

## SAR Compliance Test Report

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<b>Tested device:</b>	RM-123		
<b>FCC ID:</b>	QTKRM-123	<b>IC:</b>	661AD-RM123
<b>Supplement reports:</b>	-		
<b>Testing has been carried out in accordance with:</b>	<b>47CFR §2.1093</b> Radiofrequency Radiation Exposure Evaluation: Portable Devices <b>FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)</b> Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields <b>RSS-102</b> 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 <b>IEEE 1528 - 2003</b> IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques		
<b>Documentation:</b>	The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.		
<b>Test results:</b>	<b>The tested device complies with the requirements in respect of all parameters subject to the test.</b> 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.		
<b>Date and signatures:</b>	2006-03-09		
<b>For the contents:</b>	Gao Min EMC Test Engineer		

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## 1. SUMMARY OF SAR TEST REPORT

### 1.1 Test Details

Period of test	2006-02-17 to 2006-02-21
SN, HW and SW numbers of tested device	SN:004400751776152; HW: 0411b; SW: Vp03.09 DUT 50159
Batteries used in testing	BP-6M(S), BP-6M
Headsets used in testing	HS-23
Other accessories used in testing	Memory card: MU-25
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)	Radiated power	Position	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
2-slot GPRS1900	512/1850.2	28.9dBm EIRP	Left, Tilt	0.56W/kg	<b>0.63W/kg</b>	1.6 W/kg	<b>PASSED</b>

#### 1.2.2 Body Worn Configuration

Mode	Ch / f (MHz)	Radiated power	Separation distance	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
GSM1900	661/1880.0	32.5dBm EIRP	2.2 cm	0.30W/kg	<b>0.34W/kg</b>	1.6 W/kg	<b>PASSED</b>

\*SAR values are scaled up by 12% to cover measurement drift.

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### 1.2.3 Maximum Drift

Maximum drift covered by 12% scaling up of the SAR values	Maximum drift during measurements
0.5dB	0.40dB

### 1.2.4 Measurement Uncertainty

Expanded Uncertainty (k=2) 95%	$\pm 25.8\%$
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## 2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	General population / uncontrolled

Modes and Bands of Operation	GSM 1900	GPRS 1900	EGPRS 1900	BT
Modulation Mode	GMSK	GMSK	GMSK / 8PSK	GFSK
Duty Cycle	1/8	1/8 or 2/8	1/8 or 2/8	
Transmitter Frequency Range (MHz)	1850 – 1910	1850 – 1910	1850 – 1910	2402-2480

Outside of USA and Canada, the transmitter of the device is capable of operating also in 900, 1800&2100 bands, which are not part of this filing.

This device has Push to Talk/Voice-over-IP capability for use at the ear. Therefore, SAR for 2-slot GPRS mode was evaluated against the head profile of the phantom.

### 2.1 Picture of the Device



### 2.2 Description of the Antenna

The device has an internal patch antenna.

### 3. TEST CONDITIONS

#### 3.1 Temperature and Humidity

Ambient temperature (°C):	19.2 to 23.4
Ambient humidity (RH %):	30 to 55

#### 3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester. Communication between the device and the call tester was established by air link.

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 as used for SAR testing.

### 4. DESCRIPTION OF THE TEST EQUIPMENT

#### 4.1 Measurement System and Components

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

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE3	481	12 months	2006-03
DAE3	480	12 months	2006-09
E-field Probe ET3DV6	1650	12 months	2006-03
E-field Probe ET3DV6	1652	12 months	2006-09
Dipole validation Kit, D1900V2	547	24 months	2007-09
DASY4 software	Version 4.6	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	Agilent 8648C	3847m00258	12 months	2006-07
Amplifier	AR 5S1G4M3	302339	12 months	2006-07
Power Meter	Agilent E4419B	MY41291520	12 months	2006-07
Power Sensor	Agilent 8482A	US37295411	12 months	2006-07
Call Tester	CMU200	835352/008	-	-
Call Tester	CMU200	107645	-	-
Vector Network Analyzer	Agilent 8753S	My40002096	12 months	2006-07
Dielectric Probe Kit	Agilent 85070C	01033717	-	-

#### 4.1.1 Isotropic E-field Probe Type: ET3DV6

<b>Construction</b>	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., butyl diglycol)
<b>Calibration</b>	Calibration certificate in Appendix C
<b>Frequency</b>	10 MHz to 3 GHz (dosimetry); Linearity: $\pm 0.2$ dB (30 MHz to 3 GHz)
<b>Optical Surface Detection</b>	$\pm 0.2$ mm repeatability in air and clear liquids over diffuse reflecting surfaces
<b>Directivity</b>	$\pm 0.2$ dB in HSL (rotation around probe axis) $\pm 0.4$ dB in HSL (rotation normal to probe axis)
<b>Dynamic Range</b>	5 $\mu$ W/g to > 100 mW/g; Linearity: $\pm 0.2$ dB
<b>Dimensions</b>	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm
<b>Application</b>	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

## 4.2 Phantoms

The phantom used for all tests i.e. for both system checking and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2003.

