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T117 (EN ISO/IEC 17025)

SAR Compliance Test Report

Test report no.:	Cph_SAR_0608_02	**Date of report:**	2006-02-21
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Tested device:	RM-162		
FCC ID:	PPIRM-162	**IC:**	661U-RM162
Supplement reports:	-		

Testing has been carried out in accordance with:

47CFR §2.1093
Radiofrequency Radiation Exposure Evaluation: Portable Devices

FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)
Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

RSS-102
Evaluation Procedure for Mobile and Portable Radio Transmitters with Respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields

IEEE 1528 - 2003
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

Documentation: The documentation of the testing performed on the tested devices is archived for 15 years at TCC.

Test results: **The tested device complies with the requirements in respect of all parameters subject to the test.** The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.

Date and signatures: **2006-03-07**

For the contents:

Jesper Nielsen
Test Engineer

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2006-01-30 to 2006-02-21
SN, HW and SW numbers of tested device	IMEI: 004400/78/170010/7 HW: 3000 SW: Vpbl05w07_05w49.1 DUT#28217 (V1)
Batteries used in testing	BL-4C, DUT#28480, DUT#28481, DUT#28482
Headsets used in testing	HS-6, DUT# 28715
Other accessories used in testing	-
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

The maximum measured SAR values for Head configuration and Body Worn configuration are given in section 1.2.1 and 1.2.2 respectively. The device conforms to the requirements of the standard(s) when the maximum measured SAR value is less than or equal to the limit.

1.2.1 Head Configuration

Mode	Ch / *f* (MHz)	Radiated power	Position	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
GSM850	251 / 848.8	32.9 dBm ERP	Right, Cheek	0.51 W/kg	**0.57 W/kg**	1.6 W/kg	PASSED
2-slot GPRS1900	512 / 1850.2	30.7 dBm EIRP	Right, Cheek	0.57 W/kg	**0.64 W/kg**	1.6 W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Ch / *f* (MHz)	Radiated power	Separation distance	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
GSM850	251 / 848.8	31.7 dBm ERP	2.2 cm	0.45 W/kg	**0.50 W/kg**	1.6 W/kg	PASSED
2-slot GPRS1900	810 / 1909.8	31.2 dBm EIRP	2.2 cm	0.43 W/kg	**0.48 W/kg**	1.6 W/kg	PASSED

*SAR values are scaled up by 12% to cover measurement drift.

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1.2.3 Maximum Drift

Maximum drift covered by 12% scaling up of the SAR values	Maximum drift during measurements
0.5dB	-0.27 dB

1.2.4 Measurement Uncertainty

Expanded Uncertainty (k=2) 95%	± 25.8%

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2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	General population / uncontrolled

Modes and Bands of Operation	GSM 850 / 1900	GPRS 850 / 1900	EGPRS 850 / 1900	BT
Modulation Mode	GMSK	GMSK	GMSK / 8PSK	GFSK
Duty Cycle	1/8	1/8 or 2/8	1/8 or 2/8	
Transmitter Frequency Range (MHz)	824 – 849 1850 - 1910	824 – 849 1850 - 1910	824 – 849 1850 - 1910	2402-2480

Outside of USA and Canada, the transmitter of the device is capable of operating also in the 1800 band, which is not part of this filing.

This device has Push to Talk capability for use at the ear. Therefore, SAR for 2-slot GPRS mode was evaluated against the head profile of the phantom.

2.1 Picture of the Device

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2.2 Description of the Antenna

The device has an external stubby antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	20.5 to 21.5
Ambient humidity (RH %):	35 to 55

3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester. Communication between the device and the call tester was established by air link.

The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.

In all operating bands the measurements were performed on lowest, middle and highest channels.

The radiated output power of the device was measured by a separate test laboratory on the same unit as used for SAR testing.

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4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

The measurements were performed using an automated near-field scanning system, DASY4, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the'advanced extrapolation' algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE 3	573	12 months	2006-09
DAE 3	339	12 months	2006-08
E-field Probe ET3DV6	1808	12 months	2006-08
E-field Probe ET3DV6	1813	12 months	2006-09
Dipole Validation Kit, D835V2	476	24 months	2006-09
Dipole Validation Kit, D1900V2	5d063	24 months	2008-01
DASY4 software	Version 4.6	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	SME06	848650/011	36 months	2008-07
Amplifier	ZHL-42W	E012903	-	-
Power Meter	NRVD	840297/008	24 months	2007-11
Power Sensor	NRV-Z51	100184	24 months	2007-11
Call Tester	CMU200	836203/022	-	-
Call Tester	4400M	0411216	-	-
Vector Network Analyzer	AT8753ES	MY40001091	12 months	2006-08
Dielectric Probe Kit	HP85070B	US33020403	-	-

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4.1.1 Isotropic E-field Probe Type 1808 & 1813

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., butyl diglycol)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 3 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.2 Phantoms

The phantom used for all tests i.e. for both system checking and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2003.

System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

The SPEAG device holder (see Section 5.1) was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

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4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 - 2003 and FCC Supplement C to OET Bulletin 65. All tests were carried out using simulants whose dielectric parameters were within ± 5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

The depth of the tissue simulant was 15.0 ± 0.5 cm measured from the ear reference point during system checking and device measurements.

4.3.1 Tissue Simulant Recipes

The following recipes were used for Head and Body tissue simulants:

800MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	39.74	55.97
HEC	0.25	1.21
Sugar	58.31	41.76
Preservative	0.15	0.27
Salt	1.55	0.79

1900MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	54.88	69.02
Butyl Diglycol	44.91	30.76
Salt	0.21	0.22

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4.3.2 System Checking

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system checking results (dielectric parameters and SAR values) are given in the table below.

System checking, head tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
835	Reference result	2.27	42.0	0.91	
	± 10% window	2.04 - 2.50			
	2006-02-21	2.44	40.3	0.88	21.4
1900	Reference result	10.3	38.6	1.48	
	± 10% window	9.3 – 11.3			
	2006-01-31	10.3	38.7	1.41	21.6

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
835	Reference result	2.47	54.9	1.01	
	± 10% window	2.22 – 2.72			
	2006-01-30	2.48	52.9	0.98	21.7
1900	Reference result	10.5	53.0	1.53	
	± 10% window	9.5 - 11.6			
	2006-02-20	10.3	52.0	1.52	21.6

Plots of the system checking scans are given in Appendix A.

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4.3.3 Tissue Simulants used in the Measurements

Head tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
	Recommended value	41.5	0.90	
	± 5% window	39.4 – 43.6	0.86 – 0.95	
836	2006-02-21	40.3	0.88	21.4
	Recommended value	40.0	1.40	
	± 5% window	38.0 – 42.0	1.33 – 1.47	
1880	2006-01-31	38.8	1.40	21.6

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
	Recommended value	55.2	0.97	
	± 5% window	52.4 – 58.0	0.92 – 1.02	
836	2006-01-30	52.8	0.98	21.7
	Recommended value	53.3	1.52	
	± 5% window	50.6 – 56.0	1.44 – 1.60	
1880	2006-02-20	52.1	1.49	21.6

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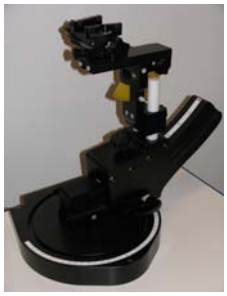
5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.



Device holder supplied by SPEAG

A Nokia designed spacer (illustrated below) was used to position the device within the SPEAG holder. The spacer positions the device so that the holder has minimal effect on the test results but still holds the device securely. The spacer was removed before the tests.

Nokia spacer

5.2 Test Positions

5.2.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

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The positions used in the measurements were according to IEEE 1528 - 2003 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

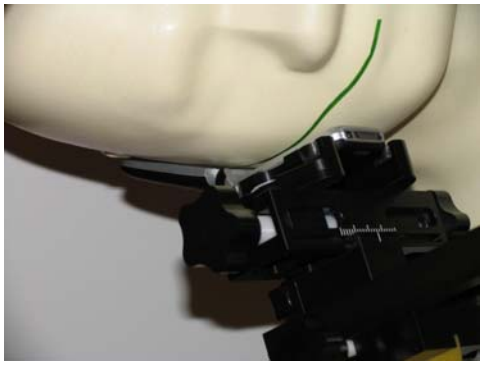

Photo of the device in “cheek” position

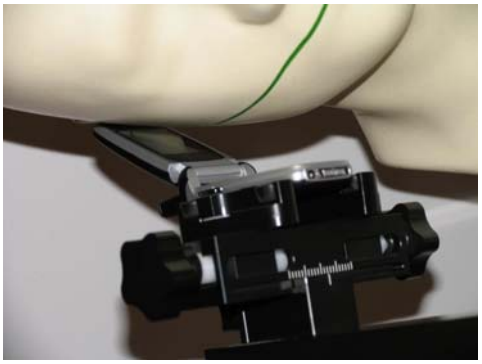

Photo of the device in “tilt” position

5.2.2 Body Worn Configuration

The device was placed in the SPEAG holder using the Nokia spacer and placed below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance indicated in the photo below using a separate flat spacer that was removed before the start of the measurements. The device was oriented with its antenna facing the phantom since this orientation gives higher results.

Photo of the device positioned for Body SAR measurement.
The spacer was removed for the tests.

