
Appendix for the Report

Dosimetric Assessment of the Siemens M46 (FCC ID: PWX-M46) According to the FCC Requirements

Body worn configuration: Measurements with “Leather Case”

April 19, 2002
IMST GmbH
Carl-Friedrich-Gauß-Str. 2
D-47475 Kamp-Lintfort

Customer
Siemens Information and Communication Mobile LLC
16745 West Bernardo Drive Suite 400
San Diego-CA 92127

The test results only relate to the items tested.
This report shall not be reproduced except in full without the written
approval of the testing laboratory.

Executive Summary

The M46 is a new mobile phone from Siemens operating in the 1900 MHz frequency range. The device has an integrated antenna. The system concept is the PCS 1900 standard.

The objective of the measurements done by IMST was the dosimetric assessment of one device in the PCS 1900 standard. The examinations have been carried out with the dosimetric assessment system „DASY3“.

The measurements were made according to the Supplement C to OET Bulletin 65 of the Federal Communications Commission (FCC) Guidelines [FCC 2001] for evaluating compliance of mobile and portable devices with FCC limits for human exposure (general population) to radiofrequency emissions.

The Siemens M46 mobile phone (FCC ID: PWX-M46) is in compliance with the Federal Communications Commission (FCC) Guidelines [FCC 2001] for uncontrolled exposure. The phone was tested in the Body Worn configuration with the following accessory: “Leather Case“.

prepared by: 

André van den Bosch
test engineer

reviewed by: 

Dipl.-Ing. Christoph Hennes
quality assurance engineer

IMST GmbH
Carl-Friedrich-Gauß-Straße 2
D-47475 Kamp-Lintfort

Tel. +49- 2842-981 373
Fax +49- 2842-981 399
email: hennes@imst.de

Table of Contents

1	SAR RESULTS.....	4
2	EVALUATION.....	5
2.1	<i>PICTURES OF THE DEVICE UNDER TEST.....</i>	<i>6</i>
2.2	<i>TEST POSITIONS FOR THE DEVICE UNDER TEST.....</i>	<i>7</i>
2.3	<i>SAR DISTRIBUTION PLOTS.....</i>	<i>9</i>
2.4	<i>SAR Z-AXIS SCAN</i>	<i>11</i>
3	REFERENCES	12

1 SAR Results

The Tables below contain the measured SAR values averaged over a mass of 1 g.

M46 with leather case (Liquid depth = 15.4 cm)	SAR _{1g} [W/kg] (Drift[dB])			Temperature	
	Channel 512 1850.20 MHz 29.9 dBm	Channel 661 1880.00 MHz 29.8 dBm	Channel 810 1909.80 MHz 29.8 dBm	Ambient	Liquid
Display towards the phantom	0.173* (0.03)	0.161* (0.01)	0.150* (-0.03)	22.5/22.8/22.9	21.1/21.2/21.4
Display towards the ground	0.276* (-0.04)	0.266* (0.04)	0.288* (-0.02)	22.8/22.5/22.9	21.2/21.1/21.4

Table 1: Measurement results in body-worn configuration for PCS 1900 for the Siemens M46 with leather case (* Cube 1).

The “Cube 1” labeling indicates that during the grid scanning an additionally peak was found which was within 2.0 dB of the highest peak. The value of the highest cube can be found in the above tables, the value from the second assessed cube can be found in the SAR distribution plot.

The above mentioned power values are conducted measured values. The power output was measured in the IMST GmbH.

Before the measurements the test side ambient conditions were checked performing SAR measurements with the phone powered off. The highest noise level was 0.0008 W/kg (1g cube) for the body positions.

2 Evaluation

In Fig. 1 the SAR results in body-worn configuration for PCS 1900 given in Table 1 are summarized and compared to the limit.

