

SAR Compliance Test Report

Test report no.:	Beij_SAR_0539_03	Date of report:	2005-10-10
Template version:	4	Number of pages:	29
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Measurements made by:	Gao Min		
Tested device:	RM-139		
FCC ID:	QTLRM-139	IC:	-
Supplement reports:	-		
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 Techniques		
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:	2005-10-12		
For the contents:	Gao Min Test Engineer		

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2005-09-26 to 2005-09-27
SN, HW and SW numbers of tested device	DUT50114 SN: IMEI: 00440074179251 HW: B2 SW: P31Env_05090
Batteries used in testing	BP-3001L SN: M36211SY00070
Headsets used in testing	EMC147-Black
Other accessories used in testing	Memory card: SD 256M;
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	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
GSM1900	661/1880.0	28.4dBm EIRP	Left, Tilt	1.6 W/kg	0.45W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Ch / f (MHz)	Radiated power	Separation distance	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
2-slot GPRS1900	661/1880.0	27.7dBm EIRP	2.2cm	1.6 W/kg	0.51W/kg	PASSED

1.2.3 Maximum Drift

Maximum drift during measurements	-0.19 dB
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1.2.4 Measurement Uncertainty

Extended Uncertainty (k=2) 95%	$\pm 29.8 \%$
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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
Modulation Mode	GMSK	GMSK
Duty Cycle	1/8	1/8 or 2/8
Transmitter Frequency Range (MHz)	1850 - 1910	1850 - 1910

Outside of USA and Canada, the transmitter of the device is capable of operating also in GSM900 and GSM1800, which are not part of this filing.

2.1 Picture of the Device



Device, front side

2.2 Description of the Antenna

The device has an internal patch antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	20.2 to 23.3
Ambient humidity (RH %):	38 to 62

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 software version 4.5, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements on the device was the 'worst-case extrapolation' algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
E-field Probe ET3DV6	1650	12 months	2006-03
DAE3	481	12 months	2006-03
Dipole validation Kit, D1800V2	2d075	24 months	2007-08

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	12 months	2006-07
Vector Network Analyzer	Agilent 8753S	My40002096	12 months	2006-07
Dielectric Probe Kit	Agilent 85070C	01033717	-	-

4.1.1 Isotropic E-field Probe 1650

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., butyl diglycol)
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 Body diameter: 12 mm Tip diameter: 6.8 mm
Application	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 ± 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

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
1800	Reference result	9.72	39.1	1.36	
	$\pm 10\%$ window	8.75 -10.69			
	2005-09-26	9.07	40.0	1.35	20.0

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ϵ_r	σ [S/m]	
1800	Reference result	9.50	53.6	1.48	
	$\pm 10\%$ window	8.55- 10.45			
	2005-09-27	9.12	54.4	1.48	20.3

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]	
1880	Recommended value	40.0	1.40	
	$\pm 5\%$ window	38.0 – 42.0	1.33 – 1.47	
	2005-09-26	39.7	1.42	20.0

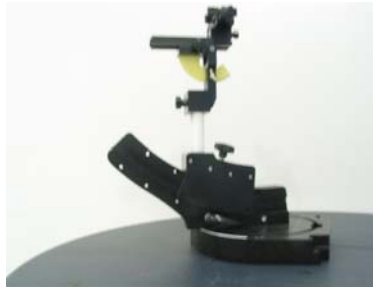
Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ϵ_r	σ [S/m]	
1880	Recommended value	53.3	1.52	
	$\pm 5\%$ window	50.6 – 56.0	1.44 – 1.60	
	2005-09-27	54.2	1.56	20.3

5. DESCRIPTION OF THE TEST PROCEDURE

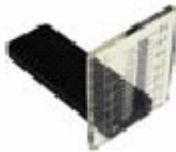
5.1 Device Holder

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".

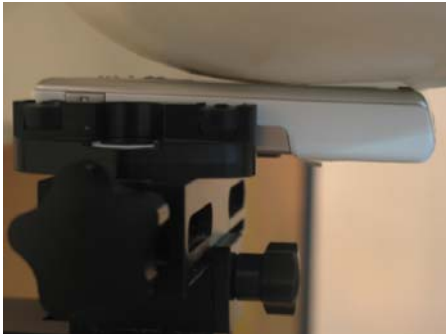


Photo of the device in “cheek” position



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.

