Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
LD/SEMC/BGGI/NM *Hamid Kami Shirazi*		*BGGIN06:378*		
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGGI/NM *Peter Lindeborg*	*060823*	*060822*	A	File

Report issued by Accredited SAR Laboratory

For

PY7A1022016 (Z558)

Date of test: *15, 28 Aug, 2006*

Laboratory:
Sony Ericsson SAR Test Laboratory
Sonyericsson Mobile Communications AB
Nya Vattentornet
SE-221 82 LUND, Sweden

Testing Engineer:
Hamid Kami Shirazi
Kami.shirazi@sonyericsson.com
+46 46232644

Testing Approval
Peter Lindeborg
Peter lindeborg@sonyericsson.com
+ 46 (0) 46 212 61 80

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

Sony Ericsson Type AAB-1022016-BV; FCC ID: PY7A1022016; IC:4170B-A1022016

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 PY7A1022016 (Z558) 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 middle of phone	
Dimensions	Max length	38mm
	Max width	16mm
Configuration	PIFA	

3.2 Device description

Device model	**PY7A1022016(Z558)**		
Serial number	**CB510905NY**		
Mode	**GSM1900**		
Crest Factor	**8.3**		
Multiple Access Scheme	**TDMA**		
Maximum Output Power Setting	**Ch512**	**Ch661**	**Ch810**
(dBm)	**30.0**	**30.0**	**30.0**
Factory Tolerance in Power Setting	**±0.5dB**		
Maximum Peak Output Power (dBm)	**30.5**	**30.5**	**30.5**
Mode	**GSM1900-GPRS2TX**		
Maximum Output Power Setting	**Ch512**	**Ch661**	**Ch810**
dBm	**30.0**	**30.0**	**30.0**
Factory Tolerance in Power Setting	**±0.5dB**		
Maximum Peak Output Power (dBm)	**30.5**	**30.5**	**30.5**
Transmitting Frequency Range(MHz)	**1850.2 – 1909.8**		
Prototype or Production Unit	**Preproduction**		
Device Category	**Portable**		
RF exposure environment	**General population / uncontrolled**		

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4 Test equipment

4.1 Dosimetric system

SAR measurements were made using the DASY4 professional system (software version 4.6, Build 23/7) with SAM twin phantom, manufactured by Schmid & Partner Engineering AG (SPEAG). The list of calibrated equipment is given below.

Description	***Serial Number***	***Due Date***
DASY3 DAE V1	419	March 2007
E-field probe ETDV6	1585	March 2007
Dipole Validation Kit, D1900V2	5d002	March 2007

4.2 Additional equipment

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

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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/cm³)
1900	Head	**Measured, 16/Aug/2006**	38.3	1.47	1.00
		Recommended	40.0	1.40	1.00
	Body	**Measured, 15/Aug/2006**	51.7	1.55	1.00
		Recommended	53.3	1.52	1.00

6 System accuracy verification

A system accuracy verification of the DASY4 was performed using the dipole validation kit listed in section 3.1. Measurement made in ambient temperature (22-23) °C and humidity (35-45) %. The obtained results are displayed in the table below.

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

f (MHz)	Tissue type	Measured / Reference	SAR (W/kg) 1g/10g	Dielectric Parameters			Liquid t(°C)
				ε_r	σ (S/m)	ρ (g/cm³)	
1900	Head	**Measured, 16/Aug/2006**	40.0/20.7	38.3	1.47	1.00	22±0.2
		Reference	39.2/20.6	39.6	1.45	1.00	22±0.2
	Body	**Measured, 15/Aug/2006**	41.4/21.8	51.7	1.55	1.00	22±0.2
		Reference	39.6/20.9	51.6	1.58	1.00	22±0.2

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LD/SEMC/BGGI/NM *Peter Lindeborg*	*060823*	*060822*	A	File

7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sonyericsson PY7A1022016 (Z558) phone

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C_i	GSM 1900-Head	GSM 1900-Body
Measurement System						
Probe Calibration	±4.8	N	1	1	±4.8	±4.8
Axial Isotropy	±4.7	R	√3	0.7	±1.9	±1.9
Spherical Isotropy	±9.6	R	√3	0.7	±3.9	±3.9
Boundary effect	±1.0	R	√3	1	±1.0	±1.0
Probe linearity	±4.7	R	√3	1	±2.7	±2.7
Detection limit	±1.0	R	√3	1	±0.6	±0.6
Readout electronics	±1.0	N	1	1	±1.0	±1.0
Response time	±0.8	R	√3	1	±0.5	±0.5
Integration time	±1.4	R	√3	1	±0.8	±0.8
RF Ambient Conditions	±3.0	R	√3	1	±1.7	±1.7
Mech. Constraints of robot	±0.4	R	√3	1	±0.2	±0.2
Probe positioning	±2.9	R	√3	1	±1.7	±1.7
Extrap, interpolation and integration	±3.9	R	√3	1	±2.3	±2.3
Measurement System Uncertainty					***±8.0***	***±8.0***
Test Sample Related						
Device positioning	±3.5	N	1	1	±3.5	±3.5
Device holder uncertainty	±3.5	N	1	1	±3.5	±3.5
Power drift	±(1.0/2.3)	R	√3	1	±0.6	±1.3
Test Sample Related Uncertainty					***±5.0***	***±5.1***
Phantom and Tissue Parameters						
Phantom uncertainty	±4.0	R	√3	1	±2.3	±2.3
Liquid conductivity (measurement)	±(5.0/2.0)	N	1	0.64	±3.2	±1.3
Liquid conductivity (target)	±5.0	R	√3	0.64	±1.8	±1.8
Liquid Permittivity (measurement)	±(4.3/3.0)	N	1	0.6	±2.6	±1.8
Liquid Permittivity (target)	±5.0	R	√3	0.6	±1.7	±1.7
Phantom and Tissue Parameters Uncertainty					***±5.3***	***±4.1***
Combined standard uncertainty					***±10.8***	***±10.3***
Extended standard uncertainty (k=2)					***±21.6***	***±20.6***

8 Test results

The measured 1-gram averaged SAR values of the device against head and body are provided in tables1 and 2. The ambient humidity and temperature of test facility were 35%-45% and 22°C–23°C respectively. The depth of tissue simulating liquid for head and body are 15.1 cm and 15cm. A base station simulator was used to control the device during the SAR measurement. The phone was supplied with full-charged battery for each measurement.

For head measurement, the device was tested on the right-hand phantom (corresponding to the right side of the head) and the left-hand phantom in two phone position, cheek (touch) and tilt (cheek + 15deg).

For body measurement phone was tested on the antenna (back) and Front against flat section of phantom with 15mm distance in both speech and Data (GPRS) mode. For all modes, the device was tested at the lowest, middle and highest frequencies in the transmit band. For Hands free used Sony Ericsson head set (HPB-60) and for Blue Tooth phone was pared with Sony Ericsson HBH-60 Blue Tooth accessory and measured on worst case speech mode and for body.

Mode	Channel	Power (dB)	Phone Position	Liquid t (°C)	SAR (W/kg)	
					Right-hand	Left-hand
					1g mass	1g mass
1900 GSM Head	512	30.5	**Cheek**	22±0.2	0.71	0.94
			Tilt	22±0.2	0.38	0.38
	661	30.5	**Cheek**	22±0.2	0.76	1.01
			Tilt	22±0.2	0.36	0.42
	810	30.5	**Cheek**	22±0.2	0.73	**1.15**
			Tilt	22±0.2	0.36	0.42

Table1: SAR measurement result for Sony Ericsson PY7A1022016 (Z558) telephone at highest possible output power. The phone has measured against head.

Mode	Channel	Power (dBm)	Phone Position	Liquid t (°C)	SAR (W/kg) in 1 g mass
GSM 1900 Body	512	30.5	**Antenna to phantom Blue Tooth**	22±0.2	0.14
			Antenna to phantom GPRS2TX	22±0.2	0.26
	661	30.5	**Antenna to phantom Blue Tooth**	22±0.2	0.16
			Antenna to phantom GPRS2TX	22±0.2	0.31
	810	30.5	**Antenna to phantom Blue Tooth**	22±0.2	**0.22**
			Antenna to phantom Hands Free	22±0.2	**0.22**
			Antenna to phantom GPRS2TX	22±0.2	0.51
			Front to phantom GPRS2TX	22±0.2	0.16

Table2: SAR measurement result for Sony Ericsson PY7A1022016 (Z558) telephone at highest possible output power. The phone has measured against the Body.

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LD/SEMC/BGGI/NM *Peter Lindeborg*	*060823*	*060822*	A	File	

9 References

[1] R.Plicanic, “SAR Measurement Specification of Wireless Handsets”, Sony Ericsson SAR Test Laboratory internal document GUG/N 03:141

[2] Basic standard for the Measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300MHz-3GHz), European Standard EN 50361, July 2001

[3] FCC, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radio Frequency Emissions,” Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01).

[4] IEEE, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques,” STD 1528-2003, June, 2003.

