

SAR Compliance Test Report

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Measurements made by:	Kai Niskala		
Tested device:	RM-33		
FCC ID:	QTKRM-33	IC:	661AD-RM33
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

Digitally signed by Kai Niskala
DN: CN = Kai Niskala, C = FI, O = Nokia,
OU = CertMT
Reason: I am the author of this document
Date: 2005.06.08 13:33:12 +03'00'

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2005-05-25 to 2005-05-30
SN, HW and SW numbers of tested device	RM-33; SN: 004400/64/173126/8; HW: 0551; SW: 3.13; DUT#: 30370
Batteries used in testing	BL-5X; DUT#'s: 30371, 30372, 30373
Headsets used in testing	HS-15; DUT#: 30374
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	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
GSM850	128 / 824.2	24.9 dBm ERP	Right, Cheek	1.6 W/kg	0.64 W/kg	PASSED
GSM1900	661 / 1880.0	31.3 dBm EIRP	Right, Tilt	1.6 W/kg	0.56 W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Ch / f (MHz)	Radiated power	Separation distance	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
GSM850	128 / 824.2	24.9 dBm ERP	1.5 cm	1.6 W/kg	0.77 W/kg	PASSED
GSM1900	512 / 1850.2	32.4 dBm EIRP	1.5 cm	1.6 W/kg	0.69 W/kg	PASSED

1.2.3 Maximum Drift

Maximum drift during measurements	-0.28 dB
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1.2.4 Measurement Uncertainty

Extended Uncertainty (k=2) 95%	$\pm 29.8 \%$
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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	GPRS	EGPRS	BT
	850 / 1900	850 / 1900	850 / 1900	BT
Modulation Mode	GMSK	GMSK	8PSK	GFSK
Duty Cycle	1/8	1/8	1/8	
Transmitter Frequency Range (MHz)	824 – 849 1850 - 1909	824 – 849 1850 - 1909	824 – 849 1850 - 1910	2402-2480

Outside of USA and Canada, the transmitter of the device is capable of operating also in GSM1800, which is not part of this filing.

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

2.1 Picture of the Device



2.2 Description of the Antenna

The device has an internal patch antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	21 to 23
Ambient humidity (RH %):	30 to 42

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 on the device was the 'worst-case extrapolation' algorithm.

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)
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.

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.

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			
	2005-05-26	2.18	41.0	0.89	21.2
1900	Reference result	9.76	39.5	1.46	
	± 10% window	8.78 – 10.74			
	2005-05-25	10.1	41.3	1.42	21.0

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
835	Reference result	2.39	54.9	1.01	
	± 10% window	2.15 – 2.63			
835	2005-05-30	2.35	54.4	0.97	21.4
1900	Reference result	9.94	52.2	1.57	
	± 10% window	8.95 – 10.93			
1900	2005-05-27	10.2	54.1	1.56	21.3

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	
	2005-05-26	41.0	0.89	22
1880	Recommended value	40.0	1.40	
	± 5% window	38.0 – 42.0	1.33 – 1.47	
	2005-05-25	41.4	1.40	22

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ϵ_r	σ [S/m]	
836	Recommended value	55.2	0.97	
	± 5% window	52.4 – 58.0	0.92 – 1.02	
	2005-05-30	54.4	0.97	22
1880	Recommended value	53.3	1.52	
	± 5% window	50.6 – 56.0	1.44 – 1.60	
	2005-05-27	54.2	1.54	22

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.

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.



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.

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	C_i	$C_i \cdot U_i$ (%)	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	±10.0	R	√3	1	±5.8	∞
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			±14.9	206
Coverage Factor for 95%			k=2				
Expanded Standard Uncertainty						±29.8	

7. RESULTS

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

850MHz Head SAR results

Option used: MMC, front cover, 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		24.9 dBm	26.9 dBm	27.1 dBm
Slide open	Left	Cheek		0.23	
		Tilt		0.14	
	Right	Cheek		0.22	
		Tilt		0.16	
Slide closed	Left	Cheek		0.54	
		Tilt		0.39	
	Right	Cheek	0.64	0.55	0.47
		Tilt		0.43	
Slide closed	Highest SAR value measurement in this band repeated with BT active		0.63		

1900MHz Head SAR results

Option used: MMC, front cover, 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		32.4 dBm	31.3 dBm	30.1 dBm
Slide open	Left	Cheek		0.14	
		Tilt		0.17	
	Right	Cheek	0.23	0.29	0.27
		Tilt		0.23	
Slide closed	Left	Cheek		0.35	
		Tilt		0.42	
	Right	Cheek		0.47	
		Tilt	0.51	0.54	0.53
Slide closed	Highest SAR value measurement in this band repeated with BT active			0.56	

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

850MHz Body SAR results

Option used: MMC, front cover, 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 level	24.9 dBm	26.9 dBm	27.1 dBm
Slide closed	Without headset	0.74	0.60	0.50
	Headset HS-15	0.68	0.56	0.48
1-slot GPRS850	Power level	24.1 dBm	26.8 dBm	27.5 dBm
Slide closed	Without headset	0.73		
Slide closed, GSM850	Highest SAR value measurement in this mode repeated with BT active	0.77		

1900MHz Body SAR results

Option used: MMC, front cover, 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 level	32.4 dBm	31.3 dBm	30.1 dBm
Slide closed	Without headset	0.65	0.57	0.51
	Headset HS-15	0.59	0.58	0.47
1-slot GPRS1900	Power level	30.4 dBm	30.4 dBm	30.3 dBm
Slide closed	Without headset		0.55	
Slide closed, GSM1900	Highest SAR value measurement in this mode repeated with BT active	0.69		

Plots of the Measurement scans are given in Appendix B.

APPENDIX A: SYSTEM CHECKING SCANS

Date/Time: 26.05.2005 10:02:12

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: Dipole 835 MHz; Serial: D835V2 - SN:480

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL850 Medium parameters used: $f = 835$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 41$; $\rho = 1000$ kg/m³

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=21.2 C/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.5 V/m; Power Drift = -0.00 dB

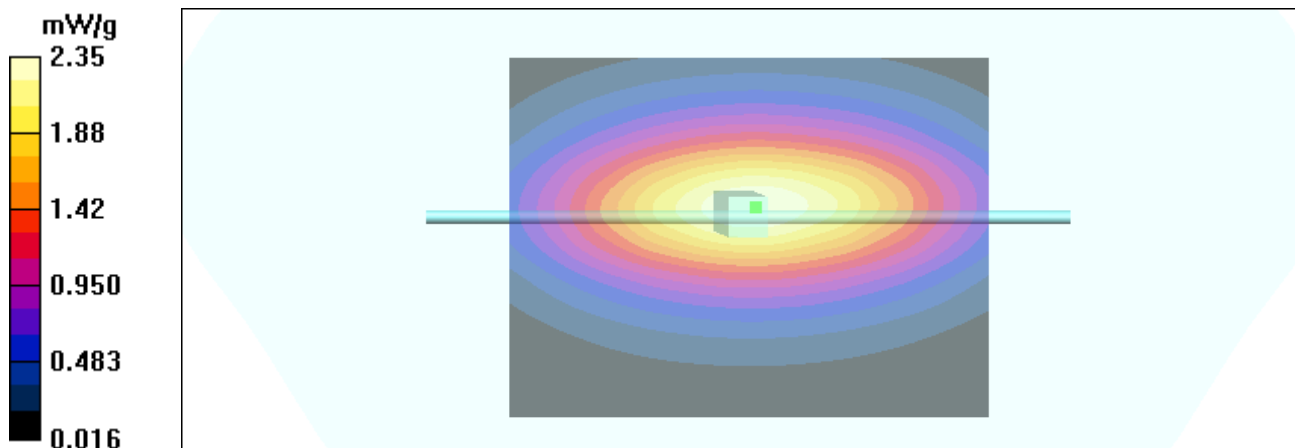
Peak SAR (extrapolated) = 3.29 W/kg

SAR(1 g) = 2.18 mW/g; SAR(10 g) = 1.42 mW/g

Maximum value of SAR (measured) = 2.36 mW/g

d=15mm, Pin=250mW, t=21.2 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.35 mW/g



Date/Time: 25.05.2005 10:16:45

Test Laboratory: TCC Nokia, Oulu Laboratory

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL1900 Medium parameters used (interpolated): $f = 1900$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 41.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1765; ConvF(5.13, 5.13, 5.13); Calibrated: 24.02.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 21.02.2005
- Phantom: SAM 4; Type: SAM 4.0; Serial: 1215
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=10mm, Pin=250mW, t=21.0 C/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 12.3 mW/g

d=10mm, Pin=250mW, t=21.0 C/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