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
Measurement System							
Probe Calibration	E2.1	± 5.8	N	1	1	± 5.8	∞
Axial Isotropy	E2.2	± 4.7	R	$\sqrt{3}$	$(1-c_p)^{1/2}$	± 1.9	∞
Hemispherical Isotropy	E2.2	± 9.6	R	$\sqrt{3}$	$(c_p)^{1/2}$	± 3.9	∞
Boundary Effect	E2.3	± 8.3	R	$\sqrt{3}$	1	± 4.8	∞
Linearity	E2.4	± 4.7	R	$\sqrt{3}$	1	± 2.7	∞
System Detection Limits	E2.5	± 1.0	R	$\sqrt{3}$	1	± 0.6	∞
Readout Electronics	E2.6	± 1.0	N	1	1	± 1.0	∞
Response Time	E2.7	± 0.8	R	$\sqrt{3}$	1	± 0.5	∞
Integration Time	E2.8	± 2.6	R	$\sqrt{3}$	1	± 1.5	∞
RF Ambient Conditions - Noise	E6.1	± 3.0	R	$\sqrt{3}$	1	± 1.7	∞
RF Ambient Conditions - Reflections	E6.1	± 3.0	R	$\sqrt{3}$	1	± 1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	± 0.4	R	$\sqrt{3}$	1	± 0.2	∞
Probe Positioning with respect to Phantom Shell	E6.3	± 2.9	R	$\sqrt{3}$	1	± 1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5.2	± 3.9	R	$\sqrt{3}$	1	± 2.3	∞
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	$\sqrt{3}$	1	± 5.8	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	± 4.0	R	$\sqrt{3}$	1	± 2.3	∞
Conductivity Target - tolerance	E3.2	± 5.0	R	$\sqrt{3}$	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	$\sqrt{3}$	0.6	± 1.7	∞
Permittivity - measurement uncertainty	E3.3	± 2.9	N	1	0.6	± 1.7	5
Combined Standard Uncertainty			RSS			± 14.9	206
Coverage Factor for 95%			k=2				
Expanded Standard Uncertainty						± 29.8	

7. RESULTS

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

1900MHz Head SAR results

Option used: MMC, front cover, etc	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
GSM	Power		26.4dBm	28.4dBm	27.3dBm
Without SD	Left	Cheek		0.35	
		Tilt	0.42	0.45	0.36
	Right	Cheek		0.40	
		Tilt		0.42	
With SD	Left	Tilt		0.42	
Without SD, BT active	Left	Tilt		0.42	

1900MHz Body SAR results

Option used: MMC, front cover, etc	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch 512 1850.2 MHz	Ch 661 1880.0 MHz	Ch 810 1909.8 MHz
GSM	Power		26.4dBm	28.4dBm	27.3dBm
Without SD	Without headset			0.27	
Without SD, BT active	Without headset			0.27	
2-slot GPRS	Power		27.0dBm	27.7dBm	27.1dBm
Without SD	Without headset		0.44	0.50	0.46
	Headset EMC147-Black		0.42	0.48	0.46
With SD	Without headset			0.51	

Plots of the Measurement scans are given in Appendix B.

APPENDIX A: SYSTEM CHECKING SCANS

Date: 2005-09-26

Liquid temperature: 20.0°C

DUT Type: Dipole 1800 MHz

Program Name: System Performance Check at 1800 MHz, Head, advanced extrapolation

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(5.41, 5.41, 5.41); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM2;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

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

Maximum value of SAR (interpolated) = 10.8 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 = -0.024 dB

Peak SAR (extrapolated) = 15.6 W/kg

SAR(1 g) = 9.07 mW/g; SAR(10 g) = 4.85 mW/g

Maximum value of SAR (measured) = 10.1 mW/g



Date: 2005-09-27

Liquid Temperature: 20.3°C

DUT Type: Dipole 1800 MHz

Program Name: System Performance Check at 1800 MHz, Body, advanced extrapolation,

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 54.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1650; ConvF(4.85, 4.85, 4.85); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2005
- Phantom: SAM1;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

