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Nokia

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SAR Compliance Test Report

Test report no.:	Bej_SAR_0913_13	**Date of report:**	2009-03-26
Template version:	11.0	**Number of pages:**	40
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Responsible test engineer:	Liang Dong	**Product contact person:**	Sun Michael
Measurements made by:	Liang Dong		
Tested device:	RM-513		
FCC ID:	QTLRM-513	**IC:**	661AB-RM513
Supplement reports:	Bej_SAR_0913_14		

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:

Liang Dong

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CONTENTS

1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2009-03-10 to 2009-03-24
SN, HW and SW numbers of tested device	SN: 001004/00/352130/0, HW: 0306, SW: pol07w41_09w03, DUT: 51143 SN: 001004/00/352793/5, HW: 0404, SW: pol07w41_09w03, DUT: 50944
Batteries used in testing	BL-5C, DUT: 51139, 51112, 50951, 50950
Headsets used in testing	HS-105, DUT: 50926
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
GSM850	251 / 848.8	30.0 dBm ERP	Right, Cheek	1.27 W/kg	**1.42 W/kg**	1.6 W/kg	PASSED
GSM1900	661 / 1880.0	30.4 dBm EIRP	Left, Cheek	1.04 W/kg	**1.16 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	190 / 836.6	28.5 dBm ERP	2.2 cm	0.797 W/kg	**0.89 W/kg**	1.6 W/kg	PASSED
2-slot GPRS1900	810 / 1909.8	29.6 dBm EIRP	2.2 cm	0.353 W/kg	**0.40 W/kg**	1.6 W/kg	PASSED

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

1.2.3 Maximum Drift

Maximum drift covered by 12% scaling up of the SAR values	Maximum drift during measurements
0.5dB	0.29dB

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 2/8	824 – 849 1850 – 1910
BT	2450	GFSK	1	2402 – 2480

2.1 Description of the Antenna

The device has an internal antenna. It is located at the top of the device underneath the back surface.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	20.6 to 22.3
Ambient humidity (RH %):	40 to 50

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 radiated peak powers given in the result tables (Section 7) are, in general, poor indicators of the maximum SAR test configuration(s) of a product. This is partially due to the measurement uncertainty associated with radiated power testing but can also be due to other factors e.g. the number of transmit slots used in multi-slot GPRS modes. An example of the multi-slot issue is a power value of 29.5dBm in 1-slot GSM power will produce a lower SAR value than 27.0dBm power in 2-slot GPRS mode.

As a result of the unreliability of radiated peak powers to indicate the maximum SAR test configurations, the sequence of SAR tests made to evaluate this device has used test logic that is based on measured SAR values. Comparison of measured SAR values has also allowed some test minimization (i.e. test elimination) to be made during the testing of this device. For example, when SAR testing multi-slot GSM/GPRS modes, it would be an inefficient use of test resources to fully SAR test every test configuration in each of the multi-slot modes as these modes will have a fixed power relationship between them that doesn't vary with test configuration. In these cases, a single comparative SAR test - using the same test configuration – is made in each of the multi-slot modes to determine the mode with the highest SAR i.e. the highest average power; the identified mode is then subjected to full SAR testing in all test configurations. These comparative SAR tests (same frequency, same test configuration) are regarded as extremely accurate as they are relative tests in which the tested device changes neither its frequency nor its position from test to test.

HW 0404 has been tested for 850MHz band, HW 0306 has been tested for 1900MHz band. These hardware builds are identical, other than HW 0404 has the correct 850MHz power tunings.

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	480	12 months	2009-09
E-field Probe ET3DV6	1652	12 months	2009-09
Dipole Validation Kit, D835V2	4d005	24 months	2010-03
Dipole Validation Kit, D1900V2	547	24 months	2009-09
DASY4 software	Version 4.6	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	8648C	3847M00258	12 months	2009-05
Call Tester	CMU200	835352/008	-	-
Amplifier	AR 5SIG4M3	302339	12 months	2009-05
RF Network Analyzer	8753ES	My40002096	12 months	2009-05
Dielectric Probe Kit	85070C	01033717	-	-
Power Meter	Agilent E4419B	My41291520	12 months	2009-05
Power Sensor	Agilent 8482A	US37295411	12 months	2009-05

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

4.2 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	39.74	55.97
HEC	0.25	1.21
Sugar	58.31	41.76
Preservative	0.15	0.27
Salt	1.55	0.79

1900MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	54.50	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	2.26	41.5	0.90	
	± 10% window	2.03 – 2.49			
835	2009-03-24	2.40	40.6	0.87	21.4
	Reference result	9.47	39.3	1.46	
	± 10% window	8.52 – 10.42			
1900	2009-03-10	9.91	39.1	1.45	21.3

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	2009-03-24	40.6	0.87	21.4
	Recommended value	40.0	1.40	
	± 5% window	38.0 – 42.0	1.33 – 1.47	
1880	2009-03-10	39.2	1.44	21.3

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	2009-03-24	53.5	0.99	21.6
	Recommended value	53.3	1.52	
	± 5% window	50.6 – 56.0	1.44 – 1.60	
1880	2009-03-10	53.6	1.54	22.0

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".

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. The device was oriented with both sides facing the phantom to find the highest results.

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
GSM	Power		29.3 dBm	29.9 dBm	30.0 dBm
HWID: 0404	Left	Cheek	0.870	1.14	1.18
		Tilt	-	0.571	-
	Right	Cheek	0.939	1.22	**1.27**
		Tilt	-	0.538	-

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
GSM	Power		29.4 dBm	30.4 dBm	30.5 dBm
HWID: 0306	Left	Cheek	0.951	**1.04**	0.898
		Tilt	-	0.515	-
	Right	Cheek	0.927	0.953	0.923
		Tilt	-	0.432	-

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
GSM		**Power**	**29.3 dBm**	**29.9 dBm**	**30.0 dBm**
HWID: 0404	Display facing phantom	Without headset	-	0.519	-
		Headset HS-105	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset HS-105	-	-	-
2-slot GPRS		**Power**	**27.8 dBm**	**28.5 dBm**	**28.6 dBm**
HWID: 0404	Display facing phantom	Without headset	-	0.686	-
		Headset HS-105	-	0.392	
	Back facing phantom	Without headset	0.635	**0.797**	0.780
		Headset HS-105	-	0.591	-

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
GSM		**Power**	**29.4 dBm**	**30.4 dBm**	**30.5 dBm**
HWID: 0306	Display facing phantom	Without headset	-	0.185	-
		Headset HS-105	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset HS-105	-	-	-
2-slot GPRS		**Power**	**28.4 dBm**	**29.5 dBm**	**29.6 dBm**
HWID: 0306	Display facing phantom	Without headset	-	0.293	-
		Headset HS-105	-	0.291	-
	Back facing phantom	Without headset	-	0.349	-
		Headset HS-105	0.296	0.350	**0.353**

Plots of the Measurement scans are given in Appendix B.

