

Prepared (also subject responsible if other)

LD/SEMC/BGLI/NM *Ramadan Plicanic*

Approved

LD/SEMC/BGLI/NMC *Peter Lindeborg*

Checked

061211

Company Internal
REPORT

No.

BGGIN06:529

Date

061208

Rev

A

Reference

File

Report issued by Accredited SAR Laboratory**For***PY7A1052021 (K550i)***Date of test:** 17, 22, 23 and 24 Nov, 2006**Laboratory:** Sony Ericsson SAR Test Laboratory
Sonyericsson Mobile Communications AB
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Peter Lindeborg
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Sony Ericsson Mobile Communications AB declares under its sole responsibility that the product

Sony Ericsson Type AAC-1052021-BV; FCC ID: PY7A1052021; IC:4170B-A1052021

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 PY7A1052021 (K550i) 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, Back, at the Bottom	
Dimensions	Max length	38mm
	Max width	18mm
Configuration	PIFA	

3.2 Device description

Device model	PY7A1052021(K550i)					
Serial number	CB510BW3HW (#6083)					
Mode	GSM 850			GSM1900		
Crest Factor	8.3			8.3		
Multiple Access Scheme	TDMA			TDMA		
Output Power Setting (dBm)	Ch128	Ch190	Ch251	Ch512	Ch661	Ch810
	32.0	32.0	32.0	29.0	29.0	29.0
Factory Tolerance in Power Setting	±0.5dB			±0.5dB		
Maximum Peak Output Power (dBm)	32.5	32.5	32.5	29.5	29.5	29.5
Mode	GPRS2TX/EDGE			GPRS2TX/EDGE		
Multiple Access Scheme	TDMA			TDMA		
Output Power Setting (dBm)	Ch128	Ch190	Ch251	Ch512	Ch661	Ch810
	31.5/ 26.5	31.5/ 26.5	31.5/ 26.5	28.0/ 25.5	28.0/ 25.5	28.0/ 25.5
Factory Tolerance in Power Setting	±0.5dB			±0.5dB		
Maximum Peak Output Power (dBm)	32.0/ 27.0	32.0/ 27.0	32.0/ 27.0	28.5/ 26.0	28.5/ 26.0	28.5/ 26.0
	4.15			4.15		
Transmitting Frequency Range(MHz)	824.2-848.8			1850.2 – 1909.8		
Prototype or Production Unit	Preproduction HW 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
DASY DAE V1	640	01 2007
E-field probe ETDV6	1815	01 2007
Dipole Validation Kit, D835V2	4d039	05 2008
Dipole Validation Kit, D1900V2	5d073	05 2008

4.2 Additional equipment

Description	Inventory Number	Due Date
Signal generator ESG-D4000A	INV 462935	032007
Directional coupler HP778D	INV 2903	032007
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	032007
Network analyzer HP8753C	INV421671	032007
S-parameter test set HP85047A	INV 421670	032007
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 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/cm ³)
850	Head	Measured, 17 November 2006	42.0	0.89	1.00
		Recommended	41.5	0.90	1.00
	Body	Measured, 24 November 2006	53.1	0.98	1.00
		Recommended	55.2	0.97	1.00
1900	Head	Measured, 22 November 2006	38.7	1.47	1.00
		Recommended	40.0	1.40	1.00
	Body	Measured, 23 November 2006	51.1	1.53	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 kits listed in section 3.1. Measurement made in ambient temperature (22.6-23.1) °C and humidity (43-32) %. 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 0.00006mW/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/cm ³)	
850	Head	Measured, 17 Nov. 2006	9.5/6.22	42.0	0.89	1.00	22.0
		Reference	9.24/6.00	41.9	0.90	1.00	23.0
	Body	Measured, 24 Nov. 2006	10.2/6.66	53.1	0.98	1.00	22.8
		Reference	9.56/6.24	56.8	0.98	1.00	23.0
1900	Head	Measured, 22 Nov. 2006	38.2/20.1	38.7	1.47	1.00	23.0
		Reference	38.7/20.4	39.4	1.41	1.00	22.8
	Body	Measured, 23 Nov. 2006	39.6/21.1	51.1	1.53	1.00	22.6
		Reference	41.6/22.0	54.7	1.54	1.00	22.7



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7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sonyericsson PY7A1052021 (K550i) phone According to IEEE 1528

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C _i	GSM 850 Head	GSM 850 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	±(1.6/1.4/0.2/0.5)	R	√3	1	±0.9	±0.8	±0.1	±0.3
Test Sample Related Uncertainty					±4.7	±4.7	±4.6	±4.6
Phantom and Tissue Parameters								
Phantom uncertainty	±4.0	R	√3	1	±2.3	±2.3	±2.3	±2.3
Liquid conductivity (measurement)	±2.5	N	1	0.64	±1.6	±1.6	±1.6	±1.6
Liquid conductivity (target)	±(1.1/1.0/5.0/0.7)	R	√3	0.64	±0.4	±0.9	±1.8	±0.3
Liquid Permittivity (measurement)	±2.5	N	1	0.6	±1.5	±1.5	±1.5	±1.5
Liquid Permittivity (target)	±(1.2/3.8/3.3/4.1)	R	√3	0.6	±0.4	±1.3	±1.1	±1.4
Phantom and Tissue Parameters Uncertainty					±3.2	±3.5	±3.8	±3.5
Combined standard uncertainty					±10.1	±10.2	±10.3	±10.2
Extended standard uncertainty (k=2)					±20.2	±20.4	±20.6	±20.4



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8 Test results

The measured 1-gram averaged SAR values of the device against head and body are provided in tables 1 and 2. The ambient humidity and temperature of test facility were 43%-32% and 22.6°C–23.1°C respectively. The depth of tissue simulating liquid for head and body were 15.6cm and 15.3cm. 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 HPH-60 or BT portable hands free HBH-610a.

Mode	Channel	Power (dB)	Phone Position	Liquid t (°C)	SAR (W/kg)	
					Right-hand	Left-hand
					1g mass	1g mass
1900 GSM Head	512	29.5	Cheek	23.0	1.08	1.02
			Tilt	23.0	-	-
	661	29.5	Cheek	23.0	1.17	1.03
			Tilt	23.0	0.45	0.41
	810	29.5	Cheek	23.0	1.06	0.94
			Tilt	23.0	-	-
850 GSM Head	128	32.5	Cheek	22.0	1.04	1.15
			Tilt	22.0	-	-
	190	32.5	Cheek	22.0	1.25	1.37
			Tilt	22.0	0.64	0.66
	251	32.5	Cheek	22.0	1.05	1.11
			Tilt	22.0	-	-

Table1: SAR measurement result for Sony Ericsson PY7A1052021 (K550i) 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	29.5	Antenna to phantom BT HF	22.6	0.40
		28.5	Antenna to phantom GPRS2TX	22.6	0.74
		28.5	Front to phantom GPRS2TX	22.6	0.50
		26.0	Antenna to phantom EDGE2Tx	22.6	0.36
	661	29.5	Antenna to phantom BT HF	22.6	0.38
			Antenna to phantom GPRS2TX	22.6	0.73
			28.3	Antenna to phantom BT HF	22.6
	810	29.5	Antenna to phantom GPRS2TX	22.6	0.29
			32.5	Antenna to phantom BT HF	22.8
GSM 850 Body	128	31.9	Antenna to phantom GPRS2TX	22.8	1.28
		31.9	Front to phantom GPRS2TX	22.8	1.07
		27.0	Antenna to phantom EDGE2Tx	22.8	0.46
		32.5	Antenna to phantom BT HF	22.8	0.83
	190	31.9	Antenna to phantom GPRS2TX	22.8	1.05
			32.5	Antenna to phantom BT HF	22.8
	251	31.9	Antenna to phantom GPRS2TX	22.8	0.89

Table2: SAR measurement result for Sony Ericsson PY7A1052021 (K550i) 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.

DASY4 Validation Report for Head TSL

Date/Time: 31.05.2006 10:59:32

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d039

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB_060425;

Medium parameters used: $f = 835$ MHz; $\sigma = 0.912$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Pin = 250 mW; d = 10 mm/Area Scan (71x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.44 mW/g

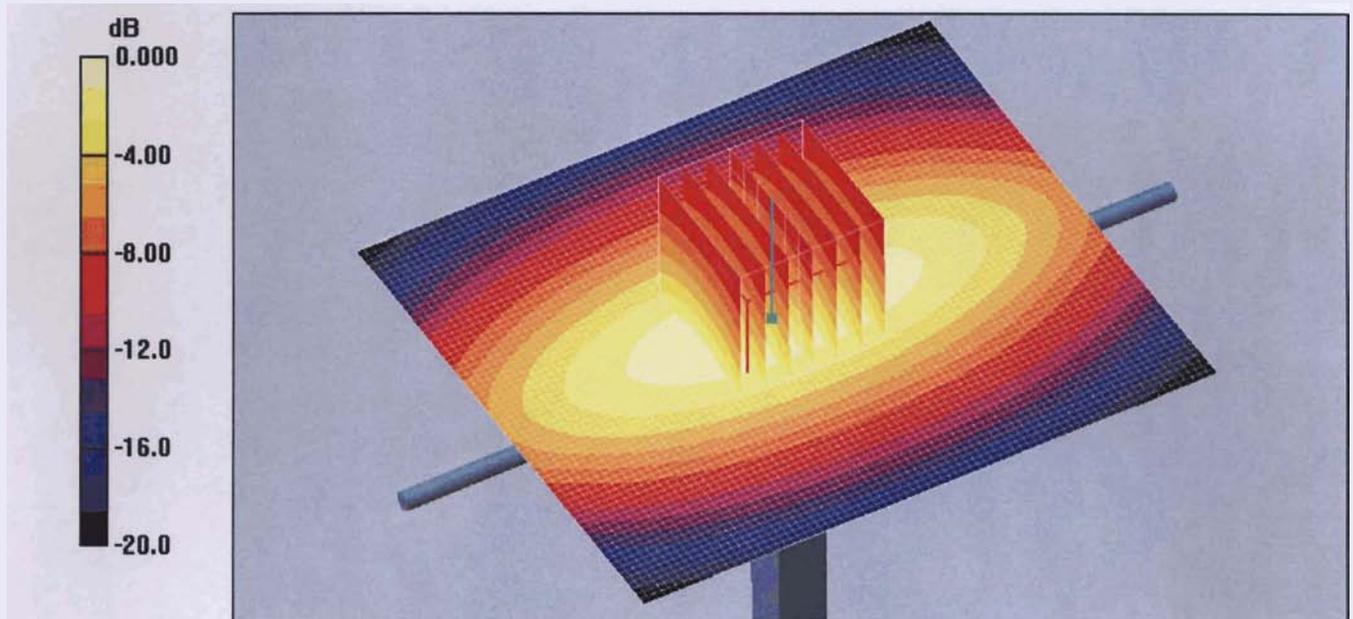
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.1 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 3.48 W/kg

SAR(1 g) = 2.31 mW/g; SAR(10 g) = 1.5 mW/g

Maximum value of SAR (measured) = 2.48 mW/g



0 dB = 2.48mW/g

DASY4 Validation Report for Body TSL

Date/Time: 31.05.2006 13:23:15

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d039

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL U10 BB;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.997 \text{ mho/m}$; $\epsilon_r = 56.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.84, 5.84, 5.84); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.59 mW/g

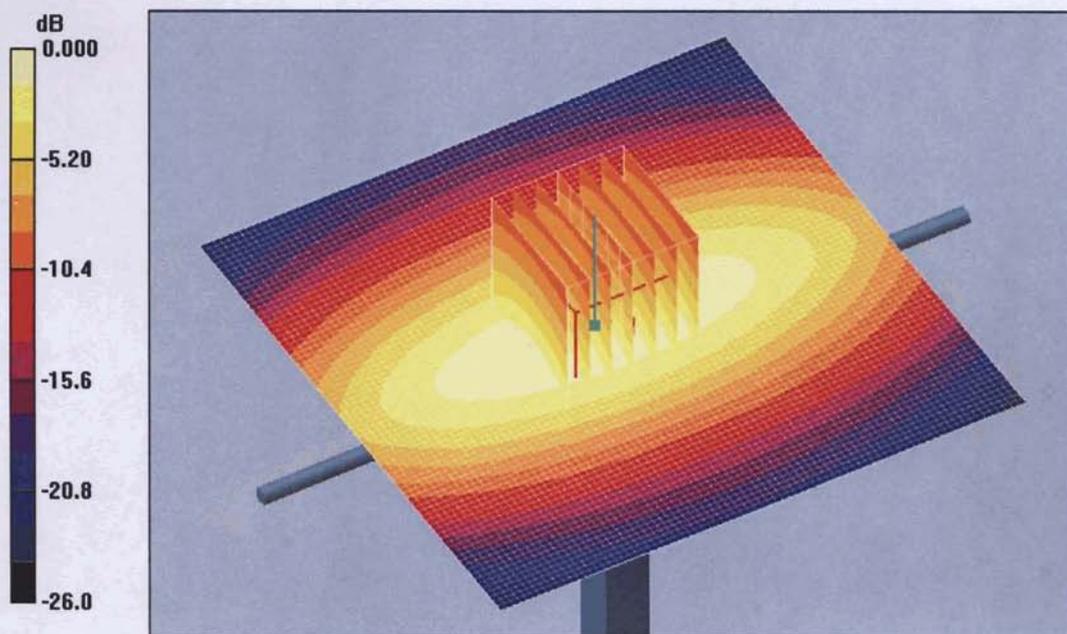
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.1 V/m; Power Drift = -0.014 dB

Peak SAR (extrapolated) = 3.45 W/kg

SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.56 mW/g

Maximum value of SAR (measured) = 2.58 mW/g



0 dB = 2.58mW/g

DASY4 Validation Report for Head TSL

Date/Time: 31.05.2006 11:49:47

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d073

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.74, 4.74, 4.74); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Pin = 250 mW; d = 10 mm/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.6 mW/g

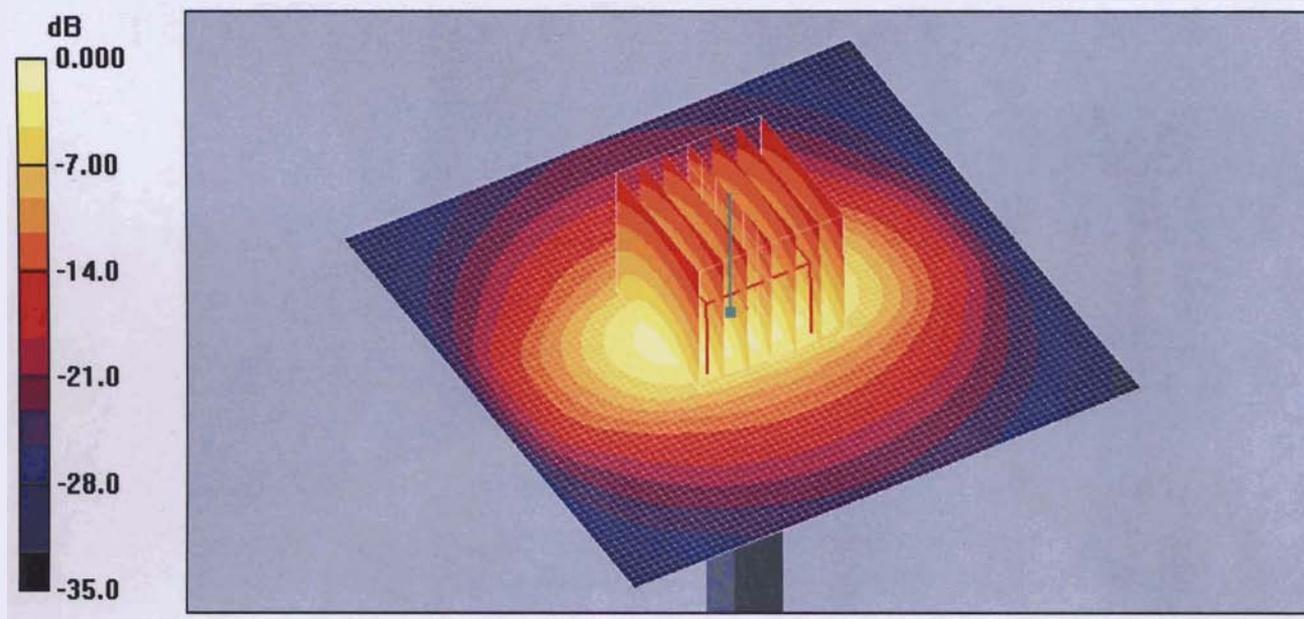
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.1 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 9.67 mW/g; SAR(10 g) = 5.11 mW/g

