Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
LD/SEMC/BGLIM *Hamid Kami Shirazi*		*BGLI08:045*		
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGLIMC *Peter Lindeborg*	*080124*	*080124*	A	File

Report issued by Accredited SAR Laboratory

For

PY7A5025011 (W62S)

Date of test: 18th to 21st Jan. 2008

Laboratory:
SAR Test Laboratory
Sony Ericsson Mobile Communications AB
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Testing Approval
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Statement of Compliance
Sony Ericsson Mobile Communications AB declares under its sole responsibility that the product

Sony Ericsson Type AAH-5025011-BV; FCC ID: PY7A5025011; IC:4170B-5025011

to which this declaration relates, is in conformity with the appropriate RF exposure standards recommendations and guidelines. It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:
(None)

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1 Table of contents

2 Introduction

In this test report, compliance of the Sony Ericsson PY7A5025011 (W62S) 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, rear, at the middle	
Dimensions	Max length	32mm
	Max width	22mm
Configuration	PIFA	

3.2 Device description

Device model	**PY7A5025011(W62S)**		
Serial number (EUT #)	**SSODP000420#10059**		
Mode	**GSM1900**		
Crest Factor	**8.3**		
Multiple Access Scheme	**TDMA**		
Maximum Output Power Setting (dBm)	**Ch512**	**Ch661**	**Ch810**
	29.4	**29.4**	**29.4**
Factory Tolerance in Power Setting	**±0.5dB**		
Maximum Peak Output Power (dBm)	**29.9**	**29.9**	**29.9**
Data and connectivity	**GPRS Class:10 ;Crest Factor:4.16 Capability Class: B**		
Maximum Output Power Setting (dBm)	**Ch512**	**Ch661**	**Ch810**
	28.6	**28.6**	**28.6**
Factory Tolerance in Power Setting	**±0.5dB**		
Maximum Peak Output Power (dBm)	**29.1**	**29.1**	**29.1**
Transmitting Frequency Range(MHz)	**1850.2 – 1909.8**		
Prototype or Production Unit	**Preproduction (HW-FP2)**		
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 4.7, Build 53) 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	698	Mars 2008
E-field probe ETDV6	1585	Mars 2008
Dipole Validation Kit, D1900V2	5d002	Jan 2009

4.2 Additional equipment

Description	***Inventory Number***	***Due Date***
Signal generator R&S SML03	INV 20007667	March 2008
Power meter R&S NRVZ	INV 20007669	March 2008
Power sensor R&S NRV-Z5	INV 20007672	March 2008
Power sensor R&S NRV-Z5	INV 20007673	March 2008
Network analyzer HP8753C	INV421671	March 2008
S-parameter test set HP85047A	INV 421670	March 2008
Dielectric probe kit HP8507D	INV 200 000 53	Self calibrated
CMU200	INV 20002149	March 2008
Thermometer Fluke 51	INV 2071	March 2008

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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		Density
			ε_r	σ (S/m)	ρ (g/cm³)
1900	Head	**Measured,2008/01/18**	38.0	1.47	1.00
		Recommended	40.0	1.40	1.00
	Body	**Measured,2008/01/21**	54.7	1.59	1.00
		Recommended	53.3	1.52	1.00

6 System accuracy verification

A system accuracy verification of the DASY4 was performed using the dipole validation kit listed in section 4.1. Measurement made in ambient temperature 21-22 °C and humidity 40-55 %. The obtained results are displayed in the table below.

RF noise had been measured in liquid when all RF equipment in lab was set off. Measured value was 0.00002mW/g in 1g mass

f (MHz)	Tissue type	Measured / Reference	SAR (W/kg) 1g/10g	Dielectric Parameters		Density	Liquid T(°C)
				ε_r	σ (S/m)	ρ (g/cm³)	
1900	Head	**Measured,2008/01/18**	38.1/19.9	38.0	1.47	1.00	20.7
		Reference	37.4/19.8	40.0	1.40	1.00	22
	Body	**Measured,2008/01/21**	38.8/20.3	54.7	1.59	1.00	20.1
		Reference	38.6/20.6	53.3	1.52	1.00	22

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7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sonyericsson PY7A5025011 (W62S) phone According to IEEE 1528

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C_i	SAR 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
Extrapolation, 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 (measurement)	±2.5	R	1	0.64	±1.6
Liquid conductivity (target)	±5.0	R	√3	0.64	±1.8
Liquid Permittivity (measurement)	±2.5	R	1	0.6	±1.5
Liquid Permittivity (target)	±5.0	R	√3	0.6	±1.7
Phantom and Tissue Parameters Uncertainty					***±4.0***
Combined standard uncertainty					***±10.8***
Extended standard uncertainty (k=2)					***±21.6***

8 Test results

The measured 1-gram averaged SAR values of the device towards head and body are provided in tables 1 and 2. The ambient humidity and temperature of test facility were 40%-55% and 21°C–22°C respectively. The depth of tissue simulating liquids for head and body are 15.2cm and 15.1cm for 1900 band. A base station simulator was used to control the device during the SAR measurement. The phone was supplied with fully charged battery for each measurement.

For head measurement, the device was tested on the right-hand side and the left-hand side of phantom in two phone positions, cheek (touch) and tilt (cheek + 15deg). The clamshell was opened during all head measurements.

For body measurement the phone was tested on the antenna (rear) and front towards 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 W62S accessory head set.

Mode	Channel	Power (dB)	Phone Position	Liquid t (°C)	SAR (W/kg)	
					Right-hand 1g mass	Left-hand 1g mass
GSM 1900 Head	512	29.9	Cheek	20.7	**0.73**	0.67
			Tilt	20.7	-	-
	661	29.8	Cheek	20.7	0.68	0.62
			Tilt	20.7	0.10	0.08
	810	29.7	Cheek	20.7	0.69	0.56
			Tilt	20.7	-	-

Table1: SAR measurement result for Sony Ericsson PY7A5025011 (W62S) telephone at highest possible output power. The phone has measured towards head.

Mode	Channel	Power (dBm)	Phone Position	Liquid T (°C)	SAR (W/kg) in 1 g mass
GSM 1900 Body	512	29.9	Antenna to phantom PHF	20.1	0.42
		29.0	Antenna to phantom GPRS2TX	20.1	**0.66**
		29.0	Front to phantom GPRS2TX	20.1	0.11
	661	29.8	Antenna to phantom PHF	20.1	0.32
		29.0	Antenna to phantom GPRS2TX	20.1	0.55
	810	29.7	Antenna to phantom PHF	20.1	0.29
		29.0	Antenna to phantom GPRS2TX	20.1	0.48
		28.8	Front to phantom GPRS2TX	20.1	0.14

Table2: SAR measurement result for Sony Ericsson PY7A5025011 (W62S) telephone at highest possible output power. The phone has measured towards 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] 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.

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10.3 Attachment

- Probe & Dipole Calibration
- Measurement plots and system validation

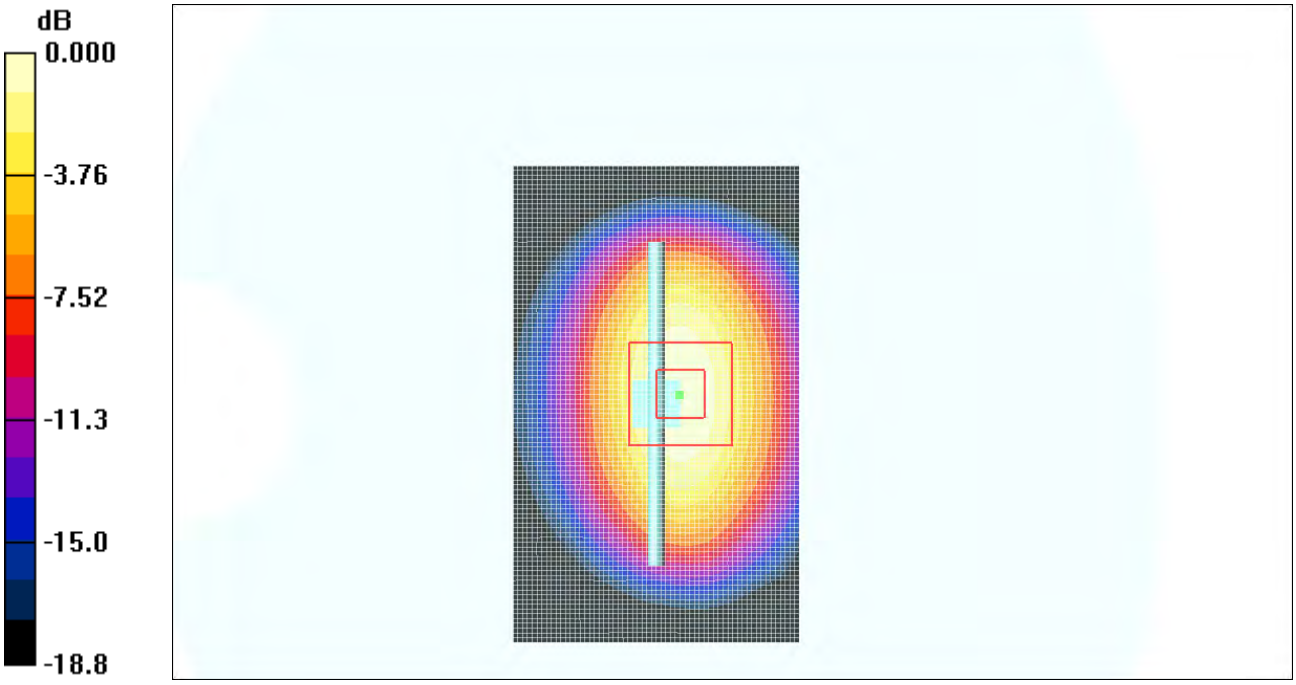
Date/Time: 2008-01-18 09:44:19

Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: SystemCheck-D1900Head.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN:5d002
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1;Communication System Channel Number: 9
Medium parameters used: f = 1900 MHz; σ = 1.47 mho/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=10mm, Pin=100mW/Area Scan (61x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 4.32 mW/g
d=10mm, Pin=100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.2 V/m; Power Drift = 0.135 dB
Peak SAR (extrapolated) = 6.59 W/kg
SAR(1 g) = 3.81 mW/g; SAR(10 g) = 1.99 mW/g
Maximum value of SAR (measured) = 4.28 mW/g



