

SAR Compliance Test Report

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Tested device:	RD-7		
FCC ID:	PYARD-7	IC:	661V-RD7
Supplement reports:	Salo_SAR_0914_05		
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 Technique		
Documentation:	The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.		
Test results:	The tested device complies with the requirements in respect of all parameters subject to the test. The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.		
Date and signatures:			
For the contents:			

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2008-12-18 to 2009-03-31
SN, HW and SW numbers of tested device	SN: 004401/10/389954/4, HW: 1.2, SW: 1.4, DUT: 13324
Batteries used in testing	-
Headsets used in testing	-
Other accessories used in testing	USB Cable, Type: CA-150D, DUT: 13325 Laptop, Type: R52, 1860, SN: GU0956093331, DUT: 13348 Laptop, Type: Amilo Notebook Pa 3553, SN: DWPD011412, DUT: 13612
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

The maximum measured SAR values for Body Worn configuration are given in section 1.2.1. 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 Body Worn Configuration

Mode	Ch / f (MHz)	Conducted power	Separation distance	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
1-slot GPRS850	251 / 848.8	29.0 dBm	0.5 cm	0.961 W/kg	1.08 W/kg	1.6 W/kg	PASSED
WCDMA850	4175 / 835.0	20.0 dBm	0.5 cm	0.938 W/kg	1.05 W/kg	1.6 W/kg	PASSED
2-slot GPRS1900	810 / 1909.8	23.5 dBm	0.5 cm	0.710 W/kg	0.80 W/kg	1.6 W/kg	PASSED

*SAR values are scaled up by 12% to cover measurement drift. As a consequence of this upwards correction of the SAR values, the contribution of measurement drift to the overall measurement uncertainty (Section 6) is reduced to zero.

1.2.2 Maximum Drift

Maximum drift covered by 12% scaling up of the SAR values	Maximum drift during measurements
0.5dB	0.36 dB

1.2.3 Measurement Uncertainty

Expanded Uncertainty (k=2) 95%	± 25.8%
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2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	General population / uncontrolled

Modes of Operation	Bands	Modulation Mode	Duty Cycle	Transmitter Frequency Range (MHz)
GPRS	850 1900	GMSK	1/8 to 2/8	824 – 849 1850 – 1910
EGPRS	850 1900	GMSK / 8PSK	1/8 to 2/8	824 – 849 1850 – 1910
WCDMA	850 (Band V)		1	826 – 847

Outside of USA and Canada, the transmitter of the device is capable of operating also in GPRS/EGPRS900, GSM/GPRS/EGPRS1800 and WCDMA2100 bands which are not part of this filing.

8PSK EGPRS mode was not measured, because maximum averaged output power is lower in 8PSK EGPRS mode than in GPRS mode.

This is a WCDMA HSUPA device. SAR tests for HSUPA mode have not been performed because none of the HSUPA Sub-test modes has an average power > 0.25dB above the basic WCDMA 12.2kbps RMC mode. A report detailing the conducted HSUPA average power values is submitted separately and summary values are presented in Appendix C.

2.1 Description of the Antenna

The device has an internal antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	19.9 to 22.9
Ambient humidity (RH %):	32 to 45

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.

The transmission mode of the device in all WCDMA tests was configured to 12.2kbps RMC with all TPC bits set as “1”.

When testing GPRS modes, comparative 1-slot and 2-slot SAR measurements are initially made for the same test configuration and the same frequency to determine which mode has the highest SAR value i.e. the highest average power. These comparative tests are extremely accurate in finding the highest average power mode as the device does not change its position or frequency during these tests. Once the higher average power/highest SAR mode had been determined, full SAR testing then took place in the identified mode. When inspecting the conducted power levels given in the Results tables (Section 7) to identify the maximum SAR case, allowance must be made for the number of transmit slots.

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(s) as used for SAR testing. The results are given in the EMC report supporting this application.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

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

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE 4	555	12 months	2009-11
DAE 4	793	12 months	2009-04
E-field Probe ES3DV3	3165	12 months	2009-04
E-field Probe ES3DV3	3131	12 months	2010-02
Dipole Validation Kit, D835V2	480	24 months	2009-05
Dipole Validation Kit, D1900V2	5d030	24 months	2010-01
DASY4 software	Version 4.7	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	SML03	101265	12 months	2009-07
Amplifier	ZHL-42 (SMA)	N072095-5	12 months	2009-07
Power Meter	NRVS	849305/028	12 months	2009-07
Power Sensor	NRV-Z32	839176/020	12 months	2009-07
Call Tester	CMU 200	101111	-	-
Call Tester	CMU 200	103293	-	-
Vector Network Analyzer	8753E	US38432928	12 months	2009-07
Dielectric Probe Kit	85070B	US33020420	-	-

4.1.1 Isotropic E-field Probe Type ES3DV3

Construction	Symmetrical design with triangular core Interleaved sensors 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 4 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 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: 20 mm Body diameter: 12 mm Tip diameter: 3.9 mm Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 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 checks and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2003.

System checking and body SAR testing were performed using 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 recipe(s) were used for Head and Body tissue simulant(s):

800MHz band

Ingredient	Body (% by weight)
Deionised Water	69.25
Tween 20	30.00
Salt	0.75

1900MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	54.50	70.25
Tween 20	45.23	29.41
Salt	0.27	0.34

4.3.2 System Checking

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

System checking, head tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
1900	Reference result	10.2	38.5	1.46	21.0
	$\pm 10\%$ window	9.2 – 11.2			
	2009-03-31	10.6	39.4	1.41	

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
835	Reference result	2.48	53.0	0.98	
	$\pm 10\%$ window	2.23 – 2.73			
	2008-12-18	2.52	53.5	0.99	21.0
	2008-12-22	2.54	53.6	0.99	21.0
	2009-03-04	2.52	52.9	0.99	21.0
	2009-03-31	2.51	53.2	1.00	21.0
1900	Reference result	9.62	53.1	1.54	
	$\pm 10\%$ window	8.66 – 10.58			
	2008-12-18	9.61	52.3	1.53	21.0
	2008-12-23	9.94	51.8	1.53	21.0
	2009-03-06	9.93	51.7	1.55	21.0

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

4.3.3 Tissue Simulants used in the Measurements

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ϵ_r	σ [S/m]	
835	Recommended value	55.2	0.97	
	$\pm 5\%$ window	52.4 – 58.0	0.92 – 1.02	
	2008-12-18	53.5	0.99	21.0
	2008-12-22	53.6	0.99	21.0
	2009-03-31	53.2	1.00	21.0
836	Recommended value	55.2	0.97	
	$\pm 5\%$ window	52.4 – 58.0	0.92 – 1.02	
	2008-12-18	53.5	0.99	21.0
	2008-12-22	53.6	0.99	21.0
	2009-03-04	52.9	0.99	21.0
	2009-03-31	53.2	1.00	21.0
1880	Recommended value	53.3	1.52	
	$\pm 5\%$ window	50.6 – 56.0	1.44 – 1.60	
	2008-12-18	52.3	1.51	21.0
	2008-12-23	51.8	1.51	21.0
	2009-03-06	51.8	1.54	21.0
	2009-03-31	52.0	1.52	21.0

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

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



Device holder supplied by SPEAG

5.2 Test Positions

5.2.1 Body Worn Configuration

The device was placed below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance of 0.5 cm using a flat spacer that was removed before starting the measurements. The device was oriented with all five sides facing the phantom to find the highest result. One each of the horizontal and vertical orientations were tested with the device directly connected to the relevant USB port of a laptop computer positioned against the phantom; the other horizontal and vertical orientations and the tip position were tested with the device connected to the laptop computer using the Nokia Connectivity Cable CA-150 which is supplied in the sales package with the device.

5.3 Scan Procedures

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

5.4 SAR Averaging Methods

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

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

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

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

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

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

7. RESULTS

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

850MHz Body SAR results

Spacer used	Device orientation	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
1-slot GPRS		Conducted Power	29.0 dBm	29.0 dBm	29.0 dBm
0.5cm	Side 1 facing phantom	Dongle in USB slot of the laptop	-	0.633	-
	Side 4 facing phantom		-	0.337	-
	Side 2 facing phantom	Dongle connected with CA-150 cable to the laptop	0.707	0.902	0.961
	Side 3 facing phantom		-	0.319	-
	Side 5 facing phantom		-	0.171	-
2-slot GPRS		Conducted Power	-	26.0 dBm	-
0.5cm	Side 1 facing phantom	Dongle in USB slot of the laptop	-	0.625	-
	Side 4 facing phantom		-	-	-
	Side 2 facing phantom	Dongle connected with CA-150 cable to the laptop	-	-	-
	Side 3 facing phantom		-	-	-
	Side 5 facing phantom		-	-	-
Spacer used	Device orientation	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 4132 826.4 MHz	Ch 4175 835.0 MHz	Ch 4233 846.6 MHz
WCDMA		Conducted Power	20.0 dBm	20.0 dBm	20.0 dBm
0.5cm	Side 1 facing phantom	Dongle in USB slot of the laptop	-	-	-
	Side 4 facing phantom		-	-	-
	Side 2 facing phantom	Dongle connected with CA-150 cable to the laptop	0.805	0.938	0.838
	Side 3 facing phantom		-	-	-
	Side 5 facing phantom		-	0.144	-

850MHz Single-point Body SAR results

Spacer used	Device orientation	Test configuration	Maximum value of interpolated SAR from area scan (W/kg)		
			Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
1-slot GPRS		Conducted Power	-	-	29.0 dBm
0.5 cm	Side 2 facing phantom	Dongle connected with CA-150 cable to the laptop	-	-	1.05
1.0 cm			-	-	0.474
1.5 cm			-	-	-
2.0 cm			-	-	-
2.5 cm			-	-	-

1900MHz Body SAR results

Spacer used	Device orientation	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
1-slot GPRS		Conducted Power	-	25.5 dBm	-
0.5cm	Side 1 facing phantom	Dongle in USB slot of the laptop	-	0.436	-
	Side 4 facing phantom		-	-	-
	Side 2 facing phantom	Dongle connected with CA-150 cable to the laptop	-	-	-
	Side 3 facing phantom		-	-	-
	Side 5 facing phantom		-	-	-
2-slot GPRS		Conducted Power	23.5 dBm	23. 5 dBm	23.5 dBm
0.5cm	Side 1 facing phantom	Dongle in USB slot of the laptop	-	0.547	-
	Side 4 facing phantom		-	0.494	-
	Side 2 facing phantom	Dongle connected with CA-150 cable to the laptop	0.458	0.666	0.710
	Side 3 facing phantom		-	0.325	-
	Side 5 facing phantom		-	0.021	-

1900MHz Single-point Body SAR results

Spacer used	Device orientation	Test configuration	Maximum value of interpolated SAR from area scan (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
2-slot GPRS		Conducted Power	-	-	23.5 dBm
0.5 cm	Side 2 facing phantom	Dongle connected with CA-150 cable to the laptop	-	-	0.829
1.0 cm			-	-	0.320
1.5 cm			-	-	-
2.0 cm			-	-	-
2.5 cm			-	-	-

Plots of the Measurement scans are given in Appendix B.

