TCC
Nokia

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

SAR Compliance Test Report

Test report no.:	Salo_SAR_0907_03	**Date of report:**	2009-02-13
Template version:	11.0	**Number of pages:**	31
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Responsible test engineer:	Virpi Tuominen	**Product contact person:**	Janne Sarna
Measurements made by:	Heikki Kuusela, Virpi Tuominen		
Tested device:	RM-320		
FCC ID:	PDNRM-320	**IC:**	661R-RM320
Supplement reports:	Salo_SAR_0724_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 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	2009-02-09 to 2009-02-10
SN, HW and SW numbers of tested device	SN: 355739/02/401508/7, HW: 4280, SW: 20.0.016, DUT: 13496
Batteries used in testing	BL-6F, DUT: 13451, 13452, 13453
Headsets used in testing	HS-45 + AD-54, DUT: 13455 + 13454
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	20.2 dBm ERP	Left, Cheek	0.195 W/kg	**0.22 W/kg**	1.6 W/kg	PASSED
2-slot GPRS1900	661 / 1880.0	25.3 dBm EIRP	Left, Tilt	0.265 W/kg	**0.30 W/kg**	1.6 W/kg	PASSED
WLAN2450**	7 / 2442.0	24.9 dBm EIRP	Left, Cheek	0.143 W/kg	**0.16 W/kg**	1.6 W/kg	PASSED
2-slot GPRS850 + WLAN2450	-	-	Left, Cheek	0.338 W/kg	**0.38 W/kg**	1.6 W/kg	PASSED
2-slot GPRS1900 + WLAN2450	-	-	Left, Tilt	0.315 W/kg	**0.35 W/kg**	1.6 W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Ch / *f* (MHz)	Radiated power	Separation distance	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
2-slot GPRS850	251 / 848.8	20.2 dBm ERP	1.5cm	0.608 W/kg	**0.68 W/kg**	1.6 W/kg	PASSED
2-slot GPRS1900	810 / 1909.8	24.8 dBm EIRP	1.5cm	0.616 W/kg	**0.69 W/kg**	1.6 W/kg	PASSED
WLAN2450**	7 / 2442.0	24.9 dBm EIRP	1.5cm	0.048 W/kg	**0.05 W/kg**	1.6 W/kg	PASSED
2-slot GPRS850 + WLAN2450	-	-	1.5cm	0.618 W/kg	**0.69 W/kg**	1.6 W/kg	PASSED
2-slot GPRS1900 + WLAN2450	-	-	1.5cm	0.656 W/kg	**0.73 W/kg**	1.6 W/kg	PASSED

*SAR values are scaled up by 12% to cover measurement drift.
**SAR data taken from Salo_SAR_0724_02

1.2.3 Maximum Drift

Maximum drift covered by 12% scaling up of the SAR values	Maximum drift during measurements
0.5dB	0.27 dB

1.2.4 Measurement Uncertainty

Expanded Uncertainty (k=2) 95%	± 25.8%

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 and WCDMA2100 bands which are not part of this filing.

2.1 Picture of the Device

Slide closed

Slide open

Slide in MPS position

2.2 Description of the Antenna

The device has internal antennas.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	19.4 to 22.1
Ambient humidity (RH %):	37 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.

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 Salo_SAR_0724_02. Some of the SAR results are duplicated from Salo_SAR_0724_02.

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 ET3DV6	1766	12 months	2009-11
E-field Probe ES3DV3	3165	12 months	2009-04
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	-	-
Call Tester	CMU 200	100084	-	-
Vector Network Analyzer	8753E	US38432928	12 months	2009-07
Dielectric Probe Kit	85070B	US33020420	-	-

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 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.1.2 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 µW/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 was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

The SPEAG device holder (see Section 5.1) was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 - 2003 and FCC Supplement C to OET Bulletin 65. All tests were carried out using simulants whose dielectric parameters were within ± 5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

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

4.3.1 Tissue Simulant Recipes

The following 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

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]	
	Reference result	2.29	41.6	0.90	
	± 10% window	2.06 – 2.52			
835	2009-02-09	2.51	40.7	0.89	21.0
	Reference result	10.2	38.5	1.46	
	± 10% window	9.20 – 11.20			
1900	2009-02-10	10.2	39.3	1.40	21.0

