

SAR Compliance Test Report

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Measurements made by:	Jose Gomez		
Tested device:	RM-437		
FCC ID:	PYARM-437	IC:	661V-RM437
Supplement reports:	SD_SAR_0840_03, SD_SAR_0847_02		
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 San Diego.		
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:

Jose Gomez
Certification Test Engineer

2008-11-25

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2008-09-30 to 2008-11-14
SN, HW and SW numbers of tested device	SN: 004401/10/319611, SW: 100.21.55, HW: 0601, DUT: 3096 SN: 004401/10/3175150, SW: 100.21.55, HW: 0601, DUT: 3091
Batteries used in testing	BL-4L, DUT: 3093, 3094
Headsets used in testing	HS-125, DUT: 3095
Other accessories used in testing	-
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

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

1.2.1 Head Configuration

Mode	Ch / f (MHz)	Radiated power	Position	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
2-slot GPRS850	251 / 848.8	22.1dBm ERP	Right, Cheek	0.667 W/kg	0.75W/kg	1.6 W/kg	PASSED
2-slot GPRS1900	512 / 1850.2	25.9dBm EIRP	Left, Cheek	0.603 W/kg	0.68W/kg	1.6 W/kg	PASSED
WLAN2450**	7 / 2442.0	22.0dBm EIRP	Left, Cheek	0.212 W/kg	0.24W/kg	1.6 W/kg	PASSED
2-slot GPRS850 + WLAN2450	-	-	Right, Cheek	0.799 W/kg	0.89W/kg	1.6 W/kg	PASSED
2-slot GPRS1900 + WLAN2450	-	-	Left, Cheek	0.815 W/kg	0.91W/kg	1.6 W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Ch / f (MHz)	Radiated power	Separation distance	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
2-slot GPRS850	251 / 848.8	22.1dBm ERP	2.2cm	0.549W/kg	0.61W/kg	1.6 W/kg	PASSED
2-slot GPRS1900	661 / 1880.0	27.5dBm EIRP	2.2cm	0.262W/kg	0.29W/kg	1.6 W/kg	PASSED
WLAN2450**	7 / 2442.0	22.0dBm EIRP	2.2cm	0.102W/kg	0.11W/kg	1.6 W/kg	PASSED
2-slot GPRS850 + WLAN2450	-	-	2.2cm	0.643W/kg	0.72W/kg	1.6 W/kg	PASSED
2-slot GPRS1900 + WLAN2450	-	-	2.2cm	0.356W/kg	0.40W/kg	1.6 W/kg	PASSED

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

** SAR results duplicated from SD_SAR_0840_03.

1.2.3 Maximum Drift

Maximum drift covered by 12% scaling up of the SAR values	Maximum drift during measurements
0.5dB	0.39dB

1.2.4 Measurement Uncertainty

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

Device category	Portable
Exposure environment	General population / uncontrolled

Modes of Operation	Bands	Modulation Mode	Duty Cycle	Transmitter Frequency Range (MHz)
GSM	850 1900	GMSK	1/8	824 – 849 1850 – 1910
GPRS	850 1900	GMSK	1/8 to 3/8	824 – 849 1850 – 1910
EGPRS	850 1900	GMSK / 8PSK	1/8 to 3/8	824 – 849 1850 – 1910
BT	2450	GFSK	1	2402 – 2480
WLAN	2450	11Mbps QPSK	1	2412 – 2462

Outside of USA and Canada, the transmitter of the device is capable of operating also in GSM/GPRS/EGPRS900, GSM/GPRS/EGPRS1800, WCDMA900 and WCDMA2100 bands which are not part of this filing.

2.1 Description of the Antenna

The device has internal antennas.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	21.2 to 21.6
Ambient humidity (RH %):	37 to 54

3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester except for testing WLAN2450 where control software was used. 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(s) as used for SAR testing.

The number of test cases reported in this document has been minimised based on the earlier testing in SD_SAR_0840_03. Additionally, some of the SAR results, SAR plots and test details given in this report are duplicated from the same earlier report.

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	860	12 months	2009-06
DAE 4	858	12 months	2009-06
E-field Probe ET3DV6	1792	12 months	2009-04
E-field Probe ET3DV6	1516	12 months	2009-10
Dipole Validation Kit, D835V2	486	24 months	2010-10
Dipole Validation Kit, D900V2	120	24 months	2009-08
Dipole Validation Kit, D1900V2	509	24 months	2010-06
Dipole Validation Kit, D2450V2	760	24 months	2009-01
DASY Software	Version 4.7	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	HP E4432B	US 40053677	24 months	2009-10
Signal Generator	HP E4432B	US 40052231	24 months	2010-06
Amplifier	Milmega AS0822-8L	1004832	-	-
Amplifier	Milmega AS0822-20L	1009777	-	-
Power Meter	Agilent E4419B	GB40202155	12 months	2009-03
Power Meter	Agilent E4417A	GB41290918	12 months	2009-01
Power Sensor	Agilent E9301A	US39211902	12 months	2009-07
Power Sensor	Agilent E9327A	US40440896	12 months	2009-04
Call Tester	CMU200	2838212008	-	-
Call Tester	CMU200	8377271008	-	-
Call Tester	CMU200	US11-40052403-1	-	-
Call Tester	CBT	20-232027	-	-
Vector Network Analyzer	Agilent 8753ES	US39174327	12 months	2009-05
Dielectric Probe Kit	Agilent 85070D	US01440165	-	-

4.1.1 Isotropic E-field Probe Type ET3DV6

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., butyl diglycol)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 3 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 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 Distance from probe tip to dipole centers: 2.7 mm

Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms
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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 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 recipe(s) were used for Head and Body tissue simulant(s):

800MHz band		
Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	51.50	69.25
Tween 20	47.35	30.00
Salt	1.15	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

2450MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	56.0	70.20
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	2.39	40.5	0.90	
	± 10% window	2.15 – 2.63			
	2008-11-13	2.36	40.3	0.89	21.5
1900	Reference result	9.96	39.1	1.48	
	± 10% window	8.96 - 10.96			
	2008-11-14	9.92	38.1	1.41	21.6
2450	Reference result	13.6	38.1	1.79	
	± 10% window	12.2 – 15.0			
	2008-09-30	13.4	39.1	1.85	20.5

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
900	Reference result	2.65	54.6	1.07	
	$\pm 10\%$ window	2.38 – 2.92			
	2008-11-12	2.85	52.5	1.03	21.3
2450	Reference result	13.6	51.1	1.97	
	$\pm 10\%$ window	12.2 – 15.0			
	2008-10-01	12.6	52.7	1.97	20.6

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	
	2008-11-13	40.3	0.89	21.5
1880	Recommended value	40.0	1.40	
	$\pm 5\%$ window	38.0 – 42.0	1.33 – 1.47	
	2008-11-14	38.2	1.40	21.6
2442	Recommended value	39.2	1.79	
	$\pm 5\%$ window	37.3 – 41.2	1.70 – 1.88	
	2008-09-30	39.1	1.84	20.5

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	
	2008-11-12	52.8	0.99	21.3
1880	Recommended value	53.3	1.52	
	$\pm 5\%$ window	50.6 – 56.0	1.44 – 1.60	
	2008-11-14	53.1	1.49	21.2
2442	Recommended value	52.7	1.94	
	$\pm 5\%$ window	50.1 – 55.3	1.85 – 2.04	
	2008-10-01	52.7	1.96	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".

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 Section 1.2.2 using a separate flat spacer that was removed before the start of the measurements.

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	$C_i \cdot U_i$ (%)	ν_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 Head SAR values for the test device are tabulated below:

850MHz 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
2-slot GPRS	Power		22.0dBm	21.8dBm	22.1dBm
	Left	Cheek	-	-	-
		Tilt	-	-	-
	Right	Cheek	0.542	0.593	0.667
		Tilt	-	-	-
2-slot GPRS	Right Cheek, BT active		-	-	0.651

1900MHz 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
2-slot GPRS	Power		25.9dBm	27.5dBm	27.7dBm
	Left	Cheek	0.603	0.599	0.587
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-slot GPRS	Left Cheek, BT active		0.598	-	-

2450MHz Head SAR results**

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
WLAN	Power		24.0dBm	22.0dBm	21.5dBm
	Left	Cheek	0.175	0.212	0.115
		Tilt	0.092	0.115	0.082
	Right	Cheek	0.102	0.132	0.079
		Tilt	0.085	0.099	0.059

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

850MHz 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
2-slot GPRS	Power	22.0dBm	21.8dBm	22.1dBm
Back facing Phantom	Without headset	0.407	0.481	0.549
	Headset HS-125	-	-	-
2-slot GPRS Back facing Phantom	Without headset, BT active	-	-	0.541

1900MHz 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
2-slot GPRS	Power	25.9dBm	27.5dBm	27.7dBm
Back facing Phantom	Without headset	0.225	0.262	0.258
	Headset HS-125	-	-	-
2-slot GPRS Back facing Phantom	Without headset, BT active	-	0.259	-

2450MHz Body SAR results**

Mode	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
WLAN	Power	24.0dBm	22.0dBm	21.5dBm
Back facing Phantom	Without headset	-	0.094	-
	Headset HS-125	0.061	0.102	0.057
Display facing Phantom	Without headset	-	0.019	-
	Headset HS-125	-	0.017	-

Simultaneous transmissions: Combined SAR results

Option used	Test configuration	Max. 1g SAR results			Combined 1g SAR values	
		WLAN**	2-slot GPRS 850	2-slot GPRS 1900	WLAN + 2-slot GPRS 850	WLAN + 2-slot GPRS 1900
	Head: Left, Cheek	0.212	-	0.603	-	0.815
	Head: Left, Tilt	0.115	-	-	-	-
	Head: Right, Cheek	0.132	0.667	-	0.799	-
	Head: Right, Tilt	0.099	-	-	-	-
Back facing Phantom	Body: Without Headset	0.094	0.549	0.262	0.643	0.356
	Body: Headset HS-125	0.102	-	-	-	-
Display facing Phantom	Body: Without Headset	0.019	-	-	-	-
	Body: Headset HS-125	0.017	-	-	-	-

Combining the maximum SAR values of WLAN2450 and the cellular bands tends to overestimate the SAR value since their maxima do not necessarily occur in the same location.

