Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas 919-472-6334		EUS/VR-00:1487/REP	
Approved	Checked	Date	Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14	A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

SAR Test Report: R288

Date of test: June 28, 2000 and July 6, 11 and 12, 2000

Laboratory:
Electromagnetic Near Field and Radio Frequency Dosimetry Laboratory
Ericsson, Inc.
7001 Development Drive, P.O. Box 13969,
Research Triangle Park, NC, 27709, USA

Test Responsible:
Mark Douglas, Ph.D.
Senior Staff Engineer, Antenna Development Group
mark.douglas@ericsson.com
(919) 472-6334

Statement of Compliance
Ericsson, Inc. declares under its sole responsibility that the that the product

Ericsson R288

to which this declaration relates, is in conformity with the appropriate RF exposure standards, recommendations and guidelines. It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

The results and statements contained herein relate only to the items tested. The names of individuals involved may be mentioned only in connection with the statements or results from this report.

Ericsson encourages all feedback, both positive and negative, on this test report.

Prepared (also subject responsible if other)		No.		
RT/EUS/VR/X Mark Douglas 919-472-6334		EUS/VR-00:1487/REP		
Approved	Checked	Date	Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14	A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

Table of Contents

Prepared (also subject responsible if other)
RT/EUS/VR/X Mark Douglas 919-472-6334
No.
EUS/VR-00:1487/REP
Approved
EUS/VR/X Mark Douglas
Checked
MGD
Date
2000-07-14
Rev
A
File
U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc
EN

1. Introduction

In this test report, compliance of the Ericsson R288 portable telephone with RF safety guidelines is demonstrated (applicable RF safety guidelines are given in [1]). The device was tested in accordance with the latest available test guidelines [1]. Detailed procedures of the test are described in the *Ericsson SAR Measurement Specification* [2].

2. Device Under Test

2.1 Antenna description

Type	Fixed stub	
Location	Left side	
Dimensions	length	30 mm
	width at base	10 mm
Configuration	Helix	

2.2 Device description

Device model	R288		
Serial number	UA2019ZMD4		
Mode	800 AMPS	800 TDMA	1900 TDMA
Multiple Access Scheme	FDMA	TDMA	TDMA
Maximum Output Power Setting [1]	26.0 dBm	26.0 dBm	26.0 dBm
Factory Tolerance in Power Setting	± 0.25	± 0.25	± 0.25
Maximum Peak Output Power [2]	26.25 dBm	26.25 dBm	26.25 dBm
Duty Cycle	1	1 / 3	1 / 3
Transmitting Frequency Range	824 – 849 MHz	824 – 849 MHz	1850 – 1910 MHz
Prototype or Production Unit	Prototype		

3. Test equipment

3.1 Dosimetric system

SAR measurements were made using the DASY3 professional system (software version 3.1c), manufactured by Schmid & Partner Engineering AG and installed Febuary, 1998. The total SAR assessment uncertainty (K = 1) of the system is ±16% and includes a +15% offset (overestimation). The extended uncertainty (K = 2) is ±32% with a +15% offset. This results in a total uncertainty range of –1% to +31% for K = 1, or –17% to +47% for K = 2. The equipment list is given below.

Description	**Serial Number**	**Due Date**
DASY3 DAE V1	345	4/01
E-field probe ETDV5	1324	2/01
Dipole Validation Kit, D900V2	049	12/00
Dipole Validation Kit, D1800V2	217	12/01

[1] This is the conducted power measured at the antenna port when the device is set to its highest power setting. It is measured at the middle of the transmit frequency band. Note that the output power may be different at other frequencies.
[2] This equals the maximum output power setting plus the factory tolerance.

3.2 Additional equipment

Description	Serial Number	Due Date
Signal Generator HP8648C	3537A01598	9/00
Dielectric probe kit HP 85070B	US33020256	8/00
Network analyzer HP 8752C	3410A03105	7/00
Power meter HP 437B	3125U13729	2/01
Power sensor HP 8482H	3318A07097	2/01
Anritsu MT8801B	MB12477	2/01

4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the tissue simulating liquids were measured with the dielectric probe kit. These values are shown in the table below. The mass density, ρ, entered into the DASY3 program is also given. Recommended limits for maximum permittivity, minimum conductivity and maximum mass density are also shown [3]. It is seen that the measured parameters result in an overestimation of SAR compared to the recommended values.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	ρ (g/cm^3)
835	**Head**	**Measured, 6/28/00**	40.8	0.90	1.00
		Recommended Limits [3]	46.1	0.74	1.03
	Muscle	**Measured, 7/11/00**	56.5	0.99	1.04
		Recommended Limits [3]	56.1	0.95	1.04
1800	**Head**	**Measured, 7/6/00**	41.7	1.71	1.00
		Recommended Limits[3]	43.5	1.15	1.03
	Muscle	**Measured, 7/12/00**	41.1	1.69	1.04
		Recommended Limits [3]	54.4	1.39	1.04

5. System accuracy verification

A system accuracy verification of the DASY3 was performed using the dipole validation kits listed in Section 3.1. The system verification test was conducted on the same day as the measurement of the DUT. The obtained results are displayed in the table below. It is seen that the system is operating within its specification, as the results are within ±5% of the reference values. At 1800 MHz, reference values are provided by the manufacturer [4]. At 900 MHz, reference values are based on an analysis performed at the laboratory using the dielectric parameters specified below (dielectric parameters have changed from those given in the manufacturer's reference). The distributions of SAR compare well with those of the reference measurements (see Appendix 1).

f (MHz)	Tissue type	Measured / Reference	SAR (W/kg), 1 gram	Dielectric Parameters			Temp. (°C)
				ε_r	σ (S/m)	ρ (g/cm^3)	
900	**Head**	**Measured, 6/28/00**	10.6	40.0	0.96	1.00	23
		Reference	10.2	40.0	0.95	1.00	23
900	**Muscle**	**Measured, 7/11/00**	10.6	55.9	1.05	1.04	23
		Reference	10.7	56.0	1.05	1.04	23
1800	**Head / Muscle**	**Measured, 7/6/00**	39.4	41.7	1.71	1.00	23
		Measured, 7/12/00	41.1	41.1	1.69	1.00	24
		Reference [4]	40.0	40.0	1.72	1.00	?

6. Test results

The measured 1-gram averaged SAR values of the device are provided in Tables 1 and 2. Also shown are the measured conducted output powers and the temperature of the test facility during the test. The depth of the tissue simulating liquid was 15 cm. A base station simulator was used to control the device during the SAR measurements. The phone was supplied with a fully-charged battery for the tests.

SAR measured against the head is presented in Table 1. The device was tested on the right-hand phantom (corresponding to the right side of the head) and the left-hand phantom. For 800 AMPS and 1900 TDMA modes, the device was tested at the lowest, middle and highest frequencies of the transmit band. For 800 TDMA mode, the maximum power is significantly lower than that of AMPS mode, therefore SAR values are also lower. For interest, the SAR results for 800 TDMA mode are presented for the cases that give the highest SAR in AMPS mode.

mode	**Chamber Temp. (°C)**	***f* (MHz)**	**Output Power (dBm)**	**SAR, 1g (W/kg)**			
				left-hand		**right-hand**	
				measured	**calculated to max. power**	**measured**	**calculated to max. power**
800 AMPS	23.1	824	26.00	1.09	1.13	1.29	**1.33**
		837	26.11	1.12	1.16	1.29	**1.33**
		849	25.70	1.03	1.06	1.18	1.22
800 TDMA	23.1	824	26.05	--	--	0.452	0.512
		837	25.71	--	--	0.443	0.502
1900 TDMA	23.1	1850	26.15	0.642	0.654	0.913	0.930
		1880	26.17	0.659	0.671	0.888	0.905
		1910	26.27	0.643	0.655	0.937	0.954

Table 1: SAR measurement results for the Ericsson R288 telephone at highest possible output power. Measured against the head.

For body-worn measurements, the device was tested against a flat phantom representing the user's body, using designated carry cases. In Table 2, SAR values are provided for the two carry cases that bring the phone closest to the body (product # KRY 104 1293 R1 and KRY 104 1004 R1B). SAR was first measured using both carry cases at the lowest frequency of each band (800 AMPS and 1900 TDMA only; 800 TDMA is not necessary due to the significantly lower output power). Next, SAR values were compared to see which carry case gave the highest SAR for each band. For this carry case, SAR was then measured at the middle and highest frequencies.

mode	**Chamber Temp. (°C)**	***f* (MHz)**	**Output Power (dBm)**	**SAR, 1g (W/kg)**			
				KRY 104 1293 R1		**KRY 104 1004 R1B**	
				measured	**calculated to max. power**	**measured**	**calculated to max. power**
800 AMPS	22.7	824	26.00	0.836	0.863	1.13	**1.17**
		837	26.11	--	--	0.995	1.03
		849	25.70	--	--	1.09	1.13
1900 TDMA	24.1	1850	26.15	0.707	0.720	0.596	0.607
		1880	26.17	0.713	0.726	--	--
		1910	26.27	0.614	0.625	--	--

Prepared (also subject responsible if other)		No.		
RT/EUS/VR/X Mark Douglas 919-472-6334		EUS/VR-00:1487/REP		
Approved	Checked	Date	Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14	A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

Table 2: SAR measurement results for the Ericsson R288 telephone at highest possible output power. Measured against the body.

