Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
LD/SEMC/BGGI/NM *Ramadan Plicanic*		*BGGIN06:265*		
Approved	Checked	Date	Rev	Reference
LD/SEMC/BGGI/NMC *Mats Hansson*	*060627*	*060626*	A	File

Report issued by Accredited SAR Laboratory

for

PY7AD022044

Date of test: *14 and 15 June, 2006*

Laboratory:
Sony Ericsson SAR Test Laboratory
Sonyericsson Mobile Communications AB
Nya Vattentornet
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Testing Engineer:
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Testing Approval
Mats Hansson
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Statement of Compliance

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

Sony EricssonType : AAD-3022044-BV; FCC ID : PY7AD022044; IC:4170B-AD022044

to which this declaration relates, is in conformity with the appropriate RF exposure standards recommendations and guidelines. It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(None)

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2 Introduction

In this test report, compliance of the Sony Ericsson PY7AD022044 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	Build in	
Location	Up on the back side (in the middle when open)	
Dimensions	Max length	38mm
	Max width	28mm
Configuration	PIFA	

3.2 Device description

Device model	PY7AD022044					
Serial number	CB5107LWCP (#4929)					
Mode	GSM1900					
Multiple Access Scheme	TDMA			TDMA, GPRS 2slots		
Output Power Setting	fl 30.8	fm 30.9	fh 31.0	fl 30.8	fm 30.9	fh 31.0
Factory Tolerance in Power Setting	±0.5 dB			±0.5 dB		
Maximum Peak Output Power	31.0dBm			31.0dBm		
Crest Factor	8.3			4.15		
Transmitting Frequency Range(MHz)	1850.2 – 1909.8					
Prototype or Production Unit	Preproduction HW EP2.2 R1.2					
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, Built 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	012007
E-field probe ET3DV6	1815	012007
Dipole Validation Kit, D1900V2	5d002	032007

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 DASY3 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,14/June/2006	39.1	1.43	1.00
		Recommended	40.0	1.40	1.00
1900	Body	Measured, 15/June/2006	51.0	1.48	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. The system verification test was conducted on the same day as the measurement of the DUT. Measurement made in ambient temperature 23.5 °C and humanity 43%. 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 0.000015mW/g in 1g mass.

f (MHz)	Liquid	Measured / Reference	SAR (W/kg) 1g/10g	Dielectric Parameters			Liquid t(°C)
				ε_r	σ (S/m)	ρ (g/cm³)	
1900	Head	Measured, 14/June/2006	37.8/19.8	39.1	1.43	1.00	23.6
		Reference	39.2/20.6	39.4	1.45	1.00	21.5
1900	Body	Measured, 15/June/2006	38.6/20.7	51.0	1.48	1.00	23.5
		Reference	39.6/20.9	51.6	1.58	1.00	22

7 SAR measurement uncertainty

DASY4 SAR measurement uncertainty evaluation for Sony Ericsson PY7AD022044 phone
According to IEEE 1528

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C_i	GSM 1900-Head	GSM 1900-Body
Measurement System						
Probe Calibration	±5.9	N	1	1	±5.9	±5.9
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
Linearity	±4.7	R	√3	1	±2.7	±2.7
System Detection Limits	±1.0	R	√3	1	±0.6	±0.6
Readout electronics	±0.3	N	1	1	±0.3	±0.3
Response time	±0.8	R	√3	1	±0.5	±0.5
Integration time	±2.6	R	√3	1	±1.5	±1.5
RF Ambient Conditions	±3.0	R	√3	1	±1.7	±1.7
Probe Positioner	±0.4	R	√3	1	±0.2	±0.2
Probe Positioning	±2.9	R	√3	1	±1.7	±1.7
Max. SAR Evaluation	±1.0	R	√3	1	±0.6	±0.6
Measurement System Uncertainty					*±8.4*	*±8.4*
Test Sample Related						
Device positioning	±2.9	N	1	1	±2.9	±2.9
Device holder uncertainty	±3.6	N	1	1	±3.6	±3.6
Power drift	-1.8/-4.5	R	√3	1	-1.0	-2.6
Test Sample Related Uncertainty					*±4.7*	*±5.3*
Phantom and Tissue Parameters						
Phantom uncertainty	±4.0	R	√3	1	±2.3	±2.3
Liquid conductivity (meas)	±2.5	N	1	0.64	±1.6	±1.6
Liquid conductivity (target)	+2.1/-2.6	R	√3	0.64	+0.8	-1.0
Liquid Permittivity (meas)	±2.5	N	1	0.6	±1.5	±1.5
Liquid Permittivity (target)	-2.3/-4.3	R	√3	0.6	-0.8	-1.5
Phantom and Tissue Parameters Uncertainty					*±3.4*	*±3.7*
Combined standard uncertainty					*±10.2*	*±10.6*
Extended standard uncertainty (k=2)					***±20.4***	***±21.2***

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8 Test results

The measured 1-gram averaged SAR values of the device against head and body are provided in Table 1 and Table 2. The ambient humidity and temperature of test facility were (41-43) % and (23.5–22.5) °C respectively.

The depth of the head and body tissue simulating liquids were 15.3cm and 15.9cm. A base station simulator was used to control the device during the SAR measurements. 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 different phones position, cheek (touch) and tilt (cheek + 15deg). For all modes, the device was tested at the lowest, middle and highest frequencies in the transmit band.

For body measurements the phone was tested in speech and data mode when the phone's antenna (Back) was against the flat section of the phantom with 15mm distance. For worst case phone was tested with front against the flat section. For speech mode it's used Sony Ericsson portable hands free HPM-20 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	512	30.8	**Cheek**	23.6	0.86	1.06
			Tilt	23.6	-	-
	661	30.9	**Cheek**	23.6	1.08	1.03
			Tilt	23.6	0.31	0.37
	810	31.0	**Cheek**	23.6	1.1	**1.1**
			Tilt	23.6	-	-

Table1: SAR measurement result for Sony Ericsson PY7AD022044 telephone at highest possible output power. Measured against the head.

Mode	Channel	Power (dBm)	Phone Position	Liquid t (°C)	SAR (W/kg) in 1 g mass
1900 GSM	512	30.8	**Antenna to phantom, speech, HPM20**	23.5	0.46
			Antenna to phantom, speech, HBH610a	23.5	0.43
			Antenna to phantom, data, GPRS 2Sl	23.5	**0.89**
	661	30.9	**Antenna to phantom, speech, HPM20**	23.5	0.36
			Antenna to phantom, data, GPRS 2Sl	23.5	0.75
	810	31.0	**Antenna to phantom, speech, HPM20**	23.5	0.3
			Antenna to phantom, data, GPRS 2Sl	23.5	0.61

Table2: SAR measurement result for Sony Ericsson PY7AD022044 telephone at highest possible output power. Measured against the body.

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9 References

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

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

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

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

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10 Appendix

10.1 Photographs of the device under test

Front & Back sides

System Connector

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Back side with battery

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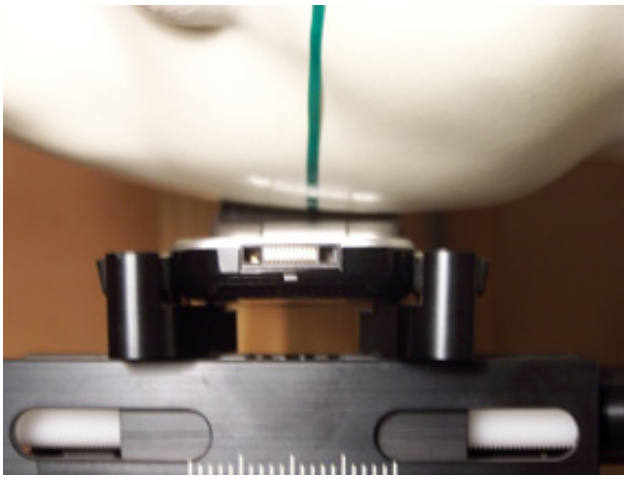
10.2 Device position on SAM Twins Phantom



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

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

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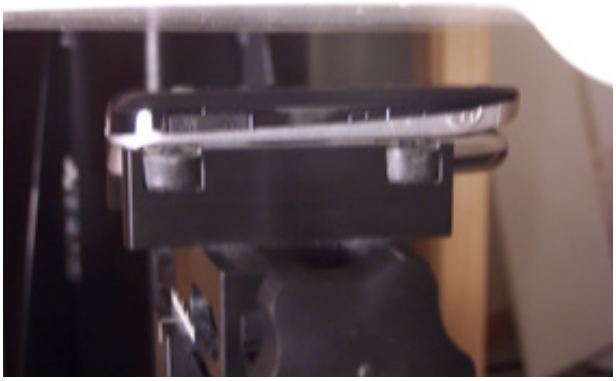
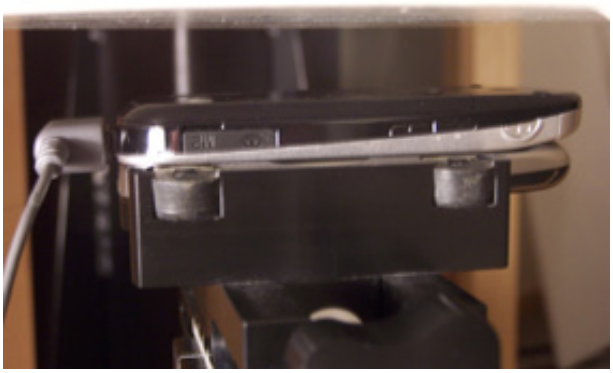




Device position against the body: 15mm distance from Phantom.

