Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
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Approved	Checked	Date	Rev	Reference
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Report issued by Accredited SAR Laboratory

for

PY7-A1022012

Date of test: *3, 4, 5 and 11 October, 2005*

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

Sony EricssonType : AAB-1022012-BV; FCC ID : PY7-A1022012; IC:4170B-A1022012

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)

This laboratory is accredited to ISO/IEC 17025 (SWEDAC accreditation no. 1847).

Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEDAC) under the terms of Swedish legislation. The accredited laboratory activities meet the requirements in SS-EN ISO/IEC 17025 (2000). This report may not be reproduced other than in full, except with the prior written approval of the issuing 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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2 Introduction

In this test report, compliance of the Sony Ericsson PY7-A1022012 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	Build in	
Location	Up on the back side	
Dimensions	Max length	32mm
	Max width	20mm
Configuration	PIFA	

3.2 Device description

Device model	PY7-A1022012	
Serial number	CB50V16YPE (#3375)	
Mode	GSM1900	GSM1900GPRS
Multiple Access Scheme	TDMA	TDMA
Maximum Output Power Setting	30.0 dBm	28.5 dBm
Factory Tolerance in Power Setting	±0.5 dB	±0.5 dB
Maximum Peak Output Power for GPRS	30.5 dBm	29 dBm
Crest Factor	8	4
Transmitting Frequency Range(MHz)	1850.2 – 1909.8	
Prototype or Production Unit	Preproduction HW R2A	
Device Category	Portable	
RF exposure environment	General population / uncontrolled	

4 Test equipment

4.1 Dosimetric system

SAR measurements were made using the DASY4 professional system (software version 4.5, Built 19) 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	433	032006
E-field probe ET3DV6	1815	012006
Dipole Validation Kit, D1900V2	5d002	032007

4.2 Additional equipment

Description	***Inventory Number***	***Due Date***
Signal generator ESG-D4000A	INV 462935	112006
Directional coupler HP778D	INV 2903	012006
Power meter R&S NRVD	INV 483920	012006
Power sensor R&S NRV-Z5	INV 2333	012006
Power sensor R&S NRV-Z5	INV 2334	012006
Termination 65N50-0-11	INV 2903	012006
Network analyzer HP8753C	INV421671	092006
S-parameter test set HP85047A	INV 421670	092006
Dielectric probe kit HP85070D	INV 20000053	Self cal

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, 03/10/2005**	38.1	1.47	1.00
		Measured, 04/10/2005	38.1	1.47	1.00
		Recommended	40.0	1.40	1.00
1900	Body	**Measured, 05/10/2005**	51.6	1.55	1.00
		Measured, 11/10/2005	52.3	1.54	1.00
		Recommended	53.3	1.52	1.00

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 32%. 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 0.00001mW/g in 1g mass.

f (MHz)	Tissue type	Measured / Reference	SAR (W/kg) 1g/10g	Dielectric Parameters			Liquid t(°C)
				ε_r	σ (S/m)	ρ (g/cm³)	
1900	Head	**Measured, 03/10/2005**	39.5/20.4	38.1	1.47	1.00	22
		Measured, 04/10/2005	38.5/20.0	38.1	1.47	1.00	22
		Reference	39.2/20.6	39.6	1.45	1.00	22
1900	Body	**Measured, 05/10/2005**	38.7/20.5	51.6	1.55	1.00	22
		Measured, 11/10/2005	38.2/20.3	52.3	1.54	1.00	22
		Reference	39.6/20.9	51.6	1.58	1.00	22

7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sonyericsson PY7-A1022012 phone