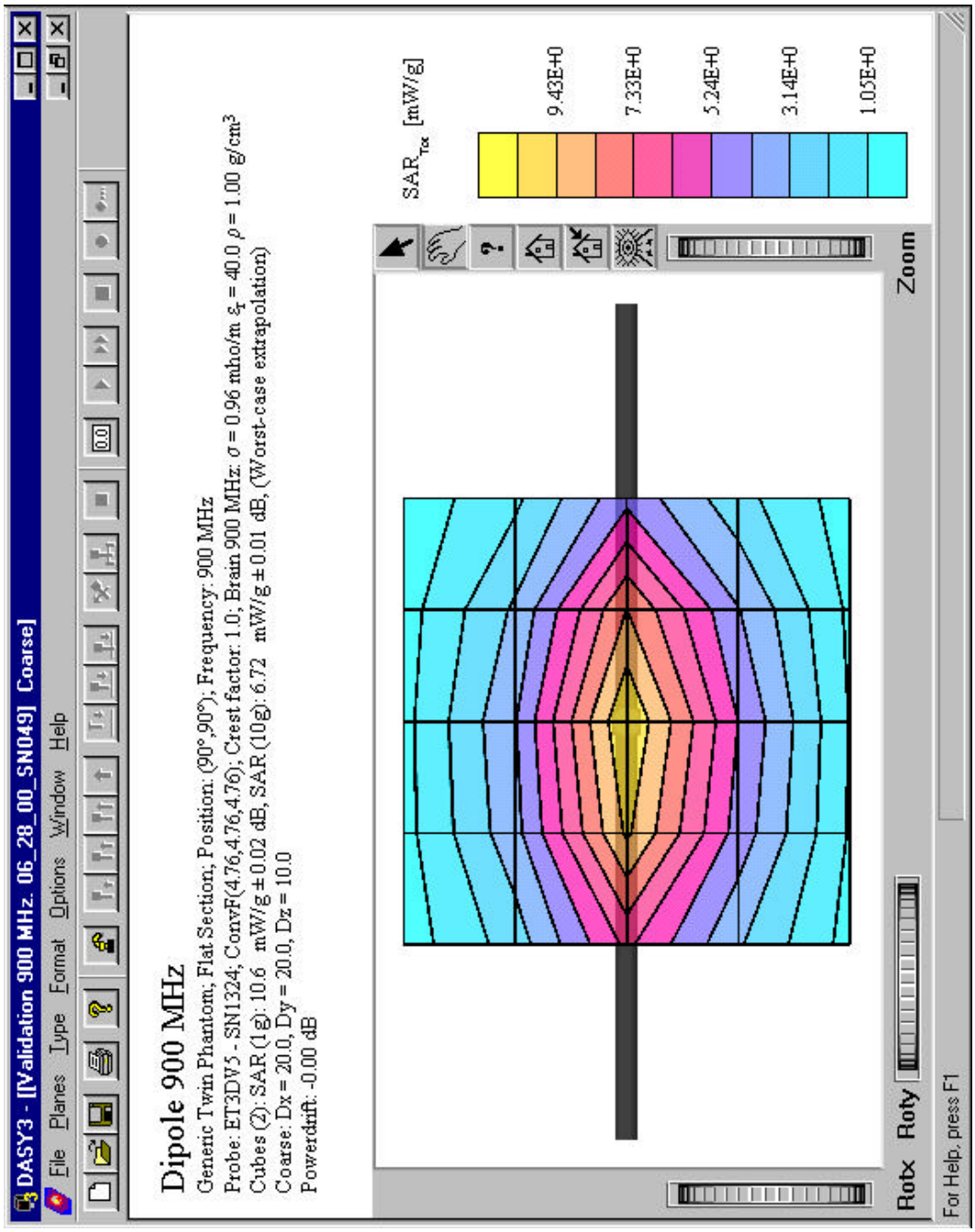
References

[1] C. Törnevik, “Ericsson SAR measurement specifiction, part 1: Introduction and Purpose,” Internal Document ERA/T/U-98:446, February, 1999.
[2] C. Törnevik, M. Siegbahn, T. Persson, M. Douglas, and R. Plicanic, “Ericsson SAR measurement specification”, Internal Document ERA/T/U-98:442, February 1999.
[3] Federal Communications Commission, “Tissue Dielectric Properties,” http://www.fcc.gov/fcc-bin/dielec.sh.
[4] Schmid and Partner Engineering AG, “DASY Dipole Validation Kit,” Type: D1800V2, S/N: 217, February, 2000.

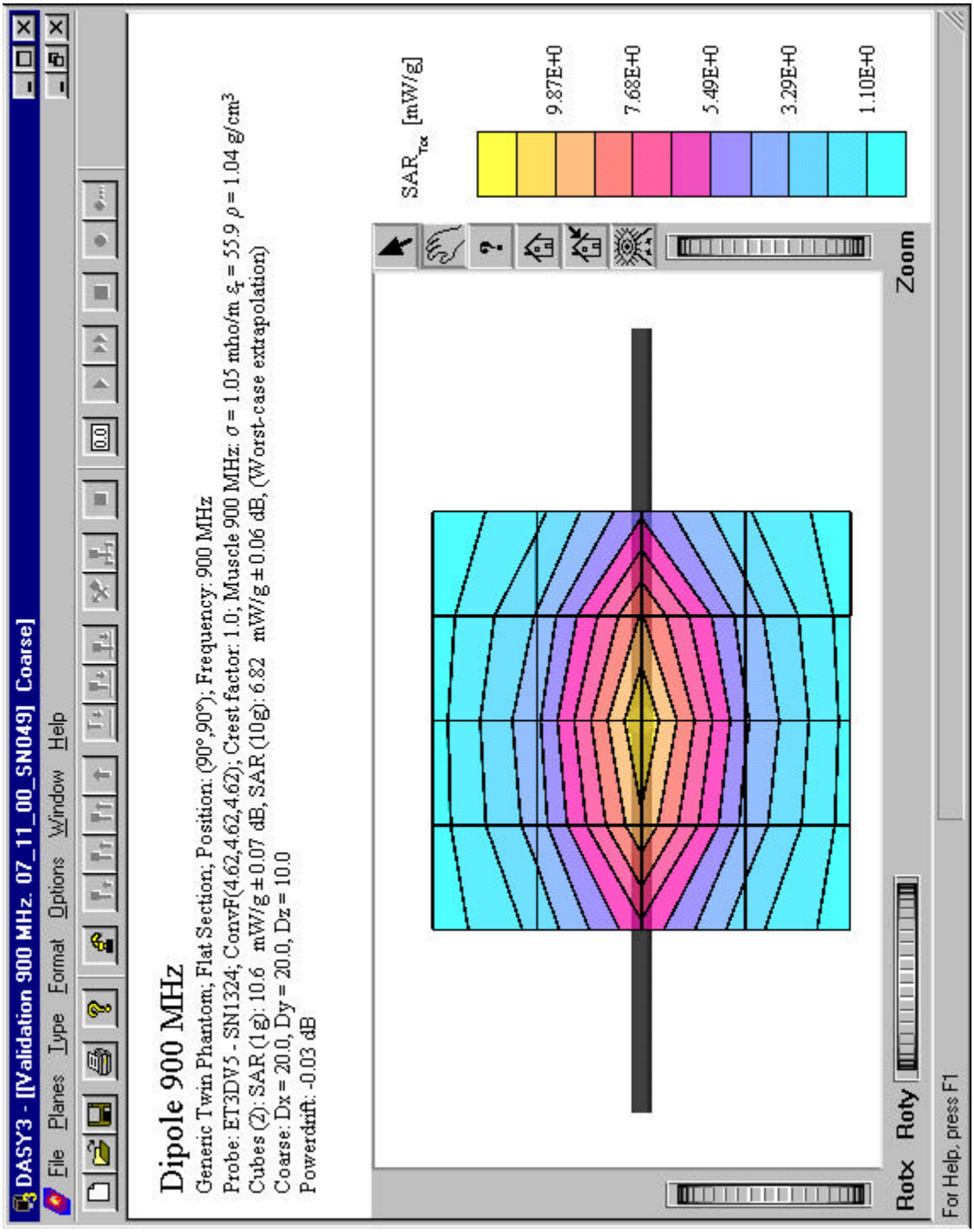
Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date	Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14	A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

