

SAR Compliance Test Report

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Tested device:	RM-819		
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Supplement reports:	FCC_RM-819_03, SAR_Photo_RM-819_07		
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:			
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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2012-03-08 to 2012-03-16
SN, HW and SW numbers of tested device	SN: 004402/13/751778/9, HW: 3300, SW: 1600.2479.7740.11451, DUT: 16253 SN: 004402/13/751804/3, HW: 3300, SW: 1600.2479.7740.11451, DUT: 16252
Batteries used in testing	-
Headsets used in testing	-
Other accessories used in testing	-
State of sample	Prototype unit
Notes	-

1.1.1 Supplement reports referenced on the front cover of this report

FCC_RM-819_03:

1 sample was used in the RM-819 SAR testing; 2 samples had used in the results copied from RM-801 / FCC ID: LJPRM-801 which were included in this earlier report.

1.2 Maximum Results

The maximum measured SAR values for Head configuration, Body Worn configuration and Wireless Router (“Hotspot”) configuration are given in section 1.2.1, 1.2.2 and 1.2.3 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
3-slot GPRS850	128 / 824.2	28.5 dBm	Left, Cheek	1.13 W/kg	1.27 W/kg	1.6 W/kg	PASSED
WCDMA850	4233 / 846.6	22.5 dBm	Left, Cheek	0.886 W/kg	0.99 W/kg	1.6 W/kg	PASSED
3-slot GPRS1900	512 / 1850.2	25.5 dBm	Left, Cheek	0.937 W/kg	1.05 W/kg	1.6 W/kg	PASSED
WCDMA1900	9262 / 1852.4	22.5 dBm	Left, Cheek	1.03 W/kg	1.15 W/kg	1.6 W/kg	PASSED
WLAN2450	11 / 2462.0	13.0 dBm	Right, Cheek	0.488 W/kg	0.55 W/kg	1.6 W/kg	PASSED
3-slot GPRS850 + WLAN2450	-	-	Right, Cheek	1.13 W/kg	1.27 W/kg	1.6 W/kg	PASSED
WCDMA850 + WLAN2450	-	-	Right, Cheek	0.886 W/kg	0.99 W/kg	1.6 W/kg	PASSED
3-slot GPRS1900 + WLAN2450	-	-	Left, Cheek	0.976 W/kg	1.09 W/kg	1.6 W/kg	PASSED
WCDMA1900 + WLAN2450	-	-	Right, Cheek	1.03 W/kg	1.15 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
3-slot GPRS850	251 / 828.8	28.5 dBm	1.5cm	0.950 W/kg	1.06 W/kg	1.6 W/kg	PASSED
WCDMA850	4132 / 826.4	22.5 dBm	1.5cm	0.804 W/kg	0.90 W/kg	1.6 W/kg	PASSED
3-slot GPRS1900	512 / 1850.2	25.5 dBm	1.5cm	0.570 W/kg	0.64 W/kg	1.6 W/kg	PASSED
WCDMA1900	9262 / 1852.4	22.5 dBm	1.5cm	0.746 W/kg	0.84 W/kg	1.6 W/kg	PASSED
WLAN2450	11 / 2462.0	15.0 dBm	1.5cm	0.057 W/kg	0.06 W/kg	1.6 W/kg	PASSED
3-slot GPRS850 + WLAN2450	-	-	1.5cm	0.968 W/kg	1.08 W/kg	1.6 W/kg	PASSED
WCDMA850 + WLAN2450	-	-	1.5cm	0.835 W/kg	0.94 W/kg	1.6 W/kg	PASSED
3-slot GPRS1900 + WLAN2450	-	-	1.5cm	0.570 W/kg	0.64 W/kg	1.6 W/kg	PASSED
WCDMA1900 + WLAN2450	-	-	1.5cm	0.771 W/kg	0.86 W/kg	1.6 W/kg	PASSED

1.2.3 Wireless Router Configuration

Mode	Ch / f(MHz)	Conducted power	Separation distance	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
4-slot GPRS850	190 / 836.6	27.0 dBm	10.0 mm	0.983 W/kg	1.10 W/kg	1.6 W/kg	PASSED
WCDMA850	4132 / 826.4	22.5 dBm	10.0 mm	1.05 W/kg	1.18 W/kg	1.6 W/kg	PASSED
4-slot GPRS1900	512 / 1850.2	24.0 dBm	10.0 mm	1.22 W/kg	1.37 W/kg	1.6 W/kg	PASSED
WCDMA1900	9262 / 1852.4	21.5 dBm	10.0 mm	1.26 W/kg	1.41 W/kg	1.6 W/kg	PASSED
WLAN2450	11 / 2462.0	14.0 dBm	10.0 mm	0.213 W/kg	0.21 W/kg	1.6 W/kg	PASSED
4-slot GPRS850 + WLAN2450	-	-	10.0 mm	1.02 W/kg	1.12 W/kg	1.6 W/kg	PASSED
WCDMA850 + WLAN2450	-	-	10.0 mm	1.06 W/kg	1.19 W/kg	1.6 W/kg	PASSED
4-slot GPRS1900 + WLAN2450	-	-	10.0 mm	1.27 W/kg	1.42 W/kg	1.6 W/kg	PASSED
WCDMA1900 + WLAN2450	-	-	10.0 mm	1.33 W/kg	1.49 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.

**SAR data taken from FCC_RM-819_03 for RM-819.

1.2.4 Summary SAR data

		FCC-defined SAR values for the Grants of Equipment Authorization
Maximum Cellular/AWS/PCS Head SAR value		1.27 W/kg
Maximum WLAN Head SAR value		0.55 W/kg
{Max + Max} Simultaneous Head SAR value	1.82 W/kg [†]	
Maximum Cellular/AWS/PCS Body SAR value		1.06 W/kg
Maximum WLAN Body SAR value		0.06 W/kg
{Max + Max} Simultaneous Body SAR value	1.12 W/kg	
Maximum Product Specific (Wireless Router) SAR value: Cellular/PCS		1.41 W/kg
Maximum Product Specific (Wireless Router) SAR value: WLAN		0.21 W/kg
Maximum Simultaneous SAR value		1.41 W/kg ^{††}

[†] The 1.82 W/kg {max + max} Simultaneous Head SAR value quoted here exceeds 1.6 W/kg; however, this summation of SAR values cannot occur in practice as the maximum Cellular/AWS/PCS/ Head SAR value of 1.27 W/kg is from Left Cheek test, whereas the WLAN Head SAR value of 0.55 W/kg is from Right Cheek.

^{††} From Section 7:

The highest {max + max} Head SAR value is 1.457W/kg (0.969 for 3-slot GPRS850, 0.488 for WLAN2450) which, scaled up by 12%, gives 1.63W/kg. Antenna Pair SAR to Peak Location Separation Ratio is 1.63W/kg / 3.08cm = 0.53 i.e. > 0.3. Therefore, according to KDB648474 D01 SAR Handsets Multi Xmitter and Ant, v01r05, Simultaneous Transmission Procedures are required. Expanded zoom SAR scans fully including the Right Cheek SAR distributions of both 3-slot GPRS850 and WLAN2450 were performed and can be found in FCC_SAR_RM-819_03. The resulting combined SAR value was 0.905 W/kg.

The highest {max + max} Body SAR value is 1.007W/kg (0.746 for 3-slot GPRS850, 0.057 for WLAN2450) which, scaled up by 12% gives 1.13W/kg

The highest {max + max} WR SAR value is 1.473W/kg (1.26 for WCDMA1900, 0.213 for WLAN2450) which, scaled up by 12% gives 1.65 W/kg. Antenna Pair SAR to Peak Location Separation Ratio is 1.65 W/kg / 7.49cm = 0.22 i.e. < 0.3. Hence simultaneous Transmission Procedures as described in KDB648474 are not required.

Consequently, the 1.41W/kg value quoted here is the highest individual WR SAR value of 1.26W/kg scaled up by 12%.

1.2.5 Maximum Drift

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

1.2.6 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
EGPRS	850 1900	GMSK / 8PSK	1/8 to 4/8	824 – 849 1850 – 1910
WCDMA	850 (Band V) 1900 (Band II)		1	826 – 847 1852 – 1908
HSUPA	850 (Band V) 1900 (Band II)		1	826 – 847 1852 – 1908
BT	2450	GFSK	1	2402 – 2480
WLAN b-mode	2450	Up to 11Mbps QPSK	1	2412 – 2462
WLAN g-mode	2450	Up to 54Mbps 64QAM	1	2412 – 2462
WLAN n-mode 20MHz	2450	Up to 72.2Mbps 64QAM	1	2412 – 2462

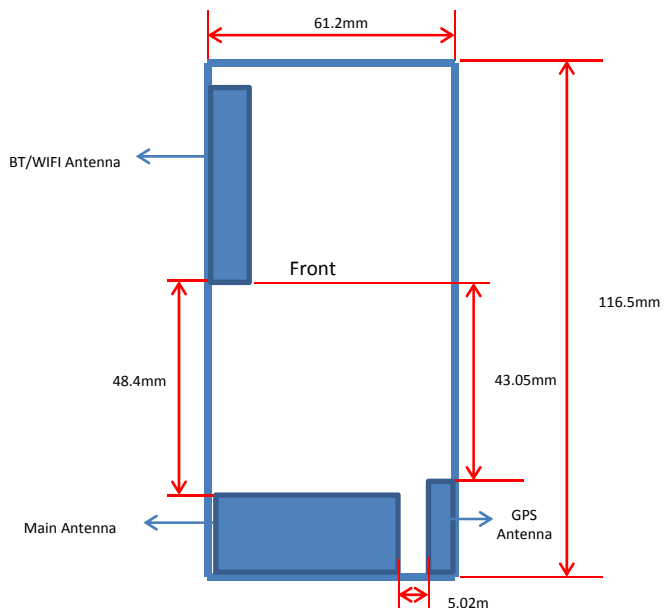
Outside of USA and Canada, the transmitter of the device is capable of operating also in GSM/GPRS/EGPRS900, GSM/GPRS/EGPRS1800, WCDMA900 and WCDMA2100 bands which are not part of this filing.

This device has Wireless Router “Hotspot” mode capability.

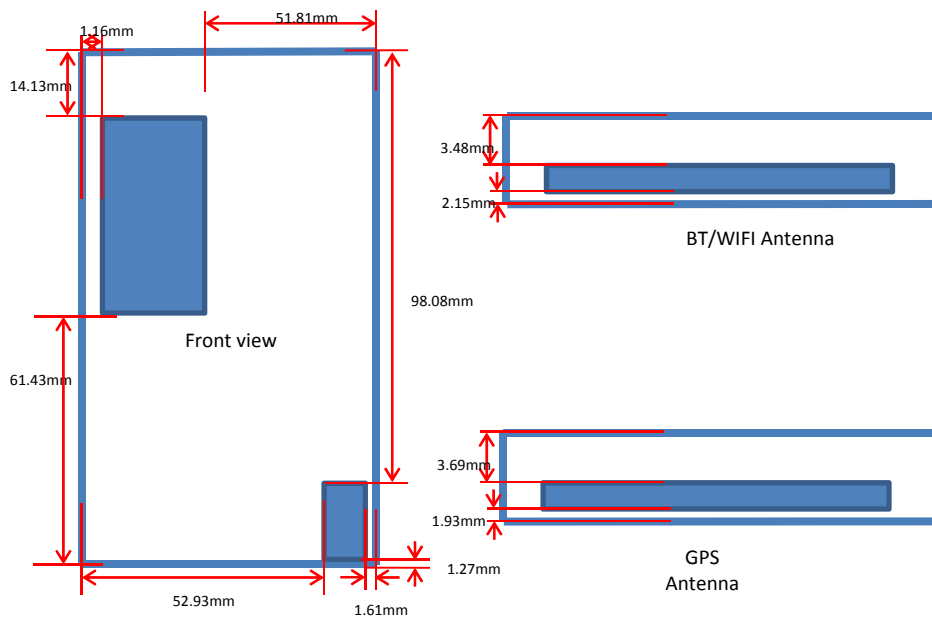
2.1 Description of the Antenna

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

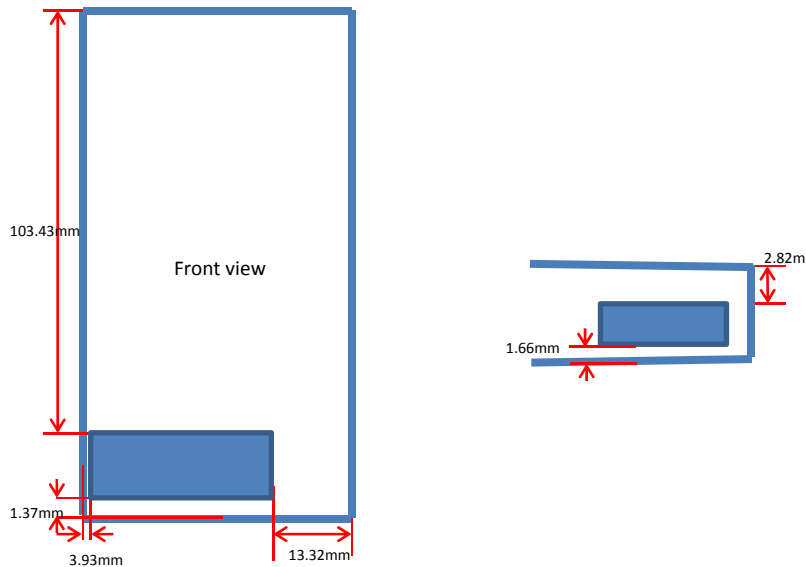
Phone Outside Dimension and Distance Between Main Antenna, BT/WIFI and GPS Antenna



Distance between Device Edges and Faces and BT/WIFI and GPS Antenna



Distance between Device Edges and Faces and Main Antenna



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 except for testing WLAN2450 where control software was used. Communication between the device and the call tester was established by air link.

The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.

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

The transmission mode of the device in all WCDMA tests was configured to 12.2kbps RMC with all TPC bits set as “1”.

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.

The transmission mode of the device in all WLAN b-mode tests was DSSS QPSK 11Mbps. This mode has the highest (or equal highest) time-averaged output power of all the WLAN b and g modulation modes in Nokia devices. In WLAN n-mode, BPSK 6.5Mbps with 20MHz bandwidth was used.

All of the Head SAR and Body-worn (at 15mm) SAR results presented in this report have been taken from the earlier report FCC_RM-819_03. This report presents test details and results for Body SAR testing at 10mm separation distance (i.e. Wireless Router “Hotspot” mode) only; these details and results are given in Section 7.

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 DASY near-field scanning system 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
DAE4	538	2011-09	2012-09
DAE 4	728	2011-05	2012-05
DAE 4	793	2011-09	2012-09
E-field Probe ES3DV3	3131	2011-09	2012-09
E-field Probe ES3DV3	3194	2011-09	2012-09
E-field Probe EX3DV4	3790	2011-05	2012-05
Dipole Validation Kit, D835V2	462	2011-09	2013-09
Dipole Validation Kit, D1900V2	5d013	2010-03	2012-03
Dipole Validation Kit, D2450V2	729	2011-09	2013-09
DASY4 software	Version 4.7	-	-
DASY5 software	Version 52.6.1.408	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration date	Calibration expiry
Signal Generator	SML03	101265	2011-08	2012-08
Amplifier	5S1G4M3	302338	-	-
Power Meter	NRVS	838624/032	2011-08	2012-08
Power Sensor	NRV-Z32	100067	2011-08	2012-08
Call Tester	CMU 200	101111	-	-
Vector Network Analyzer	8753E	US38432928	2011-08	2012-08
ENA Network Analyzer	E5071C	MY46213166	2012-01	2013-01
Dielectric Probe Kit	85070B	US33020420	-	-
Signal Generator	E4436B	US39260114	2011-08	2012-08
Amplifier	5S1G4	25583	-	-
Power Meter	NRVS	849305/028	2011-08	2012-08
Power Sensor	NRV-Z32	100069	2011-07	2012-08
Call Tester	CMU 200	104983	-	-

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 D
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 D
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 Distance from probe tip to dipole centers: 1.0 mm
Application	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.

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 Body tissue simulant(s):

800MHz band

Ingredient	Body (% by weight)
Deionised Water	69.25
Tween 20	30.00
Salt	0.75

1900MHz band

Ingredient	Body (% by weight)
Deionised Water	70.25
Tween 20	29.41
Salt	0.34

2450MHz band

Ingredient	Body (% by weight)
Deionised Water	70.20
Tween 20	29.62
Salt	0.18

4.3.2 System Checking

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

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
835	Reference result	2.45	53.5	1.00	
	± 10% window	2.20 – 2.70			
	IEEE1528 / IEC62209 Standard targets		55.2	0.97	
	2012-03-13	2.44	52.9	0.99	21.0
	2012-03-14	2.40	52.9	0.99	21.0
	2012-03-15	2.42	52.6	0.99	21.0
	2012-03-16	2.44	53.4	0.99	21.0
1900	Reference result	10.4	55.0	1.58	
	± 10% window	9.4 – 11.4			
	IEEE1528 / IEC62209 Standard targets		53.3	1.52	
	2012-03-12	10.7	53.3	1.52	21.0
	2012-03-13	10.6	52.7	1.51	21.0
2450	Reference result	13.3	51.7	2.04	
	± 10% window	12.0 – 14.6			
	IEEE1528 / IEC62209 Standard targets		52.7	1.95	
	2012-03-08	13.0	50.3	1.98	21.0
	2012-03-09	13.1	50.9	1.98	21.0
	2012-03-12	13.2	50.8	1.96	21.0
	2012-03-15	13.0	51.0	1.96	21.0

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

4.3.3 Tissue Simulants used in the Measurements

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ϵ_r	σ [S/m]	
835	Recommended value	55.2	0.97	
	$\pm 5\%$ window	52.4 – 58.0	0.92 – 1.02	
	2012-03-15	52.6	0.99	21.0
	2012-03-16	53.4	0.99	21.0
836	Recommended value	55.2	0.97	
	$\pm 5\%$ window	52.4 – 58.0	0.92 – 1.02	
	2012-03-13	52.9	0.99	21.0
	2012-03-14	52.9	0.99	21.0
1880	Recommended value	53.3	1.52	
	$\pm 5\%$ window	50.6 – 56.0	1.44 – 1.60	
	2012-03-12	53.3	1.50	21.0
	2012-03-13	52.8	1.49	21.0
2442	Recommended value	52.7	1.94	
	$\pm 5\%$ window	50.1 – 55.3	1.85 – 2.04	
	2012-03-08	50.3	1.97	21.0
	2012-03-09	51.0	1.97	21.0
	2012-03-12	50.8	1.95	21.0
	2012-03-15	51.0	1.95	21.0

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

5. DESCRIPTION OF THE TEST PROCEDURE

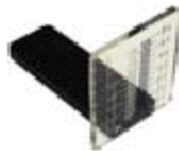
5.1 Device Holder

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 Wireless Router Configuration

The device was placed in the SPEAG holder using the Nokia spacer and positioned 10.0mm away from the flat phantom. The spacer was removed before the start of the measurements.

5.3 Scan Procedures

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

5.4 SAR Averaging Methods

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

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

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

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

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	C_i	$C_i \cdot U_i$ (%)	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	-
	Left	Cheek	-	0.723	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-slot GPRS	Conducted Power		-	30.0 dBm	-
	Left	Cheek	-	0.922	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
3-slot GPRS	Conducted Power		28.5 dBm	28.5 dBm	28.5 dBm
	Left	Cheek	1.13	1.02	0.974
		Tilt	-	0.608	-
	Right	Cheek	0.969	0.920	0.819
		Tilt	-	0.478	-
4-slot GPRS	Conducted Power		-	27.0 dBm	-
	Left	Cheek	-	0.875	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
3-slot 8PSK EGPRS	Conducted Power		24.0 dBm	-	-
	Left	Cheek	0.313	-	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-

(850MHz Table continues)

(850MHz Table continues)

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 4132 826.4 MHz	Ch 4175 835.0 MHz	Ch 4233 846.6 MHz
WCDMA	Conducted Power		22.5 dBm	22.5 dBm	22.5 dBm
	Left	Cheek	0.804	0.794	0.886
		Tilt	-	0.434	-
	Right	Cheek	-	0.727	-
		Tilt	-	0.397	-

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		-	30.0 dBm	-
	Left	Cheek	-	0.335	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-slot GPRS	Conducted Power		-	27.0 dBm	-
	Left	Cheek	-	0.582	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
3-slot GPRS	Conducted Power		25.5 dBm	25.5 dBm	25.5 dBm
	Left	Cheek	0.937	0.729	0.594
		Tilt	-	0.243	-
	Right	Cheek	-	0.580	-
		Tilt	-	0.314	-
4-slot GPRS	Conducted Power		-	24.0 dBm	-
	Left	Cheek	-	0.675	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
3-slot 8PSK EGPRS	Conducted Power		23.0 dBm	-	-
	Left	Cheek	0.409	-	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 9262 1852.4 MHz	Ch 9400 1880.0 MHz	Ch 9538 1907.6 MHz
WCDMA	Conducted Power		22.5 dBm	22.5 dBm	22.5 dBm
	Left	Cheek	1.03	0.970	0.878
		Tilt	-	0.257	-
	Right	Cheek	0.821	0.806	0.687
		Tilt	-	0.320	-

2450MHz Head SAR results**

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
WLAN b-mode	Conducted Power		15.0 dBm	15.0 dBm	15.0 dBm
	Left	Cheek	-	0.212	-
		Tilt	-	0.076	-
	Right	Cheek	0.370	0.409	0.439
		Tilt	-	0.076	-
WLAN n-mode 20MHz	Conducted Power		13.0 dBm	13.0 dBm	13.0 dBm
	Left	Cheek	-	-	-
		Tilt	-	-	-
	Right	Cheek	0.240	0.319	0.365
		Tilt	-	-	-

2450MHz Head SAR results – corrected for power drift**

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
WLAN b-mode	Conducted Power		15.0 dBm	15.0 dBm	15.0 dBm
	Left	Cheek	-	0.220	-
		Tilt	-	0.080	-
	Right	Cheek	0.372	0.438	0.461
		Tilt	-	0.083	-
WLAN n-mode 20MHz	Conducted Power		13.0 dBm	13.0 dBm	13.0 dBm
	Left	Cheek	-	-	-
		Tilt	-	-	-
	Right	Cheek	0.302	0.360	0.488
		Tilt	-	-	-

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

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
3-slot GPRS		Conducted Power	28.5 dBm	28.5 dBm	28.5 dBm
	Display facing phantom	Without headset	-	0.677	-
		Headset WH-902	-	0.582	-
	Back facing phantom	Without headset	0.912	0.927	0.950
		Headset WH-902	-	0.756	-
Mode	Device orientation	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 4132 826.4 MHz	Ch 4175 835.0 MHz	Ch 4233 846.6 MHz
WCDMA		Conducted Power	22.5 dBm	22.5 dBm	22.5 dBm
	Display facing phantom	Without headset	-	0.540	-
		Headset WH-902	-	0.407	-
	Back facing phantom	Without headset	0.804	0.733	0.790
		Headset WH-902	-	0.553	-