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10 Appendix

10.1 Photographs of the device under test

Phone Close

Phone Open

Front & Back side

Back with Battery

down Connector

Sides

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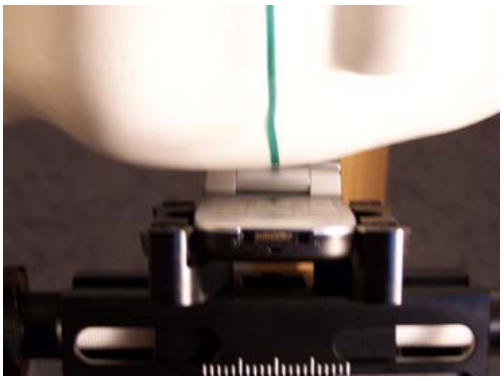
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGGI/NM *Peter Lindeborg*	*060823*	*060822*	A	File

10.2 Device position on SAM Twins Phantom



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

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

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

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Approved		Checked	Date	Rev	Reference
LD/SEMC/BGGI/NM	*Peter Lindeborg*	*060823*	*060822*	A	File

10.3 Attachment

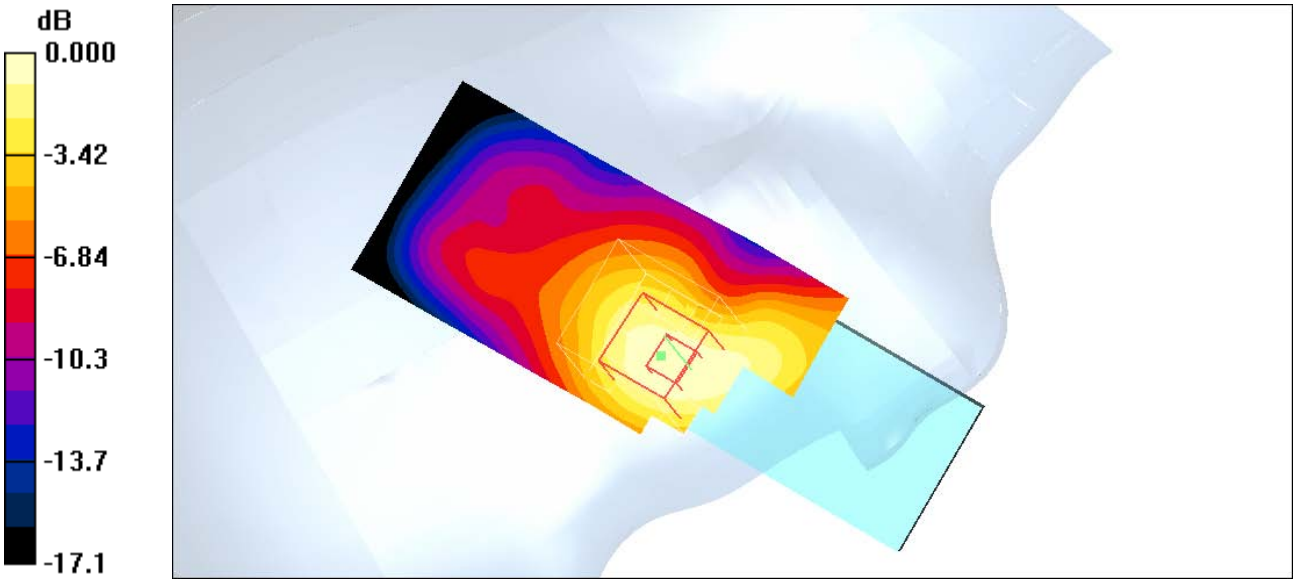
- Probe & Dipole Calibration
- Measurement plots and system validation
- Annex

Date/Time: 2006-08-16 11:51:30

Test Laboratory: Sony Ericsson Mobile Communications AB
DUT: #5549; Type: PY7A1022016; Serial: CB510905NY
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2006-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Touch position - Middle/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.850 mW/g
Touch position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.27 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.764 mW/g; SAR(10 g) = 0.450 mW/g
Maximum value of SAR (measured) = 0.826 mW/g



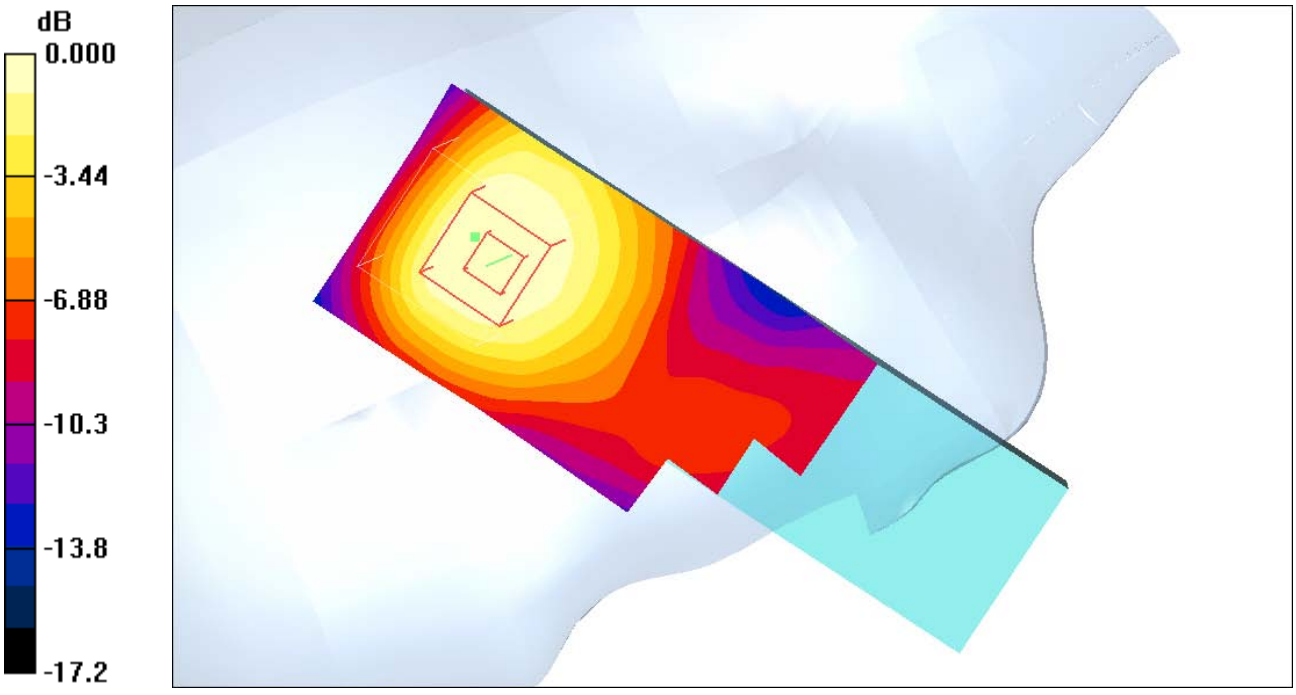
0 dB = 0.826mW/g

Date/Time: 2006-08-16 13:48:02

Test Laboratory: Sony Ericsson Mobile Communications AB
DUT: #5549; Type: PY7A1022016; Serial: CB510905NY
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.42 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2006-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Tilt position - Low/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.447 mW/g
Tilt position - Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.8 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 0.537 W/kg
SAR(1 g) = 0.380 mW/g; SAR(10 g) = 0.247 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.404 mW/g



