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Approved	Checked		
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc

Exhibit 11: SAR Test Report of Portable Cellular Phone
FCC ID: PY7A1031012 Model : T637 Hardware B Regression Testing

Date of test:
Date of Report:
March 17-18, 2004

Laboratory:
SAR Testing Laboratory
Sony Ericsson Mobile Communications, Inc.
7001 Development Drive, P.O. Box 13969, Research Triangle Park, NC, 27709, USA

Tested by:
Rodney Dixon
Technician III, Product Verification Group

Test Responsible:
Gerard Hayes
Consulting Engineer, Antenna/RF Development Group

Accreditation:
This laboratory is accredited to ISO/IEC 17025-1999 to perform the following electromagnetic exposure tests:

Specific Absorption Rate (SAR)
Dielectric parameters
RF power measurement

On the following types of products:
Wireless communications devices. A2LA certificate #1650-01

Statement of Compliance:
Sony Ericsson Mobile Communications, Inc declares under its sole responsibility that portable cellular telephone FCC ID PY7A1031012 model T637 with Hardware B modifications to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093). 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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This test report shall not be reproduced except in full, without written approval of the laboratory.
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.
Sony Ericsson Mobile Communications encourages all feedback, both positive and negative, on this test report.

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1. Introduction

The Sony Ericsson SAR Laboratory has performed measurements of the maximum potential exposure to the user of portable cellular phone FCC ID PYA1031012 model T637 with "Hardware B" modifications. The Specific Absorption Rate (SAR) of this product was measured. The applicable RF safety guidelines and the SAR measurement specifications used for the test are described in [1].

2. Description of the Device Under Test

2.1 Antenna description

Type	Internal antenna	
Location	Inside the back cover, near the top	
Dimensions	Width	38 mm
	Length	22 mm
Configuration	Patch antenna	

2.2 Device description

FCC ID Number / Device Model	PY7A1031012 / T637 Hardware B		
Serial number	BD3012GM1Y, BD3012GM2E and BD3012GKFH		
Mode(s) of Operation	GSM 800	GSM 1800	GSM 1900
Modulation Mode(s)	TDMA	TDMA	TDMA
Target Value for Maximum Output Power Setting	33 dBm	30 dBm	30 dBm
Factory Tolerance Window in Power Setting	± 1.0 dB	± 1.0 dB	± 1.0 dB
Duty Cycle	1/8	1/8	1/8
Transmitting Frequency Rang(s)	824-849 MHz	1710-1785 MHz	1850-1910 MHz
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype		
Device Category	Portable		
RF Exposure Limits	General Population / Uncontrolled		

3. Test Equipment Used

3.1 Dosimetric System

The Sony Ericsson SAR Laboratory utilizes a Dosimetric Assessment System (Dasy3™ v3.1d) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. The overall RSS uncertainty of the measurement system is ±10.61% (K=1) with an expanded uncertainty of ±21.22% (K=2). The measurement uncertainty budget is given in Appendix 5. The list of calibrated equipment used for the measurements is shown in the following table.

Description	Serial Number	Cal Due Date
DASY3 DAE V1	369	08-Sep-2004
DASY3 DAE V1	431	18-Jul-2004
E-Field Probe ETDV6	1583	16-Dec-2004
E-Field Probe ETDV6	1586	28-Aug-2004
Dipole Validation Kit, DV835V2	439	21-Jan-2005
S.A.M. Phantom used for 835MHz (Head)	1023	
S.A.M. Phantom used for 835MHz (Body)	1031	
Dipole Validation Kit, DV1800V2	217	21-Jan-2005
Dipole Validation Kit, DV1900V2	537	21-Jan-2005
S.A.M. Phantom used for 1800MHz (Head)	1020	
S.A.M. Phantom used for 1900MHz (Head)	1020	
S.A.M. Phantom used for 1900MHz (Body)	1030	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3537A01598	09-Sep-2004
Power Meter 437B	3125U113481	16-May-2004
Power Meter 437B	3125U13729	08-Jan-2005
Power Sensor - 8482H	MY41090240	13-May-2004
Power Sensor - 8482H	MY41090239	13-May-2004
Network Analyzer HP8752C	3410A3105	17-Sep-2004
Dielectric Probe Kit HP85070B	US33020256	23-Oct-2004
Digital Thermometer 61220-601	350078	10-Nov-2004
Thermometer Probe 61220-604	99172351	10-Nov-2004
Digital Hygrometer/ Thermometer	21242911	10-Nov-2004
AR Power Amplifier 5S1G4	19290	21-Jan-2005

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, along with the temperature of the simulated tissue are shown in the table below. A mass density of ρ=1g/cm3 was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits [1]. During the tests, the ambient temperature of the laboratory was in the range 22.7-23.9°C, the relative humidity was 21.0- 32.9 %, and the liquid depth above the ear reference points was more than 15.0 cm for all the cases. It is seen that the measured parameters are satisfactory for compliance testing.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Simulated Tissue Temp (°C)
835	Head	**Measured, 17-Mar-04**	40.7	0.88	22.9
		Recommended Limits	**41.50**	**0.90**	**20-25**
	Body	**Measured, 18-Mar-04**	55.2	0.97	23.4
		Recommended Limits	**55.20**	**0.97**	**20-25**
1800	Head	**Measured, 18-Mar-04**	38.4	1.35	22.6
		Recommended Limits	**40.00**	**1.40**	**20-25**
1900	Head	**Measured, 17-Mar-04**	38.1	1.46	22.1
		Recommended Limits	**40.00**	**1.40**	**20-25**
	Body	**Measured, 18-Mar-04**	51.7	1.53	22.6
		Recommended Limits	**53.30**	**1.52**	**20-25**

The list of ingredients and the percent composition used for the simulated tissue are indicated in the table below.

Ingredient	800MHz Head	800MHz Body	1800/1900MHz Head	1900MHz Body
Sugar	57.99%	56.00%	--	--
DGBE	--	--	44.92%	30.82%
Water	39.72%	41.76%	54.90%	68.89%
Salt	1.18%	0.76%	0.18%	0.29%
HEC	0.92%	1.21%	--	--
Bact.	0.19%	0.27%	--	--

5. System Accuracy Verification

A system accuracy verification of the DASY3 was performed using the measurement equipment listed in Section 3.1. The daily system accuracy verification occurs within the flat section of the SAM phantom.

A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR indicated on the dipole certification sheet. These tests were done at 835 MHz and/or 1800MHz/1900MHz. These frequencies are within 100MHz of the mid-band frequency of the test device, according to [1]. The test was conducted on the same days as the measurement of the DUT. The results from the system accuracy verification are displayed in the table below (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range 22.5-23.5 °C, the relative humidity was in the range 20.6 – 32.0 % and the liquid depth above the ear reference points was above 150 mm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The SAR distributions are shown in Appendix 1.

Daily, prior to conducting tests, measurements were made with the RF sources powered off to determine the system noise level. The highest system noise was 0.0006 W/kg, which is below the recommended limit in [1].

f (MHz)	Tissue Type	Description	SAR (W/kg) 1g / 10g	Dielectric Parameters ε_r	Dielectric Parameters σ (S/m)	Tissue Temp (°C)
835	Head	**Measured,** 17-Mar-04	9.32/ 6.08	40.7	0.88	22.9
		Recommended Limits	**9.50 / 6.20**	**41.50**	**0.90**	**20-25**
	Body	**Measured,** 18-Mar-04	9.62/6.33	55.2	0.97	23.4
		Recommended Limits	**9.90 / 6.46**	**55.20**	**0.97**	**20-25**
1800	Head	**Measured,** 18-Mar-04	37.7 / 19.9	38.4	1.34	22.6
		Recommended Limits	**38.1 / 19.80**	**40.00**	**1.40**	**20-25**
1900	Head	**Measured,** 17-Mar-04	41.6 /21.4	38.1	1.46	22.1
		Recommended Limits	**39.70 / 20.50**	**40.00**	**1.40**	**20-25**
	Body	**Measured,** 18-Mar-04	42.6 /22.5	51.74	1.53	22.6
		Recommended Limits	**40.50 / 20.89**	**53.30**	**1.52**	**20-25**

6. Test Results

The test samples were operated using a base station simulator and call processing software. For the purposes of this test the unit is commanded to set to the proper channel, transmitter power level and transmit mode of operation. The phone was tested in the configurations stipulated in [1, 2]. The phone was positioned into these configurations using the positioner supplied with the DASY 3.1d SAR measurement system.

The Cellular Phone FCC ID PY7A1031012 has the following battery option: Model #1 – BKB 193 167 Battery This battery was used for SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 4 are maximum SAR values averaged over 1 gram and 10 grams of phantom tissue. Also shown are the measured conducted output powers, the temperature of the test facility during the test, the temperature of the simulated tissue, the measured drift, and the extrapolated SAR. The extrapolated SAR corresponds to the measured SAR scaled to the maximum conducted output power.

The humidity and ambient temperature of the test facility were in the ranges 21.5-26.2% and 22.5-23.5°C, respectively. The SAR measurements were performed using the SAM phantoms listed in section 3.1.

The test conditions indicated as bold numbers in the following table are included in Appendix 2. For the purpose of regression analysis, these test conditions indicate the highest measured value for each band of operation (including "Right Cheek" for 800MHz, "Right Cheek" for 1800MHz, and "Right Tilt" for 1900MHz. All other test conditions measured lower SAR values than those included.

f (MHz)	Channel/ frequency	Conducted Output Power (dBm)	Left Head (Cheek / Touch Position)				
			Measured (W/kg) 1g / 10g	Drift (dB)	Extrapolated (W/kg) 1g / 10g	Ambient Temp (°C)	Simulate Temp (°C)
800 GSM	128 / 824	33.83	0.899 / 0.542	0.03	0.935/ 0.564	23.5	21.0
	189 / 837	33.24	0.944 / 0.540	-0.06	0.957/ 0.548	23.5	21.0
	251 / 849	32.71	0.993 / 0.600	-0.01	1.00 / 0.606	23.5	21.0
1800 GSM	512 / 1710	30.86	0.652 / 0.387	+0.14	0.673/ 0.400	23.4	21.2
	699 / 1748	30.22	0.492 / 0.294	+0.05	0.501 /0.299	23.4	21.2
	885 / 1785	30.93	0.462 / 0.274	-0.16	0.470 /0.278	23.4	21.2
1900 GSM	512 / 1850	30.90	0.610 / 0.367	-0.02	0.624 /0.376	23.3	21.5
	660/1880	30.23	0.586 / 0.347	-0.02	0.596 /0.353	23.3	21.5
	810/1910	30.92	0.607 / 0.358	-0.02	0.618 /0.365	23.3	21.5