APPENDIX A: SYSTEM CHECKING SCANS

Date/Time: 2009-03-24 9:13:08 AM

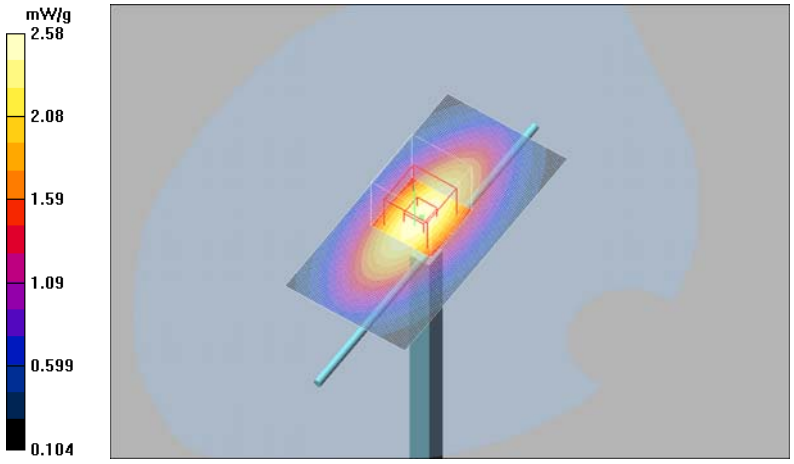
Test Laboratory: TCC Nokia
Type: D835V2; Serial: 4d005

Communication System: CW835
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 835 MHz; σ = 0.87 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.27, 6.27, 6.27); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.58 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.1 V/m
Peak SAR (extrapolated) = 3.53 W/kg
SAR(1 g) = 2.4 mW/g
SAR(10 g) = 1.57 mW/g
Power Drift = -0.024 dB
Maximum value of SAR (measured) = 2.58 mW/g



Date/Time: 2009-03-10 10:06:40 AM

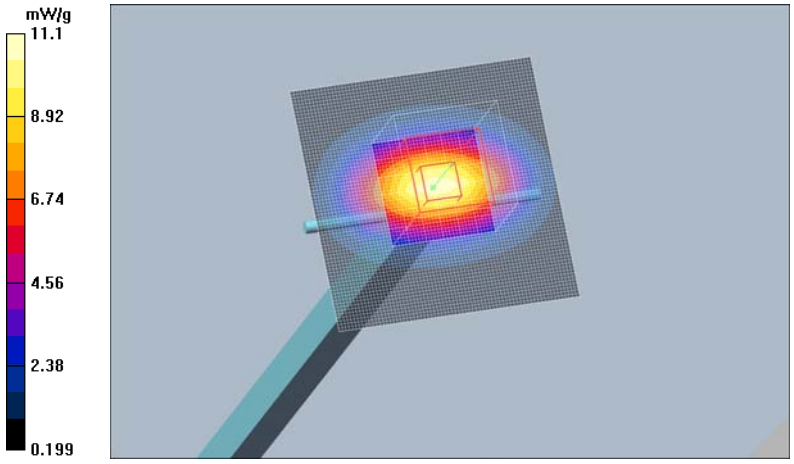
Test Laboratory: TCC Nokia
Type: D1900V2; Serial: 547

Communication System: CW1900
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.3 C
Medium parameters used: f = 1900 MHz; σ = 1.45 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.98, 4.98, 4.98); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.3 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.5 V/m
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 9.91 mW/g
SAR(10 g) = 5.18 mW/g
Power Drift = -0.041 dB
Maximum value of SAR (measured) = 11.1 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 2009-03-24 10:03:59 AM

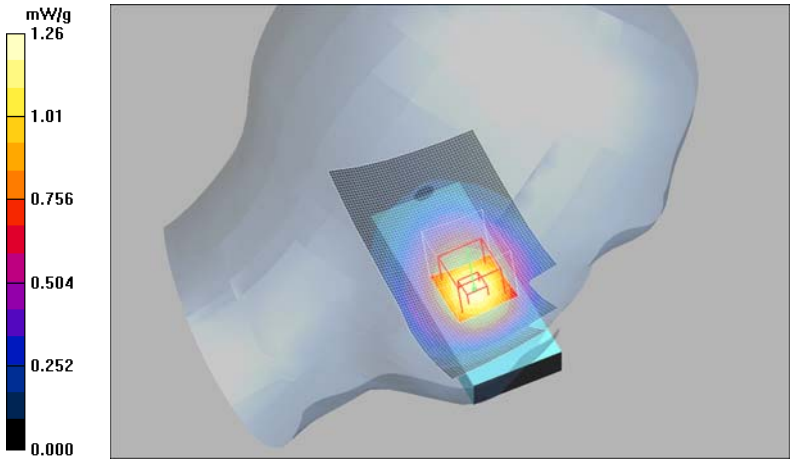
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352793/5

Communication System: GSM850
Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 849 MHz; σ = 0.884 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.27, 6.27, 6.27); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.26 mW/g

Cheek position - High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 12.4 V/m
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 1.18 mW/g
SAR(10 g) = 0.801 mW/g
Power Drift = 0.025 dB
Maximum value of SAR (measured) = 1.29 mW/g



Date/Time: 2009-03-24 10:16:00 AM

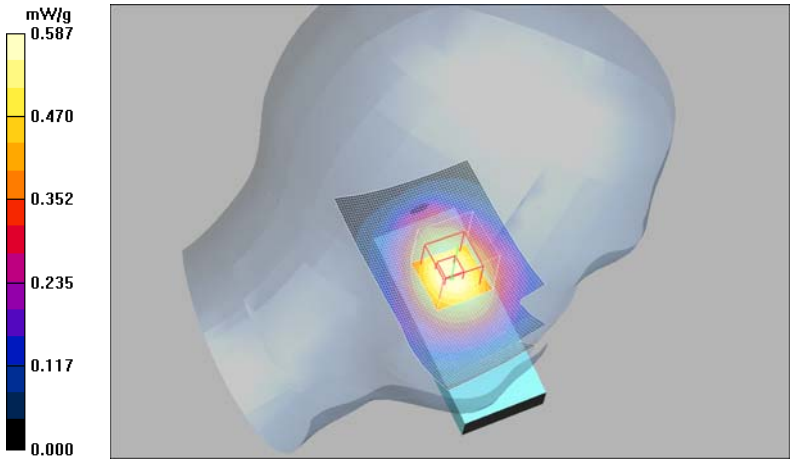
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352793/5

