27 September 2005

TRANSMITTER FREQUENCY RANGES

Precise transmitter frequency ranges for this device are:

GSM/EGPRS850 Cellular Band	824.2 – 848.8 MHz
GSM/EGPRS1900 PCS Band	1850.2 – 1909.8 MHz
BT	2402 – 2480 MHz

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FINAS
Finnish Accreditation Service
T117 (EN ISO/IEC 17025)

SAR Compliance Test Report

Test report no.:	Oulu_SAR_0533_04	**Date of report:**	2005-09-14
Template version:	4a	**Number of pages:**	69
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Measurements made by:	Kai Niskala, Rolf Rundgren		
Tested device:	RM-56		
FCC ID:	LJPRM-56	**IC:**	661E-RM56
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 Nokia.		
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:

For the contents:

Kai Niskala
Test System Manager

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2005-08-12 to 2005-08-22
SN, HW and SW numbers of tested device	SN: 004400/58/164239/2; HW: 1101; SW: 03.07; DUT#: 10692
Batteries used in testing	BL-5C; DUT#'s: 30387, 30432, 30433
Headsets used in testing	HS-6; DUT#: 30435
Other accessories used in testing	SD memory card
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
2-slot GPRS850	190 / 836.6	28.1 dBm ERP	Left, Cheek	0.90 W/kg	**1.01 W/kg**	1.6 W/kg	PASSED
2-slot GPRS1900	661 / 1880.0	31.3 dBm EIRP	Right, Cheek	0.31 W/kg	**0.35 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
2-slot GPRS850	128 / 824.2	27.9 dBm ERP	2.2 cm	0.80 W/kg	**0.90 W/kg**	1.6 W/kg	PASSED
2-slot GPRS1900	512 / 1850.2	30.7 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
0.5 dB	0.31 dB

1.2.4 Measurement Uncertainty

Expanded Uncertainty (k=2) 95%	± 27.4 %

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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	8PSK	GFSK
Duty Cycle	1/8	1/8 or 2/8	1/8 or 2/8	
Transmitter Frequency Range (MHz)	824 – 849 1850 - 1909	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 GSM900 and GSM1800 which are not part of this filing.

EGPRS mode was not measured, because maximum averaged output power is more than 3dB lower in EGPRS mode than in GPRS mode.

This device has Push to Talk/Voice–over-IP 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 internal patch antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	20.0 to 24.0
Ambient humidity (RH %):	40 to 75

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.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

The measurements were performed using an automated near-field scanning system, DASY4 software version 4.5, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the 'advanced extrapolation' algorithm.

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The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE4	555	12 months	2006-02
E-field Probe ET3DV6	1765	12 months	2006-02
Dipole Validation Kit, D835V2	480	24 months	2007-02
Dipole Validation Kit, D1900V2	5d030	24 months	2007-02

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	HP 8657B	3630U08114	12 months	2006-02
Amplifier	Amplifier Research 5S1G4	306024	-	-
Power Meter	R&S NRT	101143	12 months	2006-02
Power Sensor	R&S NRT-Z43	100239	12 months	2006-02
Thermometer	Fluke 51 II	84350048	12 months	2006-02
Thermometer	Fluke 52 II	82810048	12 months	2006-02
Network Analyzer	HP 8753D	3410A08934	12 months	2006-02
Dielectric Probe Kit	Agilent 85070D	US01440162	-	-
Radio Communication Tester	CMU 200	100084	12 months	2006-05
Radio Communication Tester	CMU 200	106354	12 months	2006-04

4.1.1 Isotropic E-field Probe ET3DV6

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)

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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.

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.

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4.3.1 Tissue Simulant Recipes

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

850MHz 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	54.50	70.25
Tween 20	45.23	29.41
Salt	0.27	0.34

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.

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System checking, head tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
835	Reference result	2.25	42.2	0.91	
	± 10% window	2.03 – 2.48			
	2005-08-12	2.14	40.6	0.88	20.6
	2005-08-15	2.20	40.4	0.88	20.0
1900	Reference result	9.76	39.5	1.46	
	± 10% window	8.78 – 10.74			
	2005-08-16	9.83	39.6	1.49	20.3

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
1900	Reference result	9.94	52.2	1.57	
	± 10% window	8.95 – 10.93			
	2005-08-17	10.4	53.3	1.60	20.8
	2005-08-22	10.1	53.0	1.61	20.3

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

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]	
836	Recommended value	41.5	0.90	
	± 5% window	39.4 – 43.6	0.86 – 0.95	
	2005-08-12	40.5	0.89	22.0
	2005-08-15	40.4	0.88	22.0
1880	Recommended value	40.0	1.40	
	± 5% window	38.0 – 42.0	1.33 – 1.47	
	2005-08-16	39.7	1.47	22.0

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Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp
		ε_r	σ [S/m]	[°C]
836	Recommended value	55.2	0.97	
	± 5% window	52.4 – 58.0	0.92 – 1.02	
	2005-08-15	55.9	0.97	22.0
1880	Recommended value	53.3	1.52	
	± 5% window	50.6 – 56.0	1.44 – 1.60	
	2005-08-17	53.4	1.58	22.0
	2005-08-22	53.1	1.59	22.0

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".

Photos of the device in “cheek” position

Photos 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.

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

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	±5.8	N	1	1	±5.8	∞
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	±8.3	R	√3	1	±4.8	∞
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	E5.2	±3.9	R	√3	1	±2.3	∞
Test sample Related							
Test Sample Positioning	E4.2.1	±6.0	N	1	1	±6.0	11
Device Holder Uncertainty	E4.1.1	±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			**±13.7**	148
Coverage Factor for 95%			**k=2**				
Expanded Uncertainty						**±27.4**	

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7. RESULTS

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

850MHz Head SAR results

Option used: Slide open/closed, SD card etc.	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
GSM850	Power		27.9 dBm	28.1 dBm	29.1 dBm
Slide closed, without SD card	Left	Cheek		0.45	
2-slot GPRS850	Power		27.9 dBm	28.1 dBm	28.8 dBm
Slide closed, without SD card	Left	Cheek	0.69	**0.90**	0.79
		Tilt		0.65	
	Right	Cheek		0.81	
		Tilt		0.57	
Slide open, without SD card	Left	Cheek		0.68	
		Tilt		0.32	
	Right	Cheek		0.63	
		Tilt		0.38	
Slide closed, with SD card	Left	Cheek		0.83	
Slide closed, without SD card, BT active	Left	Cheek		0.84	

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1900MHz Head SAR results

Option used: Slide open /closed, SD card etc.	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
GSM1900	Power		31.0 dBm	31.5 dBm	29.2 dBm
Slide closed	Left	Cheek		0.14	
2-slot GPRS1900	Power		30.7 dBm	31.3 dBm	29.4 dBm
Slide closed, with SD card	Left	Cheek		0.27	
		Tilt		0.25	
	Right	Cheek	0.29	**0.31**	0.20
		Tilt		0.20	
Slide open, with SD card	Left	Cheek		0.15	
		Tilt		0.11	
	Right	Cheek		0.12	
		Tilt		0.16	
Slide closed, without SD card	Right	Cheek		0.28	
Slide closed, with SD card, BT active	Right	Cheek		0.29	

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

850MHz Body SAR results

Option used: Slide, SD card etc	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 GPRS850	Power	27.9 dBm	28.1 dBm	28.8 dBm
Slide closed, with SD card	Without headset	**0.74**	0.74	0.73
	Headset HS-6	0.41	0.52	0.50
Slide closed, without SD card	Without headset	**0.80**		
Slide closed, without SD card, BT active	Without headset	0.78		

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1900MHz Body SAR results

Option used: Slide, SD card etc	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
2-slot GPRS1900	Power	30.7 dBm	31.3 dBm	29.4 dBm
Slide closed, with SD card	Without headset	**0.43**	0.43	0.32
	Headset HS-6	0.42	0.41	0.34
Slide closed, without SD card	Without headset	0.42		
Slide closed, with SD card, BT active	Without headset	0.37		

Plots of the Measurement scans are given in Appendix B.

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APPENDIX A: SYSTEM CHECKING SCANS

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Date/Time: 12.08.2005 11:33:18

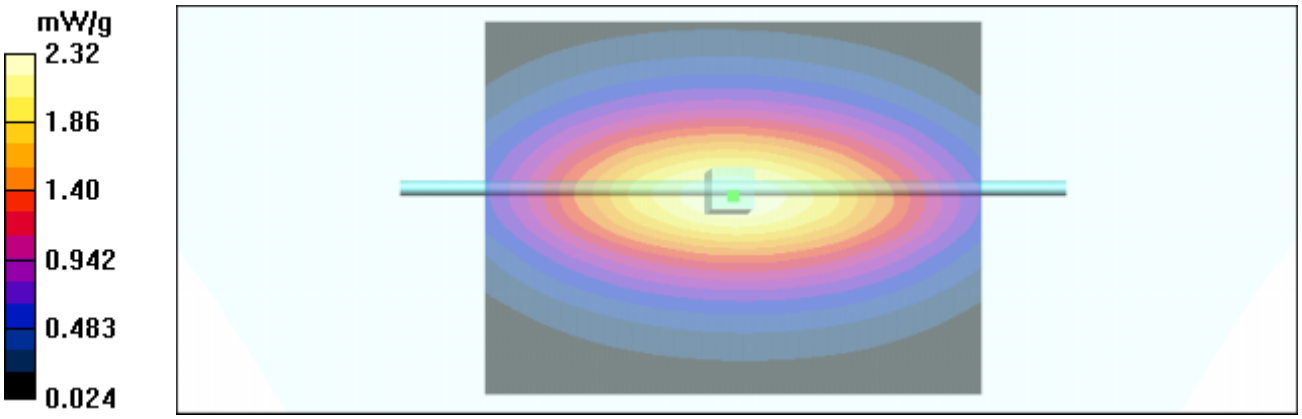
Test Laboratory: TCC Nokia, Oulu Laboratory
Type: D835V2;Serial: D835V2 - SN:480
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL850 Medium parameters used (interpolated): f = 835 MHz; σ = 0.884 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=15mm, Pin=250mW, t=20.6 C/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.9 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 3.14 W/kg
SAR(1 g) = 2.14 mW/g; SAR(10 g) = 1.39 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 2.31 mW/g

d=15mm, Pin=250mW, t=20.6 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 2.32 mW/g



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Date/Time: 15.08.2005 08:10:18

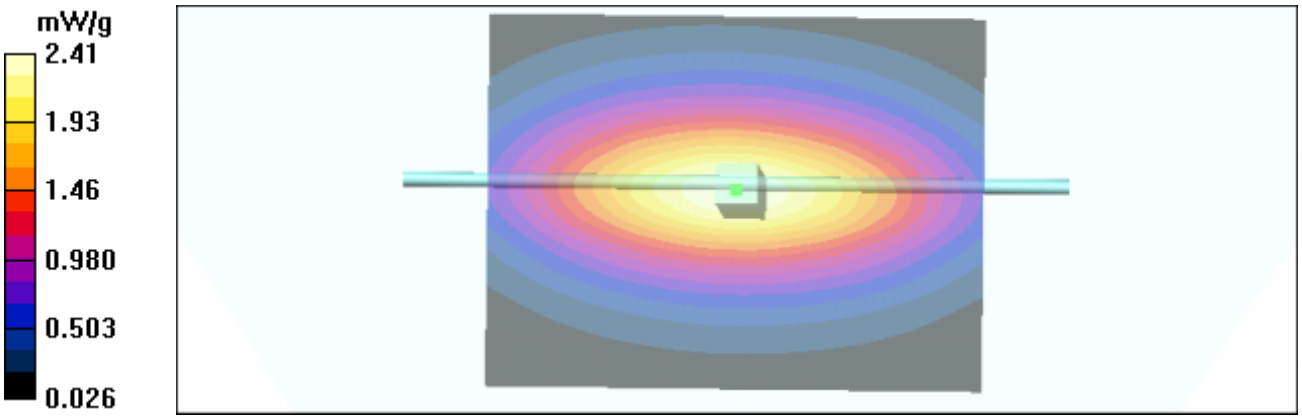
Test Laboratory: TCC Nokia, Oulu Laboratory
Type: D835V2;Serial: D835V2 - SN:480
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL850 Medium parameters used (interpolated): f = 835 MHz; σ = 0.878 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=15mm, Pin=250mW, t=20.0 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 2.41 mW/g

d=15mm, Pin=250mW, t=20.0 C/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.9 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 3.30 W/kg
SAR(1 g) = 2.2 mW/g; SAR(10 g) = 1.43 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 2.37 mW/g