APPENDIX A: SYSTEM CHECKING SCANS

Date/Time: 2009-03-31 08:53:35

Test Laboratory: TCC Nokia

Type: D1900V2; Serial: D1900V2 - SN:5d030

Communication System: CW1900

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL1900; Medium Notes: 20.3C

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.14, 5.14, 5.14); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 4; Type: Twin SAM 040 CA; Serial: TP-1018
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

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

Maximum value of SAR (interpolated) = 12.6 mW/g

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

Reference Value = 93.2 V/m

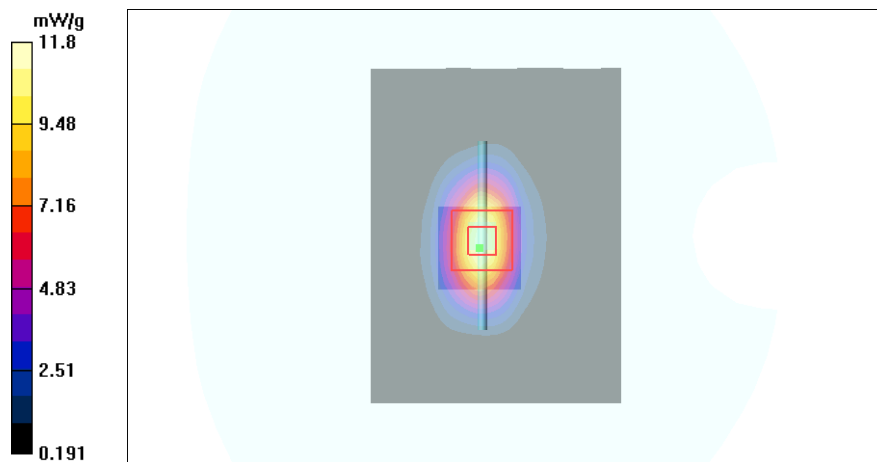
Peak SAR (extrapolated) = 19.9 W/kg

SAR(1 g) = 10.6 mW/g

SAR(10 g) = 5.46 mW/g

Power Drift = 0.003 dB

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



Date/Time: 2008-12-18 15:10:00

Test Laboratory: TCC Nokia

Type: D835V2; Serial: D835V2 - SN:480

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: 20.1 C

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.991 \text{ mho/m}$; $\epsilon_r = 53.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.75, 5.75, 5.75); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1449
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

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

Maximum value of SAR (interpolated) = 2.71 mW/g

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

Reference Value = 53.1 V/m

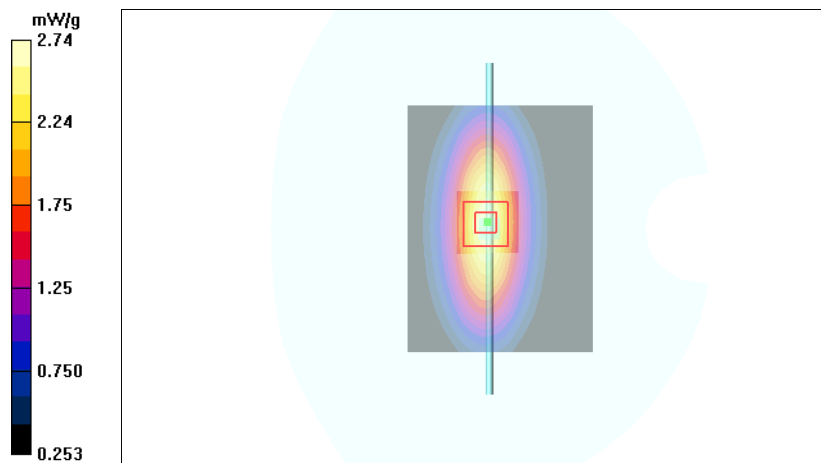
Peak SAR (extrapolated) = 3.76 W/kg

SAR(1 g) = 2.52 mW/g

SAR(10 g) = 1.66 mW/g

Power Drift = 0.000 dB

Maximum value of SAR (measured) = 2.74 mW/g



Date/Time: 2008-12-22 08:35:11

Test Laboratory: TCC Nokia

Type: D835V2; Serial: D835V2 - SN:480

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: 20.9 C

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.994 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.75, 5.75, 5.75); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1449
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

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

Maximum value of SAR (interpolated) = 2.72 mW/g

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

Reference Value = 53.1 V/m

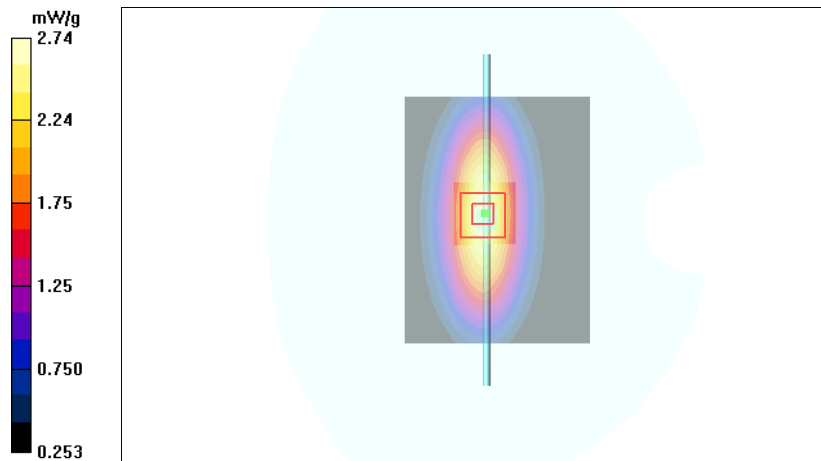
Peak SAR (extrapolated) = 3.77 W/kg

SAR(1 g) = 2.54 mW/g

SAR(10 g) = 1.66 mW/g

Power Drift = 0.009 dB

Maximum value of SAR (measured) = 2.74 mW/g



Date/Time: 2009-03-04 08:07:45

Test Laboratory: TCC Nokia
Type: D835V2; Serial: D835V2 - SN:480

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: 20.8 C

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.994 \text{ mho/m}$; $\epsilon_r = 52.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.64, 5.64, 5.64); Calibrated: 2009-02-12
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2008-11-07
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

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

Maximum value of SAR (interpolated) = 2.72 mW/g

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

Reference Value = 53.2 V/m

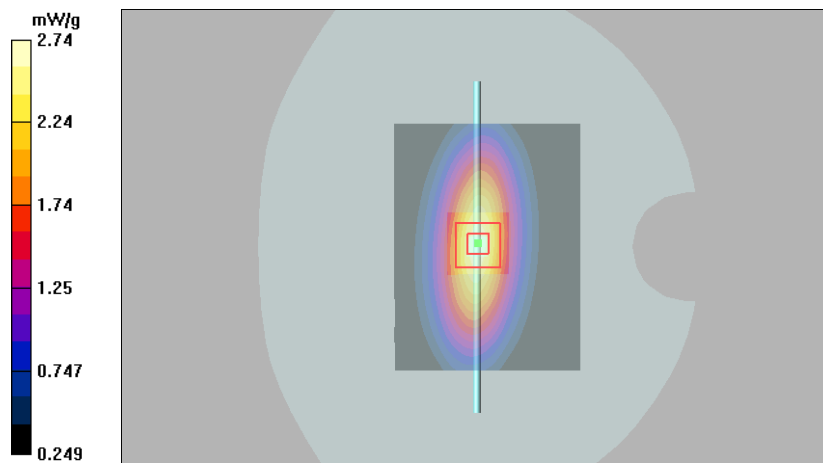
Peak SAR (extrapolated) = 3.77 W/kg

SAR(1 g) = 2.52 mW/g

SAR(10 g) = 1.65 mW/g

Power Drift = 0.001 dB

Maximum value of SAR (measured) = 2.74 mW/g



Date/Time: 2009-03-31 14:42:37

Test Laboratory: TCC Nokia
Type: D835V2; Serial: D835V2 - SN:480

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: t=20.6 C

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.998 \text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.64, 5.64, 5.64); Calibrated: 2009-02-12
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2008-11-07
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

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

Maximum value of SAR (interpolated) = 2.71 mW/g

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

Reference Value = 52.9 V/m

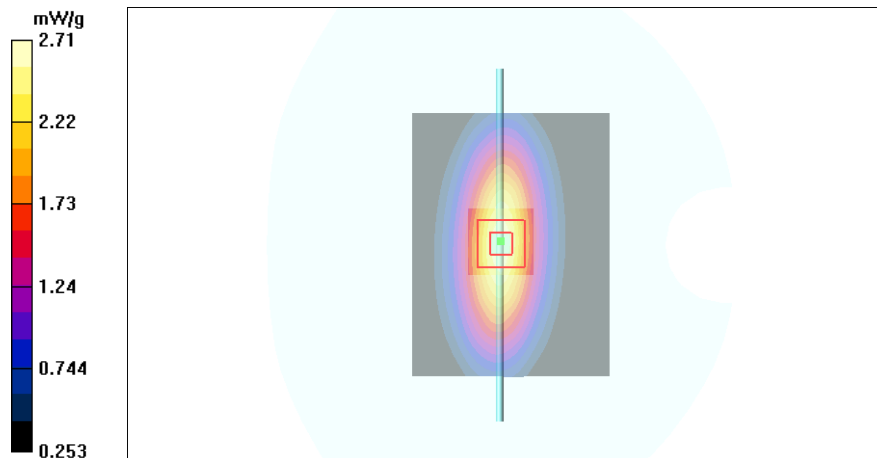
Peak SAR (extrapolated) = 3.74 W/kg

SAR(1 g) = 2.51 mW/g

SAR(10 g) = 1.64 mW/g

Power Drift = 0.006 dB

Maximum value of SAR (measured) = 2.71 mW/g



Date/Time: 2008-12-18 09:53:22

Test Laboratory: TCC Nokia

Type: D1900V2; Serial: D1900V2 - SN:5d030

Communication System: CW1900

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: 19.8 C

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1018
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