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
3-slot GPRS		Conducted Power	25.5 dBm	25.5 dBm	25.5 dBm
	Display facing phantom	Without headset	-	0.523	-
		Headset WH-902	-	0.408	-
	Back facing phantom	Without headset	0.570	0.561	0.434
		Headset WH-902	-	0.492	-
Mode	Device orientation	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 9262 1852.4 MHz	Ch 9400 1880.0 MHz	Ch 9538 1907.6 MHz
WCDMA		Conducted Power	22.5 dBm	22.5 dBm	22.5 dBm
	Display facing phantom	Without headset	-	0.658	-
		Headset WH-902	-	0.547	-
	Back facing phantom	Without headset	0.746	0.741	0.406
		Headset WH-902	-	0.735	-

2450MHz Body SAR results**

Mode	Device orientation	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
WLAN b-mode		Conducted Power	15.0 dBm	15.0 dBm	15.0 dBm
	Display facing phantom	Without headset	-	0.027	-
		Headset WH-902	-	0.030	-
	Back facing Phantom	Without headset	0.047	0.051	0.056
		Headset WH-902	-	0.045	-
WLAN n-mode 20MHz		Conducted Power	13.0 dBm	13.0 dBm	13.0 dBm
	Display facing phantom	Without headset	-	-	-
		Headset WH-902	-	-	-
	Back facing phantom	Without headset	0.031	0.037	0.045
		Headset WH-902	-	-	-

2450MHz Body SAR results – corrected for power drift**

Mode	Device orientation	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
WLAN b-mode		Conducted Power	15.0 dBm	15.0 dBm	15.0 dBm
	Display facing phantom	Without headset	-	0.033	-
		Headset WH-902	-	0.040	-
	Back facing Phantom	Without headset	0.051	0.056	0.057
		Headset WH-902	-	0.045	-
WLAN n-mode 20MHz		Conducted Power	13.0 dBm	13.0 dBm	13.0 dBm
	Display facing phantom	Without headset	-	-	-
		Headset WH-902	-	-	-
	Back facing phantom	Without headset	0.034	0.038	0.047
		Headset WH-902	-	-	-

**Simultaneous transmissions: Combined SAR results –
Individual band Max results****

Test configuration	Max. 1g SAR results				
	WLAN	3-slot GPRS850	WCDMA 850	3-slot GPRS1900	WCDMA 1900
Head: Left, Cheek	0.220	1.13	0.886	0.937	1.03
Head: Left, Tilt	0.080	0.608	0.434	0.243	0.257
Head: Right, Cheek	0.488	0.969	0.727	0.580	0.821
Head: Right, Tilt	0.083	0.478	0.397	0.314	0.320
Body: Display facing phantom, Without Headset	0.033	0.677	0.540	0.523	0.658
Body: Display facing phantom, Headset WH-902	0.040	0.582	0.407	0.408	0.547
Body: Back facing phantom, Without Headset	0.057	0.950	0.804	0.570	0.746
Body: Back facing phantom, Headset WH-902	0.045	0.756	0.553	0.492	0.735

**Simultaneous transmissions: Combined SAR results –
Max + Max combined results****

Test configuration	Max. 1g SAR results			
	3-slot GPRS850 + WLAN	WCDMA850 + WLAN	3-slot GPRS1900 + WLAN	WCDMA1900 + WLAN
Head: Left, Cheek	1.350	1.106	1.157	1.250
Head: Left, Tilt	0.688	0.514	0.323	0.337
Head: Right, Cheek	1.457	1.215	1.068	1.309
Head: Right, Tilt	0.561	0.480	0.397	0.403
Body: Display facing phantom, Without Headset	0.710	0.573	0.556	0.691
Body: Display facing phantom, Headset WH-902	0.622	0.447	0.448	0.587
Body: Back facing phantom, Without Headset	1.007	0.861	0.627	0.803
Body: Back facing phantom, Headset WH-902	0.801	0.598	0.537	0.780

The following table gives a more accurate assessment of the SAR values for simultaneous transmission. These values have been calculated using the SPEAG Combined Multiband algorithm, which is based on area scans. It a) converts the 2D area scans into 3D volume scans by assuming frequency-dependent decay characteristics for the E-field, b) sums the SAR values for WLAN2450 and the cellular bands point-by-point and c) calculates the combined average SAR values.

**Simultaneous transmissions: Combined SAR results –
SPEAG Combined Multiband algorithm results****

Test configuration	Max. 1g SAR results			
	3-slot GPRS850 + WLAN	WCDMA850 + WLAN	3-slot GPRS1900 + WLAN	WCDMA1900 + WLAN
Head: Left, Cheek	-	-	0.976	-
Head: Left, Tilt	-	-	-	-
Head: Right, Cheek	0.990	0.773	-	1.01
Head: Right, Tilt	-	-	-	-
Body: Display facing phantom, Without Headset	-	-	-	-
Body: Display facing phantom, Headset WH-902	-	-	-	-
Body: Back facing phantom, Without Headset	0.968	0.835	0.565	0.771
Body: Back facing phantom, Headset WH-902	-	-	-	-

**SAR data taken from FCC_RM-819_03.

Power reductions in Wireless router mode compared to Head and Body-worn modes

Band	Power reduction in WR mode
GSM/GPRS850	1dB in 2-slot mode
WCDMA850	0dB
GSM/GPRS1900	0dB
WCDMA1900	1dB
WLAN2450 b-mode	1dB
WLAN2450 g-mode	1dB
WLAN2450 n-mode	1dB

Body SAR assessment of Wireless Router mode at 10.0mm separation distance

850MHz Body SAR results

Option used	Device orientation	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	-
	Display facing phantom	-	0.600	-
	Back facing phantom	-	-	-
	Top edge facing phantom	-	-	-
	Bottom edge facing phantom	-	-	-
	Left edge facing phantom	-	-	-
	Right edge facing phantom	-	-	-
2-slot GPRS	Conducted Power	-	29.0 dBm	-
	Display facing phantom	-	0.466	-
	Back facing phantom	-	-	-
	Top edge facing phantom	-	-	-
	Bottom edge facing phantom	-	-	-
	Left edge facing phantom	-	-	-
	Right edge facing phantom	-	-	-
3-slot GPRS	Conducted Power	-	28.5 dBm	-
	Display facing phantom	-	0.548	-
	Back facing phantom	-	-	-
	Top edge facing phantom	-	-	-
	Bottom edge facing phantom	-	-	-
	Left edge facing phantom	-	-	-
	Right edge facing phantom	-	-	-

(850MHz Table continues)

(850MHz Table continues)

4-slot GPRS	Conducted Power	27.0 dBm	27.0 dBm	27.0 dBm
	Display facing phantom	-	0.664	-
	Back facing phantom	0.971	0.983	0.865
	Top edge facing phantom	-	0.030	-
	Bottom edge facing phantom	-	0.152	-
	Left edge facing phantom	-	0.503	-
	Right edge facing phantom	-	0.459	-
Option used	Device orientation	Ch 4132 826.4 MHz	Ch 4175 835.0 MHz	Ch 4233 846.6 MHz
WCDMA	Conducted Power	22.5 dBm	22.5 dBm	22.5 dBm
	Display facing phantom	-	0.675	-
	Back facing phantom	1.05	0.962	0.969
	Top edge facing phantom	-	0.032	-
	Bottom edge facing phantom	-	0.160	-
	Left edge facing phantom	-	0.570	-
	Right edge facing phantom	-	0.462	-

1900MHz Body SAR results

Option used	Device orientation	SAR, averaged over 1g (W/kg)		
		Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
GSM	Conducted Power	-	30.0 dBm	-
	Display facing phantom	-	-	-
	Back facing phantom	-	0.563	-
	Top edge facing phantom	-	-	-
	Bottom edge facing phantom	-	-	-
	Left edge facing phantom	-	-	-
	Right edge facing phantom	-	-	-
2-slot GPRS	Conducted Power	-	27.0 dBm	-
	Display facing phantom	-	-	-
	Back facing phantom	-	0.697	-
	Top edge facing phantom	-	-	-
	Bottom edge facing phantom	-	-	-
	Left edge facing phantom	-	-	-
	Right edge facing phantom	-	-	-
3-slot GPRS	Conducted Power	-	25.5 dBm	-
	Display facing phantom	-	-	-
	Back facing phantom	0.924	0.810	0.651
	Top edge facing phantom	-	-	-
	Bottom edge facing phantom	-	-	-
	Left edge facing phantom	-	-	-
	Right edge facing phantom	-	-	-

(1900MHz Table continues)

(1900MHz Table continues)

4-slot GPRS	Conducted Power	24.0 dBm	24.0 dBm	24.0 dBm
	Display facing phantom	1.13	0.944	0.799
	Back facing phantom	1.22	1.03	0.869
	Top edge facing phantom	-	0.119	-
	Bottom edge facing phantom	-	0.641	-
	Left edge facing phantom	-	0.231	-
	Right edge facing phantom	-	0.298	-
Option used	Device orientation	SAR, averaged over 1g (W/kg)		
		Ch 9262 1852.4 MHz	Ch 9400 1880.0 MHz	Ch 9538 1907.6 MHz
WCDMA	Conducted Power	21.5 dBm	21.5 dBm	21.5 dBm
	Display facing phantom	1.16	1.11	0.903
	Back facing phantom	1.26	1.20	0.986
	Top edge facing phantom	-	0.137	-
	Bottom edge facing phantom	-	0.772	-
	Left edge facing phantom	-	0.292	-
	Right edge facing phantom	-	0.405	-

2450MHz Body SAR results

Option used	Device orientation	SAR, averaged over 1g (W/kg)		
		Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
WLAN b-mode	Conducted Power	14.0 dBm	14.0 dBm	14.0 dBm
	Display facing phantom	-	0.088	-
	Back facing phantom	0.133	0.160	0.191
	Top edge facing phantom	-	0.043	-
	Bottom edge facing phantom	-	0.013	-
	Left edge facing phantom	-	0.149	-
	Right edge facing phantom	-	0.008	-
WLAN n-mode 20MHz	Conducted Power	12.0 dBm	12.0 dBm	12.0 dBm
	Display facing phantom	-	-	-
	Back facing phantom	0.143	0.157	0.163
	Top edge facing phantom	-	-	-
	Bottom edge facing phantom	-	-	-
	Left edge facing phantom	-	-	-
	Right edge facing phantom	-	-	-

2450MHz Body SAR results – corrected for power drift

Option used	Device orientation	SAR, averaged over 1g (W/kg)		
		Ch 1 2412.0 MHz	Ch 7 2442.0 MHz	Ch 11 2462.0 MHz
WLAN b-mode	Conducted Power	14.0 dBm	14.0 dBm	14.0 dBm
	Display facing phantom	-	0.093	-
	Back facing phantom	0.146	0.164	0.213
	Top edge facing phantom	-	0.047	-
	Bottom edge facing phantom	-	0.016	-
	Left edge facing phantom	-	0.152	-
	Right edge facing phantom	-	0.010	-
WLAN n-mode 20MHz	Conducted Power	12.0 dBm	12.0 dBm	12.0 dBm
	Display facing phantom	-	-	-
	Back facing phantom	0.154	0.174	0.170
	Top edge facing phantom	-	-	-
	Bottom edge facing phantom	-	-	-
	Left edge facing phantom	-	-	-
	Right edge facing phantom	-	-	-

**Simultaneous transmissions: Combined SAR results –
Individual band Max results**

Test configuration	Max. 1g SAR results				
	WLAN	4-slot GPRS850	WCDMA 850	4-slot GPRS1900	WCDMA 1900
Display facing phantom	0.093	0.664	0.675	1.13	1.16
Back facing phantom	0.213	0.983	1.05	1.22	1.26
Top edge facing phantom	0.047	0.030	0.032	0.119	0.137
Bottom edge facing phantom	0.016	0.152	0.160	0.641	0.772
Left edge facing phantom	0.152	0.503	0.570	0.231	0.292
Right edge facing phantom	0.010	0.459	0.462	0.298	0.405

**Simultaneous transmissions: Combined SAR results –
Max + Max combined results**

Test configuration	Max. 1g SAR results			
	4-slot GPRS850 + WLAN	WCDMA850 + WLAN	4-slot GPRS1900 + WLAN	WCDMA1900 + WLAN
Display facing phantom	0.757	0.768	1.223	1.253
Back facing phantom	1.196	1.263	1.433	1.473
Top edge facing phantom	0.077	0.079	0.166	0.184
Bottom edge facing phantom	0.168	0.176	0.657	0.788
Left edge facing phantom	0.655	0.722	0.383	0.444
Right edge facing phantom	0.469	0.472	0.308	0.415

For WCDMA1900 + WLAN the combined Max + Max SAR value > 1.6 W/kg when scaled up by 12%. The separation distance between the SAR peaks on the plots is 7.49cm, hence the value of (Max + Max SAR i.e. 1.473)/(separation distance in cm) = 0.22. As this ratio < 0.3, Simultaneous Transmission Procedures as described in KDB648474 are not required for this product and expanded zoom SAR scanning is not required to evaluate the combined SAR value.

The following table gives a more accurate assessment of the SAR values for simultaneous transmission. These values have been calculated using the SPEAG Combined Multiband algorithm, which is based on area scans. It a) converts the 2D area scans into 3D volume scans by assuming frequency-dependent decay characteristics for the E-field, b) sums the SAR values for WLAN2450 and the cellular bands point-by-point and c) calculates the combined average SAR values.

**Simultaneous transmissions: Combined SAR results –
SPEAG Combined Multiband algorithm results**

Test configuration	Max. 1g SAR results			
	4-slot GPRS850 + WLAN	WCDMA850 + WLAN	4-slot GPRS1900 + WLAN	WCDMA1900 + WLAN
Display facing phantom	-	-	-	-
Back facing phantom	1.02	1.06	1.27	1.33
Top edge facing phantom	-	-	-	-
Bottom edge facing phantom	-	-	-	-
Left edge facing phantom	-	-	-	-
Right edge facing phantom	-	-	-	-

Note: Simultaneous Transmission Procedures as described in KDB648474 are not required for this product. The Combined SAR data given in the tables above has been voluntarily calculated.

Plots of the Measurement scans are given in Appendix B.

APPENDIX A: SYSTEM CHECK SCANS

Date/Time: 2012-03-13 09:54:52

Test Laboratory: TCC Nokia

Type: D835V2; Serial: D835V2 - SN:462

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: $t = 21.1$ C

Medium parameters used: $f = 835$ MHz; $\sigma = 0.993$ mho/m; $\epsilon_r = 52.924$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.613 mW/g

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

Reference Value = 52.496 V/m

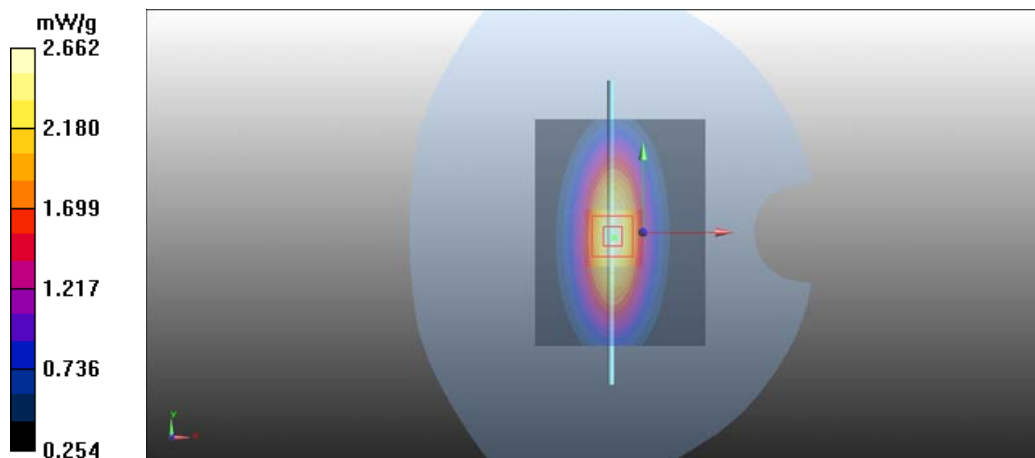
Peak SAR (extrapolated) = 3.5370

SAR(1 g) = 2.44 mW/g

SAR(10 g) = 1.61 mW/g

Power Drift = 0.0051 dB

Maximum value of SAR (measured) = 2.662 mW/g



Date/Time: 2012-03-14 09:10:27

Test Laboratory: TCC Nokia

Type: D835V2; Serial: D835V2 - SN:462

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: $t = 21.1$ C

Medium parameters used: $f = 835$ MHz; $\sigma = 0.989$ mho/m; $\epsilon_r = 52.924$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.552 mW/g

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

Reference Value = 52.038 V/m

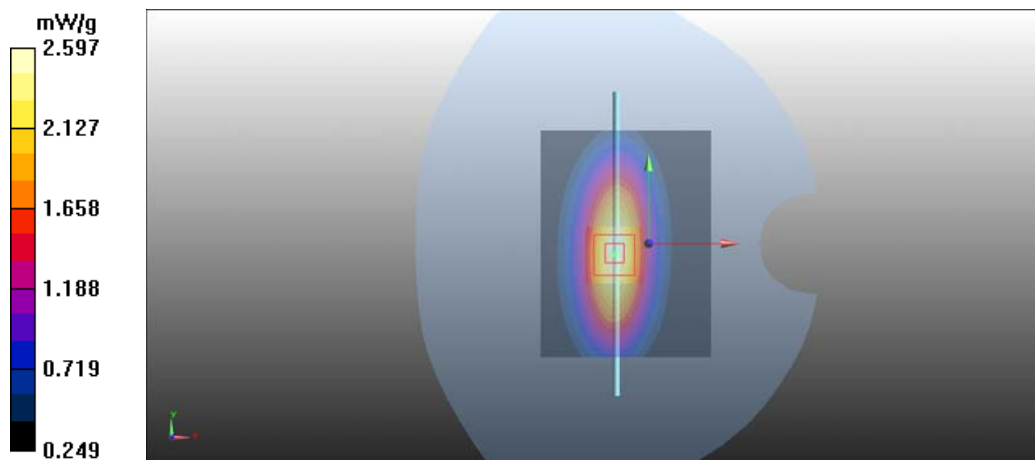
Peak SAR (extrapolated) = 3.4490

SAR(1 g) = 2.4 mW/g

SAR(10 g) = 1.58 mW/g

Power Drift = -0.0048 dB

Maximum value of SAR (measured) = 2.597 mW/g



Date/Time: 2012-03-15 08:06:09

Test Laboratory: TCC Nokia

Type: D835V2; Serial: D835V2 - SN:462

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: $t = 20.6$ C

Medium parameters used: $f = 835$ MHz; $\sigma = 0.987$ mho/m; $\epsilon_r = 52.635$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.586 mW/g

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

Reference Value = 52.435 V/m

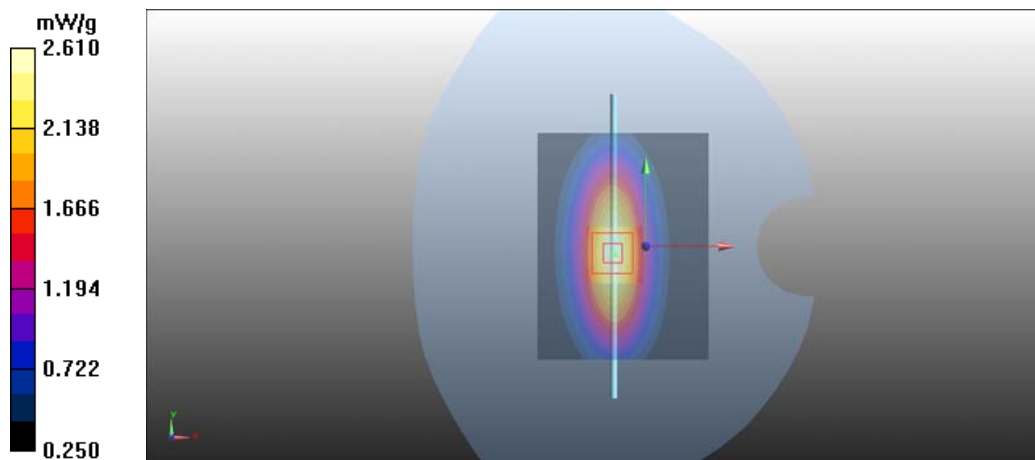
Peak SAR (extrapolated) = 3.4740

SAR(1 g) = 2.42 mW/g

SAR(10 g) = 1.6 mW/g

Power Drift = -0.0045 dB

Maximum value of SAR (measured) = 2.610 mW/g



Date/Time: 2012-03-16 08:10:28

Test Laboratory: TCC Nokia
Type: D835V2; Serial: D835V2 - SN:462

Communication System: CW835

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: t= 21 C

Medium parameters used: f = 835 MHz; σ = 0.993 mho/m; ϵ_r = 53.384; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.615 mW/g

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

Reference Value = 52.337 V/m

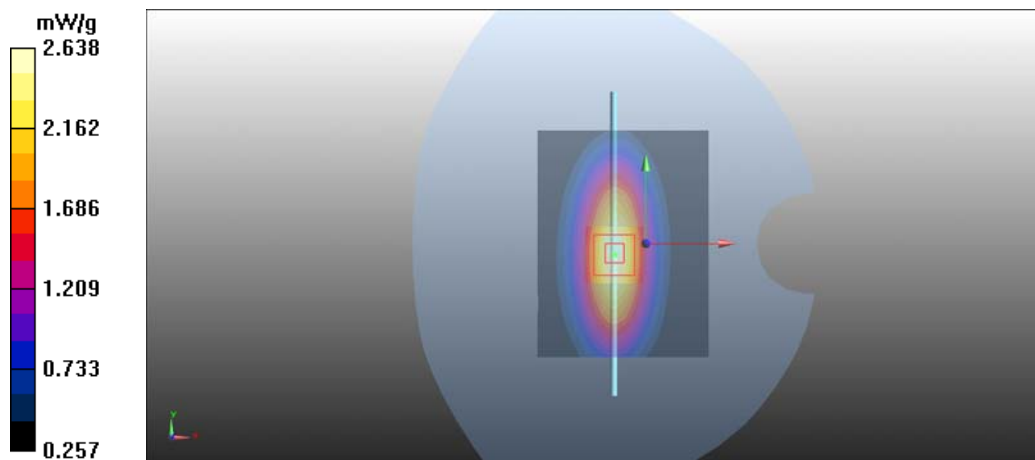
Peak SAR (extrapolated) = 3.5000

SAR(1 g) = 2.44 mW/g

SAR(10 g) = 1.61 mW/g

Power Drift = -0.01 dB

Maximum value of SAR (measured) = 2.638 mW/g



Date/Time: 2012-03-12 08:44:53

Test Laboratory: TCC Nokia

Type: D1900V2; Serial: D1900V2 - SN:5d013

Communication System: CW1900

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.523$ mho/m; $\epsilon_r = 53.265$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.971 mW/g

