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Prepared (also subject responsible if other)		No.		
Ramadan Plicanic		GUG/N 03:087		
Approved	Checked	Date	Rev	Reference
Ramadan Plicanic	23000793	030403	A	File

SAR Test Report: T310 (PY71130602)

Date of test: March 27 and April 1, 2003

Laboratory:
Electromagnetic Near Field and Radio Frequency Dosimetry Lab
Sonyericsson Mobile Communications AB
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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 1130602-BV (T310); FCC ID: PY71130602

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.

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

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2 Introduction

In this test report, compliance of the Sony Ericsson PY71130602 portable 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 the back cover, near the top	
Dimensions	Max length	38mm
	Max width	14mm
Configuration	PIFA	

3.2 Device description

Device model	T310
Serial number	BD300X3KZL
Mode	GSM 1900
Multiple Access Scheme	TDMA
Maximum Output Power Setting	29.8dBm
Factory Tolerance in Power Setting	± 0.5dB
Maximum Peak Output Power	30.3dBm
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	428	4/2003
E-field probe ETDV6	1569	4/2003
Dipole Validation Kit, D1900 V2	5d002	2/2004

4.2 Additional equipment

Description	***Inventory Number***	***Due Date***
Signal generator ESG-D4000A	INV 462935	9/2003
Directional coupler HP778D	INV 2903	1/2004
Power meter R&S NRVD	INV 483920	1/2004
Power sensor R&S NRV-Z5	INV 2333	1/2004
Power sensor R&S NRV-Z5	INV 2334	1/2004
Termination 65N50-0-11	INV 2903	1/2004
Network analyzer HP8753C	INV421671	8/2003
S-parameter test set HP85047A	INV 421670	8/2003
Dielectric probe kit HP8507D	INV 20000053	2/2004
Wavetek STABILOK 4031D	INV 421578	7/2003

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.

f (MHz)	**Tissue type**	**Limits / Measured**	**Dielectric Parameters**		
			ε_r	σ (S/m)	ρ (g/cm³)
1900	**Head**	**Measured, 03/27/03**	38.2	1.46	1.0
		Recommended	40.0	1.4	1.0
	Muscle	**Measured, 04/01/03**	51.0	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 was conducted on the same day as the measurement of the DUT. Measurement made in ambient temperature 23.0 °C and humanity 41.2%. 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 0.002 mW/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, 03/27/03**	44.0	38.2	1.46	1.0	23.0
		Reference	45.2	39.1	1.47	1.0	-
	Muscle	**Measured, 04/01/03**	44.7	51.0	1.54	1.0	23.1
		Reference	44.0	51.9	1.58	1.0	-

7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sony Ericsson PY71130602 phone

Uncertainty Component	Tol. (± %)	Prob. Dist.	Div.	Measurement on Head	Measurement on Body
Measurement System					
Probe Calibration	2.6	N	1	2.6	2.6
Axial Isotropy	4.7	R	√3	1.9	1.9
Hemispherical Isotropy	9.6	R	√3	3.9	3.9
Boundary Effect	11.0	R	√3	6.4	6.4
Linearity	4.7	R	√3	2.7	2.7
System Detection Limits	1.0	R	√3	0.6	0.6
Readout Electronics	1.0	N	1	1.0	1.0
Response Time	0.8	R	√3	0.5	0.5
Integration Time	1.8	R	√3	1.1	1.1
RF Ambient Conditions	3.0	R	√3	1.7	1.7
Probe Positioned Mechanical Tolerance	0.4	R	√3	0.2	0.2
Probe Positioning respect to Phantom Shell	2.9	R	√3	1.7	1.7
Extrapolation, interpolation and Integration Algorithm for Max. SAR	3.9	R	√3	2.3	2.3
Measurement System Uncertainty				**9.4**	**9.4**
Test Sample Related					
Test Sample Positioning		R	√3	6.7	6.7
Device Holder Uncertainty		R	√3	5.9	5.9
Output Power Variation - Drift	2.3/1.2	R	√3	1.3	0.7
Test Sample Related Uncertainty				**9.0**	**8.9**
Phantom and Tissue Parameters					
Phantom Uncertainty(shape and thickness tolerances)	4.0	R	√3	2.3	2.3
Liquid Conductivity-deviation from target values)	4.3/1.3	R	√3	2.5	0.8
Liquid Conductivity-measurement uncertainty	5	R	√3	2.9	2.9
Liquid Permitivity-deviation from target values	4.5/4.3	R	√3	2.6	2.5
Liquid Permitivity-measurement uncertainty	5	R	√3	2.9	2.9
Phantom and Tissue Parameters Uncertainty				**5.9**	**5.4**
Combined Standard Uncertainty		RSS		***14.3***	***14.0***
Expanded Uncertainty (95% CONFIDENCE LEVEL)				***28.6***	***28.0***

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 44.4% - 40.8% and 22.2 °C – 22.8 °C respectively. The depth of the head tissue simulating liquid was 15.1cm and of the muscle tissue simulating liquid was 15.5cm. 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 device was tested at the lowest, middle and highest frequencies in the transmit band.

Mode	Channel	Peak Output Power(dBm)	Phone Position	Liquid temp(°C)	SAR (W/kg) in 1g mass	
					Right-hand	Left-hand
1900 GSM	512	30.3	Cheek	22.3/22.5	0.34	0.29
			Tilt	22.5/22.8	0.39	0.32
	661	30.3	Cheek	22.3/22.6	**0.40**	0.31
			Tilt	22.5/22.8	0.49	0.46
	810	30.3	Cheek	22.4/22.7	0.40	0.35
			Tilt	22.4/22.7	**0.57**	0.51

Table1: SAR measurement result for Sony Ericsson PY71130602 telephone. Measured against the head.

