

SAR Compliance Test Report

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Tested device:	RM-811		
FCC ID:	QTLRM-811	IC:	661AB-RM811
Supplement reports:	SAR_Photo_RM-811_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.		
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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2012-02-14 to 2012-03-01
SN, HW and SW numbers of tested device	SN: 004402/13/780101/9, HW: 0202, SW: ksssb1_11w48, DUT: 52547 SN: 004402/13/780117/5, HW: 0202, SW: ksssb1_11w48, DUT: 52546
Batteries used in testing	BL-5CB, DUT: 52258, 52055
Headsets used in testing	WH-102, DUT: 52541, 52526
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)	Conducted power	Position	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
GSM850	251 / 848.8	32.5 dBm	Left, Cheek	0.982 W/kg	1.10 W/kg	1.6 W/kg	PASSED
GSM1900	810 / 1909.8	30.5 dBm	Left, Cheek	0.895 W/kg	1.00 W/kg	1.6 W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Ch / f (MHz)	Conducted power	Separation distance	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
GSM850	128 / 824.2	32.5 dBm	1.5 cm	0.572 W/kg	0.64 W/kg	1.6 W/kg	PASSED
3-slot GPRS1900	512 / 1850.2	27.0 dBm	1.5 cm	0.374 W/kg	0.42 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 Summary SAR data

		FCC-defined SAR values for the Grants of Equipment Authorization
Maximum Cellular/AWS/PCS Head SAR value		1.10 W/kg
Maximum WLAN Head SAR value		-
{Max + Max} Simultaneous Head SAR value	-	
Maximum Cellular/AWS/PCS Body SAR value		0.64 W/kg
Maximum WLAN Body SAR value		-
{Max + Max} Simultaneous Body SAR value	-	
Maximum Product Specific (Wireless Router) SAR value		-
Maximum Simultaneous SAR value		-

1.2.4 Maximum Drift

Maximum drift covered by 12% scaling up of the SAR values	Maximum drift during measurements
0.5dB	0.31dB

1.2.5 Measurement Uncertainty

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

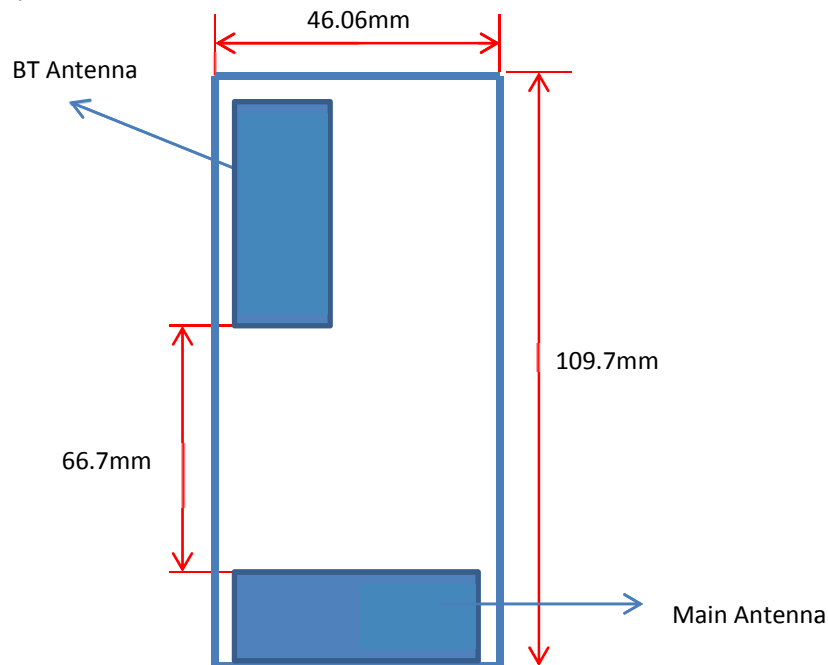
Device category	Portable
Exposure environment	General population / uncontrolled

Modes of Operation	Bands	Modulation Mode	Duty Cycle	Transmitter Frequency Range (MHz)
GSM	850 1900	GMSK	1/8	824 – 849 1850 – 1910
GPRS	850 1900	GMSK	1/8 to 4/8	824 – 849 1850 – 1910
BT	2450	GFSK	1	2402 – 2480

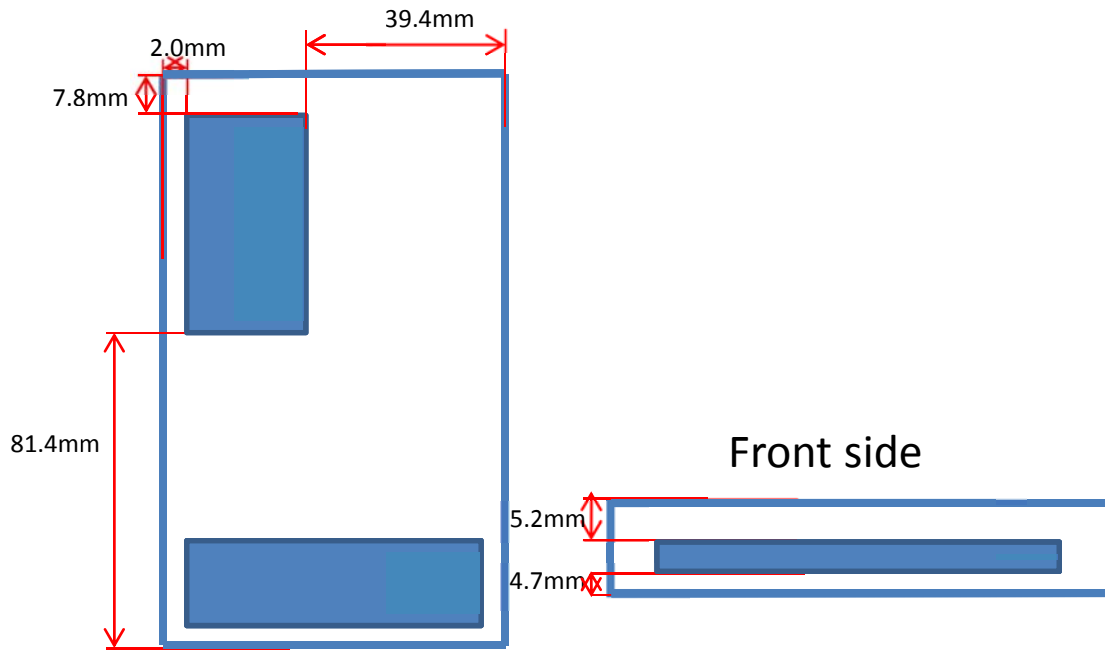
This is a BT Class 1 device; as its power tuning target is 6dBm (4mW), SAR testing was deemed unnecessary.

2.1 Description of the Antenna

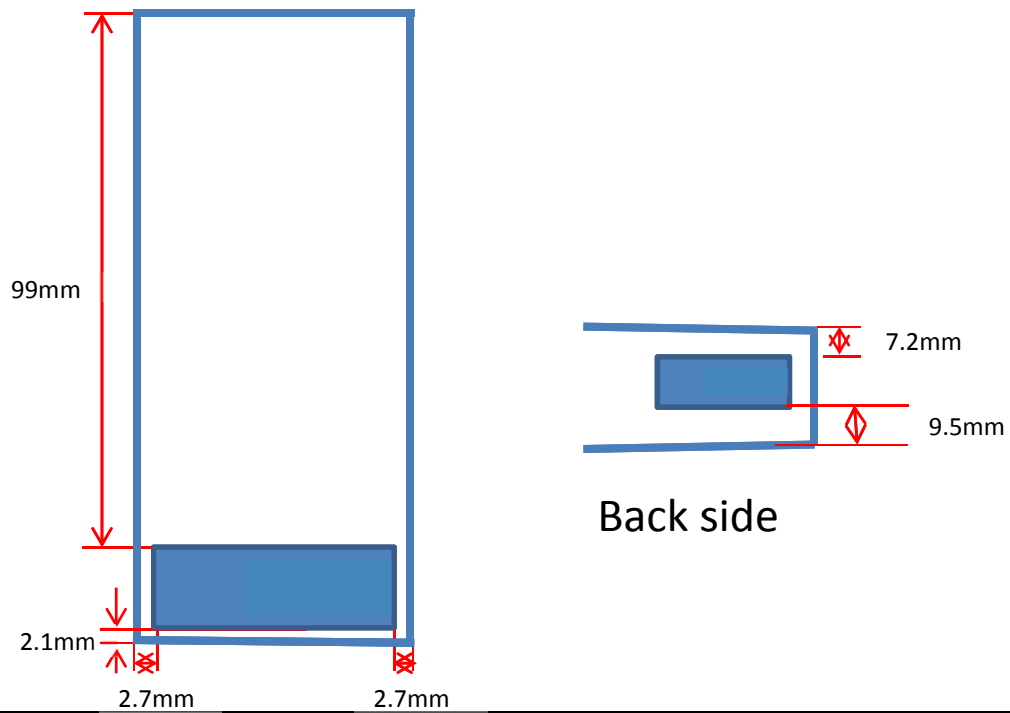
The device has an internal antenna for cellular/PCS use. The cellular/PCS antenna is located at the bottom underneath the front cover. The BT antenna is located at the top underneath the back cover. The device dimensions, antenna locations and antenna interdistances are illustrated below.



BT Antenna Radiator Distances to Device Edges and Faces



Cellular/PCS Antenna Radiator Distances to Device Edges and Faces



3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	20.5 – 22.5
Ambient humidity (RH %):	35 - 55

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.

This device was tested in all the available multi-slot GMSK GPRS modes.

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 results are given in the EMC report supporting this application.

3.3 Test Cases and Test Minimisation

The tested device examined in this report may not incorporate all of the features described in the text that follows, but its SAR evaluation will have been subjected to the same considerations and test logic described below.

Whilst it's possible to identify the maximum SAR test cases from inspection of the conducted power levels given in the Results tables (Section 7), different modes in the same band and multi-slot transmit GSM/GPRS modes can create some difficulties. Therefore the sequence of the SAR tests made in evaluating this device has used test logic that is based on measured SAR values. Comparison of measured SAR values in this way, can also allow some test minimization (i.e. test elimination) to be made.

For example, when SAR testing multi-slot GSM/GPRS/EGPRS modes, it is an inefficient use of test resources to fully SAR test every test configuration in each of the different modes as these modes have a fixed power relationship between them that is the same, irrespective of the test configuration. In the case of multi-slot GSM/GPRS modes, a single comparative SAR test - using the same test channel and test configuration – is made in each of the n-slot modes; the mode

with the highest measured SAR value 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 between tests. For different modes that operate in the same band and use the same antenna e.g. GSM/GPRS850 and WCDMA850, full SAR testing is carried out in the GSM/GPRS850 mode but WCDMA850 testing is limited to 3 channel testing in the maximum SAR test configuration for GSM/GPRS850.

Multi-slot SAR testing against the Head is always performed whenever such a device offers Push to Talk over cellular with the internal earpiece active, Dual Transfer Mode (i.e. the ability to transmit voice and data simultaneously using the same transmitter) or has WLAN (which enables a Voice over IP call to take place whilst the device can simultaneously transmit data on a cellular band). Whenever a device has an intended multi-slot use against the head, it is also Head SAR tested in EGPRS mode. It should be noted that EGPRS transmit modes can have either GMSK or 8PSK modulation but, when tested, only 8PSK EGPRS will appear explicitly in the results tables, as GMSK EGPRS mode has identical time-averaged power to the reported GPRS mode.