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

Reference Value = 90.367 V/m

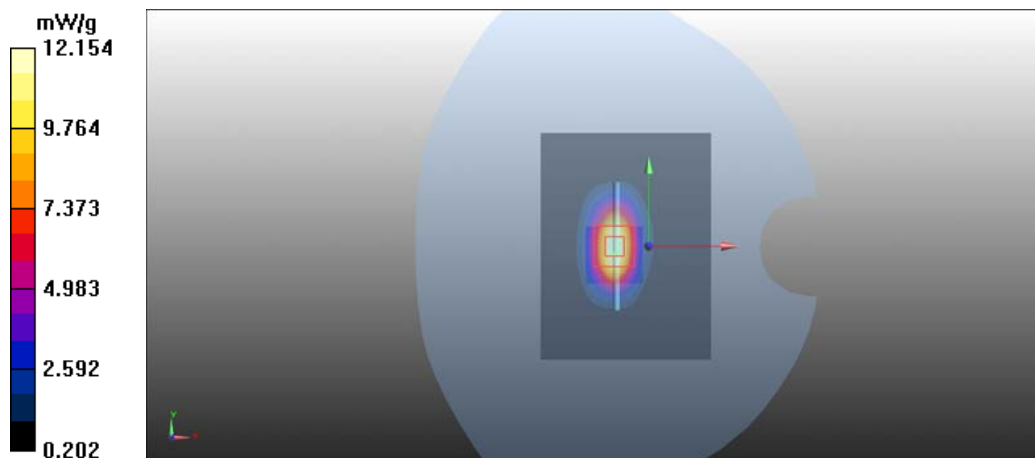
Peak SAR (extrapolated) = 19.3860

SAR(1 g) = 10.7 mW/g

SAR(10 g) = 5.62 mW/g

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 12.154 mW/g



Date/Time: 2012-03-13 08:19:35

Test Laboratory: TCC Nokia
Type: D1900V2; Serial: D1900V2 - SN:5d013

Communication System: CW1900

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: $t = 21.2$ C

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.505$ mho/m; $\epsilon_r = 52.691$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.270 mW/g

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

Reference Value = 83.478 V/m

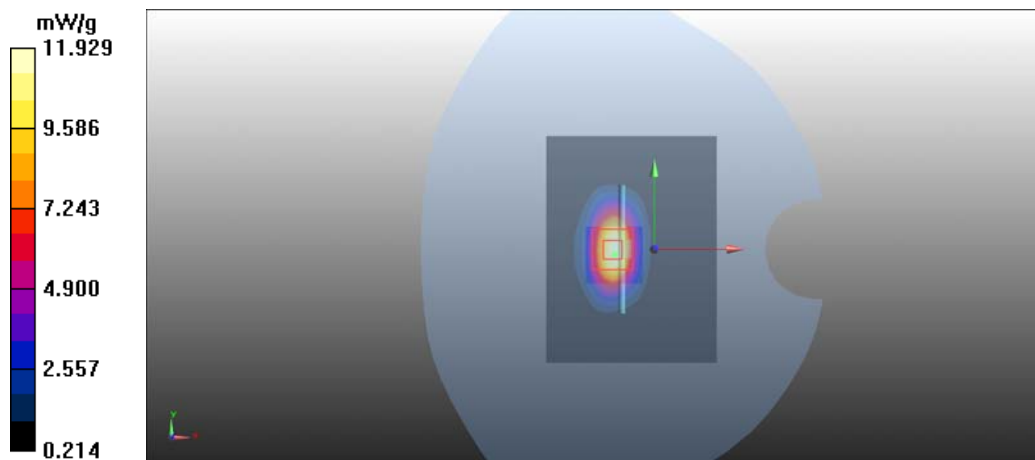
Peak SAR (extrapolated) = 19.1050

SAR(1 g) = 10.6 mW/g

SAR(10 g) = 5.52 mW/g

Power Drift = 0.16 dB

Maximum value of SAR (measured) = 11.929 mW/g



Date/Time: 2012-03-08 06:46:23

Test Laboratory: TCC Nokia

Type: D2450V2; Serial: D2450V2 - SN:729

Communication System: CW2450

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0\text{ C}$

Medium parameters used: $f = 2450\text{ MHz}$; $\sigma = 1.976\text{ mho/m}$; $\epsilon_r = 50.287$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 15.373 mW/g

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

Reference Value = 86.735 V/m

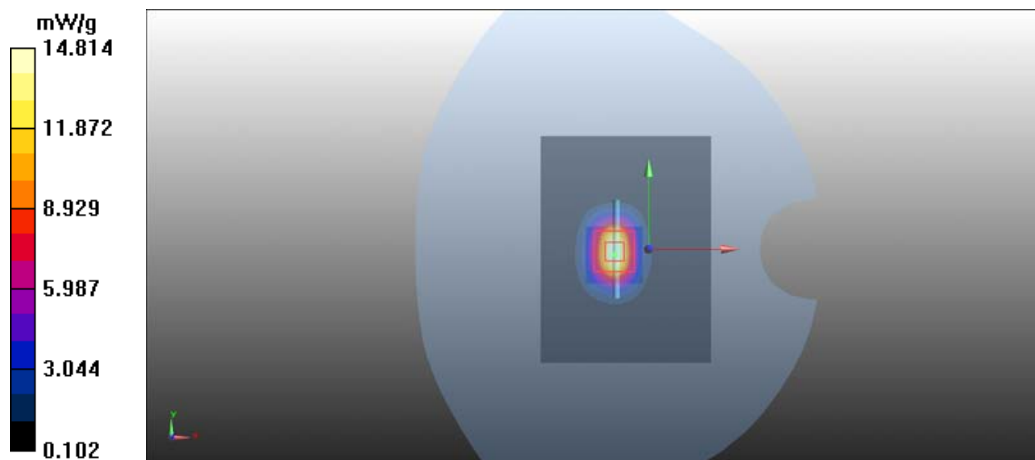
Peak SAR (extrapolated) = 26.7300

SAR(1 g) = 13 mW/g

SAR(10 g) = 6.05 mW/g

Power Drift = 0.0057 dB

Maximum value of SAR (measured) = 14.814 mW/g



Date/Time: 2012-03-09 06:46:23

Test Laboratory: TCC Nokia

Type: D2450V2; Serial: D2450V2 - SN:729

Communication System: CW2450

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0\text{ C}$

Medium parameters used: $f = 2450\text{ MHz}$; $\sigma = 1.984\text{ mho/m}$; $\epsilon_r = 50.92$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 15.373 mW/g

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

Reference Value = 86.735 V/m

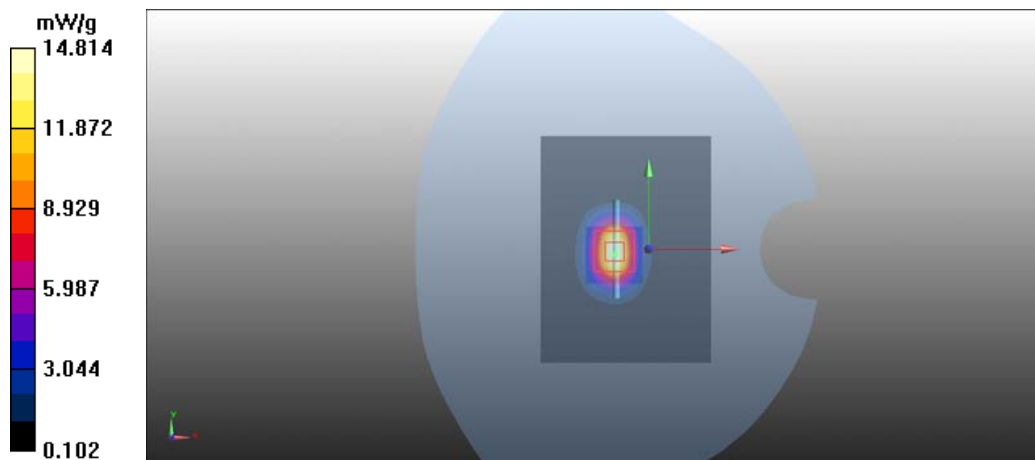
Peak SAR (extrapolated) = 26.7300

SAR(1 g) = 13.1 mW/g

SAR(10 g) = 6.05 mW/g

Power Drift = 0.00571 dB

Maximum value of SAR (measured) = 14.814 mW/g



Date/Time: 2012-03-12 06:51:35

Test Laboratory: TCC Nokia

Type: D2450V2; Serial: D2450V2 - SN:729

Communication System: CW2450

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 50.81$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 16.035 mW/g

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

Reference Value = 84.317 V/m

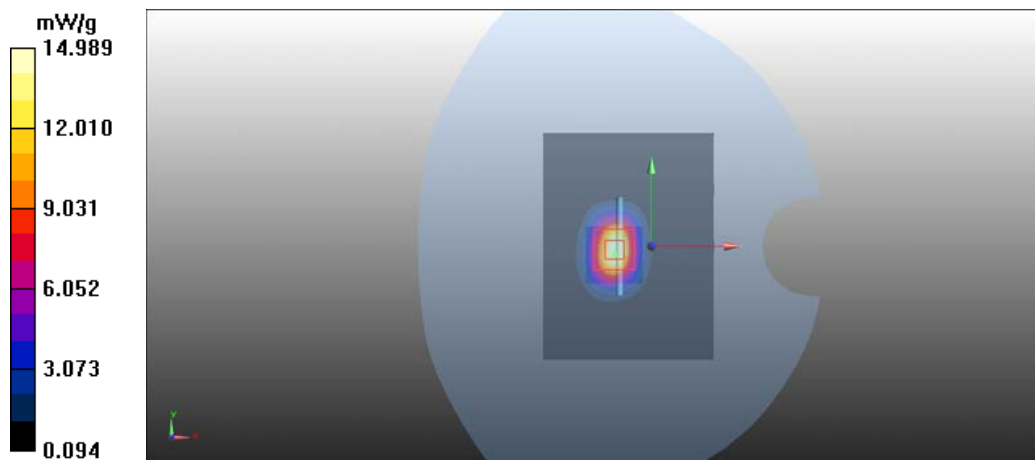
Peak SAR (extrapolated) = 26.7700

SAR(1 g) = 13.2 mW/g

SAR(10 g) = 6.08 mW/g

Power Drift = 0.09 dB

Maximum value of SAR (measured) = 14.989 mW/g



Date/Time: 2012-03-15 06:58:28

Test Laboratory: TCC Nokia

Type: D2450V2; Serial: D2450V2 - SN:729

Communication System: CW2450

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.956$ mho/m; $\epsilon_r = 50.973$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 15.410 mW/g

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

Reference Value = 85.277 V/m

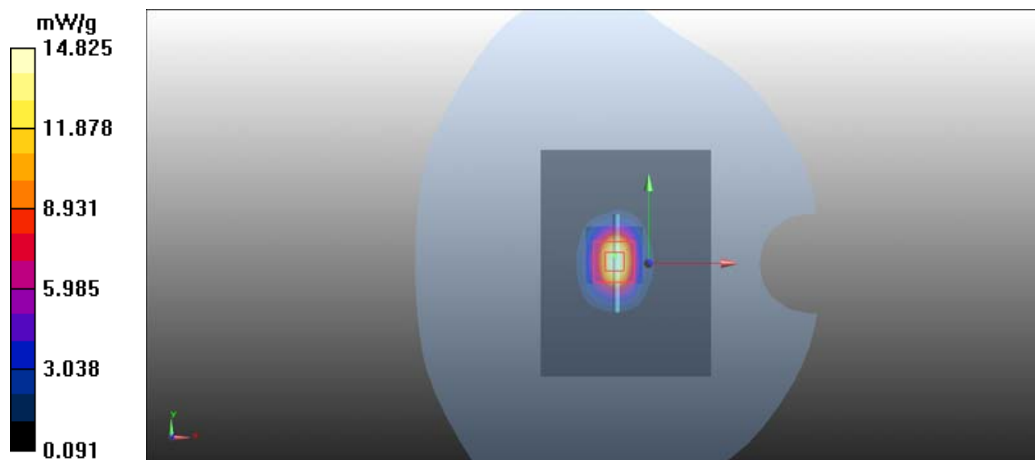
Peak SAR (extrapolated) = 26.3320

SAR(1 g) = 13 mW/g

SAR(10 g) = 6.01 mW/g

Power Drift = 0.20 dB

Maximum value of SAR (measured) = 14.825 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 2012-03-13 12:25:44

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.994$ mho/m; $\epsilon_r = 52.92$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

GSM/Body - Middle - Spacer 10mm - No Accessory - Display Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.619 mW/g

GSM/Body - Middle - Spacer 10mm - 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 = 8.625 V/m

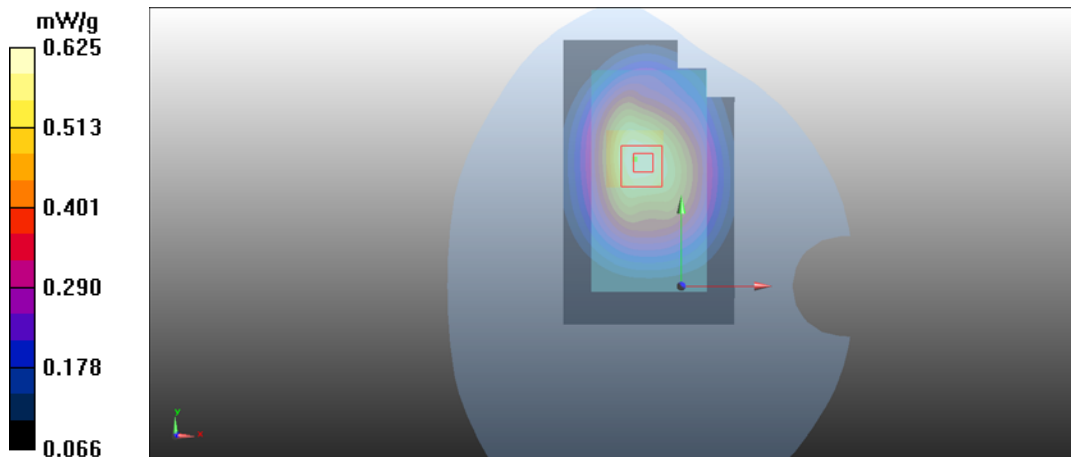
Peak SAR (extrapolated) = 0.7440

SAR(1 g) = 0.600 mW/g

SAR(10 g) = 0.450 mW/g

Power Drift = 0.34 dB

Maximum value of SAR (measured) = 0.625 mW/g



Date/Time: 2012-03-13 13:13:20

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: 2-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:4.2

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.994$ mho/m; $\epsilon_r = 52.92$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

2-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Display Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.495 mW/g

2-slot GPRS/Body - Middle - Spacer 10mm - 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 = 9.179 V/m

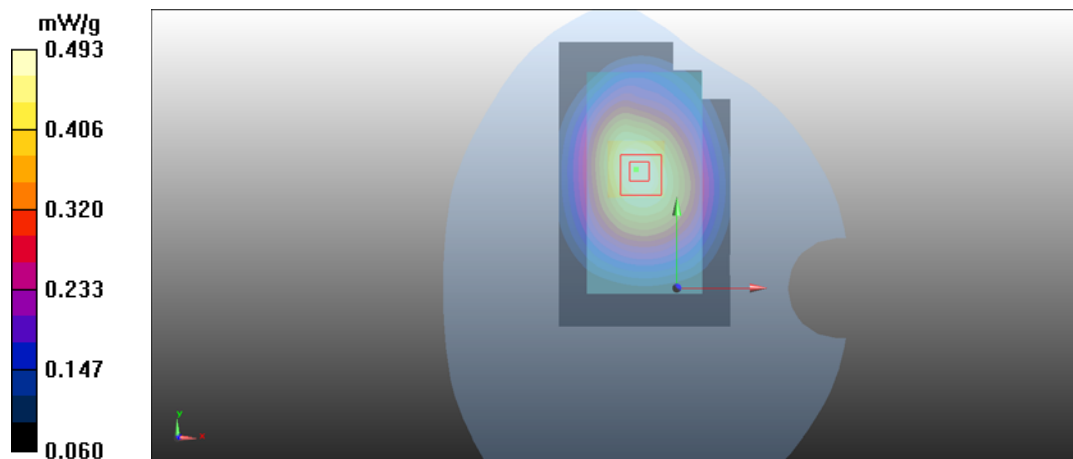
Peak SAR (extrapolated) = 0.5750

SAR(1 g) = 0.466 mW/g

SAR(10 g) = 0.351 mW/g

Power Drift = 0.05 dB

Maximum value of SAR (measured) = 0.493 mW/g



Date/Time: 2012-03-13 13:35:31

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: 3-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:2.8

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.994$ mho/m; $\epsilon_r = 52.92$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

3-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Display Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.589 mW/g

3-slot GPRS/Body - Middle - Spacer 10mm - 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 = 10.305 V/m

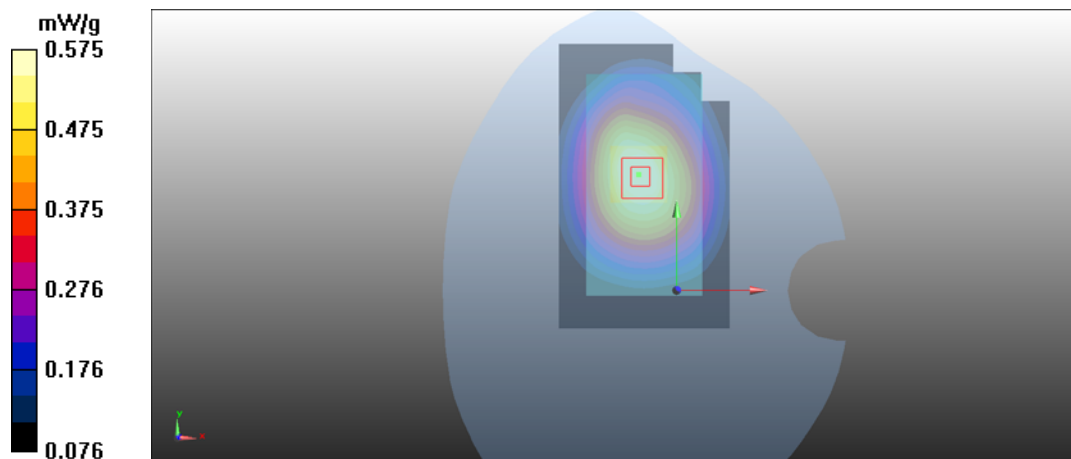
Peak SAR (extrapolated) = 0.6770

SAR(1 g) = 0.548 mW/g

SAR(10 g) = 0.415 mW/g

Power Drift = -0.10 dB

Maximum value of SAR (measured) = 0.575 mW/g



Date/Time: 2012-03-13 14:36:28

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: 4-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:2.1

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.994$ mho/m; $\epsilon_r = 52.92$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Display Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.714 mW/g

4-slot GPRS/Body - Middle - Spacer 10mm - 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 = 7.154 V/m

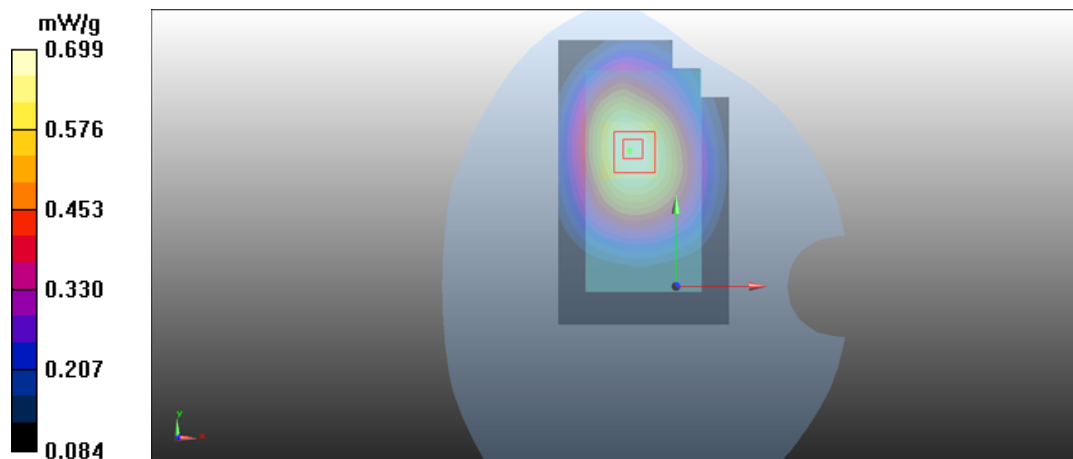
Peak SAR (extrapolated) = 0.8030

SAR(1 g) = 0.664 mW/g

SAR(10 g) = 0.503 mW/g

Power Drift = -0.05 dB

Maximum value of SAR (measured) = 0.699 mW/g



Date/Time: 2012-03-14 09:57:56

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: 4-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:2.1

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.991$ mho/m; $\epsilon_r = 52.916$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS GPRS/Body - Middle - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 1.044 mW/g

4-slot GPRS GPRS/Body - Middle - Spacer 10mm - 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 = 12.268 V/m

Peak SAR (extrapolated) = 1.2330

SAR(1 g) = 0.983 mW/g

SAR(10 g) = 0.723 mW/g

Power Drift = 0.10 dB

Maximum value of SAR (measured) = 1.038 mW/g

4-slot GPRS GPRS/Body - Middle - Spacer 10mm - No Accessory - Back Facing Phantom/Zoom Scan 2

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 12.268 V/m

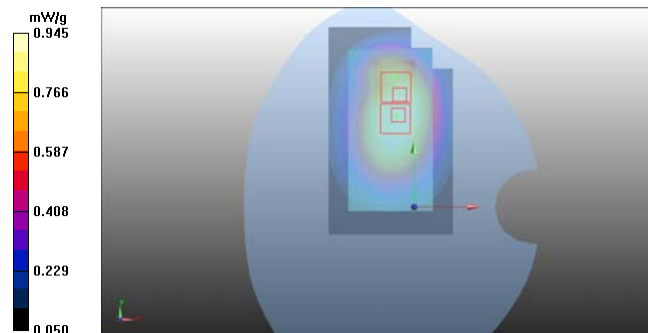
Peak SAR (extrapolated) = 1.1570

SAR(1 g) = 0.835 mW/g

SAR(10 g) = 0.542 mW/g

Power Drift = 0.10 dB

Maximum value of SAR (measured) = 0.945 mW/g



Date/Time: 2012-03-14 14:35:54

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: 4-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:2.1