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Date/Time: 16.08.2005 09:55:56

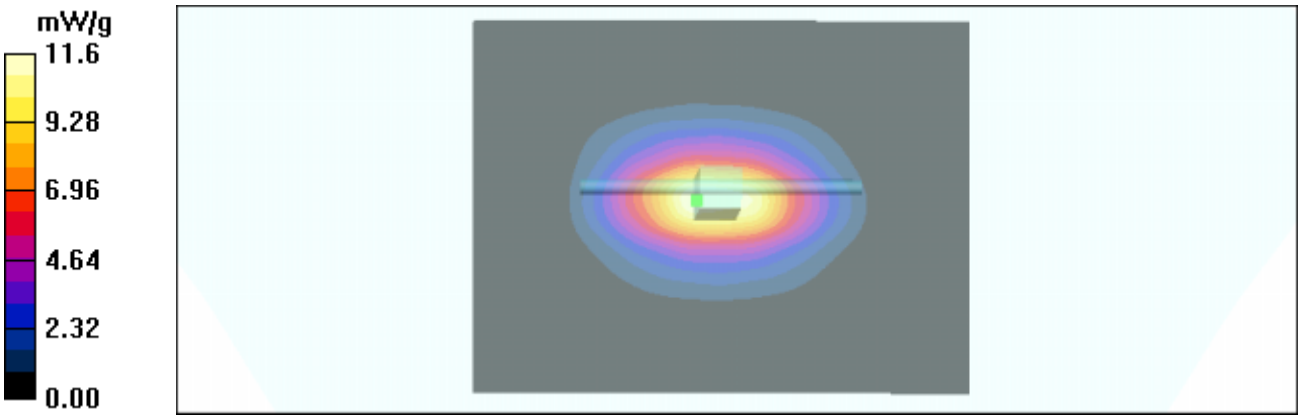
Test Laboratory: TCC Nokia, Oulu Laboratory
Type: D1900V2;Serial: D1900V2 - SN:5d030
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900 Medium parameters used (interpolated): f = 1900 MHz; σ = 1.49 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=10mm, Pin=250mW, t=20.3 C/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.6 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 9.83 mW/g; SAR(10 g) = 5.09 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 11.3 mW/g

d=10mm, Pin=250mW, t=20.3 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 11.6 mW/g



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Date/Time: 17.08.2005 09:43:59

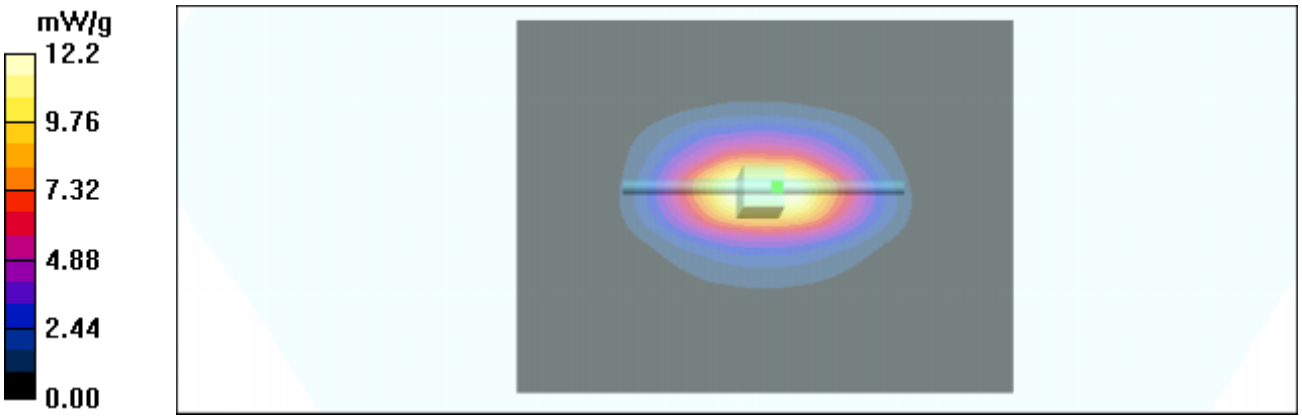
Test Laboratory: TCC Nokia, Oulu Laboratory
Type: D1900V2;Serial: D1900V2 - SN:5d030
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: BSL1900 Medium parameters used (interpolated): f = 1900 MHz; σ = 1.6 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(4.67, 4.67, 4.67); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1275
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=10mm, Pin=250mW, t=20.8 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 12.2 mW/g

d=10mm, Pin=250mW, t=20.8 C/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.1 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.44 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 11.6 mW/g



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Date/Time: 22.08.2005 09:44:11

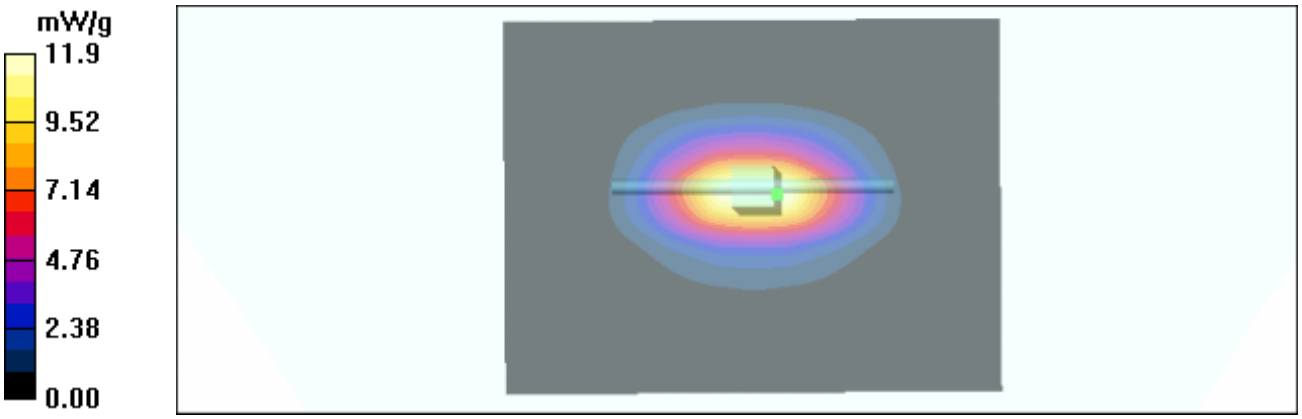
Test Laboratory: TCC Nokia, Oulu Laboratory
Type: D1900V2;Serial: D1900V2 - SN:5d030
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: BSL1900 Medium parameters used (interpolated): f = 1900 MHz; σ = 1.61 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(4.67, 4.67, 4.67); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1275
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=10mm, Pin=250mW, t=20.3 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 11.9 mW/g

d=10mm, Pin=250mW, t=20.3 C/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.7 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.29 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 11.5 mW/g



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APPENDIX B: MEASUREMENT SCANS

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Date/Time: 12.08.2005 13:57:33

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide closed
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.885 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Middle, t=20.7 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 19.4 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 0.681 W/kg
SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.322 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

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) = 0.474 mW/g

Touch position - Middle, t=20.7 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.476 mW/g

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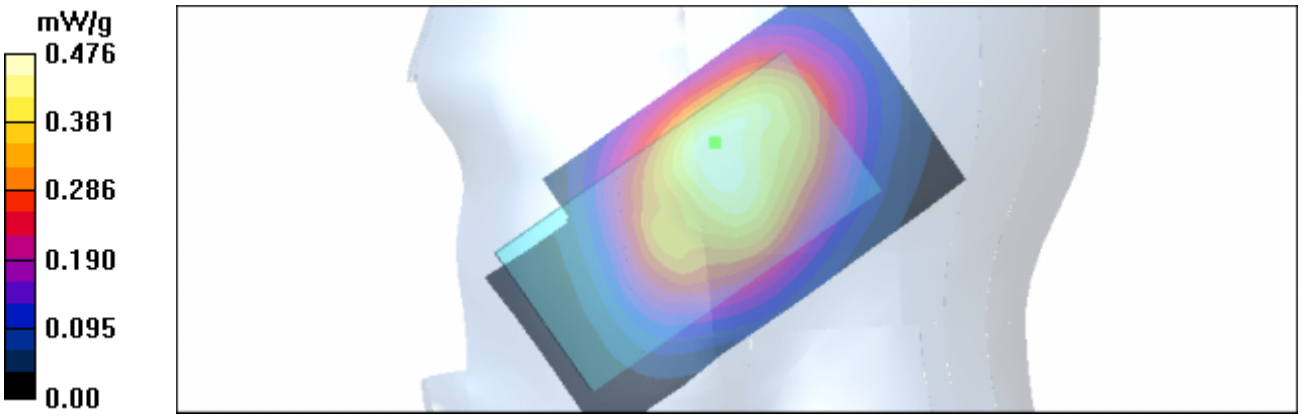

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Date/Time: 12.08.2005 13:19:41

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide closed
Communication System: GPRS 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium: HSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.885 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

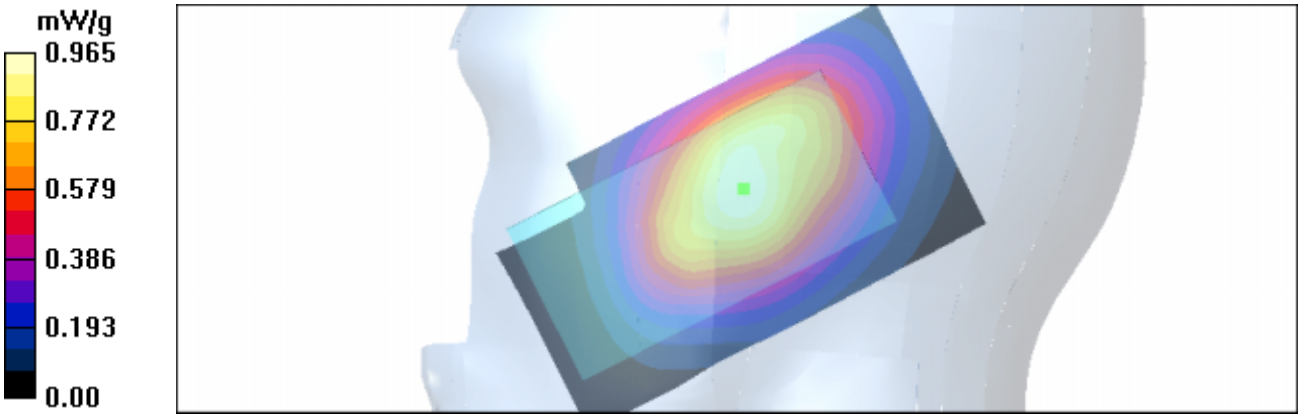
Cheek position - Middle, t=20.7 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = -0.222 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.895 mW/g; SAR(10 g) = 0.660 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 0.940 mW/g

Cheek position - Middle, t=20.7 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.965 mW/g