Maximum value of SAR (measured) = 10.9 mW/g



0 dB = 10.9mW/g

DASY4 Validation Report for Body TSL

Date/Time: 31.05.2006 14:35:04

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d073

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL U10;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.3, 4.3, 4.3); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Pin = 250 mW; d = 10 mm/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.6 mW/g

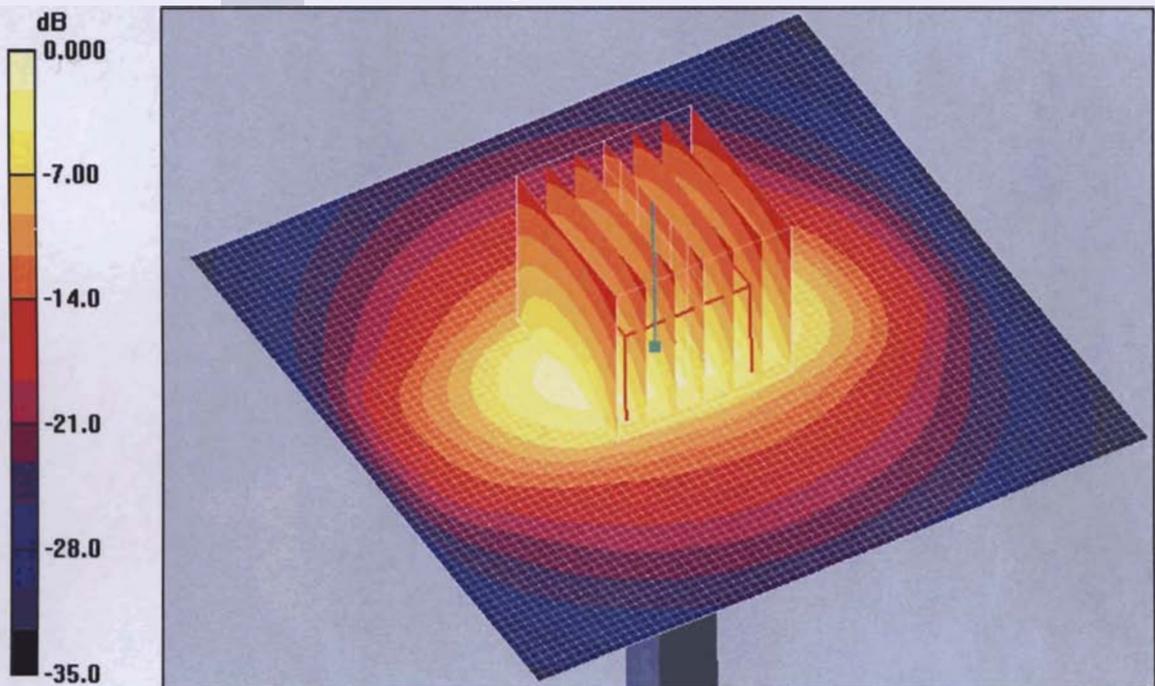
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.4 V/m; Power Drift = -0.045 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.5 mW/g

Maximum value of SAR (measured) = 11.7 mW/g



0 dB = 11.7mW/g

Date/Time: 2006-11-17 09:04:41

Test Laboratory: Sony Ericsson Mobile Communications
File Name: [Verification_835MHz_Head_061117_RP.da4](#)

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d039
Program Name: Verification measurement on 835MHz with HSL

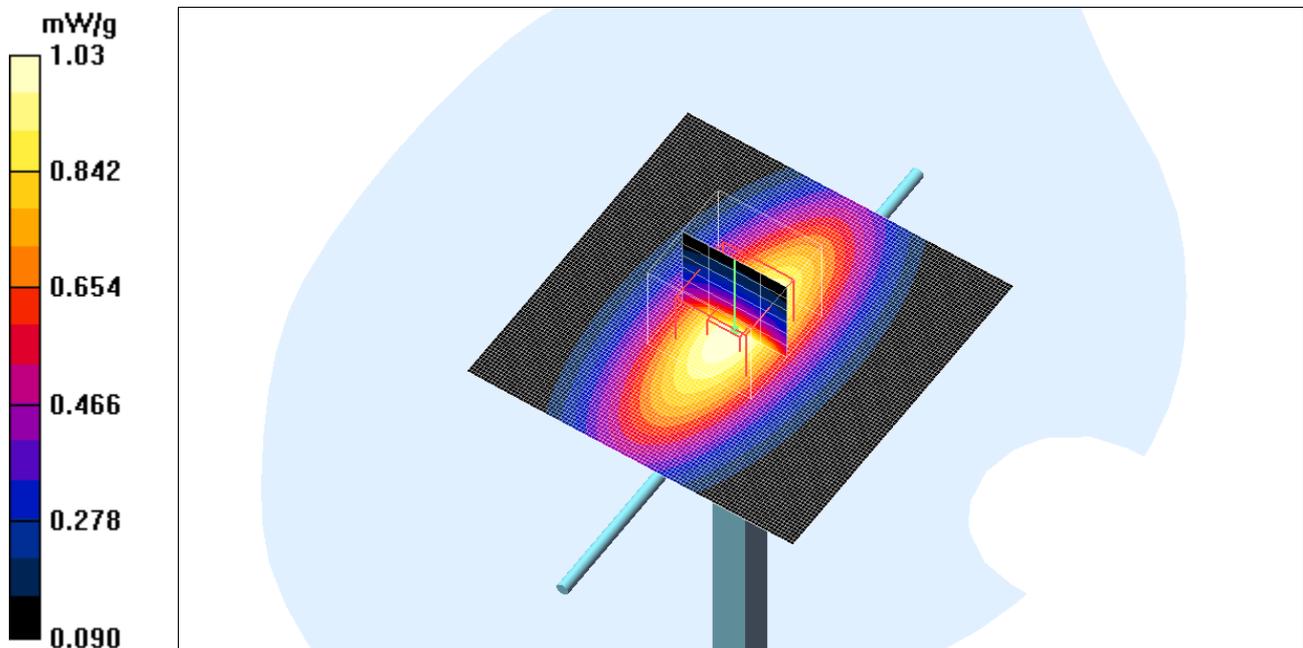
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 42$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(6.82, 6.82, 6.82); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 5; Type: SAM; Serial: 1352
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Flat, 15mm/Area Scan (101x101x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
Maximum value of SAR (interpolated) = 1.03 mW/g

Flat, 15mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 35.0 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.950 mW/g; SAR(10 g) = 0.622 mW/g
Maximum value of SAR (measured) = 1.03 mW/g



Date/Time: 2006-11-24 09:34:06

Test Laboratory: Sony Ericsson Mobile Communications
File Name: [Verification_835MHz_Body_061124_RP.da4](#)

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d039
Program Name: Verification measurement on 835MHz with BSL

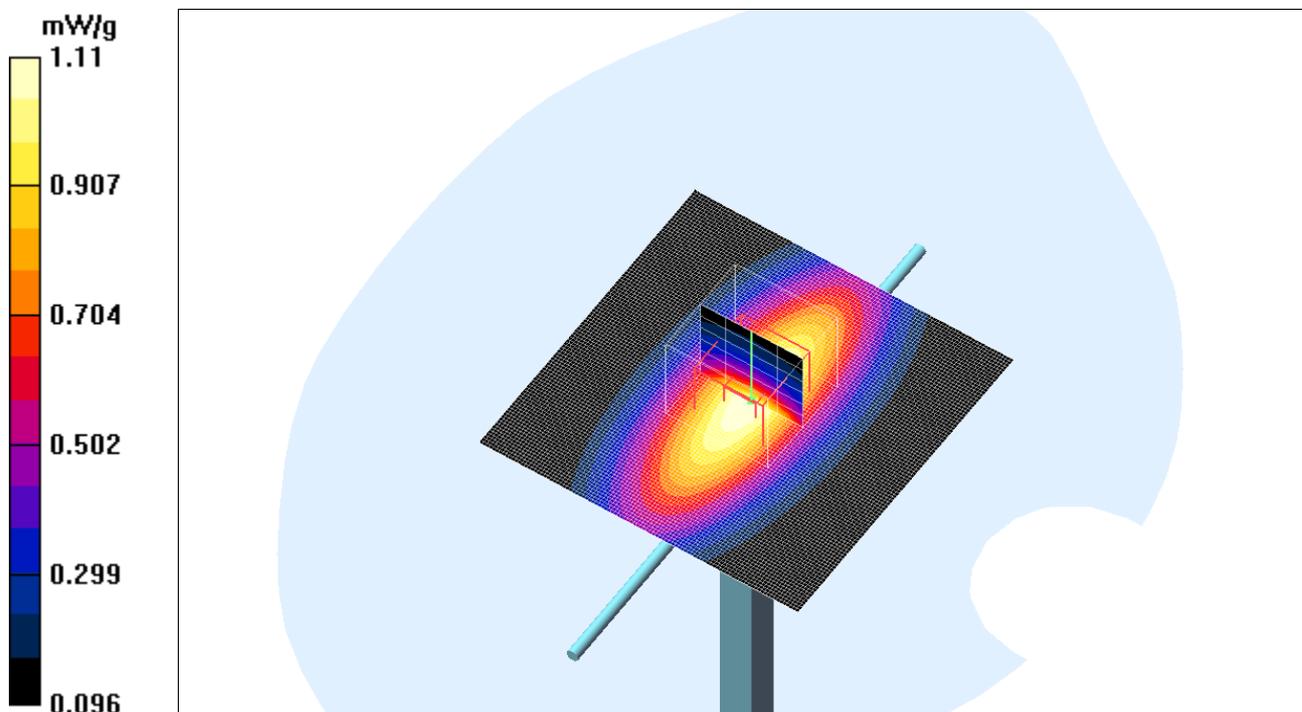
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(6.51, 6.51, 6.51); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Flat, 15mm/Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.11 mW/g

Flat, 15mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.7 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 1.48 W/kg
SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.666 mW/g
Maximum value of SAR (measured) = 1.11 mW/g



Date/Time: 2006-11-22 09:06:24

Test Laboratory: Sony Ericsson Mobile Communications
 File Name: [Verification_1900MHz_Head_061122_RP.da4](#)

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d073
Program Name: Verification Measurement on 1900MHz with HSL

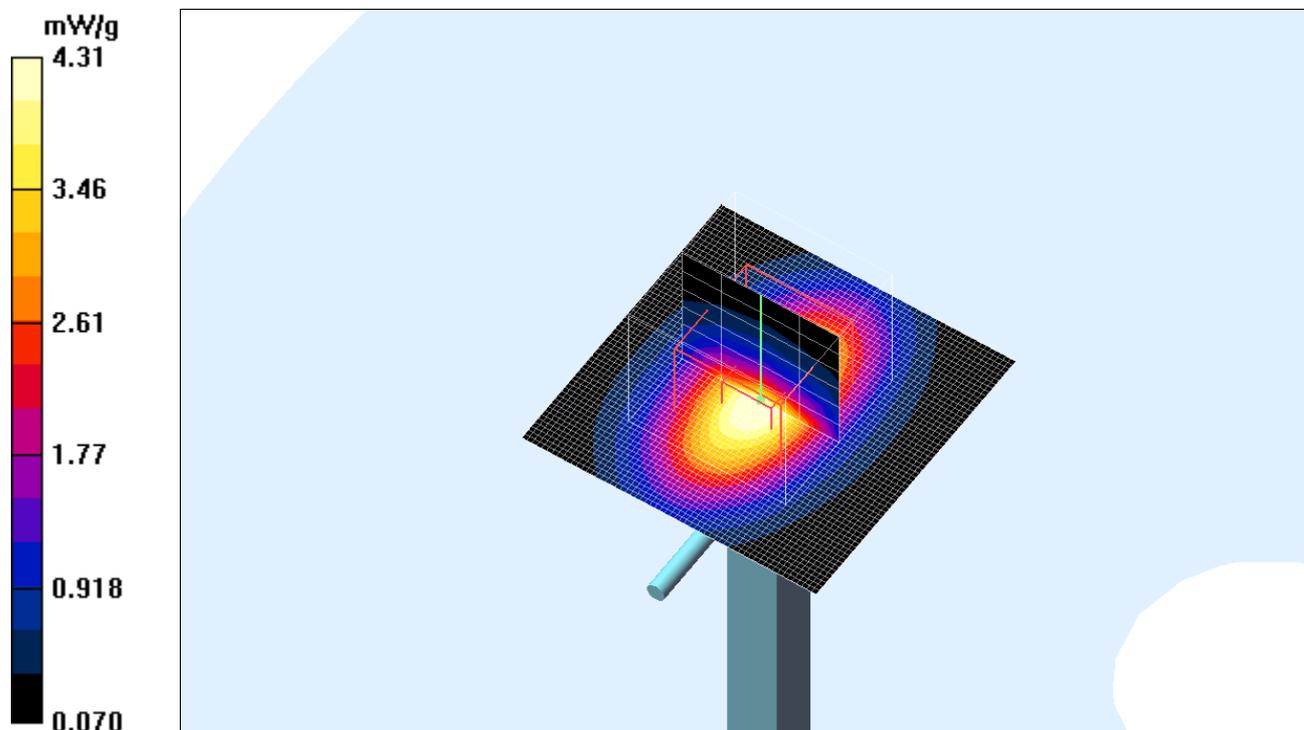
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(5.23, 5.23, 5.23); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Flat, 10mm/Area Scan (61x61x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 4.33 mW/g

Flat, 10mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 57.4 V/m; Power Drift = -0.044 dB
 Peak SAR (extrapolated) = 6.57 W/kg
SAR(1 g) = 3.82 mW/g; SAR(10 g) = 2.01 mW/g
 Maximum value of SAR (measured) = 4.31 mW/g



Date/Time: 2006-11-23 08:55:59

Test Laboratory: Sony Ericsson Mobile Communications
 File Name: [Verification_1900MHz_Body_061123_RP.da4](#)

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d073
Program Name: Verification Measurement on 1900MHz with BSL

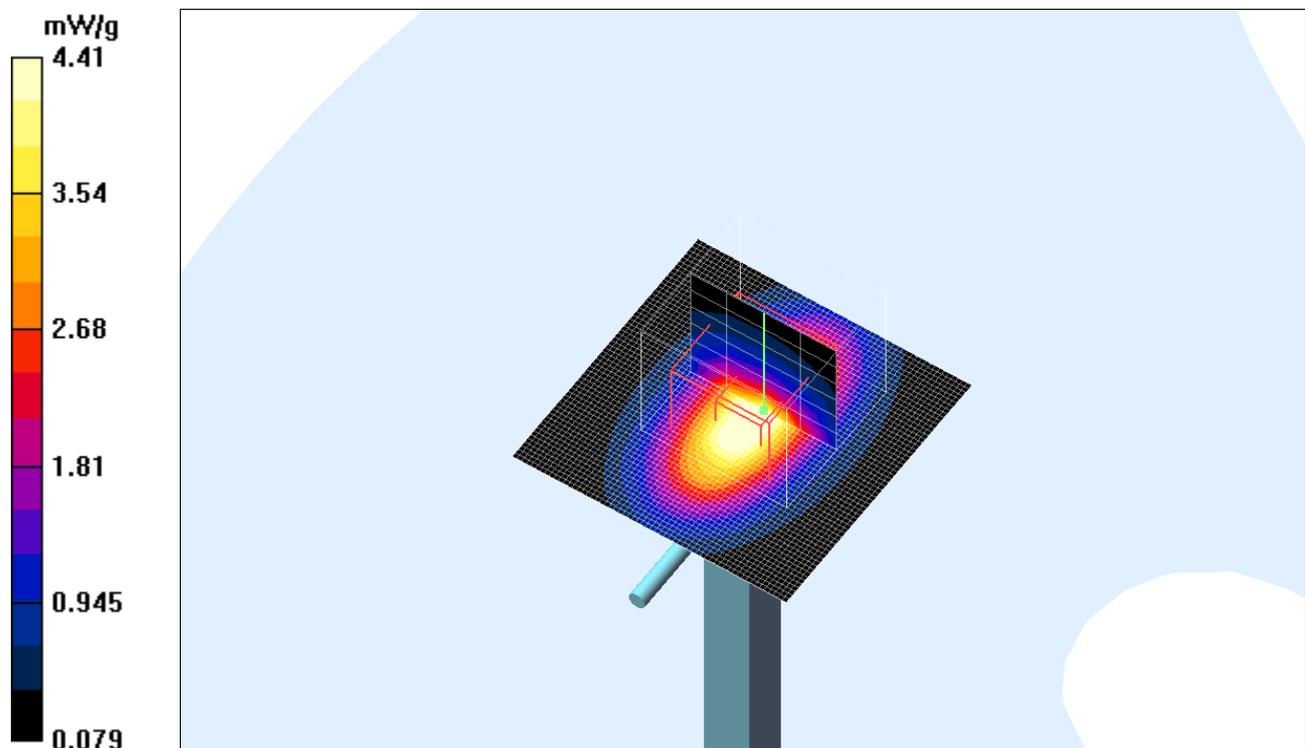
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 51.1$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(4.6, 4.6, 4.6); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Flat, 10mm/Area Scan (61x61x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 4.58 mW/g

