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Prepared (also subject responsible if other)		No.		
LD/SEMC/BGUG/NM Hamid Kami Shirazi		GUG/N 04:127		
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGUG/NMC Mats Hansson	040622	040622	A	File

SAR Test Report: PY7A1021051

Date of test: May. 19 to April. 01, 2004

Laboratory: Electromagnetic Near Field and Radio Frequency Dosimetry Lab

Sonyericsson Mobile Communications AB
Nya Vatentornet
SE-221 82 LUND, Sweden

Test Responsible:

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Statement of Compliance

Sony Ericsson Mobile Communications AB declares under its sole responsibility that the product

Sony Ericsson Type AAB-1021051-BV ; FCC ID: PY7A1021051

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

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1 Table of contents

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2 Introduction

In this report, compliance of the Sony Ericsson PY7A1021051portable telephone with RF safety guidelines is demonstrated. The applicable RF safety guidelines and the SAR measurement specifications used for the test are described in the *SAR Measurement Specifications of Wireless Handsets* [1].

3 Device Under Test

3.1 Antenna Description

Type	Internal antenna	
Location	Inside back, near the top	
Dimensions	Max length	38mm
	Max width	14mm
Configuration	PIFA	

3.2 Device description

Device model	S700i
Serial number	004601/01/485524
Mode	GSM 1900
Multiple Access Scheme	TDMA
Maximum Output Power Setting	29
Factory Tolerance in Power Setting	± 0.5dB
Maximum Peak Output Power	29.5dBm
Crest Factor	8
Transmitting Frequency Range	1850.2 – 1909.8 MHz
Prototype or Production Unit	Preproduction
Device Category	Portable
RF exposure environment	General population / uncontrolled

4 Test equipment

4.1 Dosimetric system

SAR measurements were made using the DASY3 professional system (software version 3.1c) with SAM twin phantom, manufactured by Schmid & Partner Engineering AG (SPEAG). The list of calibrated equipment is given below.

Description	*Serial Number*	*Due Date*
DASY3 DAE V1	419	4/2005
E-field probe ETDV6	1585	4/2005
Dipole Validation Kit, D1900 V2	5d002	2/2006

4.2 Additional equipment

Description	*Inventory Number*	*Due Date*
Signal generator ESG-D4000A	INV 462935	9/2004
Directional coupler HP778D	INV 2903	1/2005
Power meter R&S NRVD	INV 483920	1/2005
Power sensor R&S NRV-Z5	INV 2333	1/2005
Power sensor R&S NRV-Z5	INV 2334	1/2005
Termination 65N50-0-11	INV 2903	1/2005
Network analyzer HP8753C	INV421671	8/2004
S-parameter test set HP85047A	INV 421670	9/2004
Dielectric probe kit HP8507D	INV 20000053	2/2005
Radio Communication Tester	INV 74410	4/2005

5 Electrical parameters on 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 software is also given. Recommended limits for permittivity ε_r, conductivity σ and mass density ρ are also shown.

Application Note: The head and body tissue dielectric parameter recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table is prepared according to the following receipts. **For 1900MHz Head: Water 54.9%, Salt 0.18% and DGBE 44.92%, and**
For 1900MHz Body: Water 56.1%, DGBE 33.4%, Salt 0.5%,

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	ρ (g/cm³)
1900	Head	Measured, 01/06/04	39.1	1.47	1.0
		Recommended	40.0	1.40	1.0
	Muscle	Measured, 19/05/04	50.6	1.54	1.0
		Recommended	53.3	1.52	1.0

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6 System accuracy verification

A system accuracy verification of the DASY3 was performed using the dipole validation kit listed in section 3.1. The system verification test has done as the same day as the measurement of the DUT. The measurement made in ambient temperature 25°C and humanity 30%. The obtained results are displayed in the table below.
RF noise had been measured in liquid when all RF equipment in lab was set off. Measured value was 0.0011W/g in 1g mass.

f (MHz)	Tissue type	Measured / Reference	SAR (W/kg) 1g mass	Dielectric Parameters			t (°C)
				ε_r	σ (S/m)	ρ (g/cm³)	
1900	Head	**Measured, 01/06/04**	41.9	39.1	1.47	1.0	22
		Reference	41.6	38.8	1.44	1.0	-
	Muscle	**Measured, 19/05/04**	39.2	50.6	1.54	1.0	22
		Reference	43.2	51.2	1.59	1.0	-

7 SAR measurement uncertainty

Error description	Uncertainty (%)	Distribution	Divisor	c_i 1g	Standard Uncertainty Head	Standard Uncertainty Body
Measurement system						
Probe calibration	±4.4	Normal	1	1	±4.4	±4.4
Axial isotropy	±4.7	Rectangular	√3	$(1\text{-}c_p)^{1/2}$	±1.9	±1.9
Spherical isotropy	±9.6	Rectangular	√3	$(c_p)^{1/2}$	±3.9	±3.9
Spatial resolution	±0.0	Rectangular	√3	1	±0.0	±0.0
Boundary effects	±5.5	Rectangular	√3	1	±3.2	±3.2
Probe linearity	±4.7	Rectangular	√3	1	±2.7	±2.7
Detection limit	±1.0	Rectangular	√3	1	±0.6	±0.6
Readout electronics	±1.0	Normal	1	1	±1.0	±1.0
Response time	±0.8	Rectangular	√3	1	±0.5	±0.5
Integration time	±1.4	Rectangular	√3	1	±0.8	±0.8
RF ambient conditions	±3.0	Rectangular	√3	1	±1.7	±1.7
Mech. Constraints of robot	±0.4	Rectangular	√3	1	±0.2	±0.2
Probe positioning	±2.9	Rectangular	√3	1	±1.7	±1.7
Extrap. and integration	±3.9	Rectangular	√3	1	±2.3	±2.3
Measurement System Uncertainty					**±8.3**	**±8.3**
Test sample related						
Device positioning	±6.0	Normal	0.89	1	±6.7	±6.7
Device holder	±5.0	Normal	0.84	1	±5.9	±5.9
Power drift	-0.2/-0.7	Rectangular	√3	1	±0.1	±0.4
Test Sample Related Uncertainty					**±8.9**	**±8.9**
Phantom and setup						
Phantom uncertainty	±4.0	Rectangular	√3	1	±2.3	±2.3
Liquid conductivity (target)	±5.0	Rectangular	√3	0.6	±1.7	±1.7
Liquid conductivity (meas)	+5/-1	Rectangular	√3	0.6	+1.7	+0.4
Liquid permittivity (target)	±5.0	Rectangular	√3	0.6	±1.7	±1.7
Liquid permittivity (meas)	-2.2/-5	Rectangular	√3	0.6	-0.8	-1.7
Phantom and Tissue parameter Uncertainty					**±3.8**	**±3.8**
Combined standard uncertainty					***±12.8***	***±12.8***
Extended standard uncertainty(k=2)					***±25.6***	***±25.6***

