

SAR Compliance Test Report

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Measurements made by:	Leif Klysner / Jesper Nielsen		

Tested device:	RM-89		
FCC ID:	PYARM-89	IC:	661V-RM89

Supplement reports:	-
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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
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Documentation:	The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.
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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.
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Date and signatures:	2006-01-06
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Leif Funch Klysner
Test System Manager

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2005-11-28 to 2005-12-29
SN, HW and SW numbers of tested device	IMEI: 004400/61/171443/5 HW: 5010 SW: 05w42.1 DUT#28472
Batteries used in testing	BP-5L, DUT#28469, 28449, 28470, 28475
Headsets used in testing	HS-6, DUT#28715
Other accessories used in testing	SD-Card, DUT#28473
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	Radiated power	Position	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
2-Slot GPRS850 + WLAN2450	27.5 dBm ERP	Left, Tilt	1.6 W/kg	1.14 W/kg	PASSED
2-Slot GPRS1900 + WLAN2450	30.6 dBm EIRP	Left, Cheek	1.6 W/kg	0.88 W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Radiated power	Separation distance	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
2-Slot GPRS850 + WLAN2450	27.5 dBm ERP	2.2 cm	1.6 W/kg	1.13 W/kg	PASSED
2-Slot GPRS1900 + WLAN2450	30.4 dBm EIRP	2.2 cm	1.6 W/kg	0.60 W/kg	PASSED

1.2.3 Maximum Drift

Maximum drift during measurements	-0.32 dB
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1.2.4 Measurement Uncertainty

Extended Uncertainty (k=2) 95%	± 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 850 / 1900	GPRS 850 / 1900	EGPRS 850 / 1900	BT	WLAN 2450
Modulation Mode	GMSK	GMSK	8PSK	GFSK	
Duty Cycle	1/8	1/8, 2/8 or 3/8	1/8, 2/8 or 3/8		1
Transmitter Frequency Range (MHz)	824 – 849 1850 - 1910	824 – 849 1850 - 1910	824 – 849 1850 - 1910	2402-2480	2412-2472

Outside of USA and Canada, the transmitter of the device is capable of operating also in GSM900, GSM1800 and WCDMA2100, which are not part of this filing.

This device has Dual Transfer Mode capability for use at the ear. Therefore, SAR for 2- and 3-slot GPRS mode was evaluated against the head profile of the phantom.

2.1 Picture of the Device



Front



Side



Back

2.2 Description of the Antenna

The device has an internal patch antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	20.8 to 21.4
Ambient humidity (RH %):	35 to 55

3.2 Test Signal, Frequencies and Output Power

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

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

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

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

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 4.6, 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
DAE 3	501	12 months	2006-01
DAE 3	339	12 months	2006-08
E-field Probe ET3DV6	1807	12 months	2006-01
E-field Probe ET3DV6	1786	12 months	2006-01
Dipole Validation Kit, D835V2	476	24 months	2006-01
Dipole Validation Kit, D1900V2	5d013	24 months	2006-07
Dipole Validation Kit, D2450V2	750	24 months	2006-06

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	SMIQ03B	826046/034	36 months	2007-02
Signal Generator	SME06	848650/0011	36 months	2008-07
Amplifier	ZHL-42W	E012903	-	-
Power Meter	NRVD	840297/008	24 months	2007-11
Power Sensor	NRV-Z51	100184	24 months	2007-11
Call Tester	CMU200	836203/022	-	-
Call Tester	4400M	0411216	-	-
Vector Network Analyzer	AT8753ES	MY40001091	12 months	2006-08
Dielectric Probe Kit	HP85070B	US33020403	-	-

4.1.1 Isotropic E-field Probes 1786 & 1807

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 μ W/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
Application	Distance from probe tip to dipole centers: 2.7 mm 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 $\pm 5\%$ of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

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

4.3.1 Tissue Simulant Recipes

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

800MHz band

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

1900MHz band

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

2450MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	56.0	70.2
Tween 20	44.0	29.62
Salt	-	0.18

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

<i>f</i> [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
835	Reference result	2.27	42.0	0.91	
	± 10% window	2.04 – 2.50			
	2005-11-28	2.25	40.8	0.89	21.3
1900	Reference result	10.0	39.4	1.44	
	± 10% window	9.0 – 11.0			
	2005-12-28	10.4	38.0	1.43	21.0
2450	Reference result	13.5	38.5	1.86	
	± 10% window	12.1 – 14.9			
	2005-12-07	14.5	39.6	1.86	21.5
	2005-12-27	14.6	40.0	1.88	20.7

System checking, body tissue simulant

<i>f</i> [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
835	Reference result	2.47	54.9	1.01	
	± 10% window	2.22 – 2.72			
	2005-12-15	2.42	54.0	0.97	20.8
1900	Reference result	10.4	52.2	1.58	
	± 10% window	9.4 – 11.4			
	2005-12-27	10.3	52.7	1.51	20.6
	2005-12-29	10.7	51.2	1.54	21.5

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	
	$\pm 5\%$ window	39.4 – 43.6	0.86 – 0.95	
	2005-11-28	40.8	0.89	21.3
1880	Recommended value	40.0	1.40	
	$\pm 5\%$ window	38.0 – 42.0	1.33 – 1.47	
	2005-12-28	38.1	1.41	21.0
2442	Recommended value	39.2	1.79	
	$\pm 5\%$ window	37.3 – 41.2	1.70 – 1.88	
	2005-12-07	39.7	1.85	21.5

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ϵ_r	σ [S/m]	
836	Recommended value	55.2	0.97	
	$\pm 5\%$ window	52.4 – 58.0	0.92 – 1.02	
	2005-12-15	54.0	0.97	20.8
1880	Recommended value	53.3	1.52	
	$\pm 5\%$ window	50.6 – 56.0	1.44 – 1.60	
	2005-12-27	52.7	1.48	20.6
	2005-12-29	51.3	1.52	21.5
2442	Recommended value	52.7	1.94	
	$\pm 5\%$ window	50.1 – 55.3	1.85 – 2.04	
	2005-12-27	51.9	1.98	20.6

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".

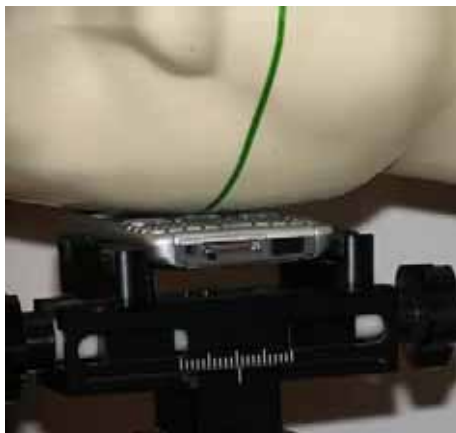


Photo of the device in “cheek” position



Photo of the device in “tilt” position

5.2.2 Body Worn Configuration

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



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

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	G_i	$G_i \cdot U_i$ (%)	ν_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:

850 MHz Head SAR results

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
3-Slot GPRS850	Power		25.0 dBm	24.8 dBm	25.4 dBm
	Left	Cheek	-	0.772	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-Slot GPRS850	Power		27.5 dBm	26.7 dBm	28.2 dBm
	Left	Cheek	-	0.792	-
		Tilt	1.11	0.929	0.859
	Right	Cheek	-	0.576	-
		Tilt	-	0.608	-
2-Slot EGPRS850	Power		24.4 dBm	24.4 dBm	25.1 dBm
	Left	Cheek	-	-	-
		Tilt	0.31	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
GSM850	Power		28.1 dBm	27.3 dBm	28.7 dBm
	Left	Cheek	-	0.427	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-Slot GPRS850	Highest SAR configuration in this band repeated with SD-Card		1.08	-	-
2-Slot GPRS850	Highest SAR value measurement in this band repeated with BT active		1.08	-	-

1900 MHz Head SAR results

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
3-Slot GPRS1900	Power		27.7 dBm	28.0 dBm	28.1 dBm
	Left	Cheek	-	0.572	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-Slot GPRS1900	Power		30.6 dBm	30.4 dBm	31.1 dBm
	Left	Cheek	0.782	0.654	0.607
		Tilt	-	0.628	-
	Right	Cheek	-	0.351	-
		Tilt	-	0.378	-
2-Slot EGPRS1900	Power		28.3 dBm	28.7 dBm	28.7 dBm
	Left	Cheek	0.301	-	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
GSM1900	Power		31.3 dBm	31.3 dBm	31.7 dBm
	Left	Cheek	-	0.350	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-Slot GPRS1900	Highest SAR Value measurement in this band repeated with SD-Card		0.756	-	-
2-Slot GPRS1900	Highest SAR value measurement in this band repeated with BT active		0.764	-	-

2450MHz Head SAR results

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 13 2472.0 MHz
WLAN2450	Power		17.3 dBm	15.9 dBm	9.5 dBm
	Left	Cheek	-	0.097	-
		Tilt	-	0.028	-
	Right	Cheek	0.182	0.164	0.167
		Tilt	-	0.033	-
	Highest SAR Value measurement in this band repeated with SD-Card		0.173	-	-

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

850 MHz Body SAR results

Mode	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
3-Slot GPRS850	Power	25.0 dBm	24.8 dBm	25.4 dBm
	Without headset	-	0.734	-
	Headset HS-6	-	-	-
2-Slot GPRS850	Power	27.5 dBm	26.7 dBm	28.2 dBm
	Without headset	0.996	0.857	0.669
	Headset HS-6	0.768	0.656	0.546
GSM850	Power	28.1 dBm	27.3 dBm	28.7 dBm
	Without headset	-	0.489	-
	Headset HS-6	-	-	-
2-Slot GPRS850	Highest SAR value measurement in this mode repeated with SD-Card	1.05	-	-
2-Slot GPRS850	Highest SAR value measurement in this mode repeated with BT active	1.09	-	-

1900 MHz Body SAR results

Mode	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
3-Slot GPRS1900	Power	27.7 dBm	28.0 dBm	28.1 dBm
	Without headset	-	0.415	-
	Headset HS-6	-	-	-
2-Slot GPRS1900	Power	30.6 dBm	30.4 dBm	31.1 dBm
	Without headset	0.463	0.496	0.443
	Headset HS-6	0.408	0.430	0.418
GSM1900	Power	31.3 dBm	31.3 dBm	31.7 dBm
	Without headset	-	0.268	-
	Headset HS-6	-	-	-
2-Slot GPRS1900	Highest SAR value measurement in this mode repeated with SD-Card	-	0.557	-
2-Slot GPRS1900	Highest SAR value measurement in this mode repeated with BT active	-	0.550	-

2450 MHz Body SAR results

Mode	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 13 2472.0 MHz
WLAN2450	Power	17.3 dBm	15.9 dBm	9.5 dBm
	Without headset	0.042	0.039	0.037
	Headset HS-6	0.036	0.038	0.038
	Highest SAR value measurement in this mode repeated with SD-Card	0.035	-	-

Combined 2-Slot GPRS850 and WLAN2450, Head SAR results

Test Configuration	Max. 1g SAR results		Sum of 1g SAR values
	WLAN	GPRS850	WLAN + GPRS850
Left Cheek	0.10	0.79	0.89
Left Tilt	0.03	1.11	1.14
Right Cheek	0.18	0.58	0.76
Right Tilt	0.03	0.61	0.64

Combined 2-Slot GPRS1900 and WLAN2450, Head SAR results

Test Configuration	Max. 1g SAR results		Sum of 1g SAR values
	WLAN	GPRS1900	WLAN + GPRS1900
Left Cheek	0.10	0.78	0.88
Left Tilt	0.03	0.63	0.66
Right Cheek	0.18	0.35	0.53
Right Tilt	0.03	0.38	0.41

Combined 2-Slot GPRS850 and WLAN2450, Body SAR results

Test Configuration	Max. 1g SAR results		Sum of 1g SAR values
	WLAN	GPRS850	WLAN + GPRS850
Without Headset	0.04	1.09	1.13
Headset HS-6	0.04	0.77	0.81

Combined 2-Slot GPRS1900 and WLAN2450, Body SAR results

Test Configuration	Max. 1g SAR results		Sum of 1g SAR values
	WLAN	GPRS1900	WLAN + GPRS1900
Without Headset	0.04	0.56	0.60
Headset HS-6	0.04	0.43	0.47

Plots of the Measurement scans are given in Appendix B.

APPENDIX A: SYSTEM CHECKING SCANS

See the following pages.

Date/Time: 2005.11.28 13:04:38

Test Laboratory: TCC Copenhagen

Type: D835V2; Serial: 476

Communication System: Continuous Wave

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Head 850; Medium Notes: Medium Temperature: $t=21.3$ C

Medium parameters used: $f = 835$ MHz; $\sigma = 0.886$ mho/m; $\epsilon_r = 40.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Advanced Extrapolation
- ConvF(6.56, 6.56, 6.56); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 2.49 mW/g

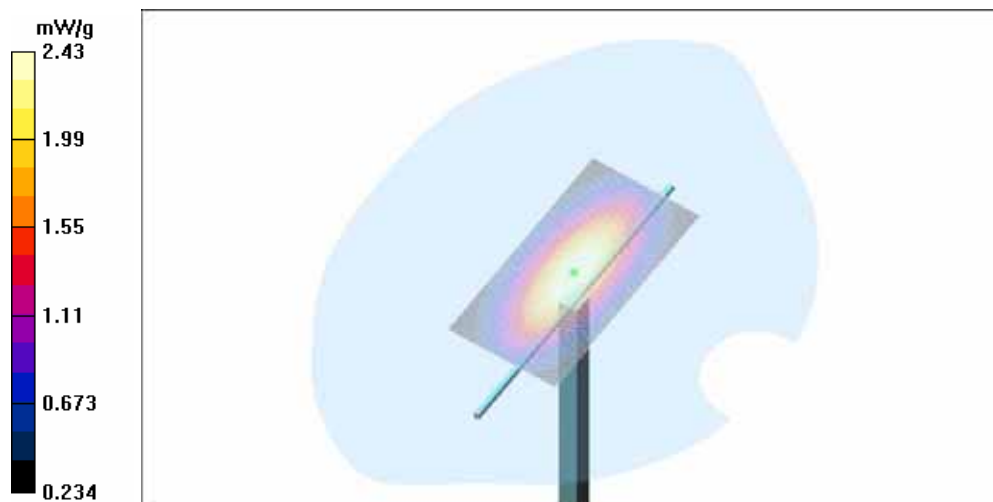
d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.2 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 3.15 W/kg

SAR(1 g) = 2.25 mW/g; SAR(10 g) = 1.49 mW/g

Maximum value of SAR (measured) = 2.43 mW/g



Date/Time: 2005.12.28 12:25:30

Test Laboratory: TCC Copenhagen

Type: D1900V2; Serial: 5d013

Communication System: Continuous Wave

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: Head 1900; Medium Notes: Medium Temperature: t=21.0 C

Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ϵ_r = 38; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Advanced Extrapolation
- ConvF(5.11, 5.11, 5.11); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 12.0 mW/g

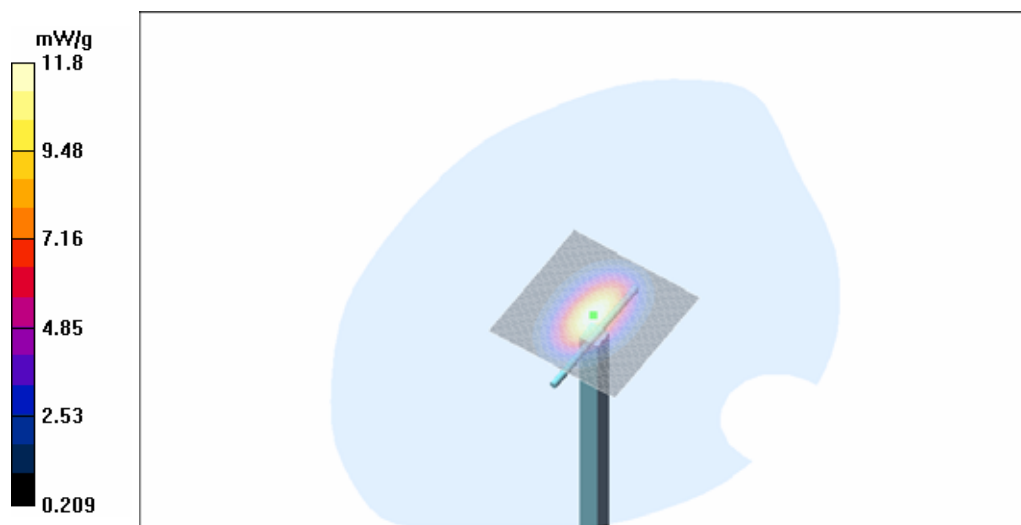
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.9 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 17.7 W/kg

SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.51 mW/g

Maximum value of SAR (measured) = 11.8 mW/g



SAR Report

Cph_SAR_0551_03

Applicant: Nokia Corporation

Type: RM-89

Copyright © 2006 TCC Copenhagen

Date/Time: 2005.12.07 12:09:37

Test Laboratory: TCC Copenhagen

Type: D2450V2; Serial: 750

Communication System: Continuous Wave

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: Head 2450; Medium Notes: Medium Temperature: t=21.5 C

Medium parameters used: f = 2450 MHz; σ = 1.86 mho/m; ϵ_r = 39.6; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Advanced Extrapolation
- ConvF(4.47, 4.47, 4.47); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM Low band; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 17.5 mW/g

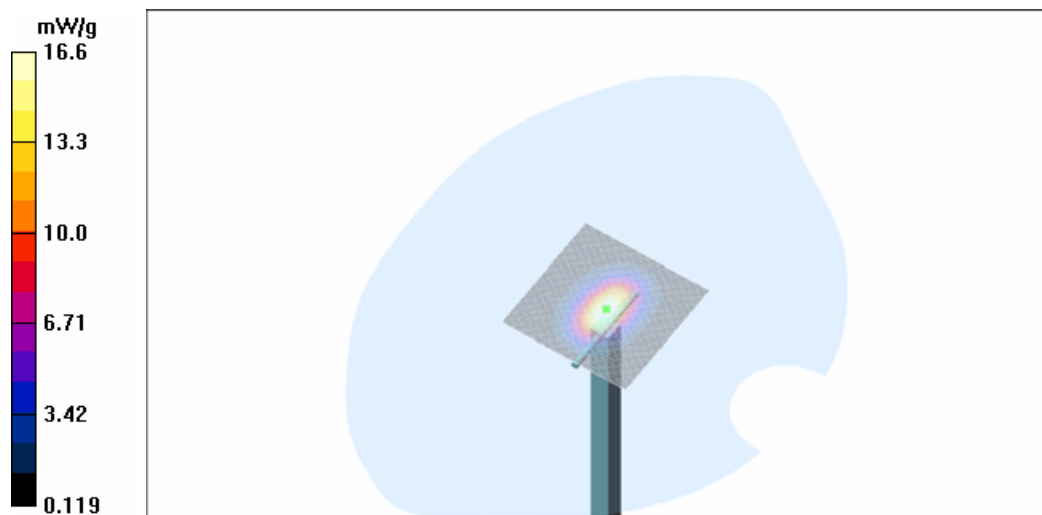
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.4 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 30.4 W/kg

SAR(1 g) = 14.5 mW/g; SAR(10 g) = 6.76 mW/g

Maximum value of SAR (measured) = 16.6 mW/g



Date/Time: 2005.12.27 17:11:35

Test Laboratory: TCC Copenhagen

Type: D2450V2; Serial: 750

Communication System: Continuous Wave

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: Head 2450; Medium Notes: Medium Temperature: t=20.7 C

Medium parameters used: f = 2450 MHz; σ = 1.88 mho/m; ϵ_r = 40; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Advanced Extrapolation
- ConvF(4.47, 4.47, 4.47); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 2; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 17.3 mW/g

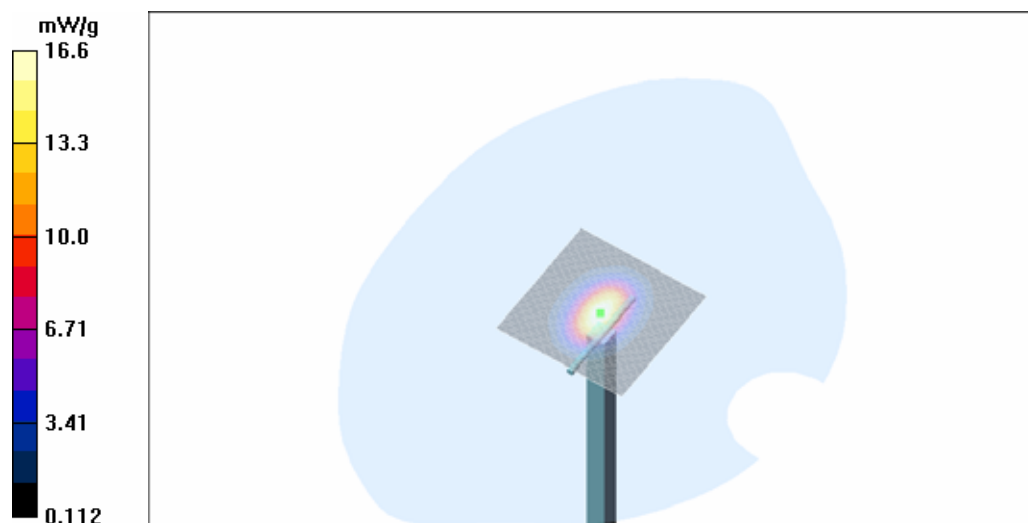
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.7 V/m; Power Drift = 0.057 dB

Peak SAR (extrapolated) = 30.8 W/kg

SAR(1 g) = 14.6 mW/g; SAR(10 g) = 6.81 mW/g

Maximum value of SAR (measured) = 16.6 mW/g



Date/Time: 2005.12.15 14:32:15

Test Laboratory: TCC Copenhagen

Type: D835V2; Serial: 476

Communication System: Continuous Wave

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Body 850; Medium Notes: Medium Temperature: $t = 20.8$ C

Medium parameters used: $f = 835$ MHz; $\sigma = 0.968$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Advanced Extrapolation
- ConvF(6.26, 6.26, 6.26); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM High band; Type: Twin Phantom; Serial: TP-1274
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 2.63 mW/g

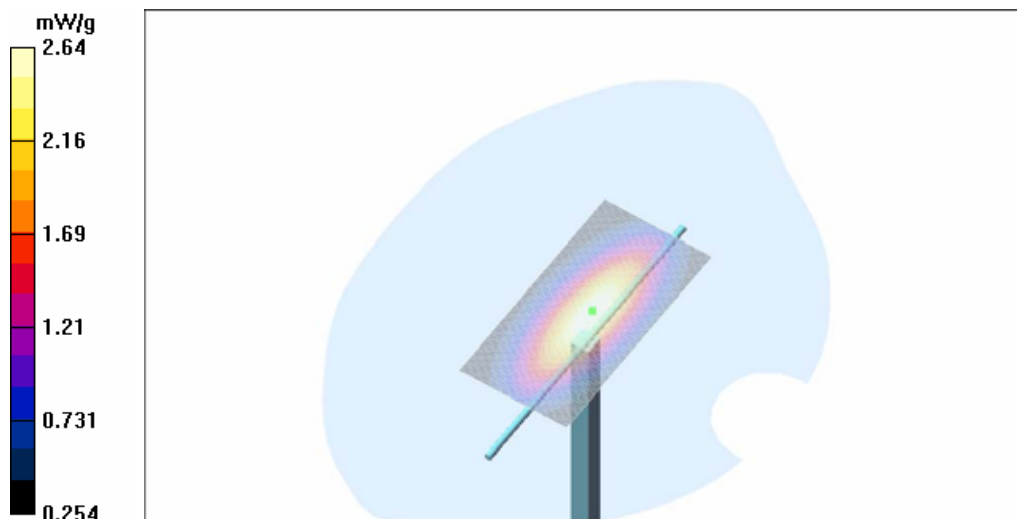
d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.9 V/m; Power Drift = -0.096 dB

Peak SAR (extrapolated) = 3.55 W/kg

SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.64 mW/g



Date/Time: 2005.12.27 12:33:02

Test Laboratory: TCC Copenhagen
Type: D1900V2; Serial: 5d013

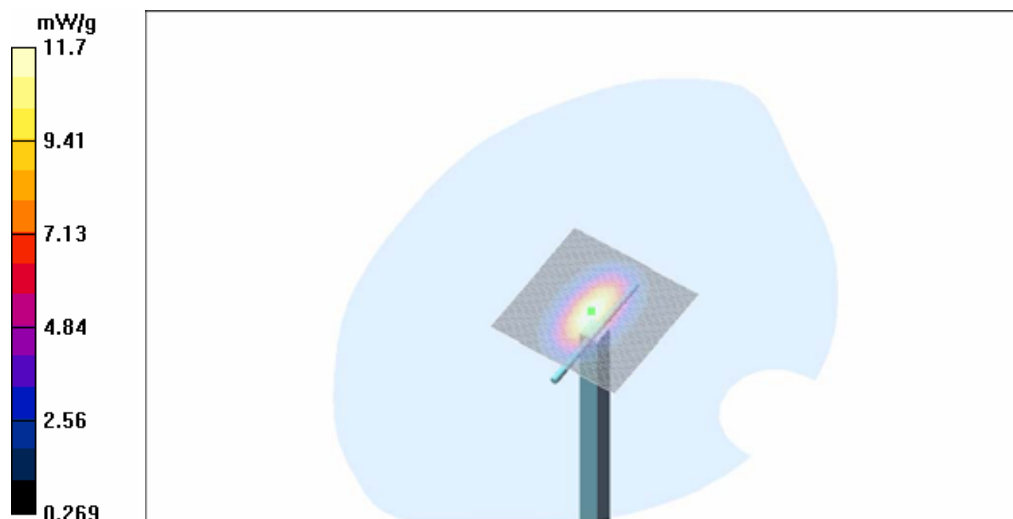
Communication System: Continuous Wave
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: Body 1900; Medium Notes: Medium Temperature: t=20.6 C
Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ϵ_r = 52.7; ρ = 1000 kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Advanced Extrapolation
- ConvF(4.44, 4.44, 4.44); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.9 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.5 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 18.1 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.41 mW/g
Maximum value of SAR (measured) = 11.7 mW/g



Date/Time: 2005.12.29 16:38:26

Test Laboratory: TCC Copenhagen

Type: D1900V2; Serial: 5d013

Communication System: Continuous Wave

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: Body 1900; Medium Notes: Medium Temperature: t=21.5 C

Medium parameters used: f = 1900 MHz; σ = 1.54 mho/m; ϵ_r = 51.2; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Advanced Extrapolation
- ConvF(4.44, 4.44, 4.44); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 12.4 mW/g

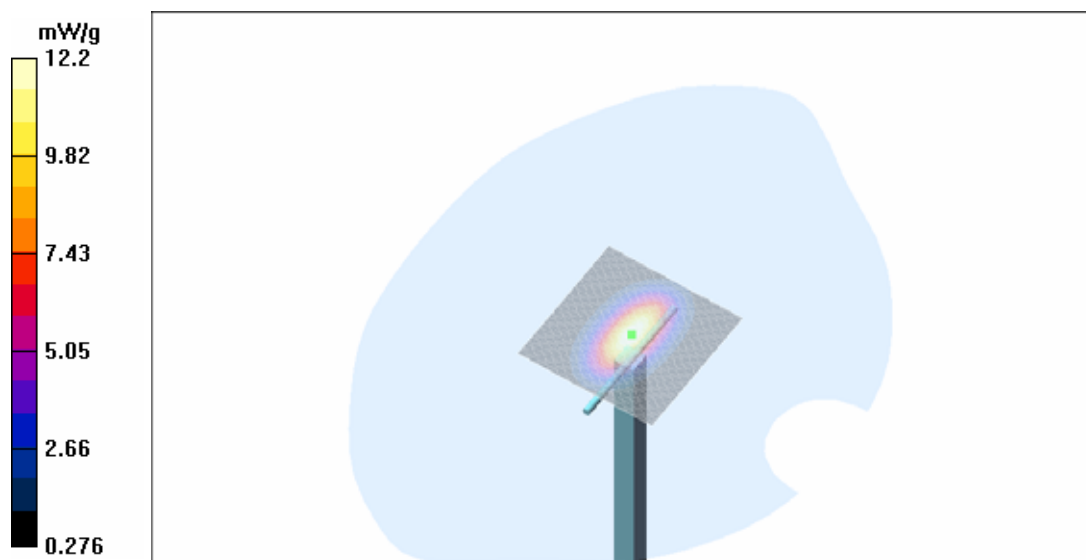
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.7 V/m; Power Drift = 0.061 dB

Peak SAR (extrapolated) = 18.5 W/kg

SAR(1 g) = 10.7 mW/g; SAR(10 g) = 5.65 mW/g

Maximum value of SAR (measured) = 12.2 mW/g



SAR Report

Cph_SAR_0551_03

Applicant: Nokia Corporation

Type: RM-89

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APPENDIX B: MEASUREMENT SCANS

SEE THE FOLLOWING PAGES

Date/Time: 2005.11.28 17:50:58

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 3-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:2.8
Medium: Head 850; Medium Notes: Medium Temperature: $t=21.3$ C
Medium parameters used: $f = 837$ MHz; $\sigma = 0.888$ mho/m; $\epsilon_r = 40.8$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(6.56, 6.56, 6.56); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.792 mW/g

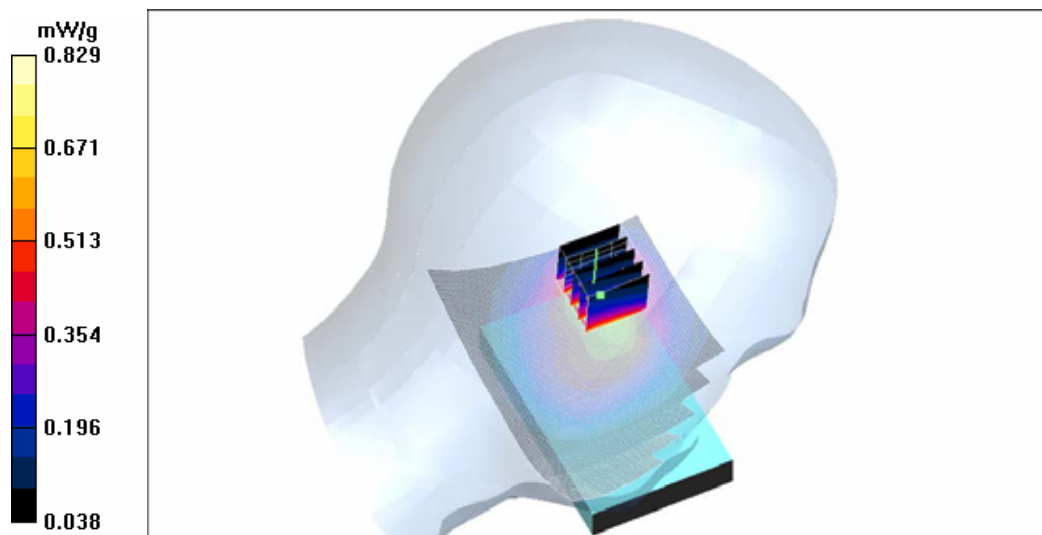
Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 24.7 V/m; Power Drift = -0.122 dB

Peak SAR (extrapolated) = 1.52 W/kg

SAR(1 g) = 0.772 mW/g; SAR(10 g) = 0.450 mW/g

Maximum value of SAR (measured) = 0.829 mW/g



Date/Time: 2005.11.28 18:10:18

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Head 850; Medium Notes: Medium Temperature: $t=21.3$ C
Medium parameters used: $f = 837$ MHz; $\sigma = 0.888$ mho/m; $\epsilon_r = 40.8$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(6.56, 6.56, 6.56); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.829 mW/g

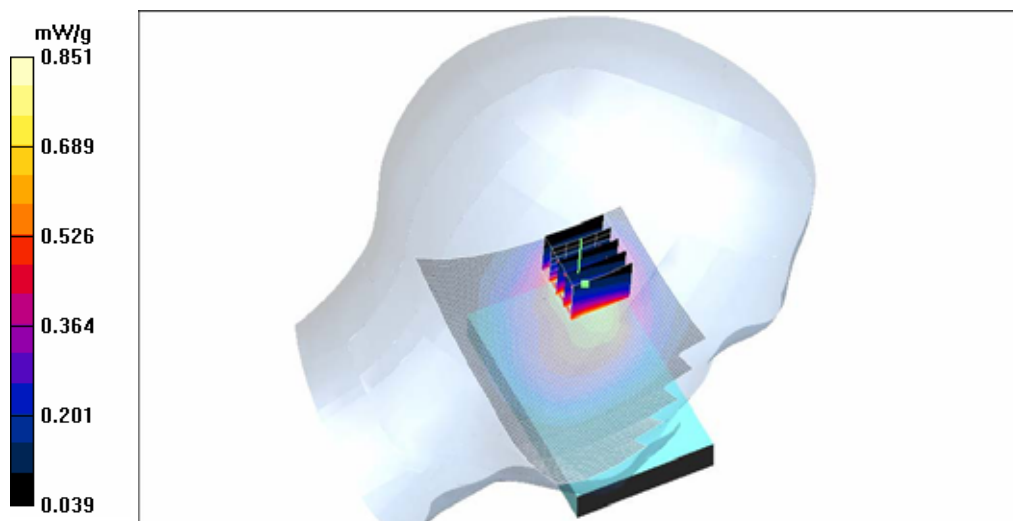
Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 25.0 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 1.52 W/kg