Table 1: SAR measurement results for the portable cellular telephone FCC ID PY7A1031012 model T637 at maximum output power. Measured against the left head in the Cheek/Touch Position.

f (MHz)	Channel/ frequency	Conducted Output Power (dBm)	Right head (Cheek / Touch Position)				
			Measured (W/kg) 1g / 10g	Drift (dB)	Extrapolated (W/kg) 1g / 10g	Ambient Temp (°C)	Simulate Temp (°C)
800 GSM	128 / 824	33.83	0.769 / 0.474	-0.01	0.800/ 0.493	23.3	21.2
	189 / 837	33.24	0.837 /0.485	-0.12	0.849/ 0.492	23.3	21.2
	251 / 849	**32.71**	**1.02 / 0.574**	**+0.19**	**1.03 / 0.579**	**23.3**	**21.2**
1800 GSM	**512 / 1710**	**30.86**	**0.748 / 0.410**	**-0.11**	**0.773 /0.423**	**23.6**	**22.0**
	699 / 1748	30.22	0.547 / 0.300	-0.04	0.557 /0.306	23.6	22.0
	885 / 1785	30.93	0.567 / 0.310	+0.01	0.576 /0.315	23.6	22.0
1900 GSM	512 / 1850	30.90	0.837 / 0.463	+0.00	0.856 /0.474	23.2	21.4
	660/1880	30.23	0.794 / 0.441	-0.00	0.807 /0.448	23.2	21.4
	810/1910	30.92	0.819 / 0.460	-0.00	0.834 /0.469	23.2	21.4

Table 2: SAR measurement results for the portable cellular telephone FCC ID PY7A1031012 model T637 at maximum output power. Measured against the right head in the Cheek/Touch Position.

F (MHz)	Channel/ frequency	Conducted Output Power (dBm)	Left Head (15° Tilt Position)

			Left Head (15° Tilt Position)				
			Measured (W/kg) 1g / 10g	Drift (dB)	Extrapolated (W/kg) 1g / 10g	Ambient Temp (°C)	Simulate Temp (°C)
800 GSM	128 / 824	33.83	0.378 / 0.188	-0.05	0.402 / 0.196	23.4	21.0
	189 / 837	33.24	0.415 / 0.259	-0.04	0.421 / 0.263	23.4	21.0
	251 / 849	32.71	0.488 / 0.307	+0.01	0.493 / 0.310	23.4	21.0
1800 GSM	512 / 1710	30.86	0.739 / 0.415	-0.06	0.763 / 0.429	23.2	21.3
	699 / 1748	30.22	0.507 / 0.287	+0.10	0.516 / 0.292	23.2	21.3
	885 / 1785	30.93	0.538 / 0.301	-0.04	0.547 / 0.306	23.2	21.3
1900 GSM	512 / 1850	30.90	0.835 / 0.469	-0.04	0.854 / 0.480	23.3	21.2
	660/1880	30.23	0.767 / 0.441	-0.06	0.779 / 0.448	23.3	21.2
	810/1910	30.92	0.863 / 0.474	-0.05	0.879 / 0.483	23.3	21.2

Table 3: SAR measurement results for the portable cellular telephone FCC ID PY7A1031012 model T637 at maximum output power. Measured against the left head in the 15° Tilt Position.

F (MHz)	Channel/ frequency	Conducted Output Power (dBm)	Right Head (15° Tilt Position)				
			Measured (W/kg) 1g / 10g	Drift (dB)	Extrapolated (W/kg) 1g / 10g	Ambient Temp (°C)	Simulate Temp (°C)
800 GSM	128 / 824	33.83	0.407 / 0.245	-0.05	0.423 / 0.255	23.1	21.2
	189 / 837	33.24	0.381 / 0.235	+0.20	0.386 / 0.238	23.1	21.2
	251 / 849	32.71	0.538 / 0.324	-0.14	0.543 / 0.327	23.1	21.2
1800 GSM	512 / 1710	30.86	0.734 / 0.401	+0.03	0.758 / 0.414	23.4	21.9
	699 / 1748	30.22	0.565 / 0.308	-0.01	0.576 / 0.314	23.4	21.9
	885 / 1785	30.93	0.552 / 0.304	-0.04	0.561 / 0.309	23.4	21.9
1900 GSM	**512 / 1850**	**30.90**	**0.992 / 0.543**	**-0.12**	**1.015 / 0.556**	**23.3**	**21.5**
	660/1880	30.23	0.932 / 0.510	-0.05	0.947 / 0.518	23.3	21.5
	810/1910	30.92	0.936 / 0.516	-0.03	0.953 / 0.526	23.3	21.5

Table 4: SAR measurement results for the portable cellular telephone FCC ID PY7A1031012 model T637 at maximum output power. Measured against the right head in the 15° Tilt Position.

6.2 Body-Worn Test Results

The SAR results shown in table 5 are the maximum SAR values averaged over 1gram and 10 grams of phantom tissue. Also shown are the measured conducted output powers, the temperature of the test facility during the test, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The extrapolated SAR corresponds to the measured SAR scaled to the maximum conducted output power. The humidity and ambient temperature of the test facility were in the ranges 20.6-31.0% and 22.7-22.9°C, respectively.

A "flat" phantom was used for the body-worn tests. This "flat" phantom corresponds to the flat portion of the SAM phantom. The tissue stimulant depth above the ear canal was verified to be above 150mm in all the measurements. The same device holder described in section 6 was used for positioning the phone. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

For regression analysis, the following body-worn accessory (which measured the highest in the original filling) was tested for this phone: Carry case model ICT-25

For the 800MHz and 1900MHz bands, a full data set output of the test conditions with the highest SAR values from the DASY™ measurement system is included as Appendix 3. The test conditions included are indicated as bold numbers in the following table. All other test conditions measured lower SAR values than those included.

f (MHz)	Channel/ frequency	Conducted Output Power (dBm)	**Body Worn PHF: HPB-20 Carry Accessory: ICT-25 (Back of phone facing body)**				
			Measured (W/kg) 1g / 10g	Drift (dB)	Extrapolated (W/kg) 1g / 10g	Ambient Temp (°C)	Simulate Temp (°C)
800 GSM	128 / 824	33.83	0.645 / 0.427	-0.14	0.671 / 0.444	22.7	22.7
	189 / 837	33.24	0.615 / 0.426	+0.07	0.624 / 0.432	22.7	22.7
	251 / 849	**32.71**	**0.667 / 0.459**	**-0.04**	**0.673 / 0.463**	**22.7**	**22.7**
1900 GSM	**512 / 1850**	**30.90**	**0.932 / 0.513**	**-0.05**	**0.954 / 0.525**	**22.9**	**22.4**
	660/1880	30.23	0.720 / 0.405	0.00	0.732 / 0.412	22.9	22.4
	810/1910	30.92	0.699 / 0.402	-0.06	0.715 / 0.409	22.9	22.4

Table 5: SAR measurement results for the portable cellular telephone FCC ID PY7A1031012 model T637 at maximum output power. Measured against the body with carry accessory ICT-14. Back of the phone facing the flat phantom.

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References

[1] FCC, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions," Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01).

[2] IEEE, "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques," Std 1528-200X, Draft 6.5 – August 20, 2001.

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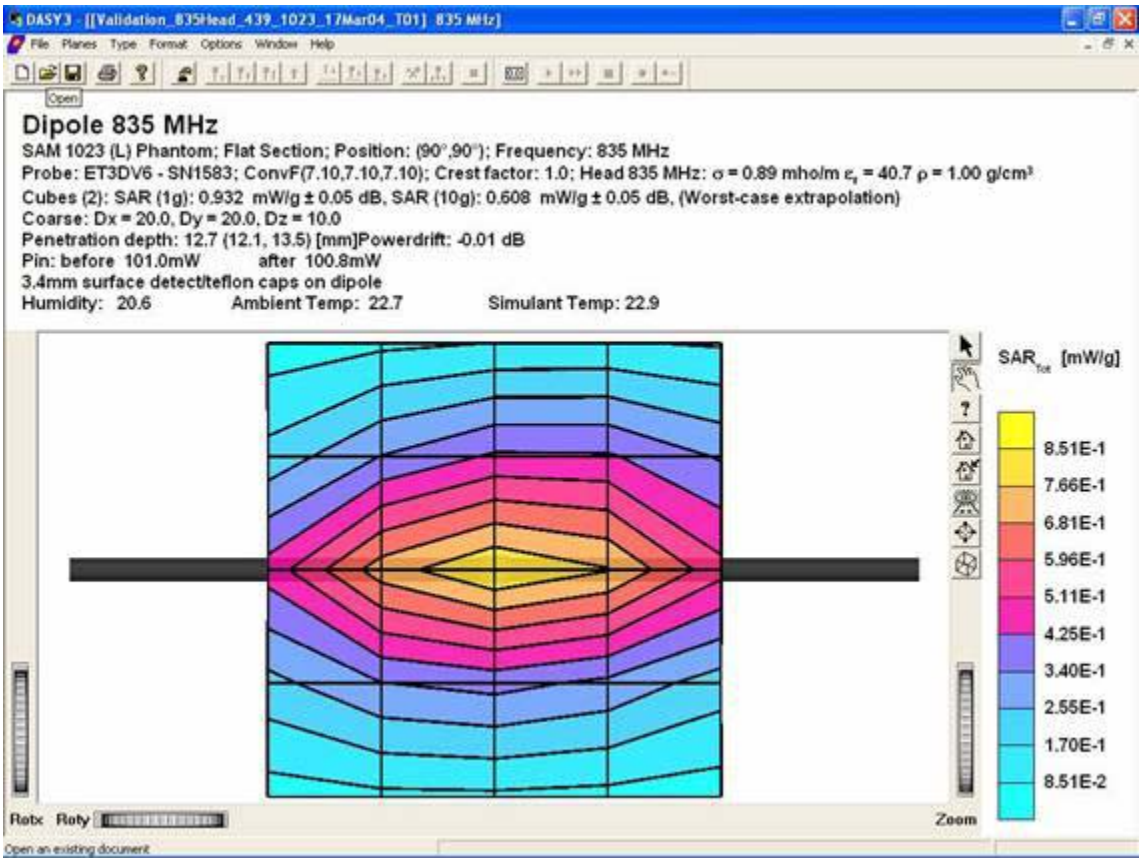
Appendix 1

SAR distribution comparison for the system accuracy verification



835 MHz SAR distribution of validation dipole antenna from system performance check on March 17, 2004 (Using head tissue).

