TCC
Nokia

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

SAR Compliance Test Report

Test report no.:	Salo_SAR_0541_03	**Date of report:**	2005-11-01
Template version:	4	**Number of pages:**	58
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Responsible test engineer:	Virpi Tuominen	**Product contact person:**	Stephen Walmsley
Measurements made by:	Janne Hirsimäki, Virpi Tuominen		
Tested device:	RM-43		
FCC ID:	QEYRM-43	**IC:**	661L-RM43
Supplement reports:	-		

Testing has been carried out in accordance with:

47CFR §2.1093
Radiofrequency Radiation Exposure Evaluation: Portable Devices

FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)
Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

RSS-102
Evaluation Procedure for Mobile and Portable Radio Transmitters with Respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields

IEEE 1528 - 2003
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

Documentation: The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.

Test results: **The tested device complies with the requirements in respect of all parameters subject to the test.** The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.

Date and signatures:

For the contents:

Virpi Tuominen
System Test Manager

CONTENTS

1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2005-10-11 to 2005-10-25
SN, HW and SW numbers of tested device	SN: 004400/42/166236/0, HW: 4005, SW: 05w36_p1, DUT: 10800 SN: 004400/42/166222/0, HW: 4005, SW: wlan_Rx_damn, DUT: 10832
Batteries used in testing	BL-5C, DUT: 10802, 10803
Headsets used in testing	AD-36, DUT: 10813
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	Position	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
GSM1900 + WLAN2450	Left Cheek	1.6 W/kg	0.74 W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Separation distance	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
GSM1900+WLAN2450	1.5cm	1.6 W/kg	0.58 W/kg	PASSED

1.2.3 Maximum Drift

Maximum drift during measurements	-0.36 dB

1.2.4 Measurement Uncertainty

Extended Uncertainty (k=2) 95%	± 29.8 %

2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	General population / uncontrolled

Modes and Bands of Operation	GSM 1900	GPRS 1900	EGPRS 1900	BT	WLAN
Modulation Mode	GMSK	GMSK	8PSK	GFSK	
Duty Cycle	1/8	1/8 or 2/8	1/8 or 2/8		1
Transmitter Frequency Range (MHz)	1850 - 1910	1850 - 1910	1850 - 1910	2402-2480	2412–2462

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

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

2.1 Picture of the Device


Device with slide closed


Device with slide open

2.2 Description of the Antenna

The device has an internal patch antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	21.5 to 23.1
Ambient humidity (RH %):	33 to 53

3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester, except in the case of WLAN2450 for which command instructions were used. When a call tester 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 as used for SAR testing.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

The measurements were performed using an automated near-field scanning system, DASY4 software version 4.6, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements on the device was the 'worst-case extrapolation' algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE V1	388	12 months	2006-01
E-field Probe ET3DV6	1396	12 months	2006-01
Dipole Validation Kit, D1900V2	5d026	24 months	2007-01
Dipole Validation Kit, D2450V2	749	24 months	2006-06

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	SML03	101265	12 months	2006-07
Amplifier	ZHL-42 (SMA)	N072095-5	12 months	2006-07
Power Meter	NRVS	849305/028	12 months	2006-07
Power Sensor	NRV-Z32	839176/020	12 months	2006-07
Call Tester	CMU 200	101111	-	-
Call Tester	CMU 200	104983	-	-
Vector Network Analyzer	8753E	US38432928	12 months	2005-10
Dielectric Probe Kit	85070B	US33020420	-	-

4.1.1 Isotropic E-field Probe SN: 1396

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., butyl diglycol)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 3 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.2 Phantoms

The phantom used for all tests i.e. for both system checking and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2003.

