

SAR Compliance Test Report

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Client:	Nokia Inc. 12278 Scripps Summit Dr. San Diego, CA 92131 U.S.A. Tel. +1-858-831-5000 Fax. +1-858-831-6500		
Tested devices:	QMNRH-48		
Supplement reports:	-		
Testing has been carried out in accordance with:	47CFR §2.1093 Radiofrequency Radiation Exposure Evaluation: Portable Devices IEEE P1528-200X Draft 6.4 Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01) Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields		
Documentation:	The documentation of the testing performed on the tested devices is archived for 15 years at TCC Oulu		
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:

2003-07-04

For the contents:



Pentti Pärnänen
Manager, TCC Oulu



Anne Kiviniemi
Test Engineer

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1. SUMMARY FOR SAR TEST REPORT

Date of test	2003-06-25 - 2003-06-26
Contact person	Pentti Pärnänen
Test plan referred to	-
FCC ID	QMNRH-48
SN, HW and SW numbers of tested devices	SN: 072/02005710, HW: 3001, SW: B 3.0
Accessories used in testing	Headset HDB-4, headset HS-1C, battery BL-5C
Notes	-
Document code	DTX 07716-EN
Responsible test engineer	Pentti Pärnänen
Measurement performed by	Anne Kiviniemi

1.1 Maximum Results Found during SAR Evaluation

The equipment is deemed to fulfil the requirements if the measured values are less than or equal to the limit. Maximum found results are reported per operating band.

1.1.1 Head Configuration

Mode	Ch / f (MHz)	Power	Position	Limit	Measured	Result
CDMA	777/848.31	24.8 dBm	Cheek	1.6 W/kg	1.29 W/kg	PASSED

1.1.2 Body Worn Configuration

Mode	Ch / f (MHz)	Power	Distance	Limit	Measured	Result
CDMA	384/836.50	25.3 dBm	1.5 cm	1.6 W/kg	1.28 W/kg	PASSED

1.1.3 Measurement Uncertainty

Combined Standard Uncertainty	± 13.6%
Expanded Standard Uncertainty (k=2)	± 27.1%

2. DESCRIPTION OF TESTED DEVICE

Device category	Portable device
Exposure environment	Uncontrolled exposure
Unit type	Prototype unit
Case type	Fixed case
Modes of Operation	CDMA-800
Modulation Mode	Offset Quadrature Phase Shift Keying
Duty Cycle	1/1
Transmitter Frequency Range (MHz)	824.7 – 848.3

2.1 Picture of Phone



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2.2 Description of the Antenna

Type	Internal integrated antenna	
Dimensions (mm)	Maximum width	34.6 mm
	Maximum length	26.9 mm
Location	Inside the back cover, near the top of the device	

2.3 Battery Options

There is only one battery, BL-5C, available for tested device.

3. TEST CONDITIONS

3.1 Ambient Conditions

Ambient temperature (°C)	22±2
Tissue simulating liquid temperature (°C)	22±1
Humidity	48

3.2 RF characteristics of the test site

Tests were performed in an enclosed RF shielded environment.

3.3 Test Signal, Frequencies, and Output Power

The device was controlled by using a radio tester. Communication between the device and the tester was established by air link.

Measurements were performed on lowest, middle and highest channels.

The phone was set to maximum power level during the all tests and at the beginning of the each test the battery was fully charged. Conducted power output was measured.

DASY4 system measures power drift during SAR testing by comparing e-field in the same location at the beginning and at the end of measurement. These records were used to monitor stability of power output.

4. DESCRIPTION OF THE TEST EQUIPMENT

The measurements were performed with an automated near-field scanning system, DASY4, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland.

Test Equipment	Serial Number	Due Date
DAE V1	371	10/03
E-field Probe ET3DV6	1381	10/03
Dipole Validation Kit, D835V2	448	02/05

E-field probe calibration records are presented in Appendix C.

Additional equipment needed in validation

Test Equipment	Model	Serial Number	Due Date
Signal Generator	Agilent E4433B	GB40050947	09/04
Amplifier	Amplifier Research 5S1G4	27573	-
Power Meter	R&S NRT	835065/049	06/04
Power Sensor	R&S NRT-Z44	835374/021	06/04
Thermometer	DO9416	1505985462	-
Vector Network Analyzer	Hewlett Packard 8753E	US38432701	05/04
Dielectric Probe Kit	Agilent 85070C	-	-

Equipment used to measure conducted power output

Test Equipment	Model	Serial Number	Due Date
Power Meter	Agilent E4416A	GB41290849	12/03
Power Sensor	Agilent E9323A	US40410622	-

4.1 System Accuracy Verification

The probes are calibrated annually by the manufacturer. Dielectric parameters of the simulating liquids are measured by using a dielectric probe kit and a vector network analyzer.

The SAR measurement of the DUT were done within 24 hours of system accuracy verification, which was done using the dipole validation kit.

The dipole antenna, which is manufactured by Schmid & Partner Engineering AG, is matched to be used near flat phantom filled with tissue simulating solution. Dipole length for 835 MHz is 161 mm with overall height of 330mm. A specific distance holder is used in the positioning of antenna to ensure correct spacing between the phantom and the dipole. Manufacturer's reference dipole data is presented in Appendix C.

Power level of 250 mW was supplied to a dipole antenna placed under the flat section of SAM phantom. The validation results are in the table below and printout of the validation test is presented in Appendix A. All the measured parameters were within the specification.

Tissue	f (MHz)	Description	SAR (W/kg), 1g	Dielectric Parameters		Temp p (°C)
				ϵ_r	σ (S/m)	
Head	835	Measured 06/25/03	10.3	41.3	0.92	22
		Reference Result	9.72	41.5	0.89	N/A
Muscle	835	Measured 06/26/03	10.2	56.5	0.96	22
		Reference Result	10.1	54.0	0.96	N/A

4.2 Tissue Simulants

All dielectric parameters of tissue simulants were measured within 24 hours of SAR measurements. The depth of the tissue simulant in the ear reference point of the phantom was $15\text{cm} \pm 5\text{mm}$ during all the tests. Volume for each tissue simulant was 26 liters.

4.2.1 Head Tissue Simulant

The composition of the brain tissue simulating liquid for 835MHz

58.31% Sugar
39.74% De-Ionized Water
1.55% Salt
0.25% HEC
0.15% Bactericide

f (MHz)	Description	Dielectric Parameters		Temp (°C)
		ϵ_r	σ (S/m)	
835	Measured 06/25/03	41.3	0.92	22
	Recommended Values	41.5	0.90	20-26

Recommended values are adopted from OET Bulletin 65 (97-01) Supplement C (01-01).

4.2.2 Muscle Tissue Simulant

The composition of the muscle tissue simulating liquid for 835MHz

55.97% De-Ionized Water
41.76% Sugar
1.21% HEC
0.79% Salt
0.27% Preservative

f (MHz)	Description	Dielectric Parameters		Temp (°C)
		ϵ_r	σ (S/m)	
835	Measured 06/26/03	56.5	0.96	22
	Recommended Values	55.2	0.97	20-26

Recommended values are adopted from OET Bulletin 65 (97-01) Supplement C (01-01).

4.3 Phantoms

"SAM v4.0" phantom", manufactured by SPEAG, was used during the measurement. It has fiberglass shell integrated in a wooden table. The shape of the shell corresponds to the phantom defined by SCC34-SC2. It enables the dosimetric



evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

The thickness of phantom shell is 2 mm except for the ear, where an integrated ear spacer provides a 6 mm spacing from the tissue boundary. Manufacturer reports tolerance in shell thickness to be ± 0.1 mm.

4.4 Isotropic E-Field Probe ET3DV6

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 3 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB

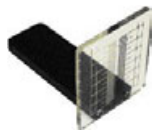


Dimensions	Overall length: 330 mm
	Tip length: 16 mm
Application	Body diameter: 12 mm
	Tip diameter: 6.8 mm
	Distance from probe tip to dipole centers: 2.7 mm
	General dosimetry up to 3 GHz
	Compliance tests of mobile phones
	Fast automatic scanning in arbitrary phantoms

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Test Positions

The device was placed in holder using a special positioning tool, which aligns the bottom of the device with holder and ensures that holder contacts only to the sides of the device. After positioning is done, tool is removed. This method provides standard positioning and separation, and also ensures free space for antenna.



Device holder was provided by SPEAG together with DASY4.

5.1.1 Against Phantom Head

Measurements were made on both the "left hand" and "right hand" side of the phantom.

The device was positioned against phantom according to OET Bulletin 65 (97-01) Supplement C (01-01) . Definitions of terms used in aligning the device to a head phantom are available in IEEE Draft Standard P1528-2001 "Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"

5.1.1.1 Initial Ear Position

The device was initially positioned with the earpiece region pressed against the ear spacer of a head phantom parallel to the "Neck-Front" line defined along the base of the ear spacer that contains the "ear reference point". The "test device reference point" is aligned to the "ear reference point" on the head phantom and the "vertical centerline" is aligned to the "phantom reference plane".

5.1.1.2 Cheek Position

"Initial ear position" alignments are maintained and the device is brought toward the mouth of the head phantom by pivoting along the "Neck-Front" line until any point on the display, keypad or mouthpiece portions of the handset is in contact

with the phantom or when any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.



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5.1.1.3 Tilt Position

In the "Cheek Position", if the earpiece of the device is not in full contact with the phantom's ear spacer and the peak SAR location for the "cheek position" is located at the ear spacer region or corresponds to the earpiece region of the handset, the device is returned to the "initial ear position" by rotating it away from the mouth until the earpiece is in full contact with the ear spacer. Otherwise, the device is moved away from the cheek perpendicular to the line passes through both "ear reference points" for approximate 2-3 cm. While it is in this position, the device is tilted away from the mouth with respect to the "test device reference point" by 15°. After the tilt, it is then moved back toward the head perpendicular to the line passes through both "ear reference points" until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process is repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously.



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5.1.2 Body Worn Configuration

Body worn SAR measurements were performed with antenna facing towards the flat part of the phantom with a separation distance of 15 mm. Headsets HDB-4 and HS-1C were connected during measurements. Body worn measurements were performed in CDMA mode.



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5.2 Scan Procedures

First coarse scans are used for quick determination of the field distribution. Next a cube scan, 5x5x7 points; spacing between each point 8x8x5 mm, is performed around the highest E-field value to determine the averaged SAR-distribution over 1g.

5.3 SAR Averaging Methods

The maximum SAR value is averaged over its volume using interpolation and extrapolation.

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot" -condition [W. Gander, Computermathematik, p. 141-150] (x, y and z -directions) [Numerical Recipes in C, Second Edition, p 123].

The extrapolation is based on least square algorithm [W. Gander, Computermathematik, p.168-180]. Through the points in the first 30 mm in all z-axis, polynomials of order four are calculated. This polynomial is then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1mm from one another.

6. MEASUREMENT UNCERTAINTY

6.1 Description of Individual Measurement Uncertainty

6.1.1 Assessment Uncertainty

Uncertainty Component	P1528 Sec	Tol. (%)	Prob Dist	Div	c_i	u_i (%)	v_i
Measurement System							
Probe Calibration	E2.1	±4.8	N	1	1	±4.8	∞
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	E5.2	±1.0	R	√3	1	±0.6	∞
Test sample Related							
Test Sample Positioning	E4.2.1	±6.0	N	1	1	±6.0	11
Device Holder Uncertainty	E4.1.1	±5.0	N	1	1	±5.0	7
Output Power Variation - SAR drift measurement	6.6.3	±10.0	R	√3	1	±5.8	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	±4.0	R	√3	1	±2.3	∞
Liquid Conductivity Target - tolerance	E3.2	±5.0	R	√3	0.64	±1.8	∞
Liquid Conductivity - measurement uncertainty	E3.3	±5.5	N	1	0.64	±3.5	5
Liquid Permittivity Target tolerance	E3.2	±5.0	R	√3	0.6	±1.7	∞
Liquid Permittivity - measurement uncertainty	E3.3	±2.9	N	1	0.6	±1.7	5
Combined Standard Uncertainty			RSS			±13.6	161
Coverage Factor for 95%			k=2				
Expanded Standard Uncertainty						±27.1	

7. RESULTS

Corresponding SAR distribution printouts of maximum results in every operating mode and position are shown in Appendix B. It also includes Z-plots of maximum measurement results in head and body worn configurations. The SAR distributions are substantially similar or equivalent to the plots submitted regardless of used channel in each mode and position. The coarse scans used in the head configuration measurements cover the whole head region.