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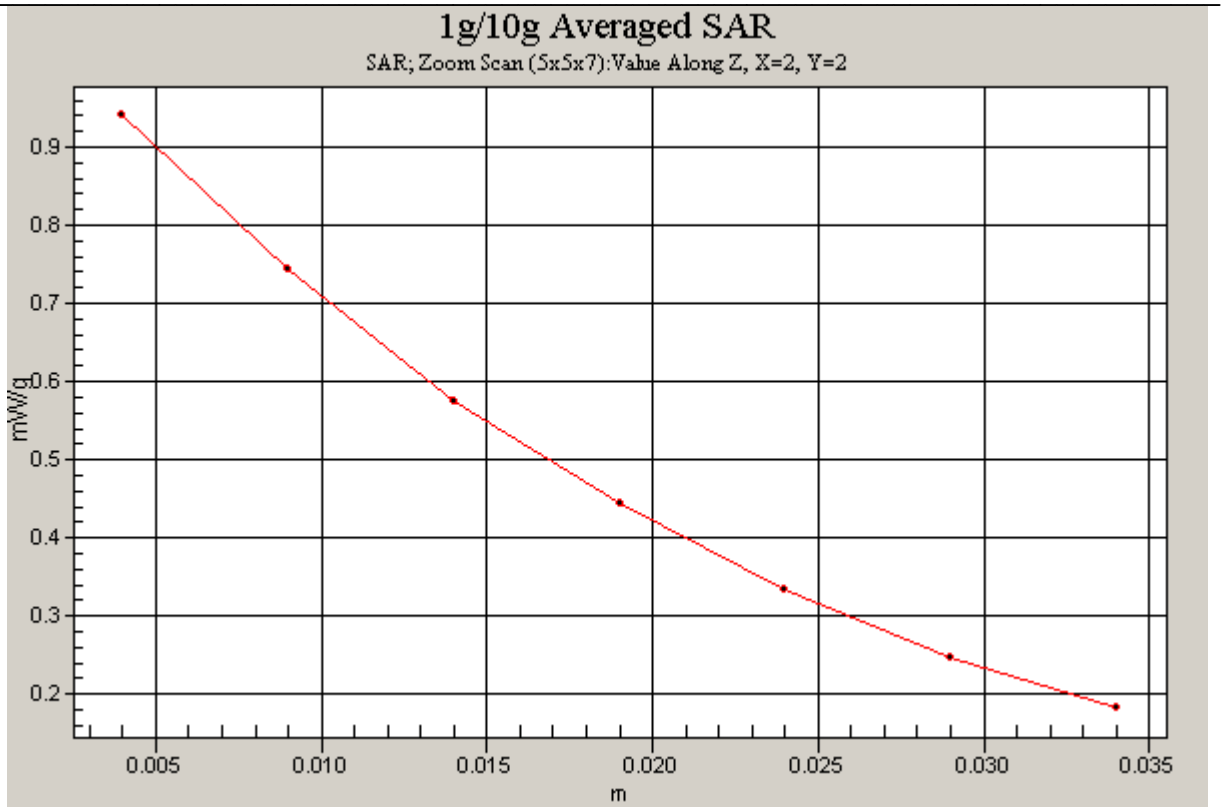

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Date/Time: 12.08.2005 13:41:30

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide closed
Communication System: GPRS 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium: HSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.885 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle, t=20.7 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.680 mW/g

Tilt position - Middle, t=20.7 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 27.1 V/m; Power Drift = -0.087 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.650 mW/g; SAR(10 g) = 0.429 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

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) = 0.722 mW/g

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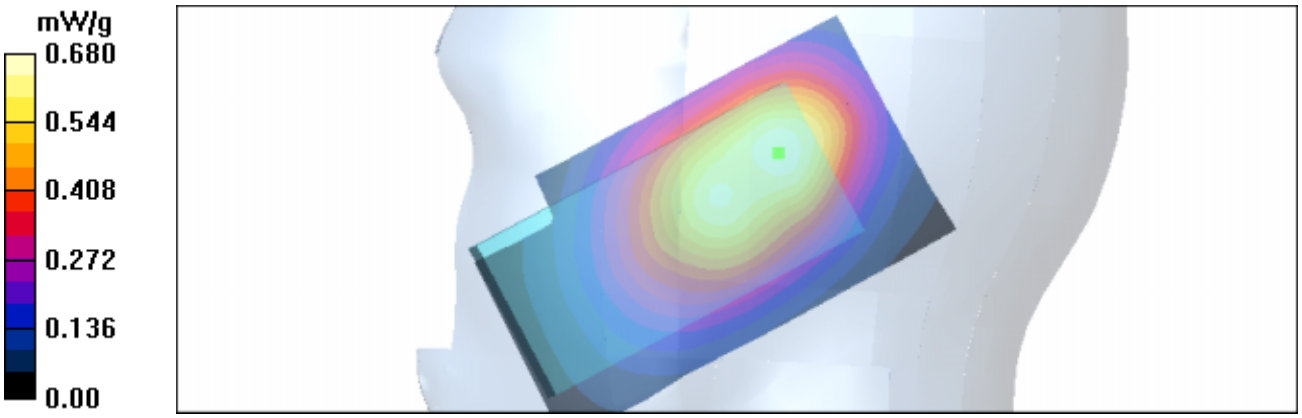

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Date/Time: 12.08.2005 14:27:47

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide closed
Communication System: GPRS 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium: HSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.885 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Cheek position - Middle, t=20.7 C/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.866 mW/g

Cheek position - Middle, t=20.7 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 26.4 V/m; Power Drift = -0.143 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.809 mW/g; SAR(10 g) = 0.598 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

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) = 0.849 mW/g

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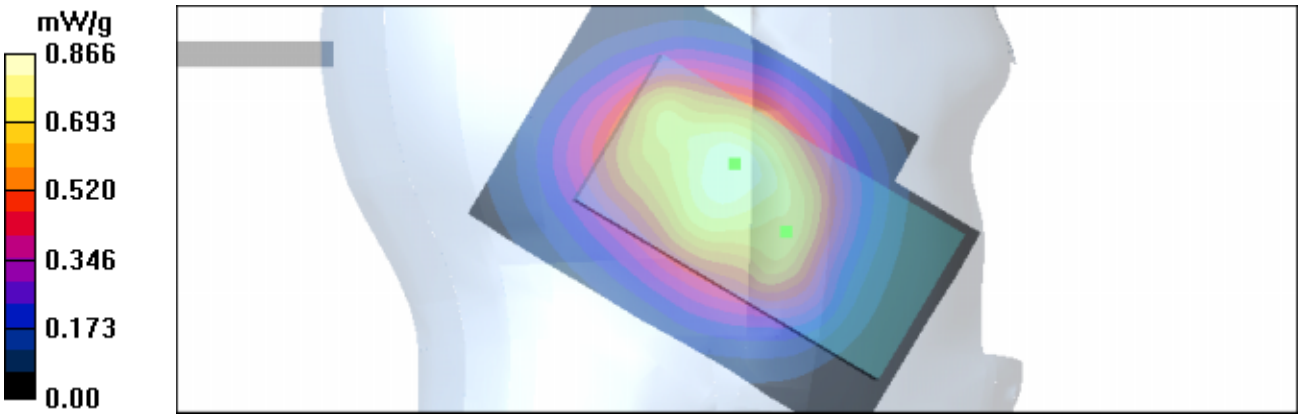

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Date/Time: 12.08.2005 15:24:23

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide closed
Communication System: GPRS 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium: HSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.885 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle, t=20.7 C/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.651 mW/g

Tilt position - Middle, t=20.7 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 27.2 V/m; Power Drift = -0.247 dB
Peak SAR (extrapolated) = 0.945 W/kg
SAR(1 g) = 0.563 mW/g; SAR(10 g) = 0.387 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

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) = 0.632 mW/g

Tilt position - Middle, t=20.7 C/Zoom Scan (5x5x7) (5x5x7)/Cube 1: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 27.2 V/m; Power Drift = -0.247 dB
Peak SAR (extrapolated) = 0.710 W/kg
SAR(1 g) = 0.566 mW/g; SAR(10 g) = 0.417 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

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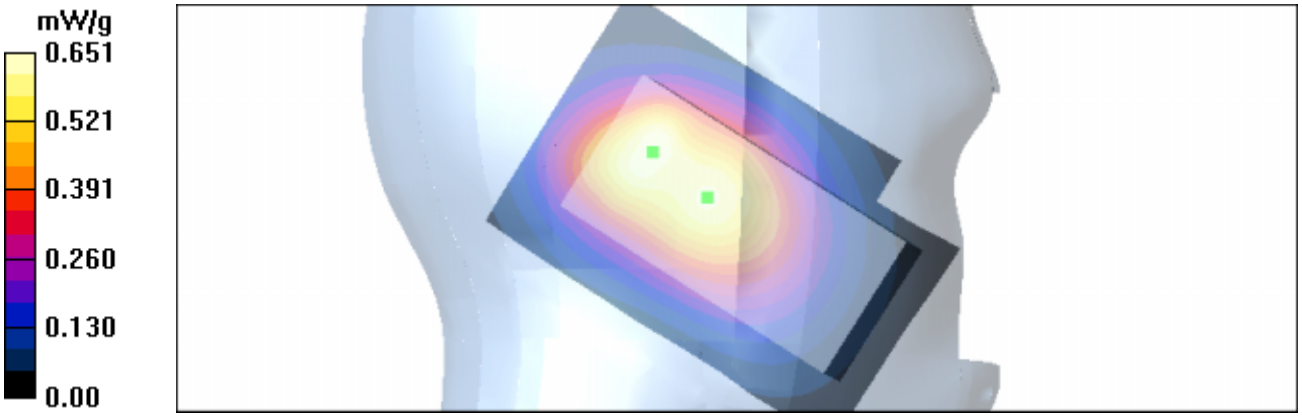
Warning: Maximum averaged SAR over 10 g is located on the boundary of the measurement cube. This cube might not incorporate the absolute averaged SAR. Please consider a refinement of the Area Scan measurement.

Maximum value of SAR (measured) = 0.592 mW/g



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Date/Time: 15.08.2005 09:41:35

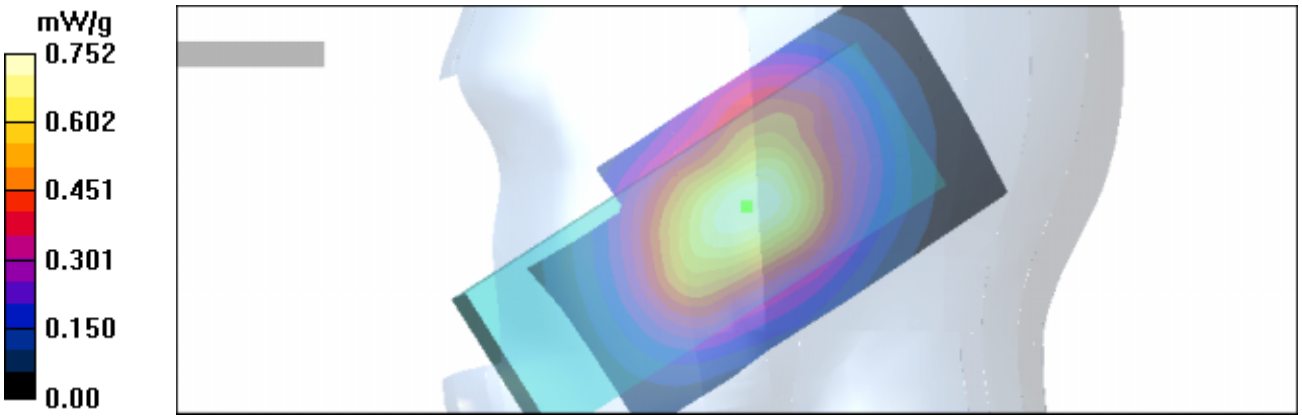
Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide open
Communication System: GPRS 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium: HSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.879 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Cheek position - Middle, t=20.5 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.752 mW/g

Cheek position - Middle, t=20.5 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.4 V/m; Power Drift = -0.209 dB
Peak SAR (extrapolated) = 0.924 W/kg
SAR(1 g) = 0.683 mW/g; SAR(10 g) = 0.479 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 0.714 mW/g



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Date/Time: 15.08.2005 10:01:09

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide open
Communication System: GPRS 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium: HSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.879 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle, t=20.5 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.368 mW/g

Tilt position - Middle, t=20.5 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 19.2 V/m; Power Drift = -0.111 dB
Peak SAR (extrapolated) = 0.672 W/kg
SAR(1 g) = 0.324 mW/g; SAR(10 g) = 0.212 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