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

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

4.3 Tissue Simulants

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

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

4.3.1 Tissue Simulant Recipes

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

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	70.2
Tween 20	44.0	29.62
Salt	-	0.18

4.3.2 System Checking

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

System checking, head tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
1900	Reference result	9.49	39.5	1.46	
	± 10% window	8.54 – 10.44			
	2005-10-10	10.1	38.2	1.40	21.0
	2005-10-11	10.3	38.3	1.41	21.0
	2005-10-12	10.1	38.5	1.39	21.0
2450	Reference result	13.5	38.5	1.86	
	± 10% window	12.2 – 14.8			
	2005-10-21	14.2	38.4	1.84	21.0
	2005-10-24	14.3	38.1	1.88	21.0

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
1900	Reference result	9.65	52.2	1.57	
	± 10% window	8.68 – 10.62			
	2005-10-12	9.95	53.3	1.53	21.0
2450	Reference result	13.2	51.5	2.00	
	± 10% window	11.9 – 14.5			
	2005-10-25	14.4	51.8	2.02	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]	
1880	Recommended value	40.0	1.40	
	± 5% window	38.0 – 42.0	1.33 – 1.47	
	2005-10-10	38.2	1.38	21.0
	2005-10-11	38.3	1.39	21.0
	2005-10-12	38.7	1.38	21.0
2442	Recommended value	39.2	1.79	
	± 5% window	37.3 – 41.2	1.70 – 1.88	
	2005-10-21	38.4	1.83	21.0
	2005-10-24	38.1	1.87	21.0

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
1880	Recommended value	53.3	1.52	
	± 5% window	50.6 – 56.0	1.44 – 1.60	
	2005-10-12	53.4	1.52	21.0
2442	Recommended value	52.7	1.94	
	± 5% window	50.1 – 55.3	1.85 – 2.04	
	2005-10-24	51.7	2.01	21.0
	2005-10-25	51.8	2.00	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”.

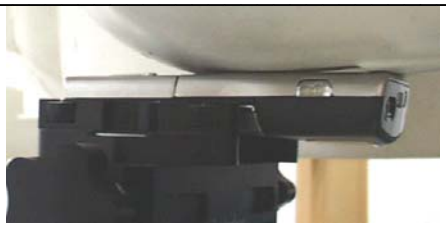


Photo of the device with slide closed in “cheek” position

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

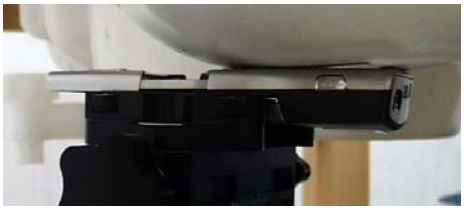


Photo of the device with slide open in “cheek” position

Photo of the device with slide open 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 slide closed with its antenna facing the phantom since this orientation gives higher results.

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

5.3 Scan Procedures

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

5.4 SAR Averaging Methods

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

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

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

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

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	c_i	$c_i . u_i$ (%)	v_i
Measurement System							
Probe Calibration	E2.1	±5.8	N	1	1	±5.8	∞
Axial Isotropy	E2.2	±4.7	R	√3	$(1-c_p)^{1/2}$	±1.9	∞
Hemispherical Isotropy	E2.2	±9.6	R	√3	$(c_p)^{1/2}$	±3.9	∞
Boundary Effect	E2.3	±8.3	R	√3	1	±4.8	∞
Linearity	E2.4	±4.7	R	√3	1	±2.7	∞
System Detection Limits	E2.5	±1.0	R	√3	1	±0.6	∞
Readout Electronics	E2.6	±1.0	N	1	1	±1.0	∞
Response Time	E2.7	±0.8	R	√3	1	±0.5	∞
Integration Time	E2.8	±2.6	R	√3	1	±1.5	∞
RF Ambient Conditions - Noise	E6.1	±3.0	R	√3	1	±1.7	∞
RF Ambient Conditions - Reflections	E6.1	±3.0	R	√3	1	±1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	±0.4	R	√3	1	±0.2	∞
Probe Positioning with respect to Phantom Shell	E6.3	±2.9	R	√3	1	±1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5.2	±3.9	R	√3	1	±2.3	∞
Test sample Related							
Test Sample Positioning	E4.2.1	±6.0	N	1	1	±6.0	11
Device Holder Uncertainty	E4.1.1	±5.0	N	1	1	±5.0	7
Output Power Variation - SAR drift measurement	6.6.3	±10.0	R	√3	1	±5.8	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	±4.0	R	√3	1	±2.3	∞
Conductivity Target - tolerance	E3.2	±5.0	R	√3	0.64	±1.8	∞
Conductivity - measurement uncertainty	E3.3	±5.5	N	1	0.64	±3.5	5
Permittivity Target - tolerance	E3.2	±5.0	R	√3	0.6	±1.7	∞
Permittivity - measurement uncertainty	E3.3	±2.9	N	1	0.6	±1.7	5
Combined Standard Uncertainty			RSS			**±14.9**	206
Coverage Factor for 95%			**k=2**				
Expanded Standard Uncertainty						**±29.8**	

