Prepared (also subject responsible if other)		No.		
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Approved	Checked			
EUS/CV/RF/P Mark Douglas	MGD	2001-4-25	C	U:\FCC Submittals\FCC_417 Ditto Nicole\XHIBIT11\New SAR.doc

SAR Test Report: T60d

Date of test: April 10-12, and 16, 2001

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 Technical Leader, Antenna Development Group

This laboratory is accredited to ISO/IEC Guide 25-1990 to perform the following electromagnetic tests:
Specific Absorption Rate (SAR), dielectric parameters, and RF power measurement on the following types of products:
Wireless communications devices

A2LA certificate Number: 1650-01

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

T60d

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)

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1. Introduction

In this report, compliance of the Ericsson T60d 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* [1].

2. Device Under Test

2.1 Antenna description

Type	Internal antenna	
Location	Inside the back cover, near the top	
Dimensions	Maximum length	38 mm
	Maximum width	51 mm
Configuration	Patch antenna	

2.2 Device description

Device model	T60d		
FCC ID	AXATR-417-A2		
Serial number	UA2020480H		
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 two DASY3 professional systems (software version 3.1c), manufactured by Schmid & Partner Engineering AG and installed in February 1998, and November 2000. The extended SAR assessment uncertainty (K = 2) is ±32% with a +15% offset. This assessment uncertainty includes measurement uncertainty (±24%) and phantom uncertainty (±10%), as described in [1]. This results in a total uncertainty range of –17% to +47%. The equipment list is given below.

Description	**Serial Number**	**Due Date**
DASY3 DAE V1	369	12/01
E-field probe ET3DV6	1538	9/01
E-field probe ET3DV5	1337	6/01
Dipole Validation Kit, D900V2	049	1/03
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	9/02
Dielectric probe kit HP 85070B	US33020256	10/01
Network analyser HP 8752C	3410A03105	7/01
Power meter E4418B	GB40206594	10/01
Power sensor HP 8482H	3318A09268	8/01
Power meter HP 437B	3125U16190	3/02
Power sensor HP 8482H	2704A06235	4/01
Power meter HP 437B	3125U13729	1/02
Power sensor HP 8482H	3318A07097	2/02

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 [2]. 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			Chamber Temp. (°C)
			e_r	s (S/m)	r (g/cm^3)	
835	Head	**Measured, 4/10/01**	41.63	0.91	1.00	24.6
		Recommended Limits [2]	46.08	0.74	1.03	--
	Muscle	**Measured, 4/12/01**	55.63	0.98	1.00	21.1
		Measured, 4/16/01	55.52	0.98	1.00	22.0
		Recommended Limits [2]	56.11	0.95	1.04	--
1800	Head	**Measured, 4/11/01**	39.17	1.76	1.00	24.1
		Recommended Limits [2]	43.54	1.15	1.03	--
	Muscle	**Measured, 4/11/01**	39.17	1.76	1.00	24.1
		Recommended Limits [2]	54.44	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 (SAR values are scaled to 1 Watt power delivered to the antenna). It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. At 900 MHz and 1800MHz, reference values are taken from the system manufacturer. The distributions of SAR compare well with those of the reference measurements (see Appendix 1).

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f (MHz)	Tissue type	Measured / Reference	SAR (W/kg), 1 gram/10 gram	Dielectric Parameters			Chamber Temp. (°C)
				e_r	s (S/m)	r (g/cm^3)	
900	**Head**	**Measured, 4/10/01**	10.80 / 6.87	40.89	0.97	1.00	24.7
		Reference	10.96 / 6.92	41.7	0.94	1.00	--
900	**Muscle**	**Measured, 4/12/01**	11.36 / 7.24	55.03	1.04	1.00	22.2
		Measured, 4/16/01	11.20 / 7.16	54.94	1.04	1.00	21.8
		Reference	11.08 / 7.08	56.1	0.99	1.00	--
1800	**Head/ Muscle**	**Measured, 4/11/01**	41.04 / 20.60	39.17	1.76	1.00	22.6
		Reference	40.00 / 20.20	40.0	1.72	1.00	--

6. Test results

The measured 1and 10-gram averaged SAR values of the device are provided in Tables 1 through 3. 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 at least 15 cm. Test commands were 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.

mode	*f* (MHz)	Output Power (dBm)	Left hand			Right hand		
			Chamber Temp. (°C)	SAR, 1g /10g (W/kg)		Chamber Temp. (°C)	SAR, 1g /10g (W/kg)	
				measured	Calculated to max. power		measured	Calculated to max. power
800 AMPS	824	26.35	24.5	1.35 / 0.97	**1.35 / 0.97**	24.7	1.35 / 0.92	**1.35** / 0.92
	837	26.25	24.5	1.31 / 0.91	1.31 / 0.91	24.4	1.26 / 0.86	1.26 / 0.86
	849	26.08	24.3	1.25 / 0.86	1.25 / 0.86	24.5	1.08 / 0.73	1.08 / 0.73
1900 TDMA	1850	25.82	22.1	0.29 / 0.14	0.30 / 0.15	22.5	0.31 / 0.16	**0.33 / 0.17**
	1880	26.01	22.2	0.25 / 0.14	0.27 / 0.15	22.5	0.25 / 0.13	0.26 / 0.14
	1910	26.21	22.2	0.23 / 0.13	0.25 / 0.14	22.5	0.18 / 0.09	0.19 / 0.10

Table 1: SAR measurement results for the Ericsson T60d 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 product # SXK 109 4518/1, product # SXK 109 4518/2, and product # SXK 107 6820/55. SAR was measured at the lowest, middle and highest frequencies of the 800 AMPS and 1900 TDMA bands (800 TDMA is not necessary due to the significantly lower output power). Results are given in Tables 2 through 3.

mode	*f* (MHz)	Output Power (dBm)	SXK 109 4518/1			SXK 109 4518/2		
			Chamber Temp. (°C)	SAR, 1g /10g (W/kg)		Chamber Temp. (°C)	SAR, 1g /10g (W/kg)	
				measured	Calculated to max. power		measured	Calculated to max. power
800 AMPS	824	26.35	21.7	0.83 / 0.58	**0.83 / 0.58**	22.3	0.78 / 0.54	**0.78 / 0.54**
	837	26.25	21.7	0.66 / 0.46	0.66 / 0.46	22.3	0.67 / 0.46	0.67 / 0.46
	849	26.08	21.9	0.53 / 0.37	0.53 / 0.37	22.3	0.58 / 0.40	0.58 / 0.40
1900 TDMA	1850	25.82	22.2	0.10 / 0.05	**0.11 / 0.05**	22.6	0.59 / 0.31	0.62 / 0.33
	1880	26.01	22.1	0.10 / 0.05	0.10 / 0.05	22.8	0.61 / 0.32	0.65 / 0.34
	1910	26.21	22.1	0.09 / 0.04	0.09 / 0.05	22.7	0.72 / 0.38	**0.76 / 0.40**