For body-worn measurements, the device was tested against flat phantom representing the user body. Under measurement phone was put on in the belt holder KRY104 157 and measurement provides for both front and back part the phone to the phantom.

Mode	Channel	Peak Output Power(dBm)	Phone Position	Liquid temp(°C)	SAR(W/kg) in 1g mass
1900 GSM	512	30.3	Back	22.4	**0.53**
			Front	22.5	0.13
	661	30.3	Back	22.4	0.49
			Front	22.6	0.14
	810	30.3	Back	22.5	0.42
			Front	22.6	0.19

Table 2: SAR measurement result for Sony Ericsson PY71130602 telephone. Measured against the body.

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9 References

[1] M.Douglas, “SAR Measurement Specification of Wireless Handsets”, Sony Ericsson internal document EUS/CV/R-01:1061/REP

[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 Wirelles Communications Devices: Experimental Techniques,” Std 1528-200x, Draft 6.5 – August 20, 2001.

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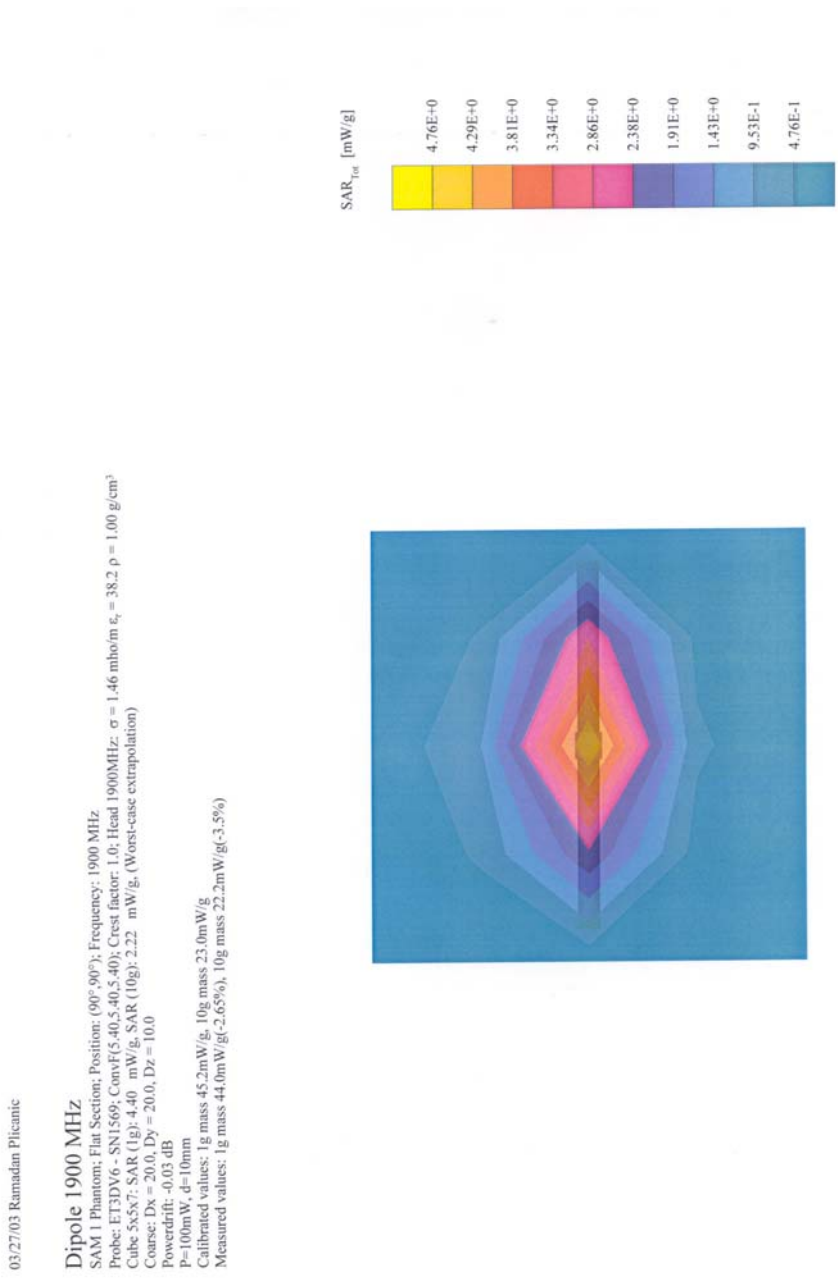
10 Appendix