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) = 0.362 mW/g

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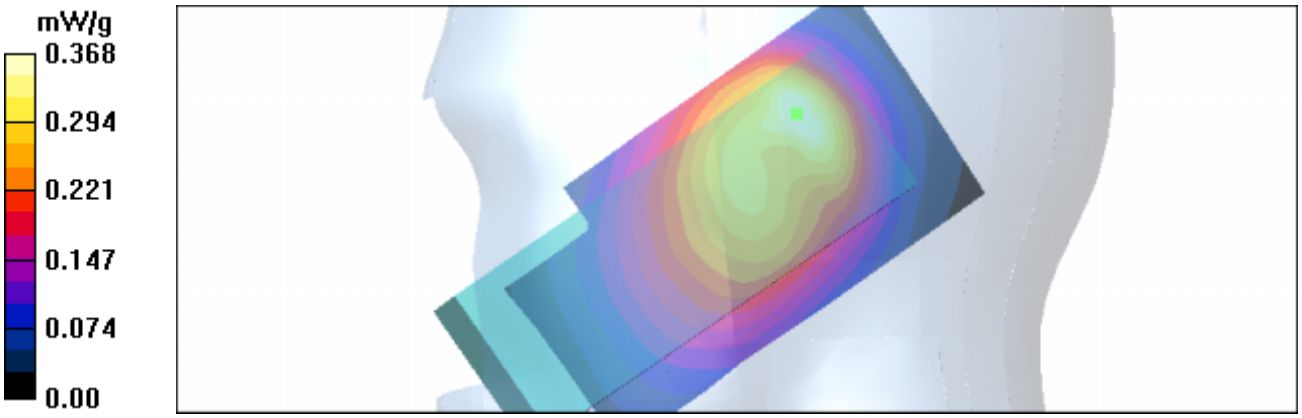

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Date/Time: 15.08.2005 08:58:43

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide open
Communication System: GPRS 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium: HSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.879 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Cheek position - Middle, t=20.3 C/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.668 mW/g

Cheek position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = -0.246 dB
Peak SAR (extrapolated) = 0.810 W/kg
SAR(1 g) = 0.626 mW/g; SAR(10 g) = 0.464 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 0.657 mW/g

Cheek position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 1:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = -0.246 dB
Peak SAR (extrapolated) = 0.954 W/kg
SAR(1 g) = 0.606 mW/g; SAR(10 g) = 0.430 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

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

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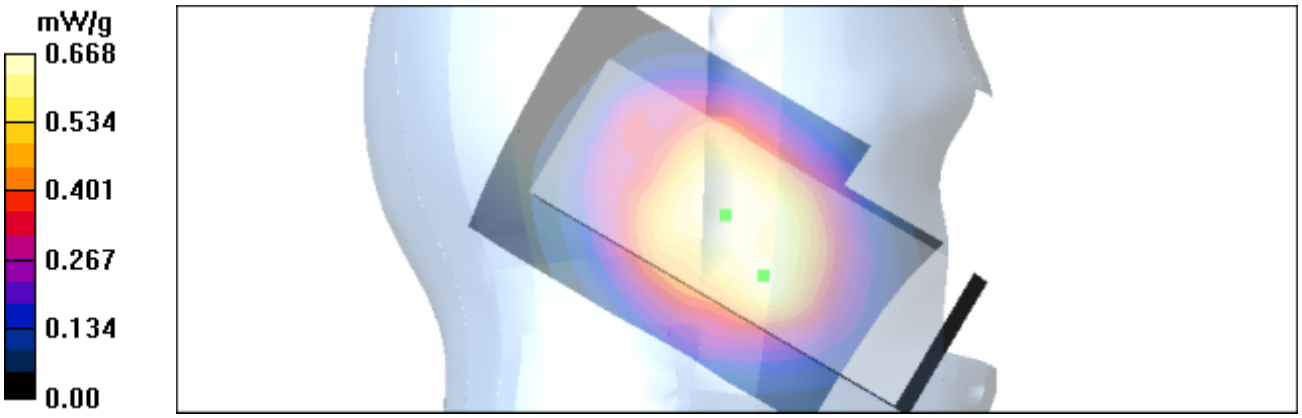
of the Area Scan measurement.

Maximum value of SAR (measured) = 0.660 mW/g



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Date/Time: 15.08.2005 09:09:54

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide open
Communication System: GPRS 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium: HSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.879 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.72, 6.72, 6.72); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 19.1 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 0.499 W/kg
SAR(1 g) = 0.383 mW/g; SAR(10 g) = 0.284 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

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) = 0.400 mW/g

Tilt position - Middle, t=20.3 C/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.409 mW/g

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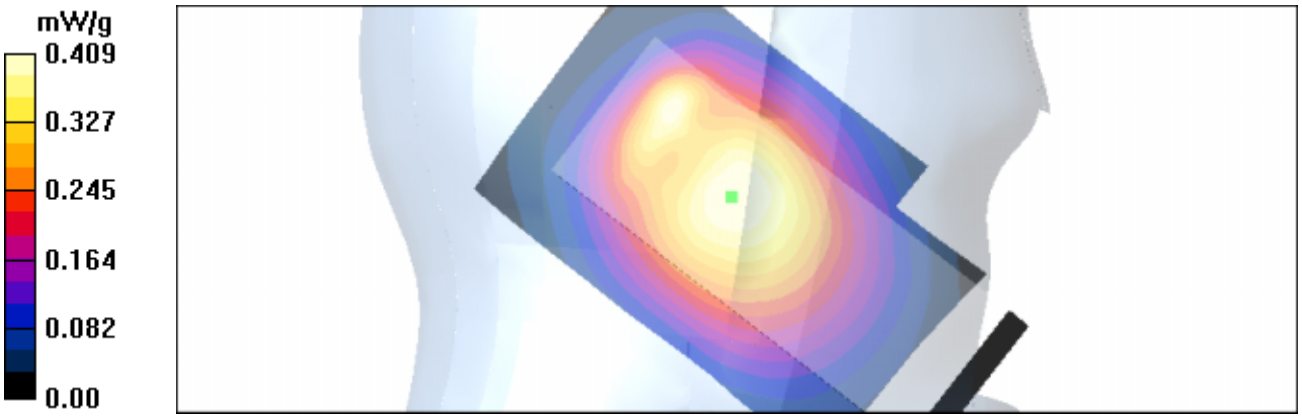

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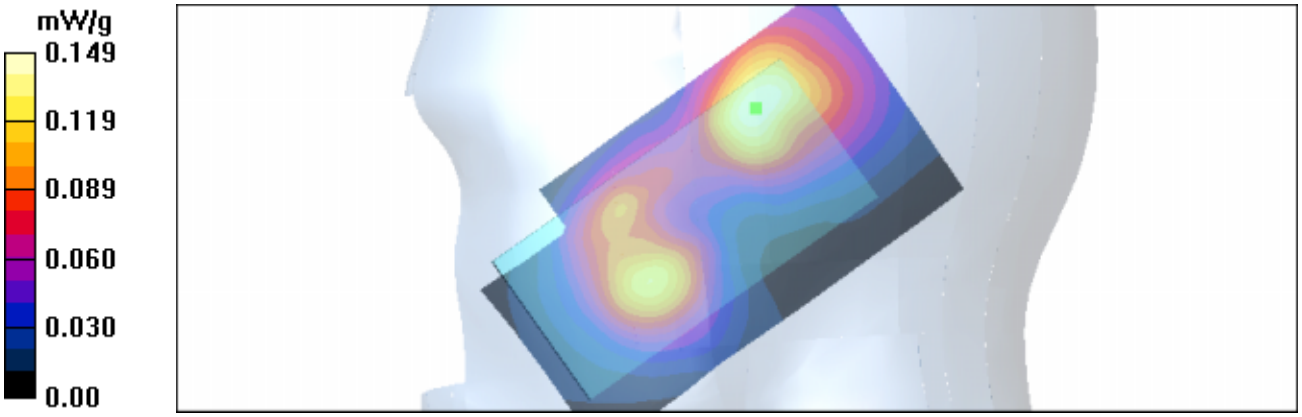
Date/Time: 16.08.2005 11:11:19

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide closed
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.42 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 0.223 W/kg
SAR(1 g) = 0.140 mW/g; SAR(10 g) = 0.081 mW/g
Maximum value of SAR (measured) = 0.154 mW/g

Touch position - Middle, t=20.3 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.149 mW/g



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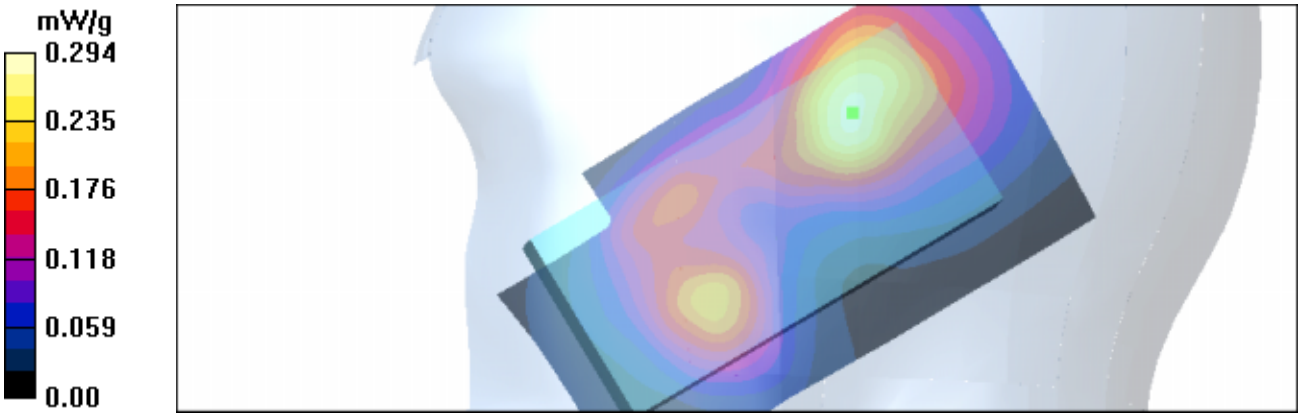
Date/Time: 16.08.2005 10:39:55

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56; Serial: 004400/58/164239/2; slide closed
Communication System: GPRS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.2
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Cheek position - Middle, t=20.3 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.281 mW/g

Cheek position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.0 V/m; Power Drift = -0.228 dB
Peak SAR (extrapolated) = 0.428 W/kg
SAR(1 g) = 0.267 mW/g; SAR(10 g) = 0.154 mW/g
Maximum value of SAR (measured) = 0.294 mW/g



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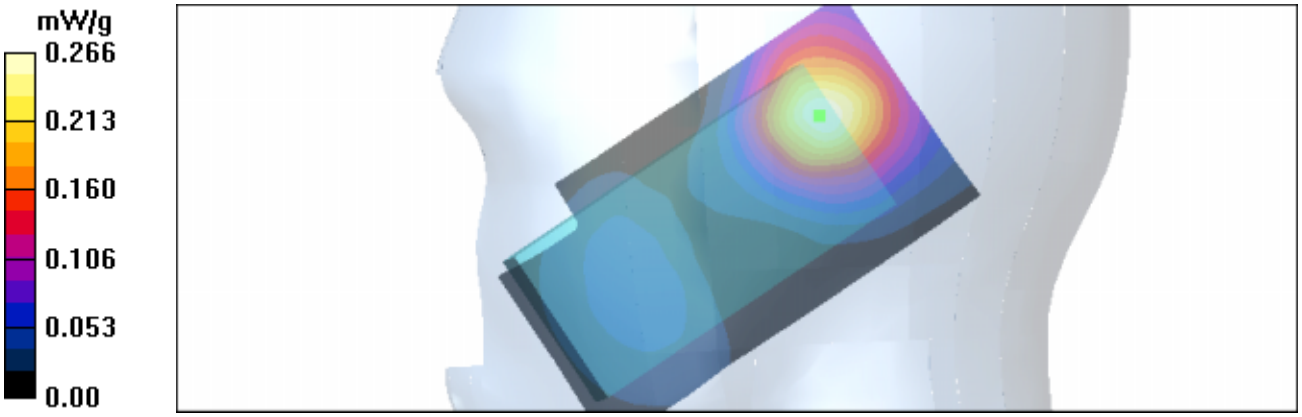
Date/Time: 16.08.2005 10:55:58

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide closed
Communication System: GPRS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.2
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle, t=20.3 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.266 mW/g

Tilt position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 12.4 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.437 W/kg
SAR(1 g) = 0.254 mW/g; SAR(10 g) = 0.143 mW/g
Maximum value of SAR (measured) = 0.285 mW/g