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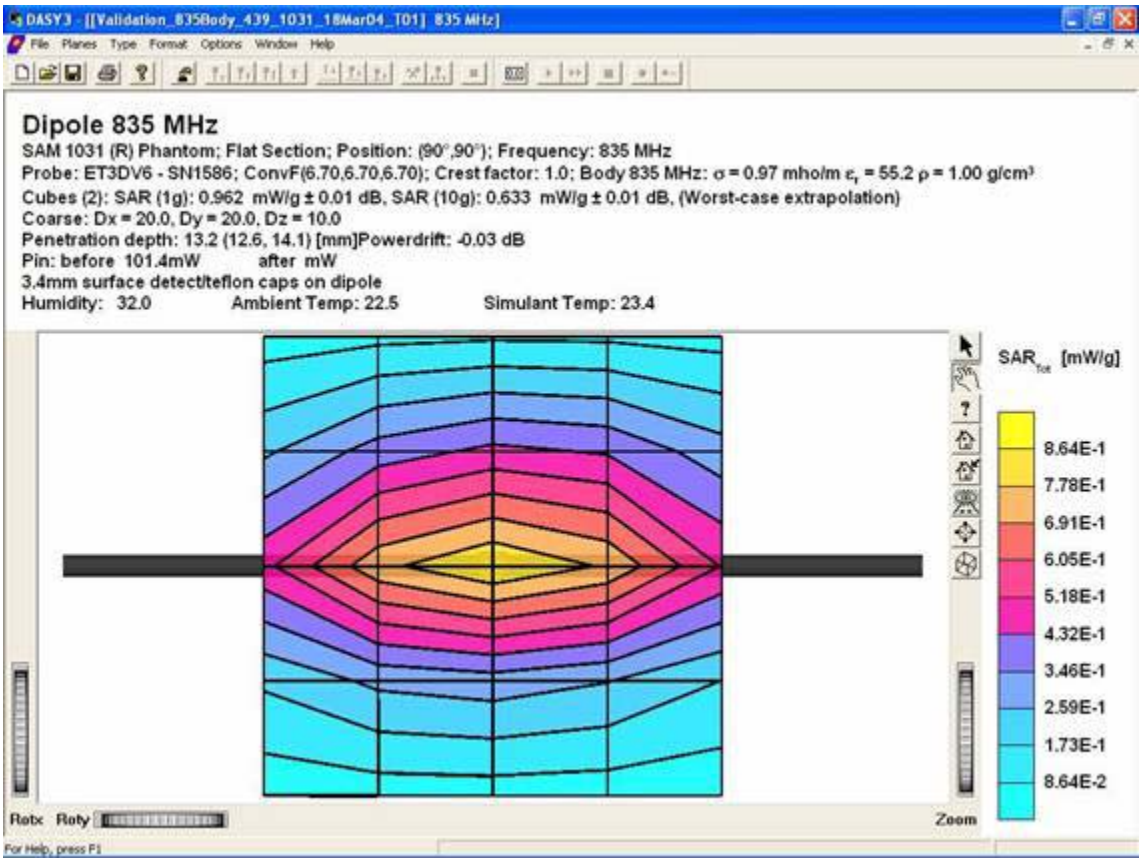

835 MHz SAR distribution of validation dipole antenna from system performance check on March 18, 2004 (Using muscle/body tissue).

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Approved	Checked		
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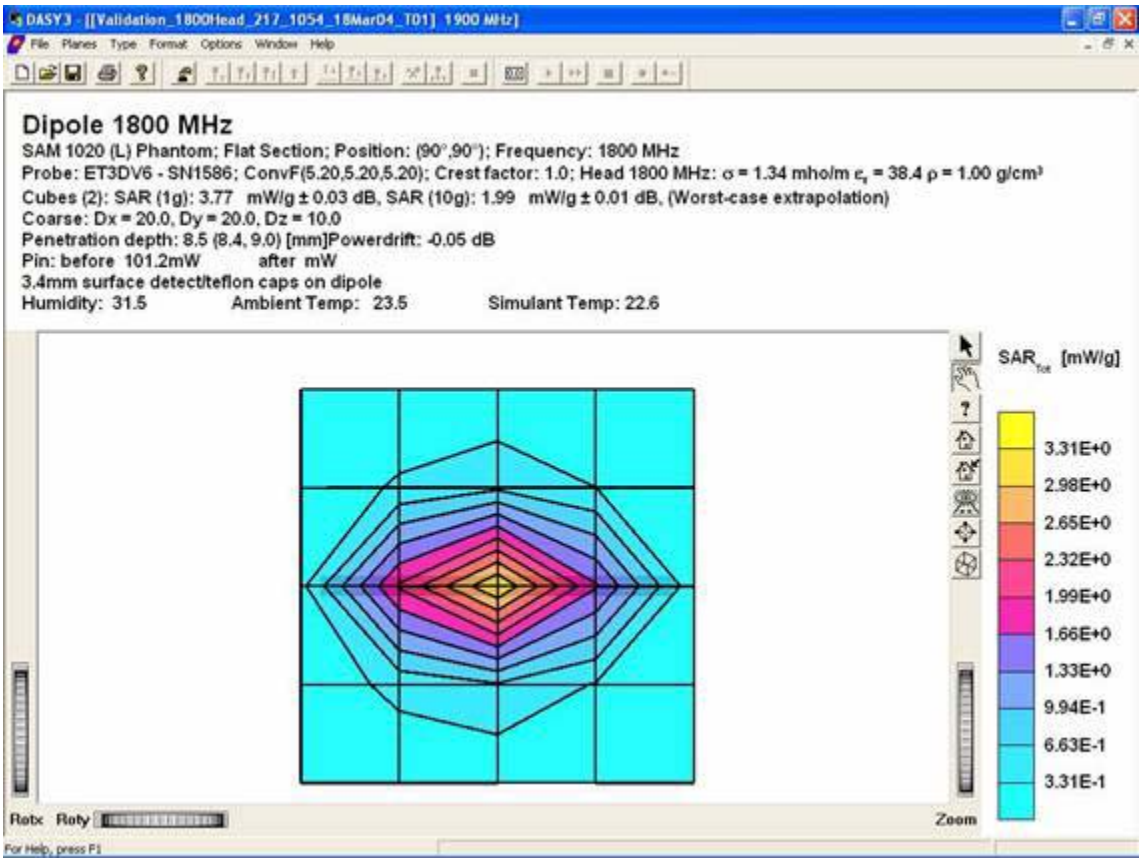
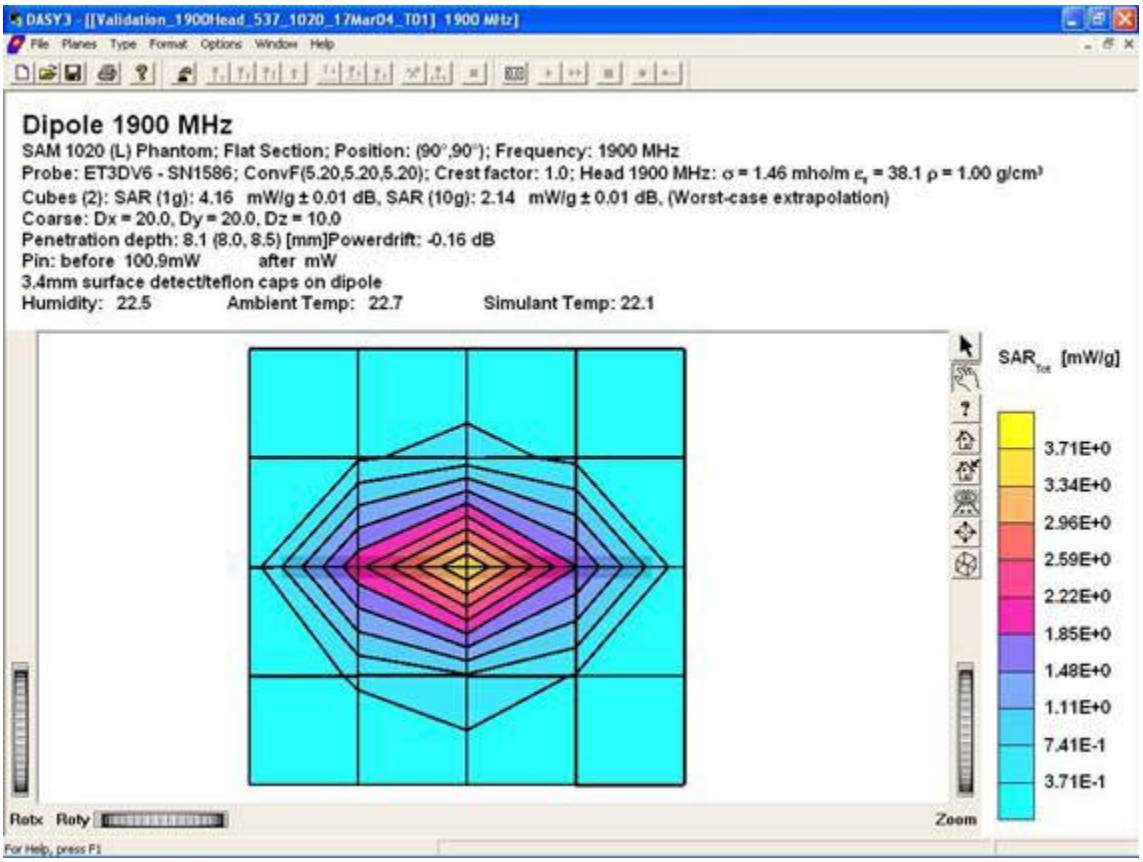


1800 MHz SAR distribution of validation dipole antenna from system performance check on March 18, 2004 (Using head tissue).



1900 MHz SAR distribution of validation dipole antenna from system performance check on March 17, 2004 (Using head tissue).