Appendix 1: SAR distribution comparison for system accuracy verification



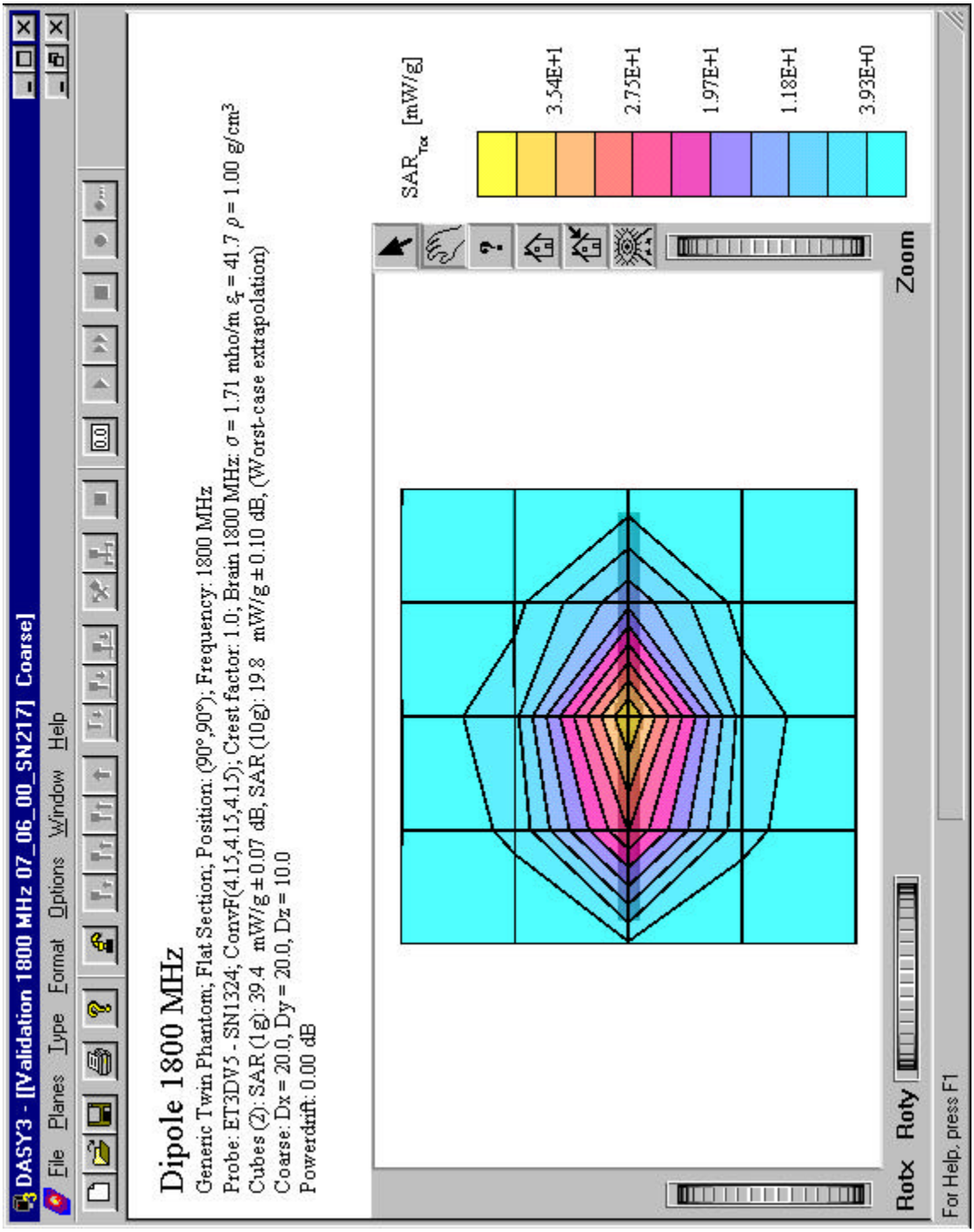
900 MHz SAR distribution of validation dipole antenna from system accuracy verification test. Measured with head simulating tissue on 6/28/00.



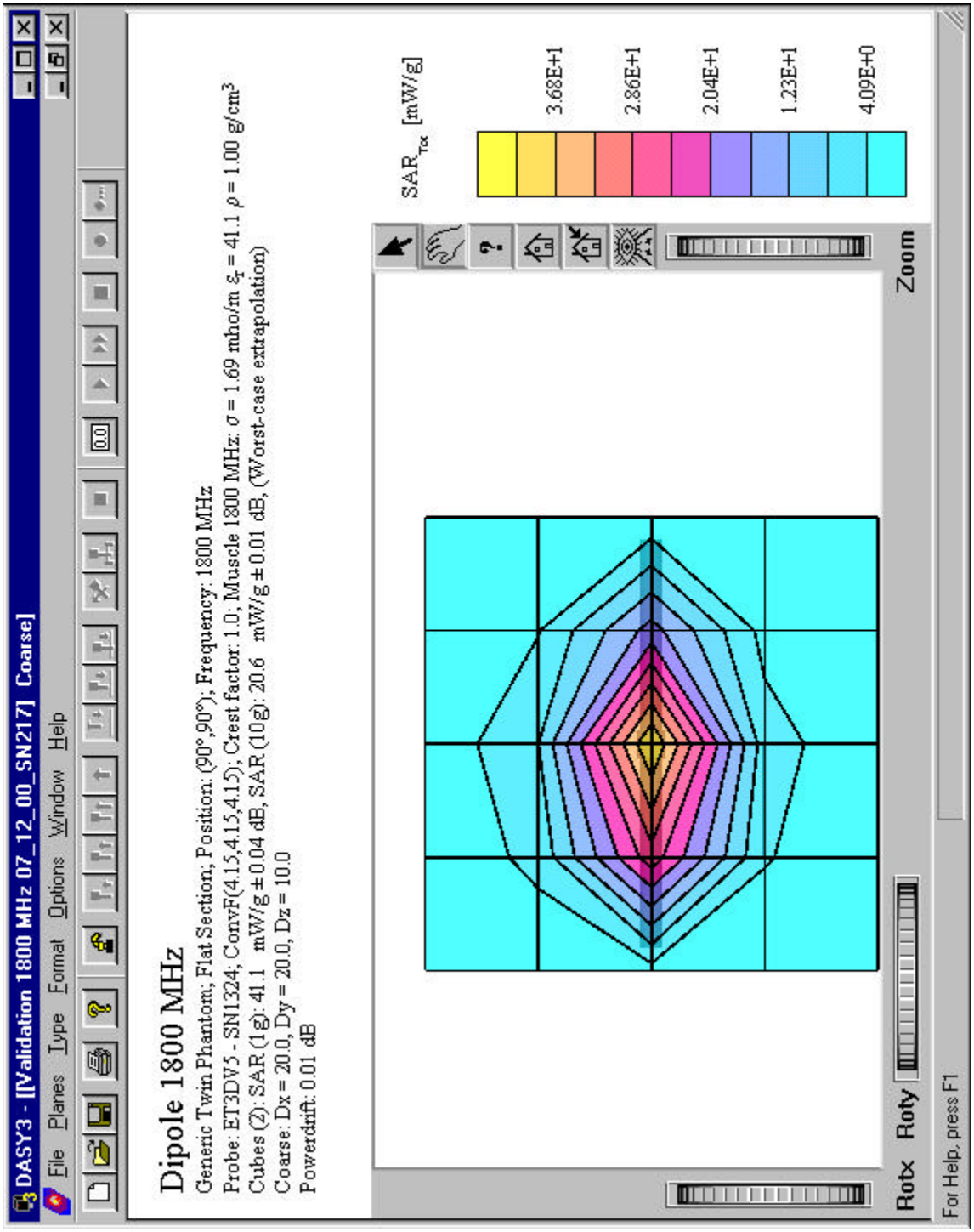
900 MHz SAR distribution of validation dipole antenna from system accuracy verification test. Measured with muscle simulating tissue on 7/11/00.

Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date / Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14 / A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN