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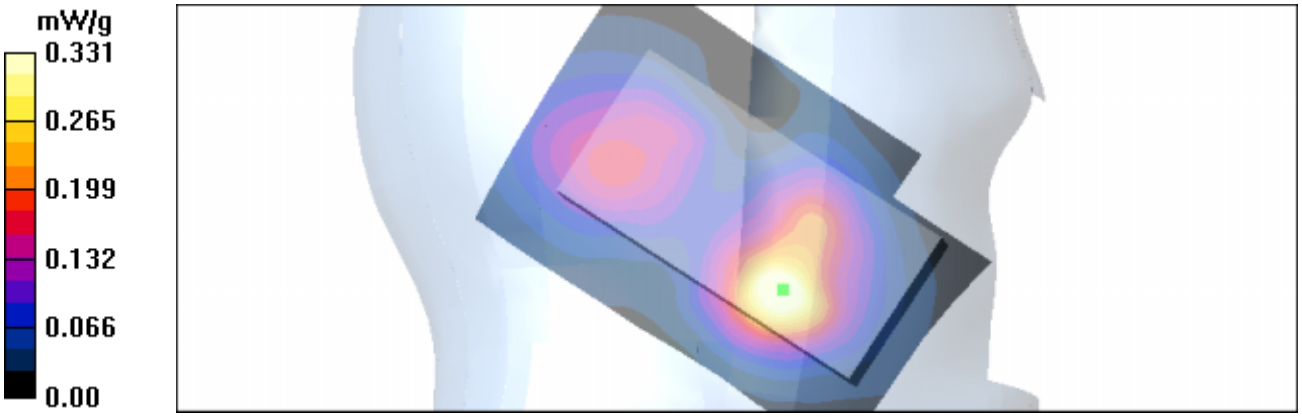
Date/Time: 16.08.2005 11:44:00

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide closed
Communication System: GPRS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.2
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Cheek position - Middle, t=20.3 C/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.358 mW/g

Cheek position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.477 W/kg
SAR(1 g) = 0.305 mW/g; SAR(10 g) = 0.175 mW/g
Maximum value of SAR (measured) = 0.331 mW/g



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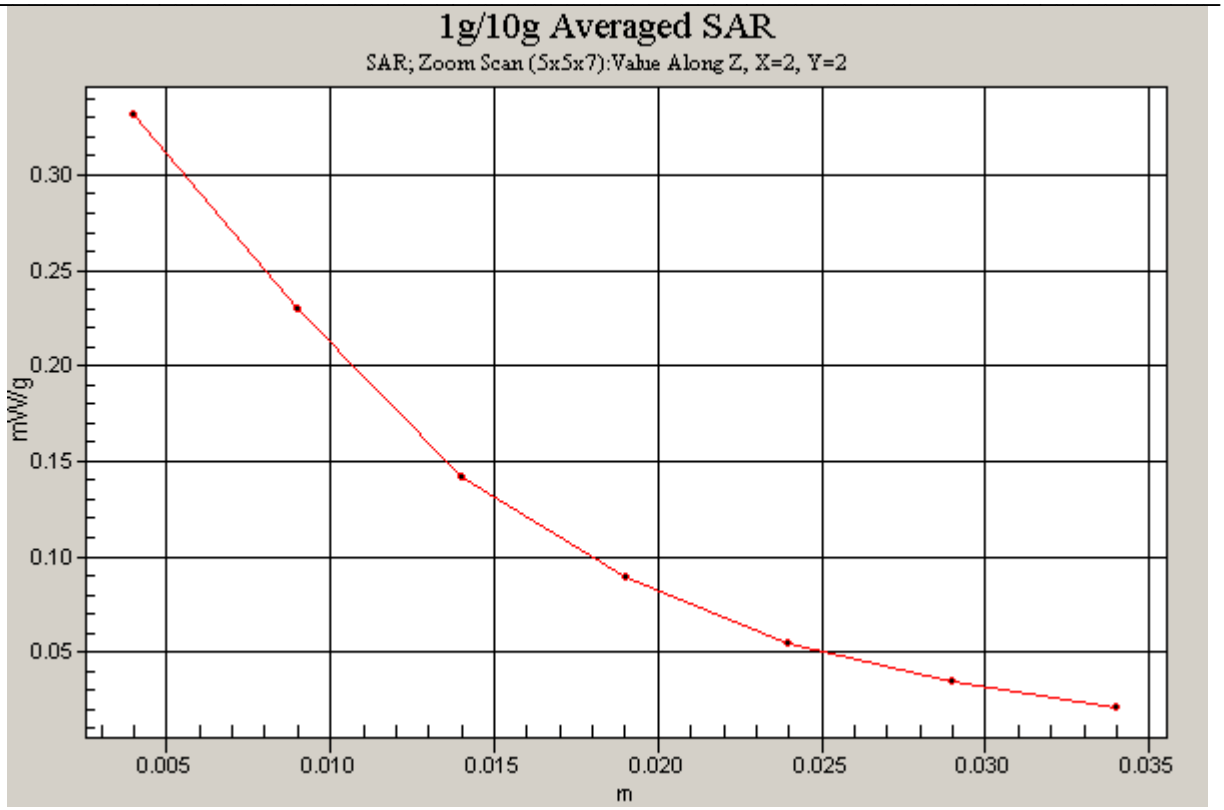

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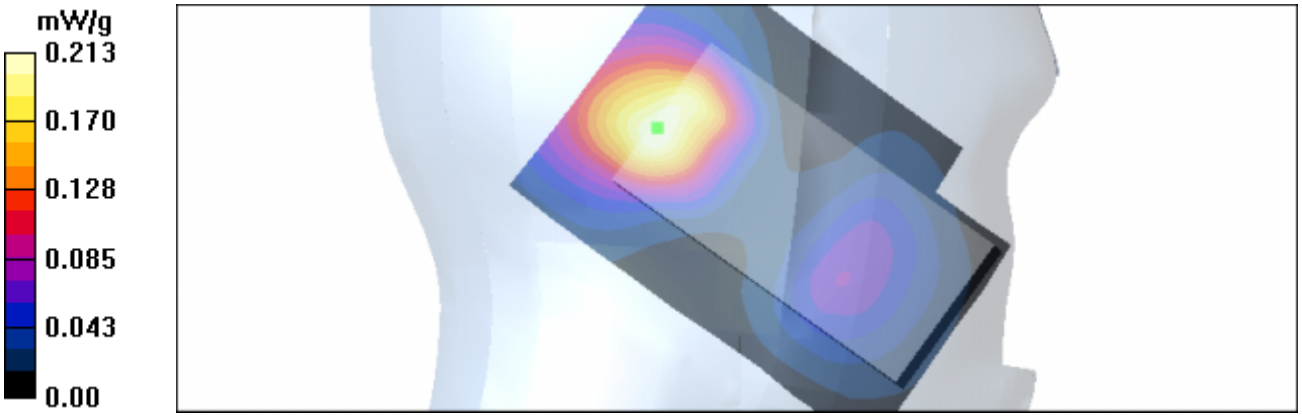
Date/Time: 16.08.2005 12:02:21

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide closed
Communication System: GPRS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.2
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle, t=20.3 C/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.213 mW/g

Tilt position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.8 V/m; Power Drift = 0.123 dB
Peak SAR (extrapolated) = 0.311 W/kg
SAR(1 g) = 0.195 mW/g; SAR(10 g) = 0.115 mW/g
Maximum value of SAR (measured) = 0.213 mW/g



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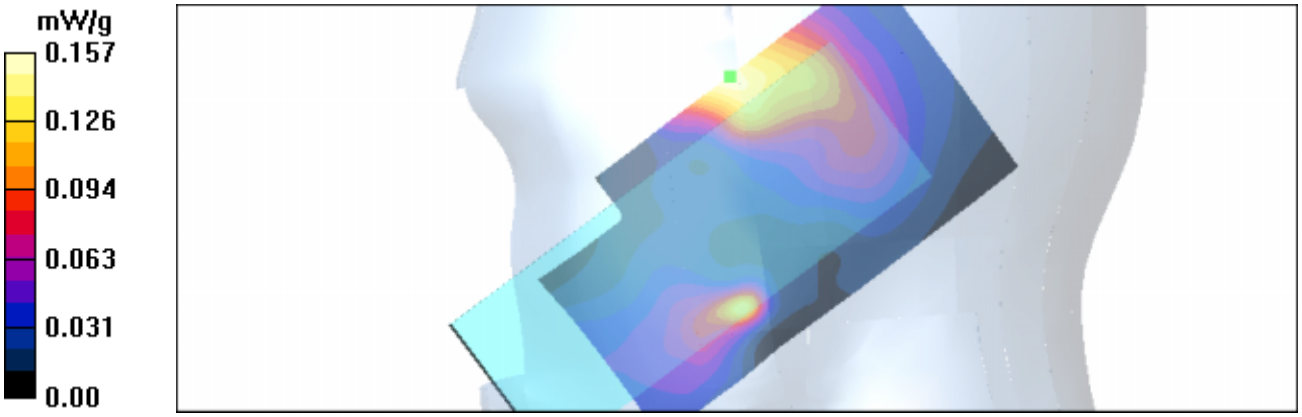
Date/Time: 16.08.2005 12:55:51

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide open
Communication System: GPRS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.2
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Cheek position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.51 V/m; Power Drift = 0.195 dB
Peak SAR (extrapolated) = 0.229 W/kg
SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.087 mW/g
Maximum value of SAR (measured) = 0.163 mW/g

Cheek position - Middle, t=20.3 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.157 mW/g



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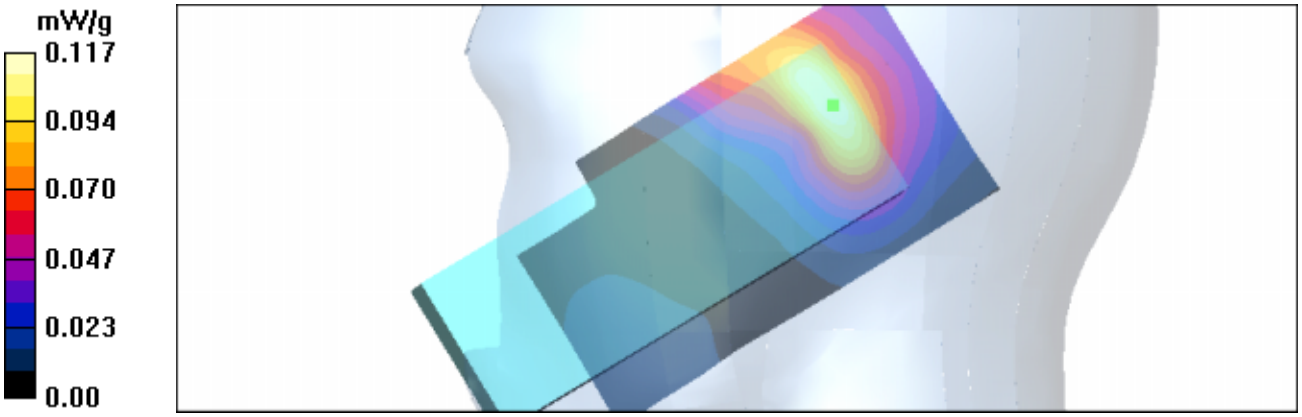
Date/Time: 16.08.2005 13:11:45

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide open
Communication System: GPRS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.2
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 8.85 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.192 W/kg
SAR(1 g) = 0.105 mW/g; SAR(10 g) = 0.058 mW/g
Maximum value of SAR (measured) = 0.122 mW/g

Tilt position - Middle, t=20.3 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.117 mW/g