Devices that have flips or slides are fully SAR tested in all device configurations consistent with their intended usage. For example, flip phones that can receive a call in closed mode are SAR tested against the head in both open and closed configurations. Similarly, slide phones are fully SAR tested in all slide configurations in which calls are intended to be made or received.

In the results tables in Section 7, the maximum SAR value for the 'basic' tests (i.e. left cheek, left tilt, right cheek and right tilt in Head SAR testing; with and without headset with the back &/or display side facing the flat phantom in Body SAR testing) is bolded for each band. In some cases, after full testing of the basic SAR test configurations has been completed, additional checking SAR tests are made. These checking tests are always based on the bolded result from the 'basic' testing. When the SAR value of a checking test exceeds the maximum value from the basic tests, it is also bolded and used as the basis for any further checking tests that might be needed.

Checking tests are largely voluntary and can cover optional batteries, different camera slide positions, optional covers, etc. In the case of optional batteries, if the construction of the optional battery is significantly different to the battery used in the full testing e.g. if the outer can is floating electrically rather than grounded, then the maximum SAR test configuration in each band is tested with the optional battery in 3 channels. For camera slides, if the slide material is metal, then checking tests in 3 channels are again run for the maximum SAR test configuration in each band. For plastic camera slides, SAR checking is only carried out in the channel that provided the maximum SAR value for the original. Optional front and back covers are tested if their shape differs significantly from the original or if their metallic content varies by more than 15% from the original; in the former case, the testing depends on the extent of the physical differences, whereas in the latter case, 3 channel SAR testing is performed in every band in the max SAR test configuration.

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 date	Calibration expiry
DAE 4	860	2011-10	2012-10
DAE 4	480	2011-10	2012-10
E-field Probe ES3DV3	3195	2011-03	2012-03
E-field Probe EX3DV4	3574	2011-10	2012-10
Dipole Validation Kit, D835V2	479	2011-03	2013-03
Dipole Validation Kit, D1900V2	547	2011-10	2013-10
DASY4 software	Version 4.7	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration date	Calibration expiry
Signal Generator	E4432B	US40052231	2011-05	2012-05
Signal Generator	Agilent 8648C	3847M00258	2011-05	2012-05
Call Tester	CMU200	110735	-	-
Call Tester	CMU200	835352/008	-	-
Amplifier	AR 5S1G4M3	302339	2011-05	2012-05
Amplifier	AR 5S1G4M1	306024	2011-05	2012-05
RF Network Analyzer	8753ES	My40002096	2011-05	2012-05
Dielectric Probe Kit	85070C	01033717	-	-
Power Meter	Agilent E4419B	My41291520	2011-05	2012-05
Power Sensor	Agilent 8482A	US37295411	2011-05	2012-05
Power Meter	R&S NRP	101293	2011-08	2012-08
Power Sensor	R&S NRP-Z51	102842	2011-11	2012-11

4.1.1 Isotropic E-field Probe Type ES3DV3

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., butyl diglycol)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 4 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 20 mm Body diameter: 12 mm Tip diameter: 3.9 mm
Application	Distance from probe tip to dipole centers: 2.0 mm General dosimetry up to 4 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.1.2 Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to >6 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 10 mm Body diameter: 12 mm Tip diameter: 2.5 mm
Application	Distance from probe tip to dipole centers: 1.0 mm General dosimetry up to 6 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 $\pm 5\%$ of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

The depth of the tissue simulant was at least 15.0 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]	
835	Reference result $\pm 10\%$ window	2.39 2.15 – 2.63	41.0	0.89	
	IEEE1528 / IEC62209 Standard targets		41.5	0.90	
	2012-02-14	2.36	41.7	0.88	22.4
1900	Reference result $\pm 10\%$ window	10.4 9.4 – 11.4	39.5	1.43	
	IEEE1528 / IEC62209 Standard targets		40.0	1.40	
	2012-02-14	10.5	38.5	1.45	21.8

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
835	Reference result $\pm 10\%$ window	2.52 2.27 – 2.77	54.3	0.99	
	FCC Supplement C / RSS-102		55.2	0.97	
	2012-02-29	2.34	53.2	0.96	22.2
1900	Reference result $\pm 10\%$ window	10.6 9.5 – 11.7	54.2	1.59	
	FCC Supplement C / RSS-102		53.3	1.52	
	2012-03-01	10.4	52.4	1.56	22.2

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

4.3.3 Tissue Simulants used in the Measurements

Head tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ϵ_r	σ [S/m]	
836	Recommended value	41.5	0.90	
	$\pm 5\%$ window	39.4 – 43.6	0.86 – 0.95	
	2012-02-14	41.6	0.89	22.4
1880	Recommended value	40.0	1.40	
	$\pm 5\%$ window	38.0 – 42.0	1.33 – 1.47	
	2012-02-14	38.6	1.44	21.8

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ϵ_r	σ [S/m]	
836	Recommended value	55.2	0.97	
	$\pm 5\%$ window	52.4 – 58.0	0.92 – 1.02	
	2012-02-29	53.2	0.96	22.2
1880	Recommended value	53.3	1.52	
	$\pm 5\%$ window	50.6 – 56.0	1.44 – 1.60	
	2012-03-01	52.4	1.54	22.2

Dielectric parameter data for the band edges is given in Appendix E.

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.

Nokia body-worn accessories are commonly available for the separation distance used in this testing.

5.3 Scan Procedures

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

5.4 SAR Averaging Methods

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

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

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

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

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

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

7. RESULTS

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

850MHz Head SAR results

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
GSM	Conducted Power		32.5 dbm	32.5 dbm	32.5 dbm
	Left	Cheek	0.971	0.955	0.982
		Tilt	-	0.417	-
	Right	Cheek	0.841	0.867	0.886
		Tilt	-	0.388	-

1900MHz Head SAR results

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
GSM	Conducted Power		30.5 dbm	30.5 dbm	30.5 dbm
	Left	Cheek	0.894	0.861	0.895
		Tilt	-	0.355	-
	Right	Cheek	0.819	0.789	0.825
		Tilt	-	0.370	-

850MHz Body SAR results

Mode	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		Conducted Power	32.5 dbm	32.5 dbm	32.5 dbm
	Display facing phantom	Without headset	0.572	0.559	0.456
		Headset WH-102	-	0.481	-
	Back facing phantom	Without headset	-	0.414	-
		Headset WH-102	-	0.379	-
2-slot GPRS		Conducted Power	-	29.5 dbm	-
	Display facing phantom	Without headset	-	0.516	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-
3-slot GPRS		Conducted Power	-	28.0 dbm	-
	Display facing phantom	Without headset	-	0.531	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-
4-slot GPRS		Conducted Power	-	26.5 dbm	-
	Display facing phantom	Without headset	-	0.494	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-

1900MHz Body SAR results

Mode	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		Conducted Power	-	30.5 dbm	-
	Display facing phantom	Without headset	-	0.291	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-
2-slot GPRS		Conducted Power		27.5 dbm	
	Display facing phantom	Without headset	-	0.271	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-
3-slot GPRS		Conducted Power	27.0 dbm	27.0 dbm	27.0 dbm
	Display facing phantom	Without headset	0.374	0.355	0.350
		Headset WH-102	-	0.270	-
	Back facing phantom	Without headset	-	0.321	-
		Headset WH-102	-	0.244	-
4-slot GPRS		Conducted Power	-	24.5 dbm	-
	Display facing phantom	Without headset	-	0.257	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-

Plots of the Measurement scans are given in Appendix B.

APPENDIX A: SYSTEM CHECKING SCANS

Date/Time: 2012-02-14 9:26:20

Test Laboratory: TCC Nokia

Type: D835V2; Serial: 479

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Head 835; Medium Notes: Medium Temperature: $t = 22.4\text{ C}$

Medium parameters used: $f = 835\text{ MHz}$; $\sigma = 0.884\text{ mho/m}$; $\epsilon_r = 41.7$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.22, 8.22, 8.22); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.68 mW/g

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

Reference Value = 55.3 V/m

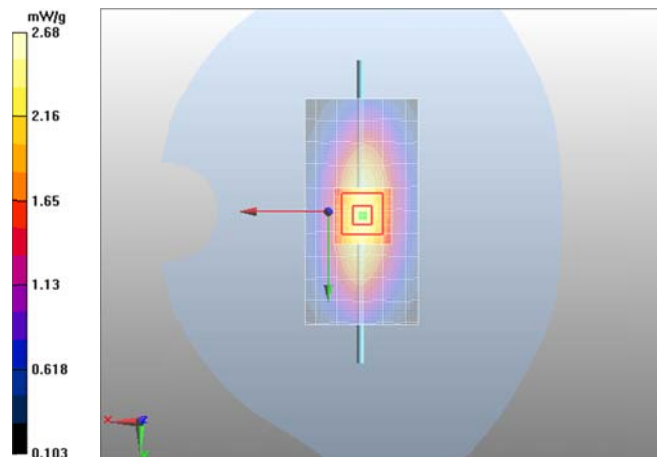
Peak SAR (extrapolated) = 3.55 W/kg

SAR(1 g) = 2.36 mW/g

SAR(10 g) = 1.55 mW/g

Power Drift = -0.213 dB

Maximum value of SAR (measured) = 2.54 mW/g



Date/Time: 2012-02-14 10:07:06

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: $t=21.8^{\circ}\text{C}$ SAM7

Medium parameters used: $f = 1900\text{ MHz}$; $\sigma = 1.45\text{ mho/m}$; $\epsilon_r = 38.5$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3195; Probe Notes:
- ConvF(5.06, 5.06, 5.06); Calibrated: 2011-03-11
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM7; Type: SAM; Serial: TP - 1412
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 12 mW/g

Configuration/d=10mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 91.7 V/m

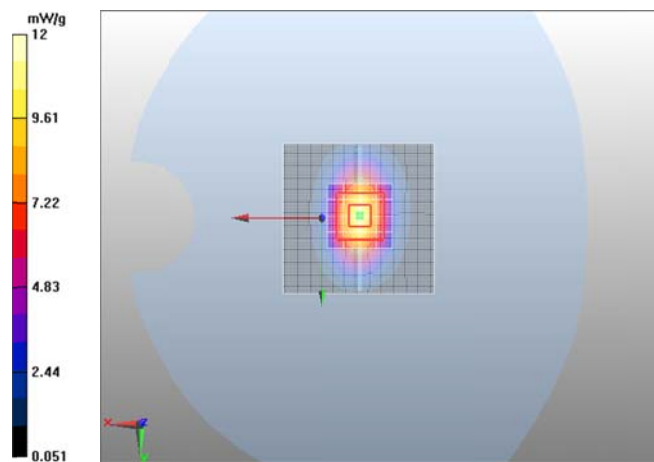
Peak SAR (extrapolated) = 19.9 W/kg

SAR(1 g) = 10.5 mW/g

SAR(10 g) = 5.4 mW/g

Power Drift = -0.045 dB

Maximum value of SAR (measured) = 11.9 mW/g



Date/Time: 2012-02-29 9:35:09

Test Laboratory: TCC Nokia
Type: D835V2; Serial: 479

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Body 835; Medium Notes: Medium Temperature: $t = 22.2\text{ C}$

Medium parameters used: $f = 835\text{ MHz}$; $\sigma = 0.962\text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.38, 8.38, 8.38); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.53 mW/g

