Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
LD/SEMC/BGGI/NM Hamid Kami Shirazi		*BGGIN05:292*		
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGGI/NM *Ramadan Plicanic*	*051010*	*05-10-10*	A	File

Report issued by Accredited SAR Laboratory

For

PY7A1022011 (k750i)

Date of test: *3-4-7, 10, 2005*

Laboratory:
Sony Ericsson SAR Test Laboratory
Sonyericsson Mobile Communications AB
Nya Vattentornet
SE-221 82 LUND, Sweden

Testing Engineer:
Hamid Kami Shirazi
Kami.shirazi@sonyericsson.com
+46 46 232644

Testing Approval
Ramadan Plicanic
Ramadan.Plicanic@sonyericsson.com
+46 46 19 38 62

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

Sony Ericsson AAB-1022011-BV; FCC ID:PY7A1022011;IC:4170B-A1022011

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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Company Internal
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1 Table of contents

Sony Ericsson

Company Internal
REPORT

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2 Introduction

In this test report, compliance of the Sony Ericsson PY7A1022011 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	PY7A1022011	
Serial number	CB50V0VG16	
Mode	GSM1900	GSM1900(GPRS2TX)
Multiple Access Scheme	TDMA	TDMA
Maximum Output Power Setting	30.0dBm	28.5dBm
Factory Tolerance in Power Setting	±0.5dBm	±0.5dBm
Maximum Peak Output Power	30,5dBm	29.0dBm
Crest Factor	8	4
Transmitting Frequency Range(MHz)	1850.2 – 1909.8	
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	March, 2006
E-field probe ET3DV6	1585	March, 2006
Dipole Validation Kit, D1900V2	5d002	March, 2007

4.2 Additional equipment

Description	***Inventory Number***	***Due Date***
Signal generator ESG-D4000A	INV 462935	11, 2006
Directional coupler HP778D	INV 2903	11, 2005
Power meter R&S NRVD	INV 483920	01, 2006
Power sensor R&S NRV-Z5	INV 2333	11, 2005
Power sensor R&S NRV-Z5	INV 2334	11, 2005
Termination 65N50-0-11	INV 2903	02, 2006
Network analyzer HP8753C	INV421671	09, 2006
S-parameter test set HP85047A	INV 421670	09, 2006
Dielectric probe kit HP8507D	INV 20 000 053	Self cal
Description	***Inventory Number***	***Due Date***

Sony Ericsson

Company Internal
REPORT

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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**	38.0	1.47	1.00
		Recommended	40.0	1.40	1.00
1900	Body	**Measured, 04/10/2005**	51.5	1.53	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 22-23 °C and humidity 40-50%. 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 0.0005 m W/g in1g 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**	40.4/20.5	38.0	1.47	1.00	22
		Measured, 04/10/2005	40,2/20.4	20.4	1.47	1.00	22
		Reference	39.2/20.6	39.6	1.45	1.00	--
1900	Body	**Measured, 04/10/2005**	40.8/21.1	51.5	1.53	1.00	22
		Measured, 07/10/2005	40.4/20.8	51.5	1.53	1.00	22
		Reference	39.6/20.9	51.6	1.58	1.00	--

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7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sonyericsson PY7A1022011 (K750i) phone

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C_i	1900 Head	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					**±7.7**	**±7.7**
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	3.7/3.0	R	√3	1	±2,1	±1.7
Test Sample Related Uncertainty					**±9.2**	**±9.1**
Phantom and Tissue Parameters						
Phantom uncertainty	±4.0	R	√3	1	±2.3	±2.3
Liquid conductivity (meas)	+5/+0.7	R	√3	0.6	±1.7	±0,2
Liquid conductivity (target)	±5.0	R	√3	0.6	±1.7	±1.7
Liquid Permittivity (meas)	-5/-3.4	R	√3	0.6	±0,9	±1,2
Liquid Permittivity (target)	±5.0	R	√3	0.6	±1.7	±1.7
Phantom and Tissue Parameters Uncertainty					**±3.8**	**±3.5**
Combined standard uncertainty					*±12.6*	*±12.4*
Extended standard uncertainty (k=2)					***±25.2***	***±24.8***