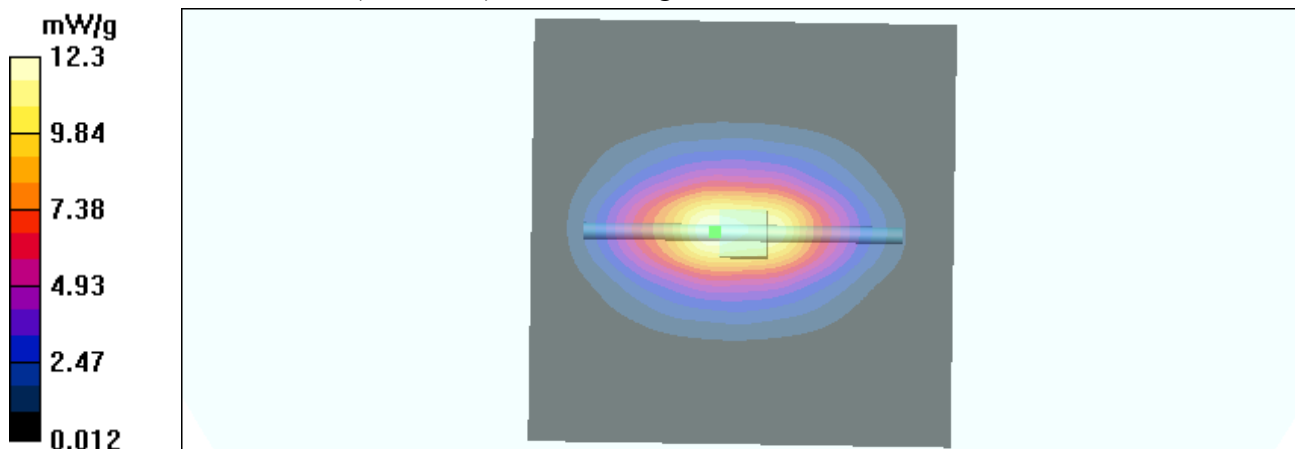
Reference Value = 96.1 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.35 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (measured) = 11.5 mW/g



Date/Time: 30.05.2005 09:48:57

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: Dipole 835 MHz; Serial: D835V2 - SN:480

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850 Medium parameters used: $f = 835$ MHz; $\sigma = 0.968$ mho/m; $\epsilon_r = 54.4$; $\rho = 1000$ kg/m³

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 1; Type: SAM 4.0; Serial: 1275
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=15mm, Pin=250mW, t=21.4 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.52 mW/g

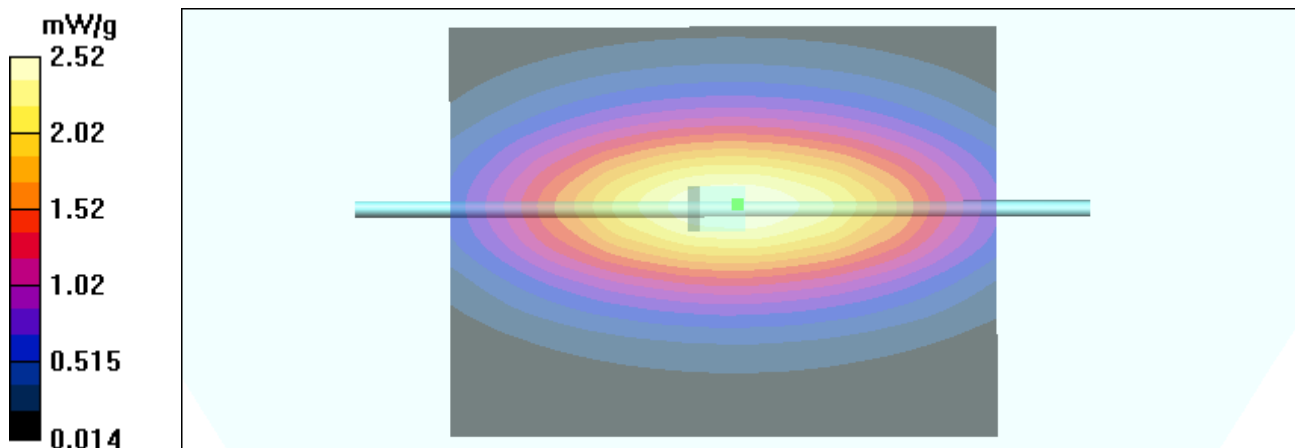
d=15mm, Pin=250mW, t=21.4 C/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.2 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 3.45 W/kg

SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.54 mW/g

Maximum value of SAR (measured) = 2.54 mW/g



Date/Time: 27.05.2005 09:28:18

Test Laboratory: TCC Nokia, Oulu Laboratory

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: BSL1900 Medium parameters used (interpolated): $f = 1900$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³

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 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=21.3 C/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 12.5 mW/g

d=10mm, Pin=250mW, t=21.3 C/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

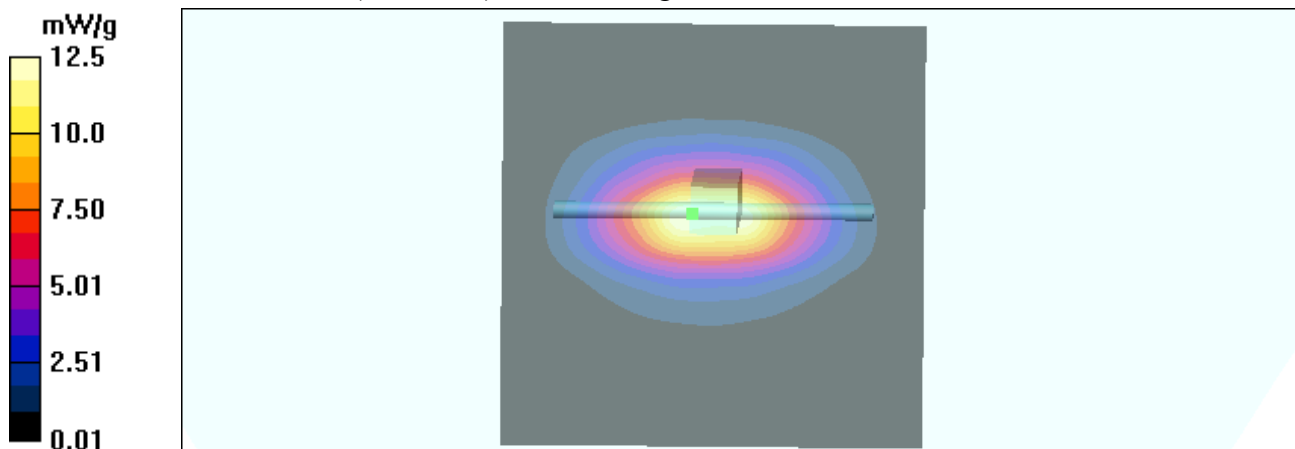
Reference Value = 92.1 V/m; Power Drift = -0.074 dB

Peak SAR (extrapolated) = 17.9 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.45 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (measured) = 11.6 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 26.05.2005 11:26:13

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide open

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: HSL850 Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.891$ mho/m; $\epsilon_r = 41$; $\rho = 1000$ kg/m³

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, $t=21.3$ C, worst case extrapolation/Area Scan

(51x111x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.238 mW/g

Cheek position - Middle, $t=21.3$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

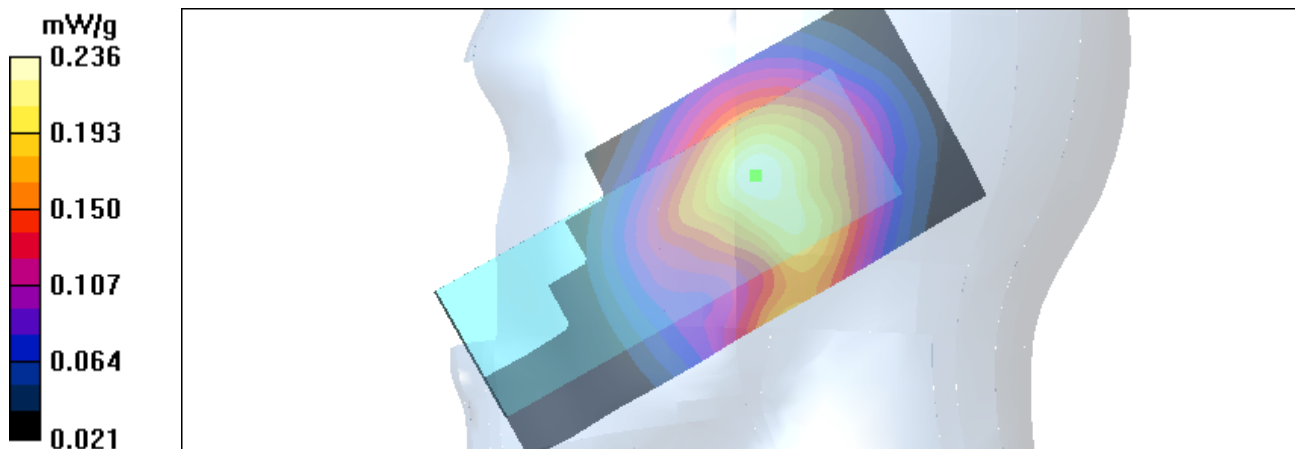
Reference Value = 12.3 V/m; Power Drift = -0.122 dB

Peak SAR (extrapolated) = 0.370 W/kg

SAR(1 g) = 0.230 mW/g; SAR(10 g) = 0.156 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (measured) = 0.236 mW/g



Date/Time: 26.05.2005 11:42:27

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide open

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: HSL850 Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.891 \text{ mho/m}$; $\epsilon_r = 41$; $\rho = 1000 \text{ kg/m}^3$

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, $t=21.3 \text{ C}$, worst case extrapolation/Area Scan (51x111x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.118 mW/g

Tilt position - Middle, $t=21.3 \text{ C}$, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