System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

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

## 4.3 Tissue Simulants

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

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

### 4.3.1 Tissue Simulant Recipes

The following recipes were used for Head and Body tissue simulants:

1900MHz band		
Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	54.88	69.02
Butyl Diglycol	44.91	30.76
Salt	0.21	0.22

### 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

<i>f</i> [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			$\epsilon_r$	$\sigma$ [S/m]	
1900	Reference result	10.1	38.7	1.47	
	$\pm 10\%$ window	9.1 – 11.1			
	2006-02-17	9.91	38.1	1.48	20.6
	2006-02-21	9.74	38.3	1.45	20.7

#### System checking, body tissue simulant

<i>f</i> [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			$\epsilon_r$	$\sigma$ [S/m]	
1900	Reference result	9.81	53.3	1.59	
	$\pm 10\%$ window	8.83 – 10.79			
	2006-02-20	9.96	52.5	1.62	20.4

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

#### 4.3.3 Tissue Simulants used in the Measurements

##### Head tissue simulant measurements

<i>f</i> [MHz]	Description	Dielectric Parameters		Temp [°C]
		$\epsilon_r$	$\sigma$ [S/m]	
1880	Recommended value	40.0	1.40	
	$\pm 5\%$ window	38.0 – 42.0	1.33 – 1.47	
	2006-02-17	38.1	1.46	20.6
	2006-02-21	38.3	1.44	20.7

##### Body tissue simulant measurements

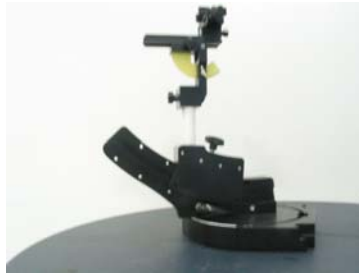
<i>f</i> [MHz]	Description	Dielectric Parameters		Temp [°C]
		$\epsilon_r$	$\sigma$ [S/m]	
1880	Recommended value	53.3	1.52	
	$\pm 5\%$ window	50.6 – 56.0	1.44 – 1.60	
	2006-02-20	52.5	1.60	20.4
	2006-02-21	51.9	1.58	20.7

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## 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".



Photo of device in "cheek" position



Photo of the device in "tilt" position

### 5.2.2 Body Worn Configuration

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



Photo of the device positioned for Body SAR measurement.  
The spacer was removed for the tests.

### 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.

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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	$G_i$	$G_i \cdot U_i$ (%)	$V_i$
<b>Measurement System</b>							
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	∞
<b>Test sample Related</b>							
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	∞
<b>Phantom and Tissue Parameters</b>							
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
<b>Combined Standard Uncertainty</b>			RSS			±12.9	116
<b>Coverage Factor for 95%</b>			k=2				
<b>Expanded Uncertainty</b>						±25.8	

## 7. RESULTS

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

### 1900MHz Head SAR results

Option used	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
<b>2-slot GPRS</b>	<b>Power</b>		<b>28.9dBm</b>	<b>29.7dBm</b>	<b>29.5dBm</b>
Without MU-25	Left	Cheek		0.32	
		Tilt	0.47	0.46	0.50
	Right	Cheek		0.31	
		Tilt		0.39	
<b>GSM</b>	<b>Power</b>		<b>31.3dBm</b>	<b>32.5dBm</b>	<b>32.4dBm</b>
Without MU-25	Left, Tilt		0.49	0.44	0.49
<b>2-slot EGPRS</b>	<b>Power</b>		<b>27.6dBm</b>	<b>28.7dBm</b>	<b>28.5dBm</b>
With MU-25	Left, Tilt				0.31
<b>2-slot GPRS, With MU-25</b>	Left, Tilt				0.52
<b>2-slot GPRS, With MU-25, BT active</b>	Left, Tilt				0.51
<b>2-slot GPRS, With MU-25, optional battery BP-6M</b>	Left, Tilt		0.56	0.47	0.46

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

### 1900MHz Body SAR results

Option used	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
<b>GSM</b>	<b>Power</b>	<b>31.3dBm</b>	<b>32.5dBm</b>	<b>32.4dBm</b>
Without MU-25	Without Headset	0.28	<b>0.29</b>	0.27
Without MU-25	With HS-23	0.29	0.28	0.26
<b>2-slot GPRS</b>	<b>Power</b>	<b>28.9dBm</b>	<b>29.7dBm</b>	<b>29.5dBm</b>
Without MU-25	Without Headset	0.26	0.28	0.25
Without MU-25	Headset HS-23	0.25	0.29	0.24
<b>GSM, With MU-25</b>	Without Headset,		<b>0.29</b>	
<b>GSM, With MU-25</b>	Without Headset, BT active		0.29	
<b>GSM, With MU-25, optional battery BP-6M</b>	Without Headset	0.27	<b>0.30</b>	0.28

Plots of the Measurement scans are given in Appendix B.

