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Supplement to "SAR Test Report: Sony Ericsson P800 mobile telephone model for GSM900, GSM1800 and GSM1900":

Results for body-worn usage

Date of test	June 17-18, 2002
Laboratory	Ericsson EMF Research Laboratory Ericsson AB Torshamnsgatan 23, SE-164 80 Stockholm, Sweden
Job No	2002-1
Customer	Kristina Gold KI/SEM/GKT/TR Sony Ericsson Mobile Communications AB Torshamnsgatan 39, Kista SE-164 80 Stockholm, Sweden

Test responsible

Lennart Hamberg
Research Engineer
lennart.hamberg@era.ericsson.se
Tel: +46 8 4043611

Test approval

Christer Törnevik
Director, EMF Health and Safety
christer.tornevik@era.ericsson.se
Tel: +46 8 7641235

Statement of Compliance

The tests reported herein show that the product model

Sony Ericsson P800 (Type Number 7130501-BV/CN)

is in compliance with the appropriate RF exposure standards, recommendations and limits.

This laboratory is accredited to ISO/IEC 17025 (SWEDAC accreditation no. 1761).

SWEDAC ACKREDITERING 1761 ISO/IEC 17025

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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.

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Test report summary

The table below summarises the SAR measurement results obtained for the Sony Ericsson P800 mobile phone mode when tested for body usage. The results show that the maximum SAR values are below the 1.6 W/kg (1g) limit and thus the P800 model is in compliance with the appropriate RF exposure standards and recommendations.

Mode	***Maximum SAR_{1g} (W/kg)***
GSM1900	***1.07***

1 General information

This report is a supplement to the document "SAR Test Report: Sony Ericsson P800 mobile telephone model for GSM900, GSM1800 and GSM1900", Ericsson Document ERA/TF-02:061, Rev. A, June 13, 2002. The main document demonstrates compliance of the P800 mobile phone model with RF safety guidelines while used against the head. In this report, compliance of the P800 wireless handsets with RF safety guidelines is demonstrated while the device is used in body-worn configurations [1]. The applicable RF safety guidelines and the SAR measurement specifications used for the test are described in [2].

2 Device Under Test

The table below summarizes the technical data for the tested device. Photographs of the device are presented in Appendix 1.

Device model	Sony Ericsson P800
Serial number of tested unit	A6101TR9HJ
Hardware revision	R2A
Mode	GSM900, GSM1800, GSM1900
Antenna	Internal
Maximum output power level[1] (dBm)	GSM900: 32.5 GSM1800: 29.5 GSM1900: 29.5
Duty cycle	1/8
Transmitter frequency range (MHz)	GSM900: 880.2-914.8 GSM1800: 1710.2-1784.8 GSM1900: 1850.2-1909.8

[1] Output power level of the phone model at the antenna port for the maximum power setting. This equals the nominal output power level plus the factory variation.

3 Test equipment

3.1 SAR test system

The SAR measurements were made using the DASY3 professional near-field scanner (software version 3.1d) by Schmid & Partner Engineering AG which was installed in September 1997. The total SAR assessment uncertainty (k=1) of the system is ±13.6% for 1g SAR assessments and 13.3% for 10g SAR assessments The corresponding extended uncertainties (k=2) are ±27.1% and ±26.6%, respectively. The equipment list is given below. In Appendix 5 calibration parameters for the SAR test probe are listed.

Description	**Asset number**	**Calibration due date**
DASY3 DAE3	S/N 422	2003-04-25
E-field probe, ET3DV6	S/N 1572	2003-04-25
Dipole validation kit, D1900V2	S/N 510	2003-05-15
SAM Phantom	S/N TP-1204	NA

3.2 Additional equipment

Description	**Asset number**	**Calibration due date**
Signal generator, R&S SMHU58	S/N 843863/034	2004-01-02
Dielectric probe kit, HP 85070C	S/N US99360060	NA
Network analyzer, HP 8752C	S/N 3410A03732	2002-11-20
Power meter, R&S NRVS	S/N 848888/052	2003-03-26
Power sensor, R&S NRV-Z5	S/N 849895/030	2003-03-26
Digital radio tester, R&S CTS-55	S/N 827443/012	2003-01-03
Thermometer, EBRO TFX-392SKWT	S/N 10130918	2002-08-14
Thermo/Hygrometer Testo 608-H2	S/N 60013082	2003-01-25