Plots of the Measurement scans are given in Appendix B.

** SAR results duplicated from SD_SAR_0840_03

APPENDIX A: SYSTEM CHECKING SCANS

Date/Time: 2008-11-13 8:50:10

Test Laboratory: TCC Nokia

Type: D835V2; Serial: 486

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL 850; Medium Notes: Liquid temperature= 21.5 C

Medium parameters used: $f = 835$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1792; Probe Notes:
- ConvF(6.55, 6.55, 6.55); Calibrated: 2008-04-14
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM1; Type: Twin Phantom; Serial: TP-1035
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Maximum value of SAR (interpolated) = 2.56 mW/g

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

Reference Value = 55.3 V/m

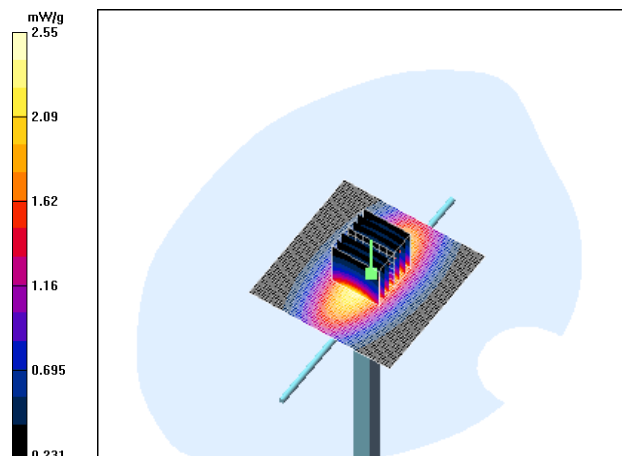
Peak SAR (extrapolated) = 3.45 W/kg

SAR(1 g) = 2.36 mW/g

SAR(10 g) = 1.54 mW/g

Power Drift = -0.009 dB

Maximum value of SAR (measured) = 2.55 mW/g



Date/Time: 2008-11-14 10:39:42

Test Laboratory: TCC Nokia

Type: D1900V2; Serial: 509

Communication System: CW1900

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL 1900; Medium Notes: Liquid temperature= 21.6C

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(5.1, 5.1, 5.1); Calibrated: 2008-10-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM1; Type: Twin Phantom; Serial: TP-1035
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

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

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

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

Reference Value = 95.5 V/m

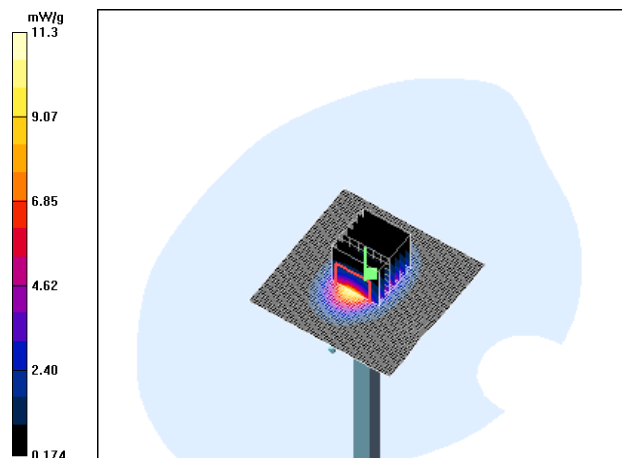
Peak SAR (extrapolated) = 17.2 W/kg

SAR(1 g) = 9.92 mW/g

SAR(10 g) = 5.25 mW/g

Power Drift = -0.006 dB

Maximum value of SAR (measured) = 11.3 mW/g



Date/Time: 2008-09-30 10:39:16

Test Laboratory: TCC Nokia

Type: D2450V2; Serial: 760

Communication System: CW2450

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HLS 2450; Medium Notes: T=20.5C

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.47, 4.47, 4.47); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 2 ; Type: Twin Phantom; Serial: NMP03309
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

System Check/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 16.8 mW/g

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

Reference Value = 90.6 V/m

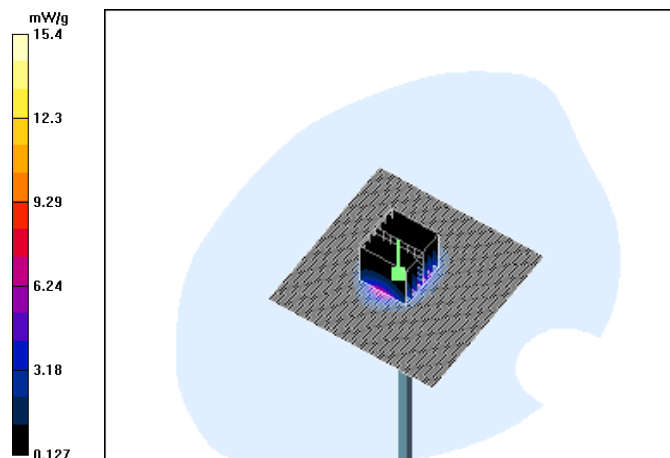
Peak SAR (extrapolated) = 25.7 W/kg

SAR(1 g) = 13.4 mW/g

SAR(10 g) = 6.49 mW/g

Power Drift = -0.193 dB

Maximum value of SAR (measured) = 15.4 mW/g



Date/Time: 2008-11-12 9:49:13

Test Laboratory: TCC Nokia

Type: D900V2; Serial: 120

Communication System: CW900

Frequency: 900 MHz; Duty Cycle: 1:1

Medium: HSL 900; Medium Notes: Liquid temperature= 21.3 C

Medium parameters used: $f = 900 \text{ MHz}$; $\sigma = 1.03 \text{ mho/m}$; $\epsilon_r = 52.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1792; Probe Notes:
- ConvF(5.99, 5.99, 5.99); Calibrated: 2008-04-14
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM2; Type: Twin Phantom; Serial: TP-1279
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

System Check/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 3.14 mW/g

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

Reference Value = 57.3 V/m

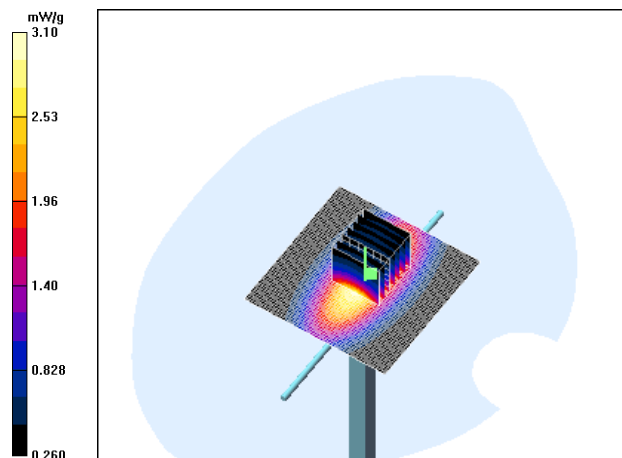
Peak SAR (extrapolated) = 4.07 W/kg

SAR(1 g) = 2.85 mW/g

SAR(10 g) = 1.86 mW/g

Power Drift = 0.000 dB

Maximum value of SAR (measured) = 3.10 mW/g



Date/Time: 2008-10-01 10:26:10

Test Laboratory: TCC Nokia

Type: D2450V2; Serial: 760

Communication System: CW2450

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: MLS 2450; Medium Notes: T=20.6C

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.21, 4.21, 4.21); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 3; Type: Twin Phantom; Serial: NMP03311
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

System Check/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 76.4 V/m

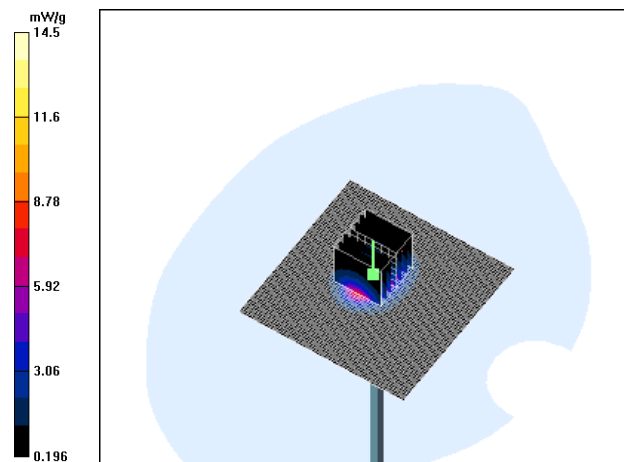
Peak SAR (extrapolated) = 22.9 W/kg

SAR(1 g) = 12.6 mW/g

SAR(10 g) = 6.24 mW/g

Power Drift = -0.193 dB

Maximum value of SAR (measured) = 14.5 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 2008-11-13 10:02:04