8 Test results

The measured 1-gram averaged SAR values of the device against the head and the body are provided in Tables 1 and 2 respectively. The humidity and ambient temperature of test facility were 30.4% - 36.8% and 24.8 °C – 25.1 °C respectively. The depth of the head tissue simulating liquid was 15 cm and of the muscle tissue simulating liquid was 15.2cm. A base station simulator was used to control the device during the SAR measurement. The phone was supplied with full-charged battery for each measurement.

For head measurement, the device was tested on the right-hand phantom (corresponding to the right side of the head) and the left-hand phantom in two phone position, cheek (touch) and tilt (cheek + 15deg). For GSM 1900 modes, the Phone was tested when it was open and also when it was close and at the lowest, middle and highest channels in the transmit band. On position and frequency where find max SAR values had been measured SAR with BT ON.

Mode	Channel	Peak Output Power (dBm)	Phone Position	Liquid temp(°C)	SAR (W/kg) in 1g mass	
			Phone Close		Right-hand	Left-hand
1900 GSM	512	29.5	**Cheek**	22.4/22.8	0.34	0.30
			Tilt	22.4/22.8	0.37	0.41
	661	29.5	**Cheek**	22.5/22.8	0.33	0.29
			Tilt	22.8/22.8	0.35	0.35
	810	29.5	**Cheek**	22.5/22.6	0.36	0.32
			Tilt	22.5/22.8	0.39	**0.42**
			Tilt(blue tooth On)	22.5/22.8	-	**0.41**

Mode	Channel	Peak Output Power (dBm)	Phone Position	Liquid temp(°C)	SAR (W/kg) in 1g mass	
			Phone Open		Right-hand	Left-hand
1900 GSM	512	29.5	**Cheek**	22/22.2	0.26	**0.31**
			Tilt	22.1/22.3	0.17	0.12
	661	29.5	**Cheek**	22.4/22.6	0.23	0.26
			Tilt	22.5/22.6	0.13	0.10
	810	29.5	**Cheek**	22.5/22.6	0.21	0.20
			Tilt	22.5/22.8	0.12	0.09

Table1: SAR measurement result for Sony Ericsson PY7A1021051 telephone. Measured against the head.

For body-worn measurements, the device was tested against flat phantom representing the user body. Under measurement the phone was put under flat section of phantom with 15mm space and the measurement provides for both front and back part of the phone to the phantom. Phone had been pared with Sony Ericsson HBH-60 hands free set. Result is provided in table2, row “Tilt + BT ON”.

We did GPRS measurement only for back part of the phone to find the max SAR value. This Was done in flat section of the phantom while the devise was either inside the belt holder or 15mm space from phantom. Data communication was sent in two time slots by using a base station.

Mode	Chanel	Peak Output Power(dBm)	Phone Position	Liquid temp(°C)	SAR(W/kg) in 1g mass
1900 GSM	512	29,5	**Front** to Phantom **15mm space**	23.2	0.08
			Back to Phantom **15mm space**	23.2	0.16
			Back to Phantom **15mm space** **Data communication mode**	23.2	0.30
	661	29,5	**Front** to Phantom **15mm space**	23.2	0.08
			Back to Phantom **15mm space**	23.2	0.12
			Back to Phantom **15mm space** **Data communication mode**	23.2	**0.24**
	810	29,5	**Front** to Phantom **15mm space**	23.2	0.09
			Back to Phantom **15mm space**	23.2	0.12
			Back to Phantom **15mm space** **Data communication mode**	23.2	**0.24**
			Back to Phantom **15mm space** **Blue tooth** measurement	23.2	**0.41**

Table 2: SAR measurement result for Sony Ericsson PY7A1021051 telephone. Measured against the body.

9 References

[1] R.Plicanic, “SAR Measurement Specification of Wireless Handsets”, Sony Ericsson internal document LD/SEMC/GUG/N 03:141

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

[3] 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 .