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5.3 Scan Procedures

First, area scans were used for determination of the field distribution. Next, a zoom scan, a minimum of 5x5x7 points covering a volume of at least 30x30x30mm, was performed around the highest E-field value to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

5.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within Dasy4 are all based on the modified Quadratic Shepard's method (Robert J. Renka, "Multivariate Interpolation Of Large Sets Of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighbouring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

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6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	c_i	$c_i . u_i$ (%)	v_i
Measurement System							
Probe Calibration	E2.1	±5.9	N	1	1	±5.9	∞
Axial Isotropy	E2.2	±4.7	R	√3	$(1-c_p)^{1/2}$	±1.9	∞
Hemispherical Isotropy	E2.2	±9.6	R	√3	$(c_p)^{1/2}$	±3.9	∞
Boundary Effect	E2.3	±1.0	R	√3	1	±0.6	∞
Linearity	E2.4	±4.7	R	√3	1	±2.7	∞
System Detection Limits	E2.5	±1.0	R	√3	1	±0.6	∞
Readout Electronics	E2.6	±1.0	N	1	1	±1.0	∞
Response Time	E2.7	±0.8	R	√3	1	±0.5	∞
Integration Time	E2.8	±2.6	R	√3	1	±1.5	∞
RF Ambient Conditions - Noise	E6.1	±3.0	R	√3	1	±1.7	∞
RF Ambient Conditions - Reflections	E6.1	±3.0	R	√3	1	±1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	±0.4	R	√3	1	±0.2	∞
Probe Positioning with respect to Phantom Shell	E6.3	±2.9	R	√3	1	±1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5	±3.9	R	√3	1	±2.3	∞
Test sample Related							
Test Sample Positioning	E4.2	±6.0	N	1	1	±6.0	11
Device Holder Uncertainty	E4.1	±5.0	N	1	1	±5.0	7
Output Power Variation - SAR drift measurement	6.6.3	±0.0	R	√3	1	±0.0	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	±4.0	R	√3	1	±2.3	∞
Conductivity Target - tolerance	E3.2	±5.0	R	√3	0.64	±1.8	∞
Conductivity - measurement uncertainty	E3.3	±5.5	N	1	0.64	±3.5	5
Permittivity Target - tolerance	E3.2	±5.0	R	√3	0.6	±1.7	∞
Permittivity - measurement uncertainty	E3.3	±2.9	N	1	0.6	±1.7	5
Combined Standard Uncertainty			RSS			**±12.9**	116
Coverage Factor for 95%			**k=2**				
Expanded Uncertainty						**±25.8**	

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7. RESULTS

The measured Head SAR values for the test device are tabulated below:

850 MHz Head SAR results

Hardware ID	Option used	Test configuration		SAR, averaged over 1g (W/kg)		
				Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
2-slot GPRS		**Power**		**32.0 dBm**	**31.9 dBm**	**32.6 dBm**
V1	Flip open	Left	Cheek	-	0.333	-
			Tilt	-	-	-
		Right	Cheek	-	-	-
			Tilt	-	-	-
GSM		**Power**		**31.9 dBm**	**32.1 dBm**	**32.9 dBm**
V1	Flip open	Left	Cheek	-	0.410	-
			Tilt	-	0.127	-
		Right	Cheek	0.300	0.413	**0.514**
			Tilt	-	0.146	-
EGPRS		**Power**		**27.1 dBm**	**26.7 dBm**	**28.2 dBm**
V1	Flip open	Right Cheek position		-	-	0.277
V1	GSM, Flip open	Right Cheek position with BT active		-	-	0.508

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1900 MHz Head SAR results

Hardware ID	Option used	Test configuration		SAR, averaged over 1g (W/kg)		
				Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
GSM		Power		33.0 dBm	32.1 dBm	32.0 dBm
V1	Flip open	Left	Cheek	-	0.260	-
			Tilt	-	-	-
		Right	Cheek	-	-	-
			Tilt	-	-	-
2-slot GPRS		Power		33.0 dBm	32.3 dBm	32.2 dBm
V1	Flip open	Left	Cheek	-	0.415	-
			Tilt	-	0.082	-
		Right	Cheek	**0.569**	0.548	0.522
			Tilt	-	0.105	-
EGPRS		Power		28.3 dBm	29.0 dBm	29.8 dBm
V1	Flip open	Right Cheek position		0.286	-	-
V1	2-slot GPRS, Flip open	Right Cheek position with BT active		0.558	-	-

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The measured Body SAR values for the test device are tabulated below:

850 MHz Body SAR results

Hardware ID	Option used	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
2-slot GPRS		Power	28.0 dBm	30.1 dBm	31.5 dBm
V1	Flip closed	Without headset	-	0.230	-
		Headset HS-6	-	-	-
GSM		Power	31.5 dBm	31.5 dBm	31.7 dBm
V1	Flip closed	Without headset	0.252	0.374	**0.449**
		Headset HS-6	0.147	0.218	0.288
V1	GSM Flip closed	without headset with BT active	-	-	0.433

1900 MHz Body SAR results

Hardware ID	Option used	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
GSM		Power	33.0 dBm	31.2 dBm	31.6 dBm
V1	Flip closed	Without headset	-	0.270	-
		Headset HS-6	-	-	-
2-slot GPRS		Power	33.0 dBm	31.9 dBm	31.2 dBm
V1	Flip closed	Without headset	0.392	0.398	**0.430**
		Headset HS-6	0.364	0.375	0.418
V1	2-slot GPRS Flip closed	without headset with BT active	-	-	0.407

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APPENDIX A: SYSTEM CHECKING SCANS

See the following pages.

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Date/Time: 2006-02-21 13:01:34

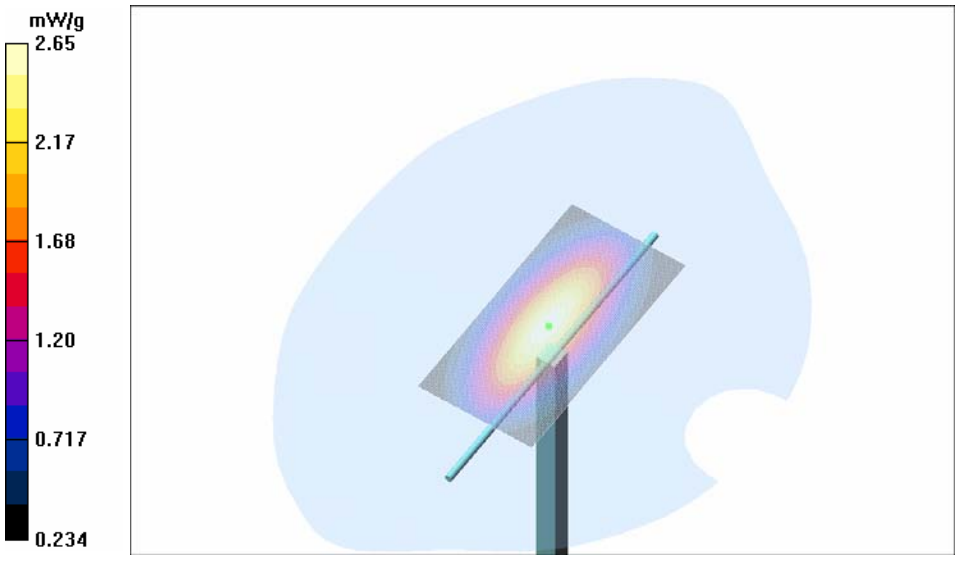
Test Laboratory: TCC Copenhagen
Type: D835V2; Serial: 476

Communication System: Continuous Wave
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 835 MHz; σ = 0.879 mho/m; εr = 40.3; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(6.17, 6.17, 6.17); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.61 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.6 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 3.71 W/kg
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.65 mW/g



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Date/Time: 2006-01-31 14:11:41

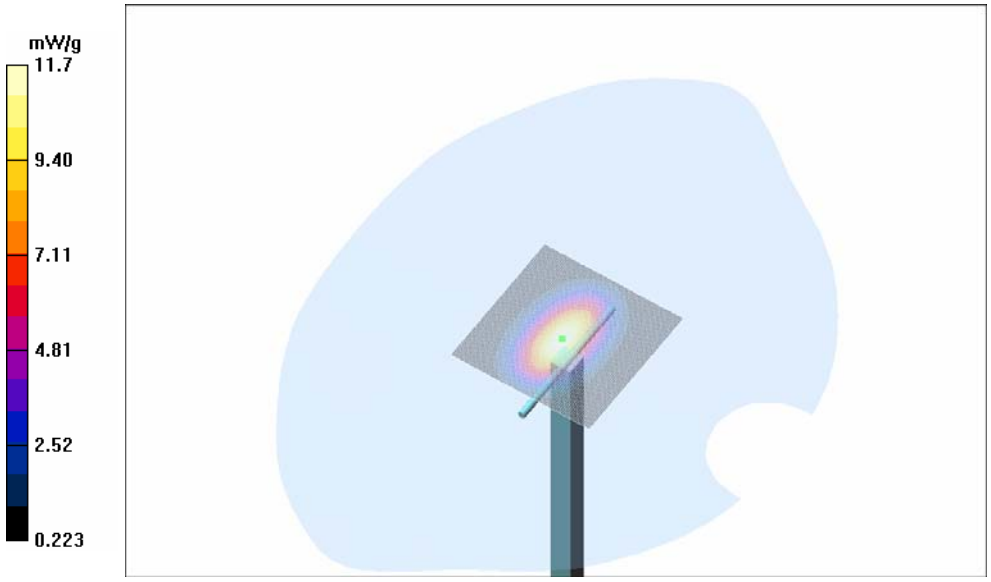
Test Laboratory: TCC Copenhagen
Type: D1900V2; Serial: 5d063

Communication System: Continuous Wave
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; εr = 38.7; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(4.78, 4.78, 4.78); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

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

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.9 V/m; Power Drift = 0.009 dB
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.39 mW/g
Maximum value of SAR (measured) = 11.7 mW/g



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Date/Time: 2006-01-30 15:54:46

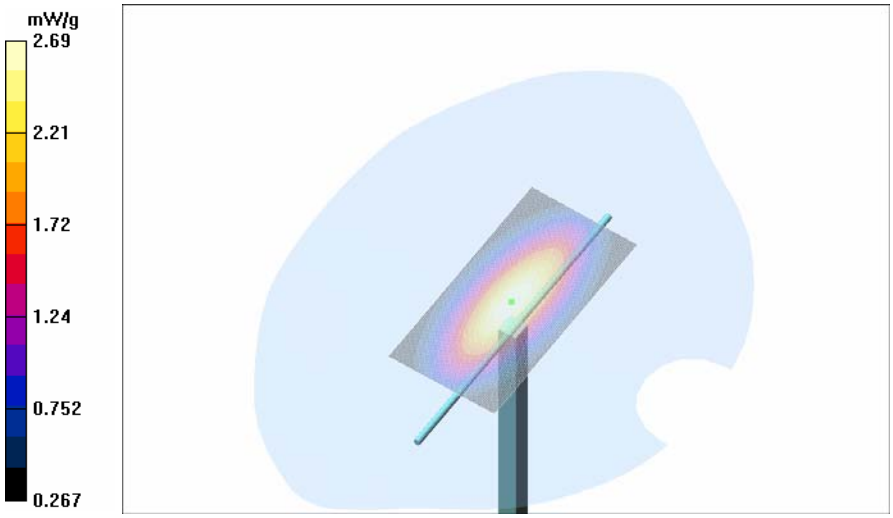
Test Laboratory: TCC Copenhagen
Type: D835V2; Serial: 476

Communication System: Continuous Wave
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.7 C
Medium parameters used: f = 835 MHz; σ = 0.982 mho/m; εr = 52.9; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(6.18, 6.18, 6.18); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 2; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.69 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.7 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 3.57 W/kg
SAR(1 g) = 2.48 mW/g; SAR(10 g) = 1.64 mW/g
Maximum value of SAR (measured) = 2.69 mW/g



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Date/Time: 2006-02-20 17:59:25