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

Reference Value = 51.9 V/m

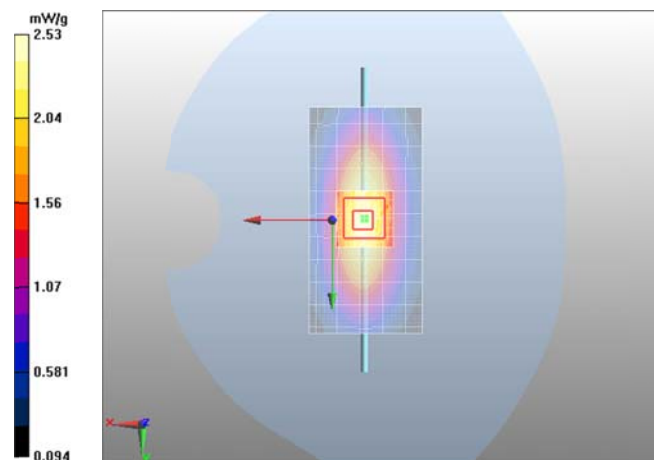
Peak SAR (extrapolated) = 3.49 W/kg

SAR(1 g) = 2.34 mW/g

SAR(10 g) = 1.55 mW/g

Power Drift = -0.104 dB

Maximum value of SAR (measured) = 2.53 mW/g



Date/Time: 2012-03-01 9:42:40

Test Laboratory: TCC Nokia

Type: D1900V2; Serial: 547

Communication System: CW1900

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: Body 1900 SAM8; Medium Notes: Medium Temperature: $t=22.2^{\circ}\text{C}$

Medium parameters used: $f = 1900\text{ MHz}$; $\sigma = 1.56\text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.72, 6.72, 6.72); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM8; Type: SAM; Serial: TP - 1215
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 12.1 mW/g

Configuration/d=10mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 86.5 V/m

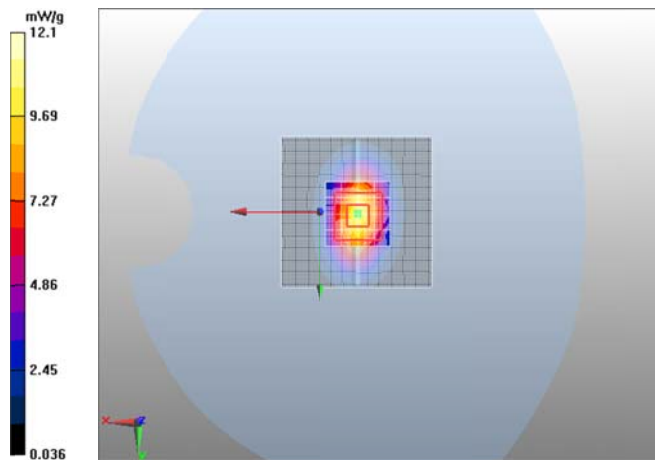
Peak SAR (extrapolated) = 19 W/kg

SAR(1 g) = 10.4 mW/g

SAR(10 g) = 5.41 mW/g

Power Drift = -0.040 dB

Maximum value of SAR (measured) = 11.7 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 2012-02-14 10:35:42

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: GSM850

Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium: Head 835; Medium Notes: Medium Temperature: $t = 22.4$ C

Medium parameters used: $f = 849$ MHz; $\sigma = 0.897$ mho/m; $\epsilon_r = 41.5$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.22, 8.22, 8.22); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

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

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

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

Reference Value = 13.7 V/m

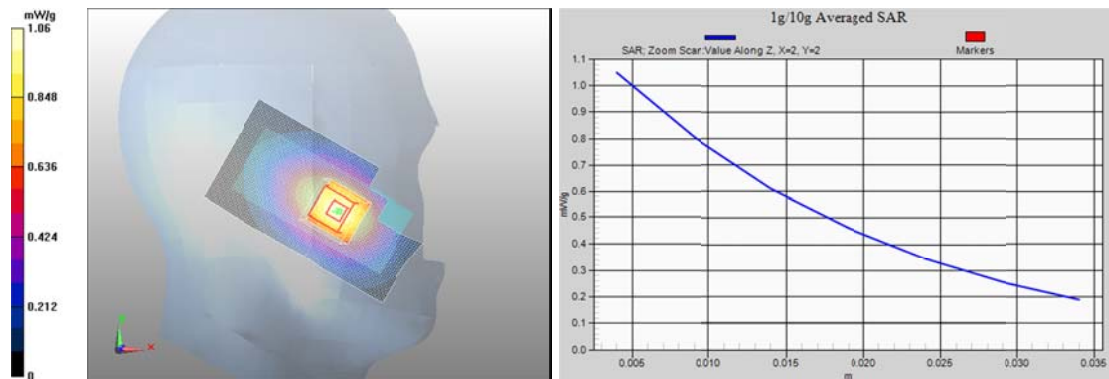
Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.982 mW/g

SAR(10 g) = 0.699 mW/g

Power Drift = -0.048 dB

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



Date/Time: 2012-02-14 10:12:32

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: Head 835; Medium Notes: Medium Temperature: $t = 22.4\text{ C}$

Medium parameters used: $f = 837\text{ MHz}$; $\sigma = 0.886\text{ mho/m}$; $\epsilon_r = 41.7$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.22, 8.22, 8.22); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

Configuration/Tilt - Middle/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.446 mW/g

Configuration/Tilt - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 15.5 V/m

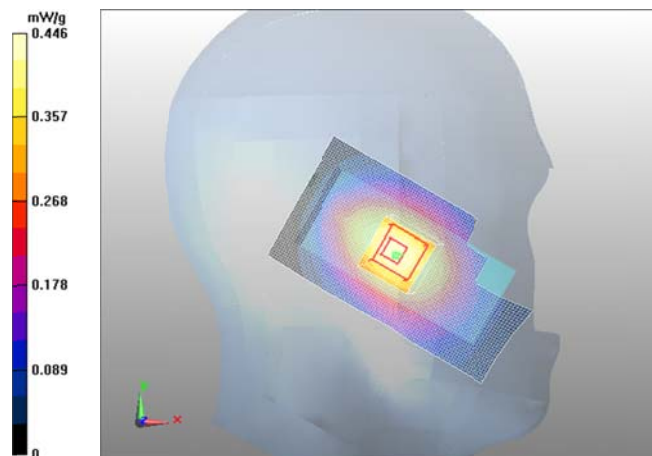
Peak SAR (extrapolated) = 0.530 W/kg

SAR(1 g) = 0.417 mW/g

SAR(10 g) = 0.307 mW/g

Power Drift = -0.032 dB

Maximum value of SAR (measured) = 0.439 mW/g



Date/Time: 2012-02-14 10:48:45

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: GSM850

Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium: Head 835; Medium Notes: Medium Temperature: $t = 22.4\text{ }^{\circ}\text{C}$

Medium parameters used: $f = 849\text{ MHz}$; $\sigma = 0.897\text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.22, 8.22, 8.22); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - High/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.971 mW/g

Configuration/Cheek - High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.5 V/m

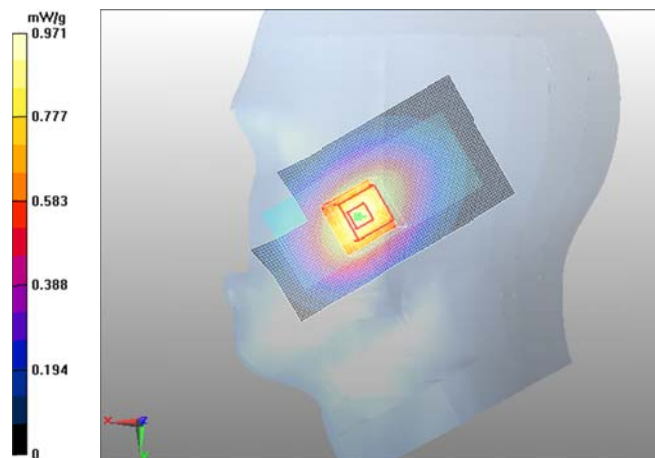
Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.886 mW/g

SAR(10 g) = 0.628 mW/g

Power Drift = -0.067 dB

Maximum value of SAR (measured) = 0.949 mW/g



Date/Time: 2012-02-14 11:32:19

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: Head 835; Medium Notes: Medium Temperature: $t = 22.4\text{ C}$

Medium parameters used: $f = 837\text{ MHz}$; $\sigma = 0.886\text{ mho/m}$; $\epsilon_r = 41.7$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.22, 8.22, 8.22); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

Configuration/Tilt - Middle/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.418 mW/g

Configuration/Tilt - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.6 V/m

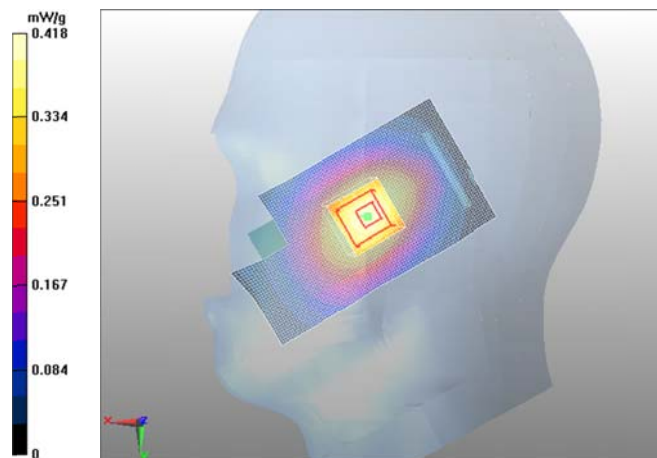
Peak SAR (extrapolated) = 0.500 W/kg

SAR(1 g) = 0.388 mW/g

SAR(10 g) = 0.285 mW/g

Power Drift = -0.148 dB

Maximum value of SAR (measured) = 0.410 mW/g



Date/Time: 2012-02-14 11:20:38

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: GSM1900

Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: Head 1900; Medium Notes: Medium Temperature: t=21.8C SAM7

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3195; Probe Notes:
- ConvF(5.06, 5.06, 5.06); Calibrated: 2011-03-11
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM7; Type: SAM; Serial: TP - 1412
- ; SEMCAD X Version 14.0 Build 61

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

Maximum value of SAR (interpolated) = 0.986 mW/g

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

Reference Value = 9.52 V/m

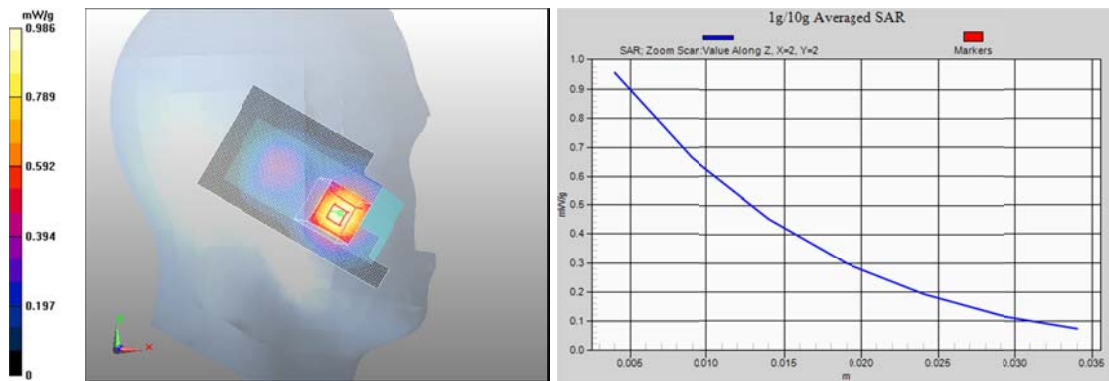
Peak SAR (extrapolated) = 1.3 W/kg

SAR(1 g) = 0.895 mW/g

SAR(10 g) = 0.543 mW/g

Power Drift = 0.104 dB

Maximum value of SAR (measured) = 0.958 mW/g



Date/Time: 2012-02-14 11:31:42

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: Head 1900; Medium Notes: Medium Temperature: $t=21.8^{\circ}\text{C}$ SAM7

Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.44\text{ mho/m}$; $\epsilon_r = 38.6$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3195; Probe Notes:
- ConvF(5.06, 5.06, 5.06); Calibrated: 2011-03-11
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM7; Type: SAM; Serial: TP - 1412
- ; SEMCAD X Version 14.0 Build 61

Configuration/Tilt position - Middle/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.437 mW/g

Configuration/Tilt position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.5 V/m

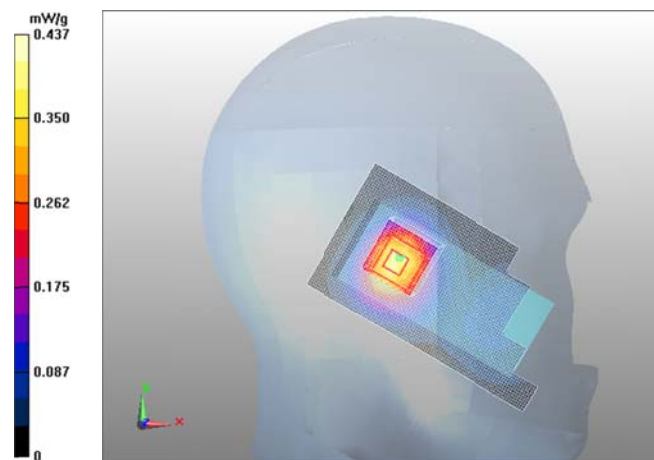
Peak SAR (extrapolated) = 0.529 W/kg

SAR(1 g) = 0.355 mW/g

SAR(10 g) = 0.219 mW/g

Power Drift = 0.00288 dB

Maximum value of SAR (measured) = 0.375 mW/g



Date/Time: 2012-02-14 12:26:24

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: GSM1900

Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: Head 1900; Medium Notes: Medium Temperature: t=21.8C SAM7

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3195; Probe Notes:
- ConvF(5.06, 5.06, 5.06); Calibrated: 2011-03-11
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM7; Type: SAM; Serial: TP - 1412
- ; SEMCAD X Version 14.0 Build 61

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

Maximum value of SAR (interpolated) = 0.915 mW/g

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

Reference Value = 11.5 V/m

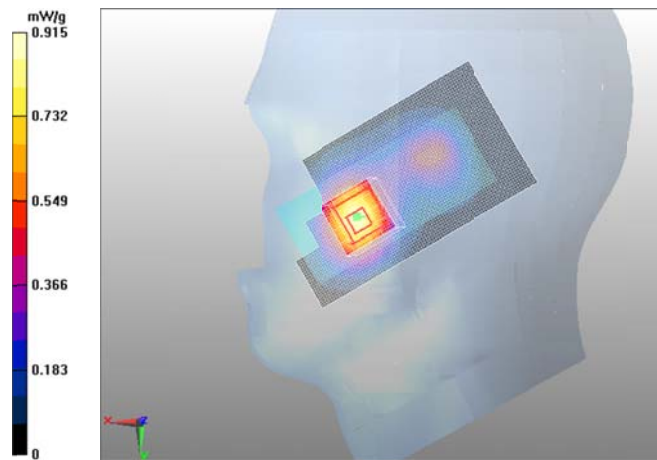
Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.825 mW/g

SAR(10 g) = 0.493 mW/g

Power Drift = -0.083 dB

Maximum value of SAR (measured) = 0.899 mW/g



Date/Time: 2012-02-14 12:58:07

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: Head 1900; Medium Notes: Medium Temperature: t=21.8C SAM7

Medium parameters used: f = 1880 MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 38.6$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3195; Probe Notes:
- ConvF(5.06, 5.06, 5.06); Calibrated: 2011-03-11
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM7; Type: SAM; Serial: TP - 1412
- ; SEMCAD X Version 14.0 Build 61

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

Maximum value of SAR (interpolated) = 0.460 mW/g

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

Reference Value = 13.1 V/m

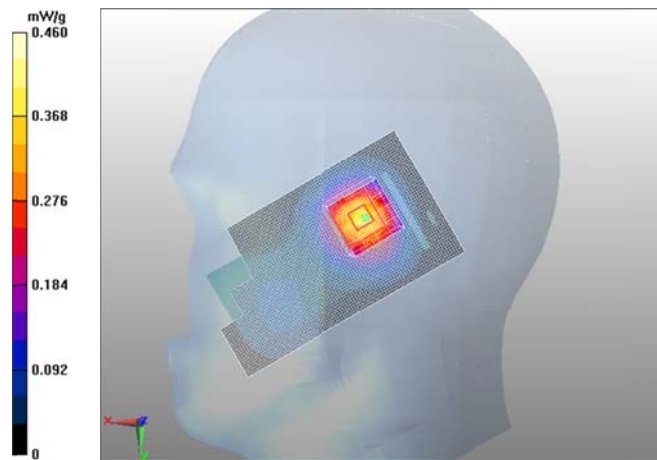
Peak SAR (extrapolated) = 0.579 W/kg

SAR(1 g) = 0.370 mW/g

SAR(10 g) = 0.220 mW/g

Power Drift = -0.00996 dB

Maximum value of SAR (measured) = 0.398 mW/g



Date/Time: 2012-02-29 12:43:27

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: GSM850

Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium: Body 835; Medium Notes: Medium Temperature: $t = 22.1\text{ C}$

Medium parameters used (interpolated): $f = 824.2\text{ MHz}$; $\sigma = 0.953\text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.38, 8.38, 8.38); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Low - No Accessory - Display Facing Phantom/Area Scan (51x91x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.611 mW/g

Configuration/Body - Low - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement

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

Reference Value = 10.4 V/m

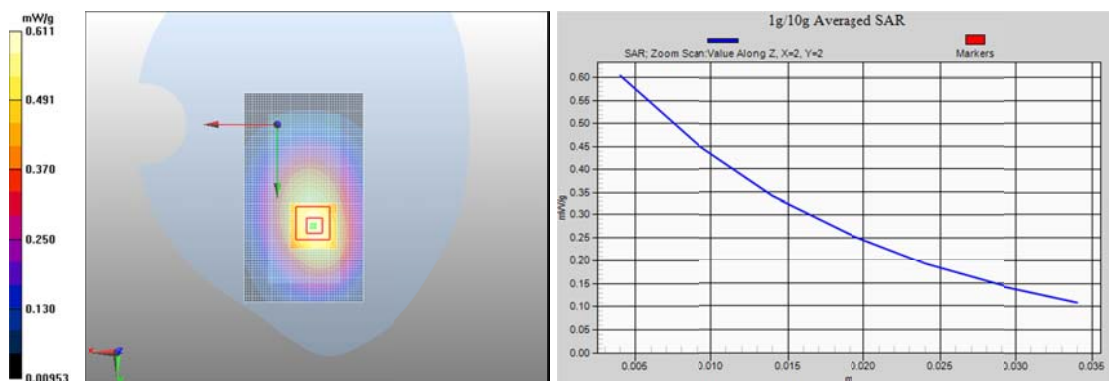
Peak SAR (extrapolated) = 0.754 W/kg

SAR(1 g) = 0.572 mW/g

SAR(10 g) = 0.412 mW/g

Power Drift = -0.092 dB

Maximum value of SAR (measured) = 0.604 mW/g



Date/Time: 2012-02-29 11:26:28

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: Body 835; Medium Notes: Medium Temperature: $t = 22.1$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.38, 8.38, 8.38); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Display Facing Phantom/Area Scan (51x91x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.509 mW/g

Configuration/Body - Middle - WH-102 - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement

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

Reference Value = 10.1 V/m

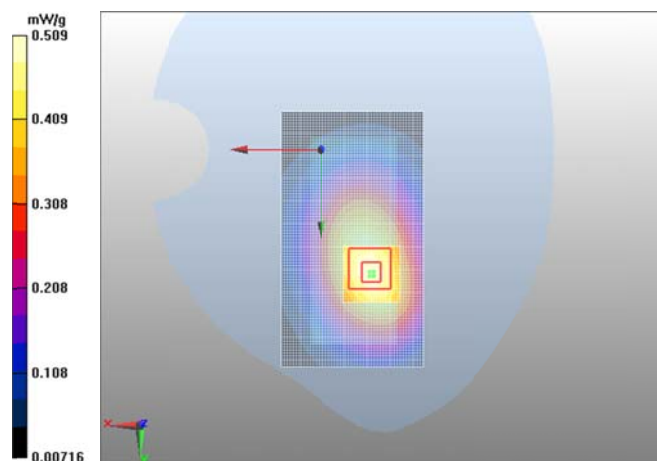
Peak SAR (extrapolated) = 0.639 W/kg

SAR(1 g) = 0.481 mW/g

SAR(10 g) = 0.345 mW/g

Power Drift = -0.046 dB

Maximum value of SAR (measured) = 0.513 mW/g



Date/Time: 2012-02-29 11:39:15

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: Body 835; Medium Notes: Medium Temperature: $t = 22.1$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.38, 8.38, 8.38); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Back Facing Phantom/Area Scan (51x91x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.437 mW/g

Configuration/Body - Middle - No Accessory - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 10.2 V/m

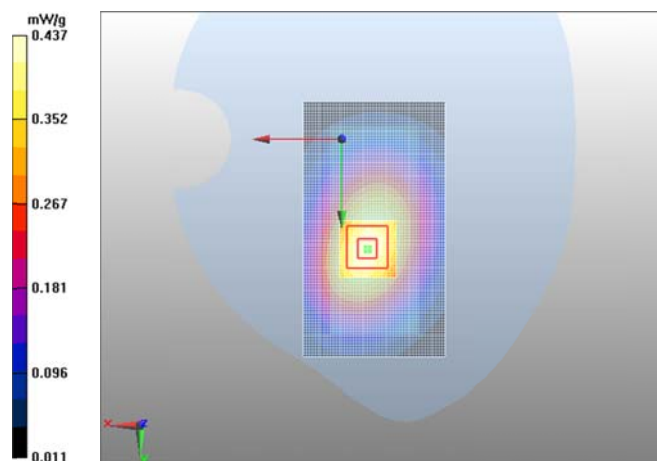
Peak SAR (extrapolated) = 0.551 W/kg

SAR(1 g) = 0.414 mW/g

SAR(10 g) = 0.297 mW/g

Power Drift = -0.108 dB

Maximum value of SAR (measured) = 0.439 mW/g



Date/Time: 2012-02-29 11:48:33

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: Body 835; Medium Notes: Medium Temperature: $t = 22.1$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.38, 8.38, 8.38); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Back Facing Phantom/Area Scan (51x91x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.405 mW/g

Configuration/Body - Middle - WH-102 - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

