel (660)

SAM Phantom; Righ Hand

Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

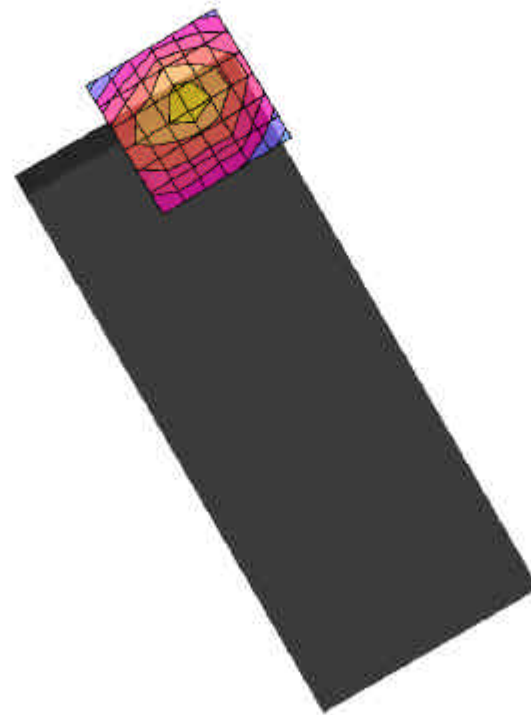
Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

Peak: 0.981 mW/g, SAR (1g): 0.507 mW/g

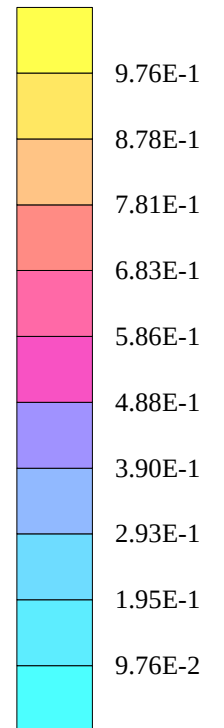
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 5.00%

03/19/03



SAR_{Tot} [mW/g]



Z100

Tilted Right Bottom Channel (512)

SAM Phantom; Righ Hand

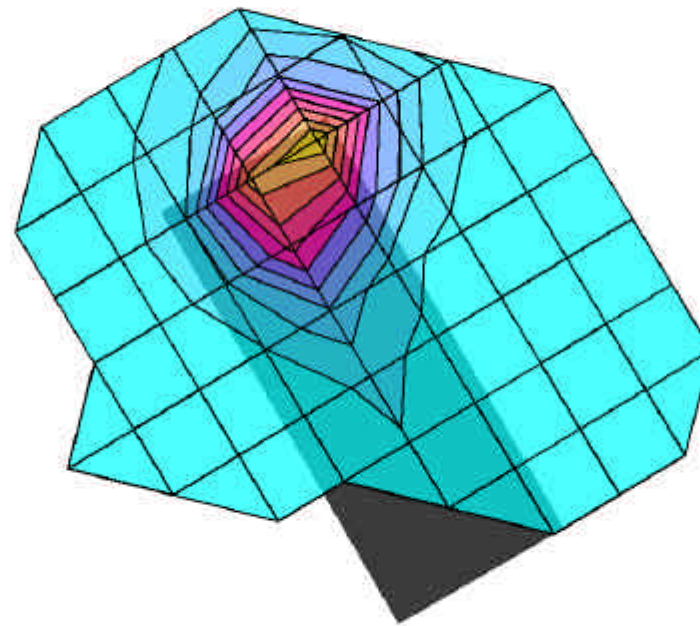
Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

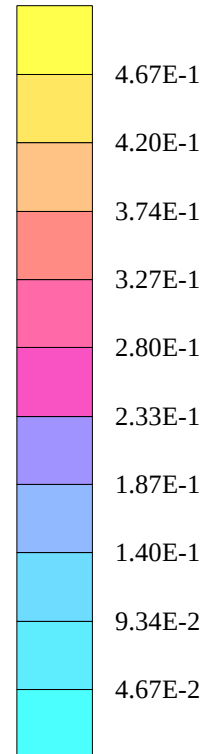
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 4.83%

03/19/03



SAR_{Tot} [mW/g]



Z100

Tilted Right Bottom Channel (512)

SAM Phantom; Righ Hand

Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

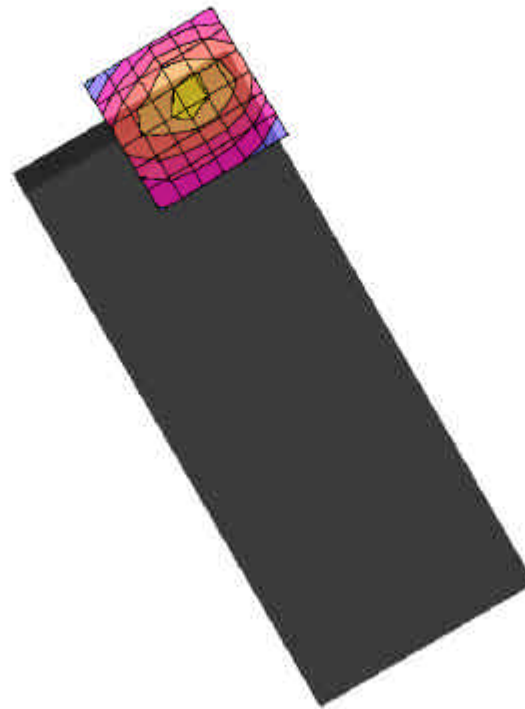
Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