0 dB = 4.28mW/g

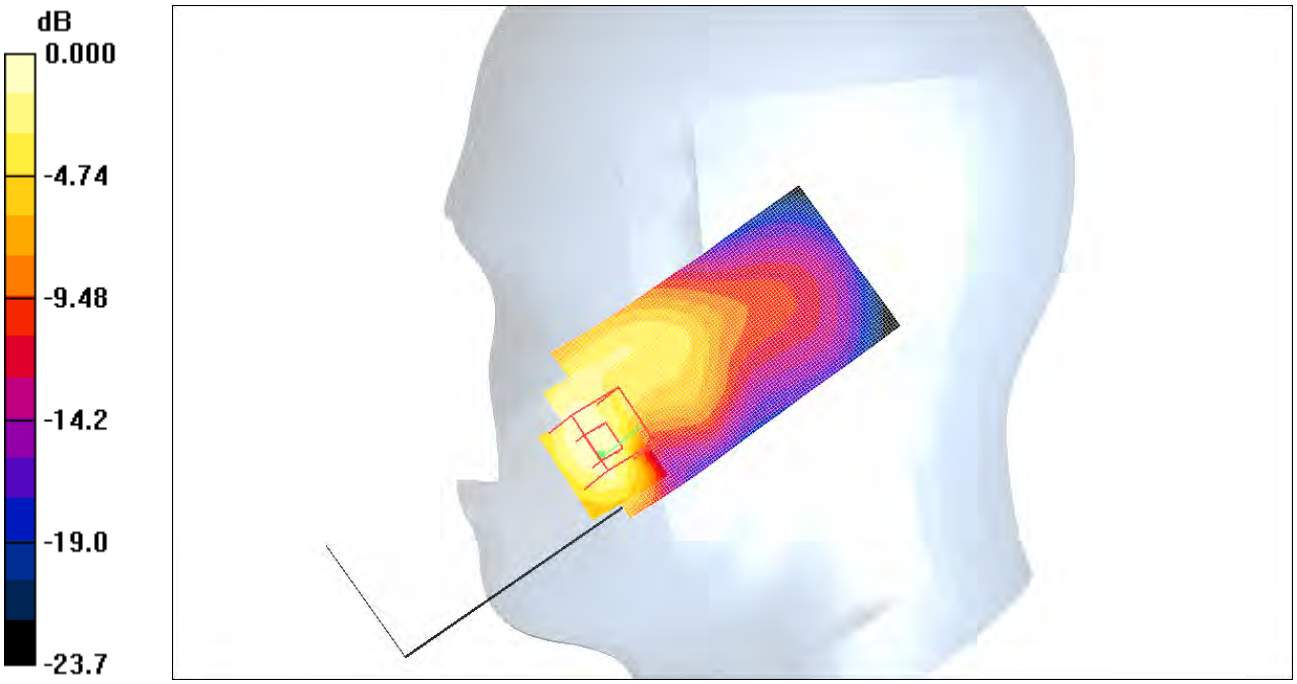
Date/Time: 2008-01-18 14:47:36

Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: RightHandSide-GSM1900.da4

DUT: #10059; Type: PY7A5025011; Serial: SSODP000420
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3;Communication System Channel Number: 512
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.44 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch position - Low 2/Area Scan (61x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.876 mW/g
Touch position - Low 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.07 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.734 mW/g; SAR(10 g) = 0.398 mW/g
Maximum value of SAR (measured) = 0.809 mW/g



0 dB = 0.809mW/g

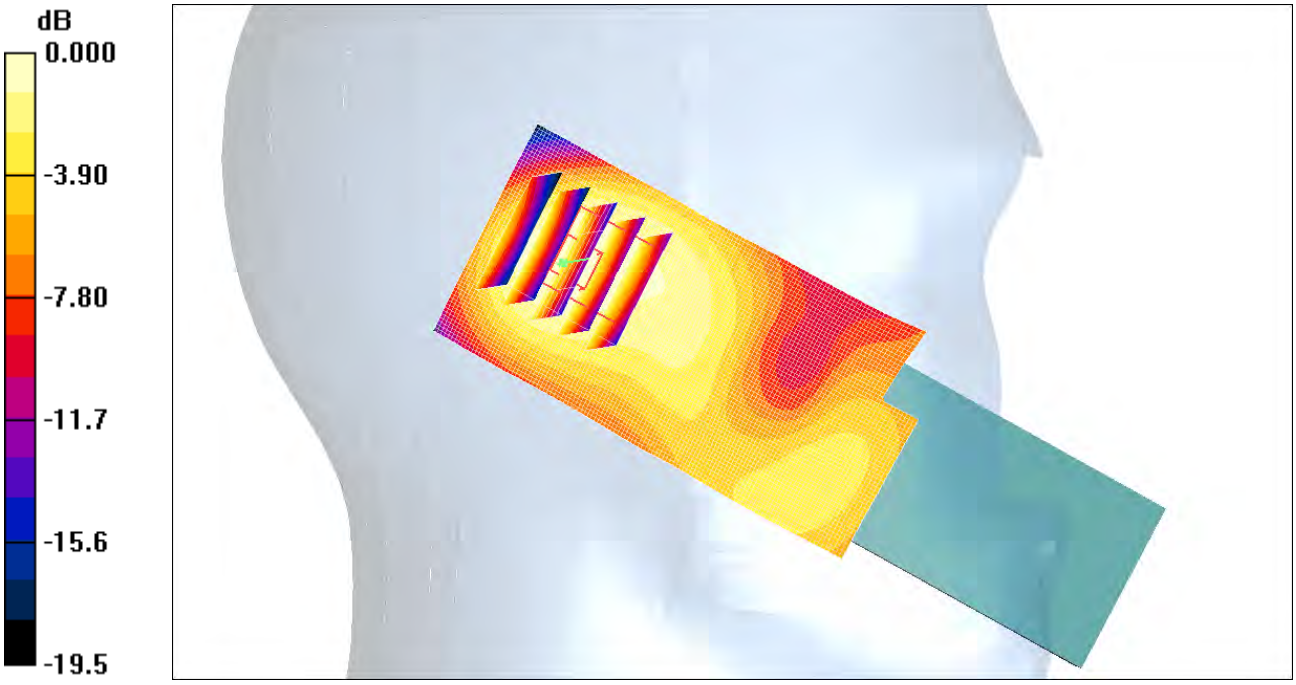
Date/Time: 2008-01-18 14:23:27

Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: LeftHandSide-GSM1900.da4

DUT: #10059; Type: PY7A5025011; Serial: SSODP000420
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3;Communication System Channel Number: 661
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Tilt position - Middle 2/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.092 mW/g
Tilt position - Middle 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.18 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 0.125 W/kg
SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.051 mW/g
Maximum value of SAR (measured) = 0.089 mW/g