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.991$ mho/m; $\epsilon_r = 52.916$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

4-sot GPRS/Body - Middle - Spacer 10mm - No Accessory - Top Edge Facing Phantom/Area Scan (31x61x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.032 mW/g

4-sot GPRS/Body - Middle - Spacer 10mm - No Accessory - Top Edge Facing Phantom/Zoom Scan (5x5x7)/Cube

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

Reference Value = 4.017 V/m

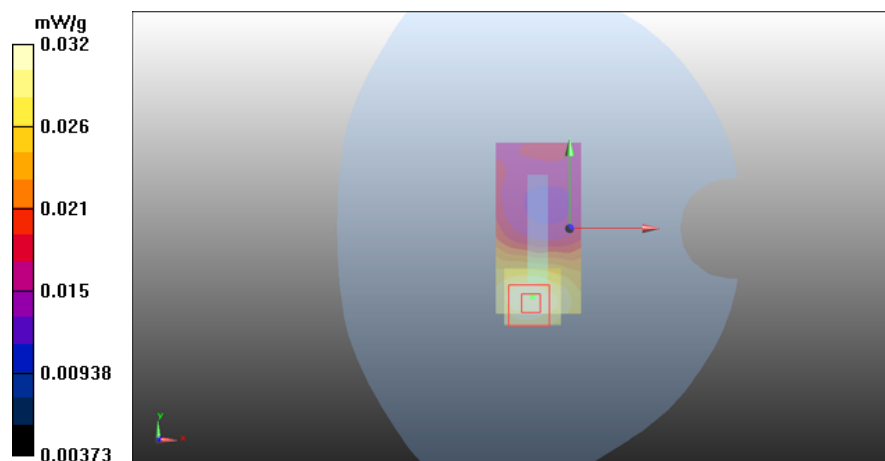
Peak SAR (extrapolated) = 0.0390

SAR(1 g) = 0.030 mW/g

SAR(10 g) = 0.022 mW/g

Power Drift = 0.21 dB

Maximum value of SAR (measured) = 0.032 mW/g



Date/Time: 2012-03-14 14:48:33

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: 4-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:2.1

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.991$ mho/m; $\epsilon_r = 52.916$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Bottom Edge Facing Phantom/Area Scan (31x61x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.170 mW/g

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Bottom Edge Facing Phantom/Zoom Scan

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 12.377 V/m

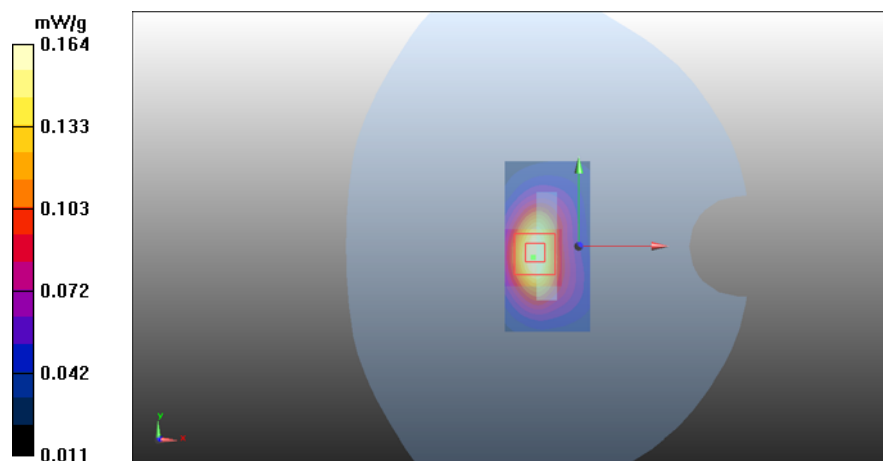
Peak SAR (extrapolated) = 0.2360

SAR(1 g) = 0.152 mW/g

SAR(10 g) = 0.093 mW/g

Power Drift = -0.00022 dB

Maximum value of SAR (measured) = 0.164 mW/g



Date/Time: 2012-03-14 13:01:28

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: 4-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:2.1

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 837$ MHz; $\sigma = 0.991$ mho/m; $\epsilon_r = 52.916$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Left Edge Facing Phantom/Area Scan (31x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.532 mW/g

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Left Edge Facing Phantom/Zoom Scan (5x5x7)/Cube

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

Reference Value = 12.773 V/m

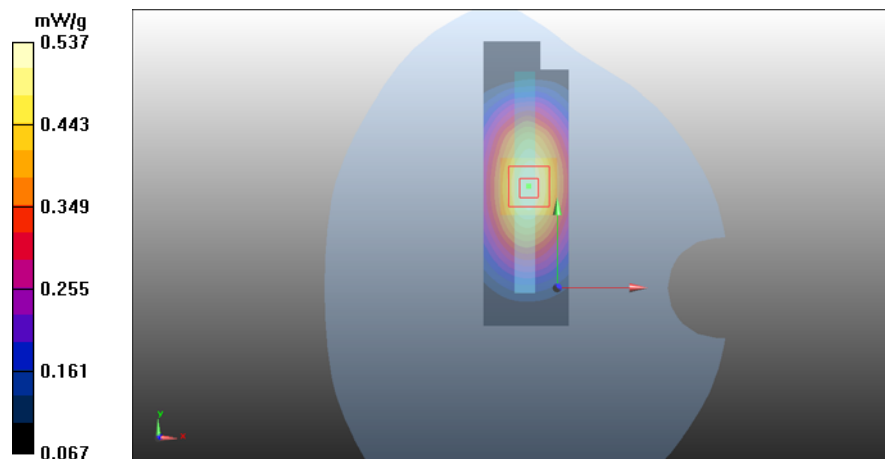
Peak SAR (extrapolated) = 0.6760

SAR(1 g) = 0.503 mW/g

SAR(10 g) = 0.356 mW/g

Power Drift = -0.04 dB

Maximum value of SAR (measured) = 0.537 mW/g



Date/Time: 2012-03-14 12:33:18

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: 4-slot GPRS850

Frequency: 836.6 MHz; Duty Cycle: 1:2.1

Medium: BSL 850; Medium Notes: $t = 21.0\text{ }^{\circ}\text{C}$

Medium parameters used: $f = 837\text{ MHz}$; $\sigma = 0.991\text{ mho/m}$; $\epsilon_r = 52.916$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Right Edge Facing Phantom/Area Scan (31x101x1):

Measurement grid: $dx=15\text{ mm}$, $dy=15\text{ mm}$

Maximum value of SAR (interpolated) = 0.491 mW/g

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Right Edge 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 = 12.402 V/m

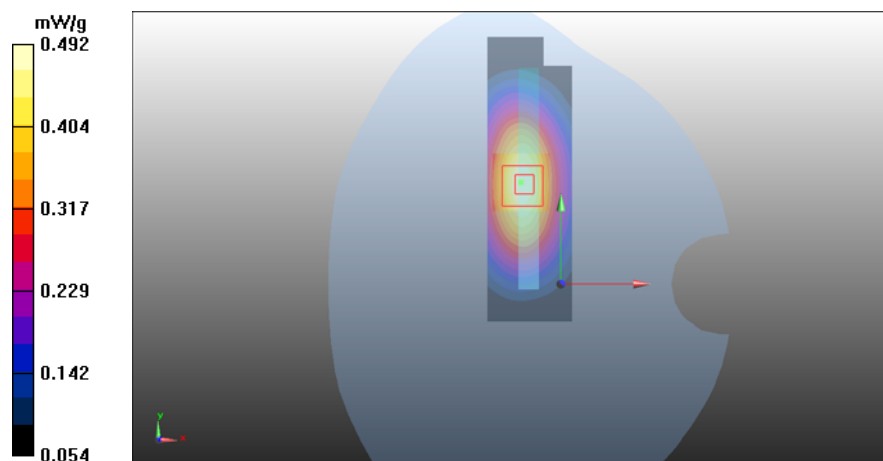
Peak SAR (extrapolated) = 0.6340

SAR(1 g) = 0.459 mW/g

SAR(10 g) = 0.314 mW/g

Power Drift = -0.15 dB

Maximum value of SAR (measured) = 0.492 mW/g



Date/Time: 2012-03-15 13:52:07

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WCDMA850

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: t= 20.6 C

Medium parameters used: f = 835 MHz; σ = 0.987 mho/m; ϵ_r = 52.635; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Display Facing Phantom/Area Scan (61x101x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.729 mW/g

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 10.076 V/m

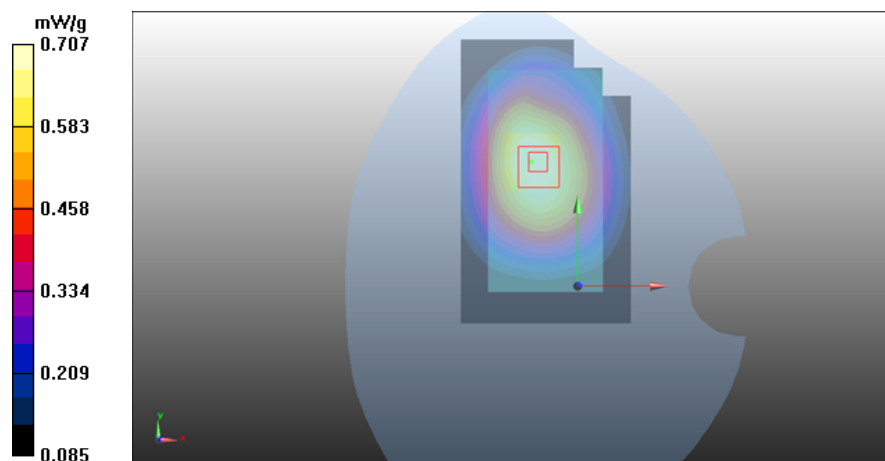
Peak SAR (extrapolated) = 0.8320

SAR(1 g) = 0.675 mW/g

SAR(10 g) = 0.510 mW/g

Power Drift = 0.14 dB

Maximum value of SAR (measured) = 0.707 mW/g



Date/Time: 2012-03-15 14:21:33

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WCDMA850

Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium: BSL850; Medium Notes: t= 20.6 C

Medium parameters used (interpolated): f = 826.4 MHz; $\sigma = 0.981$ mho/m; $\epsilon_r = 52.69$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Low - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.089 mW/g

WCDMA/Body - Low - Spacer 10mm - No Accessory - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 12.151 V/m

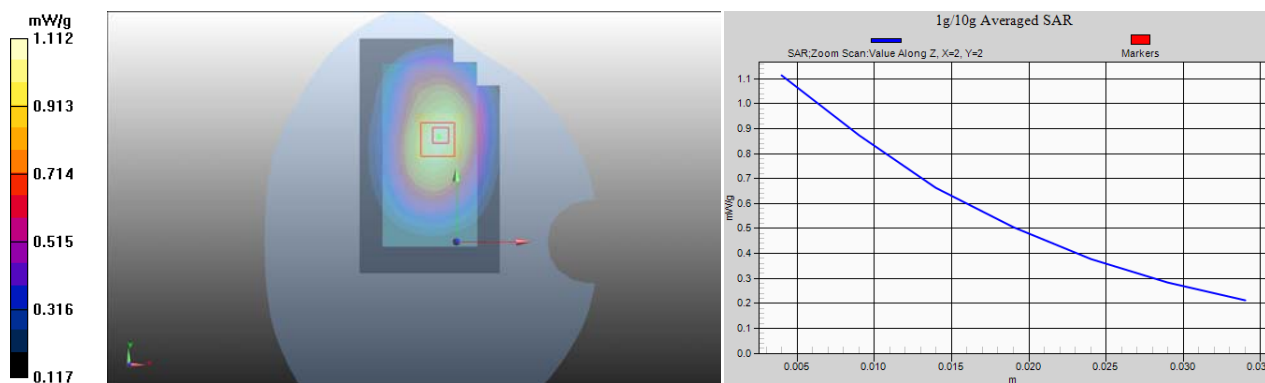
Peak SAR (extrapolated) = 1.3100

SAR(1 g) = 1.05 mW/g

SAR(10 g) = 0.777 mW/g

Power Drift = -0.07 dB

Maximum value of SAR (measured) = 1.112 mW/g



Date/Time: 2012-03-16 09:51:30

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WCDMA850

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 835$ MHz; $\sigma = 0.993$ mho/m; $\epsilon_r = 53.384$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Top Edge Facing Phantom/Area Scan (31x61x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.034 mW/g

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Top Edge Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 4.198 V/m

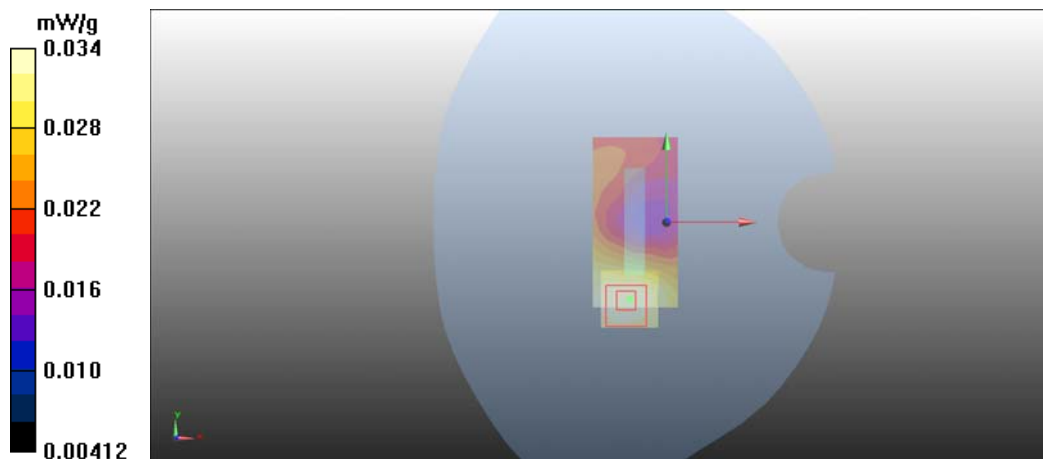
Peak SAR (extrapolated) = 0.0420

SAR(1 g) = 0.032 mW/g

SAR(10 g) = 0.024 mW/g

Power Drift = 0.17 dB

Maximum value of SAR (measured) = 0.034 mW/g



Date/Time: 2012-03-16 11:36:09

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WCDMA850

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 835$ MHz; $\sigma = 0.993$ mho/m; $\epsilon_r = 53.384$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Bottom Edge Facing Phantom/Area Scan (31x61x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.173 mW/g

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Bottom Edge Facing Phantom/Zoom Scan (5x5x7)/Cube

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

Reference Value = 12.167 V/m

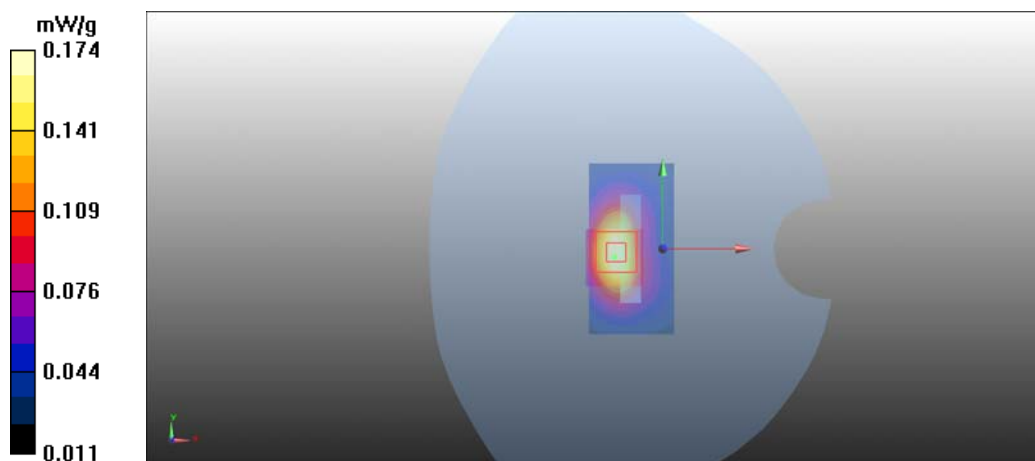
Peak SAR (extrapolated) = 0.2450

SAR(1 g) = 0.160 mW/g

SAR(10 g) = 0.099 mW/g

Power Drift = 0.13 dB

Maximum value of SAR (measured) = 0.174 mW/g



Date/Time: 2012-03-16 09:29:28

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WCDMA850

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL 850; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 835$ MHz; $\sigma = 0.993$ mho/m; $\epsilon_r = 53.384$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Left Edge Facing Phantom/Area Scan (31x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.606 mW/g

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Left Edge Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 13.784 V/m

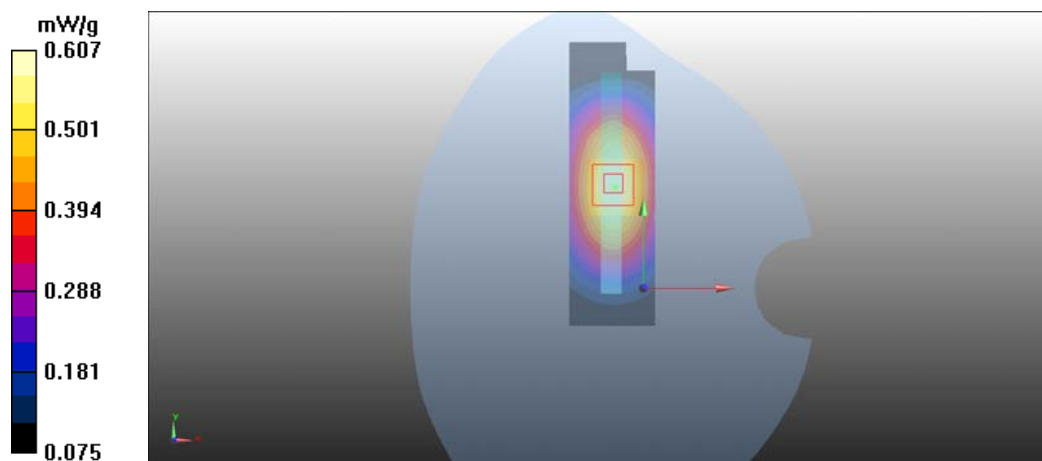
Peak SAR (extrapolated) = 0.7530

SAR(1 g) = 0.570 mW/g

SAR(10 g) = 0.404 mW/g

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 0.607 mW/g



Date/Time: 2012-03-16 09:08:16

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WCDMA850

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: BSL 850; Medium Notes: t= 21.0 C

Medium parameters used: f = 835 MHz; σ = 0.993 mho/m; ϵ_r = 53.384; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3131
- ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728; Calibrated: 2011-05-09
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Right Edge Facing Phantom/Area Scan (31x101x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.489 mW/g

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Right Edge Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 11.706 V/m

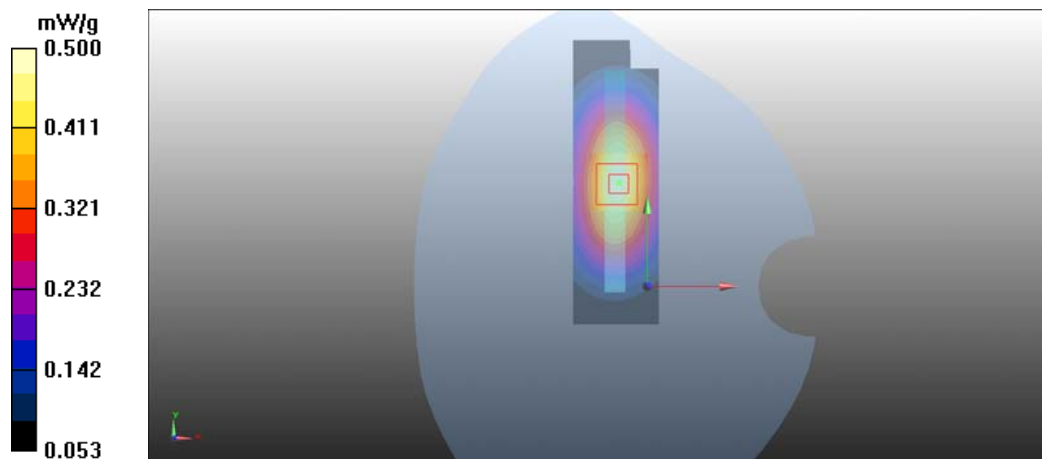
Peak SAR (extrapolated) = 0.6370

SAR(1 g) = 0.462 mW/g

SAR(10 g) = 0.318 mW/g

Power Drift = -0.02 dB

Maximum value of SAR (measured) = 0.500 mW/g



Date/Time: 2012-03-12 15:41:34

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: BSL1900; Medium Notes: $t = 21.0\text{ C}$

Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.501\text{ mho/m}$; $\epsilon_r = 53.307$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

GSM/Body - Middle - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.632 mW/g

GSM/Body - Middle - Spacer 10mm - 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 = 7.624 V/m

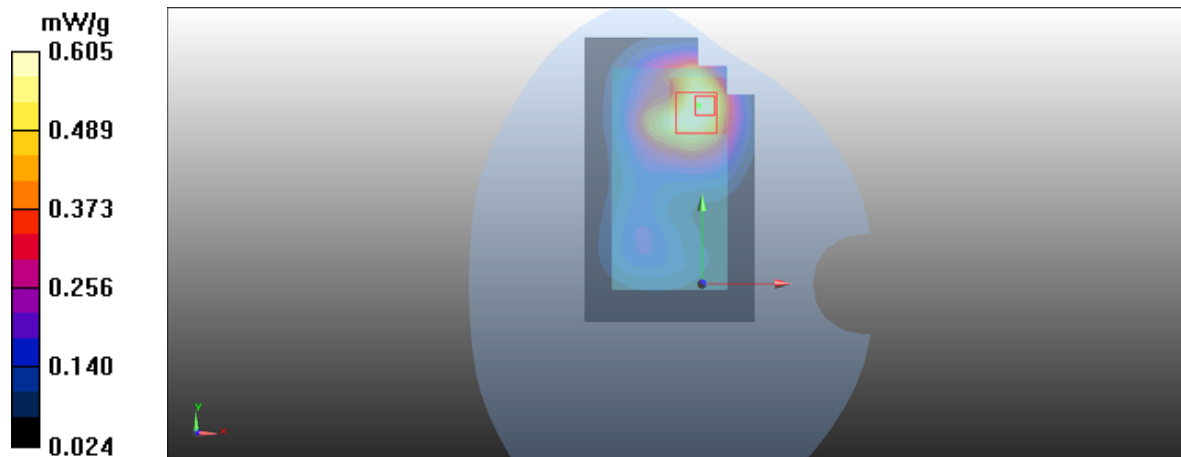
Peak SAR (extrapolated) = 0.9290

SAR(1 g) = 0.563 mW/g

SAR(10 g) = 0.346 mW/g

Power Drift = 0.12 dB

Maximum value of SAR (measured) = 0.605 mW/g



Date/Time: 2012-03-12 16:00:03

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: 2-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium: BSL1900; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.501$ mho/m; $\epsilon_r = 53.307$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

