TCC

Nokia

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

SAR Compliance Test Report

Test report no.:	FCC_RM-768_03	**Date of report:**	2012-03-16
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Measurements made by:	Zhang Luwen, Liu Xianchao		
Tested device:	RM-768		
FCC ID:	QTLRM-768	**IC:**	-
Supplement reports:	SAR_Photo_RM-768_04		

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	2012-03-15 to 2012-03-21
SN, HW and SW numbers of tested device	SN: 004402/13/740535/7, HW: 0302, SW: ga12w09.2, DUT: 52560
Batteries used in testing	BL-4U, DUT: 52562
Headsets used in testing	WH-102, DUT:52541
Other accessories used in testing	-
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

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

1.2.1 Head Configuration

Mode	Ch / *f*(MHz)	Conducted power	Position	Measured SAR value (1g avg)	Scaled* SAR Value (1g avg)	SAR limit (1g avg)	Result
GSM850	251 / 848.8	32.5 dBm	Left, Cheek	0.830 W/kg	**0.93 W/kg**	1.6 W/kg	PASSED
GSM1900	661 / 1880.0	30.5 dBm	Left, Cheek	0.941 W/kg	**1.05 W/kg**	1.6 W/kg	PASSED
WLAN2450	11 / 2462.0	15.98 dBm	Right, Cheek	0.515 W/kg	**0.58 W/kg**	1.6 W/kg	PASSED
GSM850 + WLAN2450	-	-	Left, Cheek	0.830 W/kg	**0.93 W/kg**	1.6 W/kg	PASSED
GSM1900 + WLAN2450	-	-	Right, Cheek	0.946 W/kg	**1.06 W/kg**	1.6 W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Ch / *f*(MHz)	Conducted power	Separation distance	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
GSM850	190 / 836.6	32.5 dBm	1.5 cm	0.665 W/kg	**0.74 W/kg**	1.6 W/kg	PASSED
GSM1900	810 / 1909.8	30.5 dBm	1.5 cm	0.413 W/kg	**0.46 W/kg**	1.6 W/kg	PASSED
WLAN2450	11 / 2462.0	15.98 dBm	1.5 cm	0.138 W/kg	**0.15 W/kg**	1.6 W/kg	PASSED
GSM850 + WLAN2450	-	-	1.5 cm	0.714 W/kg	**0.80 W/kg**	1.6 W/kg	PASSED
GSM1900 + WLAN2450	-	-	1.5 cm	0.463 W/kg	**0.52 W/kg**	1.6 W/kg	PASSED

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

1.2.3 Summary SAR data

		FCC-defined SAR values for the Grants of Equipment Authorization
Maximum Cellular/AWS/PCS Head SAR value		**1.05W/kg**
Maximum WLAN Head SAR value		0.58W/kg
{Max + Max} Simultaneous Head SAR value	1.63W/kg†	
Maximum Cellular/AWS/PCS Body SAR value		**0.74W/kg**
Maximum WLAN Body SAR value		0.15W/kg
{Max + Max} Simultaneous Body SAR value	0.89W/kg	
Maximum Product Specific (Wireless Router) SAR value		**-**
Maximum Simultaneous SAR value		**1.04W/kg**††

† The {Max + Max} Simultaneous Head SAR value given is > 1.6W/kg; however this combination of SAR values (GSM1900 Left Cheek + WLAN2450 Right Cheek) cannot occur in practice as the test positions are different. The highest possible {Max + Max} Simultaneous Head SAR is for Right Cheek position (see the Max + Max combined results in Section 7); it's value is 1.447W/kg, which scales to 1.62W/kg. As the separation distance between the SAR peaks is 5.66 cm, the Antenna Pair SAR to Peak Separation Ratio is 1.62/5.66 = 0.28 < 0.3; hence Simultaneous Transmission Procedures as described in KDB648474 are not required.

†† From Section 7: The highest {max + max} Head SAR value is 1.447W/kg (0.932W/kg for GSM1900, 0.515W/kg for WLAN2450) which scales to 1.62W/kg. However, Simultaneous Transmission Procedures do not apply for the reasons given above. The highest {max + max} Body SAR value is 0.803W/kg (0.665W/kg for GSM850, 0.138W/kg for WLAN2450) which scales to 0.90W/kg. Therefore the value quoted here is the highest stand-alone Head SAR value within the 1.447W/kg value i.e. 0.932W/kg for GSM1900; this scales up to 1.04W/kg.

1.2.4 Maximum Drift

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

1.2.5 Measurement Uncertainty

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

2. DESCRIPTION OF THE DEVICE UNDER TEST

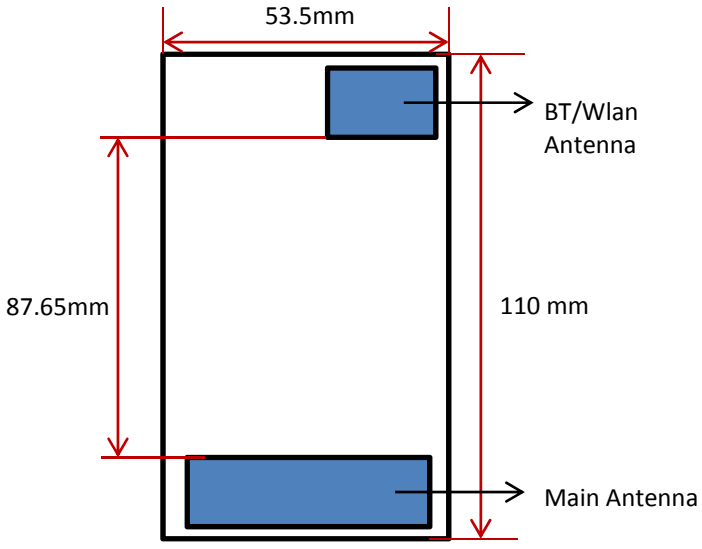
Device category	Portable
Exposure environment	General population / uncontrolled

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 4/8	824 – 849 1850 – 1910
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

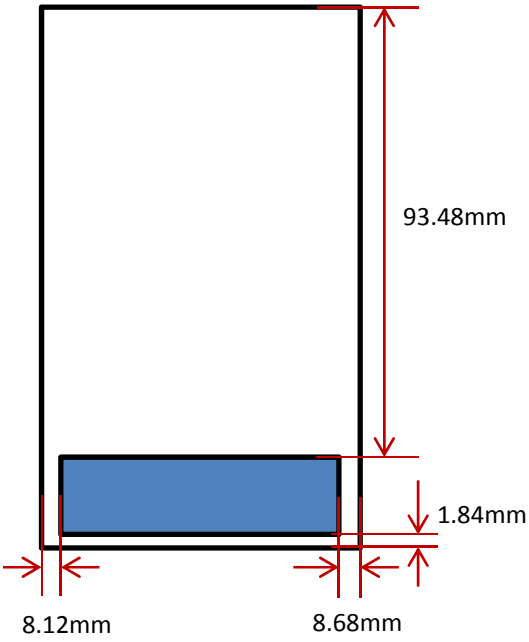
This is a BT Class 1 device; as its power tuning target is 6dBm (4mW), SAR testing was deemed unnecessary.

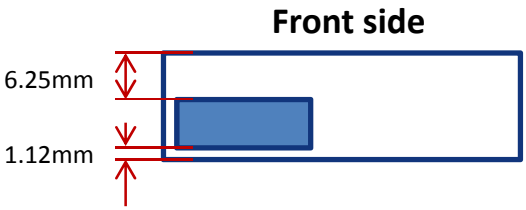
2.1 Description of the Antenna

The device has 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.

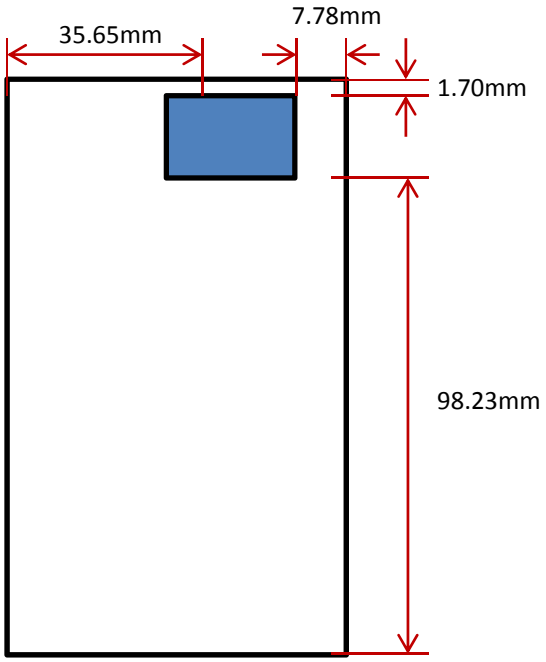


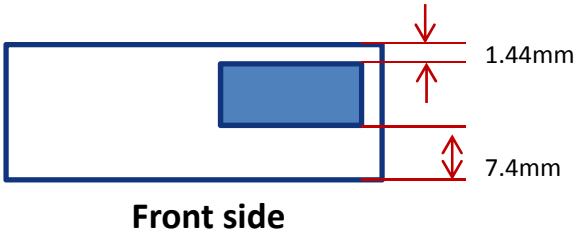
Cellular/PCS Antenna Radiator Distances to Device Edges and Faces





WLAN Antenna Radiator Distances to Device Edges and Faces





3. TEST CONDITIONS

3.1 Temperature and Humidity

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

3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester except for testing WLAN2450 where control software was used. Communication between the device and the call tester was established by air link.

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

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

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

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

The transmission mode of the device in all WLAN b-mode tests was DSSS QPSK 1Mbps. This mode was within 0.25dB of the highest time-averaged output power of all the WLAN b and g modulation modes in this device as illustrated in table below.

	Measured averaged powers				
Modulation mode	**Ch 1**	**Ch 2**	**Ch 6**	**Ch 10**	**Ch 11**
b-mode WLAN DSSS 1 Mbps	15.5	-	15.8	-	15.98
b-mode WLAN DSSS 2 Mbps	15.51	-	15.84	-	16.05
b-mode WLAN DSSS 5.5 Mbps	15.39	-	15.6	-	15.83
b-mode WLAN DSSS 11 Mbps	15.24	-	15.5	-	15.77
g-mode WLAN OFDM 6 Mbps	11.58	15.28	15.39	15.44	13.54
g-mode WLAN OFDM 9 Mbps	11.5	15.15	15.3	15.42	13.46
g-mode WLAN OFDM 12 Mbps	11.41	15.14	15.26	15.34	13.4
g-mode WLAN OFDM 18 Mbps	11.3	15.02	15.09	15.18	13.32
g-mode WLAN OFDM 24 Mbps	11.13	14.77	14.91	15.02	13.14
g-mode WLAN OFDM 36 Mbps	10.99	14.64	14.74	14.92	12.94
g-mode WLAN OFDM 48 Mbps	10.71	12.76	12.99	13	12.89
g-mode WLAN OFDM 54 Mbps	10.59	12.65	12.81	12.99	12.53

3.3 Test Cases and Test Minimisation

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

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

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

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

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

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

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

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

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

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration date	Calibration expiry
DAE 4	1319	2012-02	2013-02
DAE 4	860	2011-10	2012-10
E-field Probe EX3DV4	3836	2012-02	2013-02
E-field Probe EX3DV4	3574	2011-10	2012-10
Dipole Validation Kit, D835V2	479	2011-03	2013-03
Dipole Validation Kit, D1900V2	547	2011-10	2013-10
Dipole Validation Kit, D2450V2	883	2012-02	2014-02
Dipole Validation Kit, D2450V2	760	2011-03	2013-03
DASY4 software	Version 4.7	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration date	Calibration expiry
Signal Generator	E4432B	US40052231	2011-05	2012-05
Call Tester	CMU200	835352/008	-	-
Amplifier	AR 5S1G4M3	302339	2011-05	2012-05
RF Network Analyzer	8753ES	My40002096	2011-05	2012-05
Dielectric Probe Kit	85070C	01033717	-	-
Power Meter	Agilent E4419B	My41291520	2011-05	2012-05
Power Sensor	Agilent 8482A	US37295411	2011-05	2012-05

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 at least 15.0 cm measured from the ear reference point during system checking and device measurements.

4.3.1 Tissue Simulant Recipes

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

800MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	39.74	55.97
HEC	0.25	1.21
Sugar	58.31	41.76
Preservative	0.15	0.27
Salt	1.55	0.79

1900MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	54.50	70.25
Tween 20	45.23	29.41
Salt	0.27	0.34

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]
			ε_r	σ [S/m]	
	Reference result ± 10% window	2.39 2.15 – 2.63	41.0	0.89	
	IEEE1528 / IEC62209 Standard targets		41.5	0.90	
835	2012-03-16	2.42	40.6	0.87	21.4
	Reference result ± 10% window	10.4 9.4 – 11.4	39.5	1.43	
	IEEE1528 / IEC62209 Standard targets		40.0	1.40	
1900	2012-03-15	9.97	38.0	1.46	22.3
	Reference result ± 10% window	13.8 12.4 – 15.2	38.9	1.86	
2450	IEEE1528 / IEC62209 Standard targets		39.2	1.80	
	2012-03-20	12.6	37.9	1.79	21.6

System checking, body tissue simulant

f[MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
	Reference result ± 10% window	2.52 2.27 – 2.77	54.3	0.99	
835	FCC Supplement C / RSS-102		55.2	0.97	
	2012-03-19	2.47	54.4	0.97	21.6
	Reference result ± 10% window	10.6 9.5 – 11.7	54.2	1.59	
	FCC Supplement C / RSS-102		53.3	1.52	
1900	2012-03-19	9.72	52.1	1.55	21.6
	Reference result ± 10% window	13.3 12.0 – 14.6	51.7	1.93	
	FCC Supplement C / RSS-102		52.7	1.95	
2450	2012-03-21	12.0	51.9	1.87	21.3

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

4.3.3 Tissue Simulants used in the Measurements

Head tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
836	Recommended value	41.5	0.90	
	± 5% window	39.4 – 43.6	0.86 – 0.95	
	2012-03-16	40.7	0.87	21.4
1880	Recommended value	40.0	1.40	
	± 5% window	38.0 – 42.0	1.33 – 1.47	
	2012-03-15	38.1	1.44	22.3
2437	Recommended value	39.2	1.79	
	± 5% window	37.3 – 41.2	1.70 – 1.88	
	2012-03-20	37.9	1.77	21.6

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
836	Recommended value	55.2	0.97	
	± 5% window	52.4 – 58.0	0.92 – 1.02	
	2012-03-19	54.4	0.97	21.6
1880	Recommended value	53.3	1.52	
	± 5% window	50.6 – 56.0	1.44 – 1.60	
	2012-03-19	52.1	1.53	21.6
2437	Recommended value	52.7	1.94	
	± 5% window	50.1 – 55.3	1.85 – 2.04	
	2012-03-21	52.0	1.85	21.3

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

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

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

Device holder supplied by SPEAG

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

Nokia spacer

5.2 Test Positions

5.2.1 Against Phantom Head

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

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

5.2.2 Body Worn Configuration

The device was placed in the SPEAG holder using the Nokia spacer and placed below the flat section of the phantom. The distance between the device and the phantom was kept at the

separation distance indicated in Section 1.2.2 using a separate flat spacer that was removed before the start of the measurements. The device was oriented with both sides facing the phantom to find the highest results.

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

5.3 Scan Procedures

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

5.4 SAR Averaging Methods

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

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

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

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

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

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

7. RESULTS

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

850MHz Head SAR results

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
GSM	Conducted Power		32.5 dbm	32.5 dbm	32.5 dbm
	Left	Cheek	0.721	0.793	**0.830**
		Tilt	-	0.439	-
	Right	Cheek	-	0.696	-
		Tilt	-	0.443	-

1900MHz Head SAR results

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
GSM	Conducted Power		30.5 dbm	30.5 dbm	30.5 dbm
	Left	Cheek	0.913	**0.941**	0.886
		Tilt	-	0.434	-
	Right	Cheek	0.890	0.932	0.842
		Tilt	-	0.529	-

2450MHz Head SAR results

Mode	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 1 2412.0 MHz	Ch 6 2437.0 MHz	Ch 11 2462.0 MHz
WLAN b-mode	Conducted Power		15.50 dBm	15.80 dBm	15.98 dBm
DSSS 1 Mbps	Left	Cheek	-	0.340	-
		Tilt	-	0.460	-
	Right	Cheek	0.480	0.478	**0.515**
		Tilt	-	0.458	-

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
GSM		Conducted Power	32.5 dbm	32.5 dbm	32.5 dbm
	Display facing phantom	Without headset	-	0.522	-
		Headset WH-102	-	0.363	-
	Back facing phantom	Without headset	0.590	**0.665**	0.569
		Headset WH-102	-	0.599	-
2-slot GPRS		Conducted Power	-	29.5 dbm	-
	Display facing phantom	Without headset	-	0.504	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-
3-slot GPRS		Conducted Power	-	27.7 dbm	-
	Display facing phantom	Without headset	-	0.511	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-
4-slot GPRS		Conducted Power	-	26.5 dbm	-
	Display facing phantom	Without headset	-	0.517	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-

1900MHz Body SAR results

Mode	Device orientation	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
GSM		Conducted Power	30.5 dbm	30.5 dbm	30.5 dbm
	Display facing phantom	Without headset	-	0.359	-
		Headset WH-102	-	0.323	-
	Back facing phantom	Without headset	0.377	0.411	**0.413**
		Headset WH-102	-	0.375	-
2-slot GPRS		Conducted Power		27.5 dbm	
	Display facing phantom	Without headset	-	0.348	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-
3-slot GPRS		Conducted Power	-	25.7 dbm	-
	Display facing phantom	Without headset	-	0.345	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-
4-slot GPRS		Conducted Power	-	24.5 dbm	-
	Display facing phantom	Without headset	-	0.346	-
		Headset WH-102	-	-	-
	Back facing phantom	Without headset	-	-	-
		Headset WH-102	-	-	-

2450MHz Body SAR results

Mode	Device orientation	Test configuration	SAR, averaged over 1g (W/kg)		
			Ch 1 2412.0 MHz	Ch 6 2437.0 MHz	Ch 11 2462.0 MHz
WLAN b-mode		Conducted Power	15.50 dBm	15.80 dBm	15.98 dBm
DSSS 1 Mbps	Display facing phantom	Without headset	-	0.095	-
		Headset WH-102	-	0.088	-
	Back facing Phantom	Without headset	0.122	0.131	**0.138**
		Headset WH-102	-	0.131	-

Simultaneous transmissions: Combined SAR results – Individual band Max results

Test configuration	Max. 1g SAR results		
	WLAN	GSM 850	GSM 1900
Head: Left, Cheek	0.340	0.830	0.941
Head: Left, Tilt	0.460	0.439	0.434
Head: Right, Cheek	0.515	0.696	0.932
Head: Right, Tilt	0.458	0.443	0.529
Body: Display facing phantom, Without Headset	0.095	0.522	0.359
Body: Display facing phantom, Headset WH-102	0.088	0.363	0.323
Body: Back facing phantom, Without Headset	0.138	0.665	0.413
Body: Back facing phantom, Headset WH-102	0.131	0.599	0.375

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

Test configuration	Max. 1g SAR results	
	GSM 850 + WLAN	GSM 1900 + WLAN
Head: Left, Cheek	1.170	1.281
Head: Left, Tilt	0.899	0.894
Head: Right, Cheek	**1.211**	**1.447**†
Head: Right, Tilt	0.901	0.987
Body: Display facing phantom, Without Headset	0.617	0.454
Body: Display facing phantom, Headset WH-102	0.451	0.411
Body: Back facing phantom, Without Headset	**0.803**	**0.551**
Body: Back facing phantom, Headset WH-102	0.730	0.506

† When scaled up by 12%, this 1.447W/kg value becomes 1.62W/kg. However, the separation distance between the SAR peaks is 5.66 cm, the Antenna Pair SAR to Peak Separation Ratio is 1.62/5.66 = 0.28 i.e. < 0.3 and therefore Simultaneous Transmission Procedures as described in KDB648474 are not required.

