Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
LD/SEMC/BGGI/NM *Hamid Kami Shirazi*		*BGGIN06:196*		
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGUG/NM *Ramadan Plicanic*	*060530*	*060529*	A	File

Report issued by Accredited SAR Laboratory

For

PY7A1022015 (Z550)

Date of test: *12 to 18 May, 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 AAB-1022015-BV; FCC ID: PY7A1022015; IC:4170B-A1022015

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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2 Introduction

In this test report, compliance of the Sony Ericsson PY7A1022015 (Z550) 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	Internal antenna	
Location	Inside, at the Middle	
Dimensions	Max length	38mm
	Max width	16mm
Configuration	PIFA	

3.2 Device description

Device model	**PY7A1022015(Z550)**		
Serial number	**CB5107QBZH**		
Mode	**GSM1900**		
Crest Factor	**8**		
Multiple Access Scheme	**TDMA**		
Maximum Output Power Setting (dBm)	**Ch512**	**Ch661**	**Ch810**
	30.0	**30.0**	**30.0**
Factory Tolerance in Power Setting	**±0.5dB**		
Maximum Peak Output Power (dBm)	**30.5**	**30.5**	**30.5**
Mode	**GSM1900-GPRS2TX**		
Maximum Output Power Setting dBm	**Ch512**	**Ch661**	**Ch810**
	30.0	**30.0**	**30.0**
Factory Tolerance in Power Setting	**±0.5dB**		
Maximum Peak Output Power (dBm)	**30.5**	**30.5**	**30.5**
Transmitting Frequency Range(MHz)	**1850.2 – 1909.8**		
Prototype or Production Unit	**Preproduction ;FP1**		
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 4.6, Build 23/7) 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 2007
E-field probe ETDV6	1585	March 2007
Dipole Validation Kit, D1900V2	5d002	March 2007

4.2 Additional equipment

Description	***Inventory Number***	***Due Date***
Signal generator R&S SML03	INV 20007667	Dec. 2007
Power meter R&S NRVZ	INV 20007669	Dec. 2007
Power sensor R&S NRV-Z5	INV 20007672	Dec. 2007
Power sensor R&S NRV-Z5	INV 20007673	Dec. 2007
Network analyzer HP8753C	INV421671	March 2007
S-parameter test set HP85047A	INV 421670	March 2007
Dielectric probe kit HP8507D	INV 200 000 53	Self calibrated
CMU200	INV 20002149	March 2007

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 DASY4 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, 12/May/2006**	39.4	1.46	1.00
		Recommended	40.0	1.40	1.00
	Body	**Measured, 18/May/2006**	51.0	1.57	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. Measurement made in ambient temperature (22-23) °C and humanity (22-23) %. 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 0.0002mW/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, 12/May/2006**	40.2/21.1	39.4	1.46	1.00	22±0.2
		Reference	39.2/20.6	39.6	1.45	1.00	22±0.2
	Body	**Measured, 18/May/2006**	41.2/21.5	51.0	1.57	1.00	22±0.2
		Reference	39.6/20.9	51.6	1.58	1.00	22±0.2

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7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sonyericsson PY7A1022015 (Z550) phone

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C_i	GSM 1900-Head	GSM 1900-Body
Measurement System						
Probe Calibration	±4.8	N	1	1	±4.8	±4.8
Axial Isotropy	±4.7	R	√3	0.7	±1.9	±1.9
Spherical Isotropy	±9.6	R	√3	0.7	±3.9	±3.9
Boundary effect	±1.0	R	√3	1	±1.0	±1.0
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					***±8.0***	***±8.0***
Test Sample Related						
Device positioning	±3.5	N	1	1	±3.5	±3.5
Device holder uncertainty	±3.5	N	1	1	±3.5	±3.5
Power drift	±(0.4/1.8)	R	√3	1	±0.2	±0.8
Test Sample Related Uncertainty					***±5.0***	***±5.0***
Phantom and Tissue Parameters						
Phantom uncertainty	±4.0	R	√3	1	±2.3	±2.3
Liquid conductivity (measurement)	±(4.3/3.3)	N	1	0.64	±2.2	±2.1
Liquid conductivity (target)	±5.0	R	√3	0.64	±1.8	±1.8
Liquid Permittivity (measurement)	±(1.5/4.3)	N	1	0.6	±0.9	±2.6
Liquid Permittivity (target)	±5.0	R	√3	0.6	±1.7	±1.7
Phantom and Tissue Parameters Uncertainty					***±4.1***	***±4.8***
Combined standard uncertainty					***±10.3***	***±10.6***
Extended standard uncertainty (k=2)					***±20.6***	***±21.2***