Table 2: SAR measurement results for the Ericsson T60d telephone at highest possible output power. Measured against the body using carry accessory SXK 109 4518/1 and SXK-109-4518/2.

mode	*f* (MHz)	Output Power (dBm)	SXK 107 6820/55		
			Chamber Temp. (°C)	SAR, 1g /10g (W/kg)	
				measured	Calculated to max. power
800 AMPS	824	26.35	22.1	0.77 / 0.55	**0.77 / 0.55**
	837	26.25	21.8	0.72 / 0.50	0.72 / 0.50
	849	26.08	21.9	0.64 / 0.44	0.64 / 0.44
1900 TDMA	1850	25.82	22.2	0.49 / 0.26	0.52 / 0.27
	1880	26.01	22.3	0.62 / 0.32	0.65 / 0.34
	1910	26.21	22.4	0.64 / 0.34	**0.68 / 0.36**

Table 3: SAR measurement results for the Ericsson T60d telephone at highest possible output power. Measured against the body using carry accessory SXK 107 6820/55.

References

[1] C. Törnevik, M. Siegbahn, T. Persson, M. Douglas, and R. Plicanic, "Ericsson SAR measurement specification", Internal Document ERA/TF-00:037, March 2001.

[2] Federal Communications Commission, "Tissue Dielectric Properties," http://www.fcc.gov/fcc-bin/dielec.sh.

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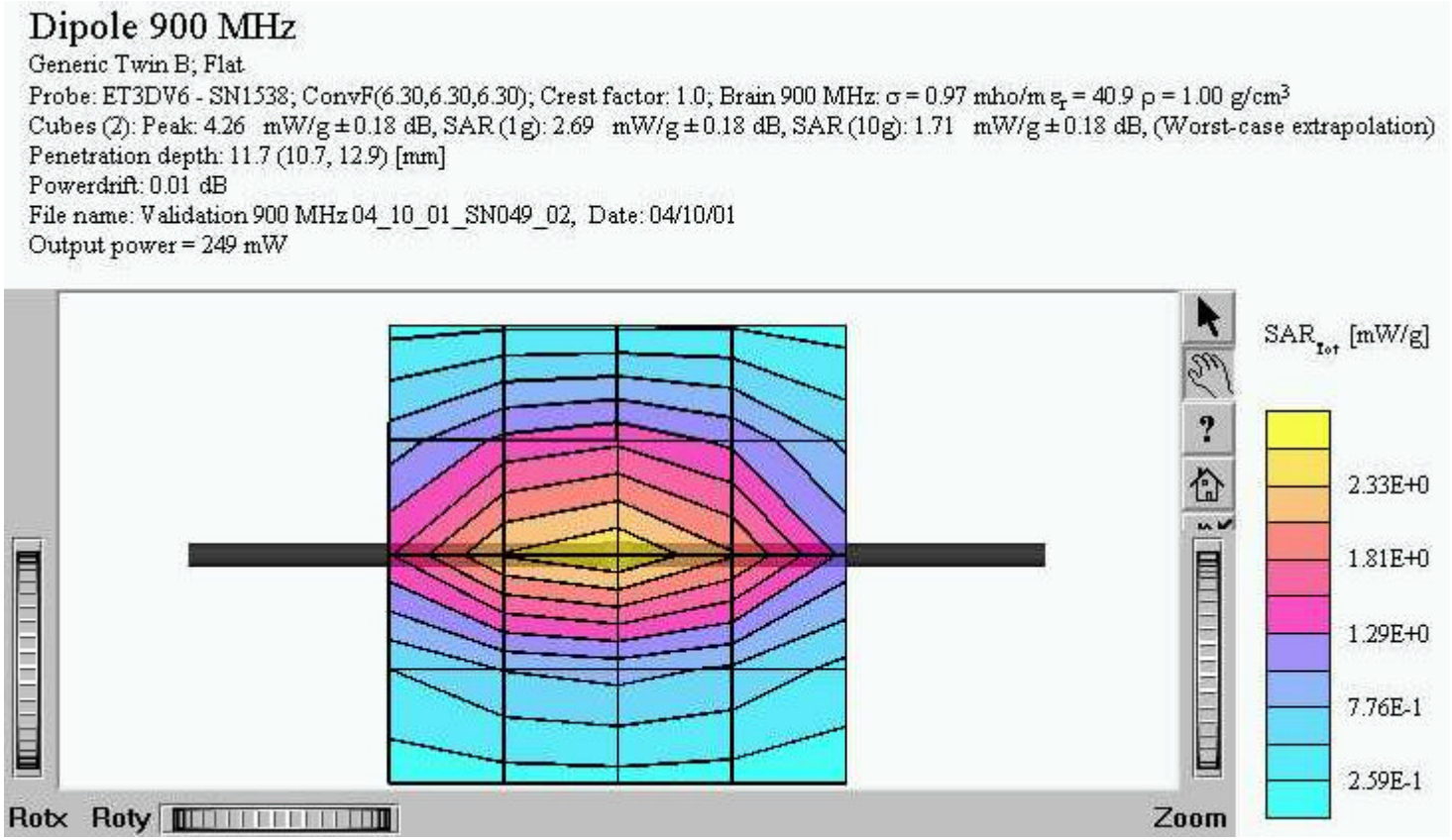
Appendix 1: SAR distribution comparison for system accuracy verification



900 MHz SAR distribution of validation dipole antenna from system accuracy verification test on April 10, 2001. Using brain tissue.