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	
	GSM 850 + WLAN	GSM 1900 + WLAN
Head: Left, Cheek	-	-
Head: Left, Tilt	-	-
Head: Right, Cheek	**0.739**	**0.946**
Head: Right, Tilt	-	-
Body: Display facing phantom, Without Headset	-	-
Body: Display facing phantom, Headset WH-102	-	-
Body: Back facing phantom, Without Headset	**0.714**	**0.463**
Body: Back facing phantom, Headset WH-102	-	-

Some of the Combined SAR values in the above table are less than the maximum SAR values for the contributing cellular band. This is due to a) minimal overlap of the SAR distributions of the cellular band with WLAN2450 and b) uncertainties associated with the different methods of calculation. In these cases, the maximum SAR values given for the combined Modes in the Summary table in Section 1.2 are those for the individual cellular band.

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: 2012-03-16 9:47:44

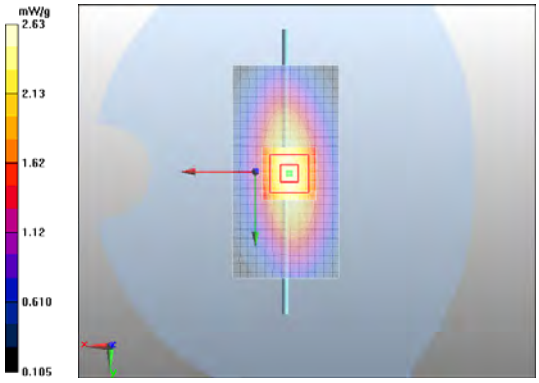
Test Laboratory: TCC Nokia
Type: D835V2; Serial: 479

Communication System: CW850
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Head 835; Medium Notes: Medium Temperature: t= 21.4 C
Medium parameters used: f = 835 MHz; σ = 0.87 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.63 mW/g

Configuration/d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.2 V/m
Peak SAR (extrapolated) = 3.65 W/kg
SAR(1 g) = 2.42 mW/g
SAR(10 g) = 1.59 mW/g
Power Drift = -0.148 dB
Maximum value of SAR (measured) = 2.62 mW/g



Date/Time: 2012-03-15 9:32:01

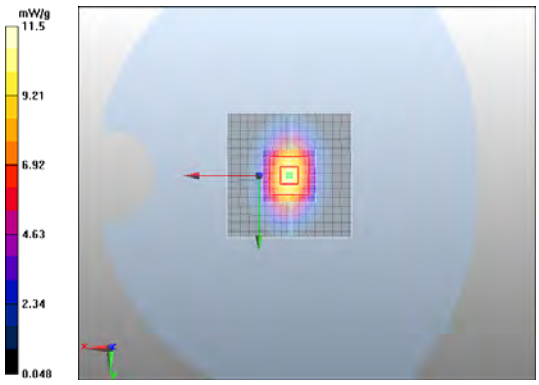
Test Laboratory: TCC Nokia
Type: D1900V2; Serial: 547

Communication System: CW1900
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: Head 1900; Medium Notes: Medium Temperature: t=22.3C
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.66, 7.66, 7.66); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM4; Type: SAM; Serial: TP - 1427
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.5 mW/g

Configuration/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.6 V/m
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 9.97 mW/g
SAR(10 g) = 5.13 mW/g
Power Drift = -0.116 dB
Maximum value of SAR (measured) = 11.2 mW/g



Date/Time: 2012-03-20 9:43:46

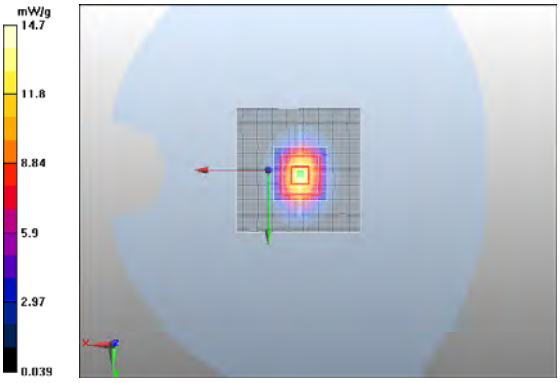
Test Laboratory: TCC Nokia
Type: D2450V2; Serial: D2450V2 - SN:883

Communication System: CW2450
Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Head 2450; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 2450 MHz; σ = 1.79 mho/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.71, 6.71, 6.71); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM5; Type: SAM; Serial: TP - 1178
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 14.7 mW/g

Configuration/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.5 V/m
Peak SAR (extrapolated) = 27.3 W/kg
SAR(1 g) = 12.6 mW/g
SAR(10 g) = 5.73 mW/g
Power Drift = 0.037 dB
Maximum value of SAR (measured) = 14.3 mW/g



Date/Time: 2012-03-19 9:31:18

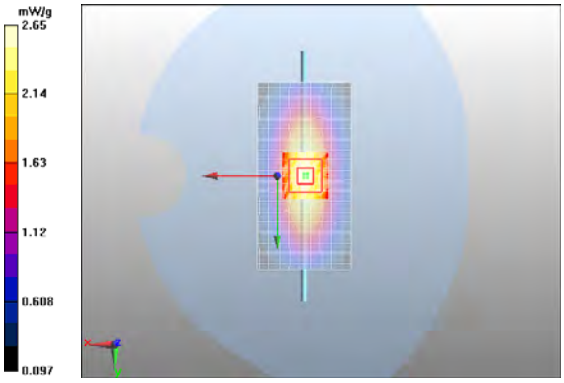
Test Laboratory: TCC Nokia
Type: D835V2; Serial: 479

Communication System: CW850
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Body 835; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 835 MHz; σ = 0.971 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.83, 8.83, 8.83); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.65 mW/g

Configuration/d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.7 V/m
Peak SAR (extrapolated) = 3.66 W/kg
SAR(1 g) = 2.47 mW/g
SAR(10 g) = 1.63 mW/g
Power Drift = -0.103 dB
Maximum value of SAR (measured) = 2.66 mW/g



Date/Time: 2012-03-19 13:14:13

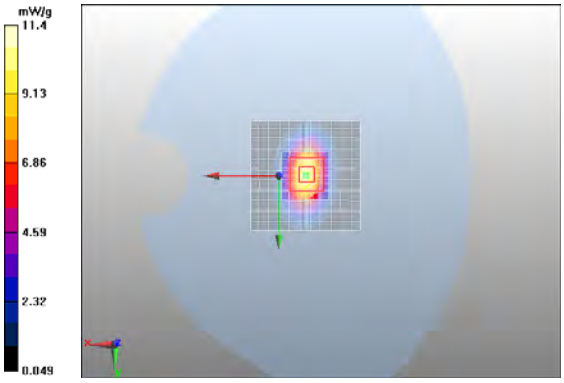
Test Laboratory: TCC Nokia
Type: D1900V2; Serial: 547

Communication System: CW1900
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.2, 7.2, 7.2); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM3; Type: SAM; Serial: TP - 1567
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.4 mW/g

Configuration/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.9 V/m
Peak SAR (extrapolated) = 17.8 W/kg
SAR(1 g) = 9.72 mW/g
SAR(10 g) = 5.07 mW/g
Power Drift = -0.117 dB
Maximum value of SAR (measured) = 10.9 mW/g



Date/Time: 2012-03-21 9:55:54

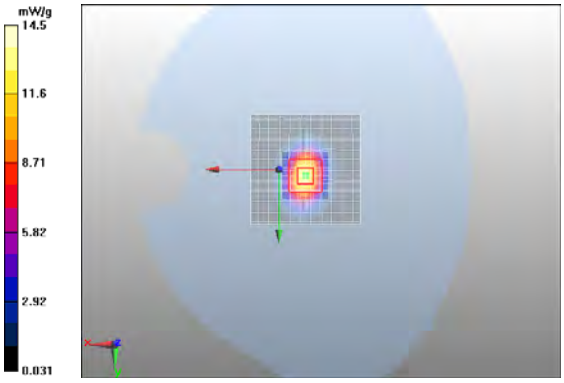
Test Laboratory: TCC Nokia
Type: D2450V2; Serial: D2450V2 - SN:760

Communication System: CW2450
Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Body 2450; Medium Notes: Medium Temperature: t=21.3C
Medium parameters used: f = 2450 MHz; σ = 1.87 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.47, 6.47, 6.47); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM6; Type: SAM; Serial: TP - 1426
- ; SEMCAD X Version 14.0 Build 61

Configuration/d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 14.5 mW/g

Configuration/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86 V/m
Peak SAR (extrapolated) = 24 W/kg
SAR(1 g) = 12 mW/g
SAR(10 g) = 5.69 mW/g
Power Drift = -0.050 dB
Maximum value of SAR (measured) = 14 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 2012-03-16 10:28:53

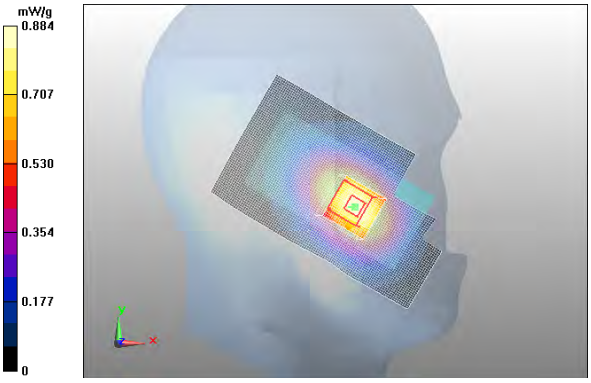
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

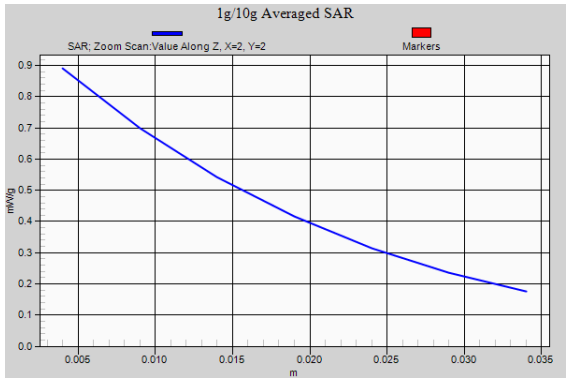
Communication System: GSM850
Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium: Head 835; Medium Notes: Medium Temperature: t= 21.4 C
Medium parameters used: f = 849 MHz; σ = 0.883 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - High/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.884 mW/g

Configuration/Cheek - High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.4 V/m
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.830 mW/g
SAR(10 g) = 0.599 mW/g
Power Drift = -0.172 dB
Maximum value of SAR (measured) = 0.891 mW/g





Date/Time: 2012-03-16 10:58:25

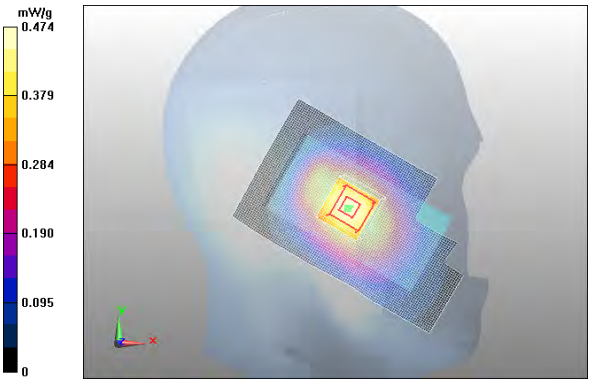
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 835; Medium Notes: Medium Temperature: t= 21.4 C
Medium parameters used: f = 837 MHz; σ = 0.872 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

Configuration/Tilt - Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.474 mW/g

Configuration/Tilt - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.2 V/m
Peak SAR (extrapolated) = 0.555 W/kg
SAR(1 g) = 0.439 mW/g
SAR(10 g) = 0.325 mW/g
Power Drift = -0.116 dB
Maximum value of SAR (measured) = 0.463 mW/g



Date/Time: 2012-03-16 11:11:18

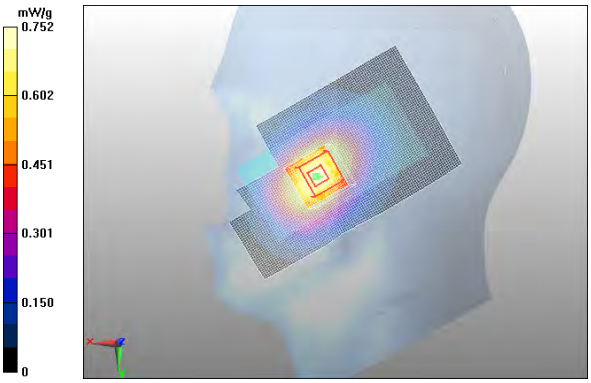
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 835; Medium Notes: Medium Temperature: t= 21.4 C
Medium parameters used: f = 837 MHz; σ = 0.872 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.752 mW/g

Configuration/Cheek - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.57 V/m
Peak SAR (extrapolated) = 0.886 W/kg
SAR(1 g) = 0.696 mW/g
SAR(10 g) = 0.503 mW/g
Power Drift = -0.066 dB
Maximum value of SAR (measured) = 0.739 mW/g



Date/Time: 2012-03-16 11:25:35

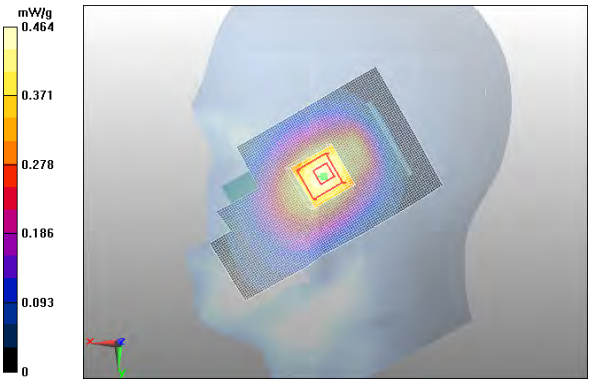
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 835; Medium Notes: Medium Temperature: t= 21.4 C
Medium parameters used: f = 837 MHz; σ = 0.872 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.54, 8.54, 8.54); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM1; Type: SAM; Serial: TP - 01097
- ; SEMCAD X Version 14.0 Build 61

Configuration/Tilt - Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.464 mW/g

Configuration/Tilt - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.2 V/m
Peak SAR (extrapolated) = 0.558 W/kg
SAR(1 g) = 0.443 mW/g
SAR(10 g) = 0.326 mW/g
Power Drift = -0.115 dB
Maximum value of SAR (measured) = 0.467 mW/g



Date/Time: 2012-03-15 9:54:47

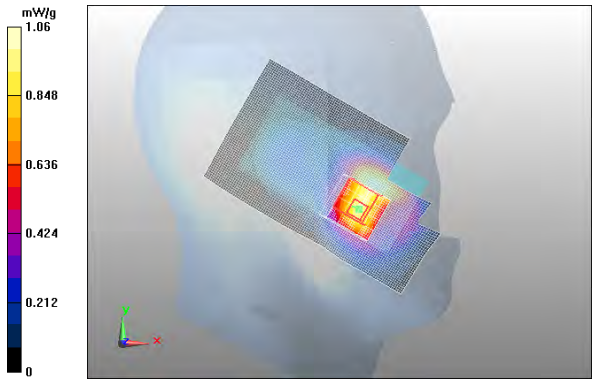
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

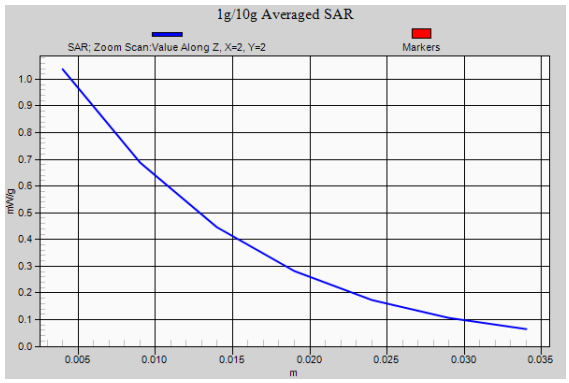
Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=22.3C
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.66, 7.66, 7.66); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM4; Type: SAM; Serial: TP - 1427
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.06 mW/g

Configuration/Cheek - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.9 V/m
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 0.941 mW/g
SAR(10 g) = 0.581 mW/g
Power Drift = -0.290 dB
Maximum value of SAR (measured) = 1.04 mW/g





Date/Time: 2012-03-15 10:35:51

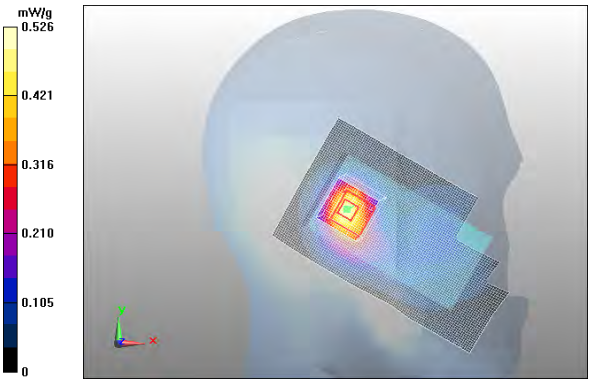
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=22.3C
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.66, 7.66, 7.66); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM4; Type: SAM; Serial: TP - 1427
- ; SEMCAD X Version 14.0 Build 61

Configuration/Tilt - Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.526 mW/g

Configuration/Tilt - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.1 V/m
Peak SAR (extrapolated) = 0.682 W/kg
SAR(1 g) = 0.434 mW/g
SAR(10 g) = 0.257 mW/g
Power Drift = -0.104 dB
Maximum value of SAR (measured) = 0.472 mW/g



Date/Time: 2012-03-15 10:49:35

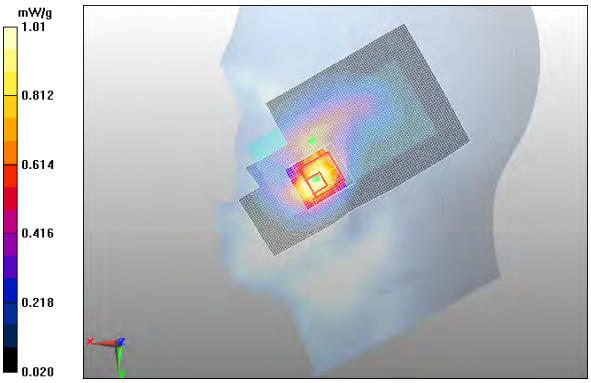
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=22.3C
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.66, 7.66, 7.66); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM4; Type: SAM; Serial: TP - 1427
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.07 mW/g

Configuration/Cheek - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 8.69 V/m
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 0.932 mW/g
SAR(10 g) = 0.515 mW/g
Power Drift = -0.156 dB
Maximum value of SAR (measured) = 1.01 mW/g



Date/Time: 2012-03-15 11:41:43

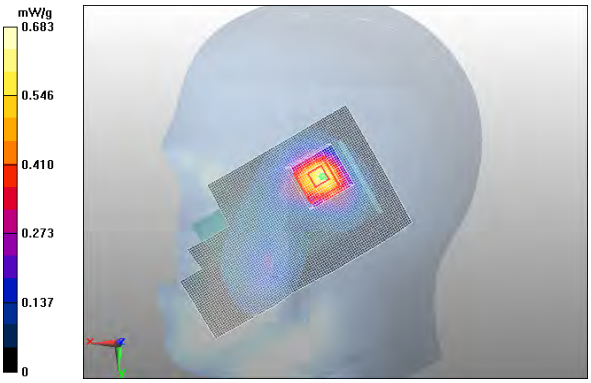
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=22.3C
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.66, 7.66, 7.66); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM4; Type: SAM; Serial: TP - 1427
- ; SEMCAD X Version 14.0 Build 61