SAR(1 g) = 0.792 mW/g; SAR(10 g) = 0.465 mW/g

Maximum value of SAR (measured) = 0.851 mW/g



Date/Time: 2005.11.28 19:09:49

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS850
Frequency: 824.2 MHz; Duty Cycle: 1:4.2
Medium: Head 850; Medium Notes: Medium Temperature: $t=21.3$ C
Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.876$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(6.56, 6.56, 6.56); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Low/Area Scan (51x91x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

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

Maximum value of SAR (interpolated) = 1.19 mW/g

Tilt position - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

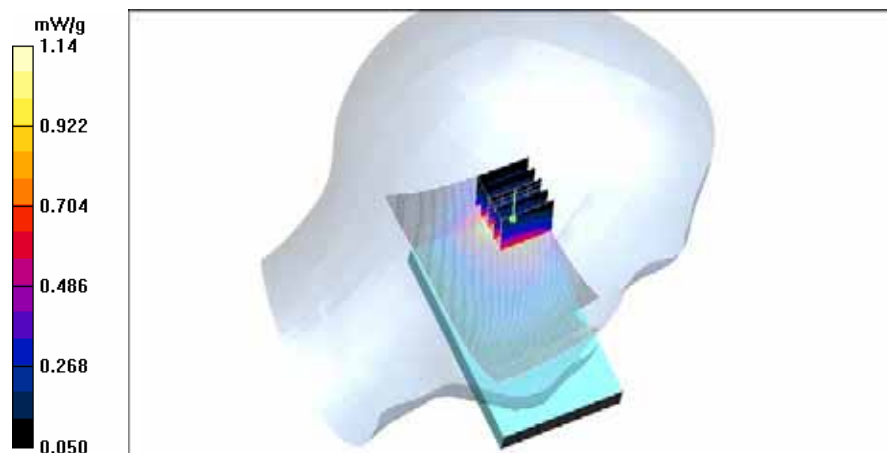
Reference Value = 29.6 V/m; Power Drift = -0.096 dB

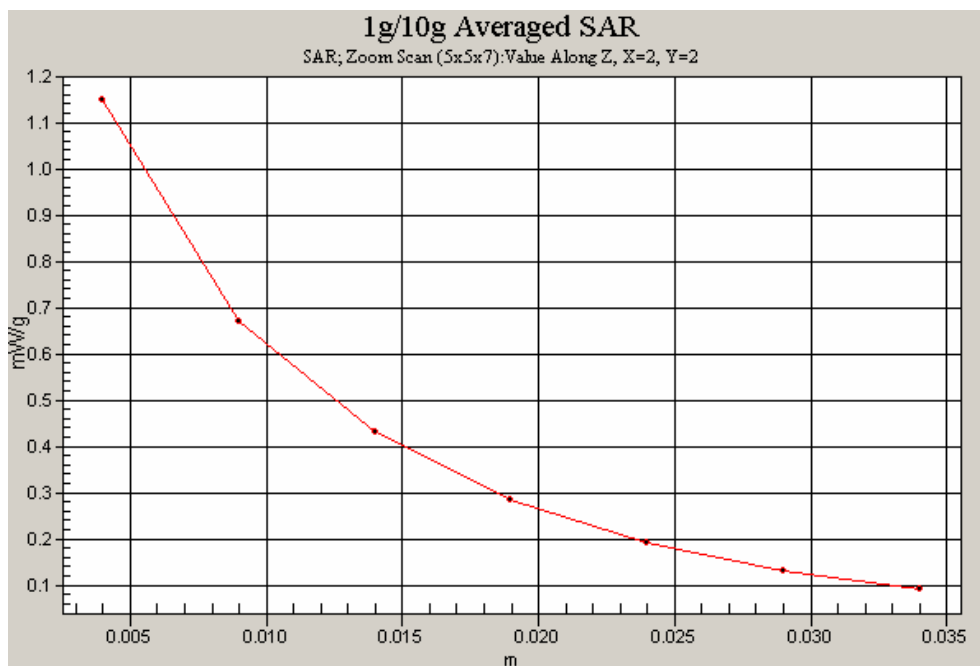
Peak SAR (extrapolated) = 2.39 W/kg

SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.629 mW/g

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

Maximum value of SAR (measured) = 1.14 mW/g





Date/Time: 2005.11.28 19:55:48

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Head 850; Medium Notes: Medium Temperature: $t=21.3$ C
Medium parameters used: $f = 837$ MHz; $\sigma = 0.888$ mho/m; $\epsilon_r = 40.8$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(6.56, 6.56, 6.56); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.594 mW/g

Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

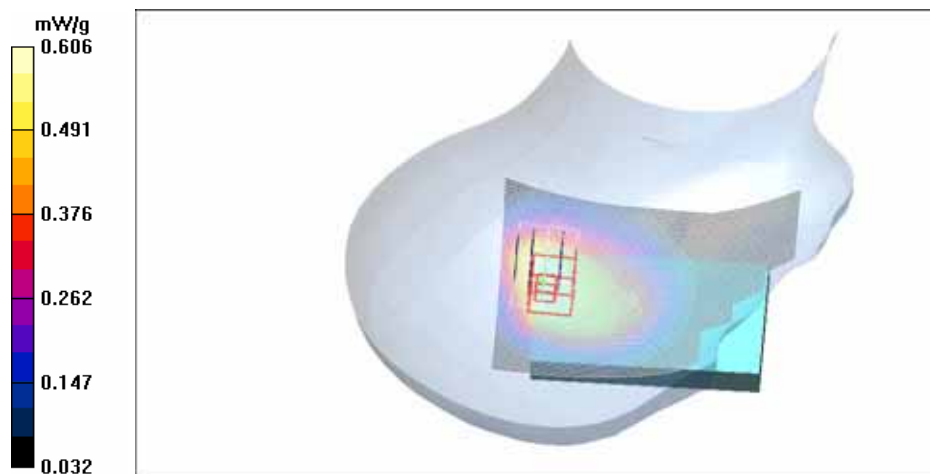
Reference Value = 25.6 V/m; Power Drift = -0.085 dB

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.576 mW/g; SAR(10 g) = 0.390 mW/g

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

Maximum value of SAR (measured) = 0.606 mW/g



Date/Time: 2005.11.28 20:13:36

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Head 850; Medium Notes: Medium Temperature: $t=21.3$ C
Medium parameters used: $f = 837$ MHz; $\sigma = 0.888$ mho/m; $\epsilon_r = 40.8$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY4 Configuration:

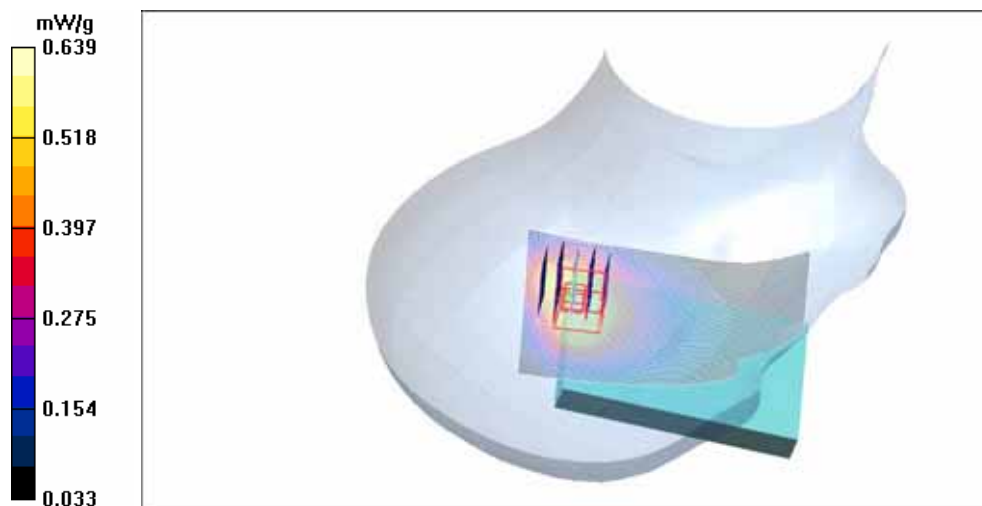
- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(6.56, 6.56, 6.56); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (51x91x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.603 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm
Reference Value = 24.7 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.608 mW/g; SAR(10 g) = 0.384 mW/g

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

Maximum value of SAR (measured) = 0.639 mW/g



Date/Time: 2005.11.28 22:04:11

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot EGPRS850
Frequency: 824.2 MHz; Duty Cycle: 1:4.2
Medium: Head 850; Medium Notes: Medium Temperature: $t=21.3$ C
Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.876$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(6.56, 6.56, 6.56); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Low/Area Scan (51x91x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

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

Maximum value of SAR (interpolated) = 0.326 mW/g

Tilt position - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

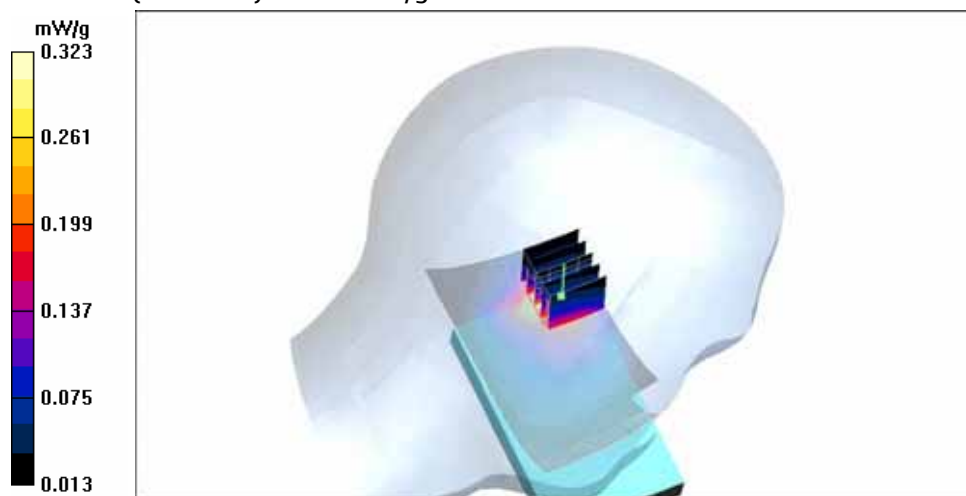
Reference Value = 16.0 V/m; Power Drift = 0.212 dB

Peak SAR (extrapolated) = 0.597 W/kg

SAR(1 g) = 0.310 mW/g; SAR(10 g) = 0.176 mW/g

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

Maximum value of SAR (measured) = 0.323 mW/g



Date/Time: 2005.11.28 17:05:37

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

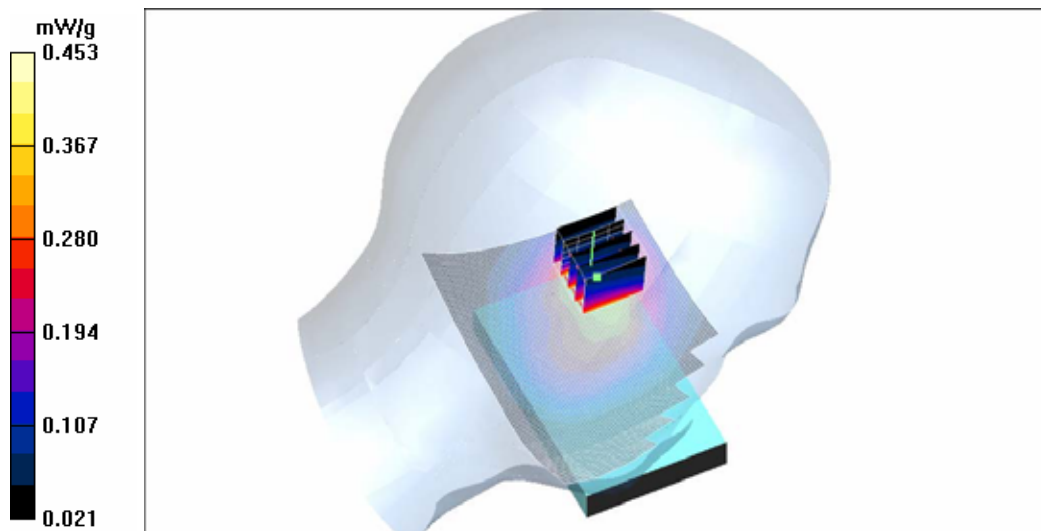
Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: $t=21.3$ C
Medium parameters used: $f = 837$ MHz; $\sigma = 0.888$ mho/m; $\epsilon_r = 40.8$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(6.56, 6.56, 6.56); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM High Band; Type: QD000P40CB; Serial: TP-1301
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.435 mW/g

Cheek position - Middle/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 = -0.099 dB
Peak SAR (extrapolated) = 0.828 W/kg
SAR(1 g) = 0.427 mW/g; SAR(10 g) = 0.250 mW/g
Maximum value of SAR (measured) = 0.453 mW/g



Date/Time: 2005.12.28 14:02:38

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

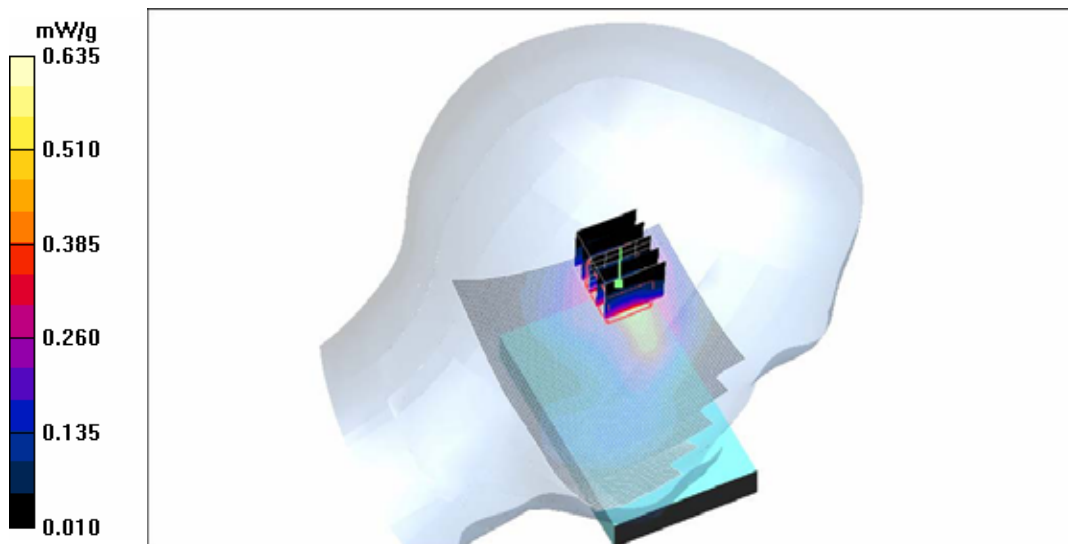
Communication System: 3-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:2.8
Medium: Head 1900; Medium Notes: Medium Temperature: $t=21.0$ C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(5.11, 5.11, 5.11); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.594 mW/g

Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm
Reference Value = 13.0 V/m; Power Drift = 0.227 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.572 mW/g; SAR(10 g) = 0.289 mW/g
Maximum value of SAR (measured) = 0.635 mW/g



Date/Time: 2005.12.28 16:54:59

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS1900
Frequency: 1850.2 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: $t=21.0\text{ C}$
Medium parameters used (interpolated): $f = 1850.2\text{ MHz}$; $\sigma = 1.38\text{ mho/m}$; $\epsilon_r = 38.3$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(5.11, 5.11, 5.11); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Low/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.763 mW/g