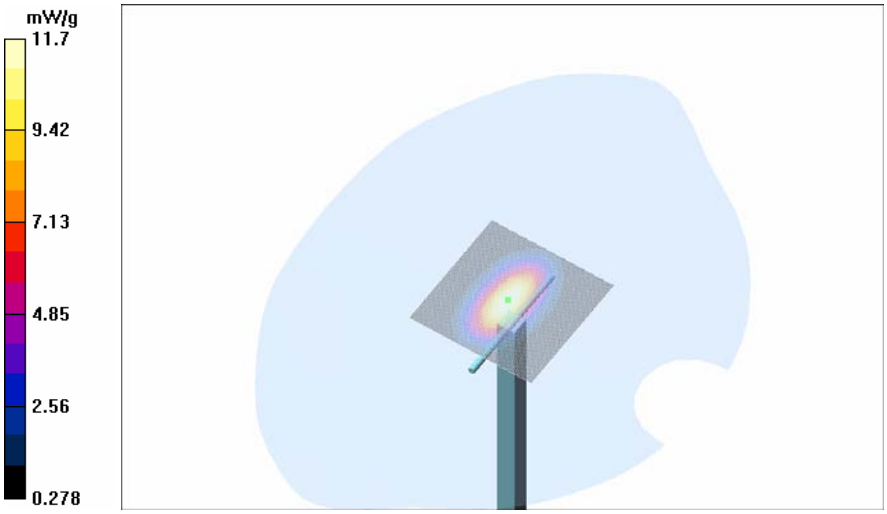
Test Laboratory: TCC Copenhagen
Type: D1900V2; Serial: 5d063

Communication System: Continuous Wave
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; εr = 52; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(4.36, 4.36, 4.36); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 12.0 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.4 V/m; Power Drift = 0.035 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.49 mW/g
Maximum value of SAR (measured) = 11.7 mW/g



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APPENDIX B: MEASUREMENT SCANS

SEE THE FOLLOWING PAGES

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Date/Time: 2006-02-21 15:02:50

Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

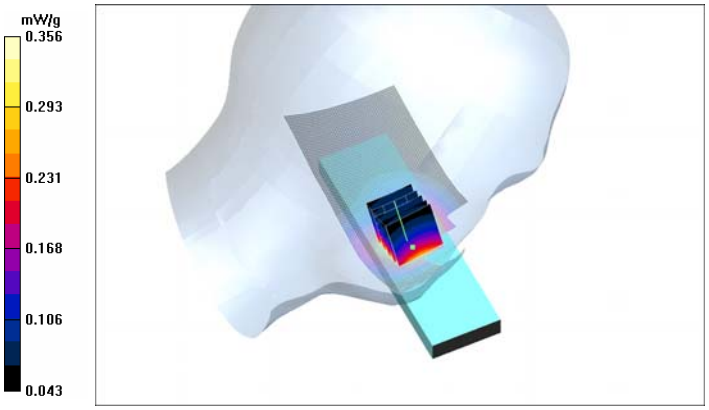
Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 837 MHz; σ = 0.881 mho/m; εr = 40.3; ρ = 1000 kg/m3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(6.17, 6.17, 6.17); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.342 mW/g

Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 4.91 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 0.461 W/kg
SAR(1 g) = 0.333 mW/g; SAR(10 g) = 0.240 mW/g

Warning: Maximum averaged SAR over 10 g is located on the boundary of the measurement cube. This cube might not incorporate the absolute averaged SAR. Please consider a refinement of the Area Scan measurement.
Maximum value of SAR (measured) = 0.356 mW/g



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Date/Time: 2006-02-21 14:31:03

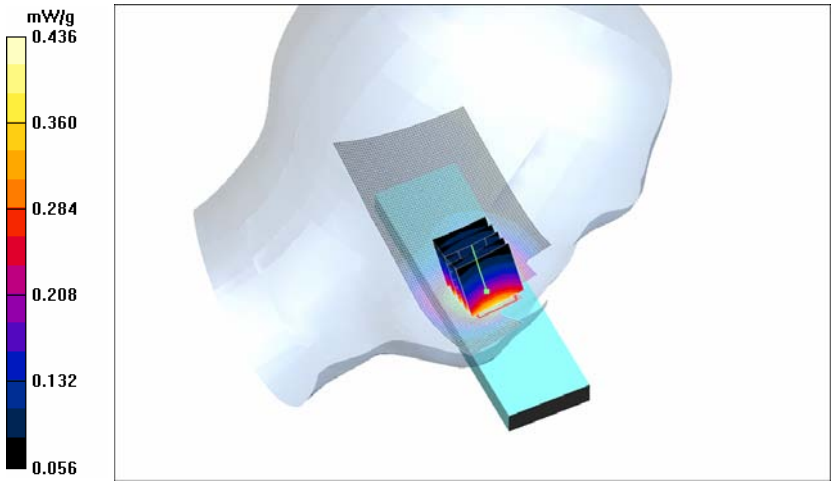
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 837 MHz; σ = 0.881 mho/m; εr = 40.3; ρ = 1000 kg/m3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(6.17, 6.17, 6.17); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.437 mW/g

Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.06 V/m; Power Drift = -0.146 dB
Peak SAR (extrapolated) = 0.543 W/kg
SAR(1 g) = 0.410 mW/g; SAR(10 g) = 0.293 mW/g
Maximum value of SAR (measured) = 0.436 mW/g



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Date/Time: 2006-02-21 14:49:30

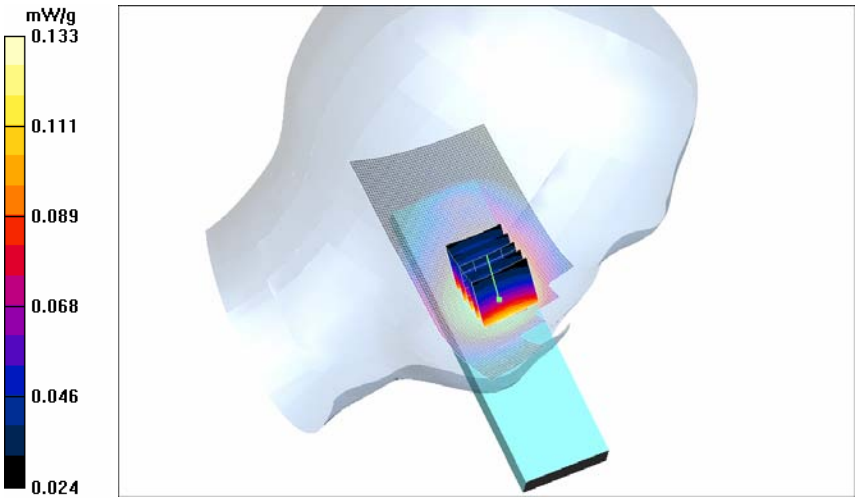
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 837 MHz; σ = 0.881 mho/m; εr = 40.3; ρ = 1000 kg/m3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(6.17, 6.17, 6.17); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.133 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.73 V/m; Power Drift = 0.006 dB
Peak SAR (extrapolated) = 0.159 W/kg
SAR(1 g) = 0.127 mW/g; SAR(10 g) = 0.097 mW/g
Maximum value of SAR (measured) = 0.133 mW/g



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Date/Time: 2006-02-21 16:43:09

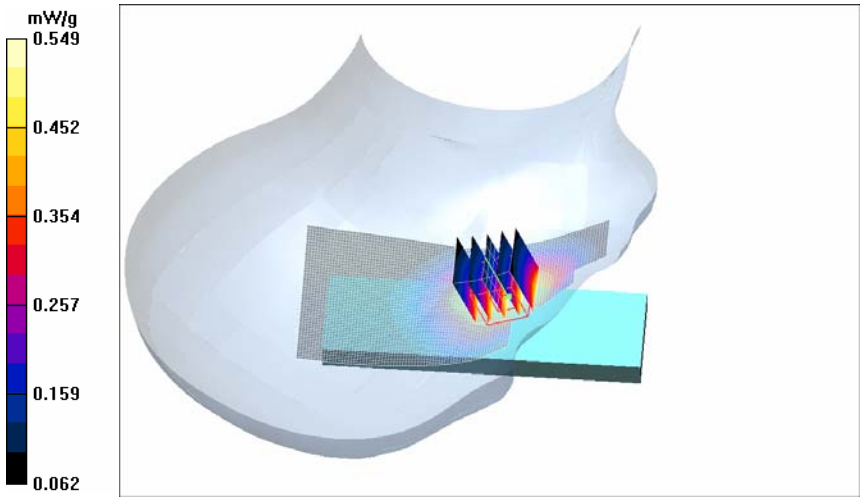
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM850
Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 849 MHz; σ = 0.893 mho/m; εr = 40.1; ρ = 1000 kg/m3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(6.17, 6.17, 6.17); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - High/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.545 mW/g

Cheek position - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.75 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 0.697 W/kg
SAR(1 g) = 0.514 mW/g; SAR(10 g) = 0.363 mW/g
Maximum value of SAR (measured) = 0.549 mW/g



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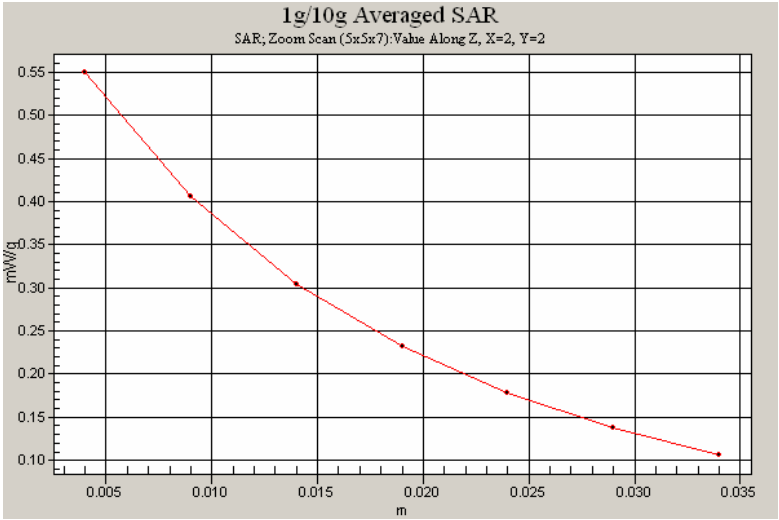

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Date/Time: 2006-02-21 15:45:27

