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SAR Compliance Test Report

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Measurements made by:	Janne Hirsimäki		
Tested device:	RM-469		
FCC ID:	PYARM-469X	**IC:**	661V-RM469
Supplement reports:	FCC_RM-469_01 for RM-469 / FCC ID: PYARM-469 / IC: 661V-RM469, Salo_SAR_0925_13 for RM-469 / FCC ID: PYARM-469 / IC: 661V-RM469, SAR_Photo_RM-469_11		
Testing has been carried out in accordance with:	**47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)** Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields **RSS-102** Evaluation Procedure for Mobile and Portable Radio Transmitters with Respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields **IEEE 1528 - 2003** IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Technique		
Documentation:	The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.		
Test results:	**The tested device complies with the requirements in respect of all parameters subject to the test.** The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.		

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2010-04-01 to 2010-04-07
SN, HW and SW numbers of tested device	SN: 359327/03/140963/8, HW: 8010, SW: 022.009, DUT: 14560
Batteries used in testing	BP-4L, DUT: 14562, 14563
Headsets used in testing	HS-48, DUT: 14564
Other accessories used in testing	-
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

The maximum measured SAR values for Head configuration and Body Worn configuration are given in section 1.2.1 and 1.2.2 respectively. The device conforms to the requirements of the standard(s) when the maximum measured SAR value is less than or equal to the limit.

1.2.1 Head Configuration

Mode	Ch / *f* (MHz)	Conducted power	Position	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
3-slot GPRS850**	251 / 848.8	30.0 dBm	Right, Cheek	0.825 W/kg	**0.92 W/kg**	1.6 W/kg	PASSED
3-slot GPRS1900**	810 / 1909.8	25.2 dBm	Left, Cheek	0.580 W/kg	**0.65 W/kg**	1.6 W/kg	PASSED
WLAN2450	1 / 2412.0	16.0 dBm	Left, Cheek	0.322 W/kg	**0.36 W/kg**	1.6 W/kg	PASSED
3-slot GPRS850 + WLAN2450	-	-	Right, Cheek	0.850 W/kg	**0.95 W/kg**	1.6 W/kg	PASSED
3-slot GPRS1900 + WLAN2450	-	-	Left, Cheek	0.603 W/kg	**0.68 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 / 848.8	30.0 dBm	2.2 cm	0.575 W/kg	**0.64 W/kg**	1.6 W/kg	**PASSED**
3-slot GPRS1900***	810 / 1909.8	25.2 dBm	2.2 cm	0.239 W/kg	**0.27 W/kg**	1.6 W/kg	**PASSED**
WLAN2450	1 / 2442.0	16.0 dBm	2.2 cm	0.038 W/kg	**0.04 W/kg**	1.6 W/kg	**PASSED**
3-slot GPRS850 + WLAN2450	-	-	2.2 cm	0.589 W/kg	**0.66 W/kg**	1.6 W/kg	**PASSED**
3-slot GPRS1900 + WLAN2450	-	-	2.2 cm	0.261 W/kg	**0.29 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 Salo_SAR_0925_13 for RM-469 / FCC ID: PYARM-469 / IC: 661V-RM-469.
*** SAR data taken from FCC_RM-469_01 for RM-469 / FCC ID: PYARM-469 / IC: 661V-RM-469.

1.2.3 Maximum Drift

Maximum drift covered by 12% scaling up of the SAR values	Maximum drift during measurements
0.5dB	0.38dB

1.2.4 Measurement Uncertainty

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

2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	General population / uncontrolled

Modes of Operation	Bands	Modulation Mode	Duty Cycle	Transmitter Frequency Range (MHz)
GSM	850 1900	GMSK	1/8	824 – 849 1850 – 1910
GPRS	850 1900	GMSK	1/8 to 3/8	824 – 849 1850 – 1910
EGPRS	850 1900	GMSK / 8PSK	1/8 to 3/8	824 – 849 1850 – 1910
BT	2450	GFSK	1	2402 – 2480
WLAN	2450	11Mbps QPSK	1	2412 – 2462

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

This device has Voice-over-IP/Dual Transfer Mode capability for use at the ear. Therefore, SAR for multi slot GPRS mode was evaluated against the head profile of the phantom. Dual Transfer Mode is a feature that utilises the multi-slot GPRS capability in this device; it allows simultaneous transmission of voice and data during the same call, using the same transmitter and antenna.

2.1 Description of the Antenna

The device has internal antennas for both cellular and WLAN use. The cellular antenna is located at the bottom underneath the back cover. The WLAN antenna is located at the top underneath the back cover.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	20.8 to 23.1
Ambient humidity (RH %):	38 to 44

3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using control software.

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

In all operating bands the measurements were performed on lowest, middle and highest channels.

The radiated output power of the device was measured by a separate test laboratory on the same unit(s) as used for SAR testing. The results are given in the EMC report supporting this application.

The transmission mode of the device in all WLAN tests was DSSS QPSK 11Mbps. This mode has the highest (or equal highest) time-averaged output power of all the WLAN modulation modes in Nokia devices.

Some of the SAR results given in this report has been copied from the earlier testing in Salo_SAR_0925_13 for RM-469 / FCC ID: PYARM-469 / IC: 661V-RM469 and FCC_RM-469_01 for RM-469 / FCC ID: PYARM-469 / IC: 661V-RM469.

Test results for three different hardwares are presented in this report: these are HW6000, HW6020 and HW8010. HW6000 is the base product; HW6020 incorporates hardware changes to the 850MHz and 1900MHz cellular bands; HW8010 incorporates hardware changes to the 2450MHz WLAN band.

3.3 Test Cases and Test Minimisation

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

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

For example, when SAR testing multi-slot GSM/GPRS/EGPRS modes, it is an inefficient use of test resources to fully SAR test every test configuration in each of the different modes as these modes have a fixed power relationship between them that is the same, irrespective of the test configuration. In the case of multi-slot GSM/GPRS modes, a single comparative SAR test - using the same test channel and test configuration – is made in each of the n-slot modes; the mode with the highest measured SAR value is then subjected to full SAR testing in all test configurations. These comparative SAR tests (same frequency, same test configuration) are regarded as extremely accurate as they are relative tests in which the tested device changes neither its frequency nor its position between tests. For different modes that operate in the same band and use the same antenna e.g. GSM/GPRS850 and WCDMA850, full SAR testing is carried out in the GSM/GPRS850 mode but WCDMA850 testing is limited to 3 channel testing in the maximum SAR test configuration for GSM/GPRS850.

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

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

In the results tables in Section 7, the maximum SAR value for the 'basic' tests (i.e. left cheek, left tilt, right cheek and right tilt in Head SAR testing; with and without headset with the back &/or

display side facing the flat phantom in Body SAR testing) is bolded for each band. In some cases, after full testing of the basic SAR test configurations has been completed, additional checking SAR tests are made. These checking tests are always based on the bolded result from the 'basic' testing. When the SAR value of a checking test exceeds the maximum value from the basic tests, it is also bolded and used as the basis for any further checking tests that might be needed.