Cheek position - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

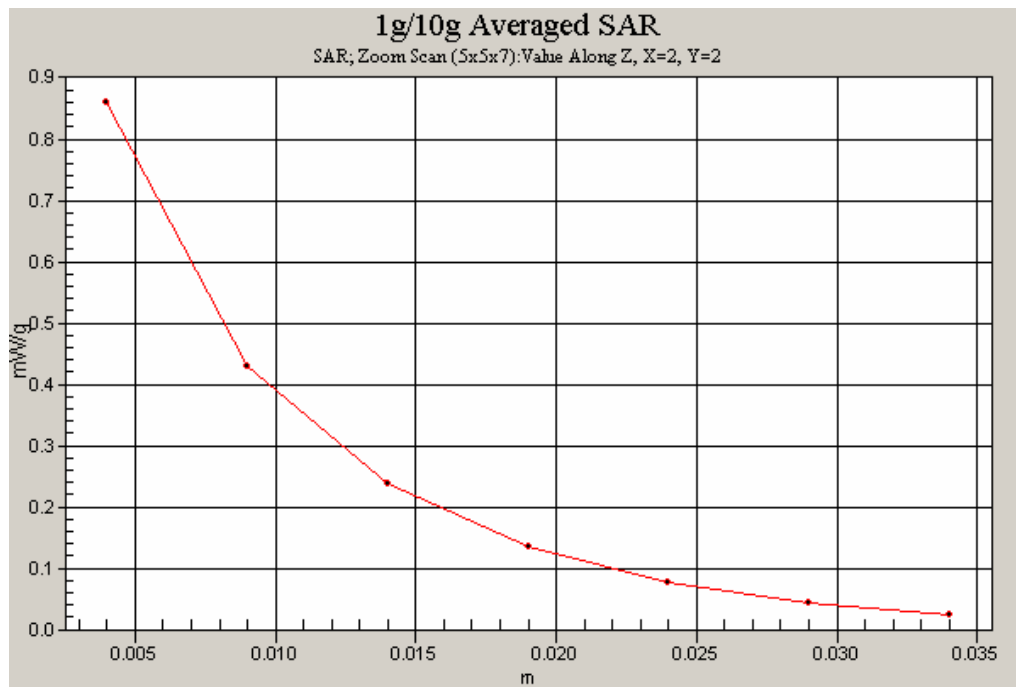
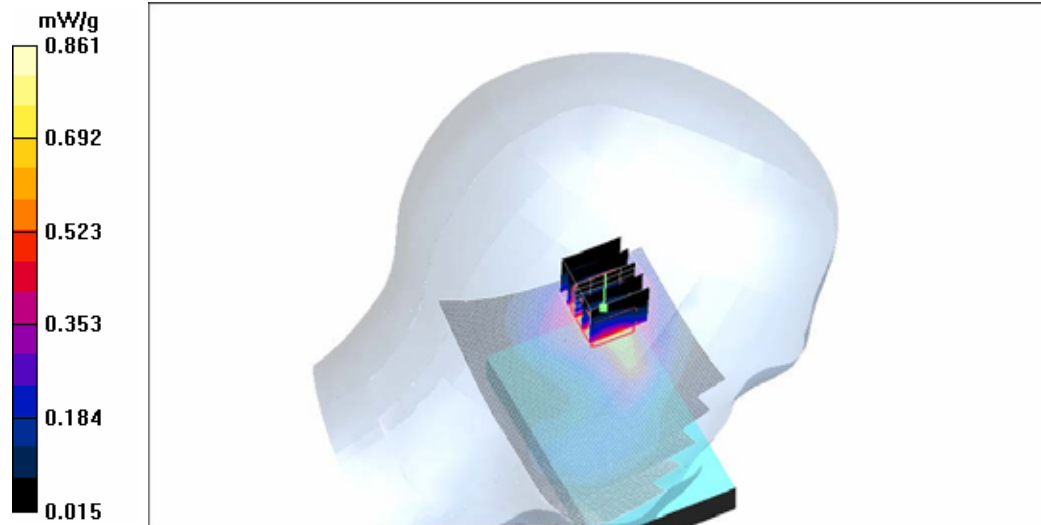
Reference Value = 16.8 V/m ; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 1.74 W/kg

SAR(1 g) = 0.782 mW/g ; SAR(10 g) = 0.400 mW/g

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

Maximum value of SAR (measured) = 0.861 mW/g



Date/Time: 2005.12.28 15:56:21

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

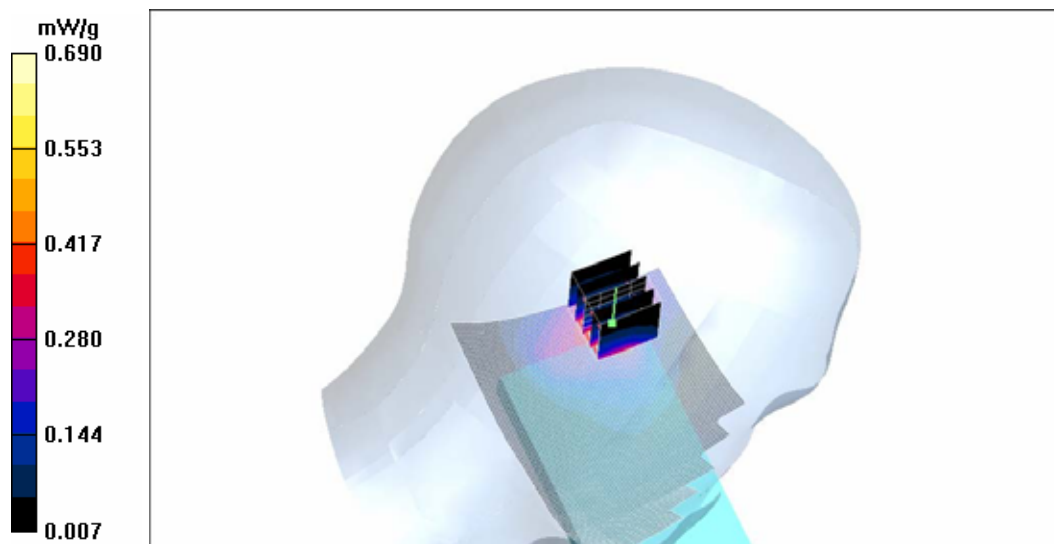
Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: $t=21.0$ C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(5.11, 5.11, 5.11); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.670 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm
Reference Value = 15.0 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.628 mW/g; SAR(10 g) = 0.309 mW/g
Maximum value of SAR (measured) = 0.690 mW/g



Date/Time: 2005.12.28 16:18:40

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

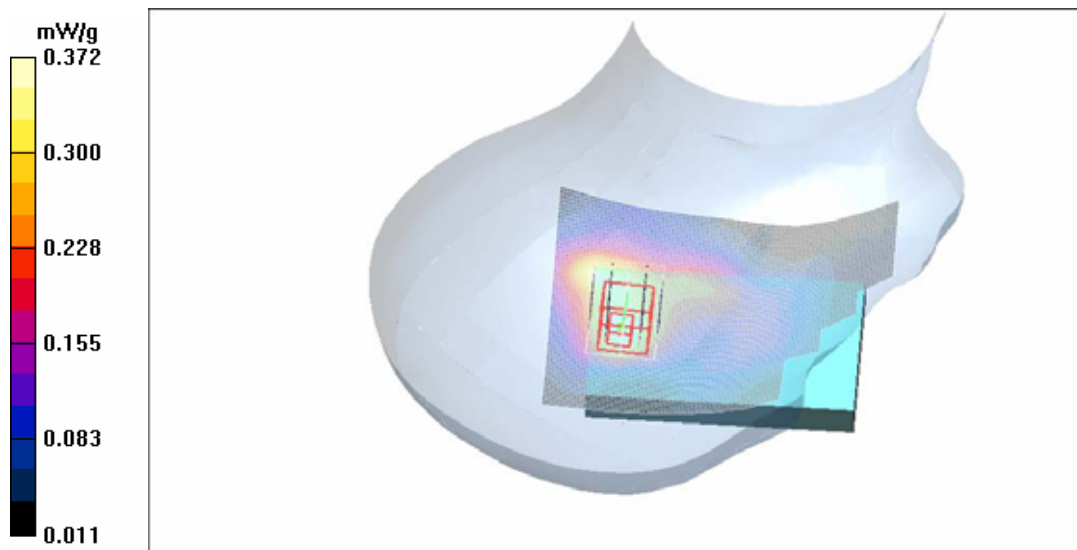
Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: $t=21.0\text{ }^{\circ}\text{C}$
Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.41\text{ mho/m}$; $\epsilon_r = 38.1$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(5.11, 5.11, 5.11); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.394 mW/g

Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$
Reference Value = 15.7 V/m ; Power Drift = -0.079 dB
Peak SAR (extrapolated) = 0.631 W/kg
SAR(1 g) = 0.351 mW/g ; SAR(10 g) = 0.208 mW/g
Maximum value of SAR (measured) = 0.372 mW/g



Date/Time: 2005.12.28 16:37:31

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

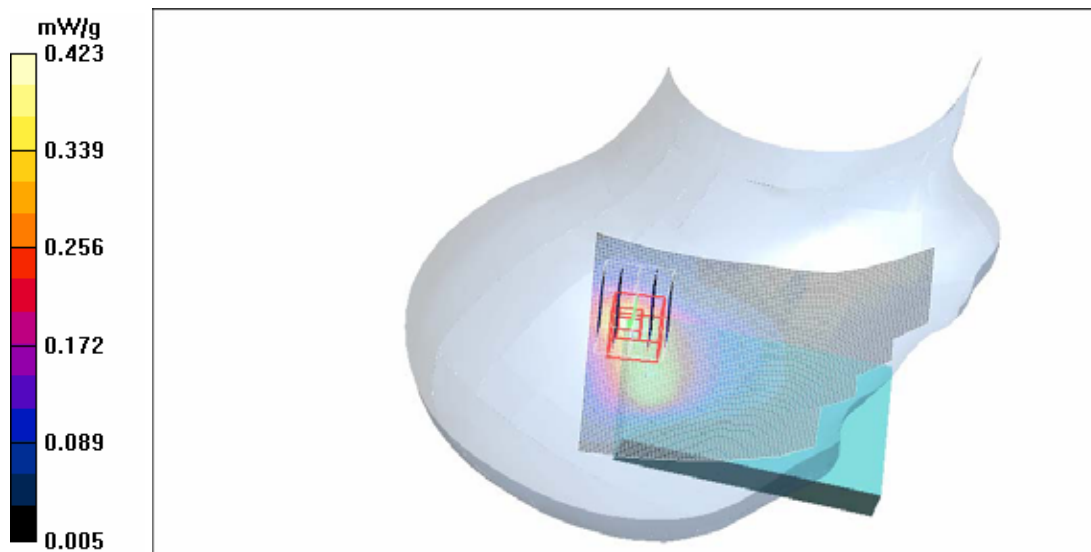
Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.0 C
Medium parameters used: f = 1880 MHz; σ = 1.41 mho/m; ϵ_r = 38.1; ρ = 1000 kg/m³
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(5.11, 5.11, 5.11); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.408 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.4 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 0.776 W/kg
SAR(1 g) = 0.378 mW/g; SAR(10 g) = 0.207 mW/g
Maximum value of SAR (measured) = 0.423 mW/g



Date/Time: 2005.12.28 20:09:44

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot EGPRS1900
Frequency: 1850.2 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: $t=21.0\text{ }^{\circ}\text{C}$
Medium parameters used (interpolated): $f = 1850.2\text{ MHz}$; $\sigma = 1.38\text{ mho/m}$; $\epsilon_r = 38.3$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(5.11, 5.11, 5.11); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Low/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.303 mW/g

Cheek position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.5 V/m ; Power Drift = -0.081 dB

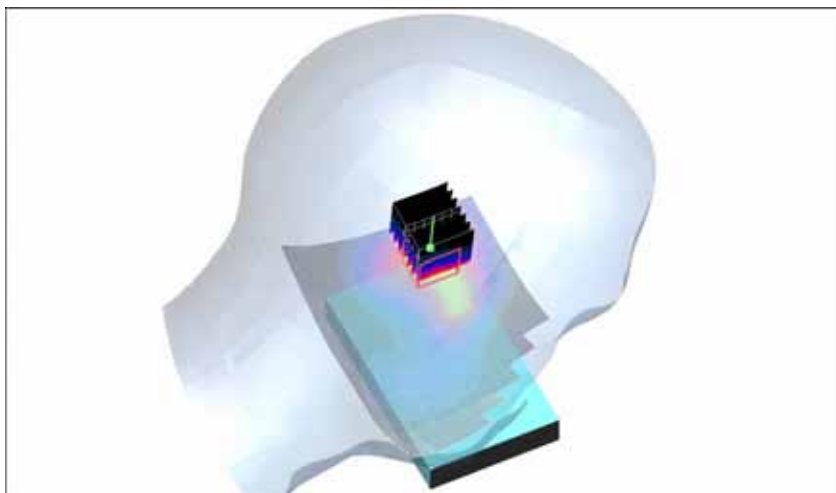
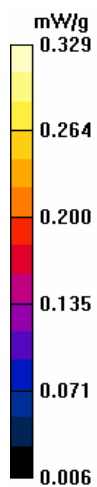
Peak SAR (extrapolated) = 0.707 W/kg

SAR(1 g) = 0.301 mW/g ; SAR(10 g) = 0.156 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) = 0.329 mW/g



Date/Time: 2005.12.28 13:15:30

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

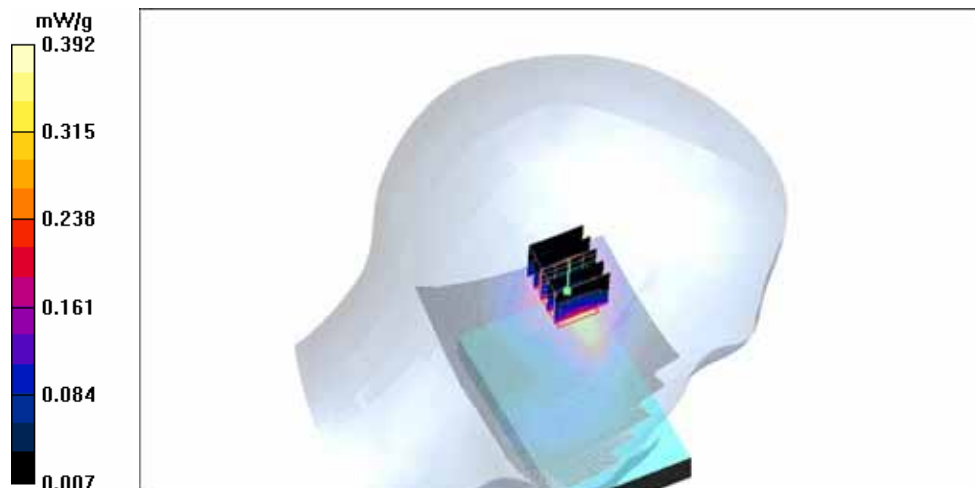
Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: $t=21.0$ C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1786; Probe Notes: Worst Case Extrapolation.
- ConvF(5.11, 5.11, 5.11); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn339; Calibrated: 17.08.2005
- Phantom: SAM Low Band; Type: QD000P40CB; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.353 mW/g

Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm
Reference Value = 10.7 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 0.776 W/kg
SAR(1 g) = 0.350 mW/g; SAR(10 g) = 0.180 mW/g
Maximum value of SAR (measured) = 0.392 mW/g



Date/Time: 2005.12.07 16:13:28

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

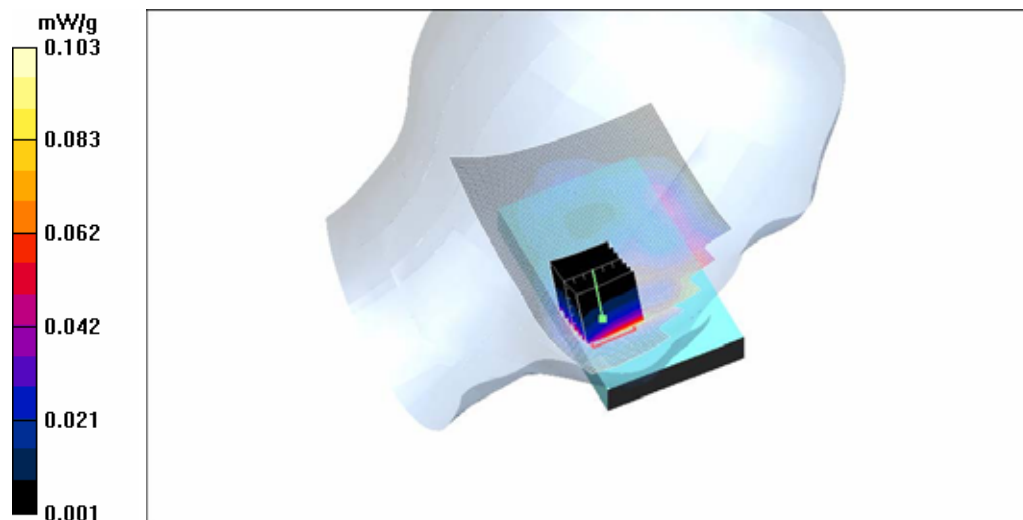
Communication System: WLAN2450
Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Head 2450; Medium Notes: Medium Temperature: $t=21.5\text{ }^{\circ}\text{C}$
Medium parameters used: $f = 2442\text{ MHz}$; $\sigma = 1.85\text{ mho/m}$; $\epsilon_r = 39.7$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.47, 4.47, 4.47); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM Low band; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.105 mW/g

Cheek position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 3.43 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 0.201 W/kg
SAR(1 g) = 0.097 mW/g; SAR(10 g) = 0.053 mW/g
Maximum value of SAR (measured) = 0.103 mW/g



Date/Time: 2005.12.07 16:37:31

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: WLAN2450
Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Head 2450; Medium Notes: Medium Temperature: $t=21.5\text{ }^{\circ}\text{C}$
Medium parameters used: $f = 2442\text{ MHz}$; $\sigma = 1.85\text{ mho/m}$; $\epsilon_r = 39.7$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.47, 4.47, 4.47); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM Low band; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.028 mW/g

Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 3.91 V/m ; Power Drift = 0.061 dB
Peak SAR (extrapolated) = 0.069 W/kg
SAR(1 g) = 0.028 mW/g ; SAR(10 g) = 0.013 mW/g
Maximum value of SAR (measured) = 0.030 mW/g



Date/Time: 2005.12.07 18:12:10

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

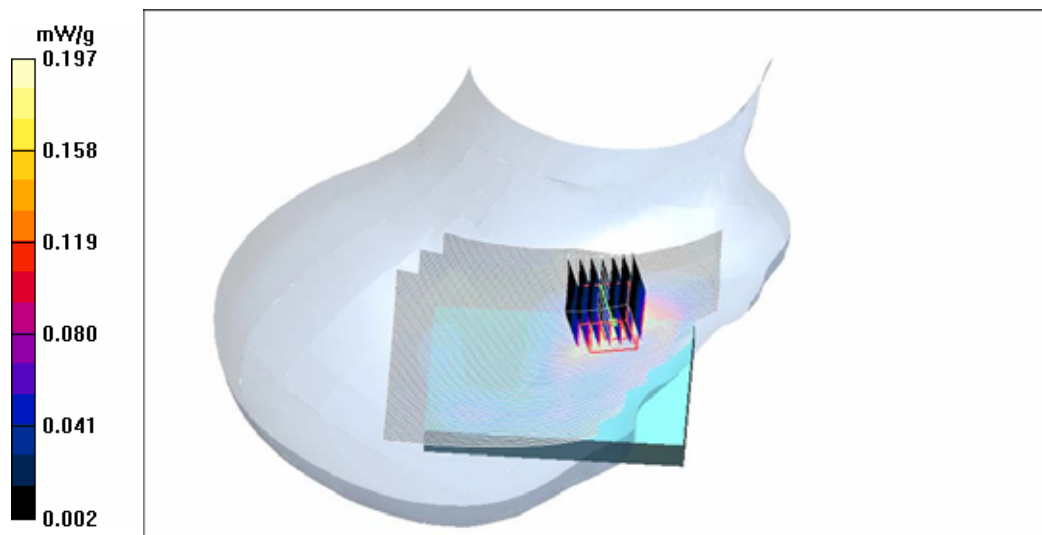
Communication System: WLAN2450
Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: Head 2450; Medium Notes: Medium Temperature: $t=21.5\text{ }^{\circ}\text{C}$
Medium parameters used: $f = 2412\text{ MHz}$; $\sigma = 1.82\text{ mho/m}$; $\epsilon_r = 39.7$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Right Section

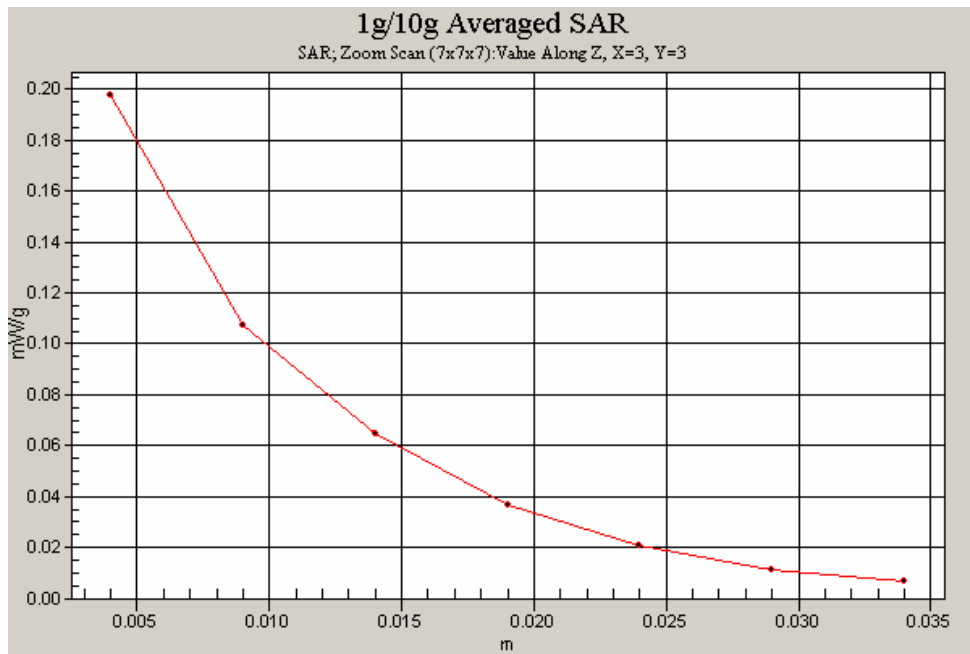
DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.47, 4.47, 4.47); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM Low band; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Low/Area Scan (111x151x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
Maximum value of SAR (interpolated) = 0.200 mW/g

Cheek position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 3.98 V/m ; Power Drift = -0.100 dB
Peak SAR (extrapolated) = 0.384 W/kg
SAR(1 g) = 0.182 mW/g ; SAR(10 g) = 0.095 mW/g
Maximum value of SAR (measured) = 0.197 mW/g





Date/Time: 2005.12.07 17:26:08

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

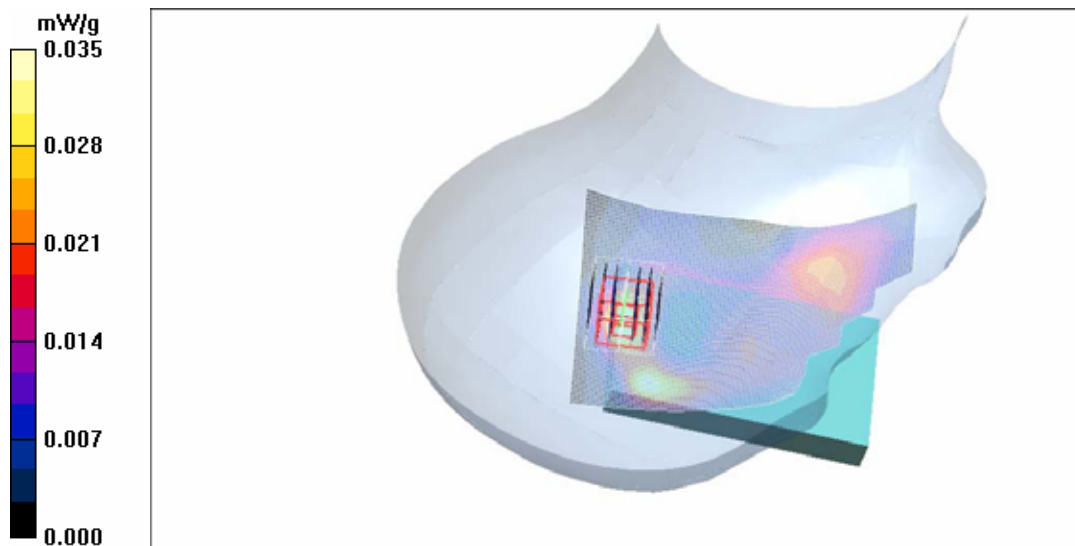
Communication System: WLAN2450
Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Head 2450; Medium Notes: Medium Temperature: $t=21.5\text{ C}$
Medium parameters used: $f = 2442\text{ MHz}$; $\sigma = 1.85\text{ mho/m}$; $\epsilon_r = 39.7$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.47, 4.47, 4.47); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM Low band; Type: Twin Phantom; Serial: TP-1037
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.037 mW/g

Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 3.97 V/m; Power Drift = 0.066 dB
Peak SAR (extrapolated) = 0.074 W/kg
SAR(1 g) = 0.033 mW/g; SAR(10 g) = 0.016 mW/g
Maximum value of SAR (measured) = 0.035 mW/g



Date/Time: 2005.12.15 20:19:44

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 3-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:2.8
Medium: Body 850; Medium Notes: Medium Temperature: $t = 20.8$ C
Medium parameters used: $f = 837$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(6.26, 6.26, 6.26); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM High band; Type: Twin Phantom; Serial: TP-1274
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory/Area Scan (111x151x1): Measurement grid: $dx=10$ mm, $dy=10$ mm
Maximum value of SAR (interpolated) = 0.786 mW/g

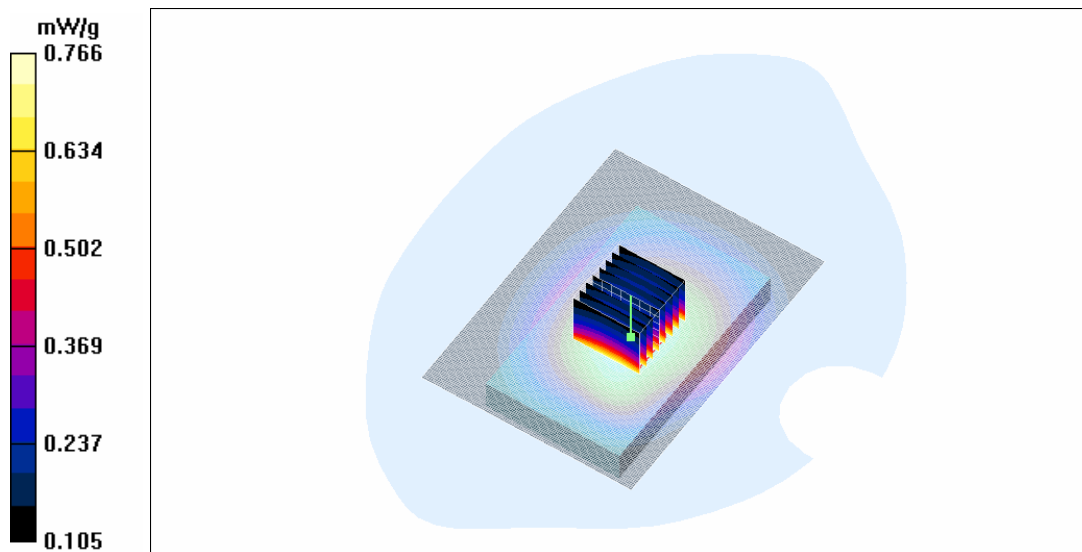
Body - Middle - No Accessory/Zoom Scan (8x8x7) (8x8x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 27.1 V/m; Power Drift = -0.187 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.734 mW/g; SAR(10 g) = 0.540 mW/g

Maximum value of SAR (measured) = 0.766 mW/g



Date/Time: 2005.12.15 15:41:51

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS850
Frequency: 824.2 MHz; Duty Cycle: 1:4.2
Medium: Body 850; Medium Notes: Medium Temperature: $t = 20.8$ C
Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.958$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(6.26, 6.26, 6.26); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM High band; Type: Twin Phantom; Serial: TP-1274
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Low - No Accessory/Area Scan (111x151x1): Measurement grid: $dx=10$ mm, $dy=10$ mm

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

Maximum value of SAR (interpolated) = 1.05 mW/g

Body - Low - No Accessory/Zoom Scan (8x8x7) (8x8x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

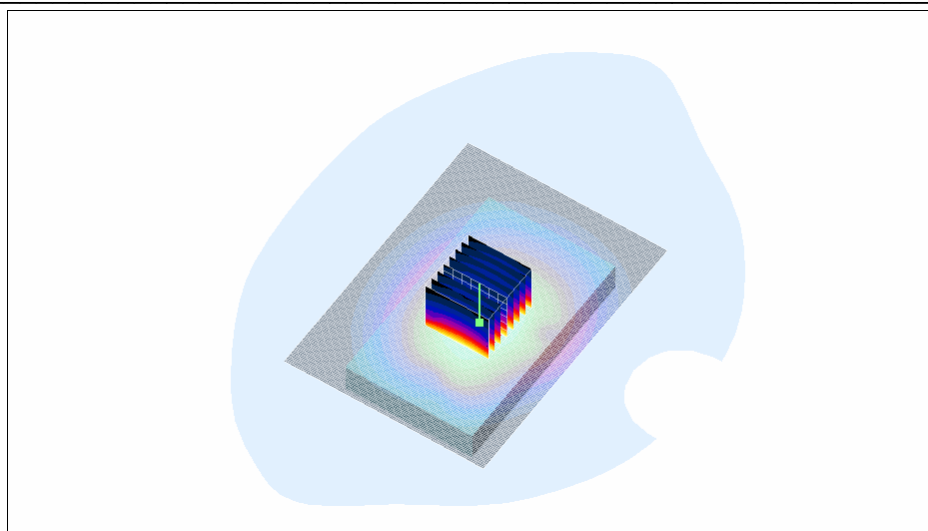
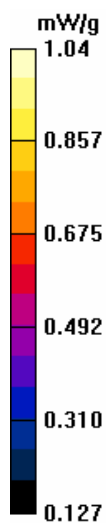
Reference Value = 31.2 V/m; Power Drift = -0.048 dB

Peak SAR (extrapolated) = 1.63 W/kg

SAR(1 g) = 0.996 mW/g; SAR(10 g) = 0.730 mW/g

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

Maximum value of SAR (measured) = 1.04 mW/g



Date/Time: 2005.12.15 16:42:10

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS850
Frequency: 824.2 MHz; Duty Cycle: 1:4.2
Medium: Body 850; Medium Notes: Medium Temperature: $t = 20.8$ C
Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.958$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(6.26, 6.26, 6.26); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM High band; Type: Twin Phantom; Serial: TP-1274
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Low - HS-6/Area Scan (111x151x1): Measurement grid: $dx=10$ mm, $dy=10$ mm

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

Maximum value of SAR (interpolated) = 0.814 mW/g

Body - Low - HS-6/Zoom Scan (8x8x7) (8x8x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

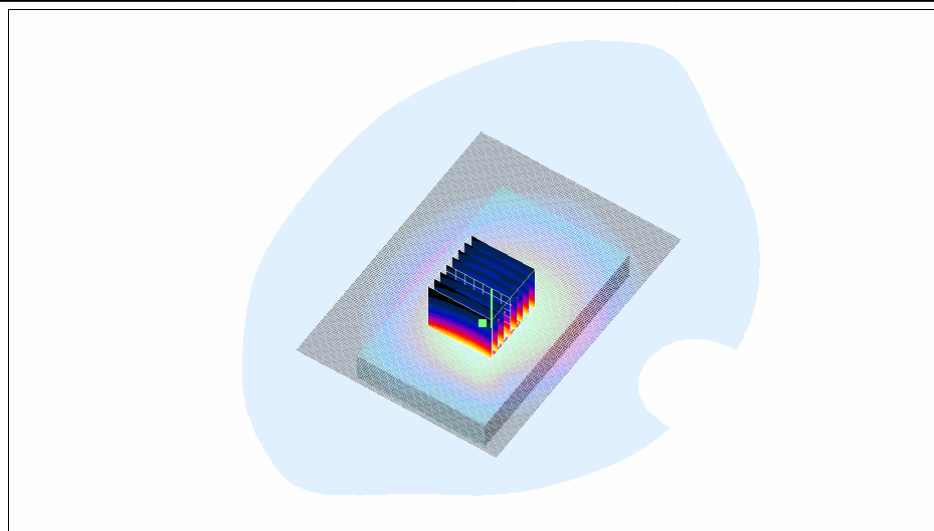
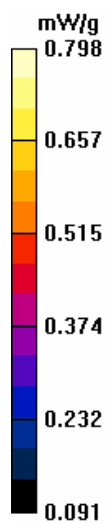
Reference Value = 26.4 V/m; Power Drift = -0.206 dB

Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.768 mW/g; SAR(10 g) = 0.561 mW/g

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

Maximum value of SAR (measured) = 0.798 mW/g



Date/Time: 2005.12.15 19:37:19

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Body 850; Medium Notes: Medium Temperature: $t = 20.8$ C
Medium parameters used: $f = 837$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(6.26, 6.26, 6.26); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM High band; Type: Twin Phantom; Serial: TP-1274
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory/Area Scan (111x151x1): Measurement grid: $dx=10$ mm, $dy=10$ mm
Maximum value of SAR (interpolated) = 0.520 mW/g