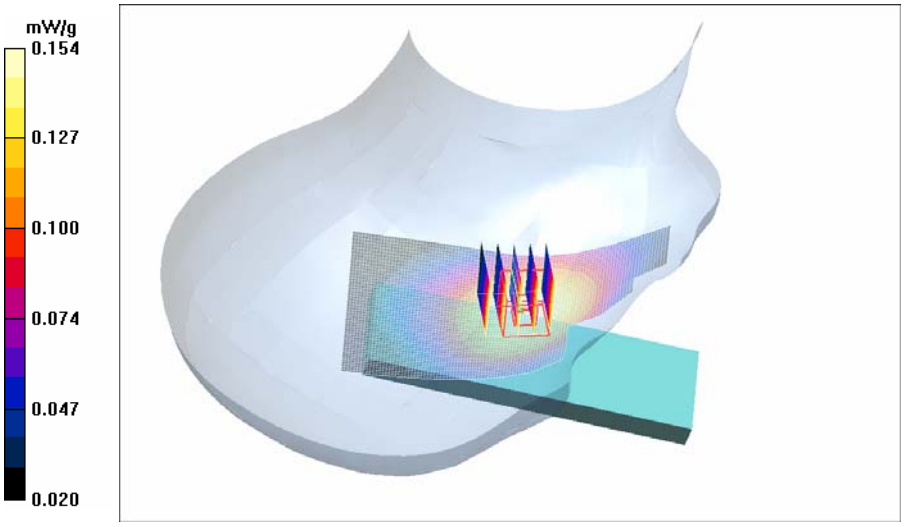
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 837 MHz; σ = 0.881 mho/m; εr = 40.3; ρ = 1000 kg/m3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(6.17, 6.17, 6.17); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.154 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.65 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.184 W/kg
SAR(1 g) = 0.146 mW/g; SAR(10 g) = 0.112 mW/g
Maximum value of SAR (measured) = 0.154 mW/g



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Date/Time: 2006-02-21 17:52:03

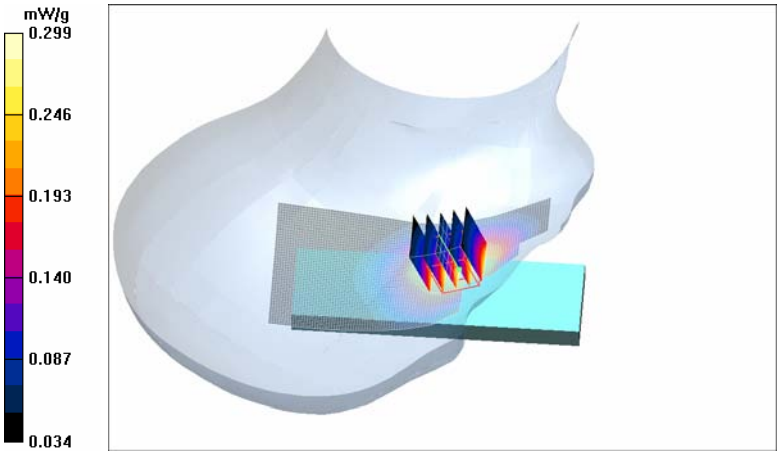
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot EGPRS850
Frequency: 848.8 MHz; Duty Cycle: 1:4.2
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 849 MHz; σ = 0.893 mho/m; εr = 40.1; ρ = 1000 kg/m3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(6.17, 6.17, 6.17); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - High/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.294 mW/g

Cheek position - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 4.20 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 0.375 W/kg
SAR(1 g) = 0.277 mW/g; SAR(10 g) = 0.197 mW/g
Maximum value of SAR (measured) = 0.299 mW/g



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Date/Time: 2006-02-21 17:10:11

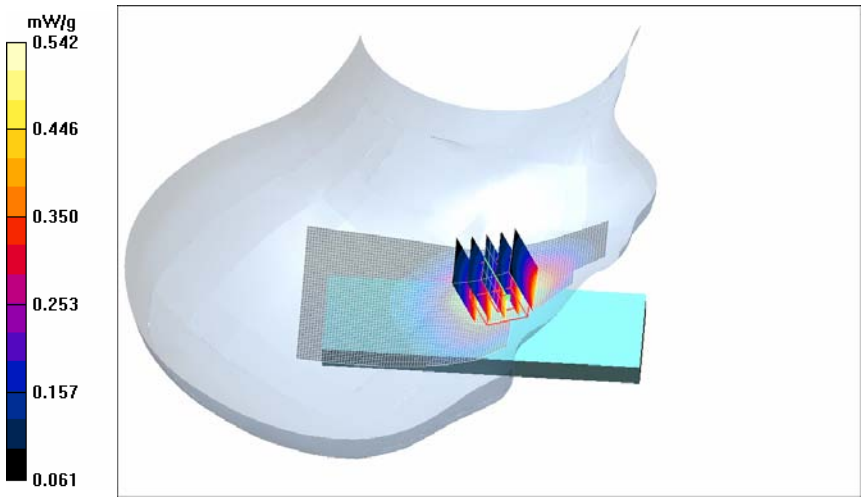
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM850
Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 849 MHz; σ = 0.893 mho/m; εr = 40.1; ρ = 1000 kg/m3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(6.17, 6.17, 6.17); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - High - BT active/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.538 mW/g

Cheek position - High - BT active/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.72 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 0.688 W/kg
SAR(1 g) = 0.508 mW/g; SAR(10 g) = 0.358 mW/g
Maximum value of SAR (measured) = 0.542 mW/g



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Date/Time: 2006-01-31 18:12:27

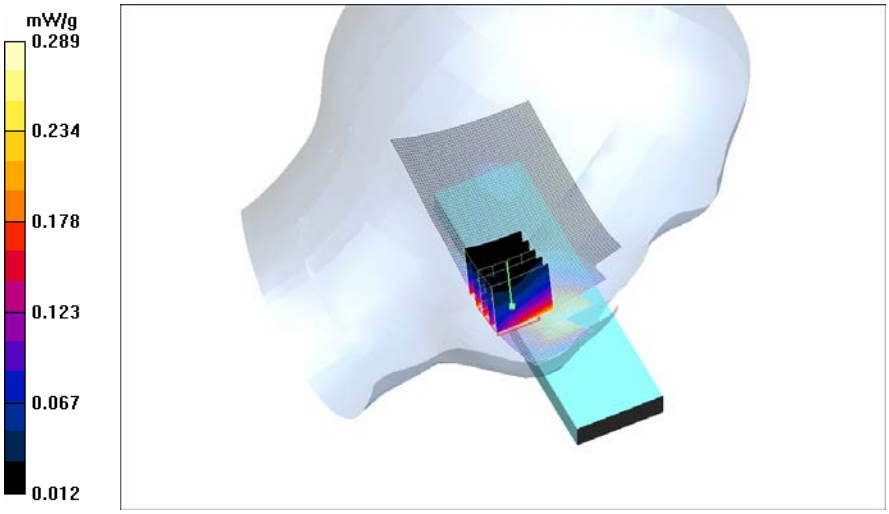
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; εr = 38.8; ρ = 1000 kg/m3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(4.78, 4.78, 4.78); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.287 mW/g

Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.20 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.442 W/kg
SAR(1 g) = 0.260 mW/g; SAR(10 g) = 0.150 mW/g
Maximum value of SAR (measured) = 0.289 mW/g



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Date/Time: 2006-01-31 14:49:19

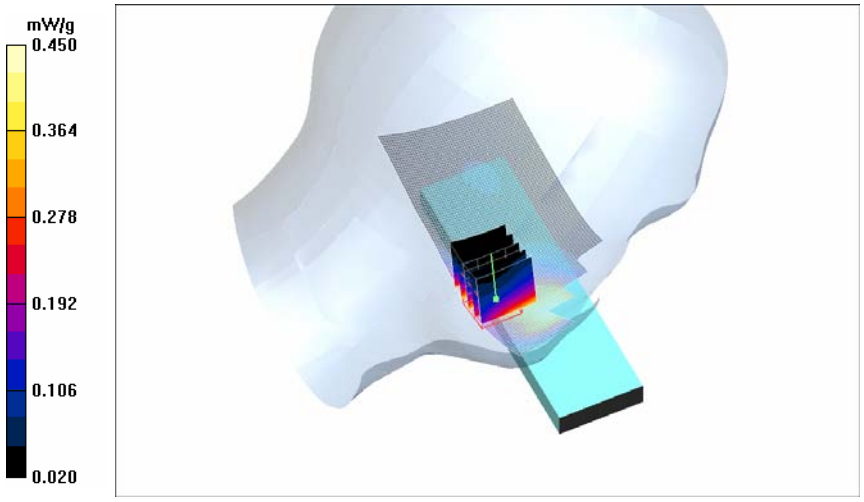
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; εr = 38.8; ρ = 1000 kg/m3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(4.78, 4.78, 4.78); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.458 mW/g

Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 6.57 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 0.712 W/kg
SAR(1 g) = 0.415 mW/g; SAR(10 g) = 0.241 mW/g
Maximum value of SAR (measured) = 0.450 mW/g



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Date/Time: 2006-01-31 15:06:39

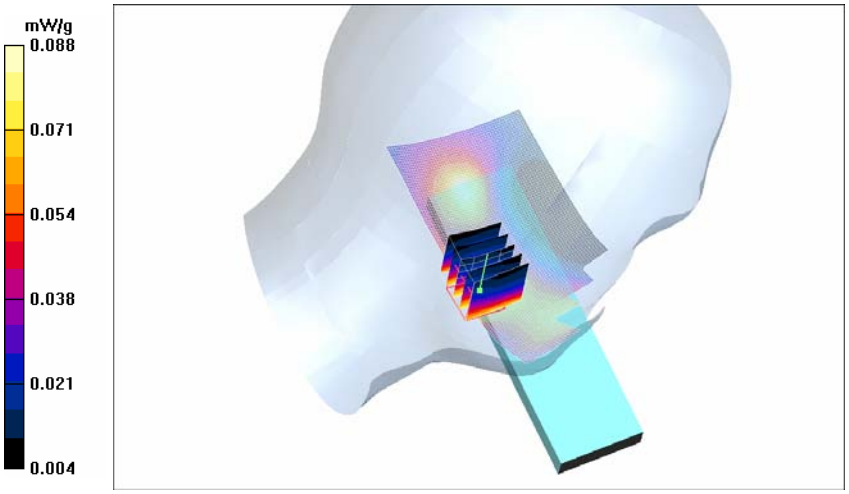
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; εr = 38.8; ρ = 1000 kg/m3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(4.78, 4.78, 4.78); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.088 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.34 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 0.112 W/kg
SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.056 mW/g
Maximum value of SAR (measured) = 0.088 mW/g



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Date/Time: 2006-01-31 16:34:55

Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot GPRS1900
Frequency: 1850.2 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.37 mho/m; εr = 38.9; ρ = 1000 kg/m3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(4.78, 4.78, 4.78); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Low/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.611 mW/g

Cheek position - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.94 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 0.812 W/kg
SAR(1 g) = 0.569 mW/g; SAR(10 g) = 0.365 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.616 mW/g