0 dB = 0.089mW/g

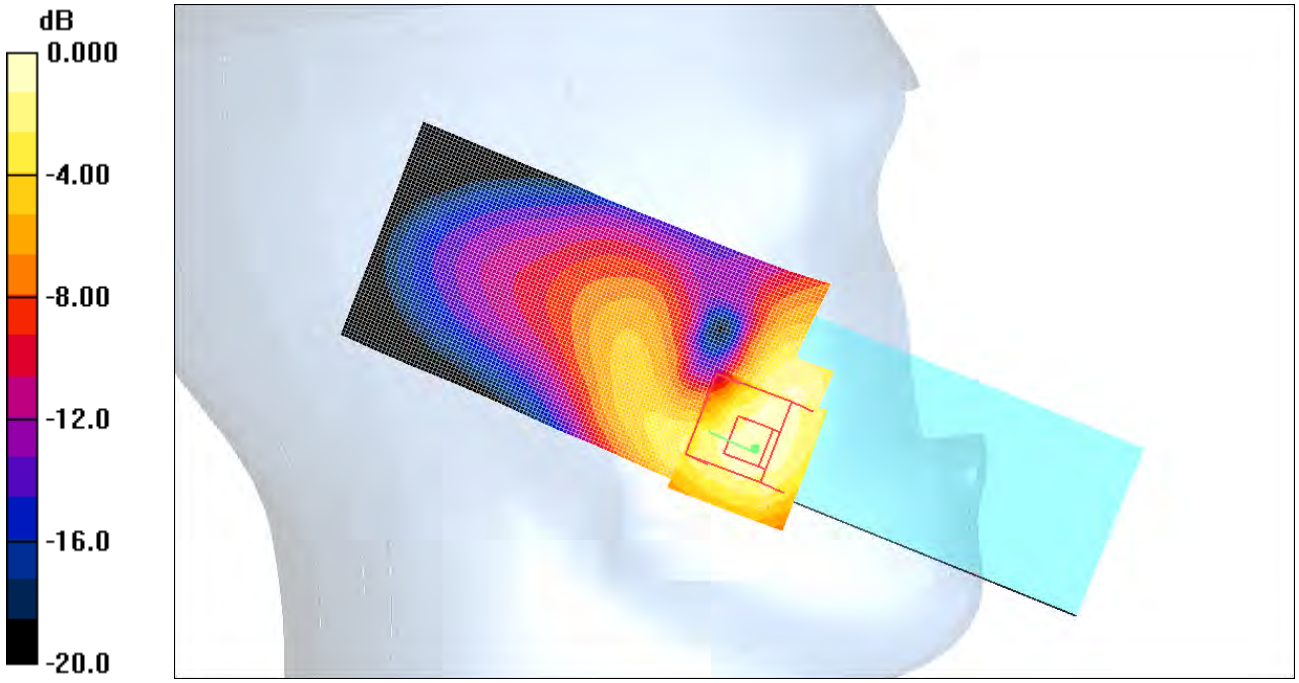
Date/Time: 2008-01-18 13:29:46

Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: LeftHandSide-GSM1900.da4

DUT: #10059; Type: PY7A5025011; Serial: SSODP000420
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3;Communication System Channel Number: 512
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.44 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Touch position - Low 2/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.753 mW/g
Touch position - Low 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.08 V/m; Power Drift = -0.100 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.669 mW/g; SAR(10 g) = 0.365 mW/g
Maximum value of SAR (measured) = 0.737 mW/g



0 dB = 0.737mW/g

Date/Time: 2008-01-18 15:44:16

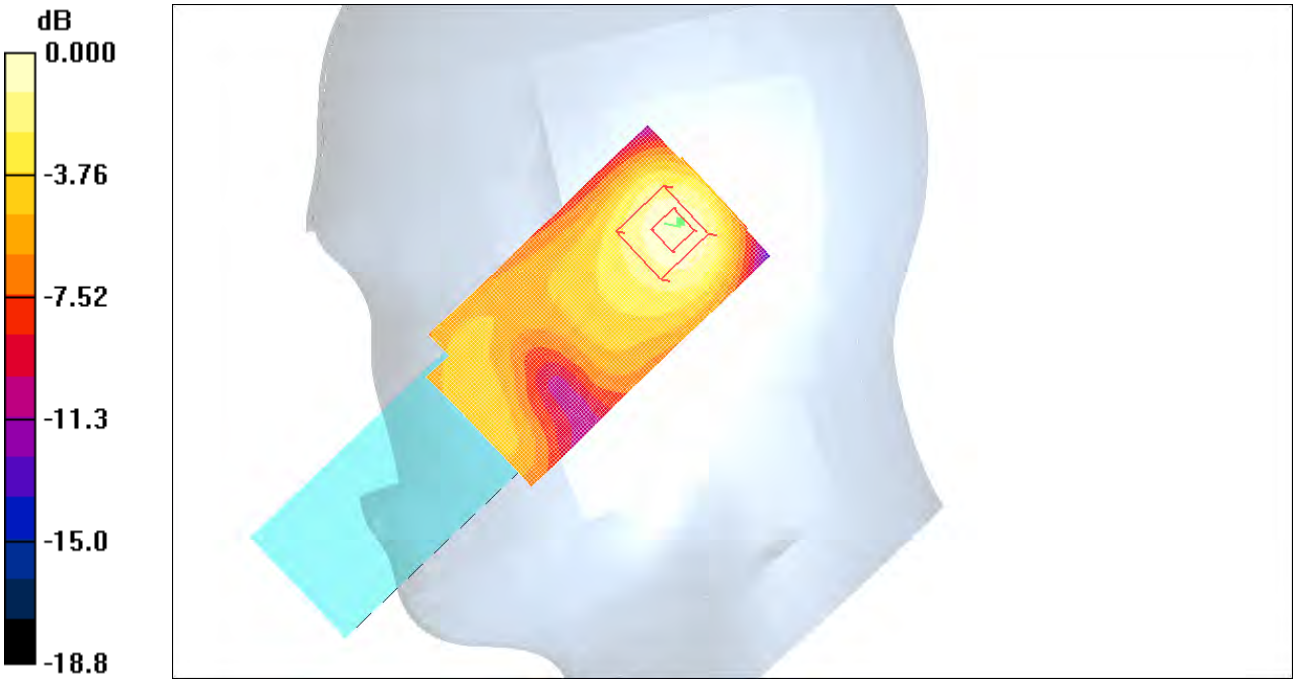
Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: RightHandSide-GSM1900.da4

DUT: #10059; Type: PY7A5025011; Serial: SSODP000420

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3;Communication System Channel Number: 661
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Tilt position - Middle 2/Area Scan (61x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.108 mW/g
Tilt position - Middle 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.93 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 0.154 W/kg
SAR(1 g) = 0.099 mW/g; SAR(10 g) = 0.058 mW/g
Maximum value of SAR (measured) = 0.109 mW/g



0 dB = 0.109mW/g

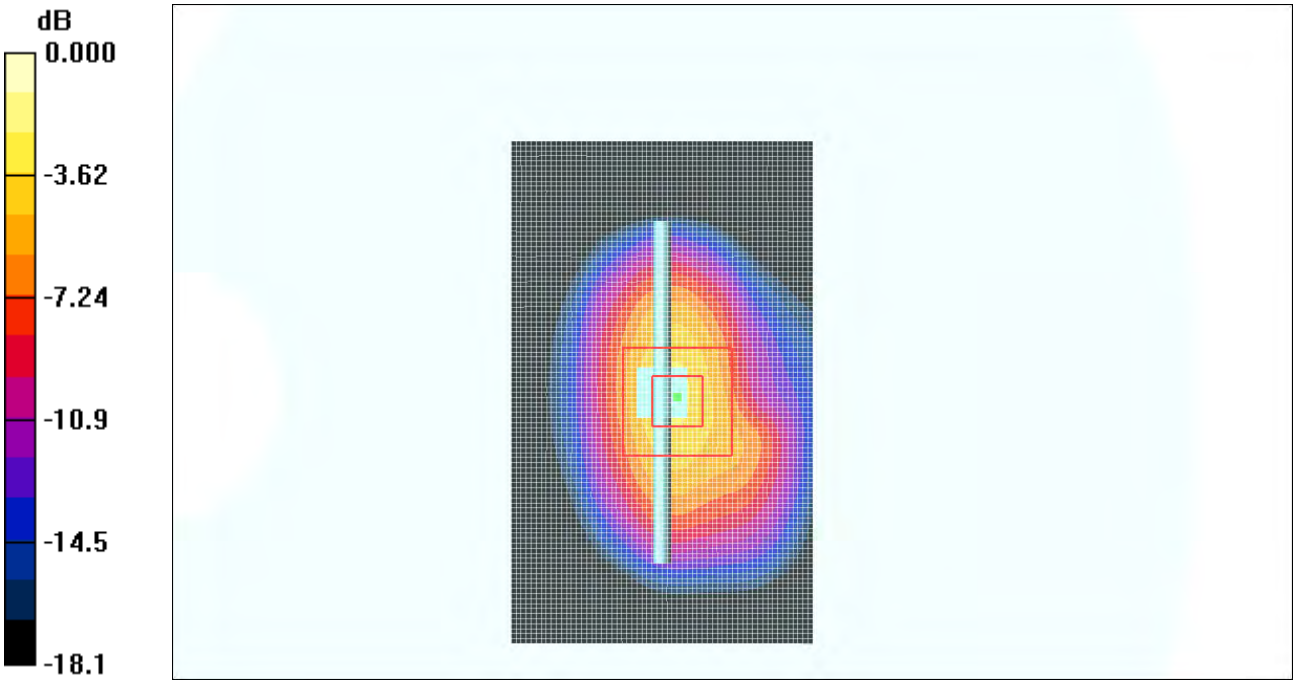
Date/Time: 2008-01-21 13:55:20

Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: SystemCheck-D1900Body.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN:5d002
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1;Communication System Channel Number: 9
Medium parameters used: f = 1900 MHz; σ = 1.59 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=10mm, Pin=100mW/Area Scan (61x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.99 mW/g
d=10mm, Pin=100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.0 V/m; Power Drift = 0.113 dB
Peak SAR (extrapolated) = 6.80 W/kg
SAR(1 g) = 3.88 mW/g; SAR(10 g) = 2.03 mW/g
Maximum value of SAR (measured) = 4.32 mW/g