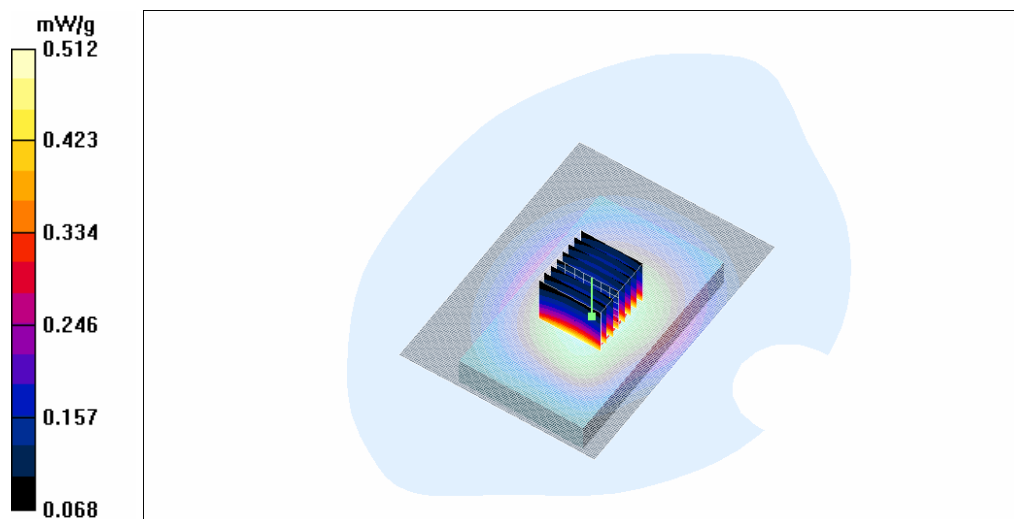
Body - Middle - No Accessory/Zoom Scan (8x8x7) (8x8x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 21.9 V/m; Power Drift = -0.103 dB

Peak SAR (extrapolated) = 0.715 W/kg

SAR(1 g) = 0.489 mW/g; SAR(10 g) = 0.359 mW/g

Maximum value of SAR (measured) = 0.512 mW/g



Date/Time: 2005.12.15 18:42:09

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS850
Frequency: 824.2 MHz; Duty Cycle: 1:4.2
Medium: Body 850; Medium Notes: Medium Temperature: $t = 20.8$ C
Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.958$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(6.26, 6.26, 6.26); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM High band; Type: Twin Phantom; Serial: TP-1274
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Low - No Accessory - SD card - BT active/Area Scan (111x151x1): Measurement grid: $dx=10$ mm, $dy=10$ mm

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

Maximum value of SAR (interpolated) = 1.11 mW/g

Body - Low - No Accessory - SD card - BT active/Zoom Scan (8x8x7) (8x8x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm
Reference Value = 32.4 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 1.90 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.799 mW/g

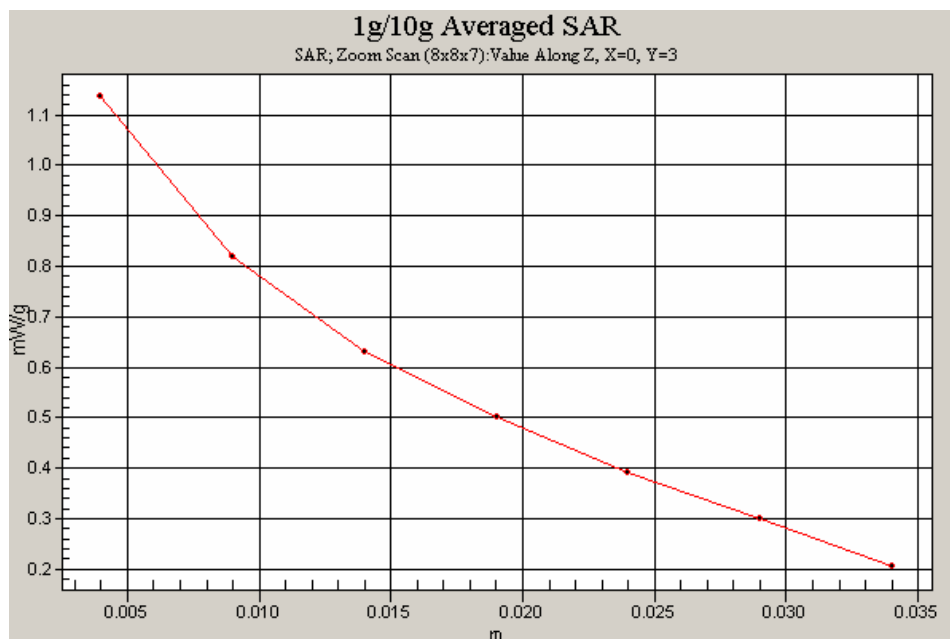
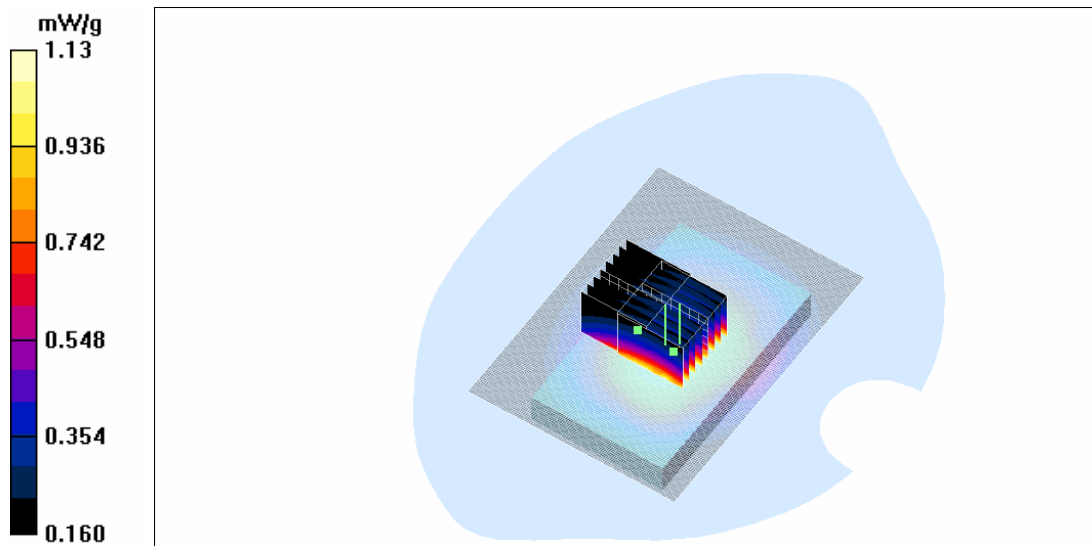
[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.13 mW/g

Body - Low - No Accessory - SD card - BT active/Zoom Scan (8x8x7) (8x8x7)/Cube 1: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm
Reference Value = 32.4 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.703 mW/g

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

Warning: Maximum averaged SAR over 1 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 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.



Date/Time: 2005.12.27 14:52:08

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 3-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:2.8
Medium: Body 1900; Medium Notes: Medium Temperature: $t=20.6\text{ }^{\circ}\text{C}$
Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.48\text{ mho/m}$; $\epsilon_r = 52.7$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.44, 4.44, 4.44); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.433 mW/g

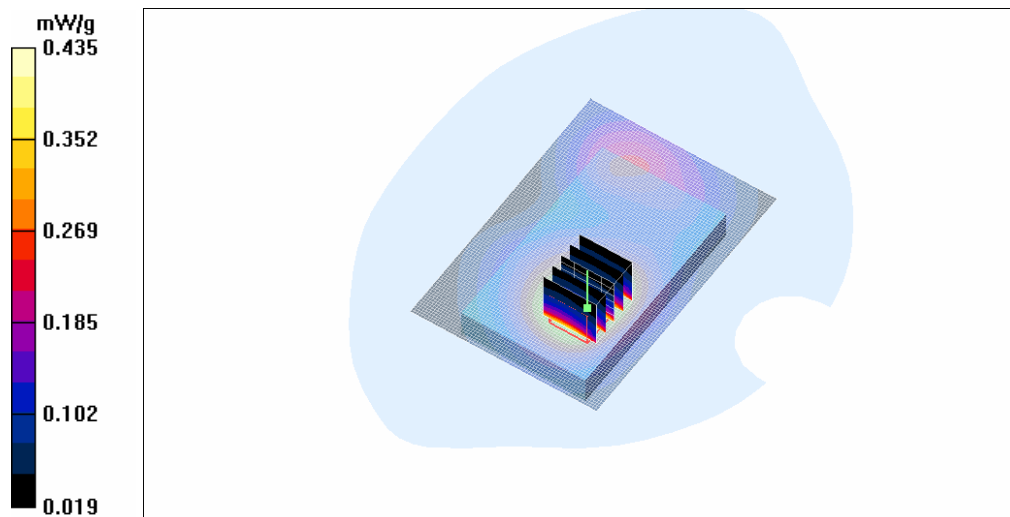
Body - Middle - No Accessory/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.4 V/m ; Power Drift = 0.140 dB

Peak SAR (extrapolated) = 0.890 W/kg

SAR(1 g) = 0.415 mW/g ; SAR(10 g) = 0.250 mW/g

Maximum value of SAR (measured) = 0.435 mW/g



Date/Time: 2005.12.27 14:28:15

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: $t=20.6$ C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.44, 4.44, 4.44); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory/Area Scan (71x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.527 mW/g

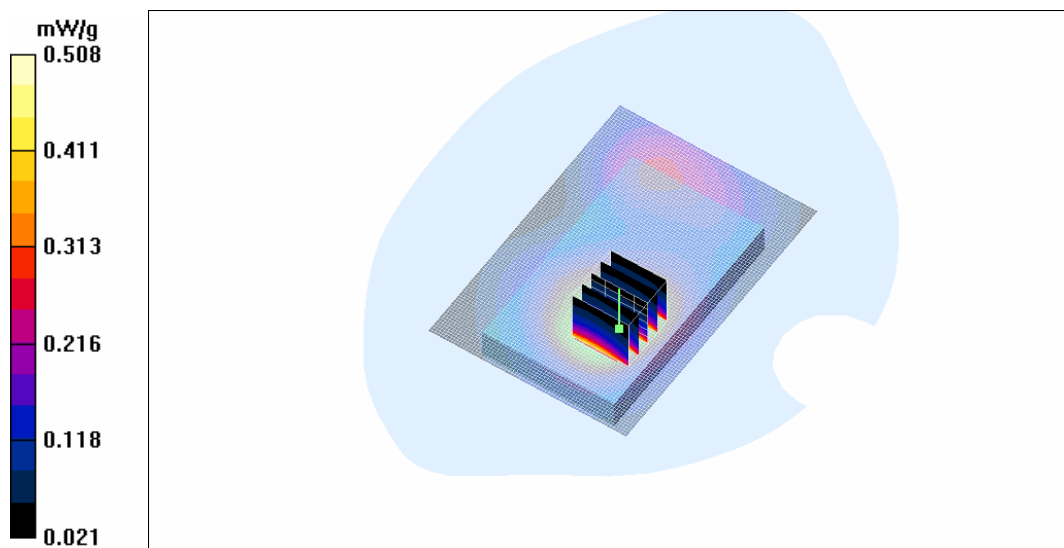
Body - Middle - No Accessory/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 11.6 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.496 mW/g; SAR(10 g) = 0.302 mW/g

Maximum value of SAR (measured) = 0.508 mW/g



Date/Time: 2005.12.27 15:45:54

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

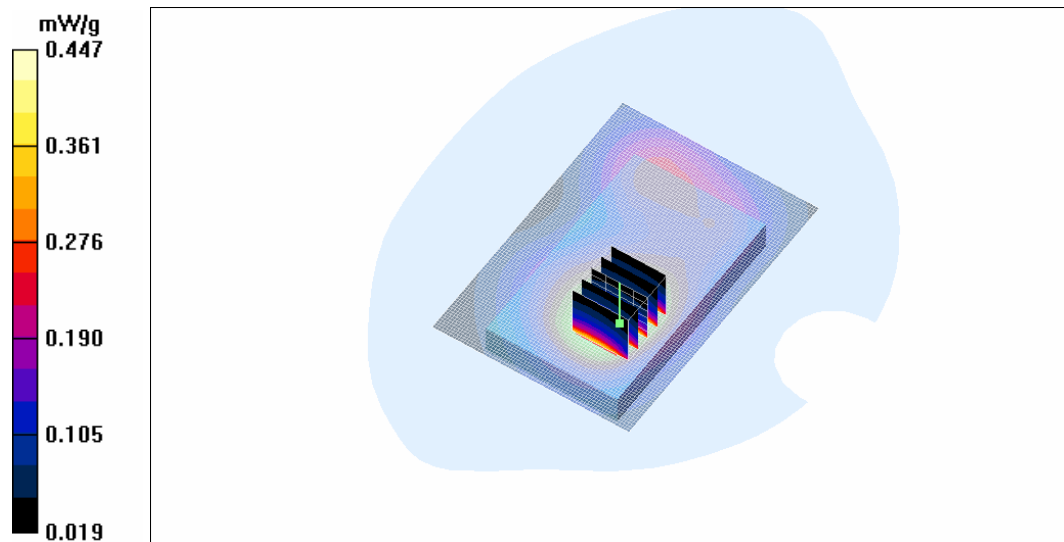
Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=20.6 C
Medium parameters used: f = 1880 MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.44, 4.44, 4.44); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle + HS-6/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.460 mW/g

Body - Middle + HS-6/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.8 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 0.863 W/kg
SAR(1 g) = 0.430 mW/g; SAR(10 g) = 0.262 mW/g
Maximum value of SAR (measured) = 0.447 mW/g



Date/Time: 2005.12.27 13:55:36

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Body 1900; Medium Notes: Medium Temperature: $t=20.6$ C
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.44, 4.44, 4.44); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory/Area Scan (71x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (interpolated) = 0.282 mW/g

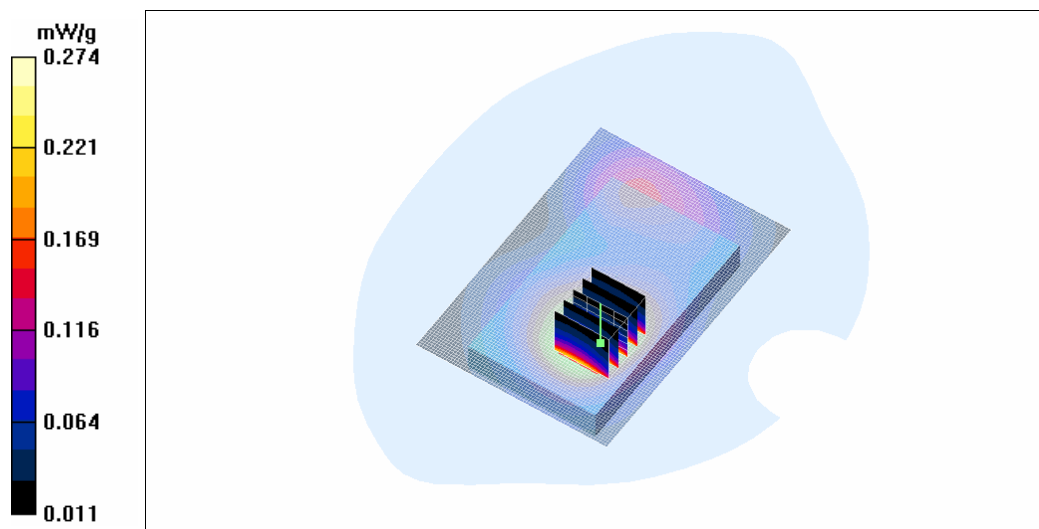
Body - Middle - No Accessory/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 8.52 V/m; Power Drift = -0.119 dB

Peak SAR (extrapolated) = 0.547 W/kg

SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.163 mW/g

Maximum value of SAR (measured) = 0.274 mW/g



Date/Time: 2005.12.29 17:26:27

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: $t=21.5\text{ }^{\circ}\text{C}$
Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.52\text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.44, 4.44, 4.44); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 3; Type: Twin Phantom; Serial: TP-1302
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Mid - No Accessory + SD-Card/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.593 mW/g

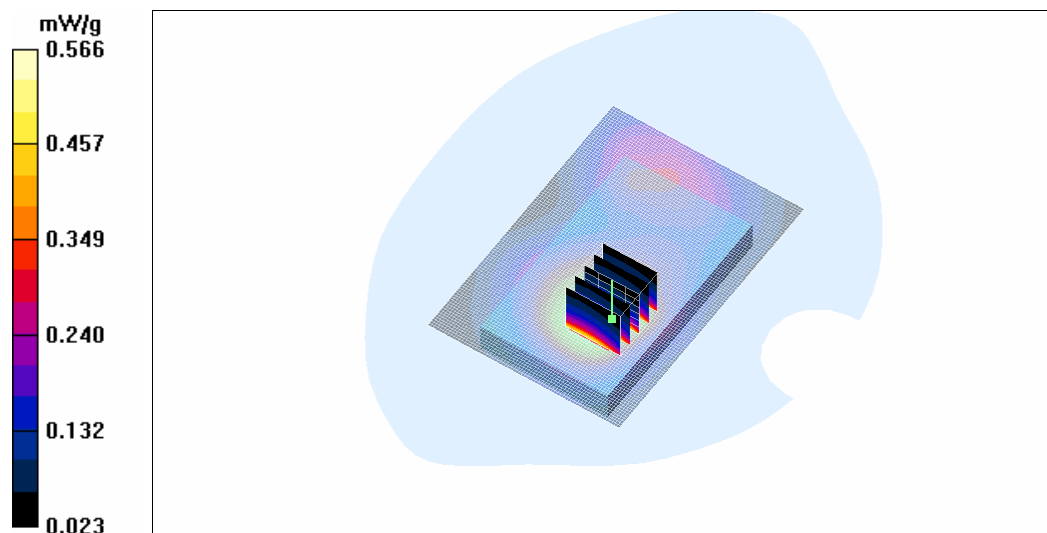
Body - Mid - No Accessory + SD-Card/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