7. RESULTS

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

1900MHz, Head SAR results

Mode	Slide	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	Closed	**Power**		**26.8 dBm**	**28.1 dBm**	**26.5 dBm**
		Left	Cheek	0.404	0.346	0.328
			Tilt	-	0.320	-
		Right	Cheek	-	0.330	-
			Tilt	-	0.331	-
2-slot GPRS	Open	**Power**		**26.5 dBm**	**26.4 dBm**	**26.0 dBm**
		Left	Cheek	0.407	0.404	**0.410**
			Tilt	-	0.301	-
		Right	Cheek	-	0.331	-
			Tilt	-	0.325	-
2-slot GPRS	Open	Left Cheek, BT active		-	-	0.391
GSM	Closed	**Power**		**29.9 dBm**	**30.7 dBm**	**29.4 dBm**
		Left Cheek		0.362	0.337	0.338
GSM	Open	**Power**		**28.9 dBm**	**29.1 dBm**	**28.1 dBm**
		Left Cheek		0.411	0.413	**0.415**
GSM	Open	Left Cheek, BT active		-	-	0.410
2-slot EGPRS	Closed	**Power**		**25.8 dBm**	**27.1 dBm**	**25.6 dBm**
		Left Cheek		0.219	0.207	0.205
2-slot EGPRS	Open	**Power**		**25.4 dBm**	**25.3 dBm**	**24.4 dBm**
		Left Cheek		0.252	0.262	0.233

2450MHz, Head SAR results

Mode	Slide	Test configuration		SAR, averaged over 1g (W/kg)		
				Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
WLAN2450	Closed	Power		22.0 dBm	22.0 dBm	17.8 dBm
		Left	Cheek	-	0.147	-
			Tilt	-	0.099	-
		Right	Cheek	0.241	0.160	0.165
			Tilt	-	0.088	-
WLAN2450	Open	Power		23.6 dBm	19.0 dBm	19.6 dBm
		Left	Cheek	**0.323**	0.153	-
			Tilt	-	0.048	-
		Right	Cheek	0.304	0.157	0.179
			Tilt	-	0.045	-

Combined 1900MHz and WLAN2450, Head SAR results

Slide	Test configuration		Max. 1g SAR results			Sum of 1g SAR values
			2-slot GPRS1900	GSM1900	WLAN2450	GSM/GPRS 1900 + WLAN2450
Closed	Left	Cheek	0.404	-	0.147	0.551
		Tilt	0.320	-	0.099	0.419
	Right	Cheek	0.330	-	0.241	0.571
		Tilt	0.331	-	0.088	0.419
Open	Left	Cheek	-	0.415	0.323	**0.738**
		Tilt	0.301	-	0.048	0.349
	Right	Cheek	0.331	-	0.304	0.635
		Tilt	0.325	-	0.045	0.370

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

1900MHz, Body SAR results

Option used: Slide	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
Closed	2-slot GPRS	26.8 dBm	28.1 dBm	26.5 dBm
	Without headset	**0.467**	0.442	0.393
	Headset AD-36	0.407	0.388	0.370
Closed	Without headset, BT active	**0.475**	-	-
Closed	GSM	29.9 dBm	30.7 dBm	29.4 dBm
	Without headset	**0.468**	0.430	0.382
	Headset AD-36	0.387	-	-
Closed	Without headset, BT active	**0.485**	-	-