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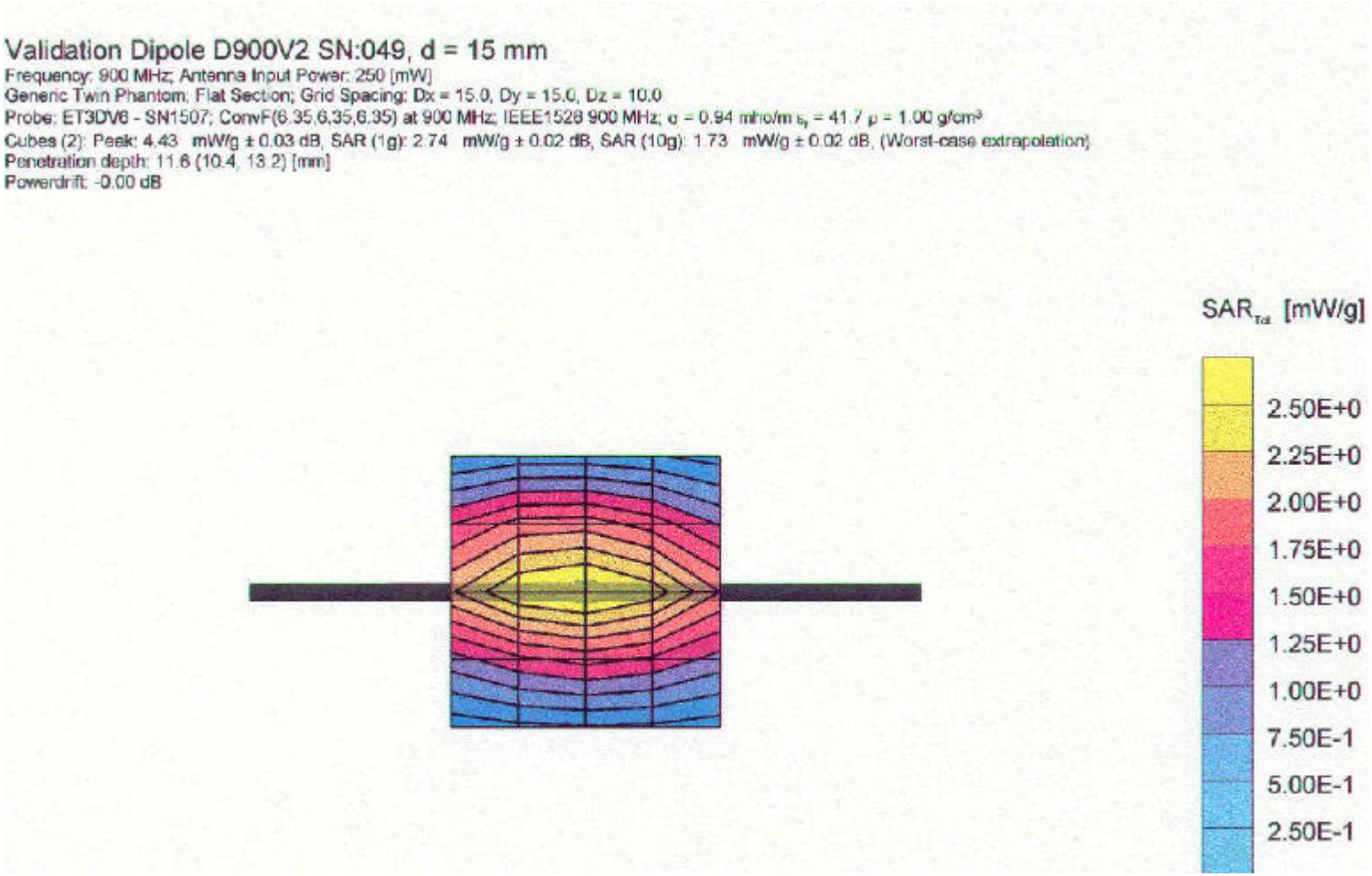

900 MHz SAR distribution of validation dipole antenna from reference measurement. Using brain tissue.

Prepared (also subject responsible if other)		No.		
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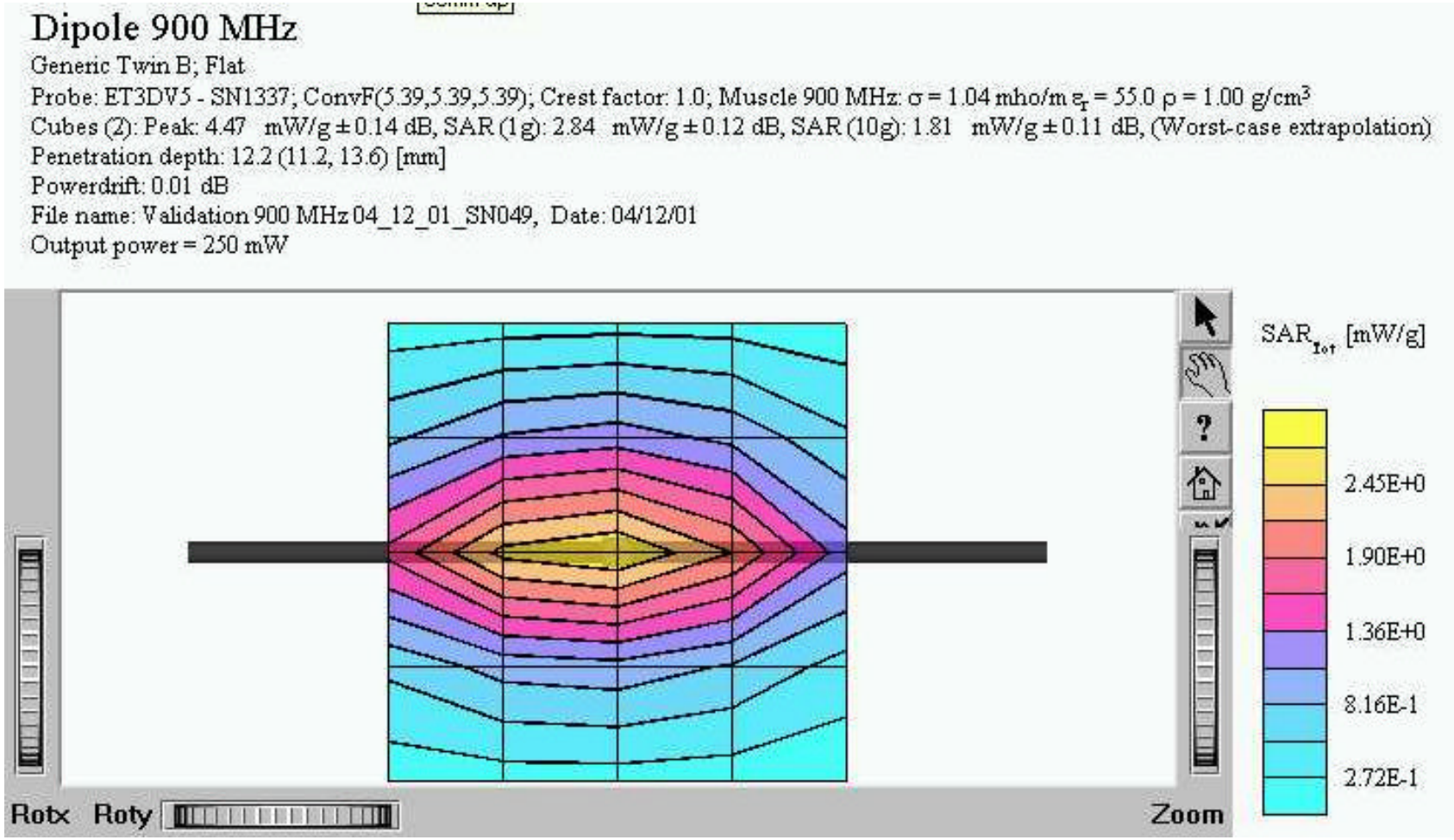

900 MHz SAR distribution of validation dipole antenna from system accuracy verification test on April 12, 2001. Using muscle tissue.