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

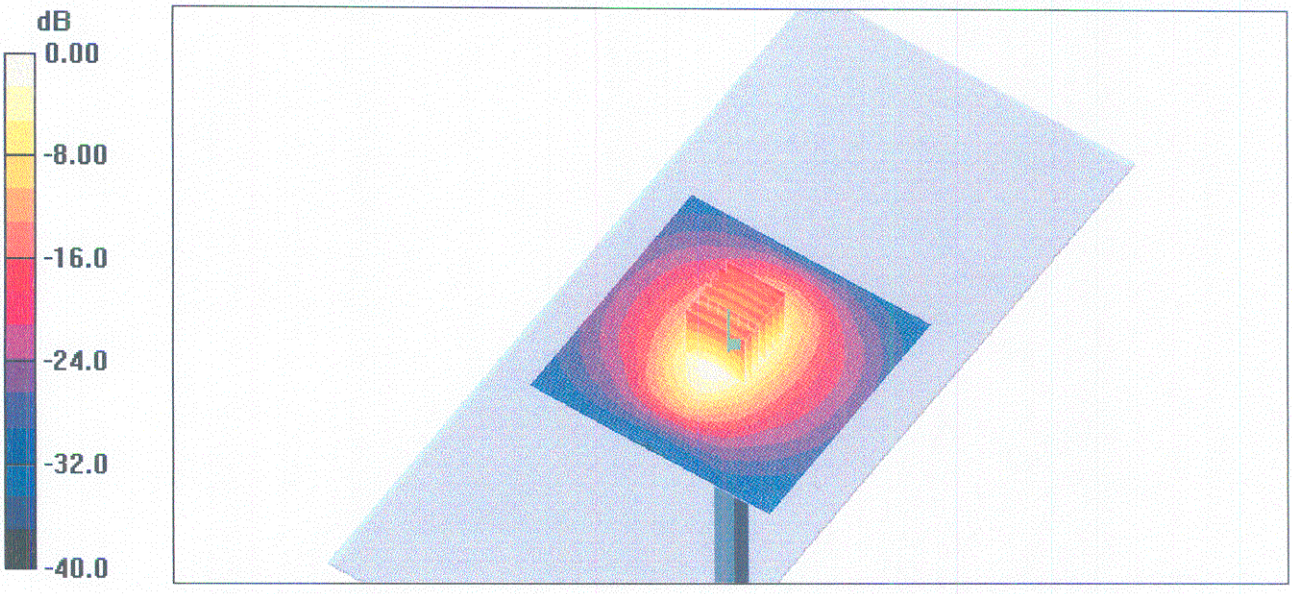
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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

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

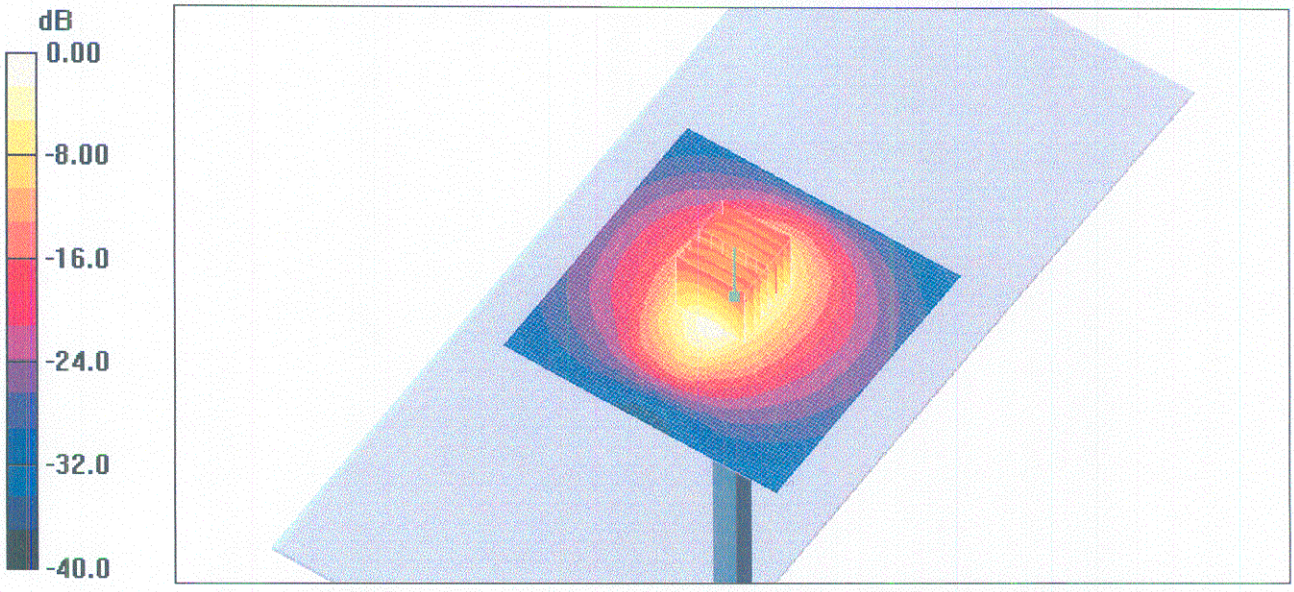
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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

Date/Time: 2006-06-14 09:20:50

Test Laboratory: Sony Ericsson Mobile Communications
File Name: Verification_1900MHz_Head_060614_RP.da4

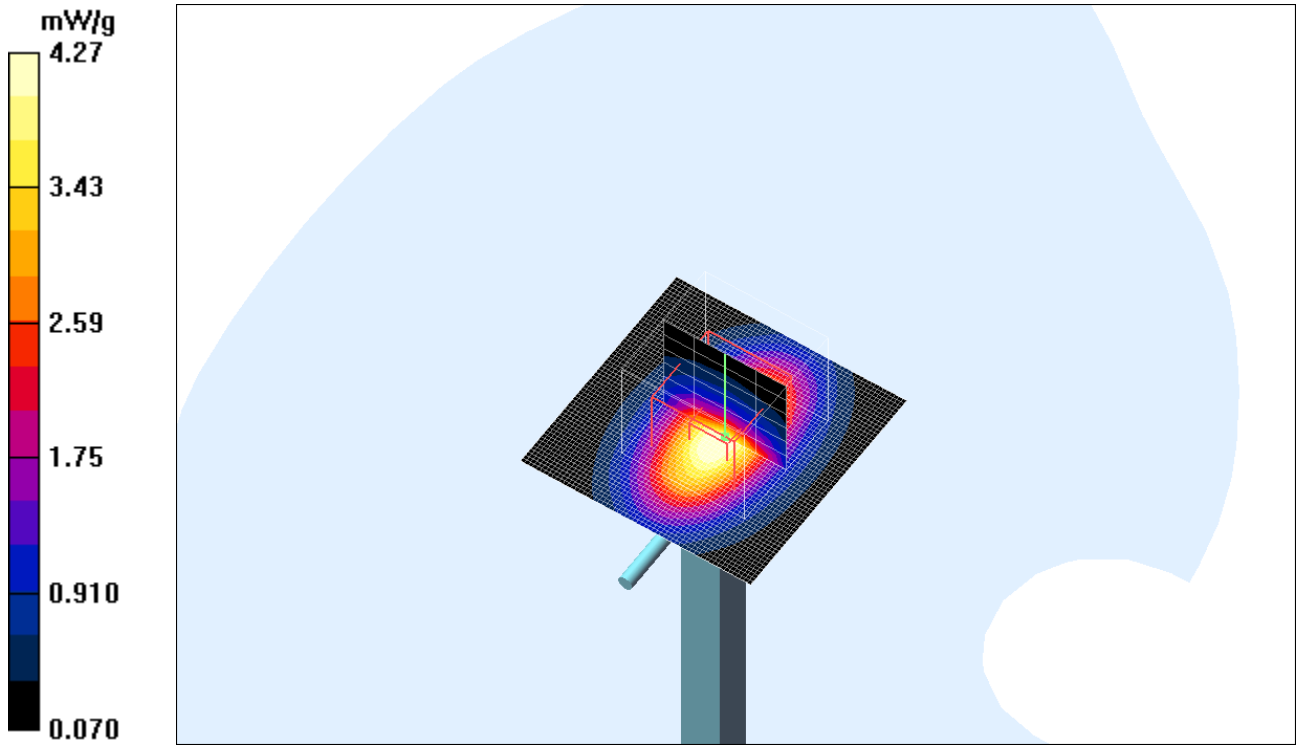
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002
Program Name: Verification Measurement on 1900MHz with HSL