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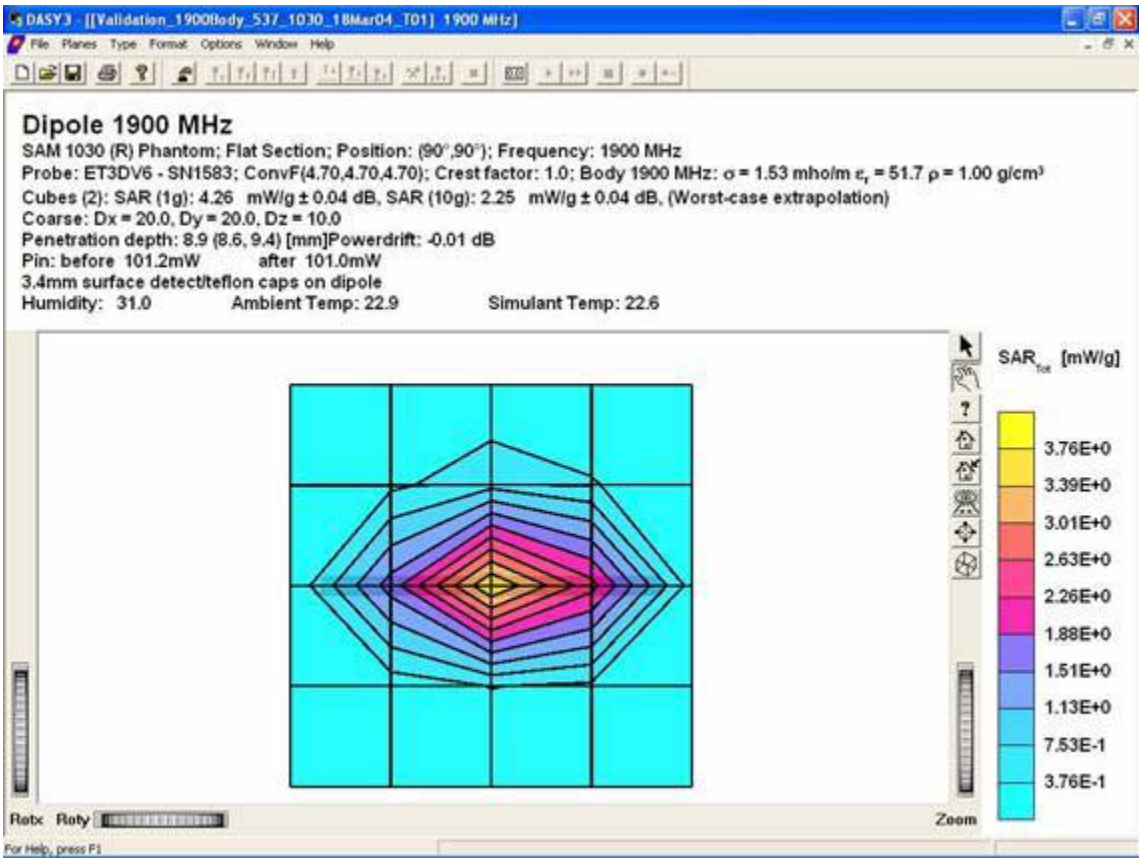

1900 MHz SAR distribution of validation dipole antenna from system performance check on March 18, 2004 (Using muscle/body tissue).

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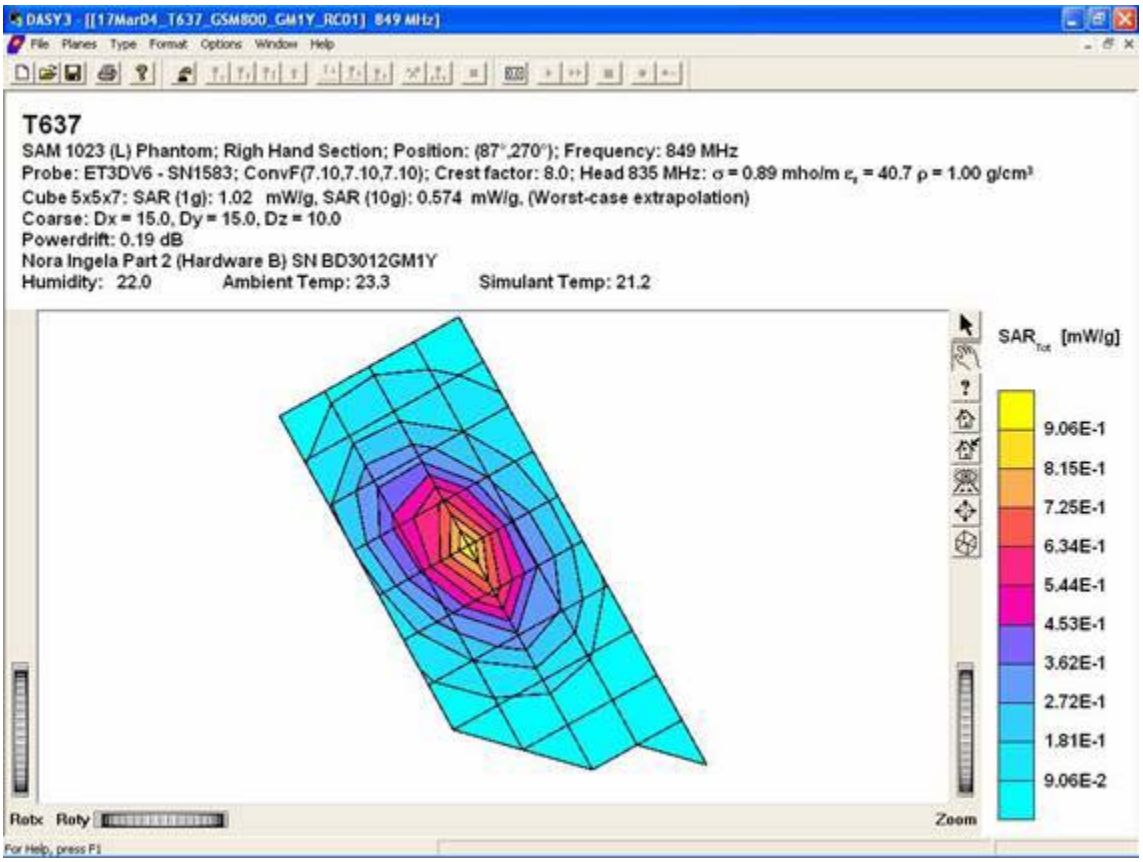
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use



Distribution of maximum SAR in 800 GSM band. Measured against the right hand side of the head in the "Cheek/Touch" position.

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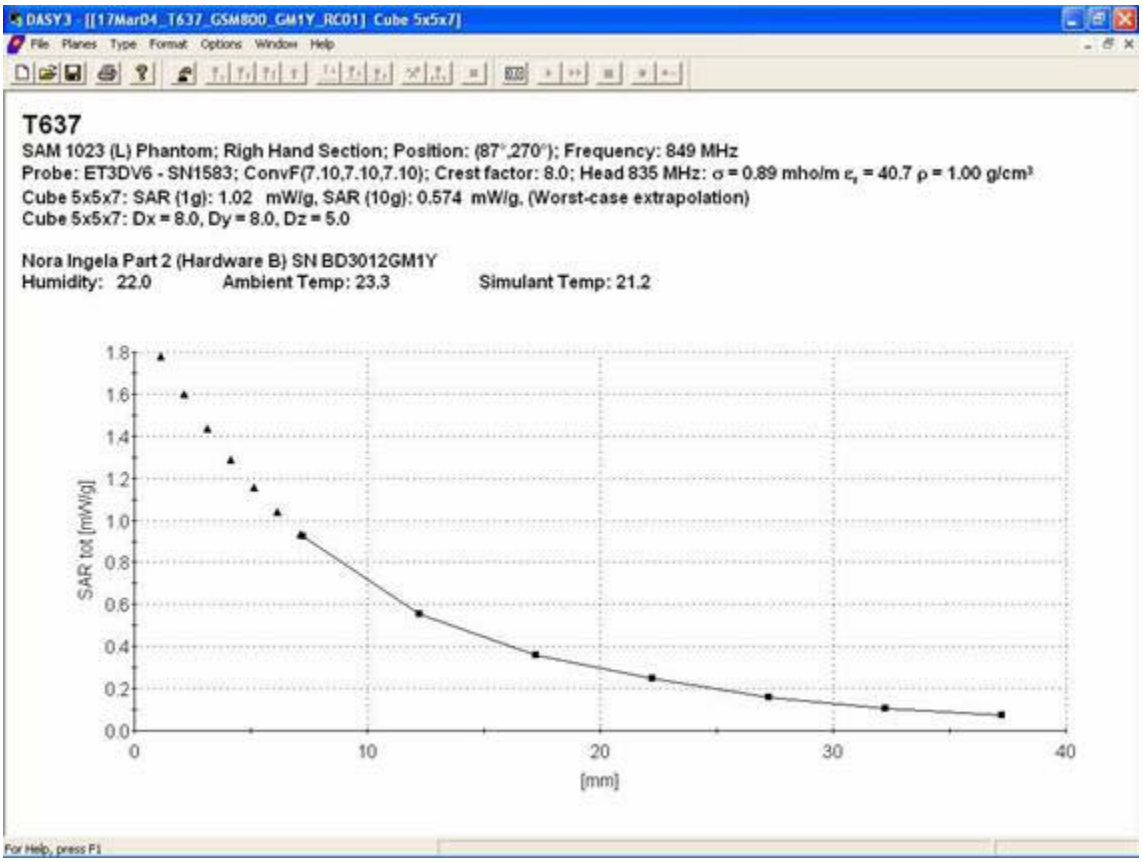
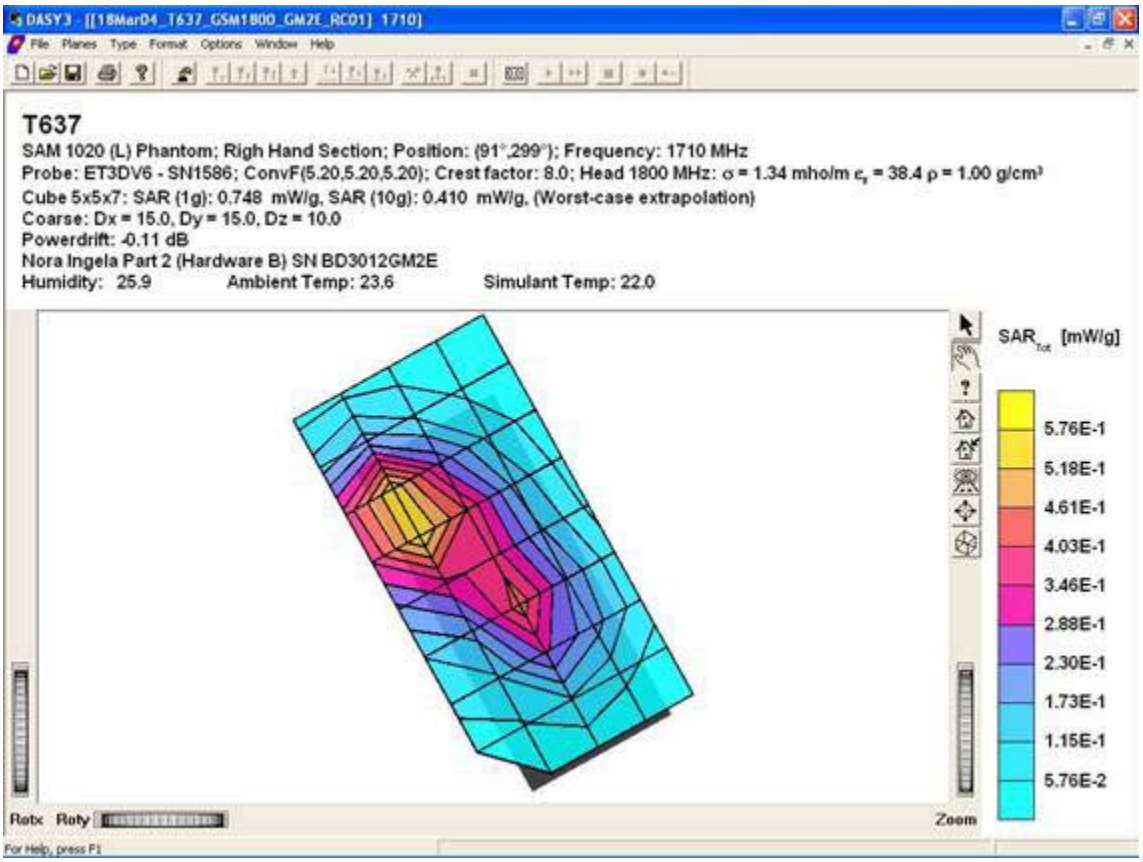