Configuration/Tilt - Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.683 mW/g

Configuration/Tilt - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16 V/m
Peak SAR (extrapolated) = 0.859 W/kg
SAR(1 g) = 0.529 mW/g
SAR(10 g) = 0.304 mW/g
Power Drift = -0.049 dB
Maximum value of SAR (measured) = 0.576 mW/g



Date/Time: 2012-03-20 13:32:30

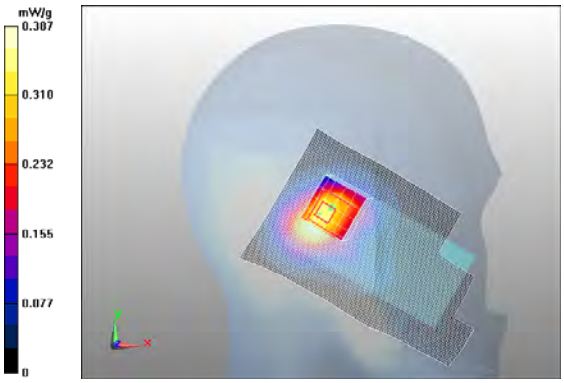
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: WLAN2450 b-mode
Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: Head 2450; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 2437 MHz; σ = 1.77 mho/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.71, 6.71, 6.71); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM5; Type: SAM; Serial: TP - 1178
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - Middle /Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.387 mW/g

Configuration/Cheek - Middle /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 14.5 V/m
Peak SAR (extrapolated) = 0.640 W/kg
SAR(1 g) = 0.340 mW/g
SAR(10 g) = 0.184 mW/g
Power Drift = 0.130 dB
Maximum value of SAR (measured) = 0.355 mW/g



Date/Time: 2012-03-20 13:48:16

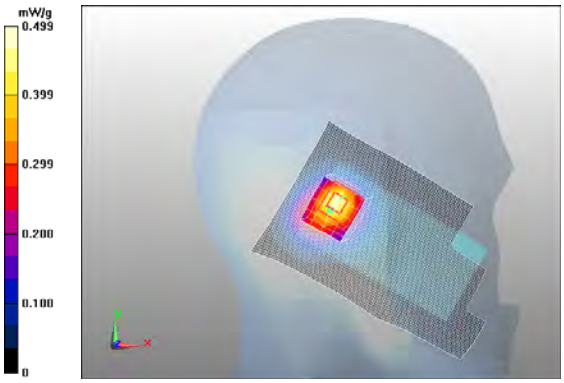
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: WLAN2450 b-mode
Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: Head 2450; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 2437 MHz; σ = 1.77 mho/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.71, 6.71, 6.71); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM5; Type: SAM; Serial: TP - 1178
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek – Tilt /Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.499 mW/g

Configuration/Cheek – Tilt /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17 V/m
Peak SAR (extrapolated) = 0.908 W/kg
SAR(1 g) = 0.460 mW/g
SAR(10 g) = 0.232 mW/g
Power Drift = -0.00347 dB
Maximum value of SAR (measured) = 0.498 mW/g



Date/Time: 2012-03-20 14:06:44

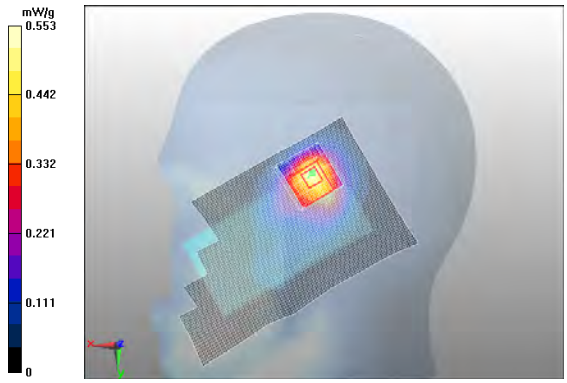
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

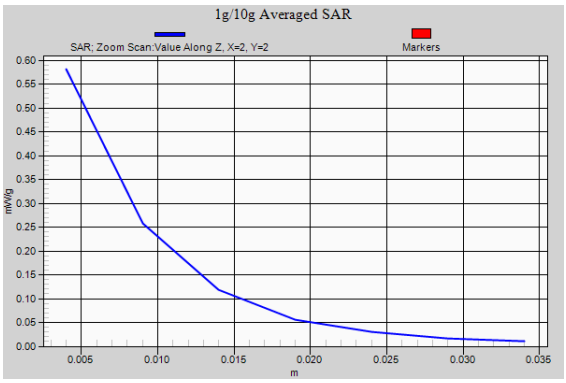
Communication System: WLAN2450 b-mode
Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: Head 2450; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 2462 MHz; σ = 1.81 mho/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.71, 6.71, 6.71); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM5; Type: SAM; Serial: TP - 1178
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - High /Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.553 mW/g

Configuration/Cheek - High /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.6 V/m
Peak SAR (extrapolated) = 1.2 W/kg
SAR(1 g) = 0.515 mW/g
SAR(10 g) = 0.247 mW/g
Power Drift = 0.233 dB
Maximum value of SAR (measured) = 0.581 mW/g





Date/Time: 2012-03-20 13:09:56

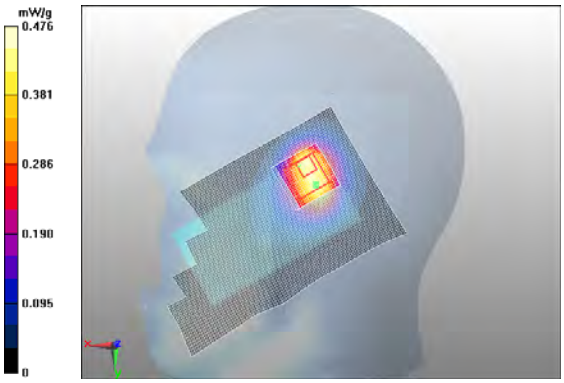
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: WLAN2450 b-mode
Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: Head 2450; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 2437 MHz; σ = 1.77 mho/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.71, 6.71, 6.71); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM5; Type: SAM; Serial: TP - 1178
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - Tilt /Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.476 mW/g

Configuration/Cheek - Tilt /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 13.6 V/m
Peak SAR (extrapolated) = 1.1 W/kg
SAR(1 g) = 0.458 mW/g
SAR(10 g) = 0.224 mW/g
Power Drift = 0.0068 dB
Maximum value of SAR (measured) = 0.500 mW/g



Date/Time: 2012-03-19 9:58:21

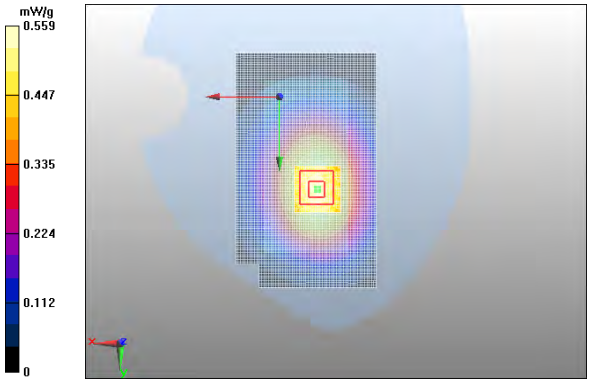
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Body 835; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.972 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.83, 8.83, 8.83); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.559 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.8 V/m
Peak SAR (extrapolated) = 0.670 W/kg
SAR(1 g) = 0.522 mW/g
SAR(10 g) = 0.387 mW/g
Power Drift = -0.298 dB
Maximum value of SAR (measured) = 0.549 mW/g



Date/Time: 2012-03-19 11:28:28

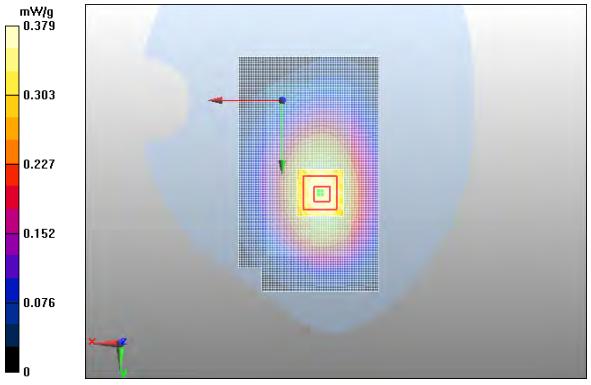
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Body 835; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.972 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.83, 8.83, 8.83); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.379 mW/g

Configuration/Body - Middle - WH-102 - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.91 V/m
Peak SAR (extrapolated) = 0.462 W/kg
SAR(1 g) = 0.363 mW/g
SAR(10 g) = 0.269 mW/g
Power Drift = -0.059 dB
Maximum value of SAR (measured) = 0.382 mW/g



Date/Time: 2012-03-19 11:39:43

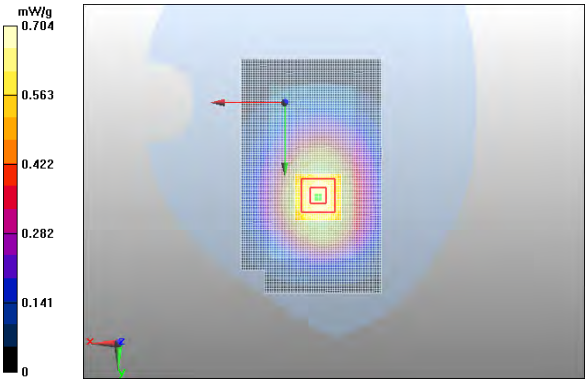
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

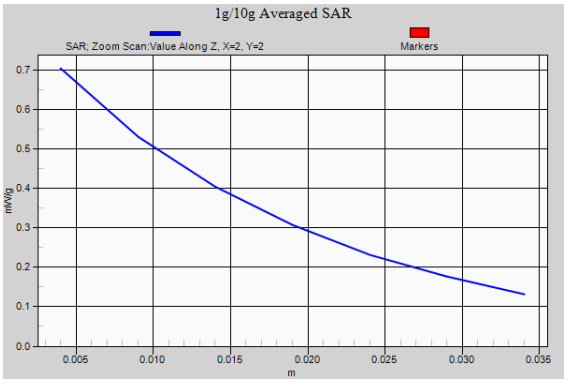
Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Body 835; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.972 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.83, 8.83, 8.83); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Back Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.704 mW/g

Configuration/Body - Middle - No Accessory - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11 V/m
Peak SAR (extrapolated) = 0.872 W/kg
SAR(1 g) = 0.665 mW/g
SAR(10 g) = 0.484 mW/g
Power Drift = 0.113 dB
Maximum value of SAR (measured) = 0.704 mW/g





Date/Time: 2012-03-19 11:53:36

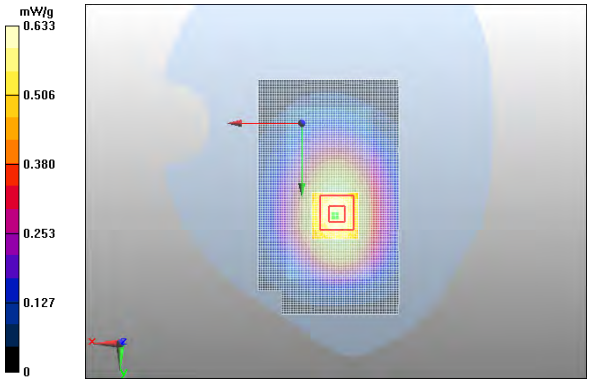
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Body 835; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.972 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.83, 8.83, 8.83); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Back Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.633 mW/g

Configuration/Body - Middle - WH-102 - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 12.4 V/m
Peak SAR (extrapolated) = 0.775 W/kg
SAR(1 g) = 0.599 mW/g
SAR(10 g) = 0.440 mW/g
Power Drift = 0.027 dB
Maximum value of SAR (measured) = 0.631 mW/g



Date/Time: 2012-03-19 16:09:43

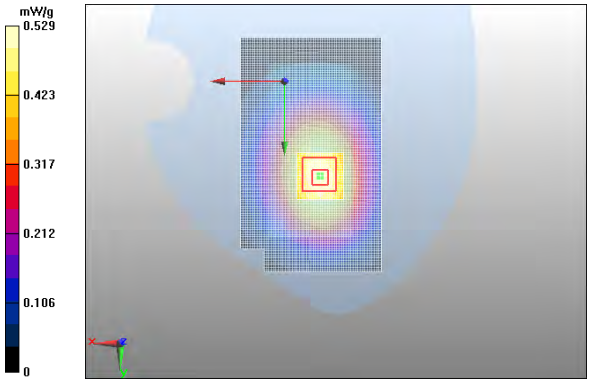
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Body 835; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.972 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.83, 8.83, 8.83); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.529 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.77 V/m
Peak SAR (extrapolated) = 0.649 W/kg
SAR(1 g) = 0.504 mW/g
SAR(10 g) = 0.373 mW/g
Power Drift = 0.024 dB
Maximum value of SAR (measured) = 0.531 mW/g



Date/Time: 2012-03-19 10:48:56

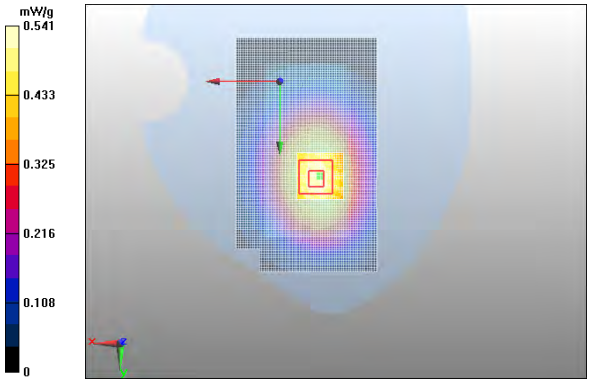
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: 3-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:2.8
Medium: Body 835; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.972 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.83, 8.83, 8.83); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.541 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.44 V/m
Peak SAR (extrapolated) = 0.670 W/kg
SAR(1 g) = 0.511 mW/g
SAR(10 g) = 0.376 mW/g
Power Drift = -0.011 dB
Maximum value of SAR (measured) = 0.535 mW/g



Date/Time: 2012-03-19 11:06:53

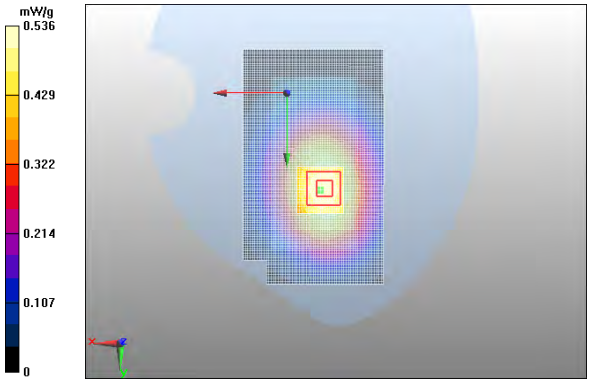
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: 4-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:2.08
Medium: Body 835; Medium Notes: Medium Temperature: t= 21.6 C
Medium parameters used: f = 837 MHz; σ = 0.972 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(8.83, 8.83, 8.83); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM2; Type: SAM; Serial: TP - 1508
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.536 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.56 V/m
Peak SAR (extrapolated) = 0.664 W/kg
SAR(1 g) = 0.517 mW/g
SAR(10 g) = 0.383 mW/g
Power Drift = -0.027 dB
Maximum value of SAR (measured) = 0.543 mW/g



Date/Time: 2012-03-19 13:37:18

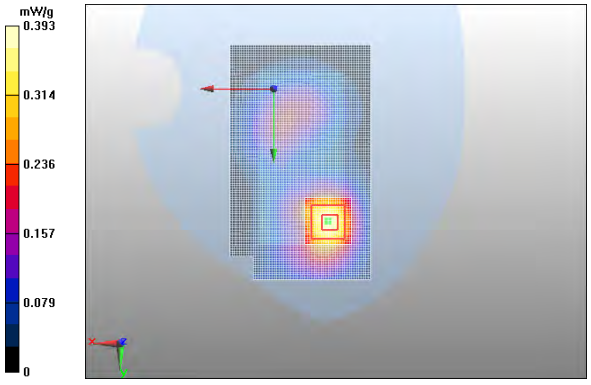
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.2, 7.2, 7.2); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM3; Type: SAM; Serial: TP - 1567
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.393 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.23 V/m
Peak SAR (extrapolated) = 0.583 W/kg
SAR(1 g) = 0.359 mW/g
SAR(10 g) = 0.211 mW/g
Power Drift = -0.040 dB
Maximum value of SAR (measured) = 0.394 mW/g



Date/Time: 2012-03-19 14:44:27

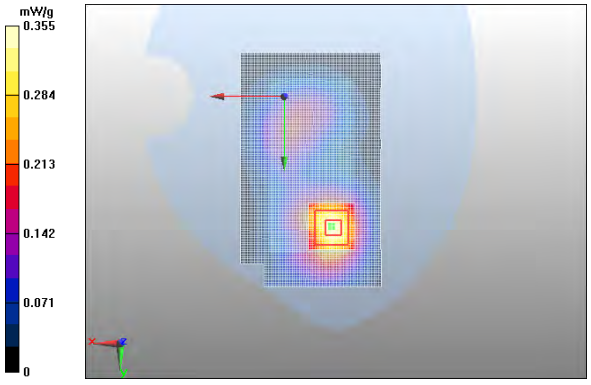
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.2, 7.2, 7.2); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM3; Type: SAM; Serial: TP - 1567
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.355 mW/g

Configuration/Body - Middle - WH-102 - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.14 V/m
Peak SAR (extrapolated) = 0.531 W/kg
SAR(1 g) = 0.323 mW/g
SAR(10 g) = 0.190 mW/g
Power Drift = 0.051 dB
Maximum value of SAR (measured) = 0.352 mW/g



Date/Time: 2012-03-19 15:26:56

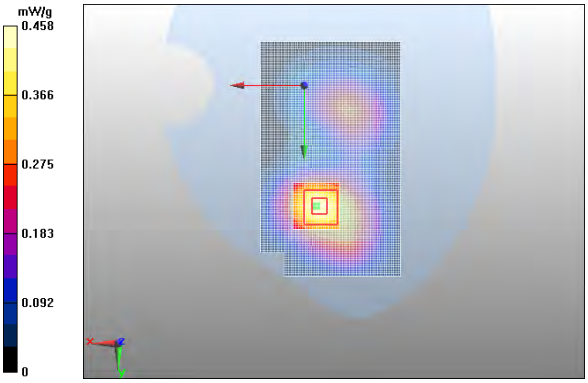
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

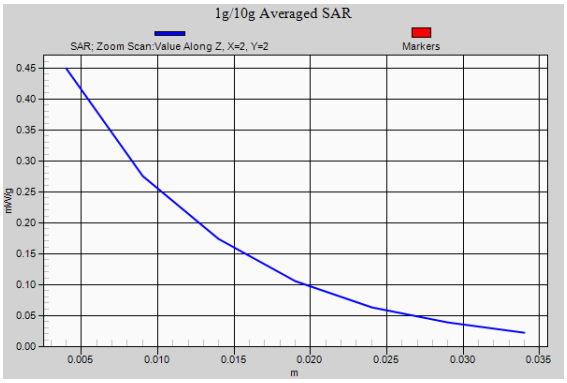
Communication System: GSM1900
Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.2, 7.2, 7.2); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM3; Type: SAM; Serial: TP - 1567
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - High - No Accessory - Back Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.458 mW/g