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

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

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

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE 4	555	12 months	2010-10
E-field Probe EX3DV4	3573	12 months	2010-11
Dipole Validation Kit, D2450V2	749	24 months	2011-10
DASY4 software	Version 4.7	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	E4436B	US39260114	12 months	2010-12
Amplifier	AS0825-20L	1009777	12 months	2010-12
Power Meter	NRVS	849305/028	12 months	2010-09
Power Sensor	NRV-Z32	825600/004	12 months	2010-09
Vector Network Analyzer	8753E	US38432928	12 months	
Dielectric Probe Kit	85070B	US33020420	-	-

4.1.1 Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to >6 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/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, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

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

4.3 Tissue Simulants

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

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

4.3.1 Tissue Simulant Recipes

The following recipe(s) were used for Head and Body tissue simulant(s):

2450MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	56.0	70.20
Tween 20	44.0	29.62
Salt	-	0.18

4.3.2 System Checking

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

System checking, head tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			εr	σ [S/m]	
	Reference result	13.2	39.1	1.78	
	± 10% window	11.9 – 14.5			
2450	2010-04-01	14.0	38.5	1.83	21.0

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			εr	σ [S/m]	
	Reference result	12.5	52.7	1.98	
	± 10% window	11.2 – 13.8			
2450	2010-04-07	13.4	51.1	2.00	21.0

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

4.3.3 Tissue Simulants used in the Measurements

Head tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
	Recommended value	39.2	1.79	
	± 5% window	37.3 – 41.2	1.70 – 1.88	
2442	2010-04-01	38.6	1.82	21.0

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
	Recommended value	52.7	1.94	
	± 5% window	50.1 – 55.3	1.85 – 2.04	
2442	2010-04-07	51.1	1.99	21.0

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.

Device holder supplied by SPEAG

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

Nokia spacer

5.2 Test Positions

5.2.1 Against Phantom Head

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

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

5.2.2 Body Worn Configuration

The device was placed in the SPEAG holder using the Nokia spacer and placed below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance indicated in the photo below using a separate flat spacer that was removed before the start of the measurements. The device was oriented with its back facing the phantom since this orientation gives the highest 2450MHz WLAN results.

5.3 Scan Procedures

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

5.4 SAR Averaging Methods

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

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

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

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

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

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

7. RESULTS

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

850MHz Head SAR results

Mode and Hardware ID	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**	-
HW6000	Left	Cheek	-	0.450	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-slot GPRS**	**Conducted Power**		**-**	**31.5 dBm**	**-**
HW6000	Left	Cheek	-	0.631	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
3-slot GPRS**	**Conducted Power**		**30.0 dBm**	**30.0 dBm**	**30.0 dBm**
HW6000	Left	Cheek	-	0.639	-
		Tilt	-	0.512	-
	Right	Cheek	0.558	0.686	**0.825**
		Tilt	-	0.452	-
3-slot GPRS***	**Conducted Power**		**30.0 dBm**	**30.0 dBm**	**30.0 dBm**
HW6020	Left	Cheek	-	-	-
		Tilt	-	-	-
	Right	Cheek	0.559	0.599	0.746
		Tilt	-	-	-
3-slot 8PSK EGPRS**	**Conducted Power**		-	-	**24.7 dBm**
HW6000	Left	Cheek	-	-	-
		Tilt	-	-	-
	Right	Cheek	-	-	0.120
		Tilt	-	-	-

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**		**-**	**29.5 dBm**	**-**
HW6000	Left	Cheek	-	0.396	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
2-slot GPRS**	**Conducted Power**		**-**	**27.0 dBm**	**-**
HW6000	Left	Cheek	-	0.428	-
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
3-slot GPRS**	**Conducted Power**		**25.2 dBm**	**25.2 dBm**	**25.2 dBm**
HW6000	Left	Cheek	0.390	0.455	**0.580**
		Tilt	-	0.390	-
	Right	Cheek	-	0.368	-
		Tilt	-	0.364	-
3-slot GPRS***	**Conducted Power**		**25.2 dBm**	**25.2 dBm**	**25.2 dBm**
HW6020	Left	Cheek	0.536	0.513	0.539
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-
3-slot 8PSK EGPRS**	**Conducted Power**		**-**	**-**	**23.7 dBm**
HW6000	Left	Cheek	-	-	0.465
		Tilt	-	-	-
	Right	Cheek	-	-	-
		Tilt	-	-	-

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**	**Conducted Power**		**16.0 dBm**	**16.0 dBm**	**16.0 dBm**
HW6000	Left	Cheek	**0.129**	0.087	0.074
		Tilt	-	0.067	-
	Right	Cheek	-	0.063	-
		Tilt	-	0.058	-
WLAN	**Conducted Power**		**16.0 dBm**	**16.0 dBm**	**16.0 dBm**
HW8010	Left	Cheek	**0.322**	0.267	0.275
		Tilt	-	0.190	-
	Right	Cheek	-	0.181	-
		Tilt	-	0.165	-

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	30.0 dBm	30.0 dBm	30.0 dBm
HW6000	Display facing phantom	Without headset	-	0.410	**-**
		Headset HS-48	-	0.268	-
	Back facing phantom	Without headset	0.351	0.481	**0.575**
		Headset HS-48	-	0.349	-
3-slot GPRS***		Conducted Power	30.0 dBm	30.0 dBm	30.0 dBm
HW6020	Display facing phantom	Without headset	-	-	**-**
		Headset HS-48	-	-	-
	Back facing phantom	Without headset	0.285	0.351	0.485
		Headset HS-48	-	-	-

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	25.2 dBm	25.2 dBm	25.2 dBm
HW6000	Display facing phantom	Without headset	-	0.142	-
		Headset HS-48	-	0.110	-
	Back facing phantom	Without headset	0.214	**0.215**	0.202
		Headset HS-48	-	0.166	-
3-slot GPRS***		Conducted Power	25.2 dBm	25.2 dBm	25.2 dBm
HW6020	Display facing phantom	Without headset	-	-	-
		Headset HS-48	-	-	-
	Back facing phantom	Without headset	0.188	0.227	**0.239**
		Headset HS-48	-	-	-

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**		**Conducted Power**	**16.0 dBm**	**16.0 dBm**	**16.0 dBm**
HW6000	Display facing phantom	Without headset	-	-	-
		Headset HS-48	-	-	-
	Back facing phantom	Without headset	**0.021**	0.015	0.013
		Headset HS-48	-	0.011	-
WLAN		**Conducted Power**	**16.0 dBm**	**16.0 dBm**	**16.0 dBm**
HW8010	Display facing phantom	Without headset	-	-	-
		Headset HS-48	-	-	-
	Back facing phantom	Without headset	**0.038**	0.031	0.034
		Headset HS-48	-	0.029	-

**Simultaneous transmissions: Combined SAR results –
Individual band Max results and Max + Max combined results**

Test configuration	Max. 1g SAR results			Combined 1g SAR values	
	WLAN	3-slot GPRS850	3-slot GPRS1900	WLAN + 3-slot GPRS850	WLAN + 3-slot GPRS1900
Head: Left, Cheek	0.322	0.639**	0.580**	0.961	**0.902**
Head: Left, Tilt	0.190	0.512**	0.390**	0.702	0.580
Head: Right, Cheek	0.181	0.825**	0.368**	**1.006**	0.549
Head: Right, Tilt	0.165	0.452**	0.364**	0.617	0.529
Body: Without Headset	0.038	0.575**	0.239***	**0.613**	**0.277**
Body: Headset HS-48	0.029	0.349**	0.166**	0.378	0.195

** SAR data taken from Salo_SAR_0925_13 for RM-469 / FCC ID: PYARM-469 / IC: 661V-RM469.
*** SAR data taken from FCC_RM-469_01 for RM-469 / FCC ID: PYARM-469 / IC: 661V-RM469

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. It is these values that appear in the Summary table in Section 1.2.