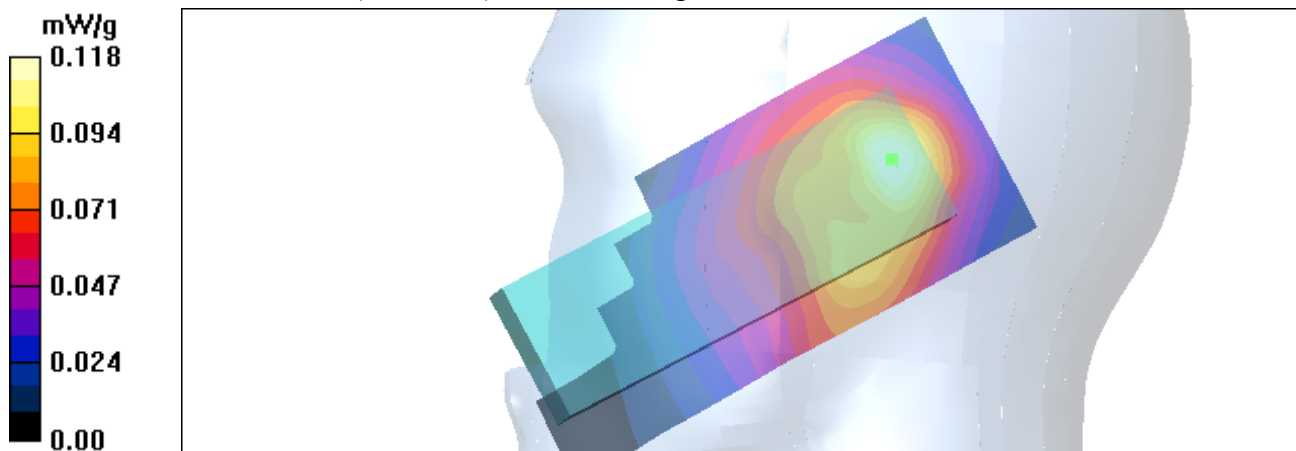
Reference Value = 11.6 V/m ; Power Drift = -0.147 dB

Peak SAR (extrapolated) = 0.418 W/kg

SAR(1 g) = 0.143 mW/g ; SAR(10 g) = 0.074 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (measured) = 0.155 mW/g



Date/Time: 26.05.2005 12:42:18

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide open

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: HSL850 Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.891$ mho/m; $\epsilon_r = 41$; $\rho = 1000$ kg/m³

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

Touch position - Middle, $t=21.2$ C, worst case extrapolation/Area Scan

(51x111x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.232 mW/g

Touch position - Middle, $t=21.2$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

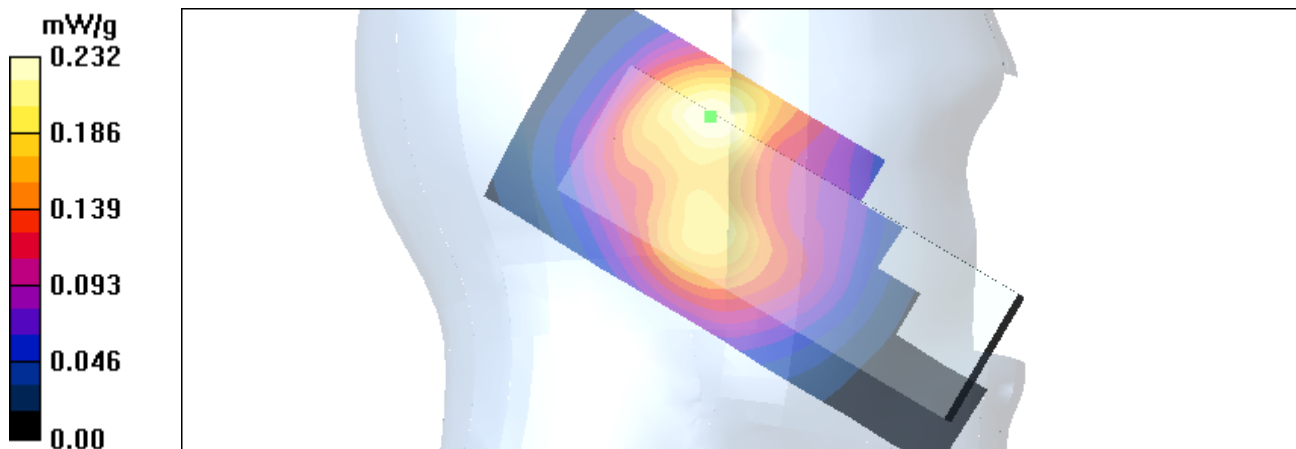
Reference Value = 12.3 V/m; Power Drift = -0.212 dB

Peak SAR (extrapolated) = 0.408 W/kg

SAR(1 g) = 0.221 mW/g; SAR(10 g) = 0.141 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (measured) = 0.234 mW/g



Date/Time: 26.05.2005 12:50:53

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide open

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: HSL850 Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.891$ mho/m; $\epsilon_r = 41$; $\rho = 1000$ kg/m³

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, $t=21.2$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 12.7 V/m; Power Drift = -0.125 dB

Peak SAR (extrapolated) = 0.438 W/kg

SAR(1 g) = 0.157 mW/g; SAR(10 g) = 0.085 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

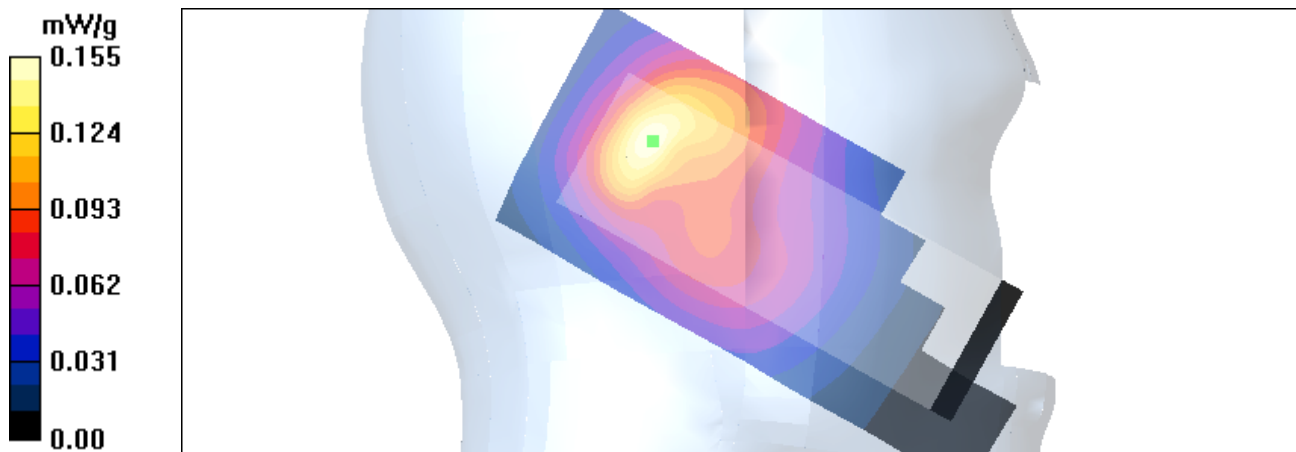
Maximum value of SAR (measured) = 0.171 mW/g

Tilt position - Middle, $t=21.2$ C, worst case extrapolation/Area Scan (51x111x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.155 mW/g



Date/Time: 26.05.2005 10:40:41

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; 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; $\sigma = 0.891$ mho/m; $\epsilon_r = 41$; $\rho = 1000$ kg/m³

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, $t=21.2$ C, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.591 mW/g

Cheek position - Middle, $t=21.2$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

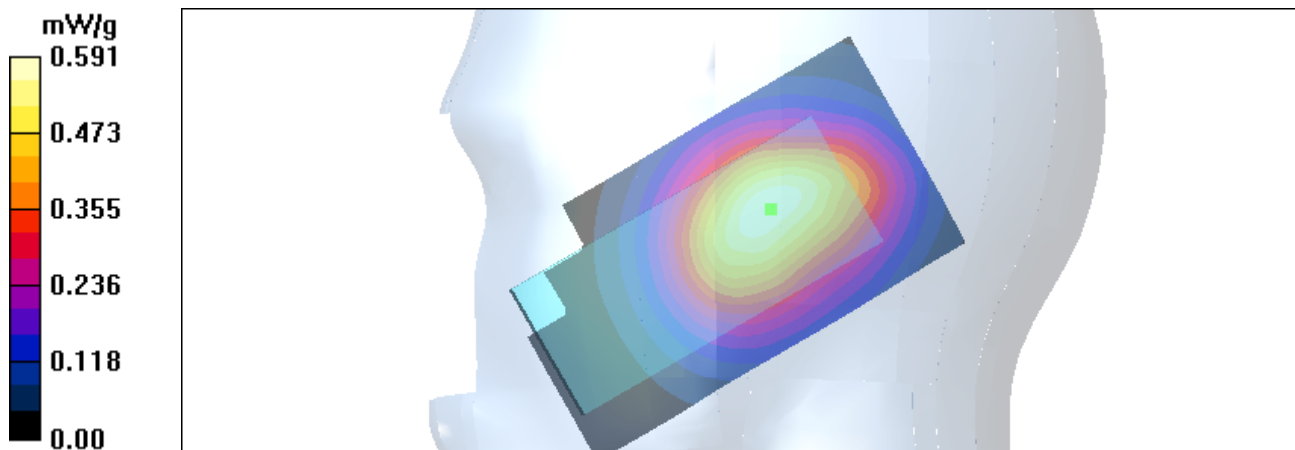
Reference Value = 22.9 V/m; Power Drift = -0.204 dB