Configuration/Body - High - No Accessory - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.5 V/m
Peak SAR (extrapolated) = 0.669 W/kg
SAR(1 g) = 0.413 mW/g
SAR(10 g) = 0.249 mW/g
Power Drift = 0.039 dB
Maximum value of SAR (measured) = 0.449 mW/g





Date/Time: 2012-03-19 15:12:46

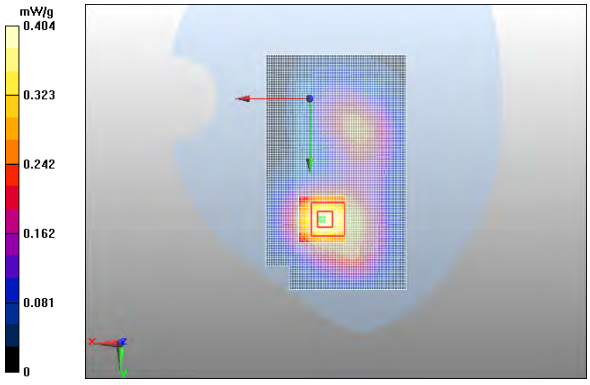
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.2, 7.2, 7.2); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM3; Type: SAM; Serial: TP - 1567
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Back Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.404 mW/g

Configuration/Body - Middle - WH-102 - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.4 V/m
Peak SAR (extrapolated) = 0.594 W/kg
SAR(1 g) = 0.375 mW/g
SAR(10 g) = 0.225 mW/g
Power Drift = 0.172 dB
Maximum value of SAR (measured) = 0.408 mW/g



Date/Time: 2012-03-19 13:55:55

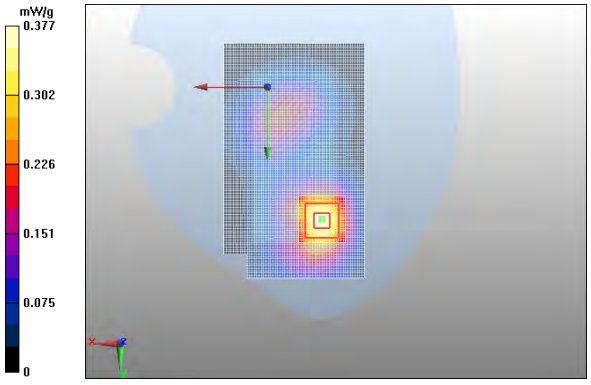
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.2, 7.2, 7.2); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM3; Type: SAM; Serial: TP - 1567
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.377 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.21 V/m
Peak SAR (extrapolated) = 0.571 W/kg
SAR(1 g) = 0.348 mW/g
SAR(10 g) = 0.205 mW/g
Power Drift = -0.071 dB
Maximum value of SAR (measured) = 0.384 mW/g



Date/Time: 2012-03-19 14:10:12

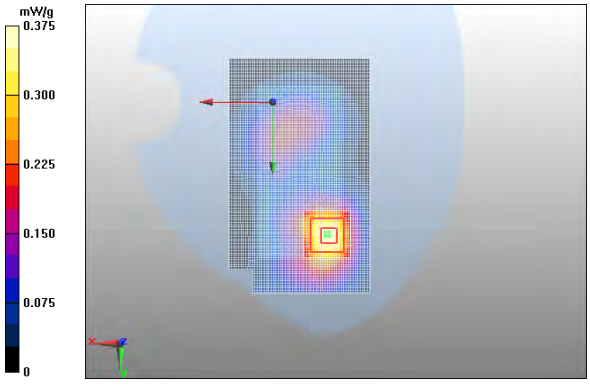
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: 3-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:2.8
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.2, 7.2, 7.2); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM3; Type: SAM; Serial: TP - 1567
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.375 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.11 V/m
Peak SAR (extrapolated) = 0.568 W/kg
SAR(1 g) = 0.345 mW/g
SAR(10 g) = 0.203 mW/g
Power Drift = -0.072 dB
Maximum value of SAR (measured) = 0.379 mW/g



Date/Time: 2012-03-19 14:24:28

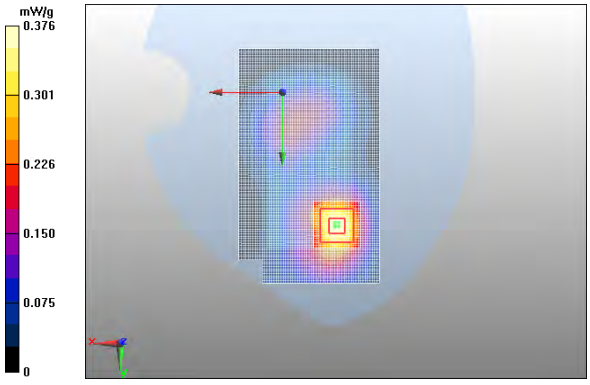
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: 4-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:2.08
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836; Probe Notes:
- ConvF(7.2, 7.2, 7.2); Calibrated: 2012-02-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2012-02-15
- Phantom: SAM3; Type: SAM; Serial: TP - 1567
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.376 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.14 V/m
Peak SAR (extrapolated) = 0.570 W/kg
SAR(1 g) = 0.346 mW/g
SAR(10 g) = 0.203 mW/g
Power Drift = 0.033 dB
Maximum value of SAR (measured) = 0.381 mW/g



Date/Time: 2012-03-21 11:55:17

Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

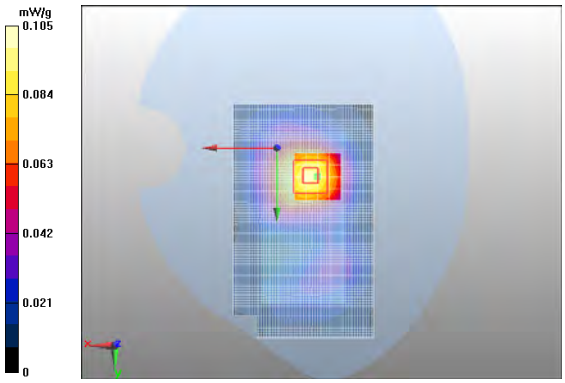
Communication System: WLAN2450 b-mode
Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: Body 2450; Medium Notes: Medium Temperature: t=21.3C
Medium parameters used: f = 2437 MHz; σ = 1.85 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.47, 6.47, 6.47); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM6; Type: SAM; Serial: TP - 1426
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.105 mW/g

Configuration/Body - Middle - No Accessory - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.77 V/m
Peak SAR (extrapolated) = 0.159 W/kg
SAR(1 g) = 0.095 mW/g
SAR(10 g) = 0.058 mW/g
Power Drift = 0.010 dB

Maximum value of SAR (measured) = 0.102 mW/g



Date/Time: 2012-03-21 13:09:18

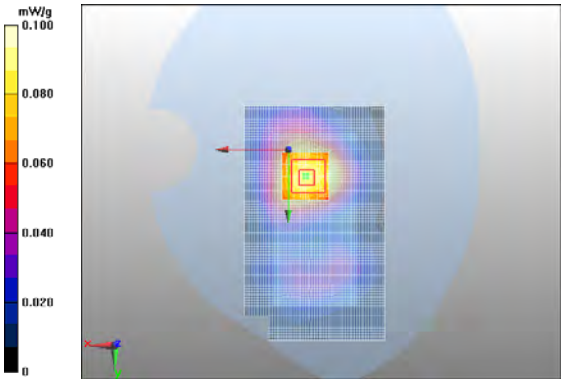
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: WLAN2450 b-mode
Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: Body 2450; Medium Notes: Medium Temperature: t=21.3C
Medium parameters used: f = 2437 MHz; σ = 1.85 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.47, 6.47, 6.47); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM6; Type: SAM; Serial: TP - 1426
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Display Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.100 mW/g

Configuration/Body - Middle - WH-102 - Display Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 6.15 V/m
Peak SAR (extrapolated) = 0.139 W/kg
SAR(1 g) = 0.088 mW/g
SAR(10 g) = 0.055 mW/g
Power Drift = 0.018 dB
Maximum value of SAR (measured) = 0.094 mW/g



Date/Time: 2012-03-21 14:04:17

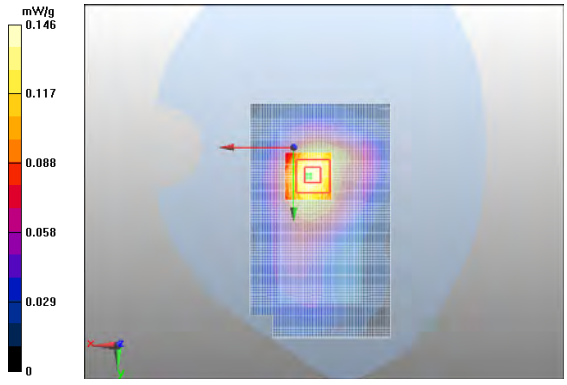
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

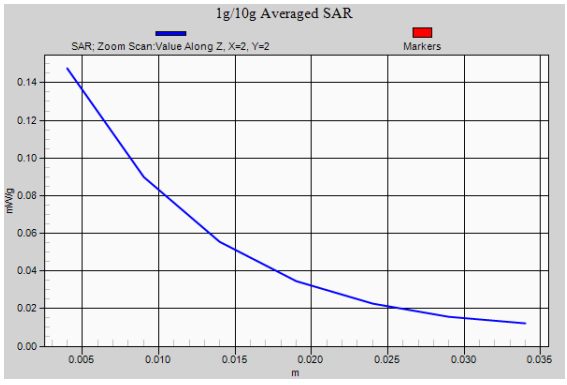
Communication System: WLAN2450 b-mode
Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: Body 2450; Medium Notes: Medium Temperature: t=21.3C
Medium parameters used: f = 2462 MHz; σ = 1.89 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.47, 6.47, 6.47); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM6; Type: SAM; Serial: TP - 1426
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - High - No Accessory - Back Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.146 mW/g

Configuration/Body - High - No Accessory - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.52 V/m
Peak SAR (extrapolated) = 0.227 W/kg
SAR(1 g) = 0.138 mW/g
SAR(10 g) = 0.083 mW/g
Power Drift = 0.092 dB
Maximum value of SAR (measured) = 0.148 mW/g





Date/Time: 2012-03-21 13:47:43

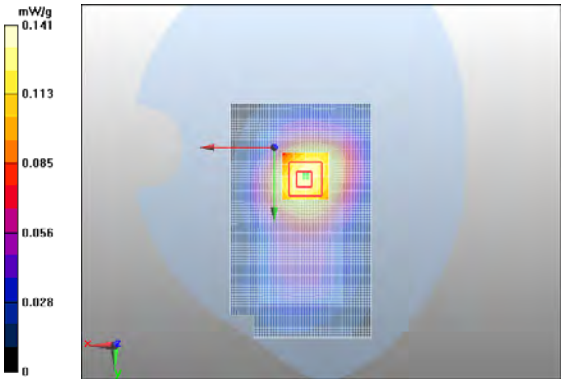
Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: WLAN2450 b-mode
Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: Body 2450; Medium Notes: Medium Temperature: t=21.3C
Medium parameters used: f = 2437 MHz; σ = 1.85 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3574; Probe Notes:
- ConvF(6.47, 6.47, 6.47); Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2011-10-19
- Phantom: SAM6; Type: SAM; Serial: TP - 1426
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - WH-102 - Back Facing Phantom/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.141 mW/g

Configuration/Body - Middle - WH-102 - Back Facing Phantom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.18 V/m
Peak SAR (extrapolated) = 0.211 W/kg
SAR(1 g) = 0.131 mW/g
SAR(10 g) = 0.082 mW/g
Power Drift = 0.049 dB
Maximum value of SAR (measured) = 0.141 mW/g



Date/Time: 2012-03-16 11:11:18, Date/Time: 2012-03-20 14:06:44

Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM850, Communication System: WLAN2450 b-mode
Frequency: 836.6 MHz, Frequency: 2462 MHz; Duty Cycle: 1:8.3, Duty Cycle: 1:1
Medium: Head 835, Medium: Head 2450; Medium Notes: Medium Temperature: t= 21.4 C, Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 837 MHz; σ = 0.872 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3 , Medium parameters used: f = 2462 MHz; σ = 1.81 mho/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Right Section

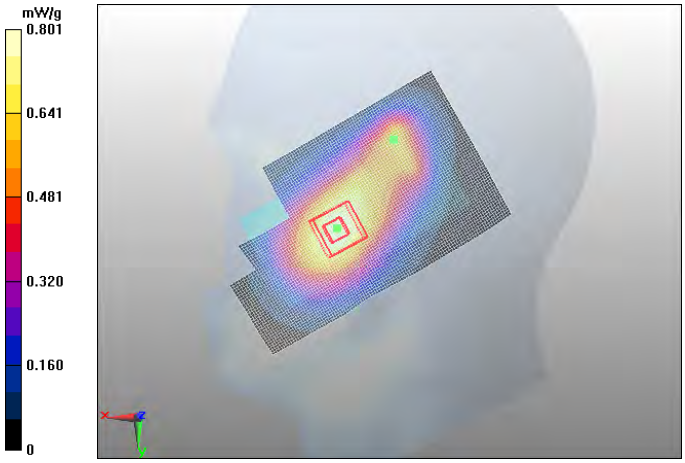
DASY4 Configuration:
- Probe: EX3DV4 - SN3836, Probe: EX3DV4 - SN3574
- ConvF(8.54, 8.54, 8.54), ConvF(6.71, 6.71, 6.71); Calibrated: 2012-02-20, Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE4 Sn1319, Electronics: DAE4 Sn860; Calibrated: 2012-02-15, Calibrated: 2011-10-19
- Phantom: SAM1, Phantom: SAM5; Type: SAM; Serial: TP - 01097, Serial: TP - 1178
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Configuration/Cheek - High/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Motorola Fast SAR of Combined Scans: SAR(1 g) = 0.739 mW/g
SAR(10 g) = 0.503 mW/g

Maximum value of SAR (measured) = 0.801 mW/g



Date/Time: 2012-03-15 10:49:35, Date/Time: 2012-03-20 14:06:44

Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM 1900, Communication System: WLAN2450 b-mode
Frequency: 1880 MHz, Frequency: 2462 MHz; Duty Cycle: 1:8.3, Duty Cycle: 1:1
Medium: Head 1900, Medium: Head 2450; Medium Notes: Medium Temperature: t=22.3C, Medium Notes: Medium Temperature: t=21.6C
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 2462 MHz; σ = 1.81 mho/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Right Section

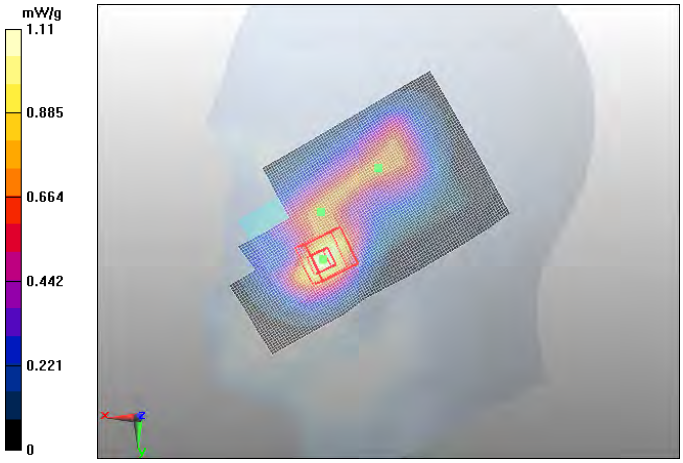
DASY4 Configuration:
- Probe: EX3DV4 - SN3836, Probe: EX3DV4 - SN3574
- ConvF(7.66, 7.66, 7.66), ConvF(6.71, 6.71, 6.71); Calibrated: 2012-02-20, Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE4 Sn1319, Electronics: DAE4 Sn860; Calibrated: 2012-02-15, Calibrated: 2011-10-19
- Phantom: SAM4, Phantom: SAM5; Type: SAM; Serial: TP - 1427, Serial: TP - 1178
- ; SEMCAD X Version 14.0 Build 61

Configuration/Cheek - Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Configuration/Cheek - High/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Motorola Fast SAR of Combined Scans: SAR(1 g) = 0.946 mW/g
SAR(10 g) = 0.525 mW/g

Maximum value of SAR (measured) = 1.11 mW/g



Date/Time: 2012-03-19 11:39:43, Date/Time: 2012-03-21 14:04:17

Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

Communication System: GSM850, Communication System: WLAN2450 b-mode
Frequency: 836.6 MHz, Frequency: 2462 MHz; Duty Cycle: 1:8.3, Duty Cycle: 1:1
Medium: Body 835, Medium: Body 2450; Medium Notes: Medium Temperature: t= 21.6 C, Medium Notes: Medium Temperature: t=21.3C
Medium parameters used: f = 837 MHz; σ = 0.972 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3 , Medium parameters used: f = 2462 MHz; σ = 1.89 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

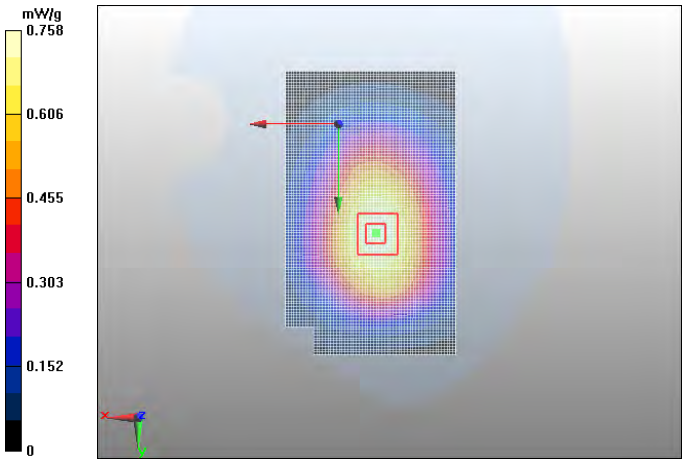
DASY4 Configuration:
- Probe: EX3DV4 - SN3836, Probe: EX3DV4 - SN3574
- ConvF(8.83, 8.83, 8.83), ConvF(6.47, 6.47, 6.47); Calibrated: 2012-02-20, Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319, Electronics: DAE4 Sn860; Calibrated: 2012-02-15, Calibrated: 2011-10-19
- Phantom: SAM2, Phantom: SAM6; Type: SAM; Serial: TP - 1508, Serial: TP - 1426
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - Middle - No Accessory - Back Facing Phantom/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Configuration/Body - High - No Accessory - Back Facing Phantom/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Motorola Fast SAR of Combined Scans: SAR(1 g) = 0.714 mW/g
SAR(10 g) = 0.497 mW/g

Maximum value of SAR (measured) = 0.758 mW/g



Date/Time: 2012-03-19 15:26:56, Date/Time: 2012-03-21 14:04:17

Test Laboratory: TCC Nokia
Type: RM-768; Serial: 004402/13/740535/7

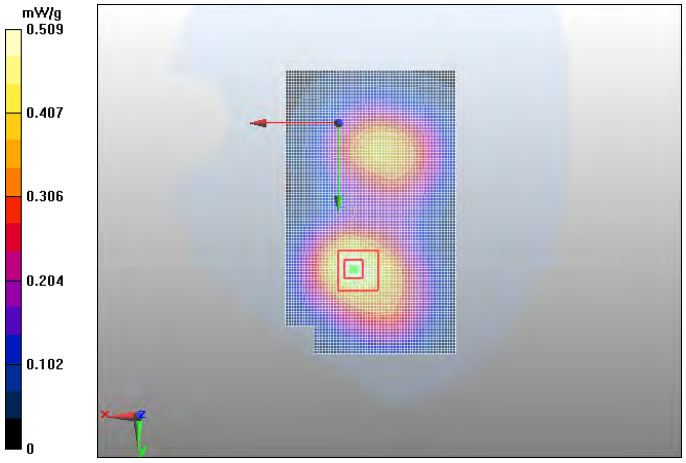
Communication System: GSM1900, Communication System: WLAN2450 b-mode
Frequency: 1909.8 MHz, Frequency: 2462 MHz; Duty Cycle: 1:8.3, Duty Cycle: 1:1
Medium: Body 1900, Medium: Body 2450; Medium Notes: Medium Temperature: t=21.6C, Medium Notes: Medium Temperature: t=21.3C
Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 2462 MHz; σ = 1.89 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3836, Probe: EX3DV4 - SN3574
- ConvF(7.2, 7.2, 7.2), ConvF(6.47, 6.47, 6.47); Calibrated: 2012-02-20, Calibrated: 2011-10-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319, Electronics: DAE4 Sn860; Calibrated: 2012-02-15, Calibrated: 2011-10-19
- Phantom: SAM3, Phantom: SAM6; Type: SAM; Serial: TP - 1567, Serial: TP - 1426
- ; SEMCAD X Version 14.0 Build 61

Configuration/Body - High - No Accessory - Back Facing Phantom/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Motorola Fast SAR of Combined Scans: SAR(1 g) = 0.463 mW/g
SAR(10 g) = 0.271 mW/g

Maximum value of SAR (measured) = 0.509 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
Swiss Calibration Service

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

Accreditation No.: SCS 108

Client Nokia Beijing TCC

Certificate No: EX3-3836_Feb12

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3836

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

Calibration date: February 20, 2012

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-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: February 21, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3836

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.40	0.47	0.45	± 10.1 %
DCP (mV)[B]	89.1	99.3	95.9	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	101.5	±3.0 %
			Y	0.00	0.00	1.00	111.8	
			Z	0.00	0.00	1.00	105.9	

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3836

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	41.5	0.90	8.54	8.54	8.54	0.67	0.68	± 12.0 %
1750	40.1	1.37	7.92	7.92	7.92	0.38	0.91	± 12.0 %
1900	40.0	1.40	7.66	7.66	7.66	0.74	0.66	± 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.

