

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

Company Internal
REPORT

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

Report issued by Accredited SAR Laboratory**for****PY7A1052121 (S302)****Date of test:** July 29th to October 14th, 2008**Laboratory:** Sony Ericsson SAR Test Laboratory
Sony Ericsson Mobile Communications AB
Maplewood, Chineham Business Park
Basingstoke, RG24 8YB,
England**Testing Engineer:** Robert Carr
Robert.Carr@sonyericsson.com
+44 1256 77 48 95

ROBERT CARR

Testing Approval: Peter Lindeborg
peter.lindeborg@sonyericsson.com
+46-46-2126180

Pl Lindeborg

Statement of Compliance

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

Sony Ericsson Type AAC-1052121-BV; FCC ID PY7A1052121; IC 4170B-A1052121

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 (2005). 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.

© Sony Ericsson Mobile Communication AB, 2008



Company Internal
REPORT

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

Table of contents

1	INTRODUCTION	3
2	CUSTOMER DETAILS	3
3	DEVICE UNDER TEST	3
3.1	ANTENNA DESCRIPTION	3
3.2	DEVICE DESCRIPTION	4
4	TEST EQUIPMENT.....	5
4.1	DOSIMETRIC SYSTEM	5
4.2	ADDITIONAL EQUIPMENT	5
5	ELECTRICAL PARAMETERS ON THE TISSUE SIMULATING LIQUID	6
6	SYSTEM ACCURACY VERIFICATION	6
7	SAR MEASUREMENT UNCERTAINTY	7
8	TEST RESULTS	8
9	REFERENCES	10
10	APPENDIX	11
10.1	PHOTOGRAPHS OF THE DEVICE UNDER TEST.....	11
10.2	DEVICE POSITION AT SAM TWIN PHANTOM	12
10.3	ATTACHMENTS	13



Company Internal
REPORT

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

1 Introduction

In this test report, compliance of the Sony Ericsson PY7A1052121 (S302) 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].

2 Customer details

Company Name:	Sony Ericsson Mobile Communications AB
Address:	Nya Vatten tornet, 221 88 Lund, Sweden
Contact Name:	Christian Pogorzelski

3 Device Under Test

3.1 Antenna Description

Type	Internal antenna	
Location	Bottom of phone	
Dimensions	Max length	36 mm
	Max width	6 mm
Configuration	A3	



Company Internal
REPORT

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

3.2 Device Description

Device model	AAC-1052121-BV					
Market name	S302					
Serial number (EUT #)	MS11D3DL1S (#12818)					
Mode	GSM 1900			GSM 850		
Crest factor	8.3			8.3		
Multiple access scheme	TDMA			TDMA		
Channel No.	512	661	810	128	190	251
Maximum output power setting ¹ [dBm]	30.5	30.5	30.5	33.0	33.0	33.0
Factory tolerance in power setting ¹	±0.5 dB			±0.5 dB		
Maximum peak output power ¹ [dBm]	31.0	31.0	31.0	33.5	33.5	33.5
Data mode	GPRS			GPRS		
Crest factor	4.15			4.15		
Maximum output power setting ¹ [dBm]	28.5	28.5	28.5	31.5	31.5	31.5
Factory tolerance in power setting ¹	±0.5 dB			±0.5 dB		
Maximum peak output power ¹ [dBm]	29.0	29.0	29.0	32.0	32.0	32.0
Data mode	EDGE			EDGE		
Crest factor	4.15			4.15		
Maximum output power setting ¹ [dBm]	27.0	27.0	27.0	28.0	28.0	28.0
Factory tolerance in power setting ¹	±0.5 dB			±0.5 dB		
Maximum peak output power ¹ [dBm]	27.5	27.5	27.5	28.5	28.5	28.5
Transmitting frequency range [MHz]	1850.2 - 1909.8			824.2 - 848.8		
GPRS Multislot class	10					
EDGE class	10					
GPRS Capability class	B					
BT Separation distance	5.35mm					
BT class and conducted power	Class 1, 6dBm					
Prototype or production unit	Preproduction					
Hardware version	M3					
Software version	EC, A41					
Device category	Portable					
RF exposure environment	General population / uncontrolled					

¹ Output power values were supplied by the customer.