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 837 MHz; σ = 0.871 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.27, 6.27, 6.27); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.587 mW/g

Tilt position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 18.6 V/m
Peak SAR (extrapolated) = 0.745 W/kg
SAR(1 g) = 0.571 mW/g
SAR(10 g) = 0.411 mW/g
Power Drift = 0.120 dB
Maximum value of SAR (measured) = 0.605 mW/g



Date/Time: 2009-03-24 10:57:45 AM

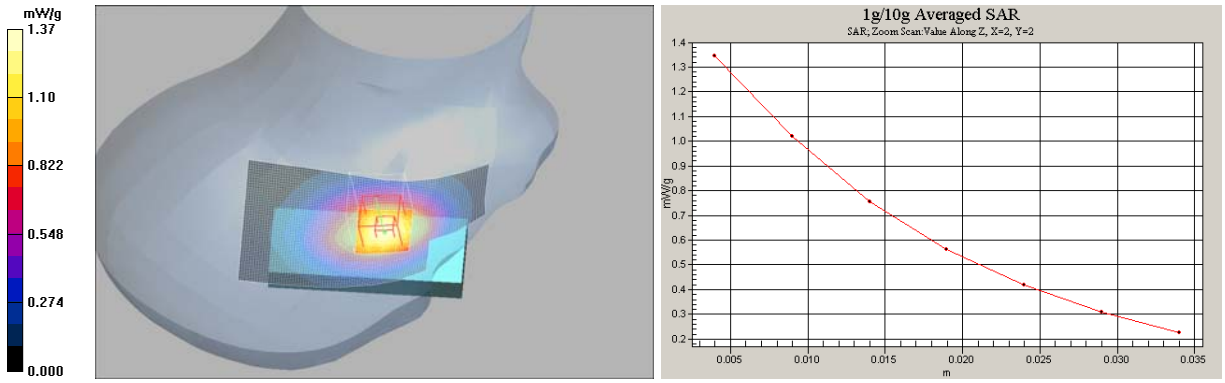
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352793/5

Communication System: GSM850
Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 849 MHz; σ = 0.884 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.27, 6.27, 6.27); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.37 mW/g

Cheek position - High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 13.5 V/m
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 1.27 mW/g
SAR(10 g) = 0.883 mW/g
Power Drift = -0.060 dB
Maximum value of SAR (measured) = 1.34 mW/g



Date/Time: 2009-03-24 11:10:04 AM

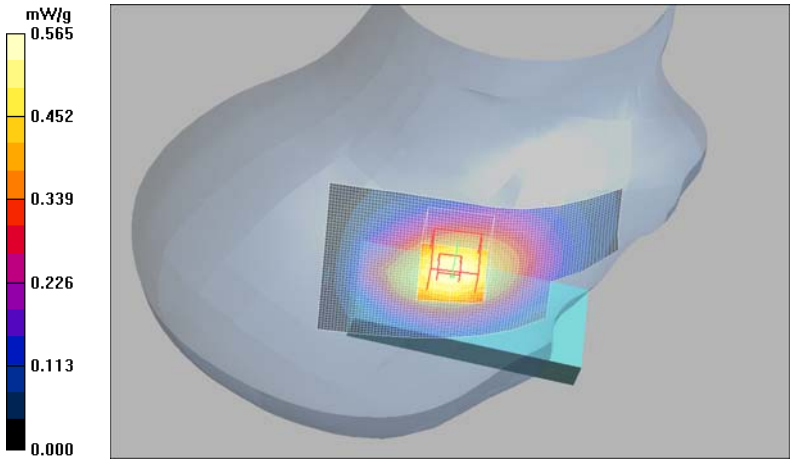
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352793/5

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=21.4 C
Medium parameters used: f = 837 MHz; σ = 0.871 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.27, 6.27, 6.27); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.565 mW/g

Tilt position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.3 V/m
Peak SAR (extrapolated) = 0.708 W/kg
SAR(1 g) = 0.538 mW/g
SAR(10 g) = 0.387 mW/g
Power Drift = 0.030 dB
Maximum value of SAR (measured) = 0.569 mW/g



Date/Time: 2009-03-10 10:48:26 AM

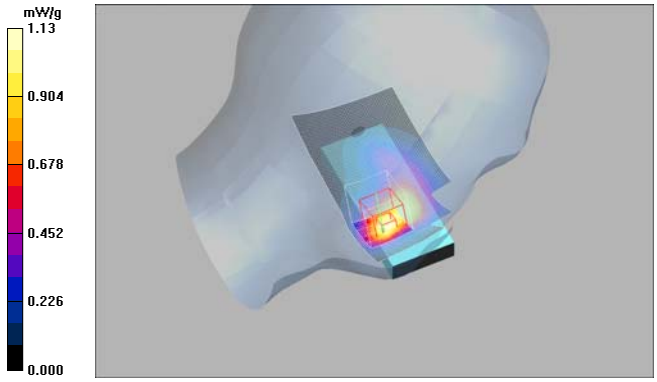
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352130/0

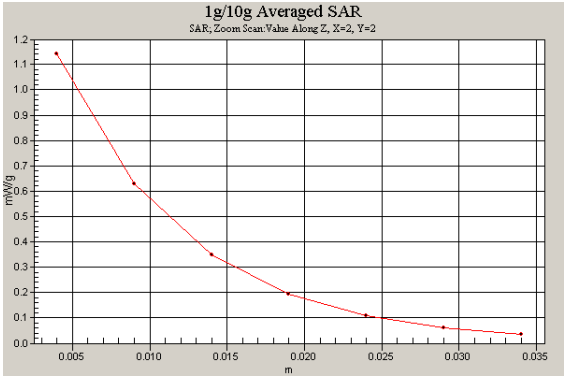
Communication System: GSM1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.3 C
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.98, 4.98, 4.98); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.13 mW/g

Cheek position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.14 V/m
Peak SAR (extrapolated) = 1.97 W/kg
SAR(1 g) = 1.04 mW/g
SAR(10 g) = 0.578 mW/g
Power Drift = 0.089 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) = 1.14 mW/g





