TCC
Nokia

T207 (EN ISO/IEC 17025)

SAR Compliance Test Report

Test report no.:	TCC0399	Date of report:	2004-12-02
Template version:	2	Number of pages:	31
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Responsible test engineer:	Gao Min	Product contact person:	Kill Vivian
Measurements made by:	Gao Min		
Tested device:	RM-30		
FCC ID:	PPIRM-30	IC:	661U-RM30
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 Beijing.

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: 2004-12-02

For the contents:

Gao Min

Gao Min
Test Engineer

CONTENTS

1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2004-10-29 to 2004-11-13
SN, HW and SW numbers of tested device	SN1:004400391647169; HW:3057;SW:3.01 SN2:004400391638705; HW:3058;SW:3.01
Batteries used in testing	BL-5B
Headsets used in testing	HS-8
Other accessories used in testing	-
State of sample	prototype unit
Notes	-

1.2 Maximum Results

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

1.2.1 Head Configuration

Mode	Ch / *f* (MHz)	ERP	Position	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
2-slot GPRS1900	810/1910	25.2dBm	Left cheek	1.6 W/kg	0.54W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Ch / *f* (MHz)	ERP	Separation distance	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
2-slot GPRS1900	810/1910	25.2dBm	2.2cm	1.6 W/kg	0.58W/kg	PASSED

1.2.3 Maximum Drift

Maximum drift during measurements	-0.2dB

1.2.4 Measurement Uncertainty

Extended Uncertainty (k=2) 95%	± 29.8 %

2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	portable
Exposure environment	general population

Modes and Bands of Operation	GSM 1900	GPRS (GSM)	EGPRS(EDGE)
Modulation Mode	GMSK	GMSK	8PSK
Duty Cycle	1/8	1/8 or 2/8	
Transmitter Frequency Range (MHz)	1850.2 - 1909.8	1850.2 - 1909.8	1850.2 - 1909.8

Outside of USA and Canada, the transmitter of the device is capable of operating also in GSM900&GSM1800, 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 also evaluated against the head profile of the phantom.

2.1 Picture of the Device

Front side view

Back side view

2.2 Description of the Antenna

The device has an internal patch antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Period of measurement:	2004-10-29 to 2004-11-13
Ambient temperature (°C):	21.0 to 24.9
Ambient humidity (RH %):	10 to23

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 power output 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, DASY 4 software version 4.2, 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
DAE3	481	12 months	03/2005
E-field Probe ET3DV6	1650	12 months	03/2005
Dipole validation Kit, D1900V2	547	24 months	03/2006

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	Agilent 8648C	3847m00258	12months	12/2004
Amplifier	AR 5S1G4M3	302339	12months	12/2004
Power Meter	Agilent E4419B	MY41291520	12months	12/2004
Power Sensor	Agilent 8482A	US37295411	12months	12/2004
Call Tester	CMU200	BJPCFT0084	12months	07/2005
Vector Network Analyzer	Agilent 8753S	MY40002096	12months	07/2005
Dielectric Probe Kit	Agilent 85070C	01033717	-	-

4.1.1 Isotropic E-field Probe 547

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 µW/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 Distance from probe tip to dipole centers: 2.7 mm
Application	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 validation testing and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2003.

Validation tests were 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 Simulating Liquids

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

The depth of the liquid was 15.0 ± 0.5 cm measured from the ear reference point during validation and device measurements.

4.3.1 Liquid Recipes

The following recipes were used for Head and Body liquids:

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 Verification of the System

The manufacturer calibrates the probes annually. Dielectric parameters of the simulating liquids were measured every day using the dielectric probe kit and the network analyser. A SAR measurement was made following the determination of the dielectric parameters of the liquids, 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 validation results (dielectric parameters and SAR values) are given in the table below.

System verification, head tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			εr	σ [S/m]	
1900	Reference result	10.20	38.8	1.47	N/A
	± 10% window	9.18 to 11.22			
	2004-11-12	9.65	39.0	1.49	21.3
	2004-11-13	9.36	39.2	1.49	21.8

System verification, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			εr	σ [S/m]	
1900	Reference result	10.60	52.5	1.58	N/A
	± 10% window	9.54 to 11.66			
	2004-10-29	9.64	54.2	1.60	22.3

Plots of the Verification 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]
		εr	σ [S/m]	
1880	Recommended value	40.0	1.40	N/A
	± 5% window	38.0 – 42.0	1.33 – 1.47	
	2004-11-12	39.1	1.47	21.3
	2004-11-13	39.3	1.47	21.8