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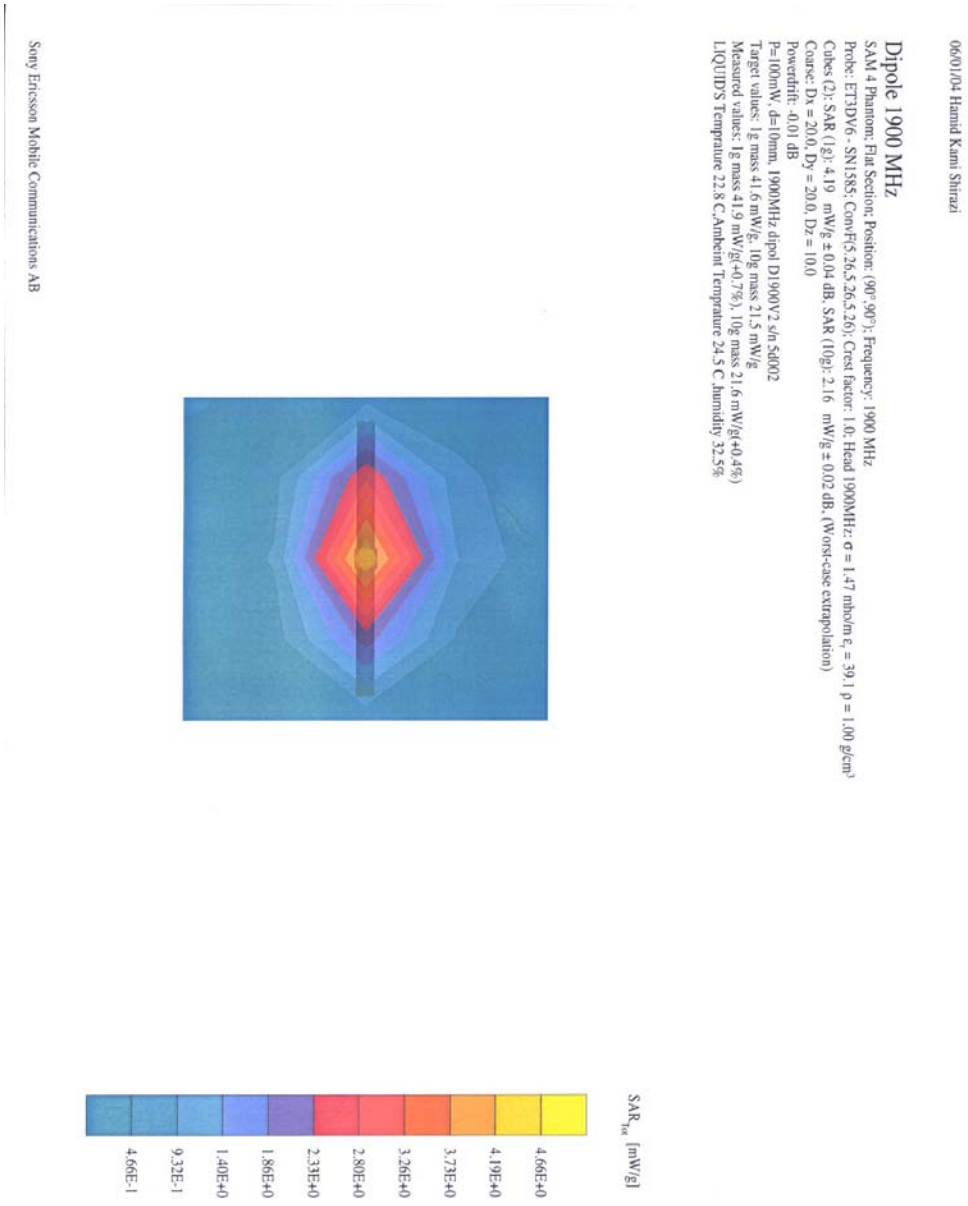
10 Appendix

10.1 SAR distribution comparison for system accuracy verification



Validation Dipole, measured with head simulating tissue on 04/06/04

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Date/Time: 04/09/03 18:49:39

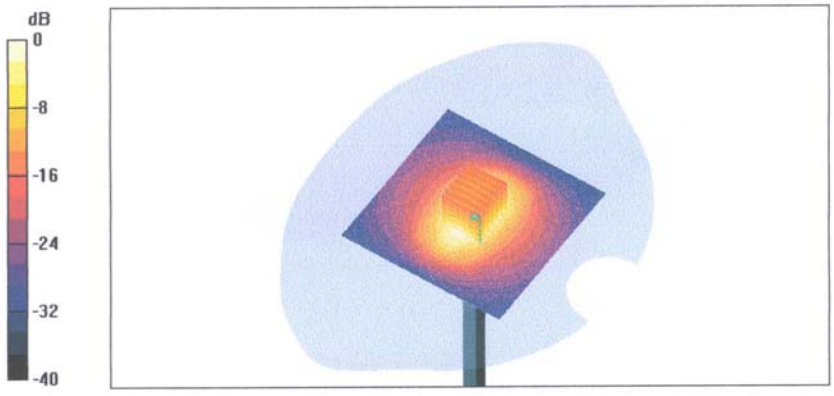
Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN5d002_SN1507_HSL1900_090403.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN5d002
Program: Dipole Calibration

Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1900 MHz (σ = 1.44 mho/m, ε_r = 38.78, ρ = 1000 kg/m^3)
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1507; ConvF(5.2, 5.2, 5.2); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 33; Postprocessing SW: SEMCAD, V1.6 Build 109

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.2 V/m
Peak SAR = 18.2 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.38 mW/g
Power Drift = 0.01 dB



1900MHz SAR distribution of validation dipole from reference measurement with head simulating tissue

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05/19/04 Hamid Kami Shirazi

Dipole 1900 MHz

SAM 4 Phantom; Flat Section; Position: (90°,90°); Frequency: 1900 MHz

Probe: ET3DV6 - SN1582; ConvF(4.58,4.58,4.58); Crest factor: 1.0; Muscle 1900: σ = 1.54 mho/m ε_r = 50.6 ρ = 1.00 g/cm^3

Cube 5x5x7: SAR (1g): 3.92 mW/g, SAR (10g): 2.02 mW/g, (Worst-case extrapolation)

Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0

Powerdrift: -0.01 dB

P=100mW, d=10mm, 1900MHz dipol D1900V2 s/n 5d002

Target values: 1g mass 43.2 mW/g, 10g mass 22.4 mW/g

Measured values: 1g mass 39.2mW/g(-9%), 10g mass 20.2 mW/g(-10%)

BODY LIQUID'S Temprature 23.2 C ; Room's Temprature 25

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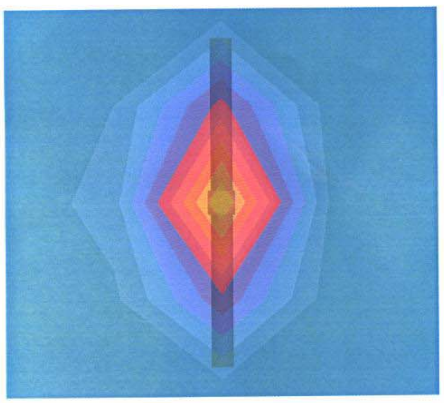