Peak SAR (extrapolated) = 0.872 W/kg

SAR(1 g) = 0.542 mW/g; SAR(10 g) = 0.376 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (measured) = 0.561 mW/g



Date/Time: 26.05.2005 10:55:32

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; 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; $\sigma = 0.891$ mho/m; $\epsilon_r = 41$; $\rho = 1000$ kg/m³

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, $t=21.2$ C, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.385 mW/g

Tilt position - Middle, $t=21.2$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 19.6 V/m; Power Drift = -0.150 dB

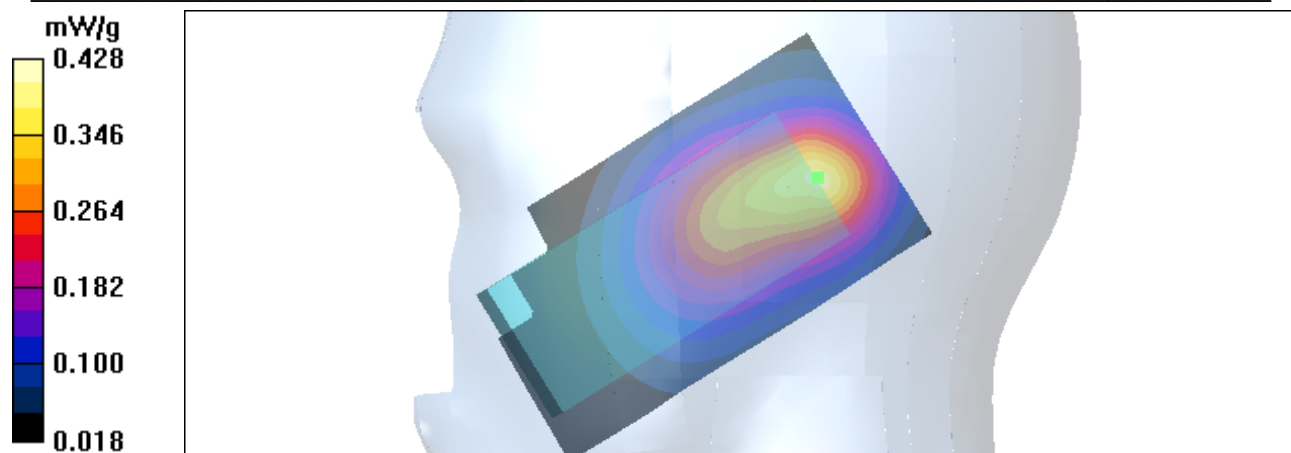
Peak SAR (extrapolated) = 0.804 W/kg

SAR(1 g) = 0.392 mW/g; SAR(10 g) = 0.230 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) = 0.428 mW/g



Date/Time: 26.05.2005 13:28:23

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide closed

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium: HSL850 Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.88$ mho/m; $\epsilon_r = 41.1$; $\rho = 1000$ kg/m³

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

Touch position - Low, t=21.2 C, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.687 mW/g

Touch position - Low, t=21.2 C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

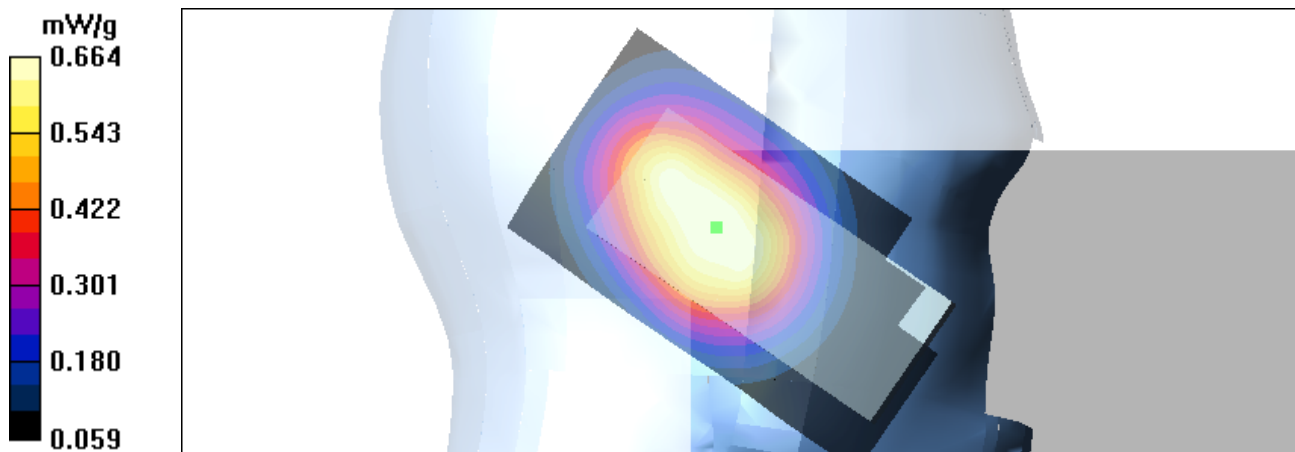
Reference Value = 25.2 V/m; Power Drift = -0.166 dB

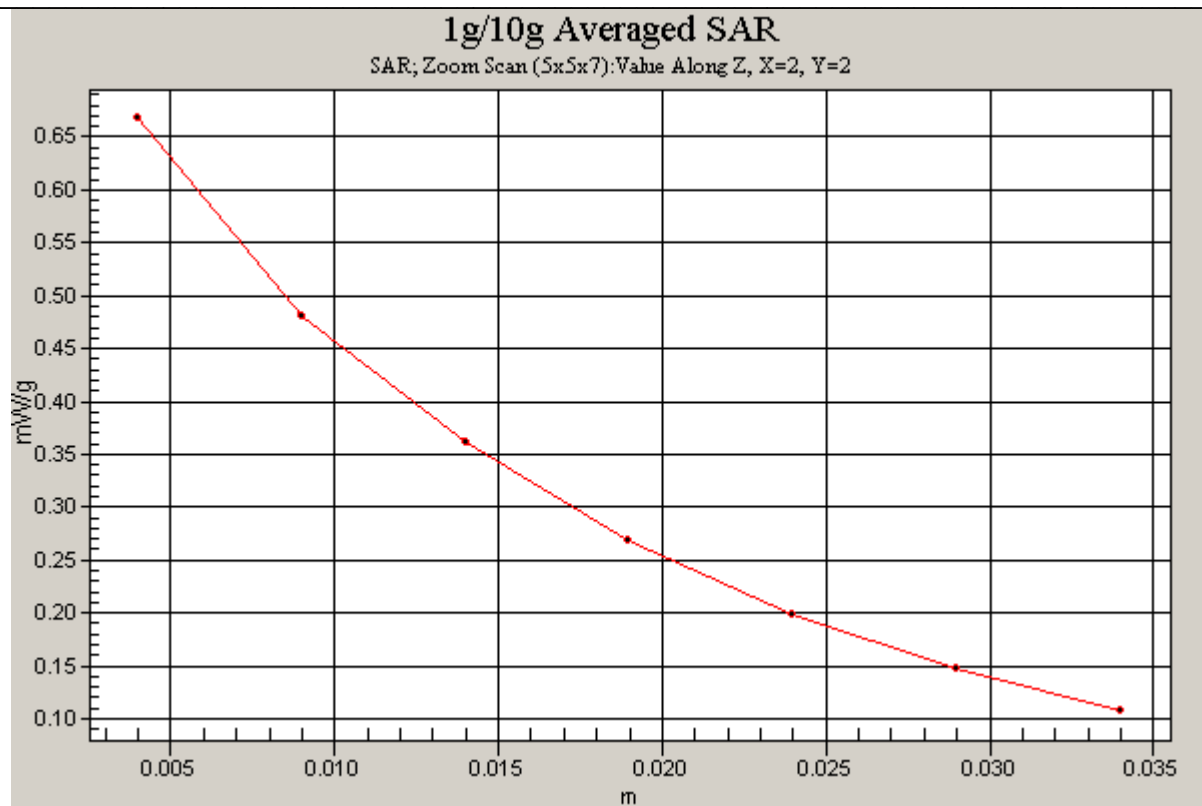
Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.636 mW/g; SAR(10 g) = 0.450 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (measured) = 0.664 mW/g





Date/Time: 26.05.2005 12:19:43

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide closed

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: HSL850 Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.891 \text{ mho/m}$; $\epsilon_r = 41$; $\rho = 1000 \text{ kg/m}^3$

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, $t=21.3 \text{ C}$, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.408 mW/g

Tilt position - Middle, $t=21.3 \text{ C}$, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