0 dB = 4.32mW/g

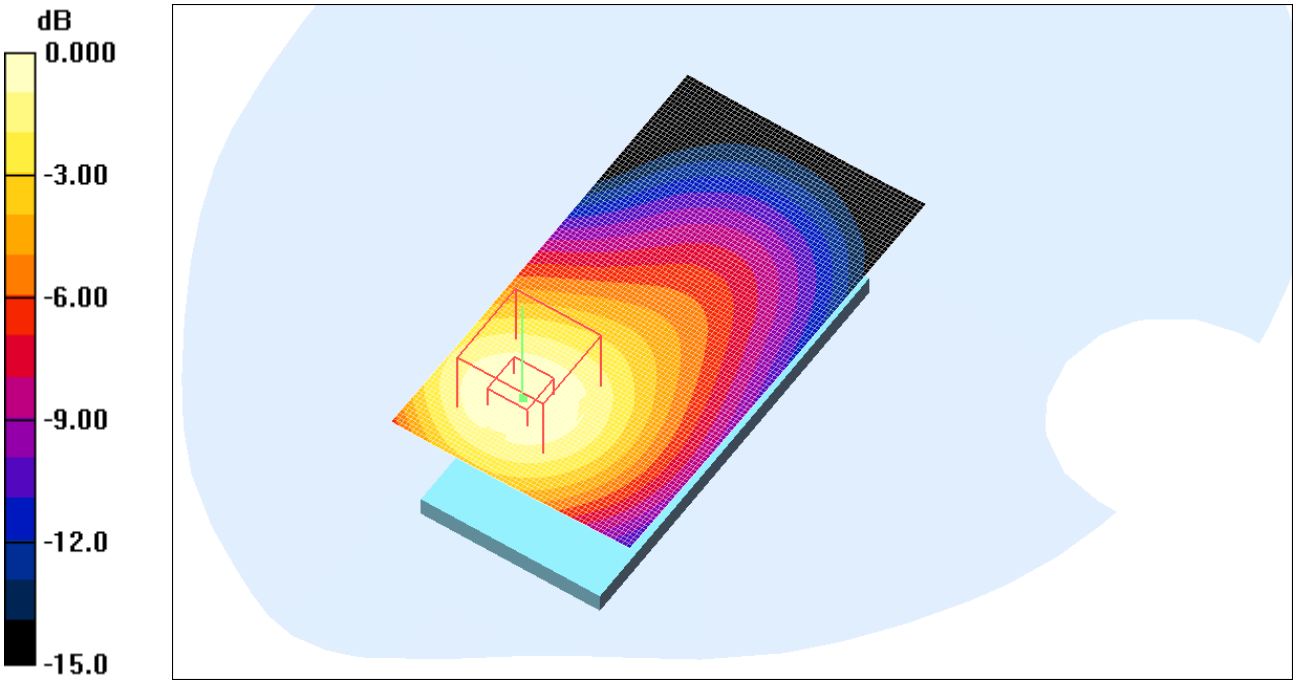
Date/Time: 2008-01-21 09:49:26

Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: Body-GSM1900-Speech.da4

DUT: #10059; Type: AAH-5025011-BV; Serial: SSODP000420
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3;Communication System Channel Number: 512
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.53 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=15mm,Back,Low ,Speech;PHF 2/Area Scan (61x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.464 mW/g
d=15mm,Back,Low ,Speech;PHF 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.65 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 0.644 W/kg
SAR(1 g) = 0.419 mW/g; SAR(10 g) = 0.261 mW/g
Maximum value of SAR (measured) = 0.452 mW/g



0 dB = 0.452mW/g

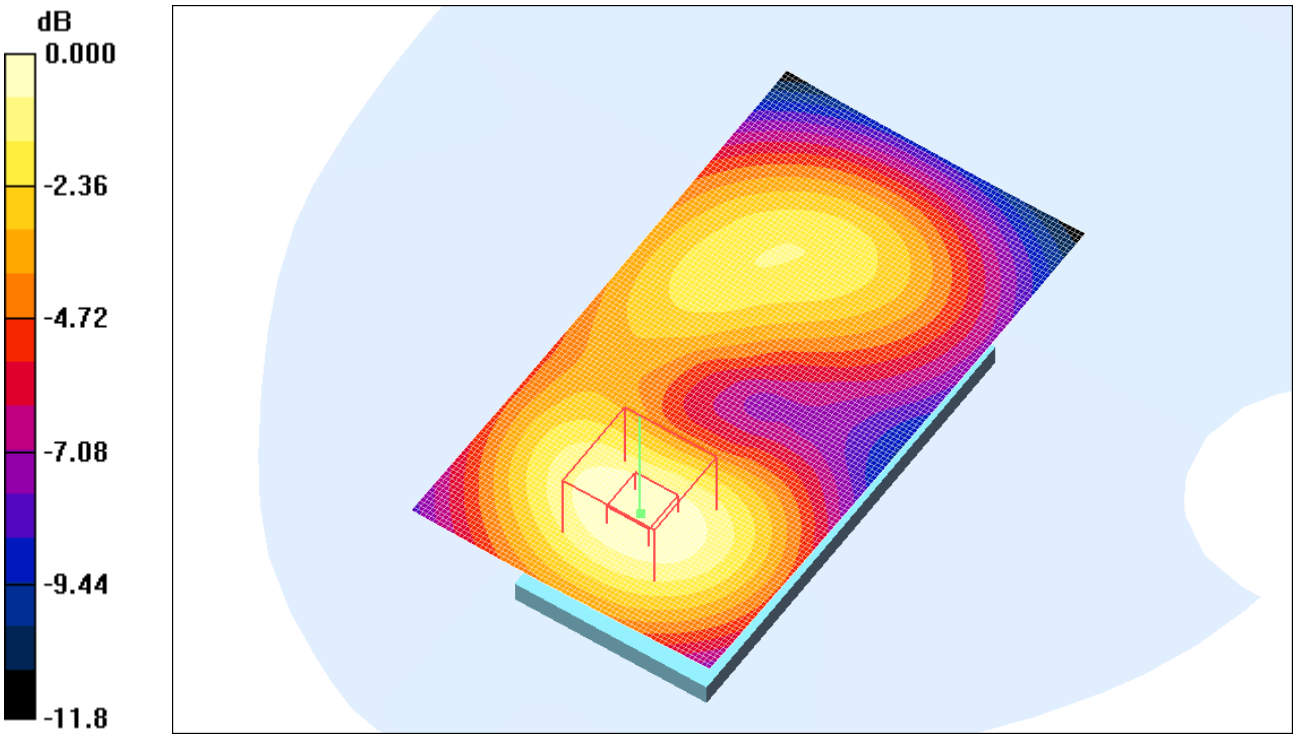
Date/Time: 2008-01-21 13:09:08

Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: Body-GSM1900-Data.da4

DUT: #10059; Type: PY7A5025011; Serial: SSODP000420
Communication System: GSM1900 GPRS2TX; Frequency: 1880 MHz;Duty Cycle: 1:4.15;Communication System Channel Number: 661
Medium parameters used: f = 1880 MHz; σ = 1.56 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=15mm,Front,Middle;GPRS2TX 2/Area Scan (71x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.152 mW/g
d=15mm,Front,Middle;GPRS2TX 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.82 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 0.221 W/kg
SAR(1 g) = 0.140 mW/g; SAR(10 g) = 0.086 mW/g
Maximum value of SAR (measured) = 0.150 mW/g



0 dB = 0.150mW/g

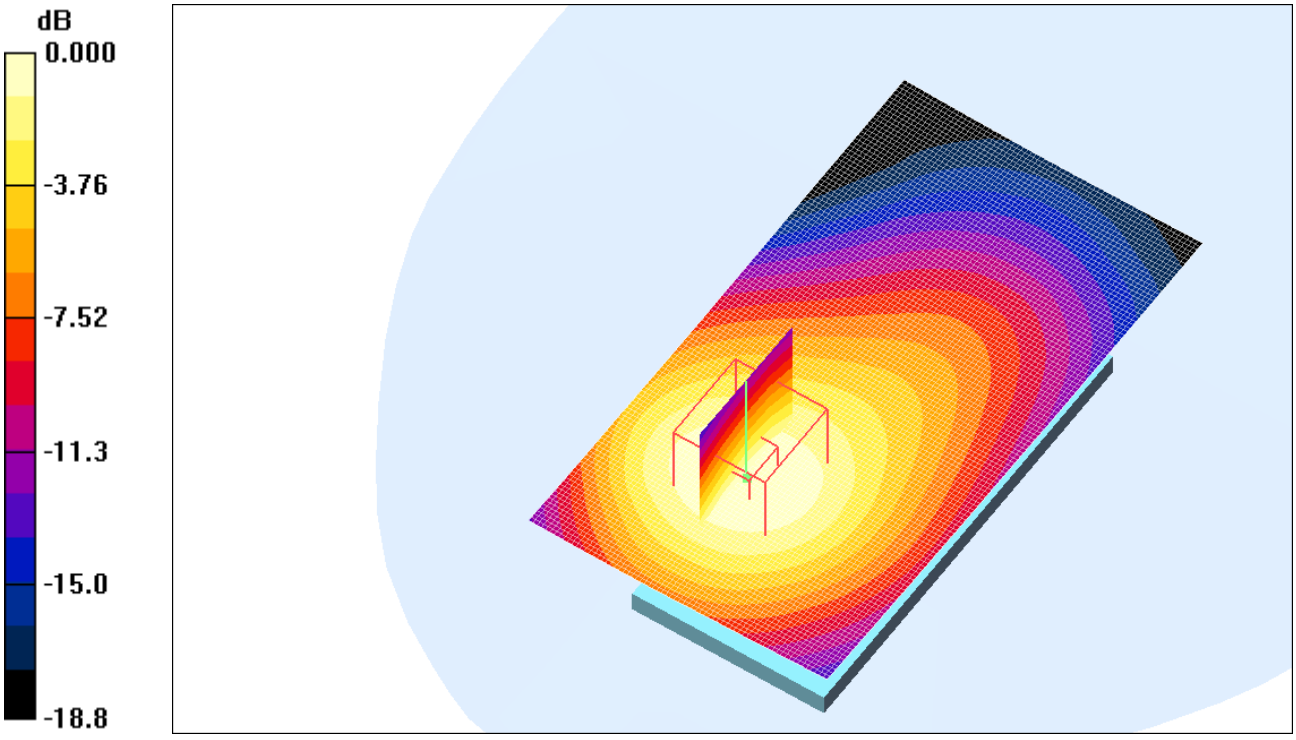
Date/Time: 2008-01-21 11:10:35

Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: Body-GSM1900-Data.da4

DUT: #10059; Type: PY7A5025011; Serial: SSODP000420
Communication System: GSM1900 GPRS2TX; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15;Communication System Channel Number: 512
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.53 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=15mm,Back,Low;GPRS2TX 2/Area Scan (71x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.711 mW/g
d=15mm,Back,Low;GPRS2TX 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.25 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.647 mW/g; SAR(10 g) = 0.406 mW/g
Maximum value of SAR (measured) = 0.705 mW/g