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
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 = 56.8 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 6.44 W/kg
SAR(1 g) = 3.78 mW/g; SAR(10 g) = 1.98 mW/g
Maximum value of SAR (measured) = 4.27 mW/g



Date/Time: 2006-06-15 08:34:53

Test Laboratory: Sony Ericsson Mobile Communications
File Name: Verification_1900MHz_Body_060615_RP.da4

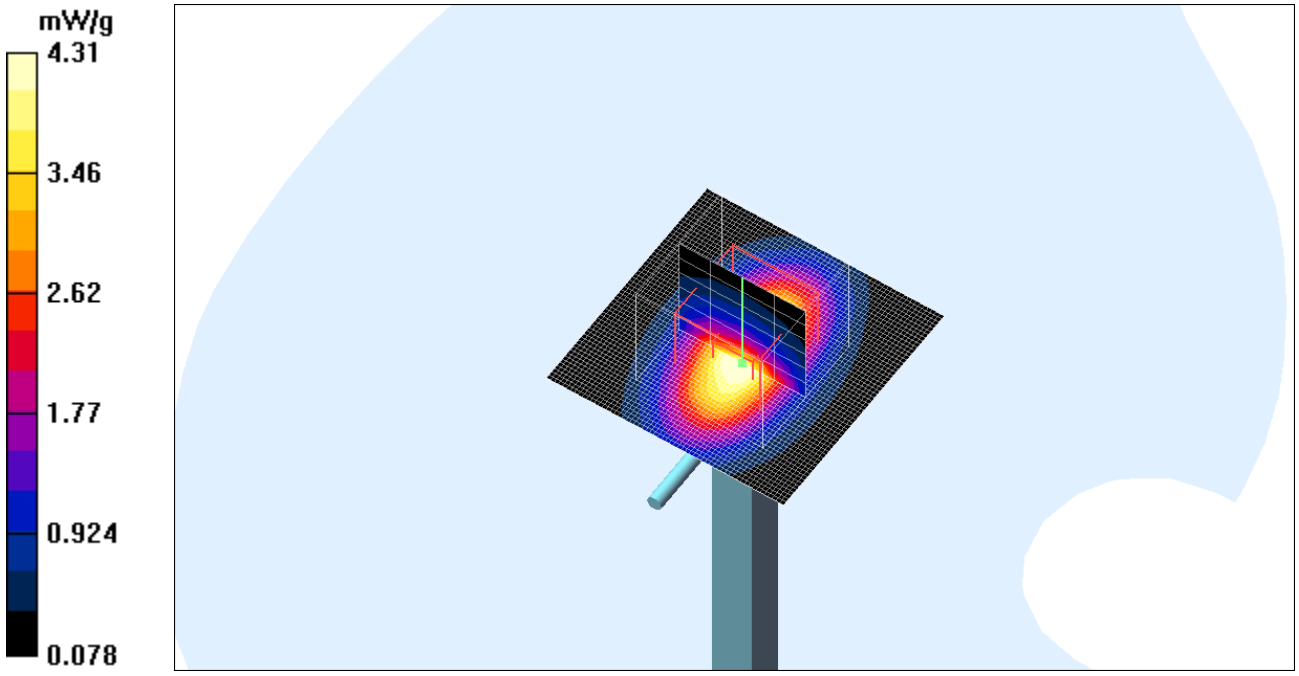
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002
Program Name: Verification Measurement on 1900MHz with BSL

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.48 mho/m; ε_r = 51; ρ = 1000 kg/m^3
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) = 4.49 mW/g

Flat, 10mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 58.1 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 6.34 W/kg
SAR(1 g) = 3.86 mW/g; SAR(10 g) = 2.07 mW/g
Maximum value of SAR (measured) = 4.31 mW/g



Date/Time: 2006-06-14 12:45:56

Test Laboratory: Sony Ericsson Mobile Communications
File Name: ch810_Left_Cheek_060614_RP.da4

DUT: PY7AD022044; Type: GSM900,1800,1900 and UMTS; Serial: #4929
Program Name: SAR Measurement on the Head

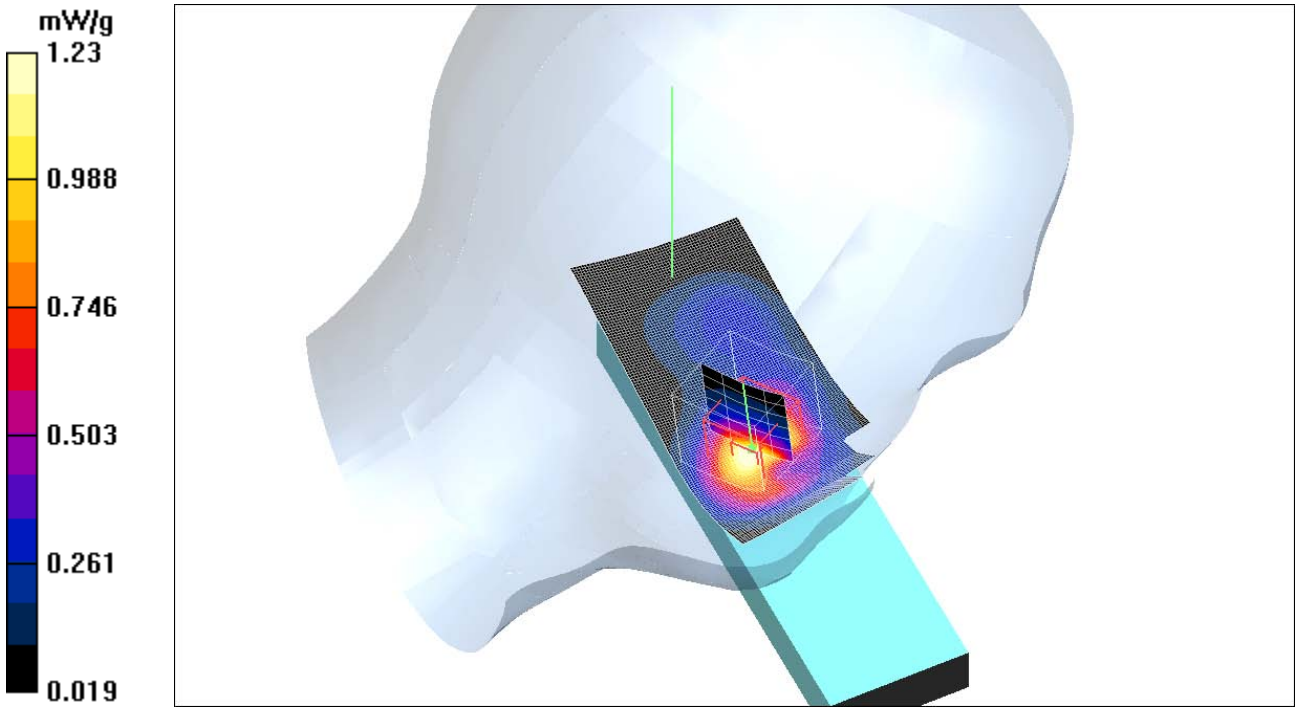
Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1909.8 MHz; σ = 1.45 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Left Section

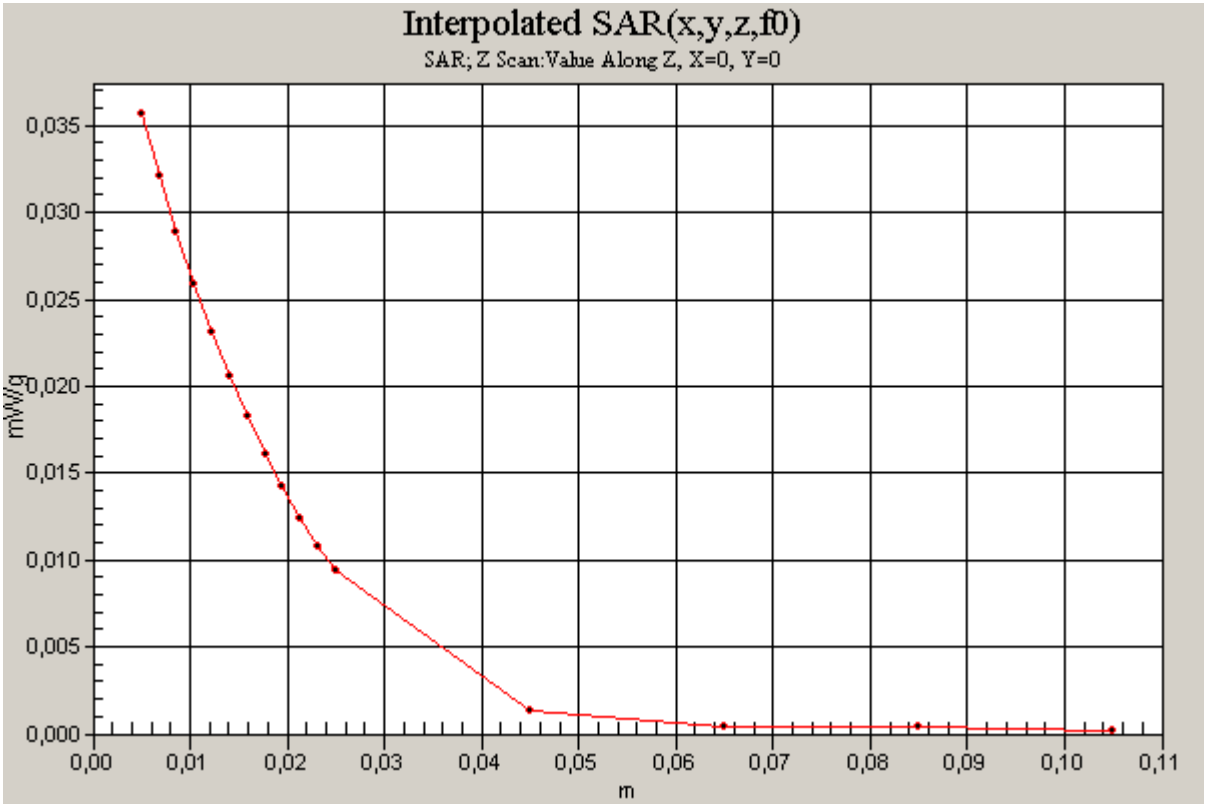
DASY4 Configuration:
- Probe: ET3DV6 - SN1815; ConvF(5.23, 5.23, 5.23); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Left, Cheek/Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.26 mW/g