Company Internal
REPORT

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

4 Test equipment

4.1 Dosimetric system

SAR measurements were made using the DASY4 professional system (software version 4.7, Build 55) with SAM twin phantom, manufactured by Schmid & Partner Engineering AG (SPEAG). The list of calibrated equipment is given below.

Description	Serial Number	Due Date
DASY4 DAE3	449	2008-12
E-field probe ET3DV6	1611	2008-12
Dipole Validation Kit, D835V2	442	2008-12
Dipole Validation Kit, D1900V2	539	2008-12
Dipole Validation Kit, D2450V2	721	2009-01

4.2 Additional equipment

Description	Inventory Number	Due Date
Signal generator R&S SMY 02	3.094	2009-04
Directional coupler HP778D	15.233	None
Power meter R&S NRVD	4.073	2009-04
Power sensor R&S NRV-Z5	4.074	2009-04
Power sensor R&S NRV-Z5	4.076	2009-04
Network analyzer Agilent 8719D	2.022	2009-04
Dielectric probe kit HP8507C	14.046	Self Cal
R&S CMU200	20011270	2009-04

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

Company Internal REPORT

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

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	Measured / Recommended	Dielectric Parameters		Density
			ϵ_r	σ [S/m]	ρ [g/cm ³]
835	Head	Measured, 2008-07-29	40.9	0.87	1.00
		Recommended	41.5	0.90	1.00
835	Body	Measured, 2008-07-30	54.3	0.99	1.00
		Recommended	55.2	0.97	1.00
1900	Head	Measured, 2008-08-05	38.1	1.47	1.00
		Recommended	40.0	1.40	1.00
1900	Body	Measured, 2008-08-06	50.9	1.58	1.00
		Recommended	53.3	1.52	1.00
2450	Head	Measured, 2008-10-13	37.4	1.89	1.00
		Recommended	39.2	1.8	1.00
2450	Body	Measured, 2008-10-14	50.32	2.04	1.00
		Recommended	52.7	1.95	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. The system verification test was conducted on the same day as the measurement of the DUT. The measurements were made at an ambient temperature of 22.0-23.4 °C and humidity 45-51 %. The obtained results are displayed in the table below.

RF noise had been measured in liquid when all RF equipment in lab was switched off. Measured value was 0.0002 mW/g in 1g mass.

f [MHz]	Tissue type	Measured / Reference	SAR [W/kg] 1g / 10g	Dielectric Parameters		Density	Liquid T[°C]
				ϵ_r	σ [S/m]	ρ [g/cm ³]	
835	Head	Measured, 2008-07-29	9.60 / 6.36	40.9	0.87	1.00	22.5
		Reference	9.43 / 6.17	41.5	0.90	1.00	22.0
835	Body	Measured, 2008-07-30	10.04 / 6.64	54.3	0.99	1.00	22.5
		Reference	9.70 / 6.51	55.2	0.97	1.00	22.0
1900	Head	Measured, 2008-08-05	39.2 / 20.6	38.1	1.47	1.00	23.0
		Reference	35.9 / 19.1	40.0	1.40	1.00	22.0
1900	Body	Measured, 2008-08-06	39.6 / 20.8	50.9	1.58	1.00	23.0
		Reference	37.0 / 19.8	53.3	1.52	1.00	22.0
2450	Head	Measured, 2008-10-13	52.8 / 23.7	37.4	1.89	1.00	22.2
		Reference	54.1 / 25.0	39.2	1.8	1.00	22.0
2450	Body	Measured, 2008-10-14	53.2 / 24.3	50.3	2.04	1.00	22.0
		Reference	52.1 / 24.3	52.7	1.95	1.00	22.0



Company Internal
REPORT

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sony Ericsson PY7A1052121 (S302) phone According to IEEE 1528