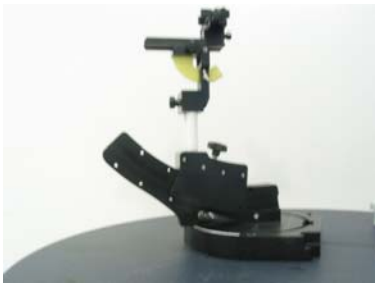
Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		εr	σ [S/m]	
1880	Recommended value	53.3	1.52	N/A
	± 5% window	50.6 – 56.0	1.44 – 1.60	
	2004-10-29	54.3	1.60	22.3

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 gave higher results.

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

5.3 Scan Procedures

First coarse scans were used for determination of the field distribution. Next a cube scan, a minimum of 5x5x7 points covering a volume of 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 coarse scan and again at the end of the cube 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 cube 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 cube scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	c_i	$c_i . u_i$ (%)	v_i
Measurement System							
Probe Calibration	E2.1	±5.8	N	1	1	±5.8	∞
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	±8.3	R	√3	1	±4.8	∞
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	±3.9	R	√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	√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			**±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:

GSM1900 Head SAR results

Hardware ID	Position		SAR, averaged over 1g (W/kg)		
			Ch 512 1850 MHz	Ch 661 1880 MHz	Ch 810 1910 MHz
3057	Power level		26.5dBm	28.3 dBm	29.1 dBm
	Left	Cheek	0.25	0.31	**0.42**
		Tilt		0.25	
	Right	Cheek		0.28	
		Tilt		0.21	
3058	Power level		26.8dBm	27.7 dBm	26.9 dBm
	Left	Cheek	0.35	0.35	0.38
		Tilt			
	Right	Cheek			
		Tilt			

GPRS 1900(2-slot) Head SAR Results

Hardware ID	Position		SAR, averaged over 1g (W/kg)		
			Ch 512 1850 MHz	Ch 661 1880 MHz	Ch 810 1910 MHz
3057	Power level		22.0dBm	23.4 dBm	25.2 dBm
	Left	Cheek	0.28	0.36	**0.54**
3058	Power level		23.6dBm	25.6 dBm	25.3 dBm
	Left	Cheek	0.39	0.39	0.43

EGPRS 1900(2-slot) Head SAR Results

Hardware ID	Position		SAR, averaged over 1g (W/kg)		
			Ch 512 1850 MHz	Ch 661 1880 MHz	Ch 810 1910 MHz
3057	Power level		22.3dBm	23.9 dBm	24.8 dBm
	Left	Cheek			0.27
3058	Power level		23.2 dBm	25.1 dBm	24.7 dBm
	Left	Cheek			0.21

GPRS 1900(2-slot) Body SAR Results

Hardware ID	Body-worn location setup	SAR, averaged over 1g (W/kg)		
		Ch 512 1850MHz	Ch 661 1880 MHz	Ch 810 1910 MHz
3057	Power level	22.0dBm	23.4 dBm	25.2 dBm
	Without headset	0.39	0.23	0.55
	Headset HS-8	0.40	0.27	0.58
3058	Power level	23.6dBm	25.6 dBm	25.3 dBm
	Without headset			
	Headset HS-8	0.30	0.37	0.45

Plots of the Measurement scans are given in Appendix B.

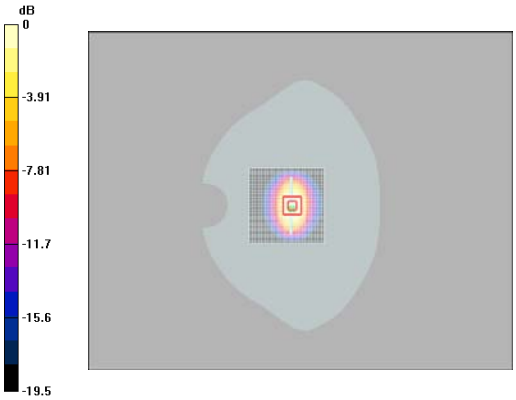
APPENDIX A: VALIDATION SCANS

Date: 2004-11-12
Test Laboratory: Nokia China
Liquid Temperature: 21.3°C
DUT: Dipole 1900 MHz; Type: D1900V2; SN: 547
Program Name: System Performance Check at 1900 MHz, Advanced Extrapolatiom
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.49 mho/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 90 V/m; Power Drift = 0.002 dB
Maximum value of SAR (interpolated) = 11.7 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90 V/m; Power Drift = 0.002 dB
Maximum value of SAR (measured) = 11 mW/g
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 9.65 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.