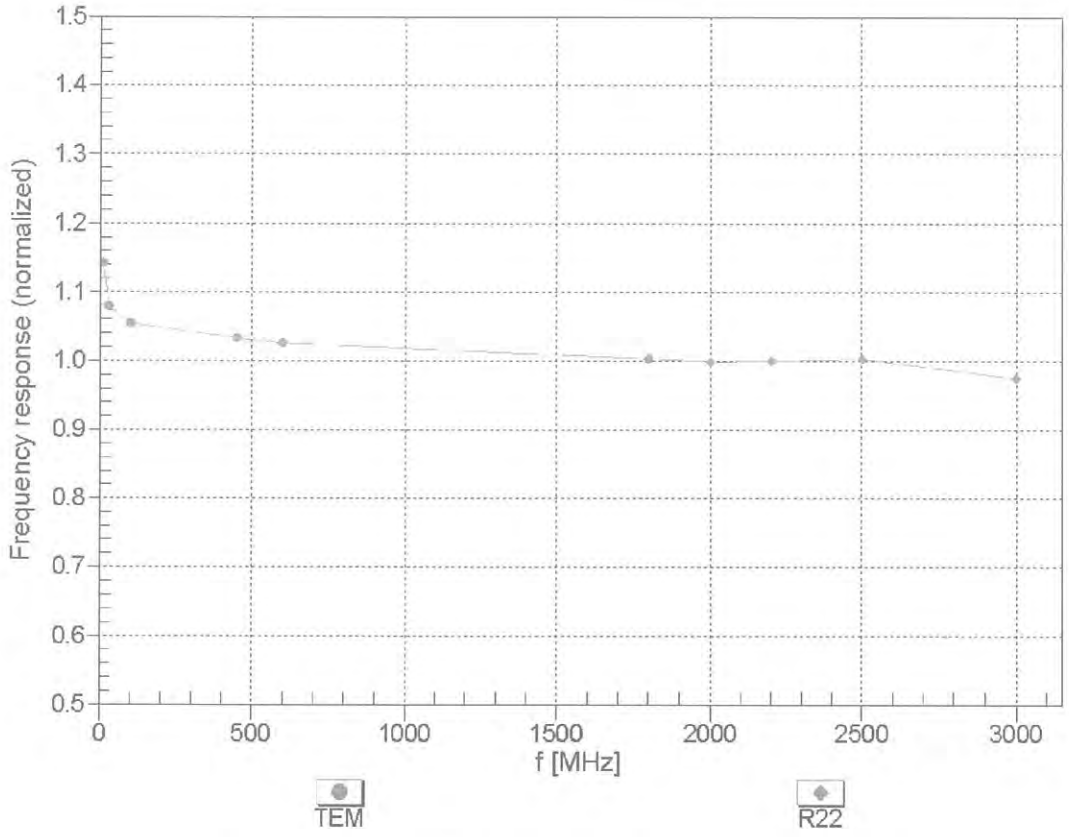
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3836

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	55.2	0.97	8.83	8.83	8.83	0.80	0.65	± 12.0 %
1750	53.4	1.49	7.64	7.64	7.64	0.49	0.81	± 12.0 %
1900	53.3	1.52	7.20	7.20	7.20	0.42	0.82	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

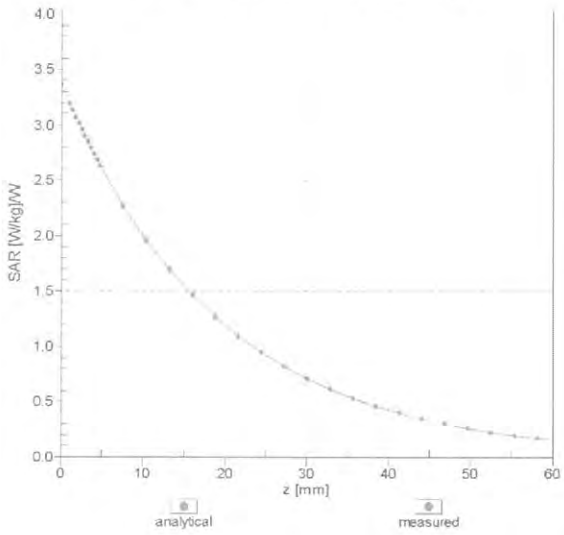
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



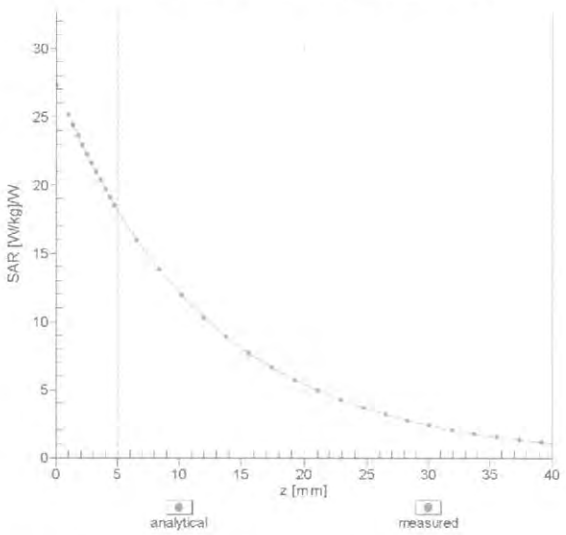
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

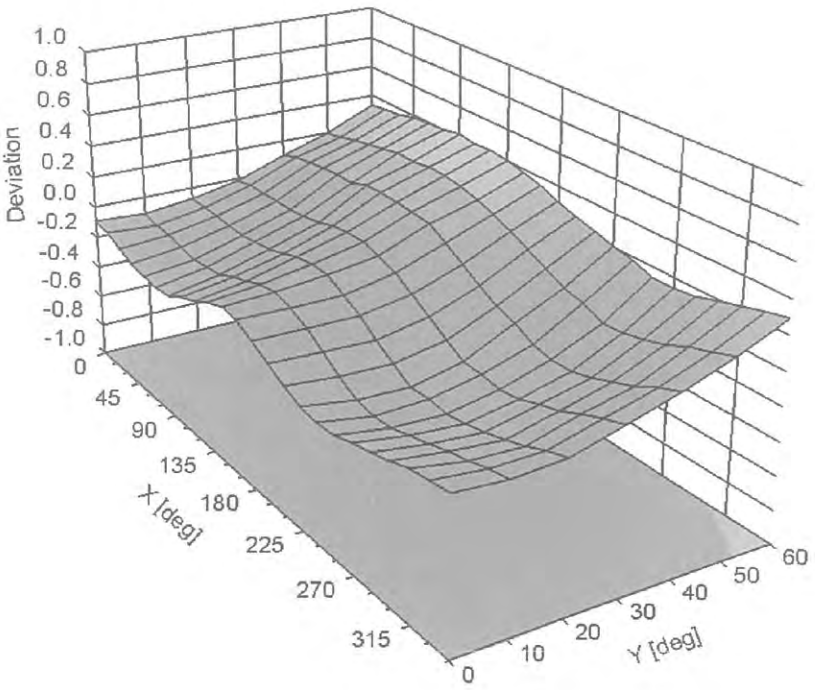


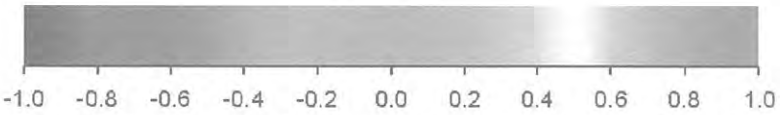
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

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

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

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

Accreditation No.: SCS 108

Client Nokia Beijing TCC

Certificate No: EX3-3574_Oct11

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3574

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

Calibration date: October 25, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: October 27, 2011

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

Basic Calibration Parameters

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

Modulation Calibration Parameters

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

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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

Calibration Parameter Determined in Head Tissue Simulating Media

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

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

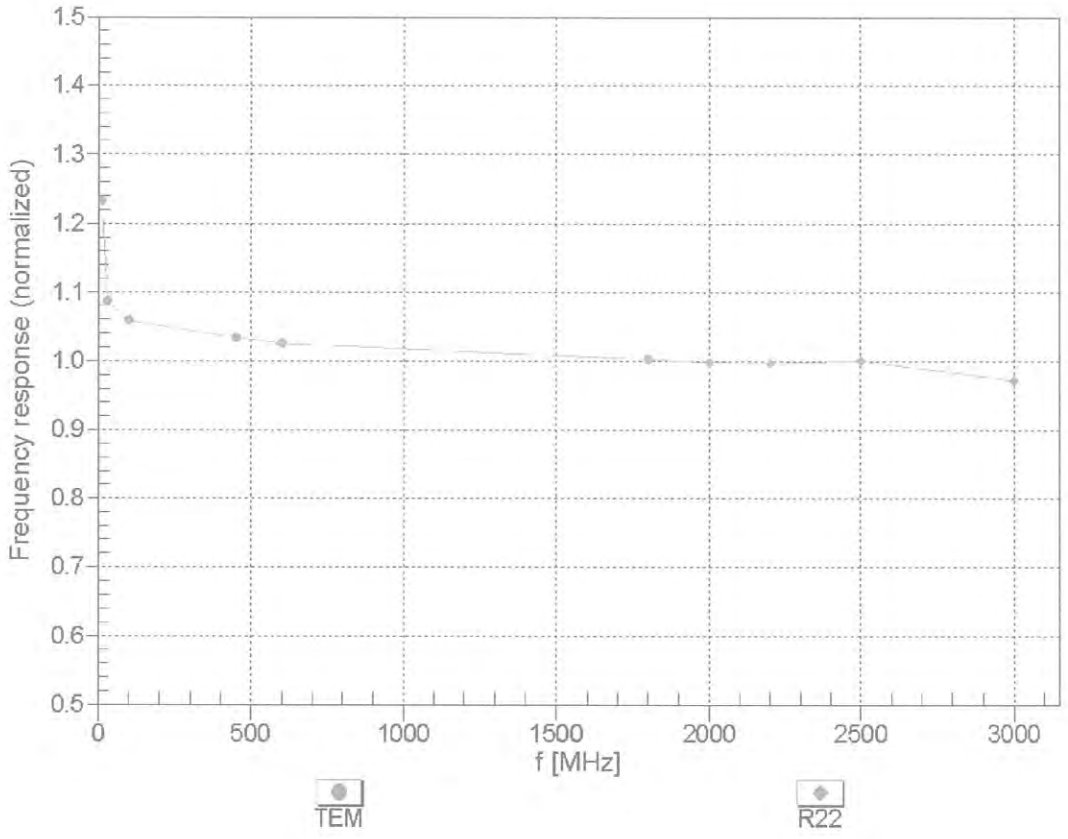
DASY/EASY - Parameters of Probe: EX3DV4- SN:3574

Calibration Parameter Determined in Body Tissue Simulating Media

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

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

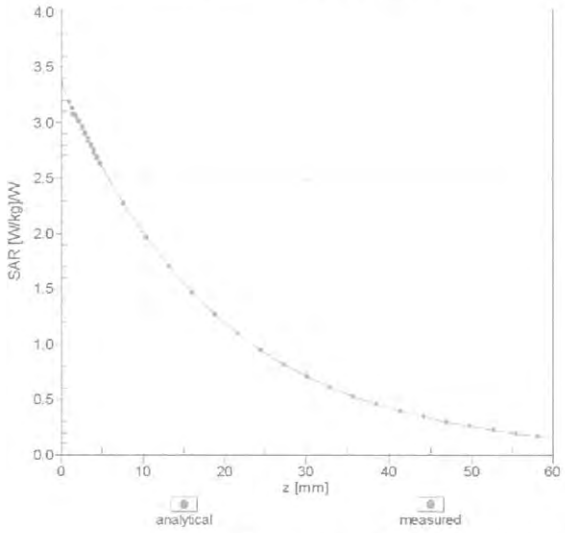
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



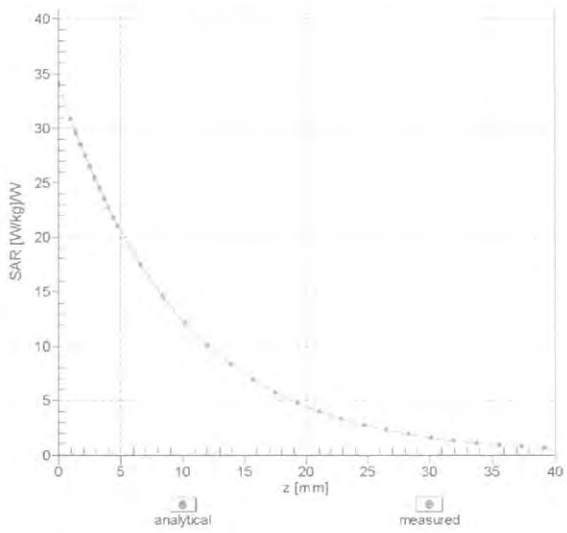
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

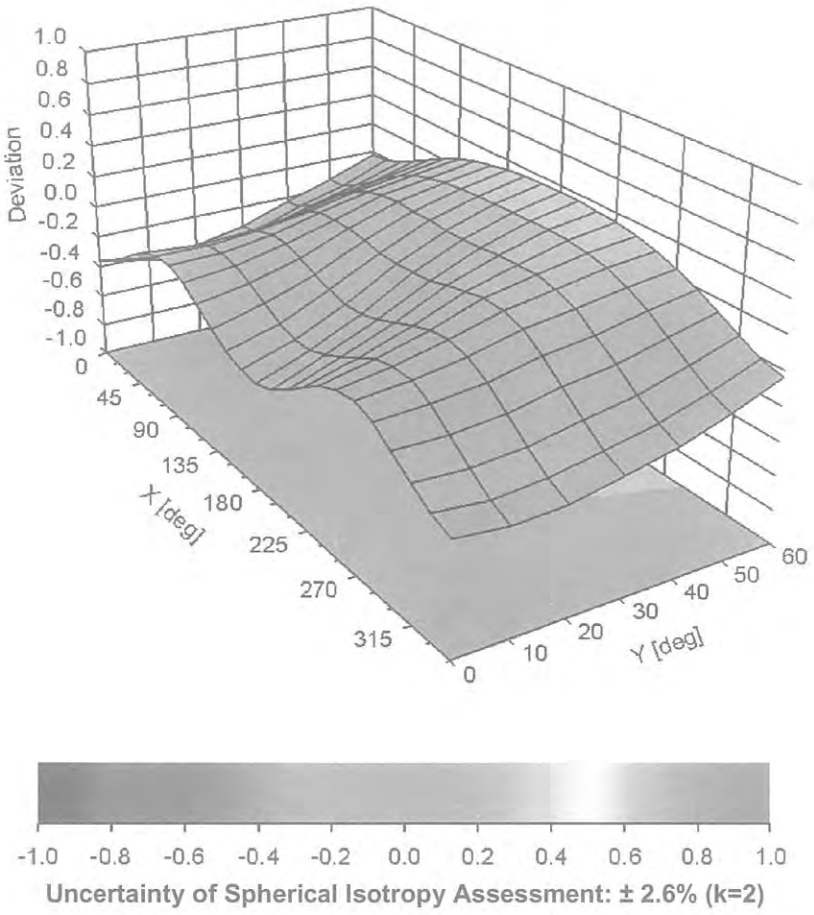


f = 2450 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

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
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Accreditation No.: SCS 108

Client Nokia Beijing TCC

Certificate No: D835V2-479_Mar11

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 479
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits
Calibration date:	March 9, 2011

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 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: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: March 10, 2011

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.2 Ω - 3.3 jΩ
Return Loss	- 29.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.0 Ω - 5.2 jΩ
Return Loss	- 24.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.388 ns

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	January 28, 2003

Date/Time: 09.03.2011 14:54:54

Test Laboratory: SPEAG, Zurich, Switzerland

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

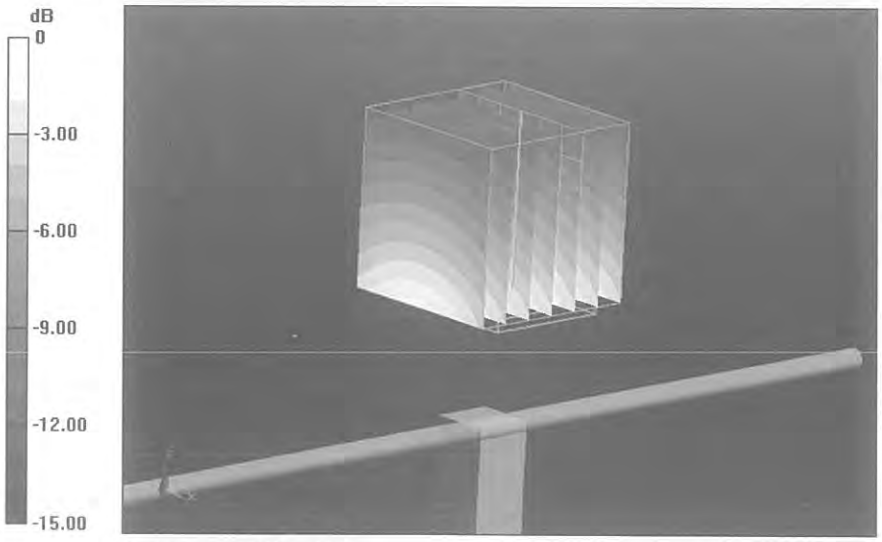
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