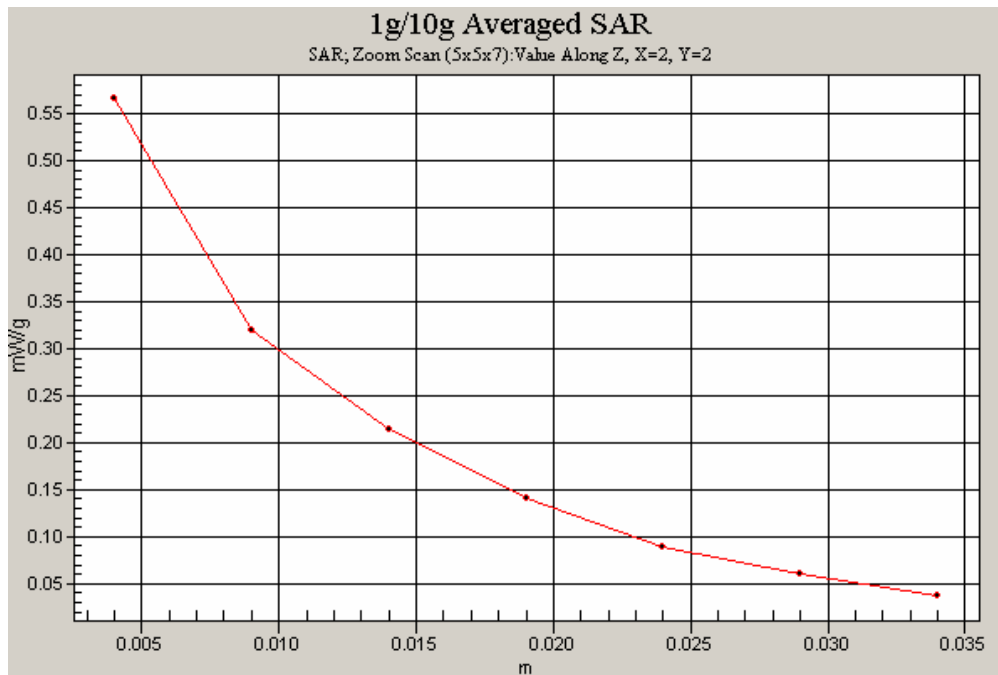
Reference Value = 12.5 V/m ; Power Drift = -0.045 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.557 mW/g ; SAR(10 g) = 0.342 mW/g

Maximum value of SAR (measured) = 0.566 mW/g





Date/Time: 2005.12.27 18:04:11

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171443/5

Communication System: WLAN2450
Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: Body 2450; Medium Notes: Medium Temperature: $t=20.6\text{ }^{\circ}\text{C}$
Medium parameters used: $f = 2412\text{ MHz}$; $\sigma = 1.94\text{ mho/m}$; $\epsilon_r = 52$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.12, 4.12, 4.12); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 1; Type: Twin Phantom; Serial: TP-1215
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Low - No Accessory/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.042 mW/g

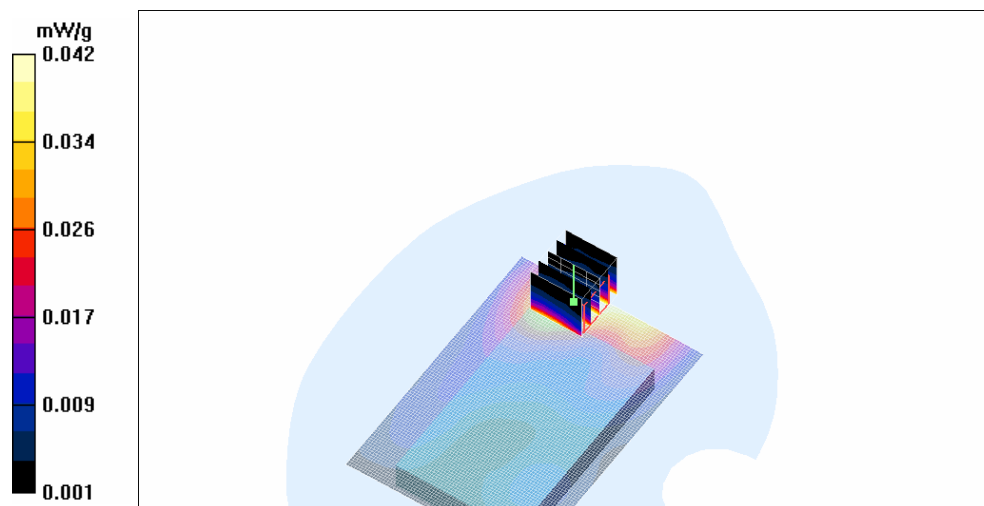
Body - Low - No Accessory/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

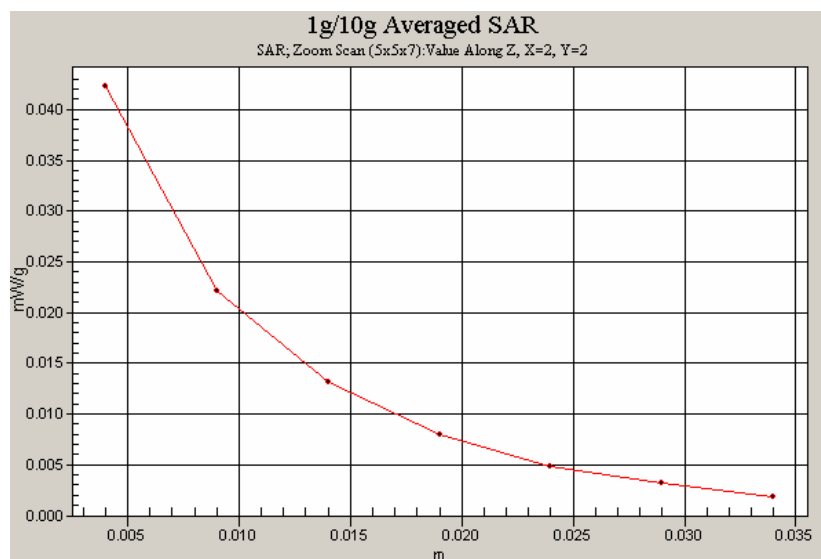
Reference Value = 2.13 V/m ; Power Drift = 0.226 dB

Peak SAR (extrapolated) = 0.093 W/kg

SAR(1 g) = 0.042 mW/g ; SAR(10 g) = 0.024 mW/g

Maximum value of SAR (measured) = 0.042 mW/g





Date/Time: 2005.12.27 19:50:05

Test Laboratory: TCC Copenhagen
Type: RM-89; Serial: 004400/61/171447/6

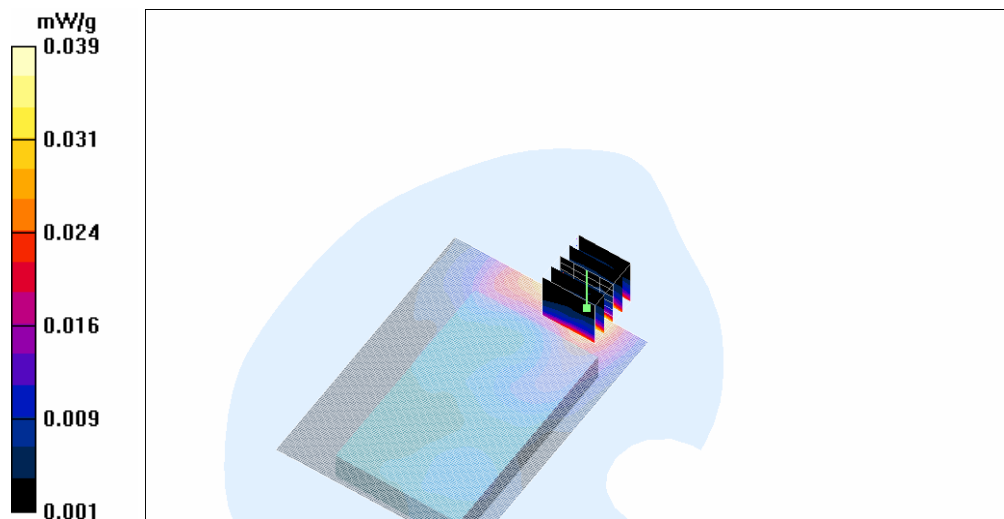
Communication System: WLAN2450
Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Body 2450; Medium Notes: Medium Temperature: $t=20.6\text{ }^{\circ}\text{C}$
Medium parameters used: $f = 2442\text{ MHz}$; $\sigma = 1.98\text{ mho/m}$; $\epsilon_r = 51.9$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1807; Probe Notes: Worst Case Extrapolation
- ConvF(4.12, 4.12, 4.12); Calibrated: 21.01.2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn501; Calibrated: 24.01.2005
- Phantom: SAM 1; Type: Twin Phantom; Serial: TP-1215
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Mid - HS-6/Area Scan (111x151x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
Maximum value of SAR (interpolated) = 0.039 mW/g

Body - Mid - HS-6/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$
Reference Value = 1.86 V/m ; Power Drift = 0.319 dB
Peak SAR (extrapolated) = 0.089 W/kg
SAR(1 g) = 0.038 mW/g ; SAR(10 g) = 0.021 mW/g
Maximum value of SAR (measured) = 0.039 mW/g



APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORTS

SEE THE FOLLOWING PAGES

18976

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



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

Accredited by the Swiss Federal Office of Metrology and Accreditation
 The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Nokia DK**

Certificate No: **ET3-1786_Jan05**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1786**

Calibration procedure(s) **QA CAL-01.v5**
Calibration procedure for dosimetric E-field probes

Calibration date: **January 21, 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	29-Sep-04 (SPEAG, No. DAE4-617_Sep04)	Sep-05

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

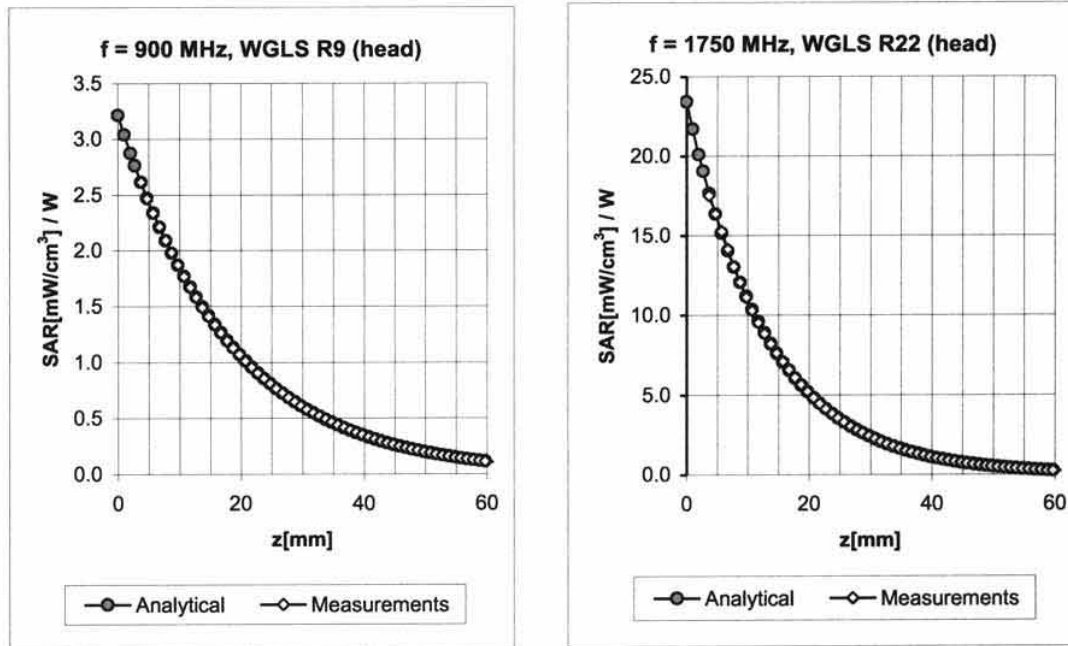
	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 21, 2005

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

28/1-05

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.67	1.74	6.56 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.59	1.86	6.36 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.62	2.23	5.29 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.59	2.40	5.11 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.59	4.74 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.71	2.10	4.55 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.59	1.91	6.38 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.47	2.19	6.06 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.57	2.68	4.68 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.57	2.82	4.52 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.62	2.45	4.41 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.72	2.03	4.20 ± 11.8% (k=2)

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

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



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 The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Nokia DK**

Certificate No: **ET3-1807_Jan05**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1807**

Calibration procedure(s) **QA CAL-01.v5**
Calibration procedure for dosimetric E-field probes

Calibration date: **January 21, 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	29-Sep-04 (SPEAG, No. DAE4-617_Sep04)	Sep-05

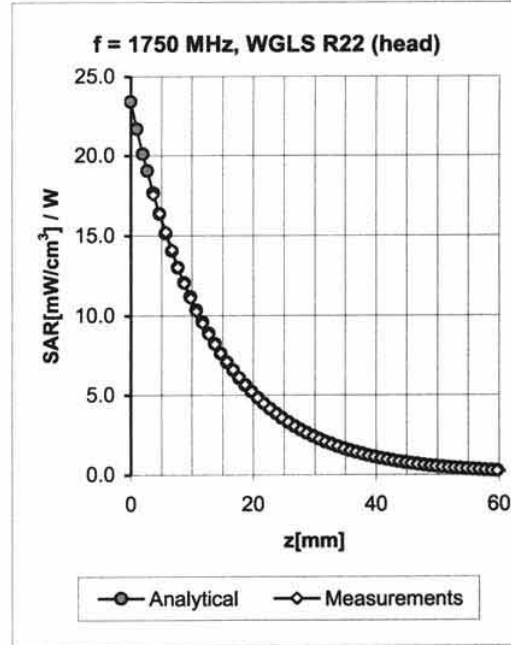
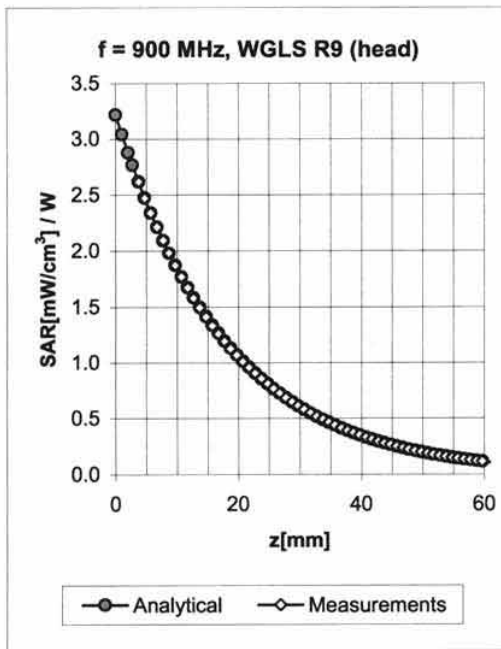
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01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

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

Issued: January 21, 2005

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

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.68	1.75	6.46 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.64	1.81	6.25 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.56	2.34	5.19 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.58	5.04 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.53	2.68	4.70 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.62	2.29	4.47 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.50	2.07	6.26 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.49	2.15	5.97 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.50	2.86	4.59 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.51	2.94	4.44 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.55	2.63	4.35 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.63	2.18	4.12 ± 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 REPORTS

SEE THE FOLLOWING PAGES

18308

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



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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 DK 2**

Certificate No: **D835V2-476_Jan05**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 476**

Calibration procedure(s) **QA CAL-05.v6
Calibration procedure for dipole validation kits**

Calibration date: **January 18, 2005**

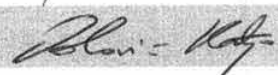
Condition of the calibrated item **In Tolerance**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference Probe ET3DV6	SN 1507	26-Oct-04 (SPEAG, No. ET3-1507_Oct04)	Oct-05
DAE4	SN 601	07-Jan-05 (SPEAG, No. DAE4-601_Jan05)	Jan-06
DAE4	SN 907	03-May-04 (SPEAG, No. DAE4-907_May04)	May-05
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-03)	In house check: Oct-05
RF generator R&S SML-03	100698	27-Mar-02 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov-05

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

Issued: January 19, 2005

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

28/1-05
DC

DASY4 Validation Report for Head TSL

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

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL 900 MHz;

Medium parameters used: $f = 835$ MHz; $\sigma = 0.91$ mho/m; $\epsilon_r = 42$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