10.1 SAR distribution comparison for system accuracy verification



Validation Dipole, measured with head simulating tissue on 03/27/03

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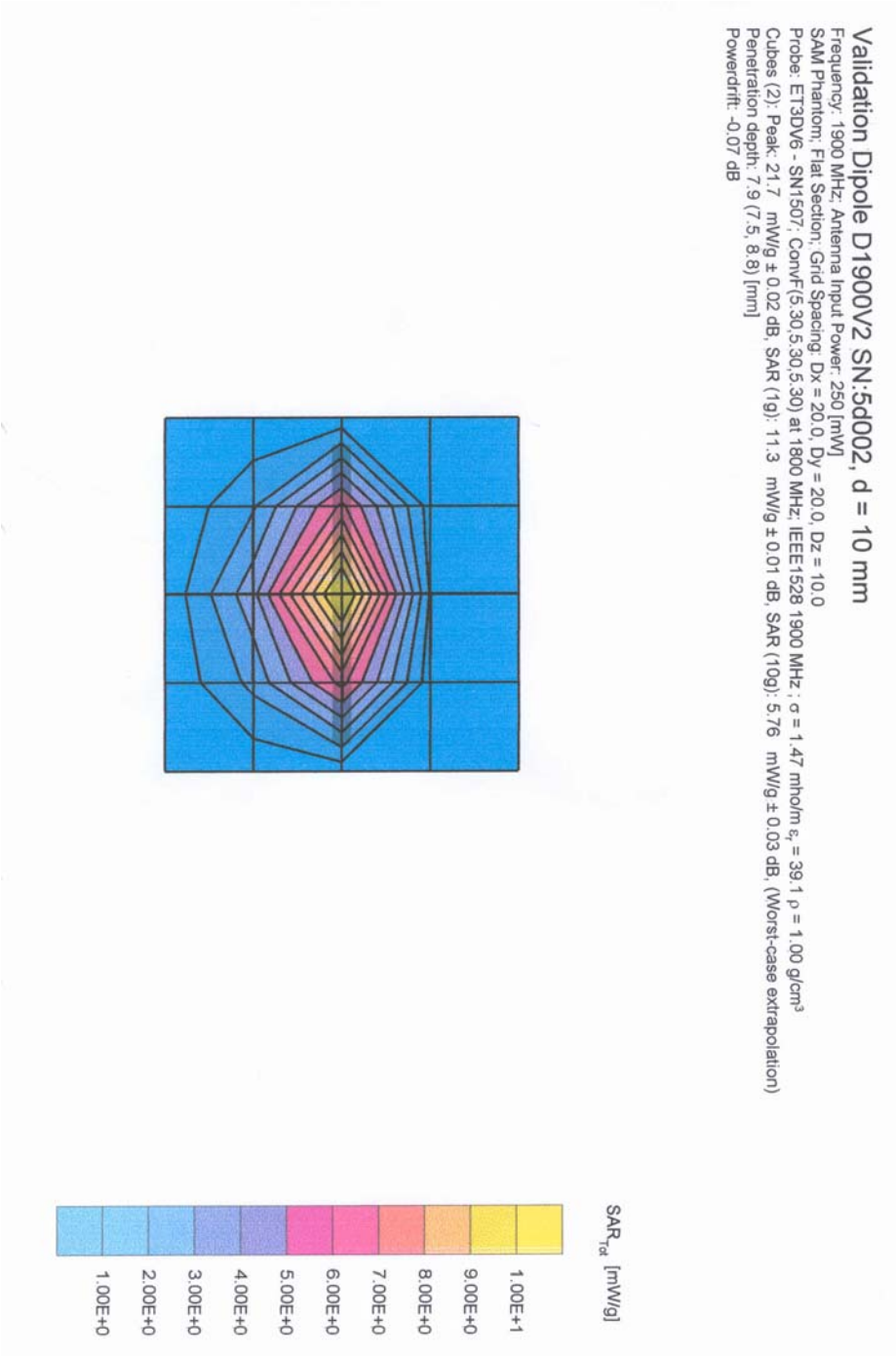

1900MHz SAR distribution of validation dipole from reference measurement

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04/01/03 Ramadan Plicanic

Dipole 1900 MHz
SAM 1 Phantom; Flat Section; Position: (90°,90°); Frequency: 1900 MHz
Probe: ET3DV6 - SN1569; ConvF(5.00,5.00,5.00); Crest factor: 1.0; Muscle 1900: σ = 1.54 mho/m ε_r = 51.0 ρ = 1.00 g/cm^3
Cubes (2): SAR (1g): 4.47 mW/g ± 0.00 dB, SAR (10g): 2.28 mW/g ± 0.01 dB, (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Powerdrift: -0.05 dB
P=100mW, d=10mm
Calibrated values: 1g mass 44.0 mW/g, 10g mass 22.4mW/g
Measured values: 1g mass 44.7 mW/g(+1.6%), 10g mass 22.8 mW/g(+1.8%)

Validation Dipole, measured with muscle simulating tissue on 04/01/03

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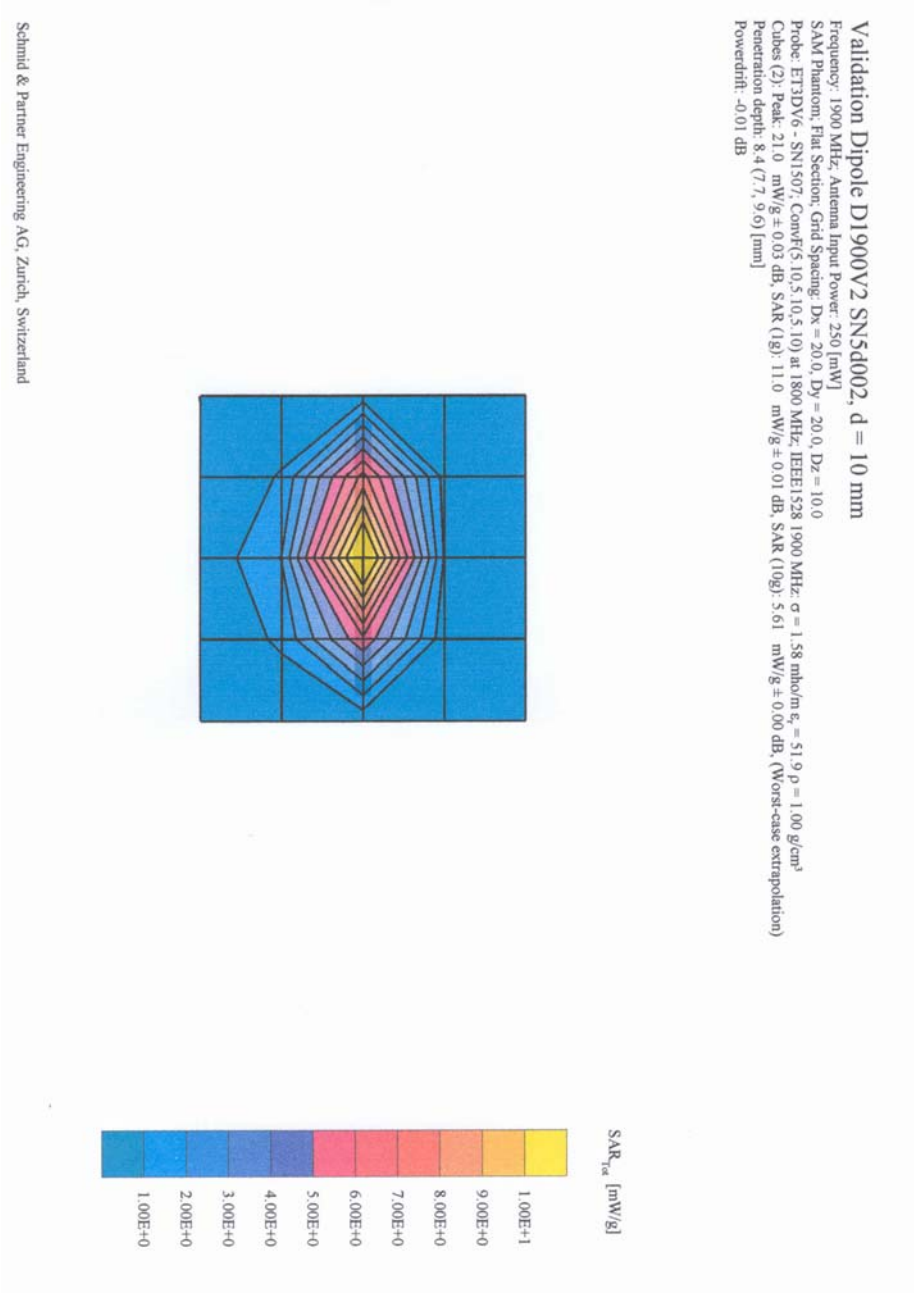