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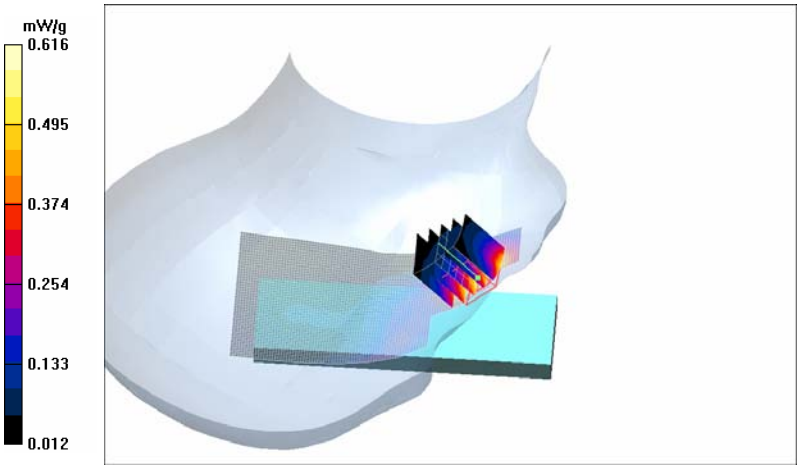

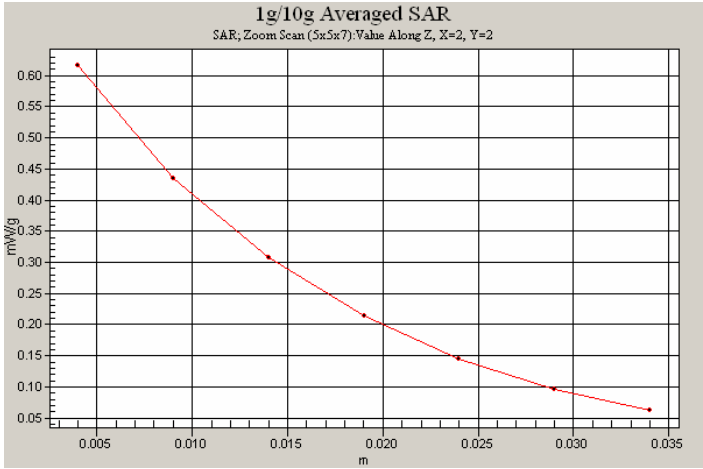

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Date/Time: 2006-01-31 15:49:33

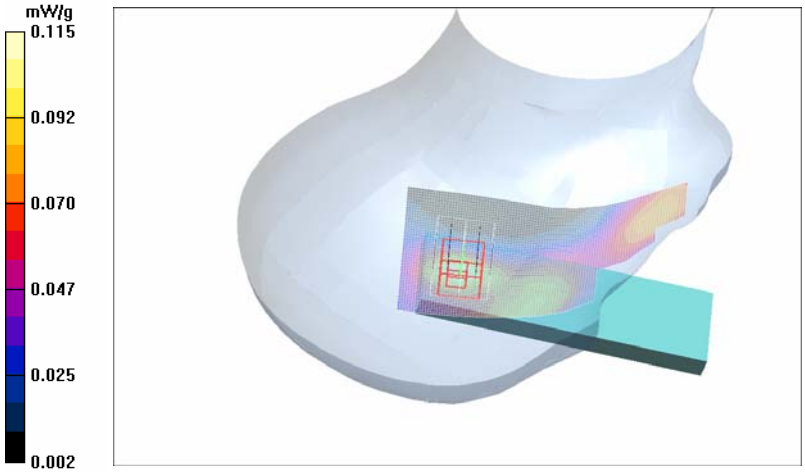
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; εr = 38.8; ρ = 1000 kg/m3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(4.78, 4.78, 4.78); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.115 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.79 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 0.169 W/kg
SAR(1 g) = 0.105 mW/g; SAR(10 g) = 0.062 mW/g
Maximum value of SAR (measured) = 0.115 mW/g



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Date/Time: 2006-01-31 17:36:06

Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot EGPRS1900
Frequency: 1850.2 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.37 mho/m; εr = 38.9; ρ = 1000 kg/m3
Phantom section: Right Section

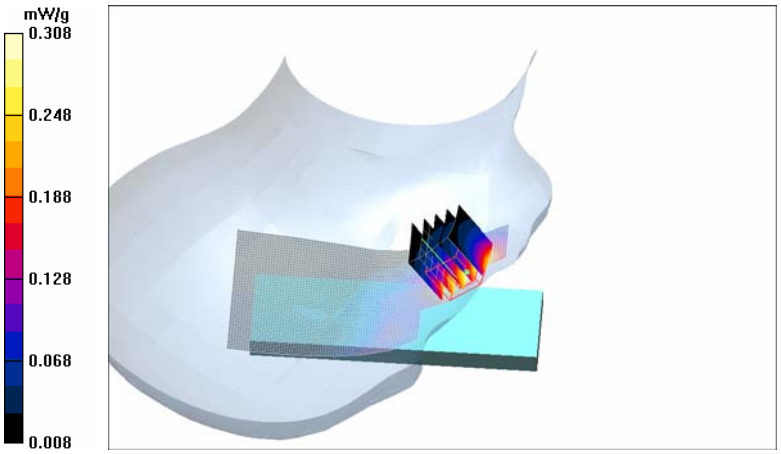
DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(4.78, 4.78, 4.78); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Low/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.309 mW/g

Cheek position - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 4.23 V/m; Power Drift = -0.267 dB
Peak SAR (extrapolated) = 0.400 W/kg
SAR(1 g) = 0.286 mW/g; SAR(10 g) = 0.186 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.308 mW/g



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Date/Time: 2006-01-31 17:06:24

Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot GPRS1900
Frequency: 1850.2 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.37 mho/m; εr = 38.9; ρ = 1000 kg/m3
Phantom section: Right Section

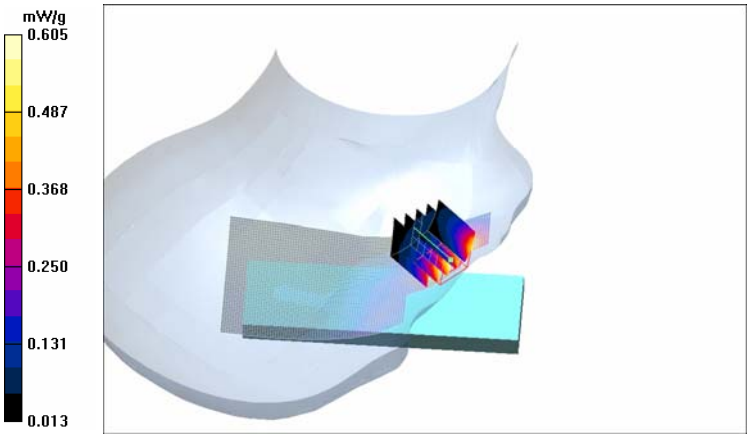
DASY4 Configuration:
- Probe: ET3DV6 - SN1808; Probe Notes: Advanced Extrapolation
- ConvF(4.78, 4.78, 4.78); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn573; Calibrated: 2005-09-21
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Low - BT active/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.605 mW/g

Cheek position - Low - BT active/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.93 V/m; Power Drift = -0.122 dB
Peak SAR (extrapolated) = 0.784 W/kg
SAR(1 g) = 0.558 mW/g; SAR(10 g) = 0.357 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.605 mW/g



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Date/Time: 2006-01-30 17:44:19

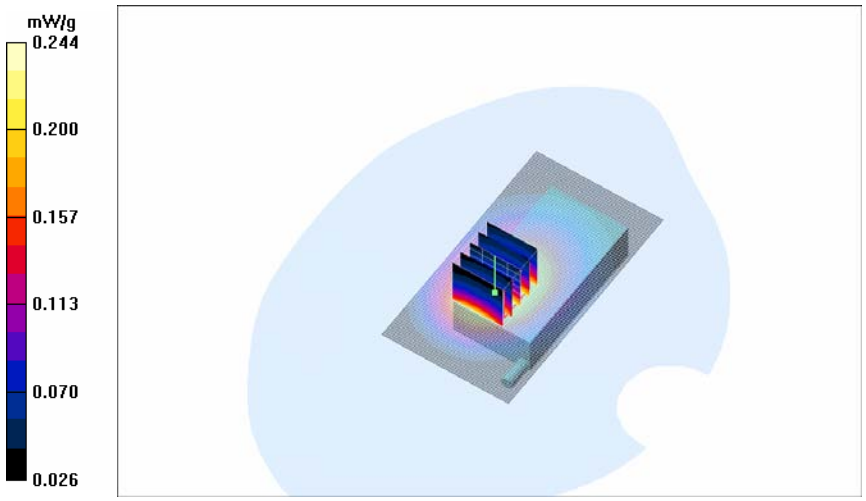
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.7 C
Medium parameters used: f = 837 MHz; σ = 0.985 mho/m; εr = 52.9; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(6.18, 6.18, 6.18); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 2; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Mid - No Accessory/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.240 mW/g

Body - Mid - No Accessory/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.4 V/m; Power Drift = 0.047 dB
Peak SAR (extrapolated) = 0.328 W/kg
SAR(1 g) = 0.230 mW/g; SAR(10 g) = 0.163 mW/g
Maximum value of SAR (measured) = 0.244 mW/g



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Date/Time: 2006-01-30 19:31:14

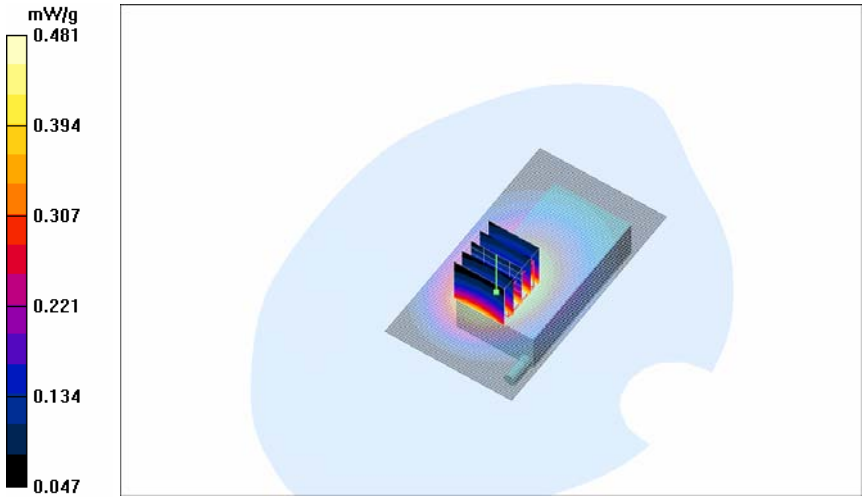
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM850
Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.7 C
Medium parameters used: f = 849 MHz; σ = 0.996 mho/m; εr = 52.7; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(6.18, 6.18, 6.18); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 2; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - High - No Accessory/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.484 mW/g

Body - High - No Accessory/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 21.7 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 0.606 W/kg
SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.319 mW/g
Maximum value of SAR (measured) = 0.481 mW/g