7.1 Head Configuration

QMNRH-48						
Mode	Channel/ <i>f</i> (MHz)	Power (dBm)	SAR, averaged over 1g (W/kg)			
			Left-hand		Right-hand	
			Cheek	Tilted	Cheek	Tilted
CDMA 800	1013/824.70	23.2	1.21	0.57	1.07	0.58
	384/836.52	25.3	1.23	0.60	0.96	0.62
	777/848.31	24.8	1.29	0.75	1.25	0.87

7.2 Body Worn Configuration

QMNRH-48			
Mode	Channel/ <i>f</i> (MHz)	Power (dBm)	SAR, averaged over 1g (W/kg)
			Headset HDB-4
CDMA 800	1013/824.70	23.2	0.72
	384/836.52	25.3	1.28
	777/848.31	24.8	1.04

QMNRH-48			
Mode	Channel/ <i>f</i> (MHz)	Power (dBm)	SAR, averaged over 1g (W/kg)
			Headset HS-1C
CDMA 800	1013/824.70	23.2	0.52
	384/836.52	25.3	0.91
	777/848.31	24.8	0.72

APPENDIX A.

Validation Test Printouts

Date/Time: 06/25/03 12:39:02

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: Dipole 835 MHz; Type: D835V2; Serial: 448

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

Medium: Head 835 MHz ($\sigma = 0.922152$ mho/m, $\epsilon_r = 41.3444$, $\rho = 1000$ kg/m³)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.3, 6.3, 6.3); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_2; Type: SAM; Serial: TP-1003
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

HSL835; t = 22.8 C/Area Scan (71x81x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 57.4 V/m

Power Drift = 0.009 dB

Maximum value of SAR = 2.78 mW/g

HSL835; t = 22.8 C/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

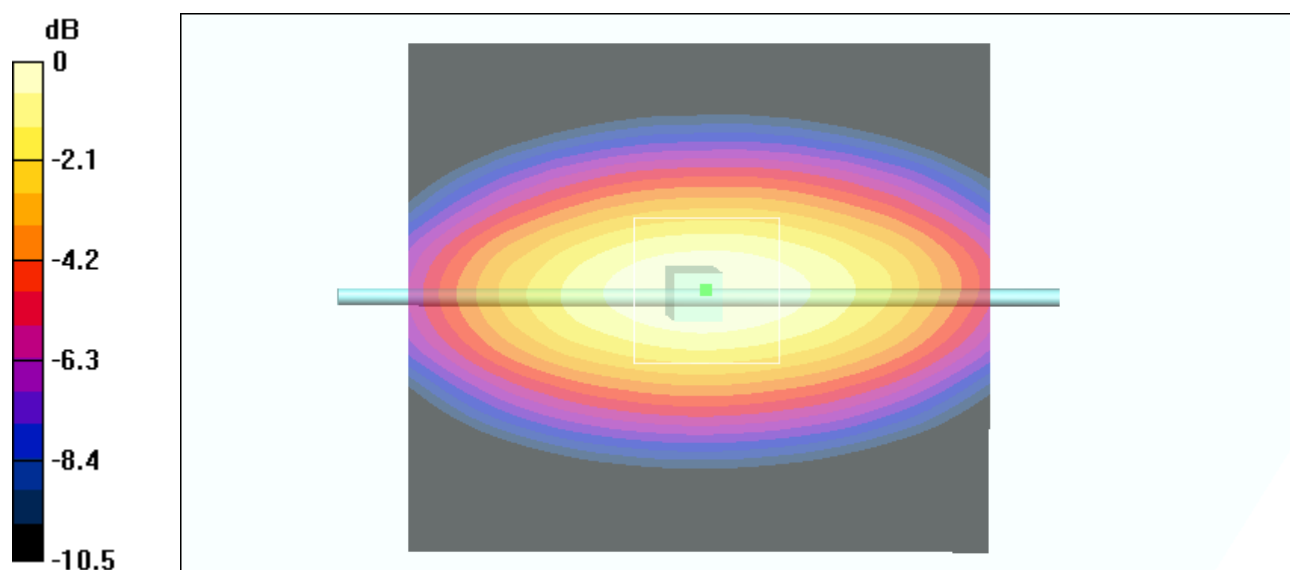
Peak SAR (extrapolated) = 3.72 W/kg

SAR(1 g) = 2.57 mW/g; SAR(10 g) = 1.67 mW/g

Reference Value = 57.4 V/m

Power Drift = 0.009 dB

Maximum value of SAR = 2.76 mW/g



0 dB = 2.76mW/g

Date/Time: 06/26/03 09:50:12

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: Dipole 835 MHz; Type: D835V2; Serial: 448

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

Medium: Muscle 850 MHz ($\sigma = 0.956154$ mho/m, $\epsilon_r = 56.4661$, $\rho = 1000$ kg/m³)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.1, 6.1, 6.1); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_3; Type: SAM; Serial: TP-1142
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

muscle 835; T = 22.5 C/Area Scan (71x81x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 55.9 V/m

Power Drift = 0.005 dB

Maximum value of SAR = 2.75 mW/g

muscle 835; T = 22.5 C/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

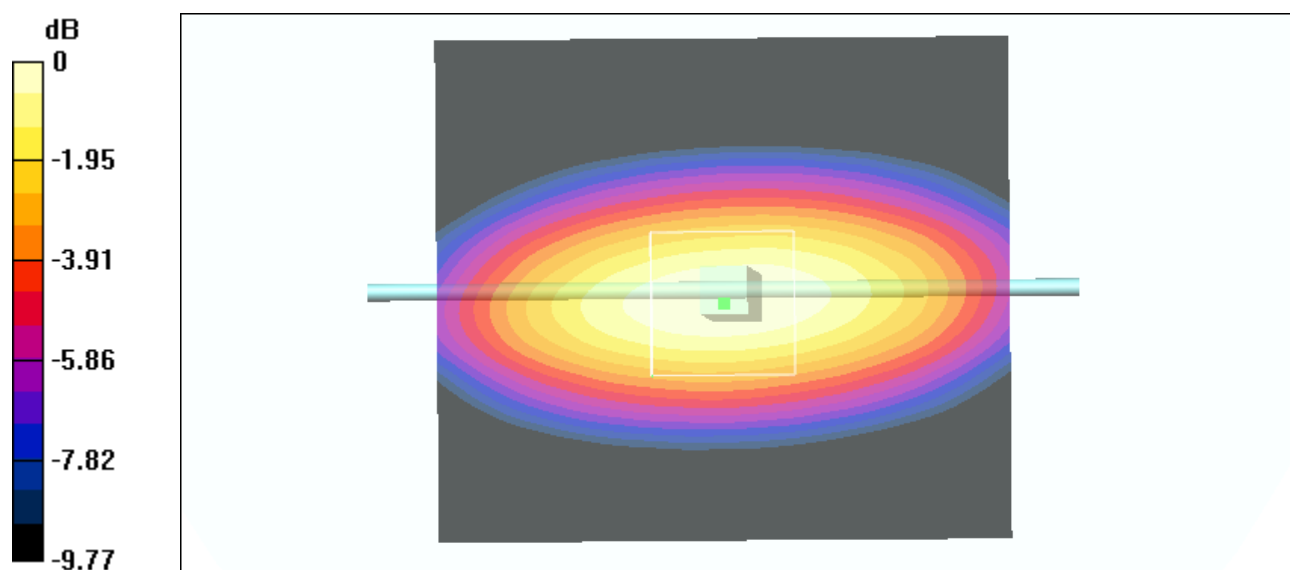
Peak SAR (extrapolated) = 3.58 W/kg

SAR(1 g) = 2.54 mW/g; SAR(10 g) = 1.68 mW/g

Reference Value = 55.9 V/m

Power Drift = 0.005 dB

Maximum value of SAR = 2.73 mW/g



0 dB = 2.73mW/g

APPENDIX B.

SAR Distribution Printouts

Date/Time: 06/25/03 12:40:23

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: QMNRH-48; Type: RH-48; Serial: 072/02005710

Communication System: CDMA; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: Head 835 MHz ($\sigma = 0.934393$ mho/m, $\epsilon_r = 41.1641$, $\rho = 1000$ kg/m³)

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.3, 6.3, 6.3); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_2; Type: SAM; Serial: TP-1003
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Cheek, T = 22.8 C, worst case extrapolation/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 32.3 V/m

Power Drift = -0.02 dB

Maximum value of SAR = 1.24 mW/g

Cheek, T = 22.8 C, worst case extrapolation/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

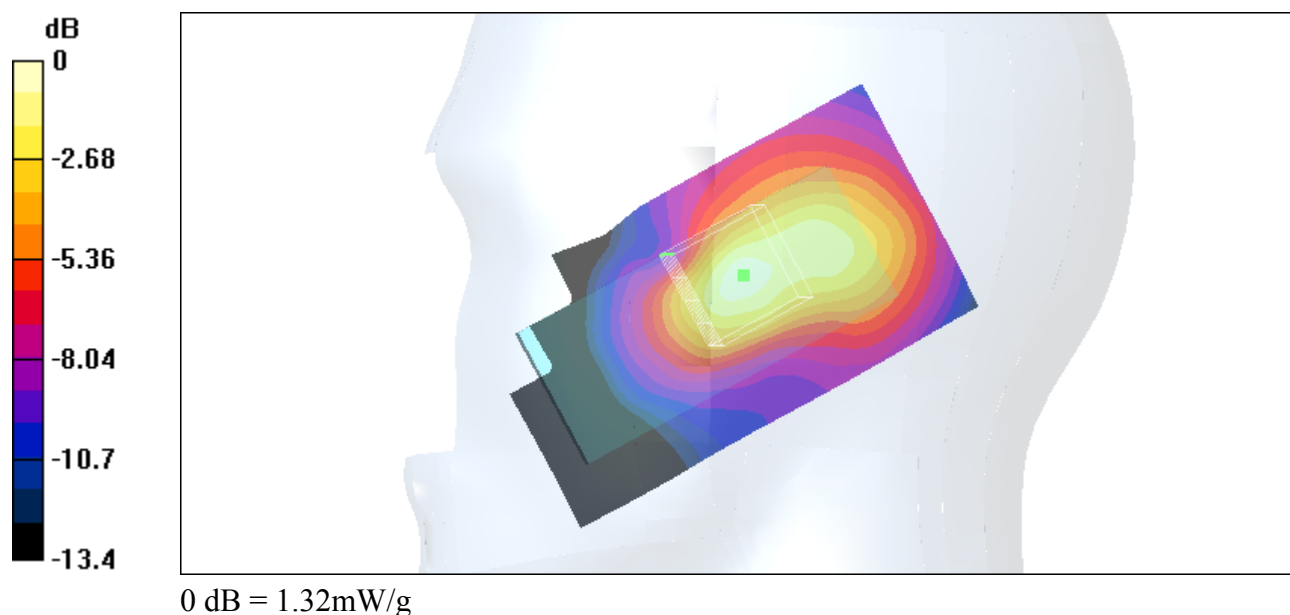
Peak SAR (extrapolated) = 3.05 W/kg

SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.679 mW/g

Reference Value = 32.3 V/m

Power Drift = -0.02 dB

Maximum value of SAR = 1.32 mW/g



Date/Time: 06/25/03 19:13:28

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: QMNRH-48; Type: RH-48; Serial: 072/02005710