Reference Value = 11.4 V/m

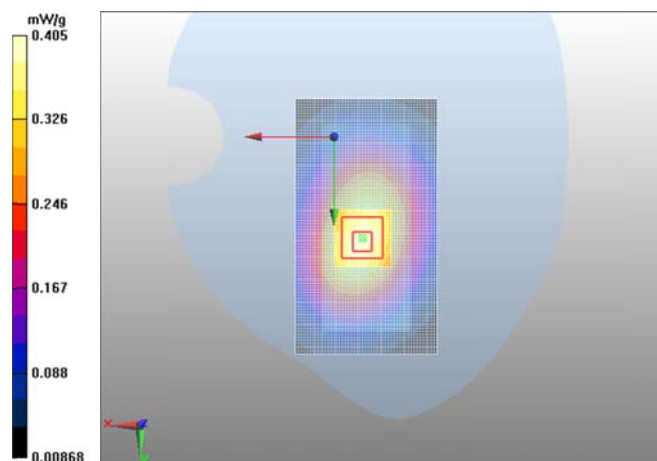
Peak SAR (extrapolated) = 0.503 W/kg

SAR(1 g) = 0.379 mW/g

SAR(10 g) = 0.275 mW/g

Power Drift = -0.026 dB

Maximum value of SAR (measured) = 0.401 mW/g



Date/Time: 2012-02-29 10:42:04

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: 2-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:4.2

Medium: Body 835; Medium Notes: Medium Temperature: $t = 22.1$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.38, 8.38, 8.38); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (51x91x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.550 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 9.17 V/m

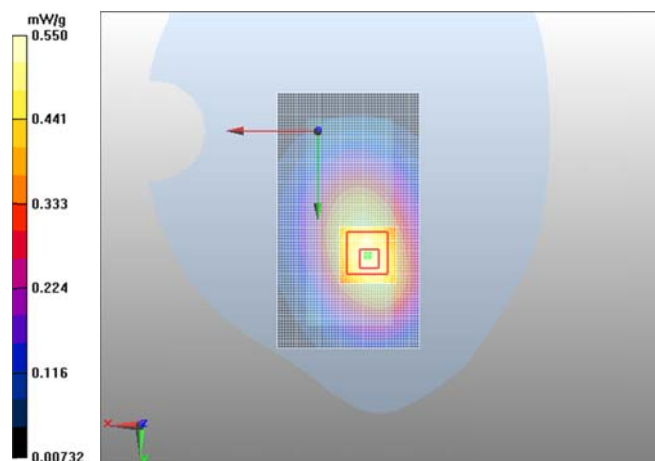
Peak SAR (extrapolated) = 0.692 W/kg

SAR(1 g) = 0.516 mW/g

SAR(10 g) = 0.369 mW/g

Power Drift = 0.043 dB

Maximum value of SAR (measured) = 0.547 mW/g



Date/Time: 2012-02-29 10:54:54

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: 3-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:2.8

Medium: Body 835; Medium Notes: Medium Temperature: $t = 22.1$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.38, 8.38, 8.38); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (51x91x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.566 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 9.28 V/m

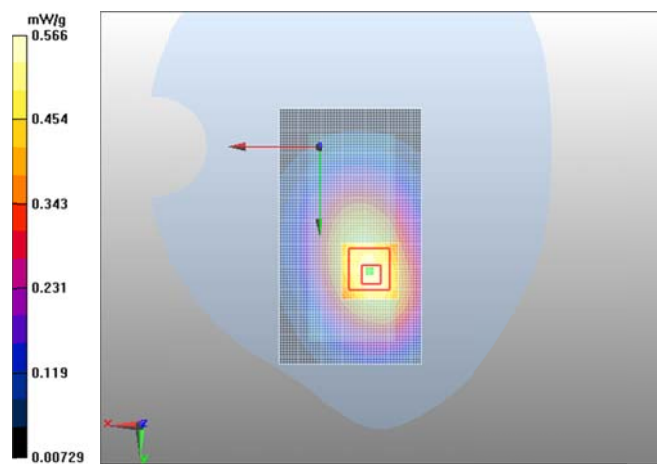
Peak SAR (extrapolated) = 0.718 W/kg

SAR(1 g) = 0.531 mW/g

SAR(10 g) = 0.381 mW/g

Power Drift = 0.019 dB

Maximum value of SAR (measured) = 0.561 mW/g



Date/Time: 2012-02-29 11:07:31

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780117/5

Communication System: 4-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:2.08

Medium: Body 835; Medium Notes: Medium Temperature: $t = 22.1$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(8.38, 8.38, 8.38); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (51x91x1): Measurement grid:
dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.521 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 8.98 V/m

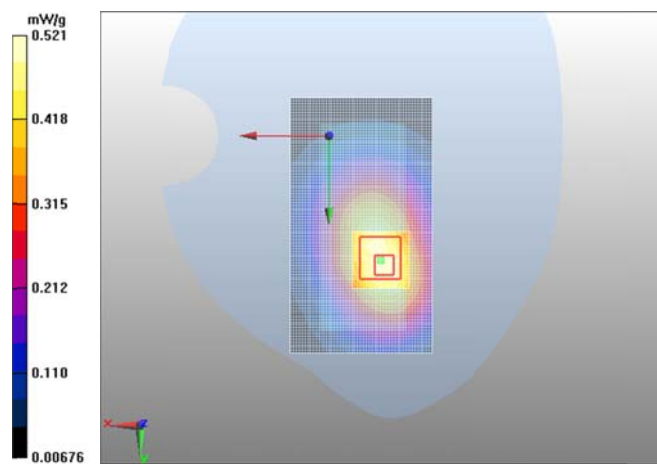
Peak SAR (extrapolated) = 0.680 W/kg

SAR(1 g) = 0.494 mW/g

SAR(10 g) = 0.354 mW/g

Power Drift = 0.068 dB

Maximum value of SAR (measured) = 0.521 mW/g



Date/Time: 2012-03-01 10:03:21

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: Body 1900 SAM8; Medium Notes: Medium Temperature: $t=22.2^{\circ}\text{C}$

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.72, 6.72, 6.72); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM8; Type: SAM; Serial: TP - 1215
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display facing phantom/Area Scan (51x91x1): Measurement grid:
 $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.339 mW/g

Configuration/Body - Middle - No Accessory - Display facing phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 9.1 V/m

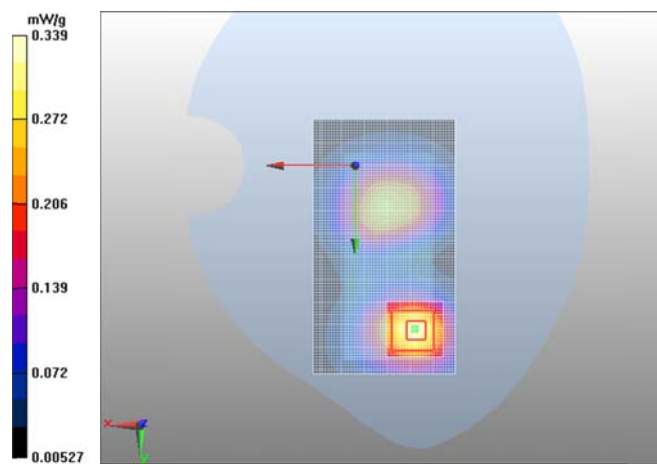
Peak SAR (extrapolated) = 0.465 W/kg

SAR(1 g) = 0.291 mW/g

SAR(10 g) = 0.176 mW/g

Power Drift = 0.030 dB

Maximum value of SAR (measured) = 0.317 mW/g



Date/Time: 2012-03-01 10:17:14

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: 2-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium: Body 1900 SAM8; Medium Notes: Medium Temperature: $t=22.2^{\circ}\text{C}$

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.72, 6.72, 6.72); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM8; Type: SAM; Serial: TP - 1215
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display facing phantom/Area Scan (51x91x1): Measurement grid:
 $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.315 mW/g

Configuration/Body - Middle - No Accessory - Display facing phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 8.82 V/m

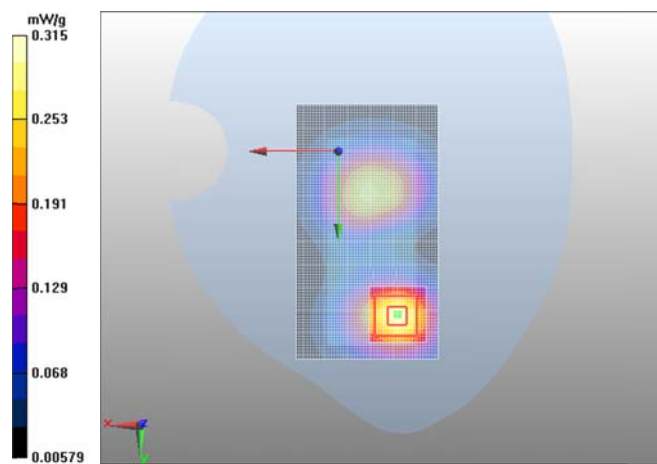
Peak SAR (extrapolated) = 0.432 W/kg

SAR(1 g) = 0.271 mW/g

SAR(10 g) = 0.164 mW/g

Power Drift = -0.031 dB

Maximum value of SAR (measured) = 0.292 mW/g



Date/Time: 2012-03-01 11:42:13

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: 3-slot GPRS1900

Frequency: 1850.2 MHz; Duty Cycle: 1:2.8

Medium: Body 1900 SAM8; Medium Notes: Medium Temperature: $t=22.2^{\circ}\text{C}$

Medium parameters used (interpolated): $f = 1850.2\text{ MHz}$; $\sigma = 1.51\text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.72, 6.72, 6.72); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM8; Type: SAM; Serial: TP - 1215
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Low - No Accessory - Display facing phantom/Area Scan (51x91x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.427 mW/g

Configuration/Body - Low - No Accessory - Display facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 11 V/m

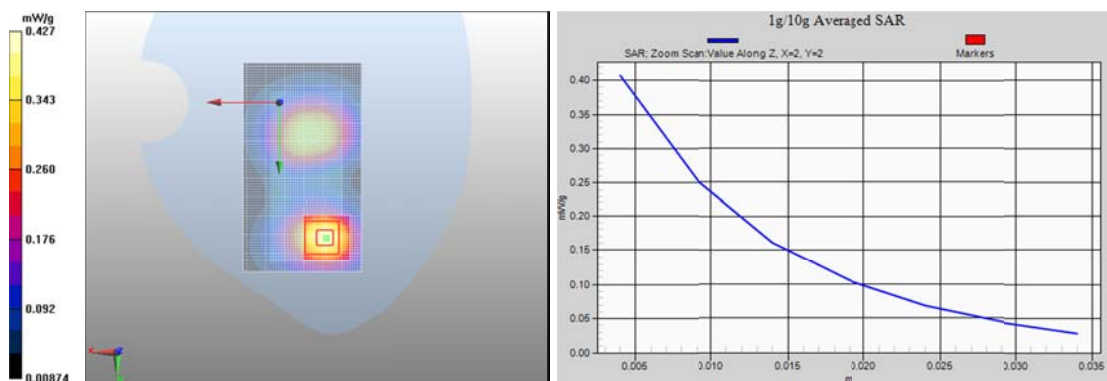
Peak SAR (extrapolated) = 0.601 W/kg

SAR(1 g) = 0.374 mW/g

SAR(10 g) = 0.226 mW/g

Power Drift = -0.196 dB

Maximum value of SAR (measured) = 0.407 mW/g



SAR Report

FCC_RM-811_01

Applicant: Nokia Corporation

Type: RM-811

Copyright © 2012 TCC Nokia

Date/Time: 2012-03-01 10:55:35

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: 3-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:2.8