1900MHz SAR distribution of validation dipole from reference measurement with muscle simulating tissue

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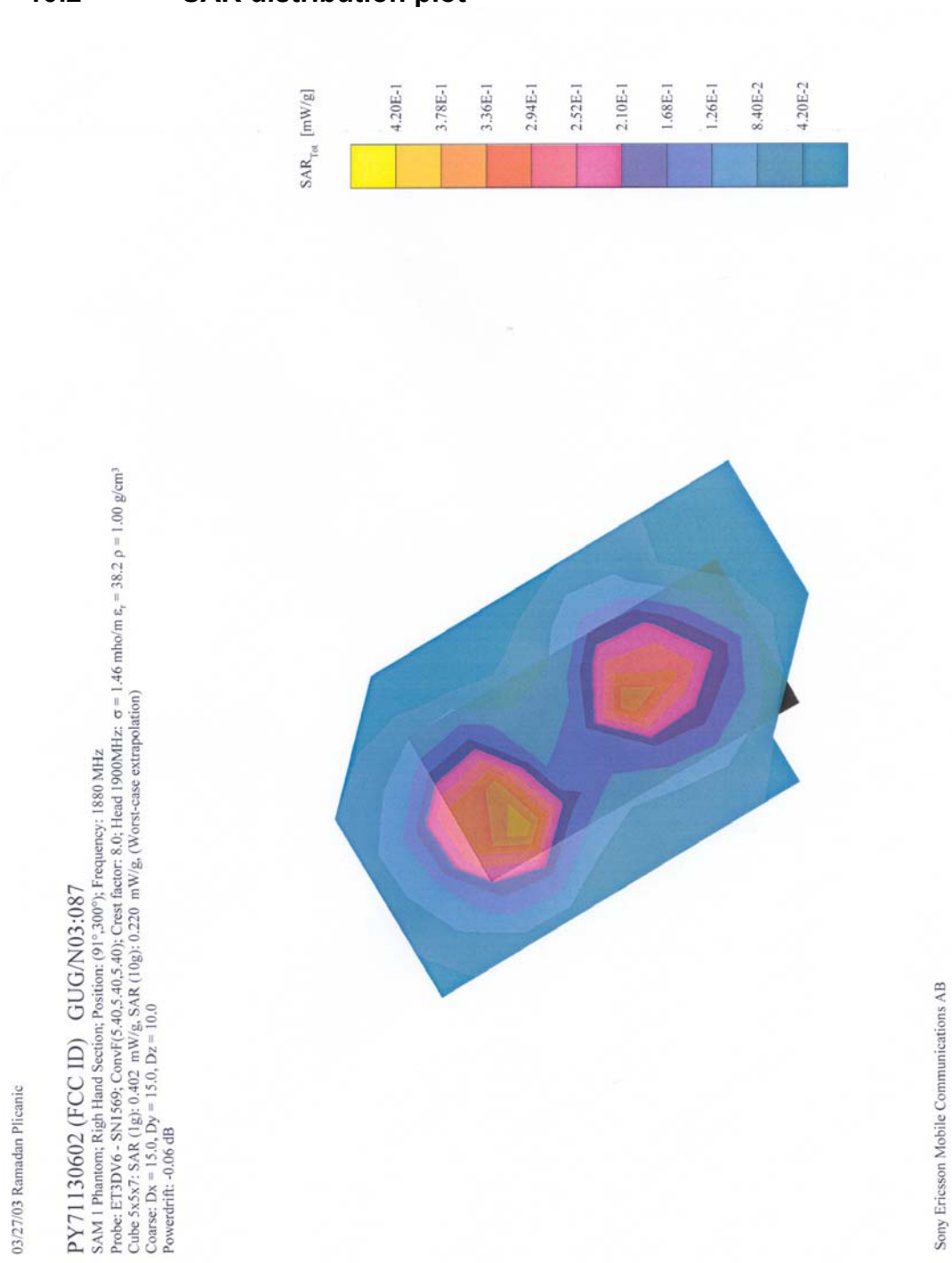
10.2 SAR distribution plot