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

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

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

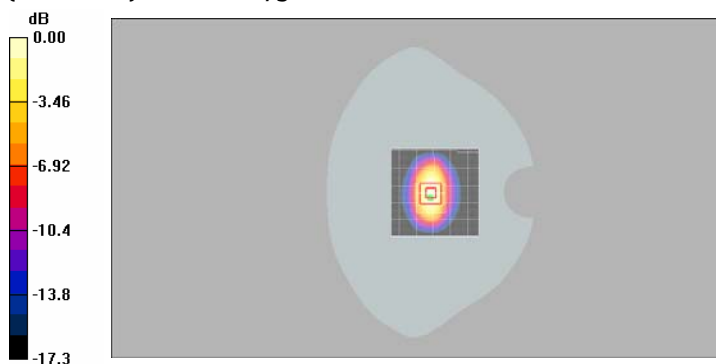
Reference Value = 89.5 V/m; Power Drift = 0.078 dB

Peak SAR (extrapolated) = 15.2 W/kg

SAR(1 g) = 9.12 mW/g; SAR(10 g) = 4.92 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) = 10.3 mW/g



0 dB = 10.3mW/g

APPENDIX B: MEASUREMENT SCANS

Date: 2005-09-26

Liquid Temperature: 20.0°C

DUT Type: RM-139

Program Name: GSM1900, Left, Cheek, worst-case extrapolation

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

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, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

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

Maximum value of SAR (interpolated) = 0.372 mW/g

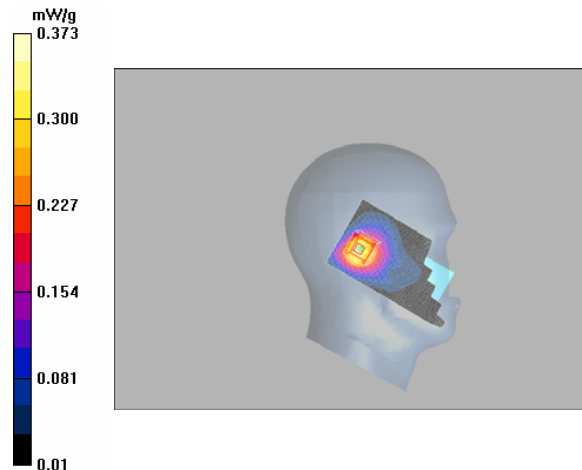
Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 16.0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.655 W/kg

SAR(1 g) = 0.354 mW/g; SAR(10 g) = 0.211 mW/g

Maximum value of SAR (measured) = 0.373 mW/g



Date: 2005-09-26

Liquid Temperature: 20.0°C

DUT Type: RM-139

Program Name: GSM1900, Left, Tilt, worst-case extrapolation

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

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, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

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

Maximum value of SAR (interpolated) = 0.490 mW/g

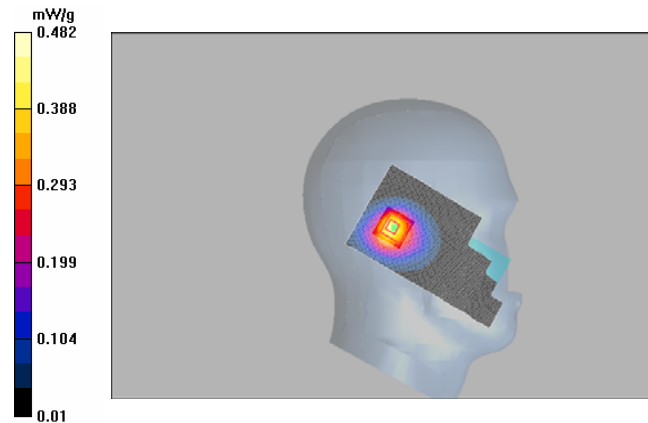
Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