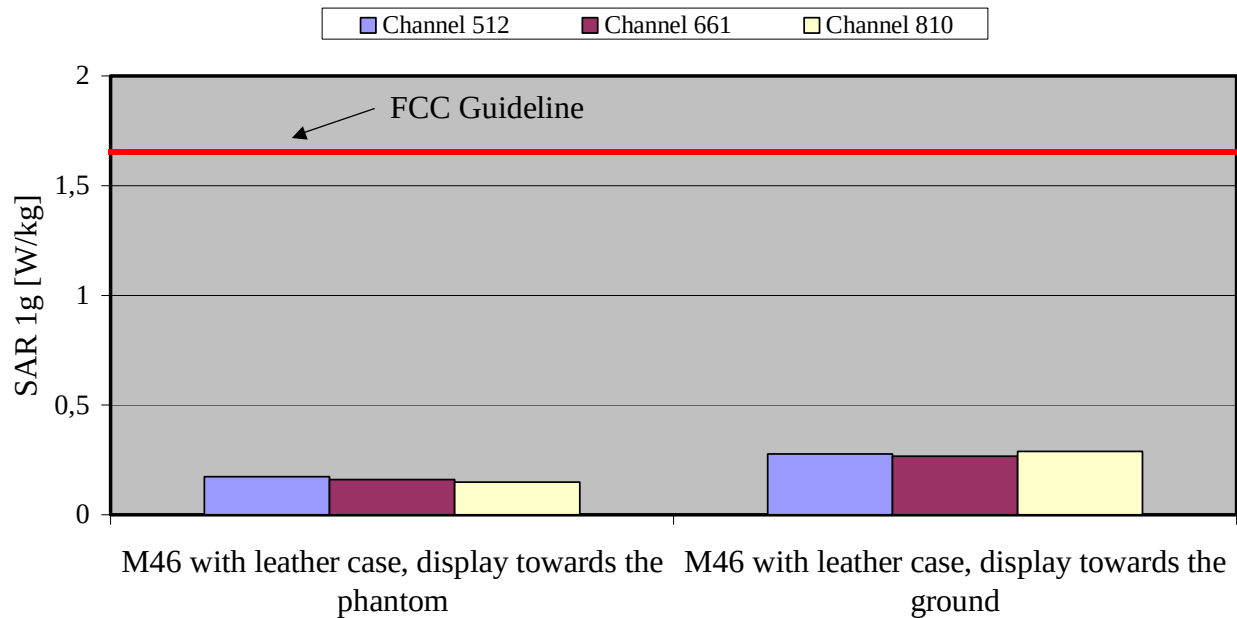


Fig. 1: The measured SAR values in body-worn configuration with leather case for the Siemens M46 for PCS 1900 in comparison to the FCC exposure limit.

The Siemens M46 mobile phone (FCC ID: PWX-M46) is in compliance with the Federal Communications Commission (FCC) Guidelines [FCC 2001] for uncontrolled exposure. The phone was tested in the Body Worn configuration with the following accessory: “Leather Case“.

2.1 Pictures of the device under test

Fig. 2 – 3 show the device under test and the used accessories.



Fig. 2: leather case



Fig. 3: Phone with leather case in the configuration: Display towards the phantom (left) and Display towards the ground (right).

2.2 Test Positions for the Device under Test

Fig. 4 – Fig. 5 shown the test positions for the SAR measurements.