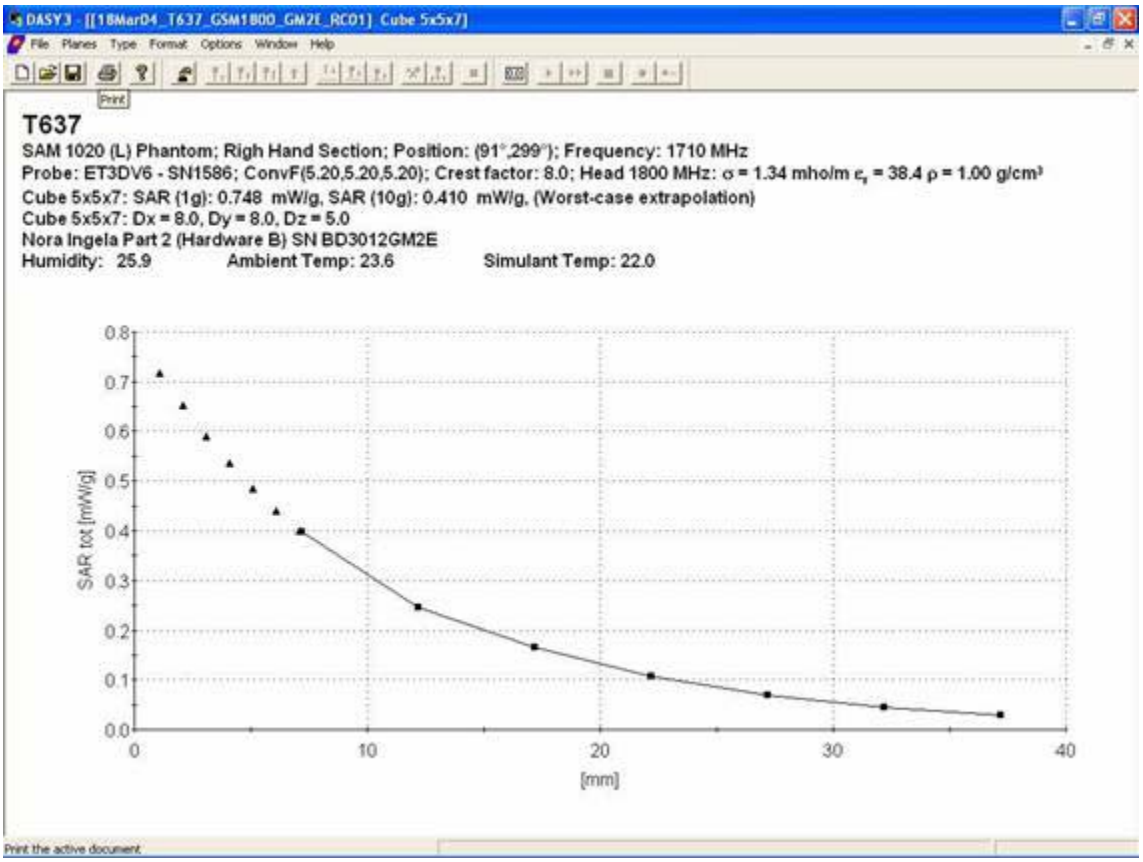
SAR Extrapolation to the phantom inner surface. Measured for Maximum SAR in 800 GSM band, while phone is against the right hand side of the head in the "Cheek/Touch"

Prepared (also subject responsible if other)		No.	
SEM/CA Gerard Hayes		SEM/CA -04:0003/REP	
Approved	Checked		
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc

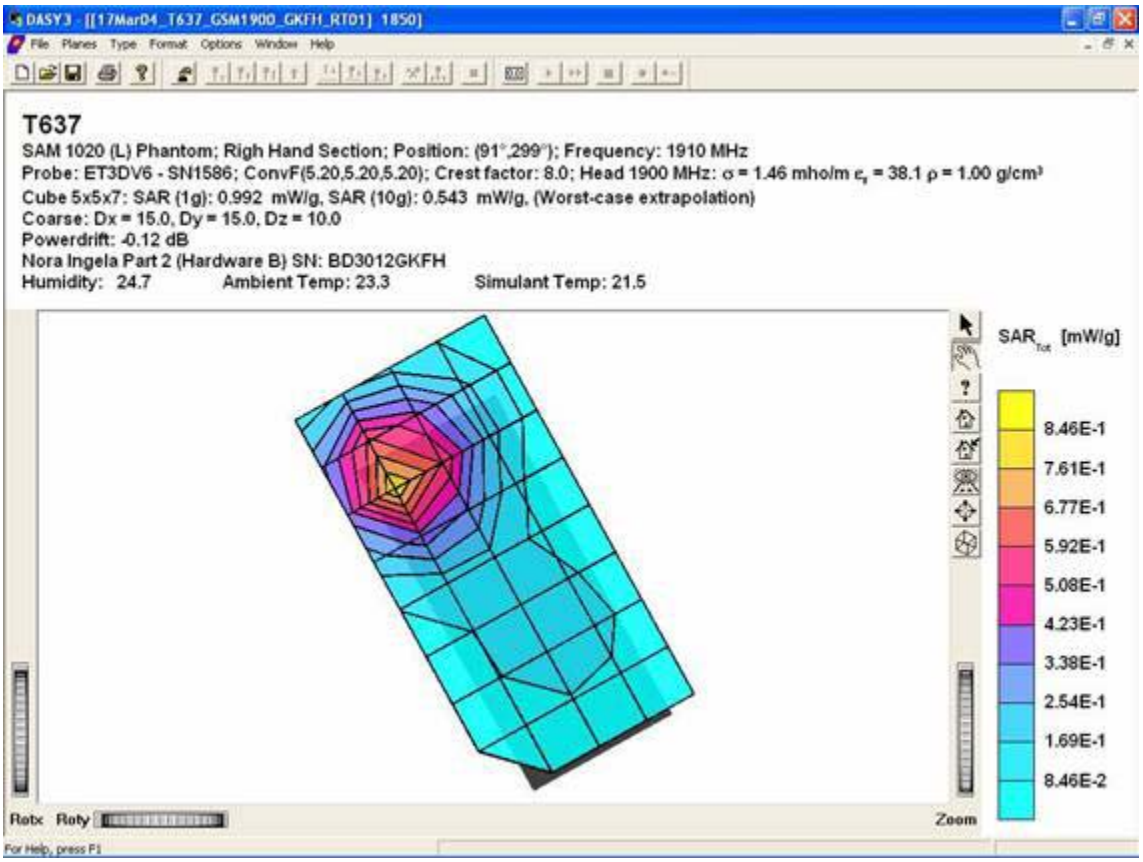


Distribution of maximum SAR in 1800 GSM band. Measured against the right hand side of the head in the "Cheek/Touch" position.

Prepared (also subject responsible if other)		No.	
SEM/CA Gerard Hayes		SEM/CA -04:0003/REP	
Approved	Checked		
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc

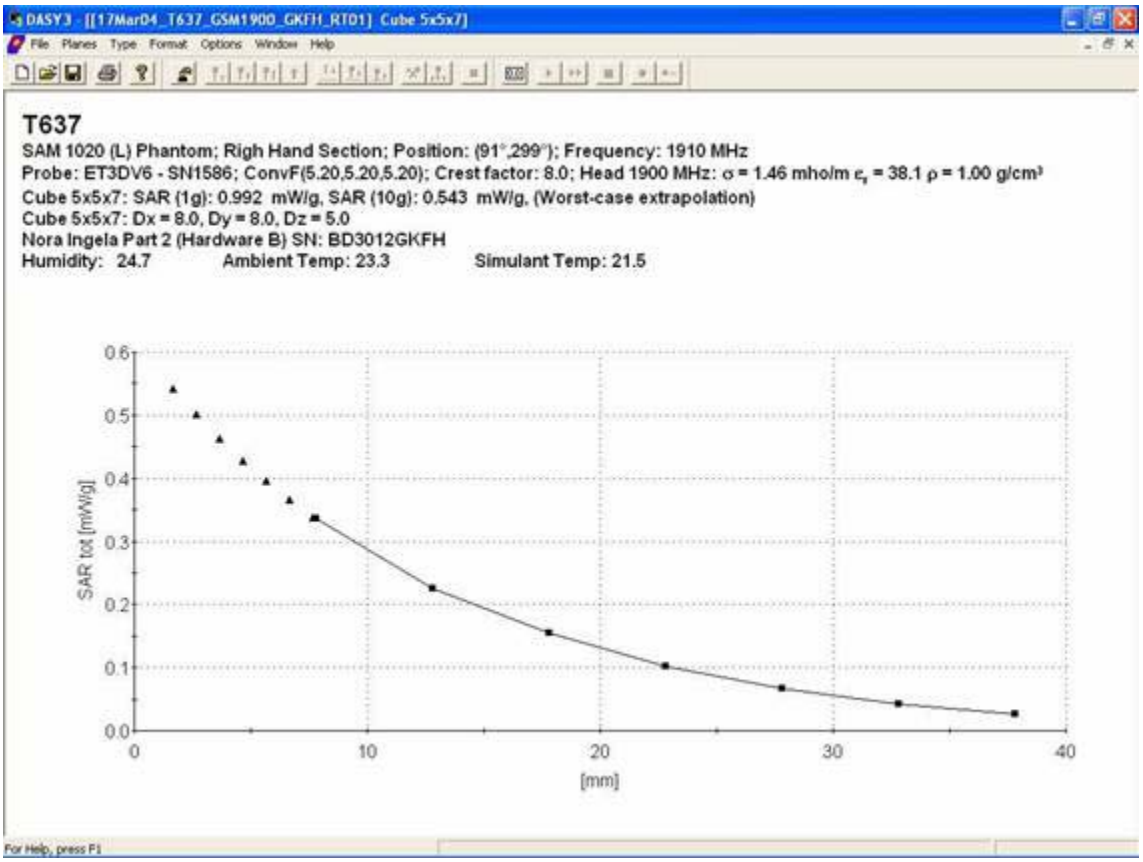


SAR Extrapolation to the phantom inner surface. Measured for Maximum SAR in 1800 GSM band, while phone is against the right hand side of the head in the "Cheek/Touch" position.