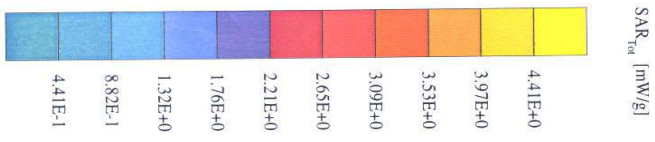

Validation Dipole, measured with muscle simulating tissue on 19/05/04

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Date/Time: 04/08/03 12:31:50

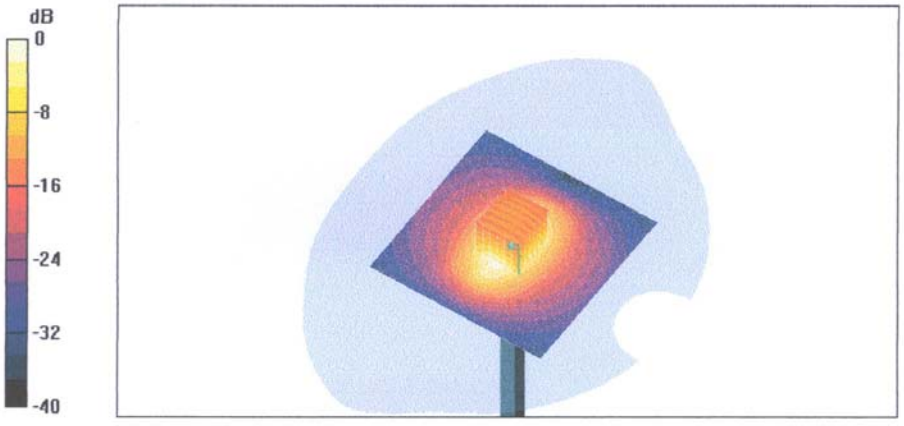
Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN5d002_SN1507_M1900_080403.da4

DUT: Dipole 1900 MHz; Serial: D1900V2 - SN5d002
Program: Dipole Calibration

Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: Muscle 1900 MHz; (σ = 1.59 mho/m, ε_r = 51.2, ρ = 1000 kg/m^3)
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1507; ConvF(4.8, 4.8, 4.8); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 33; Postprocessing SW: SEMCAD, V1.6 Build 109

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.8 V/m
Peak SAR = 18.9 W/kg
SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.6 mW/g
Power Drift = 0.02 dB



1900MHz SAR distribution of validation dipole from reference measurement with muscle simulating tissue

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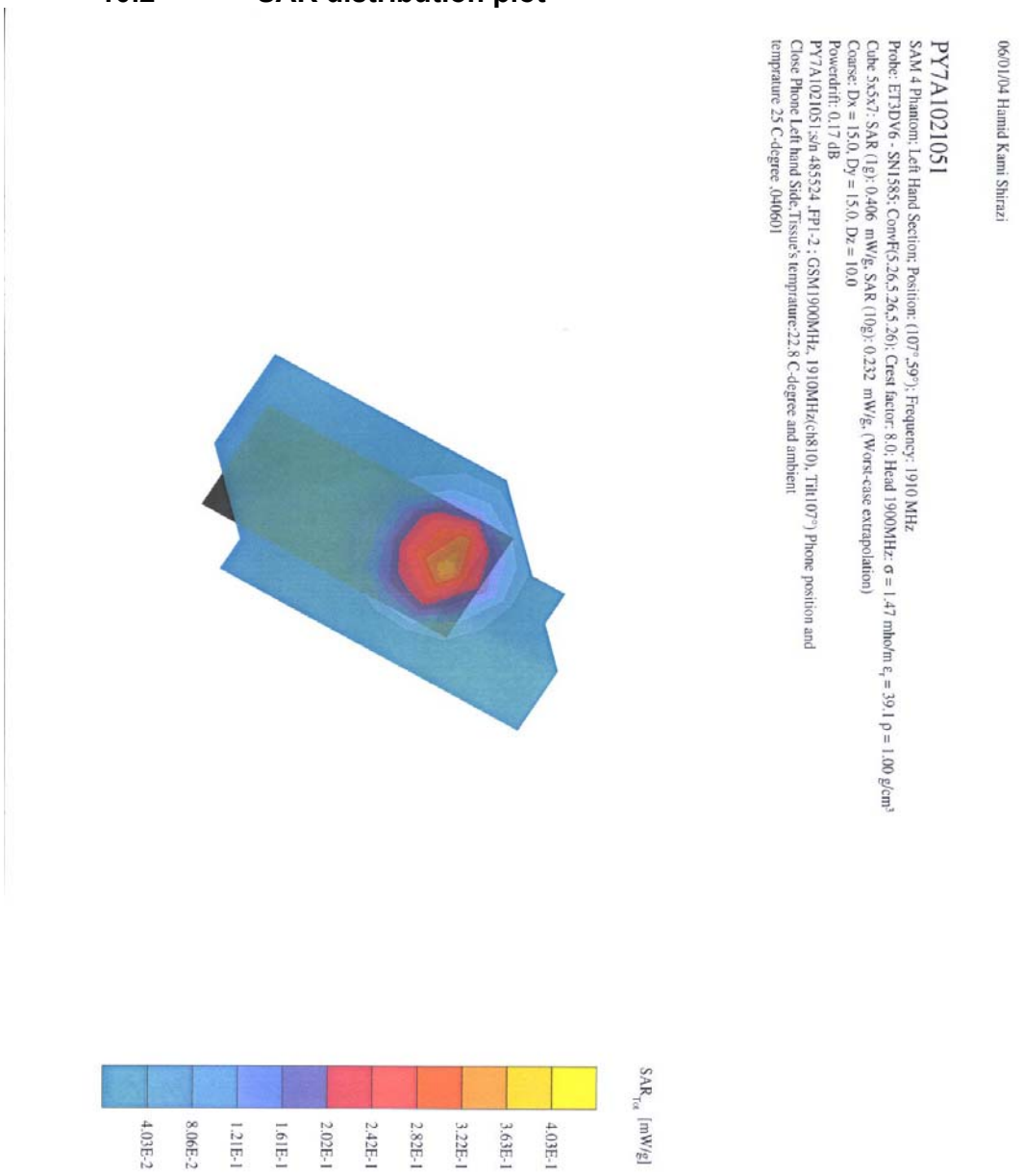
10.2 SAR distribution plot