0 dB = 0.705mW/g

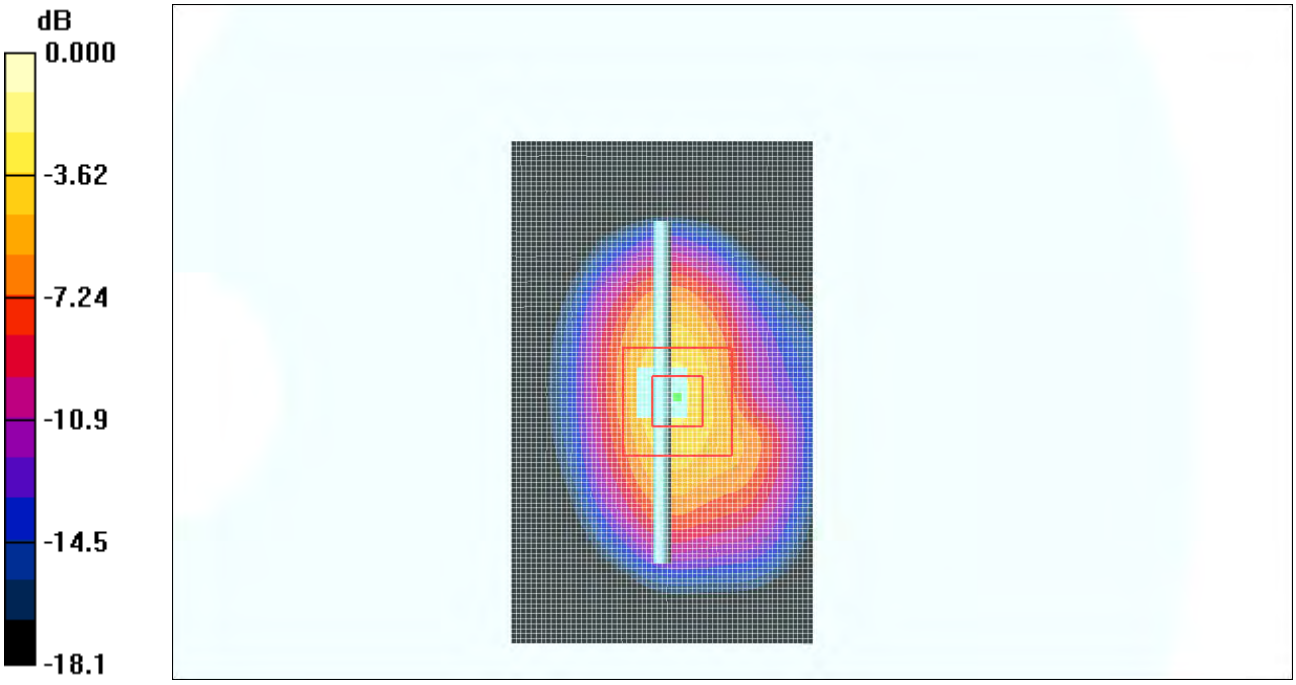
Date/Time: 2008-01-21 13:55:20

Test Laboratory: Sony Ericsson Mobile Communications AB
File Name: SystemCheck-D1900Body.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN:5d002
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1;Communication System Channel Number: 9
Medium parameters used: f = 1900 MHz; σ = 1.59 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2007-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn698; Calibrated: 2007-03-07
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=10mm, Pin=100mW/Area Scan (61x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.99 mW/g
d=10mm, Pin=100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.0 V/m; Power Drift = 0.113 dB
Peak SAR (extrapolated) = 6.80 W/kg
SAR(1 g) = 3.88 mW/g; SAR(10 g) = 2.03 mW/g
Maximum value of SAR (measured) = 4.32 mW/g



0 dB = 4.32mW/g

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
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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: D1900V2-5d002_Jan07

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d002
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	January 16, 2007
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	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6	SN: 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
Reference Probe ES3DV3	SN: 3025	19-Oct-06 (SPEAG, No. ES3-3025_Oct06)	Oct-07
DAE4	SN 907	20-Jul-06 (SPEAG, No. DAE4-907_Jul06)	Jul-07

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 Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Marcel Fehr	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 17, 2007

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	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 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 ± 0.2) °C	38.8 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.61 mW / g
SAR normalized	normalized to 1W	38.4 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**37.4 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.04 mW / g
SAR normalized	normalized to 1W	20.2 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**19.8 mW / g ± 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	51.9 ± 6 %	1.55 mho/m ± 6 %
Body TSL temperature during test	(21.1 ± 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	9.94 mW / g
SAR normalized	normalized to 1W	39.8 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**38.6 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.24 mW / g
SAR normalized	normalized to 1W	21.0 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**20.6 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	51.8 Ω - 0.3 jΩ
Return Loss	- 34.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.2 Ω + 2.3 jΩ
Return Loss	- 30.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.177 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	February 14, 2002

DASY4 Validation Report for Head TSL

Date/Time: 09.01.2007 13:35:34

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002

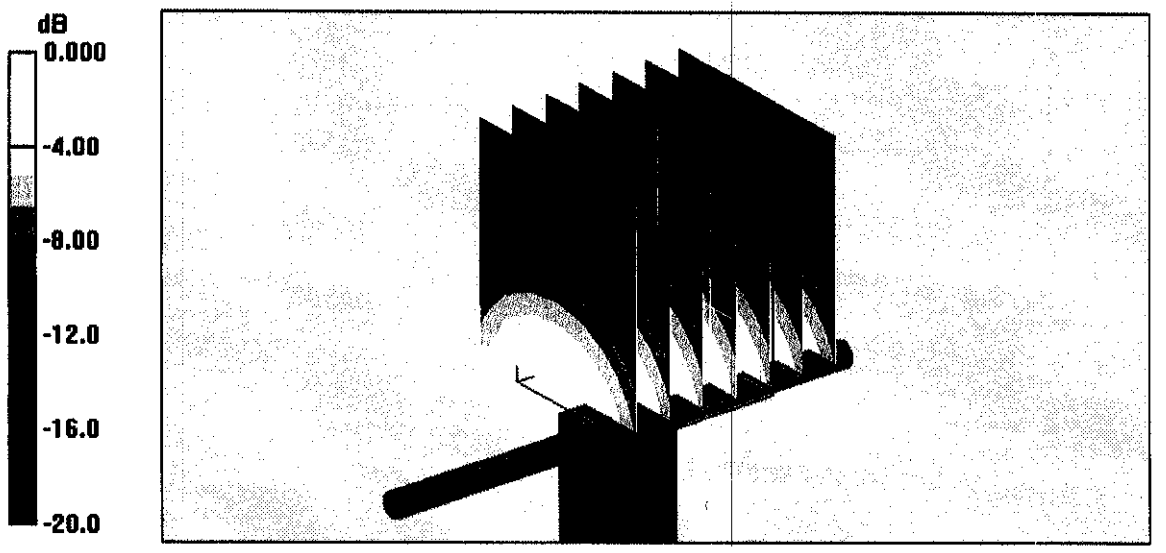
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 20.07.2006
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