Peak: 0.816 mW/g, SAR (1g): 0.426 mW/g

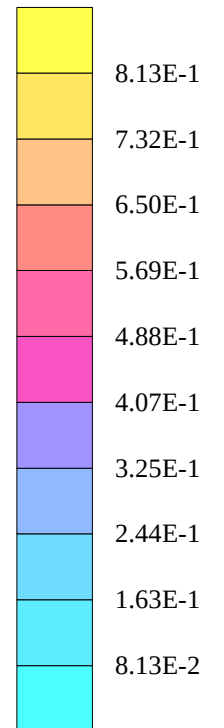
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 4.83%

03/19/03



SAR_{Tot} [mW/g]



Z100

Tilted Right Top Channel (810)

SAM Phantom; Righ Hand

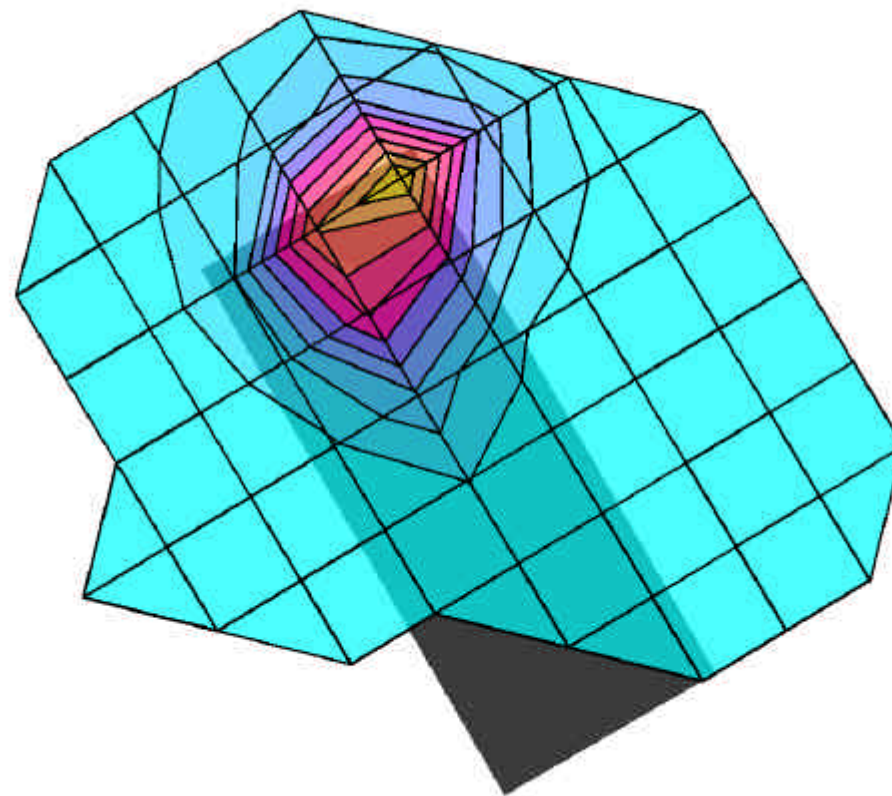
Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

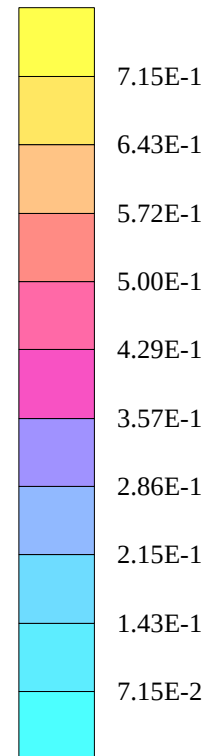
Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 3.04%

03/19/03



SAR_{Tot} [mW/g]



Z100

Tilted Right Top Channel (810)

SAM Phantom; Righ Hand

Probe: ET3DV6 - SN1529; ConvF(5.20,5.20,5.20);

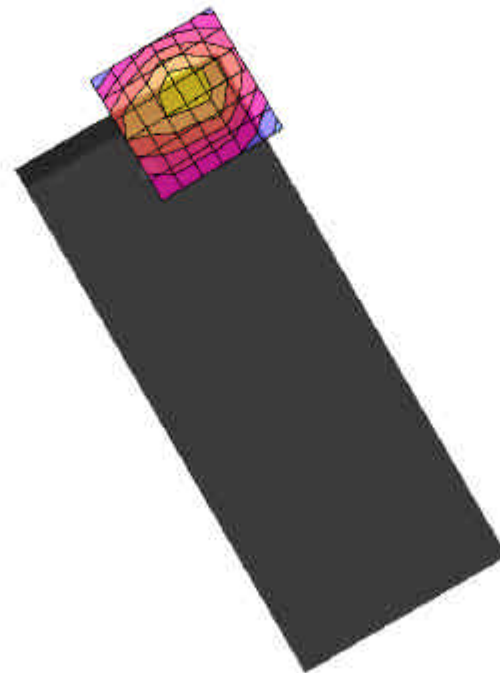
Crest factor: 8.0; Brain 1900MHz: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

Peak: 1.21 mW/g,SAR (1g): 0.633 mW/g

Lab Temperature 22.0 deg C, Fluid Temperature 20.4 deg C

SAR Drift 3.04%

03/19/03



SAR_{Tot} [mW/g]