**Distribution of max SAR in GSM 1900 mode at ch810,
Measured against the head for tilt phone position**

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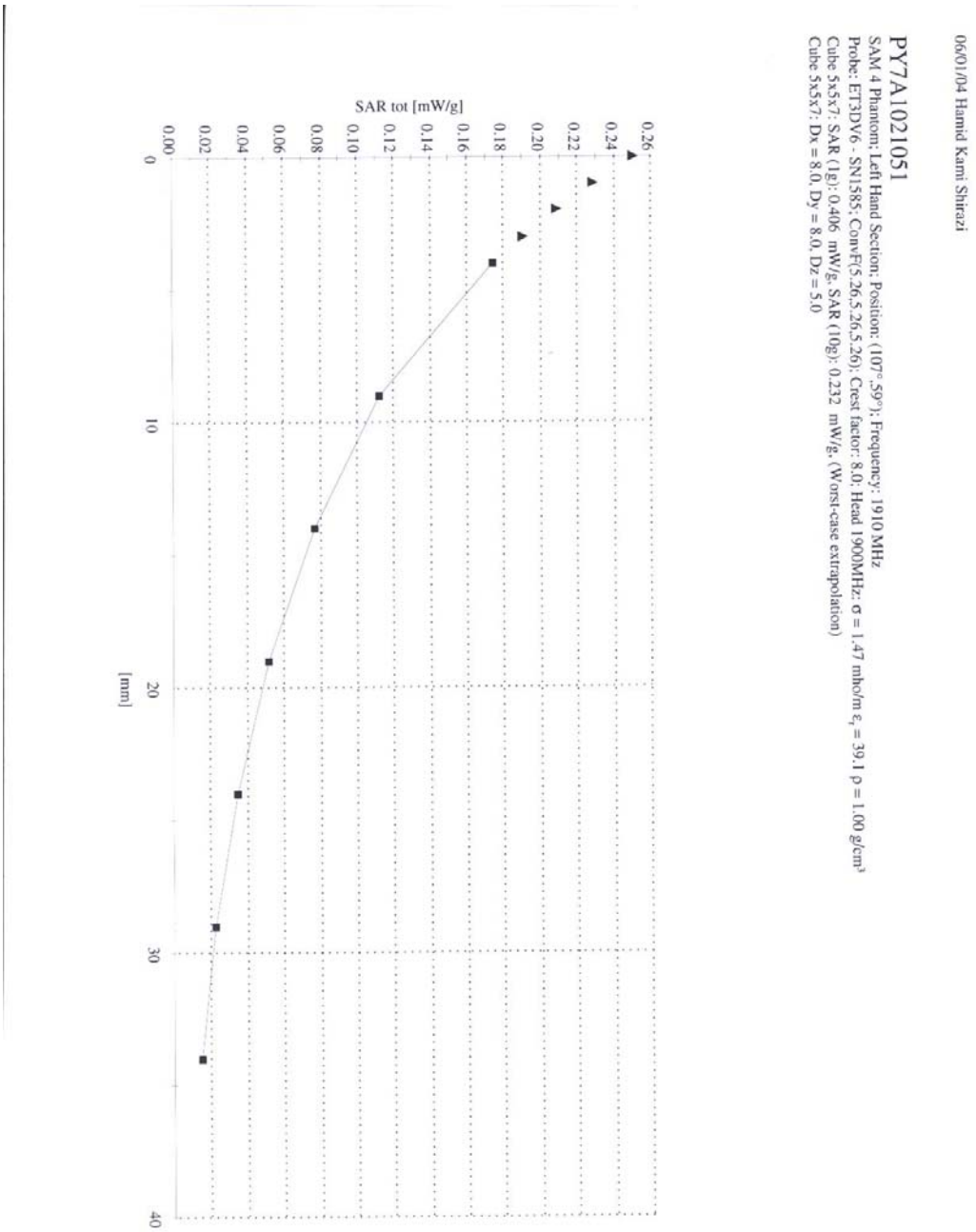

Z(x) distribution of max SAR in GSM1900 mode at ch810, Measured against the head for tilt phone position

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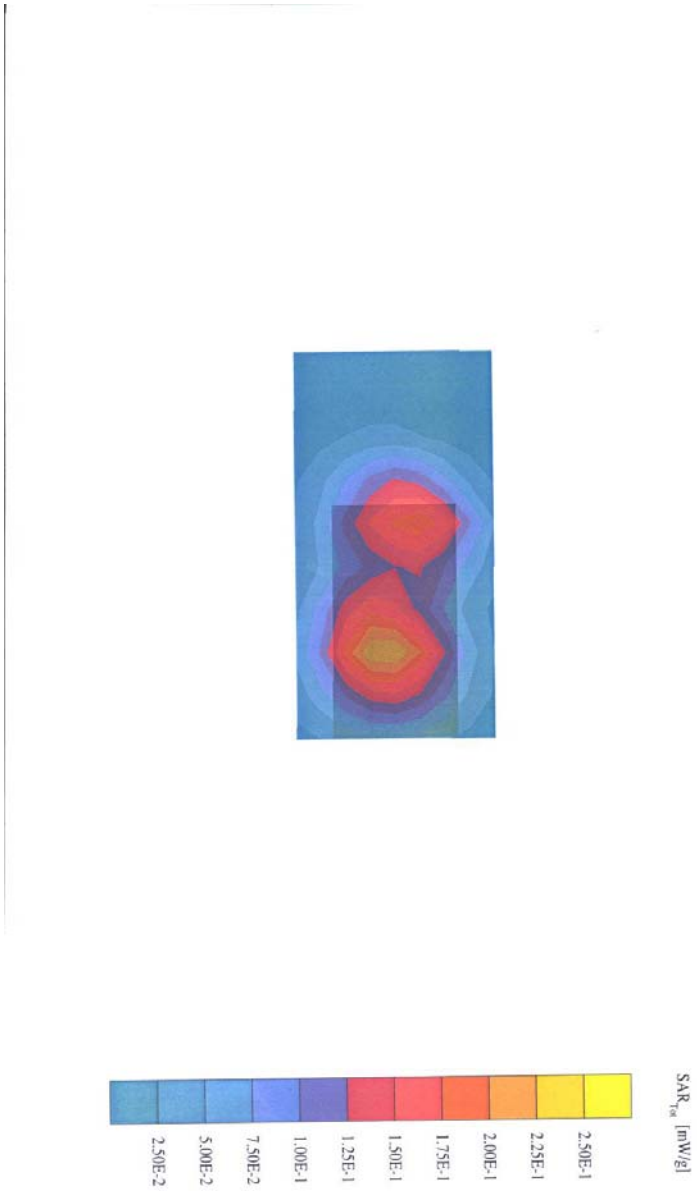