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

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

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

Reference Value = 81.9 V/m

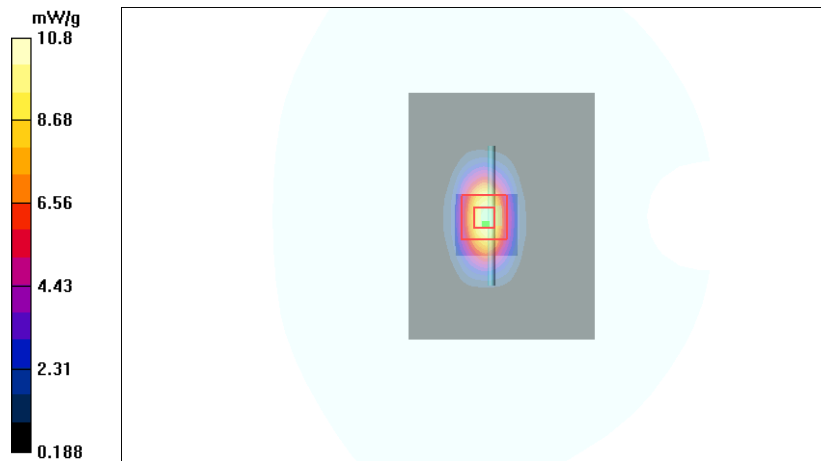
Peak SAR (extrapolated) = 17.9 W/kg

SAR(1 g) = 9.61 mW/g

SAR(10 g) = 4.96 mW/g

Power Drift = 0.001 dB

Maximum value of SAR (measured) = 10.8 mW/g



Date/Time: 2008-12-23 11:54:50

Test Laboratory: TCC Nokia

Type: D1900V2; Serial: D1900V2 - SN:5d030

Communication System: CW1900

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: 20.8 C

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

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

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

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

Reference Value = 84.9 V/m

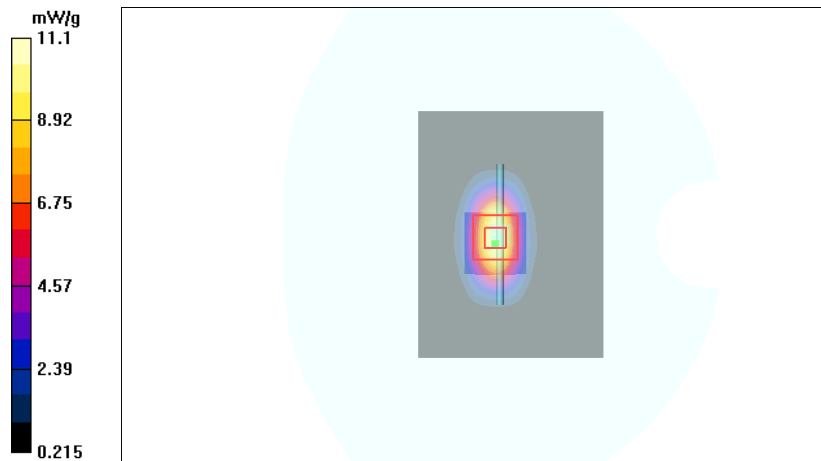
Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 9.94 mW/g

SAR(10 g) = 5.17 mW/g

Power Drift = -0.033 dB

Maximum value of SAR (measured) = 11.1 mW/g



Date/Time: 2009-03-06 09:54:53

Test Laboratory: TCC Nokia

Type: D1900V2; Serial: D1900V2 - SN:5d030

Communication System: CW1900

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t=20.2C

Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ϵ_r = 51.7; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

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

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

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

Reference Value = 84.3 V/m

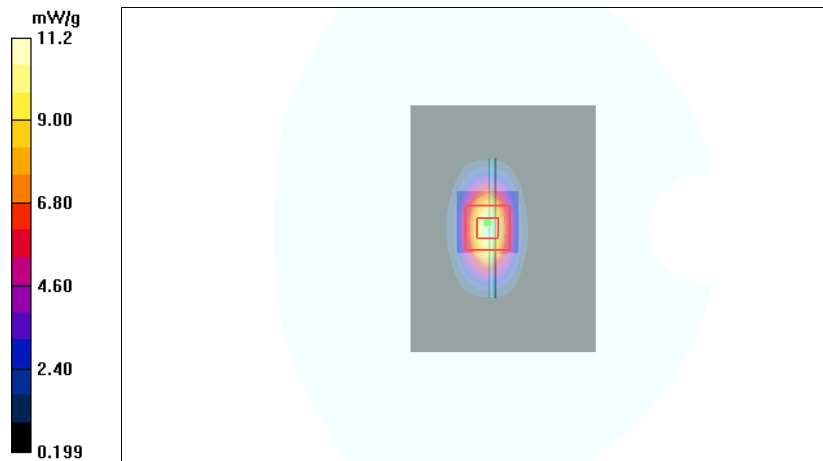
Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 9.93 mW/g

SAR(10 g) = 5.11 mW/g

Power Drift = 0.028 dB

Maximum value of SAR (measured) = 11.2 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 2008-12-18 16:14:44

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 1-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: BSL850; Medium Notes: 20.1 C

Medium parameters used: $f = 837 \text{ MHz}$; $\sigma = 0.991 \text{ mho/m}$; $\epsilon_r = 53.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.75, 5.75, 5.75); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1449
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – Middle - Spacer 0.5 cm - Without CA-150 cable - Side 1/Area Scan (101x131x1):

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

Maximum value of SAR (interpolated) = 0.683 mW/g

Body Measurement – Middle - Spacer 0.5 cm - Without CA-150 cable - Side 1/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 26.4 V/m

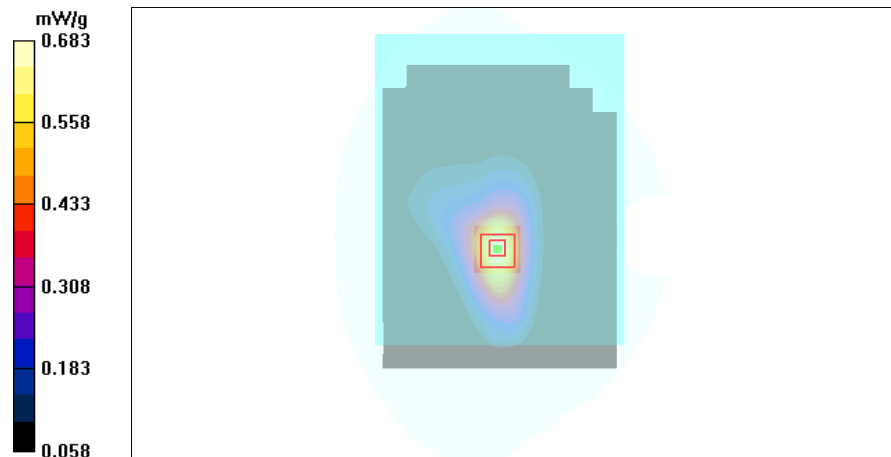
Peak SAR (extrapolated) = 0.934 W/kg

SAR(1 g) = 0.633 mW/g

SAR(10 g) = 0.415 mW/g

Power Drift = -0.162 dB

Maximum value of SAR (measured) = 0.683 mW/g



Date/Time: 2009-03-04 10:03:05

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 1-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: BSL850; Medium Notes: 20.8 C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.994$ mho/m; $\epsilon_r = 52.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.68, 5.68, 5.68); Calibrated: 2009-02-12
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2008-11-07
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement - Middle - Spacer 0.5 cm - Without CA-150 cable - Side 4/Area Scan (101x131x1):

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

Maximum value of SAR (interpolated) = 0.368 mW/g

Body Measurement - Middle - Spacer 0.5 cm - Without CA-150 cable - Side 4/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.8 V/m

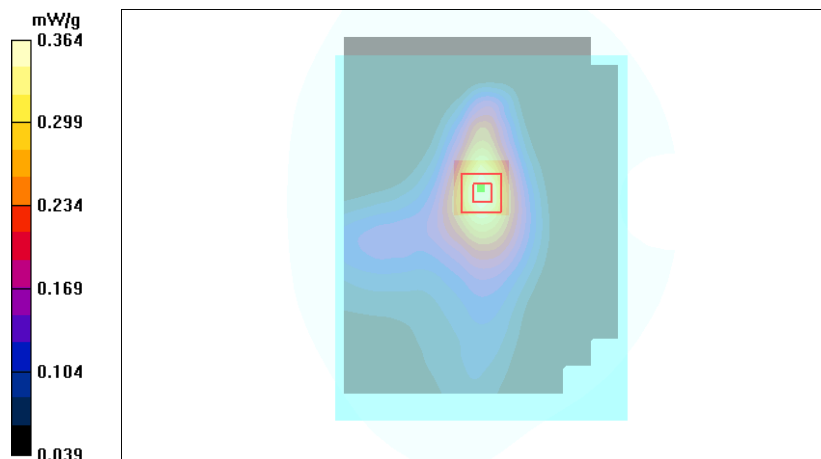
Peak SAR (extrapolated) = 0.490 W/kg

SAR(1 g) = 0.337 mW/g

SAR(10 g) = 0.228 mW/g

Power Drift = -0.264 dB

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



Date/Time: 2008-12-22 10:39:20

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 1-slot GPRS850

Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium: BSL850; Medium Notes: 20.7 C

Medium parameters used: $f = 849$ MHz; $\sigma = 1$ mho/m; $\epsilon_r = 53.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165

- ConvF(5.75, 5.75, 5.75); Calibrated: 2008-04-23

- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn793; Calibrated: 2008-04-30

- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1449

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – High - Spacer 0.5 cm - With CA-150 cable - Side 2/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Body Measurement – High - Spacer 0.5 cm - With CA-150 cable - Side 2/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.0 V/m