Communication System: CDMA; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: Head 835 MHz ($\sigma = 0.934393$ mho/m, $\epsilon_r = 41.1641$, $\rho = 1000$ kg/m³)

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.3, 6.3, 6.3); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_2; Type: SAM; Serial: TP-1003
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Tilted, T = 23.0 C, worst case extrapolation/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 27.5 V/m

Power Drift = 0.007 dB

Maximum value of SAR = 0.737 mW/g

Tilted, T = 23.0 C, worst case extrapolation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

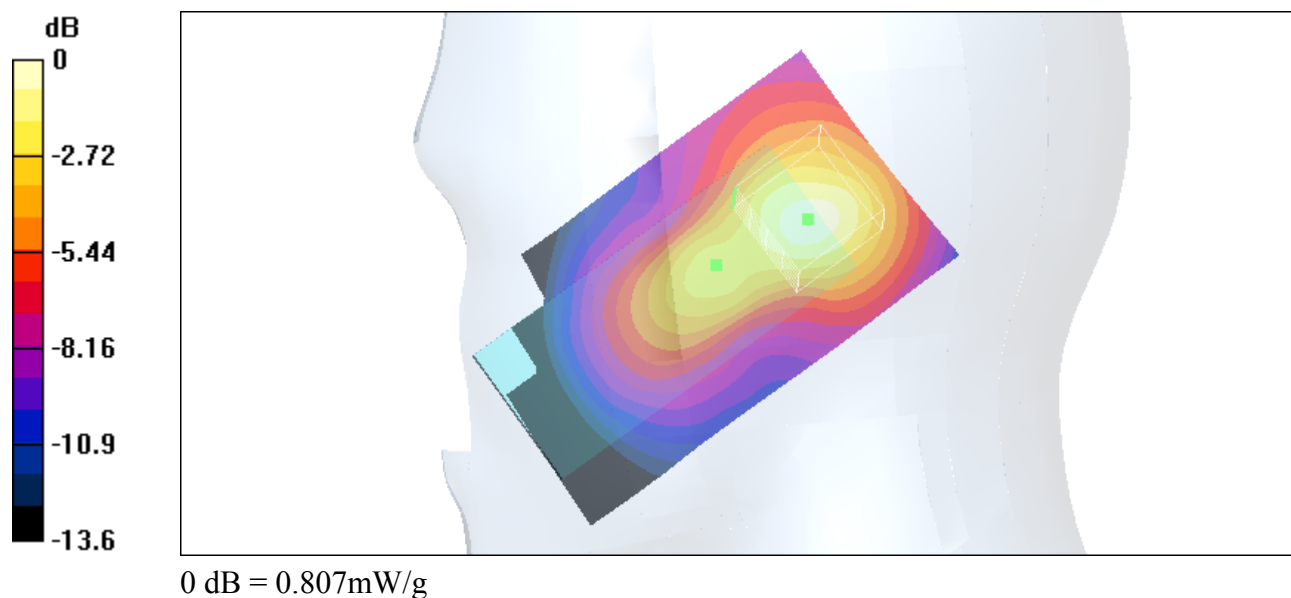
Peak SAR (extrapolated) = 1.54 W/kg

SAR(1 g) = 0.746 mW/g; SAR(10 g) = 0.402 mW/g

Reference Value = 27.5 V/m

Power Drift = 0.007 dB

Maximum value of SAR = 0.807 mW/g



Date/Time: 06/25/03 15:32:10

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: QMNRH-48; Type: RH-48; Serial: 072/02005710

Communication System: CDMA; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: Head 835 MHz ($\sigma = 0.934393$ mho/m, $\epsilon_r = 41.1641$, $\rho = 1000$ kg/m³)

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.3, 6.3, 6.3); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_2; Type: SAM; Serial: TP-1003
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Cheek, T = 23.0 C, worst case extrapolation/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 34.2 V/m

Power Drift = -0.07 dB

Maximum value of SAR = 1.31 mW/g

Cheek, T = 23.0 C, worst case extrapolation/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

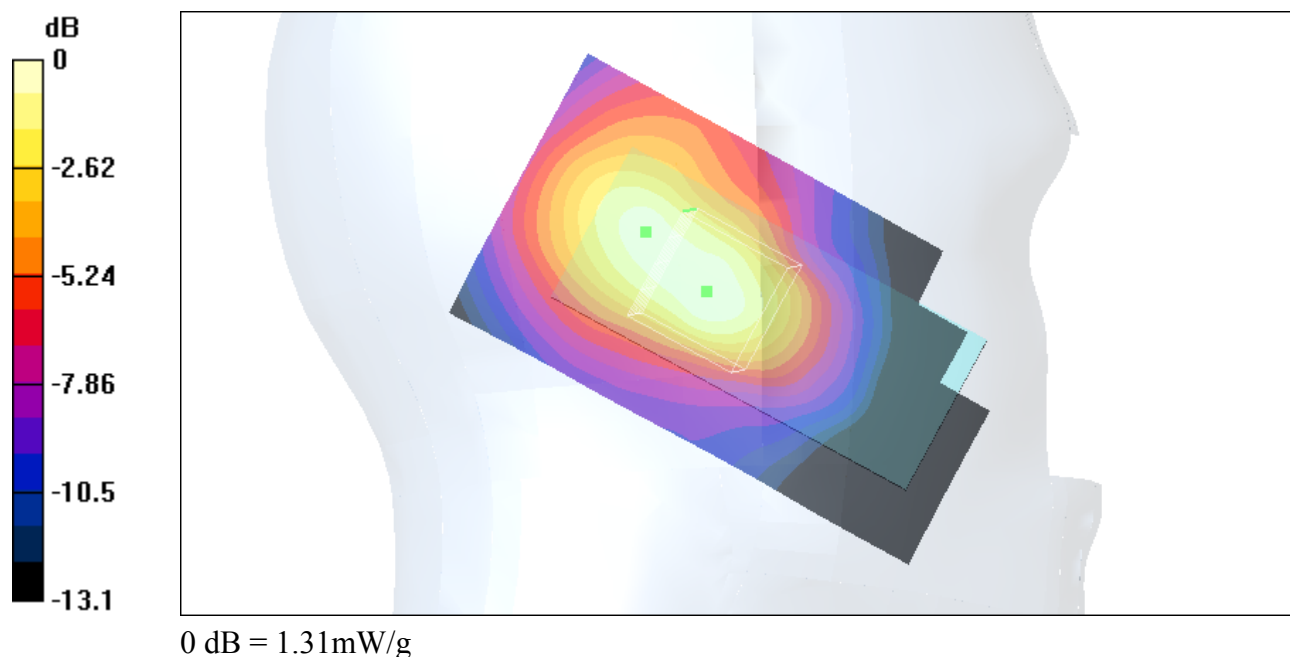
Peak SAR (extrapolated) = 2.46 W/kg

SAR(1 g) = 1.25 mW/g; SAR(10 g) = 0.728 mW/g

Reference Value = 34.2 V/m

Power Drift = -0.07 dB

Maximum value of SAR = 1.31 mW/g



Date/Time: 06/25/03 19:16:04

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: QMNRH-48; Type: RH-48; Serial: 072/02005710

Communication System: CDMA; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: Head 835 MHz ($\sigma = 0.934393$ mho/m, $\epsilon_r = 41.1641$, $\rho = 1000$ kg/m³)

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.3, 6.3, 6.3); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_2; Type: SAM; Serial: TP-1003
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Tilted, T = 23.0 C, worst case extrapolation/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 29.9 V/m

Power Drift = -0.02 dB

Maximum value of SAR = 0.885 mW/g

Tilted, T = 23.0 C, worst case extrapolation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

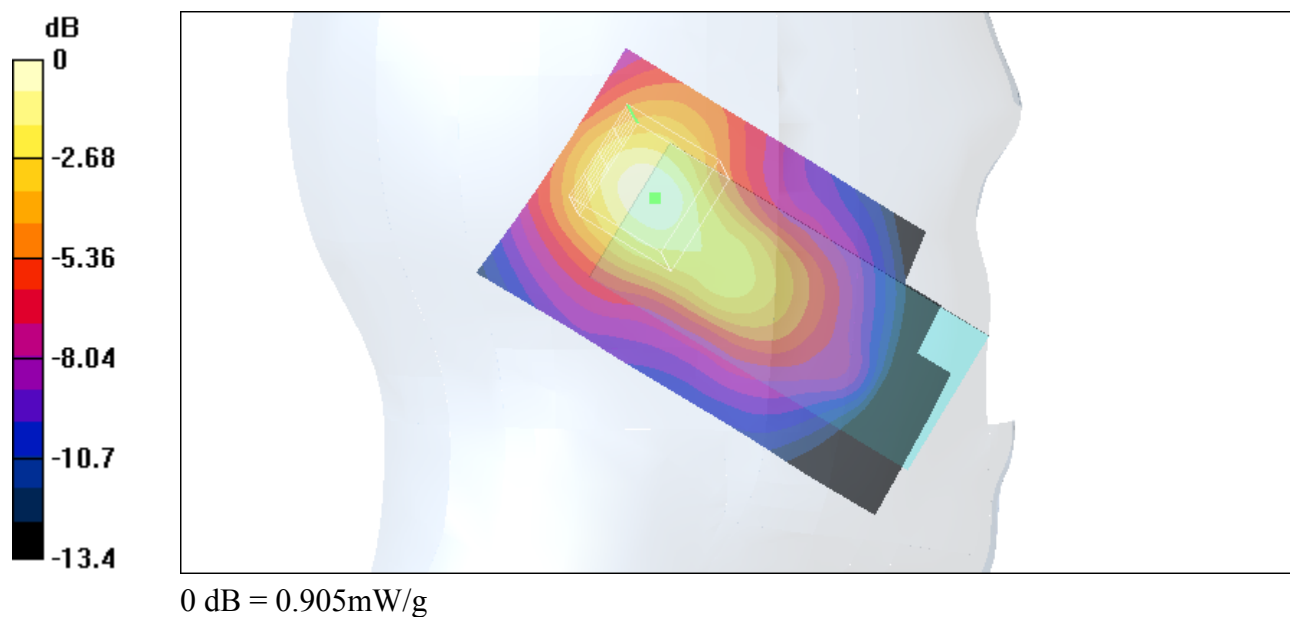
Peak SAR (extrapolated) = 1.82 W/kg

SAR(1 g) = 0.868 mW/g; SAR(10 g) = 0.466 mW/g

Reference Value = 29.9 V/m

Power Drift = -0.02 dB

Maximum value of SAR = 0.905 mW/g



Date/Time: 06/26/03 13:11:58

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: QMNRH-48; Type: RH-48; Serial: 072/02005710; Headset: HDB-4

Communication System: CDMA; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: Muscle 850 MHz ($\sigma = 0.956154$ mho/m, $\epsilon_r = 56.4661$, $\rho = 1000$ kg/m³)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.1, 6.1, 6.1); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_3; Type: SAM; Serial: TP-1142
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Body worn; t = 22.6 C, worst case extrapolation/Area Scan (51x91x1): Measurement grid:

dx=15mm, dy=15mm

Reference Value = 20.5 V/m

Power Drift = -0.1 dB

Maximum value of SAR = 1.38 mW/g

Body worn; t = 22.6 C, worst case extrapolation/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