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

Test configuration	Combined 1g SAR values	
	WLAN + 3-slot GPRS850	WLAN + 3-slot GPRS1900
Head: Left, Cheek	-	**0.603**
Head: Left, Tilt	-	-
Head: Right, Cheek	**0.850**	-
Head: Right, Tilt	-	-
Body: Without Headset	**0.589**	**0.261**
Body: Headset HS-48	-	-

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 CHECKING SCANS

Date/Time: 2010-04-01 10:38:06

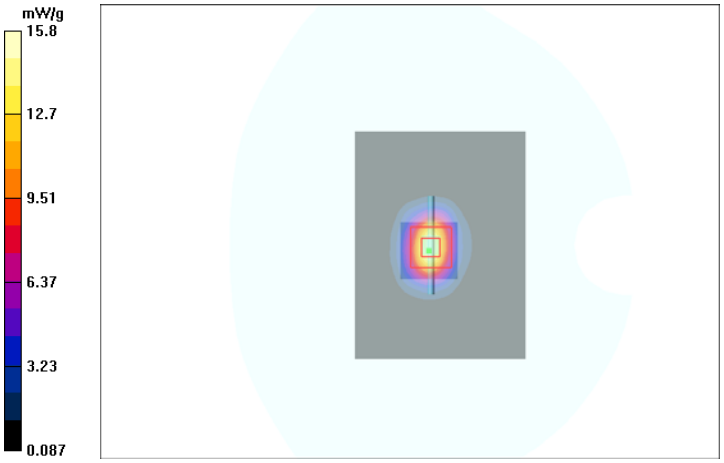
Test Laboratory: TCC Nokia
Type: D2450V2; Serial: D2450V2 - SN:749

Communication System: CW2450
Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL2450; Medium Notes: 19.5C
Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3573
- ConvF(6.56, 6.56, 6.56); Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2009-10-15
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 16.4 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.6 V/m
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 14 mW/g
SAR(10 g) = 6.42 mW/g
Power Drift = -0.003 dB
Maximum value of SAR (measured) = 15.8 mW/g



Date/Time: 2010-04-07 10:12:13

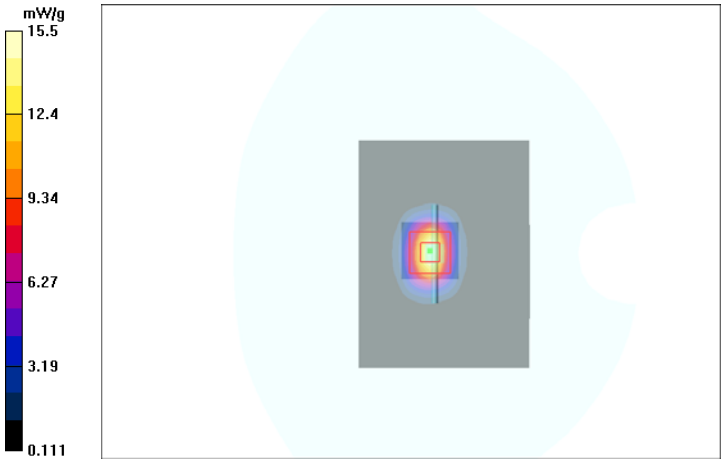
Test Laboratory: TCC Nokia
Type: D2450V2; Serial: D2450V2 - SN:749

Communication System: CW2450
Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: BSL2450; Medium Notes: 20.7C
Medium parameters used: f = 2450 MHz; σ = 2 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3573
- ConvF(6.63, 6.63, 6.63); Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2009-10-15
- Phantom: SAM2; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 15.8 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.6 V/m
Peak SAR (extrapolated) = 27.3 W/kg
SAR(1 g) = 13.4 mW/g
SAR(10 g) = 6.21 mW/g
Power Drift = 0.022 dB
Maximum value of SAR (measured) = 15.5 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 2010-04-01 14:10:25

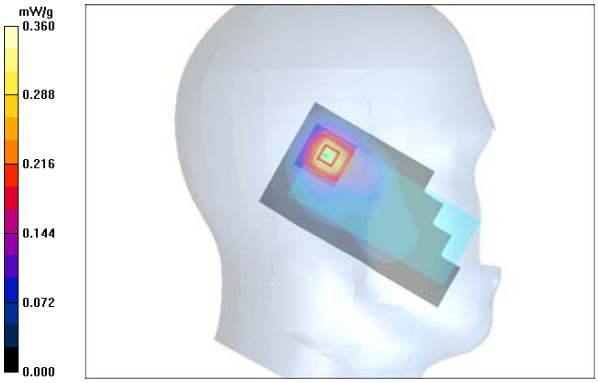
Test Laboratory: TCC Nokia
Type: RM-469; Serial: 359327/03/140963/8

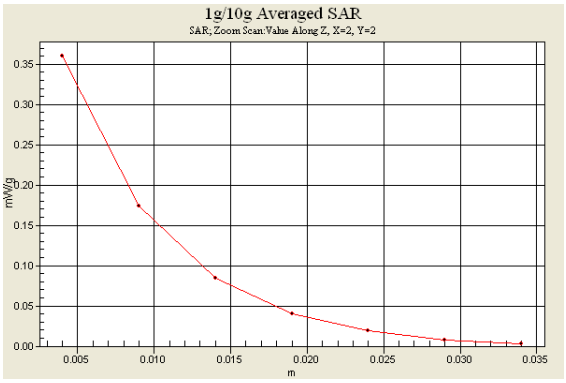
Communication System: WLAN2450
Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: HSL2450; Medium Notes: 19.4C
Medium parameters used: f = 2412 MHz; σ = 1.78 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3573
- ConvF(6.56, 6.56, 6.56); Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2009-10-15
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek position – Low – HW8010/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.329 mW/g

Cheek position – Low – HW8010/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.0 V/m
Peak SAR (extrapolated) = 0.723 W/kg
SAR(1 g) = 0.322 mW/g
SAR(10 g) = 0.151 mW/g
Power Drift = 0.107 dB
Maximum value of SAR (measured) = 0.360 mW/g





Date/Time: 2010-04-01 13:20:33

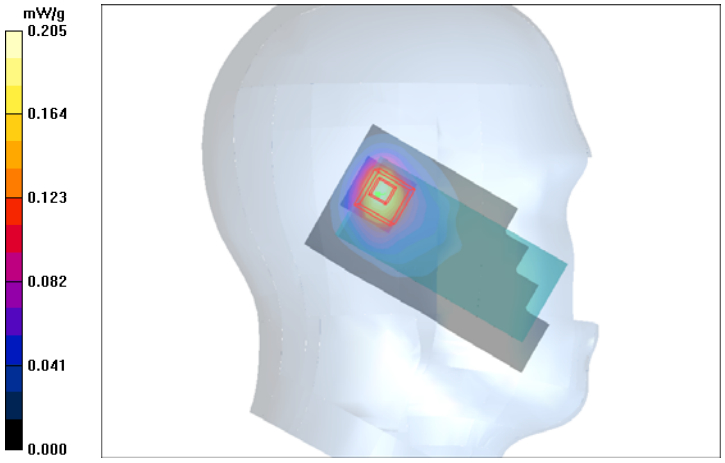
Test Laboratory: TCC Nokia
Type: RM-469; Serial: 359327/03/140963/8