Distribution of max SAR in GSM1900 mode at ch661. Measured against the head for cheek phone position

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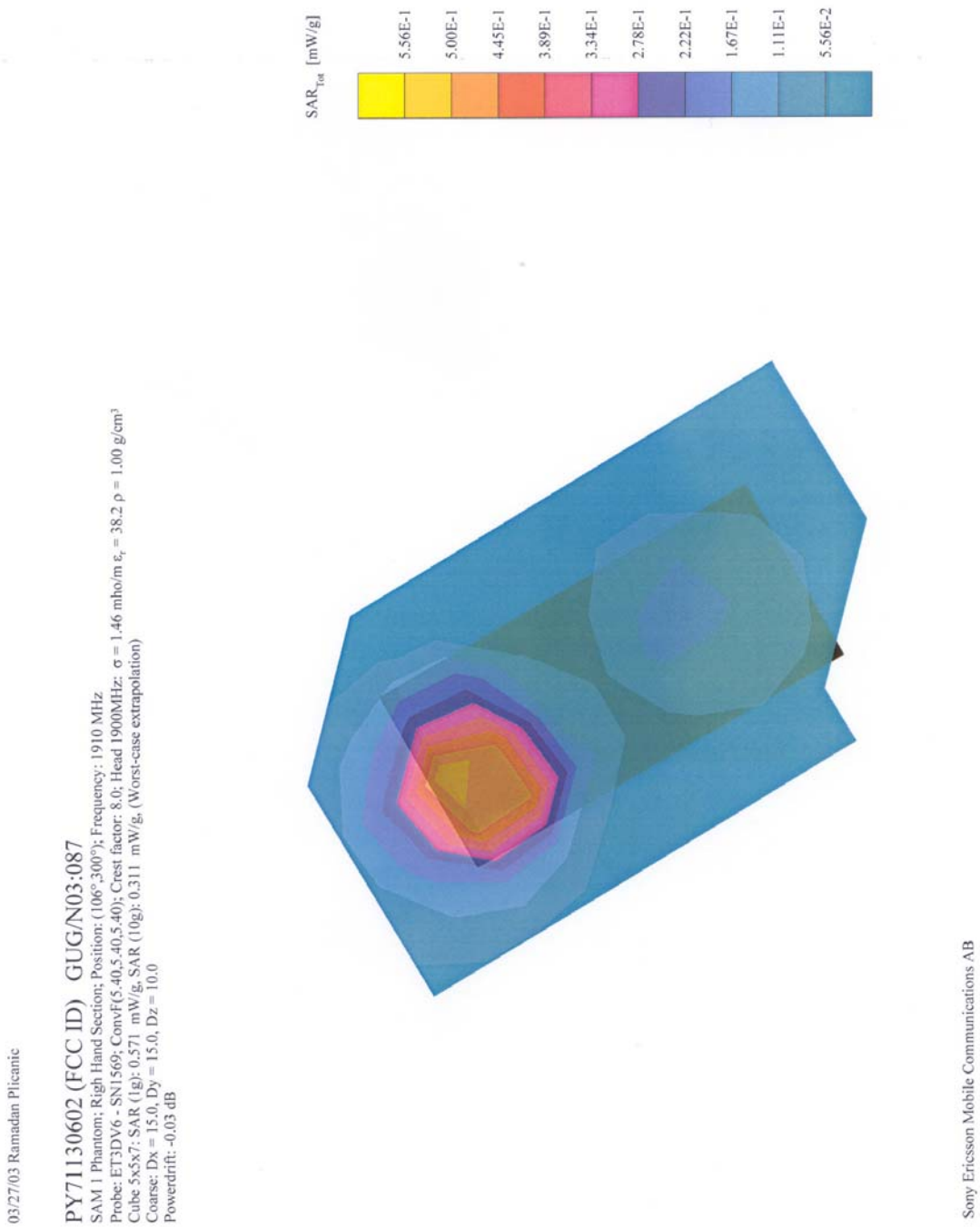

Distribution of max SAR in GSM1900 mode at ch810. Measured against the head for tilt phone position