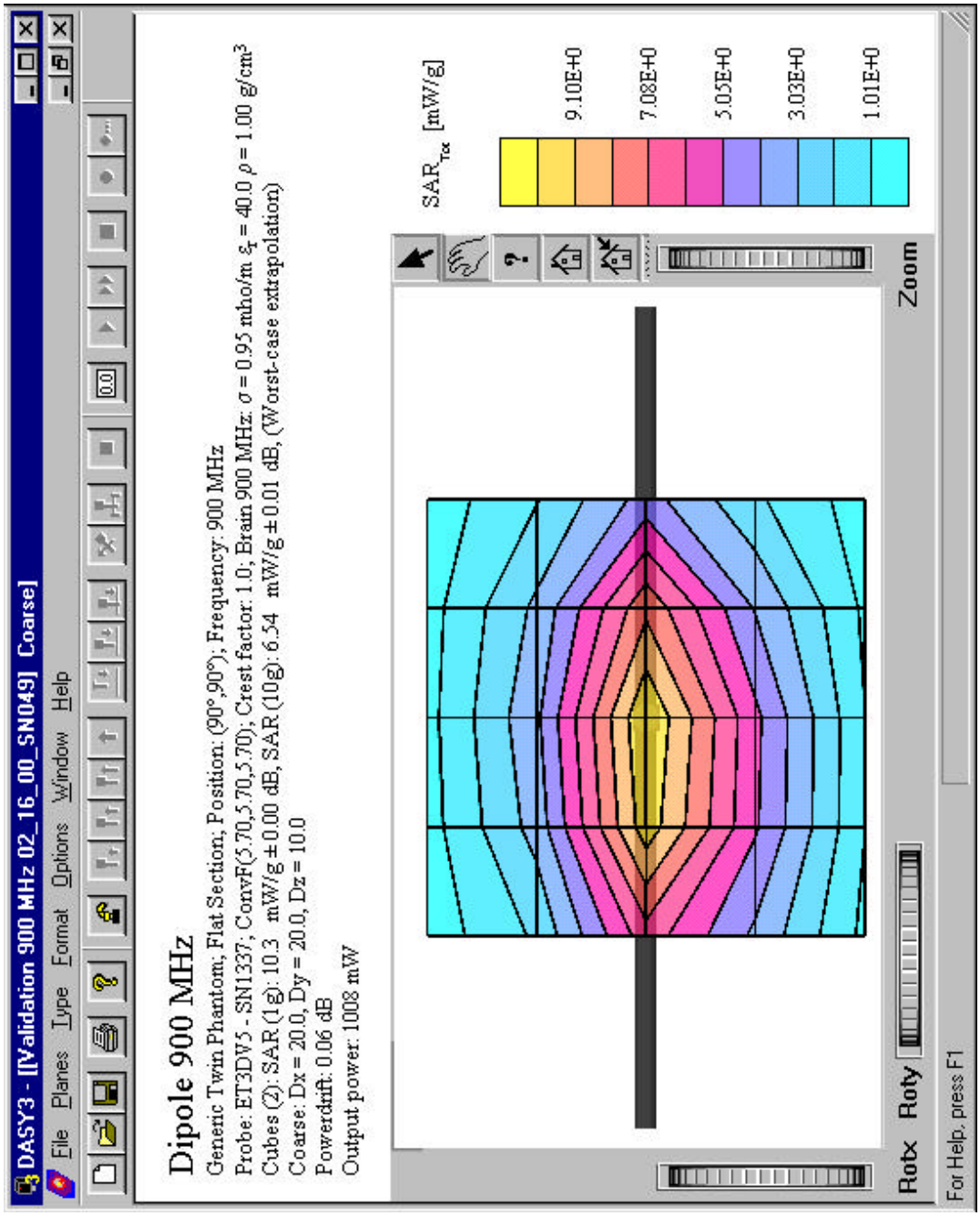
1800 MHz SAR distribution of validation dipole antenna from system accuracy verification test. Measured with head/muscle simulating tissue on 7/6/00.



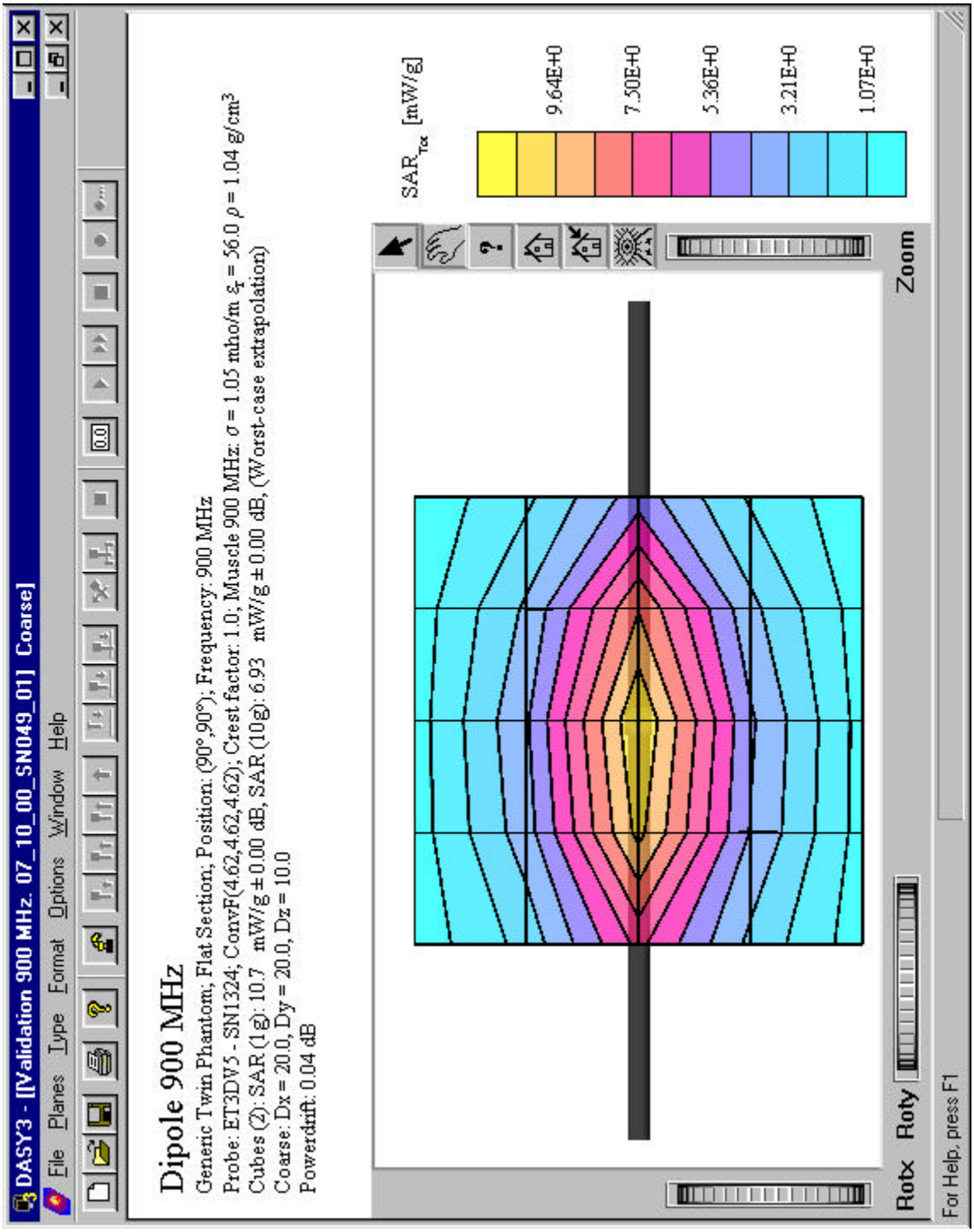
1800 MHz SAR distribution of validation dipole antenna from system accuracy verification test. Measured with head/muscle simulating tissue on 7/12/00.

Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date / Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14 / A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN



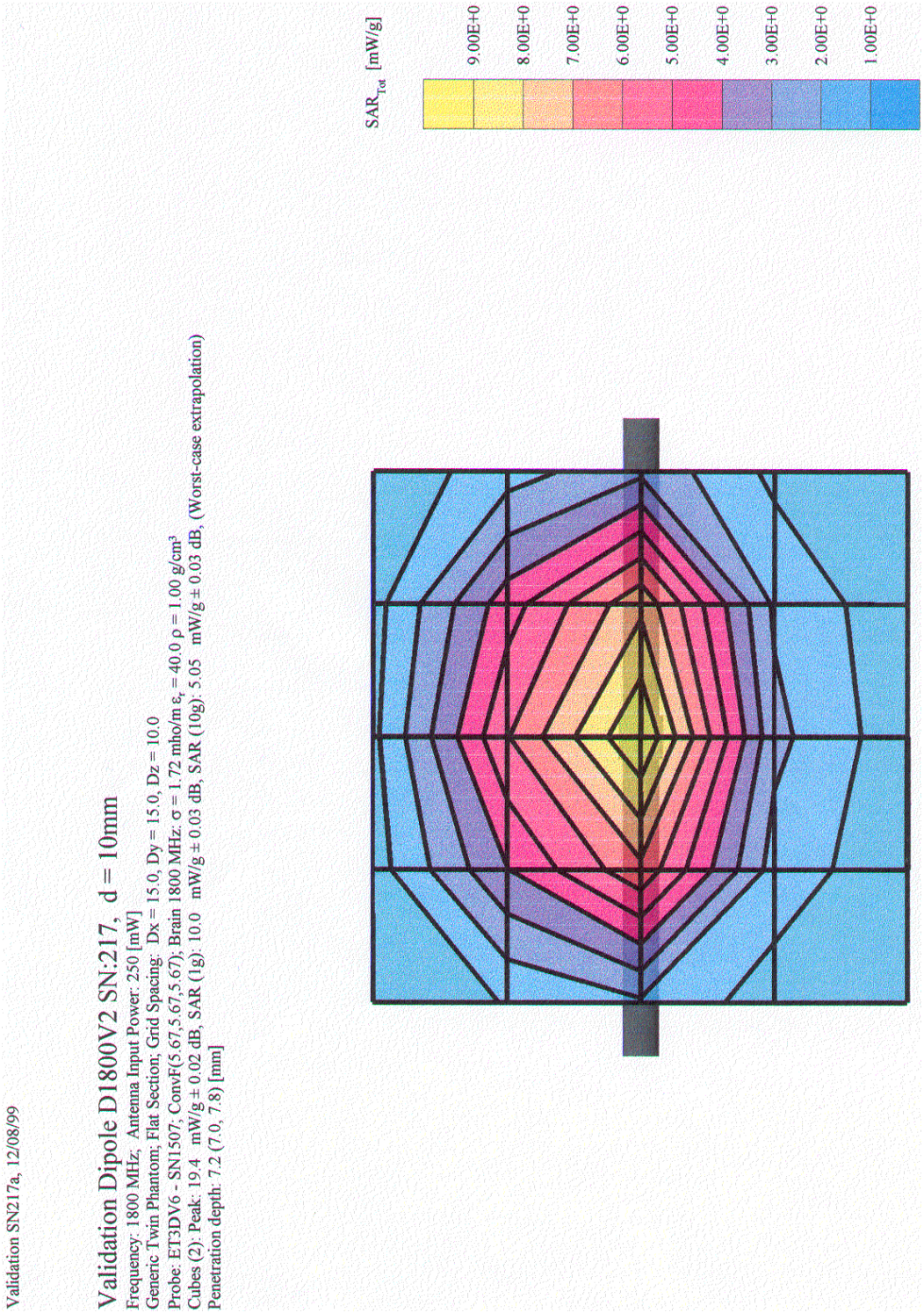
900 MHz SAR distribution of validation dipole antenna from reference measurement. For head tissue.