Test Laboratory: TCC Nokia

Type: RM-437; Serial: 004401/10/319611

Communication System: 2-slot GPRS850

Frequency: 848.8 MHz; Duty Cycle: 1:4.2

Medium: HSL 850; Medium Notes: Liquid temperature= 21.8 C

Medium parameters used: $f = 849$ MHz; $\sigma = 0.9$ mho/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1792; Probe Notes:
- ConvF(6.55, 6.55, 6.55); Calibrated: 2008-04-14
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM1; Type: Twin Phantom; Serial: TP-1035
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Cheek, High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.716 mW/g

Cheek, High/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.8 V/m

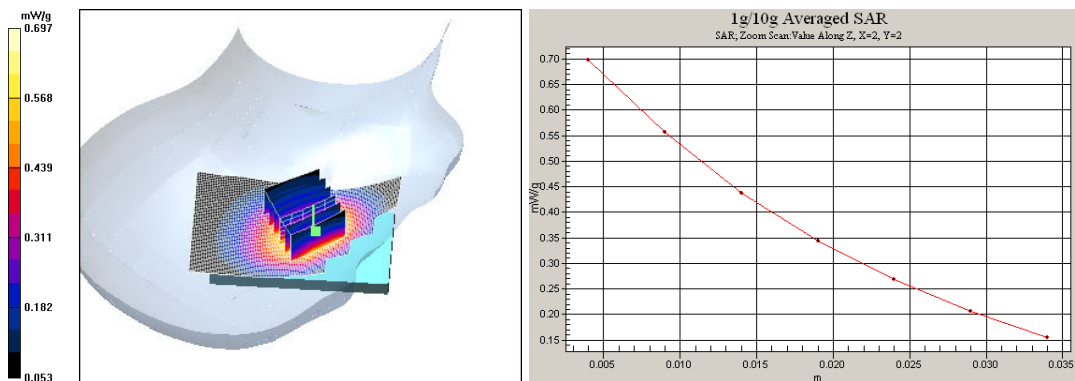
Peak SAR (extrapolated) = 0.822 W/kg

SAR(1 g) = 0.667 mW/g

SAR(10 g) = 0.497 mW/g

Power Drift = -0.001 dB

Maximum value of SAR (measured) = 0.697 mW/g



SAR Report

SD_SAR_0847_01

Applicant: Nokia Corporation

Type: RM-437

Copyright © 2008 TCC Nokia

Date/Time: 2008-11-13 10:19:14

Test Laboratory: TCC Nokia

Type: RM-437; Serial: 004401/10/319611

Communication System: 2-slot GPRS850

Frequency: 848.8 MHz; Duty Cycle: 1:4.2

Medium: HSL 850; Medium Notes: Liquid temperature= 21.8 C

Medium parameters used: $f = 849$ MHz; $\sigma = 0.9$ mho/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1792; Probe Notes:
- ConvF(6.55, 6.55, 6.55); Calibrated: 2008-04-14
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM1; Type: Twin Phantom; Serial: TP-1035
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Cheek, High, BT active/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.690 mW/g

Cheek, High, BT active/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.5 V/m

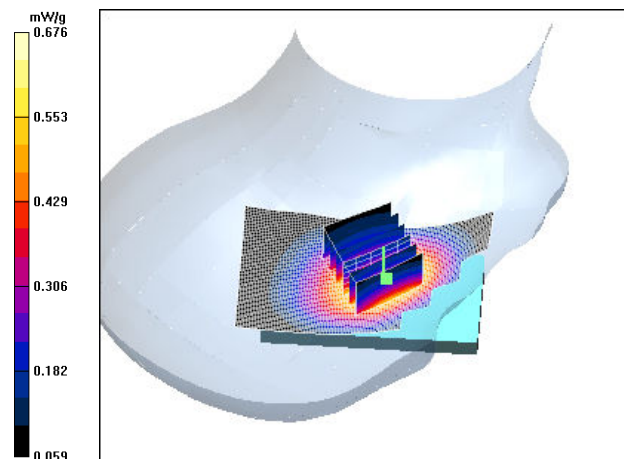
Peak SAR (extrapolated) = 0.801 W/kg

SAR(1 g) = 0.651 mW/g

SAR(10 g) = 0.485 mW/g

Power Drift = 0.017 dB

Maximum value of SAR (measured) = 0.676 mW/g



Date/Time: 2008-11-14 11:28:11

Test Laboratory: TCC Nokia

Type: RM-437; Serial: 004401/10/319611

Communication System: 2-slot GPRS1900

Frequency: 1850.2 MHz; Duty Cycle: 1:4.2

Medium: HSL 1900; Medium Notes: Liquid temperature= 21.6C

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.37$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(5.1, 5.1, 5.1); Calibrated: 2008-10-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM1; Type: Twin Phantom; Serial: TP-1035
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Cheek, Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.668 mW/g

Cheek, Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.1 V/m

Peak SAR (extrapolated) = 0.859 W/kg

SAR(1 g) = 0.603 mW/g

SAR(10 g) = 0.371 mW/g

Power Drift = -0.179 dB

Maximum value of SAR (measured) = 0.638 mW/g

Cheek, Low/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.1 V/m

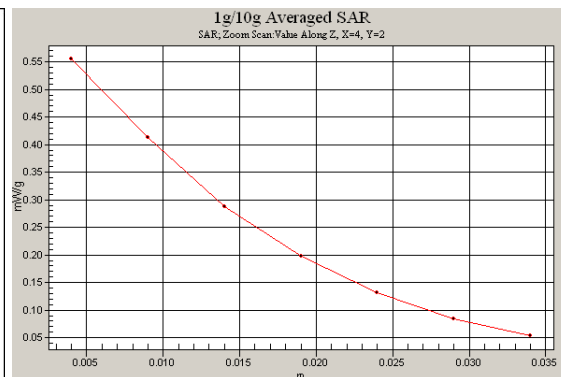
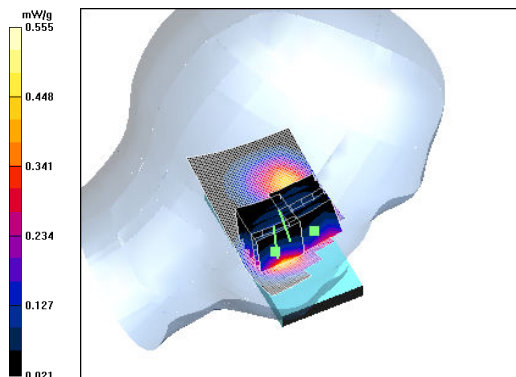
Peak SAR (extrapolated) = 0.677 W/kg

SAR(1 g) = 0.479 mW/g

SAR(10 g) = 0.319 mW/g

Power Drift = -0.179 dB

Maximum value of SAR (measured) = 0.555 mW/g



SAR Report

SD_SAR_0847_01

Applicant: Nokia Corporation

Type: RM-437

Copyright © 2008 TCC Nokia

Date/Time: 2008-11-14 12:21:12

Test Laboratory: TCC Nokia

Type: RM-437; Serial: 004401/10/319611

Communication System: 2-slot GPRS1900

Frequency: 1850.2 MHz; Duty Cycle: 1:4.2

Medium: HSL 1900; Medium Notes: Liquid temperature= 21.6C

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.37$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(5.1, 5.1, 5.1); Calibrated: 2008-10-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM1; Type: Twin Phantom; Serial: TP-1035
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Cheek, Low, BT active/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.657 mW/g

Cheek, Low, BT active/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.7 V/m

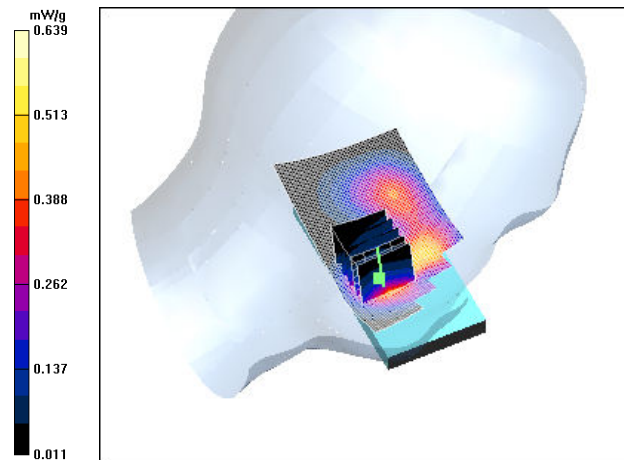
Peak SAR (extrapolated) = 0.860 W/kg

SAR(1 g) = 0.598 mW/g

SAR(10 g) = 0.367 mW/g

Power Drift = -0.133 dB

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



Date/Time: 2008-09-30 12:12:51

Test Laboratory: TCC Nokia

Type: RM-449; Serial: 004401/10/3175150

Communication System: WLAN2450

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: HLS 2450; Medium Notes: Temperature: 20.5C