Distribution of max SAR in GSM1900 mode at ch810, Measured against the body for back phone part phone with 15mm space to phantom, data communication with two time slots.

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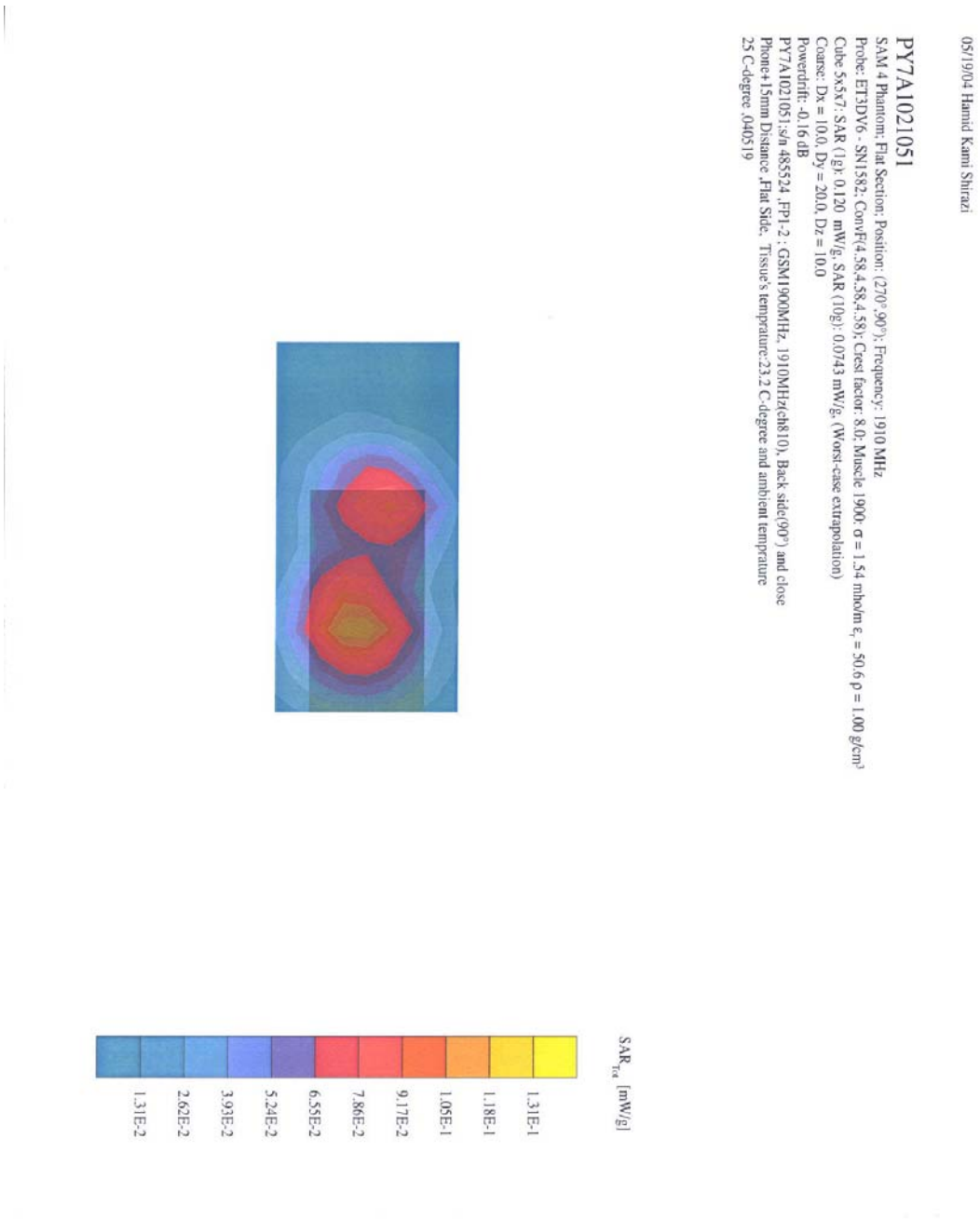

Distribution of max SAR in GSM1900 mode at ch810, Measured against the body for back phone part With 15mm space to phantom .