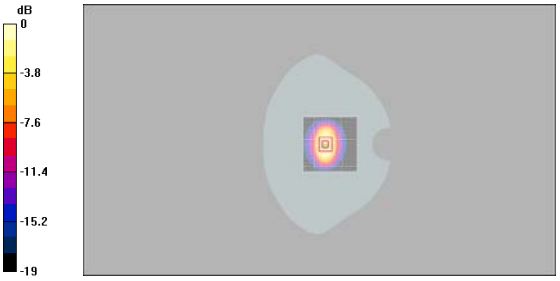


0 dB = 11mW/g

Date:2004-11-13
Test Laboratory: Nokia China
liquid Temperature: 21.8°C
DUT: Dipole 1900 MHz; Type: D1900V2; SN: 547
Program Name: System Performance Check at 1900 MHz, Advanced Extrapolation
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.49 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 87.2 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 11.4 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.2 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 10.5 mW/g
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 9.36 mW/g; SAR(10 g) = 4.78 mW/g

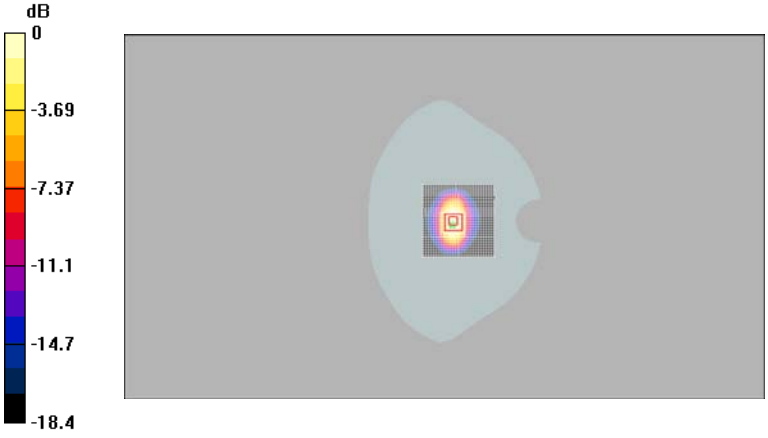


0 dB = 10.5mW/g

Date: 2004-10-29
Test Laboratory: Nokia China
Liquid Temperature: 22.3°C
DUT: Dipole 1900 MHz; Type: D1900V2; SN: 547
Program Name: System Performance Check at 1900 MHz, Advanced Extrapolation
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.6 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(4.73, 4.73, 4.73); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 88 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 12.2 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 10.9 mW/g
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 9.64 mW/g; SAR(10 g) = 5.01 mW/g



0 dB = 10.9mW/g

APPENDIX B: MEASUREMENT SCANS

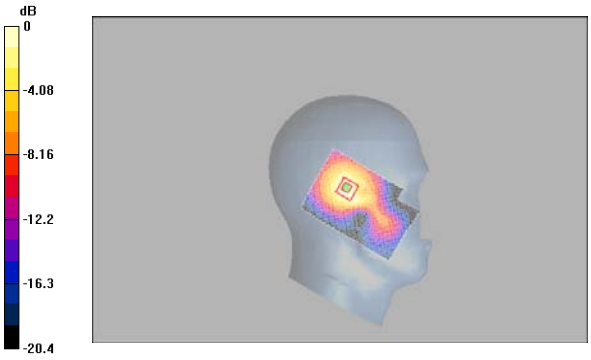
Date:2004-11-12
Test Laboratory: Nokia China
Liquid temperature: 21.7°C
DUTType: RM-30
Program Name: DCS1900, Left side, worst extrapolation, cheek position, HW3057
Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.5 mho/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

worst case, high/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 13.8 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.417 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

worst case, high/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.465 mW/g
Peak SAR (extrapolated) = 0.919 W/kg
SAR(1 g) = 0.422 mW/g; SAR(10 g) = 0.218 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