2-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.787 mW/g

2-slot GPRS/Body - Middle - Spacer 10mm - 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 = 7.936 V/m

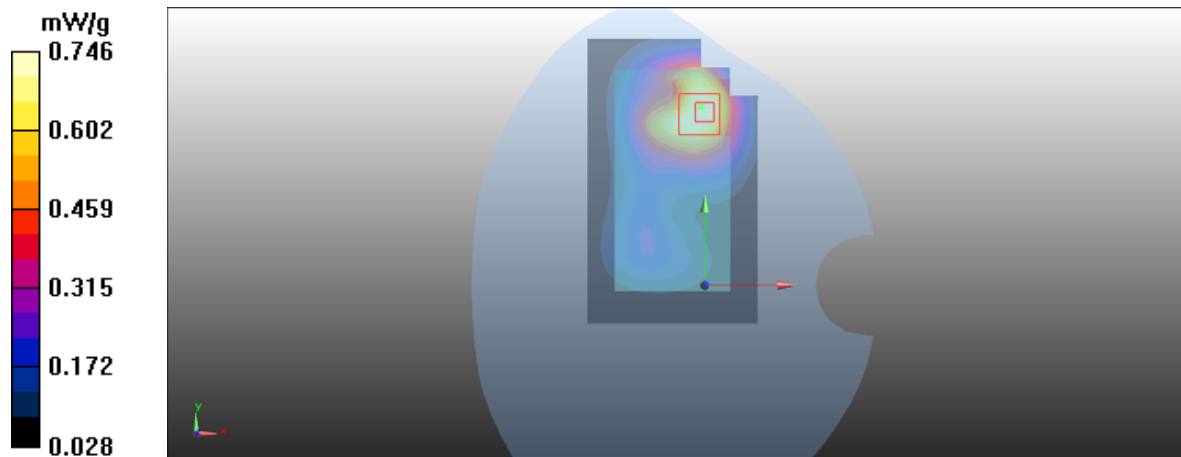
Peak SAR (extrapolated) = 1.1680

SAR(1 g) = 0.697 mW/g

SAR(10 g) = 0.428 mW/g

Power Drift = 0.39 dB

Maximum value of SAR (measured) = 0.746 mW/g



Date/Time: 2012-03-13 13:42:52

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: 3-slot GPRS1900

Frequency: 1850.2 MHz; Duty Cycle: 1:2.8

Medium: BSL1900; Medium Notes: t= 21.2 C

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.467 mho/m; ϵ_r = 52.807; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

3-slot GPRS/Body - Low - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan (61x101x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.999 mW/g

3-slot GPRS/Body - Low - Spacer 10mm - No Accessory - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 12.365 V/m

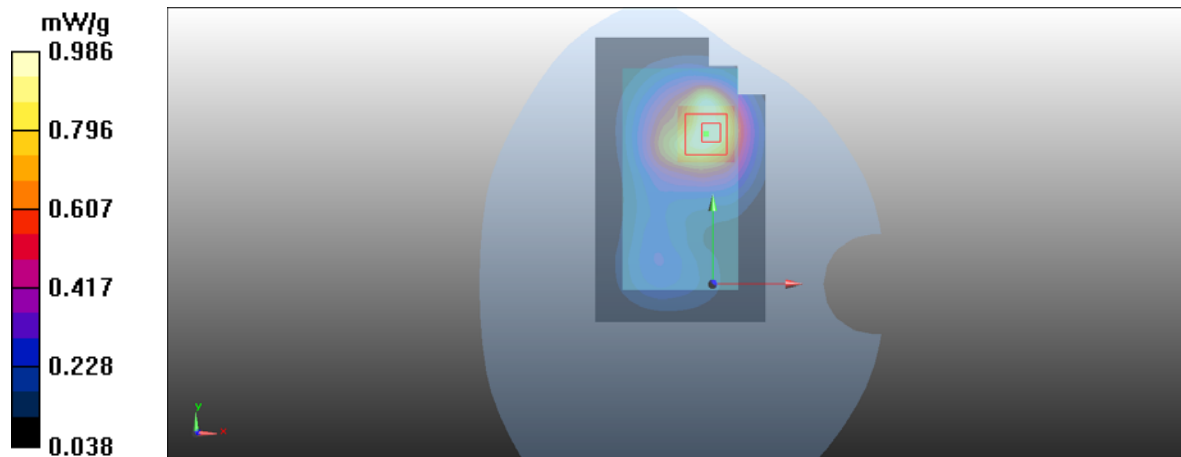
Peak SAR (extrapolated) = 1.5390

SAR(1 g) = 0.924 mW/g

SAR(10 g) = 0.568 mW/g

Power Drift = -0.07 dB

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



Date/Time: 2012-03-13 15:07:28

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: 4-slot GPRS1900

Frequency: 1850.2 MHz; Duty Cycle: 1:2.1

Medium: BSL1900; Medium Notes: $t = 21.0$ C

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.468$ mho/m; $\epsilon_r = 53.364$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS/Body - Low - Spacer 10mm - No Accessory - Display Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 1.202 mW/g

4-slot GPRS/Body - Low - Spacer 10mm - 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 = 14.370 V/m

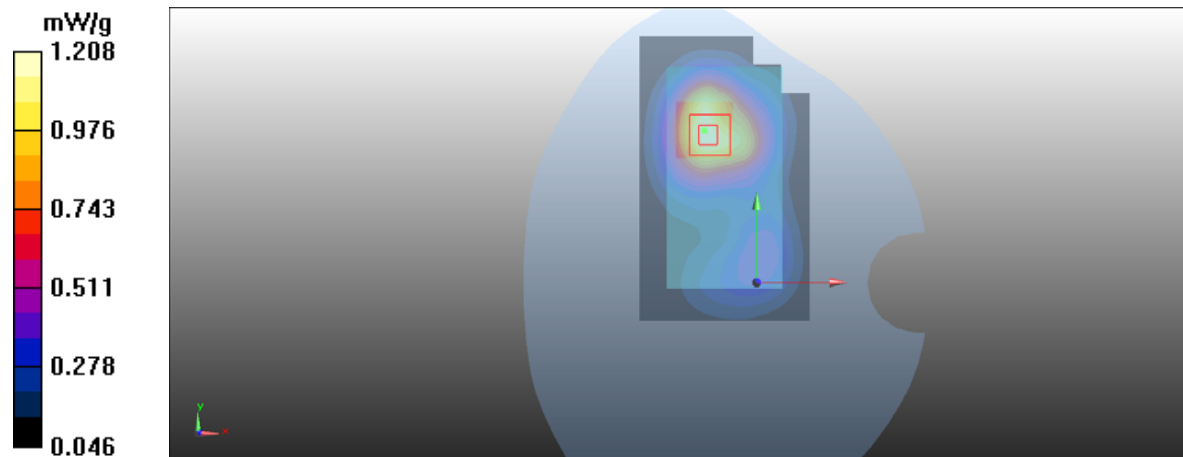
Peak SAR (extrapolated) = 1.7750

SAR(1 g) = 1.13 mW/g

SAR(10 g) = 0.702 mW/g

Power Drift = -0.08 dB

Maximum value of SAR (measured) = 1.208 mW/g



Date/Time: 2012-03-13 12:55:31

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: 4-slot GPRS1900

Frequency: 1850.2 MHz; Duty Cycle: 1:2.1

Medium: BSL1900; Medium Notes: t= 21.0 C

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.468 mho/m; ϵ_r = 53.364; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS/Body - Low - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan (61x101x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.352 mW/g

4-slot GPRS/Body - Low - Spacer 10mm - No Accessory - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 14.122 V/m

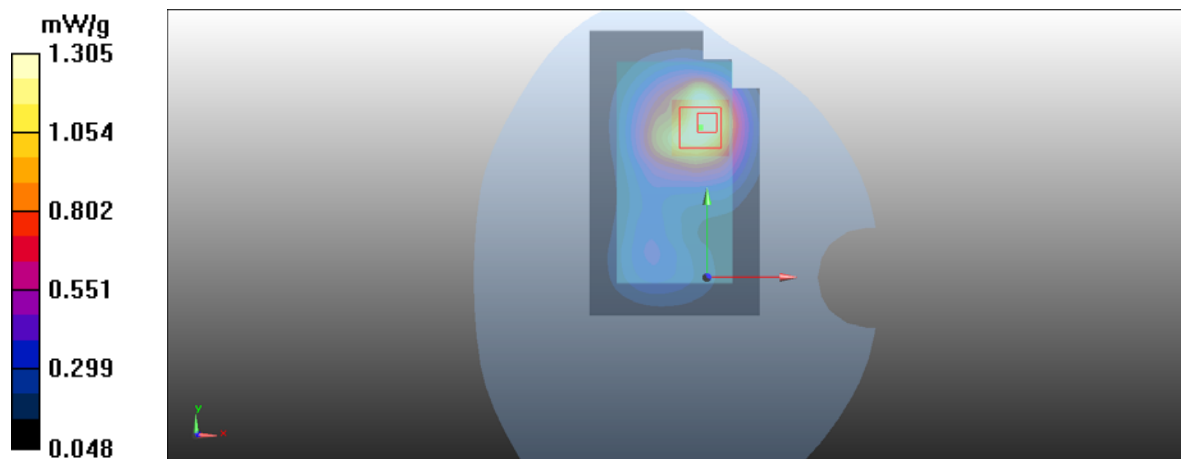
Peak SAR (extrapolated) = 2.0420

SAR(1 g) = 1.22 mW/g

SAR(10 g) = 0.748 mW/g

Power Drift = 0.08 dB

Maximum value of SAR (measured) = 1.305 mW/g



Date/Time: 2012-03-13 16:41:08

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: 4-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:2.1

Medium: BSL1900; Medium Notes: $t = 21.2$ C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.489$ mho/m; $\epsilon_r = 52.753$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

4-sot GPRS/Body - Middle - Spacer 10mm - No Accessory - Top Edge Facing Phantom/Area Scan (31x61x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.134 mW/g

4-sot GPRS/Body - Middle - Spacer 10mm - No Accessory - Top Edge Facing Phantom/Zoom Scan (5x5x7)/Cube

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

Reference Value = 8.808 V/m

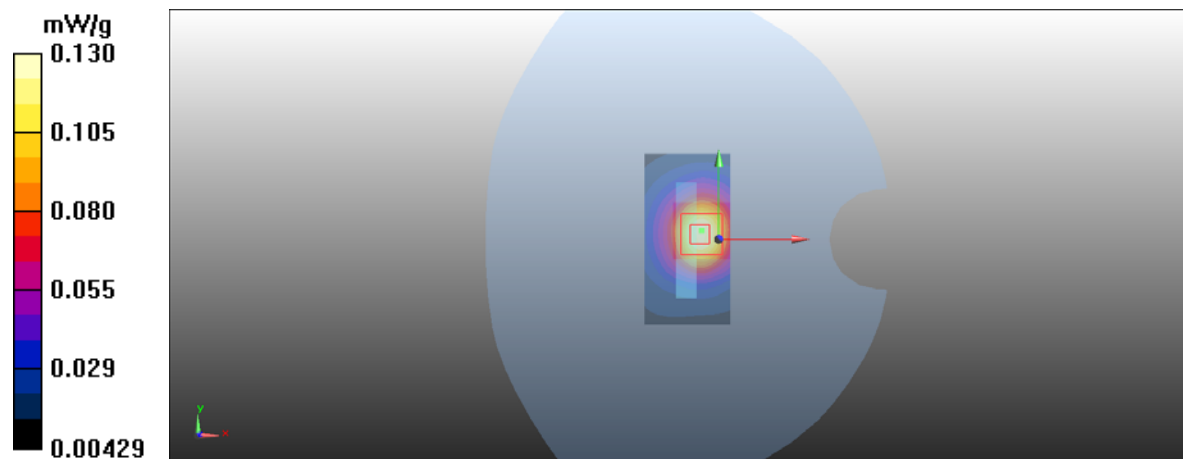
Peak SAR (extrapolated) = 0.1910

SAR(1 g) = 0.119 mW/g

SAR(10 g) = 0.071 mW/g

Power Drift = -0.02 dB

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



Date/Time: 2012-03-13 16:51:33

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: 4-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:2.1

Medium: BSL1900; Medium Notes: $t = 21.2$ C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.489$ mho/m; $\epsilon_r = 52.753$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Bottom Edge Facing Phantom/Area Scan (31x61x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.687 mW/g

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Bottom Edge Facing Phantom/Zoom Scan

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 18.357 V/m

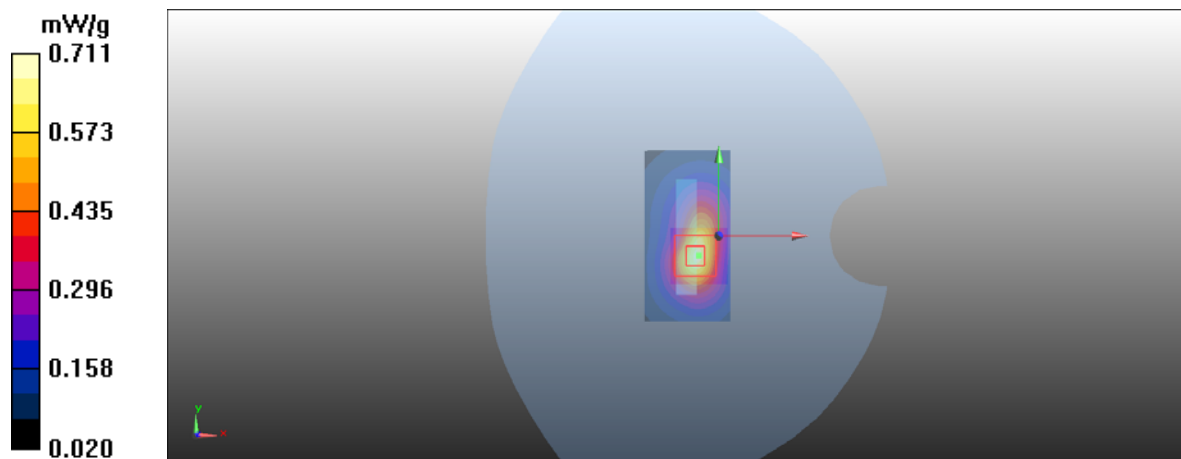
Peak SAR (extrapolated) = 1.0760

SAR(1 g) = 0.641 mW/g

SAR(10 g) = 0.353 mW/g

Power Drift = 0.10 dB

Maximum value of SAR (measured) = 0.711 mW/g



Date/Time: 2012-03-13 16:15:49

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: 4-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:2.1

Medium: BSL1900; Medium Notes: $t = 21.2$ C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.489$ mho/m; $\epsilon_r = 52.753$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Left Edge Facing Phantom/Area Scan (31x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.270 mW/g

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Left Edge Facing Phantom/Zoom Scan (5x5x7)/Cube

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

Reference Value = 11.939 V/m

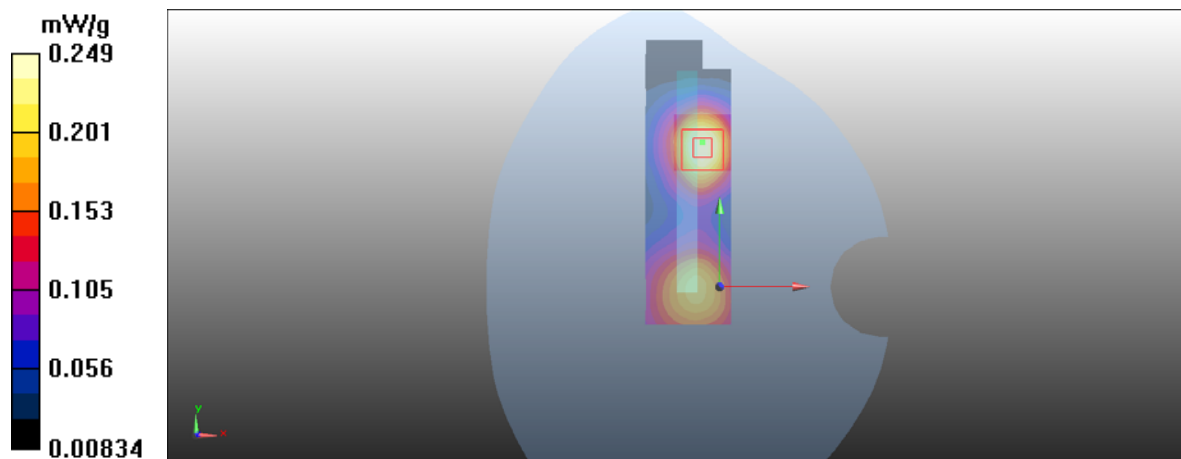
Peak SAR (extrapolated) = 0.3640

SAR(1 g) = 0.231 mW/g

SAR(10 g) = 0.141 mW/g

Power Drift = -0.17 dB

Maximum value of SAR (measured) = 0.249 mW/g



Date/Time: 2012-03-13 16:29:02

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: 4-slot GPRS1900

Frequency: 1880 MHz; Duty Cycle: 1:2.1

Medium: BSL1900; Medium Notes: $t = 21.2$ C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.489$ mho/m; $\epsilon_r = 52.753$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Right Edge Facing Phantom/Area Scan (31x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.321 mW/g

4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Right Edge Facing Phantom/Zoom Scan

(5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 8.250 V/m

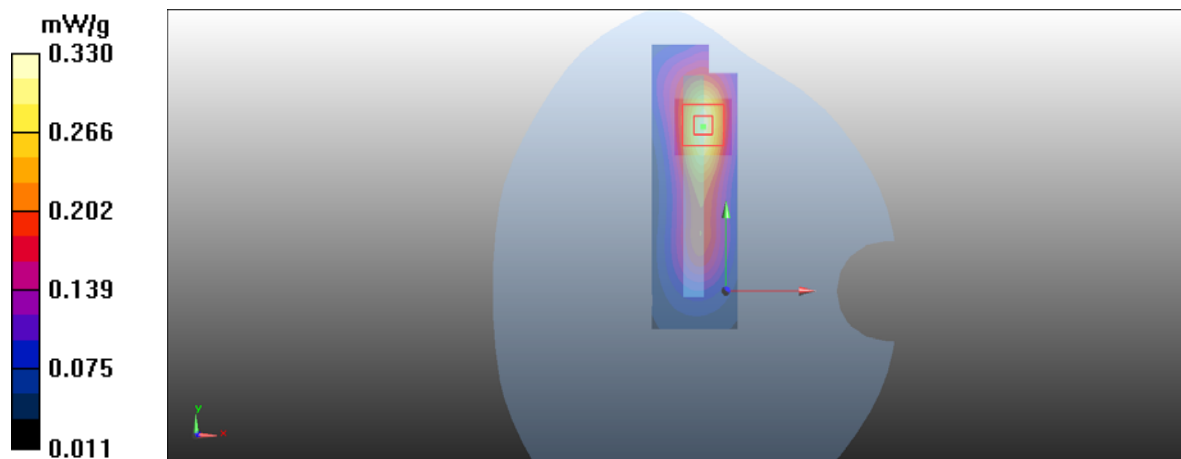
Peak SAR (extrapolated) = 0.4850

SAR(1 g) = 0.298 mW/g

SAR(10 g) = 0.176 mW/g

Power Drift = 0.11 dB

Maximum value of SAR (measured) = 0.330 mW/g



Date/Time: 2012-03-12 10:51:45

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: WCDMA1900

Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: t= 21.0 C

Medium parameters used (interpolated): f = 1852.4 MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 53.357$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Low - Spacer 10mm - No Accessory - Display Facing Phantom/Area Scan (61x101x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.264 mW/g

WCDMA/Body - Low - Spacer 10mm - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 13.427 V/m

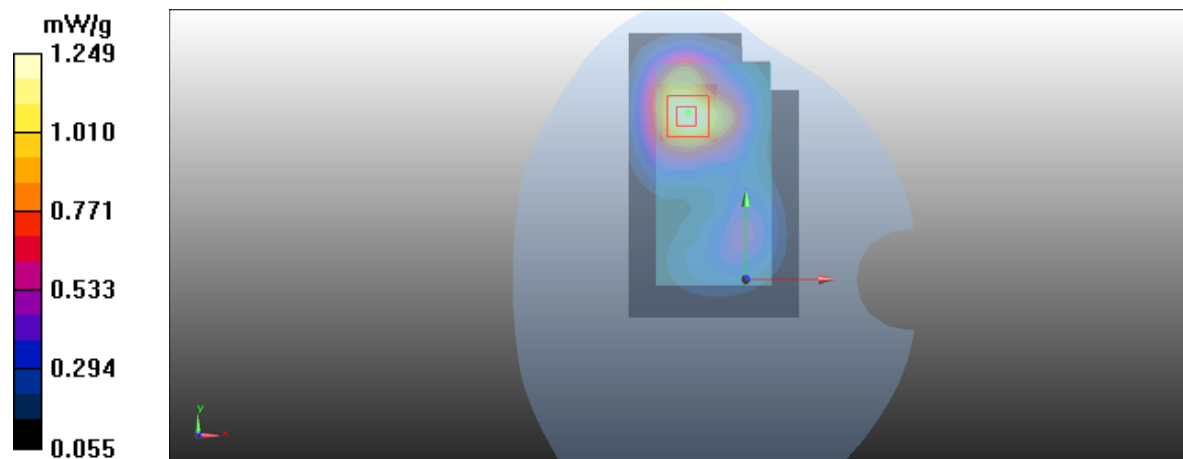
Peak SAR (extrapolated) = 1.8270

SAR(1 g) = 1.16 mW/g

SAR(10 g) = 0.716 mW/g

Power Drift = -0.09 dB

Maximum value of SAR (measured) = 1.249 mW/g



Date/Time: 2012-03-12 12:12:06

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: WCDMA1900

Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: $t = 21.0$ C

Medium parameters used (interpolated): $f = 1852.4$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 53.357$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Low - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan (61x101x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 1.431 mW/g

WCDMA/Body - Low - Spacer 10mm - 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 = 12.352 V/m