Medium parameters used: $f = 2442$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.47, 4.47, 4.47); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 2 ; Type: Twin Phantom; Serial: NMP03309
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Cheek, Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.243 mW/g

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

Reference Value = 7.71 V/m

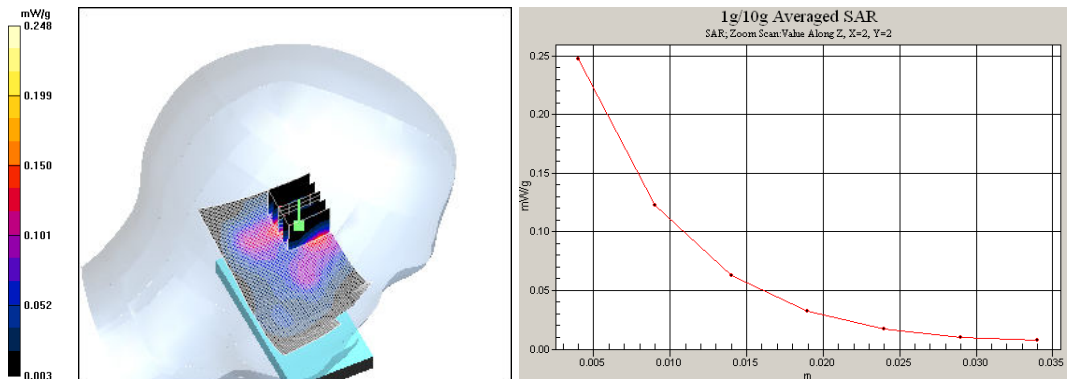
Peak SAR (extrapolated) = 0.447 W/kg

SAR(1 g) = 0.212 mW/g

SAR(10 g) = 0.099 mW/g

Power Drift = 0.004 dB

Maximum value of SAR (measured) = 0.248 mW/g



SAR Report

SD_SAR_0847_01

Applicant: Nokia Corporation

Type: RM-437

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Date/Time: 2008-09-30 12:25:33

Test Laboratory: TCC Nokia

Type: RM-449; Serial: 004401/10/3175150

Communication System: WLAN2450

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: HLS 2450; Medium Notes: Temperature: 20.5C

Medium parameters used: $f = 2442$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.47, 4.47, 4.47); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 2 ; Type: Twin Phantom; Serial: NMP03309
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Tilt, Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.126 mW/g

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

Reference Value = 7.07 V/m

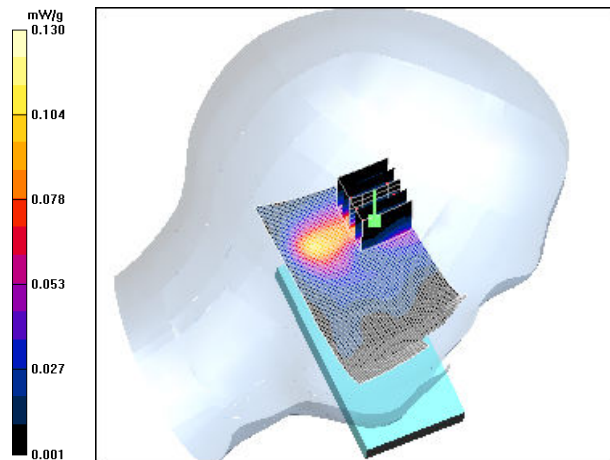
Peak SAR (extrapolated) = 0.237 W/kg

SAR(1 g) = 0.115 mW/g

SAR(10 g) = 0.056 mW/g

Power Drift = -0.104 dB

Maximum value of SAR (measured) = 0.130 mW/g



Date/Time: 2008-09-30 13:20:23

Test Laboratory: TCC Nokia

Type: RM-449; Serial: 004401/10/3175150

Communication System: WLAN2450

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: HLS 2450; Medium Notes: Temperature: 20.5C

Medium parameters used: $f = 2442$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.47, 4.47, 4.47); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 2 ; Type: Twin Phantom; Serial: NMP03309
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Cheek, Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 7.89 V/m

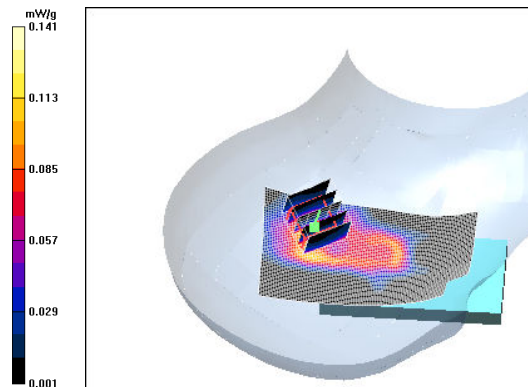
Peak SAR (extrapolated) = 0.296 W/kg

SAR(1 g) = 0.132 mW/g

SAR(10 g) = 0.074 mW/g

Power Drift = -0.100 dB

Maximum value of SAR (measured) = 0.141 mW/g



Date/Time: 2008-09-30 16:31:44

Test Laboratory: TCC Nokia

Type: RM-437; Serial: 004401/10/3175150

Communication System: WLAN2450

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: HLS 2450; Medium Notes: Temperature: 20.5C

Medium parameters used: $f = 2442$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.47, 4.47, 4.47); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 2 ; Type: Twin Phantom; Serial: NMP03309
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Tilt, Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.122 mW/g

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

Reference Value = 7.89 V/m

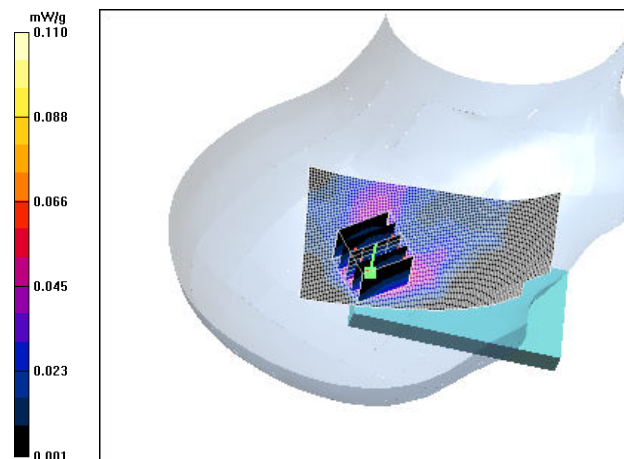
Peak SAR (extrapolated) = 0.176 W/kg

SAR(1 g) = 0.099 mW/g

SAR(10 g) = 0.052 mW/g

Power Drift = -0.202 dB

Maximum value of SAR (measured) = 0.110 mW/g



Date/Time: 2008-11-12 11:45:29

Test Laboratory: TCC Nokia

Type: RM-437; Serial: 004401/10/319611

Communication System: 2-slot GPRS850

Frequency: 848.8 MHz; Duty Cycle: 1:4.2

Medium: MSL 850; Medium Notes: Liquid temperature= 21.3 C

Medium parameters used: $f = 849$ MHz; $\sigma = 0.997$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1792; Probe Notes:
- ConvF(5.99, 5.99, 5.99); Calibrated: 2008-04-14
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM2; Type: Twin Phantom; Serial: TP-1279
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, High, Back facing phantom, No accessory/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.576 mW/g

Body, High, Back facing phantom, No accessory/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.1 V/m

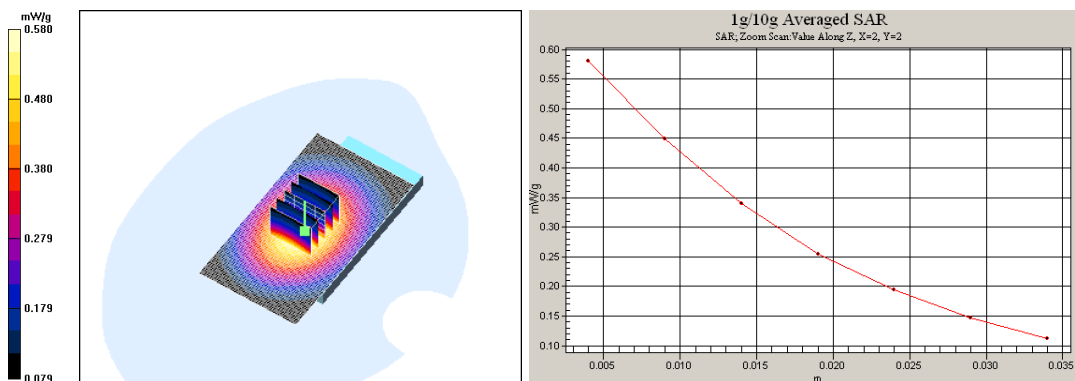
Peak SAR (extrapolated) = 0.681 W/kg

SAR(1 g) = 0.549 mW/g

SAR(10 g) = 0.407 mW/g

Power Drift = -0.008 dB

Maximum value of SAR (measured) = 0.580 mW/g



SAR Report

SD_SAR_0847_01

Applicant: Nokia Corporation

Type: RM-437

Copyright © 2008 TCC Nokia

Date/Time: 2008-11-12 12:03:52

Test Laboratory: TCC Nokia

Type: RM-437; Serial: 004401/10/319611

Communication System: 2-slot GPRS850

Frequency: 848.8 MHz; Duty Cycle: 1:4.2

Medium: MSL 850; Medium Notes: Liquid temperature= 21.3 C

Medium parameters used: $f = 849$ MHz; $\sigma = 0.997$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1792; Probe Notes:
- ConvF(5.99, 5.99, 5.99); Calibrated: 2008-04-14
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM2; Type: Twin Phantom; Serial: TP-1279
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, High, Back facing phantom, No accessory, BT active/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.565 mW/g