900 MHz SAR distribution of validation dipole antenna from reference measurement. For muscle tissue.

Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date	Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14	A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

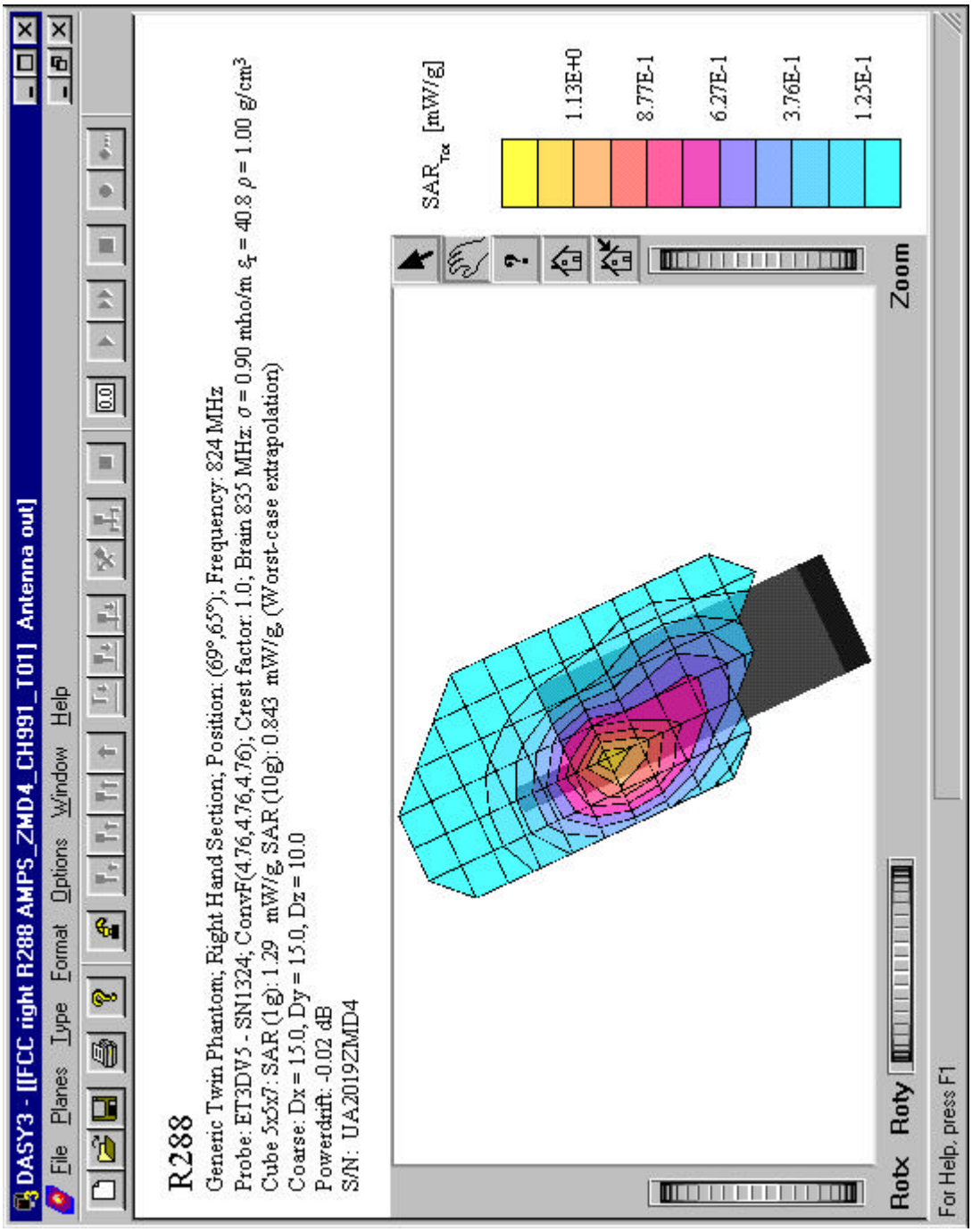


1800 MHz SAR distribution of validation dipole antenna from reference measurement.

Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date / Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14 / A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