Distribution of maximum SAR in 1900 GSM band. Measured against the right hand side of the head in the "Tilt" position.

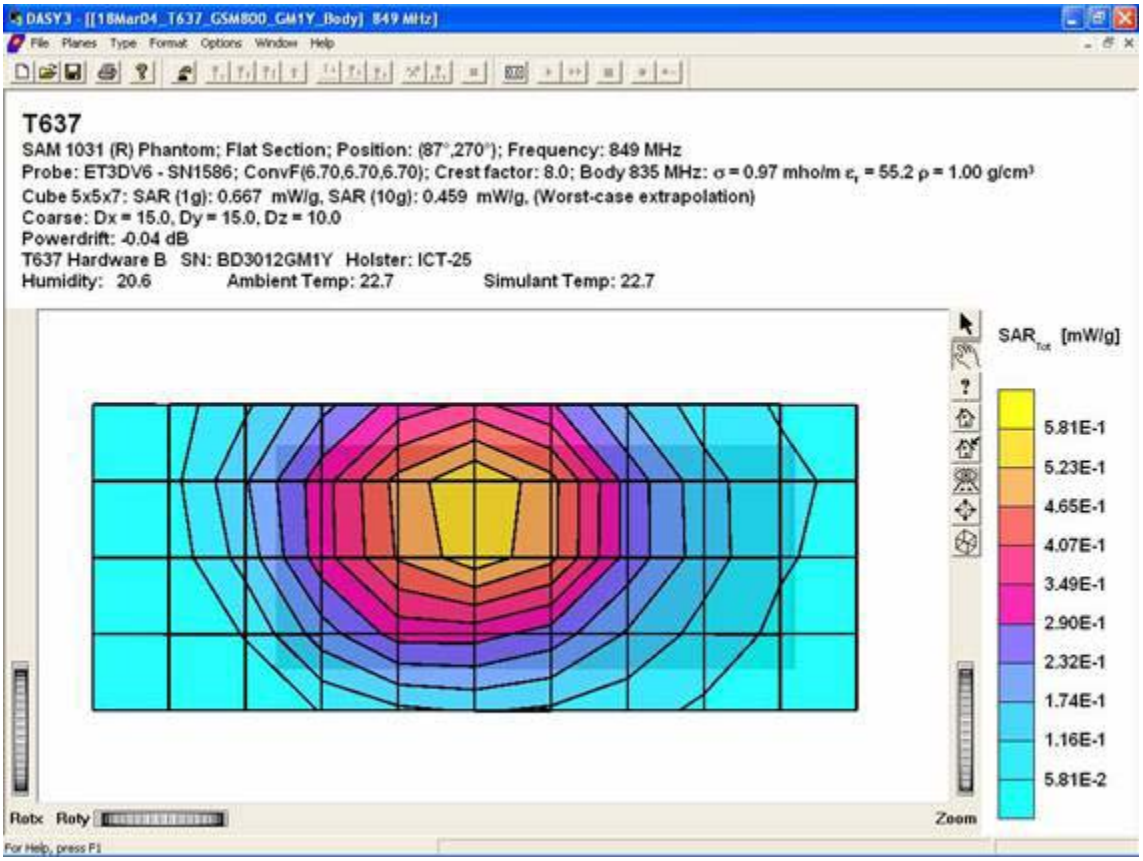
Prepared (also subject responsible if other)		No.	
SEM/CA Gerard Hayes		SEM/CA -04:0003/REP	
Approved	Checked		
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc



SAR Extrapolation to the phantom inner surface. Measured for Maximum SAR in 1900 GSM band, while phone is against the right hand side of the head in the "Tilt" position.

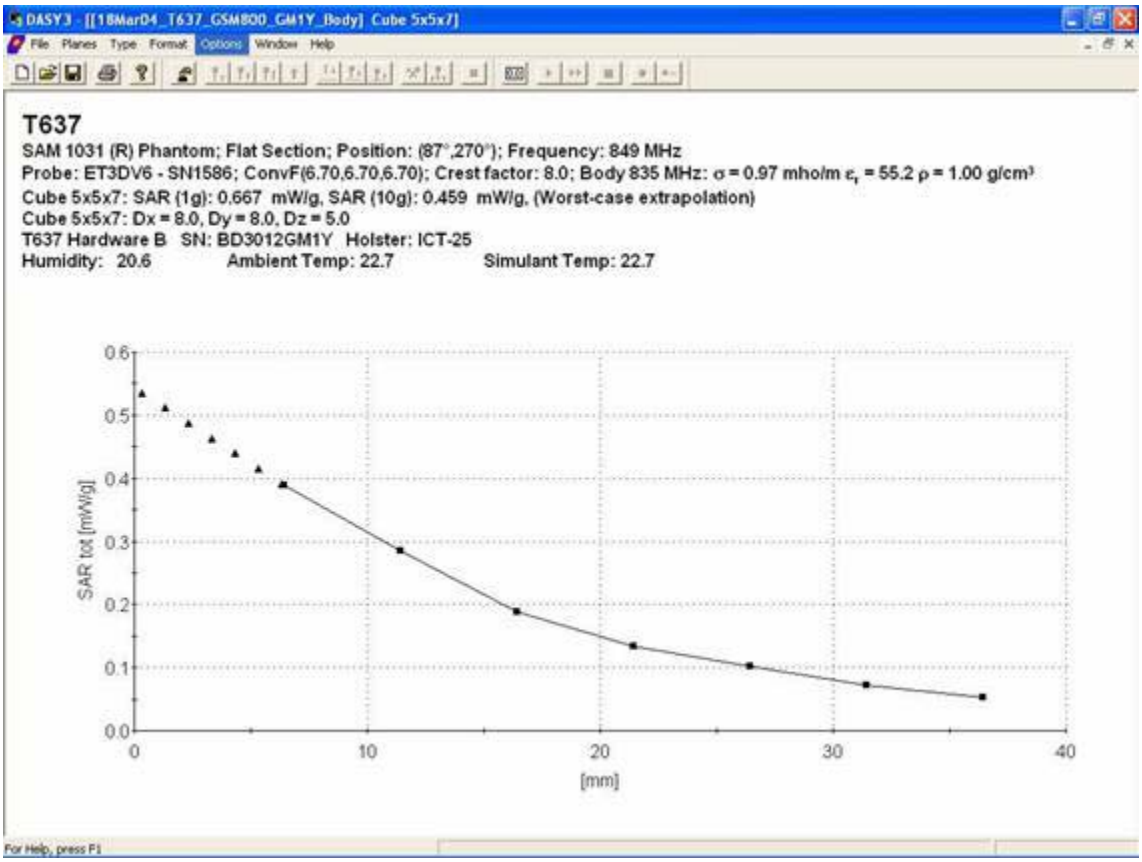
Appendix 3

SAR distribution plots for Body Worn Configuration

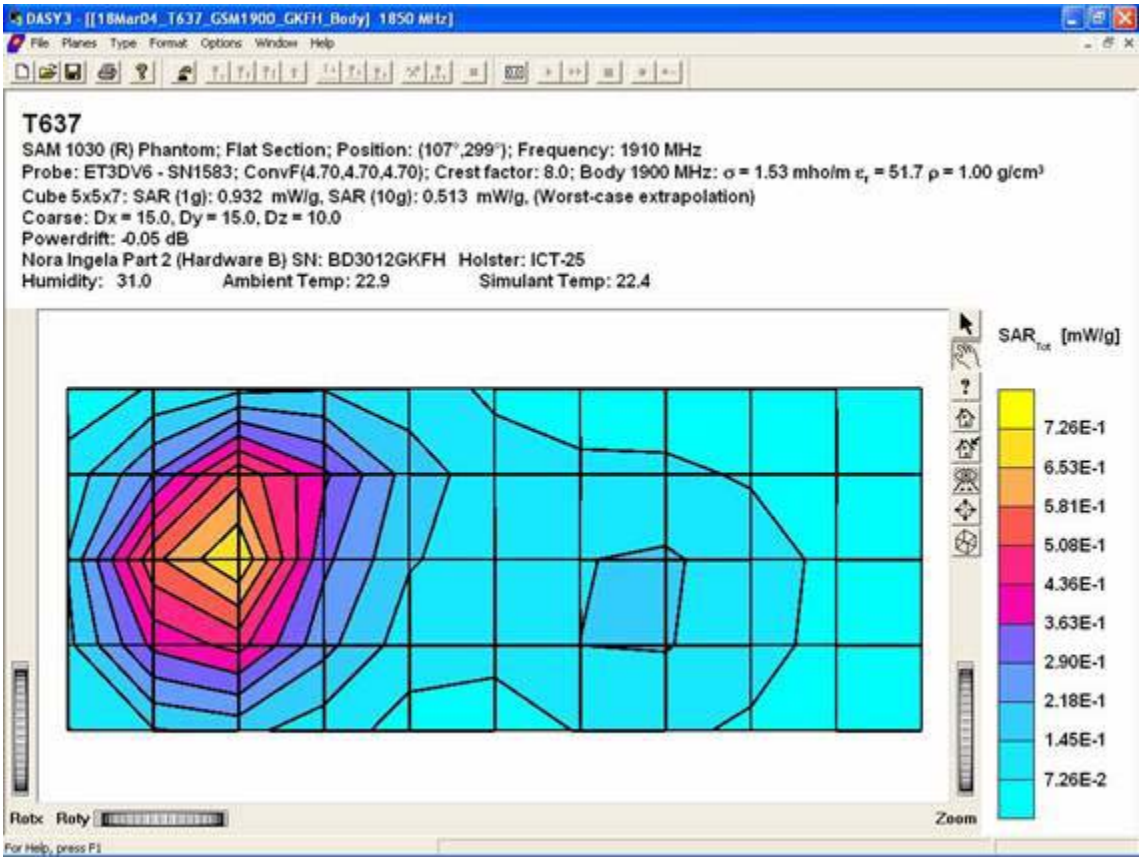


Distribution of maximum SAR in 800 GSM band. Measured with back of device facing the body using carry accessory ICT-25 and hands free accessory RLF 501 25/04 (HPE-14).