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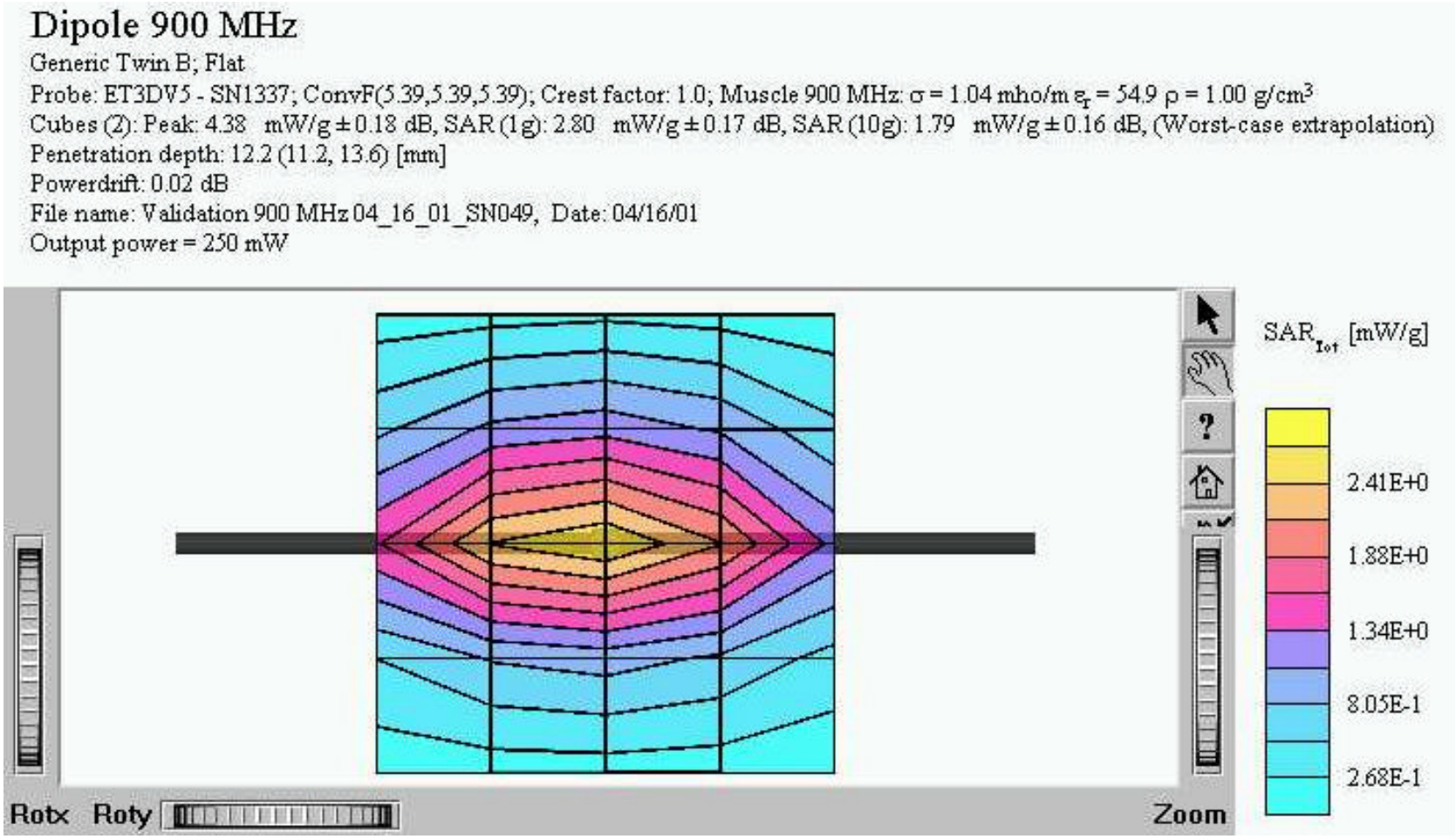
Approved	Checked			
EUS/CV/RF/P Mark Douglas	MGD	2001-4-25	C	U:\FCC Submittals\FCC_417 Ditto Nicole\XHIBIT11\New SAR.doc



900 MHz SAR distribution of validation dipole antenna from system accuracy verification test on April 16, 2001. Using muscle tissue.