Flat, 10mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 57.8 V/m; Power Drift = -0.003 dB
 Peak SAR (extrapolated) = 6.57 W/kg
SAR(1 g) = 3.96 mW/g; SAR(10 g) = 2.11 mW/g
 Maximum value of SAR (measured) = 4.41 mW/g



Date/Time: 2006-11-17 09:41:12

Test Laboratory: Sony Ericsson Mobile Communications
File Name: [ch189_Right_Cheek_061117_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM385, 900, 1800, 1900; Serial: #6083
Program Name: SAR Measurement on the Head

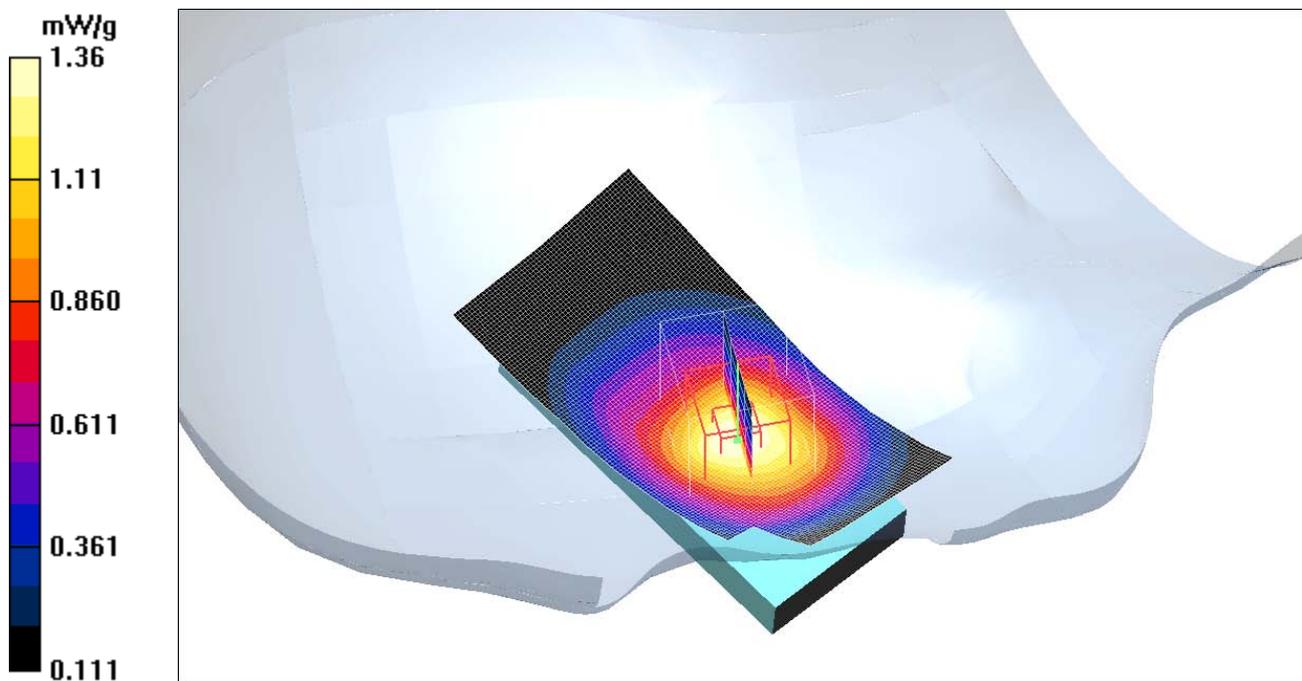
Communication System: GSM835MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 42$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(6.82, 6.82, 6.82); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 5; Type: SAM; Serial: 1352
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Right, Cheek/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.38 mW/g

Right, Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.6 V/m; Power Drift = -0.050 dB
Peak SAR (extrapolated) = 1.88 W/kg
SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.862 mW/g
Maximum value of SAR (measured) = 1.36 mW/g



Date/Time: 2006-11-17 14:17:34

Test Laboratory: Sony Ericsson Mobile Communications
File Name: [ch189_Left_Tilt_061117_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM385, 900, 1800, 1900; Serial: #6083
Program Name: SAR Measurement on the Head

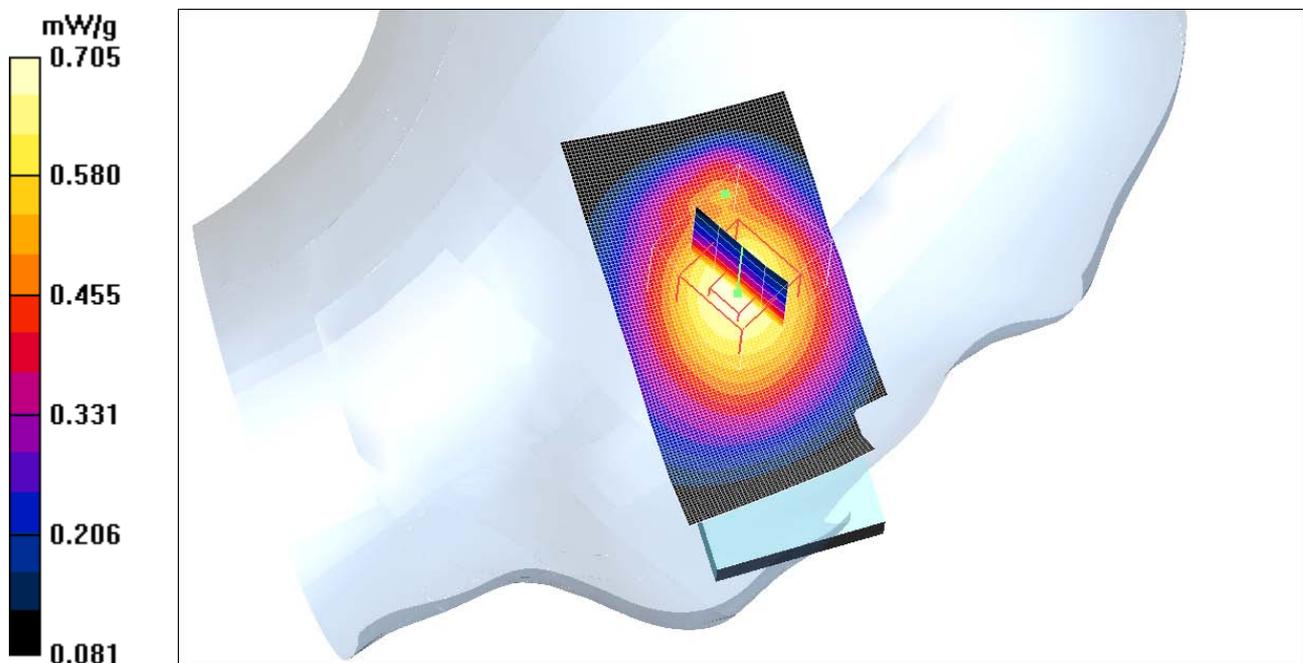
Communication System: GSM835MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 42$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(6.82, 6.82, 6.82); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 5; Type: SAM; Serial: 1352
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Left,Tilt/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.693 mW/g

Left,Tilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.5 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 0.859 W/kg
SAR(1 g) = 0.662 mW/g; SAR(10 g) = 0.480 mW/g
Maximum value of SAR (measured) = 0.705 mW/g



Date/Time: 2006-11-17 13:53:05

Test Laboratory: Sony Ericsson Mobile Communications

File Name: [ch189_Left_Cheek_061117_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM385, 900, 1800, 1900; Serial: #6083
Program Name: SAR Measurement on the Head

Communication System: GSM835MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3
 Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 42$; $\rho = 1000$ kg/m³
 Phantom section: Left Section

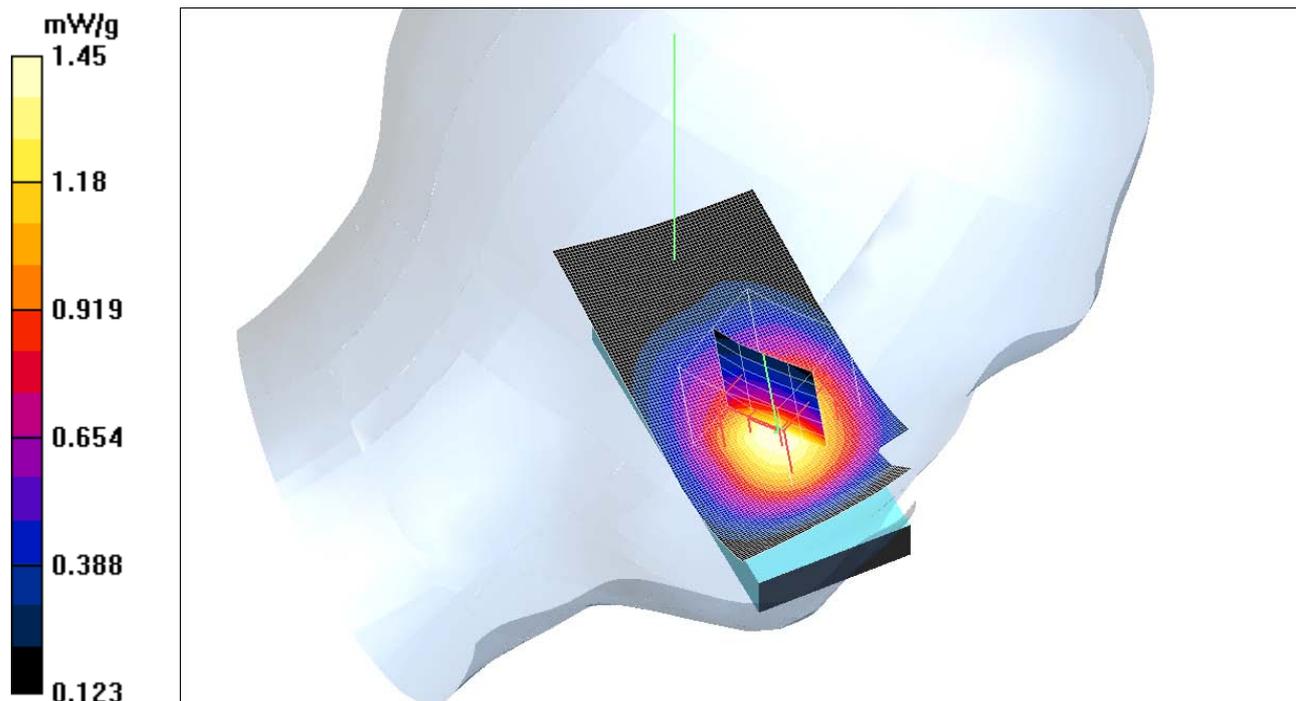
DASY4 Configuration:

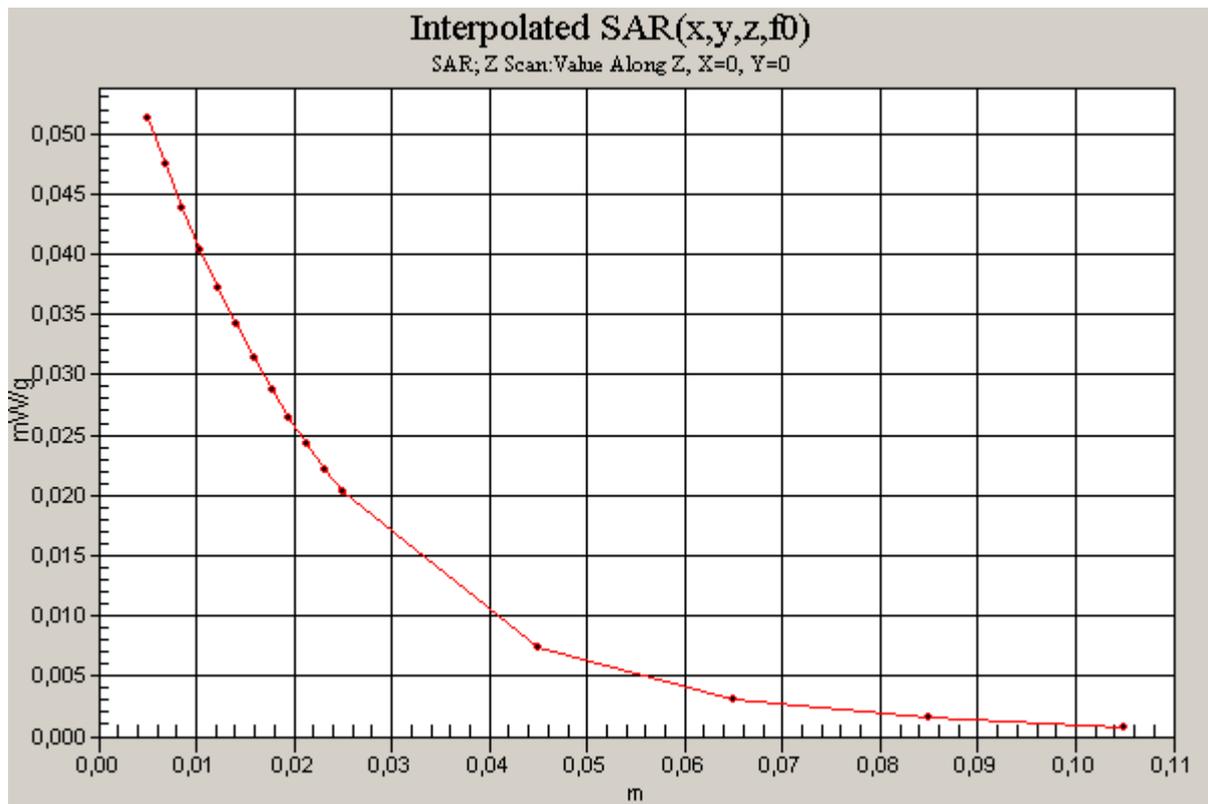
- Probe: ET3DV6 - SN1815; ConvF(6.82, 6.82, 6.82); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 5; Type: SAM; Serial: 1352
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Left, Cheek/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.46 mW/g

Left, Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 12.8V/m ; Power Drift = -0.048 dB
 Peak SAR (extrapolated) = 1.96 W/kg
SAR(1 g) = 1.37 mW/g; SAR(10 g) = 0.935 mW/g
 Maximum value of SAR (measured) = 1.45 mW/g

Left, Cheek/Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
 Maximum value of SAR (interpolated) = 0.051 mW/g





Date/Time: 2006-11-17 10:00:01

Test Laboratory: Sony Ericsson Mobile Communications

File Name: [ch189_Right_Tilt_061117_RP.da4](#)**DUT: PY7A1052021 (K550i); Type: GSM385, 900, 1800, 1900; Serial: #6083****Program Name: SAR Measurement on the Head**

Communication System: GSM835MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 42$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(6.82, 6.82, 6.82); Calibrated: 2006-01-20

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 SN640; Calibrated: 2006-01-18

- Phantom: SAM 5; Type: SAM; Serial: 1352

- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Right, Tilt/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.679 mW/g