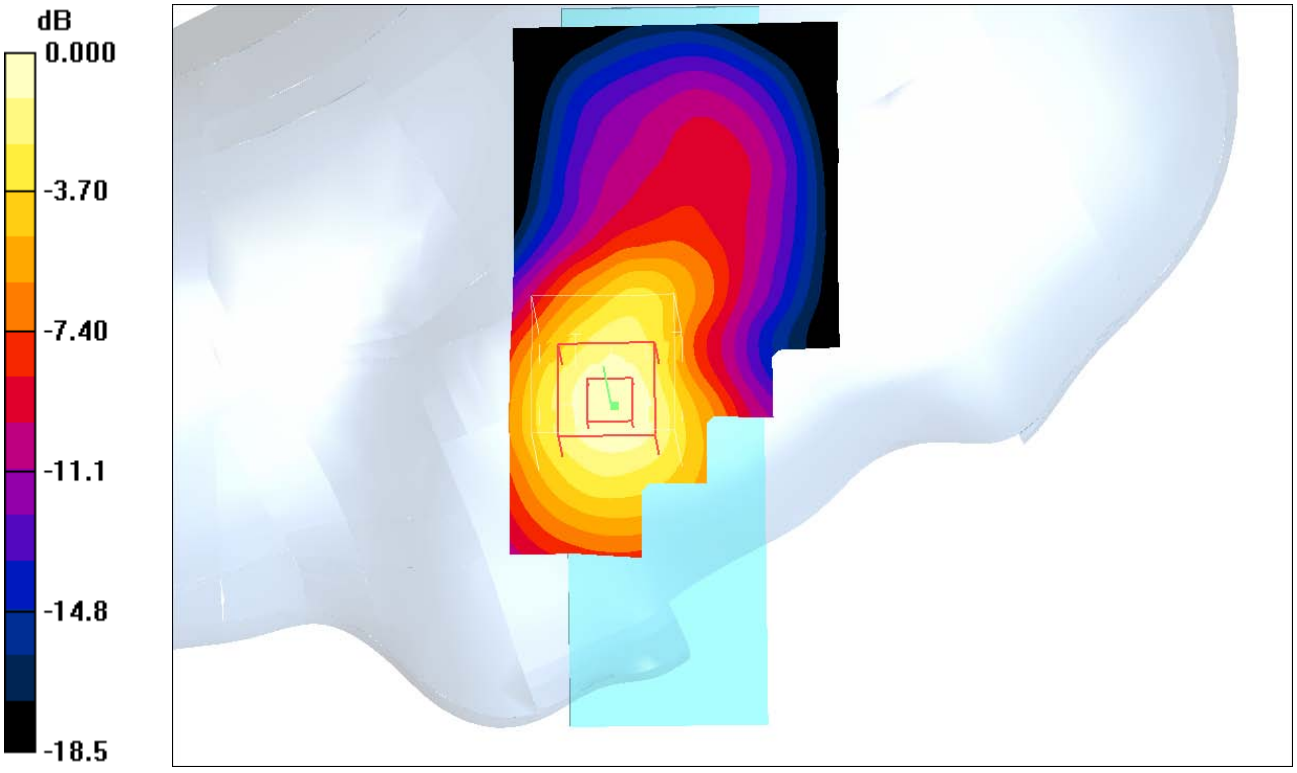
0 dB = 0.404mW/g

Date/Time: 2006-08-16 15:15:55

Test Laboratory: Sony Ericsson Mobile Communications AB
DUT: #5549; Type: PY7A1022016; Serial: CB510905NY
Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.47 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2006-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Touch position - High/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.27 mW/g
Touch position - High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.05 V/m; Power Drift = 0.043 dB
Peak SAR (extrapolated) = 1.89 W/kg
SAR(1 g) = 1.15 mW/g; SAR(10 g) = 0.643 mW/g
Maximum value of SAR (measured) = 1.27 mW/g



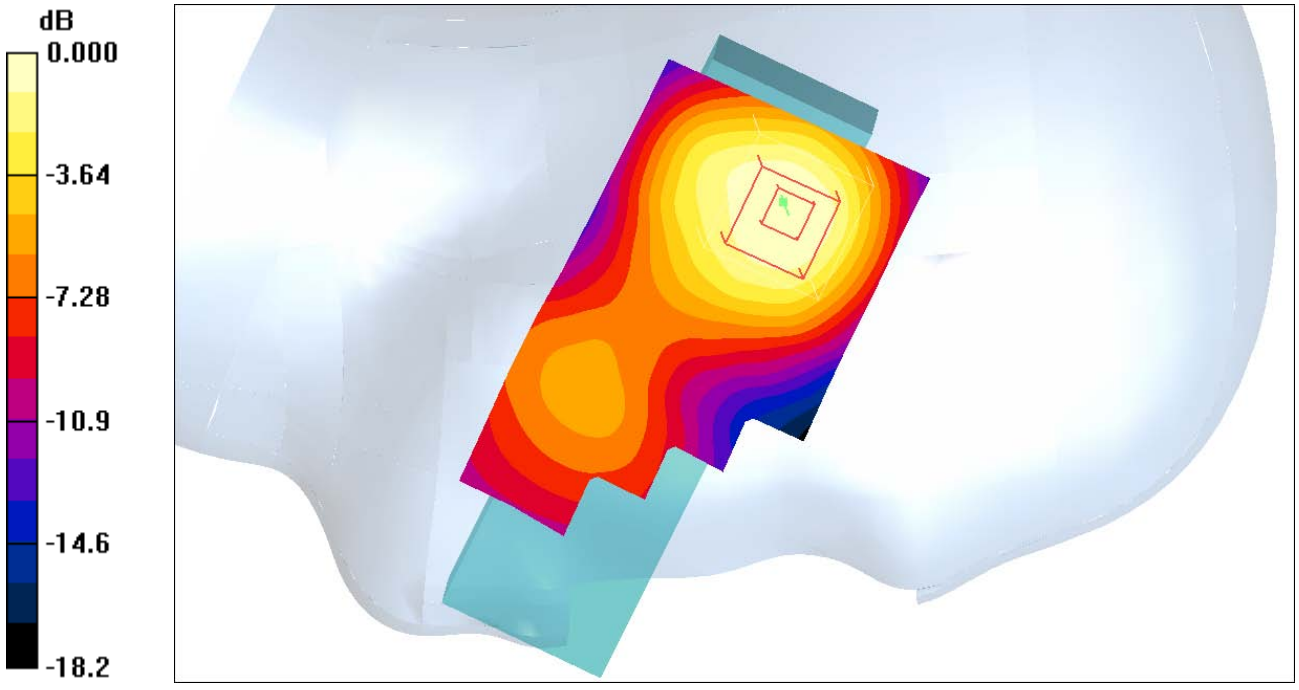
0 dB = 1.27mW/g

Date/Time: 2006-08-16 15:33:52

Test Laboratory: Sony Ericsson Mobile Communications AB
DUT: #5549; Type: PY7A1022016; Serial: CB510905NY
Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.47 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2006-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Tilt position - High/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.489 mW/g
Tilt position - High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.8 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 0.637 W/kg
SAR(1 g) = 0.424 mW/g; SAR(10 g) = 0.259 mW/g
Maximum value of SAR (measured) = 0.448 mW/g



0 dB = 0.448mW/g

Date/Time: 2006-08-15 11:54:50

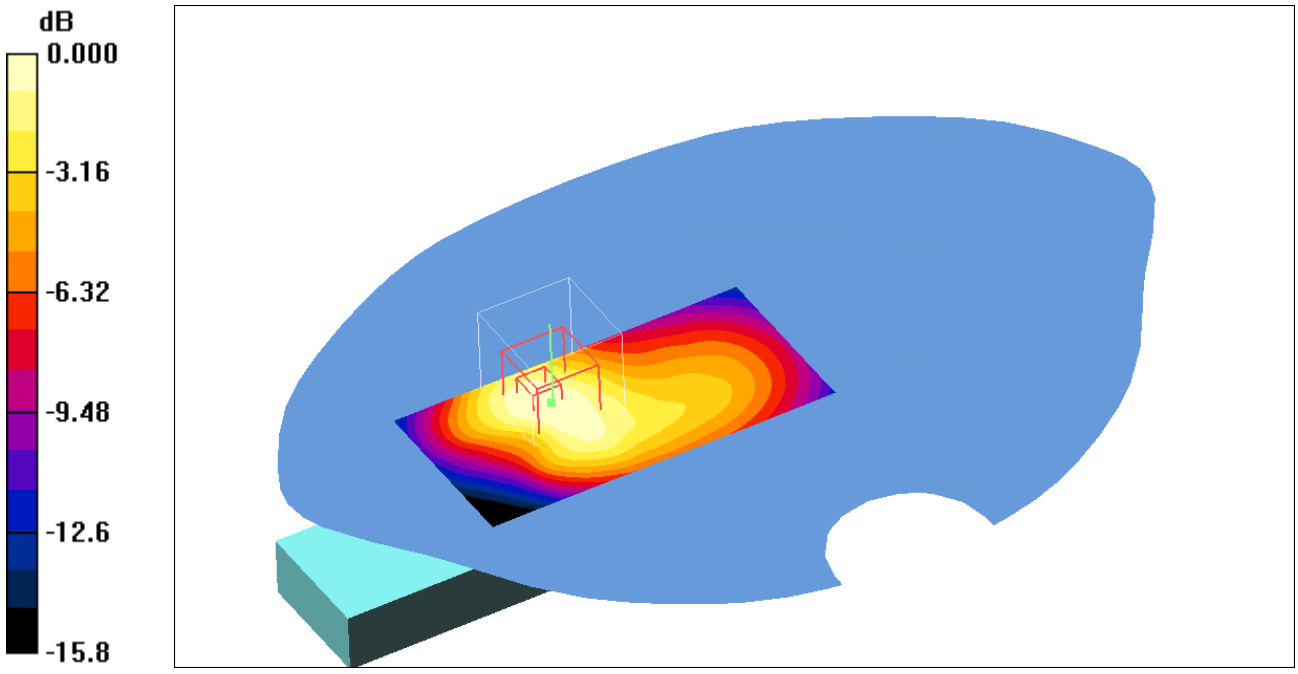
Test Laboratory: Sony Ericsson Mobile Communications AB

DUT: #5549; Type: AAB-1022016-BV; Serial: CB510905NY

Communication System: GSM1900 GPRS2TX; Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(4.56, 4.56, 4.56); Calibrated: 2006-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

d=15mm,Back,High;GPRS2TX/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.573 mW/g
d=15mm,Back,High;GPRS2TX/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.4 V/m; Power Drift = -0.084 dB
Peak SAR (extrapolated) = 0.937 W/kg
SAR(1 g) = 0.514 mW/g; SAR(10 g) = 0.294 mW/g
Maximum value of SAR (measured) = 0.543 mW/g