Medium: Body 1900 SAM8; Medium Notes: Medium Temperature: $t=22.2^{\circ}\text{C}$

Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.54\text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.72, 6.72, 6.72); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM8; Type: SAM; Serial: TP - 1215
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Display facing phantom/Area Scan (51x91x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.312 mW/g

Configuration/Body - Middle - WH-102 - Display facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement

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

Reference Value = 8.26 V/m

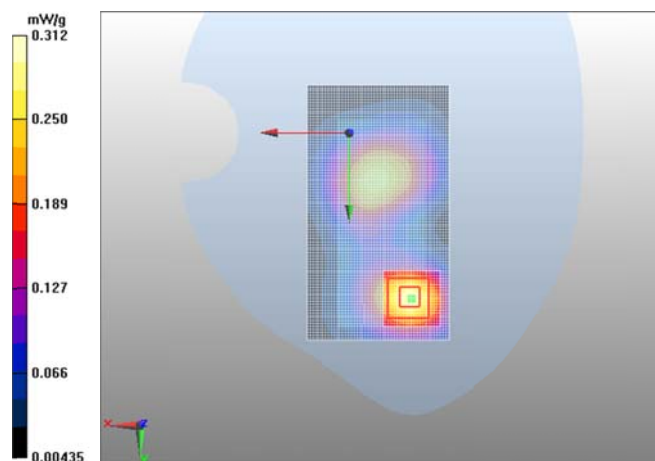
Peak SAR (extrapolated) = 0.440 W/kg

SAR(1 g) = 0.270 mW/g

SAR(10 g) = 0.161 mW/g

Power Drift = 0.172 dB

Maximum value of SAR (measured) = 0.296 mW/g



Date/Time: 2012-03-01 11:08:04

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: 3-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:2.8

Medium: Body 1900 SAM8; Medium Notes: Medium Temperature: $t=22.2^{\circ}\text{C}$

Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.54\text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.72, 6.72, 6.72); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM8; Type: SAM; Serial: TP - 1215
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Back facing phantom/Area Scan (51x91x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.359 mW/g

Configuration/Body - Middle - No Accessory - Back facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 9.36 V/m

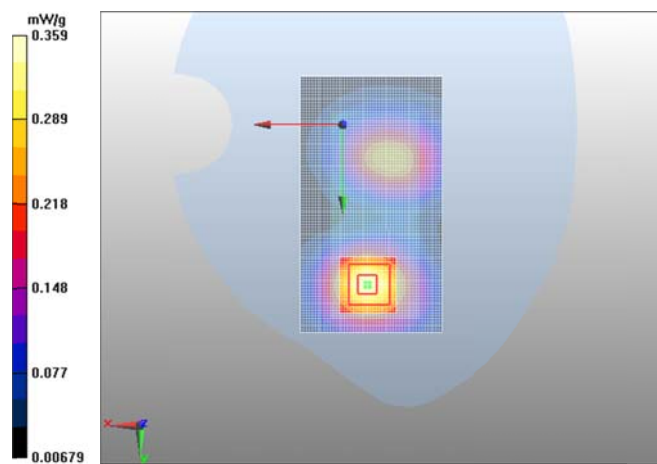
Peak SAR (extrapolated) = 0.504 W/kg

SAR(1 g) = 0.321 mW/g

SAR(10 g) = 0.198 mW/g

Power Drift = 0.100 dB

Maximum value of SAR (measured) = 0.347 mW/g



Date/Time: 2012-03-01 11:17:21

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: 3-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:2.8

Medium: Body 1900 SAM8; Medium Notes: Medium Temperature: $t=22.2^{\circ}\text{C}$

Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.54\text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.72, 6.72, 6.72); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM8; Type: SAM; Serial: TP - 1215
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Back facing phantom/Area Scan (51x91x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.273 mW/g

Configuration/Body - Middle - WH-102 - Back facing phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

Reference Value = 8.43 V/m

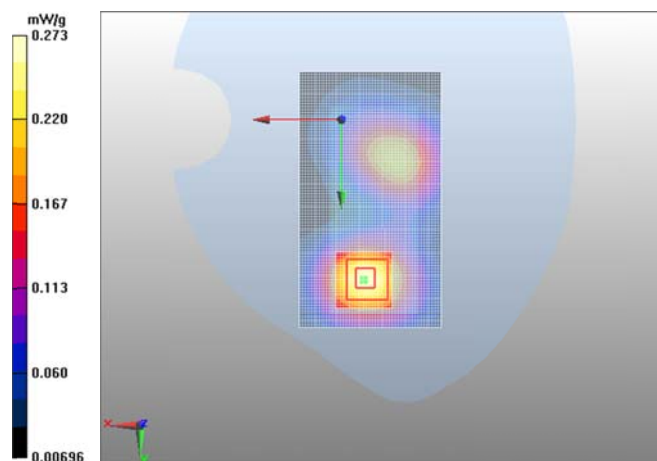
Peak SAR (extrapolated) = 0.388 W/kg

SAR(1 g) = 0.244 mW/g

SAR(10 g) = 0.150 mW/g

Power Drift = 0.056 dB

Maximum value of SAR (measured) = 0.264 mW/g



Date/Time: 2012-03-01 10:41:59

Test Laboratory: TCC Nokia

Type: RM-811; Serial: 004402/13/780101/9

Communication System: 4-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:2.08

Medium: Body 1900 SAM8; Medium Notes: Medium Temperature: $t=22.2^{\circ}\text{C}$

Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.54\text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.72, 6.72, 6.72); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2011-10-19
- Phantom: SAM8; Type: SAM; Serial: TP - 1215
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display facing phantom/Area Scan (51x91x1): Measurement grid:
 $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.298 mW/g

Configuration/Body - Middle - No Accessory - Display facing phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 8.61 V/m

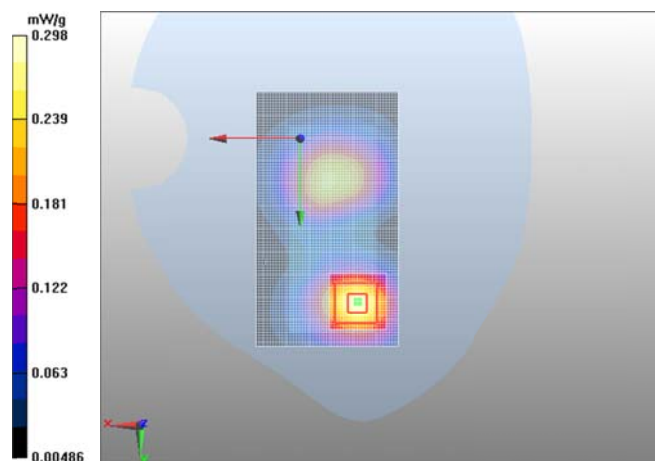
Peak SAR (extrapolated) = 0.415 W/kg

SAR(1 g) = 0.257 mW/g

SAR(10 g) = 0.155 mW/g

Power Drift = -0.051 dB

Maximum value of SAR (measured) = 0.279 mW/g



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



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: **ES3-3195_Mar11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3195**

Calibration procedure(s) **QA CAL-01.v7, QA CAL-23.v4, QA CAL-25.v3**
Calibration procedure for dosimetric E-field probes

Calibration date: **March 11, 2011**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	01-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	23-Apr-10 (No. DAE4-654_Apr10)	Apr-11
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	
Issued: March 16, 2011			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3195

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V/m})^2$) ^A	1.43	1.19	1.44	$\pm 10.1 \%$
DCP (mV) ^B	101.7	100.8	97.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	118.9	$\pm 2.7 \%$
			Y	0.00	0.00	1.00	110.7	
			Z	0.00	0.00	1.00	119.7	

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 Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3195

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	41.5	0.90	6.05	6.05	6.05	1.00	1.00	± 12.0 %
1750	40.1	1.37	5.24	5.24	5.24	1.00	1.12	± 12.0 %
1900	40.0	1.40	5.06	5.06	5.06	1.00	1.11	± 12.0 %
1950	40.0	1.40	4.89	4.89	4.89	1.00	1.09	± 12.0 %
2450	39.2	1.80	4.43	4.43	4.43	0.85	1.22	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ES3DV3- SN:3195

Calibration Parameter Determined in Body Tissue Simulating Media

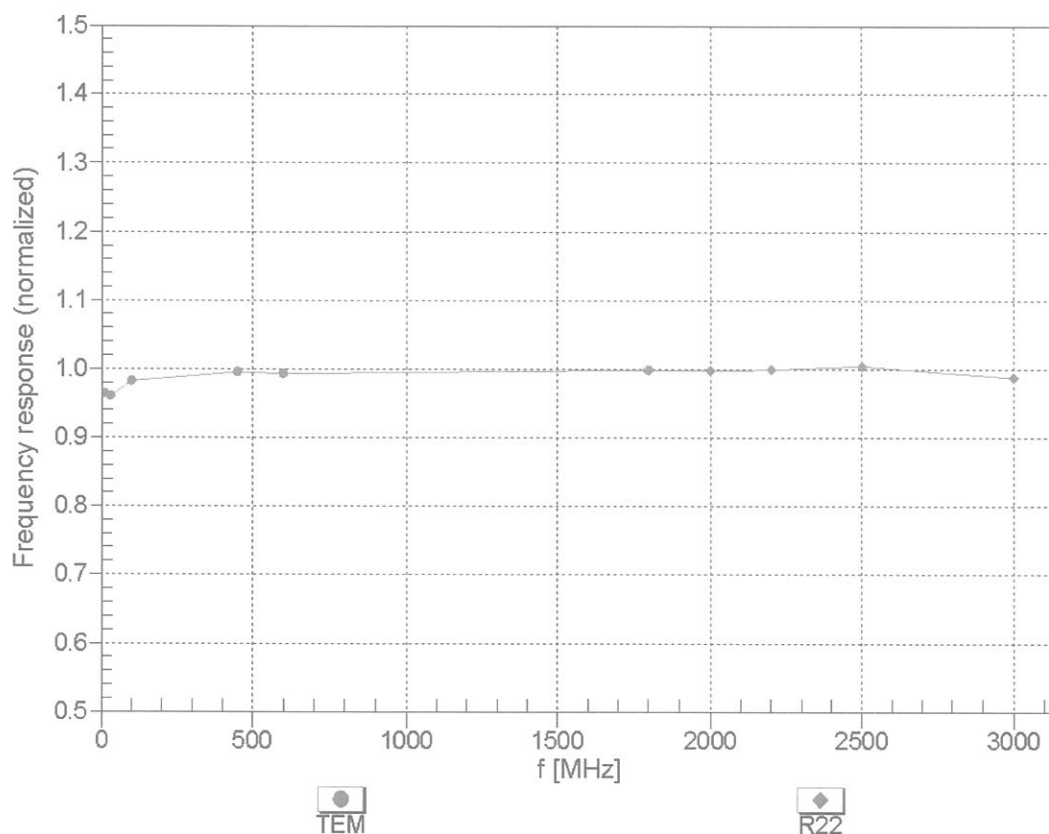
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	55.2	0.97	6.05	6.05	6.05	1.00	1.16	± 12.0 %
1750	53.4	1.49	4.86	4.86	4.86	1.00	1.20	± 12.0 %
1900	53.3	1.52	4.60	4.60	4.60	0.89	1.26	± 12.0 %
1950	53.3	1.52	4.65	4.65	4.65	0.87	1.29	± 12.0 %
2450	52.7	1.95	4.12	4.12	4.12	1.00	1.00	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