## APPENDIX A: SYSTEM CHECKING SCANS

Date: 2006-02-17

Liquid temperature: 20.6°C

**DUT Type: Dipole 1900 MHz**

**Program Name: System Performance Check at 1900 MHz, advanced extrapolation, head**

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(5.15, 5.15, 5.15); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM2;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**d=10mm, Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.6 mW/g

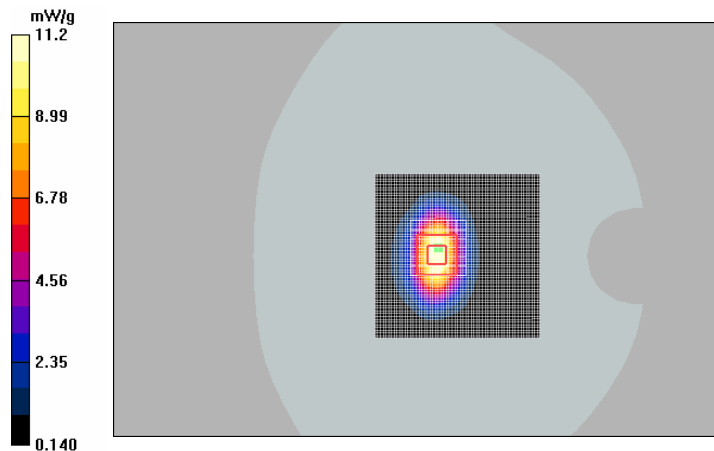
**d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 82.1 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 17.5 W/kg

**SAR(1 g) = 9.91 mW/g; SAR(10 g) = 5.13 mW/g**

Maximum value of SAR (measured) = 11.2 mW/g



Date: 2006-02-21

Liquid temperature: 20.7°C

DUT Type: Dipole 1900 MHz

Program Name: System Performance Check at 1900 MHz, advanced extrapolation, head

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.45$  mho/m;  $\epsilon_r = 38.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1652; ConvF(4.84, 4.84, 4.84); Calibrated: 9/23/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 9/15/2005
- Phantom: SAM2;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**d=10mm, Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.6 mW/g

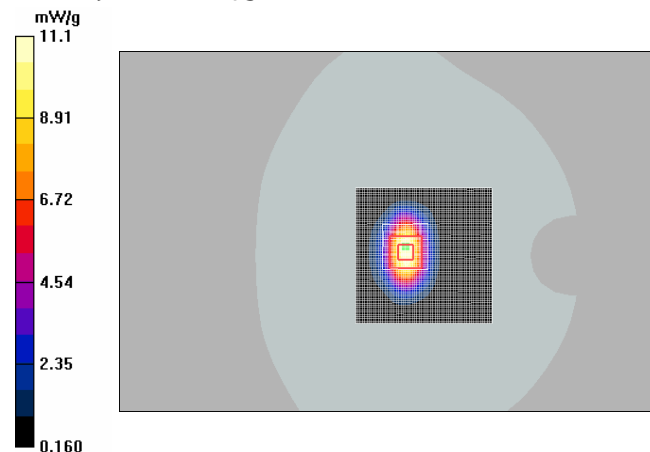
**d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 80.1 V/m; Power Drift = -0.030 dB

Peak SAR (extrapolated) = 16.8 W/kg

**SAR(1 g) = 9.74 mW/g; SAR(10 g) = 5.11 mW/g**

Maximum value of SAR (measured) = 11.1 mW/g



Date: 2006-02-20

Liquid temperature: 20.4°C

DUT Type: Dipole 1900 MHz

Program Name: System Performance Check at 1900 MHz, advanced extrapolation, body

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.62$  mho/m;  $\epsilon_r = 52.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(4.71, 4.71, 4.71); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM1;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**d=10mm, Pin=250mW/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.8 mW/g