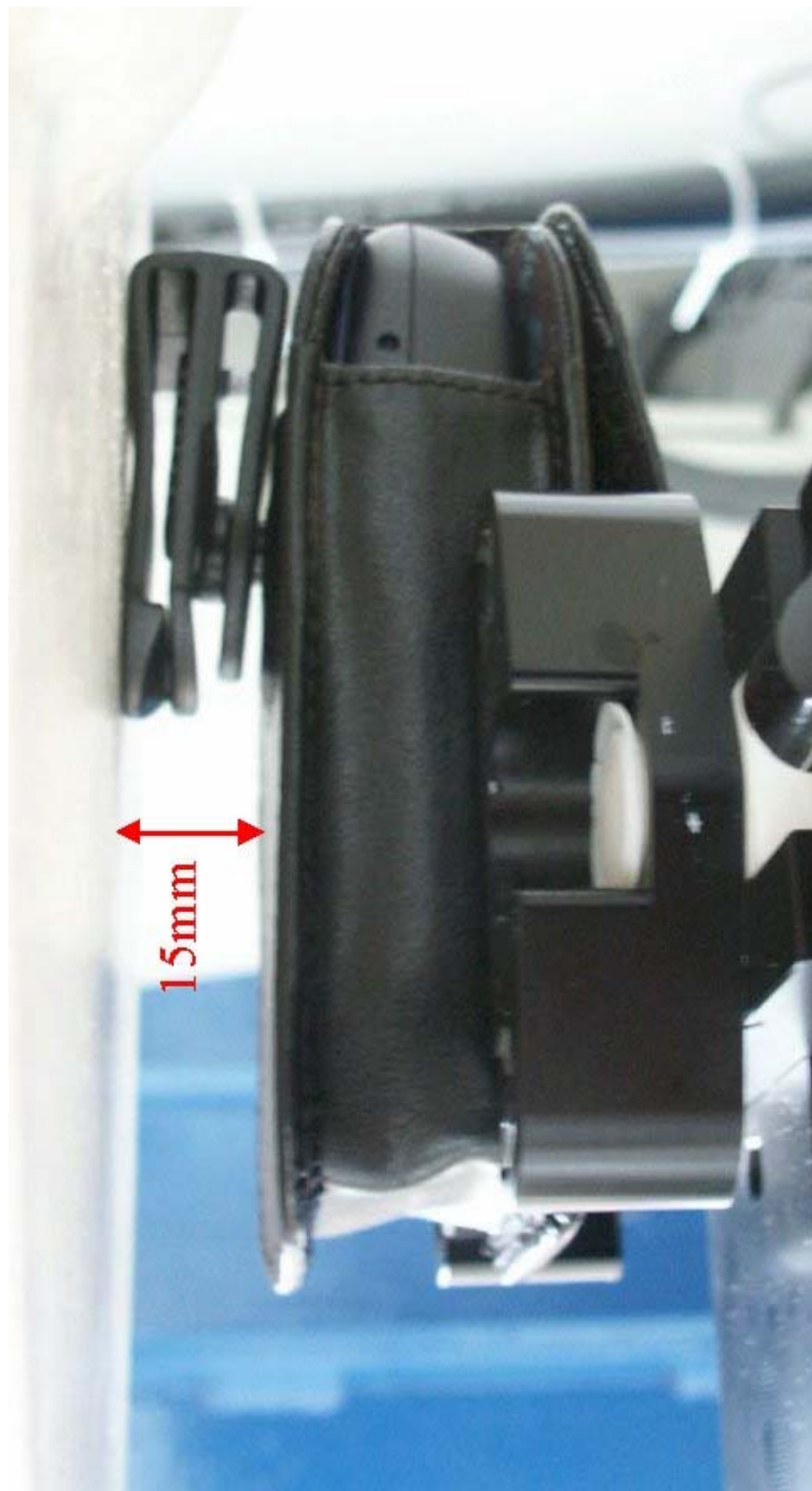


Fig. 4: Body worn configuration with leather case, display towards the phantom.



Fig. 5: Body worn configuration with leather case, display towards the ground.

2.3 SAR distribution plots

Since the SAR distribution is similar for the different channels, only the worst case plots were shown in Fig. 6 – Fig. 7.