Left, Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.16 V/m; Power Drift = 0.085 dB
Peak SAR (extrapolated) = 1.87 W/kg
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.621 mW/g
Maximum value of SAR (measured) = 1.23 mW/g

Left, Cheek/Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.036 mW/g




Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
0,035
0,030
0,025
0,020
0,015
0,010
0,005
0,000
0,00
0,01
0,02
0,03
0,04
0,05
0,06
0,07
0,08
0,09
0,10
0,11
m

Date/Time: 2006-06-14 10:49:21

Test Laboratory: Sony Ericsson Mobile Communications
File Name: ch810_Right_Cheek_060614_RP.da4

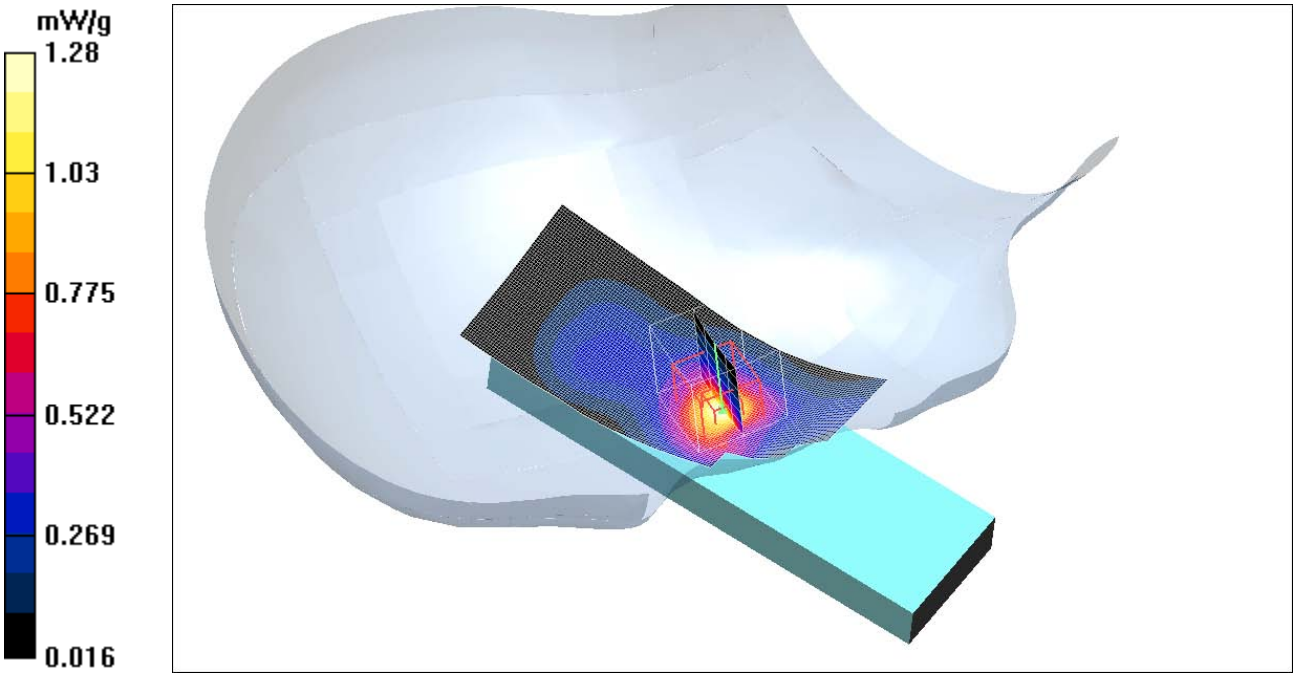
DUT: PY7AD022044; Type: GSM900,1800,1900 and UMTS; Serial: #4929
Program Name: SAR Measurement on the Head

Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1909.8 MHz; σ = 1.45 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
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, Cheek/Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.31 mW/g

Right, Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.23 V/m; Power Drift = -0.048 dB
Peak SAR (extrapolated) = 1.68 W/kg
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.604 mW/g
Maximum value of SAR (measured) = 1.28 mW/g



Date/Time: 2006-06-14 12:05:22

Test Laboratory: Sony Ericsson Mobile Communications
File Name: ch661_Left_Tilt_060614_RP.da4

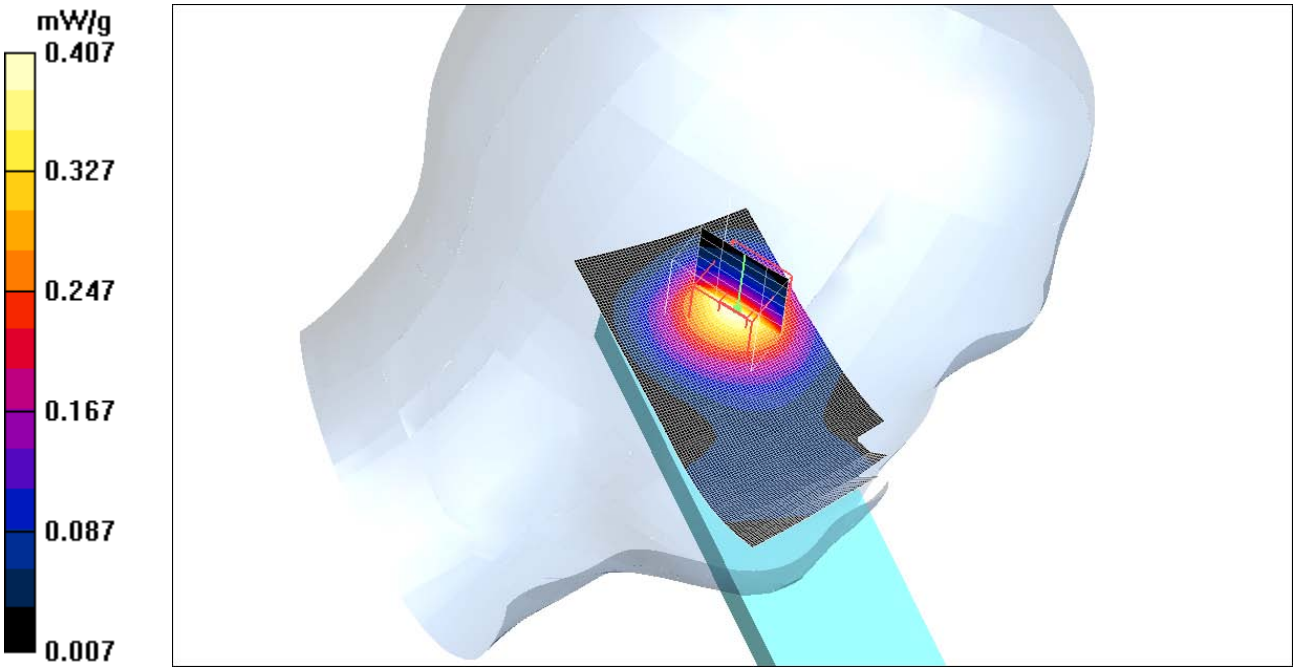
DUT: PY7AD022044; Type: GSM900,1800,1900 and UMTS; Serial: #4929
Program Name: SAR Measurement on the Head

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
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 (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.408 mW/g

Left, Tilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = 0.066 dB
Peak SAR (extrapolated) = 0.556 W/kg
SAR(1 g) = 0.371 mW/g; SAR(10 g) = 0.223 mW/g
Maximum value of SAR (measured) = 0.407 mW/g