Body, High, Back facing phantom, No accessory, BT active/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.0 V/m

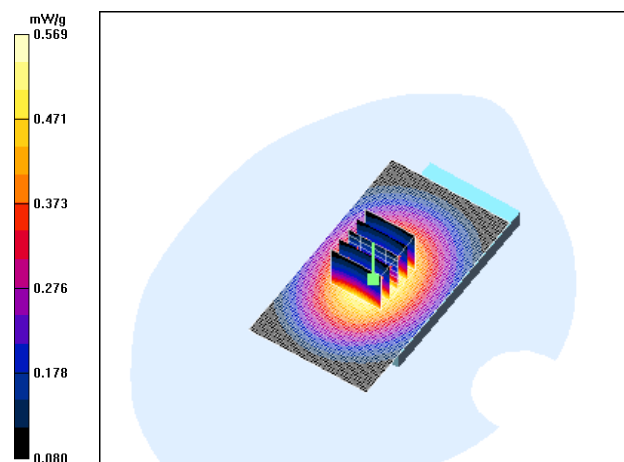
Peak SAR (extrapolated) = 0.670 W/kg

SAR(1 g) = 0.541 mW/g

SAR(10 g) = 0.402 mW/g

Power Drift = 0.006 dB

Maximum value of SAR (measured) = 0.569 mW/g



Date/Time: 2008-11-14 12:56:53

Test Laboratory: TCC Nokia

Type: RM-437; Serial: 004401/10/319611

Communication System: 2-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium: MSL 1900; Medium Notes: Liquid temperature= 21.2 C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.76, 4.76, 4.76); Calibrated: 2008-10-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM2; Type: Twin Phantom; Serial: TP-1279
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, Back facing phantom, No accessory/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.267 mW/g

Body, Middle, Back facing phantom, No accessory/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.2 V/m

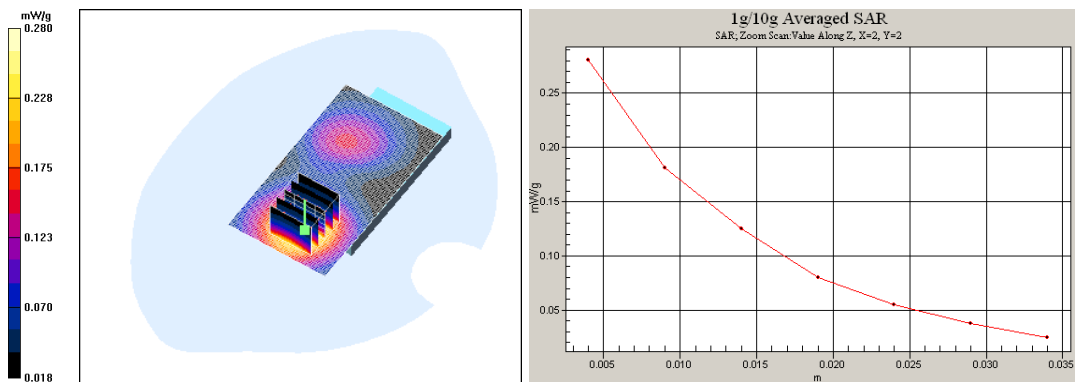
Peak SAR (extrapolated) = 0.406 W/kg

SAR(1 g) = 0.262 mW/g

SAR(10 g) = 0.173 mW/g

Power Drift = 0.014 dB

Maximum value of SAR (measured) = 0.280 mW/g



SAR Report

SD_SAR_0847_01

Applicant: Nokia Corporation

Type: RM-437

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Date/Time: 2008-11-14 13:20:45

Test Laboratory: TCC Nokia

Type: RM-437; Serial: 004401/10/319611

Communication System: 2-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium: MSL 1900; Medium Notes: Liquid temperature= 21.2 C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.76, 4.76, 4.76); Calibrated: 2008-10-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2008-06-12
- Phantom: SAM2; Type: Twin Phantom; Serial: TP-1279
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, Back facing phantom, No accessory, BT active/Area Scan (51x91x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.269 mW/g

Body, Middle, Back facing phantom, No accessory, BT active/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.2 V/m

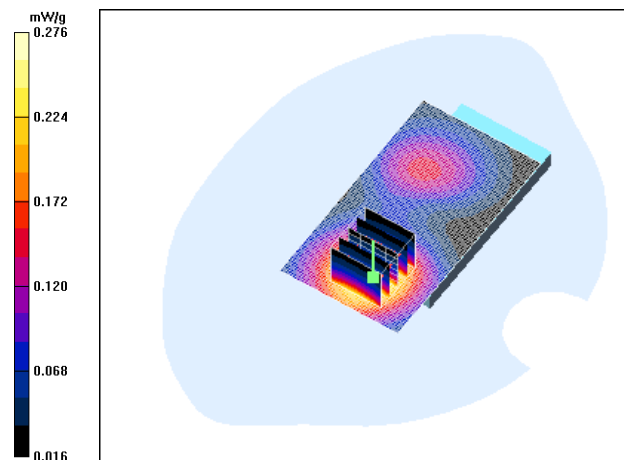
Peak SAR (extrapolated) = 0.393 W/kg

SAR(1 g) = 0.259 mW/g

SAR(10 g) = 0.171 mW/g

Power Drift = -0.044 dB

Maximum value of SAR (measured) = 0.276 mW/g



Date/Time: 2008-10-01 10:51:10

Test Laboratory: TCC Nokia

Type: RM-449; Serial: 004401/10/3175150

Communication System: WLAN2450

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: MSL 2450; Medium Notes: Temperature: 20.6C

Medium parameters used: $f = 2442$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.21, 4.21, 4.21); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 3; Type: Twin Phantom; Serial: NMP03311
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, No accessory, Back facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.106 mW/g

Body, Middle, No accessory, Back facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 7.41 V/m

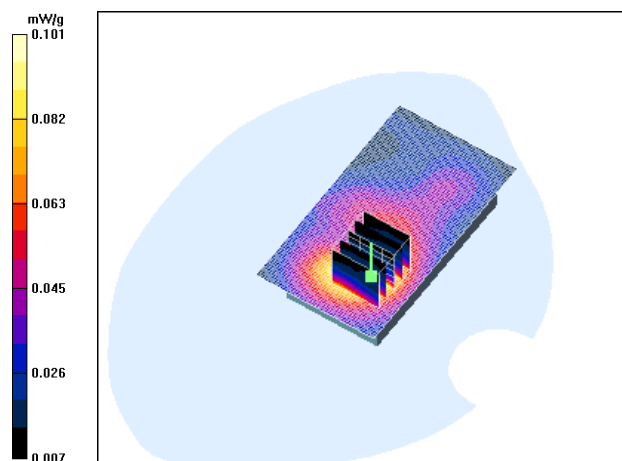
Peak SAR (extrapolated) = 0.157 W/kg

SAR(1 g) = 0.094 mW/g

SAR(10 g) = 0.058 mW/g

Power Drift = -0.390 dB

Maximum value of SAR (measured) = 0.101 mW/g



Date/Time: 2008-10-01 11:05:40

Test Laboratory: TCC Nokia

Type: RM-449; Serial: 004401/10/3175150

Communication System: WLAN2450

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: MSL 2450; Medium Notes: Temperature: 20.6C

Medium parameters used: $f = 2442$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.21, 4.21, 4.21); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 3; Type: Twin Phantom; Serial: NMP03311
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, HS-125, Back facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.112 mW/g

Body, Middle, HS-125, Back facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 7.46 V/m

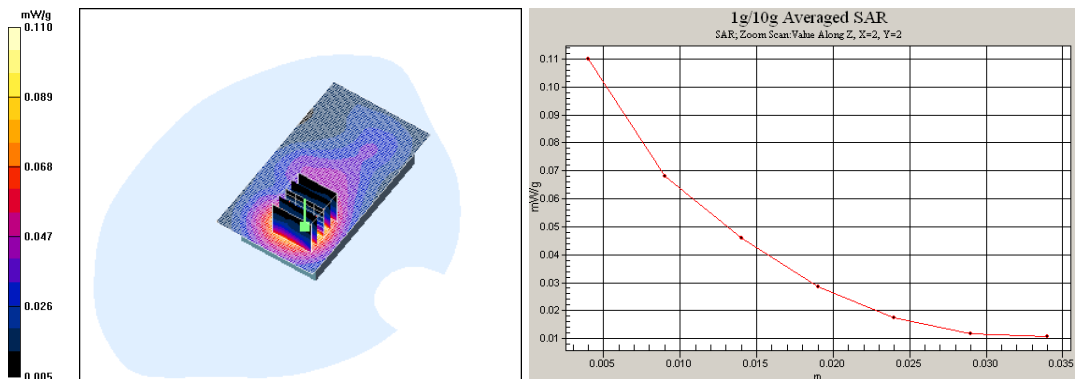
Peak SAR (extrapolated) = 0.178 W/kg

SAR(1 g) = 0.102 mW/g

SAR(10 g) = 0.061 mW/g

Power Drift = -0.245 dB

Maximum value of SAR (measured) = 0.110 mW/g



SAR Report

SD_SAR_0847_01

Applicant: Nokia Corporation

Type: RM-437

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Date/Time: 2008-10-01 11:54:05