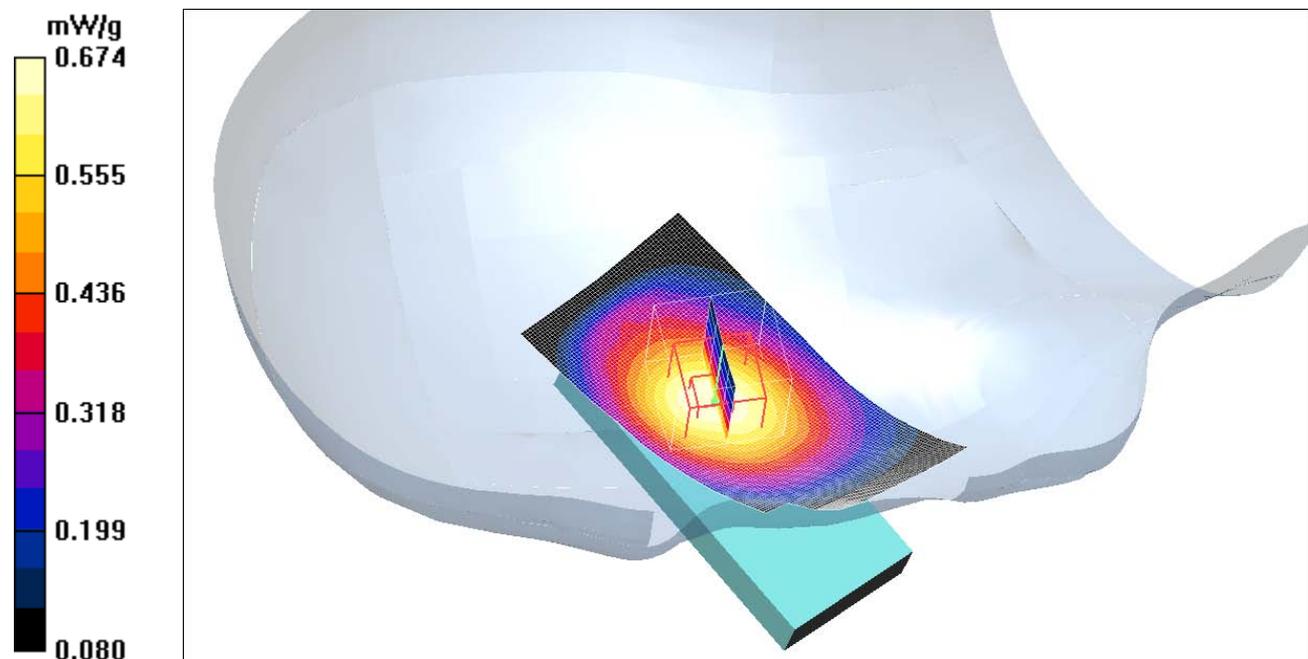
Right, Tilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.2 V/m; Power Drift = -0.014 dB

Peak SAR (extrapolated) = 0.809 W/kg

SAR(1 g) = 0.639 mW/g; SAR(10 g) = 0.467 mW/g

Maximum value of SAR (measured) = 0.674 mW/g



Date/Time: 2006-11-24 10:06:10

Test Laboratory: Sony Ericsson Mobile Communications
 File Name: [ch128_15mm_GPRS2Slot_061124_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM835, 900, 1800, 1900; Serial: #6083
Program Name: Measurement on the Body

Communication System: GSM835MHz_GPRS2Slots; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
 Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(6.51, 6.51, 6.51); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Flat,GPRS2Slots,15mm/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.36 mW/g

Flat,GPRS2Slots,15mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.9 V/m; Power Drift = -0.062 dB

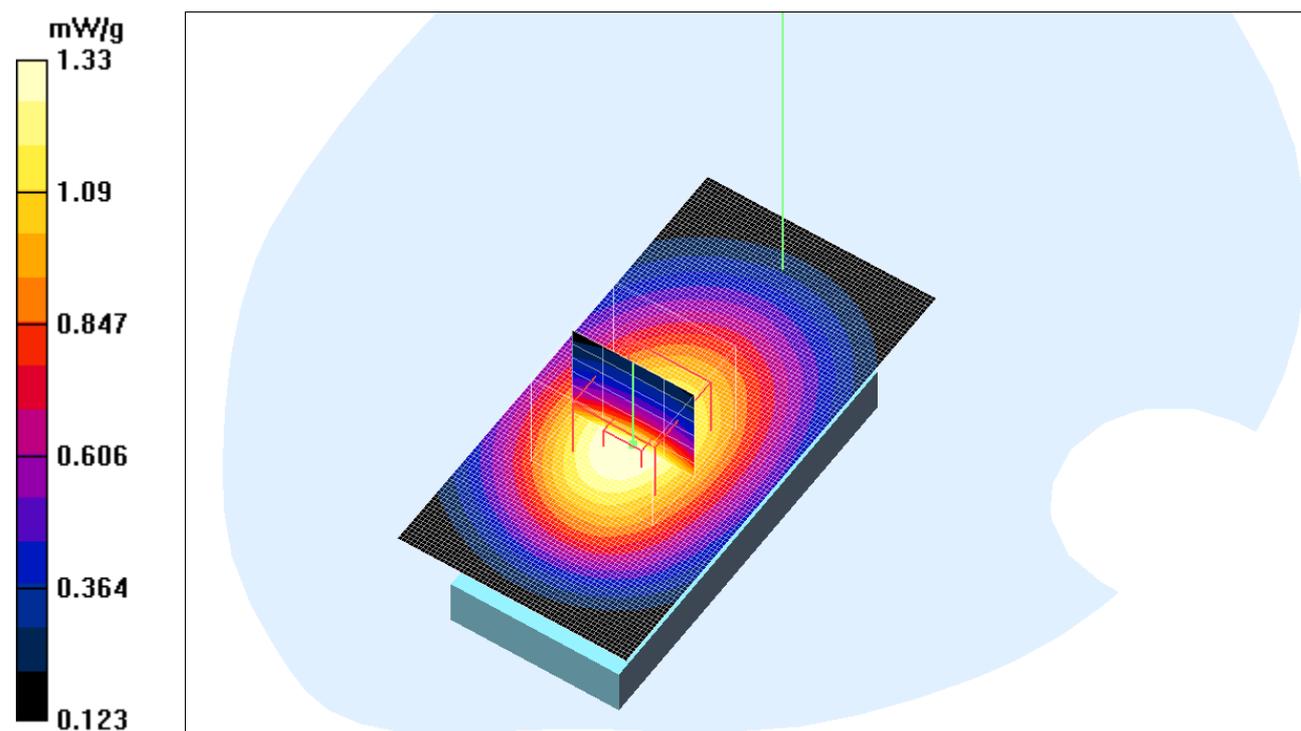
Peak SAR (extrapolated) = 1.64 W/kg

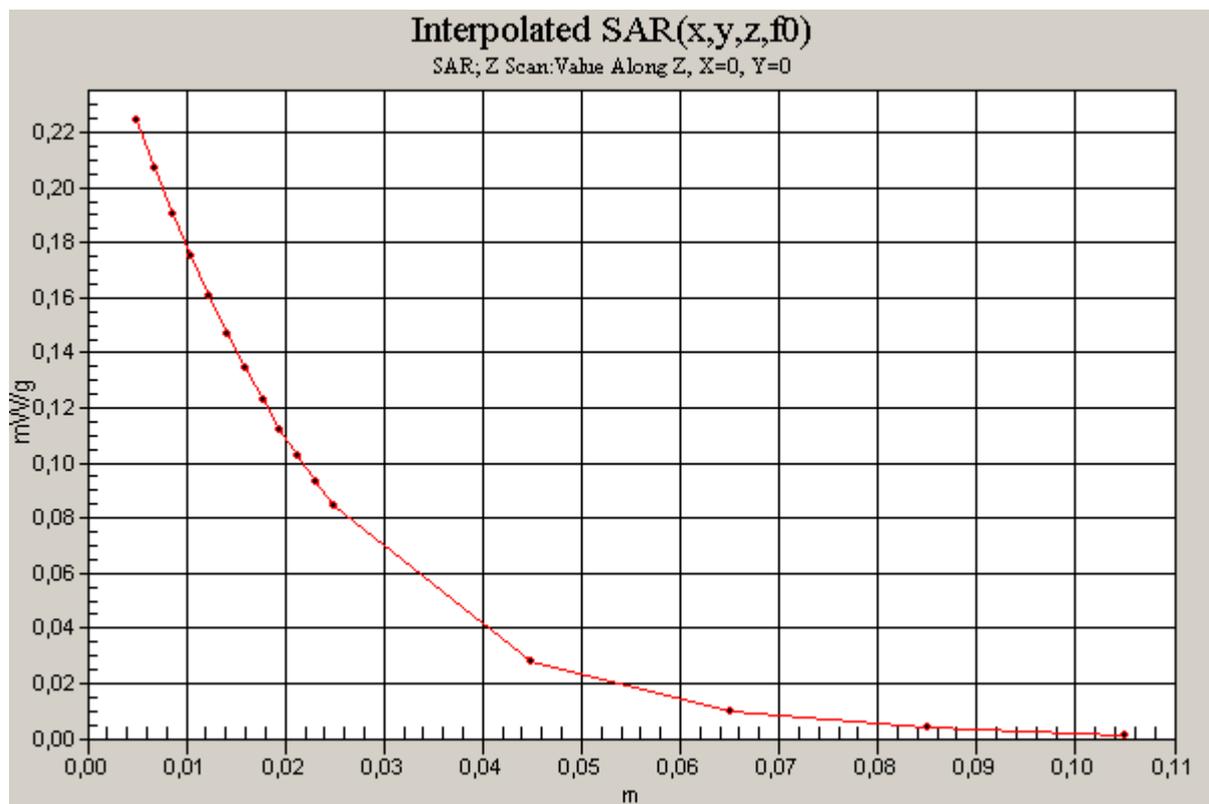
SAR(1 g) = 1.25 mW/g; SAR(10 g) = 0.884 mW/g

Maximum value of SAR (measured) = 1.33 mW/g

Flat,GPRS2Slots,15mm/Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm

Maximum value of SAR (interpolated) = 0.225 mW/g





Date/Time: 2006-11-24 14:31:07

Test Laboratory: Sony Ericsson Mobile Communications
 File Name: [ch128_15mm_Front_GPRS2Slot_061124_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM835, 900, 1800, 1900; Serial: #6083
Program Name: Measurement on the Body

Communication System: GSM835MHz_GPRS2Slots; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
 Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(6.51, 6.51, 6.51); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Flat, Speech,BT, 15mm/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.14 mW/g

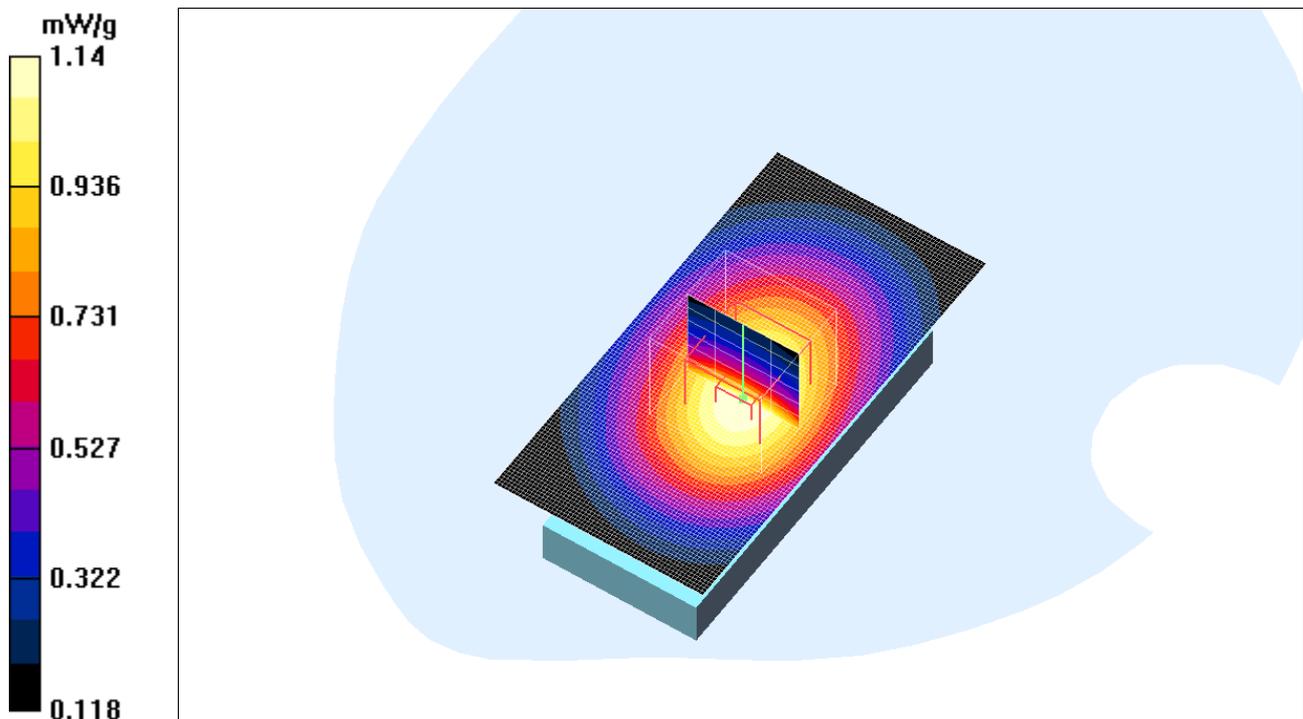
Flat, Speech,BT, 15mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,
 dy=8mm, dz=5mm

Reference Value = 20.0 V/m; Power Drift = -0.139 dB

Peak SAR (extrapolated) = 1.42 W/kg

SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.766 mW/g

Maximum value of SAR (measured) = 1.14 mW/g



Date/Time: 2006-11-22 14:17:57

Test Laboratory: Sony Ericsson Mobile Communications

File Name: [ch661_Right_Cheek_061122_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM835, 900, 1800, 1900; Serial: #6083
Program Name: SAR Measurement on the Head

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(5.23, 5.23, 5.23); Calibrated: 2006-01-20

- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)

- Electronics: DAE4 SN640; Calibrated: 2006-01-18

- Phantom: SAM 6; Type: SAM; Serial: 1351

- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Right, Cheek/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.32 mW/g

Right, Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.73 V/m; Power Drift = -0.011 dB