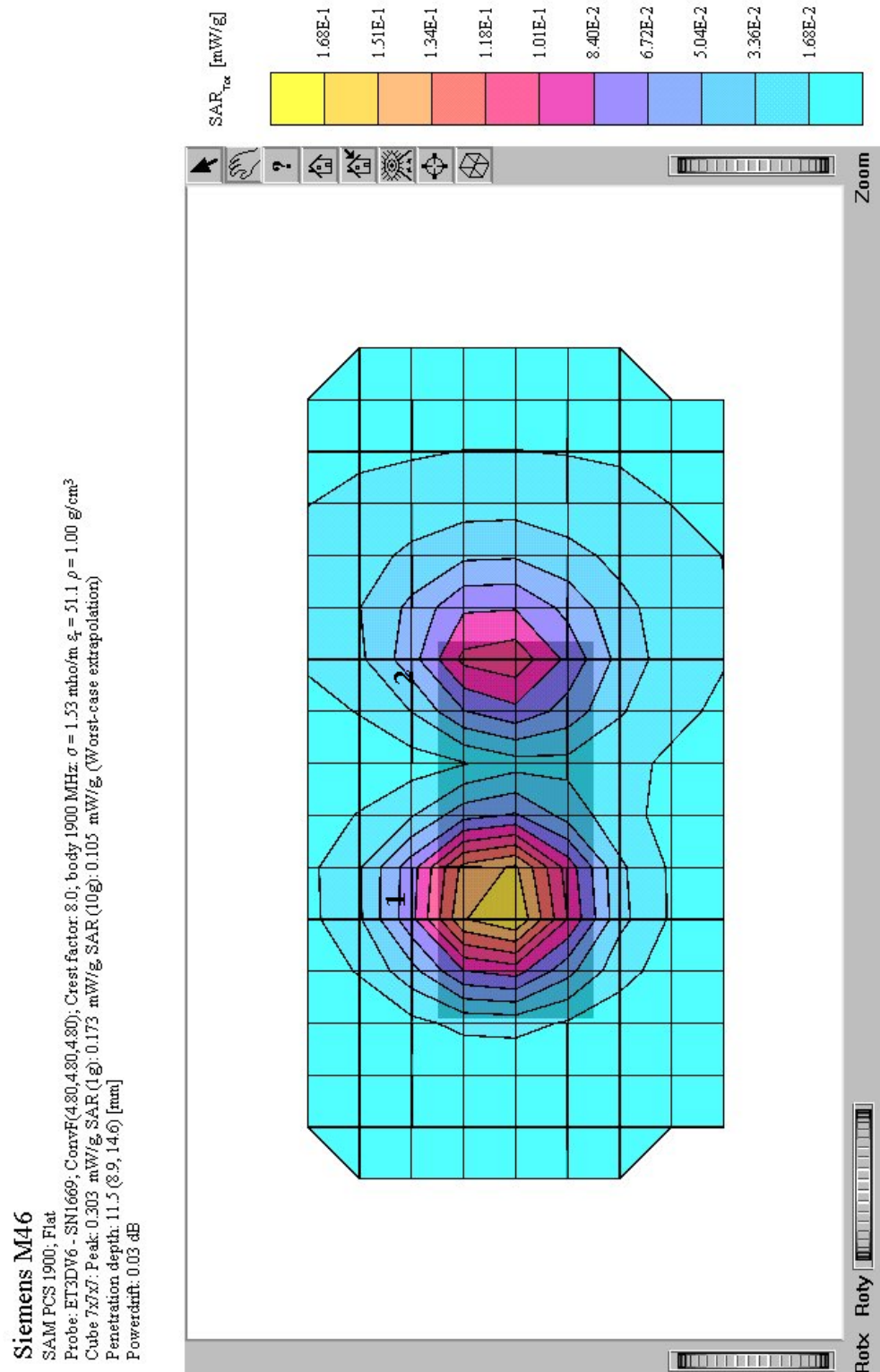


Fig. 6: Worst case SAR distribution, PCS 1900, channel 512, display towards the phantom, Cube 2: 0.0982 W/kg.

Siemens M46

SAM PCS 1900; Flat

Probe: ET3DV6 - SN1669; ConvF(480,480,480); Crest factor: 8.0; body 1900 MHz: $\sigma = 1.53$ mho/m $\epsilon_r = 51.1$ $\rho = 1.00$ g/cm³

Cube 7x7x7: Peak: 0.495 mW/g, SAR (1 g): 0.288 mW/g, SAR (10g): 0.178 mW/g, SAR (10g): 0.178 mW/g, (Worst-case extrapolation)

Penetration depth: 10.7 (8.9, 13.4) [mm]