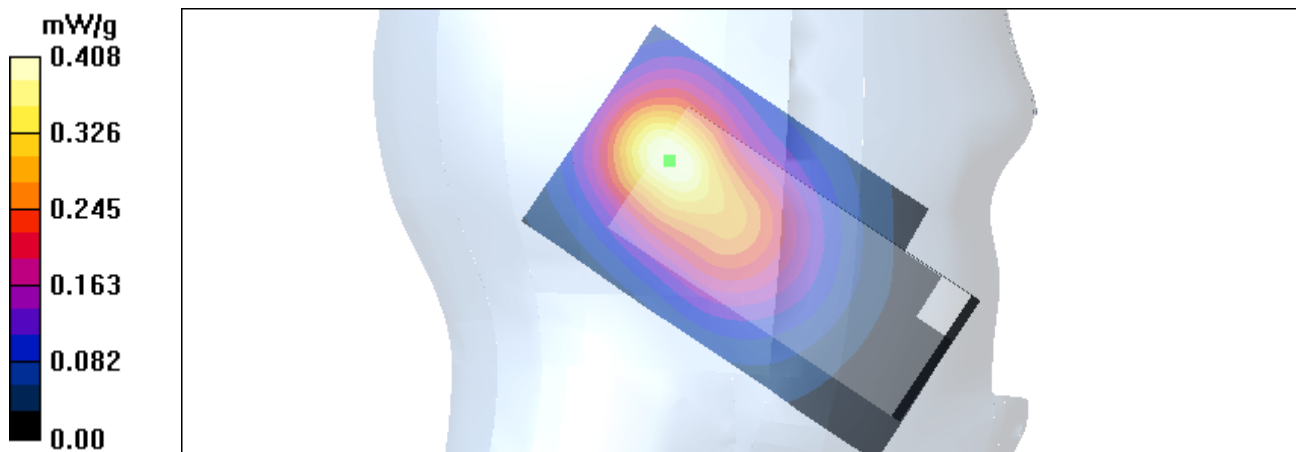
Reference Value = 20.4 V/m ; Power Drift = -0.146 dB

Peak SAR (extrapolated) = 0.944 W/kg

SAR(1 g) = 0.430 mW/g ; SAR(10 g) = 0.235 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (measured) = 0.454 mW/g



Date/Time: 25.05.2005 10:59:02

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide open

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: HSL1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

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, $t=21.0$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 8.27 V/m; Power Drift = -0.040 dB

Peak SAR (extrapolated) = 0.302 W/kg

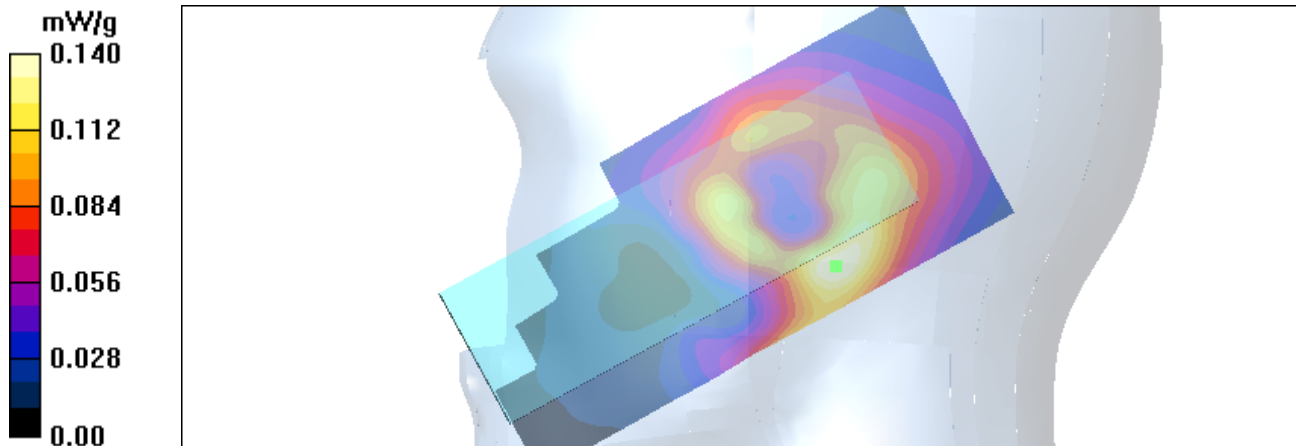
SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.076 mW/g

Maximum value of SAR (measured) = 0.143 mW/g

Touch position - Middle, $t=21.0$ C, worst case extrapolation/Area Scan

(51x111x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.140 mW/g



Date/Time: 25.05.2005 11:22:47

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide open

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: HSL1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

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, $t=21.0$ C, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.173 mW/g

Tilt position - Middle, $t=21.0$ C, worst case extrapolation/Zoom Scan (5x5x7)

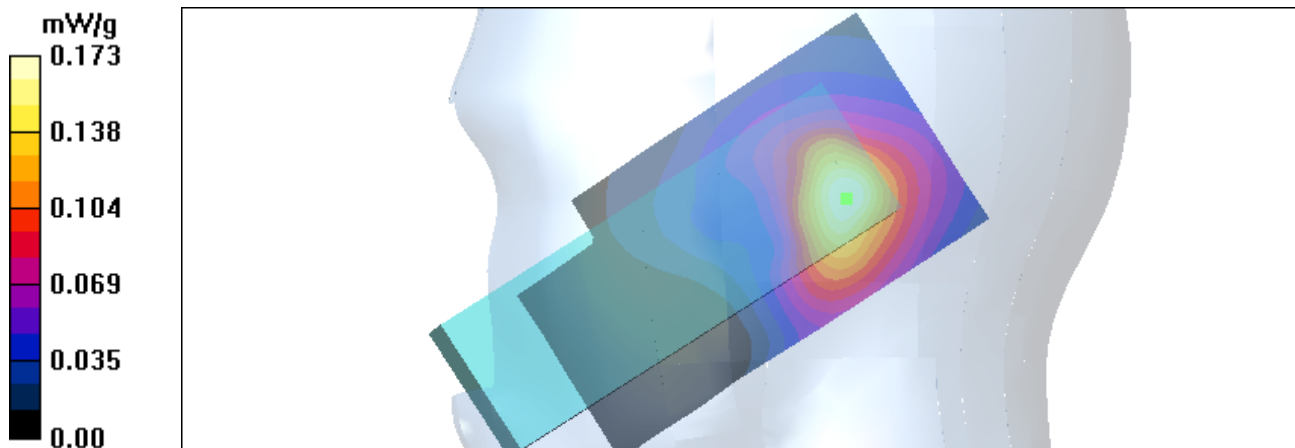
(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 10.1 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 0.352 W/kg

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.095 mW/g

Maximum value of SAR (measured) = 0.185 mW/g



Date/Time: 25.05.2005 12:07:29

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide open

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: HSL1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

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, $t=21.0$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 7.08 V/m; Power Drift = 0.120 dB

Peak SAR (extrapolated) = 0.644 W/kg

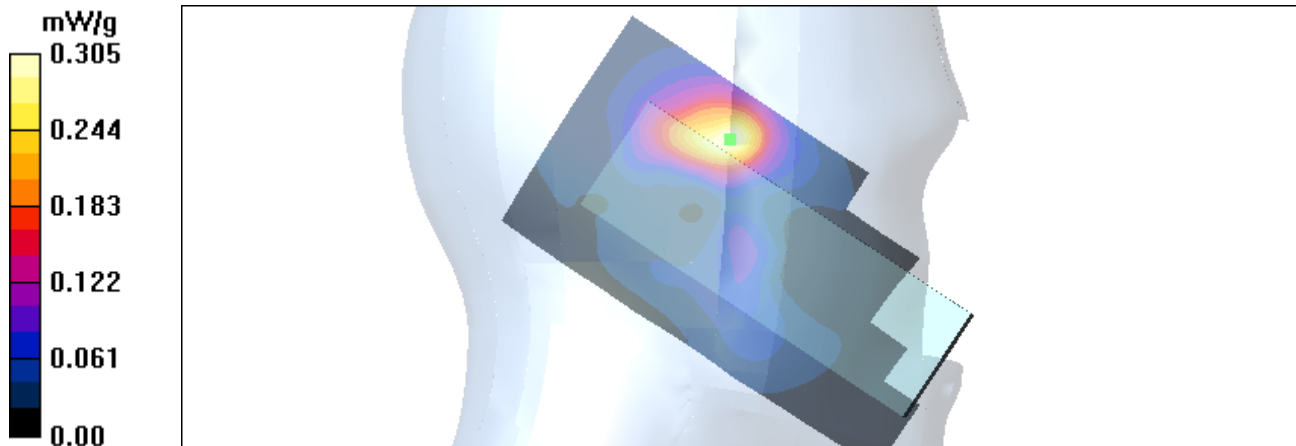
SAR(1 g) = 0.292 mW/g; SAR(10 g) = 0.151 mW/g

Maximum value of SAR (measured) = 0.317 mW/g

Cheek position - Middle, $t=21.0$ C, worst case extrapolation/Area Scan

(61x111x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.305 mW/g



Date/Time: 25.05.2005 12:25:13

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide open

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: HSL1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

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, $t=21.0$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 10.3 V/m; Power Drift = 0.149 dB