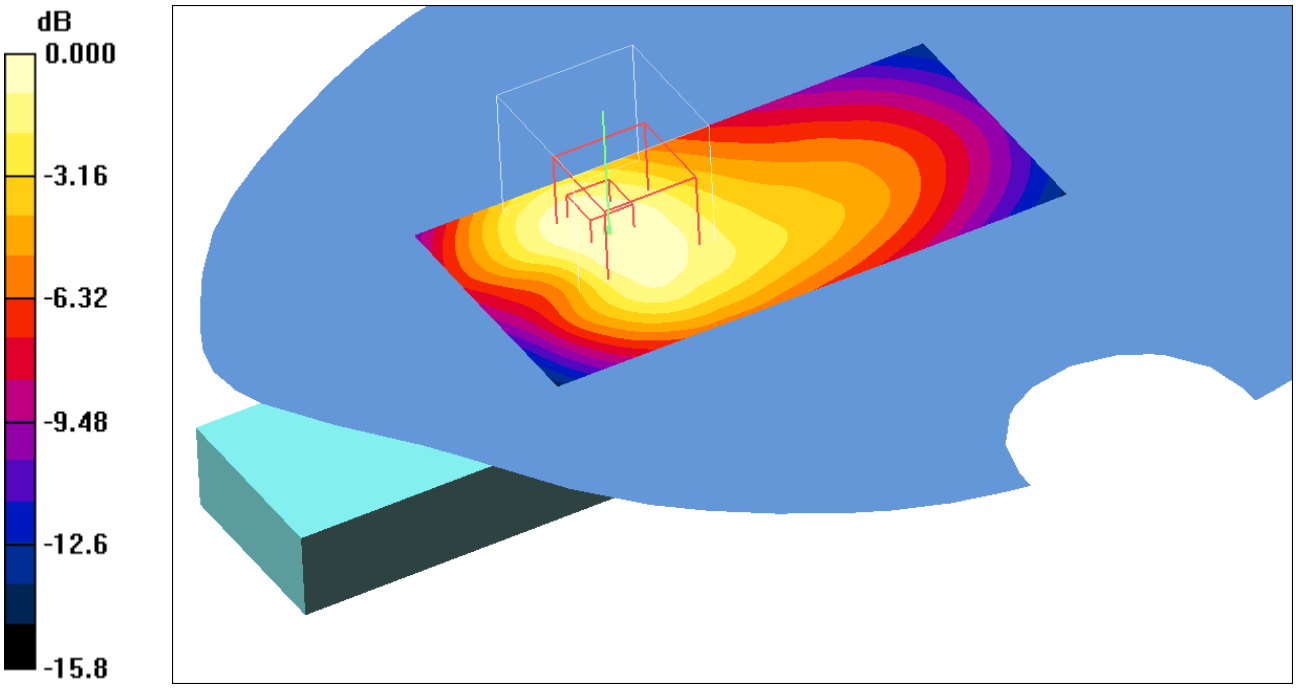
0 dB = 0.543mW/g

Date/Time: 2006-08-15 13:11:25

Test Laboratory: Sony Ericsson Mobile Communications AB
DUT: #5549; Type: PY7A1022016; Serial: CB510905NY
Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(4.56, 4.56, 4.56); Calibrated: 2006-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

d=15mm,Back,High ,Speech;Hands free/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.248 mW/g
d=15mm,Back,High ,Speech;Hands free/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.70 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 0.383 W/kg
SAR(1 g) = 0.219 mW/g; SAR(10 g) = 0.131 mW/g
Maximum value of SAR (measured) = 0.238 mW/g



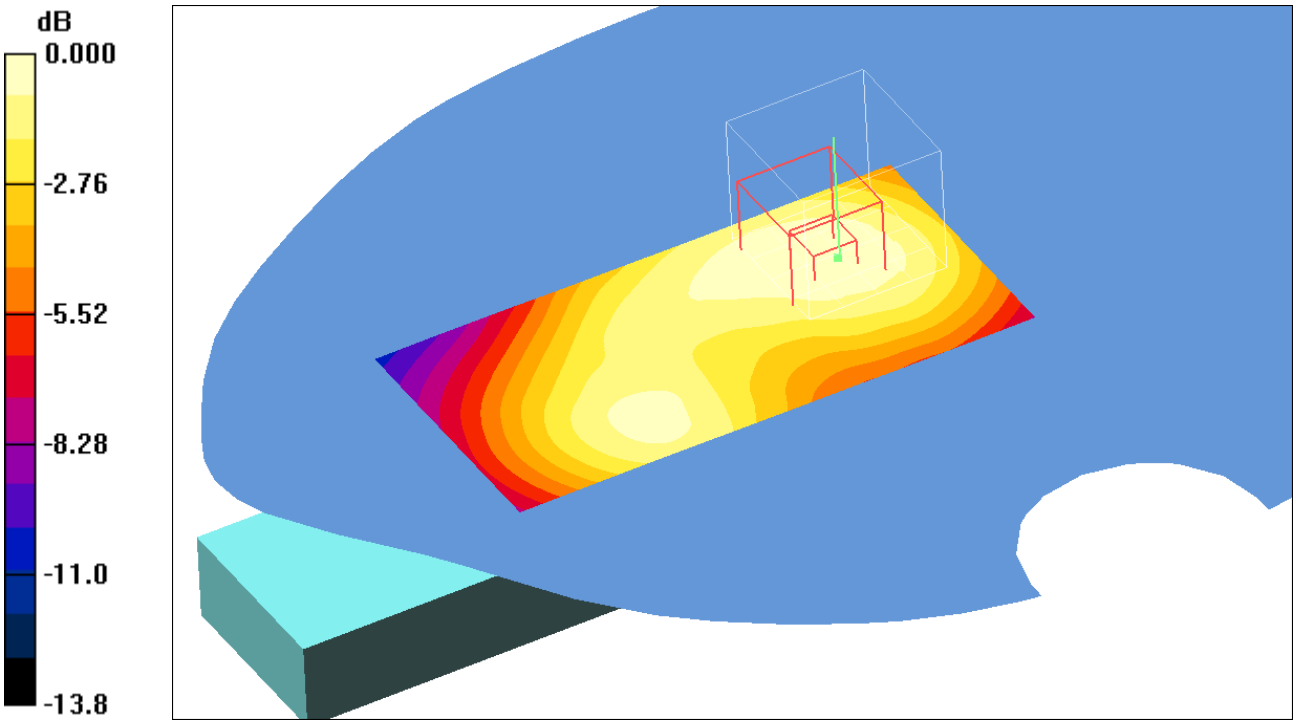
0 dB = 0.238mW/g

Date/Time: 2006-08-15 12:46:32

Test Laboratory: Sony Ericsson Mobile Communications AB
DUT: #5549; Type: PY7A1022016; Serial: CB510905NY
Communication System: GSM1900 GPRS2TX; Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(4.56, 4.56, 4.56); Calibrated: 2006-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

d=15mm,FrontHigh;GPRS2TX/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.172 mW/g
d=15mm,FrontHigh;GPRS2TX/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.248 W/kg
SAR(1 g) = 0.161 mW/g; SAR(10 g) = 0.105 mW/g
Maximum value of SAR (measured) = 0.172 mW/g



0 dB = 0.172mW/g

Date/Time: 2006-08-16 11:21:59

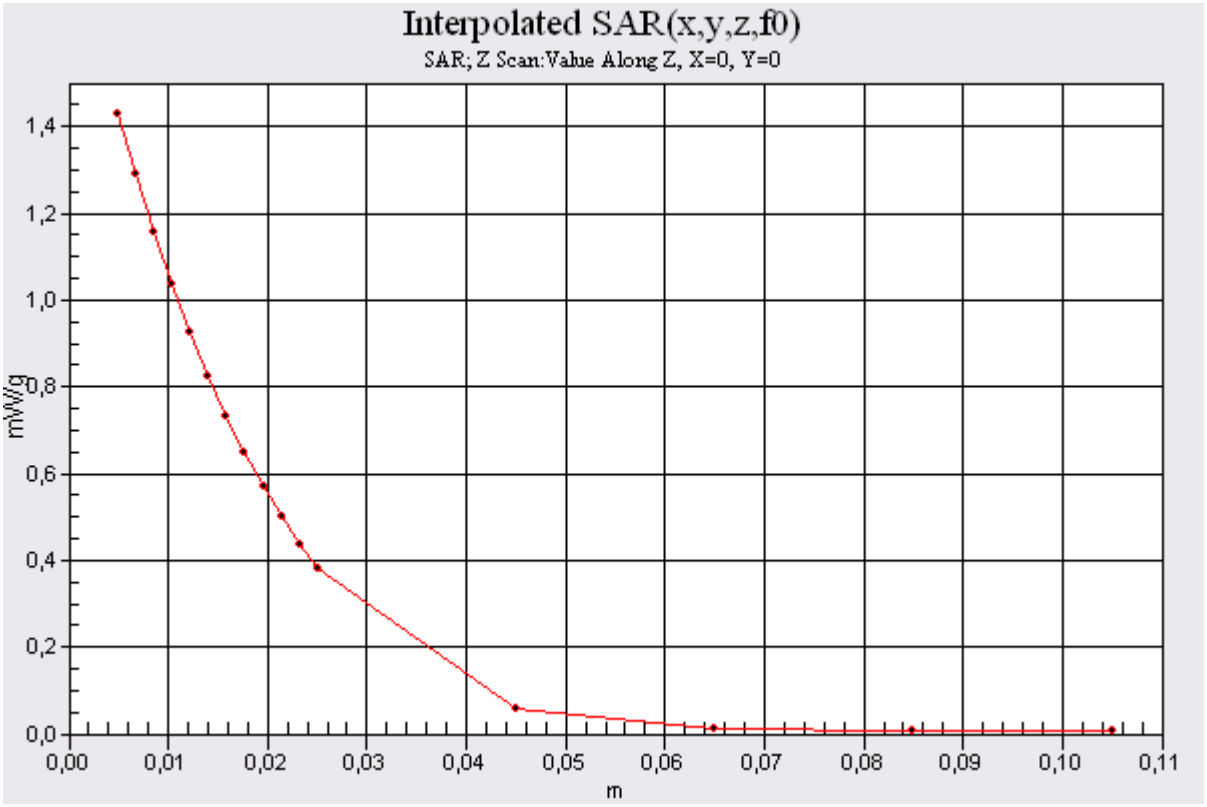
Test Laboratory: Sony Ericsson Mobile Communications AB