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]	
	Recommended value	41.5	0.90	
	± 5% window	39.4 – 43.6	0.86 – 0.95	
836	2009-02-09	40.7	0.89	21.0
	Recommended value	40.0	1.40	
	± 5% window	38.0 – 42.0	1.33 – 1.47	
1880	2009-02-10	39.4	1.39	21.0

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
	Recommended value	55.2	0.97	
	± 5% window	52.4 – 58.0	0.92 – 1.02	
836	2009-02-09	53.0	0.97	21.0
	Recommended value	53.3	1.52	
	± 5% window	50.6 – 56.0	1.44 – 1.60	
1880	2009-02-10	51.6	1.49	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

A Nokia designed spacer (illustrated below) was used to position the device within the SPEAG holder. The spacer positions the device so that the holder has minimal effect on the test results but still holds the device securely. The spacer was removed before the tests.

Nokia spacer

5.2 Test Positions

5.2.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 - 2003 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

Photo of the device with slide closed in “cheek” position

Photo of the device with slide closed in “tilt” position

Photo of the device with slide in MPS position in “cheek” position

Photo of the device with slide in MPS position in “tilt” position

5.2.2 Body Worn Configuration

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

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

5.3 Scan Procedures

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

5.4 SAR Averaging Methods

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

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

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

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

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	c_i	$c_i . u_i$ (%)	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 Head SAR values for the test device are tabulated below:

850MHz Head SAR results

Option used	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		19.1 dBm	18.9 dBm	20.2 dBm
Slide in MPS position	Left	Cheek	0.145	0.167	**0.195**
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-slot GPRS Slide in MPS position	Left Cheek, BT active		-	-	0.194

1900MHz Head SAR results

Option used	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		24.1 dBm	25.3 dBm	24.8 dBm
Slide closed	Left	Cheek	-	-	-
		Tilt	0.201	**0.265**	0.257
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-slot GPRS Slide closed	Left Tilt, BT active		-	0.248	-

2450MHz Head SAR results

Option used	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**		**22.8 dBm**	**24.9 dBm**	**21.8 dBm**
Slide closed	Left	Cheek	0.087	**0.143**	0.126
		Tilt	-	0.050	-
	Right	Cheek	-	0.132	-
		Tilt	-	0.038	-
Option used	**Test configuration**		**Ch 1 2412.0 MHz**	**Ch 7 2442.0 MHz**	**Ch 11 2462.0 MHz**
WLAN	**Power**		**26.0 dBm**	**22.7 dBm**	**21.8 dBm**
Slide open	Left	Cheek	-	0.048	-
		Tilt	-	0.050	-
	Right	Cheek	0.069	0.099	0.092
		Tilt	-	0.049	-
WLAN Slide in MPS position	Left Cheek		0.092	0.111	0.119

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

850MHz Body SAR results

Option 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
2-slot GPRS		**Power**	**19.1 dBm**	**18.9 dBm**	**20.2 dBm**
Slide closed	Display facing phantom	Without headset	-	-	-
		Headset HS-45+AD-54	-	-	-
	Back facing phantom	Without headset	0.363	0.458	**0.578**
		Headset HS-45+AD-54	-	-	-
2-slot GPRS Slide closed	Back facing phantom	Without headset, BT active	-	-	**0.608**

1900MHz Body SAR results

Option 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
2-slot GPRS		**Power**	**24.1 dBm**	**25.3 dBm**	**24.8 dBm**
Slide closed	Display facing phantom	Without headset	-	-	-
		Headset HS-45+AD-54	-	-	-
	Back facing phantom	Without headset	0.409	0.543	**0.616**
		Headset HS-45+AD-54	-	-	-
2-slot GPRS Slide closed	Back facing phantom	Without headset, BT active	-	-	0.602

2450MHz Body SAR results

Option used	Device orientation	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	22.8 dBm	24.9 dBm	21.8 dBm
Slide closed	Display facing phantom	Without headset	-	-	-
		Headset HS-45+AD-54	-	-	-
	Back facing phantom	Without headset	0.019	0.040	0.045
		Headset HS-45+AD-54	0.019	**0.048**	0.044

Simultaneous transmissions: Combined SAR results

Test configuration	Max. 1g SAR results			Combined 1g SAR values	
	WLAN	850MHz band	1900MHz band	WLAN + 850MHz band	WLAN + 1900MHz band
Head: Left, Cheek	0.143	0.195	-	**0.338**	-
Head: Left, Tilt	0.050	-	0.265	-	**0.315**
Head: Right, Cheek	0.132	-	-	-	-
Head: Right, Tilt	0.049	-	-	-	-
Body: Without Headset	0.040	0.578	0.616	**0.618**	**0.656**
Body: Headset HS-45 + AD-54	0.048	-	-	-	-

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.