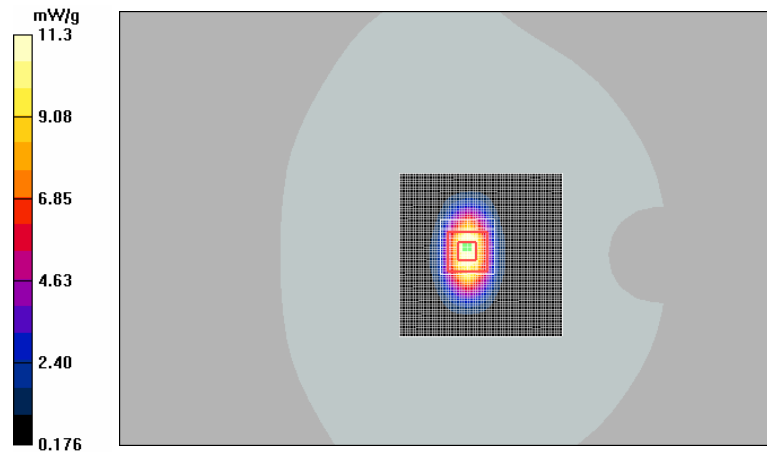
**d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.5 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 16.9 W/kg

**SAR(1 g) = 9.96 mW/g; SAR(10 g) = 5.22 mW/g**

Maximum value of SAR (measured) = 11.3 mW/g



## APPENDIX B: MEASUREMENT SCANS

Date: 2006-02-17

Liquid Temperature: 20.6°C

**DUT Type: RM-123**

**Program Name: 2-slot GPRS1900, Left side, advanced extrapolation, without MU-25, BP-6M(S)**

Communication System: 2-slot GPRS1900; Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(5.15, 5.15, 5.15); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM2; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - middle/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.386 mW/g

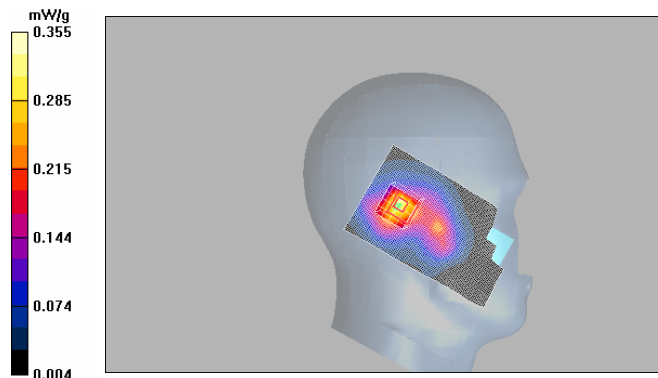
**Cheek position - middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 16.2 V/m; Power Drift = 0.029 dB

Peak SAR (extrapolated) = 0.528 W/kg

**SAR(1 g) = 0.320 mW/g; SAR(10 g) = 0.177 mW/g**

Maximum value of SAR (measured) = 0.355 mW/g



Date: 2006-02-17

Liquid Temperature: 20.6°C

**DUT Type: RM-123**

**Program Name: 2-slot GPRS1900, Left side, advanced extrapolation, without MU-25, BP-6M(S)**

Communication System: 2-slot GPRS1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.2

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 38$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(5.15, 5.15, 5.15); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM2; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - high/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.623 mW/g

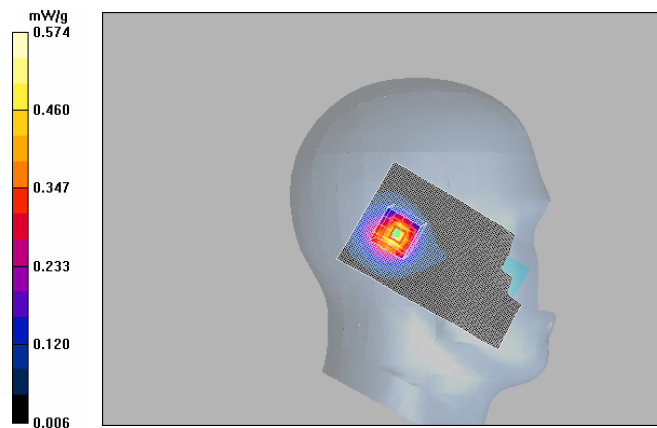
**Tilt position - high/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.7 V/m; Power Drift = -0.226 dB

Peak SAR (extrapolated) = 0.864 W/kg

**SAR(1 g) = 0.501 mW/g; SAR(10 g) = 0.267 mW/g**

Maximum value of SAR (measured) = 0.574 mW/g



Date: 2006-02-17

Liquid Temperature: 20.6°C

DUT Type: RM-123

Program Name: 2-slot GPRS1900, Right side, advanced extrapolation, without MU-25, BP-6M(S)

Communication System: 2-slot GPRS1900; Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(5.15, 5.15, 5.15); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM2; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - Middle/Area Scan (61x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.357 mW/g