Date/Time: 2009-03-10 11:03:50 AM

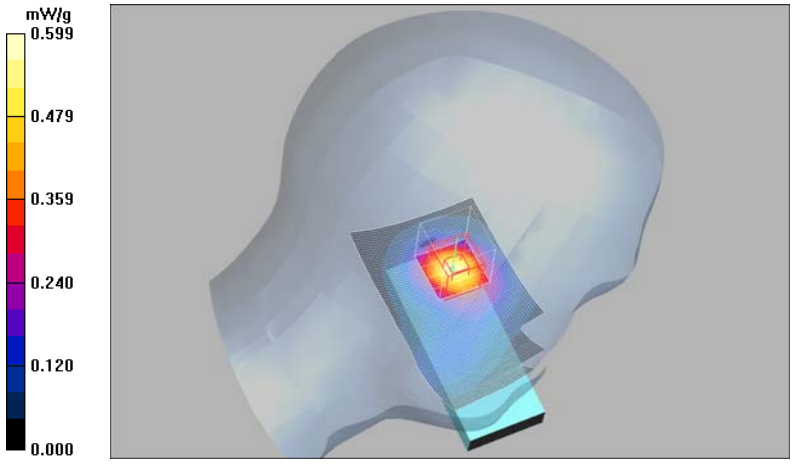
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352130/0

Communication System: GSM1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.3 C
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.98, 4.98, 4.98); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.599 mW/g

Tilt position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 14.1 V/m
Peak SAR (extrapolated) = 0.816 W/kg
SAR(1 g) = 0.515 mW/g
SAR(10 g) = 0.300 mW/g
Power Drift = -0.162 dB
Maximum value of SAR (measured) = 0.561 mW/g



Date/Time: 2009-03-10 11:58:21 AM

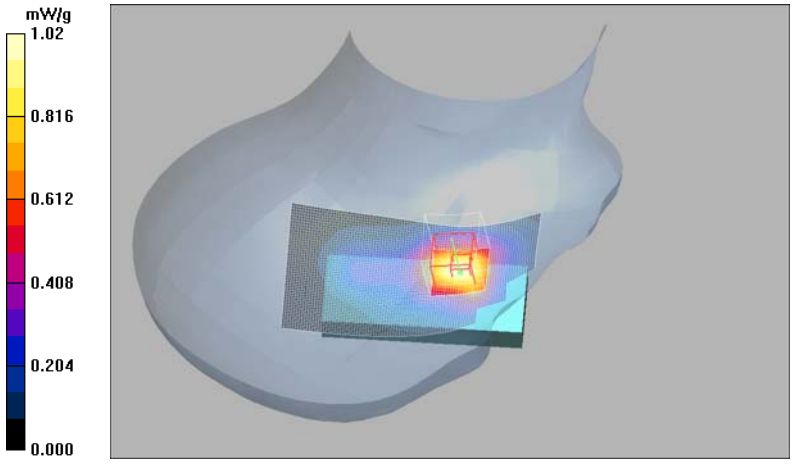
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352130/0

Communication System: GSM1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.3 C
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.98, 4.98, 4.98); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Cheek position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.02 mW/g

Cheek position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.4 V/m
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.953 mW/g
SAR(10 g) = 0.564 mW/g
Power Drift = -0.205 dB
Maximum value of SAR (measured) = 1.01 mW/g



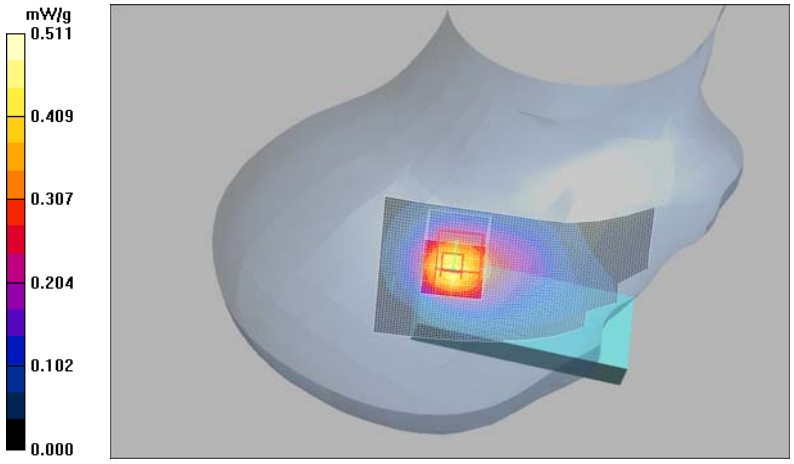
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352130/0

Communication System: GSM1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=21.3 C
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.98, 4.98, 4.98); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Tilt position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.511 mW/g

Tilt position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.4 V/m
Peak SAR (extrapolated) = 0.657 W/kg
SAR(1 g) = 0.432 mW/g
SAR(10 g) = 0.261 mW/g
Power Drift = 0.021 dB
Maximum value of SAR (measured) = 0.468 mW/g



Date/Time: 2009-03-24 1:08:53 PM

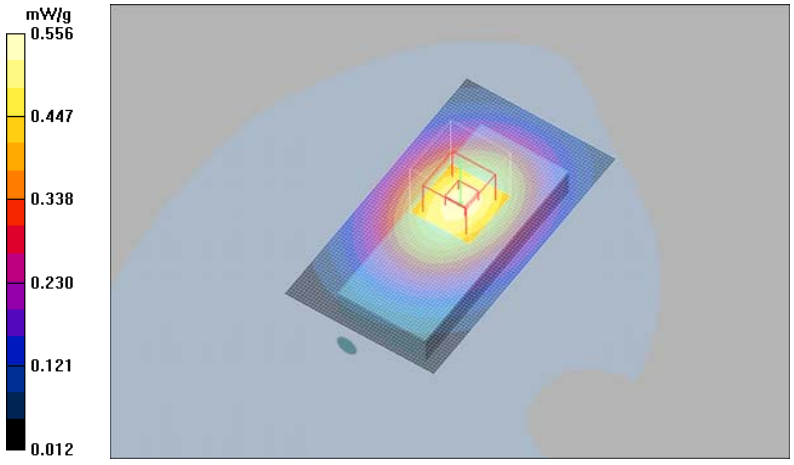
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352793/5

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.06, 6.06, 6.06); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory - Display facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.556 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 = 10.8 V/m
Peak SAR (extrapolated) = 0.663 W/kg
SAR(1 g) = 0.519 mW/g
SAR(10 g) = 0.376 mW/g
Power Drift = -0.022 dB
Maximum value of SAR (measured) = 0.552 mW/g