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

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.47 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2006-03-16
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

d=10mm, Pin=100mW/Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 1.43 mW/g

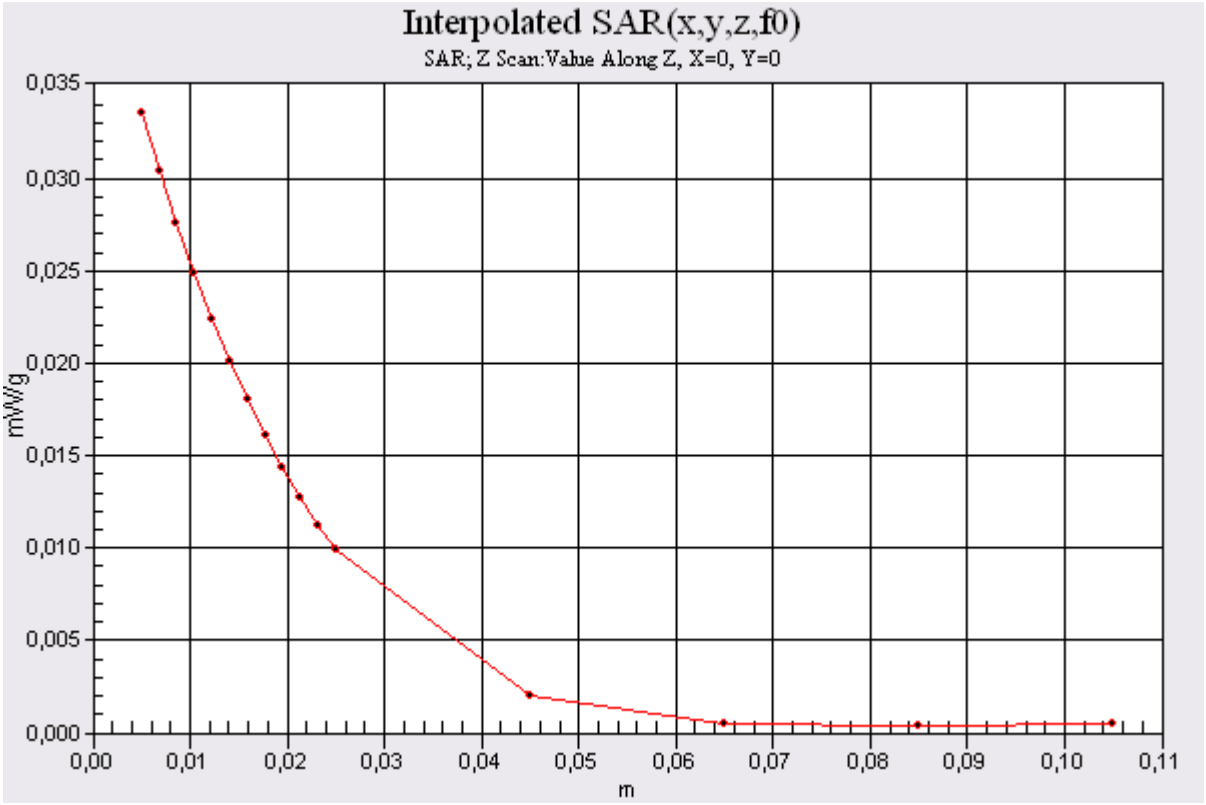


Date/Time: 2006-08-15 09:18:04

Test Laboratory: Sony Ericsson Mobile Communications AB
DUT: #5549; Type: AAB-1022016-BV; Serial: CB510905NY
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.49 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(4.56, 4.56, 4.56); Calibrated: 2006-03-16
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

d=15mm,Back,Low ,Speech;BT/Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.034 mW/g



Date/Time: 2006-08-15 08:34:16

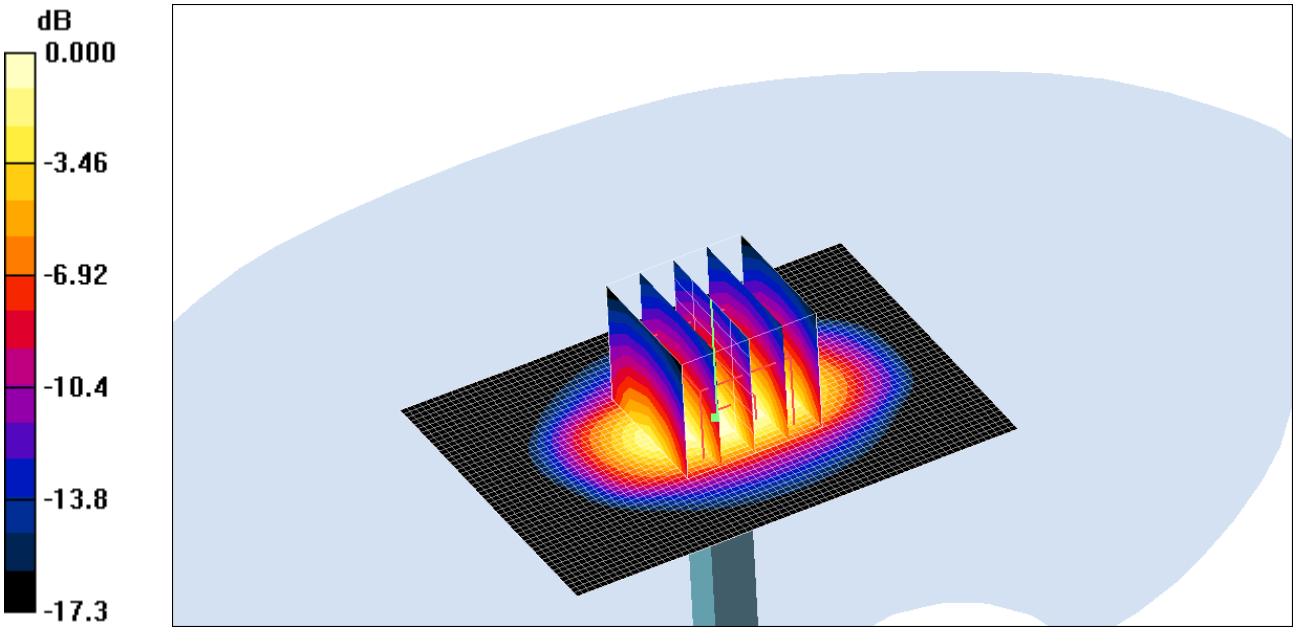
Test Laboratory: Sony Ericsson Mobile Communications AB

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

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(4.56, 4.56, 4.56); Calibrated: 2006-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

d=10mm, Pin=100mW 2/Area Scan (51x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 5.61 mW/g
d=10mm, Pin=100mW 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.7 V/m; Power Drift = -0.074 dB
Peak SAR (extrapolated) = 7.13 W/kg
SAR(1 g) = 4.14 mW/g; SAR(10 g) = 2.18 mW/g
Maximum value of SAR (measured) = 4.69 mW/g