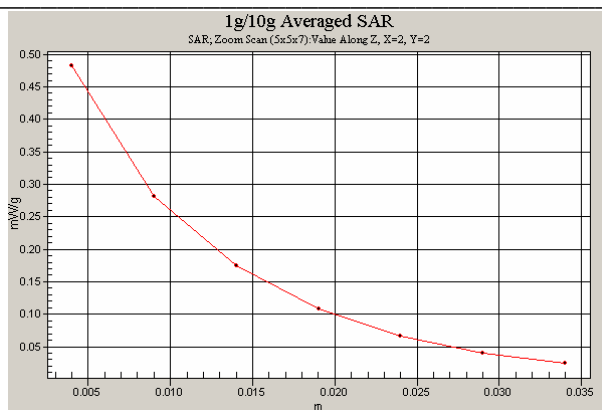
Reference Value = 17.8 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.876 W/kg

SAR(1 g) = 0.454 mW/g; SAR(10 g) = 0.253 mW/g

Maximum value of SAR (measured) = 0.482 mW/g





Date: 2005-09-26

Liquid Temperature: 20.0°C

DUT Type: RM-139

Program Name: GSM1900, Right, Cheek, worst-case extrapolation,

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

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, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

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

Maximum value of SAR (interpolated) = 0.460 mW/g

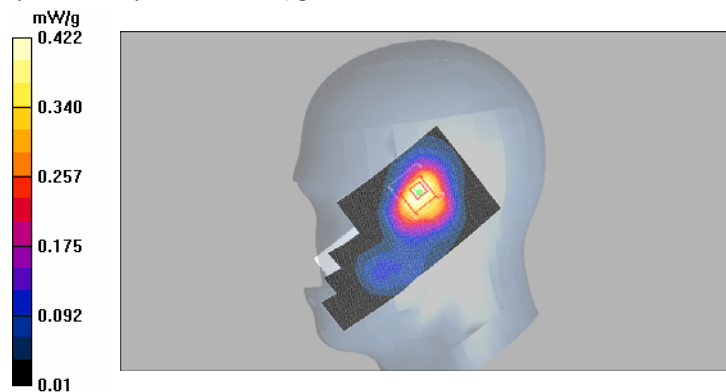
Cheek position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.7 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 0.833 W/kg

SAR(1 g) = 0.397 mW/g; SAR(10 g) = 0.227 mW/g

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



Date: 2005-09-26

Liquid Temperature: 20.0°C

DUT Type: RM-139

Program Name: GSM1900, Right, Tilt, worst-case extrapolation,

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

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, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle/Area Scan 2 (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.457 mW/g

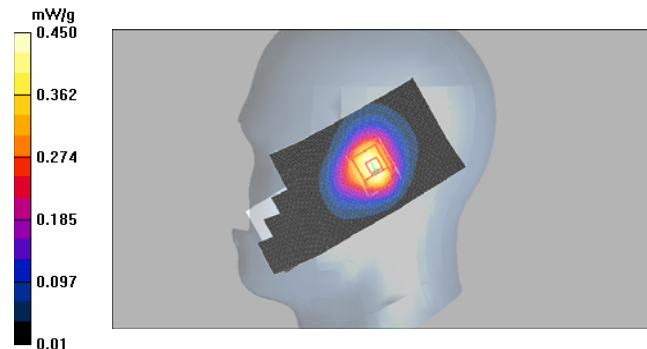
Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 16.4 V/m; Power Drift = 0.100 dB

Peak SAR (extrapolated) = 0.815 W/kg

SAR(1 g) = 0.424 mW/g; SAR(10 g) = 0.245 mW/g

Maximum value of SAR (measured) = 0.450 mW/g



Date: 2005-09-27

Liquid Temperature: 20.3°C

DUT Type: RM-139

Program Name: GSM1900, Body, worst-case extrapolation, without headset

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³

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, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Without headset-middle/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.280 mW/g