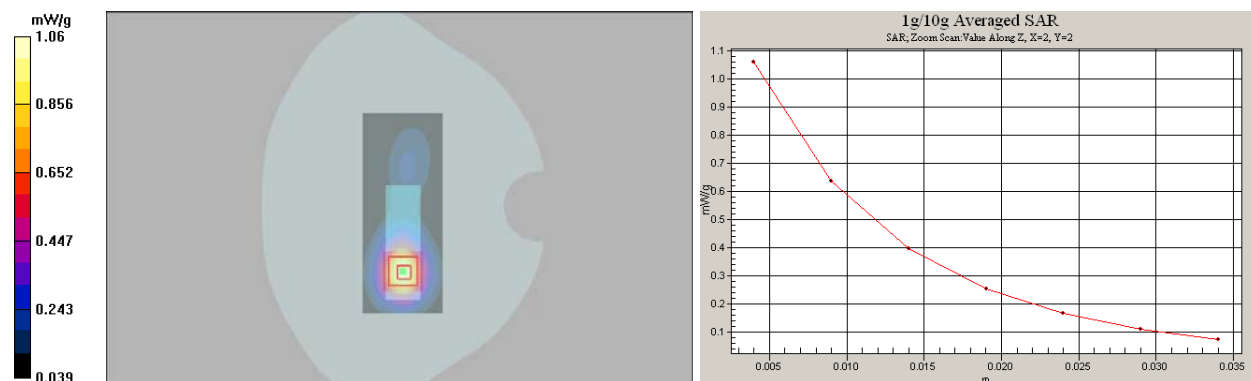
Peak SAR (extrapolated) = 1.68 W/kg

SAR(1 g) = 0.961 mW/g

SAR(10 g) = 0.552 mW/g

Power Drift = 0.038 dB

Maximum value of SAR (measured) = 1.06 mW/g



Date/Time: 2008-12-22 10:59:40

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 1-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: BSL850; Medium Notes: 20.7 C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.994$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.75, 5.75, 5.75); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1449
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – Middle - Spacer 0.5 cm - With CA-150 cable - Side 3/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.356 mW/g

Body Measurement – Middle - Spacer 0.5 cm - With CA-150 cable - Side 3/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 10.4 V/m

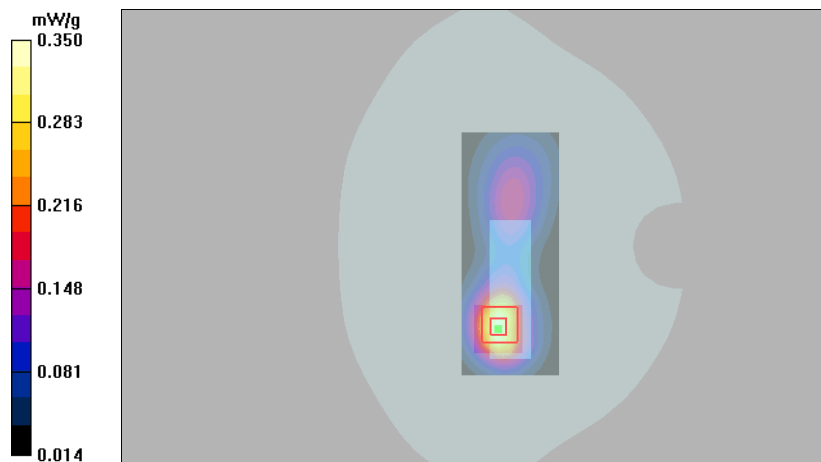
Peak SAR (extrapolated) = 0.544 W/kg

SAR(1 g) = 0.319 mW/g

SAR(10 g) = 0.185 mW/g

Power Drift = -0.087 dB

Maximum value of SAR (measured) = 0.350 mW/g



Date/Time: 2009-03-31 15:12:27

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 1-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: BSL850; Medium Notes: t=20.6 C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.998$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.64, 5.64, 5.64); Calibrated: 2009-02-12
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2008-11-07
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body - Middle - Spacer 0.5 cm - With CA-150 cable - Side 5/Area Scan (41x41x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.175 mW/g

Body - Middle - Spacer 0.5 cm - With CA-150 cable - Side 5/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 13.1 V/m

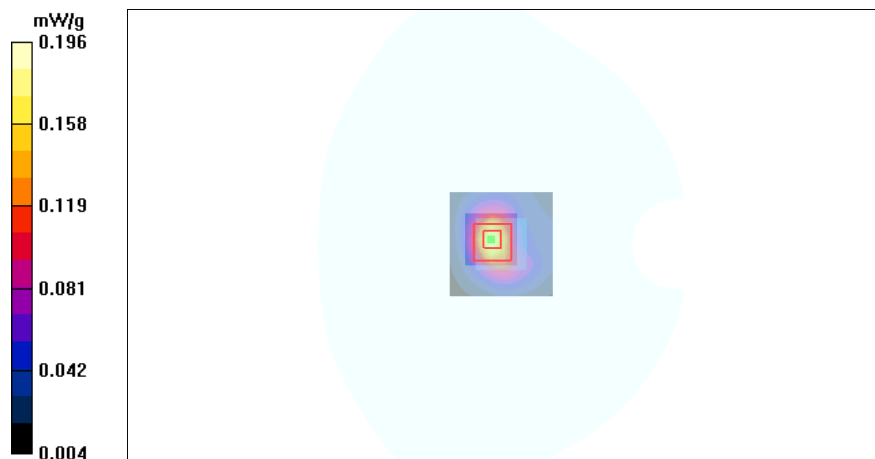
Peak SAR (extrapolated) = 0.369 W/kg

SAR(1 g) = 0.171 mW/g

SAR(10 g) = 0.086 mW/g

Power Drift = -0.189 dB

Maximum value of SAR (measured) = 0.196 mW/g



Date/Time: 2008-12-18 16:38:39

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 2-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:4.2

Medium: BSL850; Medium Notes: 20.1 C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.991$ mho/m; $\epsilon_r = 53.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.75, 5.75, 5.75); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1449
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – Middle - Spacer 0.5 cm - Without CA-150 cable - Side 1/Area Scan (101x131x1):

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

Maximum value of SAR (interpolated) = 0.681 mW/g

Body Measurement – Middle - Spacer 0.5 cm - Without CA-150 cable - Side 1/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 26.1 V/m

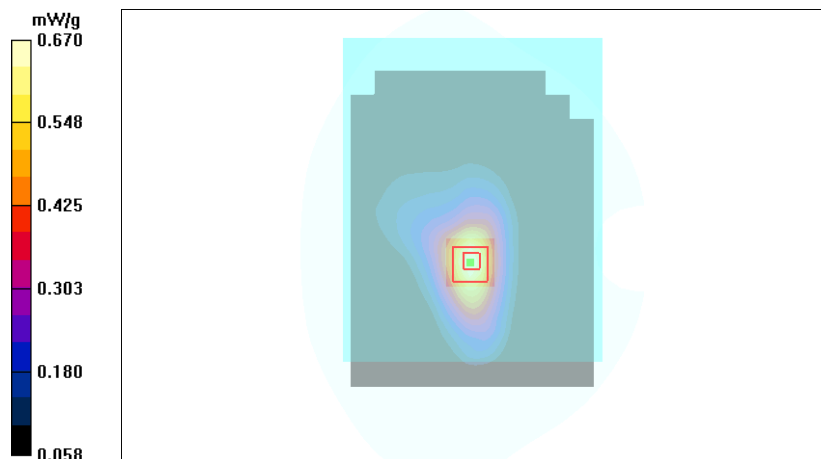
Peak SAR (extrapolated) = 0.903 W/kg

SAR(1 g) = 0.625 mW/g

SAR(10 g) = 0.413 mW/g

Power Drift = -0.044 dB

Maximum value of SAR (measured) = 0.670 mW/g



Date/Time: 2008-12-22 13:26:37

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: WCDMA850

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: 20.7 C

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.994 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165

- ConvF(5.75, 5.75, 5.75); Calibrated: 2008-04-23

- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn793; Calibrated: 2008-04-30

- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1449

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – Middle - Spacer 0.5 cm - With CA-150 cable - Side 2/Area Scan (41x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.02 mW/g

Body Measurement – Middle - Spacer 0.5 cm - With CA-150 cable - Side 2/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.4 V/m

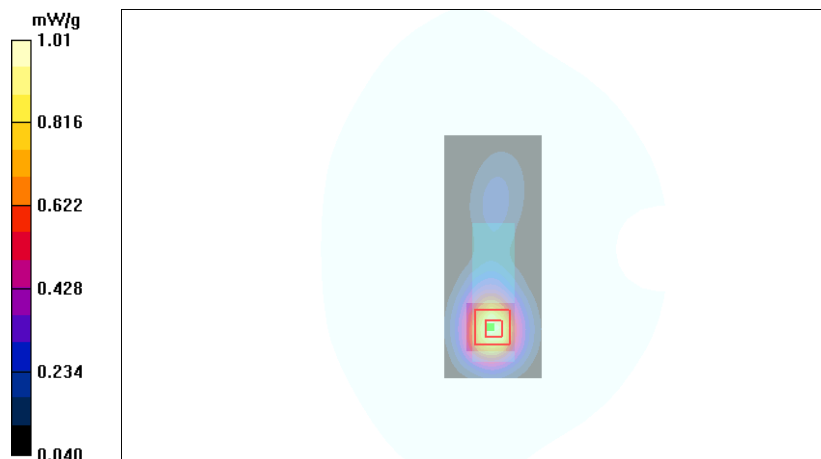
Peak SAR (extrapolated) = 1.63 W/kg

SAR(1 g) = 0.938 mW/g

SAR(10 g) = 0.543 mW/g

Power Drift = -0.083 dB

Maximum value of SAR (measured) = 1.01 mW/g



Date/Time: 2009-03-31 15:36:06

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: WCDMA850

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: t=20.6 C

Medium parameters used: f = 835 MHz; σ = 0.998 mho/m; ϵ_r = 53.2; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.64, 5.64, 5.64); Calibrated: 2009-02-12
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2008-11-07
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body - Middle - Spacer 0.5 cm - With CA-150 cable - Side 5/Area Scan (41x41x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.147 mW/g

Body - Middle - Spacer 0.5 cm - With CA-150 cable - Side 5/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 11.7 V/m