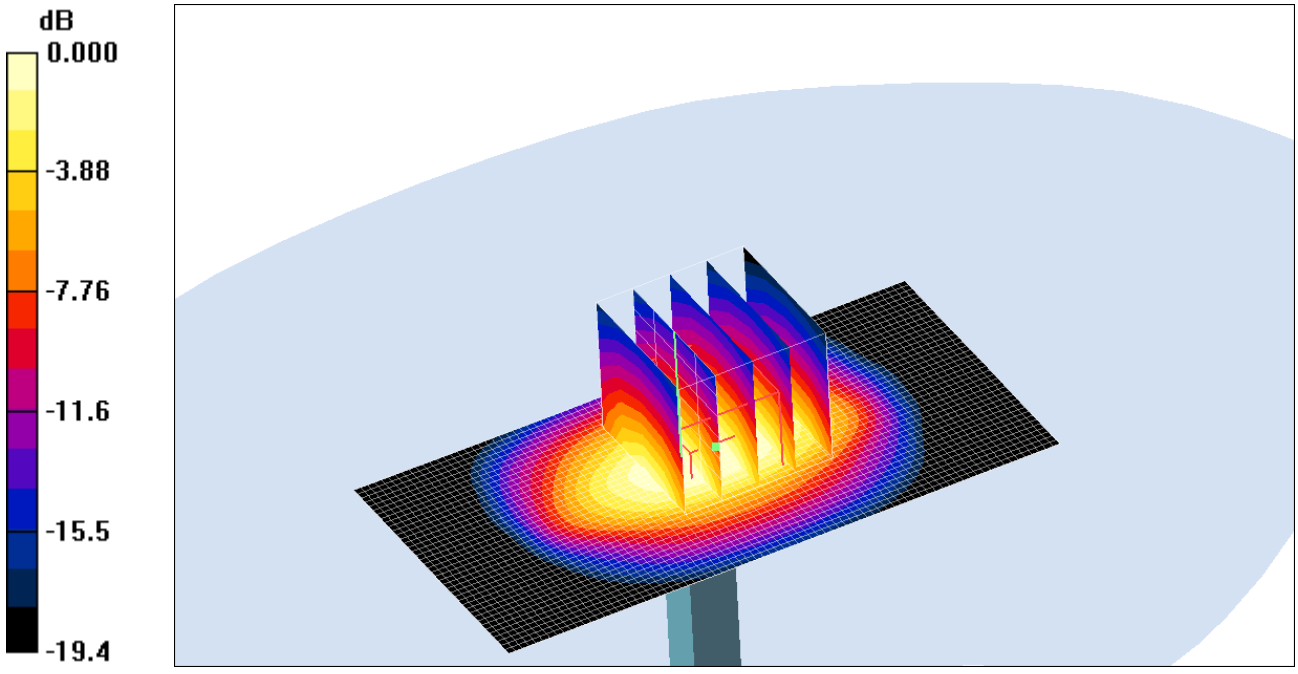
0 dB = 4.69mW/g

Date/Time: 2006-08-16 11:11:42

Test Laboratory: Sony Ericsson Mobile Communications AB
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN:5d002
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.47 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1585; ConvF(5.11, 5.11, 5.11); Calibrated: 2006-03-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn419; Calibrated: 2006-03-08
- Phantom: SAM 4; Type: SAM; Serial: 1053
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

d=10mm, Pin=100mW/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.66 mW/g
d=10mm, Pin=100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 58.0 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 7.09 W/kg
SAR(1 g) = 4 mW/g; SAR(10 g) = 2.07 mW/g
Maximum value of SAR (measured) = 4.32 mW/g



0 dB = 4.32mW/g

DASY4 Validation Report for Body TSL

Date/Time: 15.03.2005 15:20:32

Test Laboratory: SPEAG, Zurich, Switzerland

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

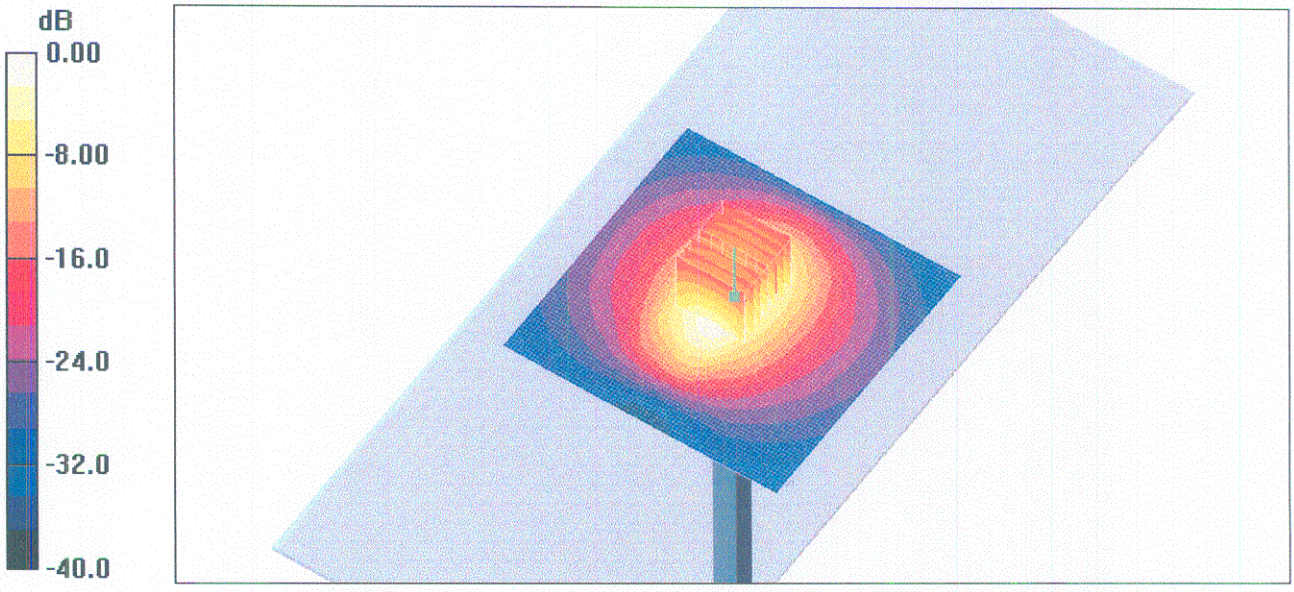
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.43, 4.43, 4.43); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.3 V/m; Power Drift = 0.061 dB
Peak SAR (extrapolated) = 16.8 W/kg
SAR(1 g) = 9.91 mW/g; SAR(10 g) = 5.23 mW/g
Maximum value of SAR (measured) = 11.3 mW/g



0 dB = 11.3mW/g

DASY4 Validation Report for Head TSL

Date/Time: 09.03.2005 15:20:45

Test Laboratory: SPEAG, Zurich, Switzerland

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

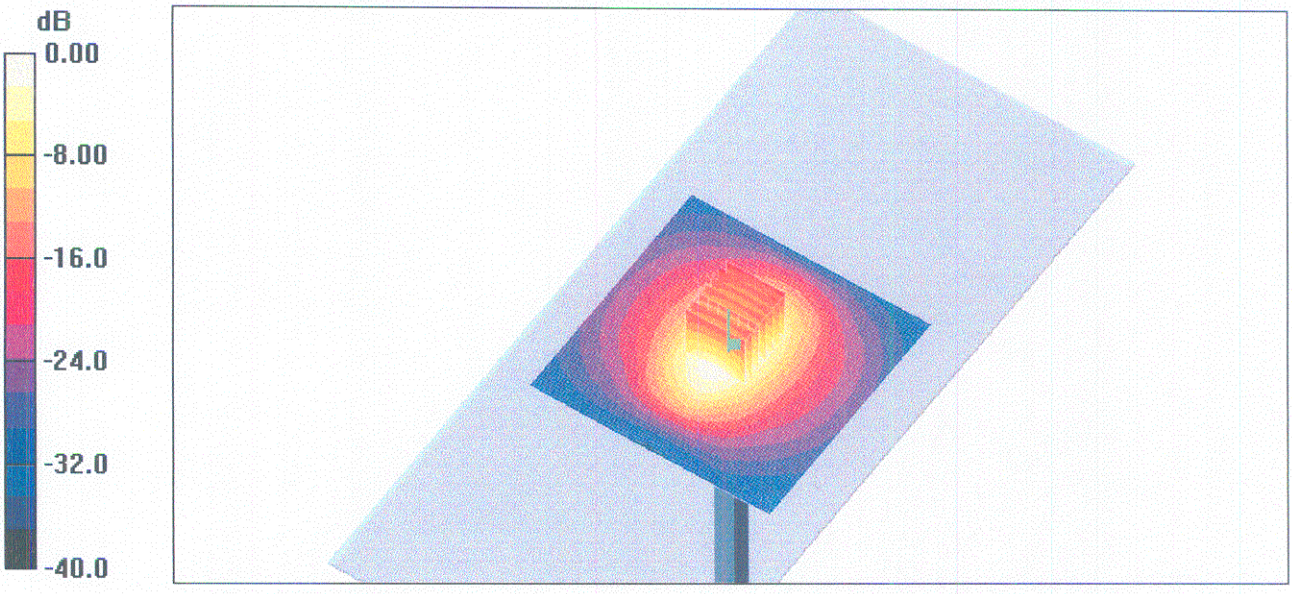
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.96, 4.96, 4.96); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.4 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.81 mW/g; SAR(10 g) = 5.15 mW/g
Maximum value of SAR (measured) = 11.0 mW/g