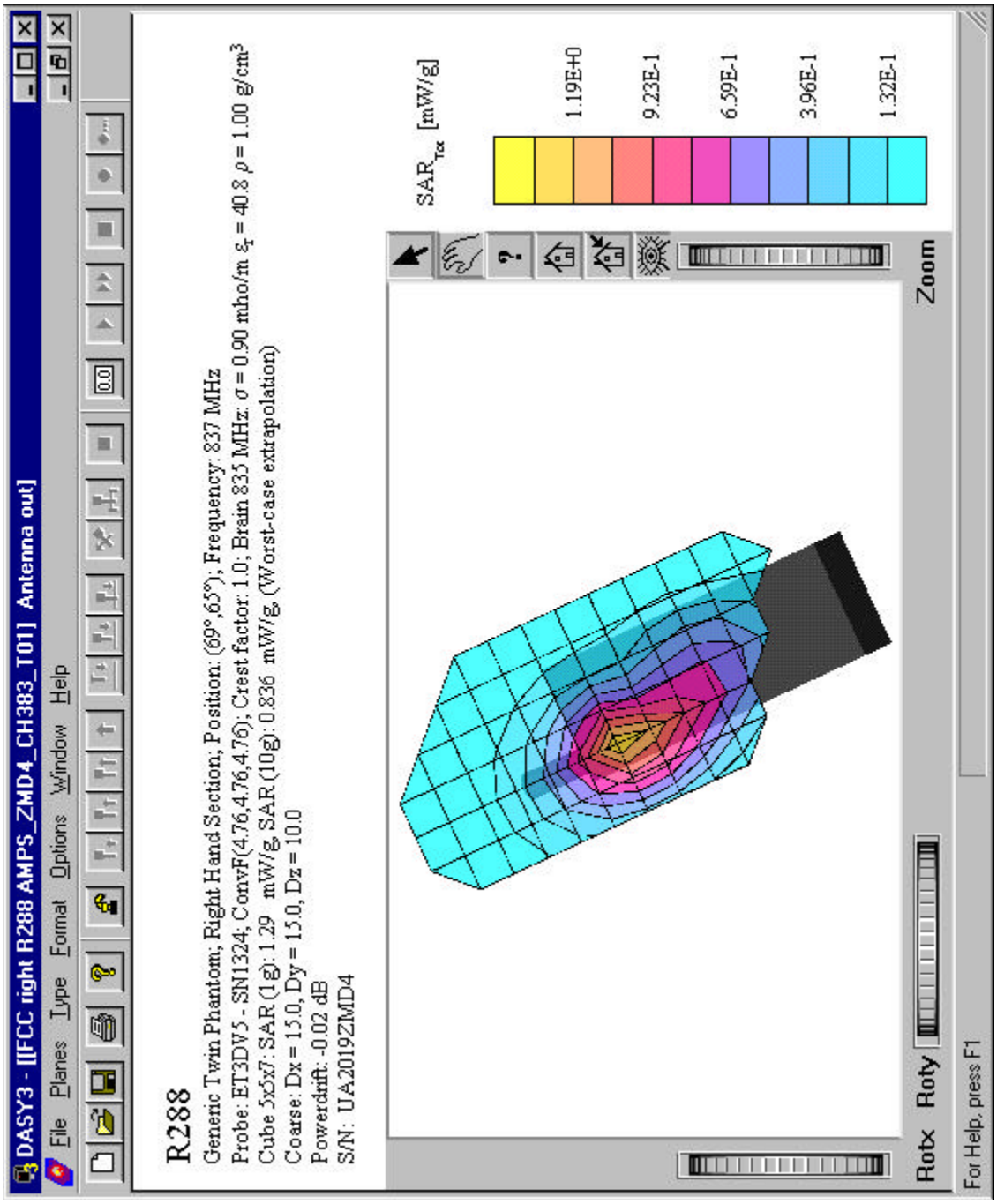
Appendix 2: SAR distribution plots



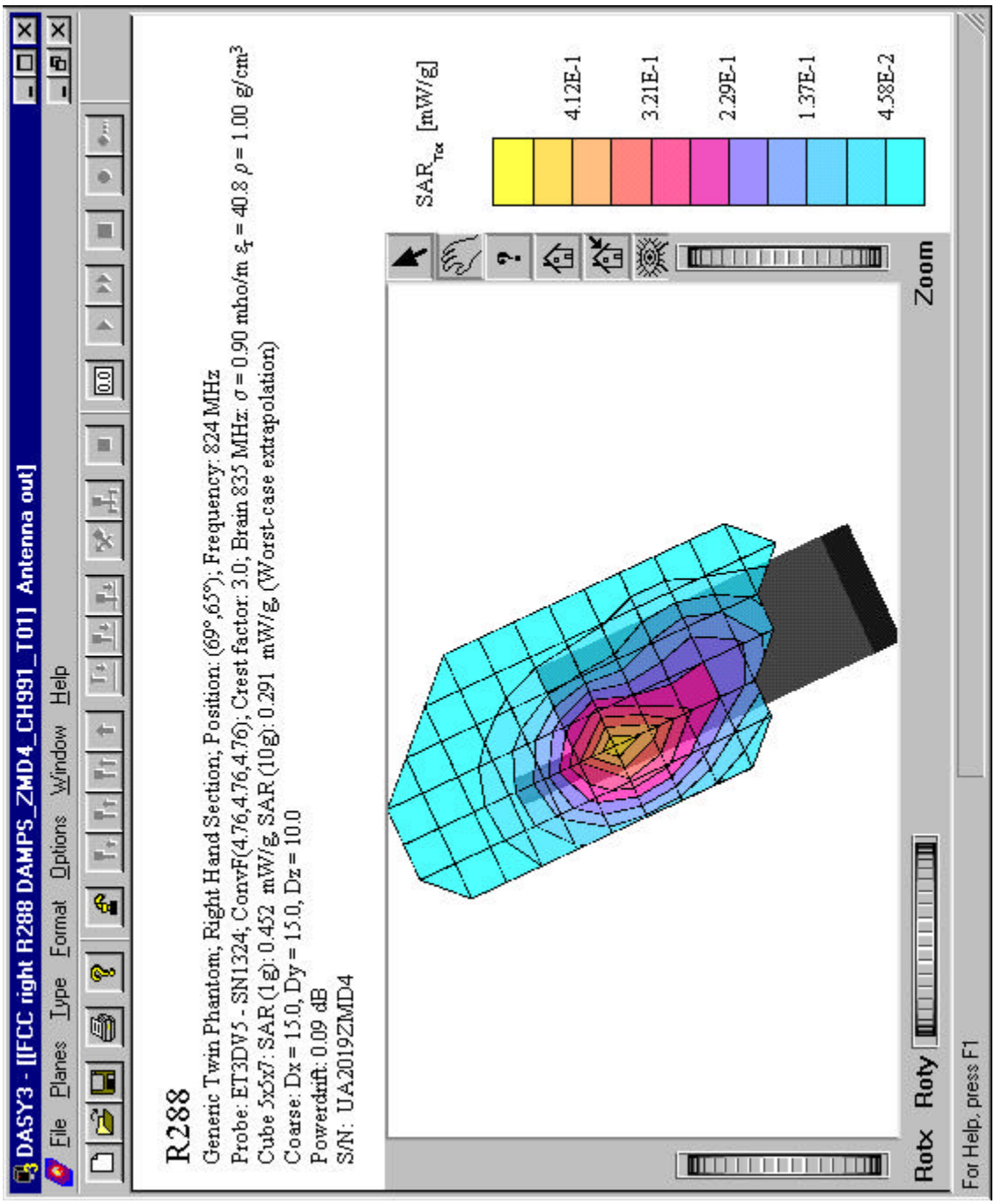
Distribution of maximum SAR in 800 AMPS mode (at 824 MHz). Measured against the head.

Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date / Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14 / A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN



Distribution of maximum SAR in 800 AMPS mode (at 837 MHz). Measured against the head.

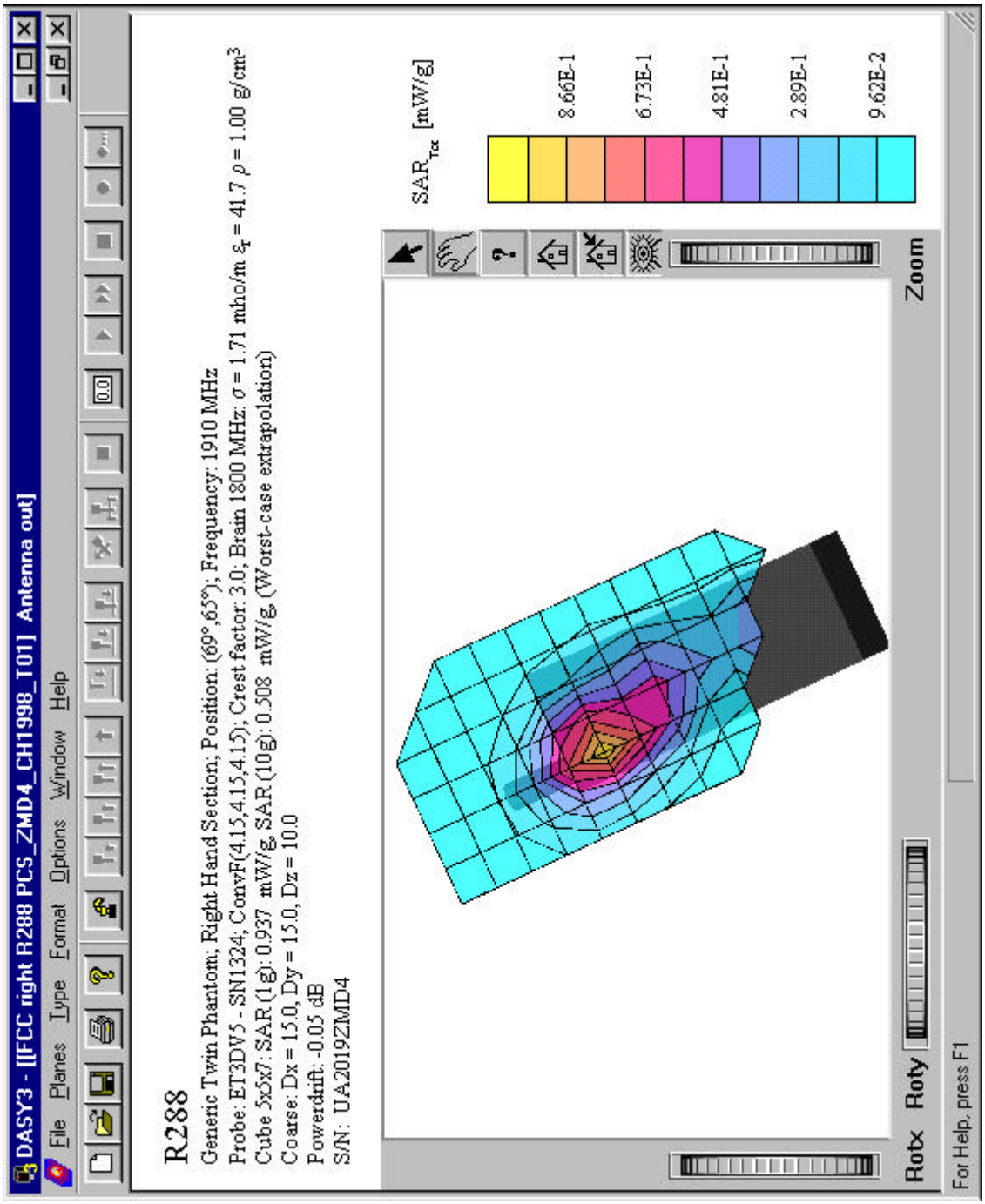


Distribution of maximum SAR in 800 TDMA mode. Measured against the head.

Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date	Rev
EUS/VR/X Mark Douglas	MGD	2000-07-14	A

File: U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

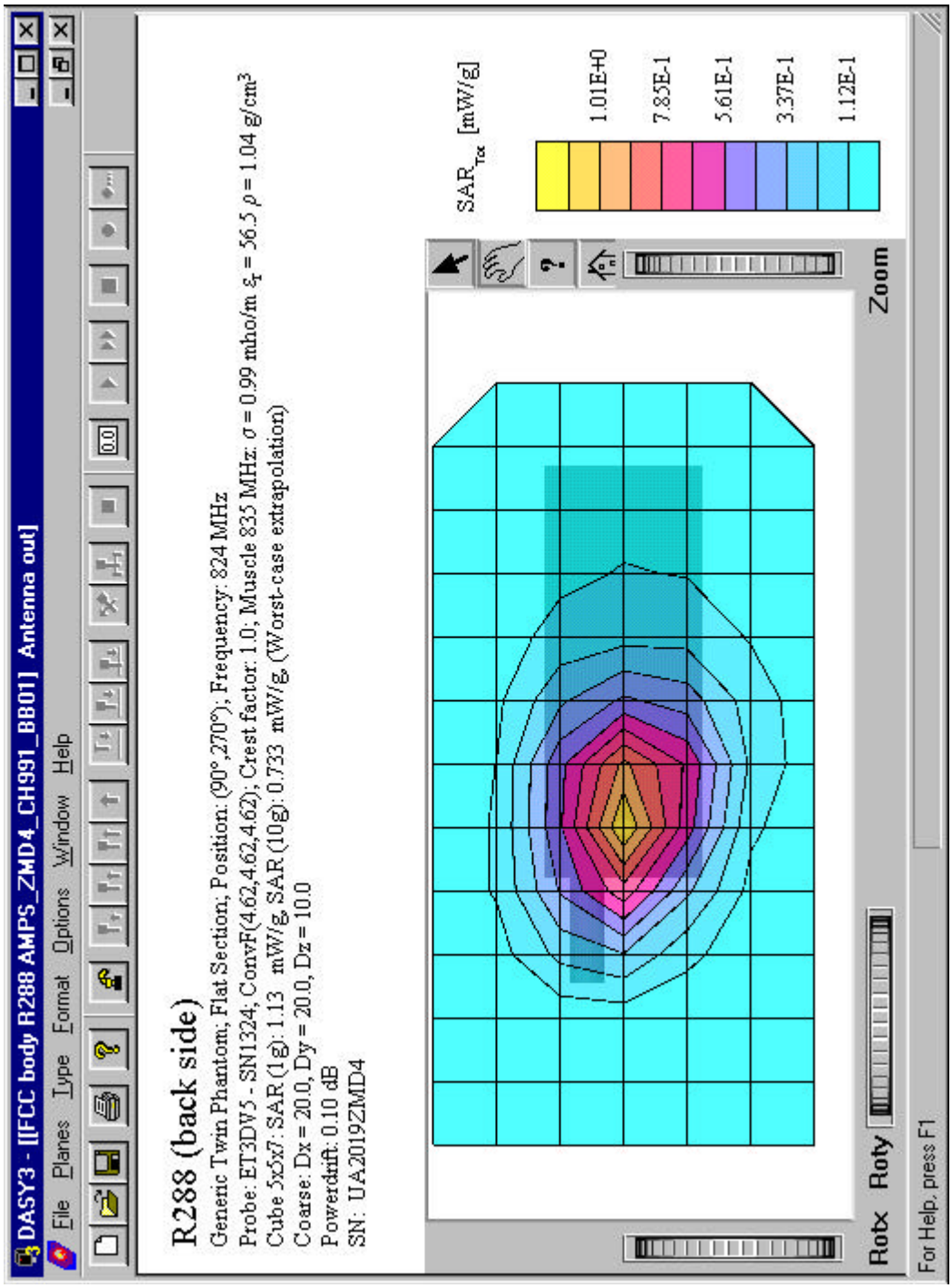


Distribution of maximum SAR in 1900 TDMA mode. Measured against the head.

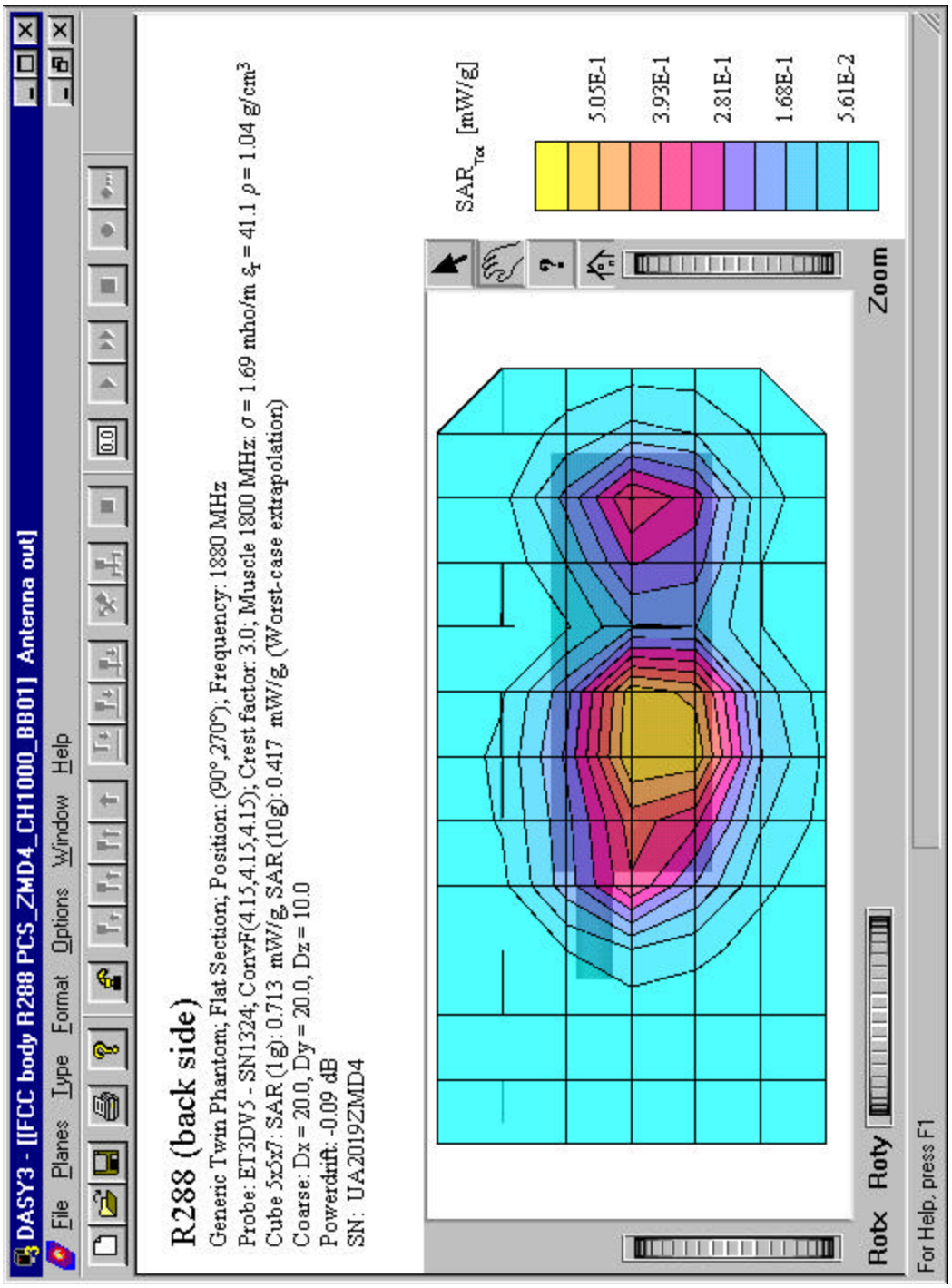
Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date	Rev
EUS/VR/X Mark Douglas	MGD	2000-07-14	A

File: U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN



Distribution of maximum SAR in 800 AMPS mode. Measured against the body.



Distribution of maximum SAR in 1900 TDMA mode. Measured against the body.

Prepared (also subject responsible if other)		No.		
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP		
Approved	Checked	Date	Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14	A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

Appendix 3: Photographs of the device under test

Front view of device.

Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date / Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14 / A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

Side view of device.

Prepared (also subject responsible if other)
RT/EUS/VR/X Mark Douglas 919-472-6334