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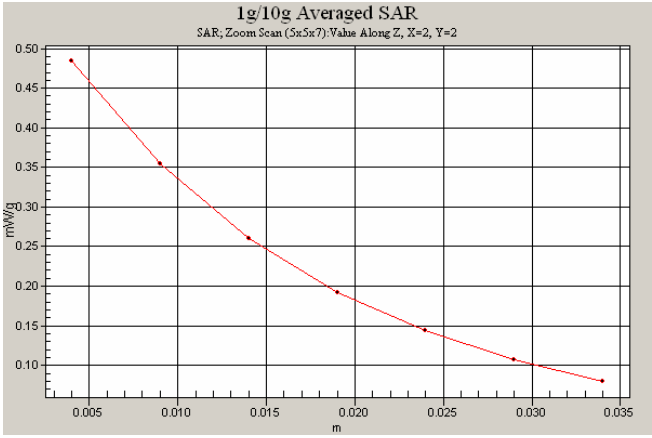

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Date/Time: 2006-01-30 20:23:55

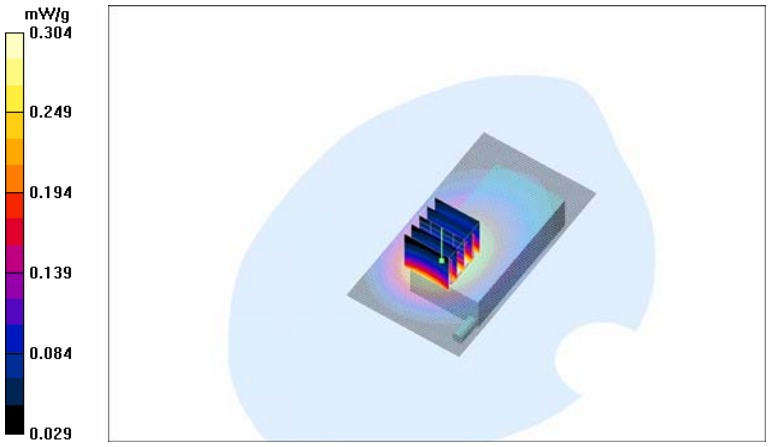
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM850
Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.7 C
Medium parameters used: f = 849 MHz; σ = 0.996 mho/m; εr = 52.7; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(6.18, 6.18, 6.18); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 2; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - High - HS-6 2/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.310 mW/g

Body - High - HS-6 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.4 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.383 W/kg
SAR(1 g) = 0.288 mW/g; SAR(10 g) = 0.205 mW/g
Maximum value of SAR (measured) = 0.304 mW/g



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Date/Time: 2006-01-30 20:36:42

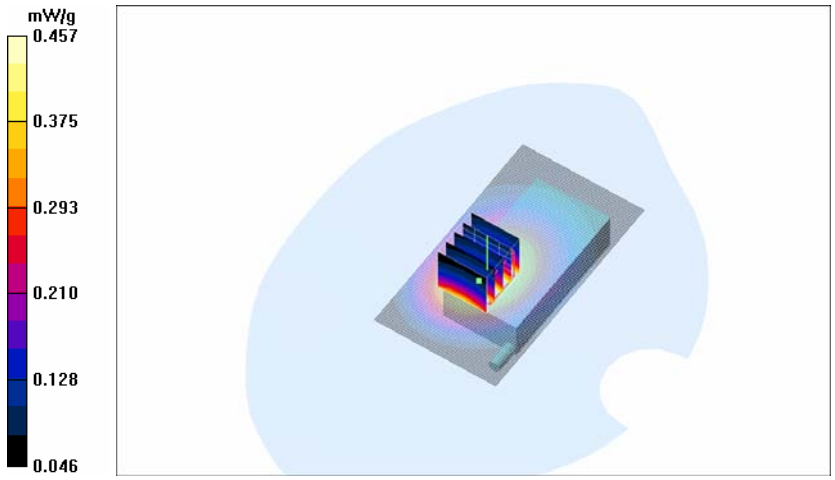
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM850
Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.7 C
Medium parameters used: f = 849 MHz; σ = 0.996 mho/m; εr = 52.7; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(6.18, 6.18, 6.18); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 2; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - High - No Accessory - BT active/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.463 mW/g

Body - High - No Accessory - BT active/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 21.0 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 0.575 W/kg
SAR(1 g) = 0.433 mW/g; SAR(10 g) = 0.309 mW/g
Maximum value of SAR (measured) = 0.457 mW/g



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Date/Time: 2006-02-20 18:53:44

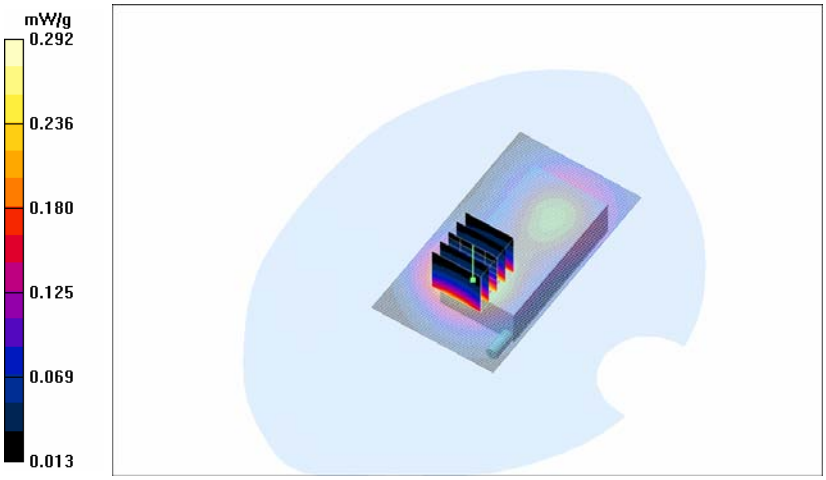
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1880 MHz; σ = 1.49 mho/m; εr = 52.1; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(4.36, 4.36, 4.36); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.292 mW/g

Body - Middle - No Accessory/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 14.6 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 0.414 W/kg
SAR(1 g) = 0.270 mW/g; SAR(10 g) = 0.171 mW/g
Maximum value of SAR (measured) = 0.292 mW/g



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Date/Time: 2006-02-20 19:38:10

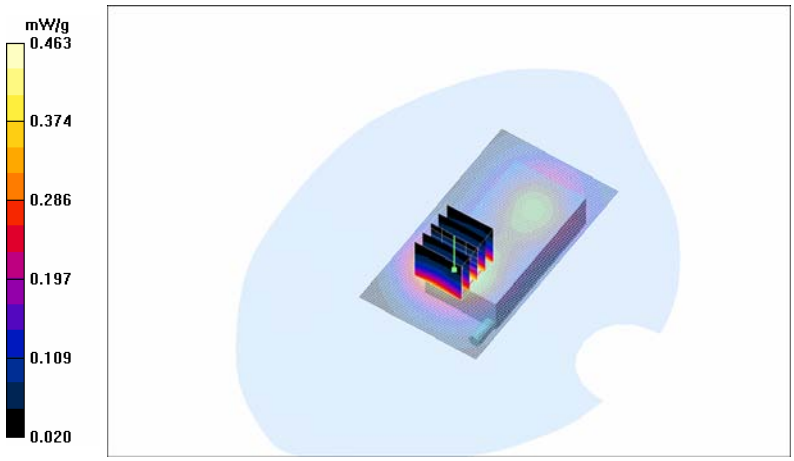
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1910 MHz; σ = 1.53 mho/m; εr = 52; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(4.36, 4.36, 4.36); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - High - No Accessory/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.464 mW/g

Body - High - No Accessory/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 18.3 V/m; Power Drift = -0.064 dB
Peak SAR (extrapolated) = 0.705 W/kg
SAR(1 g) = 0.430 mW/g; SAR(10 g) = 0.268 mW/g
Maximum value of SAR (measured) = 0.463 mW/g



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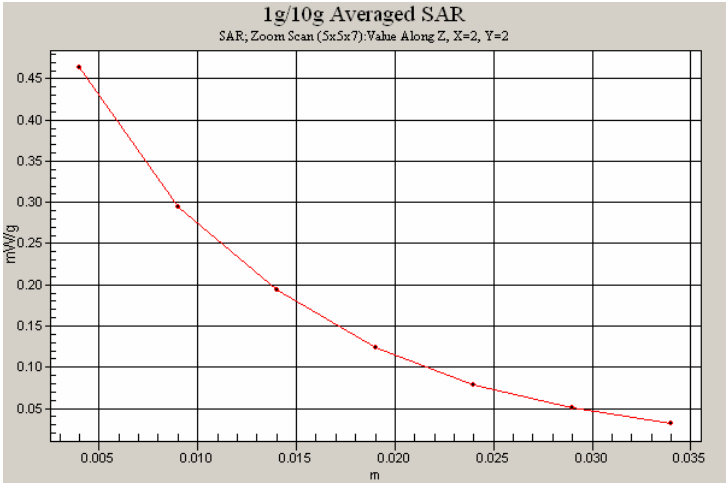

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Date/Time: 2006-02-20 20:16:41

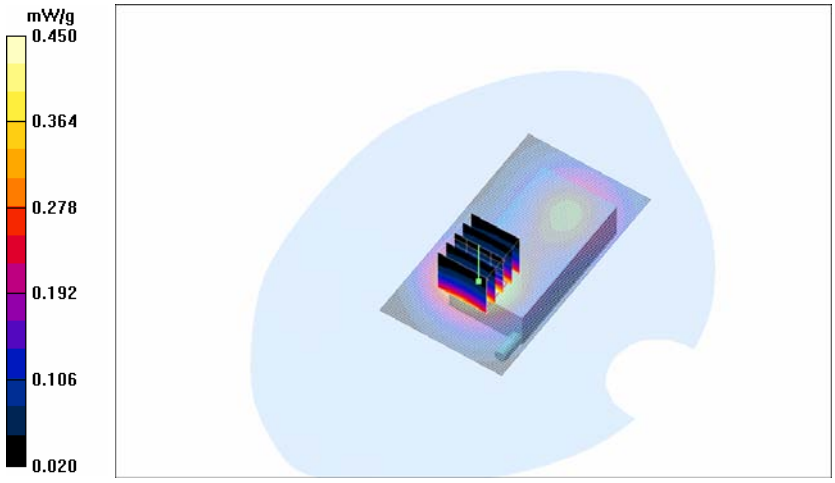
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1910 MHz; σ = 1.53 mho/m; εr = 52; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(4.36, 4.36, 4.36); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - High - HS-6/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.450 mW/g

Body - High - HS-6/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.9 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 0.663 W/kg
SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.262 mW/g
Maximum value of SAR (measured) = 0.450 mW/g



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Date/Time: 2006-02-20 20:31:04