Communication System: WLAN2450
Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: HSL2450; Medium Notes: 19.4C
Medium parameters used: f = 2442 MHz; σ = 1.82 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3573
- ConvF(6.56, 6.56, 6.56); Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2009-10-15
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt position – Middle – HW8010/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.214 mW/g

Tilt position – Middle – HW8010/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.85 V/m
Peak SAR (extrapolated) = 0.428 W/kg
SAR(1 g) = 0.190 mW/g
SAR(10 g) = 0.090 mW/g
Power Drift = -0.049 dB
Maximum value of SAR (measured) = 0.205 mW/g



Date/Time: 2010-04-01 13:39:20

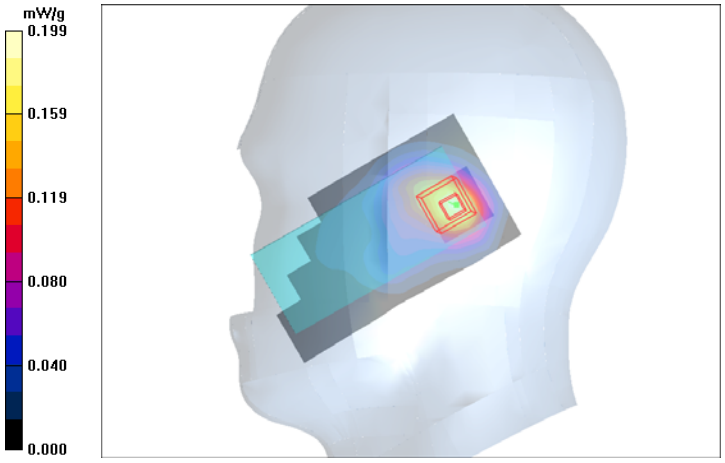
Test Laboratory: TCC Nokia
Type: RM-469; Serial: 359327/03/140963/8

Communication System: WLAN2450
Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: HSL2450; Medium Notes: 19.5C
Medium parameters used: f = 2442 MHz; σ = 1.82 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3573
- ConvF(6.56, 6.56, 6.56); Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2009-10-15
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek position – Middle – HW8010/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.188 mW/g

Cheek position – Middle – HW8010/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.69 V/m
Peak SAR (extrapolated) = 0.353 W/kg
SAR(1 g) = 0.181 mW/g
SAR(10 g) = 0.093 mW/g
Power Drift = 0.080 dB
Maximum value of SAR (measured) = 0.199 mW/g



Date/Time: 2010-04-01 13:52:27

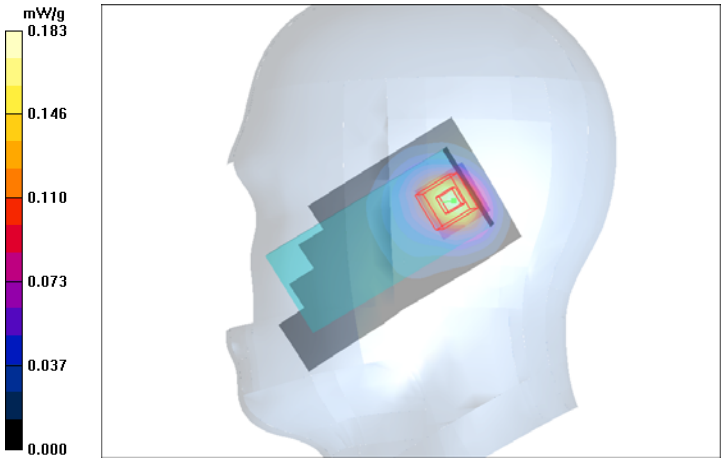
Test Laboratory: TCC Nokia
Type: RM-469; Serial: 359327/03/140963/8

Communication System: WLAN2450
Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: HSL2450; Medium Notes: 19.5C
Medium parameters used: f = 2442 MHz; σ = 1.82 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3573
- ConvF(6.56, 6.56, 6.56); Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2009-10-15
- Phantom: SAM1; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt position – Middle – HW8010/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.184 mW/g

Tilt position – Middle – HW8010/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.87 V/m
Peak SAR (extrapolated) = 0.321 W/kg
SAR(1 g) = 0.165 mW/g
SAR(10 g) = 0.083 mW/g
Power Drift = 0.008 dB
Maximum value of SAR (measured) = 0.183 mW/g



Date/Time: 2010-04-07 11:33:53

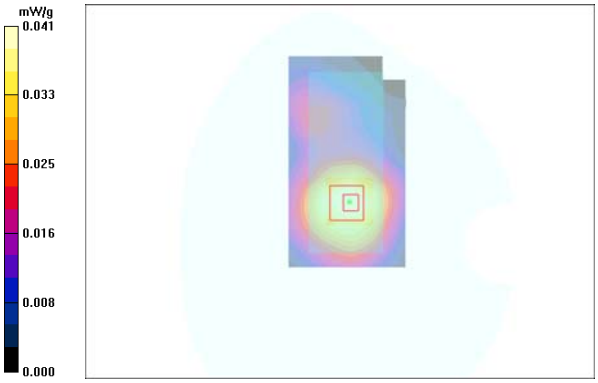
Test Laboratory: TCC Nokia
Type: RM-469; Serial: 359327/03/140963/8

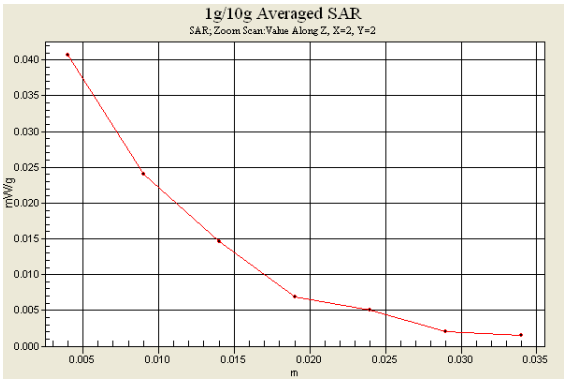
Communication System: WLAN2450
Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: BSL2450; Medium Notes: 20.7C
Medium parameters used: f = 2412 MHz; σ = 1.96 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3573
- ConvF(6.63, 6.63, 6.63); Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2009-10-15
- Phantom: SAM2; Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

Body - Low - No Accessory - Back Facing Phantom – HW8010/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.043 mW/g

Body - Low - No Accessory - Back Facing Phantom – HW8010/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 3.74 V/m
Peak SAR (extrapolated) = 0.068 W/kg
SAR(1 g) = 0.038 mW/g
SAR(10 g) = 0.023 mW/g
Power Drift = -0.050 dB
Maximum value of SAR (measured) = 0.041 mW/g





Date/Time: 2010-04-07 11:22:14

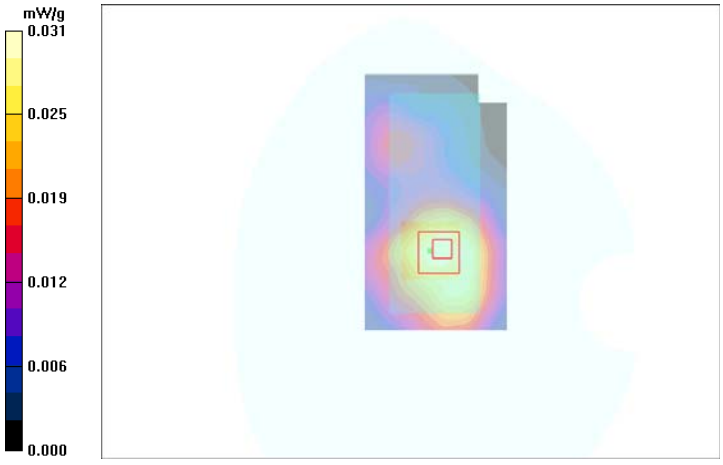
Test Laboratory: TCC Nokia
Type: RM-469; Serial: 359327/03/140963/8