Date/Time: 2006-06-14 10:08:16

Test Laboratory: Sony Ericsson Mobile Communications
File Name: ch661_Right_Tilt_060614_RP.da4

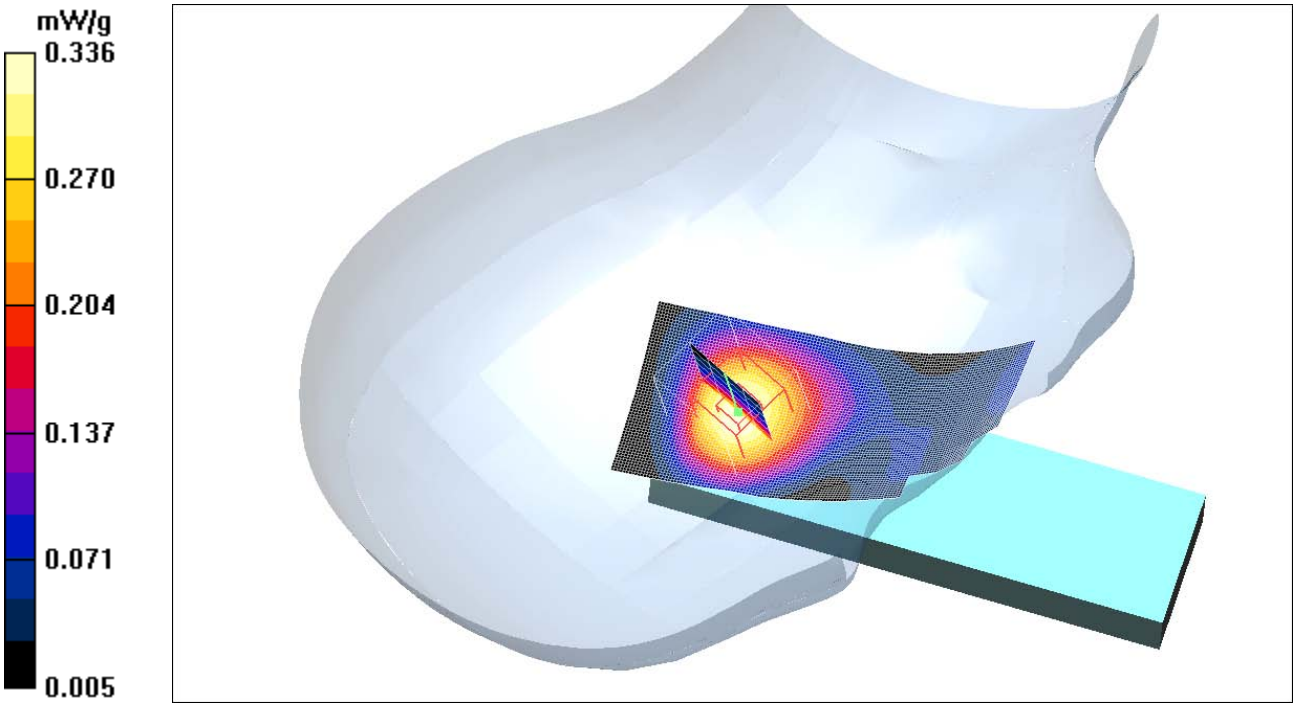
DUT: PY7AD022044; Type: GSM900,1800,1900 and UMTS; Serial: #4929
Program Name: SAR Measurement on the Head

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
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 (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.335 mW/g

Right, Tilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.311 mW/g; SAR(10 g) = 0.198 mW/g
Maximum value of SAR (measured) = 0.336 mW/g



Date/Time: 2006-06-15 11:13:32

Test Laboratory: Sony Ericsson Mobile Communications
File Name: ch512_15mm_Speech_BT_060615_RP.da4

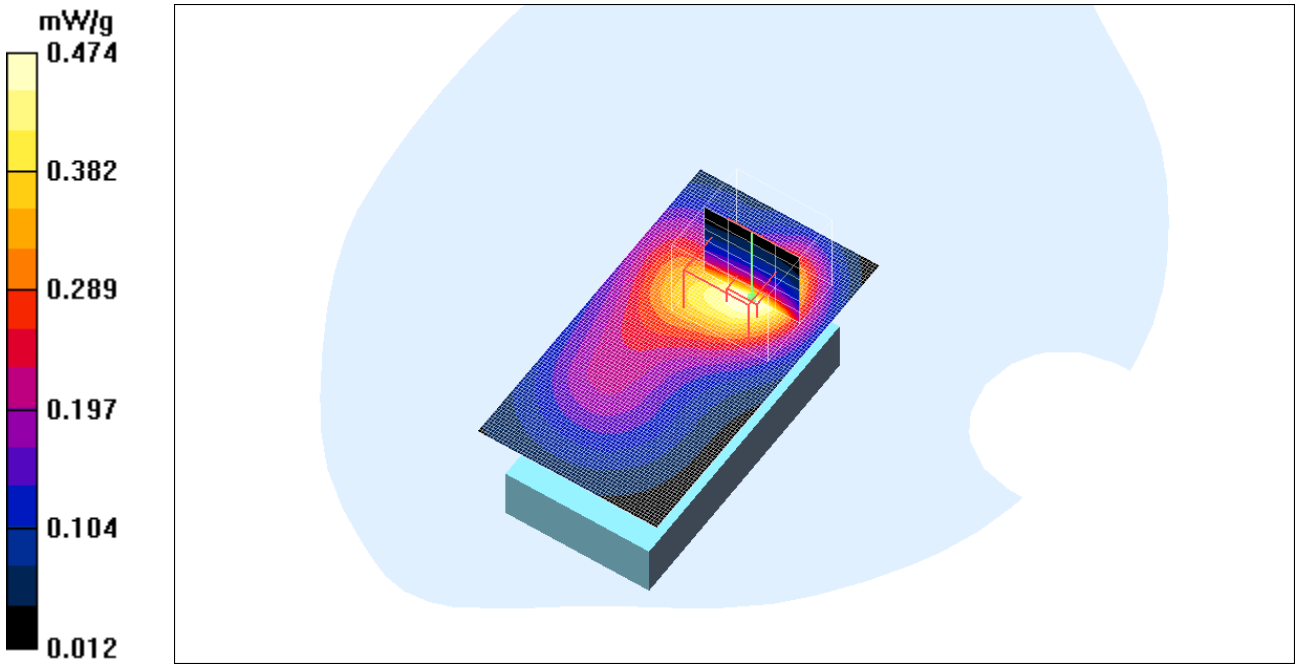
DUT: PY7AD022044; Type: GSM900,1800,1900 and UMTS; Serial: #4929
Program Name: Measurement on the Body

Communication System: GSM 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1850.2 MHz; σ = 1.4 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
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,Speech,PHF,15mm/Area Scan (61x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.483 mW/g

Flat,Speech,PHF,15mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.5 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 0.687 W/kg
SAR(1 g) = 0.429 mW/g; SAR(10 g) = 0.256 mW/g
Maximum value of SAR (measured) = 0.474 mW/g



Date/Time: 2006-06-15 09:16:25

Test Laboratory: Sony Ericsson Mobile Communications
File Name: ch512_15mm_GPRS2Slot_060615_RP.da4

DUT: PY7AD022044; Type: GSM900,1800,1900 and UMTS; Serial: #4929
Program Name: Measurement on the Body

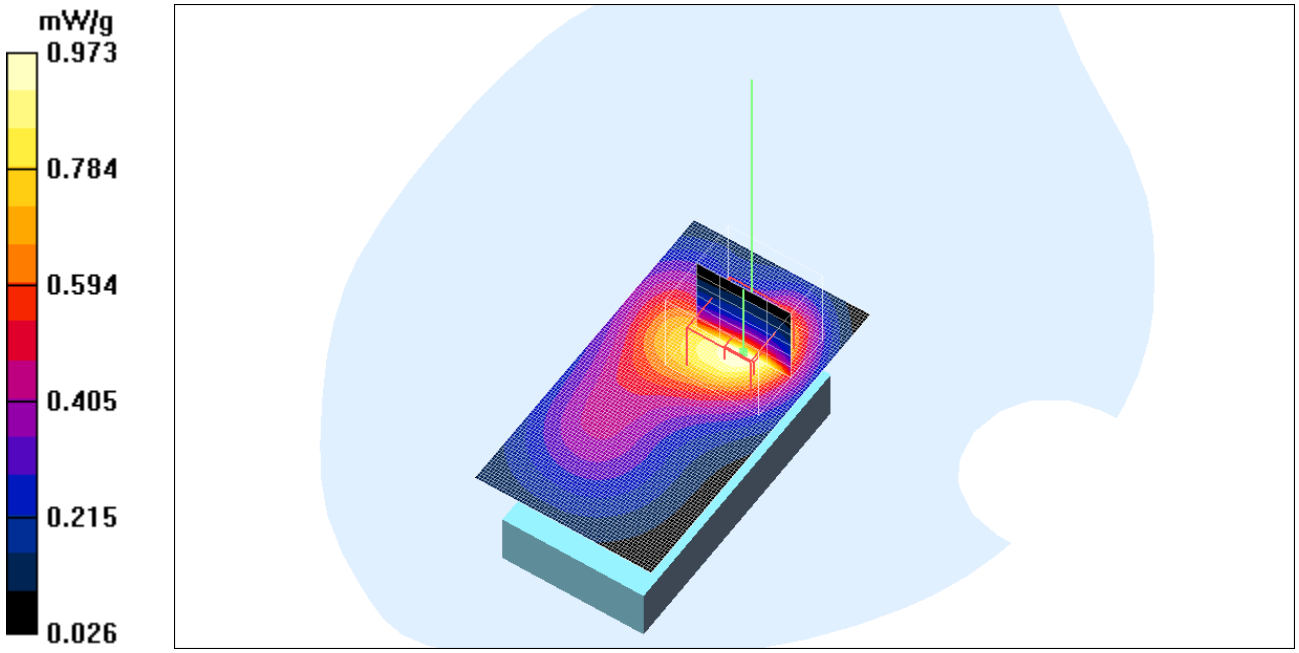
Communication System: GSM1900_GPRS; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1850.2 MHz; σ = 1.4 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