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

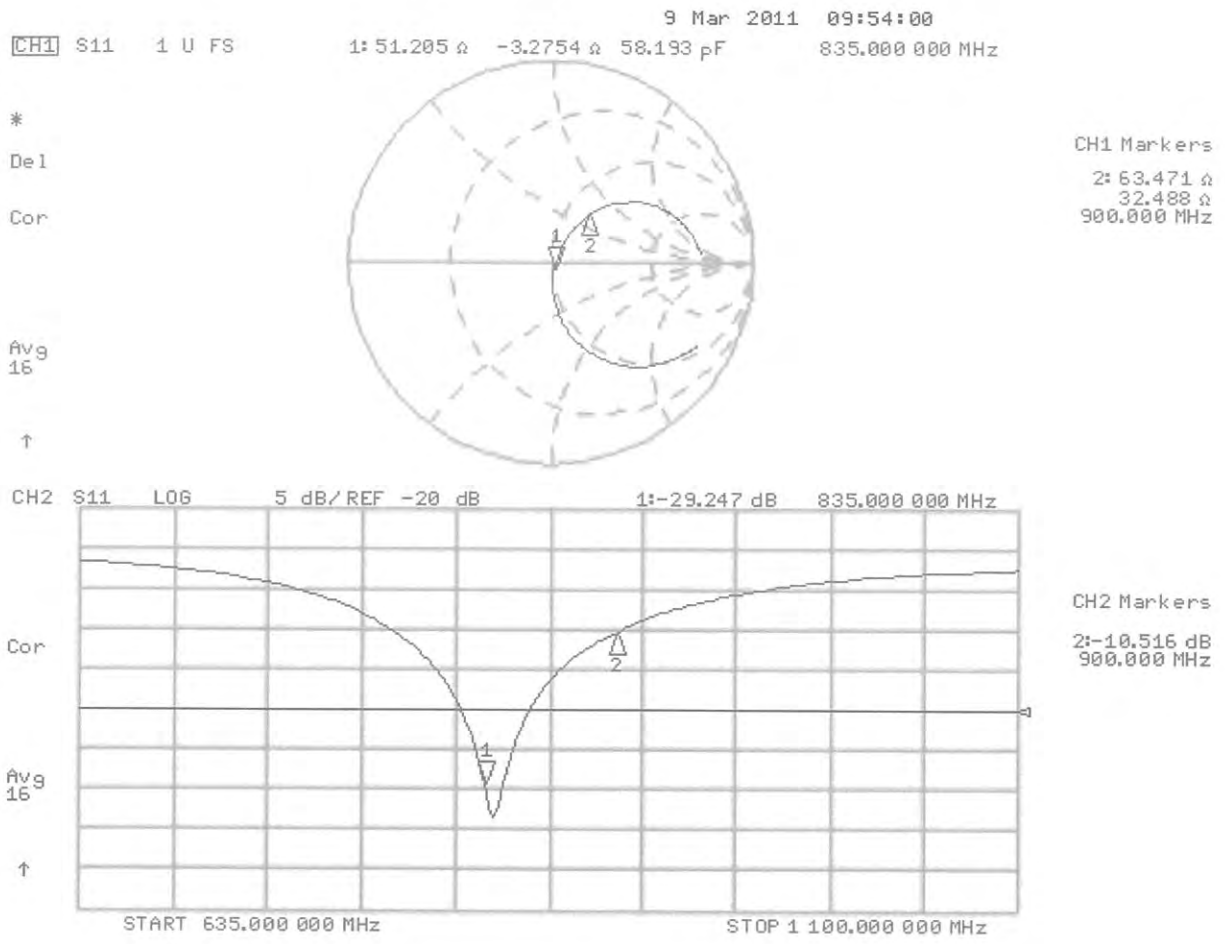
Head/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe) 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.436 V/m; Power Drift = 0.0071 dB
Peak SAR (extrapolated) = 3.602 W/kg
SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.56 mW/g
Maximum value of SAR (measured) = 2.795 mW/g



0 dB = 2.790mW/g

Impedance Measurement Plot for Head TSL



Date/Time: 09.03.2011 10:34:32

Test Laboratory: SPEAG, Zurich, Switzerland

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

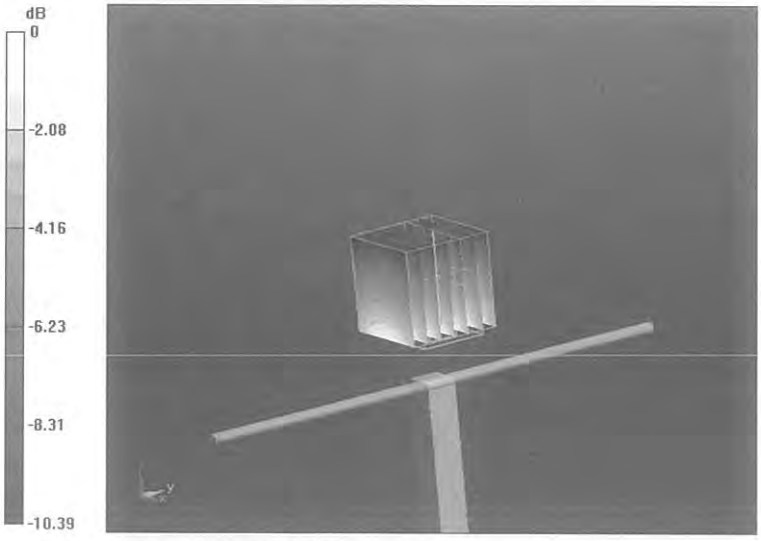
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

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

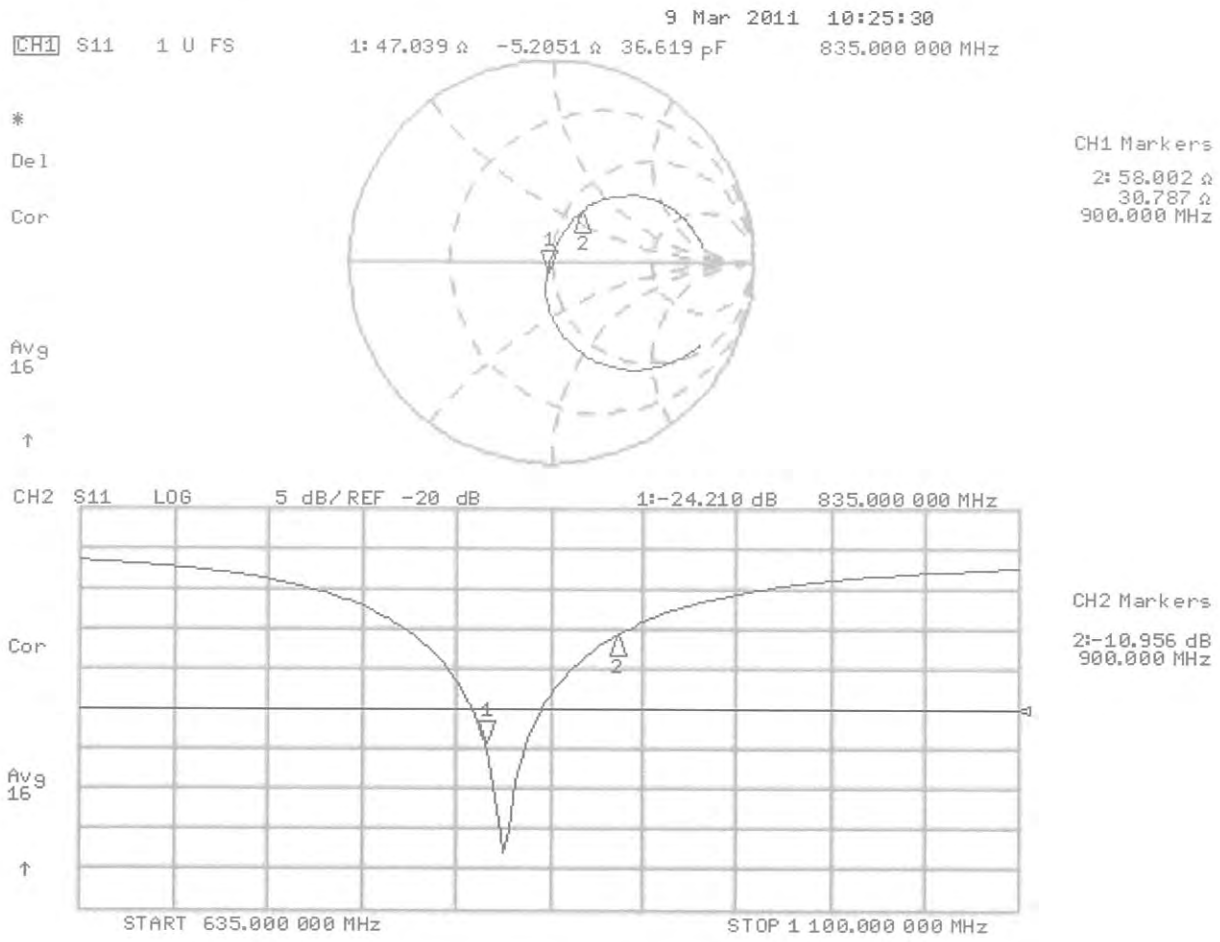
Body/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.238 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.717 W/kg
SAR(1 g) = 2.52 mW/g; SAR(10 g) = 1.65 mW/g
Maximum value of SAR (measured) = 2.938 mW/g



0 dB = 2.940mW/g

Impedance Measurement Plot for Body TSL



Dipole D835V2 – SN: 479 Antenna Parameters

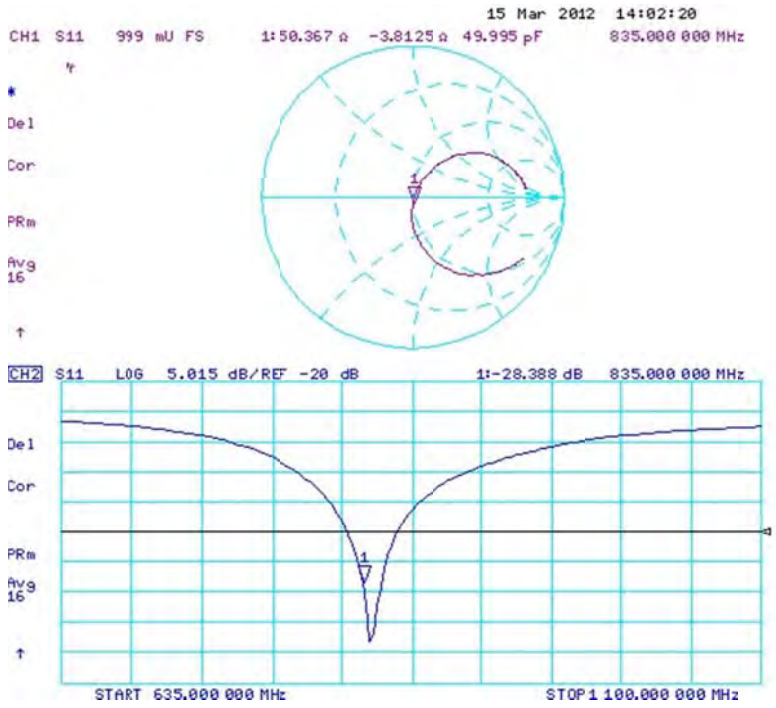
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement 2012-03-15
Impedance, transformed to feed point	51.2 Ω - 3.3 jΩ	50.4 Ω - 3.8 jΩ
Return loss	- 29.2 dB	- 28.4 dB

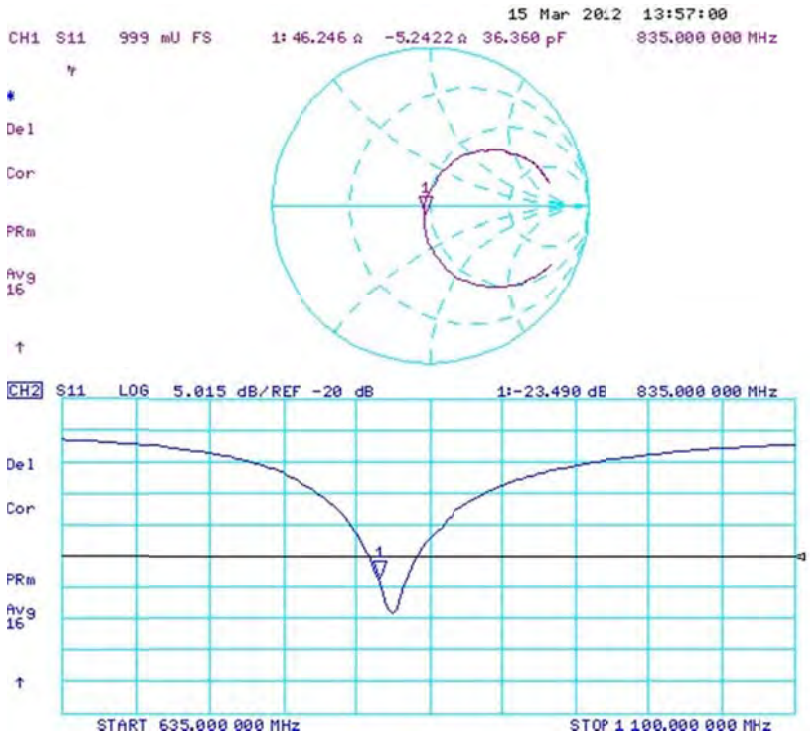
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement 2012-03-15
Impedance, transformed to feed point	47.0 Ω - 5.2 jΩ	46.2 Ω - 5.2 jΩ
Return loss	- 24.2 dB	- 23.5 dB

Impedance Measurement plot for Head TSL 835



Impedance Measurement plot for Body TSL 835



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Accreditation No.: SCS 108

Client Nokia Beijing TCC

Certificate No: D1900V2-547_Oct11

CALIBRATION CERTIFICATE

Object: D1900V2 - SN: 547

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

Calibration date: October 20, 2011

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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

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

Issued: October 20, 2011

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.5 Ω + 4.3 jΩ
Return Loss	- 27.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.8 Ω + 3.5 jΩ
Return Loss	- 26.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.191 ns

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.

Design Modification by End User

The dipole has been modified with Teflon Rings (TR) placed within identified markings close to the end of each dipole arm. Calibration has been performed with TR attached to the dipole.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 15, 2001

Date: 20.10.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

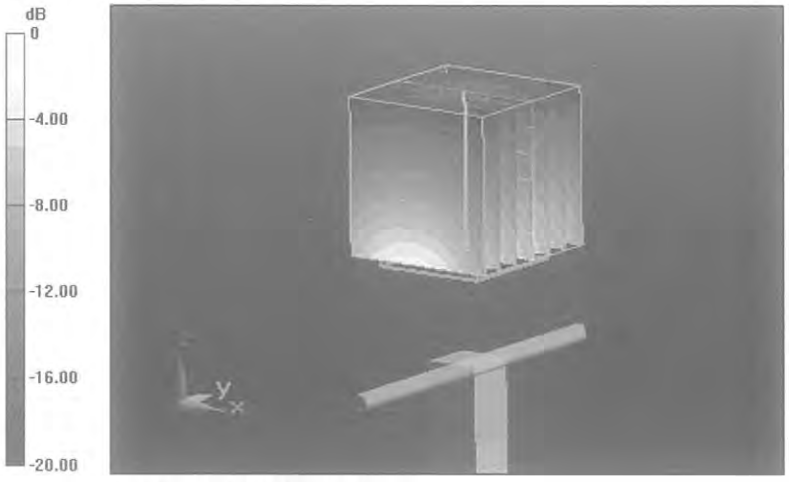
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

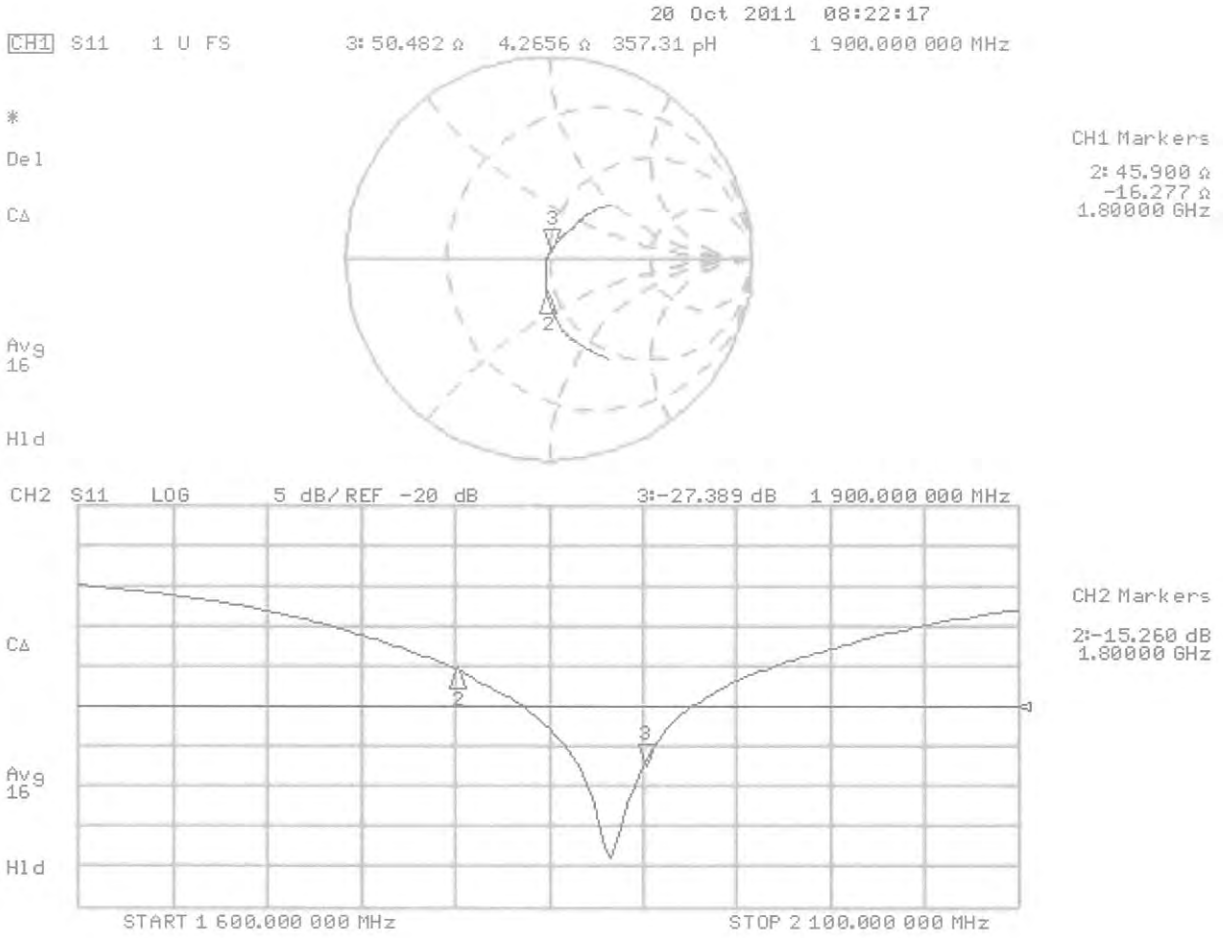
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.072 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 19.037 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.4 mW/g
Maximum value of SAR (measured) = 13.012 mW/g