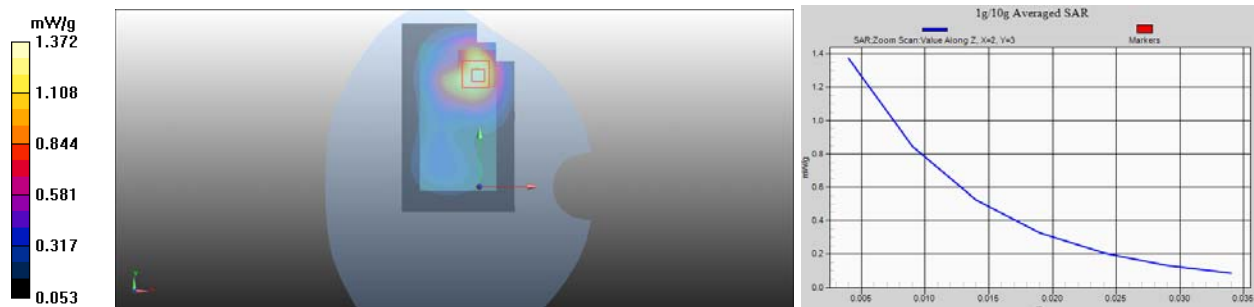
Peak SAR (extrapolated) = 2.0860

SAR(1 g) = 1.26 mW/g

SAR(10 g) = 0.769 mW/g

Power Drift = -0.0073 dB

Maximum value of SAR (measured) = 1.372 mW/g



Date/Time: 2012-03-12 14:06:35

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: WCDMA1900

Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.501$ mho/m; $\epsilon_r = 53.307$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Top Edge Facing Phantom/Area Scan (31x61x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.175 mW/g

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Top Edge Facing Phantom/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 9.880 V/m

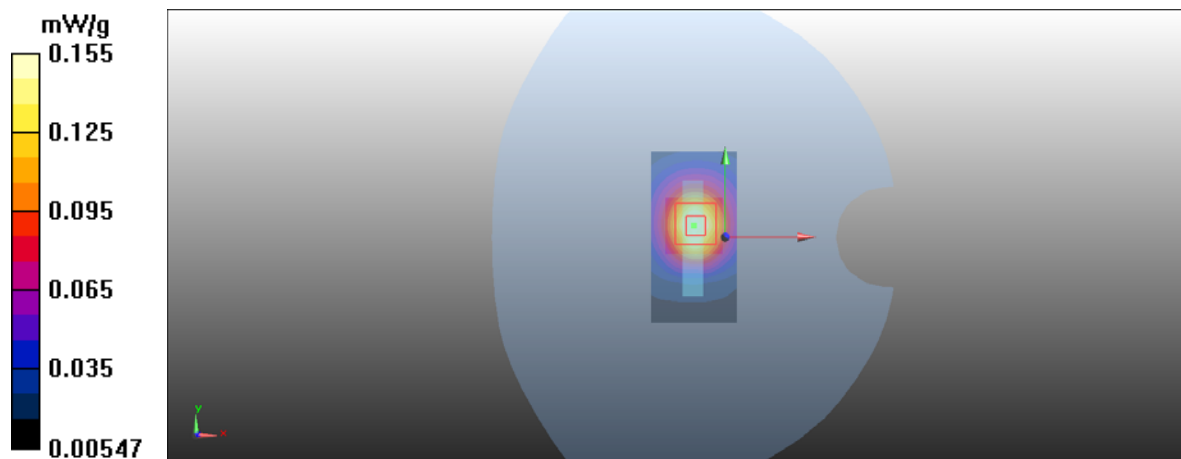
Peak SAR (extrapolated) = 0.2230

SAR(1 g) = 0.137 mW/g

SAR(10 g) = 0.082 mW/g

Power Drift = 0.08 dB

Maximum value of SAR (measured) = 0.155 mW/g



Date/Time: 2012-03-12 14:18:21

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: WCDMA1900

Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: $t = 21.0\text{ C}$

Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.501\text{ mho/m}$; $\epsilon_r = 53.307$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Bottom Edge Facing Phantom/Area Scan (31x61x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.797 mW/g

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Bottom Edge 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 = 23.570 V/m

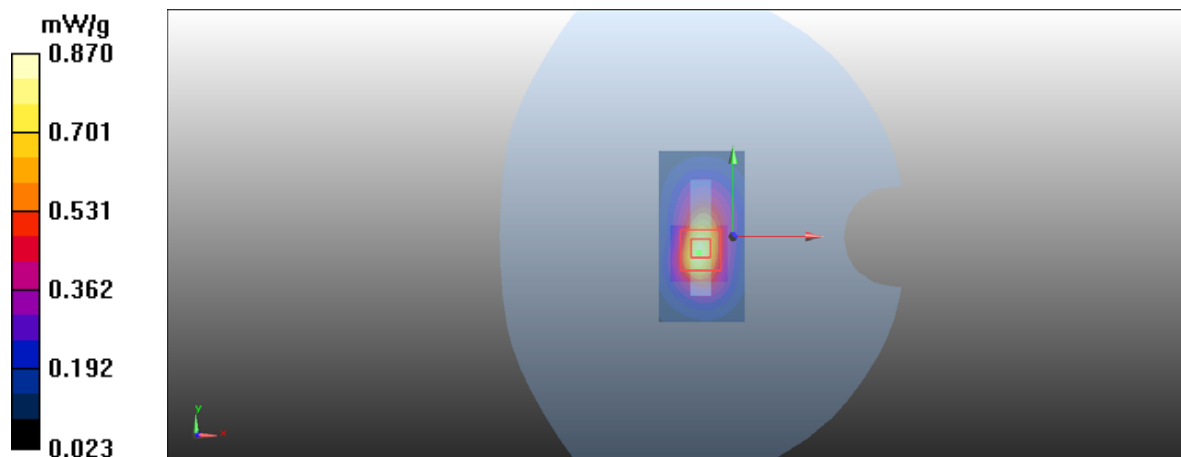
Peak SAR (extrapolated) = 1.2930

SAR(1 g) = 0.772 mW/g

SAR(10 g) = 0.426 mW/g

Power Drift = 0.01 dB

Maximum value of SAR (measured) = 0.870 mW/g



Date/Time: 2012-03-12 14:48:30

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: WCDMA1900

Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: $t = 21.0\text{ C}$

Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.501\text{ mho/m}$; $\epsilon_r = 53.307$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Left Edge Facing Phantom/Area Scan (31x101x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.326 mW/g

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Left Edge 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 = 13.136 V/m

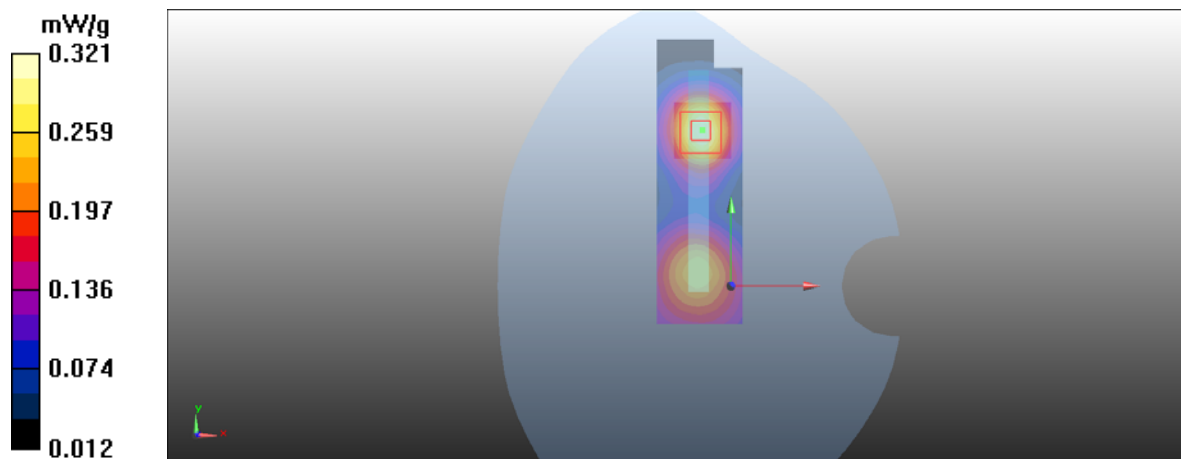
Peak SAR (extrapolated) = 0.4610

SAR(1 g) = 0.292 mW/g

SAR(10 g) = 0.176 mW/g

Power Drift = 0.04 dB

Maximum value of SAR (measured) = 0.321 mW/g



Date/Time: 2012-03-12 14:35:48

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: WCDMA1900

Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: BSL1900; Medium Notes: $t = 21.0\text{ C}$

Medium parameters used: $f = 1880\text{ MHz}$; $\sigma = 1.501\text{ mho/m}$; $\epsilon_r = 53.307$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3194
- ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2011-09-16
- Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
- Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.4 (4989)

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Right Edge Facing Phantom/Area Scan (31x101x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.453 mW/g

WCDMA/Body - Middle - Spacer 10mm - No Accessory - Right Edge 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 = 8.078 V/m

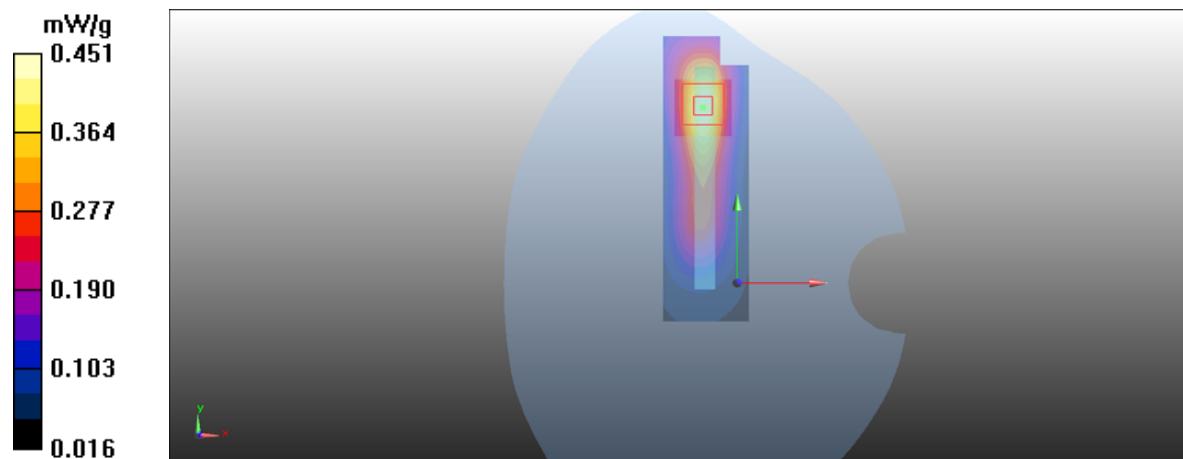
Peak SAR (extrapolated) = 0.6630

SAR(1 g) = 0.405 mW/g

SAR(10 g) = 0.238 mW/g

Power Drift = -0.15 dB

Maximum value of SAR (measured) = 0.451 mW/g



Date/Time: 2012-03-08 10:05:24

Test Laboratory: TCC Nokia

Type: RM-801; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0\text{ }^{\circ}\text{C}$

Medium parameters used: $f = 2442\text{ MHz}$; $\sigma = 1.965\text{ mho/m}$; $\epsilon_r = 50.31$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

WLAN b-mode/Body - Middle - Spacer 10mm - No Accessory - Display Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.095 mW/g

WLAN b-mode/Body - Middle - Spacer 10mm - 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 = 5.352 V/m

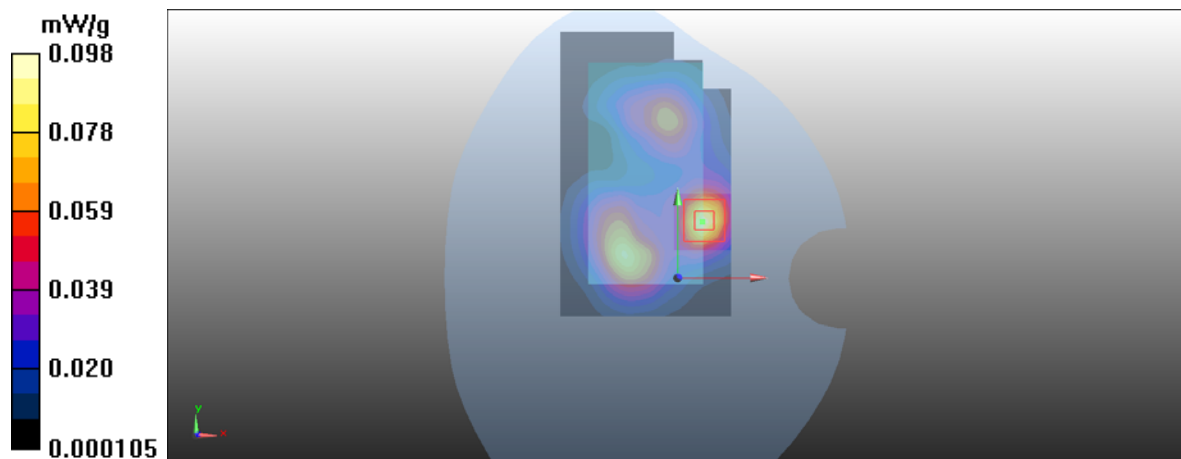
Peak SAR (extrapolated) = 0.1750

SAR(1 g) = 0.088 mW/g

SAR(10 g) = 0.043 mW/g

Power Drift = 0.03 dB

Maximum value of SAR (measured) = 0.098 mW/g



Date/Time: 2012-03-15 08:32:18

Test Laboratory: TCC Nokia

Type: RM-801; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode

Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.972$ mho/m; $\epsilon_r = 50.928$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

WLAN b-mode/Body - High - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.185 mW/g

WLAN b-mode/Body - High - Spacer 10mm - 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 = 5.761 V/m

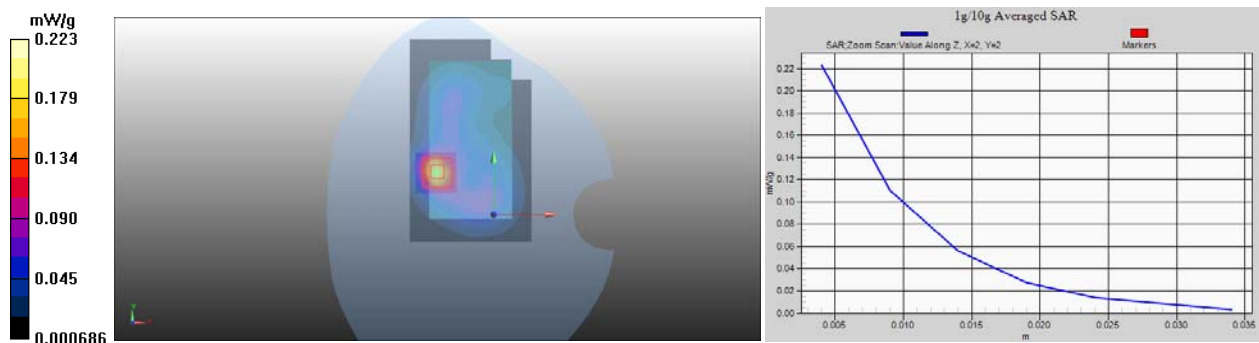
Peak SAR (extrapolated) = 0.4160

SAR(1 g) = 0.191 mW/g

SAR(10 g) = 0.087 mW/g

Power Drift = 0.48 dB

Maximum value of SAR (measured) = 0.223 mW/g



Date/Time: 2012-03-12 08:34:33

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0\text{ }^{\circ}\text{C}$

Medium parameters used: $f = 2442\text{ MHz}$; $\sigma = 1.949\text{ mho/m}$; $\epsilon_r = 50.833$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

WLAN b-mode/Body - Middle - Spacer 10mm - No Accessory – Top Edge Facing Phantom/Area Scan (31x61x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.046 mW/g

WLAN b-mode/Body - Middle - Spacer 10mm - No Accessory – Top Edge 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 = 4.595 V/m

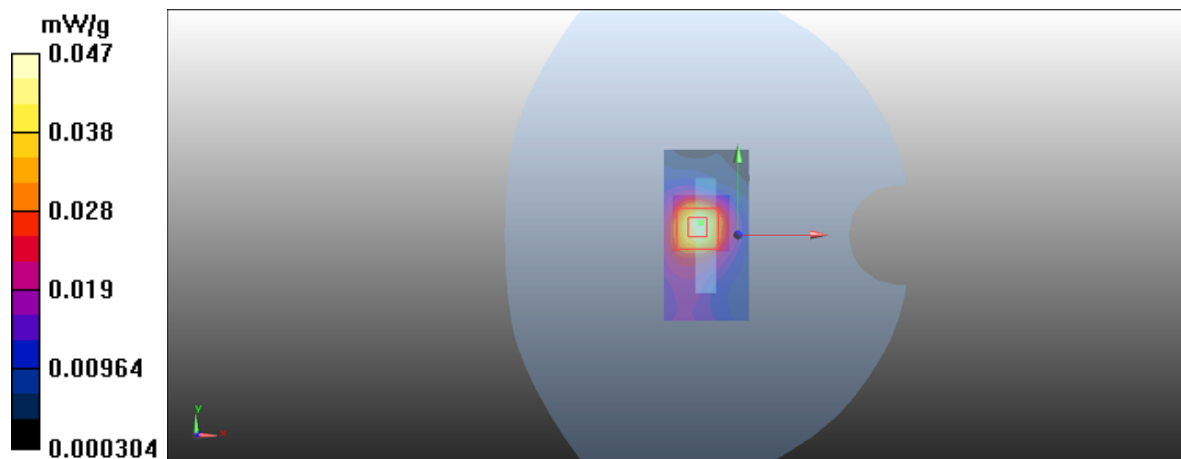
Peak SAR (extrapolated) = 0.0800

SAR(1 g) = 0.043 mW/g

SAR(10 g) = 0.023 mW/g

Power Drift = 0.35 dB

Maximum value of SAR (measured) = 0.047 mW/g



Date/Time: 2012-03-12 09:00:05

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0\text{ C}$

Medium parameters used: $f = 2442\text{ MHz}$; $\sigma = 1.949\text{ mho/m}$; $\epsilon_r = 50.833$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

WLAN b-mode/Body - Middle - Spacer 10mm - No Accessory – Bottom Edge Facing Phantom/Area Scan

(31x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.014 mW/g

WLAN b-mode/Body - Middle - Spacer 10mm - No Accessory – Bottom Edge 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 = 1.984 V/m

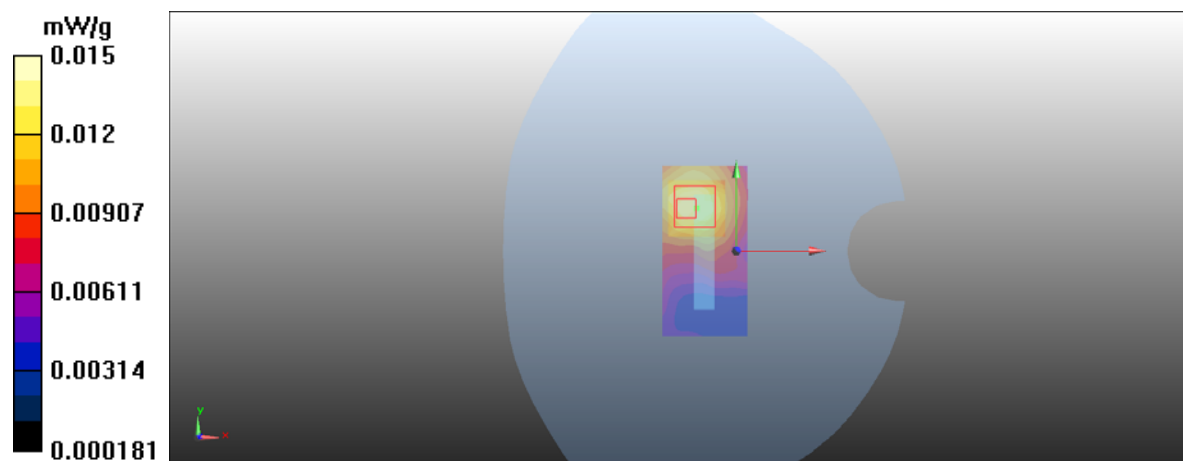
Peak SAR (extrapolated) = 0.0240

SAR(1 g) = 0.013 mW/g

SAR(10 g) = 0.00775 mW/g

Power Drift = 0.45 dB

Maximum value of SAR (measured) = 0.015 mW/g



Date/Time: 2012-03-09 14:12:31

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0\text{ C}$

Medium parameters used: $f = 2442\text{ MHz}$; $\sigma = 1.974\text{ mho/m}$; $\epsilon_r = 50.951$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

WLAN b-mode/Body - Middle - Spacer 10mm - No Accessory - Left Edge Facing Phantom/Area Scan (31x101x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.173 mW/g

WLAN b-mode/Body - Middle - Spacer 10mm - No Accessory - Left Edge 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 = 3.984 V/m

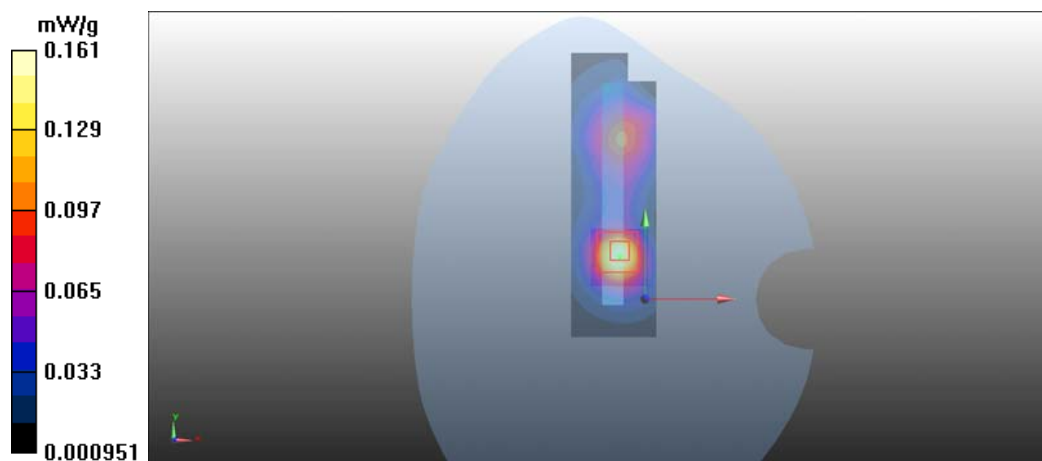
Peak SAR (extrapolated) = 0.2990

SAR(1 g) = 0.149 mW/g

SAR(10 g) = 0.072 mW/g

Power Drift = 0.15 dB

Maximum value of SAR (measured) = 0.161 mW/g



Date/Time: 2012-03-09 13:50:44

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode

Frequency: 2442 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0\text{ }^{\circ}\text{C}$