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8 Test results

The measured 1-gram and averaged SAR values of the device against the head are provided in Tables 1 and body are provided in Tables 2. The ambient humidity and temperature of test facility were 40% - 50% and 22.0 °C – 23.0 °C respectively. The depth of the head and body tissue simulating liquid were 15.1cm. 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 body measurement phone was tested on the antenna to the phantom and back to the phantom in GPRS 2 TX mode and with 15mm distance against flat section of phantom. For all modes, the device was tested at the lowest, middle and highest frequencies in the transmit band. For Blue Tooth mode, phone was pared with Sony Ericsson HBH-60 Blue Tooth head sets and measured on worst case speech mode body position.

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**	22-23	0.49	0.42
			Tilt	22-23	0.54	0.49
	661	30.3	**Cheek**	22-23	0.67	0.58
			Tilt	22-23	0.71	0.65
	810	30.4	**Cheek**	22-23	0.69	0.51
			Tilt-Blue tooth	22-23	**0.74**	-
			Tilt	22-23	**0.73**	0.66

Table1: SAR measurement result for Sony Ericsson PY7A1022011 (K750i) telephone at highest possible output power. The phone has measured against the head.

Mode	Channel	Power (dBm)	Phone Position	Liquid t (°C)	SAR (W/kg) in 1 g mass
GSM 1900 Body	512	30.3	**Front to phantom**	22-23	0.07
			Antenna to phantom	22-23	0.52
		29.0	**Antenna to phantom, GPRS 2 Slots**	22-23	0.75
	661	30.3	**Front to phantom**	22-23	0.10
			Antenna to phantom	22-23	0.73
		28.9	**Antenna to phantom, GPRS 2 Slots**	22-23	0.90
	810	30.4	**Front to phantom**	22-23	0.11
			Antenna to phantom	22-23	**0.87**
		28.7	**Antenna to phantom, GPRS 2 Slots**	22-23	**0.99**

Table2: SAR measurement result for Sony Ericsson PY7A1022011 (K750i) telephone at highest possible output power. The phone has measured against the Body.

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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.

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10 Appendix

10.1 Photographs of the device under test

Front side

Down Connector

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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

Sony Ericsson

Company Internal
REPORT

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LD/SEMC/BGGI/NM	*Ramadan Plicanic*	*051010*	*05-10-10*	A	File

Device position against the body

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

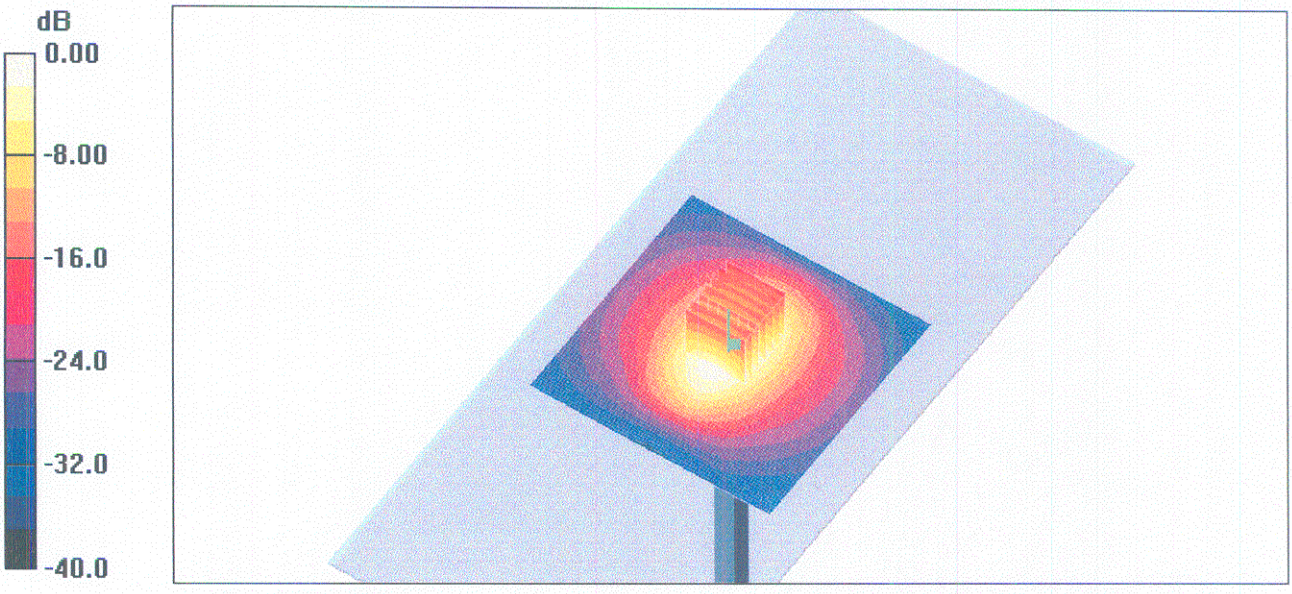
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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