Date/Time: 2009-03-24 1:22:56 PM

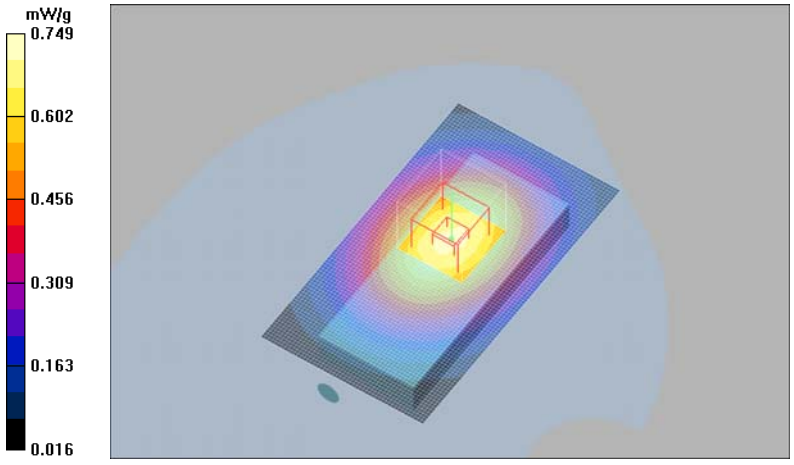
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352793/5

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.06, 6.06, 6.06); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory - Display facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.749 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 = 12.5 V/m
Peak SAR (extrapolated) = 0.872 W/kg
SAR(1 g) = 0.686 mW/g
SAR(10 g) = 0.499 mW/g
Power Drift = -0.068 dB
Maximum value of SAR (measured) = 0.733 mW/g



Date/Time: 2009-03-24 1:36:03 PM

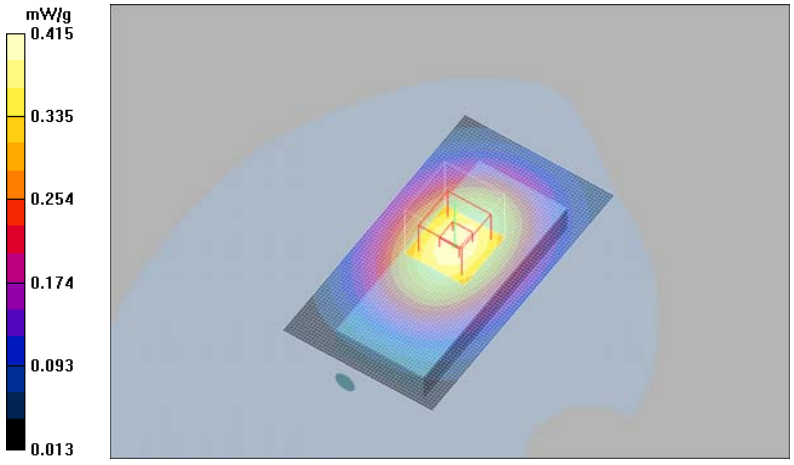
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352793/5

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.06, 6.06, 6.06); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - HS-105 - Display facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.415 mW/g

Body - Middle - HS-105 - Display facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.70 V/m
Peak SAR (extrapolated) = 0.496 W/kg
SAR(1 g) = 0.392 mW/g
SAR(10 g) = 0.286 mW/g
Power Drift = 0.046 dB
Maximum value of SAR (measured) = 0.415 mW/g



Date/Time: 2009-03-24 1:49:13 PM

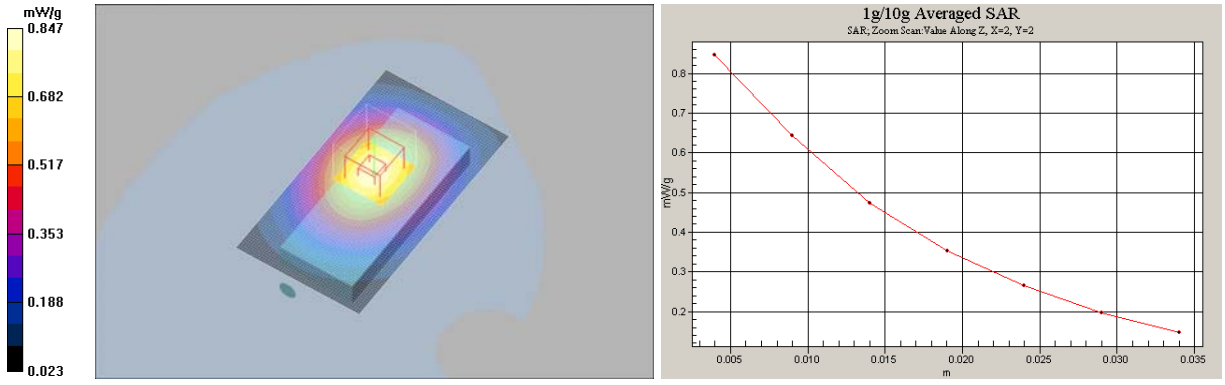
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352793/5

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.06, 6.06, 6.06); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory - Back facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.847 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 = 13.5 V/m
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.797 mW/g
SAR(10 g) = 0.577 mW/g
Power Drift = -0.033 dB
Maximum value of SAR (measured) = 0.846 mW/g



Date/Time: 2009-03-24 2:01:50 PM

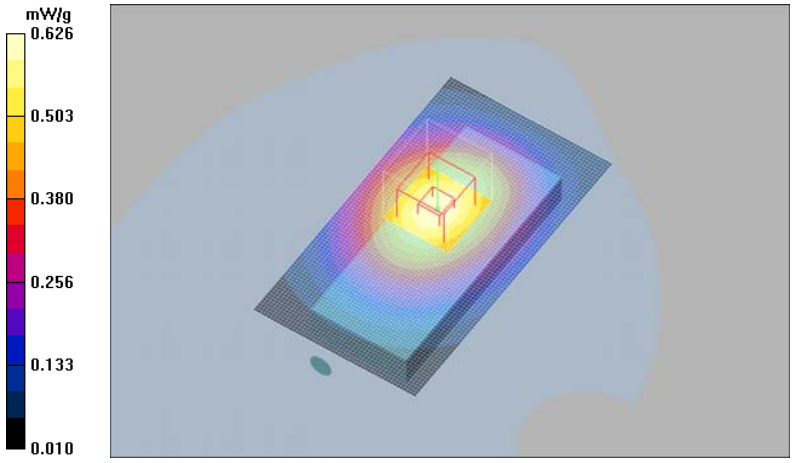
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352793/5

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(6.06, 6.06, 6.06); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - HS-105 - Back facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.626 mW/g

Body - Middle - HS-105 - Back facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.2 V/m
Peak SAR (extrapolated) = 0.776 W/kg
SAR(1 g) = 0.591 mW/g
SAR(10 g) = 0.424 mW/g
Power Drift = 0.117 dB
Maximum value of SAR (measured) = 0.629 mW/g