Communication System: WLAN2450
Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: BSL2450; Medium Notes: 20.7C
Medium parameters used: f = 2442 MHz; σ = 1.99 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3573
- ConvF(6.63, 6.63, 6.63); Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn555; Calibrated: 2009-10-15
- Phantom: SAM2; Type: Type: SAM; Serial: TP-1126
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

Body - Middle - HS-48 - Back Facing Phantom – HW8010/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.031 mW/g

Body - Middle - HS-48 - Back Facing Phantom – HW8010/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 3.31 V/m
Peak SAR (extrapolated) = 0.050 W/kg
SAR(1 g) = 0.029 mW/g
SAR(10 g) = 0.017 mW/g
Power Drift = 0.378 dB
Warning: Maximum averaged SAR over 10 g is located on the boundary of the measurement cube. This cube might not incorporate the absolute averaged SAR. Please consider a refinement of the Area Scan measurement.
Maximum value of SAR (measured) = 0.031 mW/g



Date/Time: 2009-06-22 11:46:41, Date/Time: 2010-04-01 13:39:20

Test Laboratory: TCC Nokia
Type: RM-469; Serial: 355216/03/000412/4, Serial: 359327031409638

Communication System: 3-slot GPRS850, Communication System: WLAN2450
Frequency: 848.8 MHz, Frequency: 2442 MHz; Duty Cycle: 1:2.8, Duty Cycle: 1:1
Medium: HSL850, Medium: HSL2450; Medium Notes: t=20.8 C, Medium Notes: 19.5C
Medium parameters used: f = 849 MHz; σ = 0.93 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 2442 MHz; σ = 1.82 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Right Section

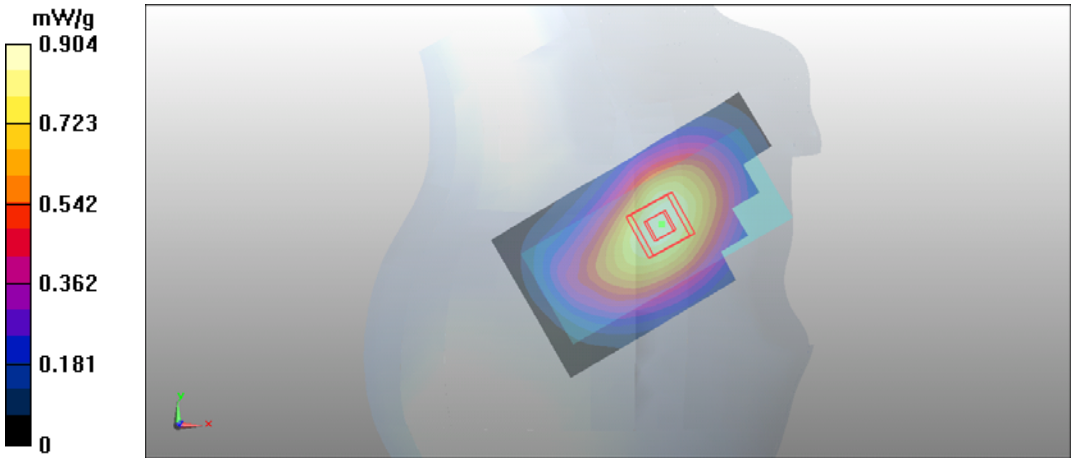
DASY4 Configuration:
- Probe: ET3DV6 - SN1395, Probe: EX3DV4 - SN3573
- ConvF(5.85, 5.85, 5.85), ConvF(6.56, 6.56, 6.56); Calibrated: 2008-07-17, Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn728, Electronics: DAE4 Sn555; Calibrated: 2009-02-09, Calibrated: 2009-10-15
- Phantom: SAM 3, Phantom: SAM1; Type: Twin SAM 040 CA, Type: SAM; Serial: TP-1179, Serial: TP-1126
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek position - High/Area Scan (6x10x1): Measurement grid: dx=15mm, dy=15mm

Configuration/Cheek position - Middle/Area Scan (6x10x1): Measurement grid: dx=15mm, dy=15mm

Motorola Fast SAR of Combined Scans: SAR(1 g) = 0.850 mW/g
SAR(10 g) = 0.587 mW/g

Maximum value of SAR (measured) = 0.904 mW/g



Date/Time: 2009-06-17 13:20:44, Date/Time: 2010-04-01 14:10:25

Test Laboratory: TCC Nokia

Type: RM-469; Serial: 355216030004124, Serial: 359327031409638

Communication System: 3-slot GPRS1900, Communication System: WLAN2450
Frequency: 1909.8 MHz, Frequency: 2412 MHz; Duty Cycle: 1:2.8, Duty Cycle: 1:1
Medium: HSL1900, Medium: HSL2450; Medium Notes: 23.9 C, Medium Notes: 19.4C
Medium parameters used: f = 1910 MHz; σ = 1.49 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3 , Medium parameters used: f = 2412 MHz; σ = 1.78 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Left Section

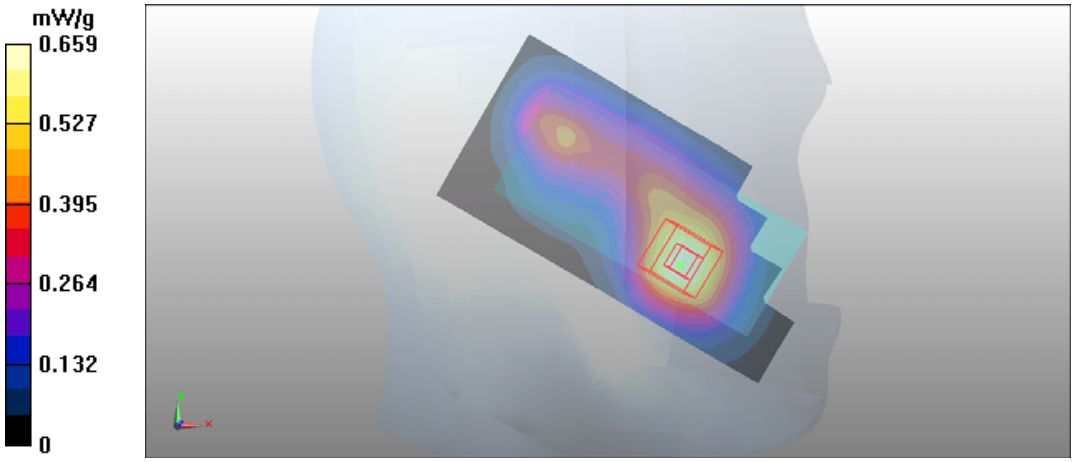
DASY4 Configuration:
- Probe: ES3DV3 - SN3131, Probe: EX3DV4 - SN3573
- ConvF(4.86, 4.86, 4.86), ConvF(6.56, 6.56, 6.56); Calibrated: 2009-02-12, Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE4 Sn555; Calibrated: 2008-11-07, Calibrated: 2009-10-15
- Phantom: SAM 1, Phantom: SAM1; Type: Twin SAM 040 CA, Type: SAM; Serial: TP-1449, Serial: TP-1126
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek position - High/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm

Configuration/Cheek position - Low/Area Scan (6x10x1): Measurement grid: dx=15mm, dy=15mm

Motorola Fast SAR of Combined Scans: SAR(1 g) = 0.603 mW/g
SAR(10 g) = 0.354 mW/g

Maximum value of SAR (measured) = 0.659 mW/g



Date/Time: 2009-06-22 13:38:34, Date/Time: 2010-04-07 11:33:53

Test Laboratory: TCC Nokia
Type: RM-469; Serial: 355216030004124, Serial: 359327031409638

Communication System: 3-slot GPRS850, Communication System: WLAN2450
Frequency: 848.8 MHz, Frequency: 2412 MHz; Duty Cycle: 1:2.8, Duty Cycle: 1:1
Medium: BSL850, Medium: BSL2450; Medium Notes: t=20.8 C, Medium Notes: 20.7C
Medium parameters used: f = 849 MHz; σ = 1.01 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 2412 MHz; σ = 1.96 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

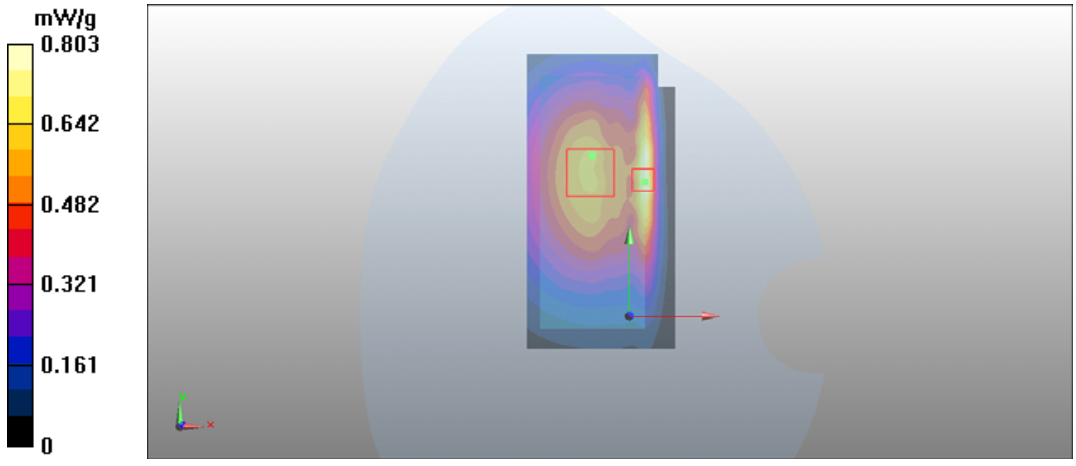
DASY4 Configuration:
- Probe: ET3DV6 - SN1395, Probe: EX3DV4 - SN3573
- ConvF(5.74, 5.74, 5.74), ConvF(6.63, 6.63, 6.63); Calibrated: 2008-07-17, Calibrated: 2009-11-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE4 Sn728, Electronics: DAE4 Sn555; Calibrated: 2009-02-09, Calibrated: 2009-10-15
- Phantom: SAM 1, Phantom: SAM2; Type: Twin SAM 040 CA, Type: ; Serial: TP-1179, Serial:
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - High - No Accessory - Back Facing Phantom/Area Scan (5x10x1): Measurement grid: dx=15mm, dy=15mm

Configuration/Body - Low - No Accessory - Back Facing Phantom/Area Scan (6x10x1): Measurement grid: dx=15mm, dy=15mm

Motorola Fast SAR of Combined Scans: SAR(1 g) = 0.589 mW/g
SAR(10 g) = 0.402 mW/g

Maximum value of SAR (measured) = 0.803 mW/g



Date/Time: 2010-04-07 11:33:53, Date/Time: 2009-10-14 11:57:57

Test Laboratory: TCC Nokia

Type: RM-469, Type: RM-481; Serial: 359327031409638, Serial: 004401/10/586237/5

Communication System: WLAN2450, Communication System: 3-slot GPRS1900
Frequency: 2412 MHz, Frequency: 1909.8 MHz; Duty Cycle: 1:1, Duty Cycle: 1:2.8
Medium: BSL2450, Medium: BSL1900; Medium Notes: 20.7C, Medium Notes: 20,0 C
Medium parameters used: f = 2412 MHz; σ = 1.96 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 1910 MHz; σ = 1.55 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

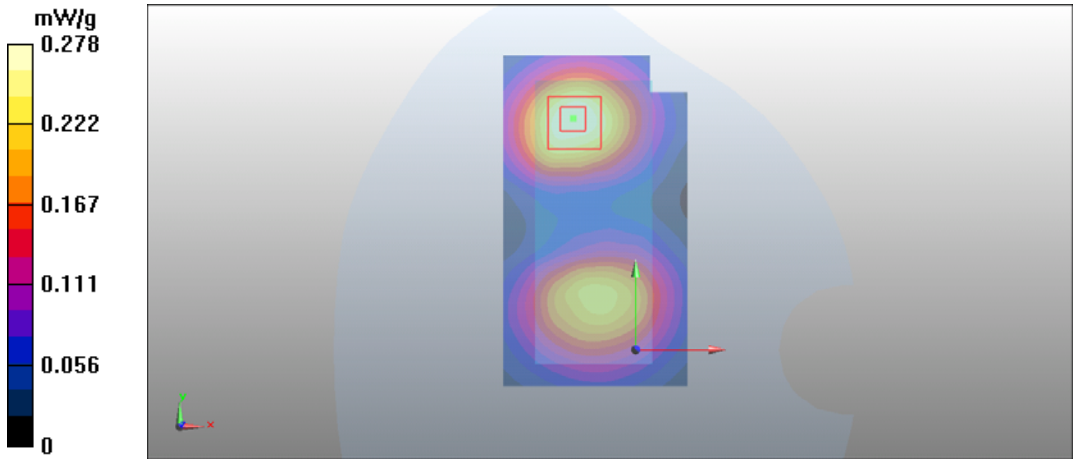
DASY4 Configuration:
- Probe: EX3DV4 - SN3573, Probe: ES3DV3 - SN3165
- ConvF(6.63, 6.63, 6.63), ConvF(4.6, 4.6, 4.6); Calibrated: 2009-11-20, Calibrated: 2009-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE4 Sn555, Electronics: DAE4 Sn793; Calibrated: 2009-10-15, Calibrated: 2009-05-15
- Phantom: SAM2, Phantom: SAM 3; Type:, Type: Twin SAM 040 CA; Serial:, Serial: TP-1179
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Low - No Accessory - Back Facing Phantom/Area Scan (6x10x1): Measurement grid: dx=15mm, dy=15mm

Configuration/Body - High - No Accessory - Back Facing Phantom/Area Scan (6x10x1): Measurement grid: dx=15mm, dy=15mm

Motorola Fast SAR of Combined Scans: SAR(1 g) = 0.261 mW/g
SAR(10 g) = 0.157 mW/g