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

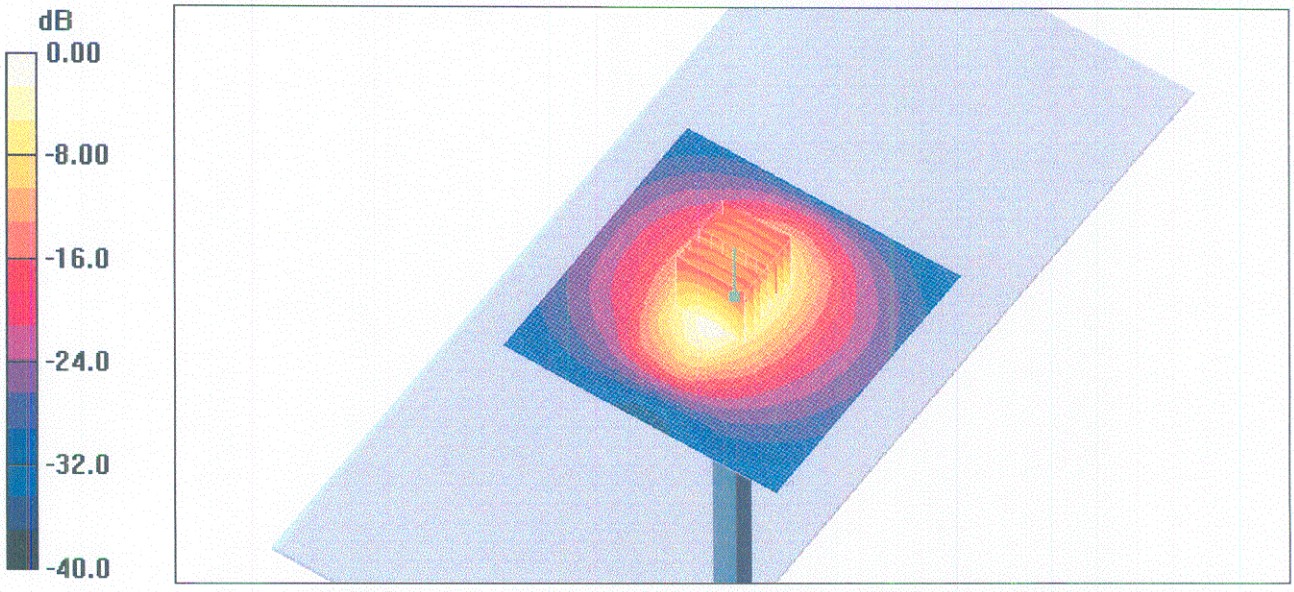
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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