APPENDIX A: SYSTEM CHECKING SCANS

Date/Time: 2009-02-09 12:08:53

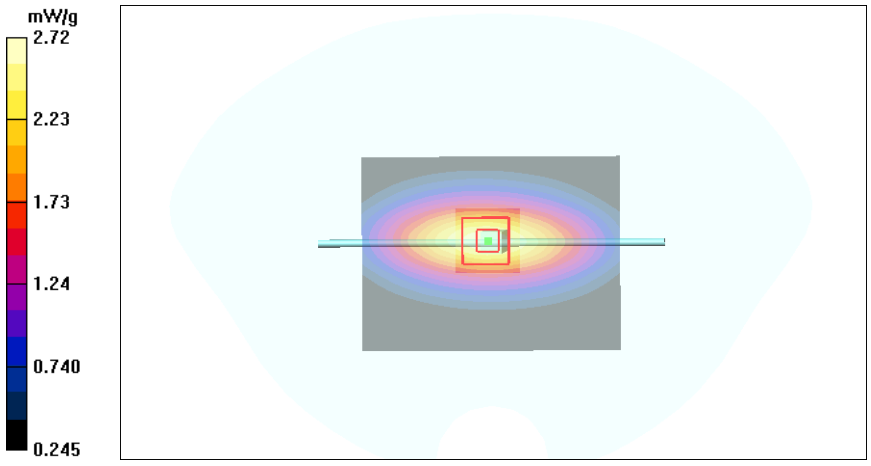
Test Laboratory: TCC Nokia
Type: D835V2; Serial: D835V2 - SN:480

Communication System: CW835
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL850; Medium Notes: 20.2 C
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1766
- ConvF(5.82, 5.82, 5.82); Calibrated: 2008-11-10
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2008-11-07
- 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) = 2.68 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.4 V/m
Peak SAR (extrapolated) = 3.71 W/kg
SAR(1 g) = 2.51 mW/g
SAR(10 g) = 1.64 mW/g
Power Drift = -0.043 dB
Maximum value of SAR (measured) = 2.72 mW/g



Date/Time: 2009-02-10 09:25:05

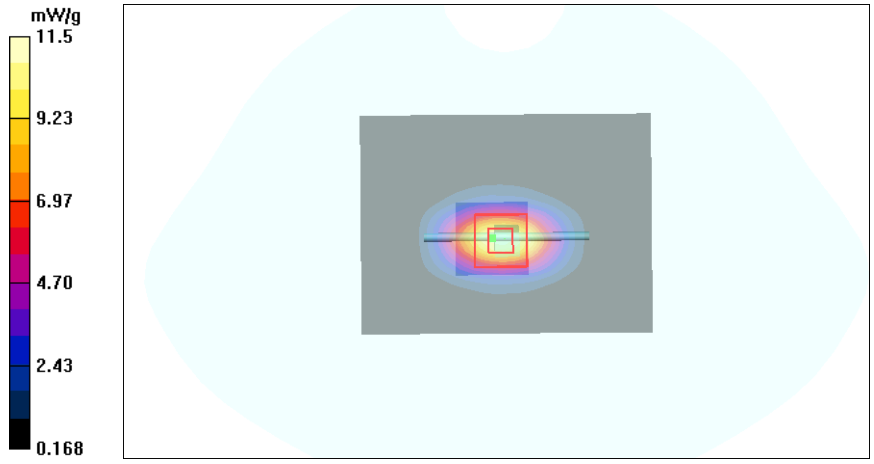
Test Laboratory: TCC Nokia
Type: D1900V2; Serial: D1900V2 - SN:5d030

Communication System: CW1900
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900; Medium Notes: 20.4C
Medium parameters used: f = 1900 MHz; σ = 1.4 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
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) = 12.2 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.9 V/m
Peak SAR (extrapolated) = 19.2 W/kg
SAR(1 g) = 10.2 mW/g
SAR(10 g) = 5.27 mW/g
Power Drift = 0.017 dB
Maximum value of SAR (measured) = 11.5 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 2009-02-09 13:21:32