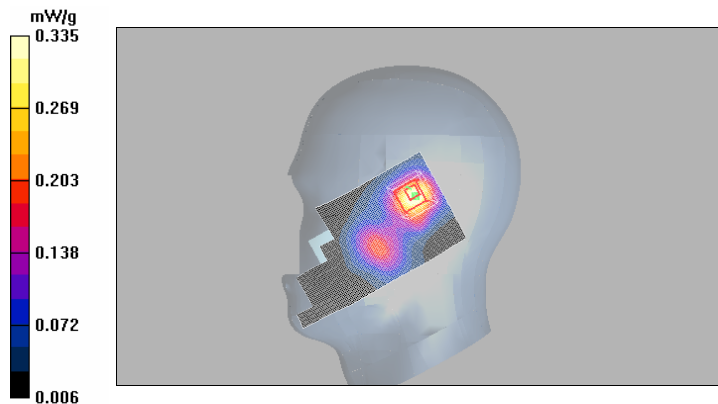
**Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 13.6 V/m; Power Drift = -0.259 dB

Peak SAR (extrapolated) = 0.588 W/kg

**SAR(1 g) = 0.312 mW/g; SAR(10 g) = 0.171 mW/g**

Maximum value of SAR (measured) = 0.335 mW/g



Date: 2006-02-17

Liquid Temperature: 20.6°C

DUT Type: RM-123

Program Name: 2-slot GPRS1900, Right side, advanced extrapolation, without MU-25, BP-6M(S)

Communication System: 2-slot GPRS1900; Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(5.15, 5.15, 5.15); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM2; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.422 mW/g

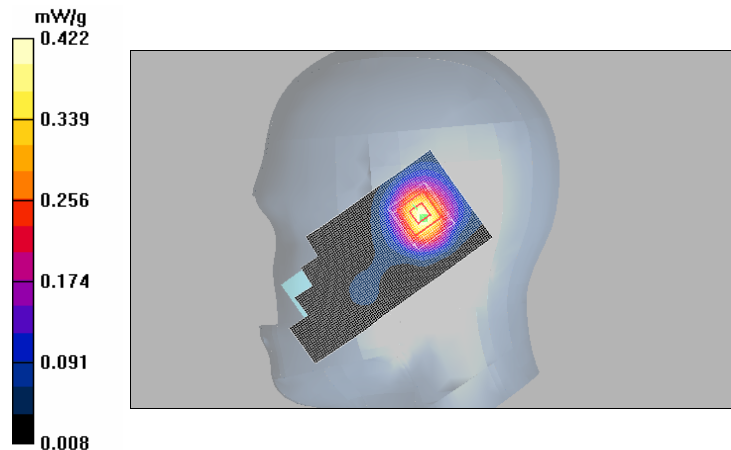
**Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 16.9 V/m; Power Drift = 0.189 dB

Peak SAR (extrapolated) = 0.683 W/kg

**SAR(1 g) = 0.386 mW/g; SAR(10 g) = 0.212 mW/g**

Maximum value of SAR (measured) = 0.422 mW/g



Date: 2006-02-17

Liquid Temperature: 20.6°C

DUT Type: RM-123

Program Name: GSM1900, Left side, advanced extrapolation, without MU-25, BP-6M(S)

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 38$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(5.15, 5.15, 5.15); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM2;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - high/Area Scan (61x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.540 mW/g

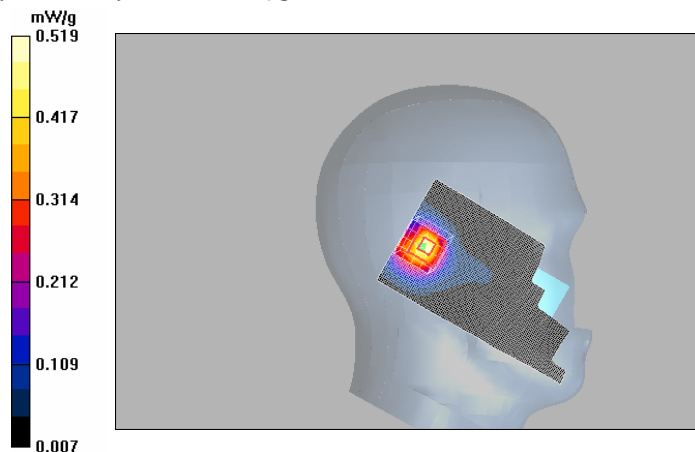
**Tilt position - high/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 18.4 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 0.875 W/kg

**SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.253 mW/g**

Maximum value of SAR (measured) = 0.519 mW/g



Date: 2006-02-17

Liquid Temperature: 20.6°C

DUT Type: RM-123

Program Name: 2 -slot EGPRS1900, Left side, advanced extrapolation, with MU-25, BP-6M(S)

Communication System: 2-slot EGPRS1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.2

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 38$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(5.15, 5.15, 5.15); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM2; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - high, with MU-25, EGPRS/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.369 mW/g