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C_i	GSM 1900-Head	GSM 1900-Body
Measurement System						
Probe Calibration	±4.4	N	1	1	±4.4	±4.4
Axial Isotropy	±4.7	R	√3	0.5	±1.4	±1.4
Spherical Isotropy	±9.6	R	√3	0.5	±2.8	±2.8
Spatial resolution	±0.0	R	√3	1	±0.0	±0.0
Boundary effect	±5.5	R	√3	1	±3.2	±3.2
Probe linearity	±4.7	R	√3	1	±2.7	±2.7
Detection limit	±1.0	R	√3	1	±0.6	±0.6
Readout electronics	±1.0	N	1	1	±1.0	±1.0
Response time	±0.8	R	√3	1	±0.5	±0.5
Integration time	±1.4	R	√3	1	±0.8	±0.8
RF Ambient Conditions	±3.0	R	√3	1	±1.7	±1.7
Mech. Constraints of robot	±0.4	R	√3	1	±0.2	±0.2
Probe positioning	±2.9	R	√3	1	±1.7	±1.7
Extrap, interpolation and integration	±3.9	R	√3	1	±2.3	±2.3
Measurement System Uncertainty					*±7.8*	*±7.8*
Test Sample Related						
Device positioning	±6.0	N	0.89	1	±6.7	±6.7
Device holder uncertainty	±5.0	N	0.84	1	±5.9	±5.9
Power drift	-2/-1.6	R	√3	1	-1.2	-0.9
Test Sample Related Uncertainty					*±9.0*	*±9.0*
Phantom and Tissue Parameters						
Phantom uncertainty	±4.0	R	√3	1	±2.3	±2.3
Liquid conductivity (meas)	+5.0/+1.97	R	√3	0.6	+1.7	+0.7
Liquid conductivity (target)	±5.0	R	√3	0.6	±1.7	±1.7
Liquid Permittivity (meas)	-4.8/-3.2	R	√3	0.6	-1.7	-1.1
Liquid Permittivity (target)	±5.0	R	√3	0.6	±1.7	±1.7
Phantom and Tissue Parameters Uncertainty					*±4.1*	*±3.6*
Combined standard uncertainty					*±12.6*	*±12.4*
Extended standard uncertainty (k=2)					***±25.2***	***±24.8***

8 Test results

The measured 1-gram averaged SAR values of the device against head and body are provided in Table 1 and Table 2. The ambient humidity and temperature of test facility were (22-25) % and (23–24) °C respectively.

The depth of the head and body tissue simulating liquids were 15.4cm and 15.2cm. A base station simulator was used to control the device during the SAR measurements. 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 different phones position, cheek (touch) and tilt (cheek + 15deg). For all modes, the device was tested at the lowest, middle and highest frequencies in the transmit band.

For body measurements the phone was tested on either the phone's antenna (Back) or the Front side phone against the flat section of the phantom with 15mm distance. GPRS measurements are done for back and front side of the phone for all three different channels. For speech mode it's used Sony Ericsson hands free HPM-61 and measured only in back side position to phantom

For Blue Tooth mode the phone was pared with Sony Ericsson HBH-200 Blue tooth head set and measured only on the worst case on body positions in speech phone mode.

Mode	Channel	Power (dB)	Phone Position	Liquid t (°C)	SAR (W/kg)	
					Right-hand	Left-hand
					1g mass	1g mass
1900 GSM	512	30.3	Cheek	22	0.27	0.22
			Tilt	22	0.28	0.26
	661	30.3	Cheek	22	0.31	0.25
			Tilt	22	0.34	0.32
	810	30.3	Cheek	22	0.31	0.25
			Tilt	22	**0.38**	0.34

Table1: SAR measurement result for Sony Ericsson PY7-A1022012 telephone at highest possible output power. measured against the head.

Mode	Channel	Power (dBm)	Phone Position	Liquid t (°C)	SAR (W/kg) in 1 g mass
1900 GSM GPRS	512	30.3	Antenna to phantom, HF HPM20	22	0.46
		29	Antenna to phantom, GPRS 2 Slots	22	1.08
			Front to phantom, GPRS 2 Slots	22	0.11
	661	30.3	Antenna to phantom, HF HPM20	22	0.62
		29	Antenna to phantom, GPRS 2 Slots	22	0.93
			Front to phantom, GPRS 2 Slots	22	0.1
	810	30.3	Antenna to phantom, HF HPM20	22	0.76
			Antenna to phantom, HBH200	22	0.79
		28.7	Antenna to phantom, GPRS 2 Slots	22	**1.22**
			Front to phantom, GPRS 2 Slots	22	0.11

Table2: SAR measurement result for Sony Ericsson PY7-A1022012 telephone at highest possible output power. measured against the Body.