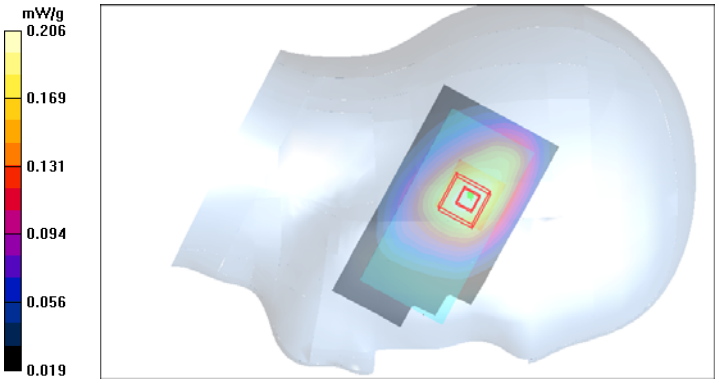
Test Laboratory: TCC Nokia
Type: RM-320; Serial: 355739/02/401508/7

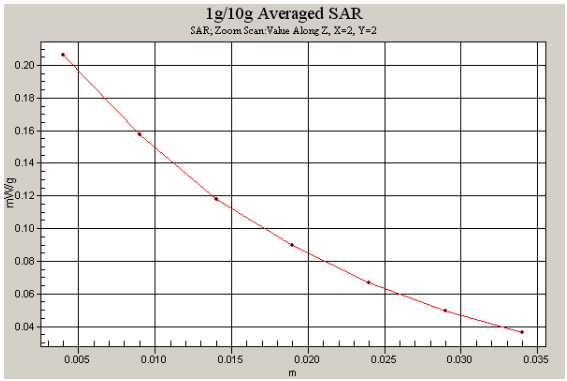
Communication System: 2-slot GPRS850
Frequency: 848.8 MHz; Duty Cycle: 1:4.2
Medium: HSL850; Medium Notes: 20.2 C
Medium parameters used: f = 849 MHz; σ = 0.898 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1766
- ConvF(5.82, 5.82, 5.82); Calibrated: 2008-11-10
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2008-11-07
- 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

Cheek position - High - Slide in MPS position/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.205 mW/g

Cheek position - High - Slide in MPS position/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 13.4 V/m
Peak SAR (extrapolated) = 0.255 W/kg
SAR(1 g) = 0.195 mW/g
SAR(10 g) = 0.141 mW/g
Power Drift = -0.018 dB
Maximum value of SAR (measured) = 0.206 mW/g





Date/Time: 2009-02-09 13:35:28

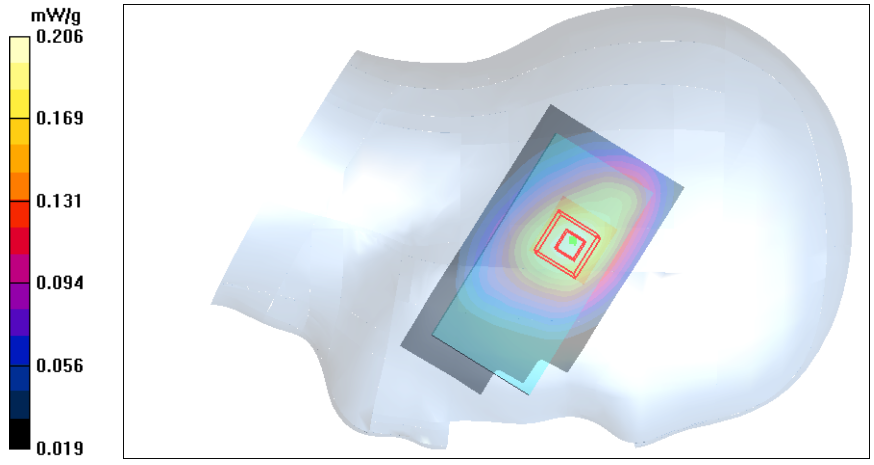
Test Laboratory: TCC Nokia
Type: RM-320; Serial: 355739/02/401508/7