Maximum value of SAR (measured) = 0.278 mW/g



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

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

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

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

Accreditation No.: SCS 108

Client Nokia Salo TCC

Certificate No: EX3-3573_Nov09

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3573

Calibration procedure(s): QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes

Calibration date: November 20, 2009

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep09)	Sep-10

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-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Marcel Fehr	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 23, 2009

DASY - Parameters of Probe: EX3DV4 SN:3573

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.47	0.43	0.54	± 10.1%
DCP (mV)[B]	92.9	93.4	92.6	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300	± 1.5%
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

DASY - Parameters of Probe: EX3DV4 SN:3573

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	8.56	8.56	8.56	0.58	0.68 ± 11.0%
1750	± 50 / ± 100	40.1 ± 5%	1.37 ± 5%	7.41	7.41	7.41	0.69	0.63 ± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	7.16	7.16	7.16	0.60	0.68 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	6.56	6.56	6.56	0.37	0.84 ± 11.0%

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

DASY - Parameters of Probe: EX3DV4 SN:3573

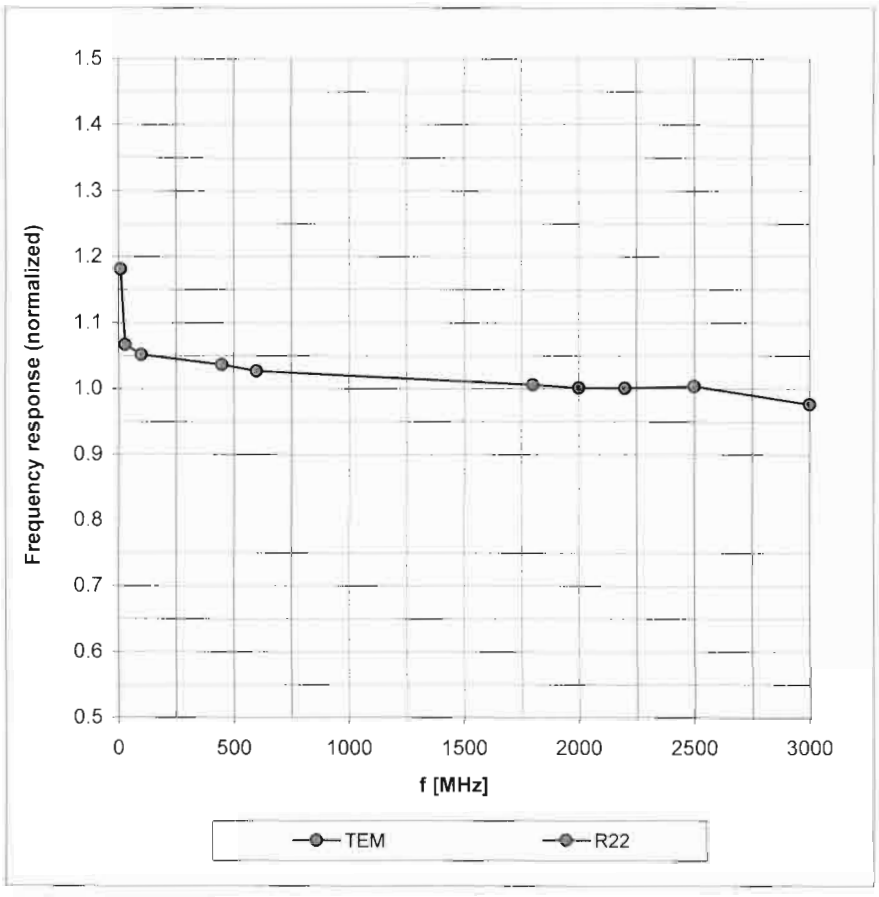
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	8.42	8.42	8.42	0.70	0.71 ± 11.0%
1750	± 50 / ± 100	53.4 ± 5%	1.49 ± 5%	7.20	7.20	7.20	0.75	0.64 ± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	6.83	6.83	6.83	0.61	0.63 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	6.63	6.63	6.63	0.40	0.85 ± 11.0%

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

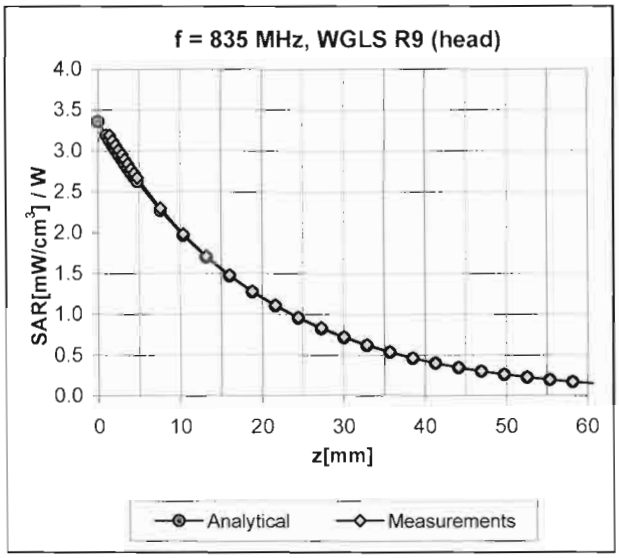
Frequency Response of E-Field

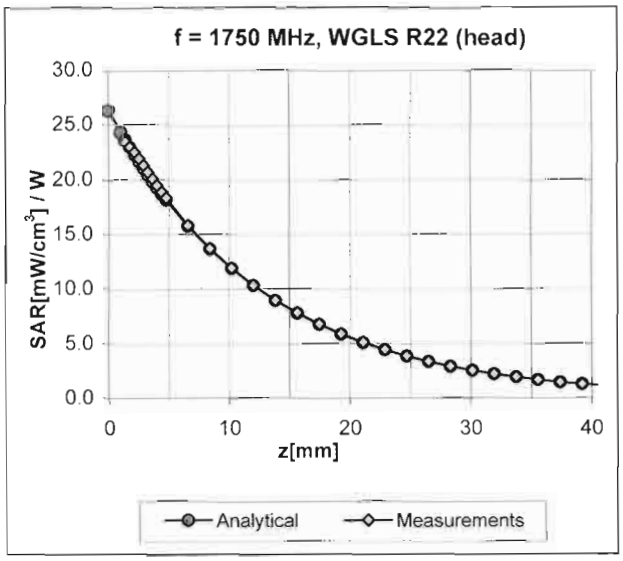
(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

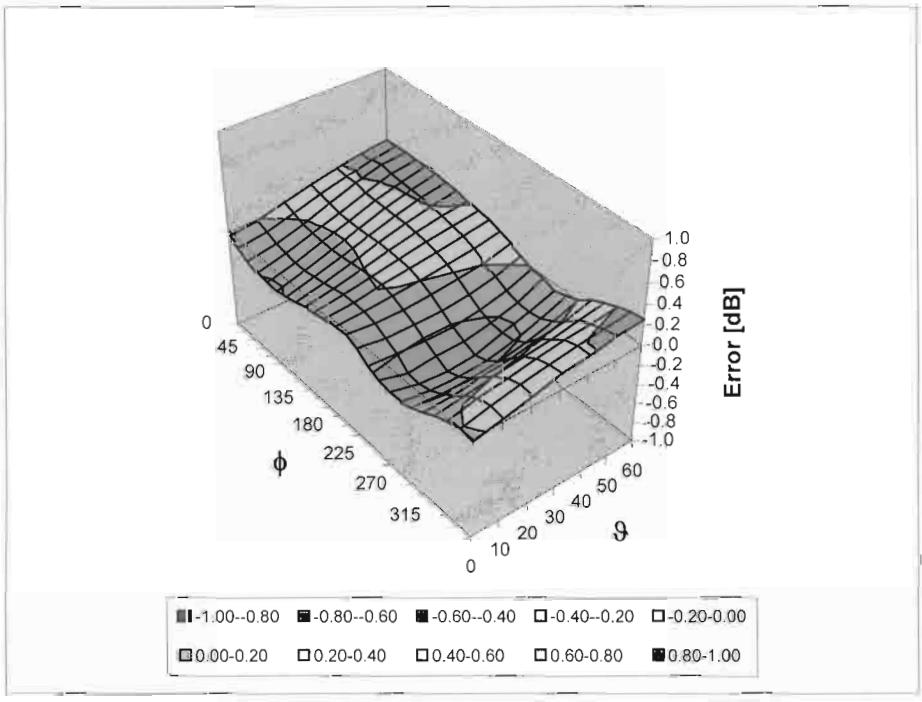
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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