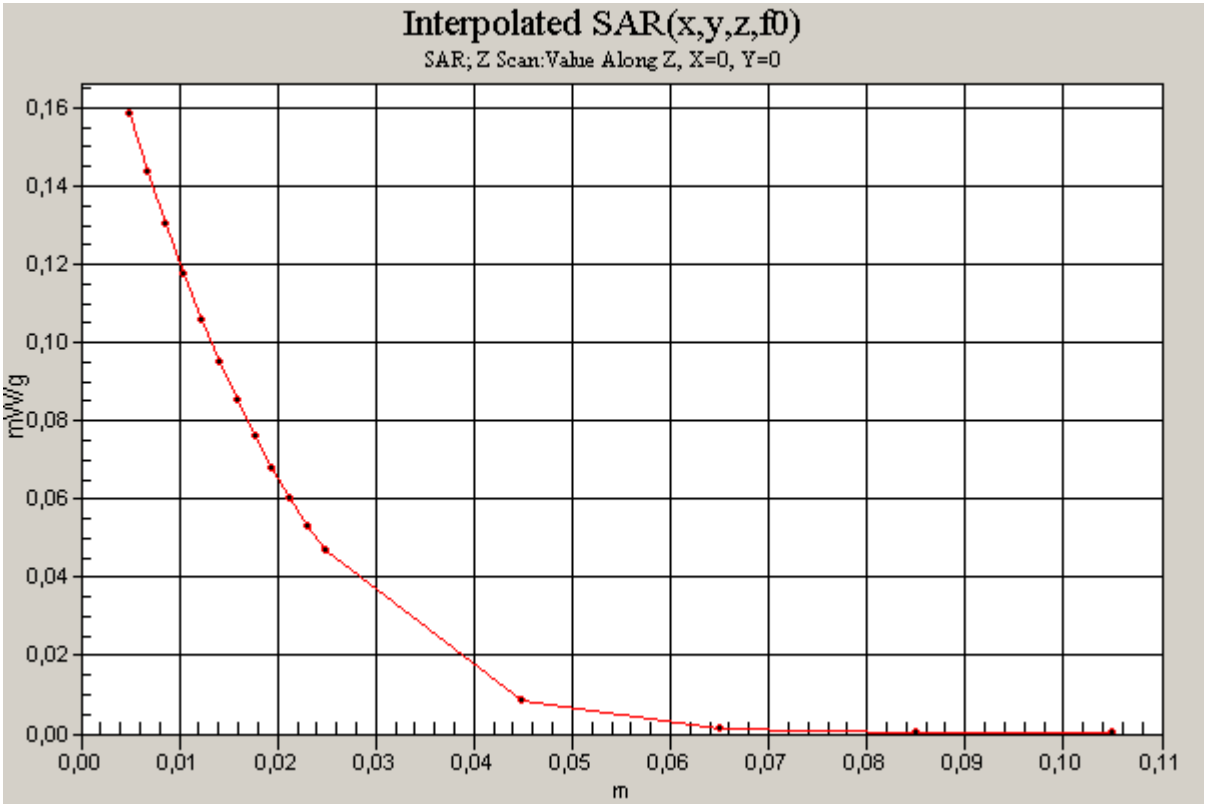
DASY4 Configuration:
- Probe: ET3DV6 - SN1815; ConvF(4.6, 4.6, 4.6); Calibrated: 2006-01-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 SN640; Calibrated: 2006-01-18
- Phantom: SAM 6; Type: SAM; Serial: 1351
- Measurement SW: DASY4, V4.6 Build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

Flat,GPRS2Slots,15mm/Area Scan (61x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.000 mW/g

Flat,GPRS2Slots,15mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = -0.121 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.890 mW/g; SAR(10 g) = 0.527 mW/g
Maximum value of SAR (measured) = 0.973 mW/g

Flat,GPRS2Slots,15mm/Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.158 mW/g




Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
0,00
0,01
0,02
0,03
0,04
0,05
0,06
0,07
0,08
0,09
0,10
0,11
m

Date/Time: 2006-06-15 10:52:55

Test Laboratory: Sony Ericsson Mobile Communications
File Name: ch512_15mm_Speech_PHF_060615_RP.da4

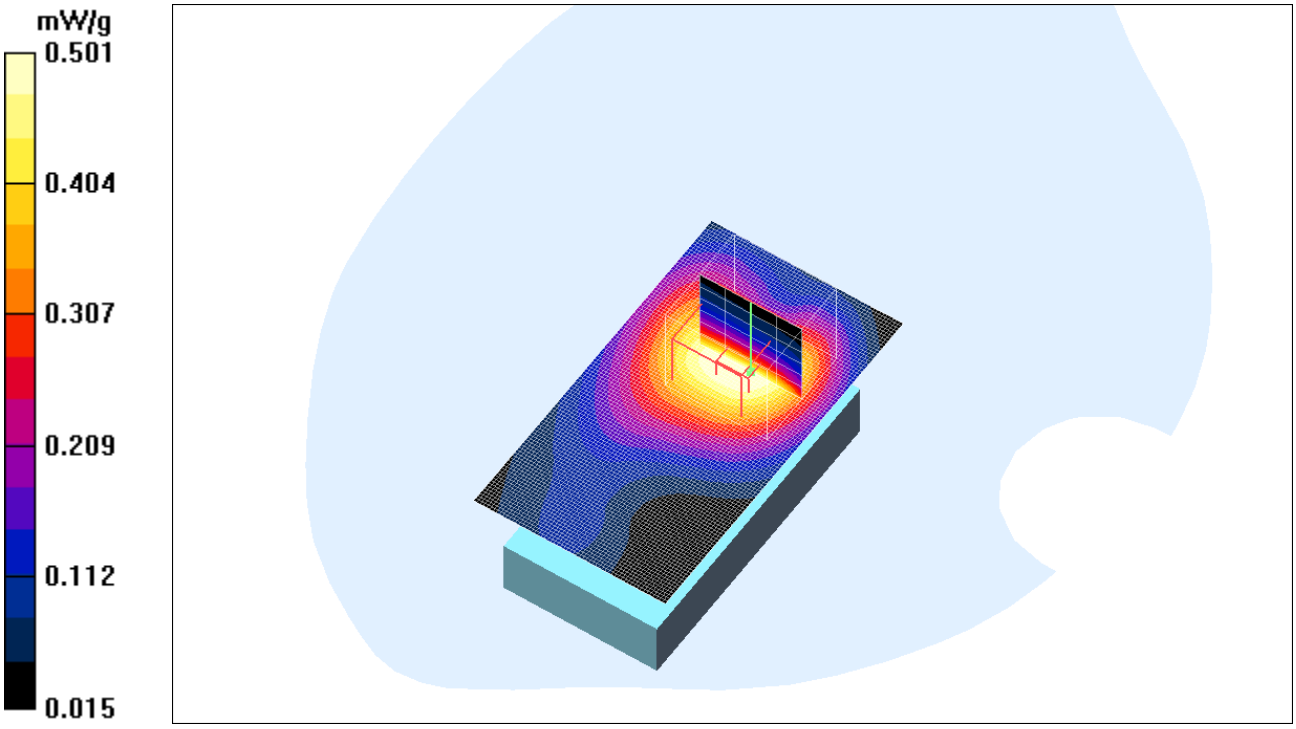
DUT: PY7AD022044; Type: GSM900,1800,1900 and UMTS; Serial: #4929
Program Name: Measurement on the Body

Communication System: GSM 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1850.2 MHz; σ = 1.4 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
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,Speech,PHF,15mm/Area Scan (61x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.509 mW/g

Flat,Speech,PHF,15mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = -0.127 dB
Peak SAR (extrapolated) = 0.692 W/kg
SAR(1 g) = 0.463 mW/g; SAR(10 g) = 0.294 mW/g
Maximum value of SAR (measured) = 0.501 mW/g