2450MHz, Body SAR results

Option used: Slide	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
Closed	WLAN2450	22.0 dBm	22.0 dBm	17.8 dBm
	Without headset	0.095	0.032	0.031
	Headset AD-36	**0.107**	0.033	0.030

Combined 1900MHz and WLAN2450, Body SAR results

Slide	Test Configuration	Max. 1g SAR results			Sum of 1g SAR values
		GSM1900	2-slot GPRS1900	WLAN2450	GSM/GPRS1900 + WLAN2450
Closed	Without headset	0.485	-	0.095	**0.580**
	With headset	-	0.407	0.107	0.514

Plots of the Measurement scans are given in Appendix B.

APPENDIX A: SYSTEM CHECKING SCANS

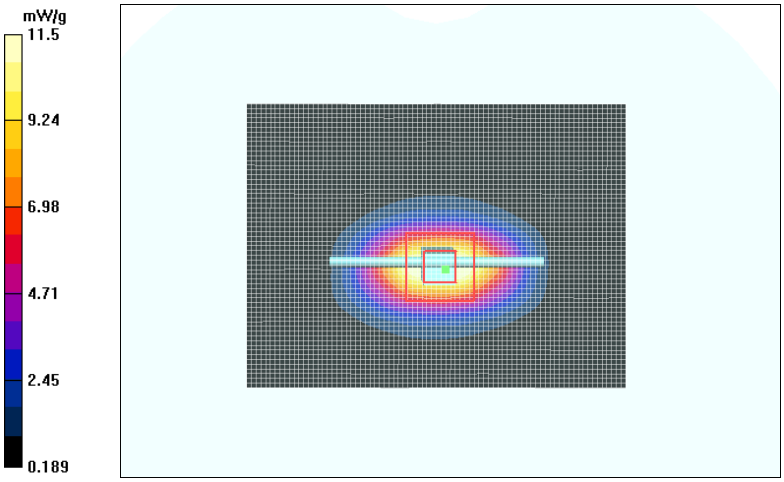
Date/Time: 2005-10-10 21:41:08
Test Laboratory: TCC Nokia
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d026, Program Name: System Check

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.4 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1396; ConvF(5.25, 5.25, 5.25); Calibrated: 20.01.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn388; Calibrated: 07.01.2005
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=250mW, t=20.9 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.2 mW/g

d=15mm, Pin=250mW, t=20.9 C/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.0 V/m; Power Drift = 0.047 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.33 mW/g
Maximum value of SAR (measured) = 11.5 mW/g

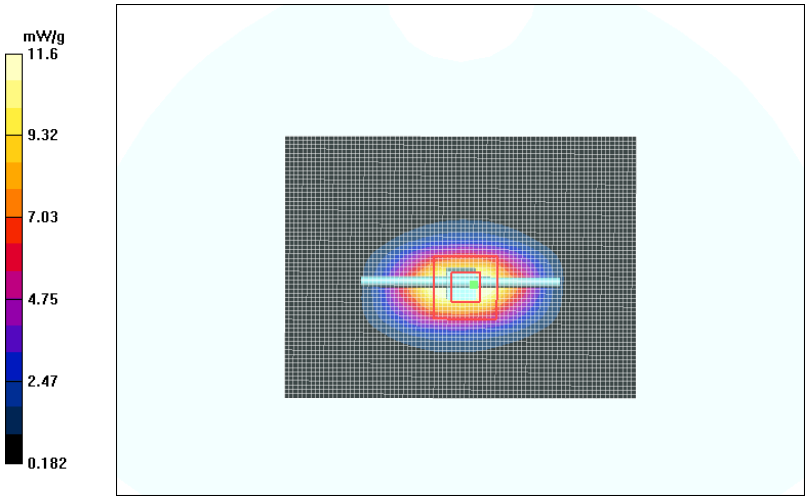


Date/Time: 2005-10-11 08:30:05
Test Laboratory: TCC Nokia
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d026, Program Name: System Check