Test Laboratory: TCC Nokia

Type: RM-449; Serial: 004401/10/3175150

Communication System: WLAN2450

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: MSL 2450; Medium Notes: Temperature: 20.6C

Medium parameters used: $f = 2442$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.21, 4.21, 4.21); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 3; Type: Twin Phantom; Serial: NMP03311
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, No accessory, Display facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.021 mW/g

Body, Middle, No accessory, Display facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

Reference Value = 3.12 V/m

Peak SAR (extrapolated) = 0.076 W/kg

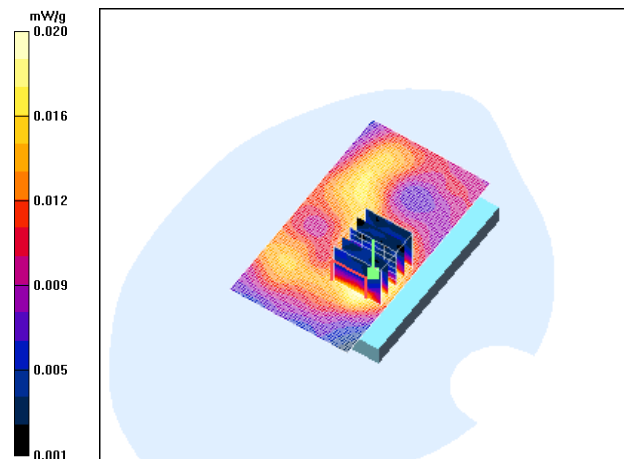
SAR(1 g) = 0.019 mW/g

SAR(10 g) = 0.00795 mW/g

Power Drift = -0.354 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) = 0.020 mW/g



SAR Report

SD_SAR_0847_01

Applicant: Nokia Corporation

Type: RM-437

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Date/Time: 2008-10-01 11:38:17

Test Laboratory: TCC Nokia

Type: RM-449; Serial: 004401/10/3175150

Communication System: WLAN2450

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: MSL 2450; Medium Notes: Temperature: 20.6C

Medium parameters used: $f = 2442$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.21, 4.21, 4.21); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: SAM 3; Type: Twin Phantom; Serial: NMP03311
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, HS-125, Display facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

Body, Middle, HS-125, Display facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 2.43 V/m

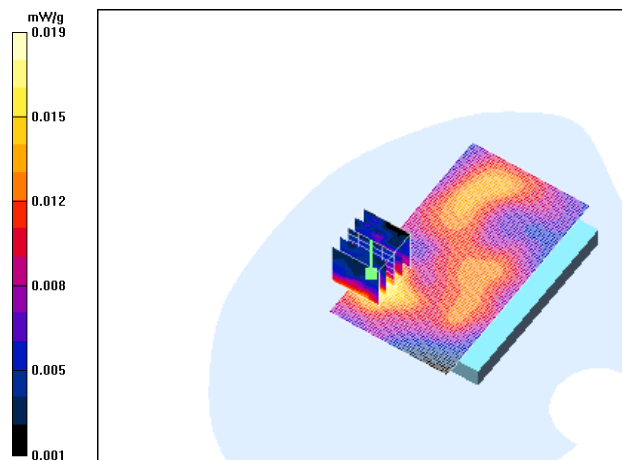
Peak SAR (extrapolated) = 0.053 W/kg

SAR(1 g) = 0.017 mW/g

SAR(10 g) = 0.00973 mW/g

Power Drift = -0.033 dB

Maximum value of SAR (measured) = 0.019 mW/g



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

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



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S Swiss Calibration Service

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 SD TCC**

Certificate No: **ET3-1792_Apr08**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1792**

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

Calibration date: **April 14, 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 (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	MY41496087	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: 654	20-Apr-07 (No. DAE4-654_Apr07)	Apr-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:	Ketja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: April 16, 2008

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

Certificate No: ET3-1792_Apr08

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SAR Report

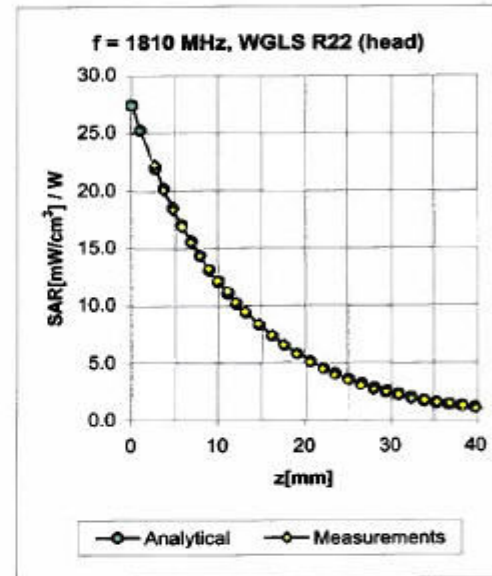
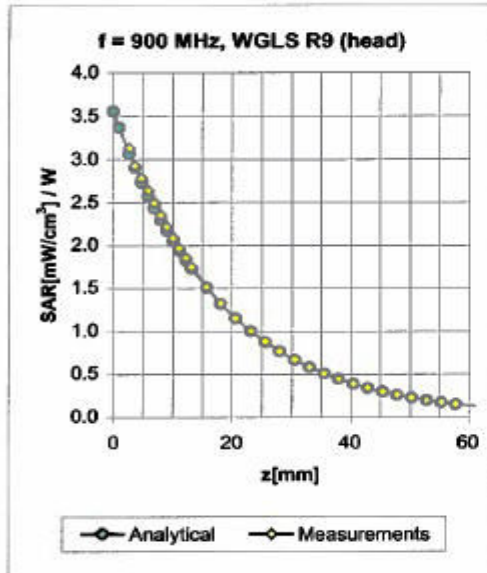
Type: RM-437

SD_SAR_0847_01

Applicant: Nokia Corporation

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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%	0.87	1.61	6.55 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.45	5.12 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.30	4.75 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.72	1.84	4.24 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.76	1.81	5.99 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.51	2.45	5.10 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.55	2.17	4.90 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.70	1.88	4.11 ± 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.

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



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S Swiss Calibration Service

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 SD TCC**

Certificate No: **ET3-1516_Oct08**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1516**

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

Calibration date: **October 21, 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 (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-08 (No. ES3-3013_Jan08)	Jan-09
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-07)	In house check: Oct-08

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

Issued: October 21, 2008

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

Certificate No: ET3-1516_Oct08

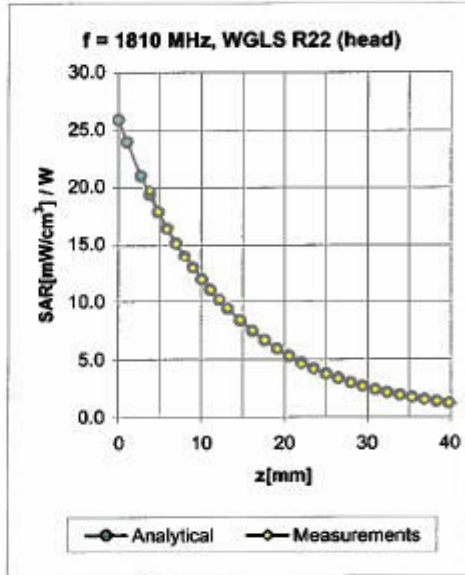
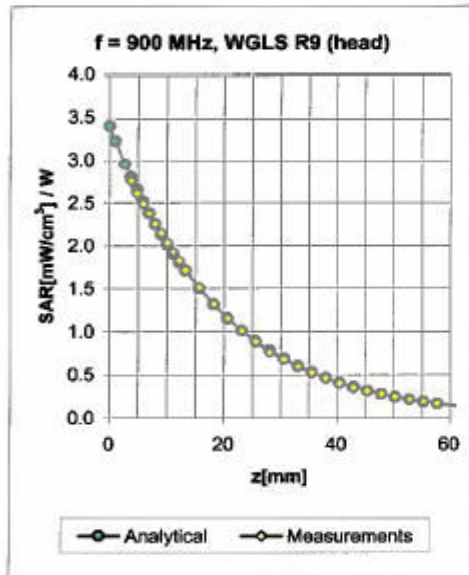
Page 1 of 9