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

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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: 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

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

Issued: January 20, 2006

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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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

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:1815

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

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1815

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

NormX	**1.95** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**93** mV
NormY	**2.02** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**93** mV
NormZ	**2.04** ± 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	7.7	4.3
SAR_{be} [%]	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_{be} [%]	Without Correction Algorithm	6.8	3.9
SAR_{be} [%]	With Correction Algorithm	0.1	0.3

Sensor Offset

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

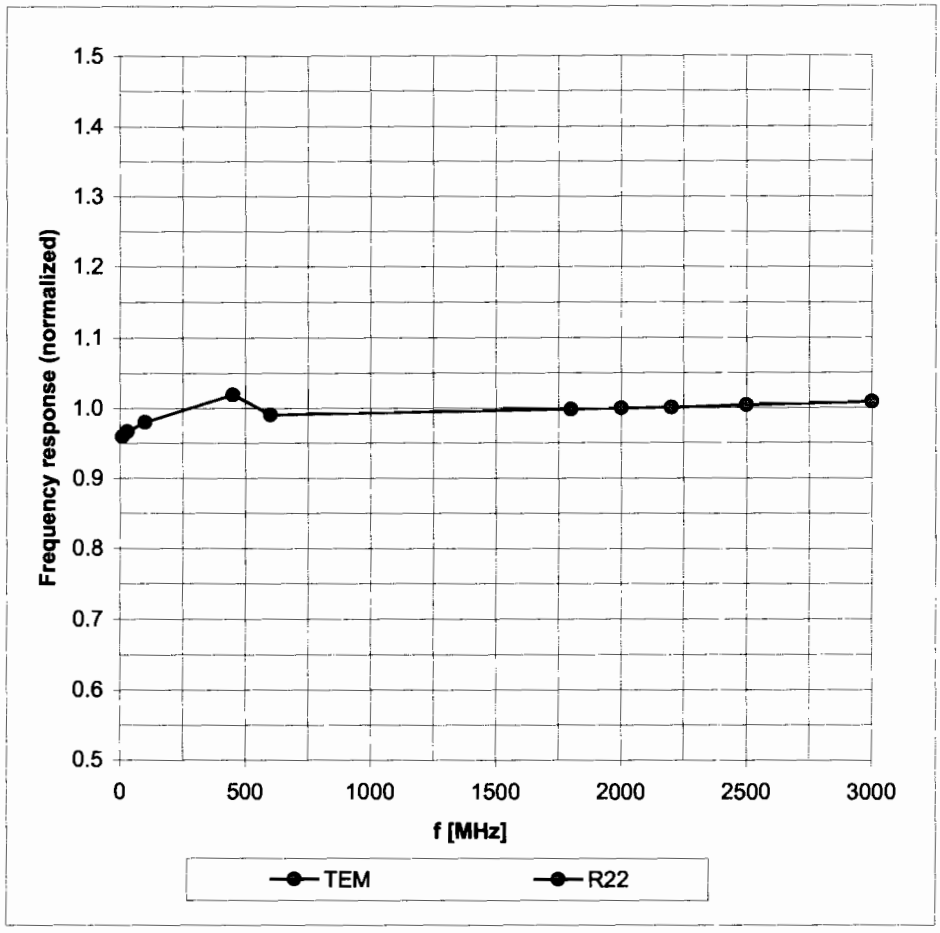
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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

[B] Numerical linearization parameter: uncertainty not required.

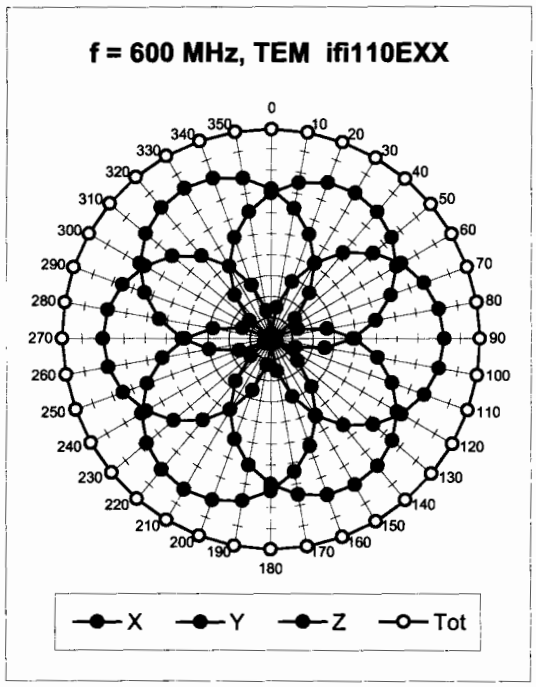
Frequency Response of E-Field

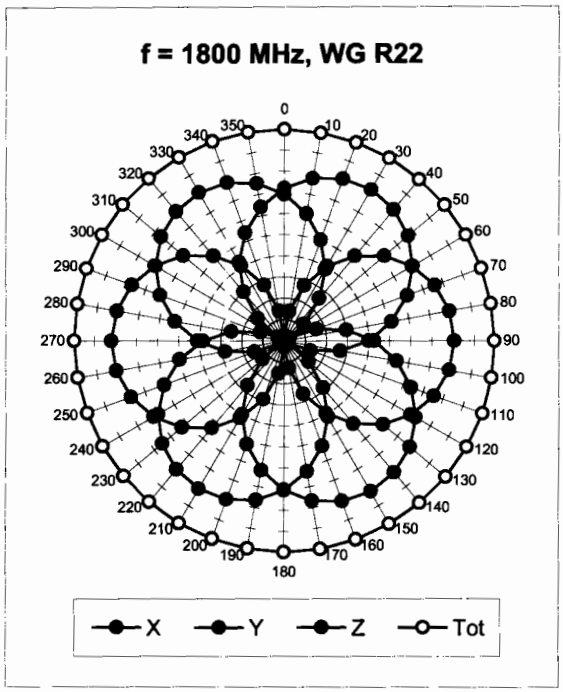
(TEM-Cell:ifi110 EXX, Waveguide: R22)