Date/Time: 2009-03-10 2:00:29 PM

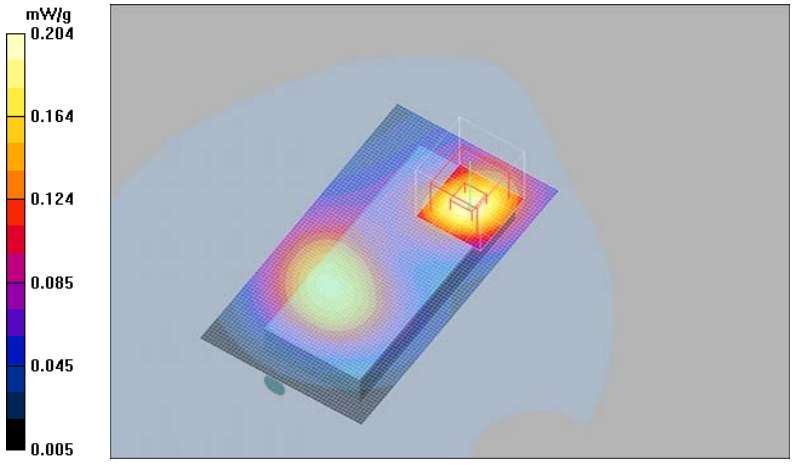
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352130/0

Communication System: GSM1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Body 1900; Medium Notes: Medium Temperature: t=22.0 C
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.37, 4.37, 4.37); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM3; Type: SAM; Serial: TP-1427
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory - Display facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.204 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 = 8.22 V/m
Peak SAR (extrapolated) = 0.325 W/kg
SAR(1 g) = 0.185 mW/g
SAR(10 g) = 0.109 mW/g
Power Drift = -0.051 dB
Maximum value of SAR (measured) = 0.199 mW/g



Date/Time: 2009-03-10 2:13:52 PM

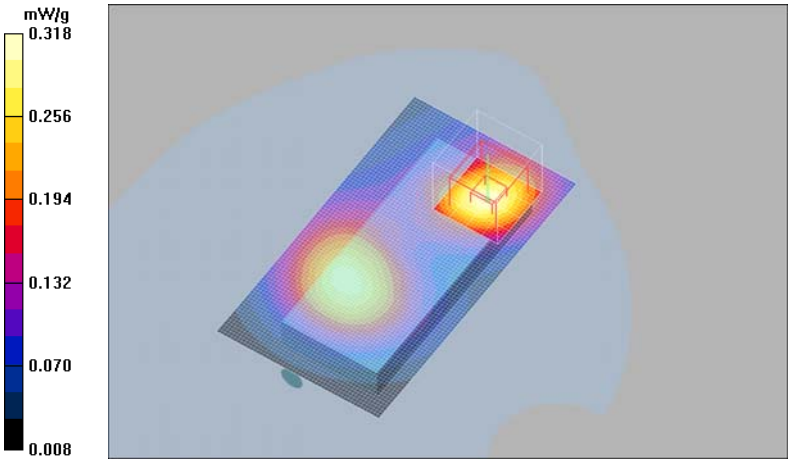
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352130/0

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=22.0 C
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.37, 4.37, 4.37); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM3; Type: SAM; Serial: TP-1427
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory - Display facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.318 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 = 10.4 V/m
Peak SAR (extrapolated) = 0.514 W/kg
SAR(1 g) = 0.293 mW/g
SAR(10 g) = 0.173 mW/g
Power Drift = -0.172 dB
Maximum value of SAR (measured) = 0.317 mW/g



Date/Time: 2009-03-10 2:27:24 PM

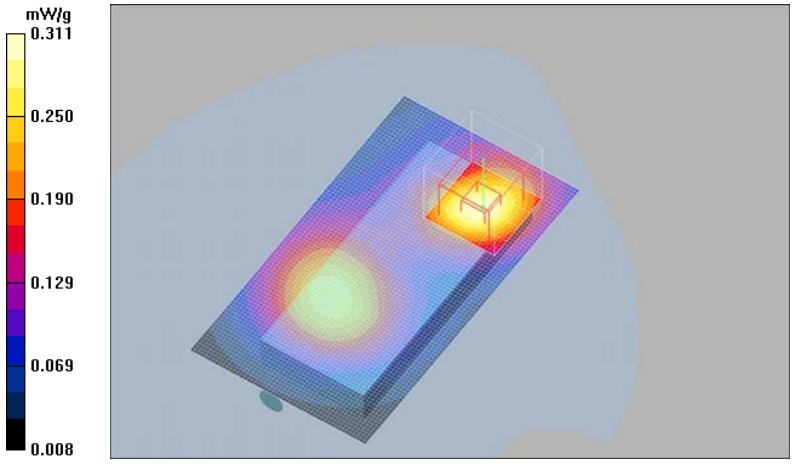
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352130/0

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=22.0 C
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.37, 4.37, 4.37); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM3; Type: SAM; Serial: TP-1427
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - HS-105 - Display facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.311 mW/g

Body - Middle - HS-105 - Display facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.2 V/m
Peak SAR (extrapolated) = 0.509 W/kg
SAR(1 g) = 0.291 mW/g
SAR(10 g) = 0.173 mW/g
Power Drift = -0.074 dB
Maximum value of SAR (measured) = 0.314 mW/g



Date/Time: 2009-03-10 2:42:19 PM

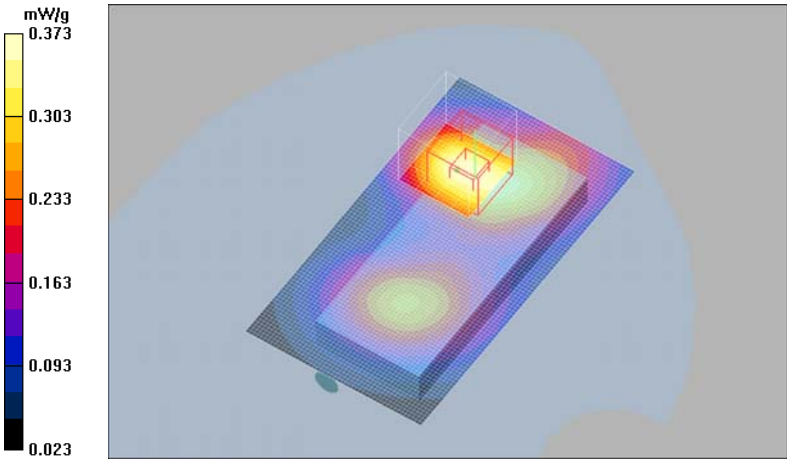
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352130/0

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=22.0 C
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.37, 4.37, 4.37); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM3; Type: SAM; Serial: TP-1427
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - Middle - No Accessory - Back facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.373 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 = 11.9 V/m
Peak SAR (extrapolated) = 0.593 W/kg
SAR(1 g) = 0.349 mW/g
SAR(10 g) = 0.216 mW/g
Power Drift = -0.041 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) = 0.369 mW/g