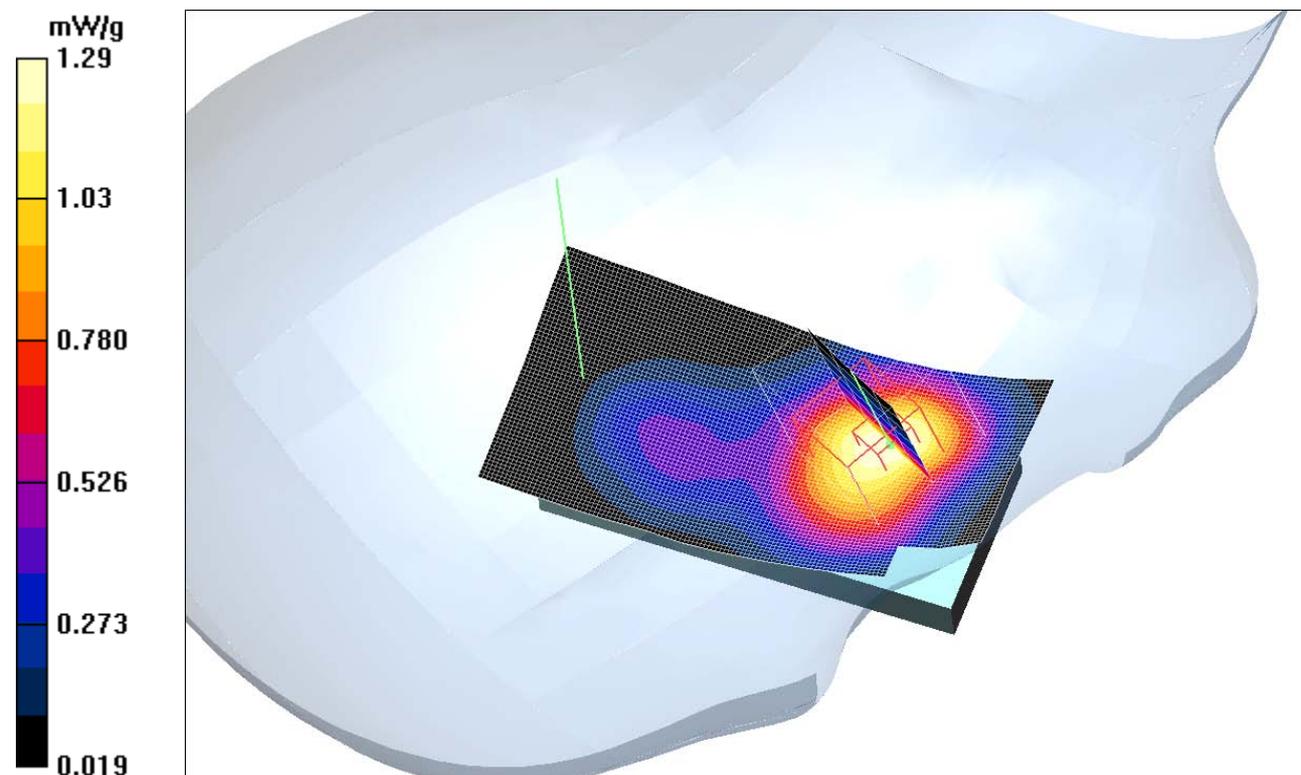
Peak SAR (extrapolated) = 1.81 W/kg

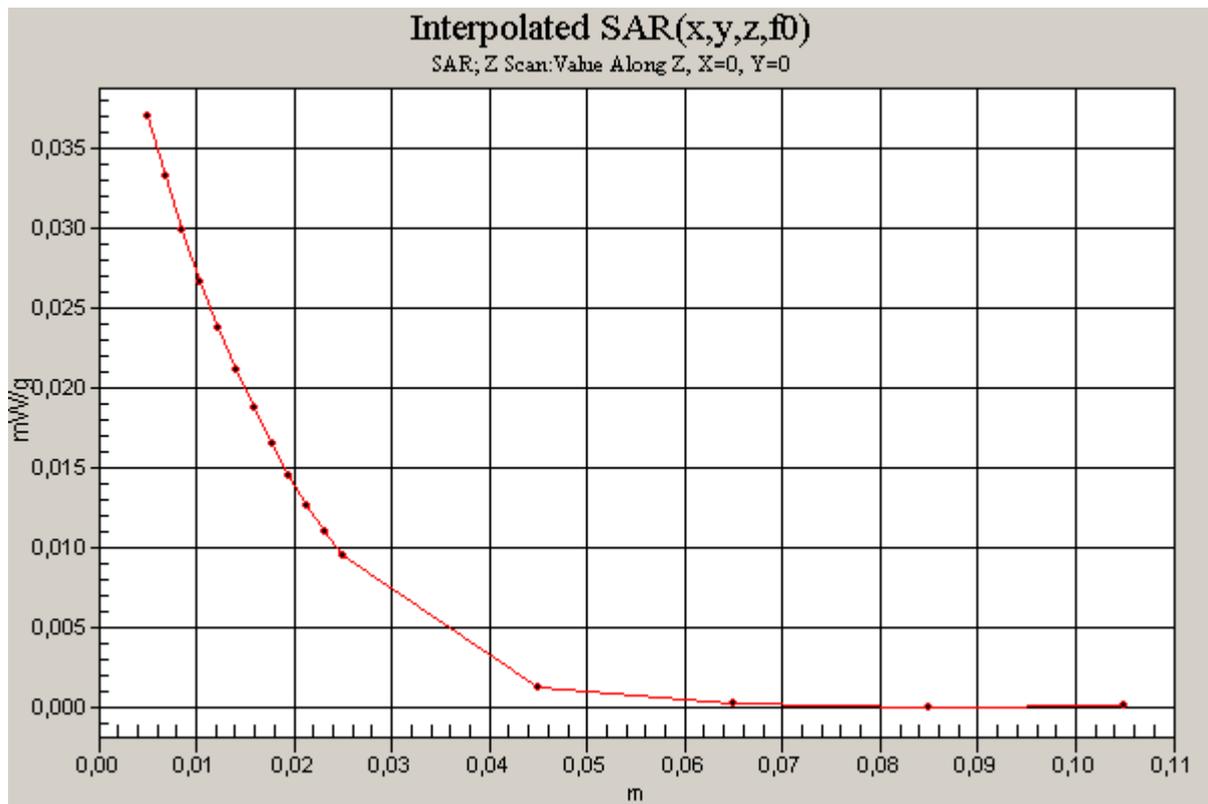
SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.698 mW/g

Maximum value of SAR (measured) = 1.29 mW/g

Right, Cheek/Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm

Maximum value of SAR (interpolated) = 0.037 mW/g





Date/Time: 2006-11-22 09:51:57

Test Laboratory: Sony Ericsson Mobile Communications
 File Name: [ch661_Left_Tilt_061122_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM835, 900, 1800, 1900; Serial: #6083
Program Name: SAR Measurement on the Head

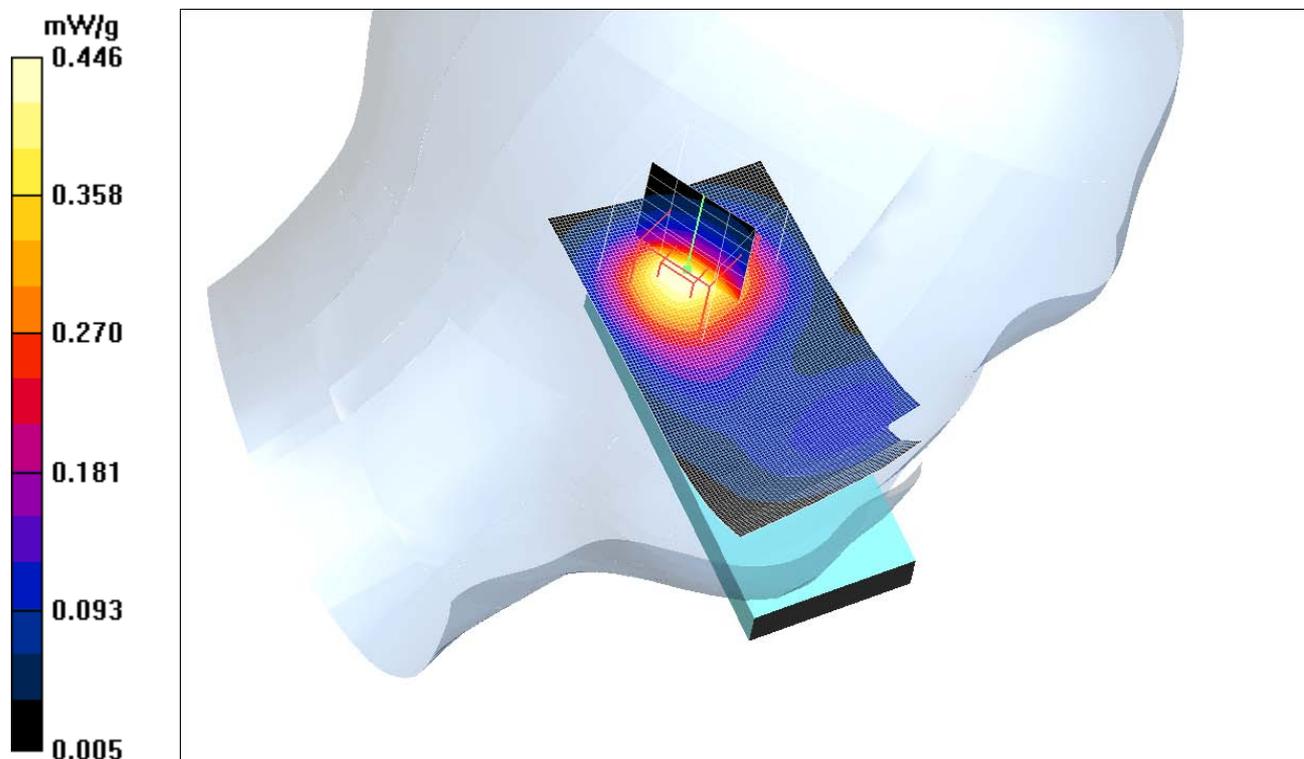
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³
 Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(5.23, 5.23, 5.23); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Left, Tilt/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.471 mW/g

Left, Tilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 15.0 V/m; Power Drift = 0.148 dB
 Peak SAR (extrapolated) = 0.616 W/kg
SAR(1 g) = 0.409 mW/g; SAR(10 g) = 0.244 mW/g
 Maximum value of SAR (measured) = 0.446 mW/g



Date/Time: 2006-11-22 09:30:44

Test Laboratory: Sony Ericsson Mobile Communications
File Name: [ch661_Left_Cheek_061122_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM835, 900, 1800, 1900; Serial: #6083
Program Name: SAR Measurement on the Head

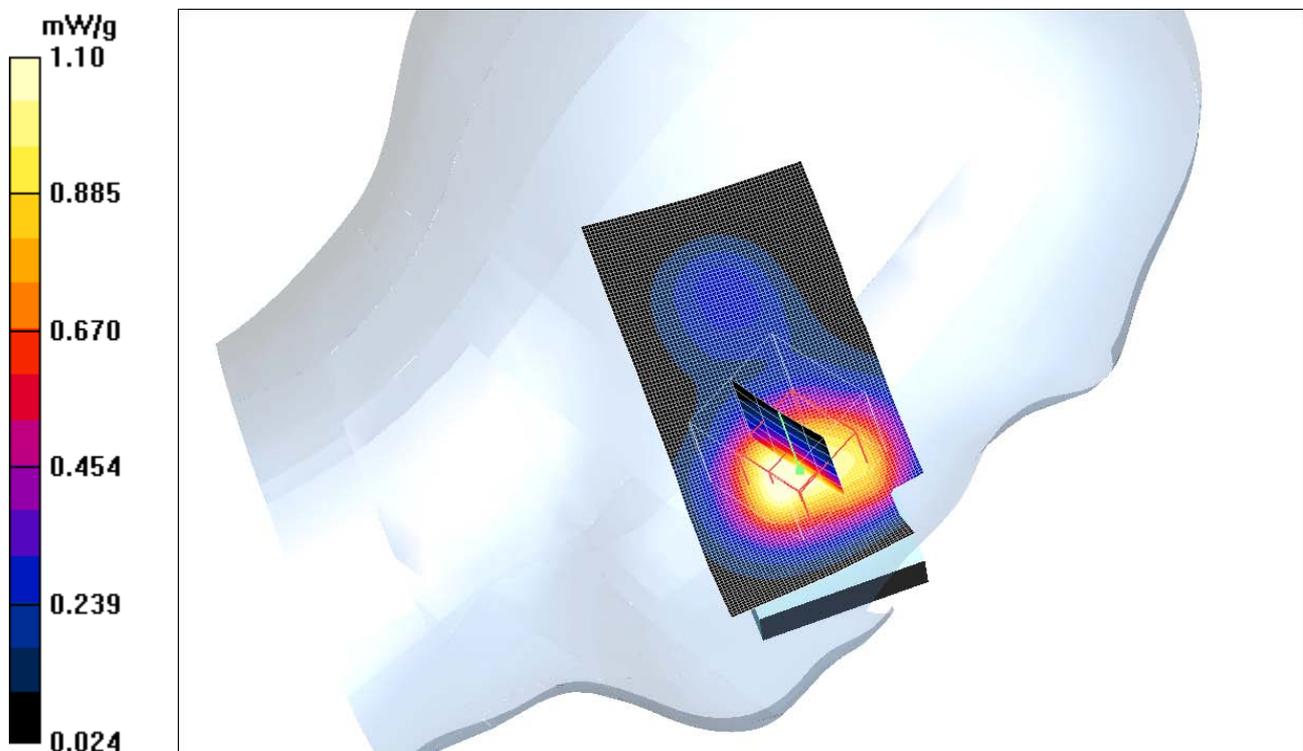
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(5.23, 5.23, 5.23); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Left, Cheek/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.13 mW/g

Left, Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.83 V/m; Power Drift = 0.142 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.635 mW/g
Maximum value of SAR (measured) = 1.10 mW/g



Date/Time: 2006-11-22 12:41:55

Test Laboratory: Sony Ericsson Mobile Communications
File Name: [ch661_Right_Tilt_061122_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM835, 900, 1800, 1900; Serial: #6083
Program Name: SAR Measurement on the Head

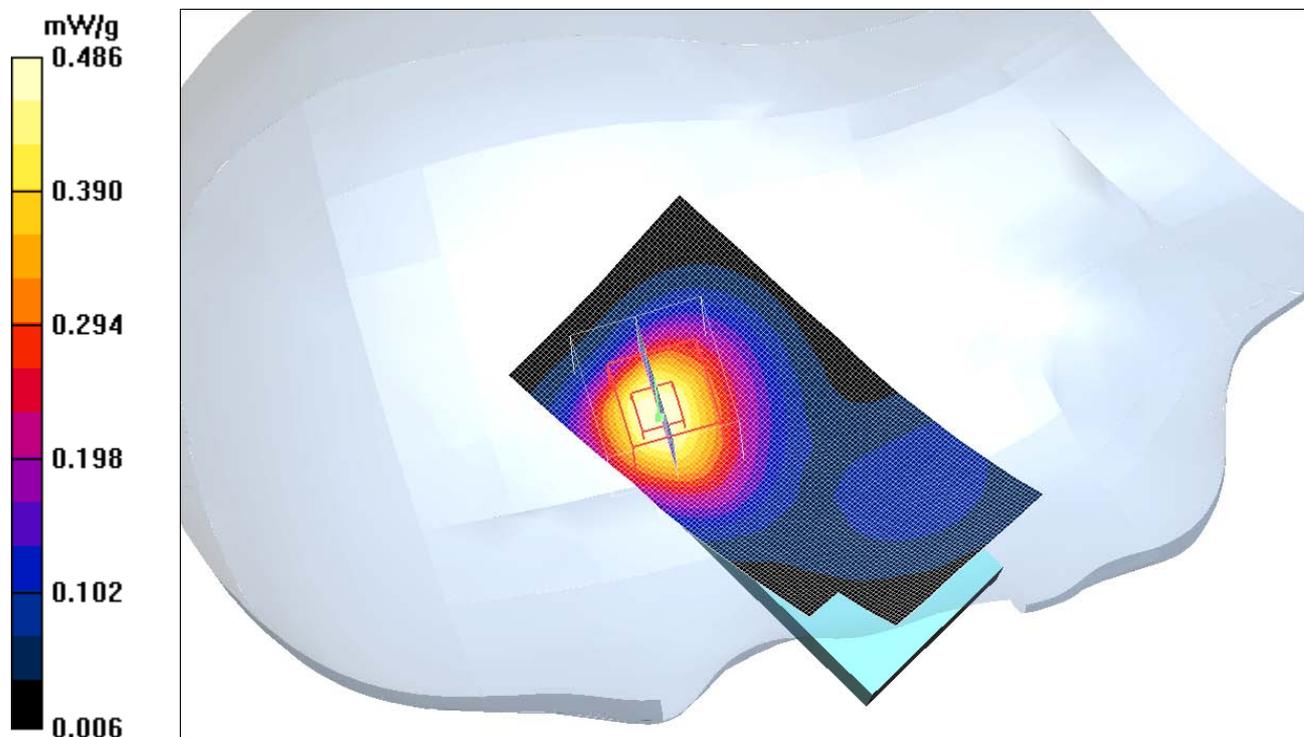
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(5.23, 5.23, 5.23); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Right, Tilt/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.495 mW/g

Right, Tilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.5 V/m; Power Drift = -0.057 dB
Peak SAR (extrapolated) = 0.689 W/kg
SAR(1 g) = 0.445 mW/g; SAR(10 g) = 0.262 mW/g
Maximum value of SAR (measured) = 0.486 mW/g



Date/Time: 2006-11-23 12:21:51

Test Laboratory: Sony Ericsson Mobile Communications
 File Name: [ch512_15mm_GPRS2Slot_061123_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM835, 900, 1800, 1900; Serial: #6083
Program Name: Measurement on the Body

Communication System: GSM1900_GPRS; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15
 Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 51.2$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(4.6, 4.6, 4.6); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Flat,GPRS2Slots,15mm/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.850 mW/g

Flat,GPRS2Slots,15mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.7 V/m; Power Drift = -0.043 dB