9 References

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

[2] Basic standard for the Measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300MHz-3GHz), European Standard EN 50361, July 2001

[3] 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).

[4] 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 1528-2003, June, 2003.

10 Appendix

10.1 Photographs of the device under test

Front & Back sides

System Connector

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Approved		Checked	Date	Rev	Reference
LD/SEMC/BGGI/NMC Mats Hansson		*051013*	*051012*		File

Back side with battery

10.2 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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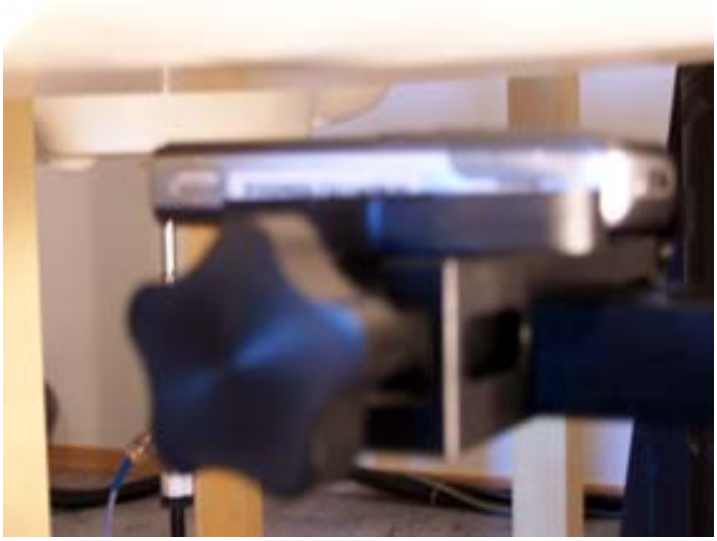
Approved		Checked	Date	Rev	Reference
LD/SEMC/BGGI/NMC Mats Hansson		*051013*	*051012*		File



Device position against the body: 15mm distance from Phantom.

DASY4 Validation Report for Body TSL

Date/Time: 15.03.2005 15:20:32

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002

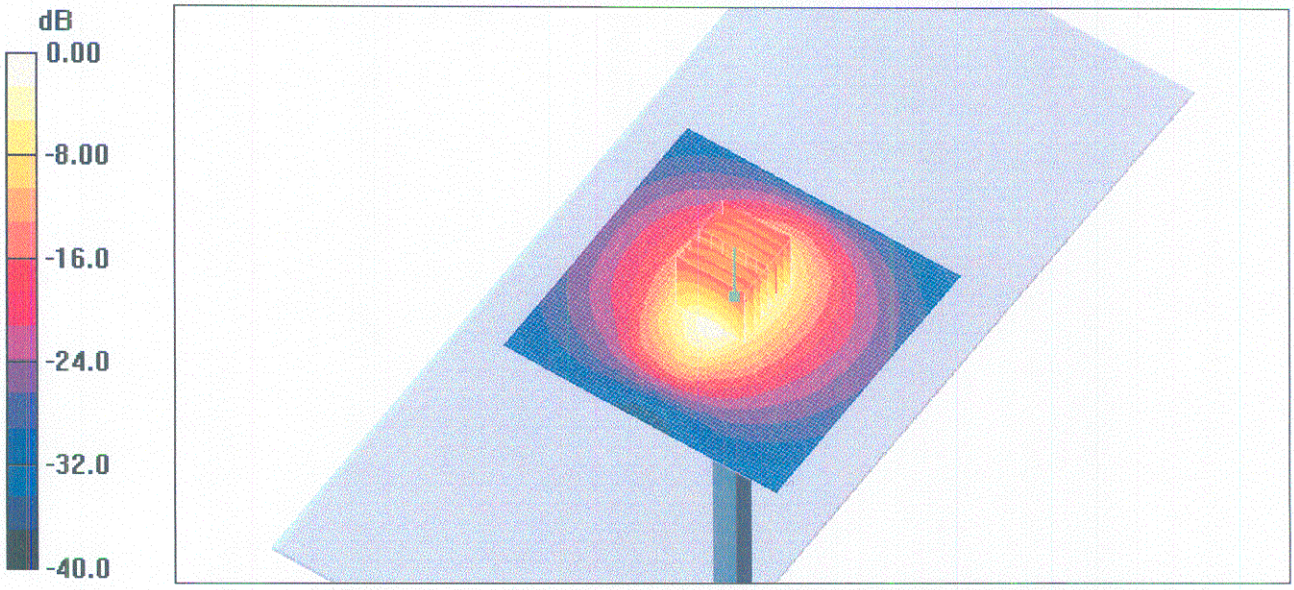
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.43, 4.43, 4.43); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.3 V/m; Power Drift = 0.061 dB
Peak SAR (extrapolated) = 16.8 W/kg
SAR(1 g) = 9.91 mW/g; SAR(10 g) = 5.23 mW/g
Maximum value of SAR (measured) = 11.3 mW/g