Peak SAR (extrapolated) = 0.467 W/kg

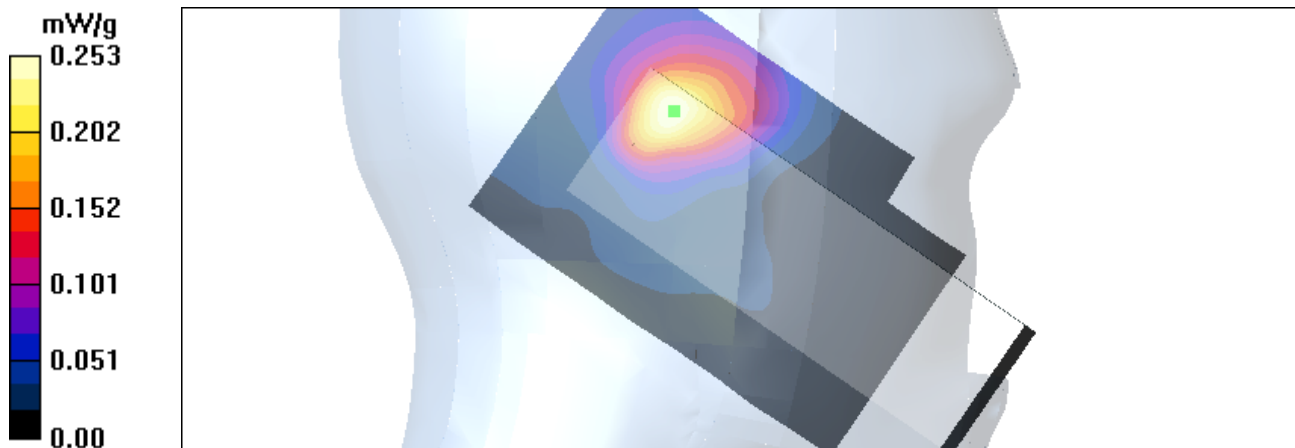
SAR(1 g) = 0.230 mW/g; SAR(10 g) = 0.126 mW/g

Maximum value of SAR (measured) = 0.247 mW/g

Tilt position - Middle, $t=21.0$ C, worst case extrapolation/Area Scan (61x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.253 mW/g



Date/Time: 25.05.2005 14:31:12

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide closed

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: HSL1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

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, $t=21.1$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 15.1 V/m; Power Drift = -0.085 dB

Peak SAR (extrapolated) = 0.725 W/kg

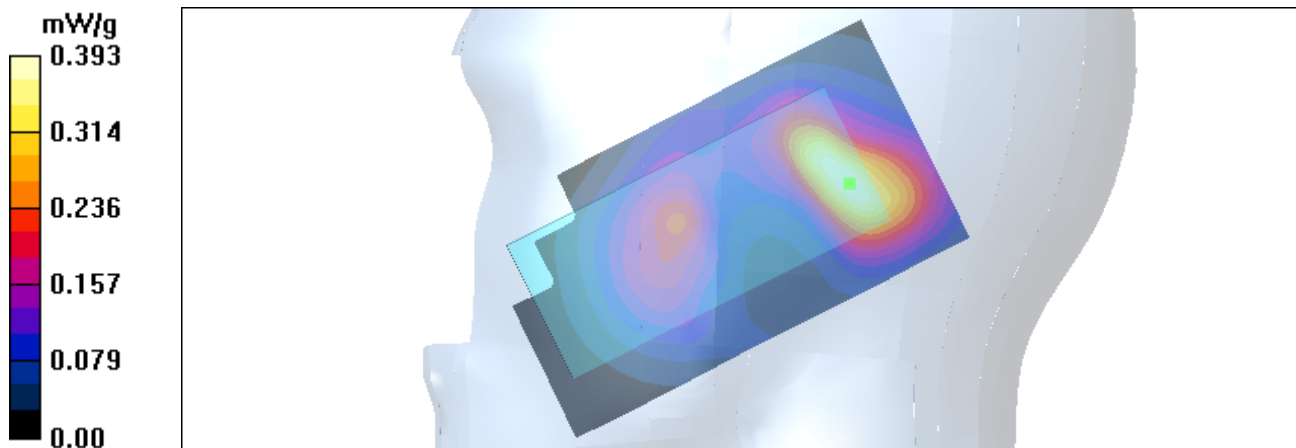
SAR(1 g) = 0.349 mW/g; SAR(10 g) = 0.193 mW/g

Maximum value of SAR (measured) = 0.364 mW/g

Touch position - Middle, $t=21.1$ C, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.393 mW/g



Date/Time: 25.05.2005 14:53:06

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide closed

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: HSL1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

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, $t=21.1$ C, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.477 mW/g

Tilt position - Middle, $t=21.1$ C, worst case extrapolation/Zoom Scan (5x5x7)

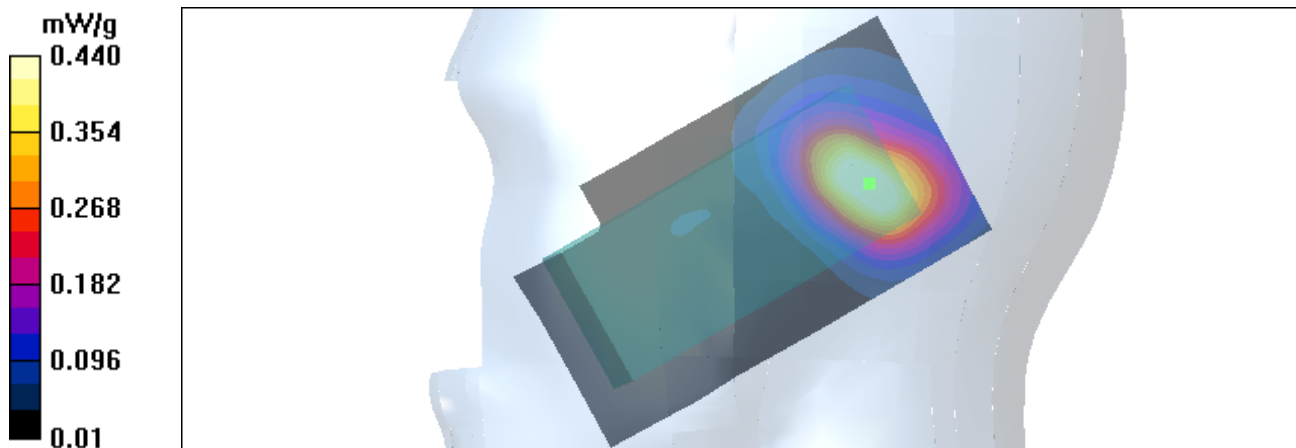
(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 16.9 V/m; Power Drift = -0.040 dB

Peak SAR (extrapolated) = 0.862 W/kg

SAR(1 g) = 0.421 mW/g; SAR(10 g) = 0.232 mW/g

Maximum value of SAR (measured) = 0.440 mW/g



Date/Time: 25.05.2005 13:48:13

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide closed

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: HSL1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

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, $t=21.0$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 13.2 V/m; Power Drift = -0.079 dB

Peak SAR (extrapolated) = 1.10 W/kg

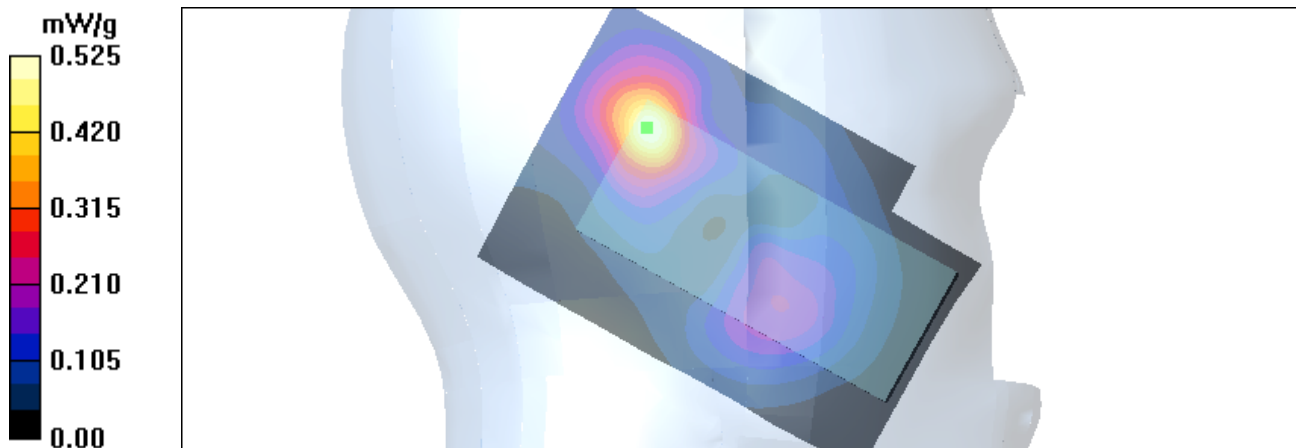
SAR(1 g) = 0.472 mW/g; SAR(10 g) = 0.232 mW/g

Maximum value of SAR (measured) = 0.522 mW/g

Cheek position - Middle, $t=21.0$ C, worst case extrapolation/Area Scan (61x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.525 mW/g



Date/Time: 25.05.2005 16:13:35

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide closed; BT active

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: HSL1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

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, $t=21.0$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 16.4 V/m; Power Drift = -0.110 dB