0 dB = 11.0mW/g

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
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: ET3-1585_Mar06

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1585
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	March 16, 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	2-Feb-06 (SPEAG, No. DAE4-654_Feb06)	Feb-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 Nov-05)	In house check: Nov 06

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: March 18, 2006

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) 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:

- *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, 2005
Recalibrated:	March 16, 2006

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	**1.89** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**93** mV
NormY	**1.74** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**93** mV
NormZ	**1.91** ± 10.1%	$\mu V/(V/m)^2$	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_{be} [%]	Without Correction Algorithm	7.5	4.1
SAR_{be} [%]	With Correction Algorithm	0.1	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	6.0	3.2
SAR_{be} [%]	With Correction Algorithm	0.2	0.3

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

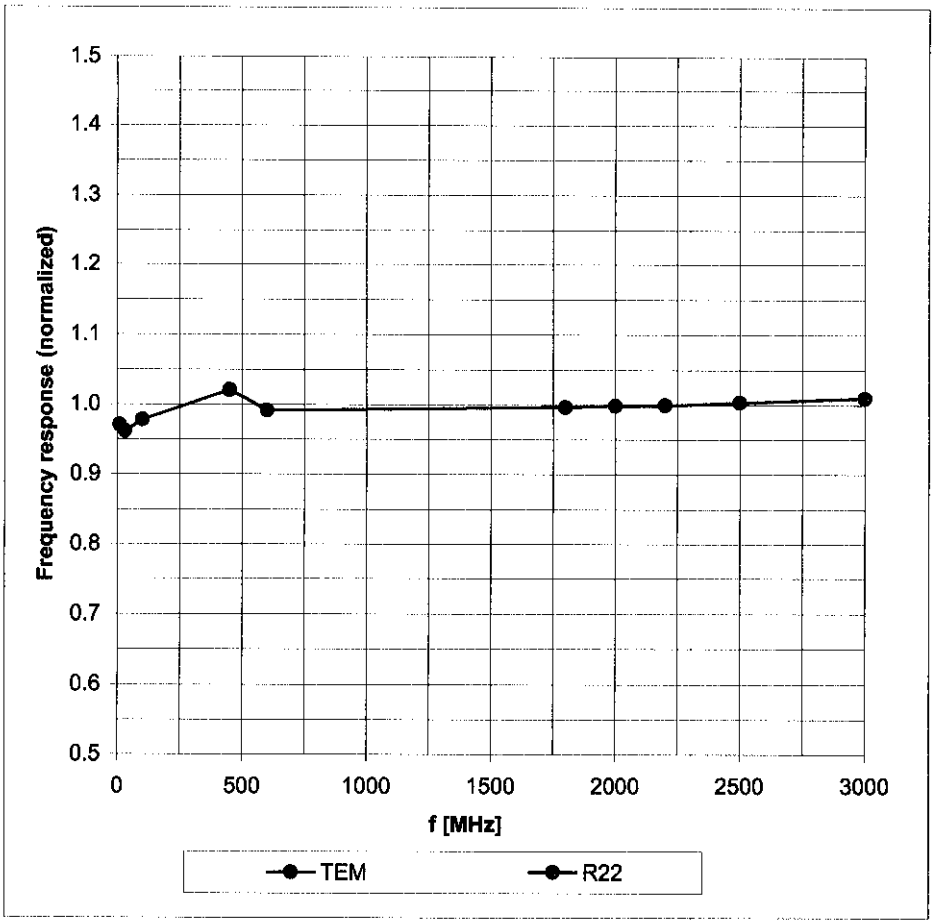
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

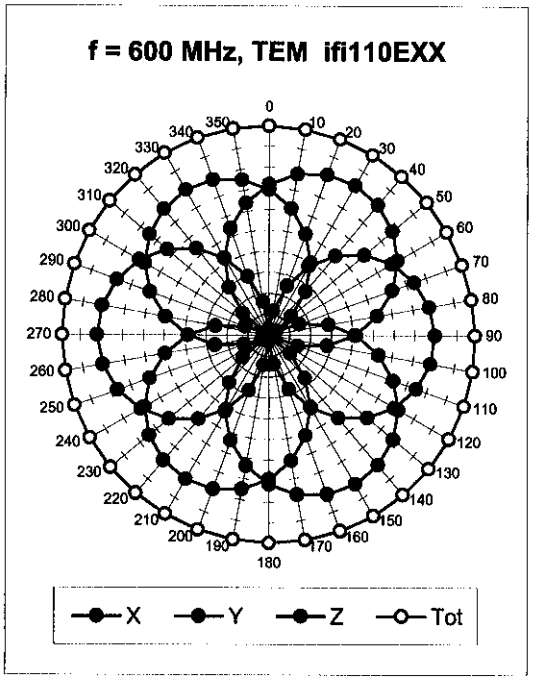
Frequency Response of E-Field

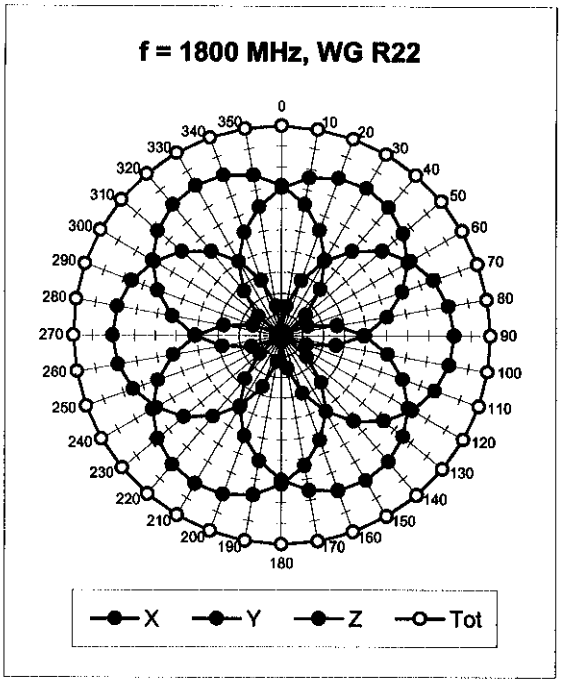
(TEM-Cell:ifi110 EXX, Waveguide: R22)