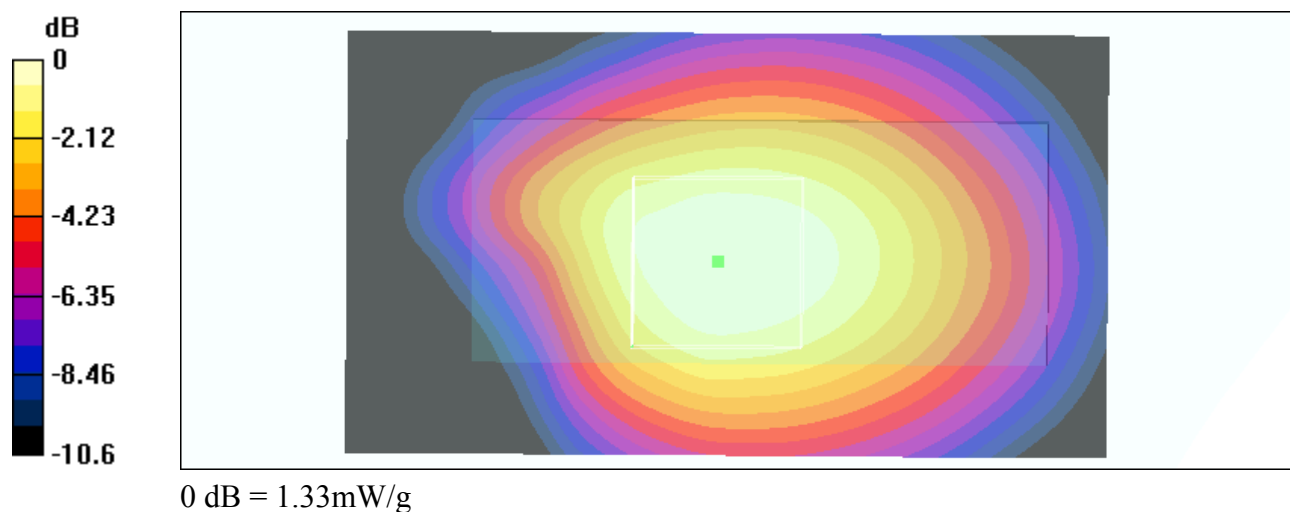
Peak SAR (extrapolated) = 1.95 W/kg

SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.876 mW/g

Reference Value = 20.5 V/m

Power Drift = -0.1 dB

Maximum value of SAR = 1.33 mW/g



Date/Time: 06/26/03 13:13:38

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: QMNRH-48; Type: RH-48; Serial: 072/02005710; Headset: HS-1C

Communication System: CDMA; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: Muscle 850 MHz ($\sigma = 0.956154$ mho/m, $\epsilon_r = 56.4661$, $\rho = 1000$ kg/m³)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.1, 6.1, 6.1); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_3; Type: SAM; Serial: TP-1142
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Body worn; t = 23.0 C, worst case extrapolation/Area Scan (51x91x1): Measurement grid:

dx=15mm, dy=15mm

Reference Value = 17.6 V/m

Power Drift = -0.09 dB

Maximum value of SAR = 0.997 mW/g

Body worn; t = 23.0 C, worst case extrapolation/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

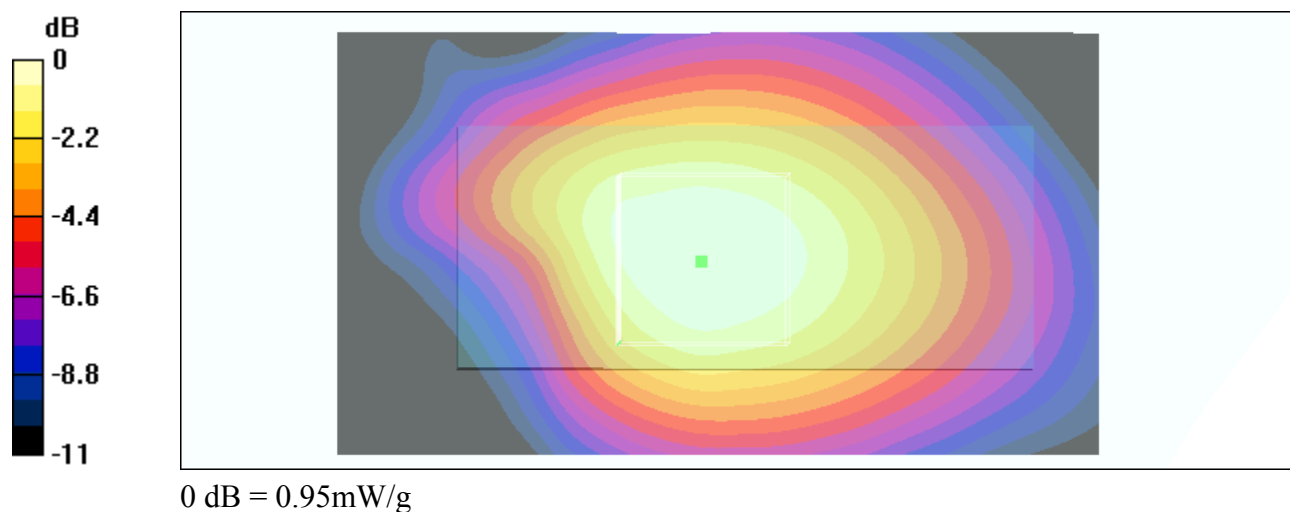
Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.914 mW/g; SAR(10 g) = 0.623 mW/g

Reference Value = 17.6 V/m

Power Drift = -0.09 dB

Maximum value of SAR = 0.95 mW/g



Date/Time: 06/25/03 12:40:23

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: QMNRH-48; Type: RH-48; Serial: 072/02005710

Communication System: CDMA; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: Head 835 MHz ($\sigma = 0.934393$ mho/m, $\epsilon_r = 41.1641$, $\rho = 1000$ kg/m³)

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.3, 6.3, 6.3); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_2; Type: SAM; Serial: TP-1003
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Cheek, T = 22.8 C, worst case extrapolation/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 32.3 V/m

Power Drift = -0.02 dB

Maximum value of SAR = 1.24 mW/g

Cheek, T = 22.8 C, worst case extrapolation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

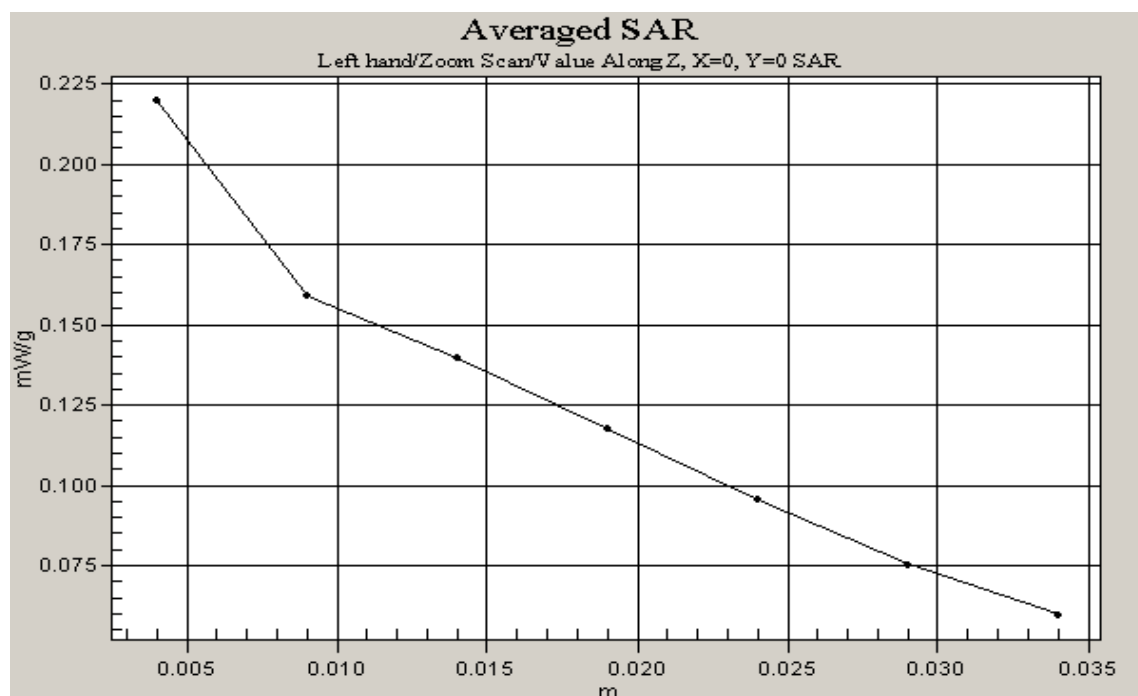
Peak SAR (extrapolated) = 3.05 W/kg

SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.679 mW/g

Reference Value = 32.3 V/m

Power Drift = -0.02 dB

Maximum value of SAR = 1.32 mW/g



Date/Time: 06/26/03 13:11:58

Test Laboratory: Nokia Mobile Phones, Oulu; DTX07716-EN

DUT: QMNRH-48; Type: RH-48; Serial: 072/02005710; Headset: HDB-4

Communication System: CDMA; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: Muscle 850 MHz ($\sigma = 0.956154$ mho/m, $\epsilon_r = 56.4661$, $\rho = 1000$ kg/m³)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1381; ConvF(6.1, 6.1, 6.1); Calibrated: 21.10.2002
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 18.10.2002
- Phantom: SAM_3; Type: SAM; Serial: TP-1142
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Body worn; t = 22.6 C, worst case extrapolation/Area Scan (51x91x1): Measurement grid:

dx=15mm, dy=15mm

Reference Value = 20.5 V/m

Power Drift = -0.1 dB

Maximum value of SAR = 1.38 mW/g

Body worn; t = 22.6 C, worst case extrapolation/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

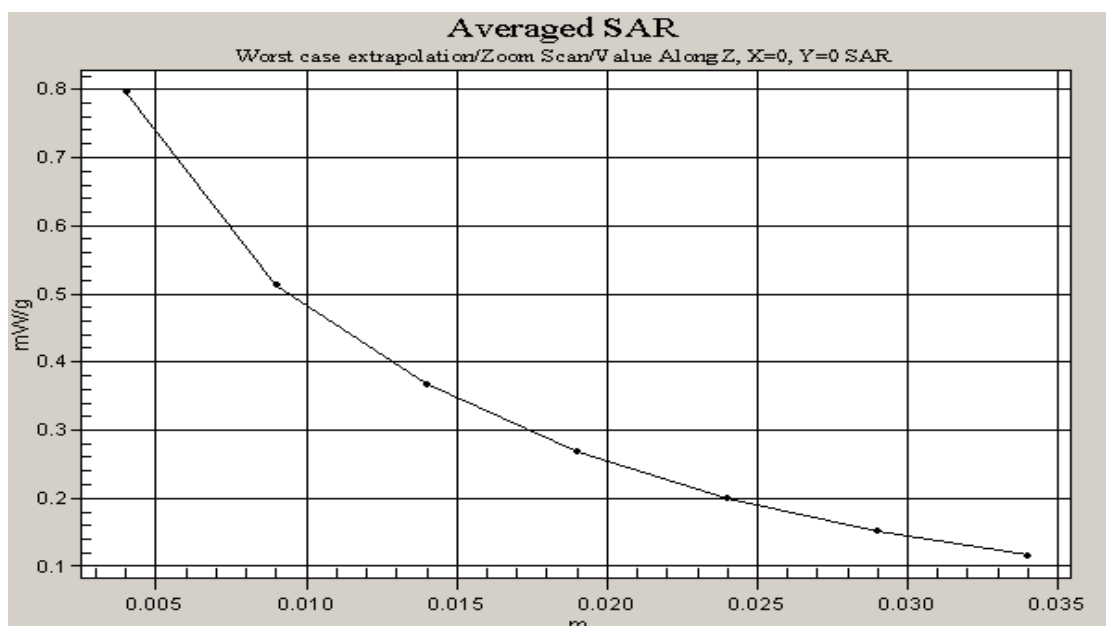
Peak SAR (extrapolated) = 1.95 W/kg

SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.876 mW/g

Reference Value = 20.5 V/m

Power Drift = -0.1 dB

Maximum value of SAR = 1.33 mW/g



APPENDIX C.