4 Electrical parameters of the tissue simulating liquid

The parameters of the tissue simulating liquid were measured with the dielectric probe kit prior to the SAR measurement and the results are shown in the table below. Specified standard values for the permittivity and the conductivity are also given [1]. The measured values are within 5% of the standard values. The mass density of the liquid entered into the DASY3 program was 1000 kg/m^3. The depth of the head tissue liquid was 15 cm.

f (MHz)	**Liquid type**	**Measured/Specification**	e_r	s **(S/m)**	**Liquid Temp (°C)**
1900	Muscle tissue	Measured	52.7	1.55	23.1
		Specified value [1]	53.3	1.52	-
		Difference (%)	+1	+2	-

5 System performance check

A simplified system performance check for the DASY3 was conducted before the SAR measurements with the D1900V2 validation kit and the obtained results are displayed in the table below. The results are within 10% of the reference values obtained from numerical simulations for 1900MHz muscle simulant [3]. An evaluation of the test facility showed that the SAR system noise met the standard requirements [4]. The temperature of the test facility during the tests was in the range 22.9°C to 23.5°C and the relative humidity was 43%-44%. Appendix 2 shows the measured SAR distribution.

f (MHz)	Measured/ Reference	SAR 1g (W/kg)	SAR 10g (W/kg)	e_r	s (S/m)	Date
1900	Measured	40.37	20.77	52.7	1.55	2002-06-17
	Reference [3]	40.50	20.89	53.3	1.52	-
	Difference (%)	0	-1	+1	+2	-

6 Test Results

For body-worn SAR measurements, the device was positioned such that it was touching the flat phantom representing the user's body as shown in Appendix 3. The device was tested for both flip configurations, with and without flip and for the two available handsfree accessories. For the configuration giving maximum SAR, the device was tested at the lowest, middle and the highest frequencies of the transmit bands corresponding to the GSM1900 traffic channels 512, 661 and 810. A digital radio tester was used to control the device during the SAR measurements. The phone was supplied with a fully charged battery for the tests.

The table below presents the measured 1g averaged SAR for the device and the corresponding values normalized to 29.5 dBm maximum output power level for the GSM1900 mode.

6.1 Results for the GSM1900 mode

Configuration	Phone Position	f (MHz)	Liquid Temp (°C)	Measured output power (dBm)	SAR_{1g} (W/kg)	
					Measured	Normalized to max power, 29.5 dBm
Flip, with handsfree accessory HPB-10	Front[2]	1880.0	23.2	28.8	0.50	0.59
	Back[3]	1880.0	23.4	28.8	0.73	0.86
Flip, with stereo headset accessory	Front	1880.0	23.4	28.8	0.49	0.58
	Back	1850.2	23.5	28.9	0.93	**1.07**
		1880.0	23.3	28.8	0.74	0.87
		1909.8	23.5	28.8	0.66	0.78

[2] Front of the phone facing the body.
[3] Back of the phone facing the body

Configuration	Phone Position	f (MHz)	Liquid Temp (°C)	Measured output power (dBm)	SAR_{1g} (W/kg)	
					Measured	Normalized to max power, 29.5 dBm
No flip, with handsfree accessory HPB-10	Front	1880.0	23.5	28.8	0.64	0.75
	Back	1880.0	22.9	28.8	0.69	0.81
No flip, with stereo headset accessory	Front	1880.0	23.1	28.8	0.65	0.76
	Back	1850.2	23.4	28.9	0.75	0.86
		1880.0	23.1	28.8	0.71	0.83
		1909.8	23.5	28.8	0.59	0.69

Appendix 4 shows the maximum SAR distribution in the flat phantom giving the maximum 1g SAR of 1.07 W/kg.

For the configuration and frequency giving maximum SAR, the device was tested with the 0 dBm bluetooth transmitter turned on and off. After normalization to the maximum output power level the 1g averaged SAR was found to be 0.98 W/kg and 1.03 W/kg with and without bluetooth, respectively. Thus, the bluetooth transmitter does not increase maximum SAR.

7 Conclusion

The results above show that the maximum SAR for the Sony Ericsson P800 mobile phone is below the 1.6 W/kg (1g) limit. Consequently, the P800 model is in compliance with the appropriate RF exposure standards and recommendations.

8 References

[1] FCC, "Evaluating Compliance with FCC Guidelines from Human Exposure To Radiofrequency Electromagnetic Fields", Supplement C Edition 01-01 to OET Bulletin 65 Edition 97-01, June 2001.