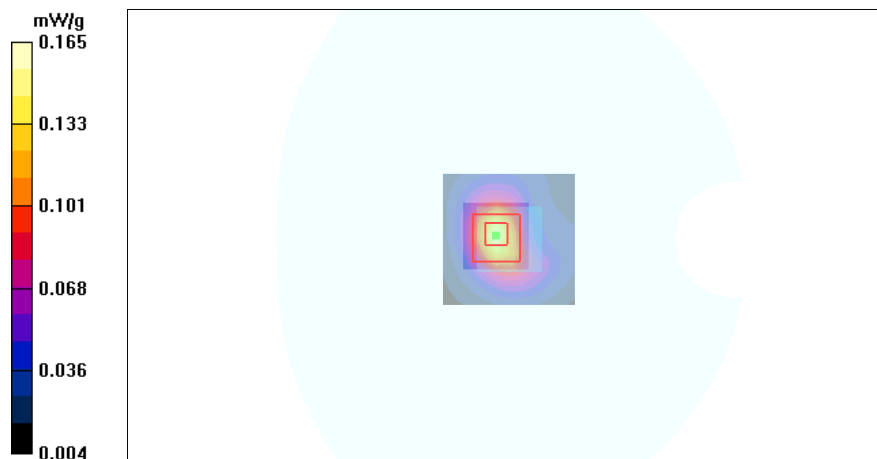
Peak SAR (extrapolated) = 0.290 W/kg

SAR(1 g) = 0.144 mW/g

SAR(10 g) = 0.075 mW/g

Power Drift = 0.001 dB

Maximum value of SAR (measured) = 0.165 mW/g



Date/Time: 2008-12-22 14:52:23

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 1-slot GPRS850

Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium: BSL850; Medium Notes: 20.7 C

Medium parameters used: $f = 849 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 53.5$; $\rho = 1000 \text{ kg/m}^3$

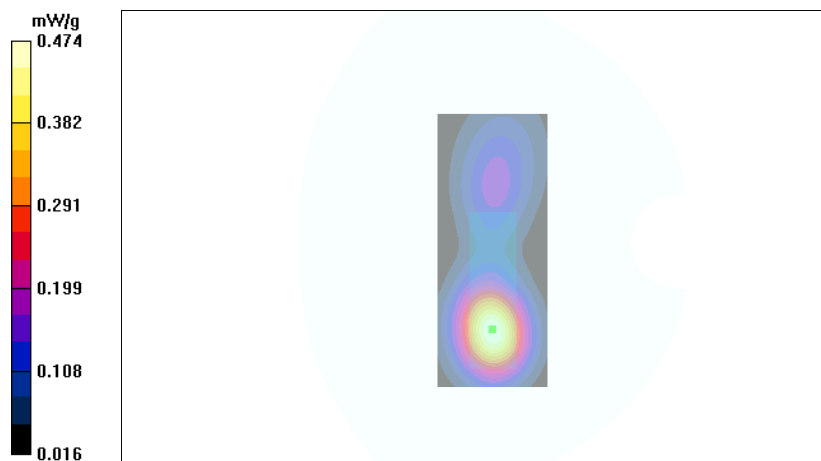
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.75, 5.75, 5.75); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1449
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – High - Spacer 1 cm - With CA-150 cable - Side 2/Area Scan (41x101x1): Measurement grid:
 $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.474 mW/g



Date/Time: 2008-12-22 10:39:20

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 1-slot GPRS850

Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium: BSL850; Medium Notes: 20.7 C

Medium parameters used: $f = 849 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 53.5$; $\rho = 1000 \text{ kg/m}^3$

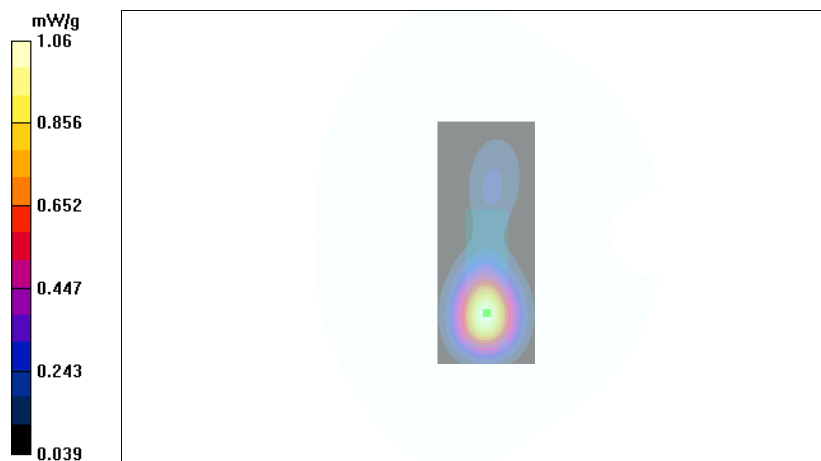
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.75, 5.75, 5.75); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1449
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – High - Spacer 0.5 cm - With CA-150 cable - Side 2/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

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



Date/Time: 2008-12-18 13:10:22

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 1-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: BSL1900; Medium Notes: 19.7 C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – Middle - Spacer 0.5 cm - Without CA-150 cable - Side 1/Area Scan (101x131x1):

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

Maximum value of SAR (interpolated) = 0.506 mW/g

Body Measurement – Middle - Spacer 0.5 cm - Without CA-150 cable - Side 1/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 11.8 V/m

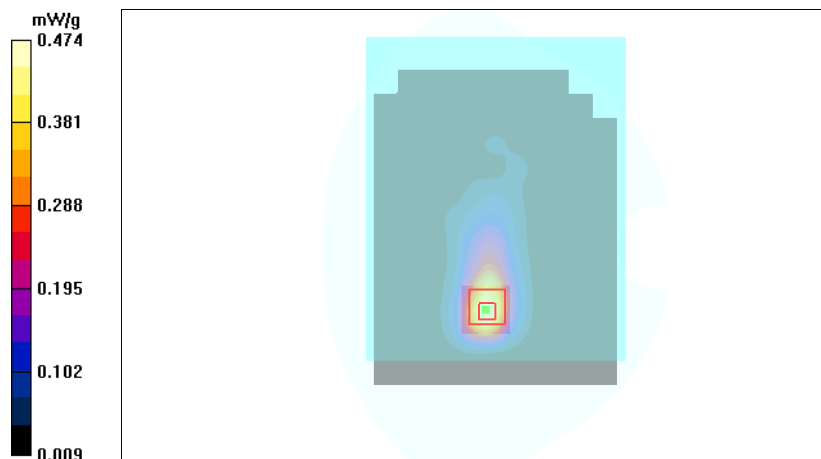
Peak SAR (extrapolated) = 0.721 W/kg

SAR(1 g) = 0.436 mW/g

SAR(10 g) = 0.251 mW/g

Power Drift = -0.082 dB

Maximum value of SAR (measured) = 0.474 mW/g



Date/Time: 2008-12-18 12:21:52

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 2-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium: BSL1900; Medium Notes: 19.7 C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – Middle - Spacer 0.5 cm - Without CA-150 cable - Side 1/Area Scan (81x131x1):

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

Maximum value of SAR (interpolated) = 0.629 mW/g

Body Measurement – Middle - Spacer 0.5 cm - Without CA-150 cable - Side 1/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 13.4 V/m

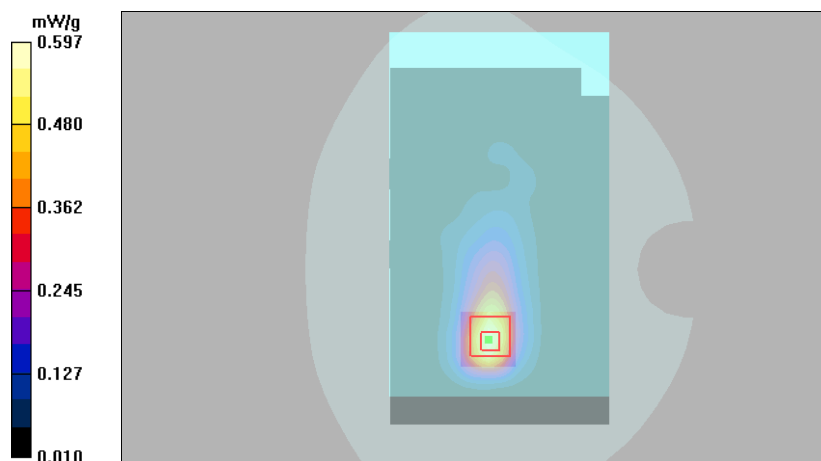
Peak SAR (extrapolated) = 0.916 W/kg

SAR(1 g) = 0.547 mW/g

SAR(10 g) = 0.315 mW/g

Power Drift = -0.042 dB

Maximum value of SAR (measured) = 0.597 mW/g



Date/Time: 2009-03-06 11:36:26

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 2-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium: BSL1900; Medium Notes: t=20.2C

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ϵ_r = 51.8; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement - Middle - Spacer 0.5 cm - Without CA-150 cable - Side 4/Area Scan (101x131x1):

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

Maximum value of SAR (interpolated) = 0.572 mW/g

Body Measurement - Middle - Spacer 0.5 cm - Without CA-150 cable - Side 4/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.4 V/m

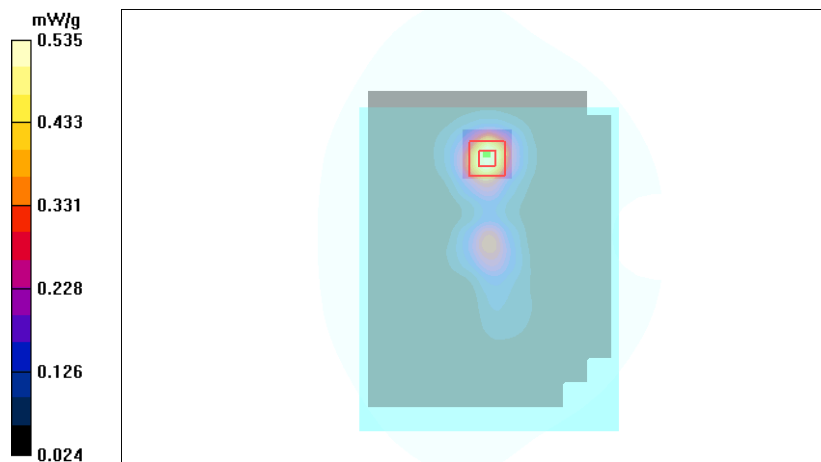
Peak SAR (extrapolated) = 0.846 W/kg

SAR(1 g) = 0.494 mW/g

SAR(10 g) = 0.277 mW/g

Power Drift = -0.054 dB

Maximum value of SAR (measured) = 0.535 mW/g



Date/Time: 2008-12-23 13:35:46

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 2-slot GPRS1900

Frequency: 1909.8 MHz; Duty Cycle: 1:4.2

Medium: BSL1900; Medium Notes: 20.8 C

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 51.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165

- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23

- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn793; Calibrated: 2008-04-30

- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – High - Spacer 0.5 cm - With CA-150 cable - Side 2/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Body Measurement – High - Spacer 0.5 cm - With CA-150 cable - Side 2/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 13.0 V/m

Peak SAR (extrapolated) = 1.42 W/kg

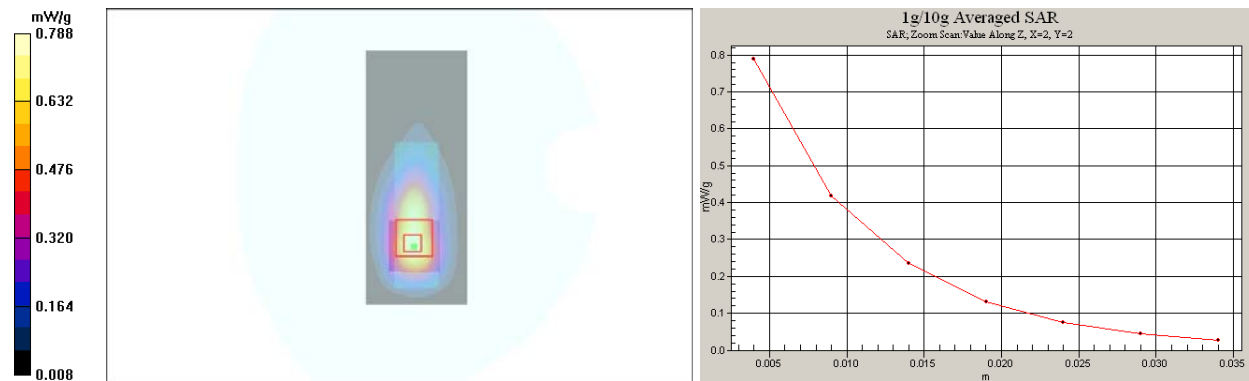
SAR(1 g) = 0.710 mW/g

SAR(10 g) = 0.391 mW/g

Power Drift = 0.017 dB

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) = 0.788 mW/g



Date/Time: 2008-12-23 12:50:58

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 2-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium: BSL1900; Medium Notes: 20.8 C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – Middle - Spacer 0.5 cm - With CA-150 cable - Side 3/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.361 mW/g

Body Measurement – Middle - Spacer 0.5 cm - With CA-150 cable - Side 3/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 10.6 V/m

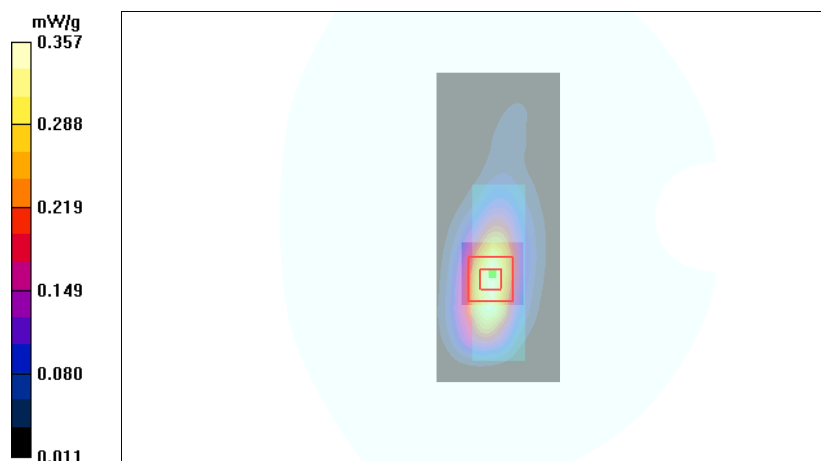
Peak SAR (extrapolated) = 0.551 W/kg

SAR(1 g) = 0.325 mW/g

SAR(10 g) = 0.185 mW/g

Power Drift = -0.009 dB

Maximum value of SAR (measured) = 0.357 mW/g



Date/Time: 2009-03-31 10:07:54

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 2-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium: BSL1900; Medium Notes: 20.3C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body - Middle - Spacer 0.5 cm - With CA-150 cable - Side 5/Area Scan (41x41x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.018 mW/g

Body - Middle - Spacer 0.5 cm - With CA-150 cable - Side 5/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 3.00 V/m

Peak SAR (extrapolated) = 0.033 W/kg

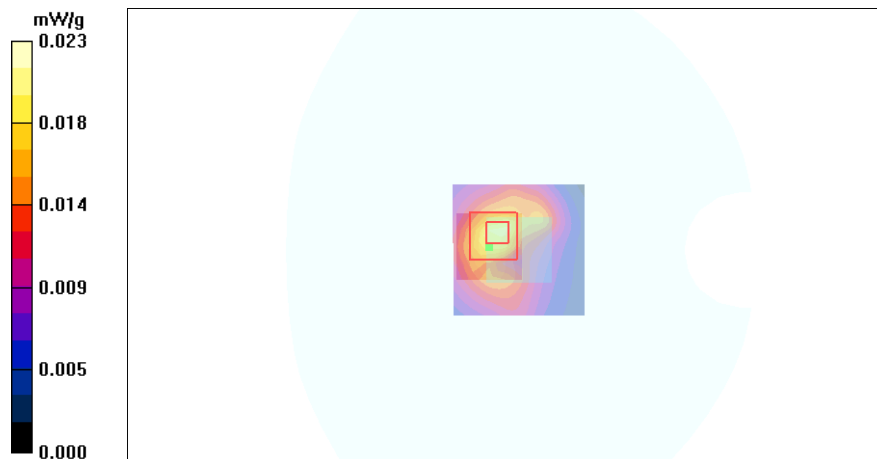
SAR(1 g) = 0.021 mW/g

SAR(10 g) = 0.012 mW/g

Power Drift = 0.387 dB

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) = 0.023 mW/g



Date/Time: 2008-12-23 13:35:46

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 2-slot GPRS1900

Frequency: 1909.8 MHz; Duty Cycle: 1:4.2

Medium: BSL1900; Medium Notes: 20.8 C

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 51.7$; $\rho = 1000$ kg/m³

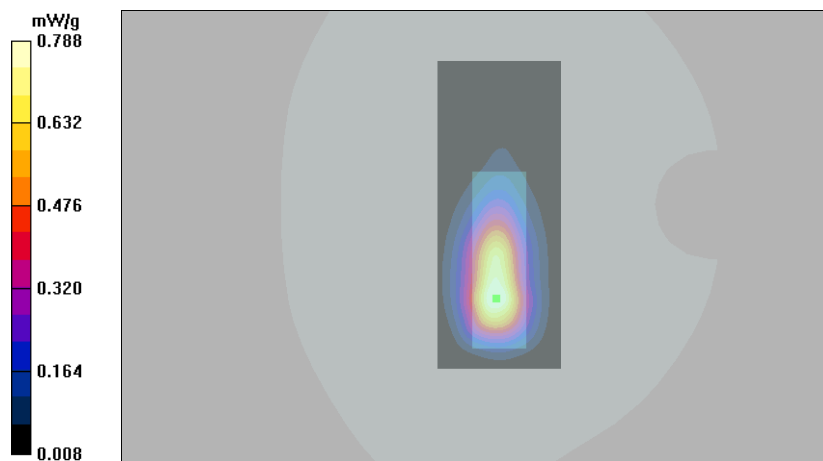
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – High - Spacer 0.5 cm - With CA-150 cable - Side 2/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

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



Date/Time: 2008-12-23 13:53:50

Test Laboratory: TCC Nokia

Type: RD-7; Serial: 004401/10/389954/4

Communication System: 2-slot GPRS1900

Frequency: 1909.8 MHz; Duty Cycle: 1:4.2

Medium: BSL1900; Medium Notes: 20.8 C

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 51.7$; $\rho = 1000$ kg/m³

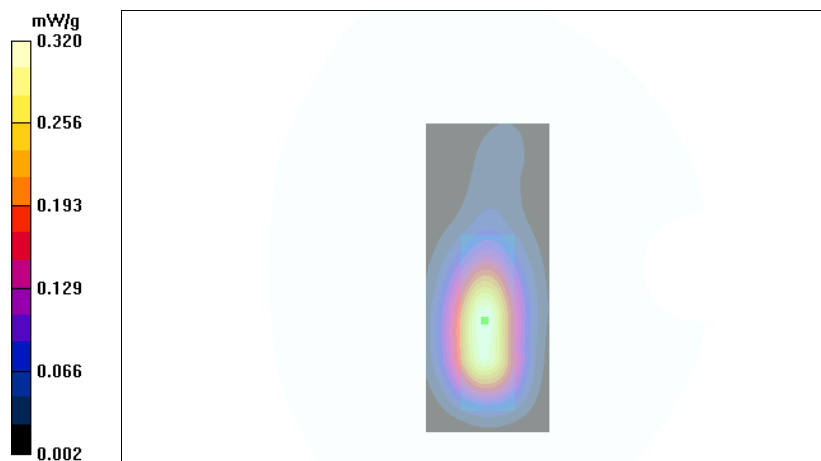
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3165
- ConvF(5.23, 5.23, 5.23); Calibrated: 2008-04-23
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE4 Sn793; Calibrated: 2008-04-30
- Phantom: SAM 3; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Body Measurement – High - Spacer 1.0 cm - With CA-150 cable - Side 2/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.320 mW/g



APPENDIX C: CONDUCTED AVERAGE POWER MEASUREMENTS FOR WCDMA AND HSUPA

Test Laboratory: Sporton Labs
Type: RD-7

C.1 WCDMA850 Test results

Average power

Ch / f [MHz]	P [dBm]
4132 / 826.4	20.66
4182 / 835.0	20.32
4233 / 846.6	20.38

C.2 HSUPA850 Test results

Average power

Ch / f [MHz]	P [dBm]				
	Subtest mode 1	Subtest mode 2	Subtest mode 3	Subtest mode 4	Subtest mode 5
4132 / 826.4	18.80	18.20	19.50	18.40	18.20
4182 / 835.0	18.30	17.60	19.00	18.00	17.90
4233 / 846.6	18.40	17.90	19.30	18.20	18.20

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Client **Nokia Salo TCC**

Certificate No: **ES3-3131_Feb09**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3131**

Calibration procedure(s) **QA CAL-01.v6 and QA CAL-23.v3**
Calibration procedure for dosimetric E-field probes