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

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

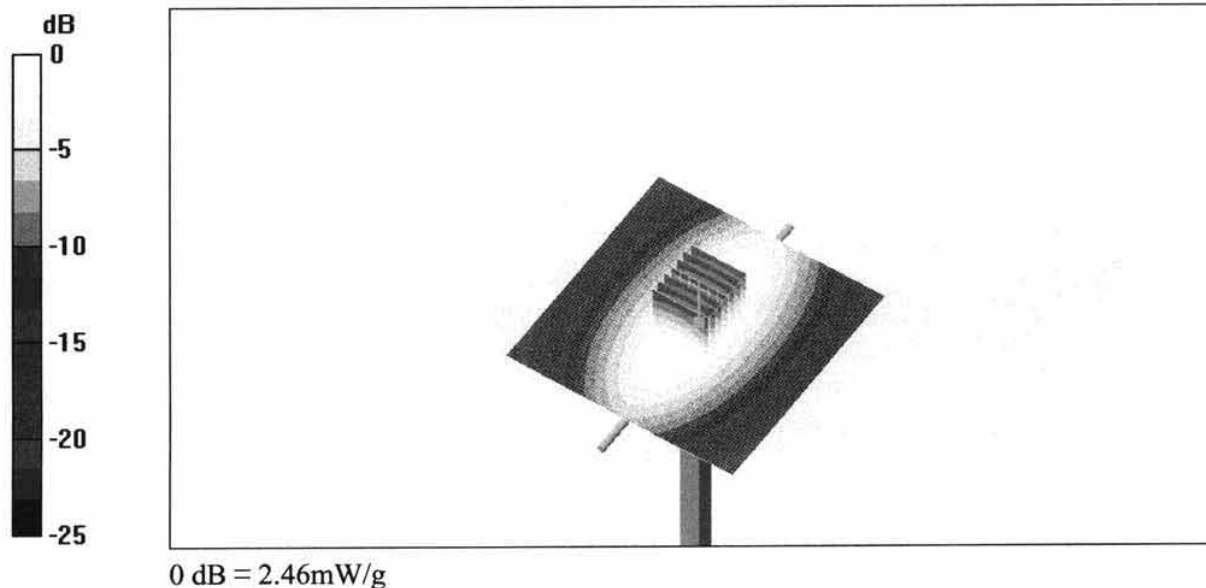
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 3.32 W/kg

SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.49 mW/g

Maximum value of SAR (measured) = 2.46 mW/g



DASY4 Validation Report for Body TSL

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

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: MSL 900 MHz;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1.01 \text{ mho/m}$; $\epsilon_r = 54.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

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

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

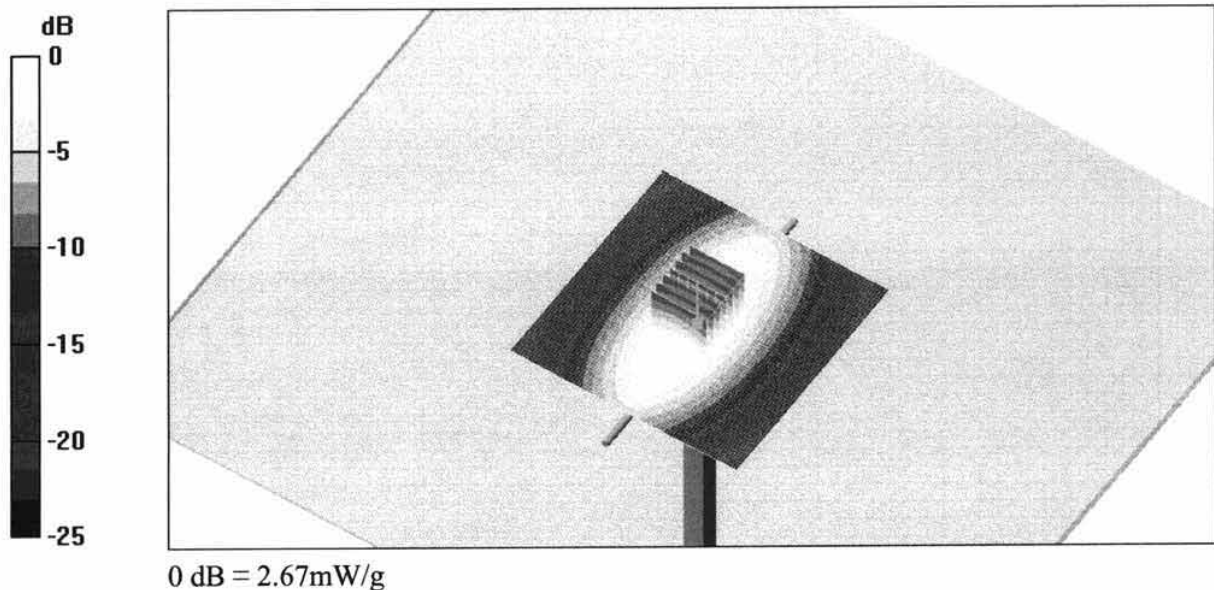
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 53.7 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 3.56 W/kg

SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.62 mW/g

Maximum value of SAR (measured) = 2.67 mW/g



Client

Nokia Salo TCC

CALIBRATION CERTIFICATE

Object(s) D1900V2 - SN:5d013

Calibration procedure(s) QA CAL-05.v2
Calibration procedure for dipole validation kits

Calibration date: July 13, 2004

Condition of the calibrated item In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	US37292783	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Oct 05

Calibrated by:	Name Judith Mueller	Function Technician	Signature 
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: July 15, 2004

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN5d013

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

Medium: HSL 1900 MHz;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.96, 4.96, 4.96); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn903; Calibrated: 2/19/2004
- Phantom: Flat Phantom quarter size; Type: QD000P50AA; Serial: SN:1002;
- Measurement SW: DASY4, V4.3 Build 8; Postprocessing SW: SEMCAD, V1.8 Build 117

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

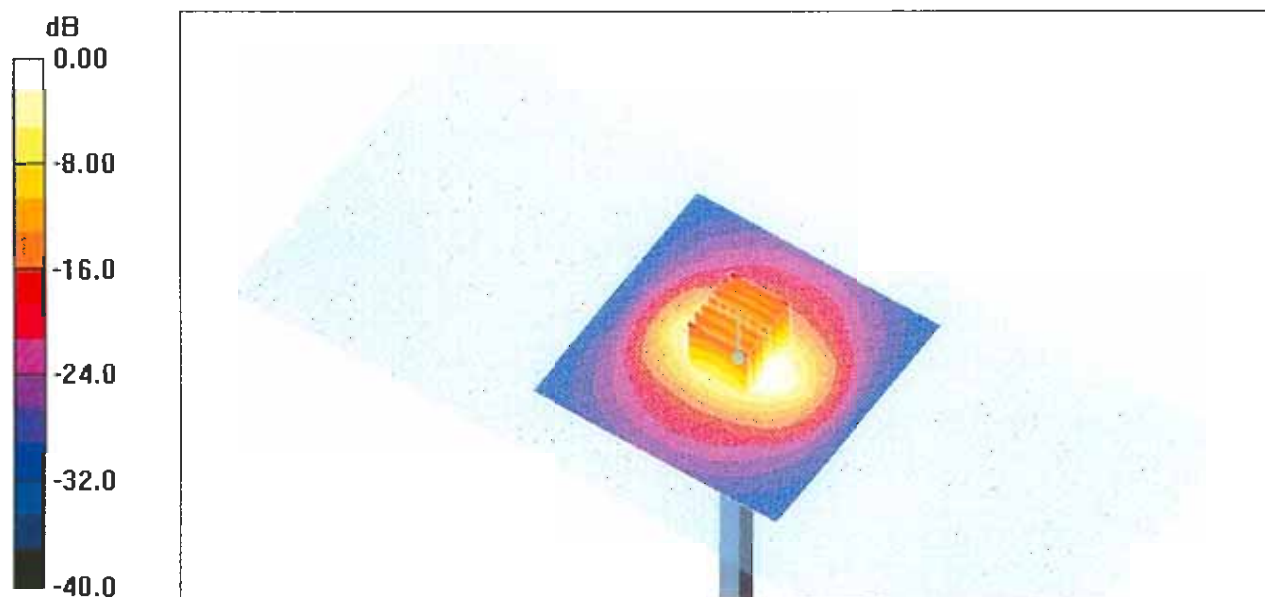
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.6 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 17.9 W/kg

SAR(1 g) = 10 mW/g; SAR(10 g) = 5.24 mW/g

Maximum value of SAR (measured) = 11.4 mW/g



0 dB = 11.4mW/g

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN5d013

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

Medium: Muscle 1900 MHz;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.58$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.57, 4.57, 4.57); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn903; Calibrated: 2/19/2004
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006;
- Measurement SW: DASY4, V4.3 Build 8; Postprocessing SW: SEMCAD, V1.8 Build 117

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.0 mW/g

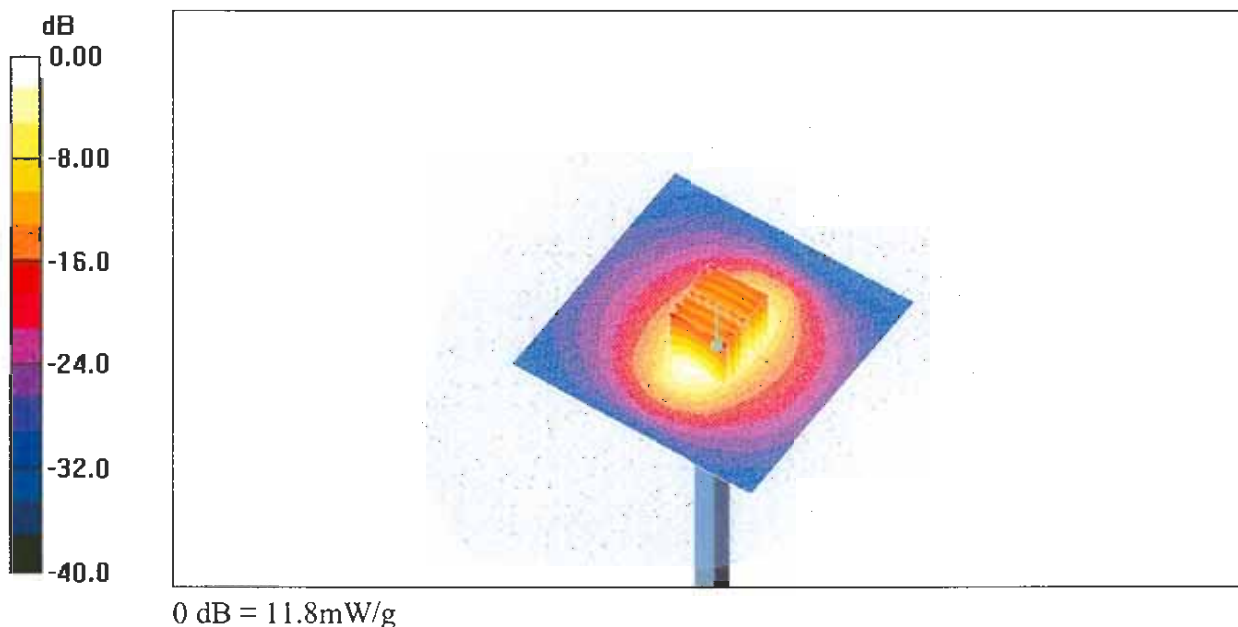
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 82.5 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 18.9 W/kg

SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.41 mW/g

Maximum value of SAR (measured) = 11.8 mW/g



Client Nokia DK

CALIBRATION CERTIFICATE

Object(s) D2450V2 - SN:750

Calibration procedure(s) QA CAL-05.v2
Calibration procedure for dipole validation kits

Calibration date: June 7, 2004

Condition of the calibrated item In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	US37292783	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Oct 05

Calibrated by:	Name Judith Mueller	Function Technician	Signature 
Approved by:	Katja Pokovic	Laboratory Director	
			Date issued: June 14, 2004

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN750

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL 2450 MHz;

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.86$ mho/m; $\epsilon_r = 38.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.55, 4.55, 4.55); Calibrated: 9/29/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn411; Calibrated: 11/6/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006;
- Measurement SW: DASY4, V4.2 Build 54; Postprocessing SW: SEMCAD, V1.8 Build 112

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 88.8 V/m; Power Drift = 0.0 dB

Maximum value of SAR (interpolated) = 15.3 mW/g

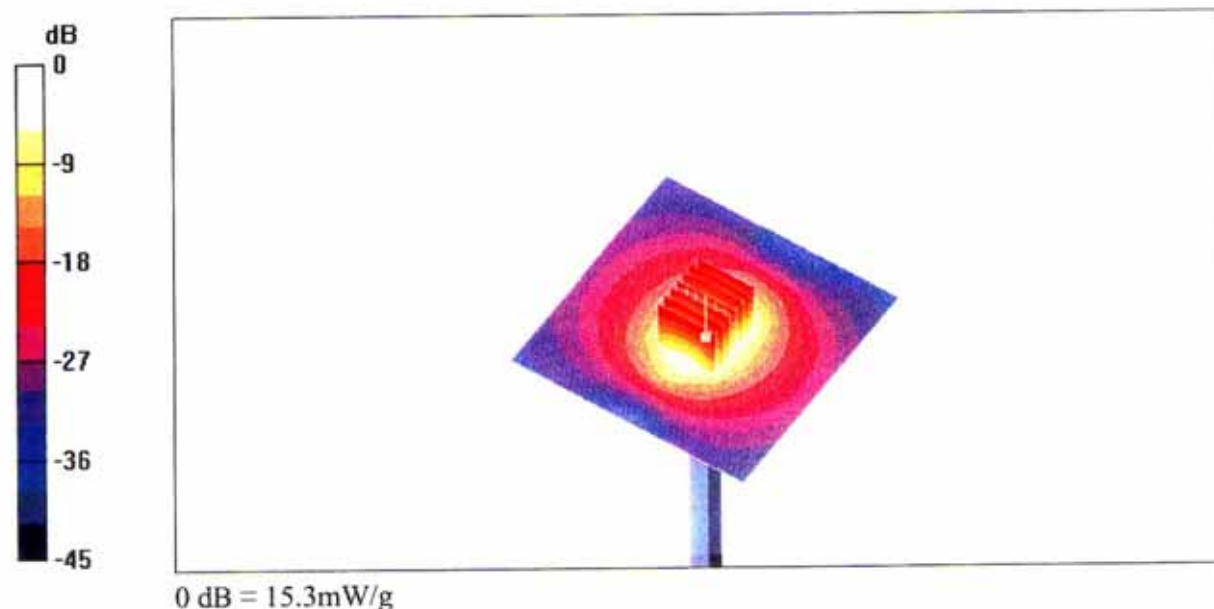
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.8 V/m; Power Drift = 0.0 dB

Maximum value of SAR (measured) = 15.3 mW/g

Peak SAR (extrapolated) = 29.5 W/kg

SAR(1 g) = 13.5 mW/g; SAR(10 g) = 6.15 mW/g



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

Client **Nokia DK**

CALIBRATION CERTIFICATE

Object(s) **D2450V2 - SN:750**

Calibration procedure(s) **QA CAL-05.v2**
Calibration procedure for dipole validation kits

Calibration date: **June 7, 2004**

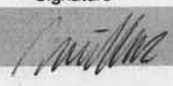
Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

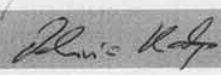
This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	US37292783	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Oct 05

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	

Approved by:	Katja Pokovic	Laboratory Director	
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Date issued: June 14, 2004

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

1. Measurement Conditions

The measurements were performed in the quarter size flat phantom filled with **body simulating solution** of the following electrical parameters at 2450 MHz:

Relative Dielectricity	51.7	$\pm 5\%$
Conductivity	1.96 mho/m	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ES3DV2 (SN:3025, Conversion factor 4.22 at 2450 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the quarter size flat phantom and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. Lossless spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was $250\text{mW} \pm 3\%$. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ES3DV2 SN:3025 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	49.2 mW/g $\pm 16.8\%$ ($k=2$)¹
averaged over 10 cm^3 (10 g) of tissue:	22.7 mW/g $\pm 16.2\%$ ($k=2$)¹

¹ validation uncertainty

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN750

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: Muscle 2450 MHz;

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 51.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.22, 4.22, 4.22); Calibrated: 9/29/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 7/22/2004
- Phantom: Flat Phantom quarter size; Type: QD000P50AA; Serial: SN:1001;
- Measurement SW: DASY4, V4.3 Build 17; Postprocessing SW: SEMCAD, V1.8 Build 124

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.1 mW/g

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

Reference Value = 83.9 V/m; Power Drift = 0.1 dB

Peak SAR (extrapolated) = 25.2 W/kg

SAR(1 g) = 12.3 mW/g; SAR(10 g) = 5.67 mW/g

Maximum value of SAR (measured) = 14.2 mW/g