Peak SAR (extrapolated) = 1.36 W/kg

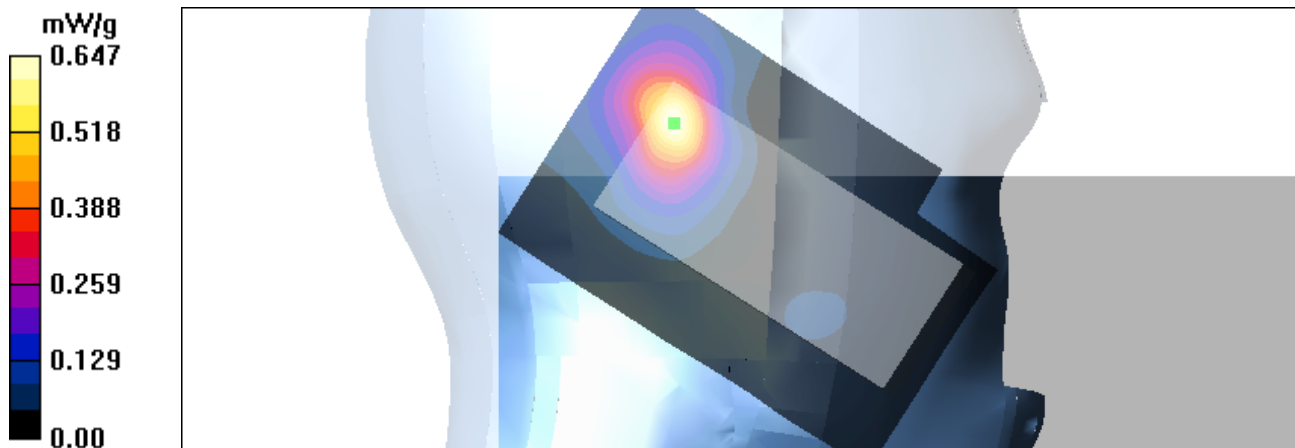
SAR(1 g) = 0.564 mW/g; SAR(10 g) = 0.271 mW/g

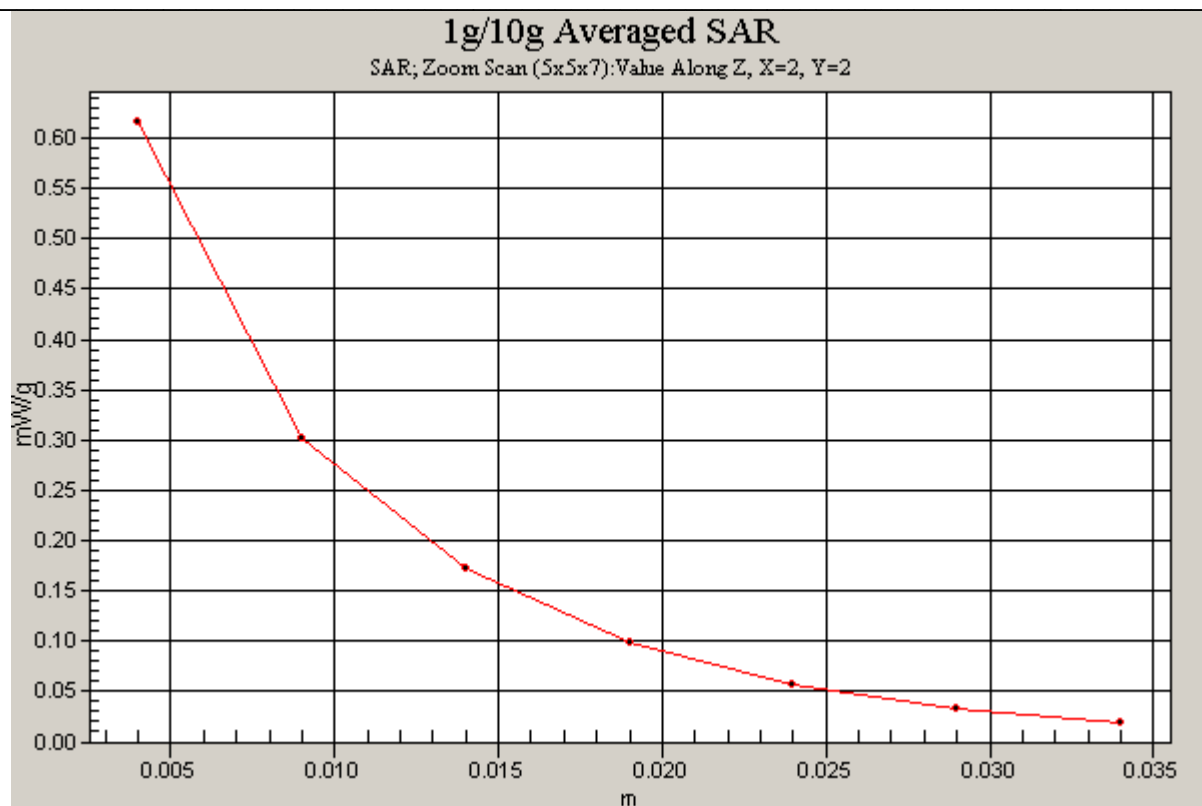
Maximum value of SAR (measured) = 0.617 mW/g

Tilt position - Middle, $t=21.0$ C, worst case extrapolation/Area Scan (61x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.647 mW/g





Date/Time: 30.05.2005 12:59:41

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide closed; without Headset; BT active

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium: BSL850 Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.957$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

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 1; Type: SAM 4.0; Serial: 1275
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body worn - Low, $t=21.4$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 18.0 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.766 mW/g; SAR(10 g) = 0.531 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

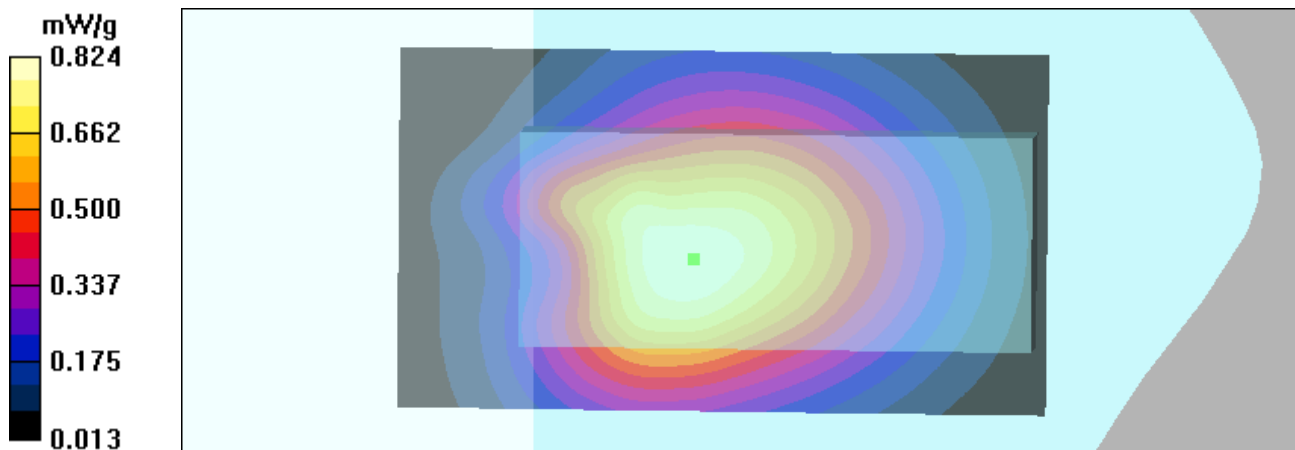
Maximum value of SAR (measured) = 0.805 mW/g

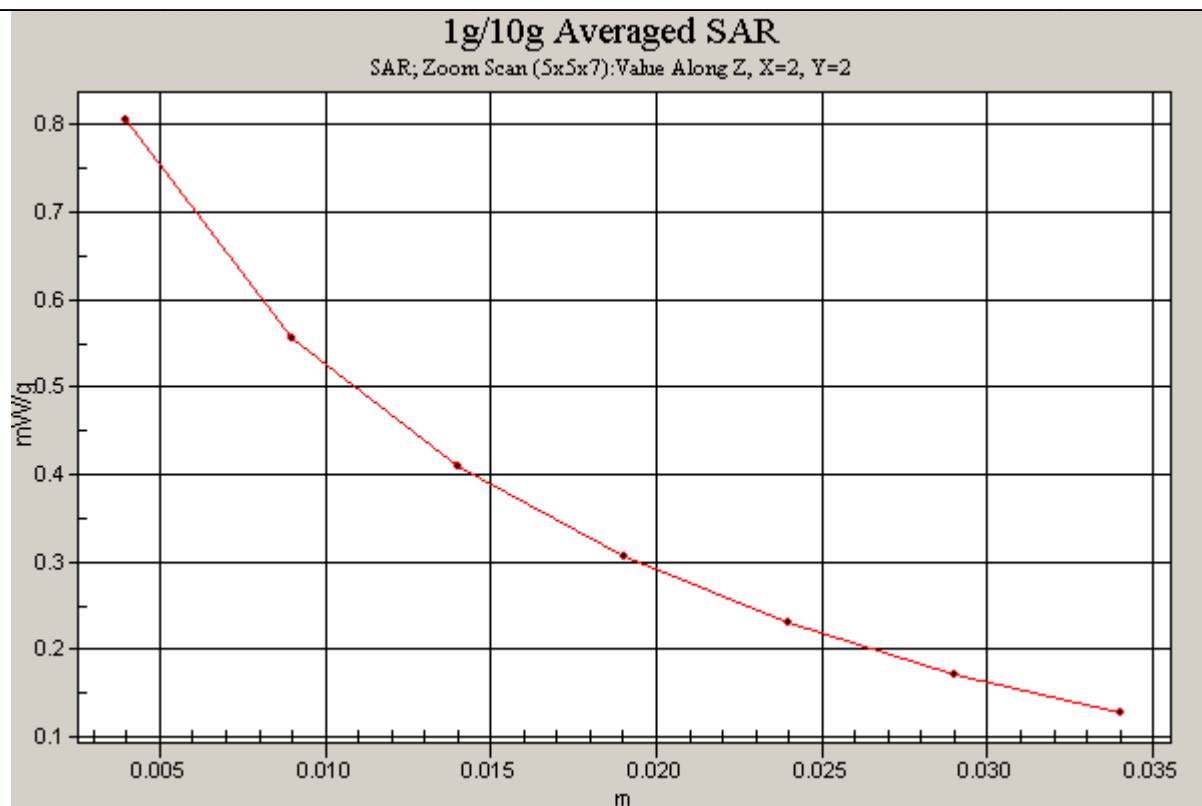
Body worn - Low, $t=21.4$ C, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.824 mW/g