[2] Martin Siegbahn, “Ericsson SAR Measurement Specification of Wireless Terminals”, Ericsson document ERA/T/F-01:126, Rev A, December 4, 2001.

[3] M. Douglas, “Reference values for system validation using body material,” internal Sony Ericsson document EUS/CV/R-01:1118 /REP.

[4] Martin Siegbahn, “Measurements of SAR system noise in the Ericsson EMF Research Laboratory”, Ericsson document ERA/T/F-01:137, Rev. A, December 13, 2001.

APPENDIX 1: Photographs of the DUT

(a)

(b)

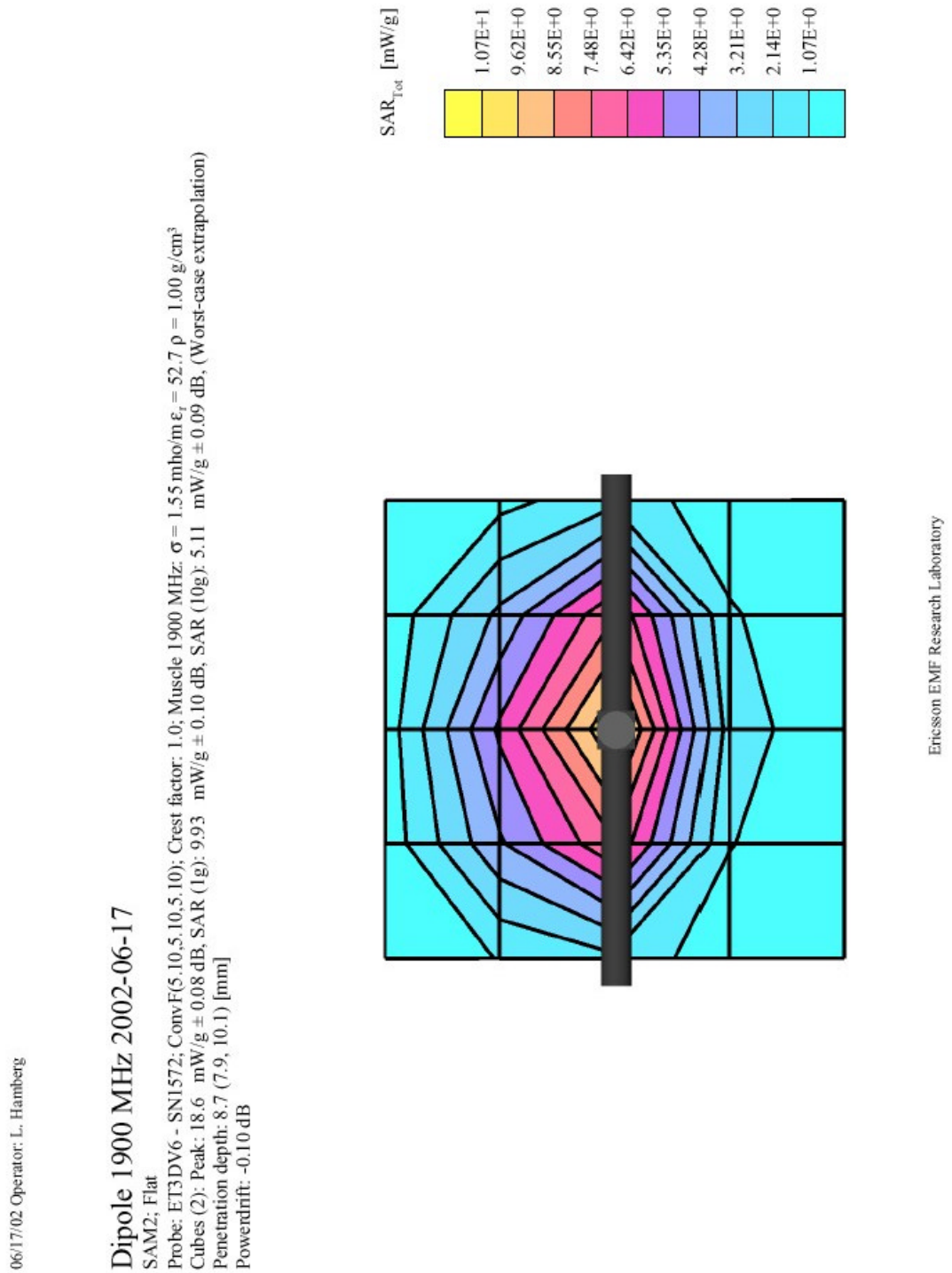
Front view of the Sony Ericsson P800 mobile phone with flip (a) and without flip (b).