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

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

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

Accreditation No.: SCS 108

Client **Nokia Salo TCC**

Certificate No: D2450V2-749_Oct09

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 749

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

Calibration date: October 21, 2009

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-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	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

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

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

Issued: October 22, 2009

DASY5 Validation Report for Head TSL

Date/Time: 21.10.2009 11:01:04

Test Laboratory: SPEAG, Zurich, Switzerland

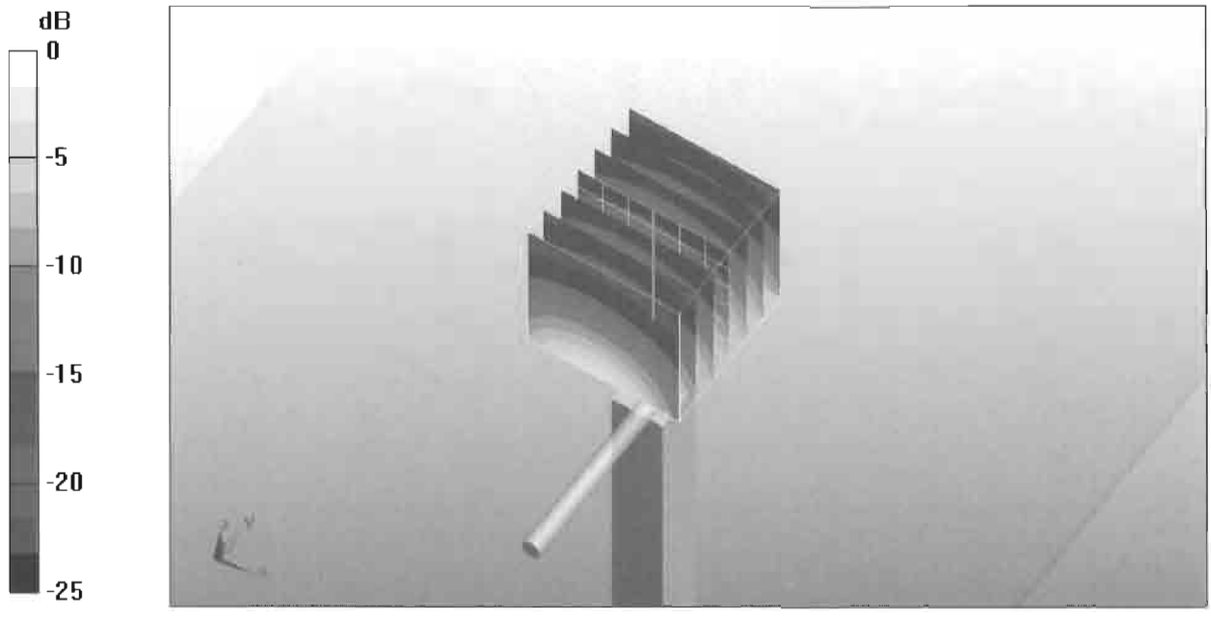
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:749

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U11 BB
Medium parameters used: f = 2450 MHz; σ = 1.78 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- 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 = 100.7 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 26.8 W/kg
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.18 mW/g
Maximum value of SAR (measured) = 16.9 mW/g



0 dB = 16.9mW/g

DASY5 Validation Report for Body

Date/Time: 21.10.2009 12:07:58

Test Laboratory: SPEAG, Zurich, Switzerland

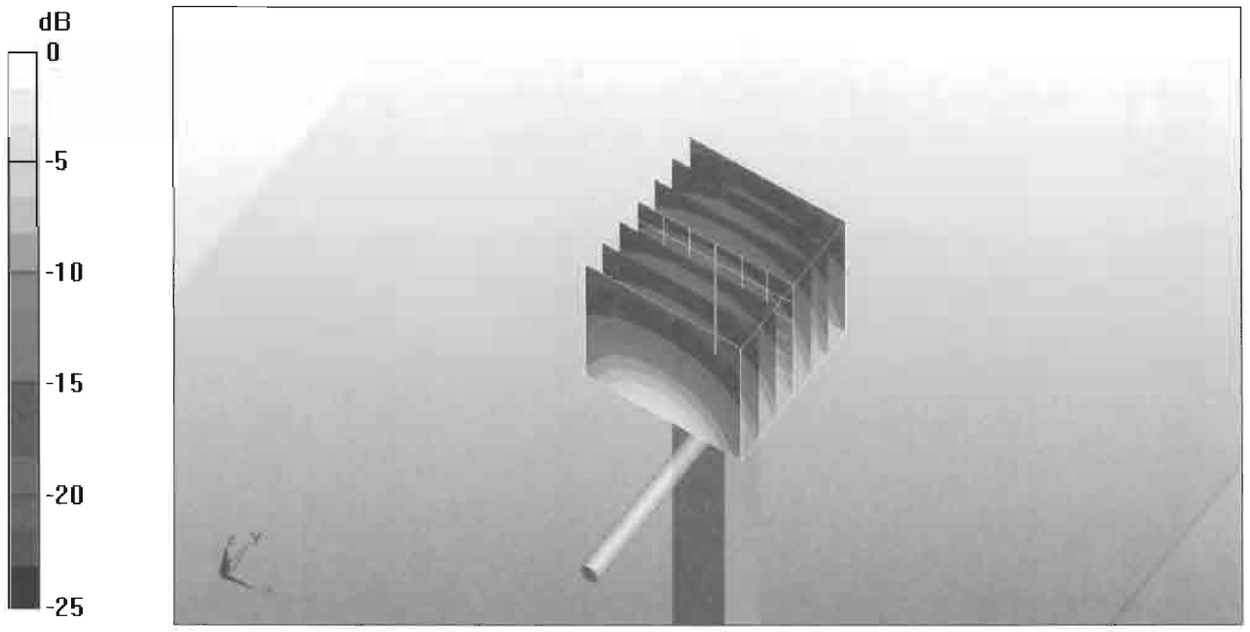
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:749

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL U10 BB
Medium parameters used: f = 2450 MHz; σ = 1.98 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- 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 = 93.9 V/m; Power Drift = 0.046 dB
Peak SAR (extrapolated) = 25.8 W/kg
SAR(1 g) = 12.5 mW/g; SAR(10 g) = 5.81 mW/g
Maximum value of SAR (measured) = 16.4 mW/g



0 dB = 16.4mW/g