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C _i	1g mass
Measurement System					
Probe Calibration	±5.9	N	1	1	±5.9
Axial Isotropy	±4.7	R	√3	0.7	±1.9
Spherical Isotropy	±9.6	R	√3	0.7	±3.9
Boundary effect	±1.0	R	√3	1	±0.6
Probe linearity	±4.7	R	√3	1	±2.7
Detection limit	±1.0	R	√3	1	±0.6
Readout electronics	±0.3	N	1	1	±0.3
Response time	±0.8	R	√3	1	±0.5
Integration time	±2.6	R	√3	1	±1.5
RF Ambient Conditions	±3.0	R	√3	1	±1.7
Mech. Constraints of robot	±0.4	R	√3	1	±0.2
Probe positioning	±2.9	R	√3	1	±1.7
Extrap, interpolation and integration	±1.0	R	√3	1	±0.6
Measurement System Uncertainty					±8.4
Test Sample Related					
Device positioning	±3.5	N	1	1	±3.5
Device holder uncertainty	±3.5	N	1	1	±3.5
Power drift	±5.0	R	√3	1	±2.9
Test Sample Related Uncertainty					±5.5
Phantom and Tissue Parameters					
Phantom uncertainty	±4.0	R	√3	1	±2.3
Liquid conductivity (measured)	±2.5	R	1	0.64	±1.6
Liquid conductivity (target)	±5.0	R	√3	0.64	±1.8
Liquid Permittivity (measured)	±2.5	R	1	0.6	±1.5
Liquid Permittivity (target)	±5.0	R	√3	0.6	±1.7
Phantom and Tissue Parameters Uncertainty					±4.1
Combined standard uncertainty					±10.8
Extended standard uncertainty (k=2)					±21.6

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

Company Internal REPORT

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

8 Test results

The ambient humidity and temperature of test facility were 45-51% and 22.0-23.4 °C respectively. A base station simulator was used to control the device during the SAR measurement. The DUT was supplied with a fully charged battery for each measurement.

For head measurement, the DUT was tested on the right-hand side, and the left-hand side of the phantom in two phone positions, cheek (touch) and tilt (cheek + 15°). The DUT was tested at the lowest, middle and highest frequencies in the transmission band. The measured 1-gram averaged SAR values of the DUT towards the head are provided in Table 1.

For body measurement the DUT was tested with the back (antenna) and front(display) towards the phantom flat section with 15 mm distance in both speech and data mode. For all modes, the device was tested at the lowest, middle and highest frequencies in the transmission band. For portable hands free (PHF) usage the Sony Ericsson head set HPB-60 was connected to the DUT, and for Bluetooth (BT) the DUT was paired with Sony Ericsson HBH-60. The measured 1-gram averaged SAR values of the DUT towards the body are provided in Table 2.

The DUT was tested in stand alone Bluetooth mode due to the separation distance being less than 2.5cm. The DUT was put into Bluetooth test mode and tested at the lowest, middle and highest frequencies of the Bluetooth band.

Band	Channel	Measured output power ² [dBm]	Position	Liquid T [°C]	Measured SAR [W/kg]	
					Left-hand 1g mass	Right-hand 1g mas
GSM 850	128	32.6	Cheek	22.9	1.06	1.12
			Tilt	22.9	-	-
	190	32.8	Cheek	22.9	1.21	1.32
			Tilt	22.9	0.60	0.63
	251	33.0	Cheek	22.9	1.23	1.25
			Tilt	22.9	-	-
GSM 1900	512	30.0	Cheek	22.6	1.05	1.22
			Tilt	22.6	-	-
	661	30.5	Cheek	22.6	1.13	0.98
			Tilt	22.6	0.39	0.34
	810	30.5	Cheek	22.6	0.83	0.84
			Tilt	22.6	-	-
BT Mode	0	6.0	Cheek	22.2	0.005	0.003
			Tilt	22.2	-	-
	39		Cheek	22.2	0.005	0.003
			Tilt	22.2	0.002	0.002
	78		Cheek	22.2	0.005	0.004
			Tilt	22.2	-	-

Table 1: SAR measurement result for Sony Ericsson PY7A1052121 telephone at highest possible output power. Measured towards the head.

² Measured output values were provided by the customer.