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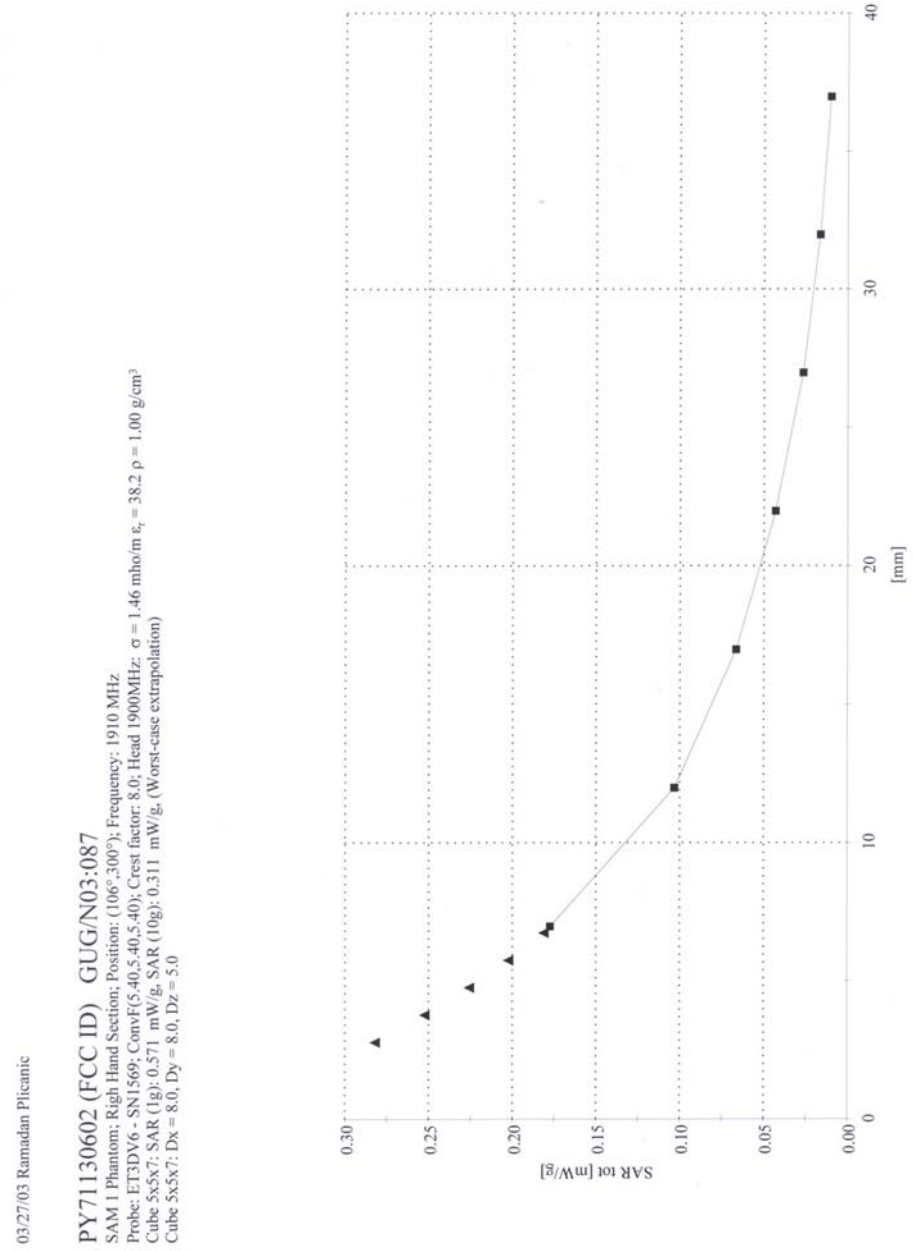

Z(x) distribution of max SAR in GSM1900 mode at ch810. Measured against the head for tilt phone position

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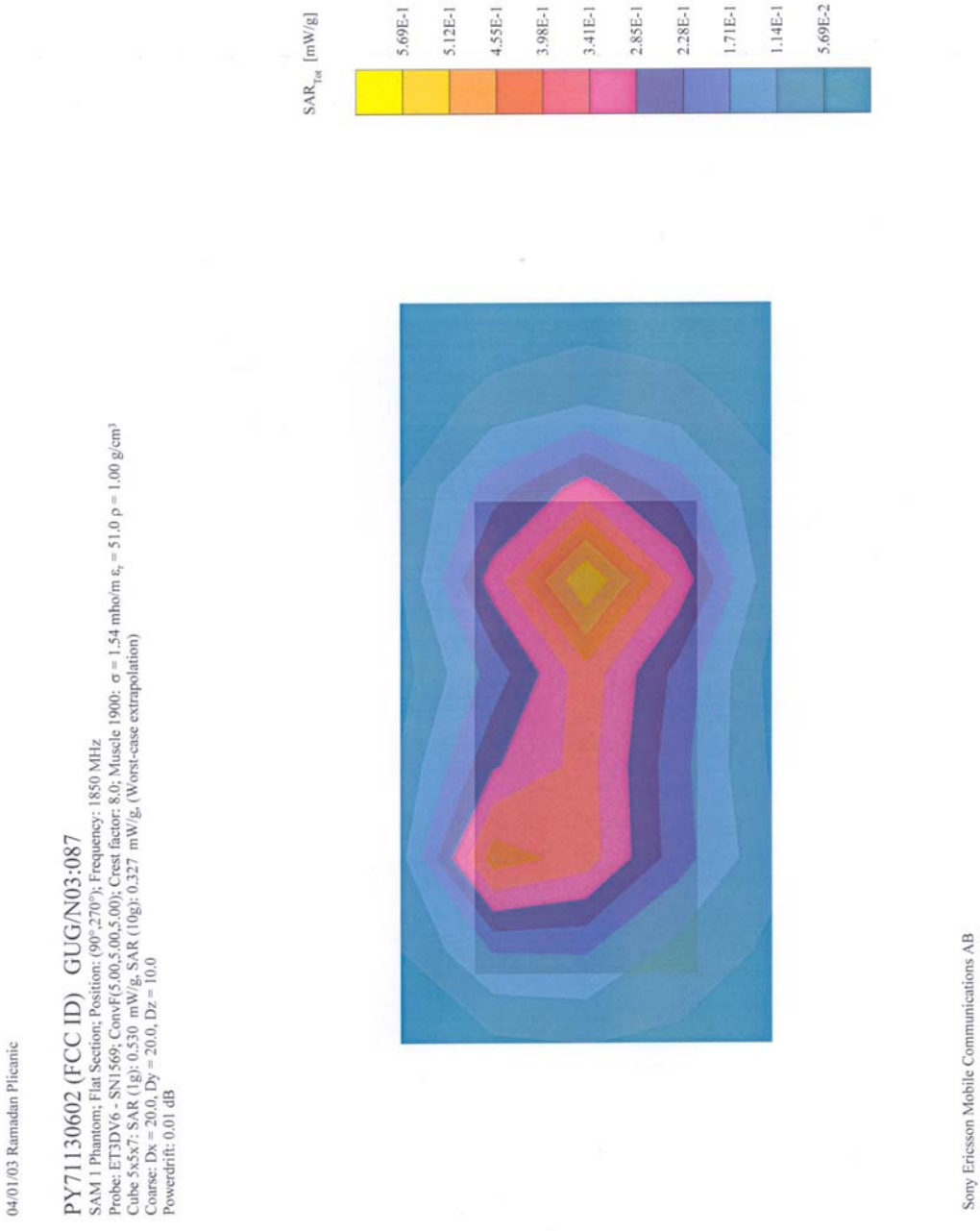