0 dB = 11.3mW/g

DASY4 Validation Report for Head TSL

Date/Time: 09.03.2005 15:20:45

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002

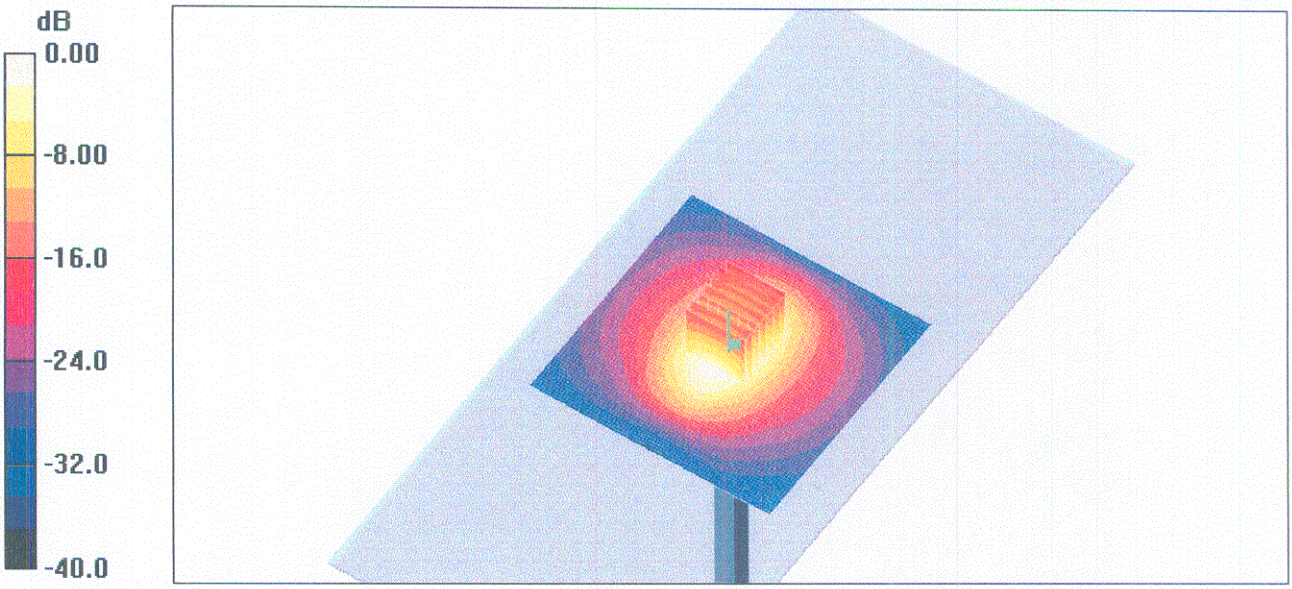
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.96, 4.96, 4.96); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.4 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.81 mW/g; SAR(10 g) = 5.15 mW/g
Maximum value of SAR (measured) = 11.0 mW/g



0 dB = 11.0mW/g