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.41 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1396; ConvF(5.25, 5.25, 5.25); Calibrated: 20.01.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn388; Calibrated: 07.01.2005
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=250mW, t=21.8 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.5 mW/g

d=15mm, Pin=250mW, t=21.8 C/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.5 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.45 mW/g
Maximum value of SAR (measured) = 11.6 mW/g



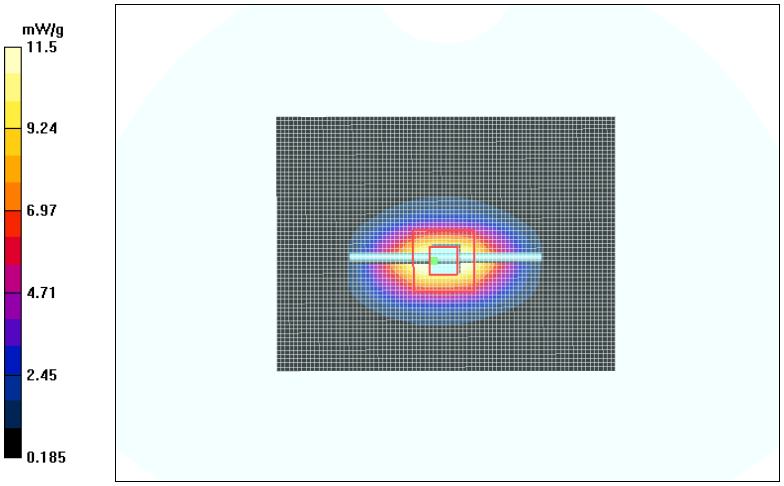
Date/Time: 2005-10-12 16:09:40
Test Laboratory: TCC Nokia
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d026, Program Name: System Check

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.39 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1396; ConvF(5.25, 5.25, 5.25); Calibrated: 20.01.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn388; Calibrated: 07.01.2005
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=247mW, t=21.8 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.2 mW/g

d=15mm, Pin=247mW, t=21.8 C/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.2 V/m; Power Drift = 0.055 dB
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.36 mW/g
Maximum value of SAR (measured) = 11.5 mW/g



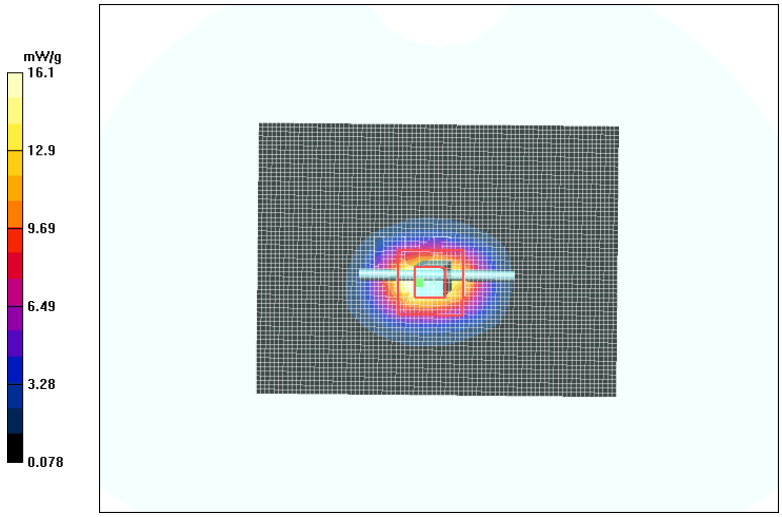
Date/Time: 2005-10-21 09:20:52
Test Laboratory: TCC Nokia
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:749, Program Name: System Check

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1396; ConvF(4.59, 4.59, 4.59); Calibrated: 20.01.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn388; Calibrated: 07.01.2005
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=250mW, t=21.8 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 18.1 mW/g

d=15mm, Pin=250mW, t=21.8 C/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.2 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 30.4 W/kg
SAR(1 g) = 14.2 mW/g; SAR(10 g) = 6.59 mW/g
Maximum value of SAR (measured) = 16.1 mW/g