**Tilt position - high, with MU-25, EGPRS/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

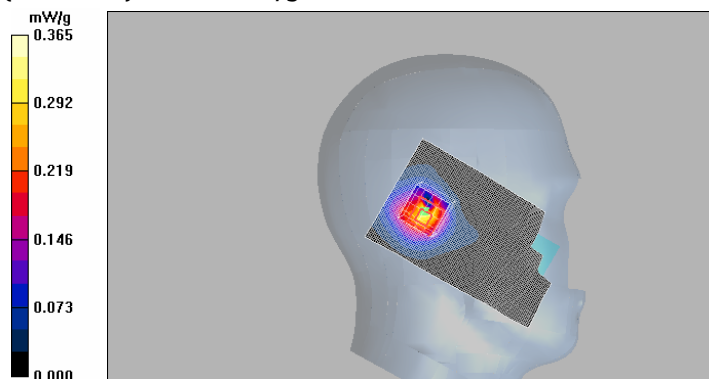
Reference Value = 16.0 V/m; Power Drift = -0.240 dB

Peak SAR (extrapolated) = 0.534 W/kg

**SAR(1 g) = 0.306 mW/g; SAR(10 g) = 0.144 mW/g**

**Warning: Maximum averaged SAR over 10 g is located on the boundary of the measurement cube. This cube might not incorporate the absolute averaged SAR. Please consider a refinement of the Area Scan measurement.**

Maximum value of SAR (measured) = 0.365 mW/g



Date: 2006-02-21

Liquid Temperature: 20.7°C

DUT Type: RM-123

Program Name: 2-slot GPRS1900, Left side, advanced extrapolation, with MU-25, BP-6M

Communication System: 2-slot GPRS1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4.2

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1652; ConvF(4.84, 4.84, 4.84); Calibrated: 9/23/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 9/15/2005
- Phantom: SAM2; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - low, with MU-25, BP-6M/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.680 mW/g

**Tilt position - low, with MU-25, BP-6M/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

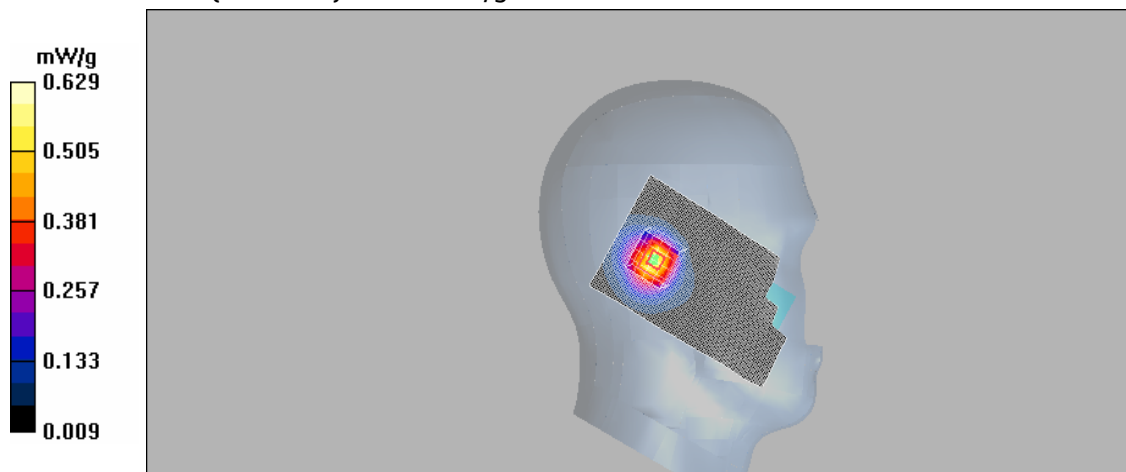
Reference Value = 21.5 V/m; Power Drift = -0.056 dB