Prepared (also subject responsible if other)		No.	
SEM/CA Gerard Hayes		SEM/CA -04:0003/REP	
Approved	Checked		
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc

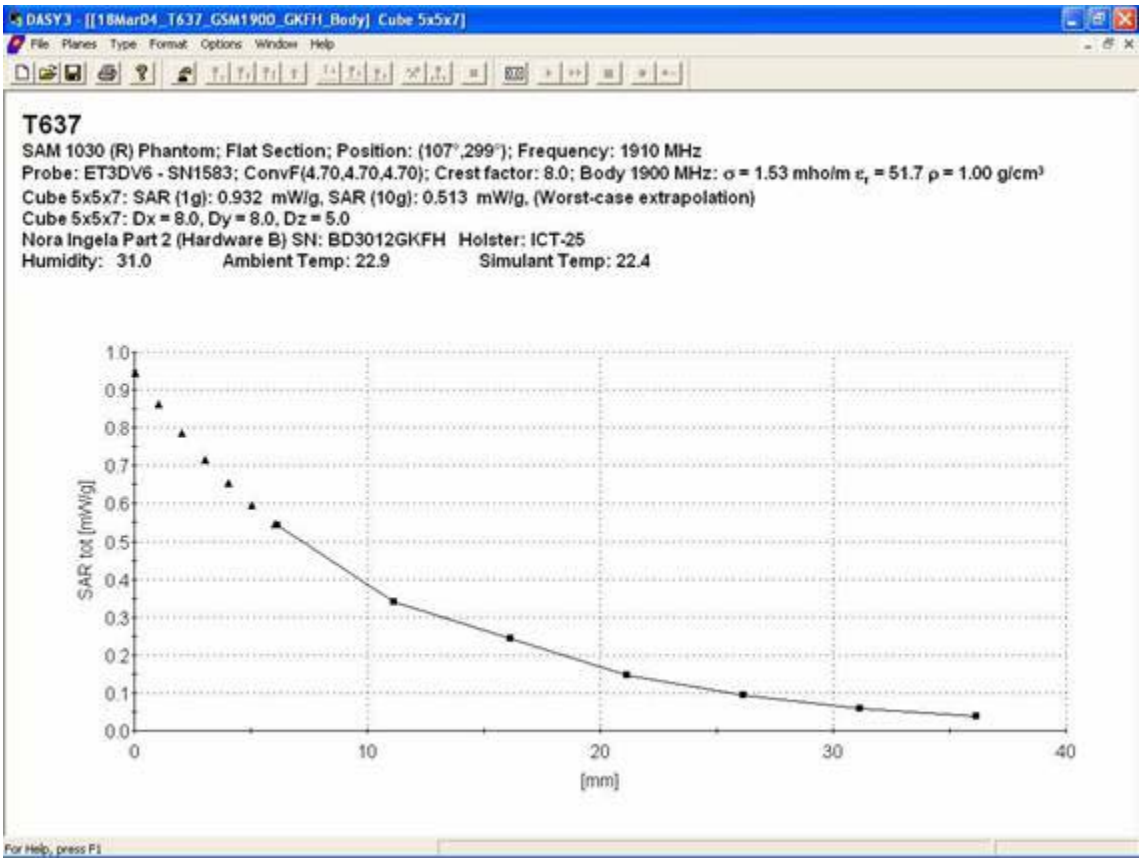


SAR Extrapolation to the phantom inner surface. Measured for maximum SAR in 800 GSM band, while phone is against the body using carry accessory ICT-25 and hands free accessory RLF 501 25/04 (HPE-14).



Distribution of maximum SAR in 1900 GSM band. Measured with back of device facing the body using carry accessory ICT-25 and hands free accessory RLF 501 25/04 (HPE-14).

Prepared (also subject responsible if other)		No.	
SEM/CA Gerard Hayes		SEM/CA -04:0003/REP	
Approved	Checked		
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc



SAR Extrapolation to the phantom inner surface. Measured for maximum SAR in 1900 GSM band, while back of the phone is against the body using carry accessory ICT-25 and hands free accessory RLF 501 25/04 (HPE-14).

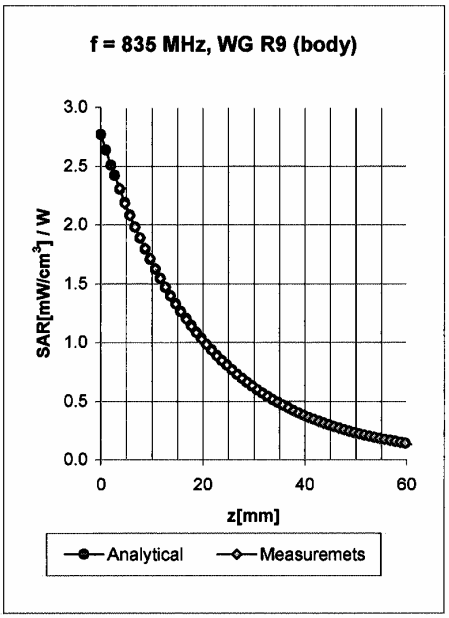
Prepared (also subject responsible if other)		No.	
SEM/CA Gerard Hayes		SEM/CA -04:0003/REP	
Approved	Checked		
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc

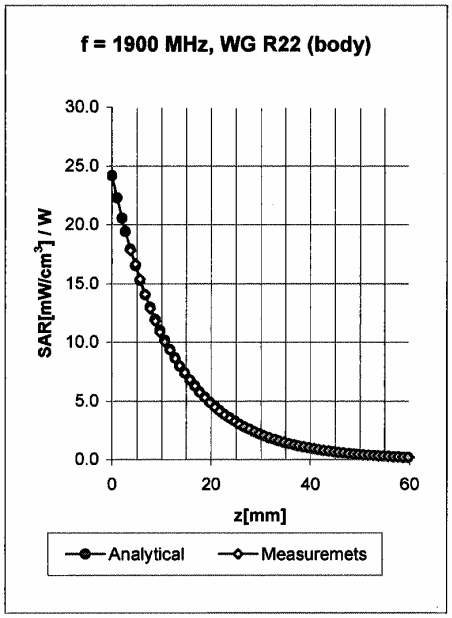
Appendix 4

Probe Calibration Certificate

ET3DV6 SN:1583 **December 16, 2003**

Conversion Factor Assessment





Body **835 MHz** ε_r **= 55.2 ± 5%** σ **= 0.97 ± 5% mho/m**

Valid for f=750-950 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**6.7** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.7** ± 9.5% (k=2)	Alpha	**0.32**
ConvF Z	**6.7** ± 9.5% (k=2)	Depth	**2.70**

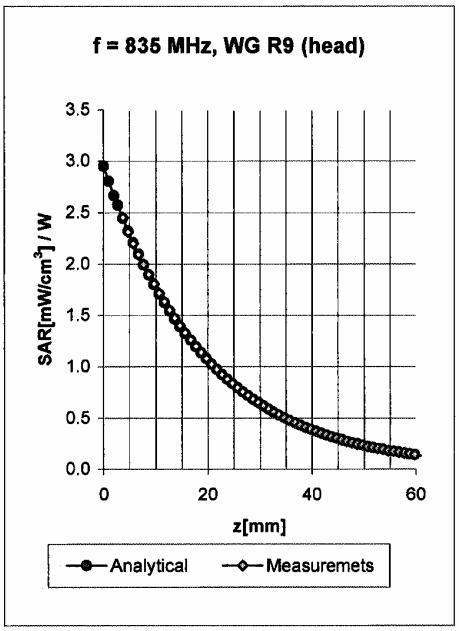
Body **1900 MHz** ε_r **= 53.3 ± 5%** σ **= 1.52 ± 5% mho/m**

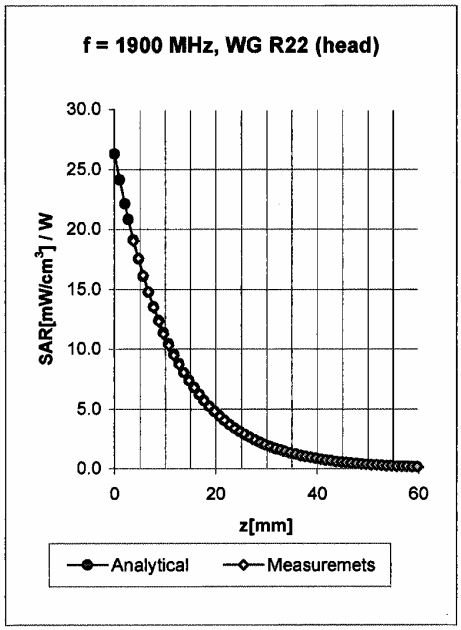
Valid for f=1800-2000 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.7** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.7** ± 9.5% (k=2)	Alpha	**0.60**
ConvF Z	**4.7** ± 9.5% (k=2)	Depth	**2.58**

ET3DV6 SN:1583 **December 16, 2003**

Conversion Factor Assessment





Head **835 MHz** ε_r **= 41.5 ± 5%** σ **= 0.90 ± 5% mho/m**

Valid for f=750-950 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**7.1**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**7.1**	± 9.5% (k=2)	Alpha	**0.29**
ConvF Z	**7.1**	± 9.5% (k=2)	Depth	**2.76**

Head **1900 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

Valid for f=1800-2000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.2**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.2**	± 9.5% (k=2)	Alpha	**0.47**
ConvF Z	**5.2**	± 9.5% (k=2)	Depth	**2.82**

ET3DV6 SN:1583 **December 16, 2003**

DASY - Parameters of Probe: ET3DV6 SN:1583

Sensitivity in Free Space

NormX	**1.76** $\mu V/(V/m)^2$	DCP X	**95** mV
NormY	**1.95** $\mu V/(V/m)^2$	DCP Y	**95** mV
NormZ	**1.92** $\mu V/(V/m)^2$	DCP Z	**95** mV

Sensitivity in Tissue Simulating Liquid

Head **835 MHz** ε_r **= 41.5 ± 5%** σ **= 0.90 ± 5% mho/m**

Valid for f=750-950 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**7.1** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**7.1** ± 9.5% (k=2)	Alpha	**0.29**
ConvF Z	**7.1** ± 9.5% (k=2)	Depth	**2.76**

Head **1900 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

Valid for f=1800-2000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.2** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.2** ± 9.5% (k=2)	Alpha	**0.47**
ConvF Z	**5.2** ± 9.5% (k=2)	Depth	**2.82**

Boundary Effect

Head **835 MHz** **Typical SAR gradient: 5 % per mm**

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	8.8	5.1
SAR_{be} [%]	With Correction Algorithm	0.4	0.5