Date/Time: 2009-03-10 3:17:28 PM

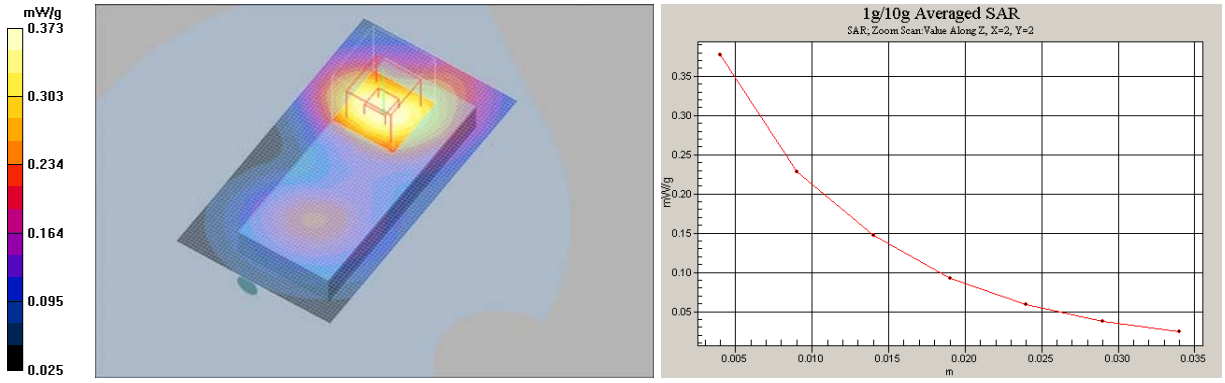
Test Laboratory: TCC Nokia
Type: RM-513; Serial: 001004/00/352130/0

Communication System: 2-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=22.0 C
Medium parameters used: f = 1910 MHz; σ = 1.57 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1652; Probe Notes:
- ConvF(4.37, 4.37, 4.37); Calibrated: 2008-09-16
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2008-09-16
- Phantom: SAM3; Type: SAM; Serial: TP-1427
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Body - High - HS-105 - Back facing phantom/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.373 mW/g

Body - High - HS-105 - Back facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.8 V/m
Peak SAR (extrapolated) = 0.608 W/kg
SAR(1 g) = 0.353 mW/g
SAR(10 g) = 0.219 mW/g
Power Drift = -0.094 dB
Maximum value of SAR (measured) = 0.377 mW/g



APPENDIX C: CONDUCTED POWER TUNING TARGETS FOR RM-513

GSM/GPRS850:

Power Level	Target Power (RMS)	
	1 TX Slot	2 TX Slot
5	32.3 dBm	30.3 dBm

GSM/GPRS1900:

Power Level	Target Power (RMS)	
	1 TX Slot	2 TX Slot
0	30.5 dBm	28.5 dBm

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

Please see the following pages.

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

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

Accredited by the Swiss 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 Beijing TCC

Certificate No: ET3-1652_Sep08

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1652
Calibration procedure(s)	QA CAL-01.v6 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	September 16, 2008
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	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

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	i.V. F. Bomholt

Issued: September 17, 2008

DASY - Parameters of Probe: ET3DV6 SN:1652

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.98** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**91** mV
NormY	**2.04** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**93** mV
NormZ	**1.96** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**91** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

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

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	10.0	5.7
SAR_{be} [%]	With Correction Algorithm	0.8	0.3

TSL **1750 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	12.5	7.5
SAR_{be} [%]	With Correction Algorithm	0.9	0.4

Sensor Offset

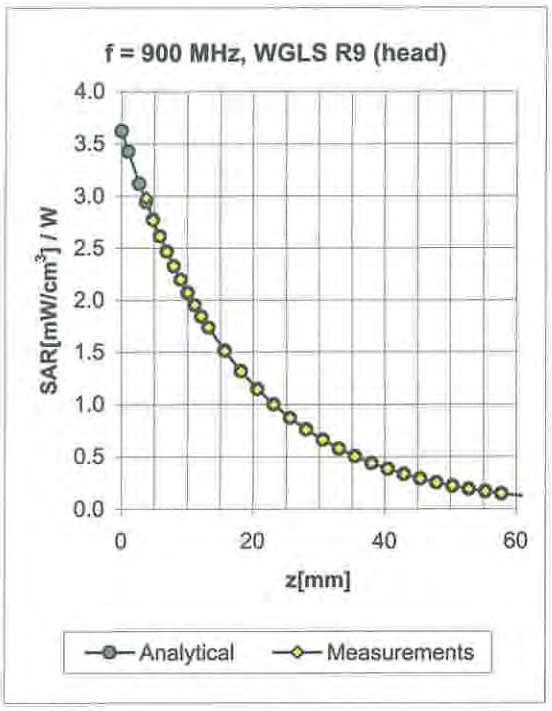
Probe Tip to Sensor Center	**2.7** mm

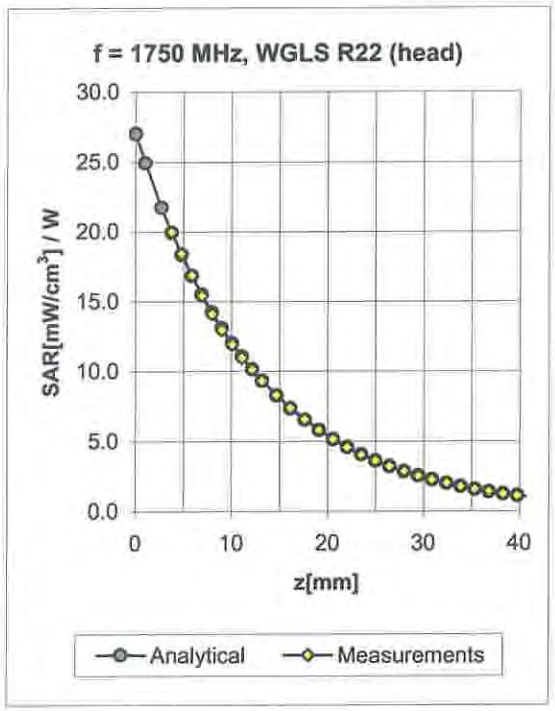
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

Conversion Factor Assessment





f [MHz]	Validity [MHz][c]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.33	2.57	6.27 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.28	3.02	6.06 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.71	2.06	5.22 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.80	1.82	4.98 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.83	1.72	4.85 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.85	1.60	4.45 ± 11.0% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.47	2.28	6.06 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.48	2.38	5.92 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.74	2.09	4.62 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.84	1.85	4.37 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.83	1.86	4.46 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.85	1.70	3.81 ± 11.0% (k=2)

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

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

Please see the following pages.