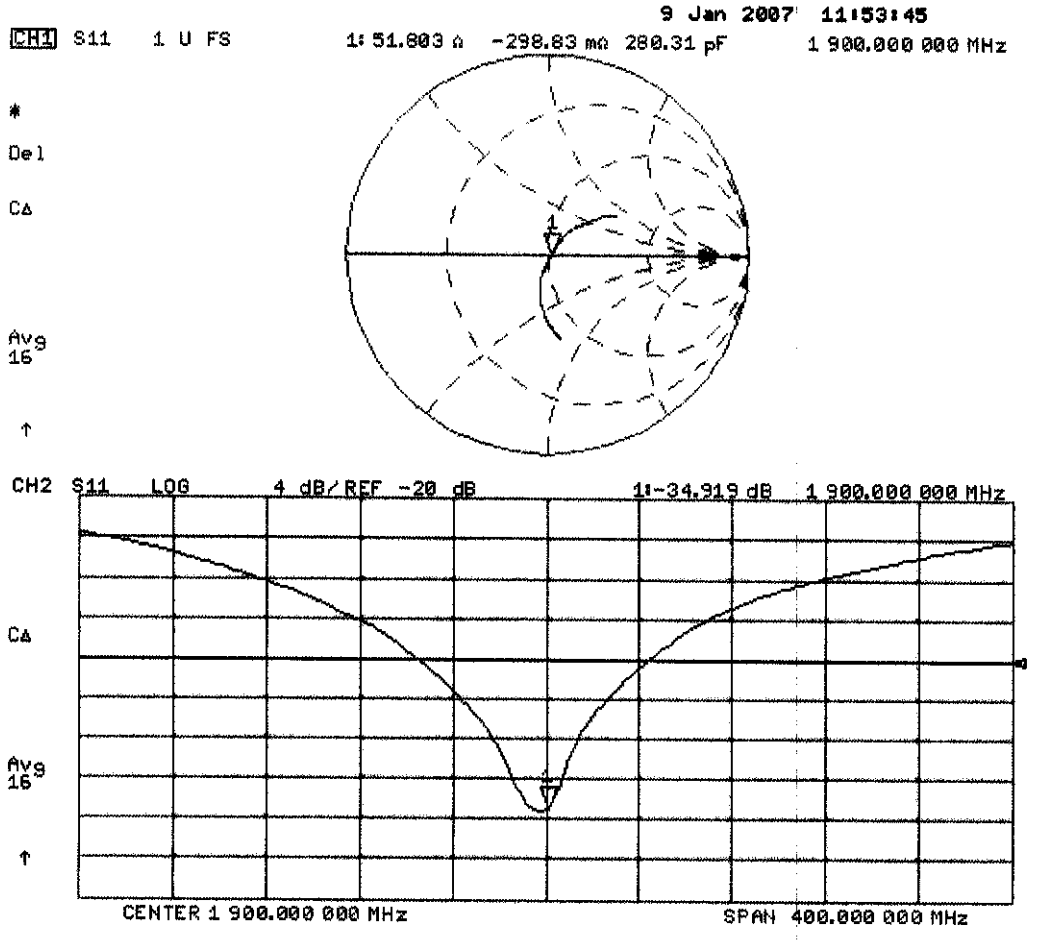
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.7 V/m; Power Drift = 0.033 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.61 mW/g; SAR(10 g) = 5.04 mW/g
Maximum value of SAR (measured) = 11.0 mW/g



0 dB = 11.0mW/g

Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 16.01.2007 15:03:08

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002

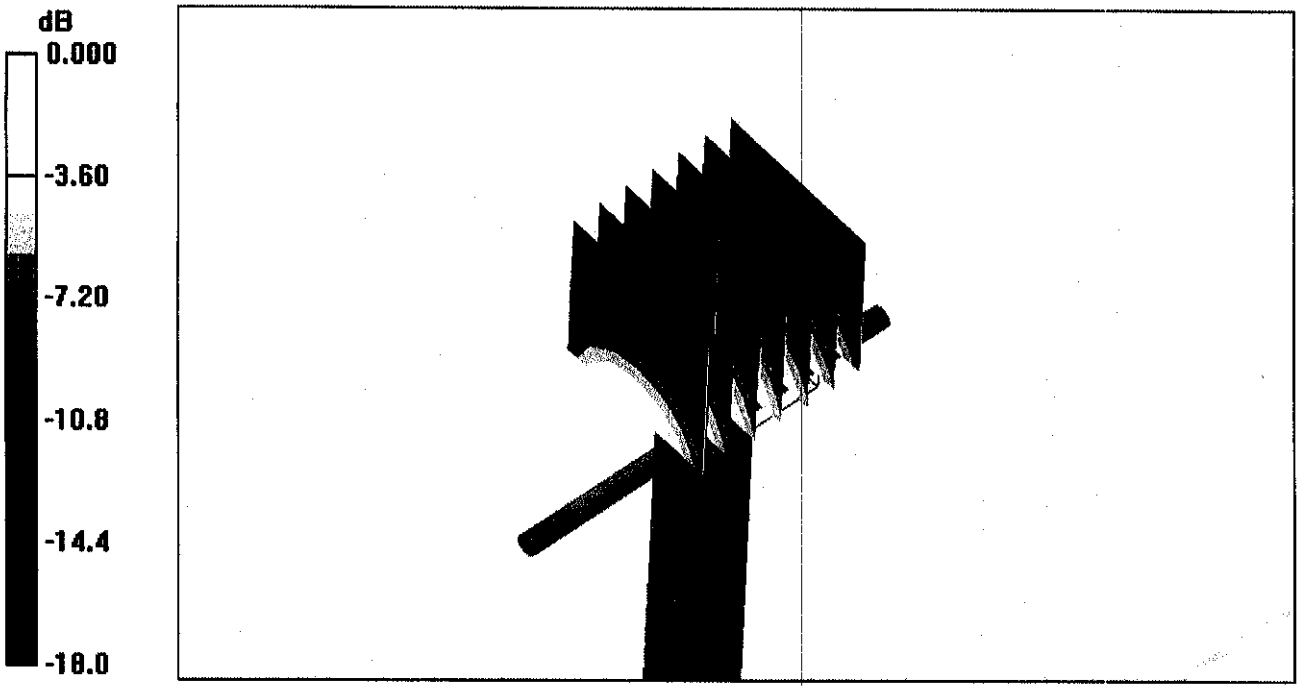
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL U10 BB;
Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.43, 4.43, 4.43); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 20.07.2006
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

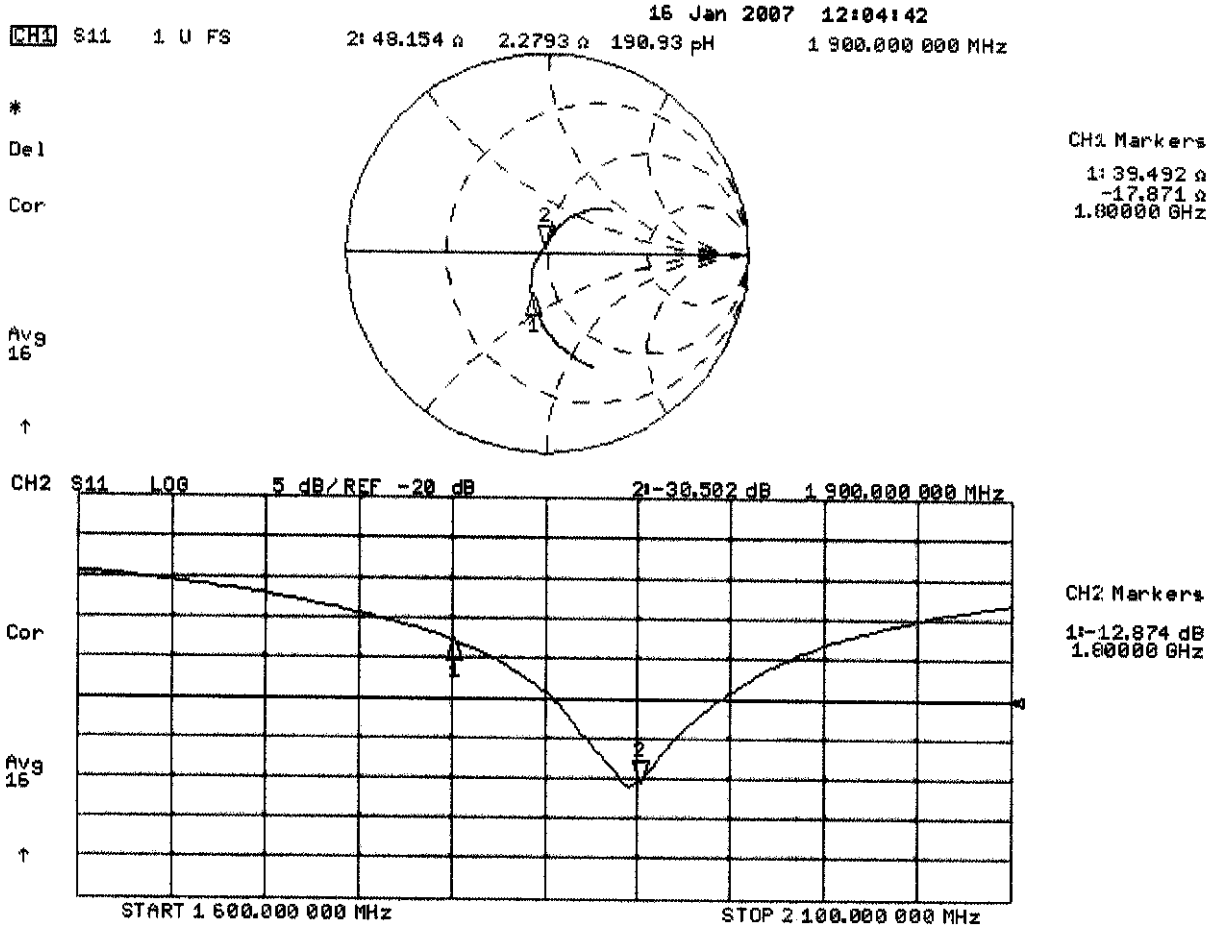
Pin = 250 mW; d = 10 mm 2/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.8 V/m; Power Drift = 0.053 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.94 mW/g; SAR(10 g) = 5.24 mW/g
Maximum value of SAR (measured) = 11.3 mW/g