Medium parameters used: $f = 2442\text{ MHz}$; $\sigma = 1.974\text{ mho/m}$; $\epsilon_r = 50.951$; $\rho = 1000\text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY4, Version 4.7 (55); SEMCAD X Version 14.6.4 (4989)

WLAN b-mode /Body - Middle - Spacer 10mm - No Accessory - Right Edge Facing Phantom/Area Scan

(31x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.00985 mW/g

WLAN b-mode /Body - Middle - Spacer 10mm - No Accessory - Right Edge 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 = 0.877 V/m

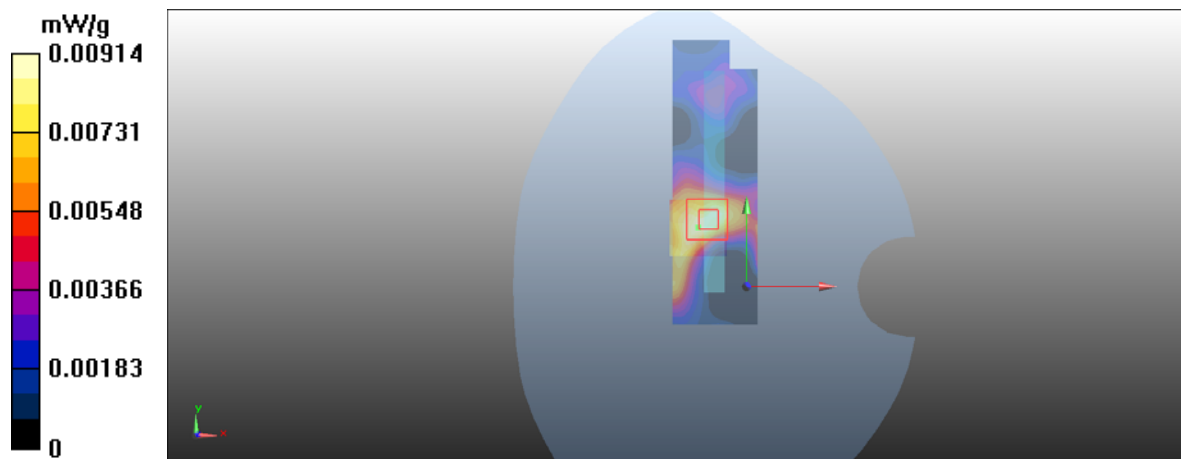
Peak SAR (extrapolated) = 0.0200

SAR(1 g) = 0.00798 mW/g

SAR(10 g) = 0.00412 mW/g

Power Drift = 0.72 dB

Maximum value of SAR (measured) = 0.00914 mW/g



Date/Time: 2012-03-15 11:19:40

Test Laboratory: TCC Nokia

Type: RM-801; Serial: 004402/13/751804/3

Communication System: WLAN2450 n-mode

Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: BSL2450; Medium Notes: $t = 21.0$ C

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.972$ mho/m; $\epsilon_r = 50.928$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3790
- ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2011-09-15
- Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

WLAN n-mode/Body - High - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan (61x101x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.158 mW/g

WLAN n-mode/Body - High - Spacer 10mm - 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 = 5.917 V/m

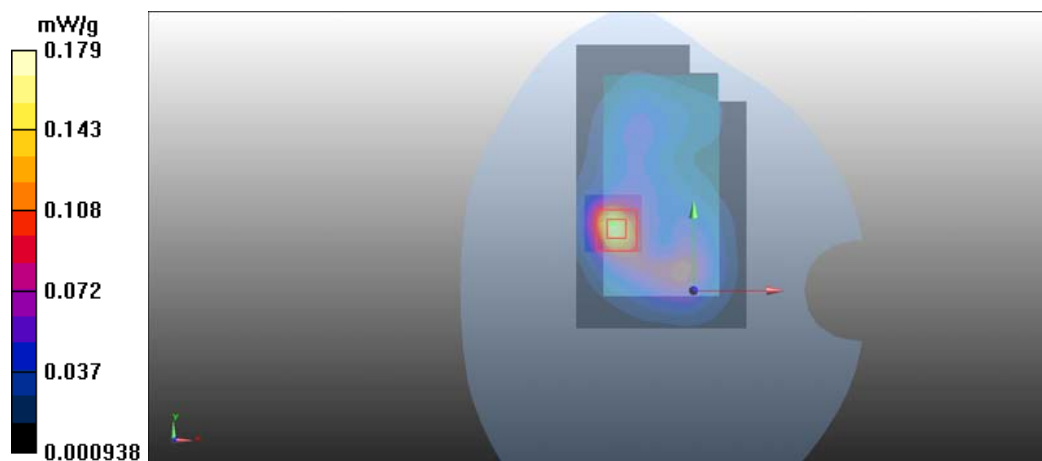
Peak SAR (extrapolated) = 0.3480

SAR(1 g) = 0.163 mW/g

SAR(10 g) = 0.074 mW/g

Power Drift = 0.19 dB

Maximum value of SAR (measured) = 0.179 mW/g



Date/Time: 2012-03-14 09:57:56

DASY Configuration for Configuration/4-slot GPRS/Body - Middle - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan:

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: 4-slot GPRS850; Frequency: 836.6 MHz; Duty Cycle: 1:2.1; PMF: 1.44914

Medium: BSL 850 Medium parameters used: $f = 837$ MHz; $\sigma = 0.991$ mho/m; $\epsilon_r = 52.916$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Probe: ES3DV3 - SN3131; ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn728; Calibrated: 2011-05-09

Phantom: SAM1; Type: SAM; Serial: TP-1126

Measurement SW: DASY4, Version 4.7 (55)

Date/Time: 2012-03-15 08:32:18

DASY Configuration for WLAN b-mode/Body - High - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan:

Test Laboratory: TCC Nokia

Type: RM-801; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode; Frequency: 2462 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL2450 Medium parameters used: $f = 2462$ MHz; $\sigma = 1.972$ mho/m; $\epsilon_r = 50.928$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Probe: EX3DV4 - SN3790; ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24

Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))

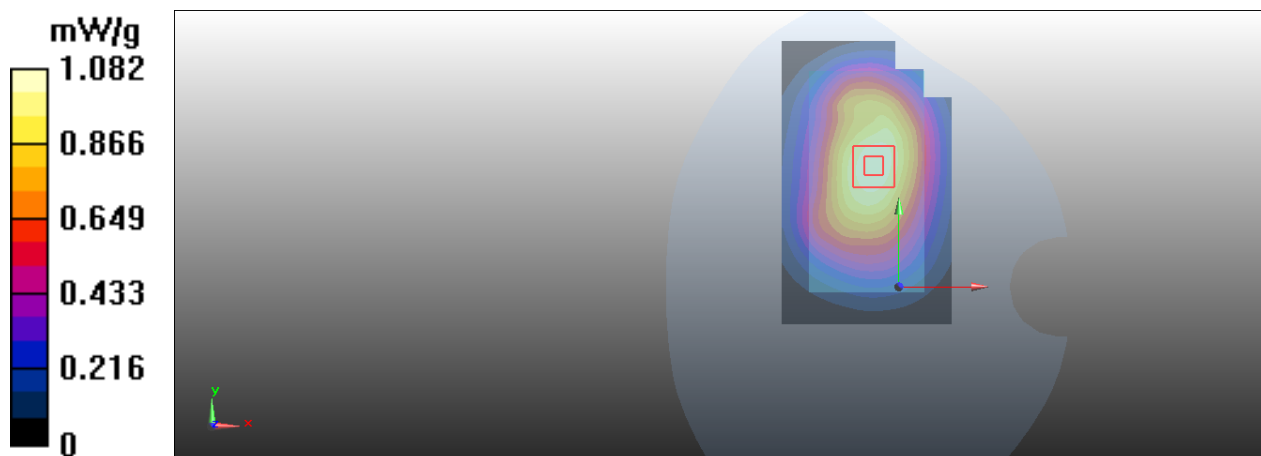
Electronics: DAE4 Sn538; Calibrated: 2011-09-15

Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179

Measurement SW: DASY52, Version 52.8 (0)

Fast SAR of Combined Scans: SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.719 mW/g

Maximum value of SAR (interpolated) = 1.082 mW/g



Date/Time: 2012-03-15 14:21:33

DASY Configuration for Configuration/WCDMA/Body - Low - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan:

Phantom/Area Scan:

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751804/3

Communication System: WCDMA850; Frequency: 826.4 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL850 Medium parameters used (interpolated): $f = 826.4 \text{ MHz}$; $\sigma = 0.981 \text{ mho/m}$; $\epsilon_r = 52.69$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Probe: ES3DV3 - SN3131; ConvF(5.92, 5.92, 5.92); Calibrated: 2011-09-14
Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn728; Calibrated: 2011-05-09
Phantom: SAM1; Type: SAM; Serial: TP-1126
Measurement SW: DASY4, Version 4.7 (55)

Date/Time: 2012-03-15 08:32:18

DASY Configuration for WLAN b-mode/Body - High - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan:

Test Laboratory: TCC Nokia

Type: RM-801; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode; Frequency: 2462 MHz; Duty Cycle: 1:1; PMF: 1

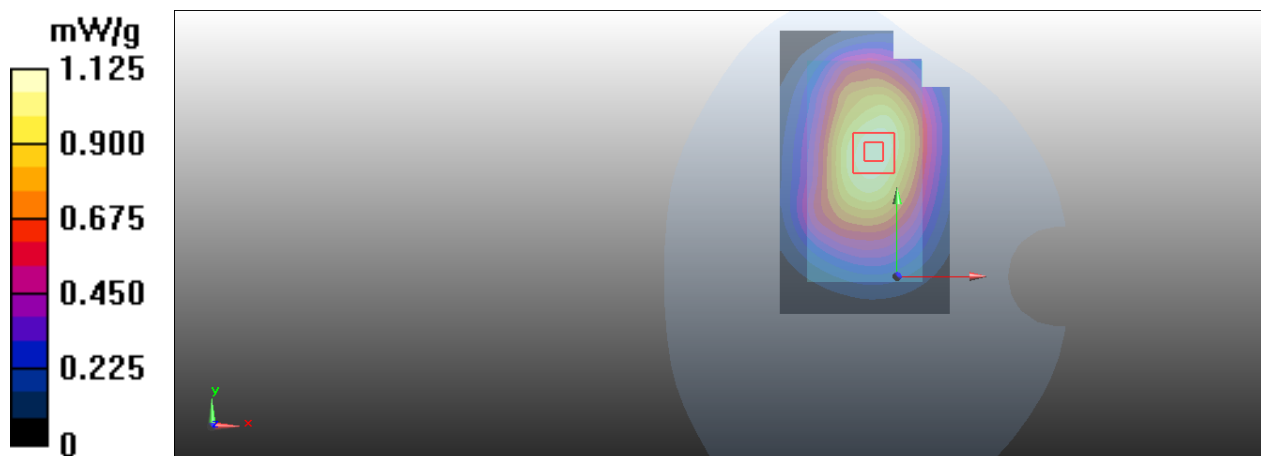
Medium: BSL2450 Medium parameters used: $f = 2462 \text{ MHz}$; $\sigma = 1.972 \text{ mho/m}$; $\epsilon_r = 50.928$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Probe: EX3DV4 - SN3790; ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn538; Calibrated: 2011-09-15
Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
Measurement SW: DASY52, Version 52.8 (0)

Fast SAR of Combined Scans: SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.750 mW/g

Maximum value of SAR (interpolated) = 1.125 mW/g



Date/Time: 2012-03-13 12:55:31

DASY Configuration for Configuration/4-slot GPRS/Body - Low - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan:

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: 4-slot GPRS1900; Frequency: 1850.2 MHz; Duty Cycle: 1:2.1; PMF: 1.44914

Medium: BSL1900 Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $\sigma = 1.468 \text{ mho/m}$; $\epsilon_r = 53.364$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Probe: ES3DV3 - SN3194; ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14

Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))

Electronics: DAE4 Sn793; Calibrated: 2011-09-16

Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177

Measurement SW: DASY4, Version 4.7 (80)

Date/Time: 2012-03-15 08:32:18

DASY Configuration for WLAN b-mode/Body - High - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan:

Test Laboratory: TCC Nokia

Type: RM-801; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode; Frequency: 2462 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL2450 Medium parameters used: $f = 2462 \text{ MHz}$; $\sigma = 1.972 \text{ mho/m}$; $\epsilon_r = 50.928$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Probe: EX3DV4 - SN3790; ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24

Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))

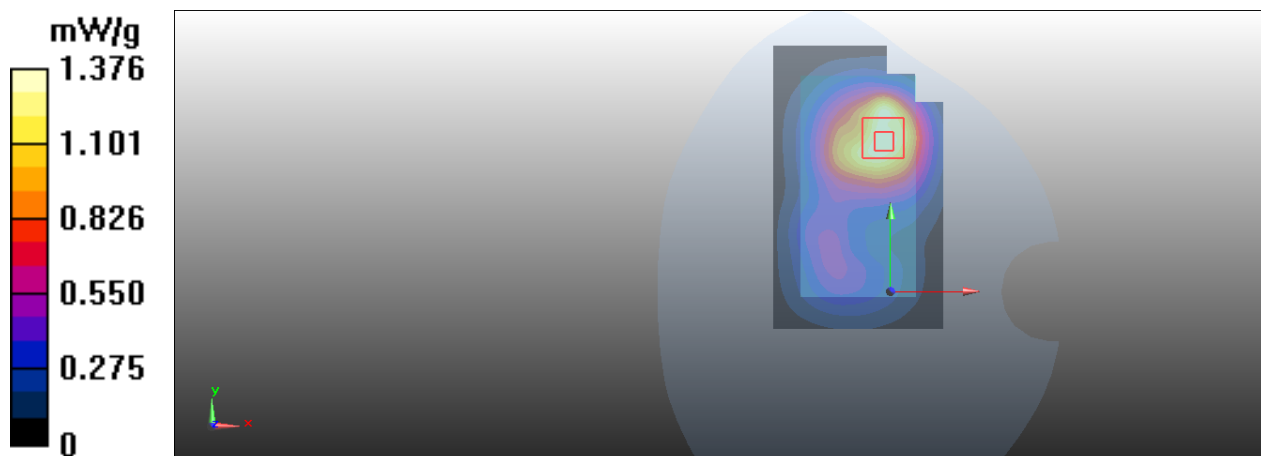
Electronics: DAE4 Sn538; Calibrated: 2011-09-15

Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179

Measurement SW: DASY52, Version 52.8 (0)

Fast SAR of Combined Scans: SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.776 mW/g

Maximum value of SAR (interpolated) = 1.376 mW/g



Date/Time: 2012-03-12 12:12:06

DASY Configuration for Configuration/WCDMA/Body - Low - Spacer 10mm - No Accessory - Back Facing

Phantom/Area Scan:

Test Laboratory: TCC Nokia

Type: RM-819; Serial: 004402/13/751778/9

Communication System: WCDMA1900; Frequency: 1852.4 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL1900 Medium parameters used (interpolated): $f = 1852.4 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 53.357$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Probe: ES3DV3 - SN3194; ConvF(4.59, 4.59, 4.59); Calibrated: 2011-09-14
Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn793; Calibrated: 2011-09-16
Phantom: SAM 2; Type: Twin SAM 040 CA; Serial: TP - 1177
Measurement SW: DASY4, Version 4.7 (80)

Date/Time: 2012-03-15 08:32:18

DASY Configuration for WLAN b-mode/Body - High - Spacer 10mm - No Accessory - Back Facing Phantom/Area Scan:

Test Laboratory: TCC Nokia

Type: RM-801; Serial: 004402/13/751804/3

Communication System: WLAN2450 b-mode; Frequency: 2462 MHz; Duty Cycle: 1:1; PMF: 1

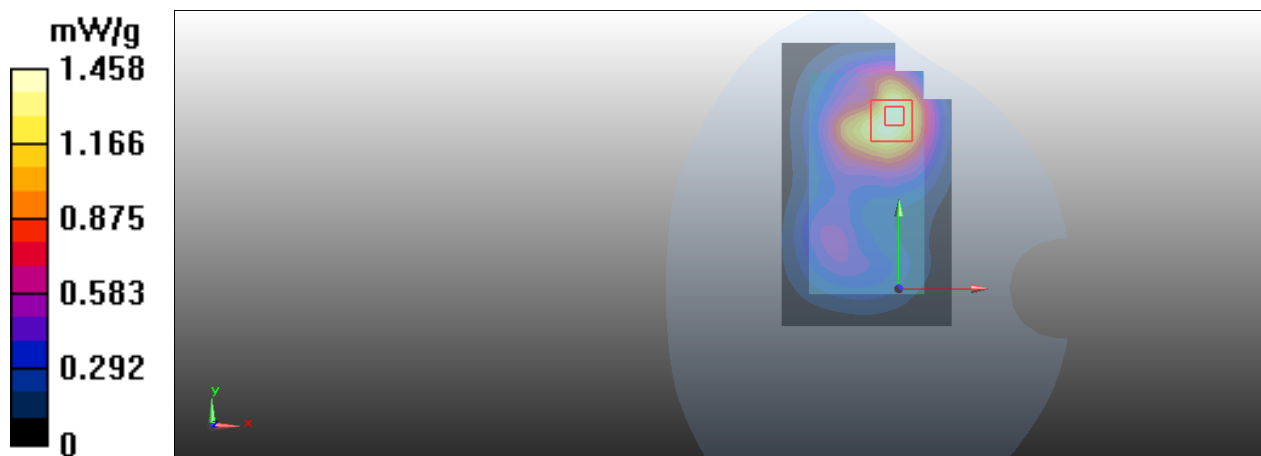
Medium: BSL2450 Medium parameters used: $f = 2462 \text{ MHz}$; $\sigma = 1.972 \text{ mho/m}$; $\epsilon_r = 50.928$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Probe: EX3DV4 - SN3790; ConvF(6.85, 6.85, 6.85); Calibrated: 2011-05-24
Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn538; Calibrated: 2011-09-15
Phantom: SAM 1; Type: Twin SAM 040 CA; Serial: TP-1179
Measurement SW: DASY52, Version 52.8 (0)

Fast SAR of Combined Scans: SAR(1 g) = 1.33 mW/g; SAR(10 g) = 0.795 mW/g

Maximum value of SAR (interpolated) = 1.458 mW/g



APPENDIX C: DIELECTRIC PARAMETERS OF THE TISSUE SIMULANTS

Body tissue simulant dielectric parameters used in the measurements:

f (MHz)	Date	Dielectric Parameters					
		Ch 4132 826.4 MHz		Ch 4175 835.0 MHz		Ch 4233 846.6 MHz	
		ϵ_r	σ [S/m]	ϵ_r	σ [S/m]	ϵ_r	σ [S/m]
835	2012-03-15	52.7	0.98	52.6	0.99	52.6	0.99
	2012-03-16	53.4	0.99	53.4	0.99	53.3	1.00
f (MHz)	Date	Dielectric Parameters					
		Ch 128 824.2 MHz		Ch 190 836.6 MHz		Ch 251 848.8 MHz	
		ϵ_r	σ [S/m]	ϵ_r	σ [S/m]	ϵ_r	σ [S/m]
836	2012-03-13	53.0	0.99	52.9	0.99	52.9	1.00
	2012-03-14	53.0	0.98	52.9	0.99	52.9	1.00
f (MHz)	Date	Dielectric Parameters					
		Ch 512 1850.2 MHz		Ch 661 1880.0 MHz		Ch 810 1909.8 MHz	
		ϵ_r	σ [S/m]	ϵ_r	σ [S/m]	ϵ_r	σ [S/m]
1880	2012-03-12	53.4	1.47	53.3	1.50	53.2	1.53
	2012-03-13	52.8	1.47	52.8	1.49	52.7	1.52
f (MHz)	Date	Dielectric Parameters					
		Ch 9262 1852.4 MHz		Ch 9400 1880.0 MHz		Ch 9538 1907.6 MHz	
		ϵ_r	σ [S/m]	ϵ_r	σ [S/m]	ϵ_r	σ [S/m]
1880	2012-03-12	53.4	1.47	53.3	1.50	53.2	1.53
f (MHz)	Date	Dielectric Parameters					
		Ch 1 2412.0 MHz		Ch 7 2442.0 MHz		Ch 11 2462.0 MHz	
		ϵ_r	σ [S/m]	ϵ_r	σ [S/m]	ϵ_r	σ [S/m]
2442	2012-03-08	50.4	1.93	50.3	1.97	50.3	1.99
	2012-03-09	51.1	1.94	51.0	1.97	50.9	2.00
	2012-03-12	50.9	1.91	50.8	1.95	50.8	1.98
	2012-03-15	51.1	1.91	51.0	1.94	50.9	1.97

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



Accredited by the Swiss Accreditation Service (SAS)
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Nokia Salo TCC**

Certificate No: **ES3-3131_Sep11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3131**

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

Calibration date: **September 14, 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 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: September 15, 2011

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3131

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)
750	41.9	0.89	6.10	6.10	6.10	0.80	1.00	± 12.0 %
835	41.5	0.90	5.88	5.88	5.88	0.80	1.31	± 12.0 %
1750	40.1	1.37	5.14	5.14	5.14	0.80	1.25	± 12.0 %
1900	40.0	1.40	4.92	4.92	4.92	0.80	1.25	± 12.0 %
2450	39.2	1.80	4.32	4.32	4.32	0.79	1.25	± 12.0 %
2600	39.0	1.96	4.21	4.21	4.21	0.76	1.30	± 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:3131

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)
750	55.5	0.96	5.97	5.97	5.97	0.80	1.00	± 12.0 %
835	55.2	0.97	5.92	5.92	5.92	0.80	1.34	± 12.0 %
1750	53.4	1.49	4.64	4.64	4.64	0.80	1.35	± 12.0 %
1900	53.3	1.52	4.44	4.44	4.44	0.80	1.28	± 12.0 %
2450	52.7	1.95	4.07	4.07	4.07	0.80	1.17	± 12.0 %
2600	52.5	2.16	3.97	3.97	3.97	0.80	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.



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client **Nokia Salo TCC** Certificate No: **ES3-3194_Sep11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3194**

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

Calibration date: **September 14, 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 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

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

Issued: September 15, 2011

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3194

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)
750	41.9	0.89	6.27	6.27	6.27	0.80	1.00	± 12.0 %
835	41.5	0.90	6.05	6.05	6.05	0.80	1.00	± 12.0 %
1750	40.1	1.37	5.29	5.29	5.29	0.80	1.27	± 12.0 %
1900	40.0	1.40	5.10	5.10	5.10	0.80	1.27	± 12.0 %
2450	39.2	1.80	4.43	4.43	4.43	0.80	1.29	± 12.0 %
2600	39.0	1.96	4.33	4.33	4.33	0.77	1.36	± 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:3194

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)
750	55.5	0.96	6.15	6.15	6.15	0.80	1.00	± 12.0 %
835	55.2	0.97	6.08	6.08	6.08	0.80	1.00	± 12.0 %
1750	53.4	1.49	4.76	4.76	4.76	0.80	1.32	± 12.0 %
1900	53.3	1.52	4.59	4.59	4.59	0.80	1.33	± 12.0 %
2450	52.7	1.95	4.19	4.19	4.19	0.80	1.00	± 12.0 %
2600	52.5	2.16	4.08	4.08	4.08	0.80	1.25	± 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.