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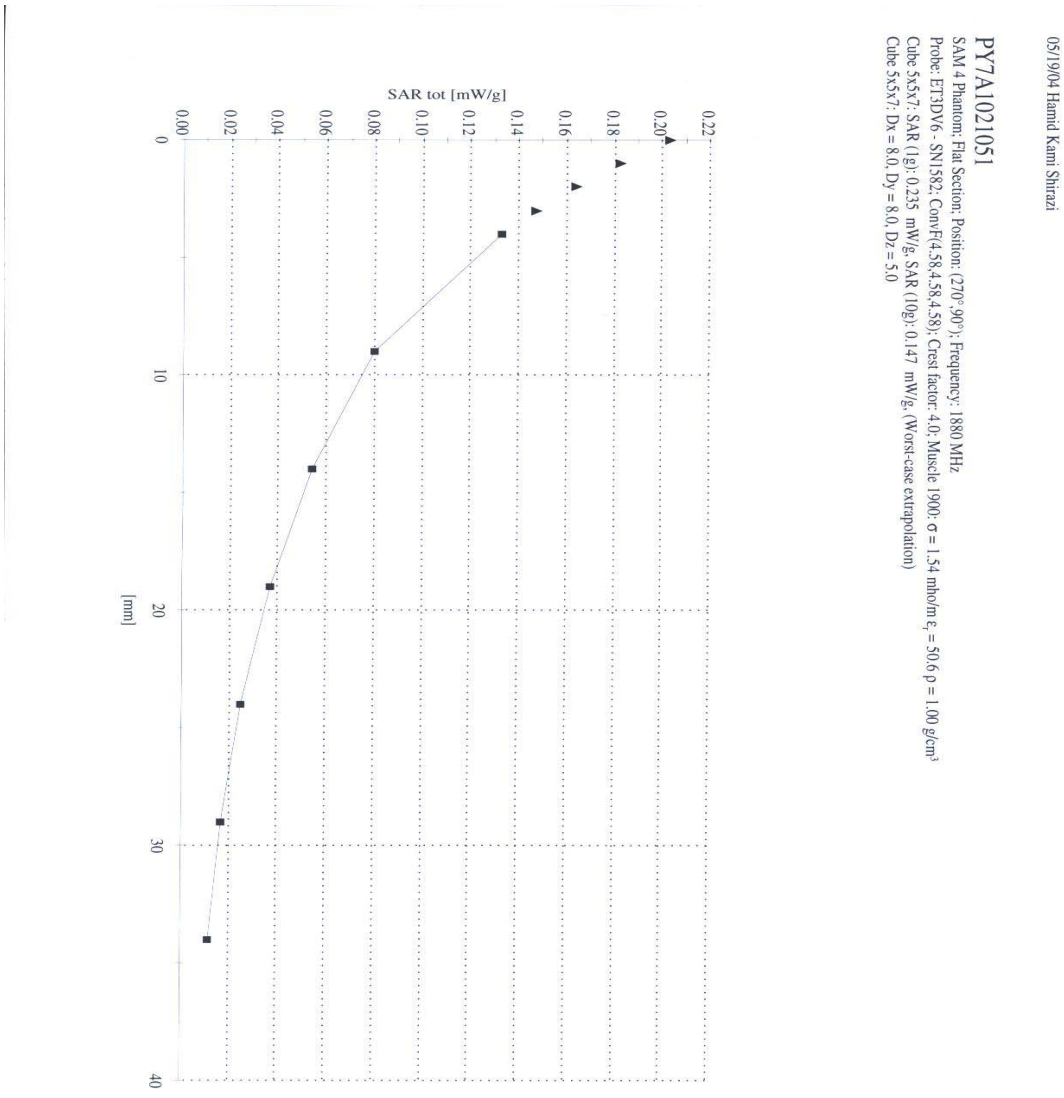

Z(x) distribution of max SAR in GSM1900 mode at ch810, Measured against the body

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10.3 Photographs of the device under test

Front and back (phone closed)

Front and back (phone open)

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Sides

Battery

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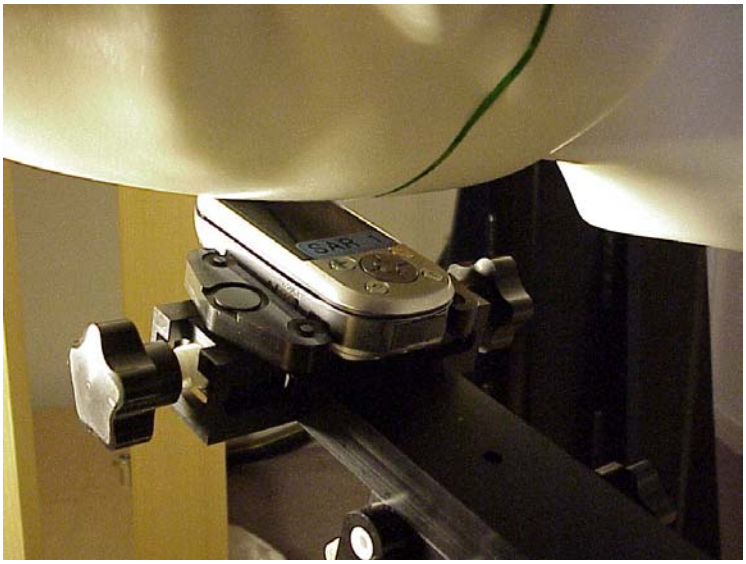
10.4 Device position on SAM Twins Phantom



Device position against the head: Tilt phone position (phone closed)

Device position against the head: Tilt phone position (phone opened)

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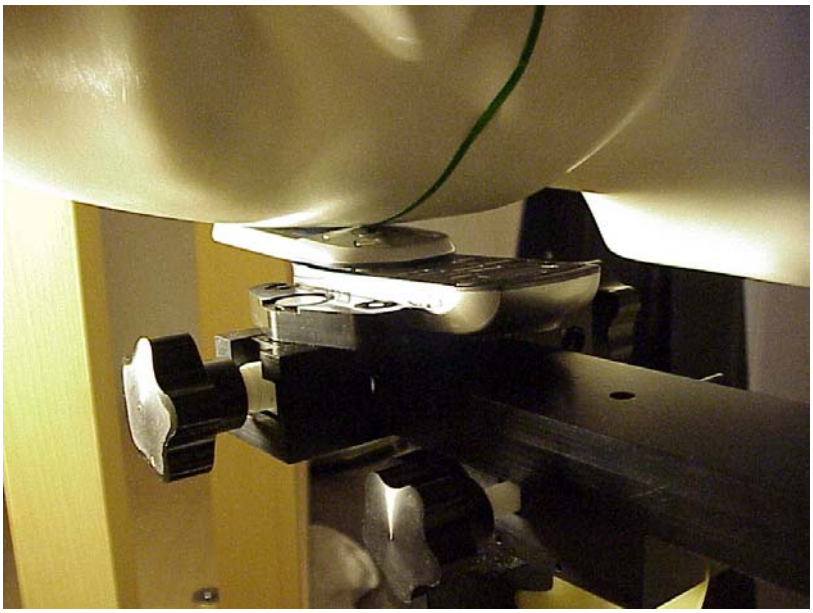
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGUG/NMC Mats Hansson	040622	040622	A	File