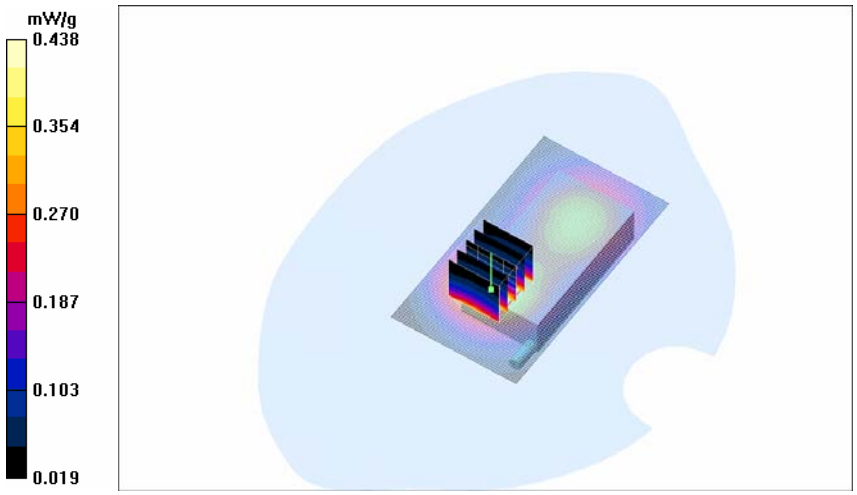
Test Laboratory: TCC Copenhagen
Type: RM-162; Serial: 004400/78/170010/7

Communication System: 2-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6 C
Medium parameters used: f = 1910 MHz; σ = 1.53 mho/m; εr = 52; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1813; Probe Notes: Advanced Extrapolation
- ConvF(4.36, 4.36, 4.36); Calibrated: 2005-09-19
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 2005-08-17
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - High - No Accessory - BT active/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.440 mW/g

Body - High - No Accessory - BT active/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.7 V/m; Power Drift = -0.120 dB
Peak SAR (extrapolated) = 0.657 W/kg
SAR(1 g) = 0.407 mW/g; SAR(10 g) = 0.252 mW/g
Maximum value of SAR (measured) = 0.438 mW/g



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APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORTS

See the following pages

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Accreditation No.: SCS 108

Client Nokia DK

Certificate No: ET3-1808_Aug05

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1808
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	August 30, 2005
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	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 654	29-Nov-04 (SPEAG, No. DAE4-654_Nov04)	Nov-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 30, 2005

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

7/9-05

DASY - Parameters of Probe: ET3DV6 SN:1808

Sensitivity in Free Space[A]

NormX	**1.94** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**94** mV
NormY	**1.68** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**94** mV
NormZ	**1.95** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**94** mV

Diode Compression[B]

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	8.1	4.4
SAR_{be} [%]	With Correction Algorithm	0.1	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	12.3	8.4
SAR_{be} [%]	With Correction Algorithm	0.8	0.2

Sensor Offset

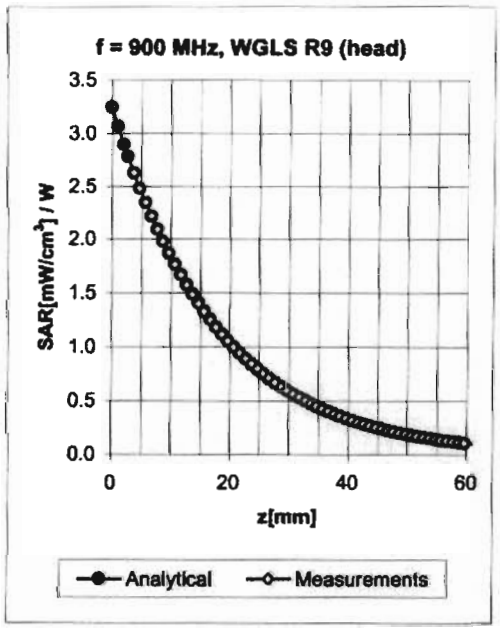
Probe Tip to Sensor Center **2.7** mm

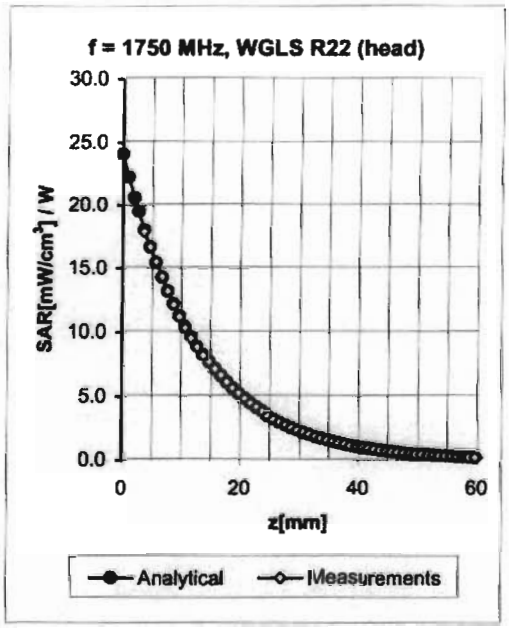
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

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%	0.62	1.73	6.17 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.57	1.83	5.92 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.58	2.30	4.90 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.46	4.78 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.55	2.54	4.60 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.70	2.15	4.27 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.47	2.10	6.07 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.47	2.11	5.78 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.56	2.73	4.26 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.59	2.66	4.20 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.59	2.51	4.11 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.76	1.89	4.02 ± 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.

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Accreditation No.: SCS 108

Client Nokia (NMP / Copenhagen)

Certificate No: ET3-1813_Sep04

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1813
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	September 30, 2004
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-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	3-Apr-03 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	3-Apr-03 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN:3013	8-Jan-04 (SPEAG, No. ES3-3013_Jan04)	Jan-05
DAE4	SN: 617	26-May-04 (SPEAG, No. DAE4-617_May04)	May-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Nov 04

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	N. Vetterli
Approved by:	Katja Pokovic	Technical Manager	Pokovic Katja

Issued: October 1, 2004

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DASY - Parameters of Probe: ET3DV6 SN:1813

Sensitivity in Free Space[A]

NormX	**1.66** ± 9.9%	$\mu V/(V/m)^2$	DCP X	**95** mV
NormY	**1.72** ± 9.9%	$\mu V/(V/m)^2$	DCP Y	**95** mV
NormZ	**1.56** ± 9.9%	$\mu V/(V/m)^2$	DCP Z	**95** mV

Diode Compression[B]

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	9.5	5.2
SAR_{be} [%]	With Correction Algorithm	0.7	0.0

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	12.9	8.6
SAR_{be} [%]	With Correction Algorithm	0.5	0.2

Sensor Offset

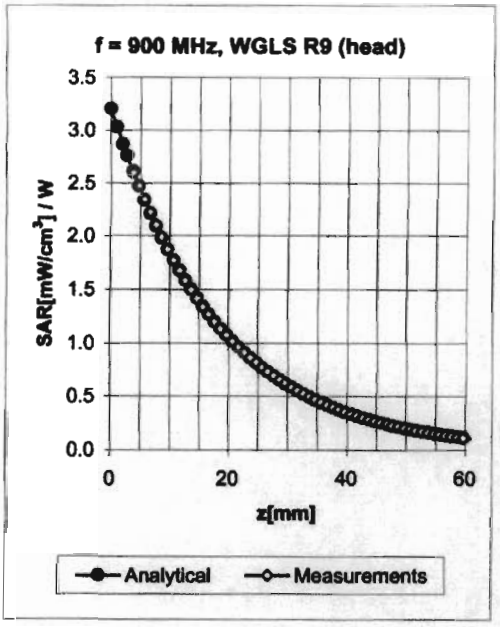
Probe Tip to Sensor Center **2.7** mm

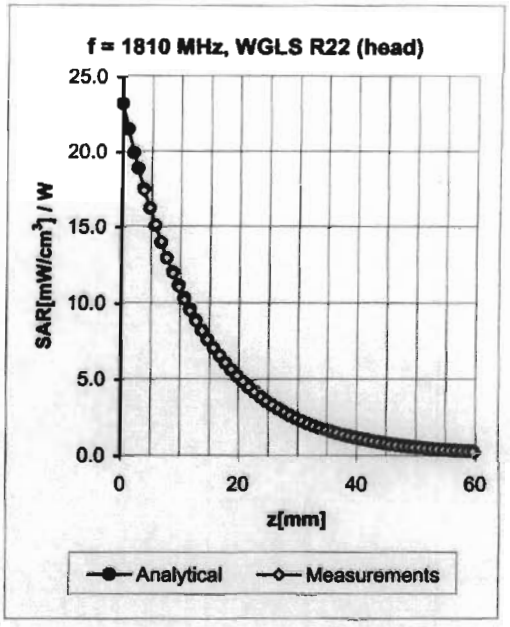
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

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%	1.02	1.53	6.37 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.96	1.59	6.17 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.58	2.33	5.13 ± 11.0% (k=2)
1900	± 50 / ± 101	Head	40.0 ± 5%	1.40 ± 5%	0.55	2.52	4.96 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.77	4.75 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.62	2.37	4.50 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.99	1.58	6.17 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.93	1.65	5.95 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	2.77	4.55 ± 11.0% (k=2)
1900	± 50 / ± 101	Body	53.3 ± 5%	1.52 ± 5%	0.53	2.96	4.41 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	2.67	4.42 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.59	2.30	4.21 ± 11.8% (k=2)

[c] The validity of ± 100 MHz only applies for DASY 4.3 B17 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.

APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORTS

See the following pages

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Accreditation No.: SCS 108

Client Nokia DK 2

Certificate No: D835V2-476_Jan05

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 476
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	January 18, 2005
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 E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference Probe ET3DV6	SN 1507	26-Oct-04 (SPEAG, No. ET3-1507_Oct04)	Oct-05
DAE4	SN 601	07-Jan-05 (SPEAG, No. DAE4-601_Jan05)	Jan-06
DAE4	SN 907	03-May-04 (SPEAG, No. DAE4-907_May04)	May-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-03)	In house check: Oct-05
RF generator R&S SML-03	100698	27-Mar-02 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov-05

	Name	Function	Signature
Calibrated by:	Judith Müller	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 19, 2005

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28/1-05
JC

DASY4 Validation Report for Head TSL

Date/Time: 01/18/05 14:32:56

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN476

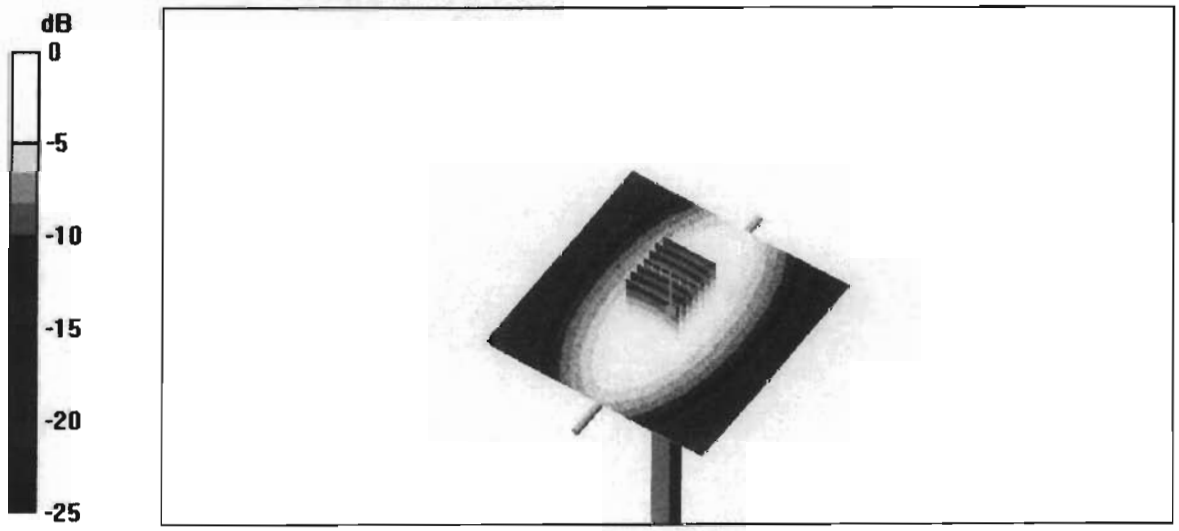
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL 900 MHz;
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 42; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.24, 6.24, 6.24); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom half size; Type: QD000P49AA; Serial: SN:1001;
- Measurement SW: DASY4, V4.4 Build 11; Postprocessing SW: SEMCAD, V1.8 Build 133

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.47 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 3.32 W/kg
SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.49 mW/g
Maximum value of SAR (measured) = 2.46 mW/g



0 dB = 2.46mW/g

DASY4 Validation Report for Body TSL

Date/Time: 01/11/05 10:36:02

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN476

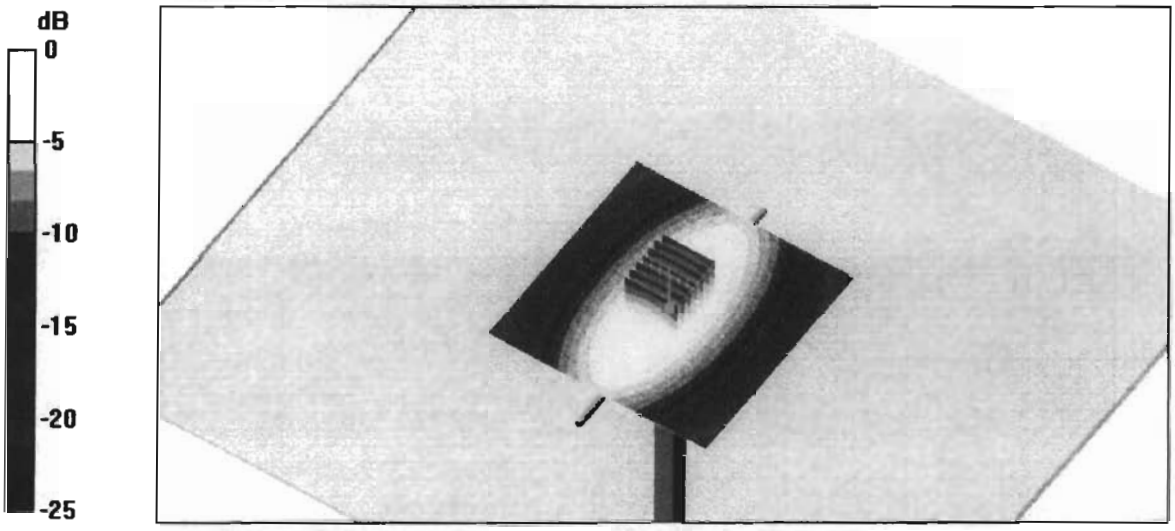
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL 900 MHz;
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.98, 5.98, 5.98); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 03.05.2004
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001;
- Measurement SW: DASY4, V4.4 Build 10; Postprocessing SW: SEMCAD, V1.8 Build 133

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.68 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.7 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.62 mW/g
Maximum value of SAR (measured) = 2.67 mW/g



0 dB = 2.67mW/g

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Accreditation No.: SCS 108

Client [redacted]

Certificate No: D1900V2-5d063_Oct05

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d063
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	October 25, 2005
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 E442	GB37480704	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Power sensor HP 8481A	US37292783	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Reference 20 dB Attenuator	SN: 5086 (20g)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference 10 dB Attenuator	SN: 5047.2 (10r)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference Probe ET3DV6	SN 1507	26-Oct-04 (SPEAG, No. ET3-1507_Oct04)	Oct-05
DAE4	SN 601	07-Jan-05 (SPEAG, No. DAE4-601_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator R&S SML-03	100698	27-Mar-02 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov-05

	Name	Function	Signature
Calibrated by:	Judith Müller	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 26, 2005

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DASY4 Validation Report for Head TSL

Date/Time: 25.10.2005 16:04:03

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d063

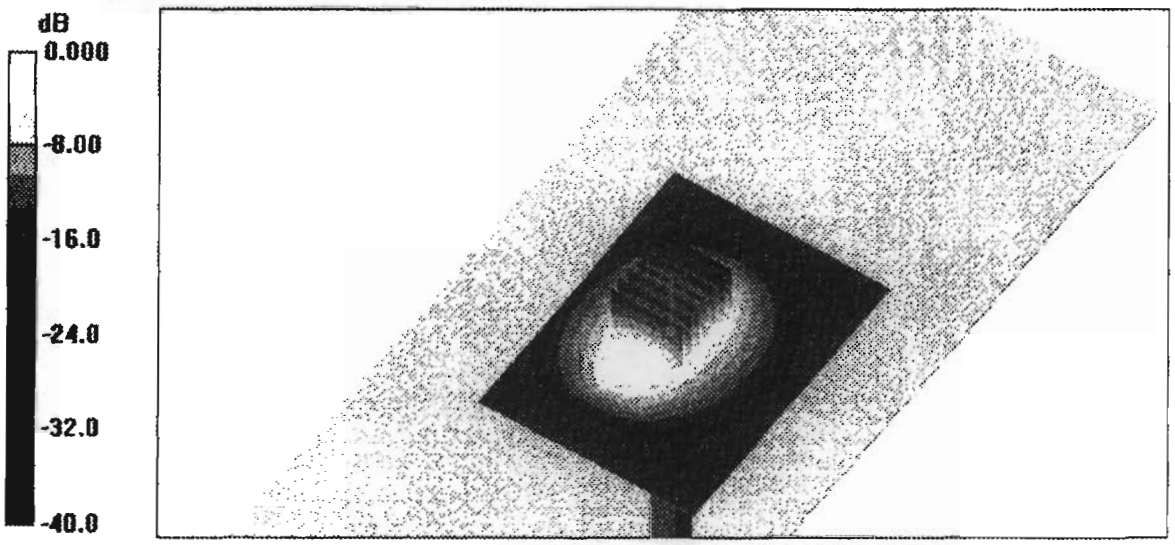
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1900 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.48 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.6 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 159

Pin = 250 mW; d = 10 mm/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.1 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.3 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.36 mW/g
Maximum value of SAR (measured) = 11.7 mW/g



0 dB = 11.7mW/g

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

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Accreditation No.: SCS 108

Client Nokia Denmark

Certificate No: D1900V2-5d063_Jan06

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d063
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	January 10, 2006
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Power sensor HP 8481A	US37292783	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Reference 20 dB Attenuator	SN: 5086 (20g)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference 10 dB Attenuator	SN: 5047.2 (10r)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference Probe ET3DV6	SN 1507	28-Oct-05 (SPEAG, No. ET3-1507_Oct05)	Oct-06
DAE4	SN 601	15-Dec-05 (SPEAG, No. DAE4-601_Dec05)	Dec-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov-06

	Name	Function	Signature
Calibrated by:	Judith Müller	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 17, 2006

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

DASY4 Validation Report for Body TSL

Date/Time: 10.01.2006 15:46:39

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d063

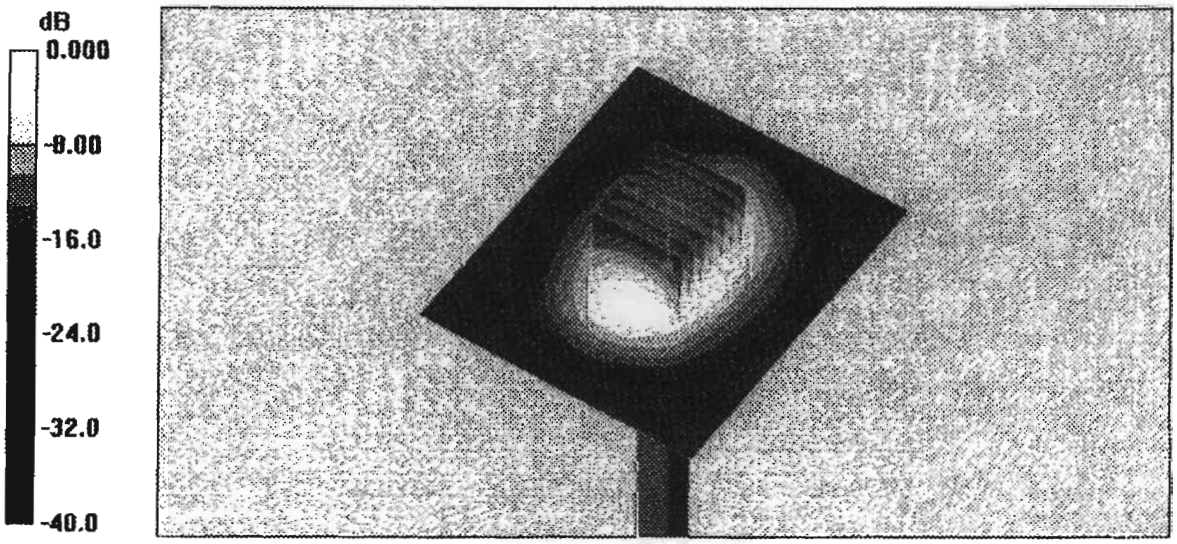
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL U10;
Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.3, 4.3, 4.3); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Pin = 250 mW; d = 10 mm 2/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 13.0 mW/g

Pin = 250 mW; d = 10 mm 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.2 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.6 mW/g
Maximum value of SAR (measured) = 12.0 mW/g



0 dB = 12.0mW/g