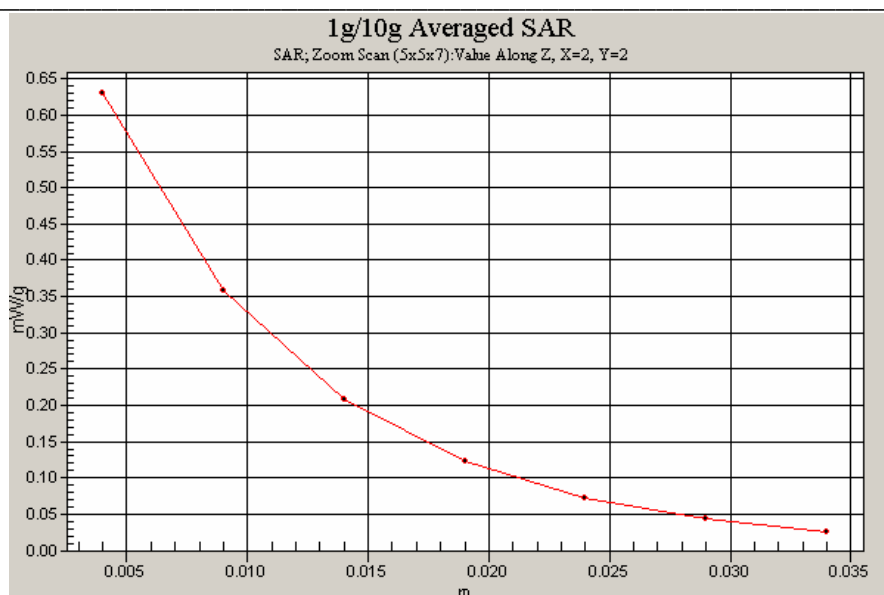
Peak SAR (extrapolated) = 0.963 W/kg

**SAR(1 g) = 0.560 mW/g; SAR(10 g) = 0.298 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.629 mW/g





Date: 2006-02-20

Liquid Temperature: 20.4°C

DUT Type: RM-123

Program Name: GSM1900, body, advanced extrapolation, without headset, without MU-25, BP-6M(S)

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.6$  mho/m;  $\epsilon_r = 52.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(4.71, 4.71, 4.71); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM1; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**without headset-middle/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.311 mW/g

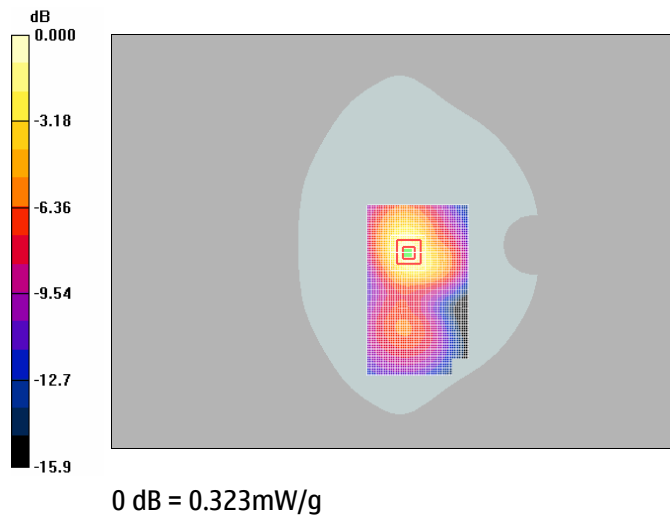
**without headset-middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 13.0 V/m; Power Drift = -0.069 dB

Peak SAR (extrapolated) = 0.440 W/kg

**SAR(1 g) = 0.292 mW/g; SAR(10 g) = 0.174 mW/g**

Maximum value of SAR (measured) = 0.323 mW/g



Date: 2006-02-20

Liquid Temperature: 20.4°C

DUT Type: RM-123

Program Name: 2-slot GPRS1900, body, advanced extrapolation, without headset, without MU-25, BP-6M(S)

Communication System: 2-slot GPRS1900; Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.6$  mho/m;  $\epsilon_r = 52.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(4.71, 4.71, 4.71); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM1; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Without headset - middle/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.283 mW/g

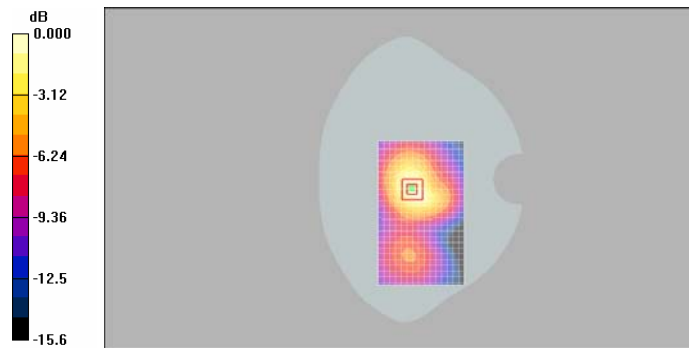
**Without headset - middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.0 V/m; Power Drift = -0.070 dB

Peak SAR (extrapolated) = 0.421 W/kg

**SAR(1 g) = 0.280 mW/g; SAR(10 g) = 0.167 mW/g**

Maximum value of SAR (measured) = 0.309 mW/g



0 dB = 0.309mW/g

Date: 2006-02-20

Liquid Temperature: 20.4°C

DUT Type: RM-123

Program Name: 2-slot GPRS1900, body, advanced extrapolation, with HS-23, without MU-25, BP-6M(S)