(a)

(b)

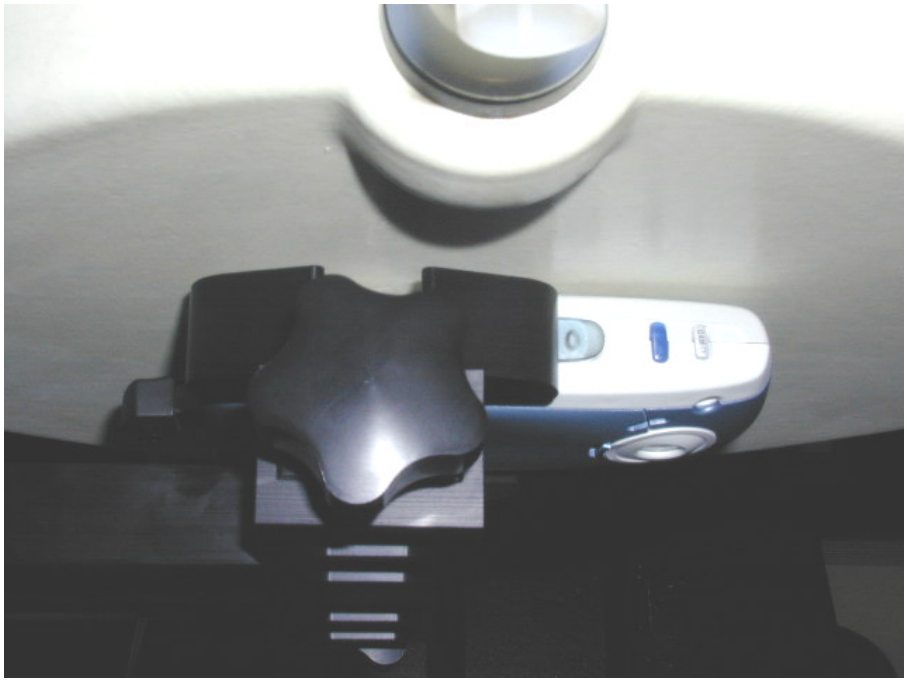
Side view of the Sony Ericsson P800 mobile phone with flip (a) and without flip (b).

APPENDIX 2: SAR distribution for system performance check.



SAR distribution plots for the 1900 MHz validation dipole antenna (S/N 510). The plot shows the measurement data obtained prior to the SAR testing.