Communication System: 2-slot GPRS850
Frequency: 848.8 MHz; Duty Cycle: 1:4.2
Medium: HSL850; Medium Notes: 20.2 C
Medium parameters used: f = 849 MHz; σ = 0.898 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1766
- ConvF(5.82, 5.82, 5.82); Calibrated: 2008-11-10
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2008-11-07
- 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

Cheek position - High – Slide in MPS position - BT/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.204 mW/g

Cheek position - High – slide in MPS position - BT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 13.5 V/m
Peak SAR (extrapolated) = 0.254 W/kg
SAR(1 g) = 0.194 mW/g
SAR(10 g) = 0.140 mW/g
Power Drift = -0.176 dB
Maximum value of SAR (measured) = 0.206 mW/g



Date/Time: 2009-02-10 12:05:38

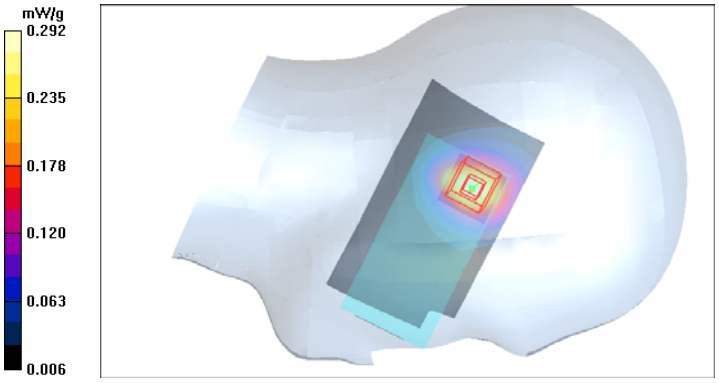
Test Laboratory: TCC Nokia
Type: RM-320; Serial: 355739/02/401508/7

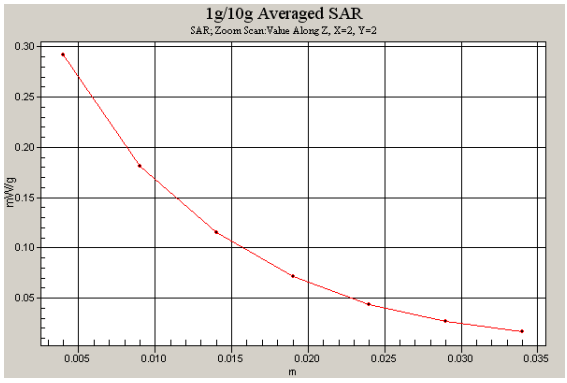
Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: HSL1900; Medium Notes: 20.0C
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section

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

Tilt position - Middle - Slide closed/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.298 mW/g

Tilt position - Middle - Slide closed/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 13.9 V/m
Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.265 mW/g
SAR(10 g) = 0.153 mW/g
Power Drift = -0.065 dB
Maximum value of SAR (measured) = 0.292 mW/g





Date/Time: 2009-02-10 12:47:01

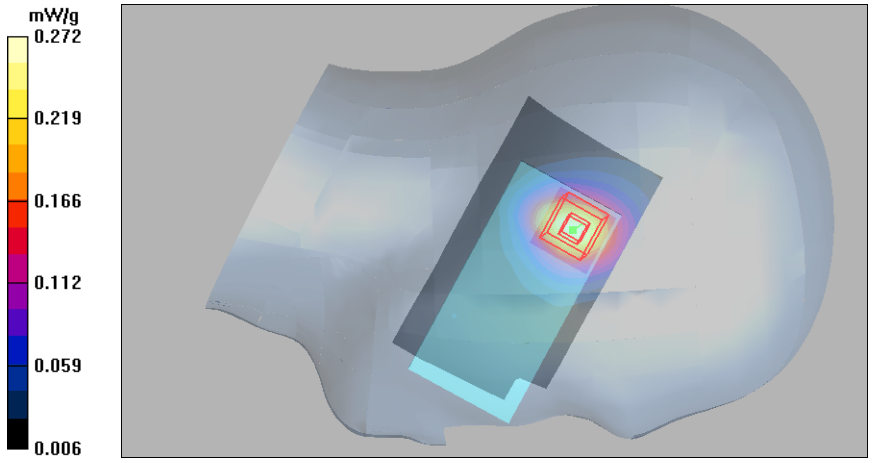
Test Laboratory: TCC Nokia
Type: RM-320; Serial: 355739/02/401508/7