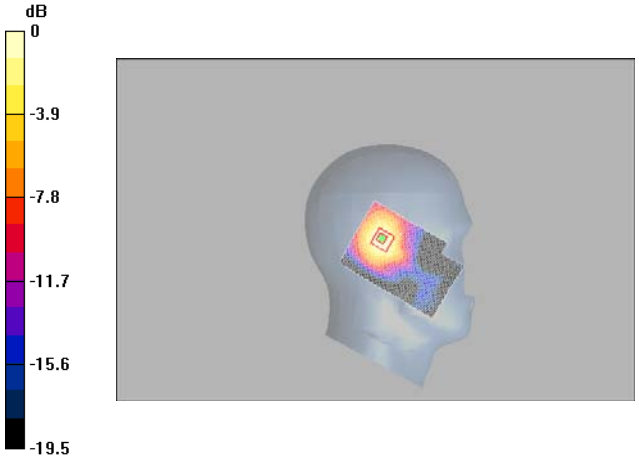


0 dB = 0.465mW/g

Test Laboratory: Nokia China
Liquid temperature: 21.7°C
DUT Type: RM-30;
Program Name: DCS1900, Left side, worst case extrapolation, tilt position, HW3057
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Tilt position - Middle/Area Scan 2 (61x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 12.4 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.271 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 12.4 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.271 mW/g
Peak SAR (extrapolated) = 0.528 W/kg
SAR(1 g) = 0.250 mW/g; SAR(10 g) = 0.132 mW/g

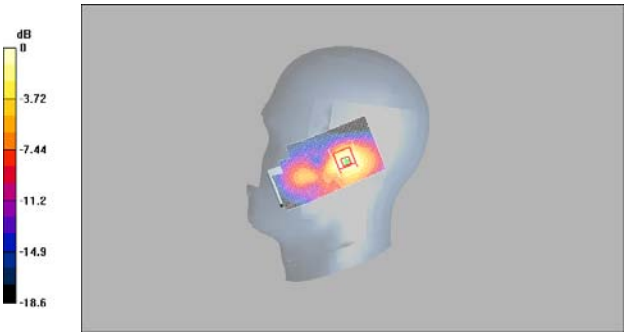


0 dB = 0.271mW/g

Date:2004-11-12
Test Laboratory: Nokia China
Liquid temperature: 21.7°C
DUT Type: RM-30
Program Name: DCS1900, Right side, worst case extrapolation, cheek position, HW3057
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1; ;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Touch position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 10.8 V/m; Power Drift = -0.007 dB
Maximum value of SAR (interpolated) = 0.301 mW/g

Touch position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = -0.007 dB
Maximum value of SAR (measured) = 0.301 mW/g
Peak SAR (extrapolated) = 0.545 W/kg
SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.146 mW/g

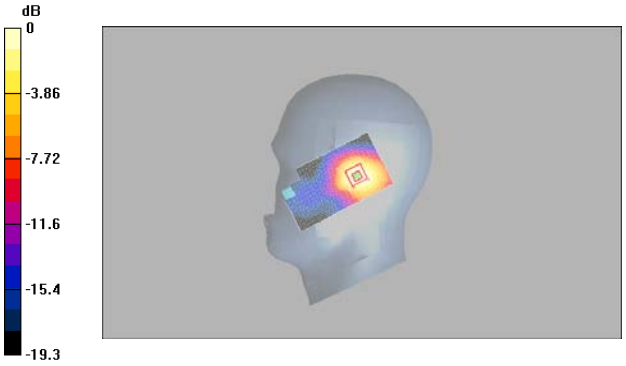


0 dB = 0.301mW/g

Date:2004-11-12
Test Laboratory: Nokia China
Liquid temperature: 21.9°C
DUT Type: RM-30;
Program Name: DCS1900, Right side, worst case extrapolation, tilt position, HW3057
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1; ;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Tilt position - Middle/Area Scan 2 (51x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 11.1 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 0.231 mW/g

Tilt position - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.1 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 0.219 mW/g
Peak SAR (extrapolated) = 0.408 W/kg
SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.113 mW/g