Distribution of max SAR in GSM1900 mode at ch512. Measured against the body for back phone position to the phantom

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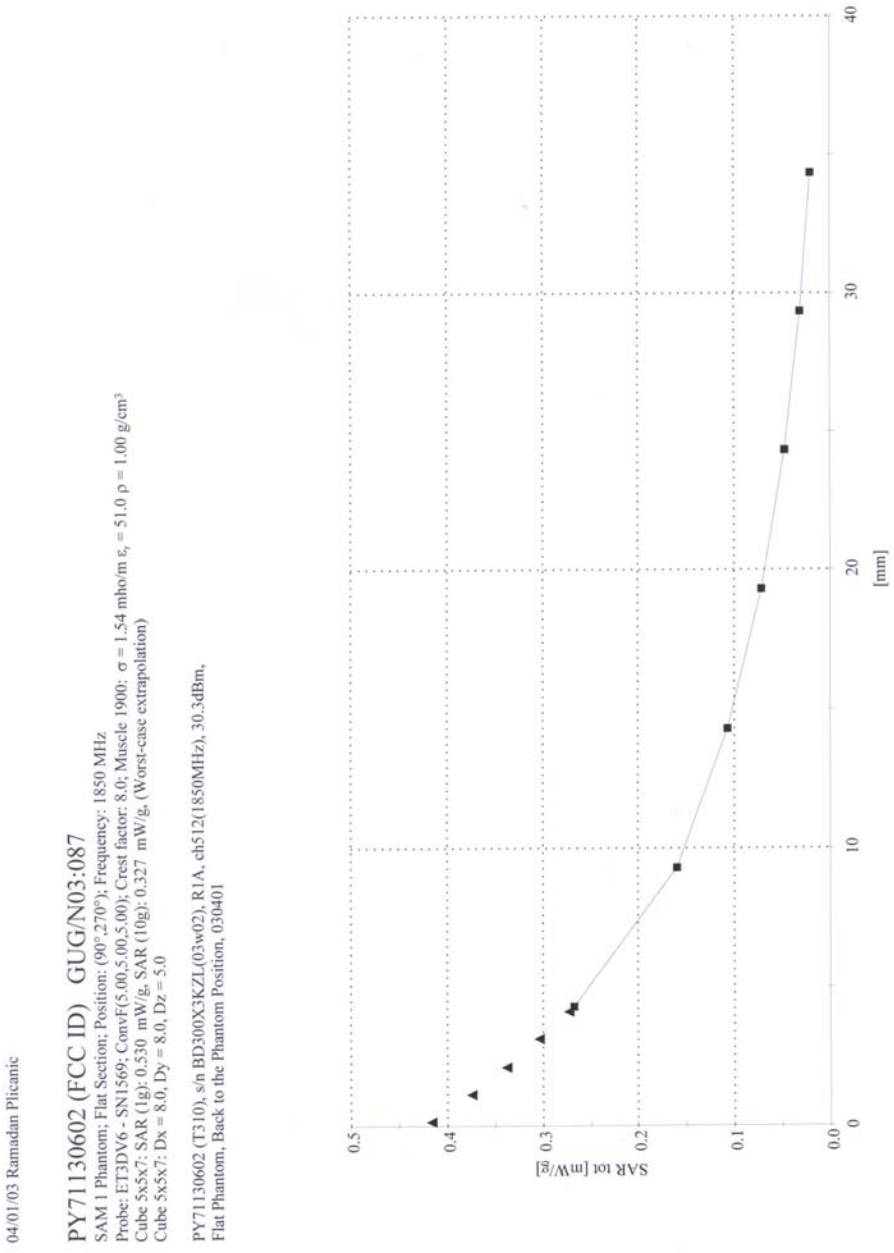

Z(x) distribution of max SAR in GSM1900 mode at ch512. Measured against the body for back phone position to the phantom

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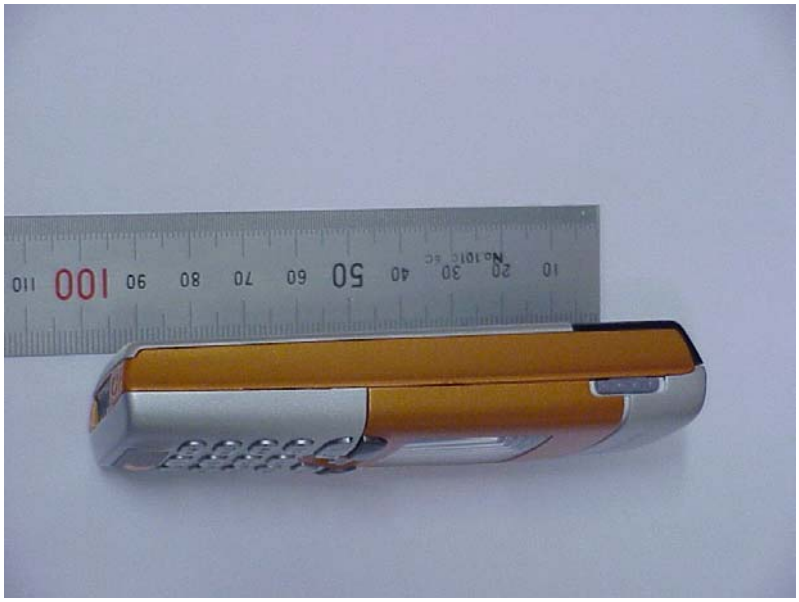
10.3 Photographs of the device under test