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Accreditation No.: SCS 108

Client Nokia Salo TCC

Certificate No: EX3-3790_May11

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3790

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

Calibration date: May 24, 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 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

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

Issued: May 27, 2011

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3790

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)
750	41.9	0.89	8.74	8.74	8.74	0.80	0.72	± 12.0 %
835	41.5	0.90	8.49	8.49	8.49	0.80	0.69	± 12.0 %
1750	40.1	1.37	7.49	7.49	7.49	0.80	0.59	± 12.0 %
1900	40.0	1.40	7.25	7.25	7.25	0.80	0.59	± 12.0 %
2450	39.2	1.80	6.67	6.67	6.67	0.75	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.

DASY/EASY - Parameters of Probe: EX3DV4- SN:3790

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)
750	55.5	0.96	8.57	8.57	8.57	0.80	0.74	± 12.0 %
835	55.2	0.97	8.39	8.39	8.39	0.80	0.75	± 12.0 %
1750	53.4	1.49	7.72	7.72	7.72	0.80	0.72	± 12.0 %
1900	53.3	1.52	7.32	7.32	7.32	0.80	0.71	± 12.0 %
2450	52.7	1.95	6.85	6.85	6.85	0.80	0.58	± 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.

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



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Accreditation No.: SCS 108

Client Nokia Salo TCC Certificate No: D835V2-462_Sep11

CALIBRATION CERTIFICATE

Object D835V2 - SN: 462

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

Calibration date: September 13, 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 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: S5086 (20b)	29-Mar-11 (No. 217-01367)	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-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-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

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 13, 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: 462

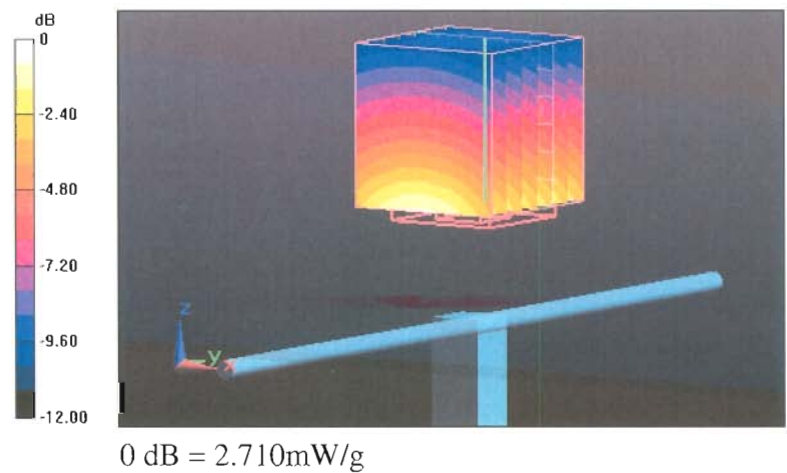
Communication System: CW; Frequency: 835 MHz
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 41.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 56.987 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.423 W/kg
SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.52 mW/g
Maximum value of SAR (measured) = 2.708 mW/g



Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 462

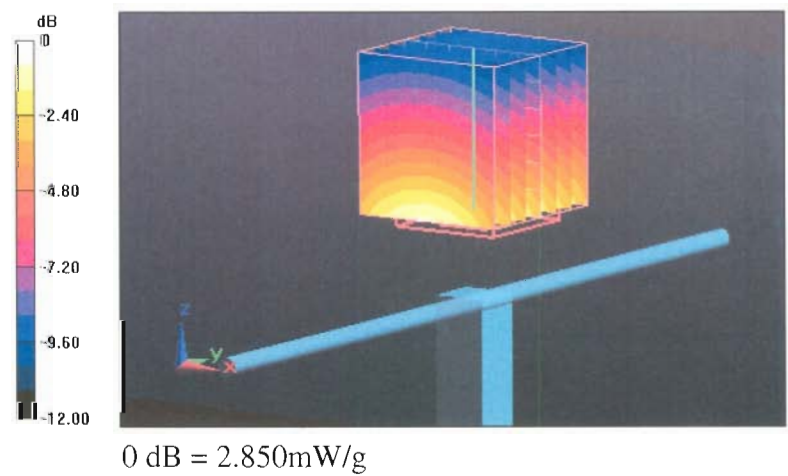
Communication System: CW; Frequency: 835 MHz
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 53.5$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 55.464 V/m; Power Drift = 0.0033 dB
Peak SAR (extrapolated) = 3.540 W/kg
SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.61 mW/g
Maximum value of SAR (measured) = 2.851 mW/g





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Accreditation No.: **SCS 108**

Client **Nokia Salo TCC**

Certificate No: **D1900V2-5d013_Mar10**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d013**

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

Calibration date: **March 23, 2010**

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-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV3	SN: 3205	26-Jun-09 (No. ES3-3205_Jun09)	Jun-10
DAE4	SN: 601	02-Mar-10 (No. DAE4-601_Mar10)	Mar-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-09)	In house check: Oct-10

Calibrated by: **Dinco Iliev** **Laboratory Technician**

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

Issued: March 23, 2010

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

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω + 6.5 j Ω
Return Loss	- 23.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.7 Ω + 7.0 j Ω
Return Loss	- 22.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.195 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 30, 2002

DASY5 Validation Report for Head TSL

Date/Time: 23.03.2010 10:16:39

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d013

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

Medium: HSL U11 BB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 41.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

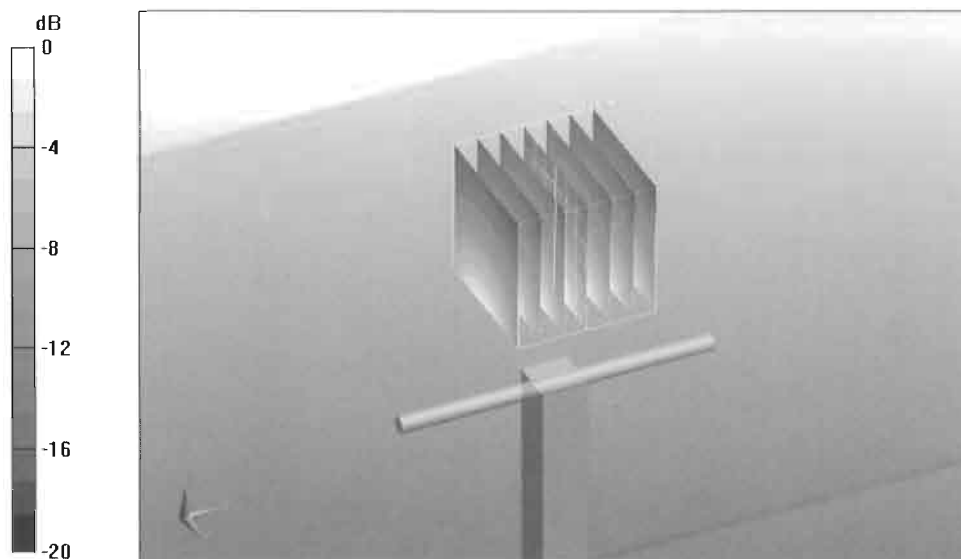
Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.4 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 18.5 W/kg

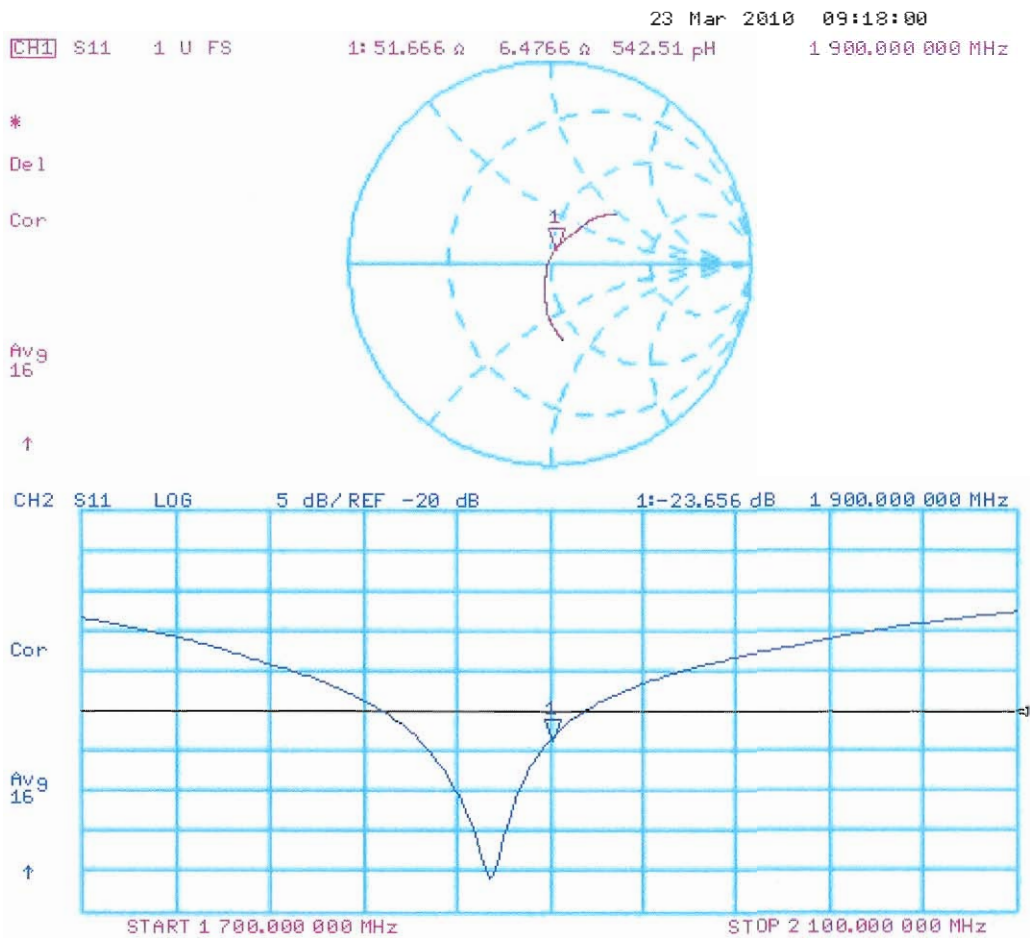
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.32 mW/g

Maximum value of SAR (measured) = 12.6 mW/g



0 dB = 12.6mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 23.03.2010 13:12:18

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d013

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

Medium: MSL U11 BB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.58$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

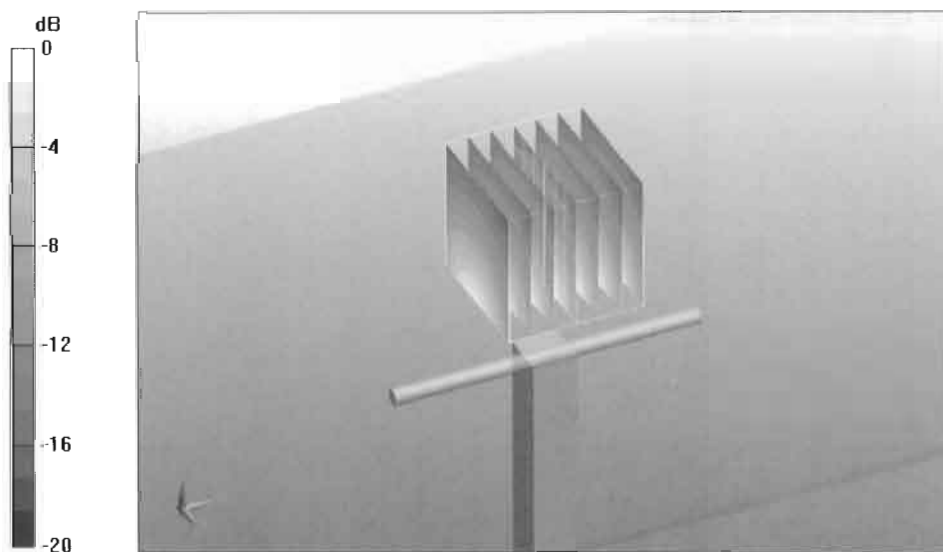
Pin250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.9 V/m; Power Drift = 0.00956 dB

Peak SAR (extrapolated) = 17.5 W/kg

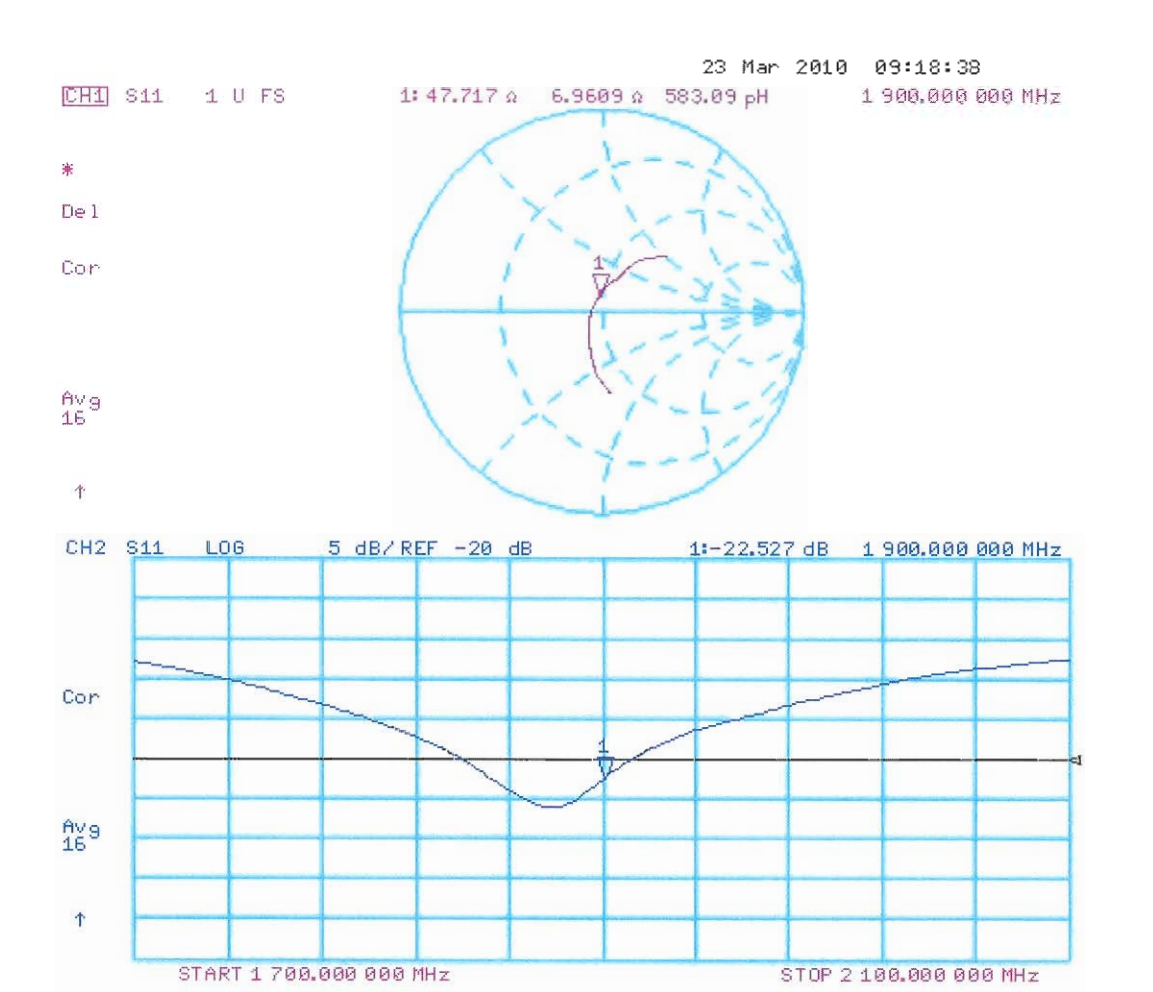
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.58 mW/g

Maximum value of SAR (measured) = 12.7 mW/g



0 dB = 12.7mW/g

Impedance Measurement Plot for Body TSL



Dipole D1900V2 – SN: 5d013 Antenna Parameters

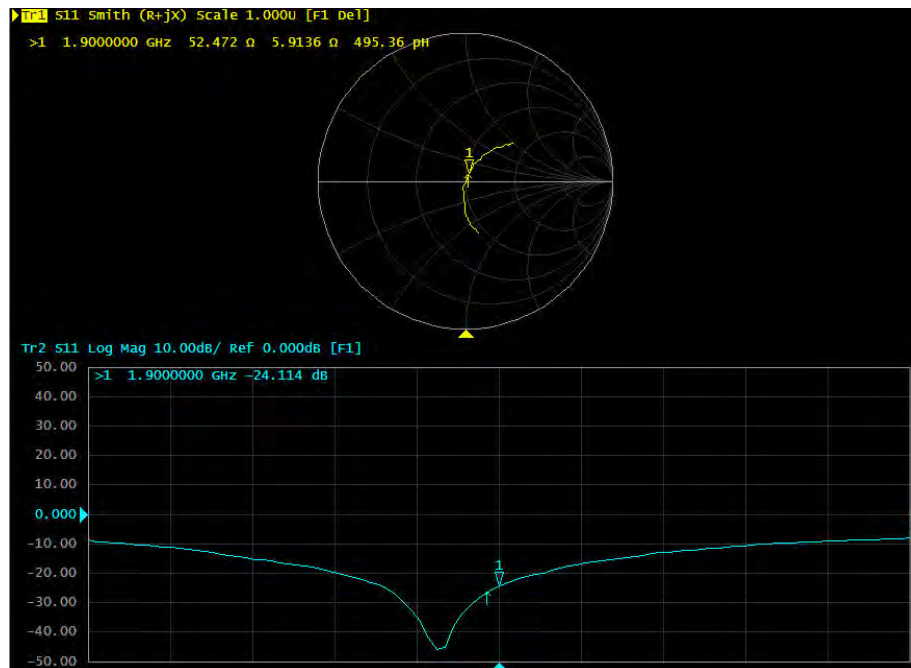
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement 2012-02-27
Impedance, transformed to feed point	51.7 Ω + 6.5 j Ω	52.5 Ω + 5.9 j Ω
Return loss	-23.7 dB	-24.1 dB

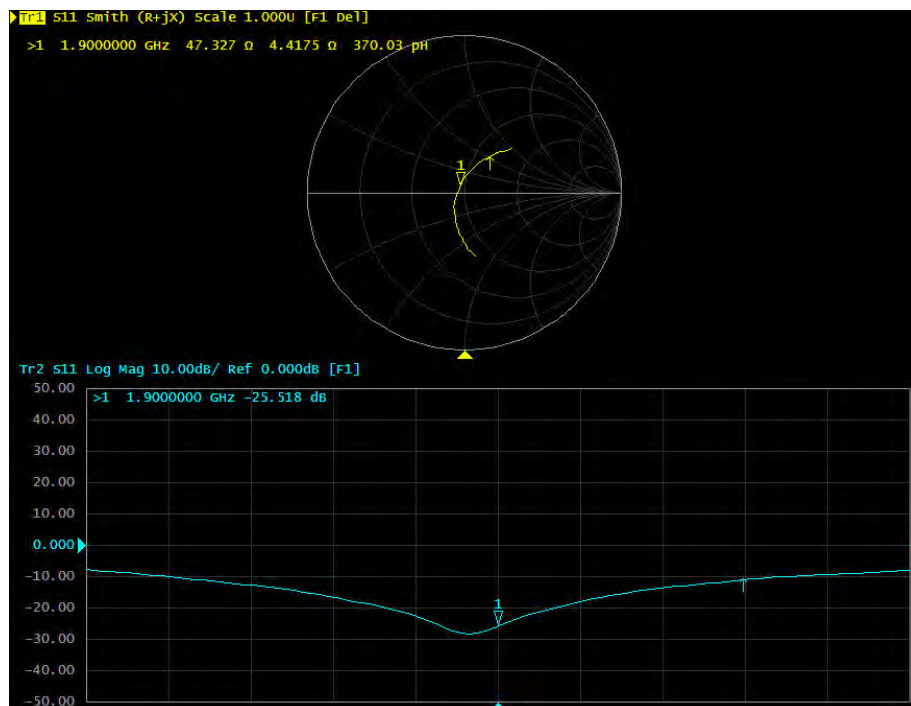
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement 2012-02-27
Impedance, transformed to feed point	47.7 Ω + 7.0 j Ω	47.3 Ω + 4.4 j Ω
Return loss	-22.5 dB	-25.5 dB

Impedance Measurement Plot for Head TSL 1900



Impedance Measurement Plot for Body TSL 1900





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 Salo TCC**

Certificate No: **D2450V2-729_Sep11**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 729**

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

Calibration date: **September 13, 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 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: S5086 (20b)	29-Mar-11 (No. 217-01367)	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-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-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

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 13, 2011

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

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 729

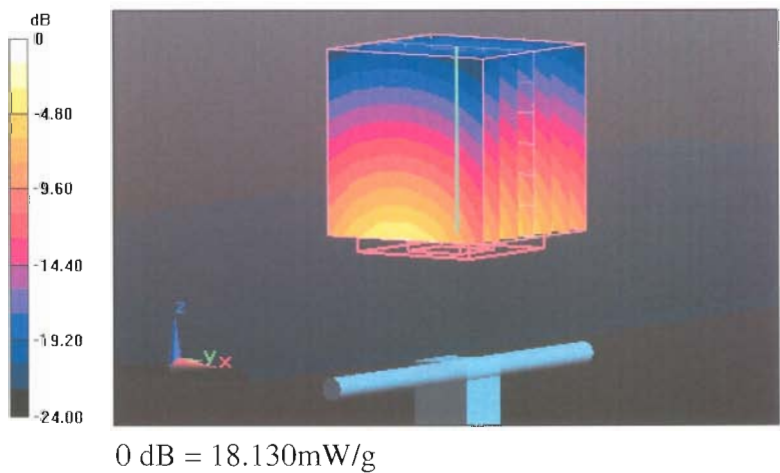
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.85 \text{ mho/m}$; $\epsilon_r = 38.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); 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: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 102.5 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 28.852 W/kg
SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.45 mW/g
Maximum value of SAR (measured) = 18.134 mW/g



Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 729

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 2.04 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); 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: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 96.035 V/m; Power Drift = -0.0016 dB
Peak SAR (extrapolated) = 27.393 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.18 mW/g
Maximum value of SAR (measured) = 17.569 mW/g