0 dB = 13.010mW/g

Impedance Measurement Plot for Head TSL



Date: 18.10.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

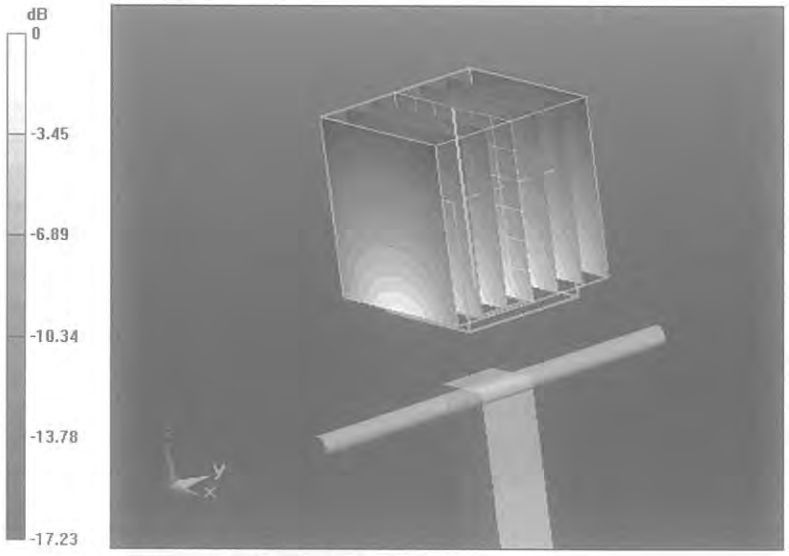
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.59 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

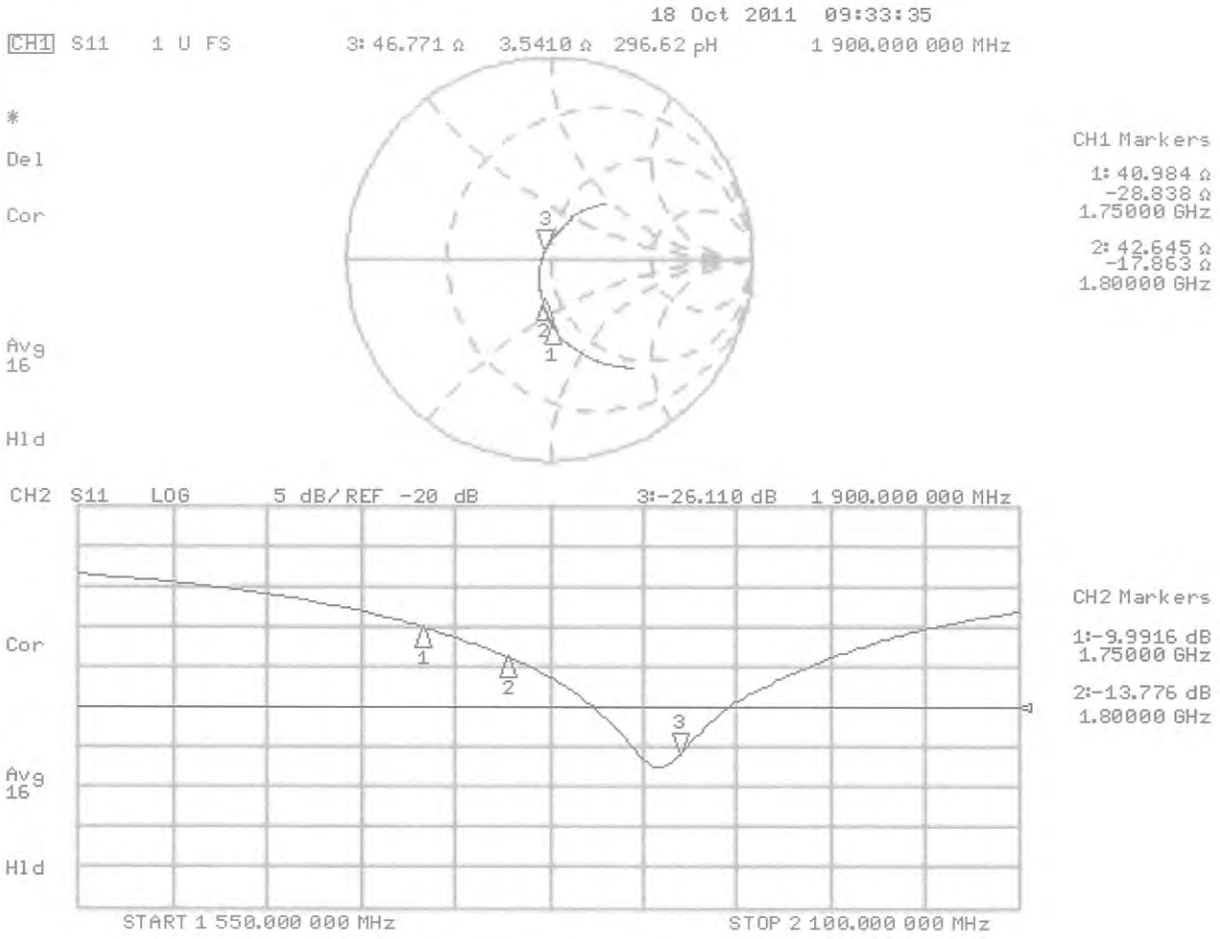
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.823 V/m; Power Drift = 0.0092 dB
Peak SAR (extrapolated) = 18.788 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.5 mW/g
Maximum value of SAR (measured) = 13.491 mW/g



0 dB = 13.490mW/g

Impedance Measurement Plot for Body TSL



Dipole D1900V2 – SN: 547 Antenna Parameters

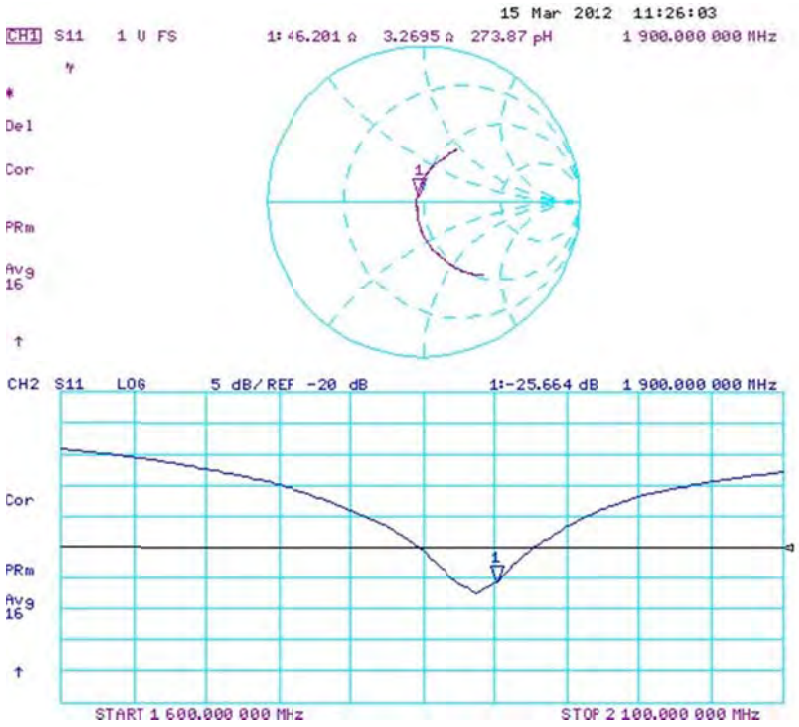
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement 2012-03-15
Impedance, transformed to feed point	50.5 Ω + 4.3 jΩ	46.2 Ω + 3.3 jΩ
Return loss	- 27.4 dB	- 25.7 dB

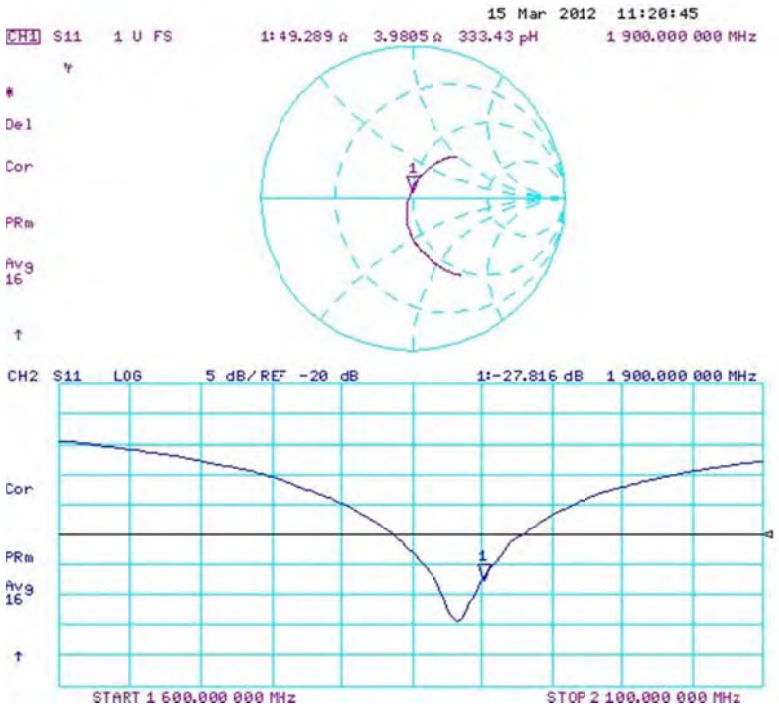
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement 2012-03-15
Impedance, transformed to feed point	46.8 Ω + 3.5 jΩ	49.2 Ω + 4.0 jΩ
Return loss	- 26.1 dB	- 27.8 dB

Impedance Measurement plot for Head TSL 1900



Impedance Measurement plot for Body TSL 1900



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Accreditation No.: SCS 108

Client Nokia Beijing TCC

Certificate No: D2450V2-883_Feb12

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 883

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

Calibration date: February 23, 2012

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 23, 2012

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.1 Ω - 0.4 jΩ
Return Loss	- 28.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.4 Ω + 1.0 jΩ
Return Loss	- 39.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.165 ns

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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
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	October 06, 2011

Date: 23.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 883

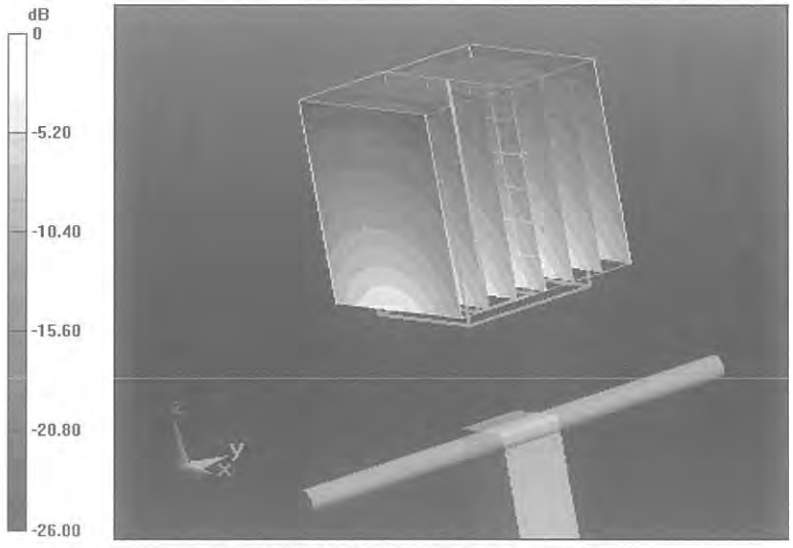
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

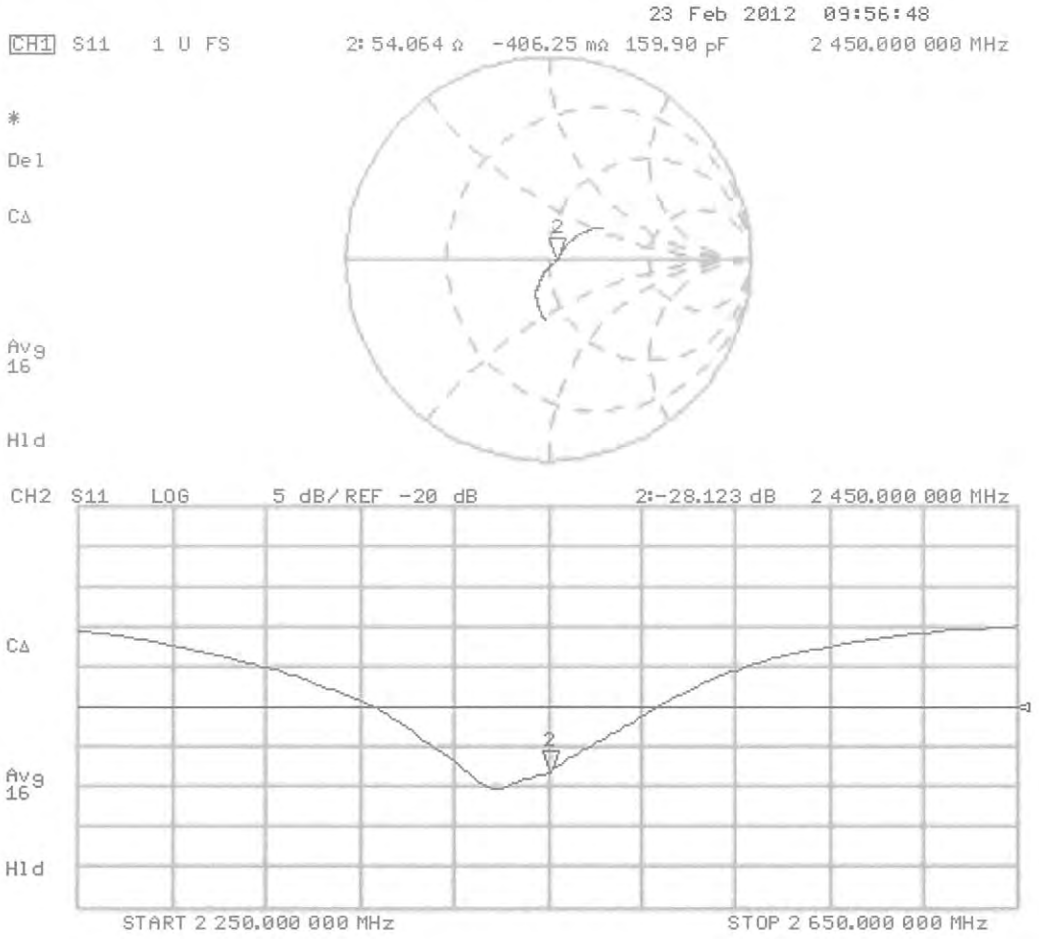
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.8 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 28.8960
SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.36 mW/g
Maximum value of SAR (measured) = 17.788 mW/g



0 dB = 17.790mW/g = 25.00 dB mW/g

Impedance Measurement Plot for Head TSL



Date: 23.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 883

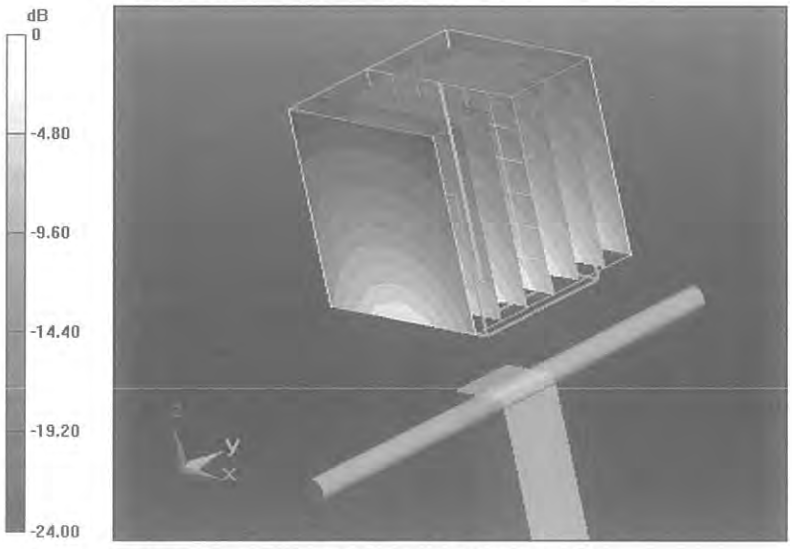
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

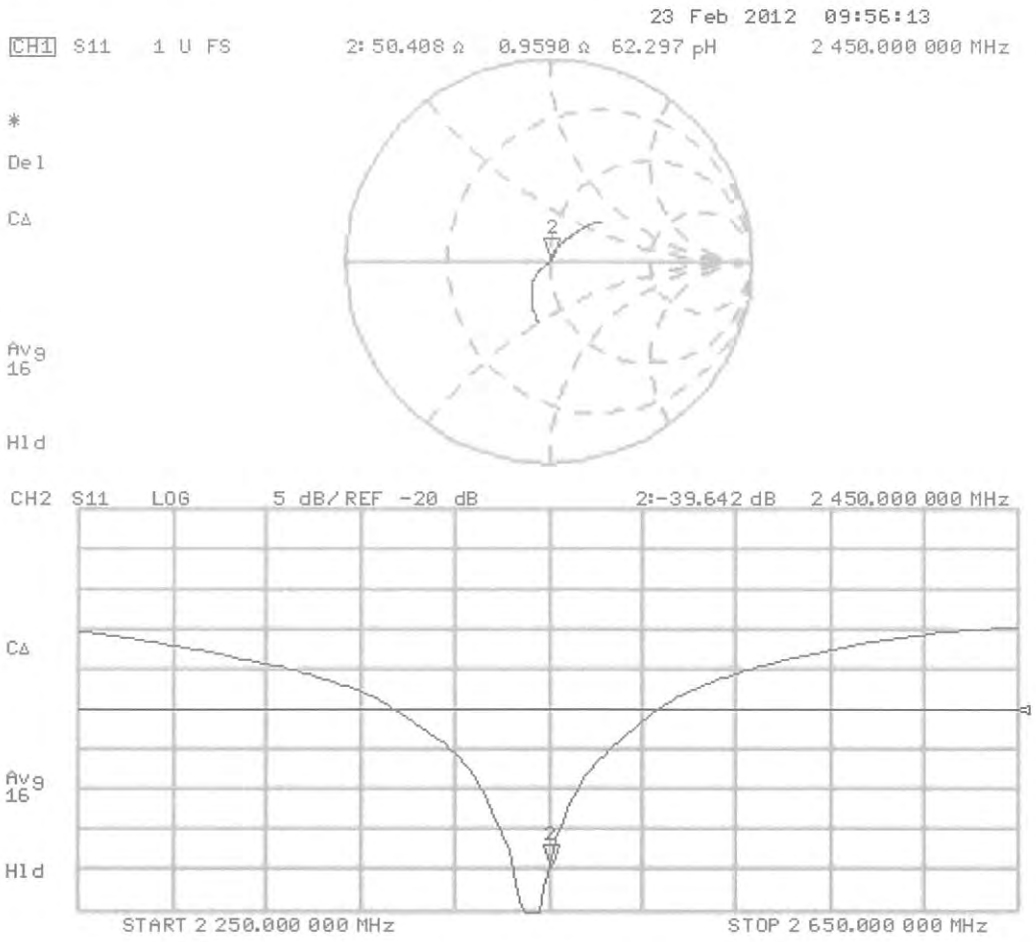
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.084 V/m; Power Drift = -0.00038 dB
Peak SAR (extrapolated) = 26.9170
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.12 mW/g
Maximum value of SAR (measured) = 17.333 mW/g