SAR Report
SD_SAR_0847_01
Applicant: Nokia Corporation

Type: RM-437

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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%	0.39	3.35	6.26	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.55	2.34	5.10	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.58	2.29	4.81	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.90	1.80	4.29	± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.63	2.67	6.01	± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.65	2.23	4.76	± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.65	2.24	4.66	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	1.80	3.83	± 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 D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

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



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S Swiss Calibration Service

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 SD TCC**

Certificate No: **D835V2-486_Oct08**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 486**

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

Calibration date: **October 22, 2008**

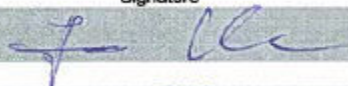
Condition of the calibrated item **In Tolerance**

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 (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	01-Jul-08 (No. 217-00864)	Jul-09
Type-N mismatch combination	SN: 5047.2 / 06327	01-Jul-08 (No. 217-00867)	Jul-09
Reference Probe ES3DV2	SN: 3025	28-Apr-08 (No. ES3-3025_Apr08)	Apr-09
DAE4	SN: 601	14-Mar-08 (No. DAE4-601_Mar08)	Mar-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 22, 2008

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

DASY5 Validation Report for Head TSL

Date/Time: 22.10.2008 11:34:32

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:486

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

Medium: HSL 900 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.9$ mho/m; $\epsilon_r = 40.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.97, 5.97, 5.97); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

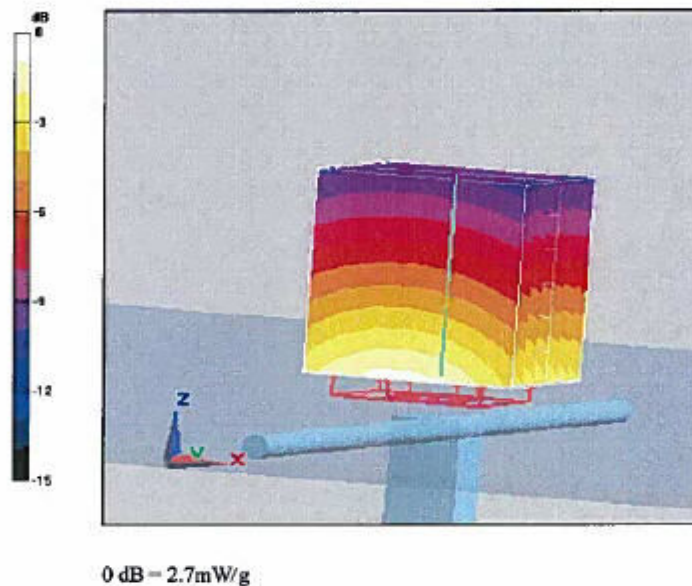
Pin=250mW; dip=15mm; dist=3.4mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.9 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 3.52 W/kg

SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.57 mW/g

Maximum value of SAR (measured) = 2.7 mW/g



DASY5 Validation Report for Body TSL

Date/Time: 20.10.2008 10:14:40

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:486

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

Medium: MSL900

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.9, 5.9, 5.9); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

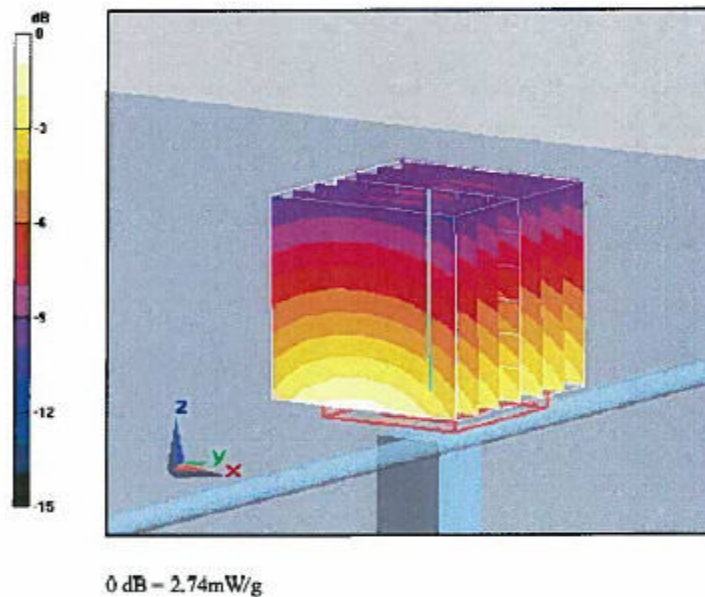
Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.5 V/m; Power Drift = 0.015 dB

Peak SAR (extrapolated) = 3.51 W/kg

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

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



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Accreditation No.: **SCS 108**

Client **Nokia SD TCC**

Certificate No: **D900V2-120_Aug07**

CALIBRATION CERTIFICATE

Object **D900V2 - SN: 120**

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

Calibration date: **August 27, 2007**

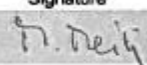
Condition of the calibrated item **In Tolerance**

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 $(22 \pm 3)^{\circ}\text{C}$ 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	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)	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	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:	Mike Meli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 29, 2007

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DASY4 Validation Report for Head TSL

Date/Time: 27.08.2007 14:39:35

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:120

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: HSL 900 MHz;

Medium parameters used: $f = 900 \text{ MHz}$; $\sigma = 0.941 \text{ mho/m}$; $\epsilon_r = 39.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.01, 6.01, 6.01); 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:

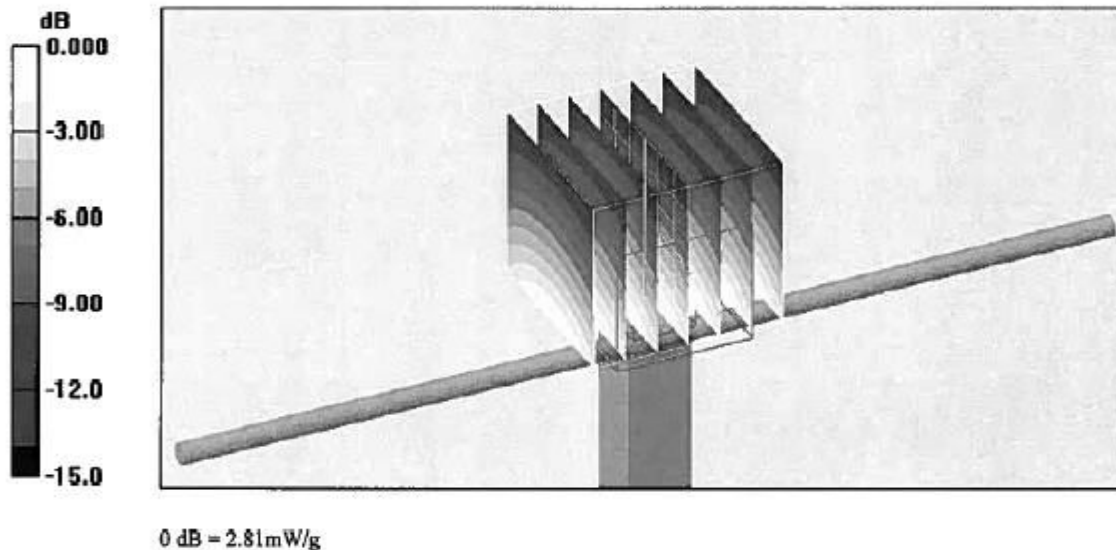
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 57.1 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 3.79 W/kg

SAR(1 g) = 2.59 mW/g; SAR(10 g) = 1.67 mW/g

Maximum value of SAR (measured) = 2.81 mW/g



DASY4 Validation Report for Body TSL

Date/Time: 23.08.2007 14:35:10

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:120

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: MSL900;

Medium parameters used: $f = 900 \text{ MHz}$; $\sigma = 1.07 \text{ mho/m}$; $\epsilon_r = 54.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.8, 5.8, 5.8); 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 after straightening the arms/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

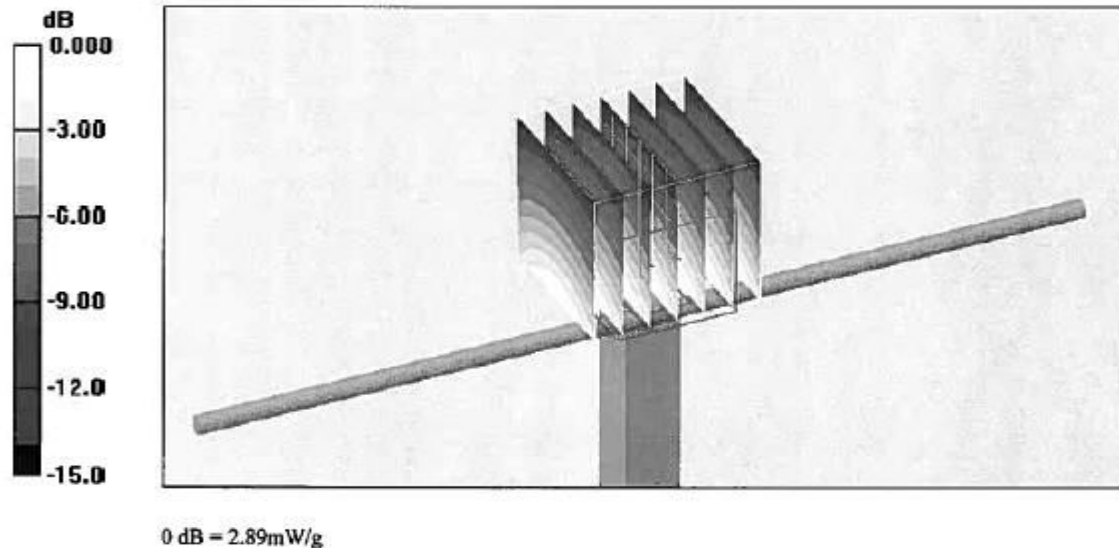
$dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 54.7 V/m; Power Drift = 0.002 dB