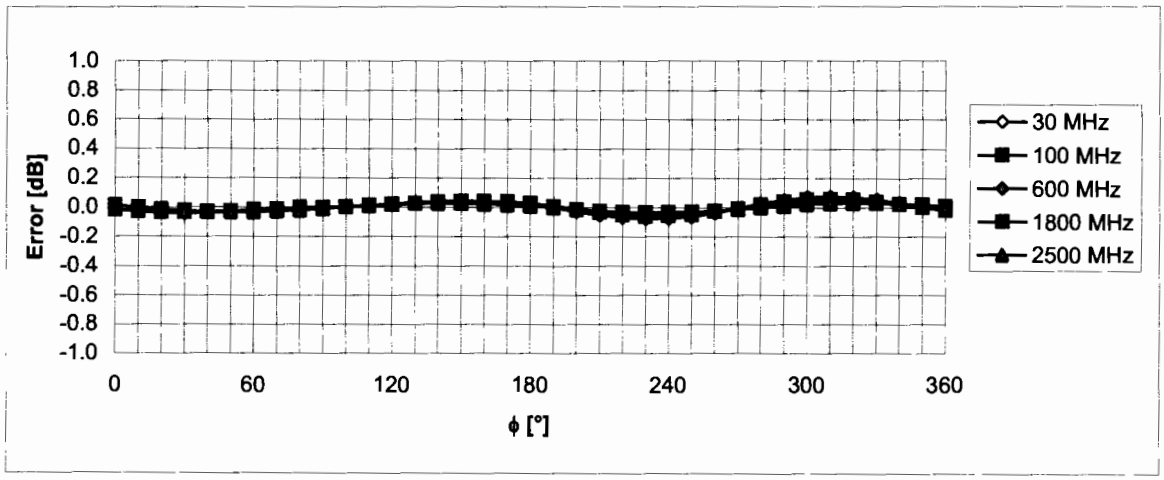


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



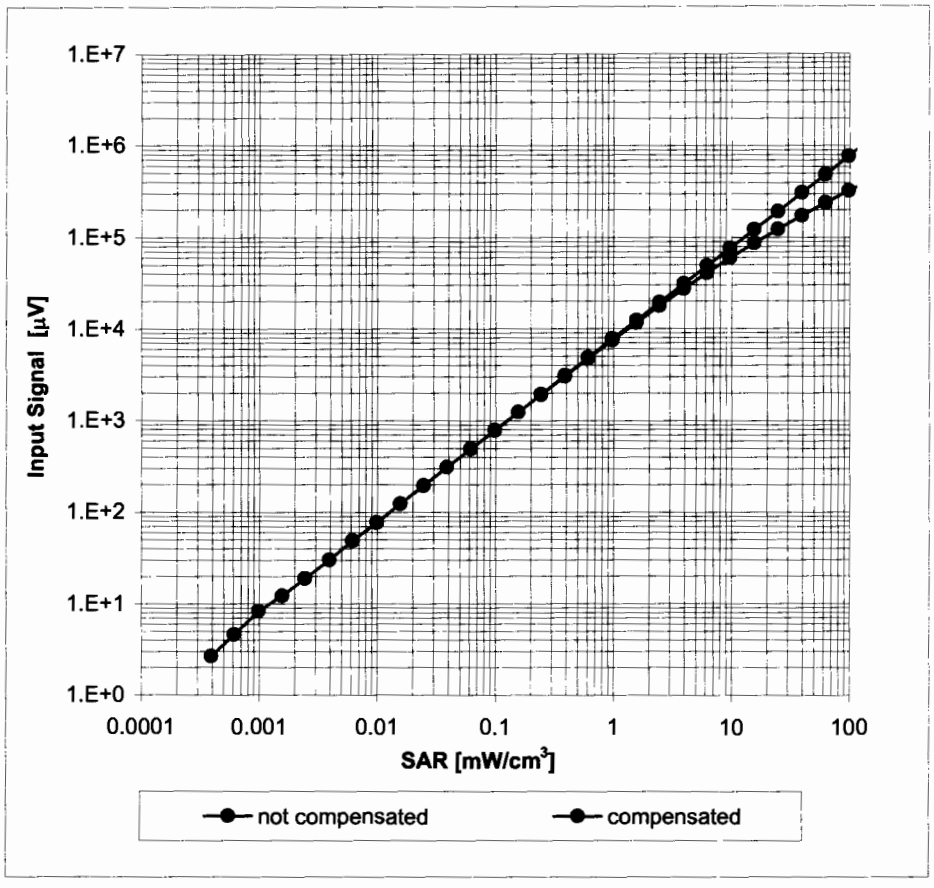


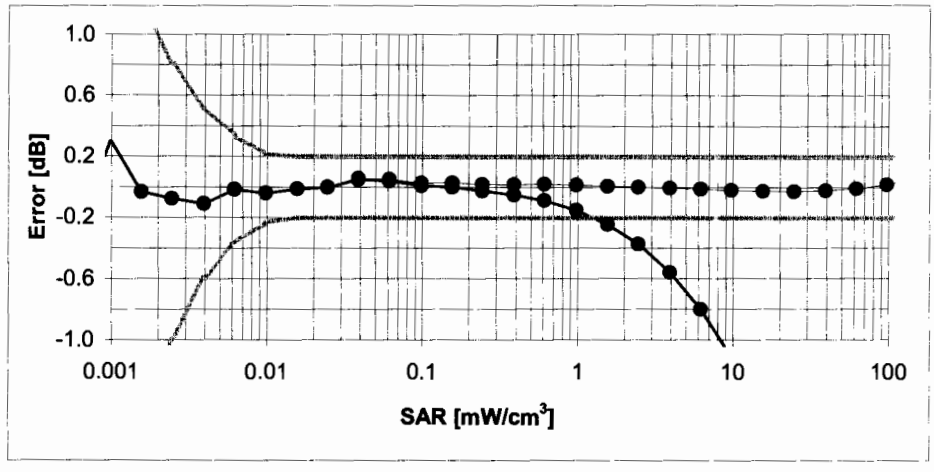


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

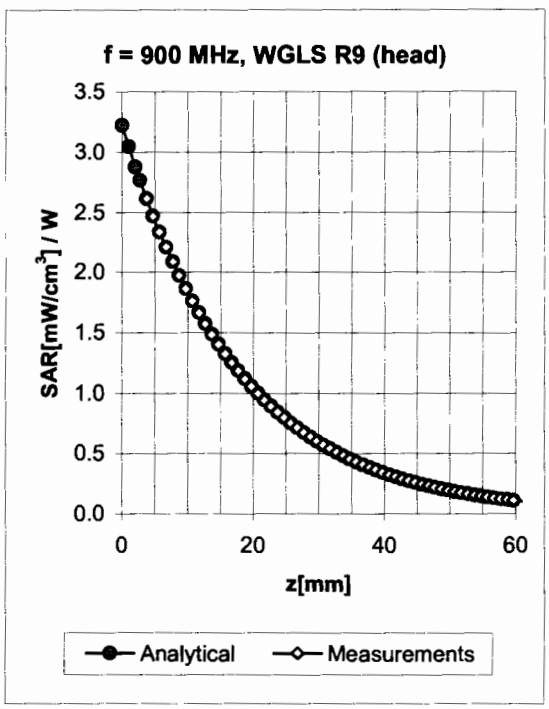
(Waveguide R22, f = 1800 MHz)

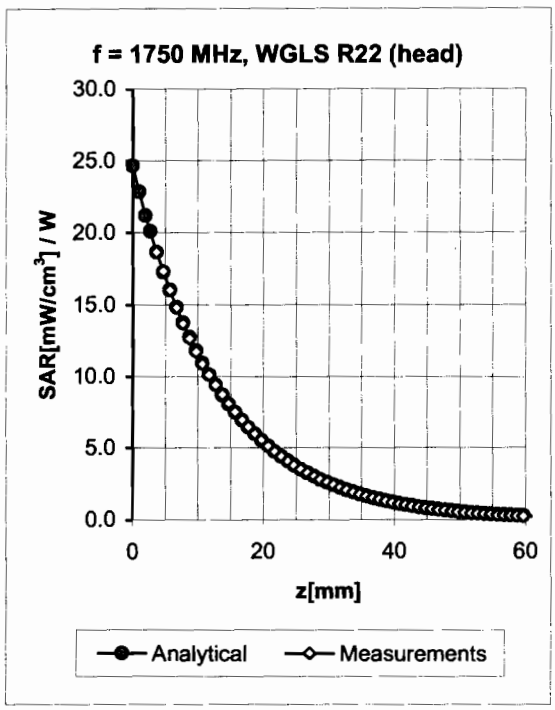




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



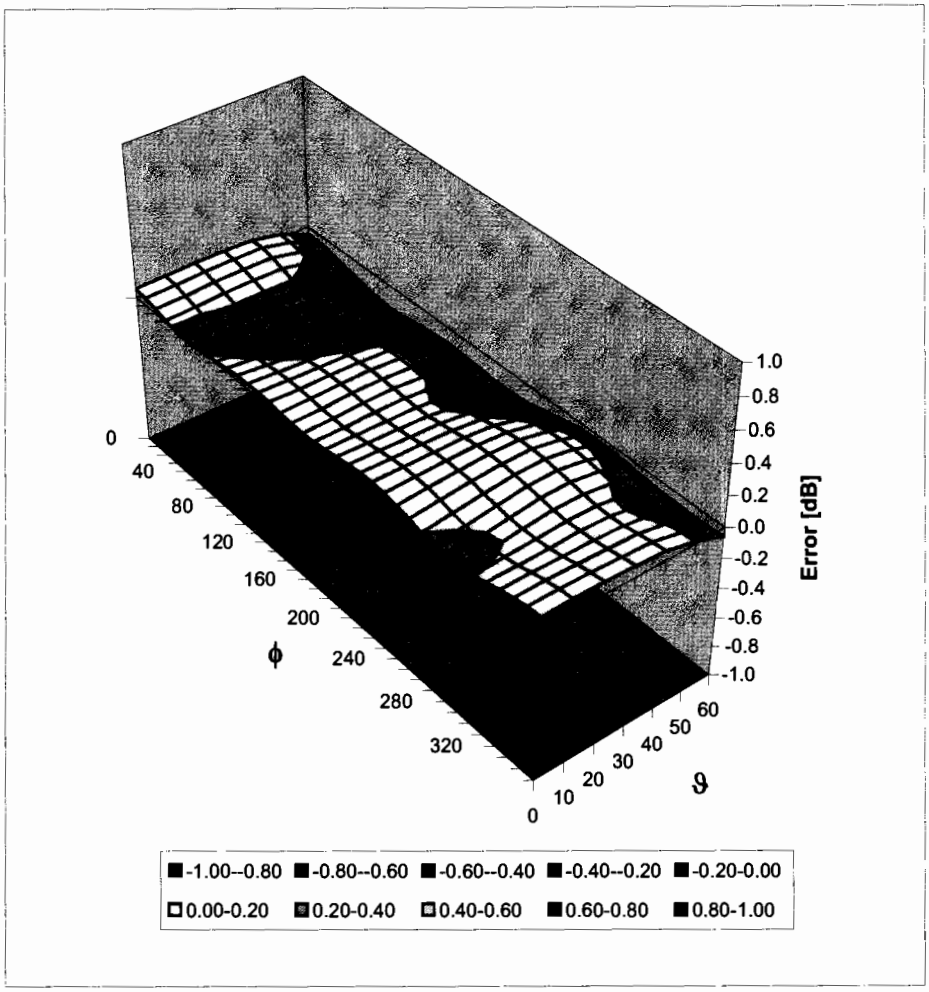


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.54	1.76	6.82 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.48	1.93	6.66 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.54	1.72	5.40 ± 11.0% (k=2)
1900	± 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: ± 2.6% (k=2)