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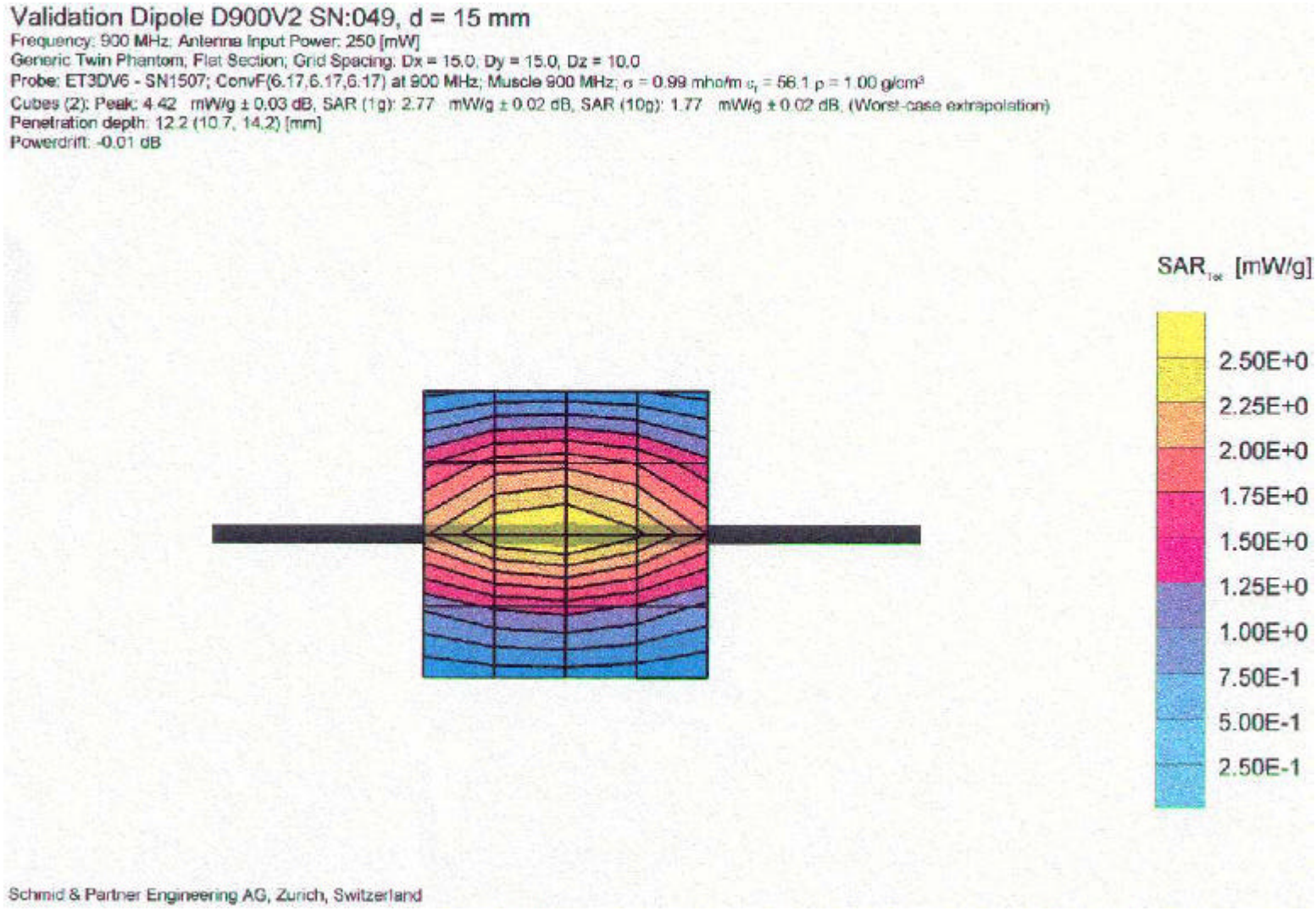
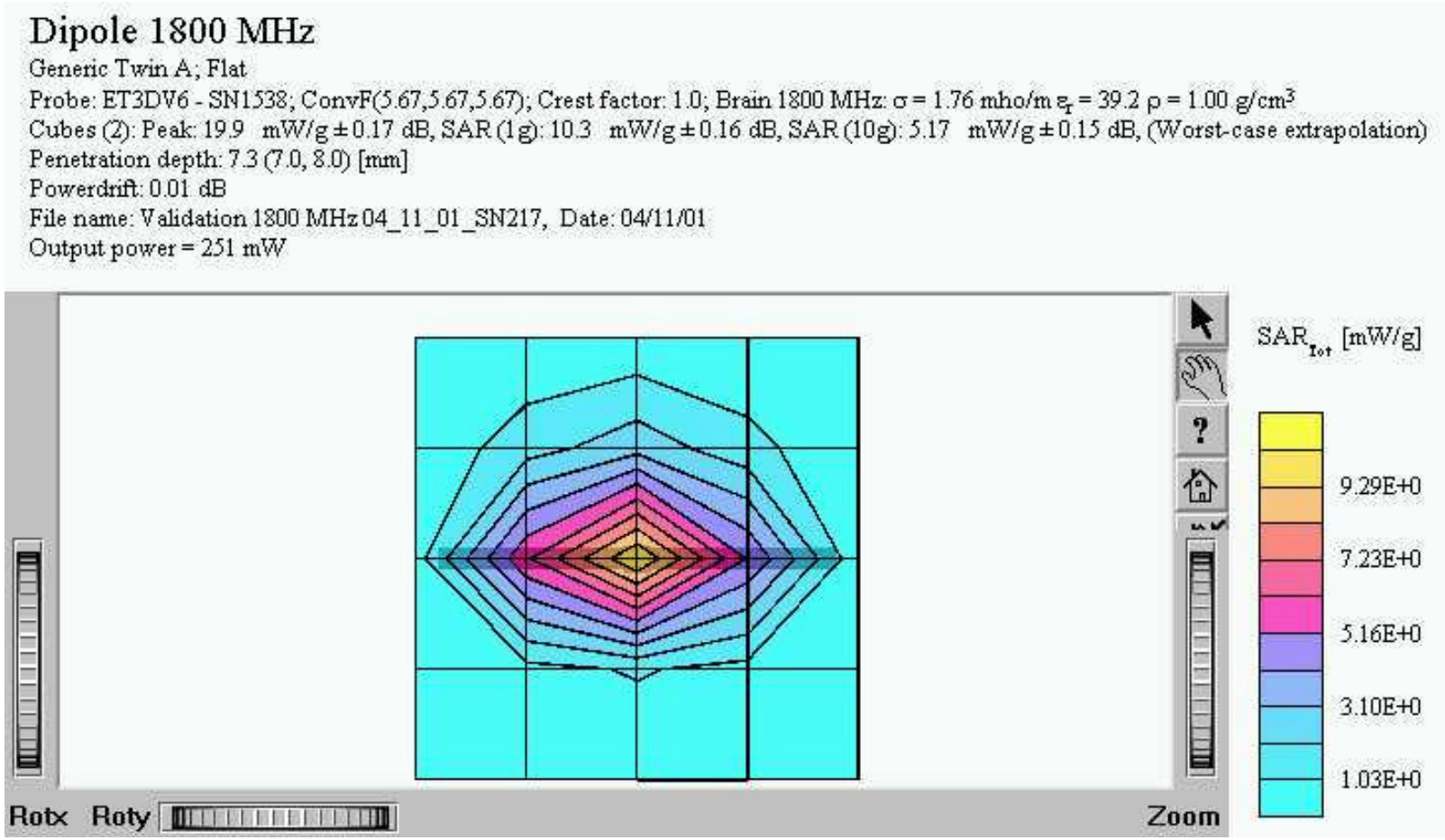


900 MHz SAR distribution of validation dipole antenna from reference measurement. Using muscle tissue.



1800 MHz SAR distribution of validation dipole antenna from system accuracy verification test on April 11, 2001. Using head/muscle tissue.