Calibration Certificate(s)

Calibration Certificate

Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1381

Place of Calibration:

Zurich

Date of Calibration:

October 21, 2002

Calibration Interval:

12 months

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:

N. Vetter

Approved by:

Alain Kutz

Probe ET3DV6

SN:1381

Manufactured:	September 18, 1999
Last calibration:	October 25, 2001
Recalibrated:	October 21, 2002

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1381

Sensitivity in Free Space

NormX	1.57 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.69 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.78 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	95	mV
DCP Y	95	mV
DCP Z	95	mV

Sensitivity in Tissue Simulating Liquid

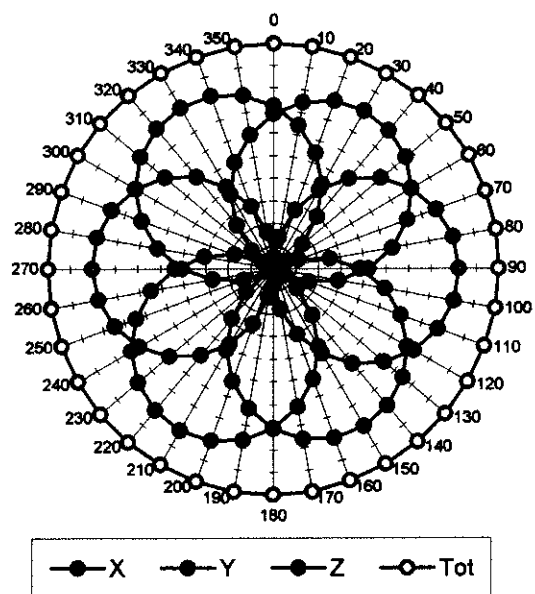
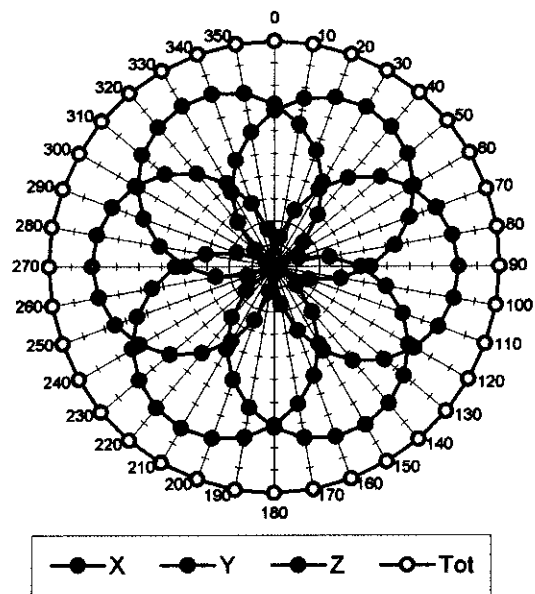
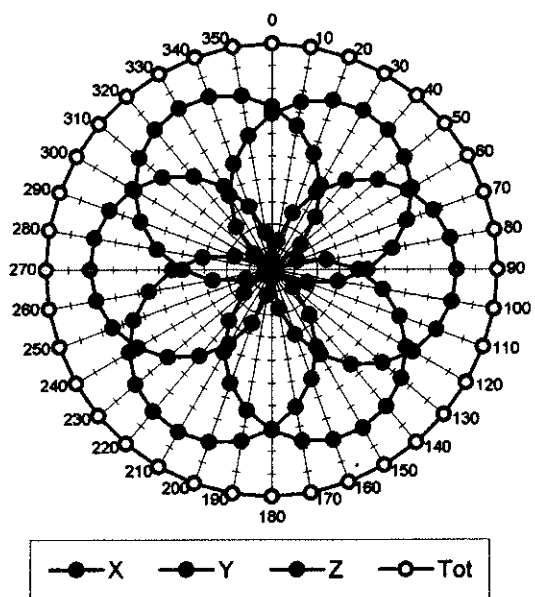
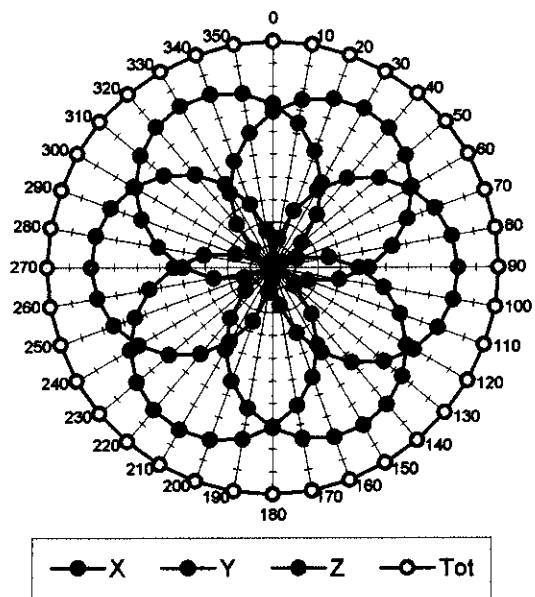
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\% \text{ mho/m}$
Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$
ConvF X	6.3 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.3 $\pm 9.5\%$ (k=2)	Alpha	0.43
ConvF Z	6.3 $\pm 9.5\%$ (k=2)	Depth	2.44
Head	1880 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
ConvF X	5.1 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	5.1 $\pm 9.5\%$ (k=2)	Alpha	0.61
ConvF Z	5.1 $\pm 9.5\%$ (k=2)	Depth	2.32

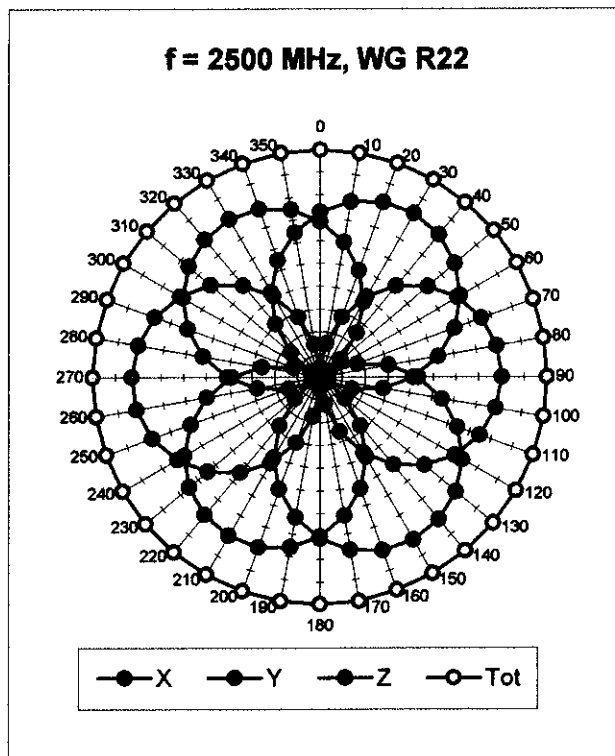
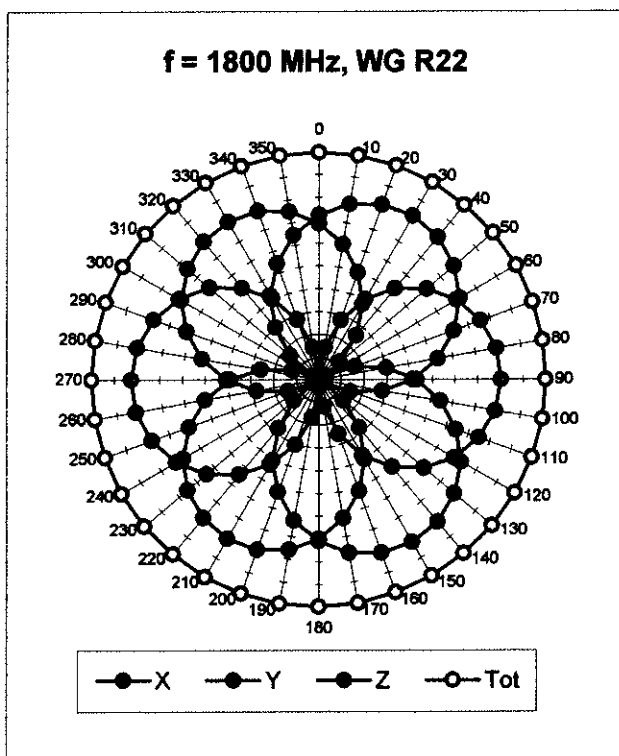
Boundary Effect

Head	835 MHz	Typical SAR gradient: 5 % per mm	
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%]	Without Correction Algorithm	11.0	6.1
SAR _{be} [%]	With Correction Algorithm	0.4	0.6
Head	1880 MHz	Typical SAR gradient: 10 % per mm	
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%]	Without Correction Algorithm	13.9	8.9
SAR _{be} [%]	With Correction Algorithm	0.2	0.2

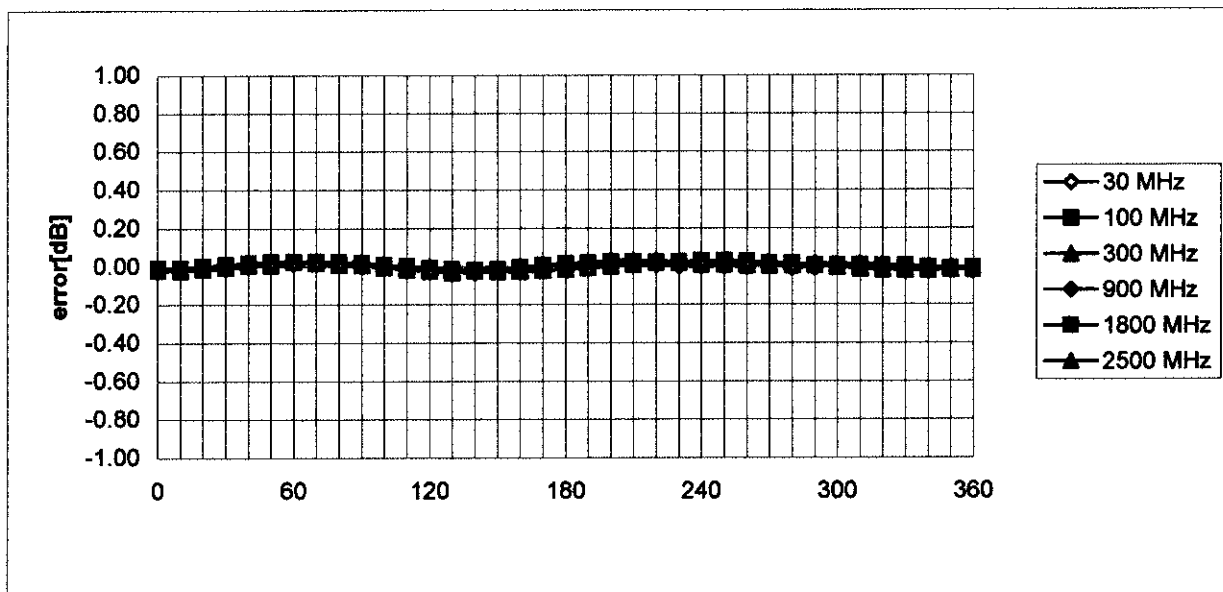
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.6 $\pm$ 0.2	mm