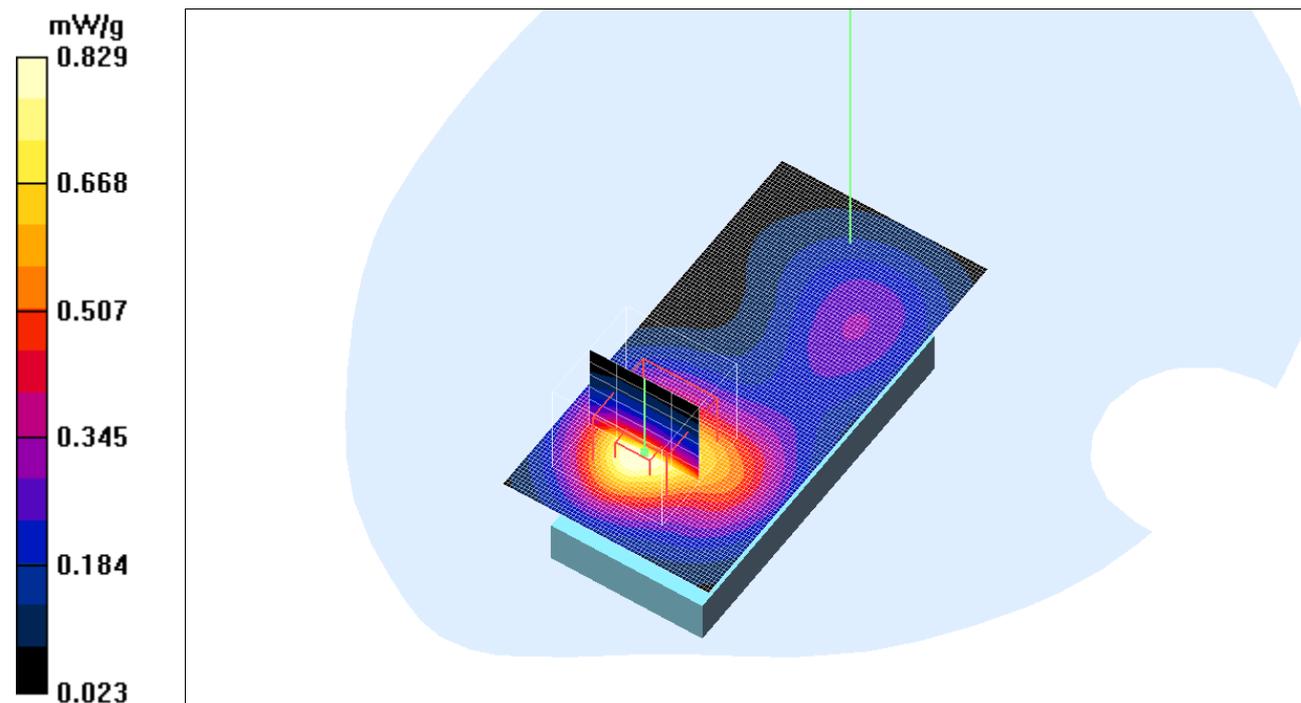
Peak SAR (extrapolated) = 1.20 W/kg

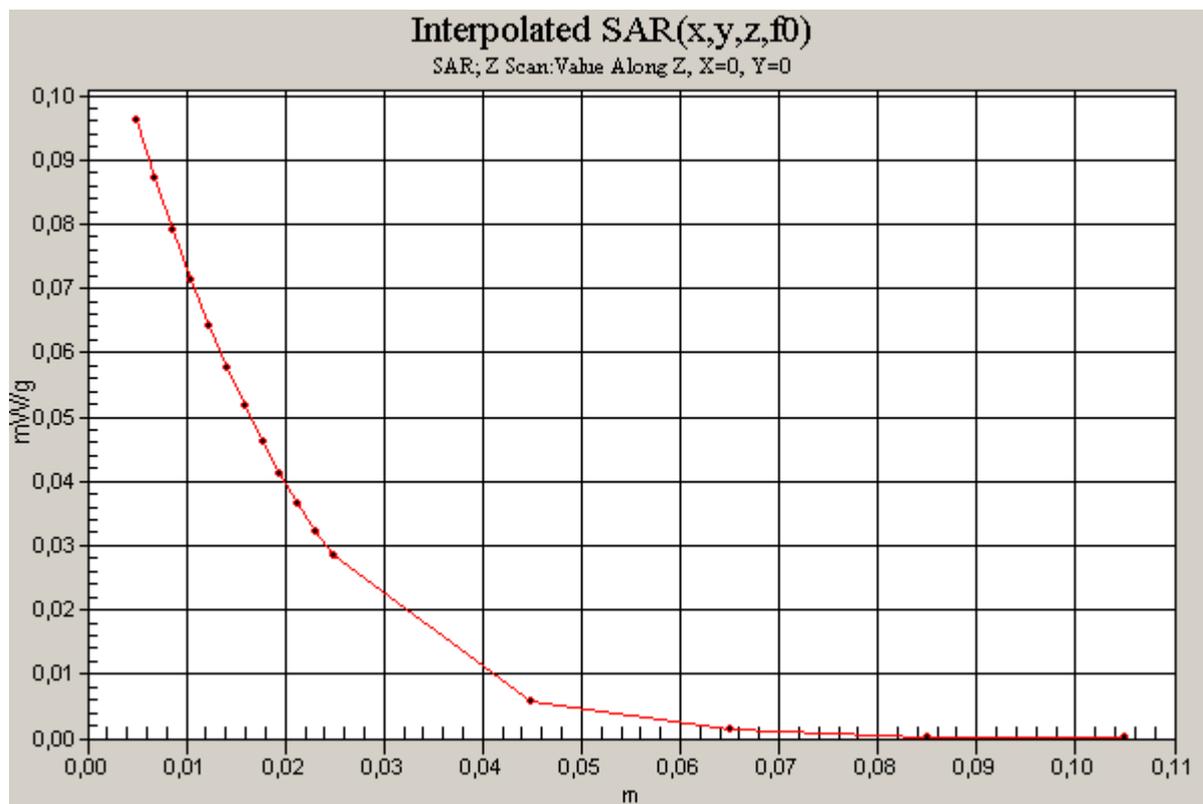
SAR(1 g) = 0.749 mW/g; SAR(10 g) = 0.439 mW/g

Maximum value of SAR (measured) = 0.829 mW/g

Flat,GPRS2Slots,15mm/Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm

Maximum value of SAR (interpolated) = 0.096 mW/g





Date/Time: 2006-11-28 10:03:08

Test Laboratory: Sony Ericsson Mobile Communications
File Name: [ch512_15mm_GPRS2Slot_Front_061128_RP.da4](#)

DUT: PY7A1052021 (K550i); Type: GSM835, 900, 1800, 1900; Serial: #6083
Program Name: Measurement on the Body

Communication System: GSM1900_GPRS; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 51.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1815; ConvF(4.6, 4.6, 4.6); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Flat,GPRS2Slots,15mm/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.540 mW/g

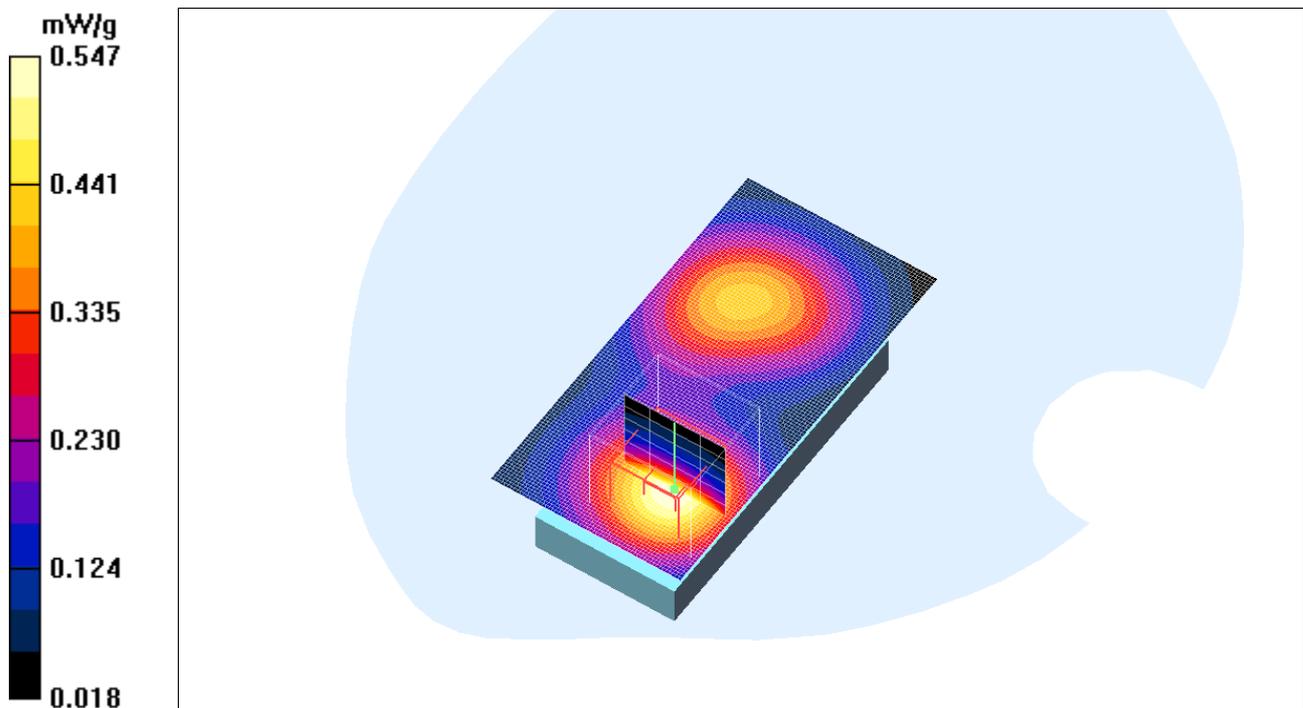
Flat,GPRS2Slots,15mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,
dy=8mm, dz=5mm

Reference Value = 14.1 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 0.753 W/kg

SAR(1 g) = 0.498 mW/g; SAR(10 g) = 0.304 mW/g

Maximum value of SAR (measured) = 0.547 mW/g





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Accreditation No.: **SCS 108**

Client **Sony Ericsson Lund**

Certificate No. **ET3-1815_Jan06**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1815**

Calibration procedure(s) **QA CAL-01.v5
Calibration procedure for dosimetric E-field probes**

Calibration date: **January 20, 2006**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
DAE4	SN: 654	27-Oct-05 (SPEAG, No. DAE4-654_Oct05)	Oct-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov 06

Calibrated by: **Name: Katja Pokovic, Function: Technical Manager, Signature: [Signature]**

Approved by: **Name: Fin Bernholt, Function: R&D Director, Signature: [Signature]**

Issued: January 20, 2006

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
Polarization ϕ	ϕ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * *frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * *ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ET3DV6

SN:1815

Manufactured:	February 27, 2004
Last calibrated:	January 20, 2005
Recalibrated:	January 20, 2006

Calibrated for DASYS Systems

(Note: non-compatible with DASYS2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1815

Sensitivity in Free Space ^A			Diode Compression ^B	
NormX	1.95 ± 10.1%	μV/(V/m) ²	DCP X	93 mV
NormY	2.02 ± 10.1%	μV/(V/m) ²	DCP Y	93 mV
NormZ	2.04 ± 10.1%	μV/(V/m) ²	DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL 900 MHz Typical SAR gradient: 5 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{b_{0e}} [%]	Without Correction Algorithm	7.7	4.3
SAR _{b_{0e}} [%]	With Correction Algorithm	0.0	0.2

TSL 1750 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{b_{0e}} [%]	Without Correction Algorithm	6.8	3.9
SAR _{b_{0e}} [%]	With Correction Algorithm	0.1	0.3

Sensor Offset

Probe Tip to Sensor Center	2.7 mm
Optical Surface Detection	low, but repeatable

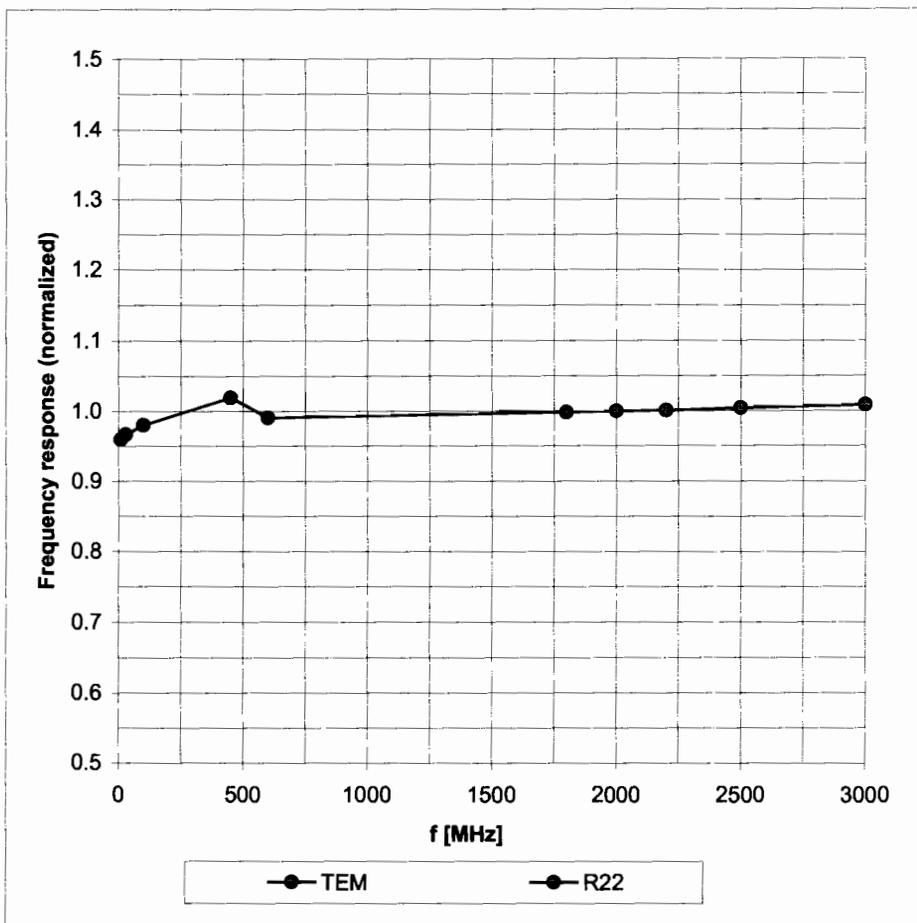
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

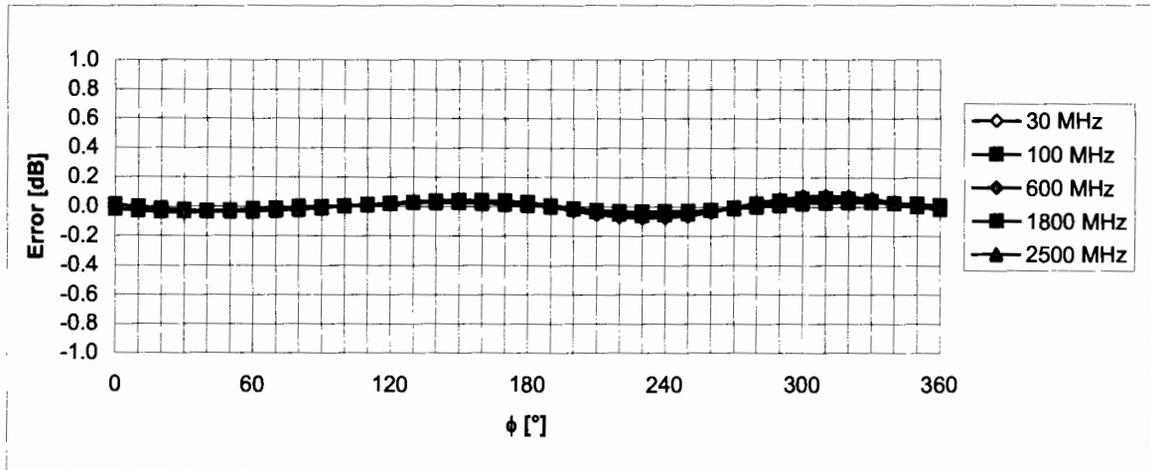
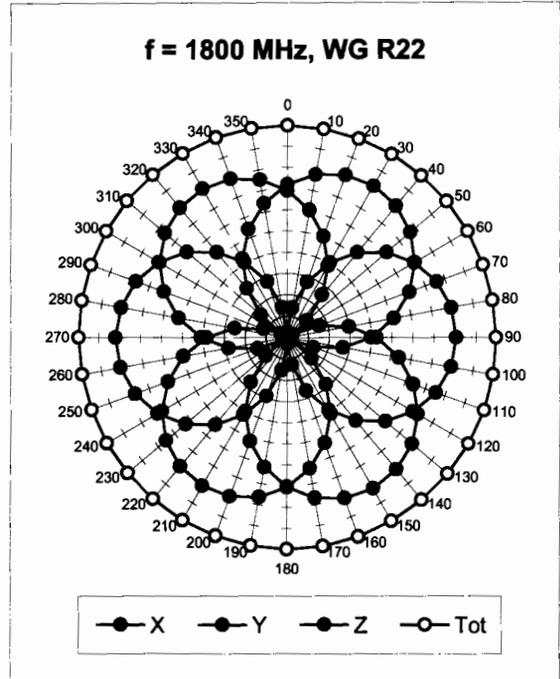
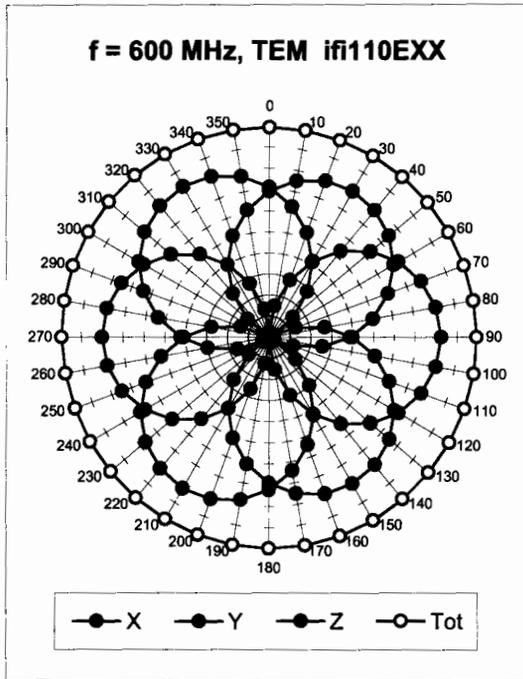
Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