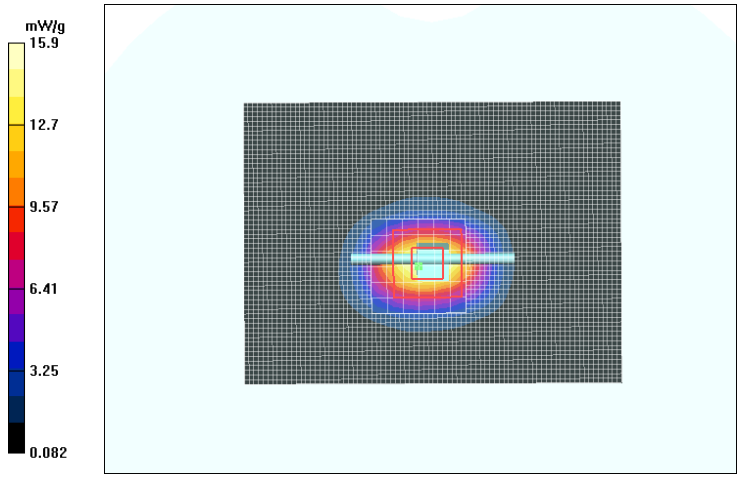
Date/Time: 2005-10-24 09:50:09
Test Laboratory: TCC Nokia
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:749, Program Name: System Check

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.88 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1396; ConvF(4.59, 4.59, 4.59); Calibrated: 20.01.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn388; Calibrated: 07.01.2005
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=247mW, t=21.9 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 17.8 mW/g

d=15mm, Pin=247mW, t=21.9 C/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.6 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 30.3 W/kg
SAR(1 g) = 14.3 mW/g; SAR(10 g) = 6.63 mW/g
Maximum value of SAR (measured) = 15.9 mW/g



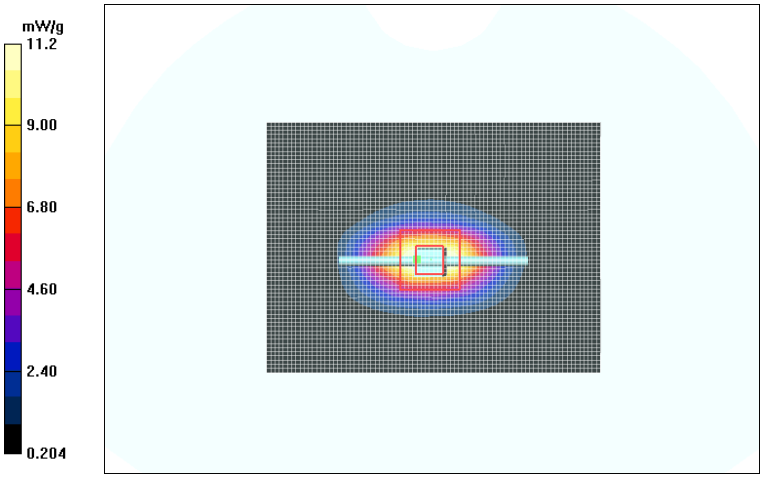
Date/Time: 2005-10-12 08:38:41
Test Laboratory: TCC Nokia
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d026, Program Name: System Check

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1396; ConvF(4.64, 4.64, 4.64); Calibrated: 20.01.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn388; Calibrated: 07.01.2005
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=250mW, t=20.8 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.0 mW/g

d=15mm, Pin=250mW, t=20.8 C/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.1 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.95 mW/g; SAR(10 g) = 5.3 mW/g
Maximum value of SAR (measured) = 11.2 mW/g



Date/Time: 2005-10-25 09:18:42
Test Laboratory: TCC Nokia
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:749, Program Name: System Check

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1396; ConvF(4.18, 4.18, 4.18); Calibrated: 20.01.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn388; Calibrated: 07.01.2005
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=251mW, t=22.0 C/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 17.2 mW/g

d=15mm, Pin=251mW, t=22.0 C/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.4 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 31.3 W/kg
SAR(1 g) = 14.4 mW/g; SAR(10 g) = 6.67 mW/g
Maximum value of SAR (measured) = 16.3 mW/g