Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
LD/SEMC/BGGI/NM *Ramadan Plicanic*		*BGGIN06:042*		
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGGI/NMC *Mats Hansson*		*060207*	A	File

Report issued by Accredited SAR Laboratory

for

PY7A1042012 (J220a)

Date of test: *30 January, 1,2 and 3 February 2006*

Laboratory:
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Statement of Compliance

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

Sony Ericsson Type : AAA-1042012-BV; FCC ID : PY7A1042012; IC:4170B-A1042012

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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1 Table of contents

2 Introduction

In this test report, compliance of the Sony Ericsson PY7A1042012 (J220a) 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	38mm
	Max width	26mm
Configuration	PIFA	

3.2 Device description

Device model	PY7A1042012 (J220a)					
Serial number	WUJI000105 (#3993)					
Mode	GSM850			GSM1900		
Multiple Access Scheme	TDMA					
Maximum Output Power Setting (dBm)	fl	fm	fh	fl	fm	fh
	32.7	32	32.5	29.6	29.6	29.8
Factory Tolerance in Power Setting (dB)	±0.5					
Maximum Peak Output Power (dBm)	fl	fm	fh	fl	fm	fh
	33.2	32.5	33	30.1	30.1	30.3
Crest Factor	8					
Transmitting Frequency Range(MHz)	824.2 – 848.8			1850.2 – 1909.8		
Prototype or Production Unit	Preproduction HW P1F					
Device Category	Portable					
RF exposure environment	General population / uncontrolled					

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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	640	012007
E-field probe ET3DV6	1815	012007
Dipole Validation Kit, D835V2	484	032007
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	012007
Power meter R&S NRVD	INV 20007668	122007
Power sensor R&S NRV-Z5	INV 20007670	122007
Power sensor R&S NRV-Z5	INV 20007671	122007
Termination 65N50-0-11	INV 2903	012007
Network analyzer HP8753C	INV421671	092006
S-parameter test set HP85047A	INV 421670	092006
Dielectric probe kit HP85070D	INV 20000053	Self cal

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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 DASY 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)
835	**Head**	**Measured,30/01/2006**	41.3	0.88	1.00
		Recommended	41.5	0.9	1.00
835	**Body**	**Measured, 03/02/2006**	57.6	1.02	1.00
		Recommended	55.2	0.97	1.00
1900	**Head**	**Measured, 01/02/2006**	39.7	1.47	1.00
		Recommended	40.0	1.40	1.00
1900	**Body**	**Measured, 02/02/2006**	51.6	1.55	1.00
		Recommended	53.3	1.52	1.00

6 System accuracy verification

A system accuracy verification of the DASY4 was performed using the dipole validation kit listed in section 3.1. Dipoles were supplied with 100mW power on different frequencies. The system verification test was conducted on the same day as the measurement of the DUT. Measurement made in ambient temperature 22-22.5 °C and humanity 23-22%. 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 0.00002mW/g in 1g mass.

f (MHz)	Liquid	Measured / Reference	SAR (W/kg) 1g/10g	Dielectric Parameters			Liquid t(°C)
				ε_r	σ (S/m)	ρ (g/cm³)	
835	**Head**	**Measured, 30/01/2006**	9.32/6.08	41.3	0.88	1.00	22
		Reference	9.08/5.96	42.2	0.91	1.00	21.6
835	**Body**	**Measured, 03/02/2006**	10.1/6.57	57.6	1.02	1.00	22.9
		Reference	9.48/6.24	54.9	1.01	1.00	21.4
1900	**Head**	**Measured, 01/02/2006**	41.5/21.1	39.7	1.47	1.00	21.8
		Reference	39.2/20.6	39.4	1.45	1.00	21.5
1900	**Body**	**Measured, 02/02/2006**	41.0/21.4	51.6	1.55	1.00	21.6
		Reference	39.6/20.9	51.6	1.58	1.00	22

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7 SAR measurement uncertainty

DASY4 SAR measurement uncertainty evaluation for Sony Ericsson PY7A1042012 phone According to IEEE 1528

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C_i	GSM 835-Head	GSM 835-Body	GSM 1900-Head	GSM 1900-Body
Measurement System								
Probe Calibration	±5.9	N	1	1	±5.9	±5.9	±5.9	±5.9
Axial Isotropy	±4.7	R	√3	0.7	±1.9	±1.9	±1.9	±1.9
Spherical Isotropy	±9.6	R	√3	0.7	±3.9	±3.9	±3.9	±3.9
Boundary Effect	±1.0	R	√3	1	±1.0	±1.0	±1.0	±1.0
Linearity	±4.7	R	√3	1	±2.7	±2.7	±2.7	±2.7
System Detection Limits	±1.0	R	√3	1	±0.6	±0.6	±0.6	±0.6
Readout electronics	±0.3	N	1	1	±0.3	±0.3	±0.3	±0.3
Response time	±0.8	R	√3	1	±0.5	±0.5	±0.5	±0.5
Integration time	±2.6	R	√3	1	±1.5	±1.5	±1.5	±1.5
RF Ambient Conditions	±3.0	R	√3	1	±1.7	±1.7	±1.7	±1.7
Probe Positioner	±0.4	R	√3	1	±0.2	±0.2	±0.2	±0.2
Probe Positioning	±2.9	R	√3	1	±1.7	±1.7	±1.7	±1.7
Max. SAR Evaluation	±1.0	R	√3	1	±0.6	±0.6	±0.6	±0.6
Measurement System Uncertainty					*±8.4*	*±8.4*	*±8.4*	*±8.4*
Test Sample Related								
Device positioning	±2.9	N	1	1	±2.9	±2.9	±2.9	±2.9
Device holder uncertainty	±3.6	N	1	1	±3.6	±3.6	±3.6	±3.6
Power drift	2.1/1.4/1.4/1.6	R	√3	1	±1.2	±0.8	±0.8	±0.9
Test Sample Related Uncertainty					*±4.8*	*±4.7*	*±4.7*	*±4.7*
Phantom and Tissue Parameters								
Phantom uncertainty	±4.0	R	√3	1	±2.3	±2.3	±2.3	±2.3
Liquid conductivity (meas)	±2.5	N	1	0.64	±1.6	±1.6	±1.6	±1.6
Liquid conductivity (target)	2.2/5.0/5.0/2.0	R	√3	0.64	±0.8	±1.8	±1.8	±0.7
Liquid Permittivity (meas)	±2.5	N	1	0.6	±1.5	±1.5	±1.5	±1.5
Liquid Permittivity (target)	0.5/4.3/0.8/3.2	R	√3	0.6	±0.2	±1.5	±0.3	±1.1
Phantom and Tissue Parameters Uncertainty					*±3.3*	*±3.9*	*±3.7*	*±3.4*
Combined standard uncertainty					*±10.2*	*±10.4*	*±10.3*	*±10.2*
Extended standard uncertainty (k=2)					***±20.4***	***±20.8***	***±20.6***	***±20.4***