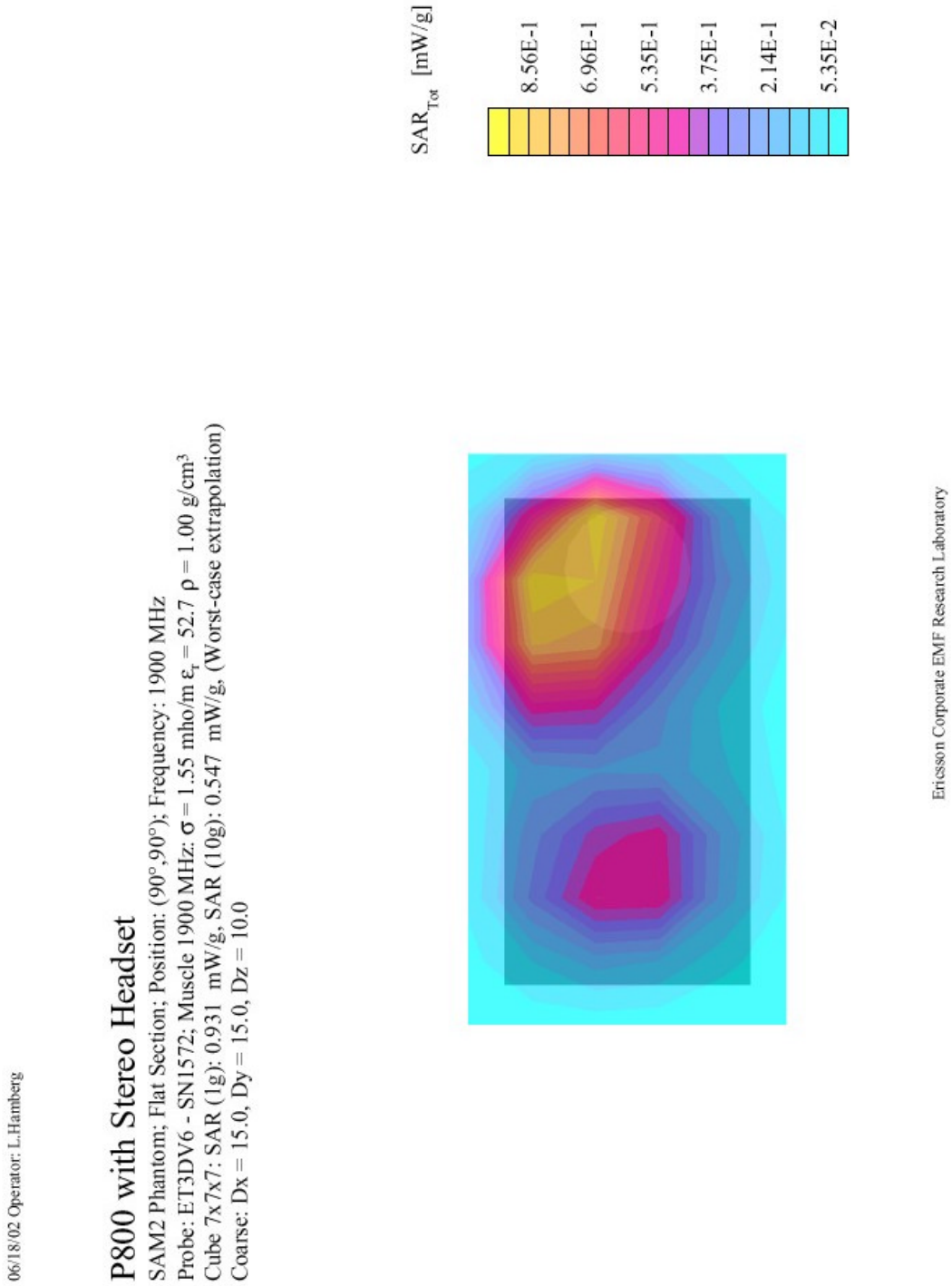
APPENDIX 3: Photographs of the DUT when positioned for SAR measurements



The P800 with front side facing the flat phantom.

The P800 with back side facing the flat phantom.

APPENDIX 4: SAR distribution plots



Distribution of maximum SAR in GSM1900 mode giving the maximum 1g averaged SAR.

APPENDIX 5: Probe calibration parameters for ET3DV6 SN:1572

Sensitivity in Free Space		Diode Compression		
Norm X	**1.92** μV/(V/m)^2	DCP X	**96**	mV
Norm Y	**1.80** μV/(V/m)^2	DCP Y	**96**	mV
Norm Z	**1.98** μV/(V/m)^2	DCP Z	**96**	mV

Sensitivity in Tissue Simulating Liquid

Muscle **1900 MHz** e_r**=53.3** ± **5%** s **=1.52**± **5% mho/m**

ConvF X	**5.1** ± 8.0 % (k=2)	Boundary effect	
ConvF Y	**5.1** ± 8.0 % (k=2)	Alpha	**0.42**
ConvF Z	**5.1** ± 8.0 % (k=2)	Depth	**2.52**

Sensor Offset

Probe Tip to Sensor Center:	**2.7**	mm
Optical Surface Detection:	**1.1** ± **0.2**	mm

APPENDIX 6. Accreditation information

SWEDAC

Styrelsen för ackreditering och teknisk kontroll
Swedish Board for Accreditation and Conformity Assessment

ACKREDITERINGSBEVIS

ACCREDITATION CERTIFICATE

Ericsson Radio Systems AB

Ericsson EMF Research Laboratory

har genom beslut den
following the decision on

27 april 2001

ackrediterats som
is accredited as

provningslaboratorium
testing laboratory

och därvid erhållit registreringsnummer
and has been assigned registration number

1761

Styrelsen för ackreditering och teknisk kontroll
Swedish Board for Accreditation and Conformity Assessment

Lars Ettarp
Generaldirektör
Director General

Ackrediterat organ har rätt att använda nedanstående märke.
An accredited body is entitled to use the following logotype.

SWEDAC ACKREDITERING

Ackrediteringens omfattning och villkor framgår av ackrediteringsbeslutet.
The scope and conditions of accreditation are specified in the accreditation decision.