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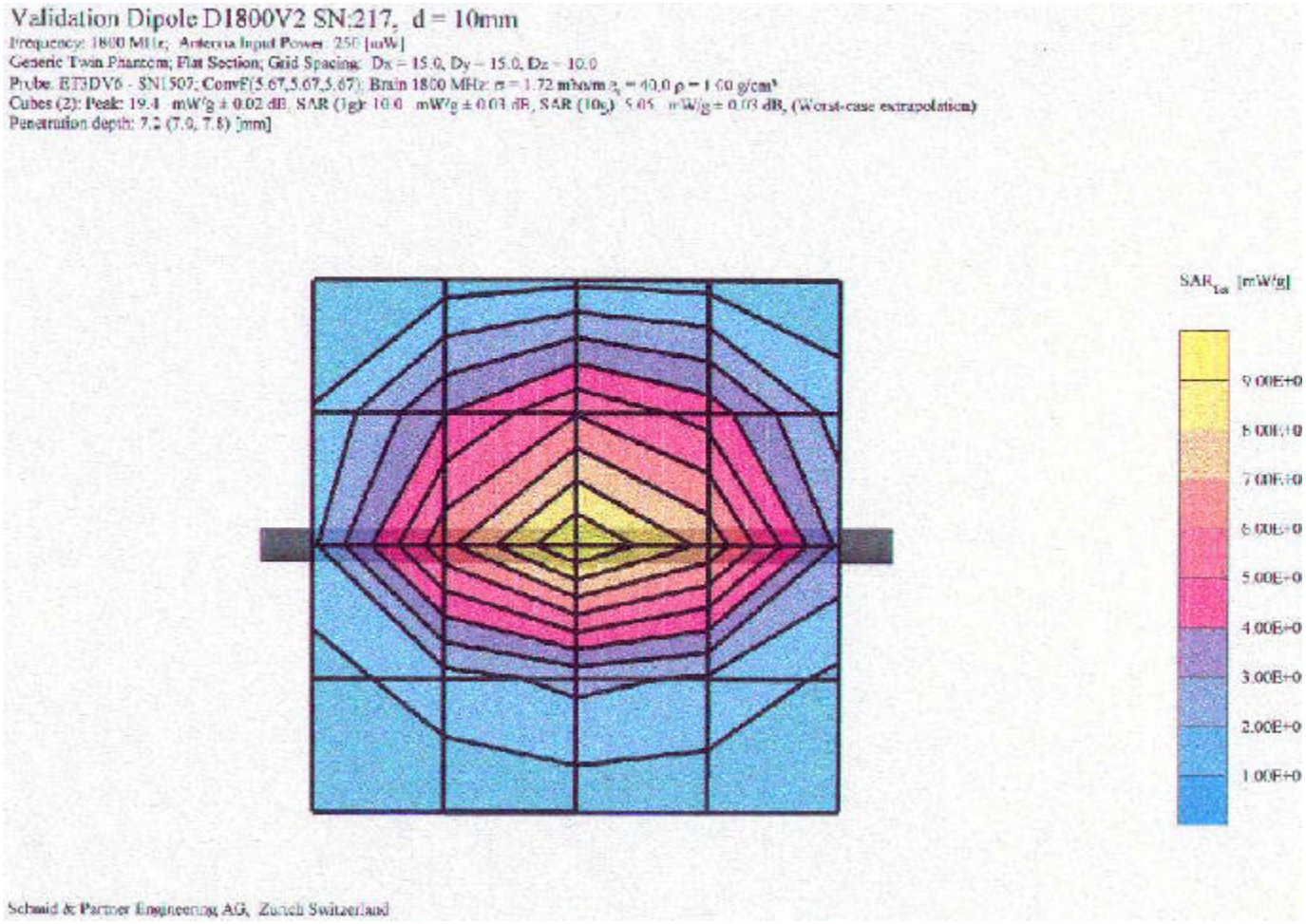

1800 MHz SAR distribution of validation dipole antenna from reference measurement. Using head/muscle tissue.

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Approved	Checked			
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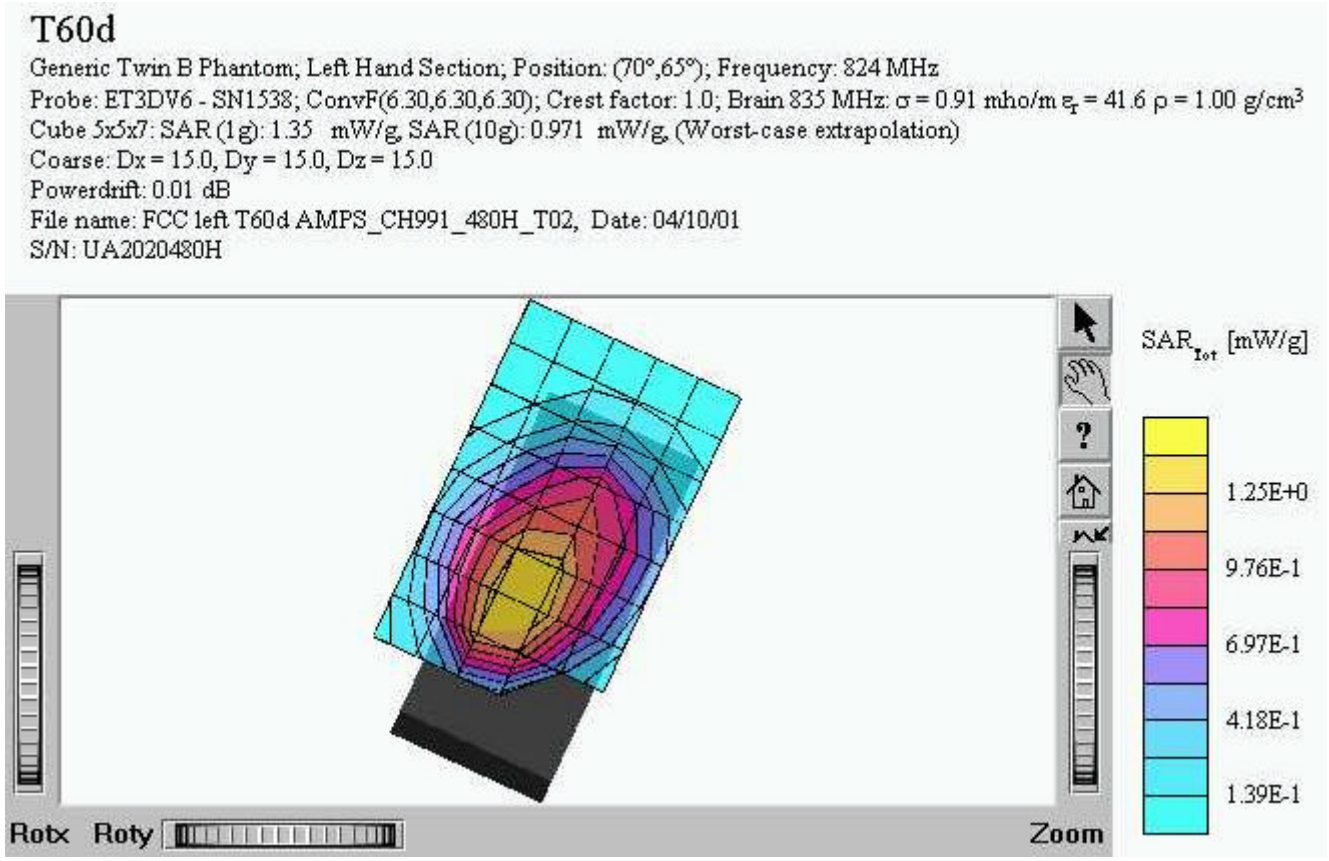
Appendix 2: SAR distribution plots