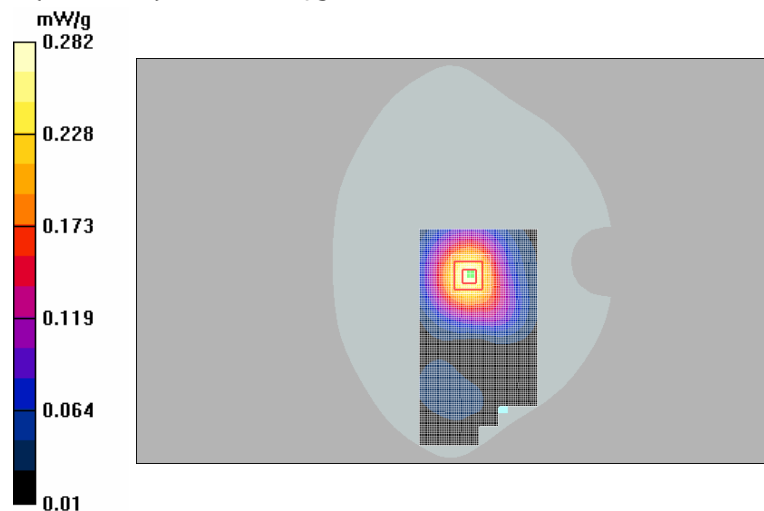
Without headset-middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.5 V/m; Power Drift = -0.013 dB

Peak SAR (extrapolated) = 0.531 W/kg

SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.162 mW/g

Maximum value of SAR (measured) = 0.282 mW/g



Date: 2005-09-27

Liquid Temperature: 20.3°C

DUT Type: RM-139

Program Name: GSM1900, Body, worst-case extrapolation, without headset, BT active

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³

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, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Without headset, with BT active-middle/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.275 mW/g

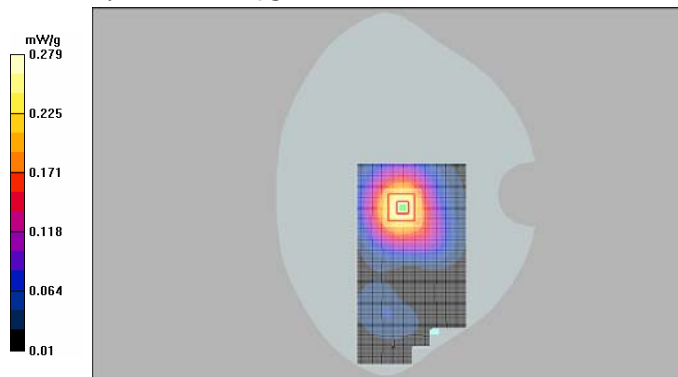
Without headset, with BT active-middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.3 V/m; Power Drift = -0.049 dB

Peak SAR (extrapolated) = 0.523 W/kg

SAR(1 g) = 0.266 mW/g; SAR(10 g) = 0.160 mW/g

Maximum value of SAR (measured) = 0.279 mW/g



Date: 2005-09-27

Liquid Temperature: 20.3°C

DUT Type: RM-139

Program Name: 2-slot GPRS1900, Body, worst-case extrapolation, without headset

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³

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, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Without headset - middle/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.518 mW/g

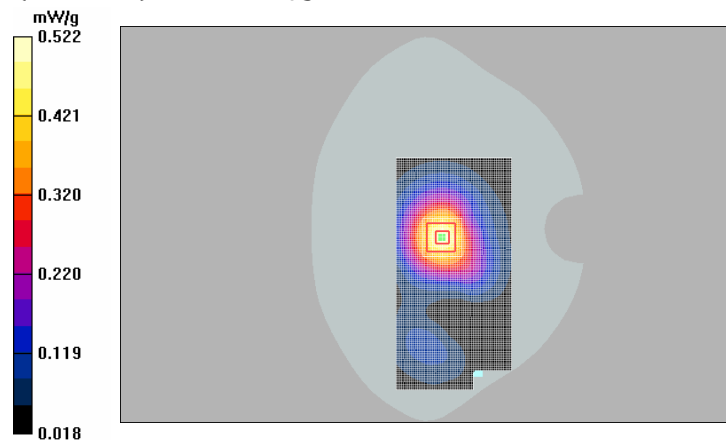
Without headset - middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 17.8 V/m; Power Drift = -0.172 dB

Peak SAR (extrapolated) = 0.978 W/kg

SAR(1 g) = 0.498 mW/g; SAR(10 g) = 0.299 mW/g

Maximum value of SAR (measured) = 0.522 mW/g



Date: 2005-09-27

Liquid Temperature: 20.3°C

DUT Type: RM-139

Program Name: 2-slot GPRS1900, Body, worst-case extrapolation, with EMC147-Black

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³

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, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

With EMC147-black- middle/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.499 mW/g