Company Internal
REPORT

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

Band	Channel	Measured output power ³ [dBm]	Position / Mode	Liquid T [°C]	Measured SAR [W/kg] 1g mass
GSM 850	128	31.1	Back / GPRS	22.5	0.95
		32.6	Back / BT	22.5	0.74
	190	31.3	Back / GPRS	22.5	1.05
			Front To Phantom	22.5	0.91
		27.9	Back / EDGE	22.5	0.29
		32.8	Back / PHF	22.5	0.71
			Back / BT	22.5	0.78
	251	31.5	Back / GPRS	22.5	1.01
		33.0	Back / BT	22.5	0.77
GSM 1900	512	27.3	Back / EDGE	23.0	0.32
		30.0	Back / BT	23.0	0.28
			Back / PHF	23.0	0.28
		28.4	Front To Phantom	23.0	0.31
			Back / GPRS	23.0	0.32
	661	28.4	Back / GPRS	23.0	0.36
		30.5	Back / BT	23.0	0.24
	810	28.2	Back / GPRS	23.0	0.32
		30.5	Back / BT	23.0	0.20
BT Mode	0	6.0	Back	21.8	0.0007
	39		Back	21.8	0.0009
	78		Back	21.8	0.0002

Table 2: SAR measurement result for Sony Ericsson PY7A1052121 telephone at highest possible output power. Measured towards the body.

³ Measured output values were provided by the customer.



Company Internal
REPORT

Prepared (also subject responsible if other)

BA/SEMC/BGLINS *Robert Carr*

Approved

LD/SEMC/BGLIMC *Peter Lindeborg*

Checked

081016

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

9 References

- [1] R.Plicanic. "SAR Measurement Specification of Wireless Handsets". Sony Ericsson SAR Test Laboratory internal document GUG/N 03:141
- [2] 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).
- [3] 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.
- [4] IEC 62209-1. "Procedure to measure the Specific Absorption Rate (SAR) for hand-held mobile wireless devices in the frequency range of 300 MHz to 3 GHz". February 2005.

Company Internal
REPORT

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

10 Appendix

10.1 Photographs of the device under test



Front & Back



Sides



Back side with battery



Top and Bottom

Prepared (also subject responsible if other)

BA/SEMC/BGLINS Robert Carr

Approved

LD/SEMC/BGLIMC Peter Lindeborg

Checked

081016

Company Internal
REPORT

No.

BGLI08:894.

Date

081016

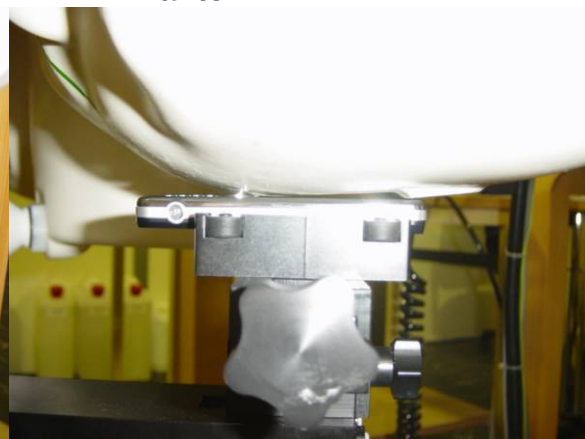
Rev

B

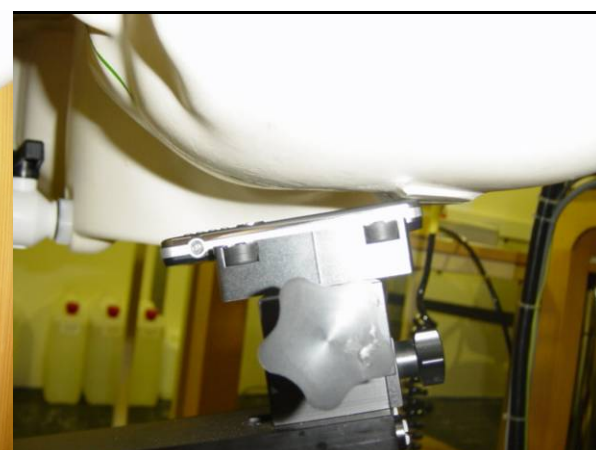
Reference

File

10.2 Device position at SAM Twin Phantom



DUT position towards the head: Cheek (touch) position



DUT position towards the head: Tilt (touch + 15°) position



DUT position towards the Body: 15mm from phantom



Company Internal
REPORT

Prepared (also subject responsible if other)

BA/SEMC/BGLINS *Robert Carr*

Approved

LD/SEMC/BGLIMC *Peter Lindeborg*

Checked

081016

No.

BGLI08:894.

Date

081016

Rev

B

Reference

File

10.3

Attachments

- System validation
- Measurement plots for head and body position
- Probe calibration
- Dipole calibration