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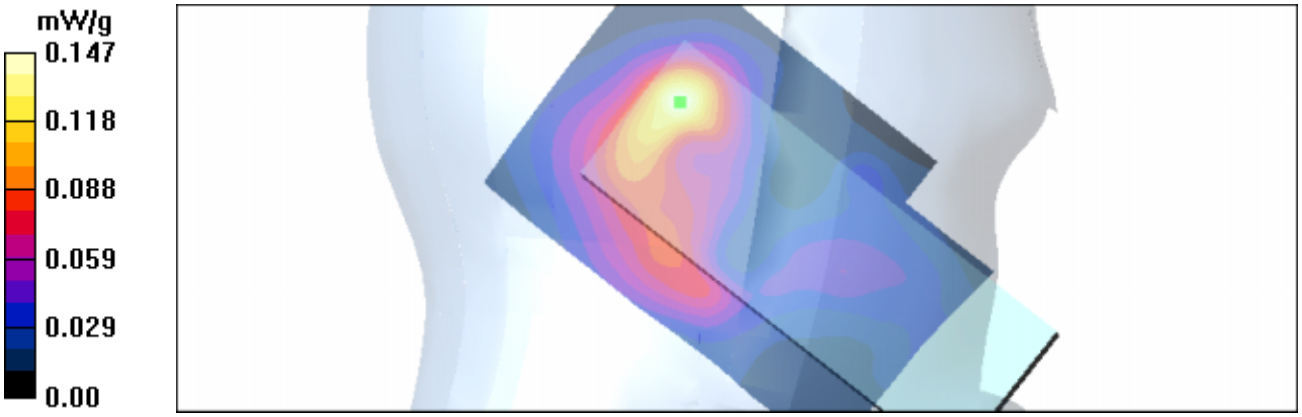
Date/Time: 16.08.2005 12:17:00

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide open
Communication System: GPRS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.2
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Cheek position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.46 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.186 W/kg
SAR(1 g) = 0.116 mW/g; SAR(10 g) = 0.067 mW/g
Maximum value of SAR (measured) = 0.125 mW/g

Cheek position - Middle, t=20.3 C/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.147 mW/g



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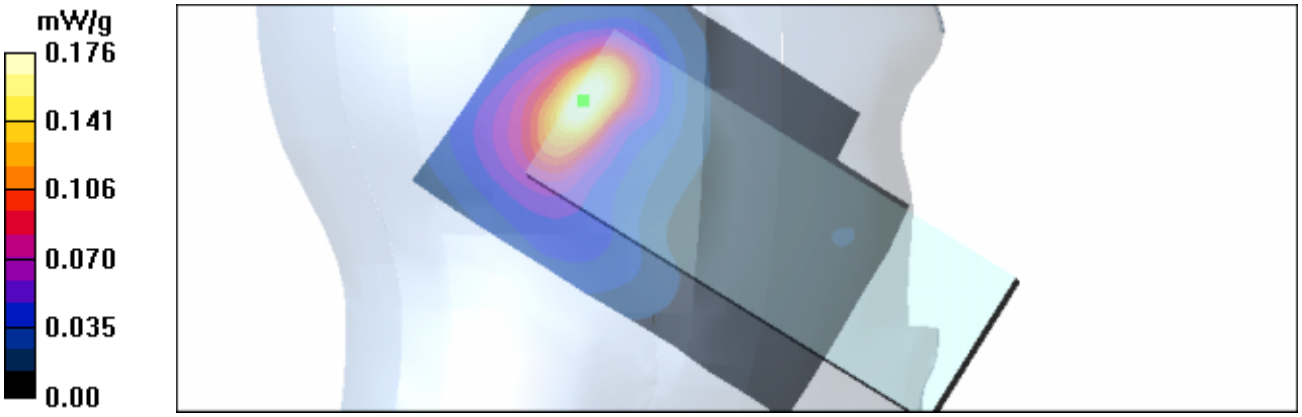
Date/Time: 16.08.2005 12:40:43

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; slide open
Communication System: GPRS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.2
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle, t=20.3 C/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.176 mW/g

Tilt position - Middle, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.2 V/m; Power Drift = 0.171 dB
Peak SAR (extrapolated) = 0.264 W/kg
SAR(1 g) = 0.163 mW/g; SAR(10 g) = 0.089 mW/g
Maximum value of SAR (measured) = 0.181 mW/g



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Date/Time: 15.08.2005 16:08:35

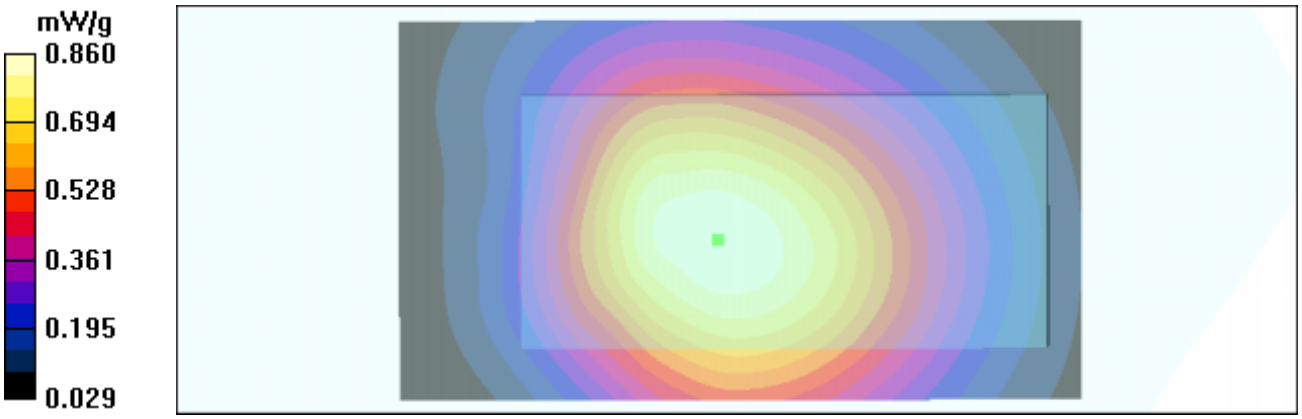
Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; without headset; without SD card
Communication System: GPRS 850; Frequency: 824.2 MHz;Duty Cycle: 1:4.2
Medium: BSL850 Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.959 mho/m; ε_r = 56; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.32, 6.32, 6.32); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body worn - Low, t=20.6 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 20.5 V/m; Power Drift = -0.100 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.799 mW/g; SAR(10 g) = 0.592 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 0.841 mW/g

Body worn - Low, t=20.6 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.860 mW/g



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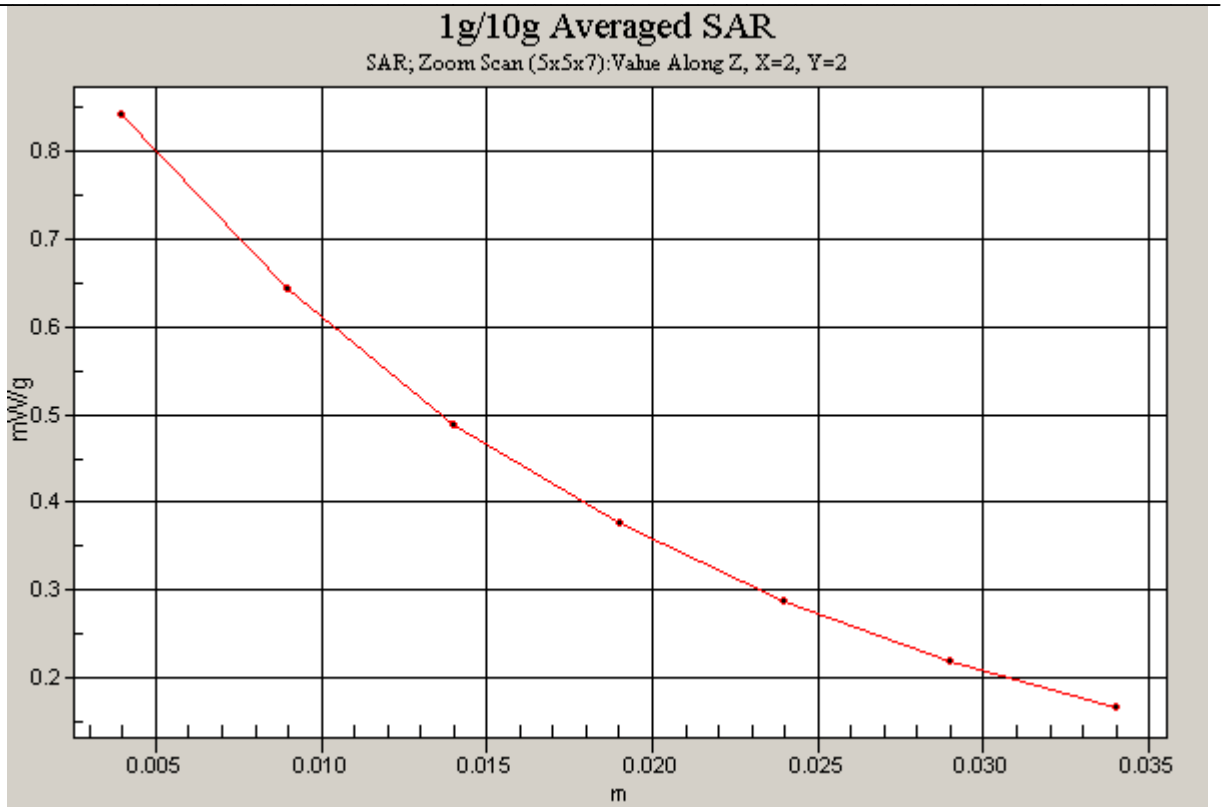

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Date/Time: 15.08.2005 15:05:56

Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; with headset HS-6; with SD card
Communication System: GPRS 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium: BSL850 Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.971 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(6.32, 6.32, 6.32); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1272
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body worn - Middle, t=20.5 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.5 V/m; Power Drift = -0.189 dB
Peak SAR (extrapolated) = 0.669 W/kg
SAR(1 g) = 0.519 mW/g; SAR(10 g) = 0.377 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

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) = 0.548 mW/g

Body worn - Middle, t=20.5 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.564 mW/g

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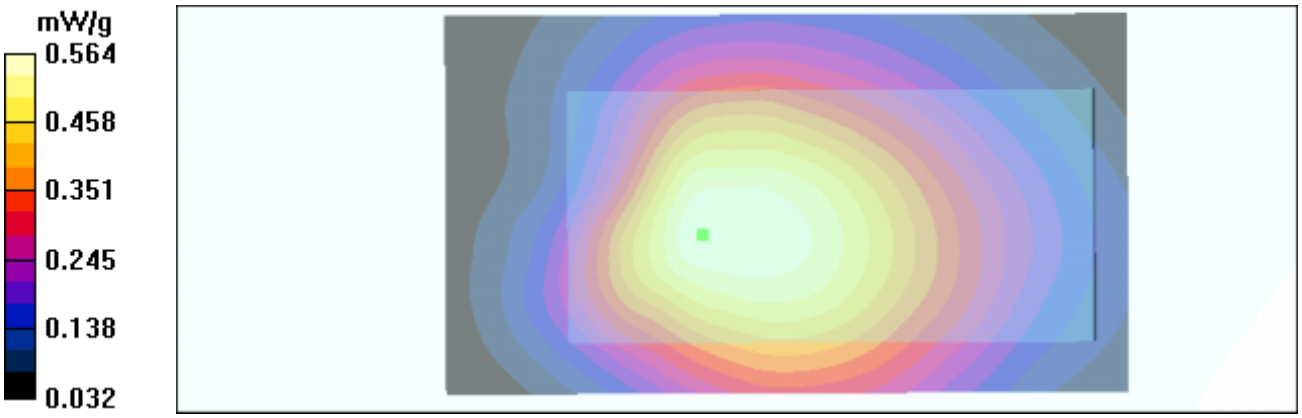

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Date/Time: 17.08.2005 10:17:22

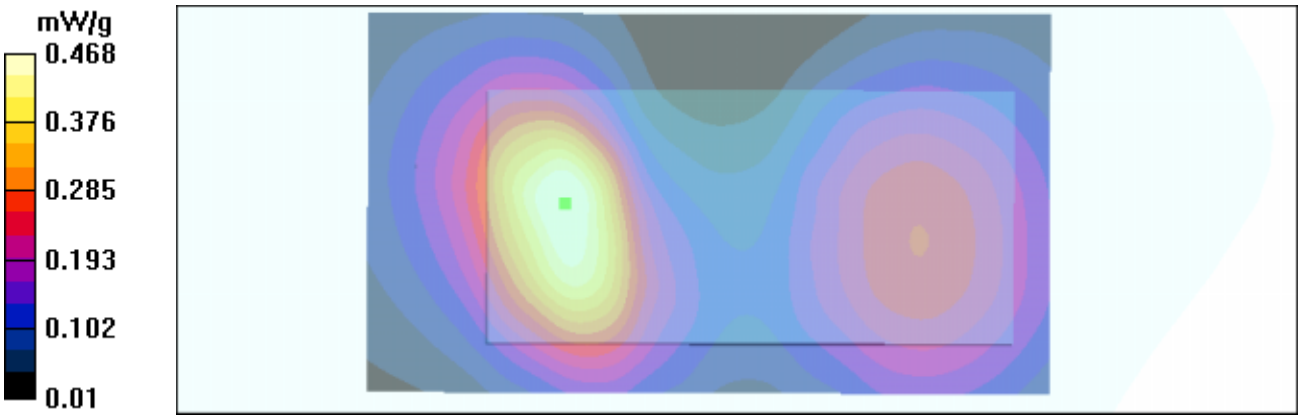
Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; without headset, with SD card
Communication System: GPRS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4.2
Medium: BSL1900 Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.55 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(4.67, 4.67, 4.67); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1275
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body worn - Low, t=20.8 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.486 mW/g