Powerdrift: -0.02 dB

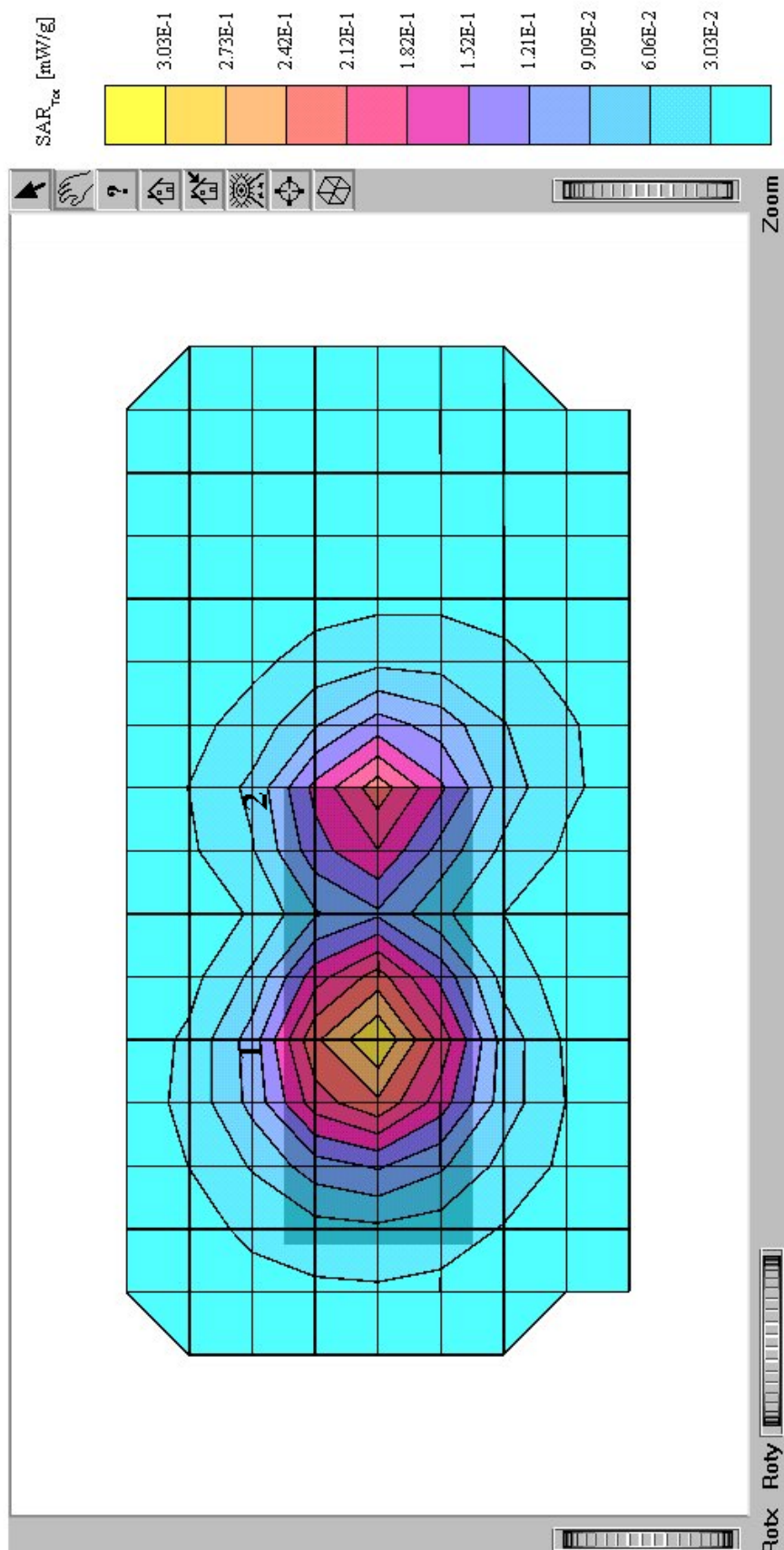


Fig. 7: Worst case SAR distribution, PCS 1900, channel 810, display towards the ground, Cube 2: 0.159 W/kg.

2.4 SAR z-axis scan

The following picture shows the plots of SAR versus liquid depth for the worst case value.