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 (23-22) % and (22–22.5) °C respectively. The depth of the head and body tissue simulating liquids were 15.3cm 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 in speech and data mode when the phone's antenna (Back) was against the flat section of the phantom with 15mm distance. For worst case phone was tested with front against the flat section. For speech mode it's used Sony Ericsson portable hands free HPB-60.

Mode	Channel	Power (dB)	Phone Position	Liquid t (°C)	SAR (W/kg)	
					Right-hand	Left-hand
					1g mass	1g mass
850 GSM	124	33.1	Cheek	22	1.11	1.04
			Tilt	22	0.65	0.72
	189	32.5	Cheek	22	**1.27**	1.26
			Tilt	22	0.78	0.87
	251	33	Cheek	22	1.17	1.15
			Tilt	22	0.72	0.76
1900 GSM	512	30.1	Cheek	21.8	0.3	0.45
			Tilt	21.8	0.31	0.38
	661	30.1	Cheek	21.8	0.3	0.51
			Tilt	21.8	0.33	0.47
	810	30.3	Cheek	21.8	0.29	0.44
			Tilt	21.8	0.3	0.4

Table1: Head SAR measurement result for Sony Ericsson PY7A1042012 telephone at highest possible output power.

Mode	Channel	Power (dBm)	Phone Position	Liquid t (°C)	SAR (W/kg) in 1 g mass
850 GSM	124	33.1	Antenna to phantom, speech	22.9	0.67
			Antenna to phantom, data	22.9	**1.25**
			Front to phantom, data	22.9	0.43
	189	32.5	Antenna to phantom, speech	22.9	0.58
			Antenna to phantom, data	22.9	1.01
	251	33	Antenna to phantom, speech	22.9	0.61
			Antenna to phantom, data	22.9	0.78
1900 GSM	512	30.1	Antenna to phantom, speech	21.6	0.97
			Antenna to phantom, data	21.6	1.02
	661	30.1	Antenna to phantom, speech	21.6	**1.14**
			Antenna to phantom, data	21.6	1.04
			Front to phantom, speech	21.6	0.11
	810	30.3	Antenna to phantom, speech	21.6	0.92
			Antenna to phantom, data	21.6	0.83

Table2: Body SAR measurement result for Sony Ericsson PY7A1042012 telephone at highest possible output power.

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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.

[5] IEC, “Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear(frequency range of 300MHz to 3GHz,” Std. 62209-1, February, 2005.

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10 Appendix

10.1 Photographs of the device under test

Front & Back sides

System Connector

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Back side with battery

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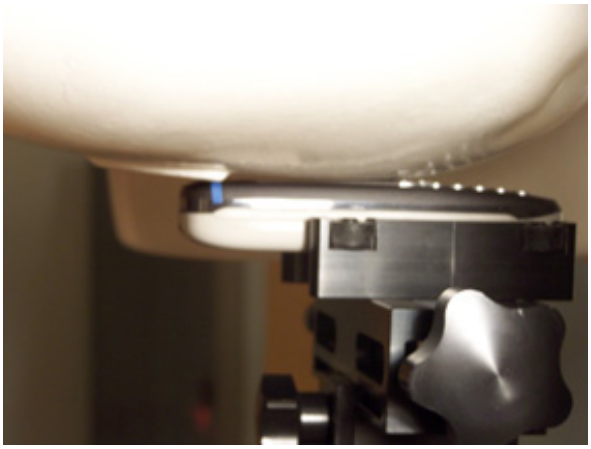
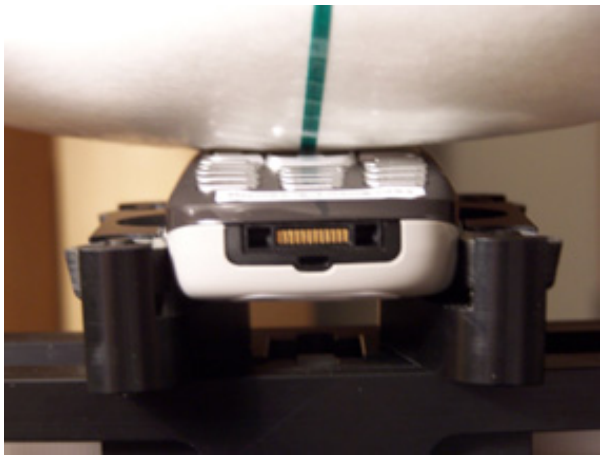
10.2 Device position on SAM Twins Phantom





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

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

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