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: HSL1900; Medium Notes: 20.0C
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3165
- ConvF(5.14, 5.14, 5.14); 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 4; Type: Twin SAM 040 CA; Serial: TP-1018
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Tilt position - Middle - Slide closed - BT/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.275 mW/g

Tilt position - Middle - Slide closed - BT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 13.4 V/m
Peak SAR (extrapolated) = 0.401 W/kg
SAR(1 g) = 0.248 mW/g
SAR(10 g) = 0.143 mW/g
Power Drift = -0.033 dB
Maximum value of SAR (measured) = 0.272 mW/g



Date/Time: 2009-02-09 14:16:05

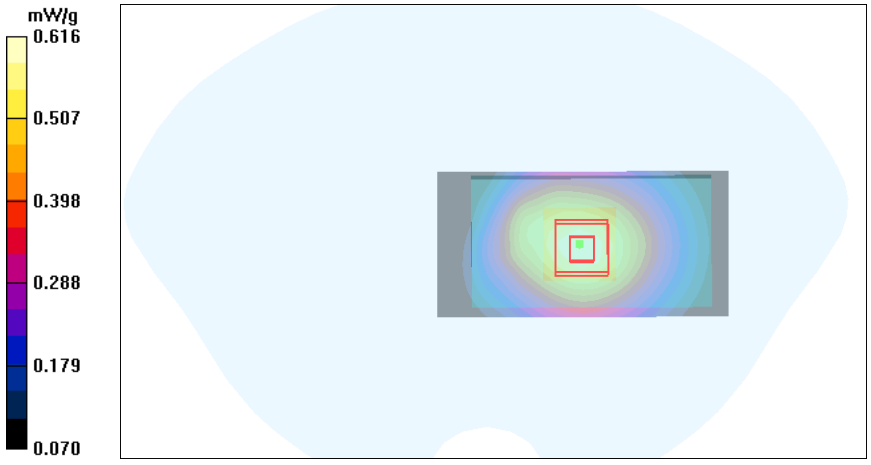
Test Laboratory: TCC Nokia
Type: RM-320; Serial: 355739/02/401508/7

Communication System: 2-slot GPRS850
Frequency: 848.8 MHz; Duty Cycle: 1:4.2
Medium: BSL850; Medium Notes: 20.6 C
Medium parameters used: f = 849 MHz; σ = 0.985 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1766
- ConvF(5.7, 5.7, 5.7); Calibrated: 2008-11-10
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))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 - High - Slide Closed - No Accessory - Back Facing Phantom/Area Scan (41x81x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.614 mW/g

Body Measurement - High - Slide Closed - No Accessory - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.6 V/m
Peak SAR (extrapolated) = 0.750 W/kg
SAR(1 g) = 0.578 mW/g
SAR(10 g) = 0.415 mW/g
Power Drift = -0.035 dB
Maximum value of SAR (measured) = 0.616 mW/g



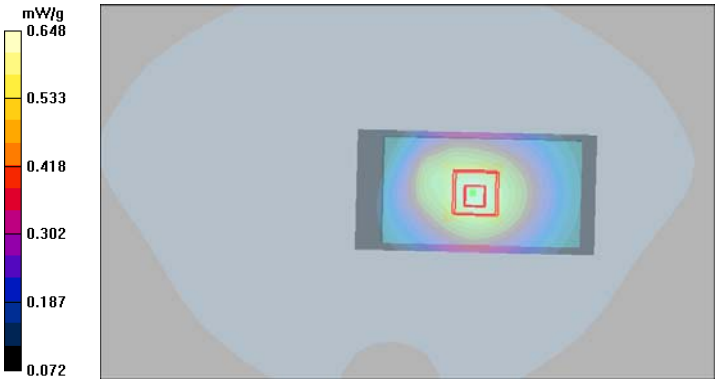
Test Laboratory: TCC Nokia
Type: RM-320; Serial: 355739/02/401508/7