Calibration date: **February 12, 2009**

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 (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: February 12, 2009

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

DASY - Parameters of Probe: ES3DV3 SN:3131

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.36 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	94 mV
NormY	1.30 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	95 mV
NormZ	1.29 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SAR _{be} [%]	Without Correction Algorithm	9.2	5.4
SAR _{be} [%]	With Correction Algorithm	0.8	0.5

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SAR _{be} [%]	Without Correction Algorithm	9.2	5.6
SAR _{be} [%]	With Correction Algorithm	0.9	0.4

Sensor Offset

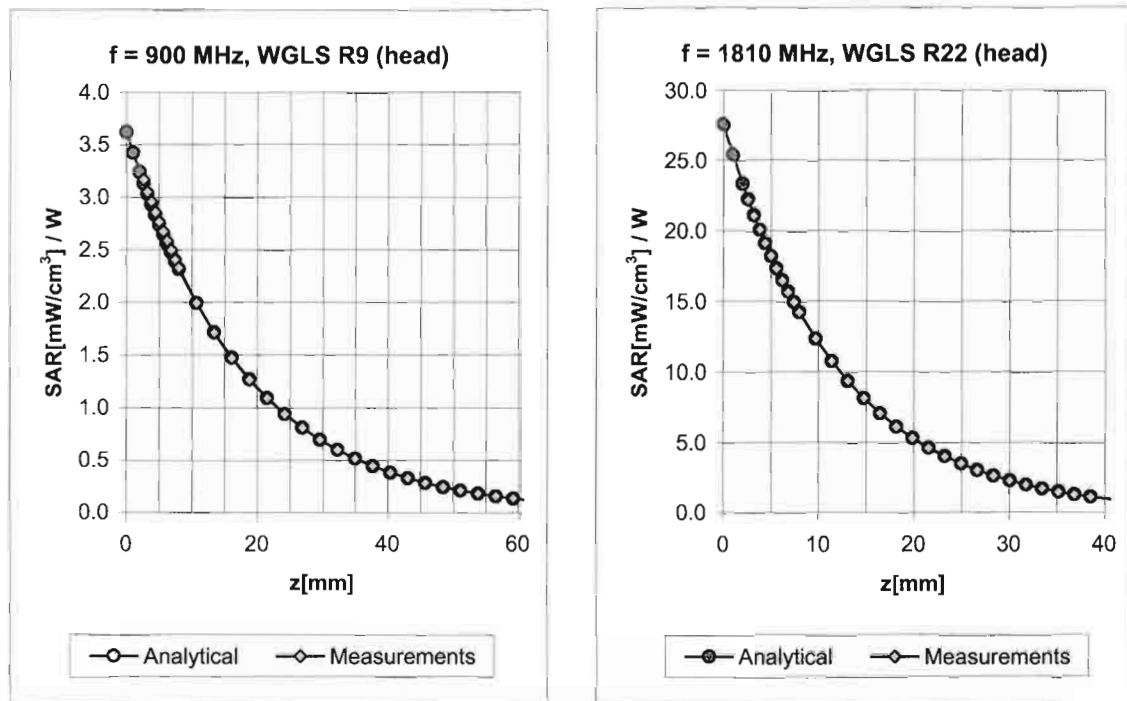
Probe Tip to Sensor Center **2.0 mm**

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.69	1.17	5.70 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.39	1.63	4.86 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.47	1.46	4.66 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.42	1.74	4.33 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.69	1.26	5.64 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.49	1.37	4.65 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.45	1.46	4.61 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	1.08	3.98 ± 11.0% (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.



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Client **Nokia Salo TCC**

Certificate No: **ES3-3165_Apr08**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3165**

Calibration procedure(s) **QA CAL-01.v6 and QA CAL-23.v3
Calibration procedure for dosimetric E-field probes**

Calibration date: **April 23, 2008**

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 (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	3-Sep-07 (No. DAE4-660_Sep07)	Sep-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: April 23, 2008

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

DASY - Parameters of Probe: ES3DV3 SN:3165

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.21 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	96 mV
NormY	1.10 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	92 mV
NormZ	1.13 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SAR _{be} [%]	Without Correction Algorithm	9.3	5.6
SAR _{be} [%]	With Correction Algorithm	0.7	0.5

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SAR _{be} [%]	Without Correction Algorithm	9.3	5.8
SAR _{be} [%]	With Correction Algorithm	0.9	0.5

Sensor Offset

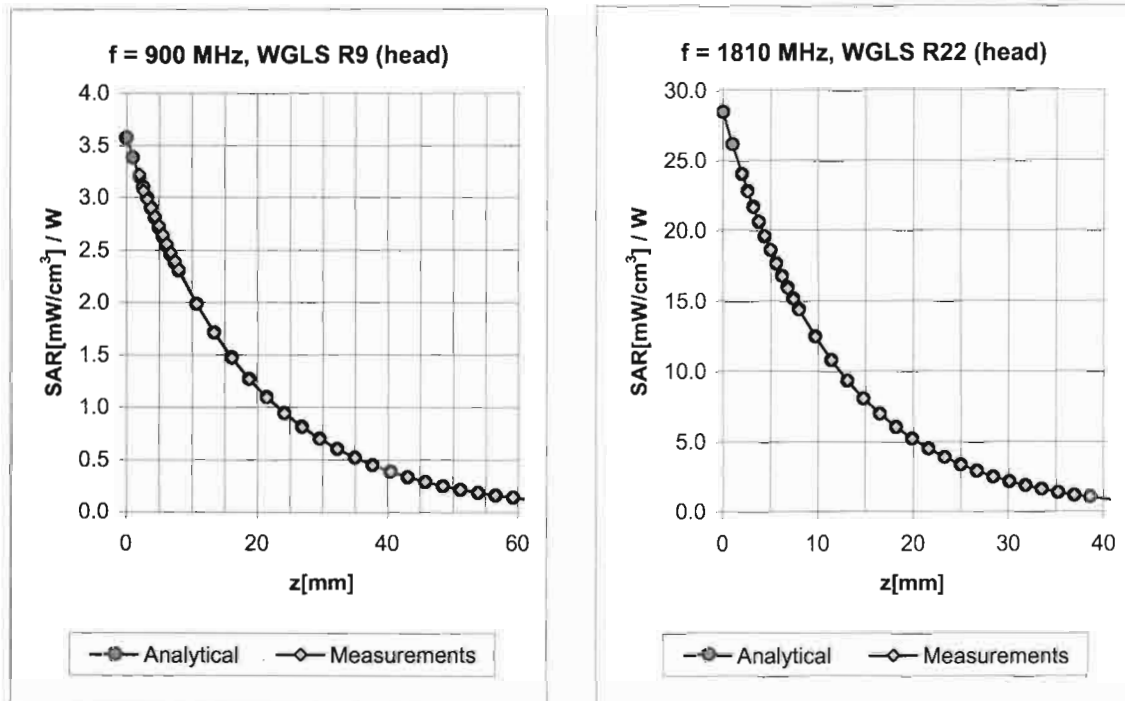
Probe Tip to Sensor Center **2.0 mm**

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	$\pm 50 / \pm 100$	Head	$41.5 \pm 5\%$	$0.97 \pm 5\%$	0.84	1.20	$6.23 \pm 11.0\% (k=2)$
1810	$\pm 50 / \pm 100$	Head	$40.0 \pm 5\%$	$1.40 \pm 5\%$	0.93	1.13	$5.14 \pm 11.0\% (k=2)$
1950	$\pm 50 / \pm 100$	Head	$40.0 \pm 5\%$	$1.40 \pm 5\%$	0.88	1.17	$4.87 \pm 11.0\% (k=2)$
2450	$\pm 50 / \pm 100$	Head	$39.2 \pm 5\%$	$1.80 \pm 5\%$	0.79	1.24	$4.57 \pm 11.0\% (k=2)$
2600	$\pm 50 / \pm 100$	Head	$39.0 \pm 5\%$	$1.96 \pm 5\%$	0.73	1.30	$4.49 \pm 11.0\% (k=2)$
900	$\pm 50 / \pm 100$	Body	$55.0 \pm 5\%$	$1.05 \pm 5\%$	1.00	1.14	$5.75 \pm 11.0\% (k=2)$
1810	$\pm 50 / \pm 100$	Body	$53.3 \pm 5\%$	$1.52 \pm 5\%$	0.97	1.12	$5.23 \pm 11.0\% (k=2)$
1950	$\pm 50 / \pm 100$	Body	$53.3 \pm 5\%$	$1.52 \pm 5\%$	0.79	1.29	$4.96 \pm 11.0\% (k=2)$
2450	$\pm 50 / \pm 100$	Body	$52.7 \pm 5\%$	$1.95 \pm 5\%$	0.63	1.50	$4.24 \pm 11.0\% (k=2)$
2600	$\pm 50 / \pm 100$	Body	$52.5 \pm 5\%$	$2.16 \pm 5\%$	0.70	1.44	$4.07 \pm 11.0\% (k=2)$

^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 E: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)



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 Salo TCC**

Certificate No: **D835V2-480_May07**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 480**

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

Calibration date: **May 21, 2007**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6 (HF)	SN 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Marcel Fehr	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 30, 2007

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

DASY4 Validation Report for Head TSL

Date/Time: 21.05.2007 15:29:18

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL 900 MHz;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:

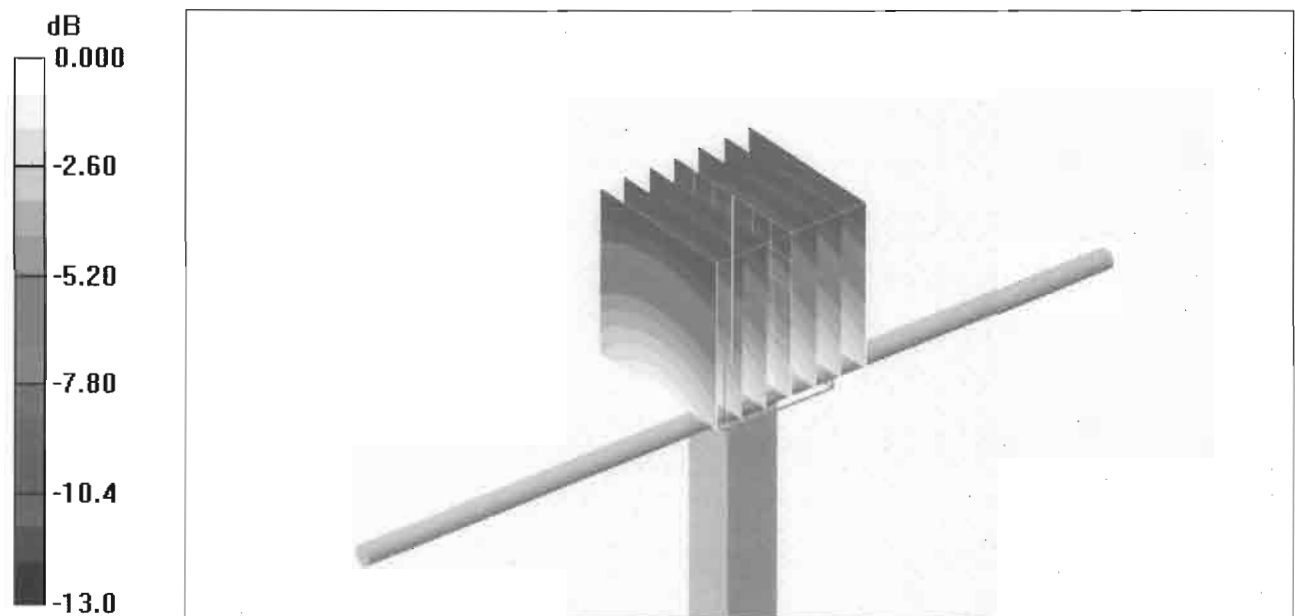
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 54.7 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 3.29 W/kg

SAR(1 g) = 2.29 mW/g; SAR(10 g) = 1.5 mW/g

Maximum value of SAR (measured) = 2.47 mW/g



0 dB = 2.47mW/g

DASY4 Validation Report for Body TSL

Date/Time: 21.05.2007 12:35:17

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: MSL900;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.75, 5.75, 5.75); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0:

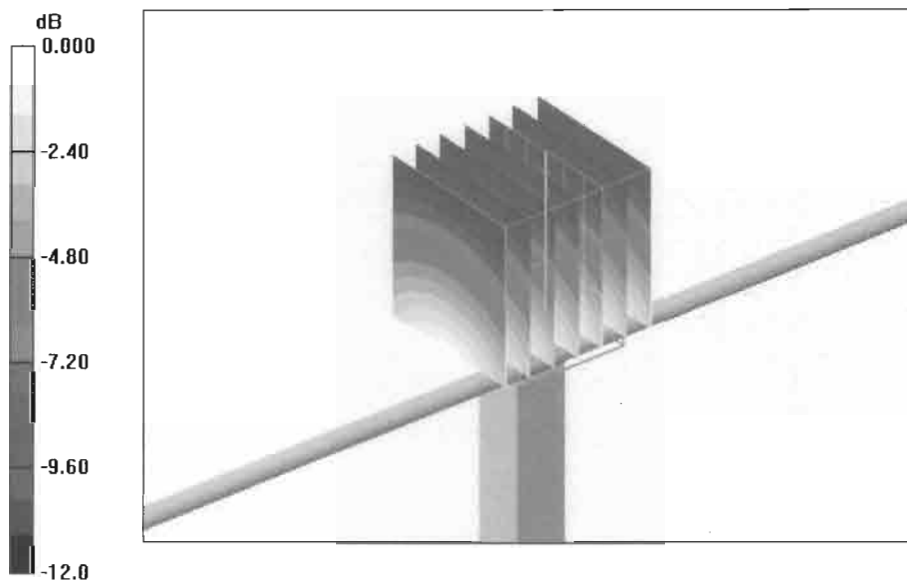
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 54.8 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 3.45 W/kg

SAR(1 g) = 2.48 mW/g; SAR(10 g) = 1.65 mW/g

Maximum value of SAR (measured) = 2.69 mW/g



0 dB = 2.69mW/g



Accredited by the Swiss Accreditation Service (SAS)
 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 Salo TCC**

Certificate No: **D1900V2-5d030_Jan08**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d030**

Calibration procedure(s) **QA CAL-05.v7**
Calibration procedure for dipole validation kits

Calibration date: **January 29, 2008**

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-442A	GB37480704	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference 10 dB Attenuator	SN: 5047.2 (10r)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference Probe ET3DV6 (HF)	SN: 1507	26-Oct-07 (SPEAG, No. ET3-1507_Oct07)	Oct-08
DAE4	SN 601	3-Jan-08 (SPEAG, No. DAE4-601_Jan08)	Jan-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-07)	In house check: Oct-08
RF generator R&S SMT-06	100005	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Oct-08

Calibrated by: **Mike Meili** **Laboratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Issued: January 30, 2008

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

DASY4 Validation Report for Head TSL

Date/Time: 29.01.2008 14:30:03

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.86, 4.86, 4.86); Calibrated: 26.10.2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.01.2008
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

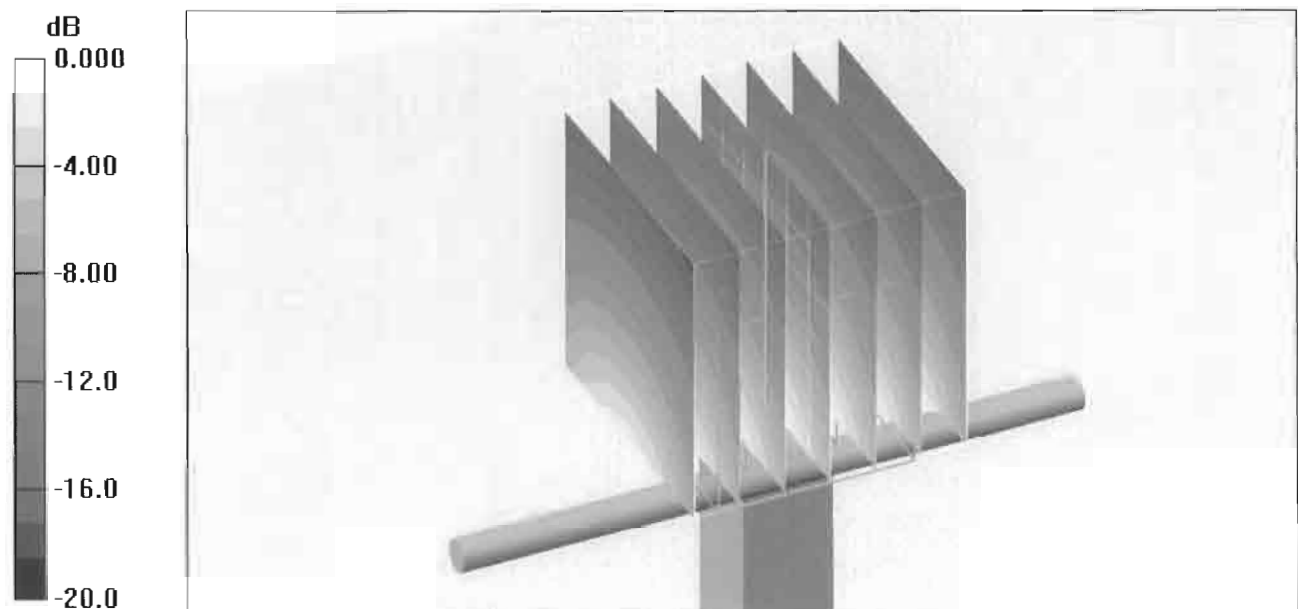
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.8 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 18.0 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.3 mW/g

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



0 dB = 11.5mW/g

DASY4 Validation Report for Body TSL

Date/Time: 22.01.2008 14:15:36

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: MSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.48, 4.48, 4.48); Calibrated: 26.10.2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.01.2008
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

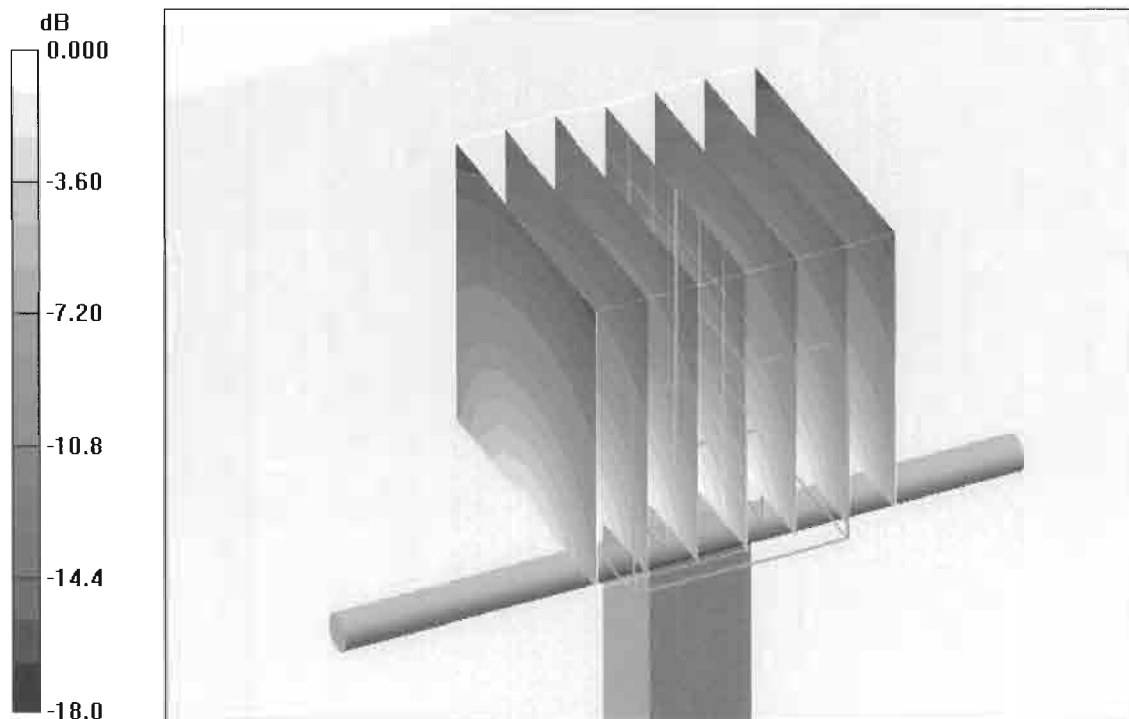
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.4 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 9.62 mW/g; SAR(10 g) = 5.1 mW/g

Maximum value of SAR (measured) = 10.9 mW/g



0 dB = 10.9mW/g