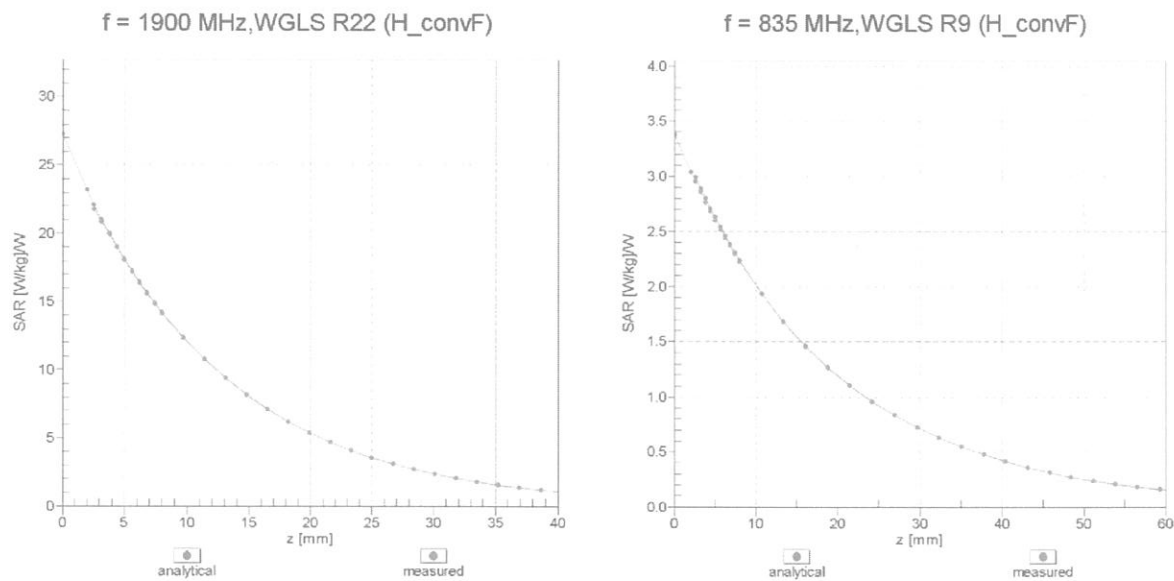
Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

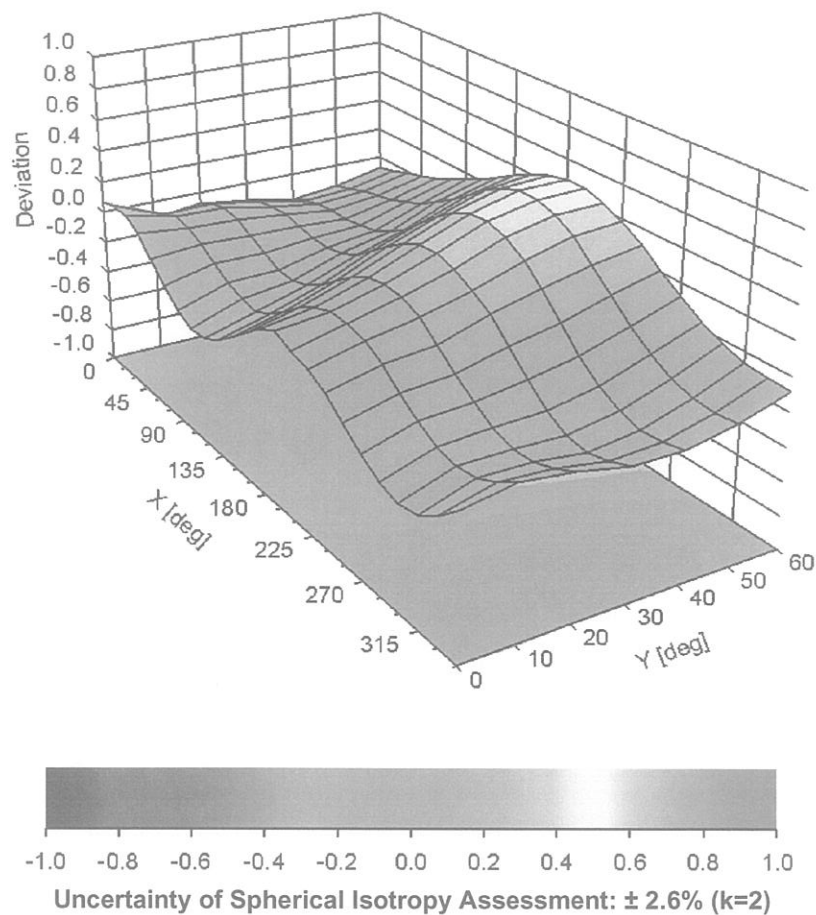


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, ϑ), f = 900 MHz





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: **EX3-3574_Oct11**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3574**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes**

Calibration date: **October 25, 2011**

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	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			
Issued: October 27, 2011			

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3574

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.53	0.48	0.43	± 10.1 %
DCP (mV) ^B	97.2	98.5	101.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	117.3	±2.5 %
			Y	0.00	0.00	1.00	116.3	
			Z	0.00	0.00	1.00	109.8	

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3574

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	41.5	0.90	8.22	8.22	8.22	0.80	0.67	± 12.0 %
1750	40.1	1.37	7.95	7.95	7.95	0.68	0.71	± 12.0 %
1900	40.0	1.40	7.57	7.57	7.57	0.80	0.64	± 12.0 %
1950	40.0	1.40	7.30	7.30	7.30	0.80	0.63	± 12.0 %
2450	39.2	1.80	6.71	6.71	6.71	0.80	0.61	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: EX3DV4- SN:3574

Calibration Parameter Determined in Body Tissue Simulating Media

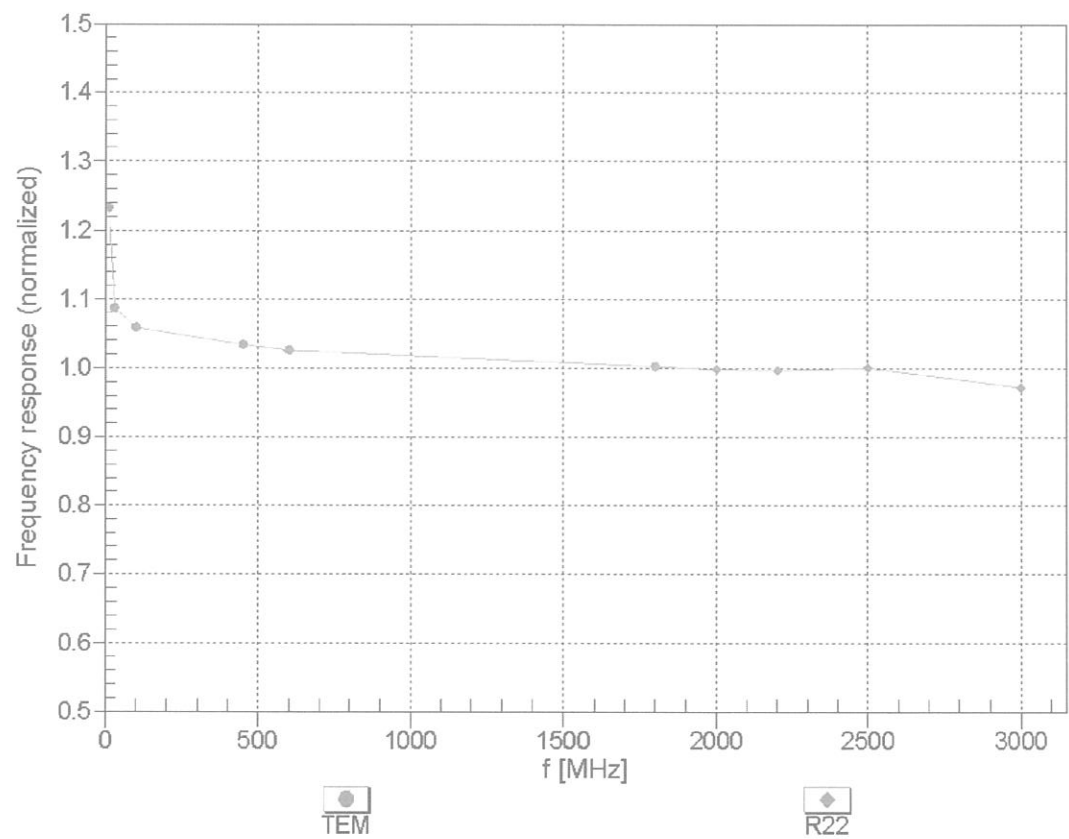
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	55.2	0.97	8.38	8.38	8.38	0.80	0.70	± 12.0 %
1750	53.4	1.49	6.94	6.94	6.94	0.78	0.62	± 12.0 %
1900	53.3	1.52	6.72	6.72	6.72	0.80	0.62	± 12.0 %
1950	53.3	1.52	6.93	6.93	6.93	0.72	0.68	± 12.0 %
2450	52.7	1.95	6.47	6.47	6.47	0.80	0.59	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

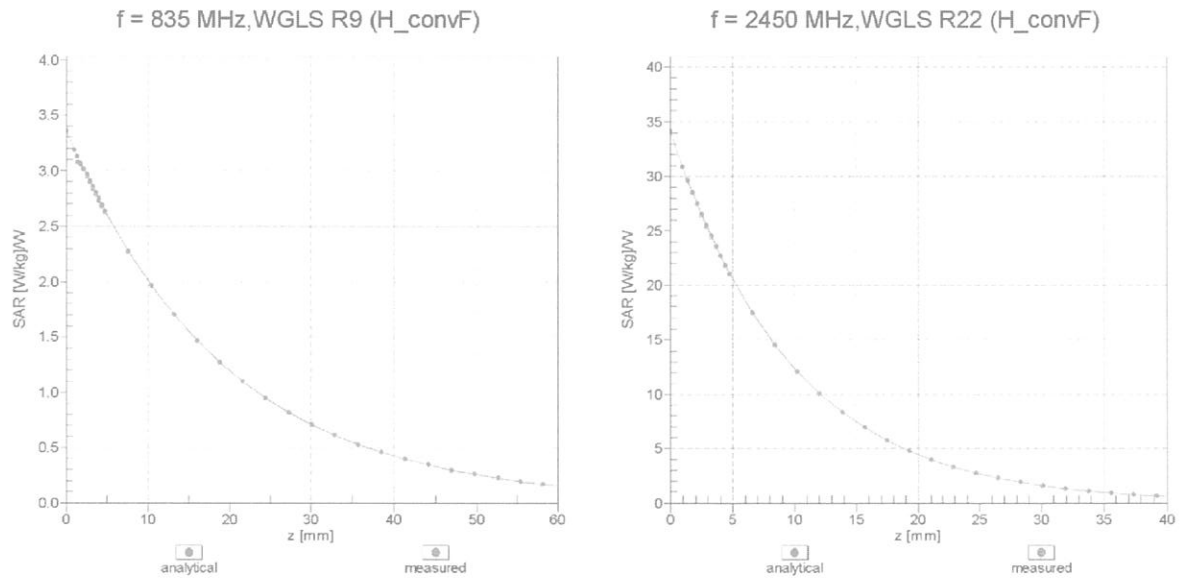
Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