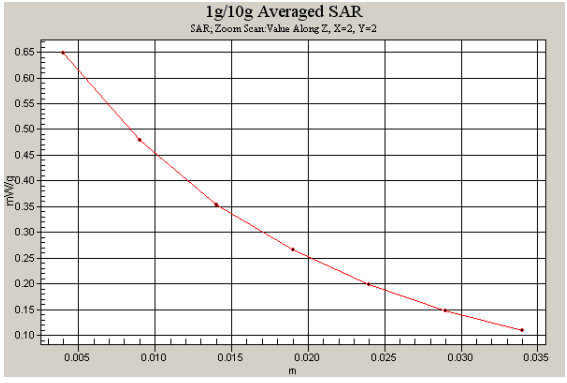
Communication System: 2-slot GPRS850
Frequency: 848.8 MHz; Duty Cycle: 1:4.2
Medium: BSL850; Medium Notes: 20.6 C
Medium parameters used: f = 849 MHz; σ = 0.985 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1766
- ConvF(5.7, 5.7, 5.7); Calibrated: 2008-11-10
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))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 - High - Slide Closed - No Accessory - Back Facing Phantom - BT/Area Scan (41x81x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.645 mW/g

Body Measurement - High - Slide Closed - No Accessory - Back Facing Phantom - BT/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.0 V/m
Peak SAR (extrapolated) = 0.803 W/kg
SAR(1 g) = 0.608 mW/g
SAR(10 g) = 0.435 mW/g
Power Drift = -0.116 dB
Maximum value of SAR (measured) = 0.648 mW/g





Date/Time: 2009-02-10 13:54:29

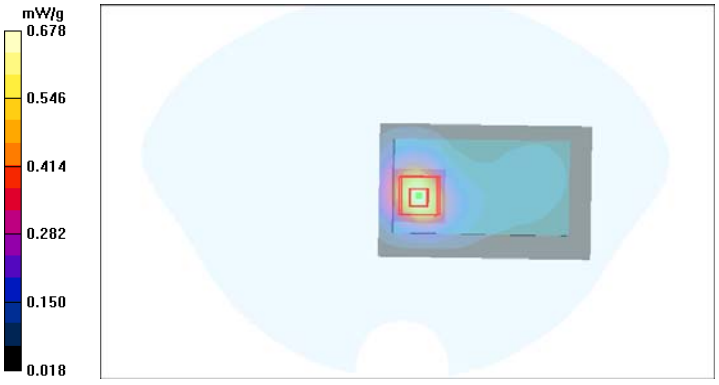
Test Laboratory: TCC Nokia
Type: RM-320; Serial: 355739/02/401508/7

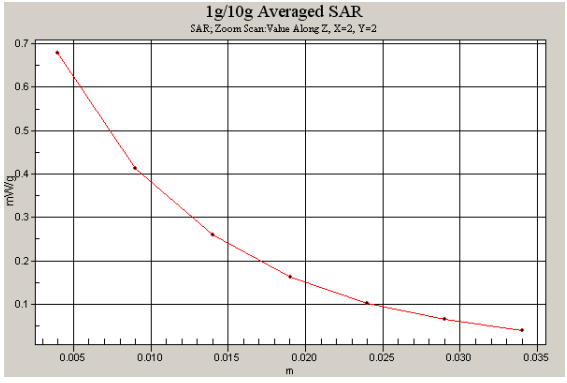
Communication System: 2-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:4.2
Medium: BSL1900; Medium Notes: 20.0 C
Medium parameters used: f = 1910 MHz; σ = 1.52 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 - Slide Closed - No Accessory - Back Facing Phantom/Area Scan (51x81x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.692 mW/g

Body Measurement - High - Slide Closed - No Accessory - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 19.2 V/m
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.616 mW/g
SAR(10 g) = 0.349 mW/g
Power Drift = -0.041 dB
Maximum value of SAR (measured) = 0.678 mW/g





Date/Time: 2009-02-10 14:08:19

Test Laboratory: TCC Nokia
Type: RM-320; Serial: 355739/02/401508/7

Communication System: 2-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:4.2
Medium: BSL1900; Medium Notes: 20.0 C
Medium parameters used: f = 1910 MHz; σ = 1.52 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
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 - Slide Closed - No Accessory - Back Facing Phantom - BT/Area Scan (51x81x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.667 mW/g

Body Measurement - High - Slide Closed - No Accessory - Back Facing Phantom - BT/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 18.8 V/m
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.602 mW/g
SAR(10 g) = 0.341 mW/g
Power Drift = -0.041 dB
Maximum value of SAR (measured) = 0.662 mW/g