Device position against the head: Cheek phone position (phone opened)

Device position against the head: Cheek phone position (phone closed)

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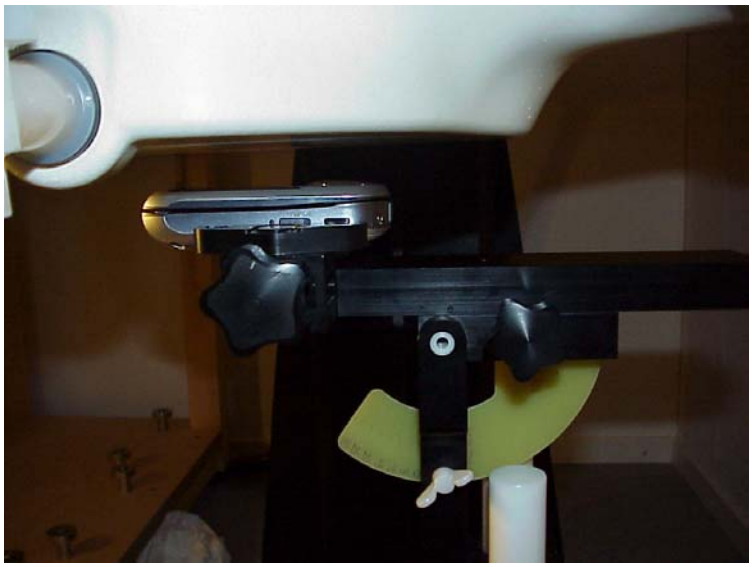
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGUG/NMC Mats Hansson	040622	040622	A	File



Device position against the body: Phone with 15mm space under phantom

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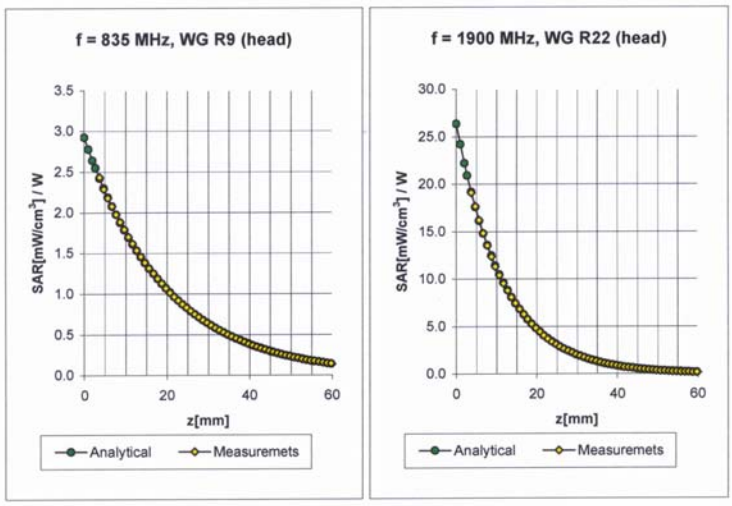
10.5 Probe calibration parameters

ET3DV6 SN:1582 April 16, 2003

Conversion Factor Assessment



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

ConvF X	**7.4** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**7.4** ± 8.9% (k=2)	Alpha	**0.28**
ConvF Z	**7.4** ± 8.9% (k=2)	Depth	**2.79**

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

ConvF X	**5.3** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.3** ± 8.9% (k=2)	Alpha	**0.49**
ConvF Z	**5.3** ± 8.9% (k=2)	Depth	**2.57**

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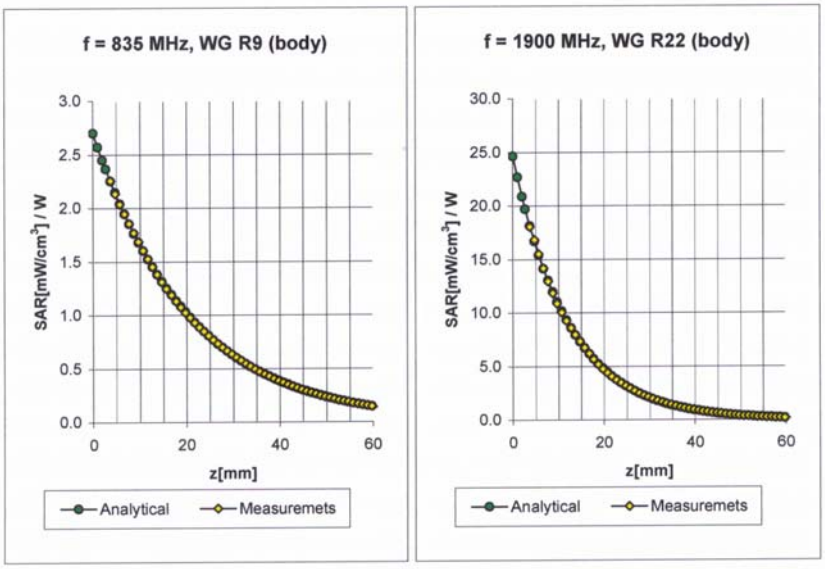
ET3DV6 SN:1585 April 16, 2003

Conversion Factor Assessment



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

Valid for f=800-1000 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	**0.34**
ConvF Z	**6.7** ± 9.5% (k=2)	Depth	**2.48**

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

Valid for f=1710-1910 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	**2.55**