0 dB = 11.3mW/g

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
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Accreditation No.: SCS 108

Client Sony Ericsson Lund — Certificate No: ET3-1585_Mar07

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1585
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	March 16, 2007
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	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41498087	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	4-Apr-06 (METAS, No. 251-00558)	Apr-07
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	21-Jun-06 (SPEAG, No. DAE4-654_Jun06)	Jun-07

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 Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Fin Bomholt	R&D Director	

Issued: March 16, 2007

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,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:

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) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,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*.
- *DCPx,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 *NORMx,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:1585

Manufactured:	May 7, 2001
Last calibrated:	March 16, 2006
Recalibrated:	March 16, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1585

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.83** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**97** mV
NormY	**1.72** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**94** mV
NormZ	**1.94** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**97** 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_{be} [%]	Without Correction Algorithm	7.8	4.0
SAR_{be} [%]	With Correction Algorithm	0.4	0.1

TSL **1750 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	12.7	8.7
SAR_{be} [%]	With Correction Algorithm	0.4	0.3

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

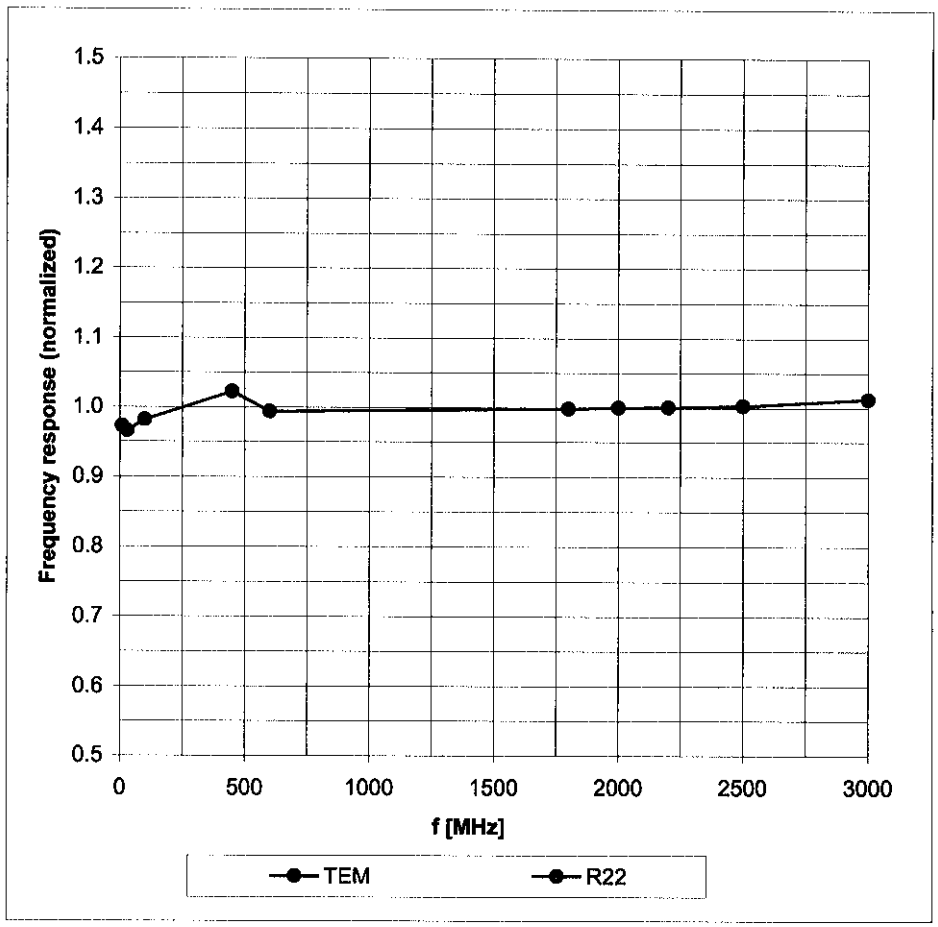
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

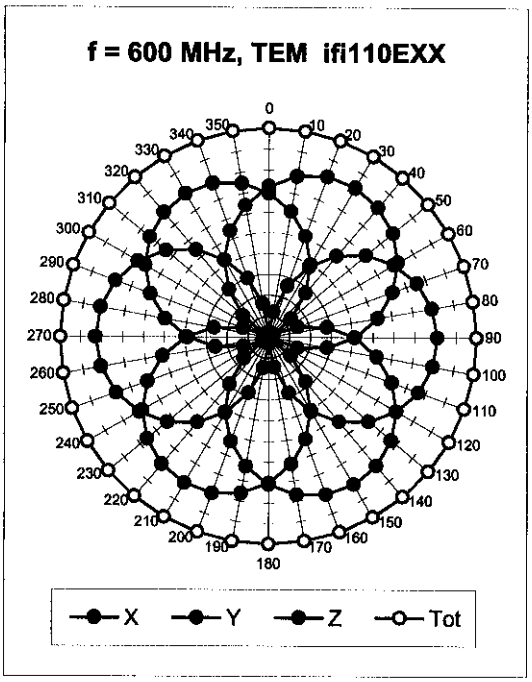
Frequency Response of E-Field

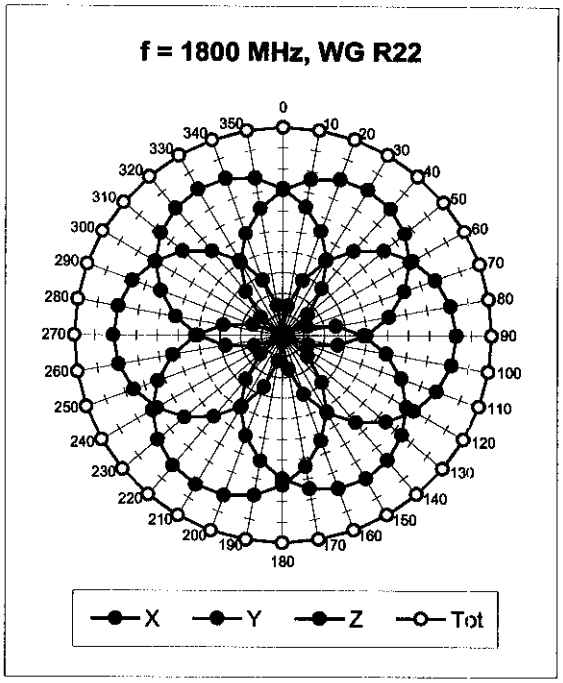
(TEM-Cell:ifi110 EXX, Waveguide: R22)