No.
EUS/VR-00:1487/REP

Approved
EUS/VR/X Mark Douglas

Checked
MGD

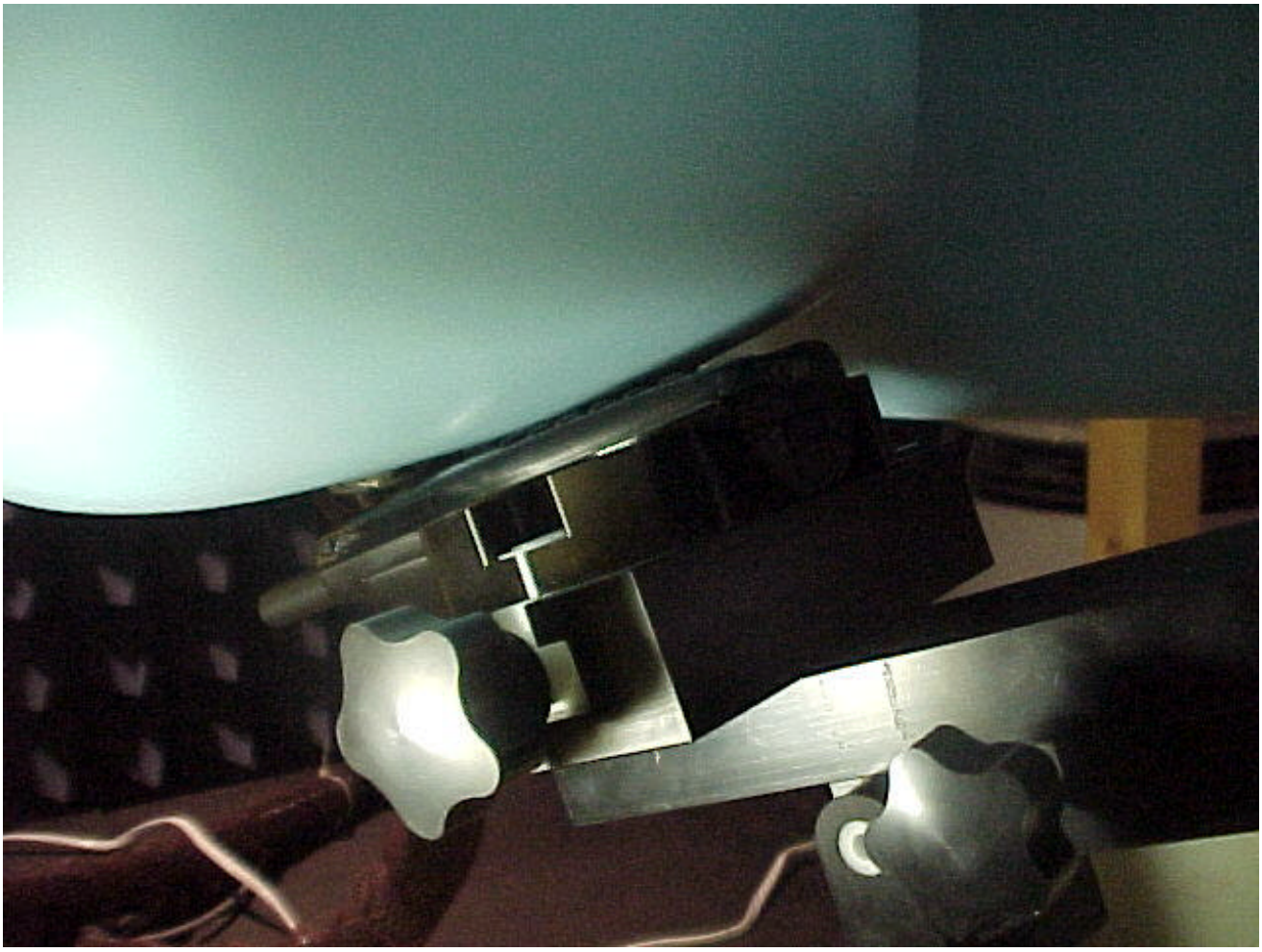
Date
2000-07-14

Rev
A

File
U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

Appendix 4: Position of device on Generic Twin Phantom



Device position against the head.

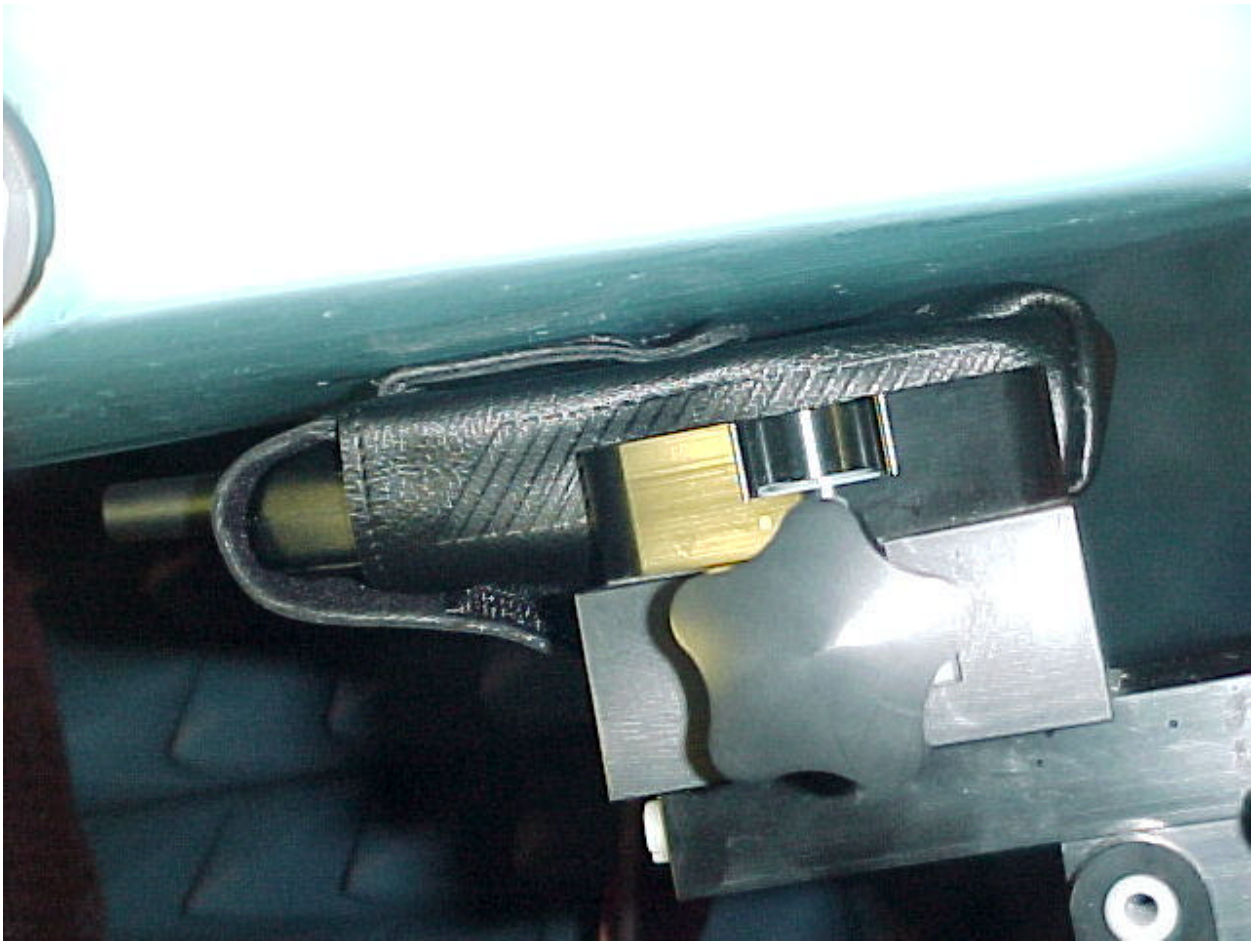
Prepared (also subject responsible if other)		No.	
RT/EUS/VR/X Mark Douglas	919-472-6334	EUS/VR-00:1487/REP	
Approved	Checked	Date / Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14 / A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

Device position against the body with accessory KRY 104 1293 R1.

Prepared (also subject responsible if other)		No.		
RT/EUS/VR/X Mark Douglas 919-472-6334		EUS/VR-00:1487/REP		
Approved	Checked	Date	Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14	A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN



Device position against the body with accessory KRY 104 1004 R1B.

Prepared (also subject responsible if other)		No.		
RT/EUS/VR/X Mark Douglas 919-472-6334		EUS/VR-00:1487/REP		
Approved	Checked	Date	Rev	File
EUS/VR/X Mark Douglas	MGD	2000-07-14	A	U:\FCC_TRNS\FCC_378 dana linda\R288\Exhibit11\Ditto Linda 2.doc

EN

Appendix 5: Probe calibration parameters for ET3DV5 SN:1324

DASY3 - Parameters of Probe: ET3DV5 SN:1324

Sensitivity in Free Space

Diode Compression

NormX	**1.51** $\mu V/(V/m)^2$	DCP X	**104** mV
NormY	**1.73** $\mu V/(V/m)^2$	DCP Y	**104** mV
NormZ	**1.52** $\mu V/(V/m)^2$	DCP Z	**104** mV

Sensitivity in Tissue Simulating Liquid

Brain **450 MHz** ε_r **= 48 ± 5%** σ **= 0.50 ± 10% mho/m**

ConvF X	**5.07** extrapolated	Boundary effect:	
ConvF Y	**5.07** extrapolated	Alpha	**0.07**
ConvF Z	**5.07** extrapolated	Depth	**4.22**

Brain **900 MHz** ε_r **= 42.5 ± 5%** σ **= 0.86 ± 10% mho/m**

ConvF X	**4.76** ± 7% (k=2)	Boundary effect:	
ConvF Y	**4.76** ± 7% (k=2)	Alpha	**0.27**
ConvF Z	**4.76** ± 7% (k=2)	Depth	**3.47**

Brain **1500 MHz** ε_r **= 41 ± 5%** σ **= 1.32 ± 10% mho/m**

ConvF X	**4.35** interpolated	Boundary effect:	
ConvF Y	**4.35** interpolated	Alpha	**0.54**
ConvF Z	**4.35** interpolated	Depth	**2.48**

Brain **1800 MHz** ε_r **= 41 ± 5%** σ **= 1.69 ± 10% mho/m**

ConvF X	**4.15** ± 7% (k=2)	Boundary effect:	
ConvF Y	**4.15** ± 7% (k=2)	Alpha	**0.68**
ConvF Z	**4.15** ± 7% (k=2)	Depth	**1.98**

Sensor Offset

Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**2.0 ± 0.2**	mm