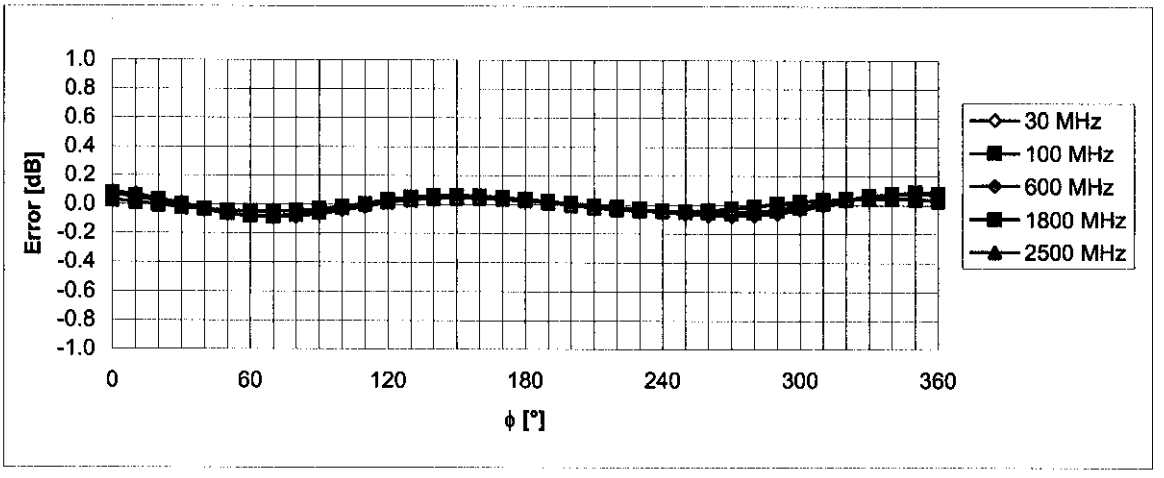


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



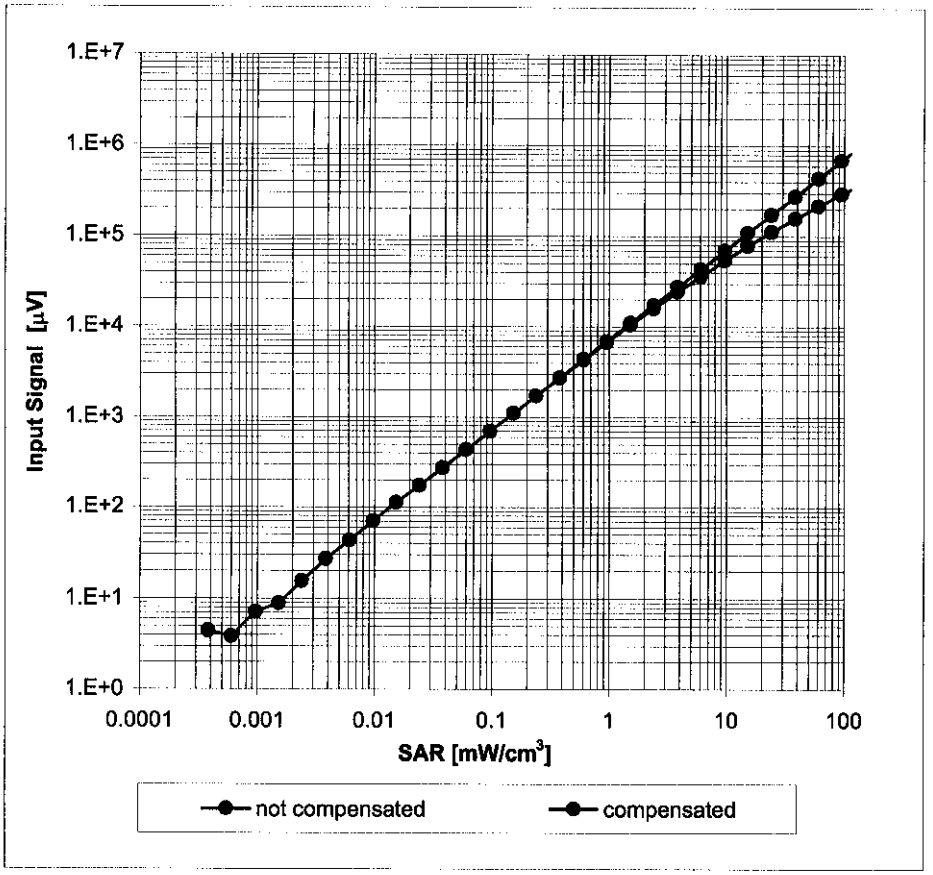


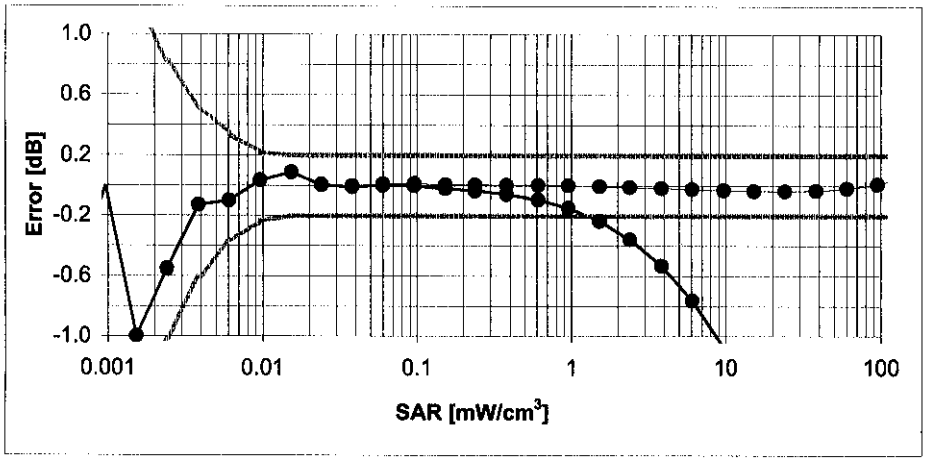


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

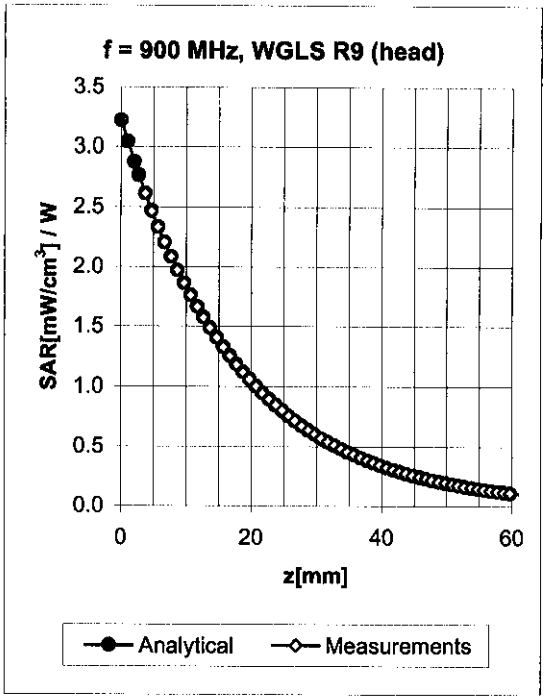
(Waveguide R22, f = 1800 MHz)

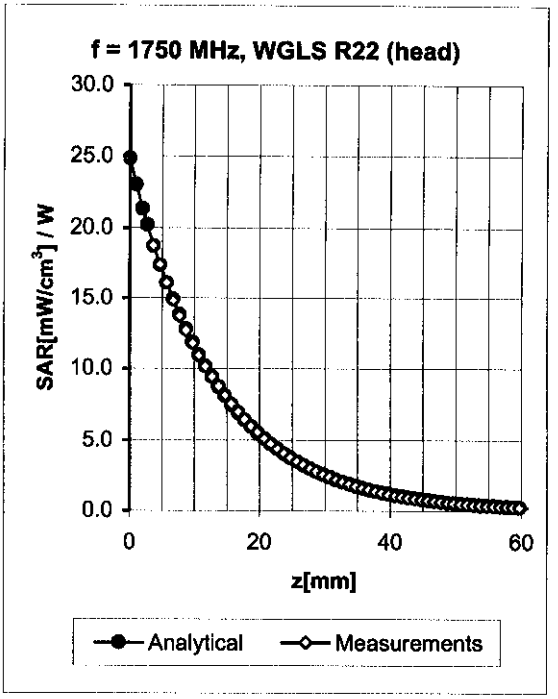




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



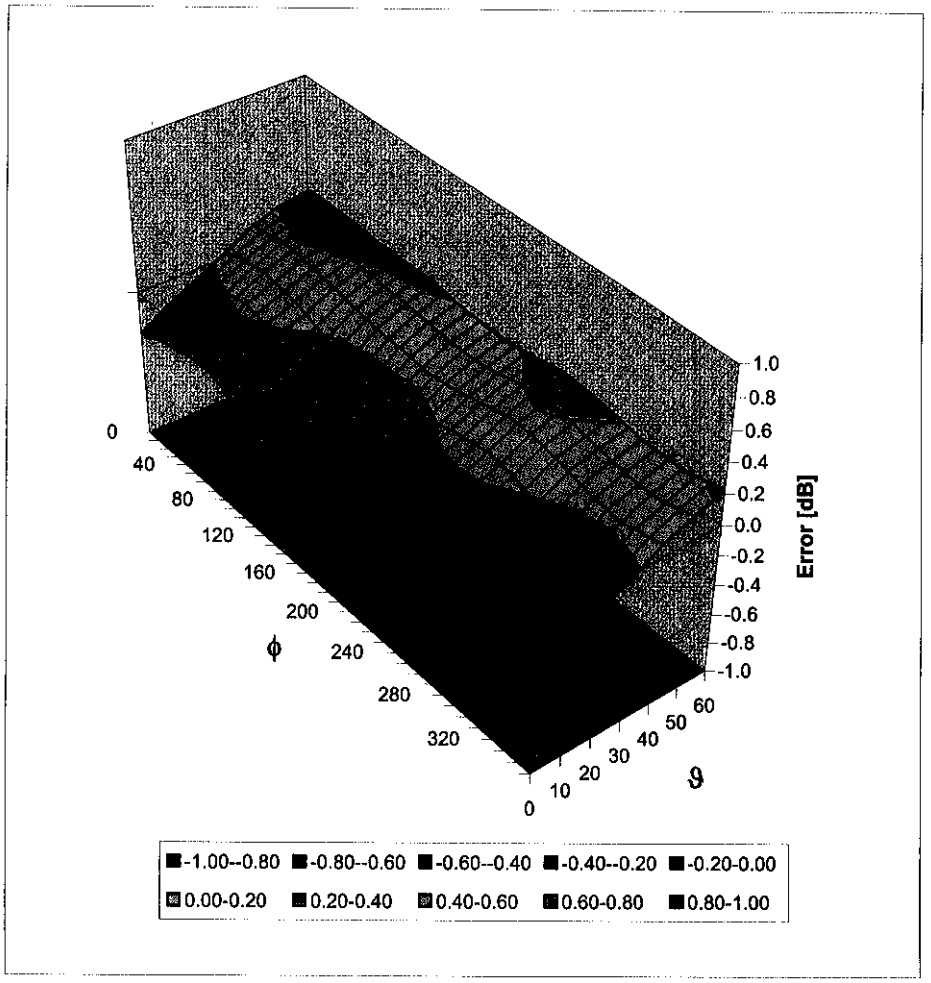


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.52	1.80	6.77 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.49	1.89	6.63 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.45	2.80	5.36 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.47	2.59	5.11 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.48	2.18	4.44 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.48	2.00	6.53 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.44	2.12	6.21 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.53	2.67	4.77 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.64	2.35	4.56 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.61	2.29	4.07 ± 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)