Front side



Left side

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Back side

Battery

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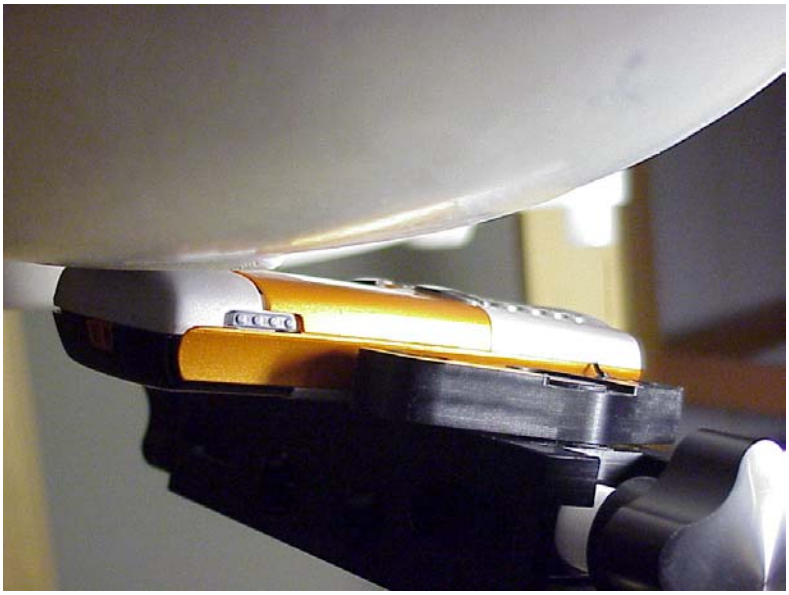
10.4 Device position on SAM Twins Phantom

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



Device position against the head: Tilt (cheek+15deg) phone position

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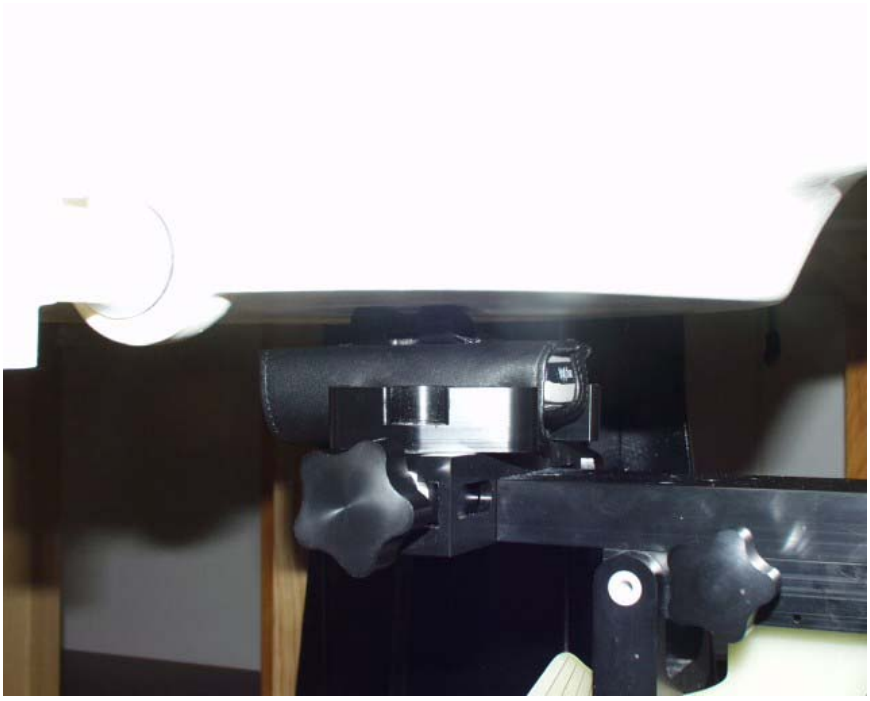

Device position against the body: Phone in belt clip

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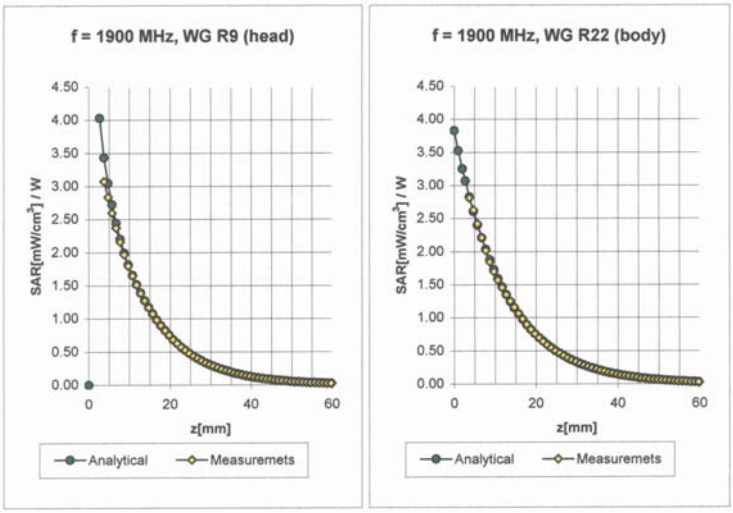
10.5 Probe calibration parameters

ET3DV6 SN:1569 April 25, 2002

Conversion Factor Assessment



Head	1900 MHz	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m		
	ConvF X	5.4 ± 8.9% (k=2)		Boundary effect:	
	ConvF Y	5.4 ± 8.9% (k=2)		Alpha	0.47
	ConvF Z	5.4 ± 8.9% (k=2)		Depth	2.44
Body	1900 MHz	ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m		
	ConvF X	5.0 ± 8.9% (k=2)		Boundary effect:	
	ConvF Y	5.0 ± 8.9% (k=2)		Alpha	0.65
	ConvF Z	5.0 ± 8.9% (k=2)		Depth	2.16

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