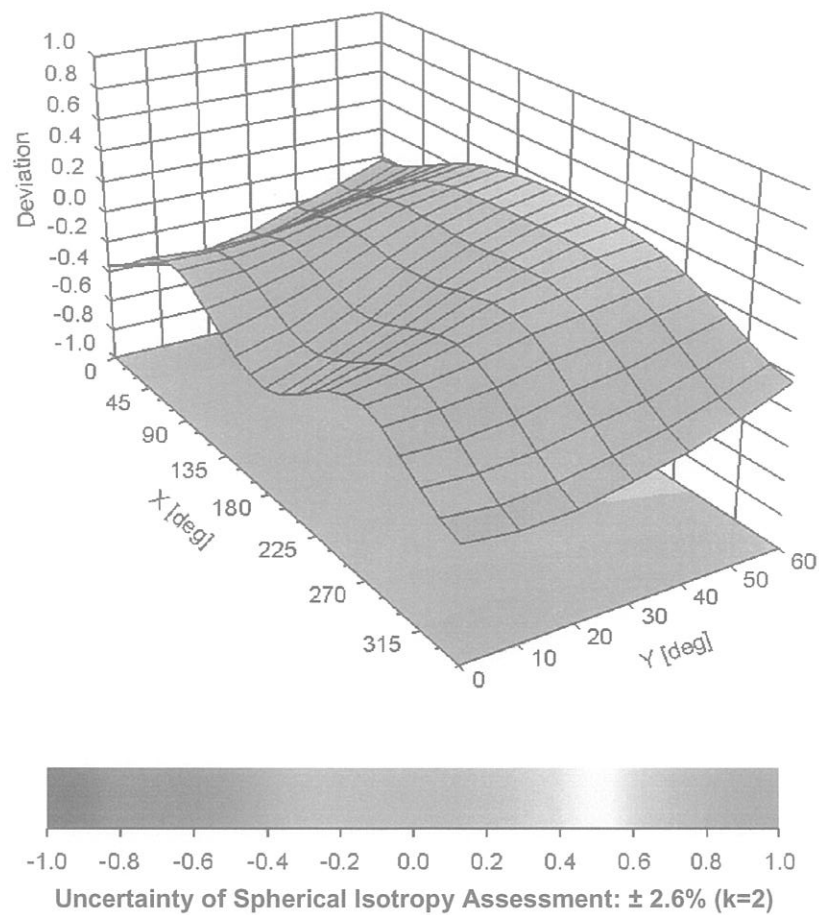
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), $f = 900 \text{ MHz}$



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



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: **D835V2-479_Mar11**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 479**

Calibration procedure(s) **QA CAL-05.v8**
Calibration procedure for dipole validation kits

Calibration date: **March 9, 2011**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Signature

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

Issued: March 10, 2011

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

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:479

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

Medium: HSL900

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 41$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6 Build 2, Version 52.6.2 (424)
- Postprocessing SW: SEMCAD X, V14.4 Build 4, Version 14.4.4 (2829)

Head/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe) 2/Zoom Scan (7x7x7) (7x7x7)/Cube

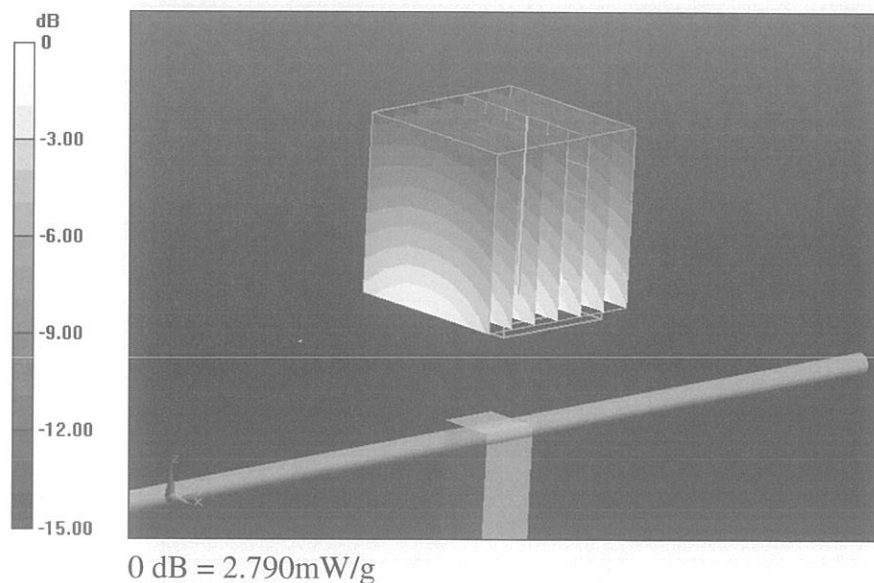
0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 57.436 V/m; Power Drift = 0.0071 dB

Peak SAR (extrapolated) = 3.602 W/kg

SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.56 mW/g

Maximum value of SAR (measured) = 2.795 mW/g



Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:479

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

Medium: MSL900

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6 Build 2, Version 52.6.2 (424)
- Postprocessing SW: SEMCAD X, V14.4 Build 4, Version 14.4.4 (2829)

Body/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

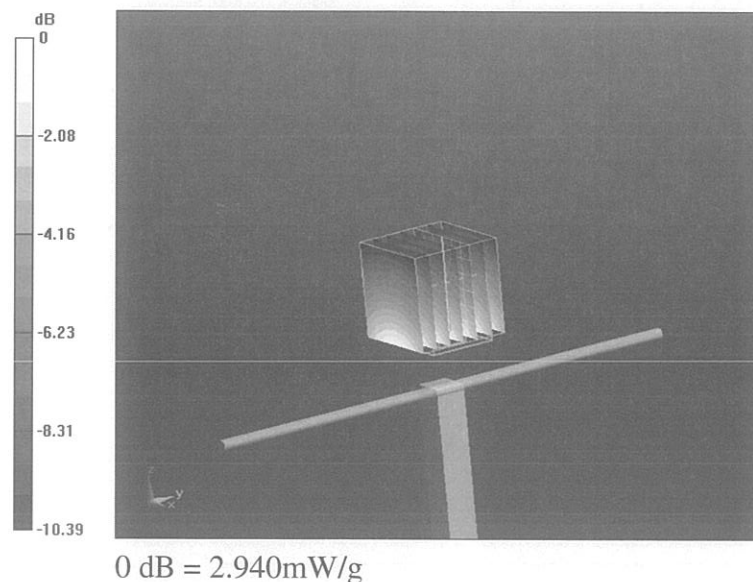
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.238 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.717 W/kg

SAR(1 g) = 2.52 mW/g; SAR(10 g) = 1.65 mW/g

Maximum value of SAR (measured) = 2.938 mW/g





Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Nokia Beijing TCC**

Certificate No: **D1900V2-547_Oct11**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 547**

Calibration procedure(s) **QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **October 20, 2011**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: October 20, 2011

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

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

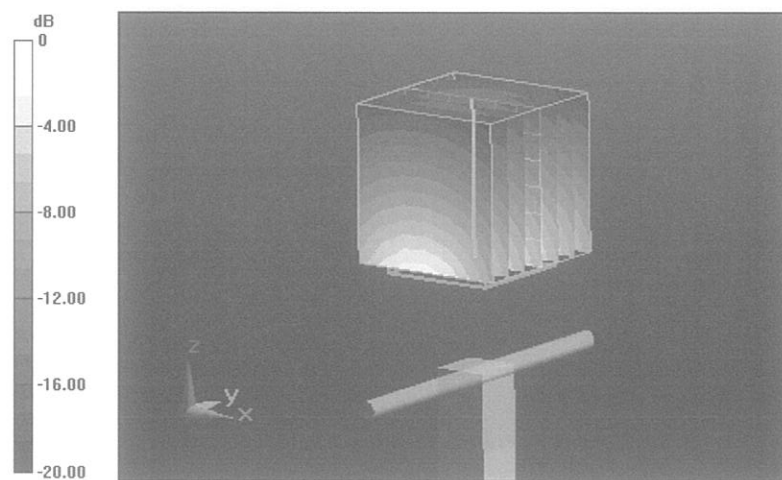
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.072 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 19.037 W/kg

SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.4 mW/g

Maximum value of SAR (measured) = 13.012 mW/g



DASY5 Validation Report for Body TSL

Date: 18.10.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.59$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

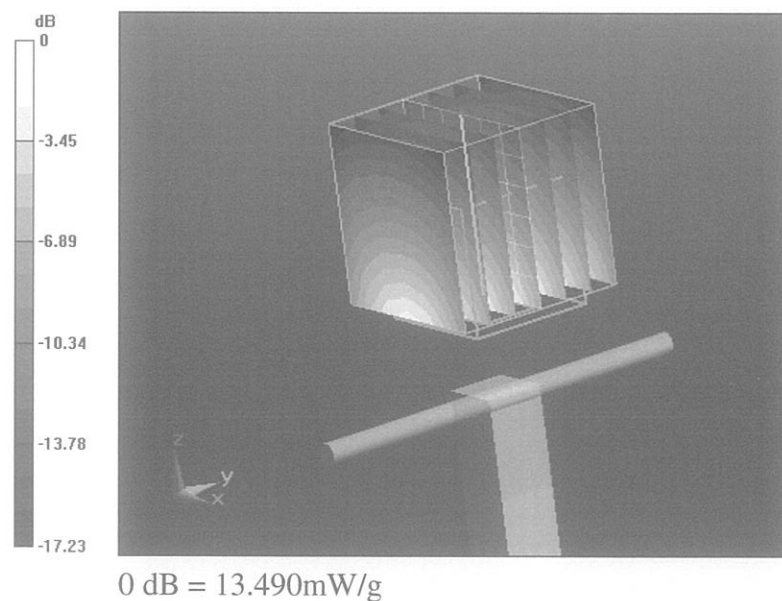
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.823 V/m; Power Drift = 0.0092 dB

Peak SAR (extrapolated) = 18.788 W/kg

SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.5 mW/g

Maximum value of SAR (measured) = 13.491 mW/g



APPENDIX E: DIELECTRIC PARAMETERS OF THE TISSUE SIMULANTS

Head tissue simulant dielectric parameters used in the measurements:

f (MHz)	Date	Dielectric Parameters					
		128		190		251	
		ϵ_r	σ [S/m]	ϵ_r	σ [S/m]	ϵ_r	σ [S/m]
836	2012-02-14	41.8	0.87	41.7	0.89	41.5	0.90
f (MHz)	Date	Dielectric Parameters					
		512		661		810	
		ϵ_r	σ [S/m]	ϵ_r	σ [S/m]	ϵ_r	σ [S/m]
1880	2012-02-14	38.8	1.41	38.6	1.44	38.4	1.46

Body tissue simulant dielectric parameters used in the measurements:

f (MHz)	Date	Dielectric Parameters					
		128		190		251	
		ϵ_r	σ [S/m]	ϵ_r	σ [S/m]	ϵ_r	σ [S/m]
836	2012-02-29	53.2	0.95	53.0	0.97	53.1	0.97
f (MHz)	Date	Dielectric Parameters					
		512		661		810	
		ϵ_r	σ [S/m]	ϵ_r	σ [S/m]	ϵ_r	σ [S/m]
1880	2012-03-01	52.3	1.51	52.4	1.54	52.4	1.56