Distribution of maximum SAR in 800 AMPS band. Scan region covers left side. Measured against the head.

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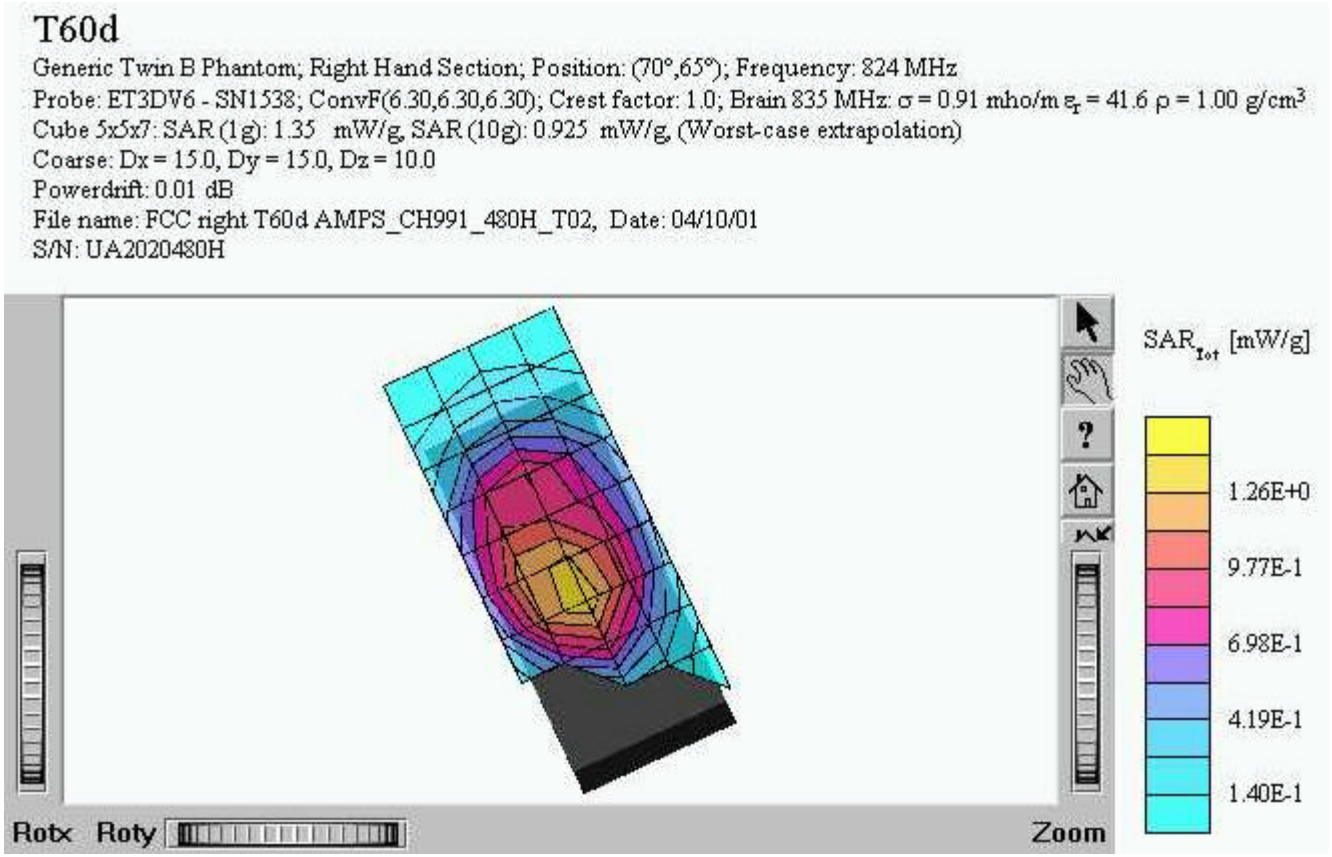
Approved	Checked			
EUS/CV/RF/P Mark Douglas	MGD	2001-4-25	C	U:\FCC Submittals\FCC_417 Ditto Nicole\XHIBIT11\New SAR.doc