Head **1900 MHz** **Typical SAR gradient: 10 % per mm**

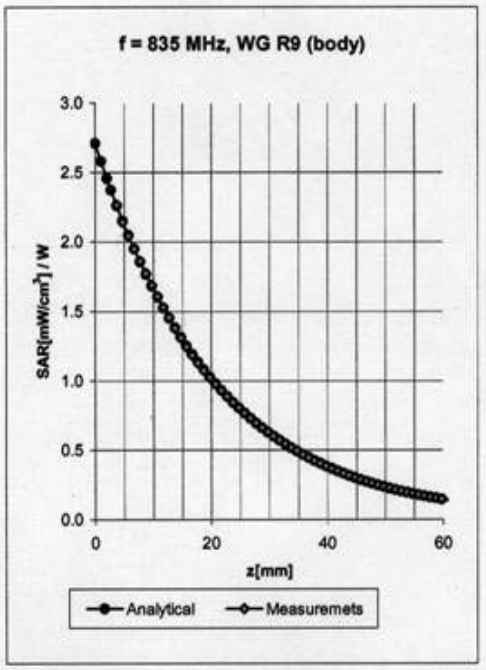
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	14.1	10.1
SAR_{be} [%]	With Correction Algorithm	0.3	0.3

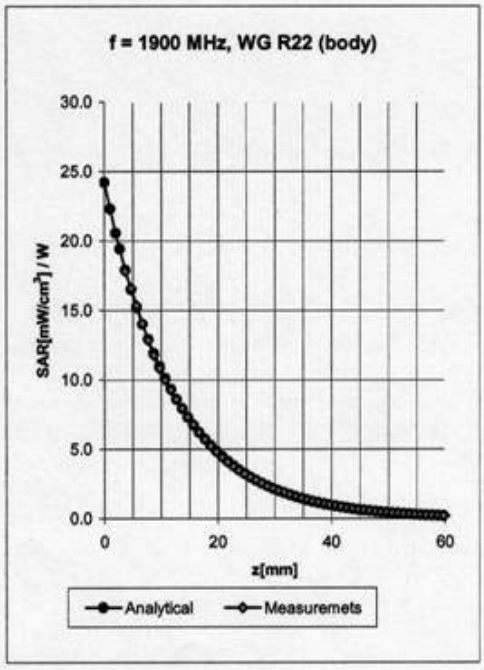
Sensor Offset

Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.8 ± 0.2**	mm

ET3DV6 SN:1586 **August 28, 2003**

Conversion Factor Assessment





Body	835 MHz	ε_r = 55.2 ± 5%	σ = 0.97 ± 5% mho/m

Valid for f=750-950 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	6.7 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.7 ± 9.5% (k=2)	Alpha	0.35
ConvF Z	6.7 ± 9.5% (k=2)	Depth	2.61

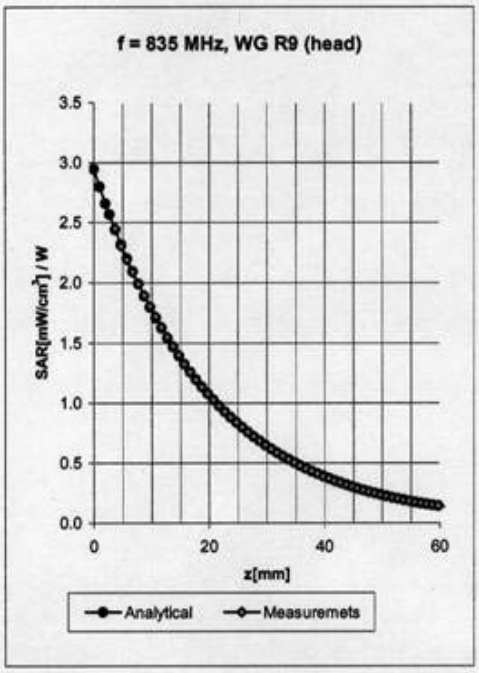
Body	1900 MHz	ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m

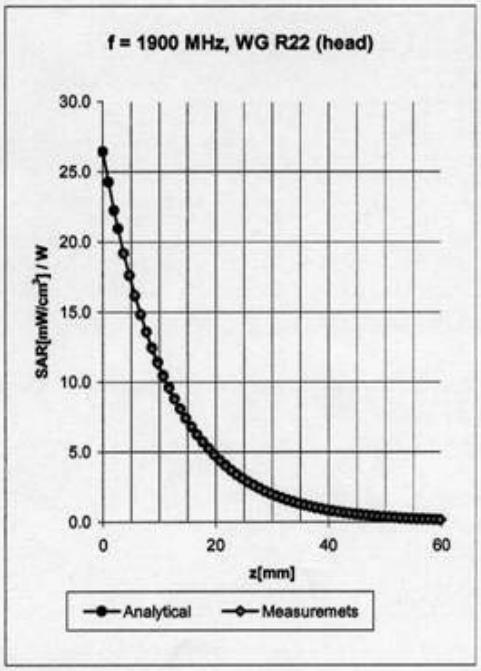
Valid for f=1800-2000 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	4.8 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	4.8 ± 9.5% (k=2)	Alpha	0.59
ConvF Z	4.8 ± 9.5% (k=2)	Depth	2.62

ET3DV6 SN:1586 **August 28, 2003**

Conversion Factor Assessment





Head 835 MHz ε_r = 41.5 ± 5% σ = 0.90 ± 5% mho/m

Valid for f=750-950 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	6.6 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.6 ± 9.5% (k=2)	Alpha	0.30
ConvF Z	6.6 ± 9.5% (k=2)	Depth	3.06

Head 1900 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1800-2000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	5.2 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.2 ± 9.5% (k=2)	Alpha	0.49
ConvF Z	5.2 ± 9.5% (k=2)	Depth	2.62

ET3DV6 SN:1586 **August 28, 2003**

DASY - Parameters of Probe: ET3DV6 SN:1586

Sensitivity in Free Space

NormX	1.88 µV/(V/m)^2	DCP X	96 mV
NormY	1.82 µV/(V/m)^2	DCP Y	96 mV
NormZ	1.83 µV/(V/m)^2	DCP Z	96 mV

Sensitivity in Tissue Simulating Liquid

Head 835 MHz ε_r = 41.5 ± 5% σ = 0.90 ± 5% mho/m

Valid for f=750-950 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	6.6 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.6 ± 9.5% (k=2)	Alpha	0.30
ConvF Z	6.6 ± 9.5% (k=2)	Depth	3.06

Head 1900 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1800-2000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	5.2 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.2 ± 9.5% (k=2)	Alpha	0.49
ConvF Z	5.2 ± 9.5% (k=2)	Depth	2.62

Boundary Effect

Head 835 MHz **Typical SAR gradient: 5 % per mm**

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	10.3	6.0
SAR_{be} [%]	With Correction Algorithm	0.5	0.7

Head 1900 MHz **Typical SAR gradient: 10 % per mm**

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	13.3	9.1
SAR_{be} [%]	With Correction Algorithm	0.2	0.2

Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.8 ± 0.2	mm

Prepared (also subject responsible if other)		No.	
SEM/CA Gerard Hayes		SEM/CA -04:0003/REP	
Approved	Checked		
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc

Appendix 5

Measurement Uncertainty Budget

Prepared (also subject responsible if other)		No.	
SEM/CA Gerard Hayes		SEM/CA -04:0003/REP	
Approved	Checked		
SEM/CA Gerard Hayes		A	X:\SAR Chamber\FCC reports\T637\Final Reports\T637 Hardware B Regression.doc

1. Table 1. Uncertainty Budget for System Performance Check (Dipole & flat phantom)

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i (1-g)**	**c_i (10-g)**	**1-g u_i (±%)**	**10-g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration (*k*=1)	E2.1	4.8	N	1	1	1	4.8	4.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	8.3	R	1.73	1	1	4.8	4.8	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1.0	N	1	1	1	1.0	1.0	∞
Response Time	E.2.7	0.0	R	1.73	1	1	0.0	0.0	∞
Integration Time	E.2.8	0.0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance(corresponds to the mechanical constrains of the robot)	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	1.73	1	1	1.7	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	3.9	R	1.73	1	1	2.3	2.3	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	1.0	R	1.73	1	1	0.6	0.6	∞
Input Power and SAR Drift Measurement	8, 6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty - shell thickness tolerance	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity - deviation from target values (5)	E.3.2	4.3	R	1.73	0.64	0.43	1.59	1.07	∞
Liquid Conductivity - measurement uncertainty (6)	E.3.3	6.20	R	1.73	0.64	0.43	2.29	1.54	∞
Liquid Permittivity - deviation from target values (5)	E.3.2	3.7	R	1.73	0.6	0.49	1.28	1.05	∞
Liquid Permittivity - measurement uncertainty (6)	E.3.3	6.08	R	1.73	0.6	0.49	2.11	1.72	∞
Combined Standard Uncertainty			RSS				10.61	10.31	
Expanded Uncertainty (95% CONFIDENCE LEVEL)							21.22	20.62	

2. Table 2. Uncertainty Budget for the Device Under Test

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i (1-g)**	**c_i (10-g)**	**1-g u_i (±%)**	**10-g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration (*k*=1)	E2.1	4.8	N	1	1	1	4.8	4.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	8.3	R	1.73	1	1	4.8	4.8	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1.0	N	1	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	1.4	R	1.73	1	1	0.8	0.8	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance(corresponds to the mechanical constrains of the robot)	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	1.73	1	1	1.7	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	3.9	R	1.73	1	1	2.3	2.3	∞
Test sample Related									
Test Sample Positioning	E.4.2	1.8	N	1	1	1	1.8	1.8	4
Device Holder Uncertainty	E.4.1	1.6	R	1.73	1	1	0.9	0.9	4
Output Power Variation - SAR drift measurement (4)	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity - deviation from target values (5)	E.3.2	4.3	R	1.73	0.64	0.43	1.6	1.1	∞
Liquid Conductivity - measurement uncertainty (6)	E.3.3	6.20	R	1.73	0.64	0.43	2.3	1.5	∞
Liquid Permittivity - deviation from target values (5)	E.3.2	3.7	R	1.73	0.6	0.49	1.3	1.0	∞
Liquid Permittivity - measurement uncertainty (6)	E.3.3	6.08	R	1.73	0.6	0.49	2.1	1.7	∞

Combined Standard Uncertainty			RSS				10.83	10.54	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			K=2				21.67	21.08	

Table 4a. Values for ε'

Uncertainty Component	Tolerance (±%)	Probability Distribution	Divisor	c_i	Standard Uncertainty (±%)	v_i or v_{eff}
Repeatability (n repeats)	0.97	N	1	1	0.97	4
Network analyzer uncertainty sources	8.38	R	1.73	1	4.83	∞
Dielectric Error Sources	5.93	R	1.73	1	3.42	∞
Combined standard uncertainty					6.08	

Table 4b. Values for σ

Uncertainty Component	Tolerance (±%)	Probability Distribution	Divisor	c_i	Standard Uncertainty (±%)	v_i or v_{eff}
Repeatability (n repeats)	1.85	N	1	1	1.85	4
Network analyzer uncertainty sources	8.38	R	1.73	1	4.83	∞
Dielectric Error Sources	5.93	R	1.73	1	3.42	∞
Combined standard uncertainty					6.20	