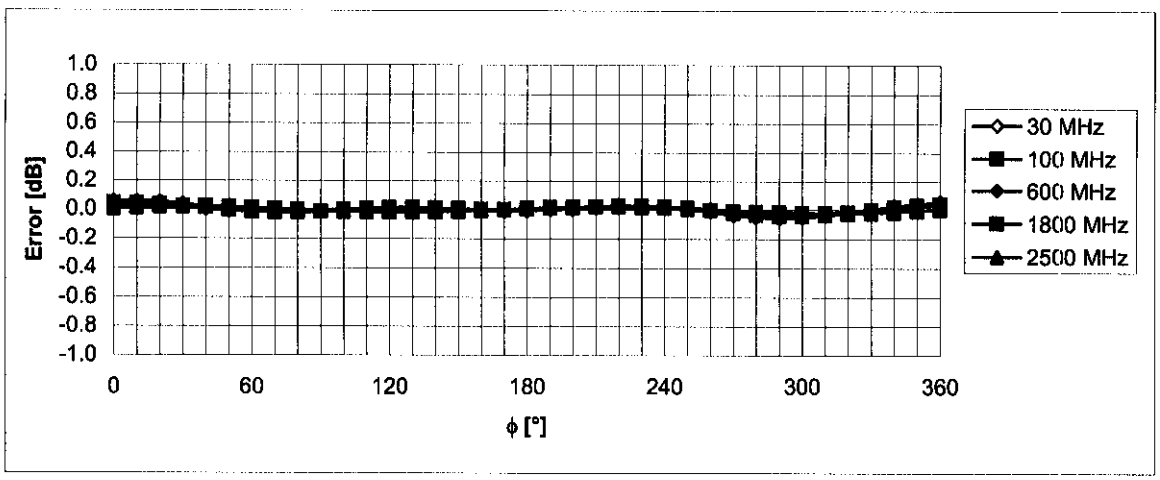


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



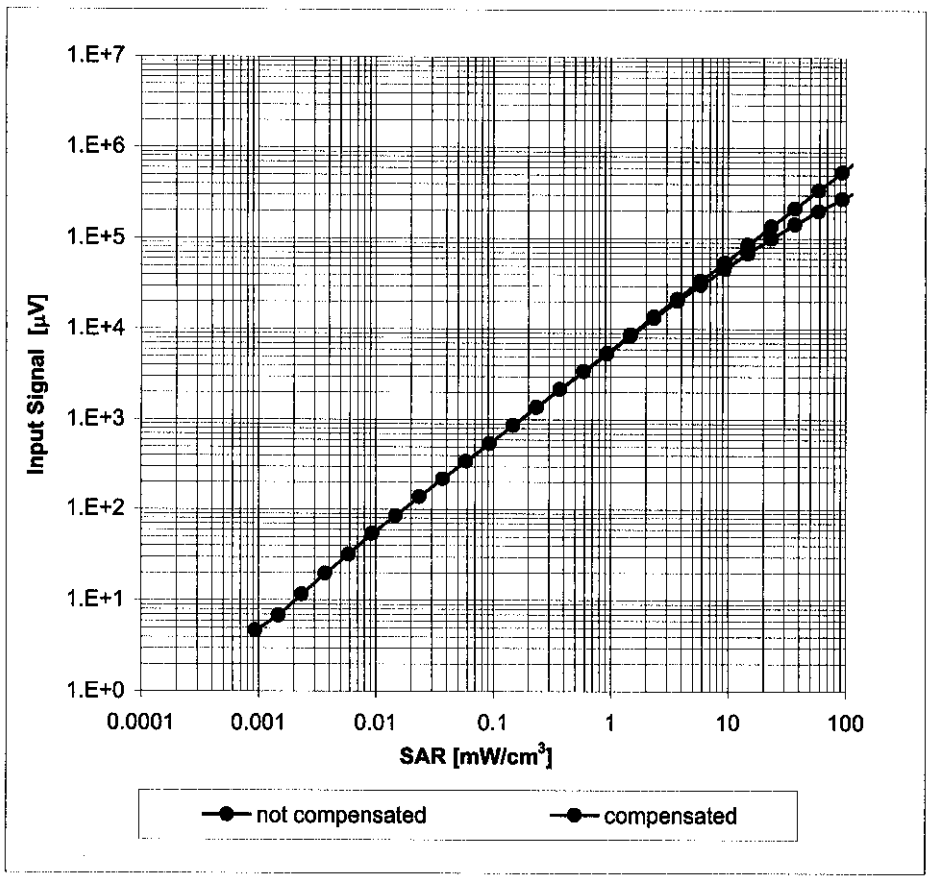


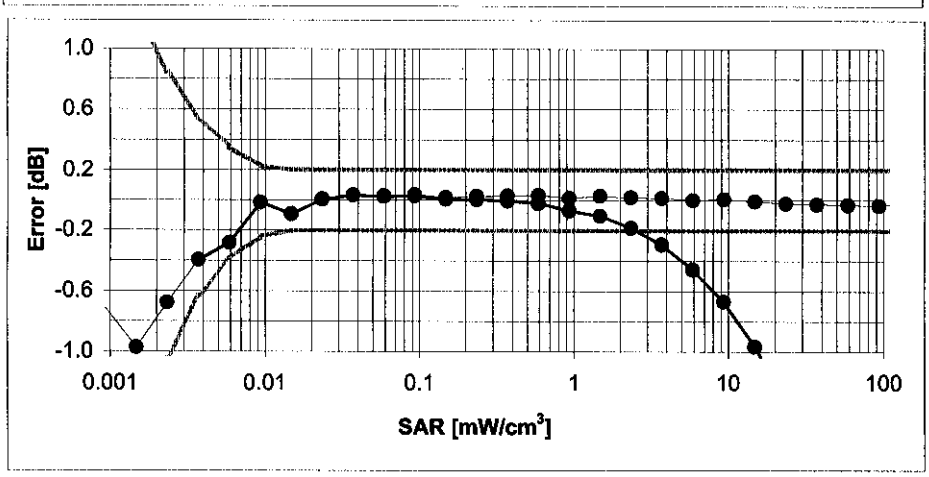


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

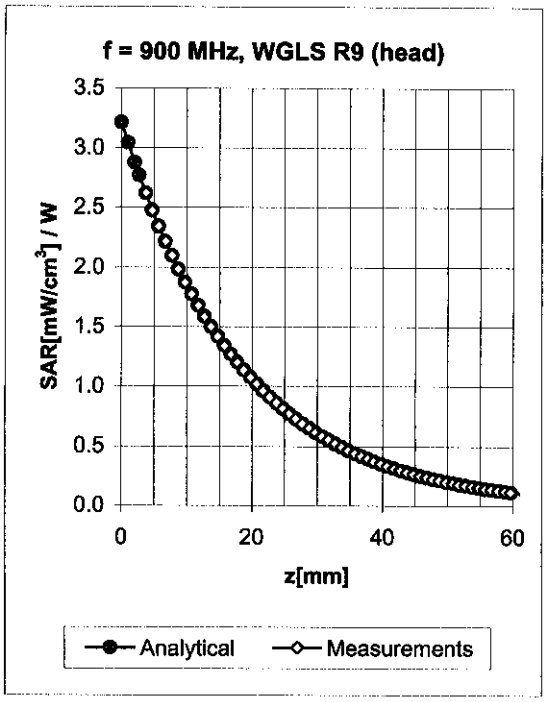
(Waveguide R22, f = 1800 MHz)

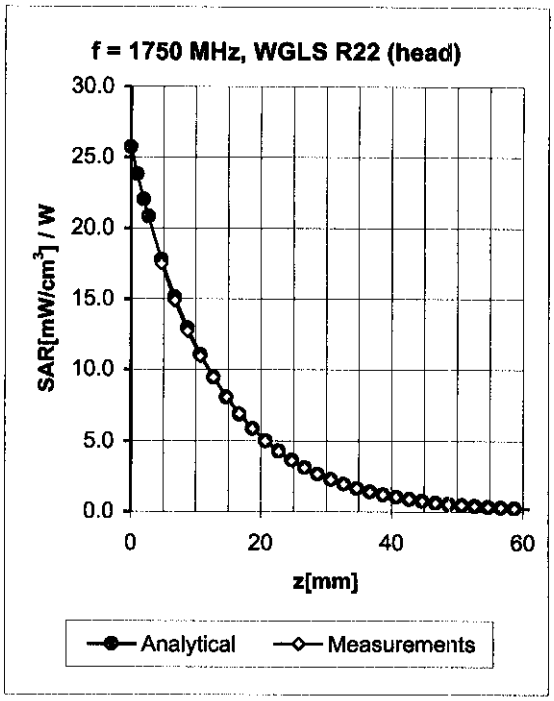




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



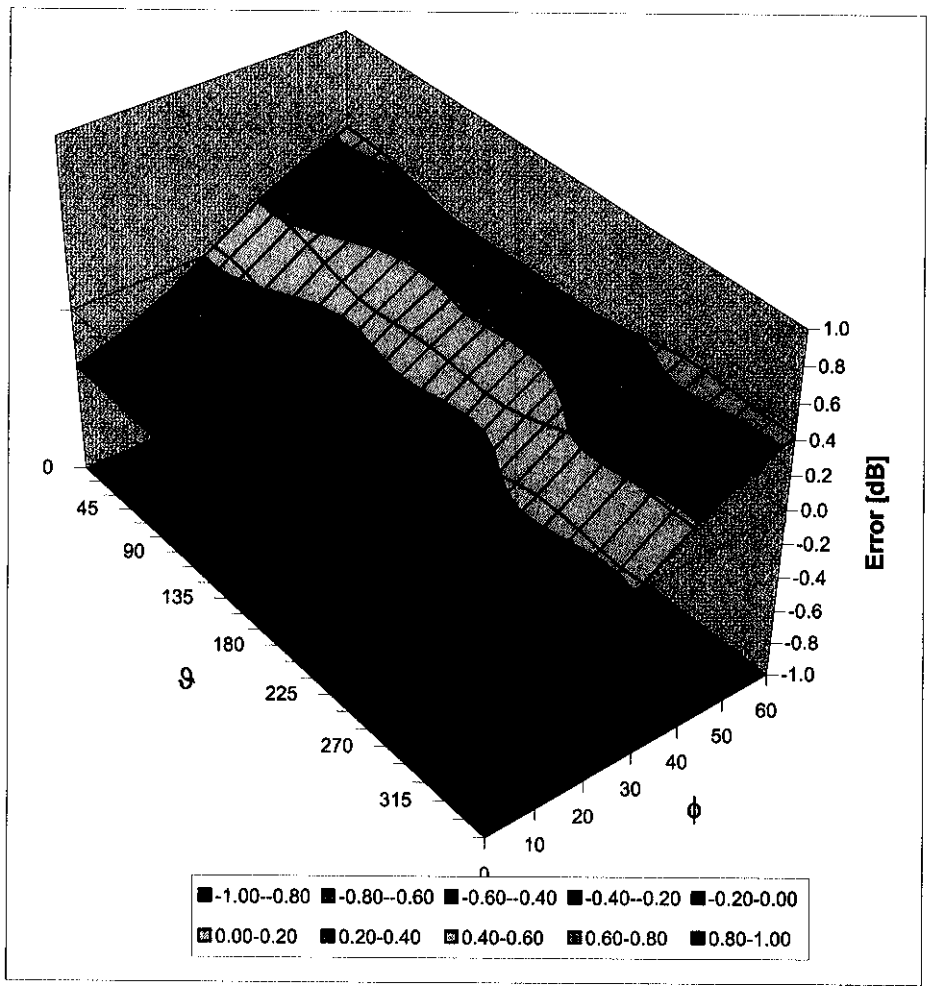


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.26	2.73	6.58	± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.26	2.84	6.30	± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.45	2.73	5.20	± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.47	2.82	5.11	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.62	2.02	4.54	± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.31	2.67	6.56	± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.33	2.73	6.18	± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.55	2.77	4.95	± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.64	2.46	4.72	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.55	2.36	4.12	± 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: ± 2.6% (k=2)