Date/Time: 30.05.2005 11:20:57

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide closed; with Headset HS-15

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium: BSL850 Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.957$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

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 1; Type: SAM 4.0; Serial: 1275
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body worn - Low, $t=21.5$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 15.1 V/m; Power Drift = -0.061 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.675 mW/g; SAR(10 g) = 0.466 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

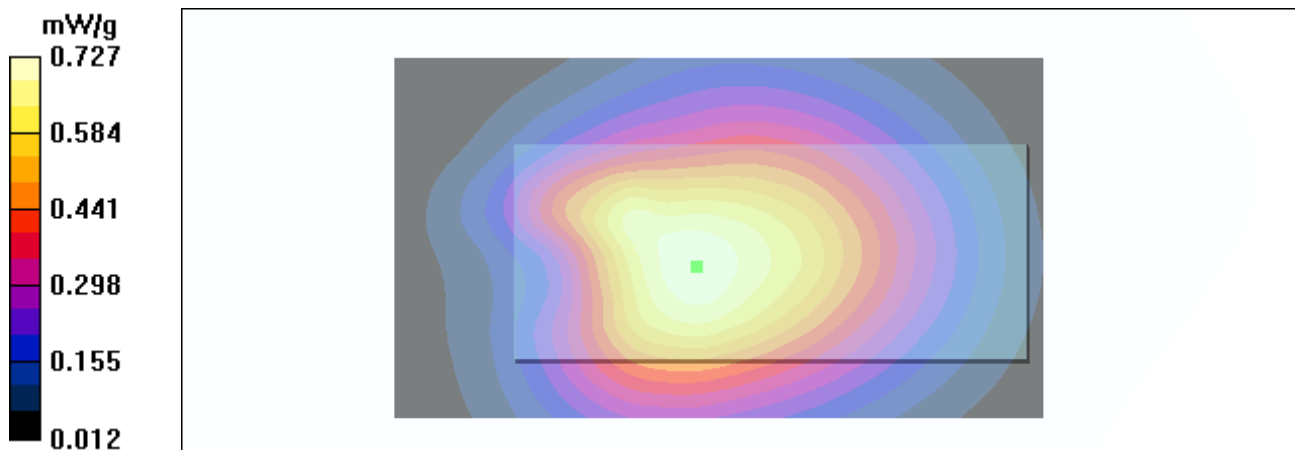
Maximum value of SAR (measured) = 0.703 mW/g

Body worn - Low, $t=21.5$ C, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.727 mW/g



Date/Time: 27.05.2005 13:40:48

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; slide closed; without Headset; BT active

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: BSL1900 Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³

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 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body worn - Low, $t=21.3$ C, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 18.1 V/m; Power Drift = -0.111 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.687 mW/g; SAR(10 g) = 0.426 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

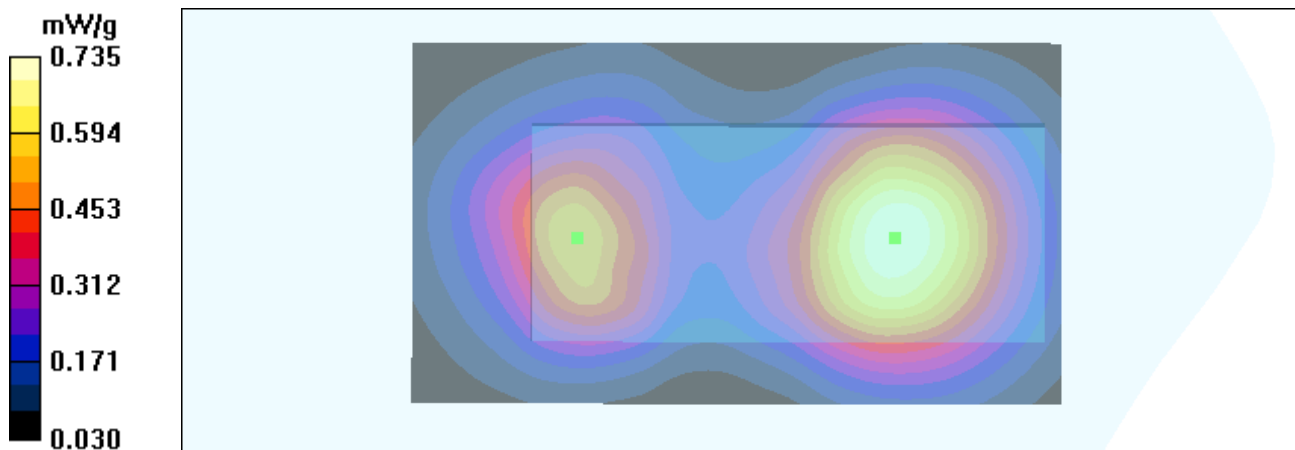
Maximum value of SAR (measured) = 0.708 mW/g

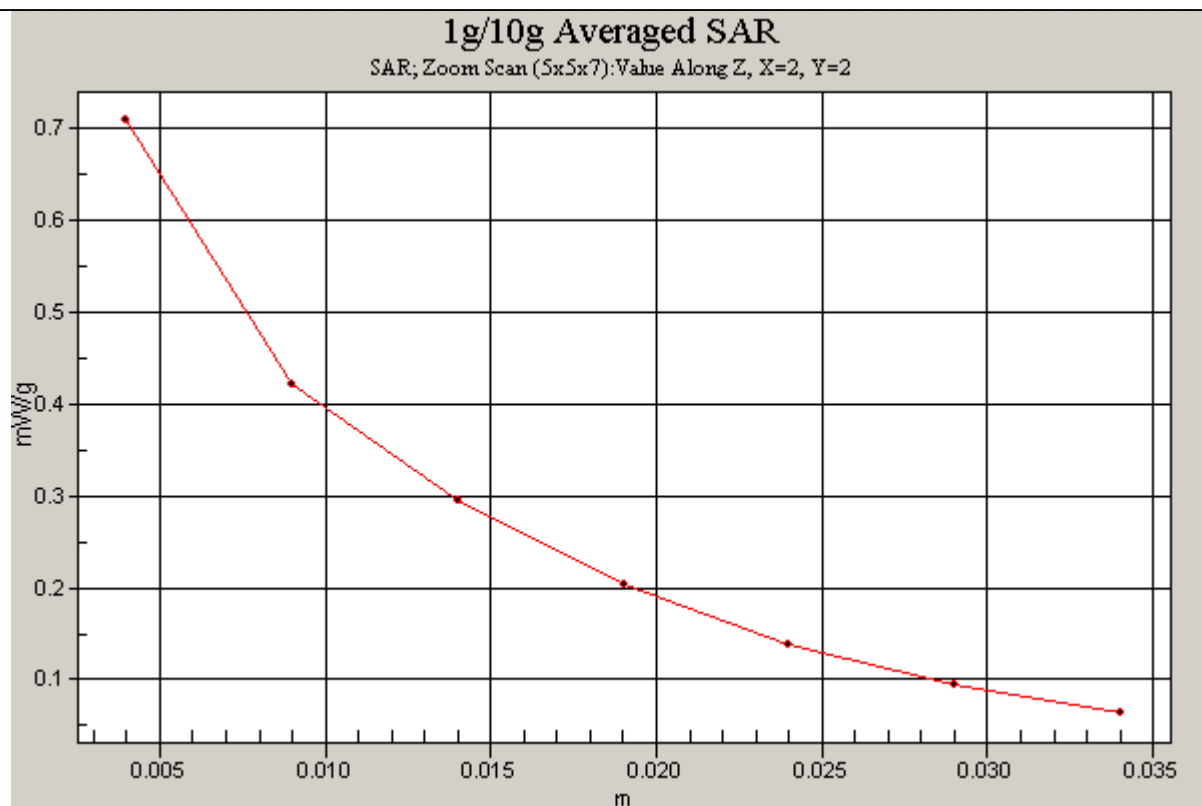
Body worn - Low, $t=21.3$ C, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.735 mW/g





Date/Time: 27.05.2005 11:50:02

Test Laboratory: TCC Nokia, Oulu Laboratory

DUT: RM-33; Serial: 004400/64/173126/8; Slide closed; with Headset HS-15

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: BSL1900 Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $\sigma = 1.51 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$

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 4; Type: SAM 4.0; Serial: 1342
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body worn - Low, $t=21.2 \text{ C}$, worst case extrapolation/Zoom Scan (5x5x7)

(5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.9 V/m ; Power Drift = -0.112 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.586 mW/g ; SAR(10 g) = 0.365 mW/g

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (measured) = 0.610 mW/g

Body worn - Low, $t=21.2 \text{ C}$, worst case extrapolation/Area Scan (51x91x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation!](#)

Maximum value of SAR (interpolated) = 0.623 mW/g