Peak SAR (extrapolated) = 3.73 W/kg

SAR(1 g) = 2.65 mW/g; SAR(10 g) = 1.73 mW/g

Maximum value of SAR (measured) = 2.89 mW/g



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Accreditation No.: **SCS 108**

Client **Nokia SD TCC**

Certificate No: **D1900V2-509 Jun08**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 509**

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

Calibration date: **June 19, 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 (No. 217-00736)	Oct-08
Power sensor HP 8461A	US37292783	04-Oct-07 (No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (No. 217-00718)	Aug-08
Type-N mismatch combination	SN: 5047.2 / 06327	08-Aug-07 (No. 217-00721)	Aug-08
Reference Probe ES3DV2	SN: 3025	28-Apr-08 (No. ES3-3025_Apr08)	Apr-09
DAE4	SN: 601	14-Mar-08 (No. DAE4-601_Mar08)	Mar-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8461A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-08
RF generator R&S SMT-06	100005	4-Aug-98 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

Calibrated by: **Claudio Leubler** **Laboratory Technician** 

Approved by: **Kajsa Pokovic** **Technical Manager** 

Issued: June 23, 2008

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DASY4 Validation Report for Head TSL

Date/Time: 18.06.2008 14:57:06

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:509

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

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.9, 4.9, 4.9); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

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

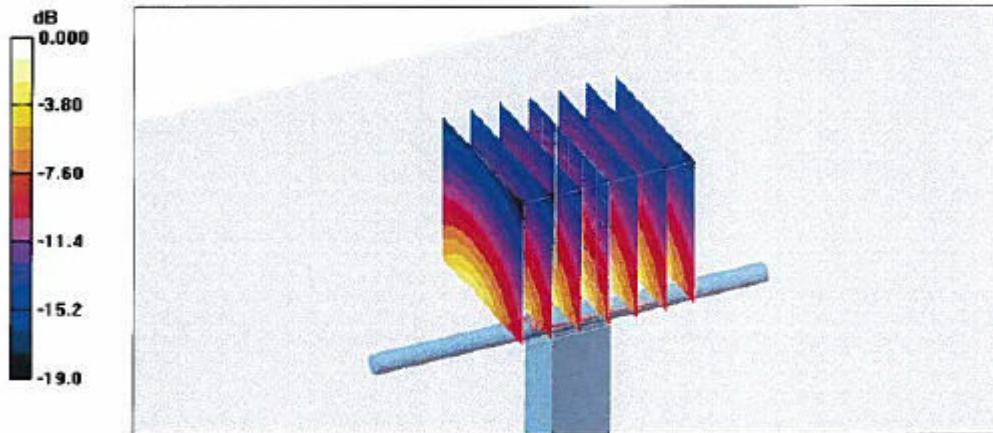
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.2 V/m; Power Drift = 0.060 dB

Peak SAR (extrapolated) = 18.5 W/kg

SAR(1 g) = 9.96 mW/g; SAR(10 g) = 5.12 mW/g

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



0 dB = 12.0mW/g

DASY4 Validation Report for Body TSL

Date/Time: 19.06.2008 15:04:52

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:509

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

Medium: MSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.58$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.5, 4.5, 4.5); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

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

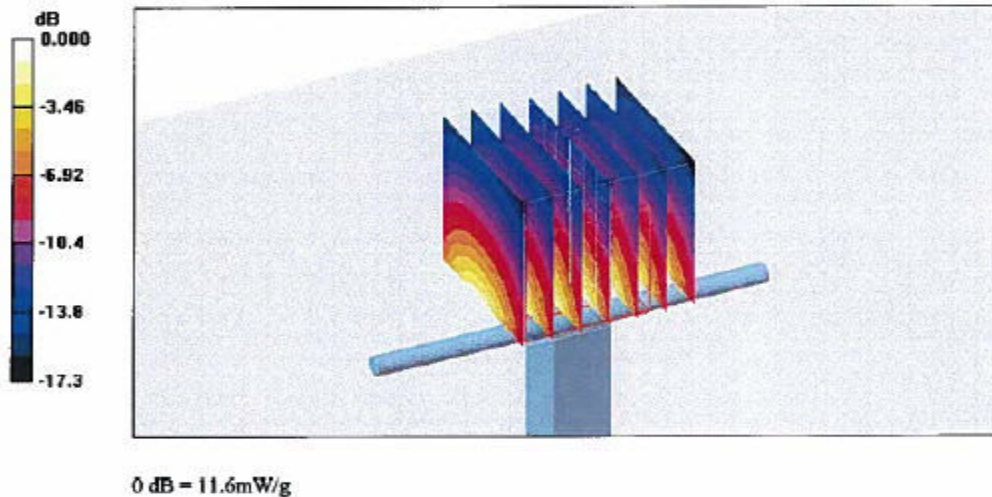
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.6 V/m; Power Drift = 0.001 dB

Peak SAR (extrapolated) = 17.3 W/kg

SAR(1 g) = 9.77 mW/g; SAR(10 g) = 5.11 mW/g

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



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Accreditation No.: **SCS 108**

Client **Nokia SD TCC**

Certificate No: **D2450V2-760_Jan07**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 760**

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

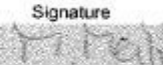
Calibration date: **January 17, 2007**

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
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 ES3DV2	SN 3025	19-Oct-06 (SPEAG, No. ES3-3025_Oct06)	Oct-07
DAE4	SN: 907	20-Jul-06 (SPEAG, No. DAE4-907_Jul06)	Jul-07
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
Calibrated by:	Name Mike Melli	Function Laboratory Technician	Signature 
Approved by:	Katja Pokovic	Technical Manager	
Issued: January 22, 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: 17.01.2007 14:12:07

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN760

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

Medium: HSL U10 BB;

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.79$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025 (HF); ConvF(4.5, 4.5, 4.5); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 20.07.2006
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm 2/Zoom Scan (7x7x7)/Cube 0:

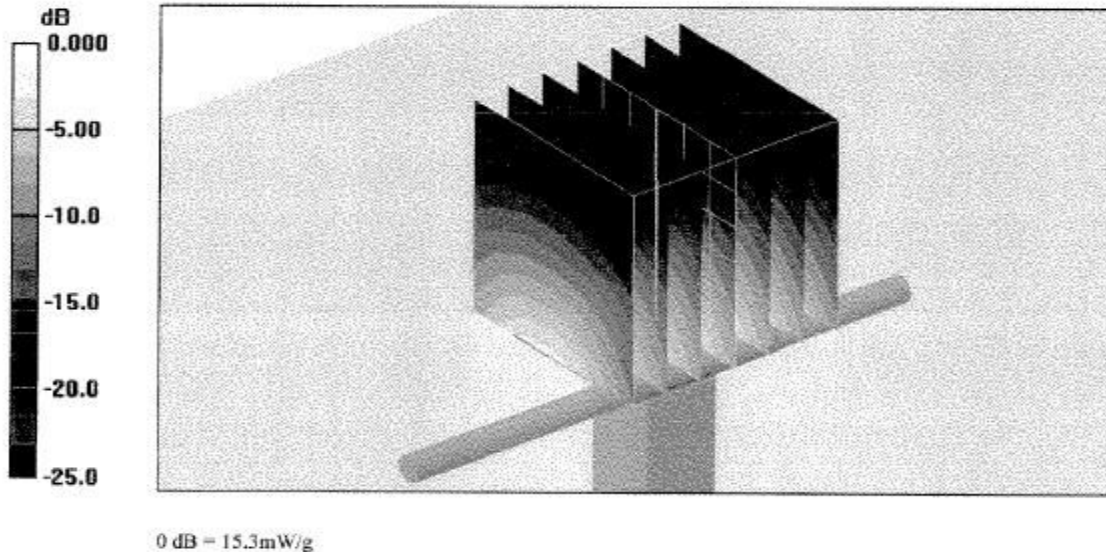
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.1 V/m; Power Drift = 0.014 dB

Peak SAR (extrapolated) = 29.1 W/kg

SAR(1 g) = 13.6 mW/g; SAR(10 g) = 6.3 mW/g

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



DASY4 Validation Report for Body TSL

Date/Time: 17.01.2007 17:38:05

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN760

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

Medium: MSL U10 BB;

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 51.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025 (HF); ConvF(4.16, 4.16, 4.16); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 20.07.2006
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm 2/Zoom Scan (7x7x7)/Cube 0:

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

Reference Value = 89.4 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 28.7 W/kg

SAR(1 g) = 13.6 mW/g; SAR(10 g) = 6.29 mW/g

Maximum value of SAR (measured) = 15.2 mW/g