Receiving Pattern (ϕ), $\theta = 0^\circ$ **f = 30 MHz, TEM cell if110****f = 100 MHz, TEM cell if110****f = 300 MHz, TEM cell if110****f = 900 MHz, TEM cell if110**

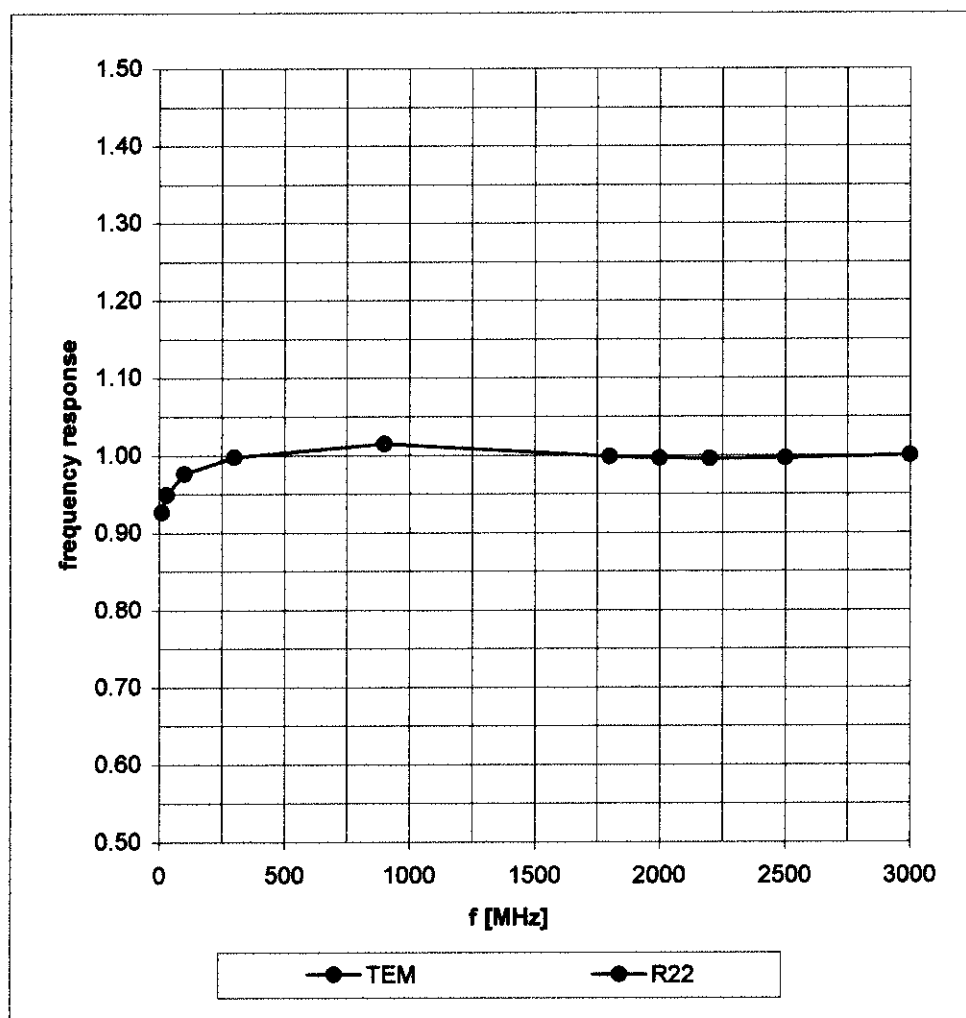


Isotropy Error (ϕ), $\theta = 0^\circ$

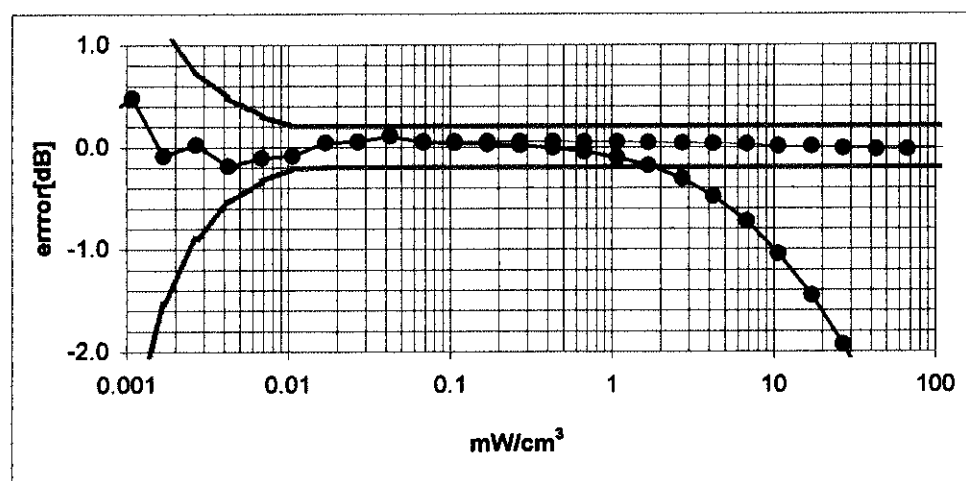
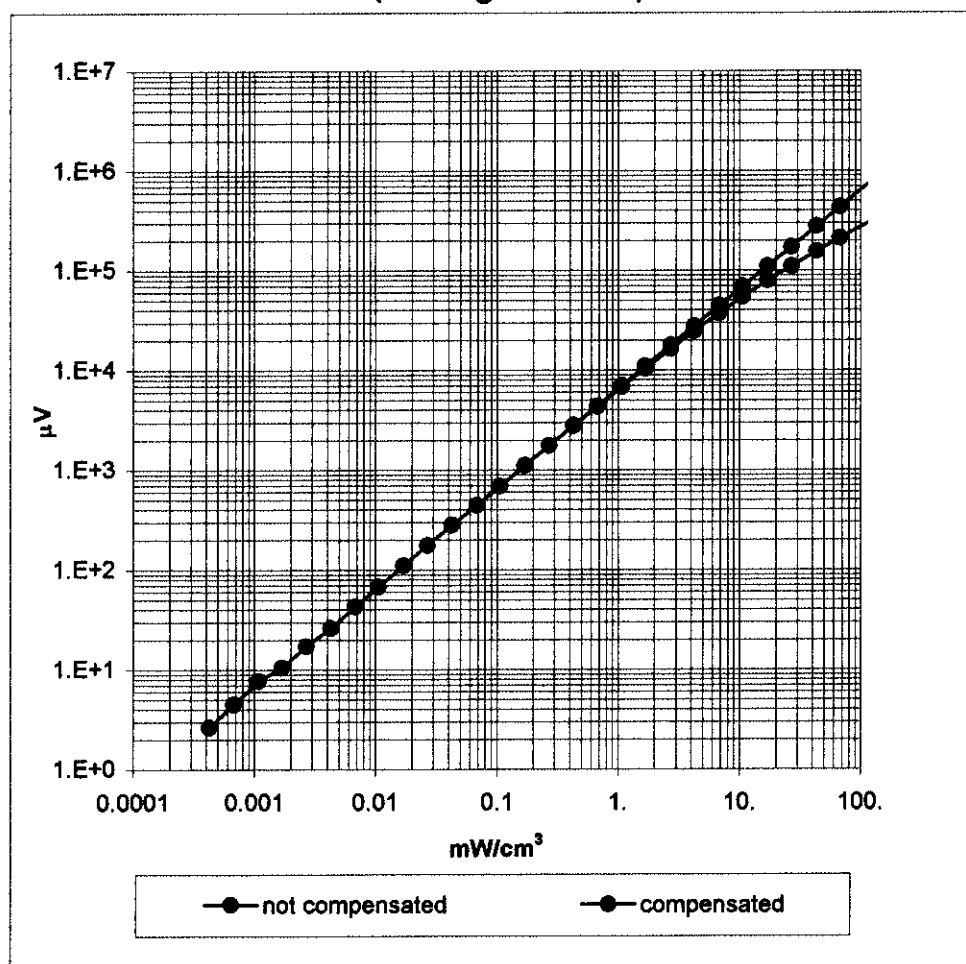


Frequency Response of E-Field

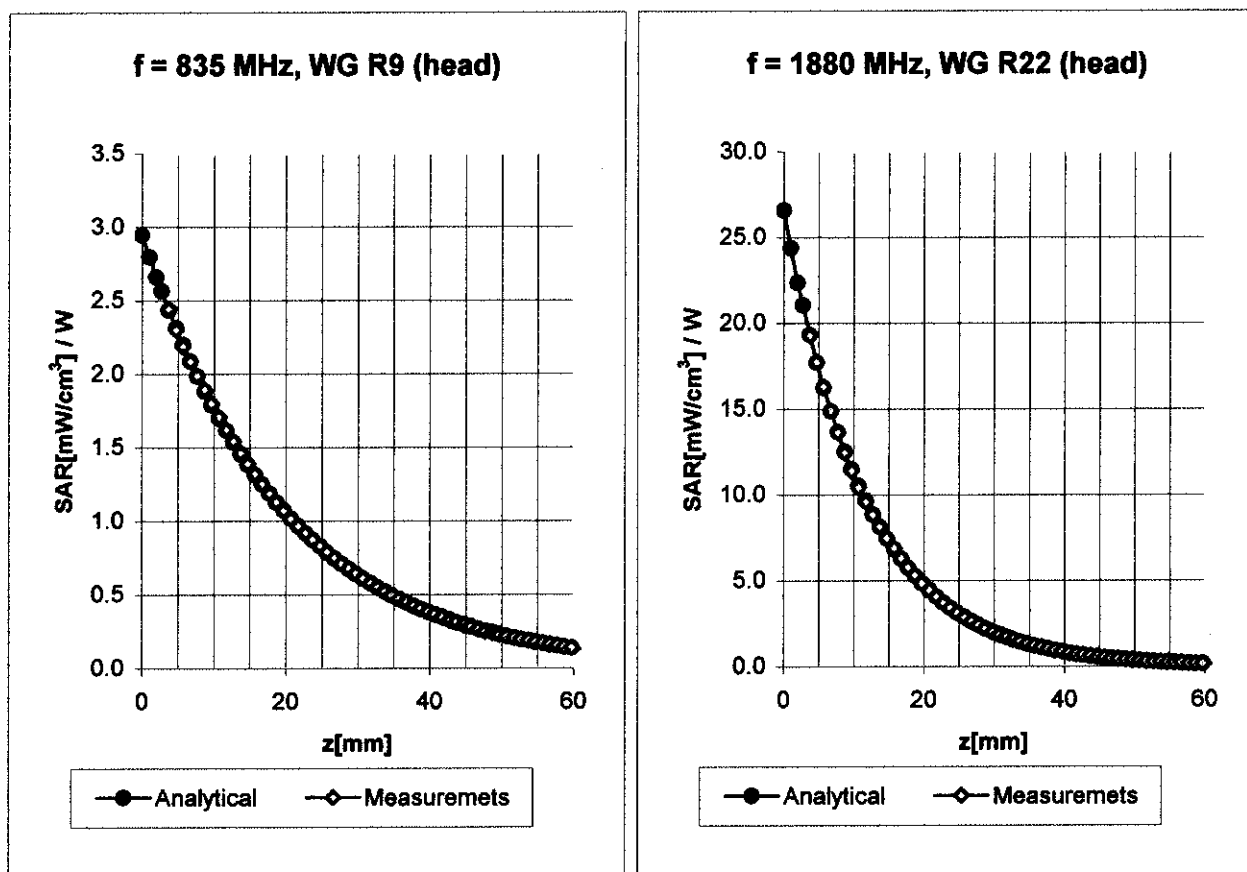
(TEM-Cell:ifi110, Waveguide R22)



Dynamic Range f(SAR_{brain}) (Waveguide R22)