Body worn - Low, t=20.8 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = -0.069 dB
Peak SAR (extrapolated) = 0.713 W/kg
SAR(1 g) = 0.432 mW/g; SAR(10 g) = 0.258 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 0.468 mW/g



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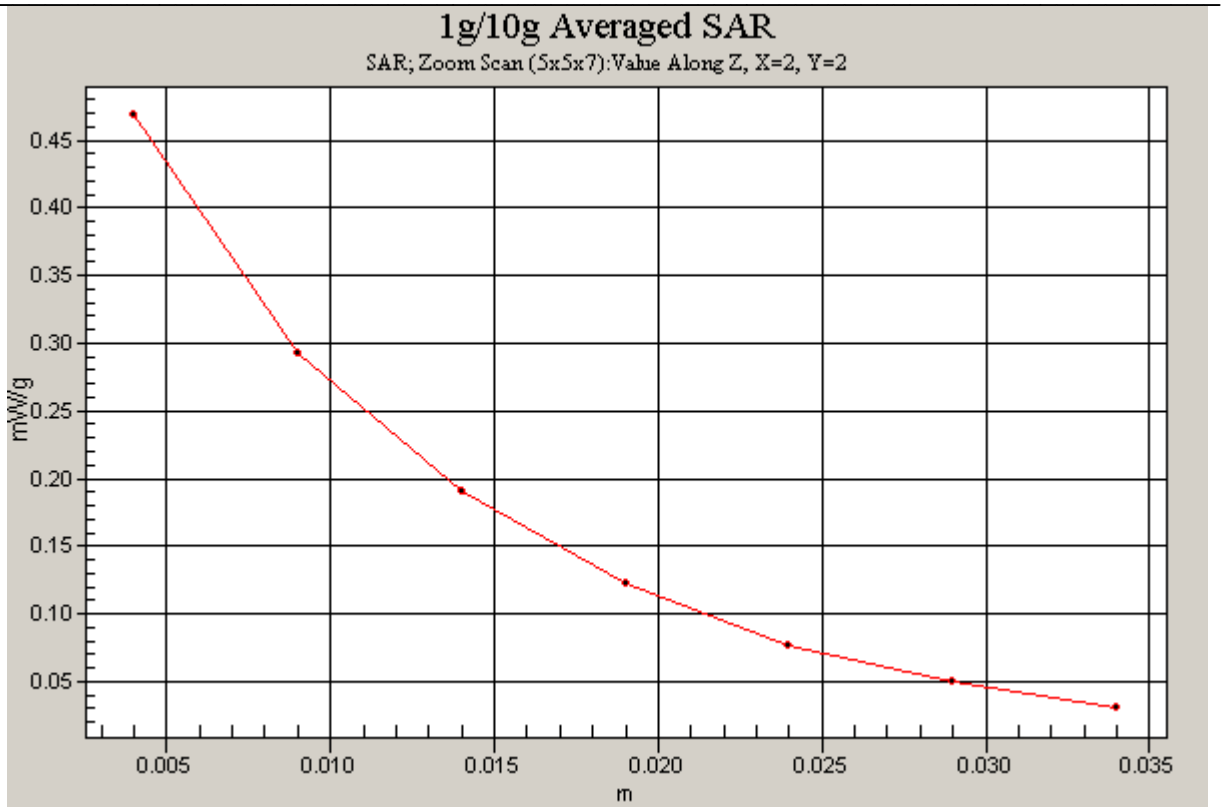

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Date/Time: 22.08.2005 10:20:46

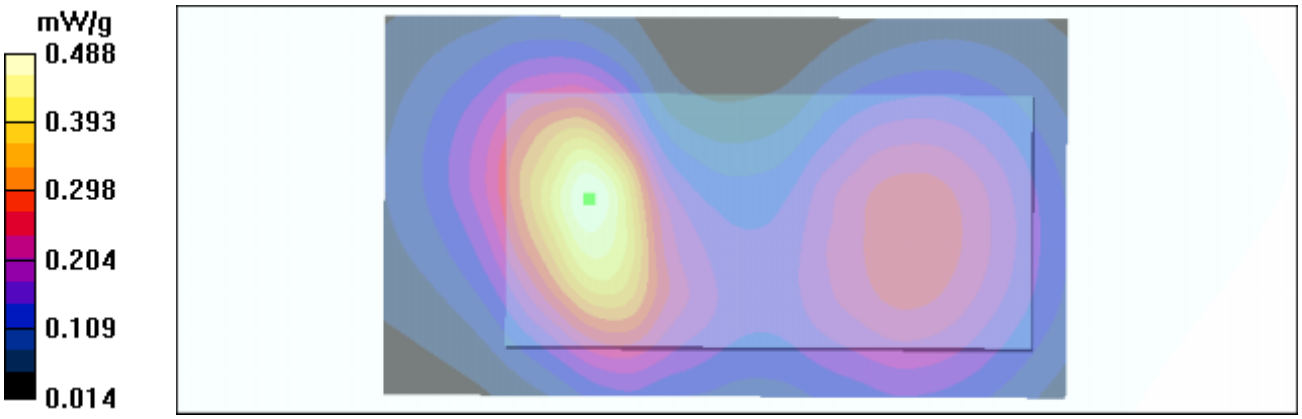
Test Laboratory: TCC Nokia, Oulu Laboratory
Type: RM-56;Serial: 004400/58/164239/2; with headset HS-6, with SD card
Communication System: GPRS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4.2
Medium: BSL1900 Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.57 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1765; ConvF(4.67, 4.67, 4.67); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 1; Type: SAM 4.0; Serial: 1275
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body worn - Low, t=20.3 C/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (interpolated) = 0.488 mW/g

Body worn - Low, t=20.3 C/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.226 dB
Peak SAR (extrapolated) = 0.682 W/kg
SAR(1 g) = 0.416 mW/g; SAR(10 g) = 0.249 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 0.450 mW/g



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APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)

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Calibration Laboratory of
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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

Client **Nokia Oulu**

Certificate No: ET3-1765_Feb05

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1765
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	February 24, 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	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)	10-Aug-04 (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)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06

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-04)	In house check: Nov 05

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

Issued: February 25, 2005

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

DASY - Parameters of Probe: ET3DV6 SN:1765

Sensitivity in Free Space[A]

NormX	**1.61** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**93** mV
NormY	**1.86** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**93** mV
NormZ	**1.94** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**93** 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	8.7	4.4
SAR_{be} [%]	With Correction Algorithm	0.6	0.1

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

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	13.1	8.4
SAR_{be} [%]	With Correction Algorithm	0.6	0.1

Sensor Offset

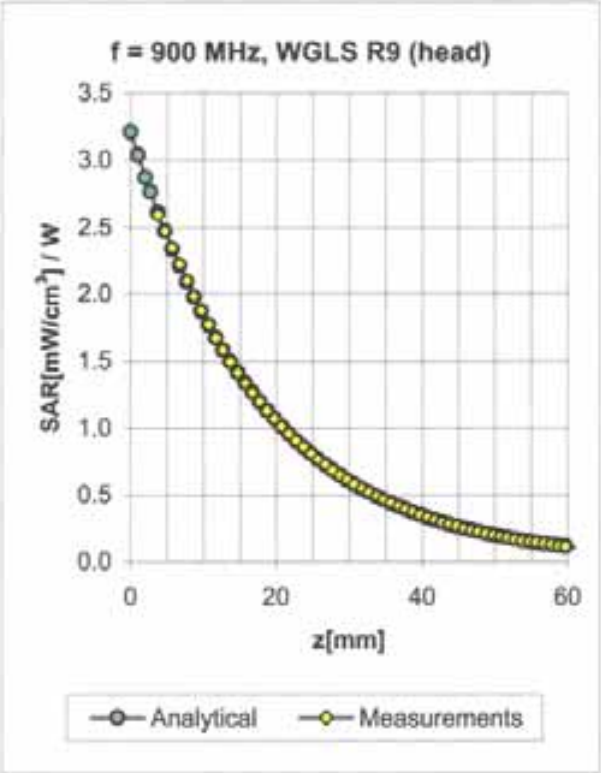
Probe Tip to Sensor Center **2.7** mm

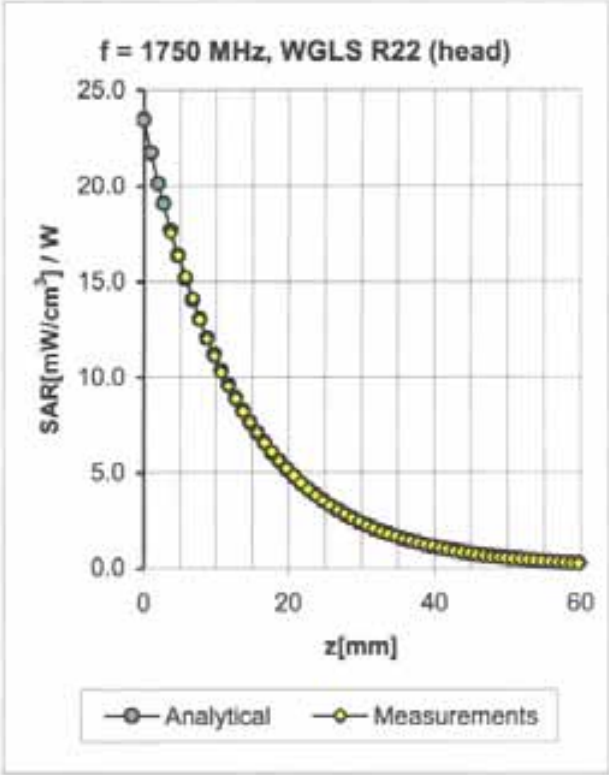
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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%	1.22	1.42	6.72 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	1.28	1.37	6.43 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.68	2.14	5.21 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.65	2.30	5.13 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.60	2.48	4.89 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.72	2.21	4.55 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	1.24	1.45	6.32 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	1.17	1.50	6.00 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.60	2.64	4.75 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.60	2.71	4.67 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.66	2.42	4.50 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.78	1.95	4.35 ± 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.

APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

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Calibration Laboratory of
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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 **Nokia Oulu 2**

Certificate No: D835V2-480_Feb05

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 480
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	February 24, 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

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:	Mike Meili	Laboratory Technician	Mike Meili
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 25, 2005

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DASY4 Validation Report for Head TSL

Date/Time: 24.02.2005 12:58:31

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN480

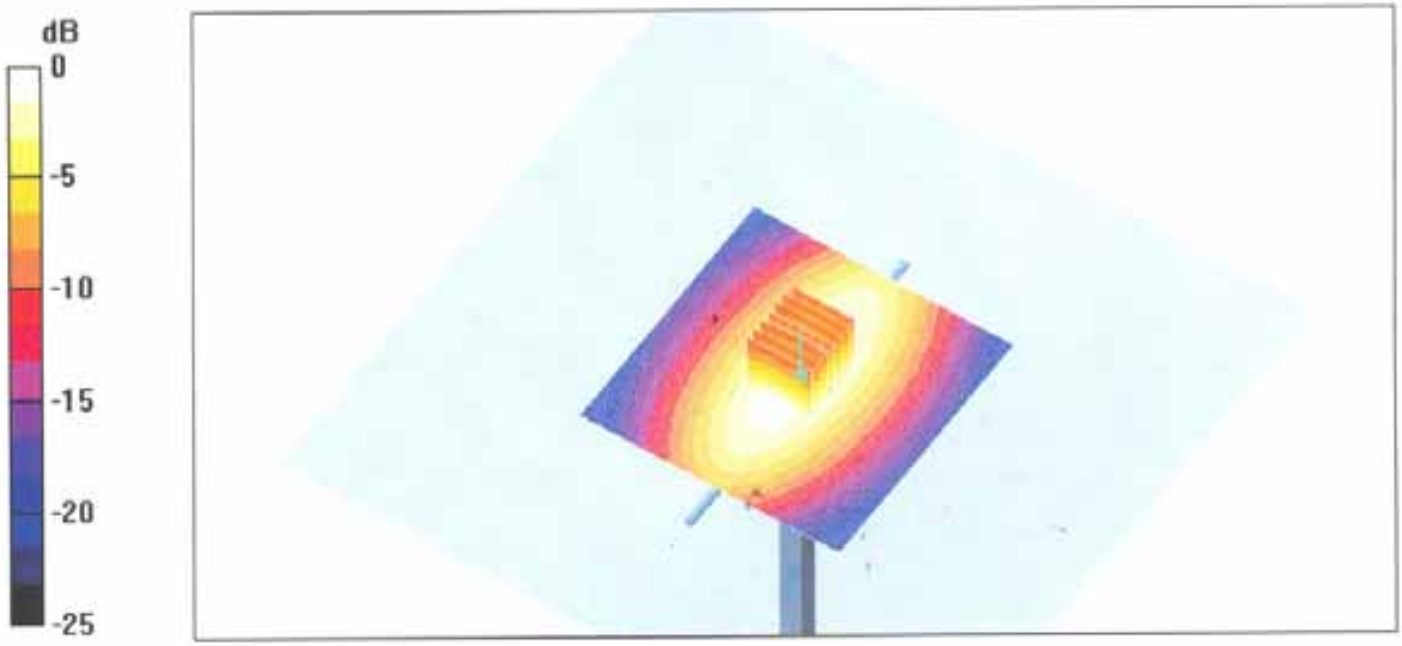
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL 900 MHz;
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 42.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 4.9L; Type: QD000P49AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 17; Postprocessing SW: SEMCAD, V1.8 Build 144

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.42 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.8 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.25 W/kg
SAR(1 g) = 2.25 mW/g; SAR(10 g) = 1.48 mW/g
Maximum value of SAR (measured) = 2.42 mW/g



0 dB = 2.42 mW/g

DASY4 Validation Report for Body TSL

Date/Time: 11.02.2005 12:37:22

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN480

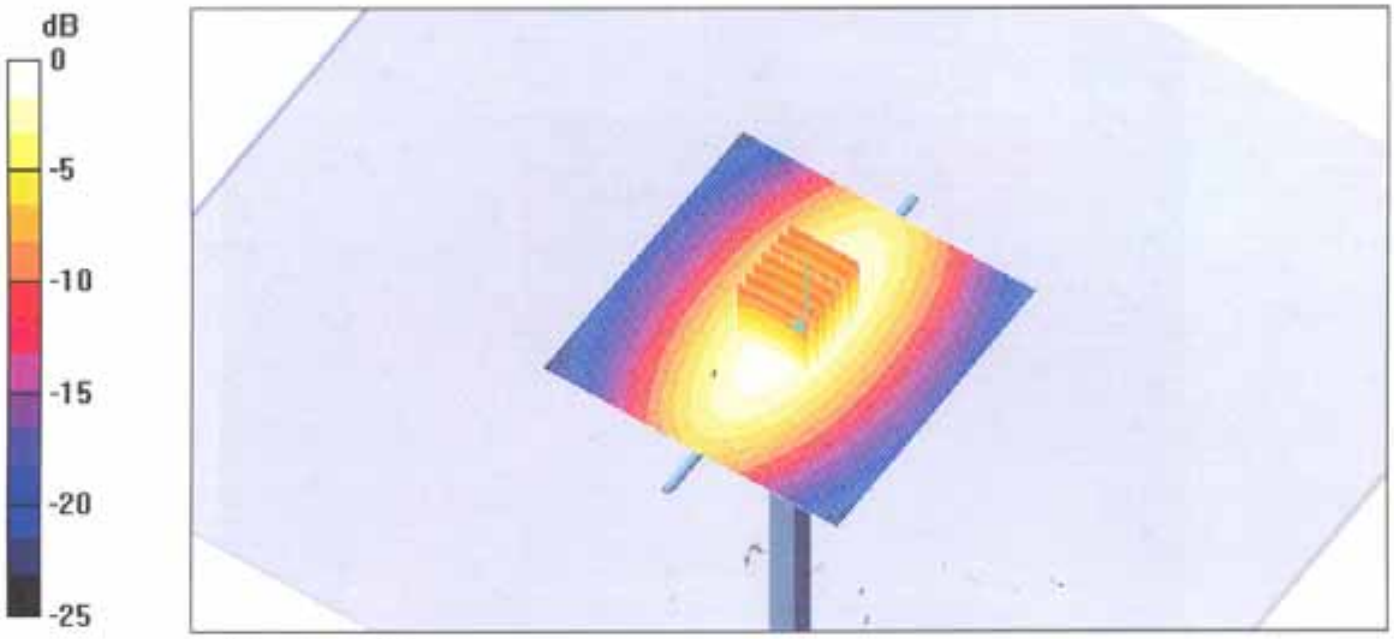
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: M900;
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.98, 5.98, 5.98); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 13; Postprocessing SW: SEMCAD, V1.8 Build 142

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.59 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.8 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 3.4 W/kg
SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.6 mW/g



0 dB = 2.6 mW/g

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client **Nokia Oulu 2**

Certificate No: D1900V2-5d030_Feb05

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d030
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	February 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

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:	Mike Meili	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 25, 2005

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DASY4 Validation Report for Head TSL

Date/Time: 18.02.2005 15:49:29

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d030

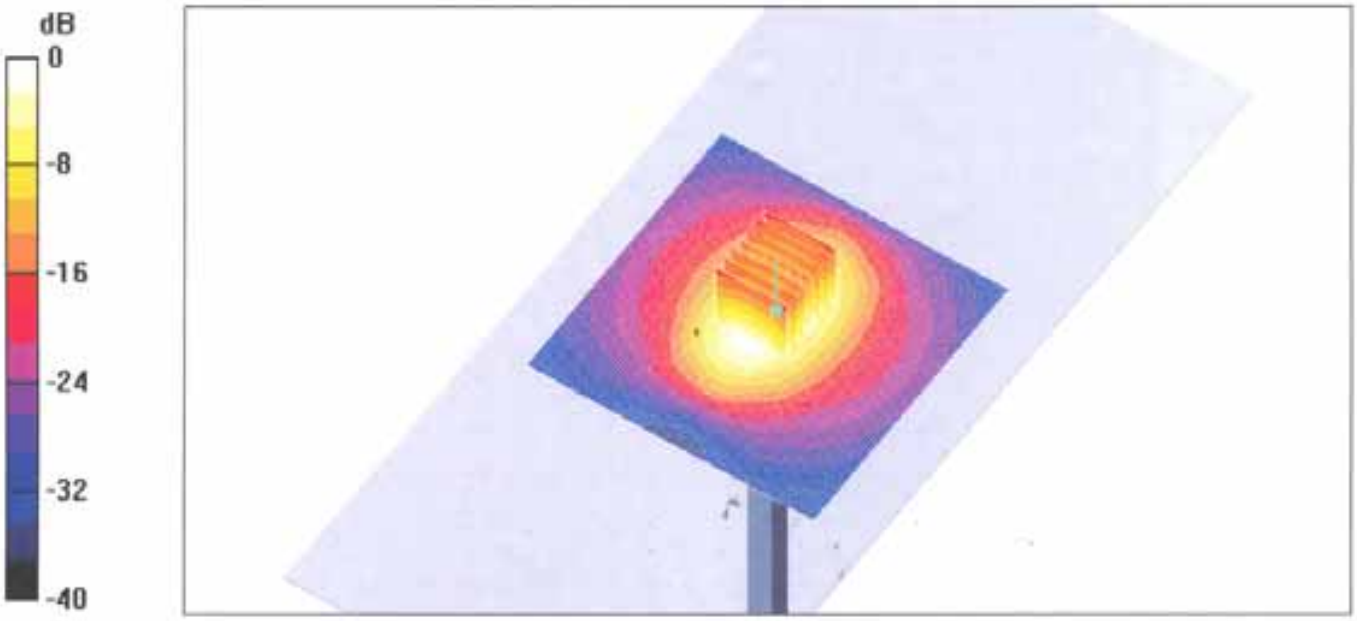
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1800 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 11; Postprocessing SW: SEMCAD, V1.8 Build 144

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.2 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.4 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 9.76 mW/g; SAR(10 g) = 5.09 mW/g
Maximum value of SAR (measured) = 11.1 mW/g



0 dB = 11.1 mW/g

DASY4 Validation Report for Body TSL

Date/Time: 14.02.2005 17:05:1

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d030

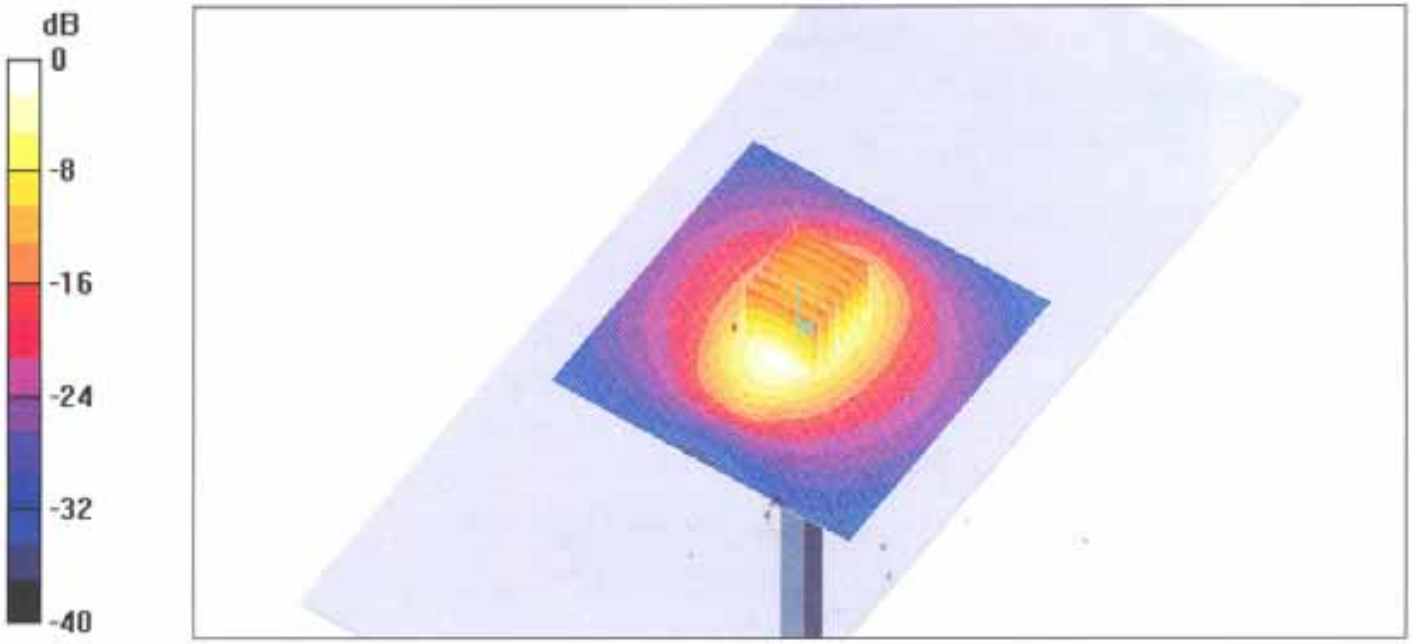
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: Muscle 1800 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 13; Postprocessing SW: SEMCAD, V1.8 Build 142

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.5 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.4 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 9.94 mW/g; SAR(10 g) = 5.3 mW/g
Maximum value of SAR (measured) = 11.2 mW/g



0 dB = 11.2 mW/g