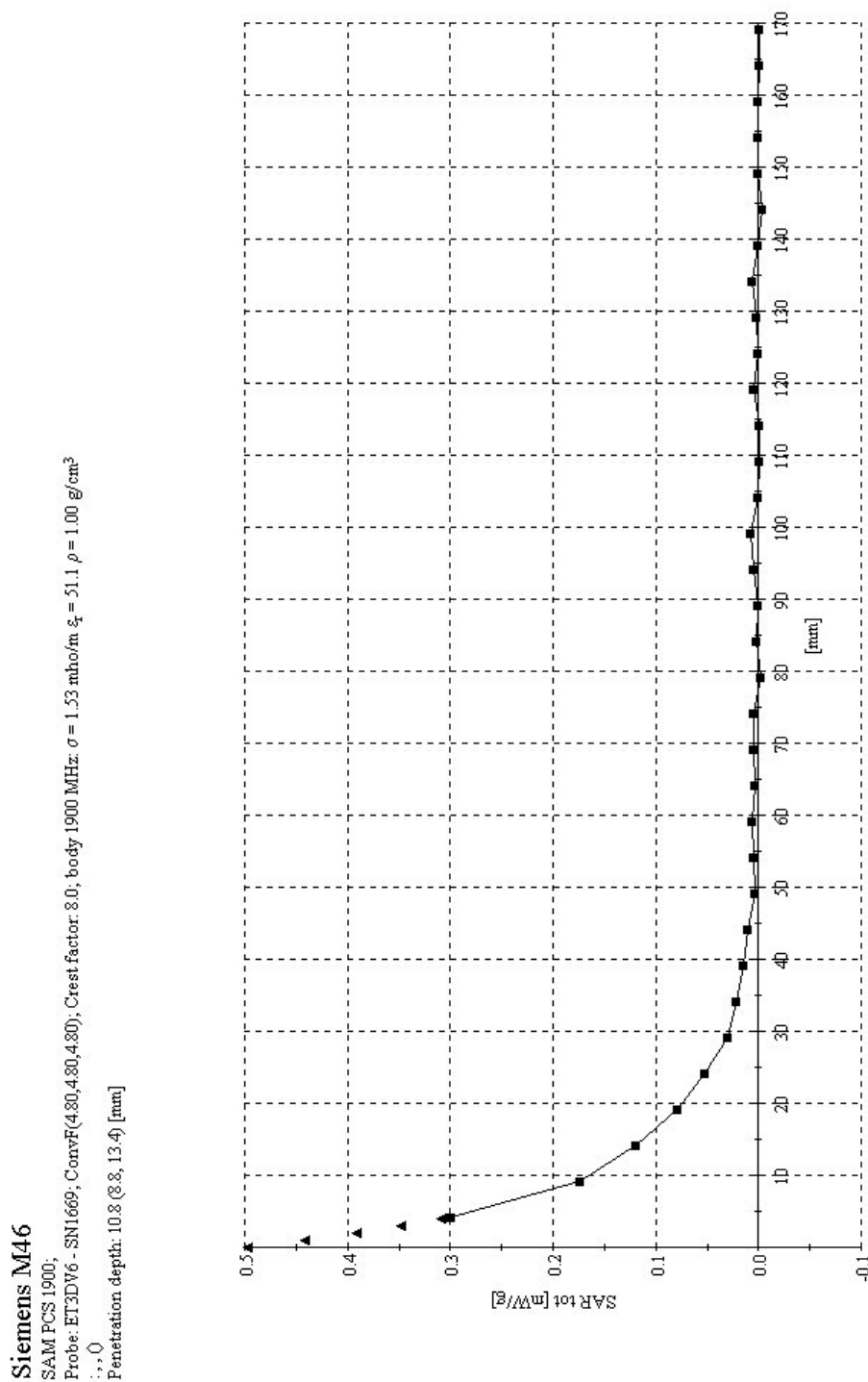


Fig. 8: SAR versus liquid depth at the location with the highest values: PCS 1900, channel 810, display towards the ground.

3 References

- [DASY 1995] Referenzliste des Herstellers, der Fa. Schmid & Partner Engineering AG, über installierte DASY-Systeme mit RX90 Robotern: Deutsche Telekom, Forschungs- und Technologiezentrum; Motorola Cellular - MRO; Motorola; Ericsson Mobile Communications AB; Nokia Mobile Phones LTD; IMST GmbH, 1995.
- [FCC 2001] Federal Communications Commission: Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01), FCC, 2001.
- [IEEE 1999] IEEE Std C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, Inst. of Electrical and Electronics Engineers, Inc., 1999.
- [IEEE 200x] IEEE Std 1528-200x: DRAFT Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques. Draft 6.2, Inst. of Electrical and Electronics Engineers, Inc., 2000.
- [NIST 1994] NIST: Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results, Technical Note 1297 (TN1297), United States Department of Commerce Technology Administration, National Institute of Standards and Technology, 1994.