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

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

Accredited by the Swiss 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 Beijing TCC**

Certificate No: D835V2-4d005_Mar08

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d005
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	March 10, 2008
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference Probe ES3DV2	SN: 3025	01-Mar-08 (SPEAG, No. ES3-3025_Mar08)	Mar-09
DAE4	SN 601	03-Jan-08 (SPEAG, No. DAE4-601_Jan08)	Jan-09
DAE4	SN 909	03-Sep-07 (SPEAG, No. DAE4-909_Sep07)	Sep-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	04-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 11, 2008

DASY4 Validation Report for Head TSL

Date/Time: 07.03.2008 12:45:35

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d005

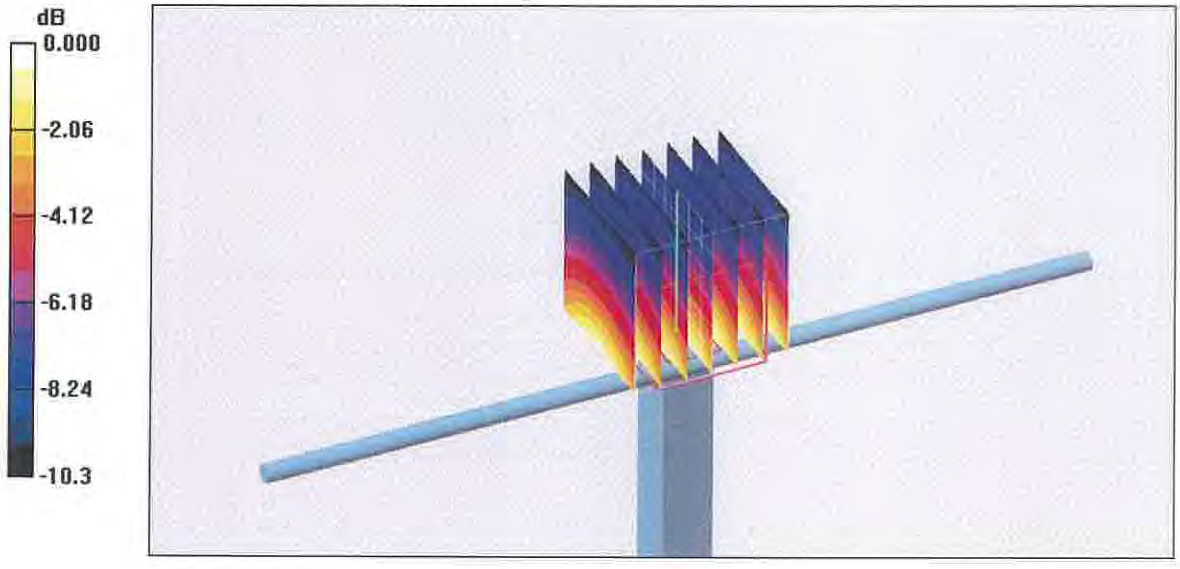
Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL 900 MHz;
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(6.09, 6.09, 6.09); Calibrated: 01.03.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.01.2008
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

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 = -0.012 dB
Peak SAR (extrapolated) = 3.28 W/kg
SAR(1 g) = 2.26 mW/g; SAR(10 g) = 1.49 mW/g
Maximum value of SAR (measured) = 2.56 mW/g



0 dB = 2.56mW/g

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

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

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

Accreditation No.: SCS 108

Client Nokia Beijing TCC

Certificate No: D1900V2-547_Sep07

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 547
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	September 18, 2007
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	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	SN: 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
Reference Probe ES3DV3	SN: 3025	19-Oct-06 (SPEAG, No. ES3-3025_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 R&S SMT-06	100005	4-Aug-99 (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 Meili	Laboratory Technician	M. Meili
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 21, 2007

Date/Time: 13.09.2007 16:37:47

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:547

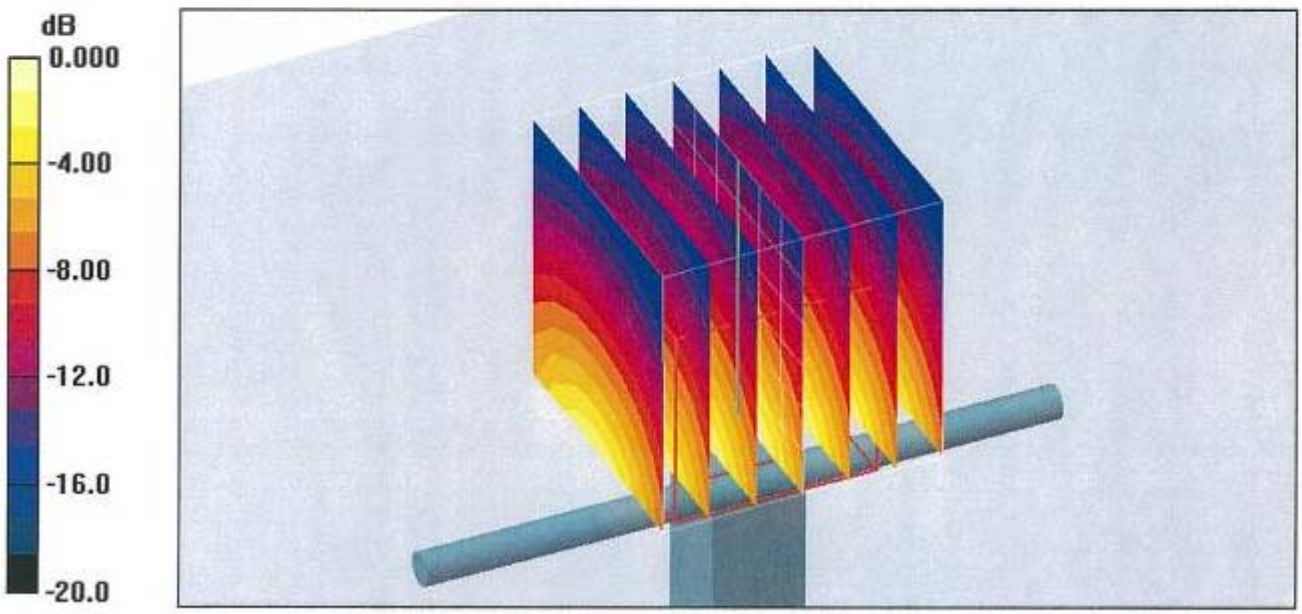
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.7 V/m; Power Drift = 0.033 dB
Peak SAR (extrapolated) = 16.2 W/kg
SAR(1 g) = 9.47 mW/g; SAR(10 g) = 4.98 mW/g
Maximum value of SAR (measured) = 10.6 mW/g



0 dB = 10.6mW/g