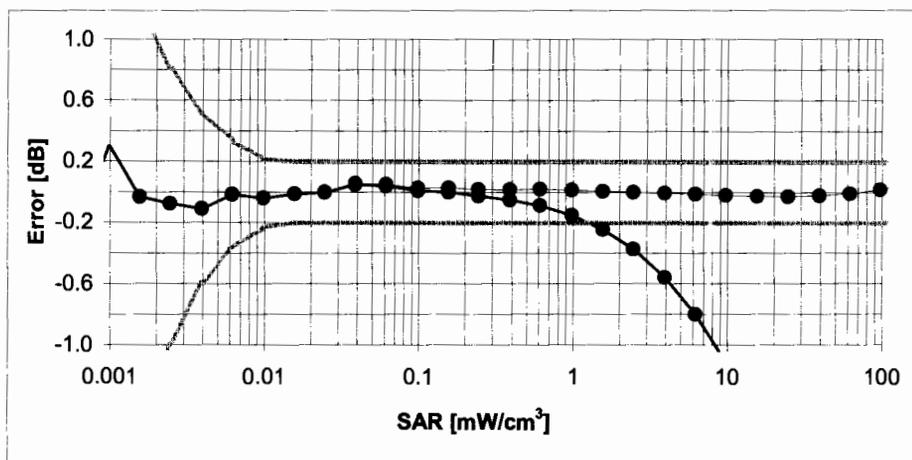
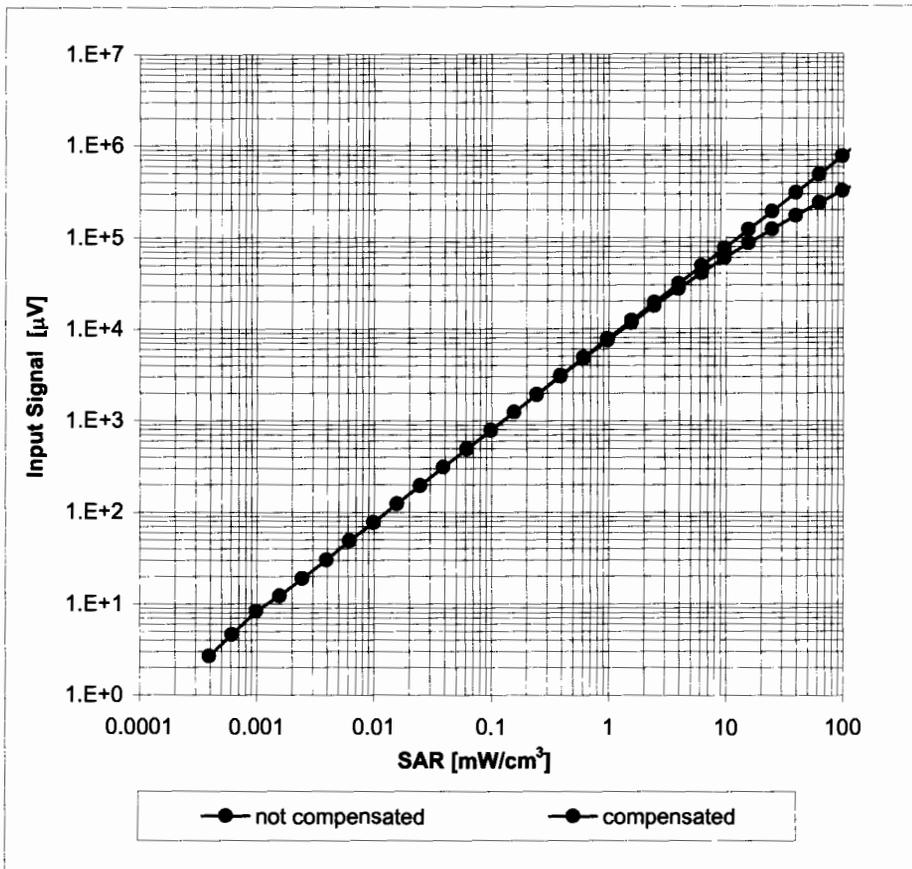
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$



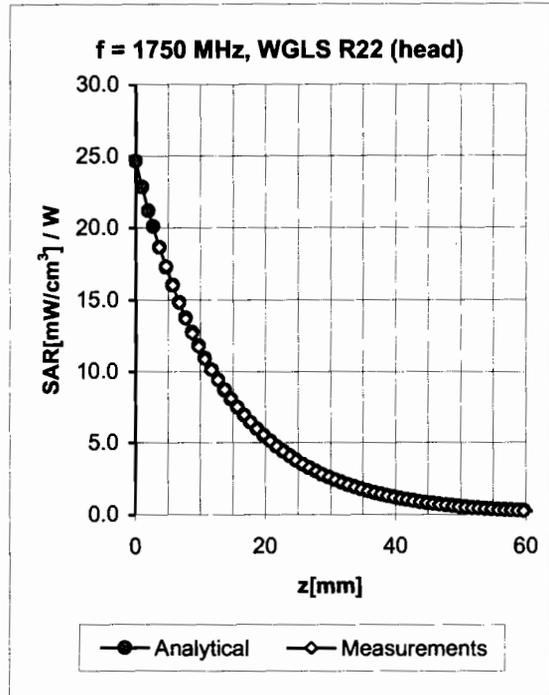
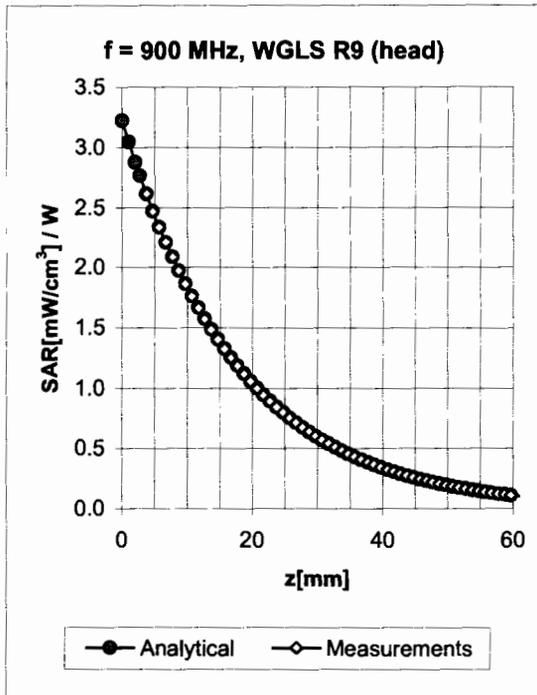
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (Waveguide R22, $f = 1800 \text{ MHz}$)



Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment

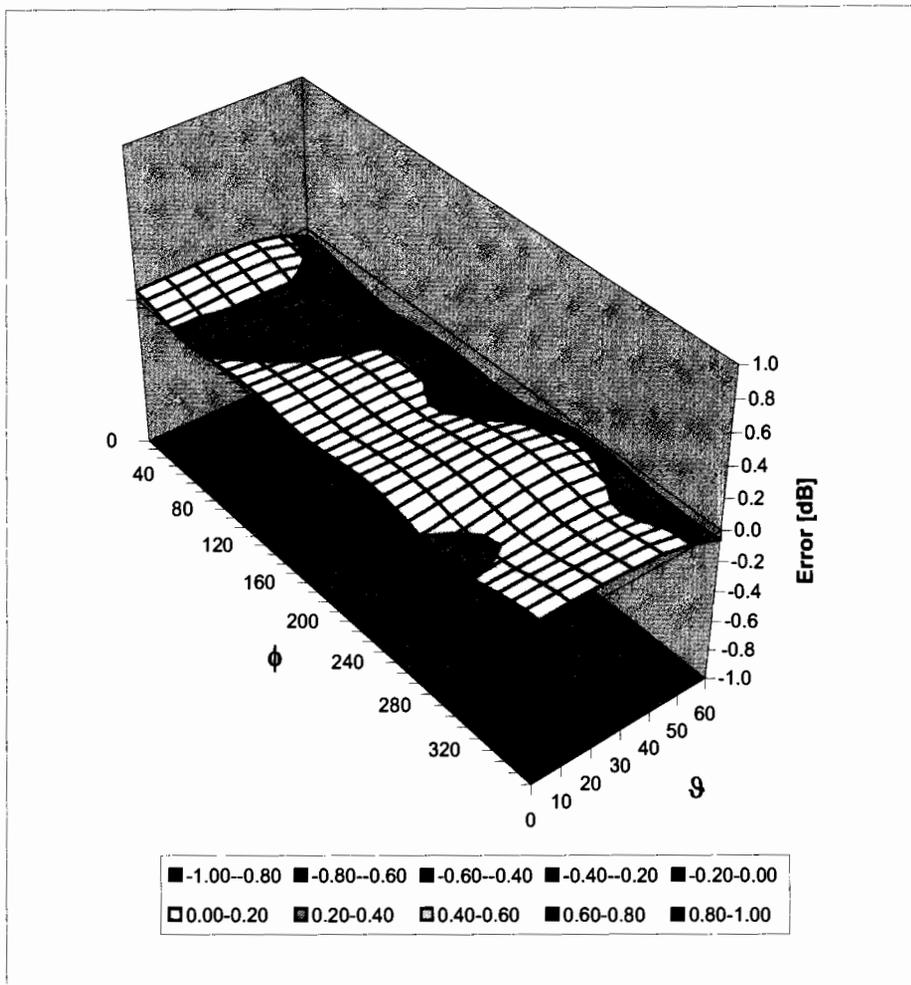


f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.54	1.76	6.82 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.48	1.93	6.66 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.54	1.72	5.40 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.60	1.66	5.23 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.60	1.42	4.57 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.42	2.10	6.51 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.41	2.19	6.36 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.65	1.97	4.85 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.62	2.14	4.60 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.40	2.06	4.20 ± 11.8% (k=2)

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Deviation from Isotropy in HSL

Error (ϕ , ϑ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)



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Accreditation No.: **SCS 108**

Client **Sony Ericsson Lund**

Certificate No: **D1900V2-5d073_May06**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d073**

Calibration procedure(s) **QA CAL-05.v6
Calibration procedure for dipole validation kits**

Calibration date: **May 31, 2006**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Power sensor HP 8481A	US37292783	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Reference 20 dB Attenuator	SN: 5086 (20g)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference 10 dB Attenuator	SN: 5047.2 (10r)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference Probe ET3DV6	SN: 1507	28-Oct-05 (SPEAG, No. ET3-1507_Oct05)	Oct-06
DAE4	SN: 601	15-Dec-05 (SPEAG, No. DAE4-601_Dec05)	Dec-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov-06

Calibrated by: **Mike Meili** Name: **Mike Meili** Function: **Laboratory Technician** Signature: *[Signature]*

Approved by: **Katja Pokovic** Name: **Katja Pokovic** Function: **Technical Manager** Signature: *[Signature]*

Issued: June 1, 2006

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	39.4 \pm 6 %	1.41 mho/m \pm 6 %
Head TSL temperature during test	(22.8 \pm 0.2) °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.67 mW / g
SAR normalized	normalized to 1W	38.7 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	38.2 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.11 mW / g
SAR normalized	normalized to 1W	20.4 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	20.3 mW / g \pm 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.7 ± 6 %	1.54 mho/m ± 6 %
Body TSL temperature during test	(22.7 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.4 mW / g
SAR normalized	normalized to 1W	41.6 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	41.9 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.50 mW / g
SAR normalized	normalized to 1W	22.0 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	22.2 mW / g ± 16.5 % (k=2)

² Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.6 Ω + 5.7 j Ω
Return Loss	- 24.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.9 Ω + 6.4 j Ω
Return Loss	- 23.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.192 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 24, 2006

DASY4 Validation Report for Head TSL

Date/Time: 31.05.2006 11:49:47

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d073

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.74, 4.74, 4.74); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Pin = 250 mW; d = 10 mm/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.6 mW/g

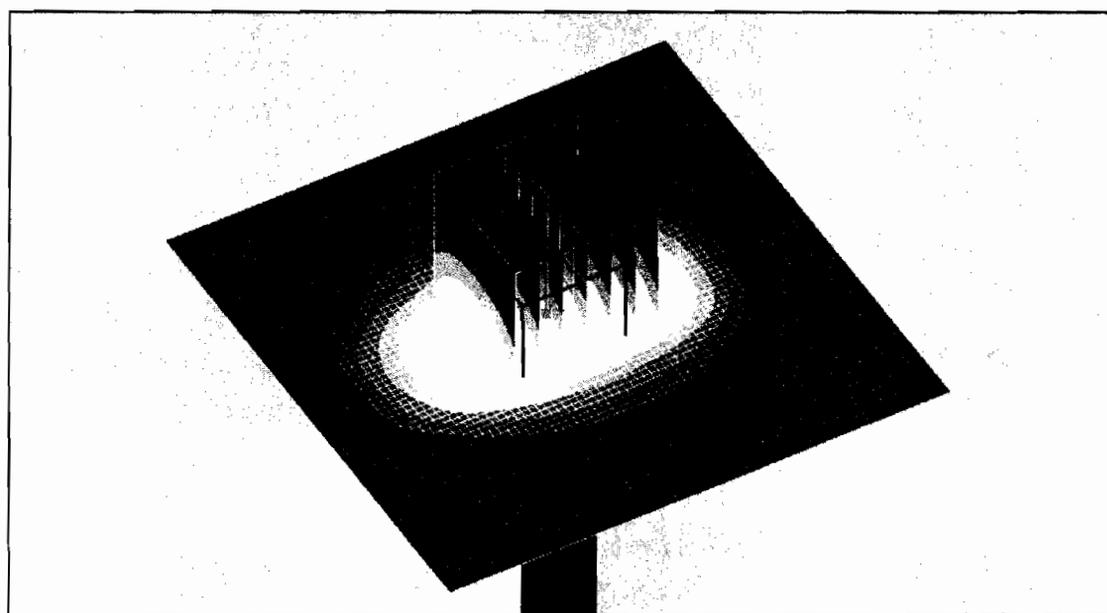
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.1 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 9.67 mW/g; SAR(10 g) = 5.11 mW/g

Maximum value of SAR (measured) = 10.9 mW/g



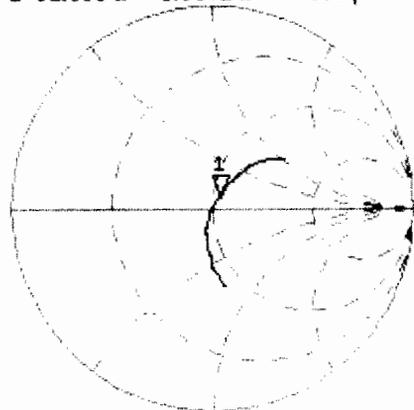
0 dB = 10.9mW/g

Impedance Measurement Plot for Head TSL

31 May 2006 09:41:45

CH1 S11 1 U FS 1: 52.600 Ω 5.6641 Ω 474.45 pF 1 900.000 000 MHz

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Del
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Avg
16

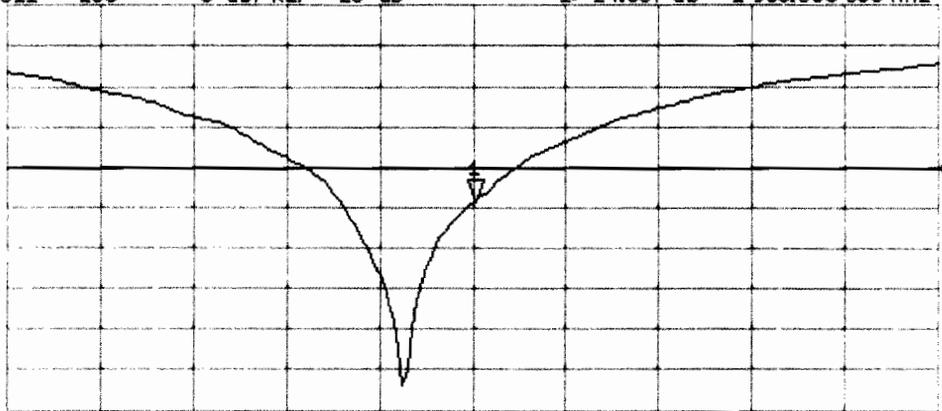
↑

CH2 S11 LOG 5 dB/REF -20 dB 1:-24.337 dB 1 900.000 000 MHz

CA

Avg
16

↑



CENTER 1 900.000 000 MHz

SPAN 400.000 000 MHz

DASY4 Validation Report for Body TSL

Date/Time: 31.05.2006 14:35:04

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d073

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL U10;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.3, 4.3, 4.3); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Pin = 250 mW; d = 10 mm/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.6 mW/g