0 dB = 17.330mW/g = 24.78 dB mW/g

Impedance Measurement Plot for Body TSL



Dipole D2450V2 – SN: 883 Antenna Parameters

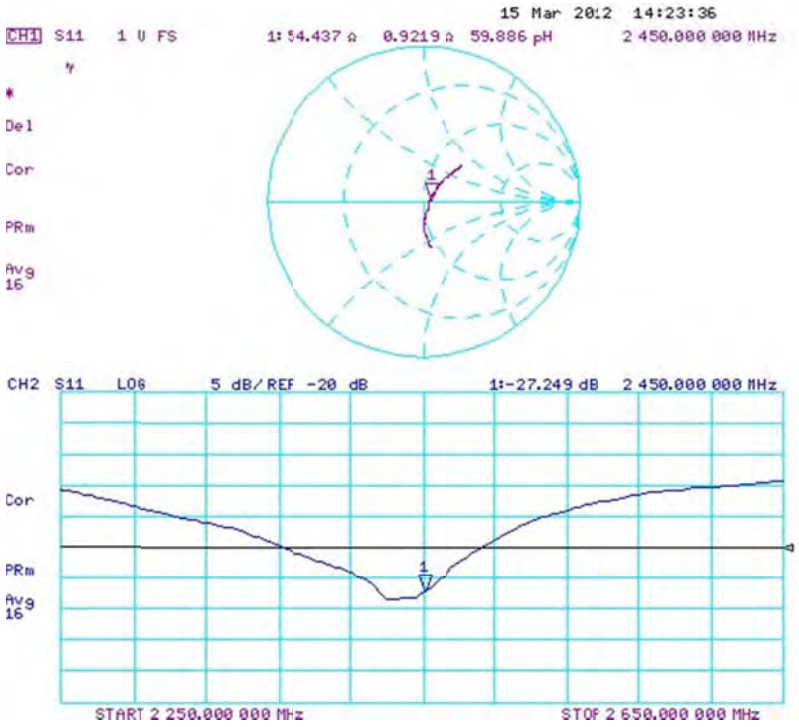
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement 2012-03-15
Impedance, transformed to feed point	54.1 Ω - 0.4 jΩ	54.4 Ω + 0.9 jΩ
Return loss	- 28.1 dB	- 27.2 dB

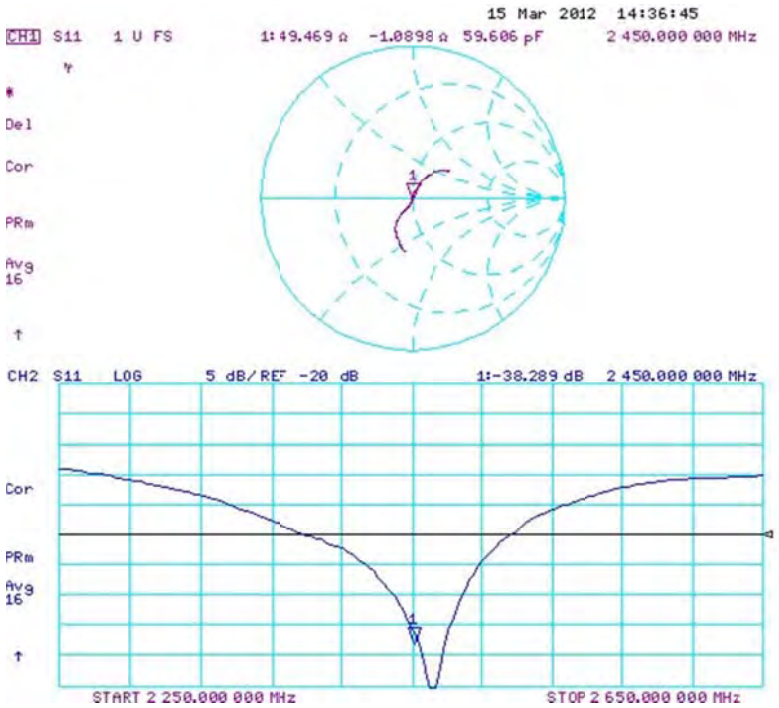
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement 2012-03-15
Impedance, transformed to feed point	50.4 Ω + 1.0 jΩ	49.5 Ω - 1.1 jΩ
Return loss	- 39.6 dB	- 38.3 dB

Impedance Measurement plot for Head TSL 2450



Impedance Measurement plot for Body TSL 2450



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

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

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

Accreditation No.: SCS 108

Client Nokia Beijing TCC

Certificate No: D2450V2-760_Mar11

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 760
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits
Calibration date:	March 17, 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: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: March 17, 2011

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.3 Ω + 2.7 jΩ
Return Loss	- 25.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.3 Ω + 5.6 jΩ
Return Loss	- 25.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.159 ns

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 22, 2004

Date/Time: 17.03.2011 12:48:58

Test Laboratory: SPEAG, Zurich, Switzerland

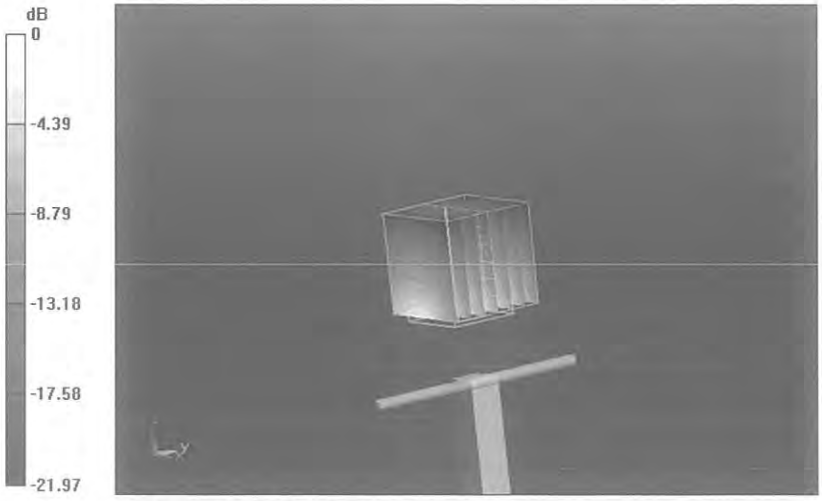
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:760

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 2450 MHz; σ = 1.72 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

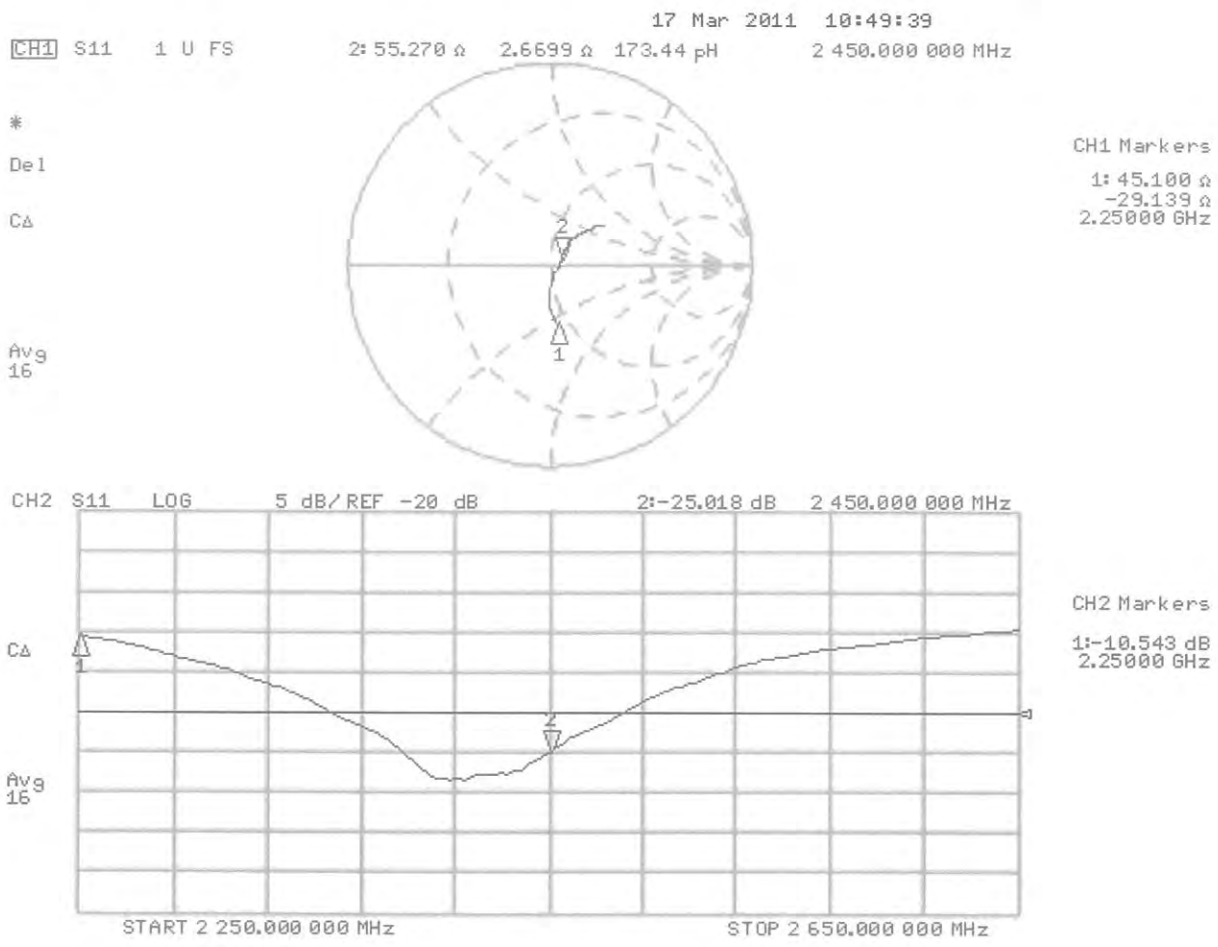
- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

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 = 101.2 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 27.253 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.25 mW/g
Maximum value of SAR (measured) = 17.126 mW/g



0 dB = 17.130mW/g

Impedance Measurement Plot for Head TSL



Date/Time: 08.03.2011 14:08:11

Test Laboratory: SPEAG, Zurich, Switzerland

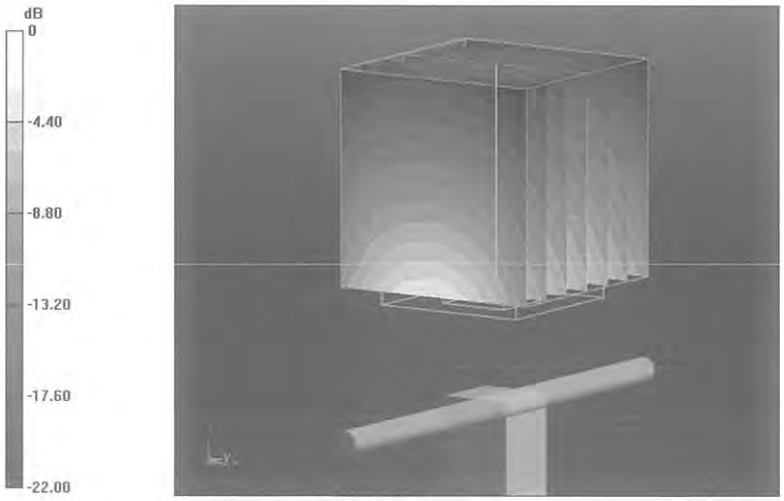
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:760

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL U12 BB
Medium parameters used: f = 2450 MHz; σ = 1.93 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

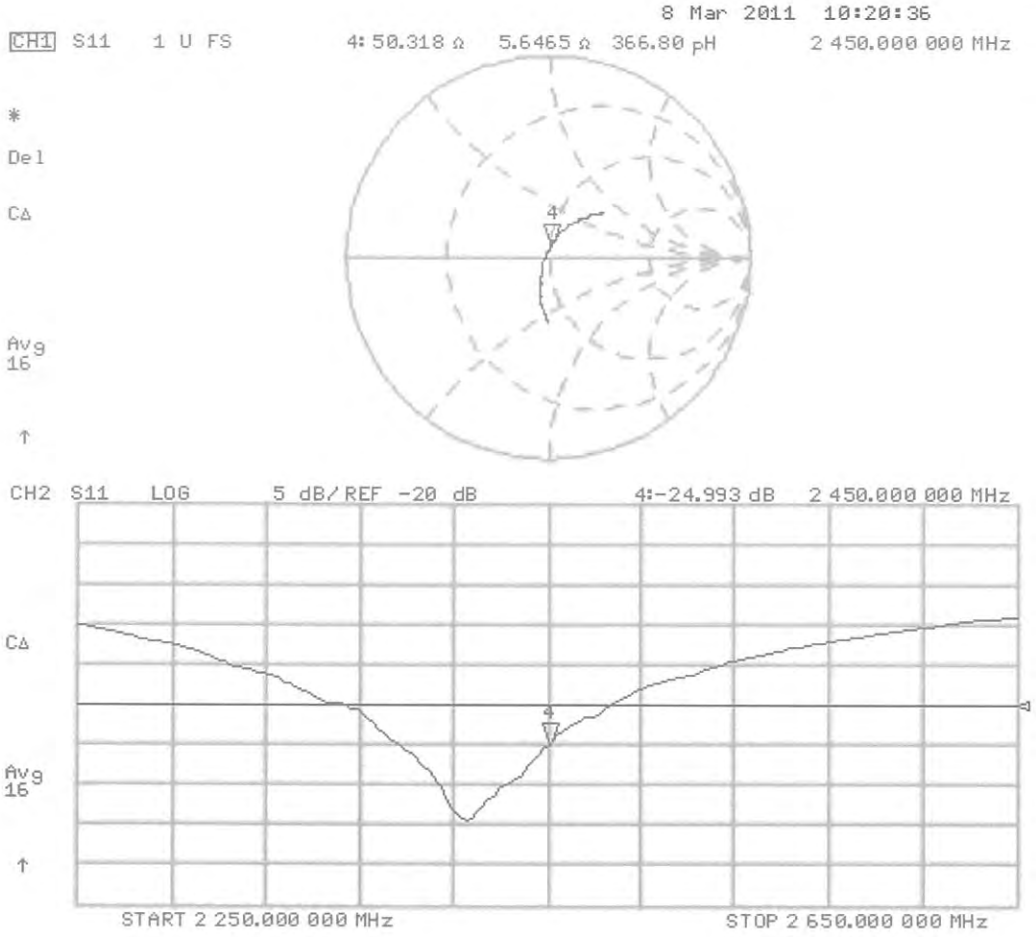
- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

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 = 97.844 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 27.853 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.14 mW/g
Maximum value of SAR (measured) = 17.439 mW/g



0 dB = 17.440mW/g

Impedance Measurement Plot for Body TSL



Dipole D2450V2 – SN: 760 Antenna Parameters

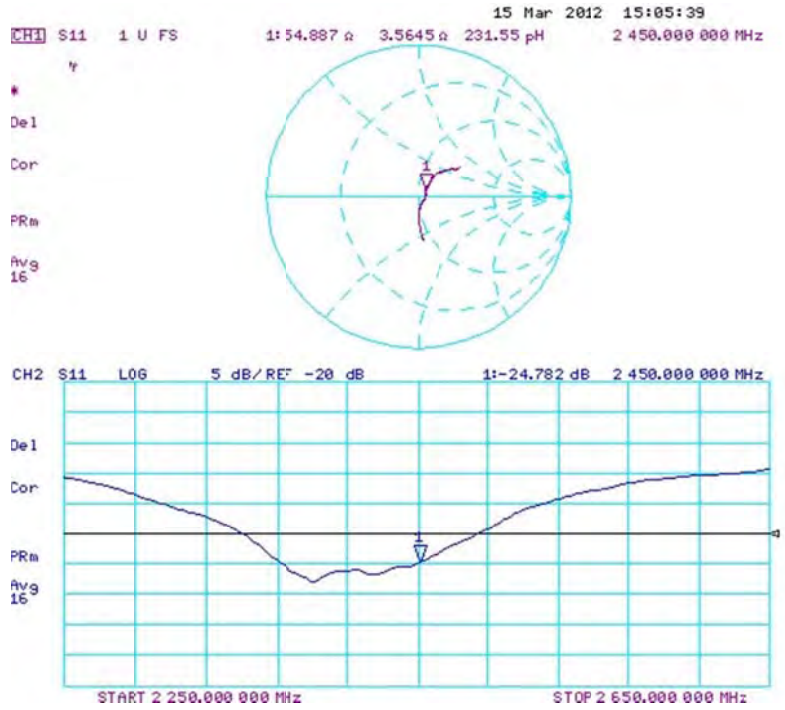
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement 2012-03-15
Impedance, transformed to feed point	55.3 Ω + 2.7 jΩ	54.9 Ω + 3.6 jΩ
Return loss	- 25.0 dB	- 24.8 dB

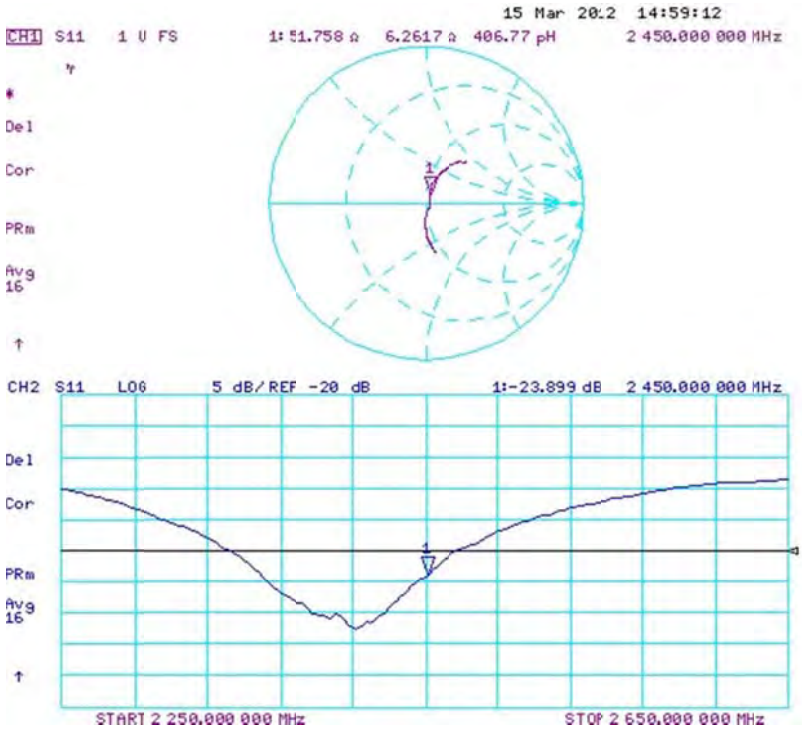
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement 2012-03-15
Impedance, transformed to feed point	50.3 Ω + 5.6 jΩ	51.8 Ω + 6.3 jΩ
Return loss	- 25.0 dB	- 23.9 dB

Impedance Measurement plot for Head TSL 2450



Impedance Measurement plot for Body TSL 2450



APPENDIX E: DIELECTRIC PARAMETERS OF THE TISSUE SIMULANTS

Head tissue simulant dielectric parameters used in the measurements:

f (MHz)	Date	Dielectric Parameters					
		128		190		251	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
GSM/GPRS 850	2012-03-16	40.7	0.86	40.7	0.87	40.5	0.88
f (MHz)	Date	Dielectric Parameters					
		512		661		810	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
GSM/GPRS 1900	2012-03-15	38.2	1.41	38.1	1.44	38.0	1.47
f (MHz)	Date	Dielectric Parameters					
		1		6		11	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
WLAN2450	2012-03-20	38.0	1.73	37.9	1.77	37.9	1.81

Body tissue simulant dielectric parameters used in the measurements:

f (MHz)	Date	Dielectric Parameters					
		128		190		251	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
GSM/GPRS 850	2012-03-19	54.5	0.96	54.4	0.97	54.3	0.98
f (MHz)	Date	Dielectric Parameters					
		512		661		810	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
GSM/GPRS 1900	2012-03-19	52.2	1.50	52.1	1.53	52.1	1.56
f (MHz)	Date	Dielectric Parameters					
		1		6		11	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
WLAN2450	2012-03-21	52.1	1.81	52.0	1.85	51.8	1.89