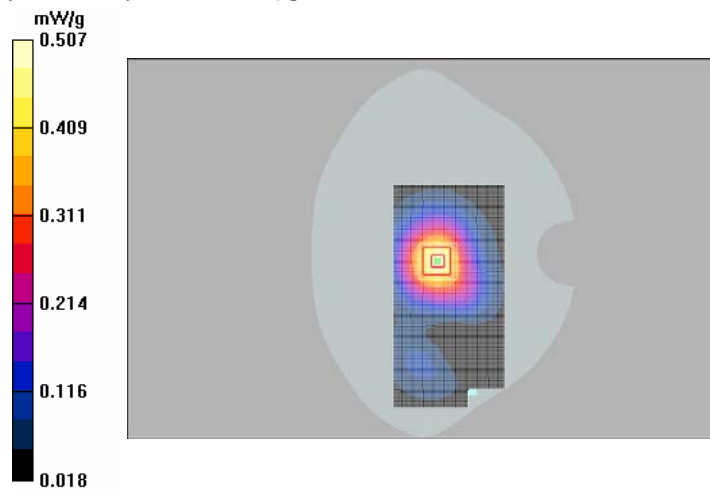
With EMC147-black- middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 17.2 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 0.940 W/kg

SAR(1 g) = 0.482 mW/g; SAR(10 g) = 0.290 mW/g

Maximum value of SAR (measured) = 0.507 mW/g



Date: 2005-09-27

Liquid Temperature: 20.3°C

DUT Type: RM-139

Program Name: 2-slot GPRS1900, Body, worst-case extrapolation, without headset, with SD

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³

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, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Without headset, with SD - middle/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.498 mW/g

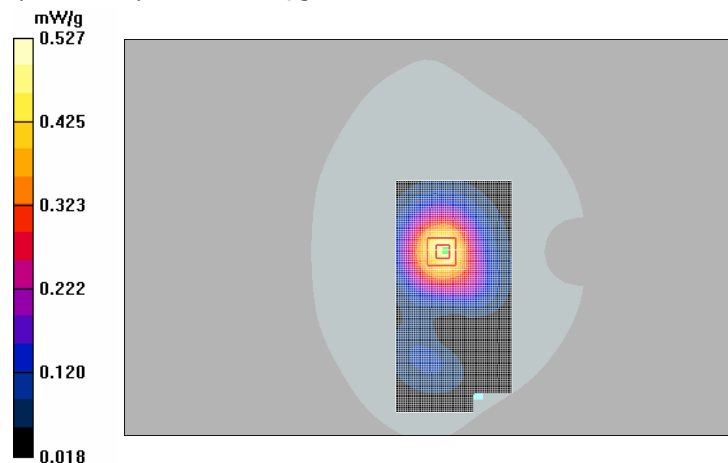
Without headset, with SD - middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

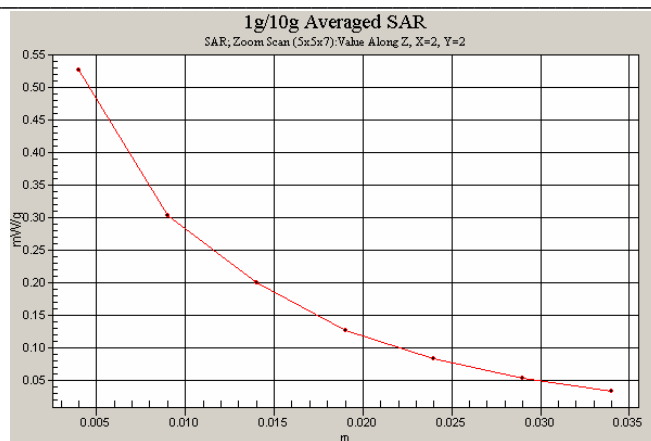
Reference Value = 17.1 V/m; Power Drift = 0.176 dB

Peak SAR (extrapolated) = 0.980 W/kg

SAR(1 g) = 0.508 mW/g; SAR(10 g) = 0.306 mW/g

Maximum value of SAR (measured) = 0.527 mW/g





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

Please see document named ET3DV6-SN1650

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

Please see documents named D1800 Head&Body