8 Test results

The measured 1-gram averaged SAR values of the device against head and body are provided in tables1 and 2. The ambient humidity and temperature of test facility were 22%-23% and 22°C–23°C respectively. The depth of tissue simulating liquid for head and body are 15.3cm and 15cm. 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 (back) and Front against flat section of phantom with 15mm distance in both speech and Data (GPRS) mode. For all modes, the device was tested at the lowest, middle and highest frequencies in the transmit band. For Hands free used Sony Ericsson head set (HPB-60) and for Blue Tooth phone was pared with Sony Ericsson HBH-60 Blue Tooth accessory and measured on worst case speech mode and for body.

Mode	Channel	Power (dB)	Phone Position	Liquid t (°C)	SAR (W/kg)	
					Right-hand	Left-hand
					1g mass	1g mass
1900 GSM Head	512	30.5	Cheek	22±0.2	0.83	1.00
			Tilt	22±0.2	0.41	0.42
	661	30.5	Cheek	22±0.2	0.82	**1.03**
			Tilt	22±0.2	0.39	0.44
	810	30.4	Cheek	22±0.2	0.92	1.02
			Tilt	22±0.2	0.39	0.46

Table1: SAR measurement result for Sony Ericsson PY7A1022015 (Z550) telephone at highest possible output power. The phone has measured against head.

Mode	Channel	Power (dBm)	Phone Position	Liquid t (°C)	SAR (W/kg) in 1 g mass
GSM 1900 Body	512	30.5	Antenna to phantom Hands Free	22±0.2	0.19
			Antenna to phantom GPRS2TX	22±0.2	0.22
	661	30.5	Antenna to phantom Hands Free	22±0.2	0.19
			Antenna to phantom GPRS2TX	22±0.2	0.22
	810	30.4	Antenna to phantom Hands Free	22±0.2	0.22
			Antenna to phantom GPRS2TX	22±0.2	**0.28**
			Antenna to phantom Bluetooth	22±0.2	0.20
			Front to phantom Hands Free	22±0.2	0.08

Table2: SAR measurement result for Sony Ericsson PY7A1022015 (Z550) 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 & Back Close

Front & Back Open

Down Connector

Sides (Close)

Sides (Open)

Back with Battery

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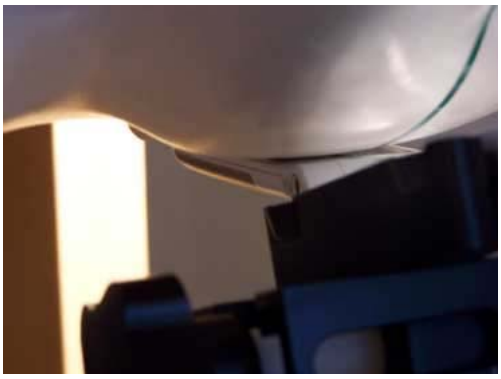
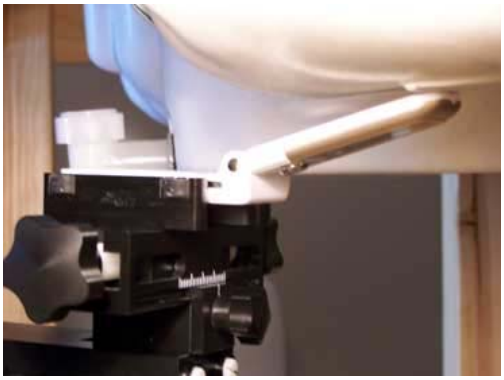
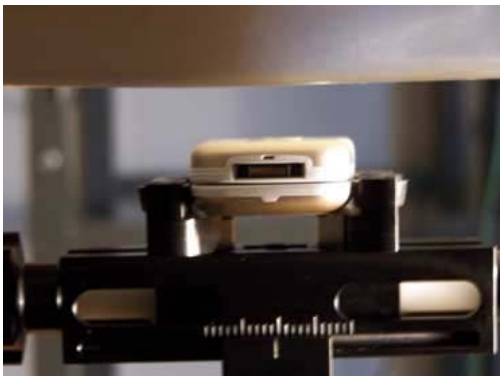
10.2 Device position on SAM Twins Phantom




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

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

Device position against the body: Phone on 15mm distance against Phantom

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10.3 Attachment

- Probe & Dipole Calibration
- Measurement plots and system validation
- Annex