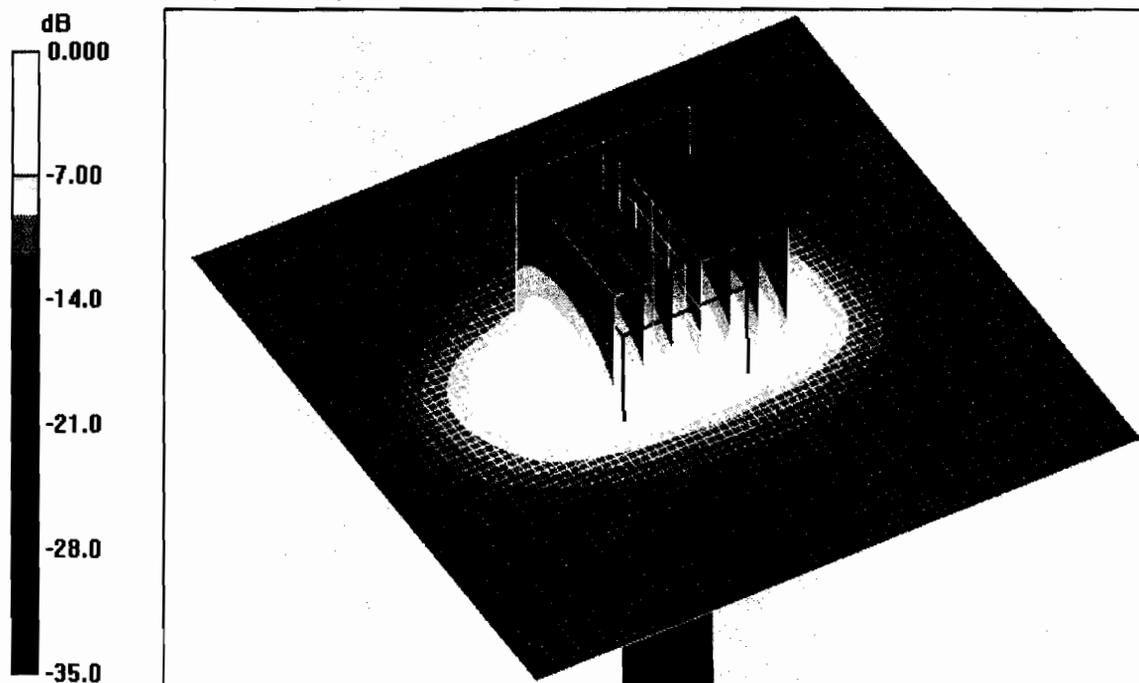
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.4 V/m; Power Drift = -0.045 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.5 mW/g

Maximum value of SAR (measured) = 11.7 mW/g



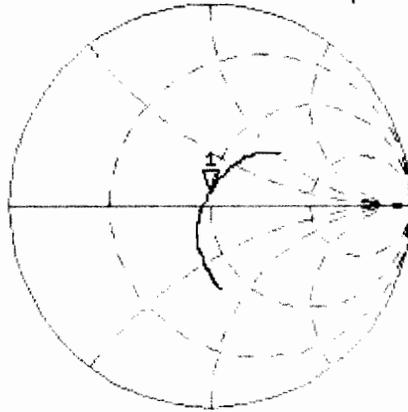
0 dB = 11.7mW/g

Impedance Measurement Plot for Body TSL

31 May 2006 12:30:26

CH1 S11 1 U FS 1: 48.850 Ω 6.3867 Ω 534.99 pF 1 900.000 000 MHz

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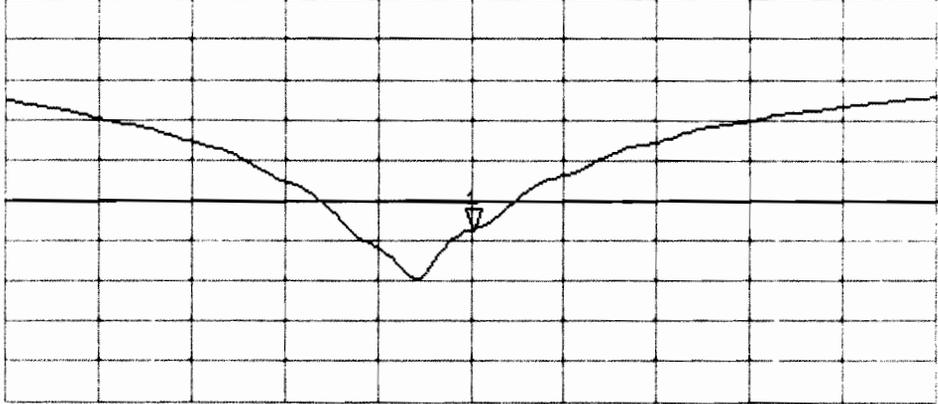
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CH2 S11 LOG 5 dB/REF -20 dB 1:-23.676 dB 1 900.000 000 MHz

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CENTER 1 900.000 000 MHz

SPAN 400.000 000 MHz



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The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Sony Ericsson Lund**

Certificate No: **D835V2-4d039_May06**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d039**

Calibration procedure(s) **QA CAL-05.v6
Calibration procedure for dipole validation kits**

Calibration date: **May 31, 2006**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Power sensor HP 8481A	US37292783	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Reference 20 dB Attenuator	SN: 5086 (20g)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference 10 dB Attenuator	SN: 5047.2 (10r)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference Probe ET3DV6	SN 1507	28-Oct-05 (SPEAG, No. ET3-1507_Oct05)	Oct-06
DAE4	SN 601	15-Dec-05 (SPEAG, No. DAE4-601_Dec05)	Dec-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov-06

Calibrated by:	Name Mike Meili	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: June 1, 2006

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	41.9 \pm 6 %	0.90 mho/m \pm 6 %
Head TSL temperature during test	(23.0 \pm 0.2) °C	---	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	2.31 mW / g
SAR normalized	normalized to 1W	9.24 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	9.29 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.50 mW / g
SAR normalized	normalized to 1W	6.00 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	6.03 mW / g \pm 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	56.8 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature during test	(23.2 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	condition	
SAR measured	250 mW input power	2.39 mW / g
SAR normalized	normalized to 1W	9.56 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	9.66 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.56 mW / g
SAR normalized	normalized to 1W	6.24 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	6.31 mW / g ± 16.5 % (k=2)

² Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.1 Ω - 2.1 j Ω
Return Loss	- 32.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.9 Ω - 3.5 j Ω
Return Loss	- 27.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.382 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 20, 2005

DASY4 Validation Report for Head TSL

Date/Time: 31.05.2006 10:59:32

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d039

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB_060425;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.912 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Pin = 250 mW; d = 10 mm/Area Scan (71x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.44 mW/g

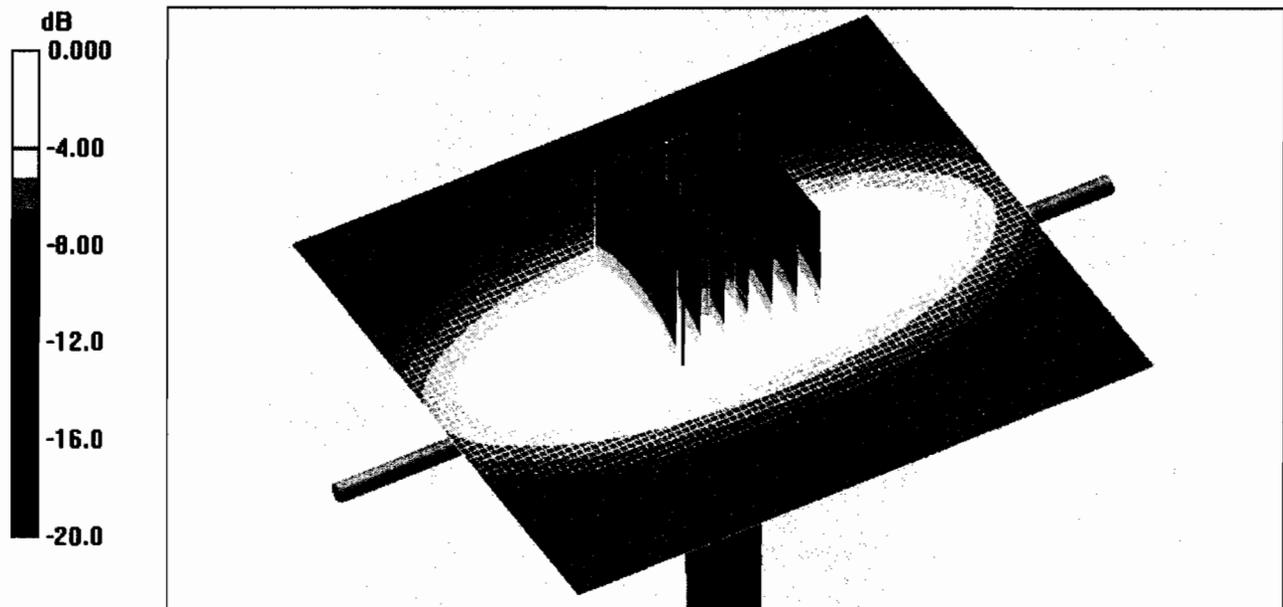
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.1 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 3.48 W/kg

SAR(1 g) = 2.31 mW/g; SAR(10 g) = 1.5 mW/g

Maximum value of SAR (measured) = 2.48 mW/g



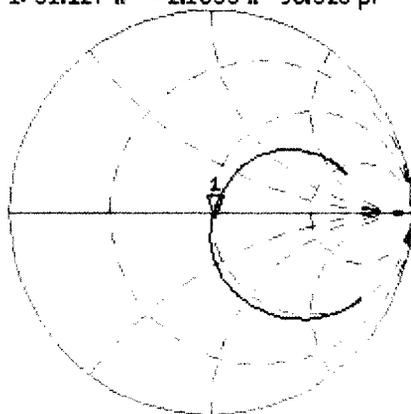
0 dB = 2.48mW/g

Impedance Measurement Plot for Head TSL

31 May 2006 09:35:47

CH1 S11 1 U FS 1: 51.127 Ω -2.1055 Ω 90.528 pF 835.000 000 MHz

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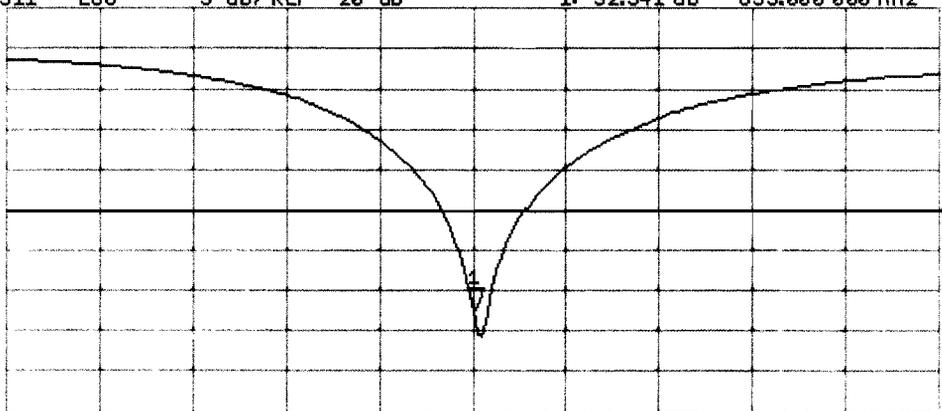


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CH2 S11 LOG 5 dB/REF -20 dB 1: -32.541 dB 835.000 000 MHz

CA

Avg
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CENTER 835.000 000 MHz

SPAN 400.000 000 MHz

DASY4 Validation Report for Body TSL

Date/Time: 31.05.2006 13:23:15

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d039

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL U10 BB;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.997 \text{ mho/m}$; $\epsilon_r = 56.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.84, 5.84, 5.84); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.59 mW/g

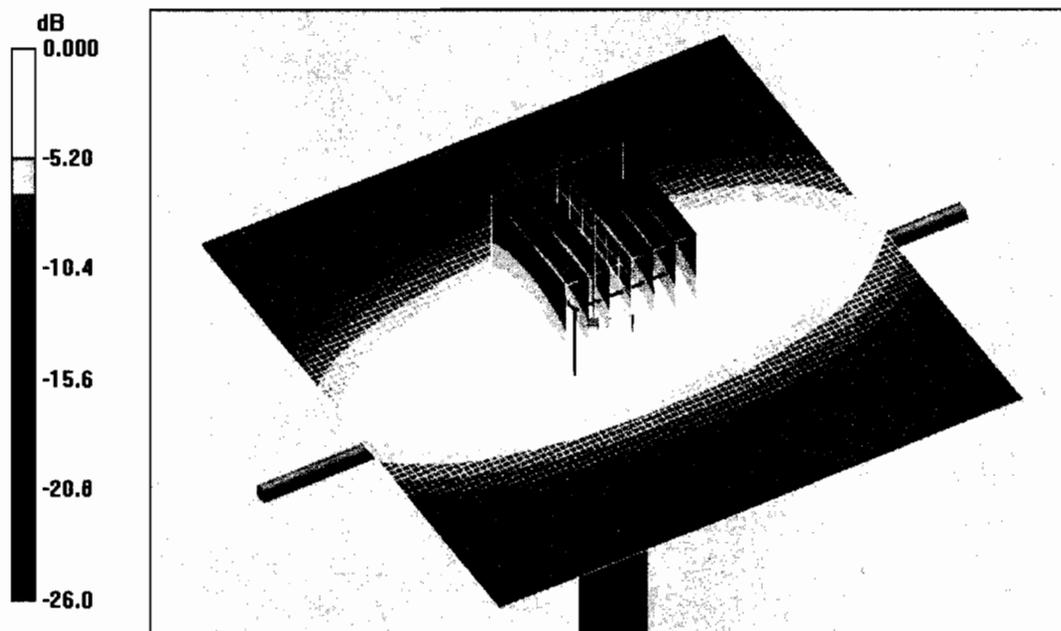
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.1 V/m; Power Drift = -0.014 dB

Peak SAR (extrapolated) = 3.45 W/kg

SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.56 mW/g

Maximum value of SAR (measured) = 2.58 mW/g



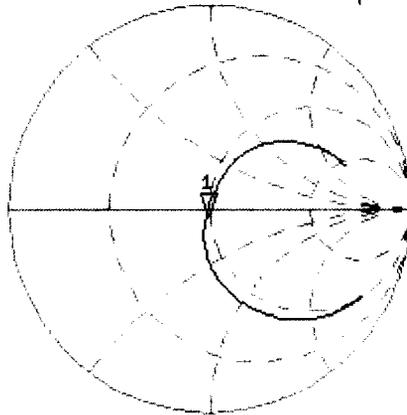
0 dB = 2.58mW/g

Impedance Measurement Plot Body TSL

31 May 2006 12:26:44

CH1 S11 1 U FS 1: 47.943 Ω -3.5078 Ω 54.337 pF 835.000 000 MHz

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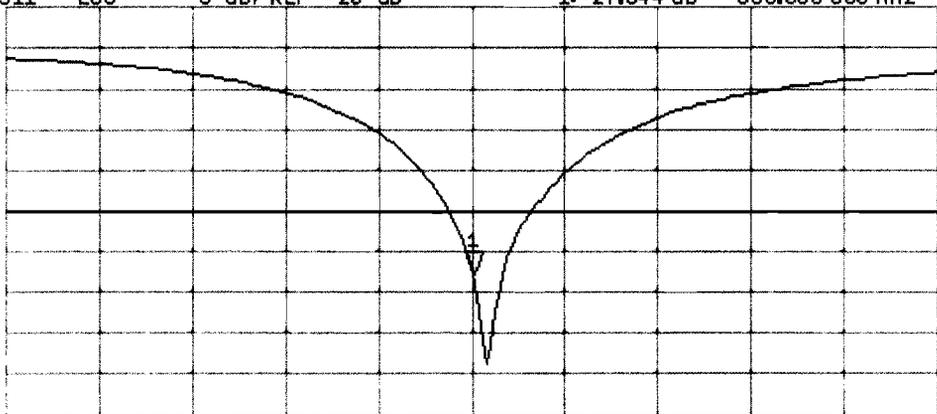
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CH2 S11 LOG 5 dB/REF -20 dB 1:-27.644 dB 835.000 000 MHz

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CENTER 835.000 000 MHz

SPAN 400.000 000 MHz