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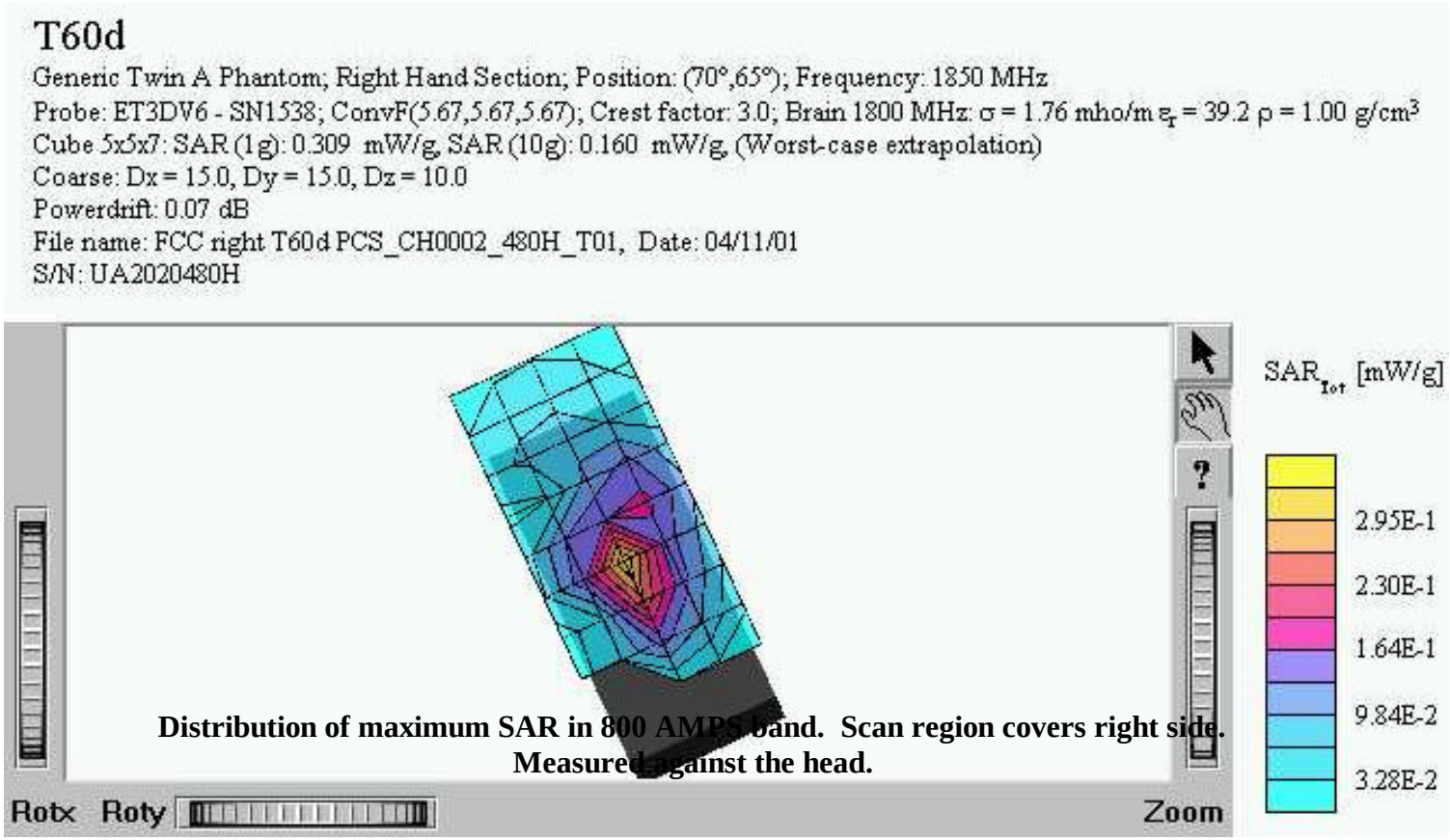

Distribution of maximum SAR in 800 AMPS band. Scan region covers right side. Measured against the head.

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Distribution of maximum SAR in 1900 PCS band. Measured against the head.

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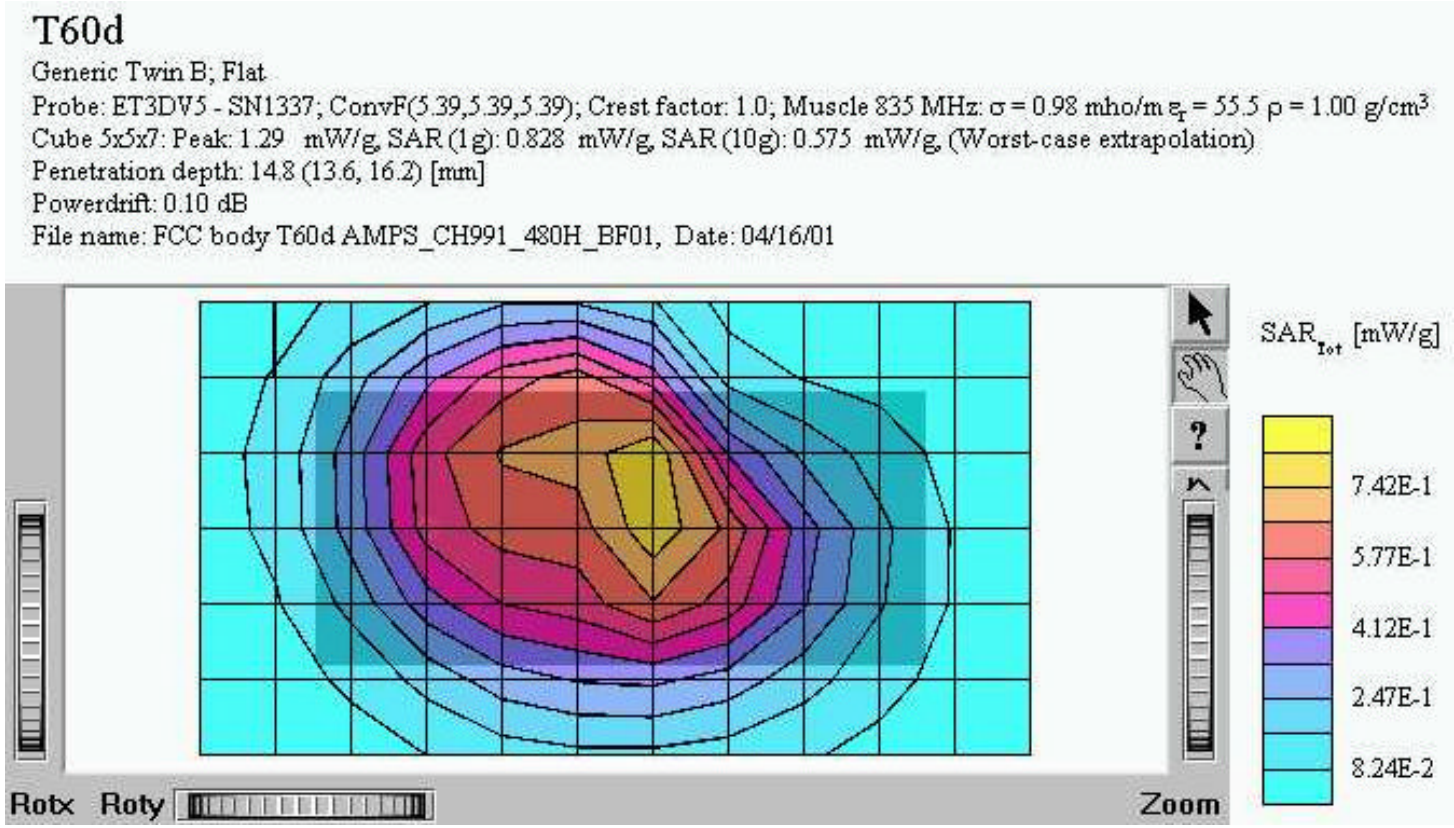

Distribution of maximum SAR in 800 AMPS band. Measured against the body using product # SXK –109-4518/1 as a carry case.