Communication System: 2-slot GPRS1900; Frequency: 1880 MHz; Duty Cycle: 1:4.2

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.6$  mho/m;  $\epsilon_r = 52.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(4.71, 4.71, 4.71); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM1; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**With HS-23 - middle/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.309 mW/g

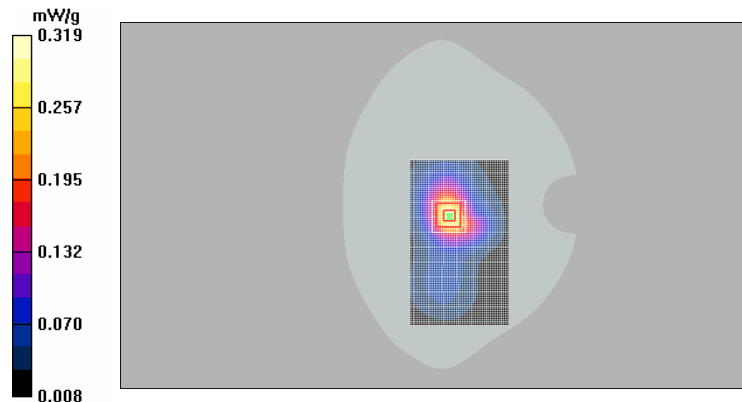
**With HS-23 - middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.2 V/m; Power Drift = -0.170 dB

Peak SAR (extrapolated) = 0.435 W/kg

**SAR(1 g) = 0.288 mW/g; SAR(10 g) = 0.170 mW/g**

Maximum value of SAR (measured) = 0.319 mW/g



Date: 2006-02-21

Liquid Temperature: 20.7°C

DUT Type: RM-123

Program Name: GSM1900, body, advanced extrapolation, without headset, with MU-25, BP-6M

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1652; ConvF(4.37, 4.37, 4.37); Calibrated: 9/23/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 9/15/2005
- Phantom: SAM1; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**without headset, with MU-25-middle, BP-6M/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.318 mW/g

**without headset, with MU-25-middle, BP-6M/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid:

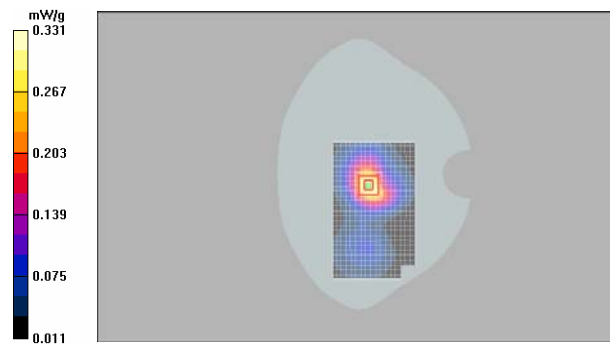
dx=7.5mm, dy=7.5mm, dz=5mm

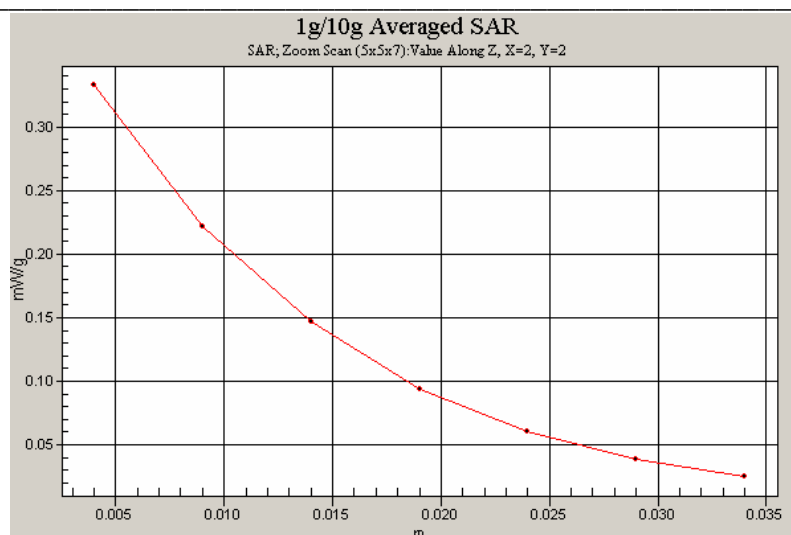
Reference Value = 13.0 V/m; Power Drift = -0.192 dB

Peak SAR (extrapolated) = 0.457 W/kg

**SAR(1 g) = 0.300 mW/g; SAR(10 g) = 0.181 mW/g**

Maximum value of SAR (measured) = 0.331 mW/g





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

See another documents named: “ET3DV6-SN1650”& “ET3DV6-SN1652” which are not included in this file.

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

See another document named “D1900 for head&body” which is not included in this file.