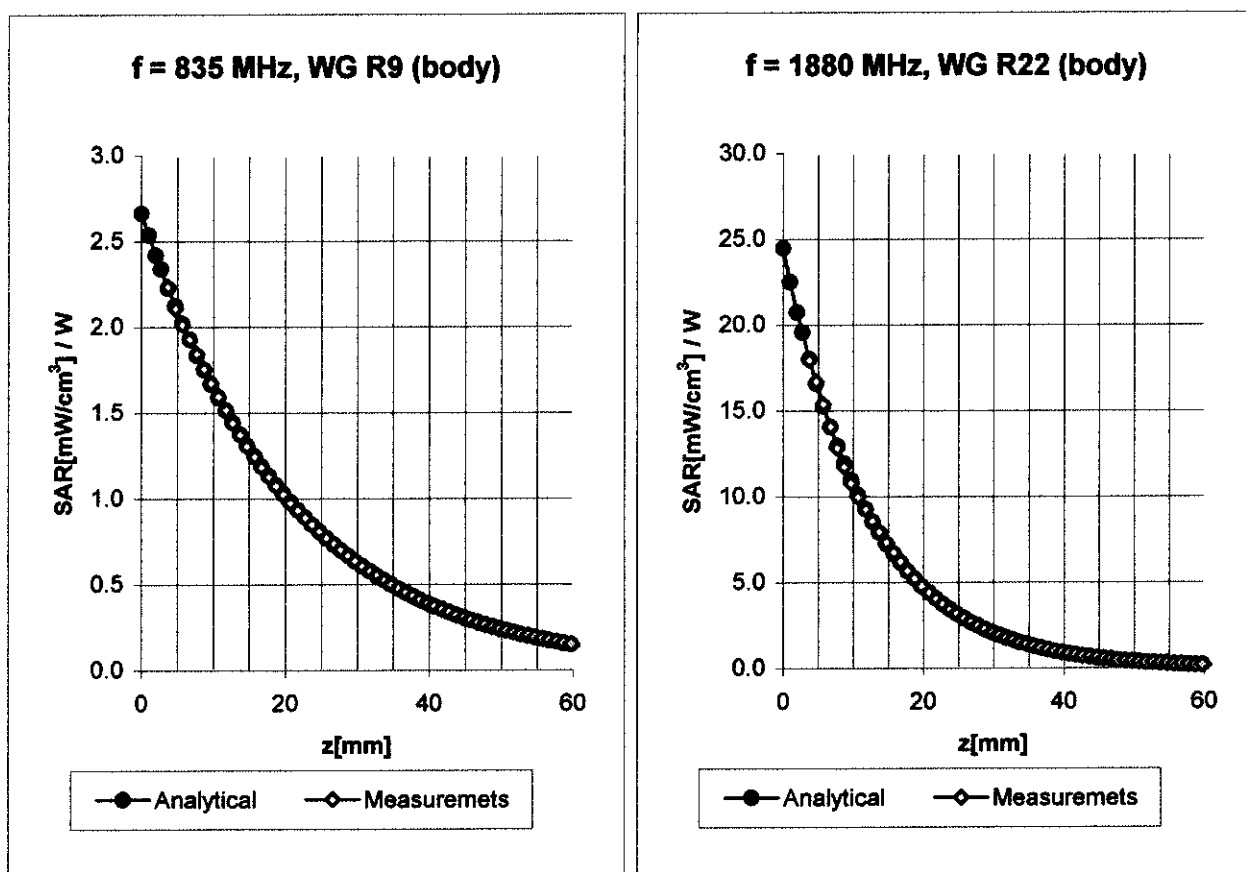
Conversion Factor Assessment



Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\% \text{ mho/m}$
Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$
	ConvF X	$6.3 \pm 9.5\% (k=2)$	Boundary effect:
	ConvF Y	$6.3 \pm 9.5\% (k=2)$	Alpha 0.43
	ConvF Z	$6.3 \pm 9.5\% (k=2)$	Depth 2.44

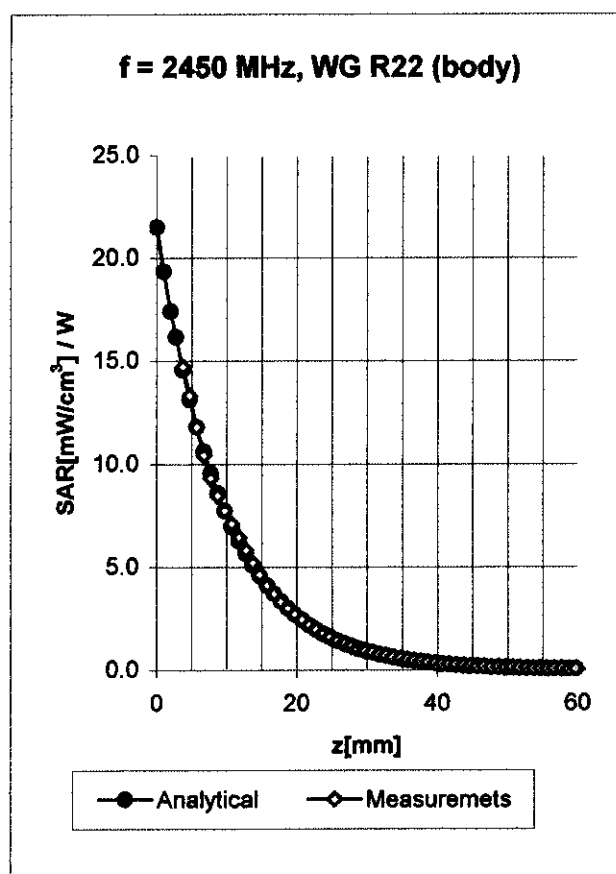
Head	1880 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
	ConvF X	$5.1 \pm 9.5\% (k=2)$	Boundary effect:
	ConvF Y	$5.1 \pm 9.5\% (k=2)$	Alpha 0.61
	ConvF Z	$5.1 \pm 9.5\% (k=2)$	Depth 2.32

Conversion Factor Assessment



Body	835 MHz	$\epsilon_r = 55.2 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
Body	900 MHz	$\epsilon_r = 55.0 \pm 5\%$	$\sigma = 1.05 \pm 5\%$ mho/m
	ConvF X	6.1 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	6.1 $\pm 9.5\%$ (k=2)	Alpha 0.49
	ConvF Z	6.1 $\pm 9.5\%$ (k=2)	Depth 2.35
Body	1880 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\%$ mho/m
Body	1800 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\%$ mho/m
	ConvF X	4.9 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	4.9 $\pm 9.5\%$ (k=2)	Alpha 0.81
	ConvF Z	4.9 $\pm 9.5\%$ (k=2)	Depth 2.07

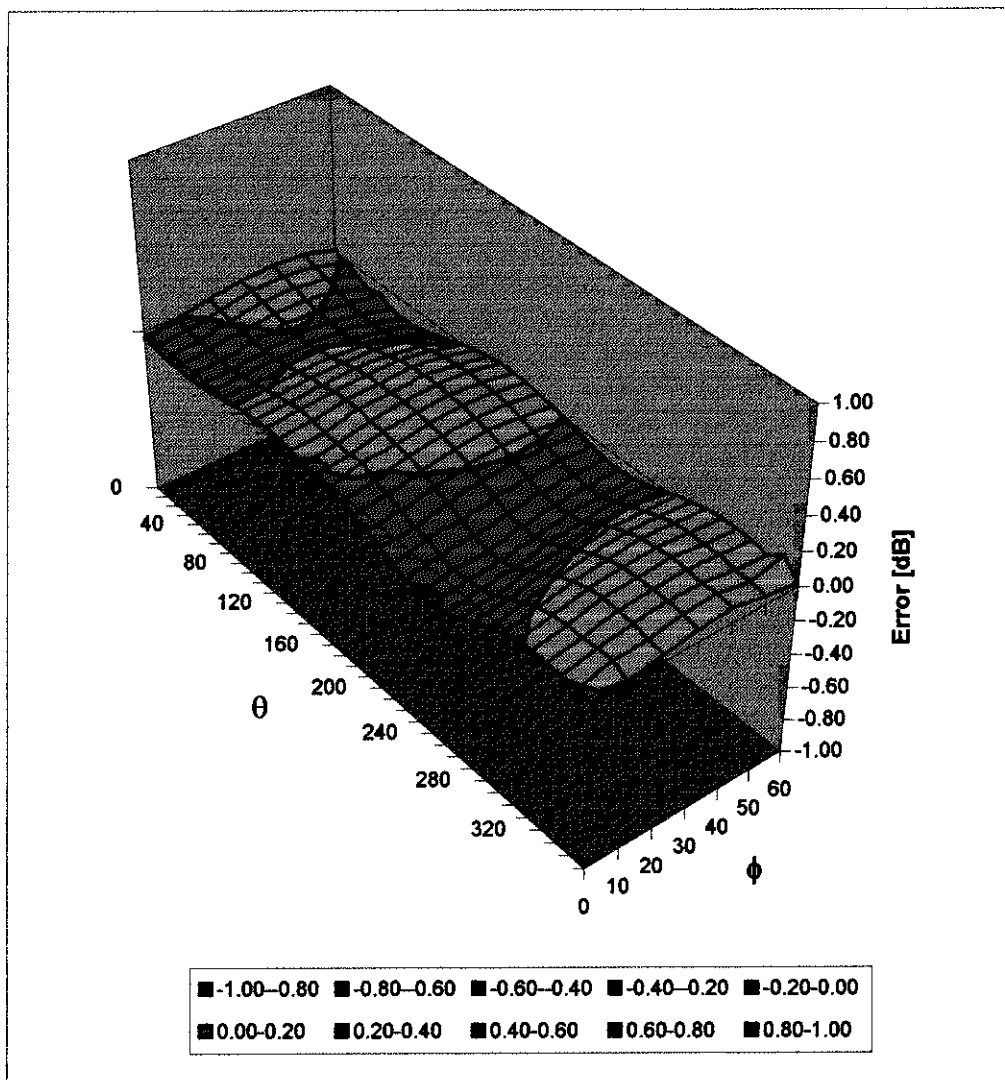
Conversion Factor Assessment



2450	Body	MHz	$\epsilon_r = 52.7 \pm 5\%$	$\sigma = 1.95 \pm 5\% \text{ mho/m}$
	ConvF X		4.5 $\pm 8.9\%$ (k=2)	Boundary effect:
	ConvF Y		4.5 $\pm 8.9\%$ (k=2)	Alpha 1.00
	ConvF Z		4.5 $\pm 8.9\%$ (k=2)	Depth 1.99

Deviation from Isotropy in HSL

Error (θ, ϕ), $f = 900$ MHz



Client **Nokia Mobile Phones (Oulu)**

CALIBRATION CERTIFICATE

Object(s) **D835V2 - SN: 448**

Calibration procedure(s) **QA CAL-05 v2
Calibration procedure for dipole validation kits**

Calibration date: **February 25, 2003**

Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date	Scheduled Calibration
RF generator R&S SML-03	100698	27-Mar-2002	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02	Oct-03
Network Analyzer HP 8753E	US38432426	3-May-00	In house check: May 03

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Laboratory Director	
Approved by:	Nils Kuster	Quality Manager	

Date issued: February 26, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

DASY

Dipole Validation Kit

Type: D835V2

Serial: 448

Manufactured:	October 24, 2001
Calibrated:	February 25, 2003

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with head simulating solution of the following electrical parameters at 835 MHz:

Relative Dielectricity	41.5	$\pm 5\%$
Conductivity	0.89 mho/m	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.7 at 835 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was $250\text{mW} \pm 3\%$. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	9.72 mW/g $\pm 17.5\%$ (k=2)¹
averaged over 10 cm^3 (10 g) of tissue:	6.28 mW/g $\pm 17.5\%$ (k=2)¹

¹ validation uncertainty

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	1.386 ns	(one direction)
Transmission factor:	0.994	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 835 MHz:	$\text{Re}\{Z\} = 50.7 \Omega$
	$\text{Im}\{Z\} = -3.7 \Omega$
Return Loss at 835 MHz	-28.5 dB

4. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with body simulating solution of the following electrical parameters at 835 MHz:

Relative Dielectricity	54.0	$\pm 5\%$
Conductivity	0.96 mho/m	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.3 at 835 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was $250\text{mW} \pm 3\%$. The results are normalized to 1W input power.

5. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 4. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm³ (1 g) of tissue: **10.12 mW/g ± 17.5 % (k=2)²**

averaged over 10 cm³ (10 g) of tissue: **6.60 mW/g ± 17.5 % (k=2)²**

6. Dipole Impedance and Return Loss

The dipole was positioned at the flat phantom sections according to section 4 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 835 MHz: **Re{Z} = 45.8 Ω**

Im {Z} = -5.9 Ω

Return Loss at 835 MHz **-22.5 dB**

7. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

8. Design

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.

9. Power Test

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

² validation uncertainty

Date/Time: 02/25/03 16:31:55

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN448_SN1507_HSL835_250203.da4

DUT: Dipole 835 MHz; Serial: D835V2 - SN448
Program: Dipole Calibration

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

Medium: HSL 835 MHz; ($\sigma = 0.89$ mho/m, $\epsilon_r = 41.5$, $\rho = 1000$ kg/m³)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.7, 6.7, 6.7); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 23; Postprocessing SW: SEMCAD, V1.6 Build 105

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

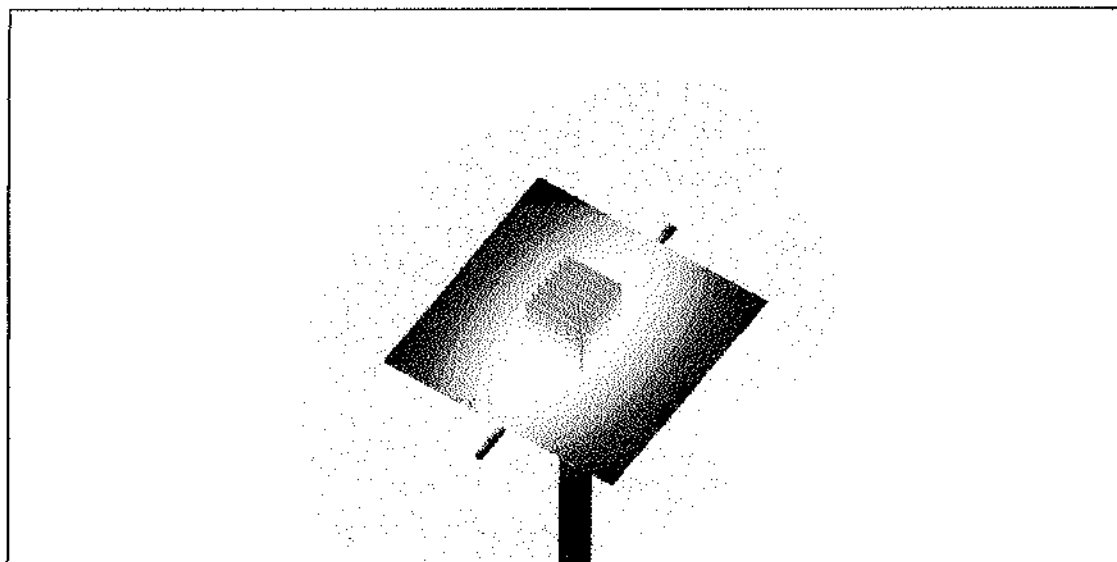
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.4 V/m

Peak SAR = 3.57 W/kg

SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.57 mW/g

Power Drift = 0.0003 dB



25 Feb 2003 11:06:30

CH1 S11 1 U F8

1: 50.650 $\angle$ -3.7344 $\angle$ 51.041 pF

835.000 000 MHz

De 1

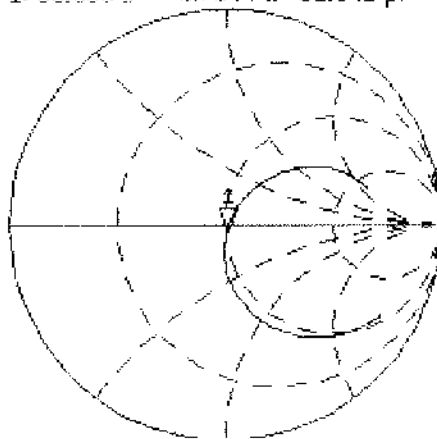
PRm

Cor

Avg

16

↑



CH2

S11

LOG

5 dB/REF -20 dB

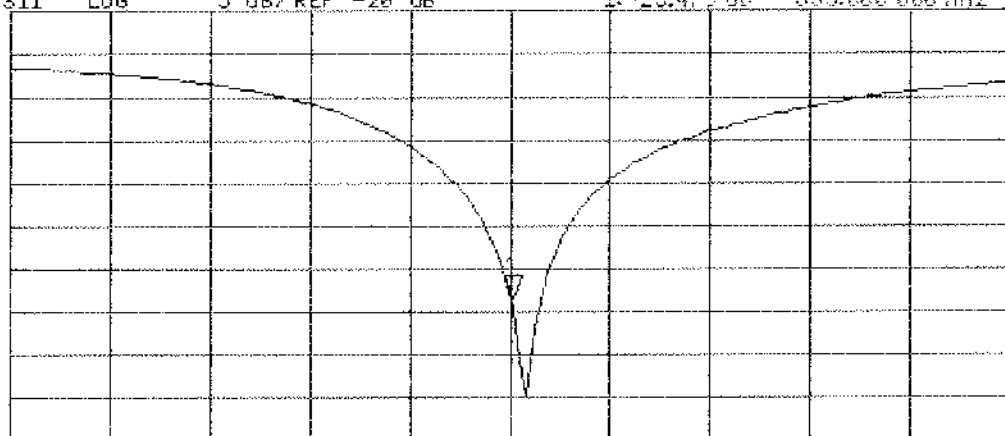
1: -20.423 dB

835.000 000 MHz

PRm

Cor

↑



CENTER 835.000 000 MHz

SPAN 400.000 000 MHz

Date/Time: 02/24/03 12:45:04

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN448_SN1507_M835_240203.da4

SN448_SN1507_M835_240203**Program: Dipole Calibration**

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

Medium: Muscle 835 MHz; ($\sigma = 0.96$ mho/m, $\epsilon_r = 54$, $\rho = 1000$ kg/m³)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.3, 6.3, 6.3); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Software: DASY4, V4.1 Build 21

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

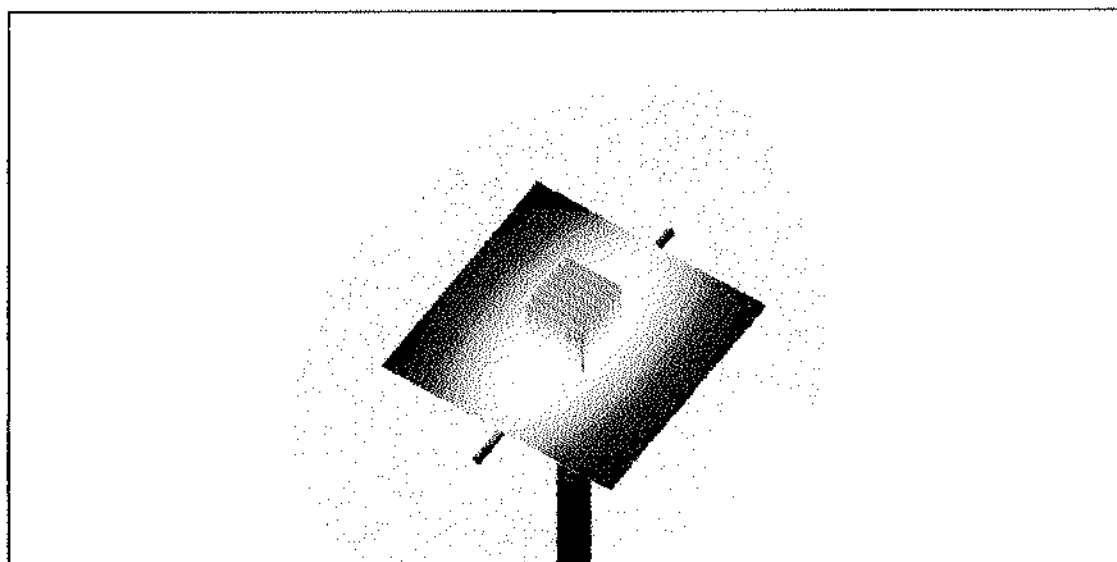
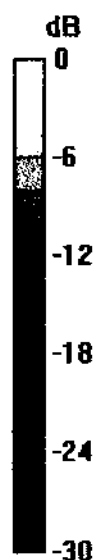
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.8 V/m

Peak SAR = 3.61 W/kg

SAR(1 g) = 2.53 mW/g; SAR(10 g) = 1.65 mW/g

Power Drift = 0.01 dB



24 Feb 2003 10:44:17

YV8
Body

CR1 S11 1 U FS

1: 45.775 Ω -5.8809 Ω 32.411 pF

835.000 000 MHz

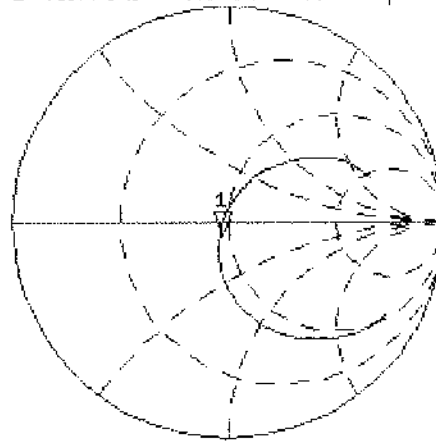
tr

De1

PRM

Cor
Avg
16

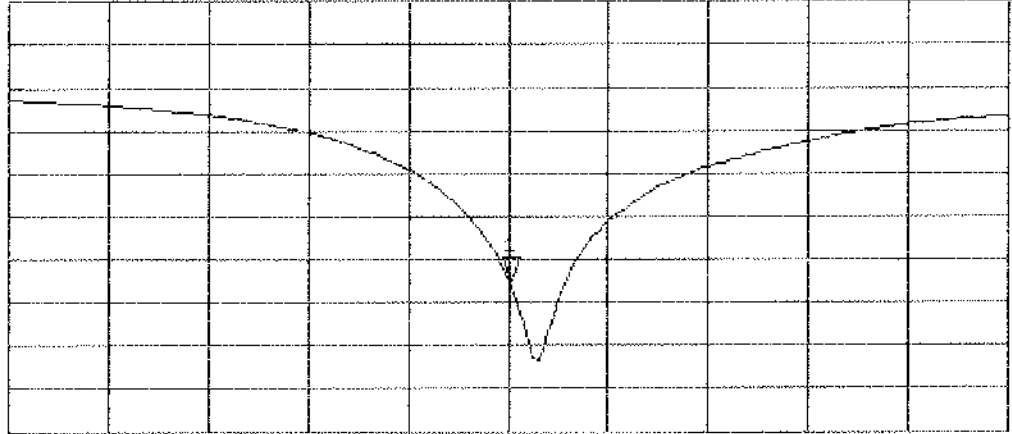
↑



CH2 S11 LOG 5 dB REF 10 dB 1: -22.450 dB 835.000 000 MHz

PRM
Cor

↑



START 635.000 000 MHz

STOP 1 035.000 000 MHz