0 dB = 0.219mW/g

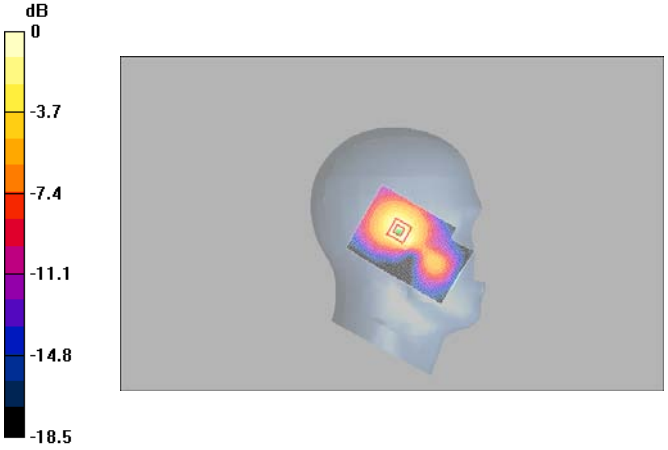
Date:2004-11-12
Test Laboratory: Nokia China
Liquid temperature: 21.9°C
DUT Type: RM-30;
Program Name: DCS1900, Left side, worstcase extrapolation, cheek position, HW3058
Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.5 mho/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1; ;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

worst case, high/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 11.8 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 0.383 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

worst case, high/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.8 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 0.402 mW/g
Peak SAR (extrapolated) = 0.791 W/kg
SAR(1 g) = 0.377 mW/g; SAR(10 g) = 0.194 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

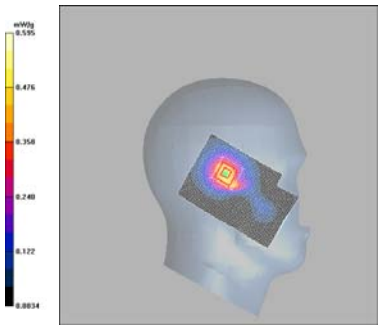


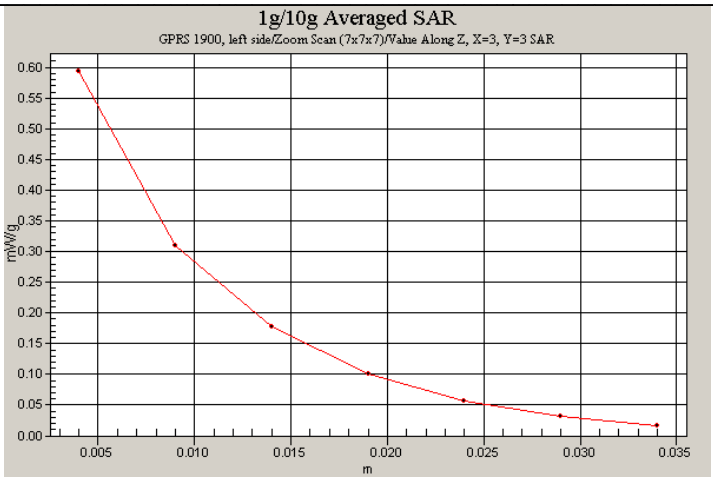
0 dB = 0.402mW/g

Date:2004-11-13
Test Laboratory: Nokia China
Liquid temperature: 22.0°C
DUT Type RM-30;
Program Name: GPRS 1900, left side, worst case extrapolation, cheek position, HW3057
Communication System: GPRS1900; Frequency: 1910 MHz;Duty Cycle: 1:4.2
Medium parameters used: f = 1910 MHz; σ = 1.5 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Touch position - high/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 14.7 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.514 mW/g

Touch position - high/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.7 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.595 mW/g
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.543 mW/g; SAR(10 g) = 0.280 mW/g

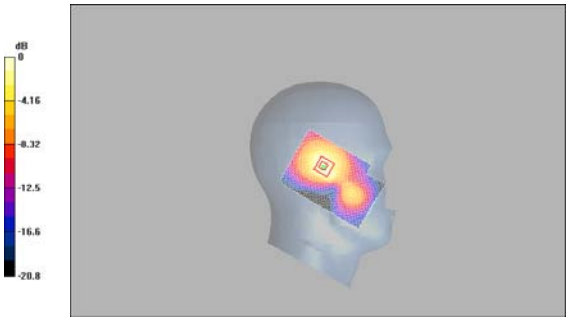




Date:2004-11-13
Test Laboratory: Nokia China
Liquid temperature: 22.1°C
DUT Type: RM-30
Program Name: GPRS 1900, left side, worst case extrapolation, cheek position, HW3058
Communication System: GPRS1900; Frequency: 1910 MHz;Duty Cycle: 1:4.2
Medium parameters used: f = 1910 MHz; σ = 1.5 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Touch position - high/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 12.4 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.432 mW/g

Touch position - high/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.4 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.460 mW/g
Peak SAR (extrapolated) = 0.917 W/kg
SAR(1 g) = 0.428 mW/g; SAR(10 g) = 0.219 mW/g

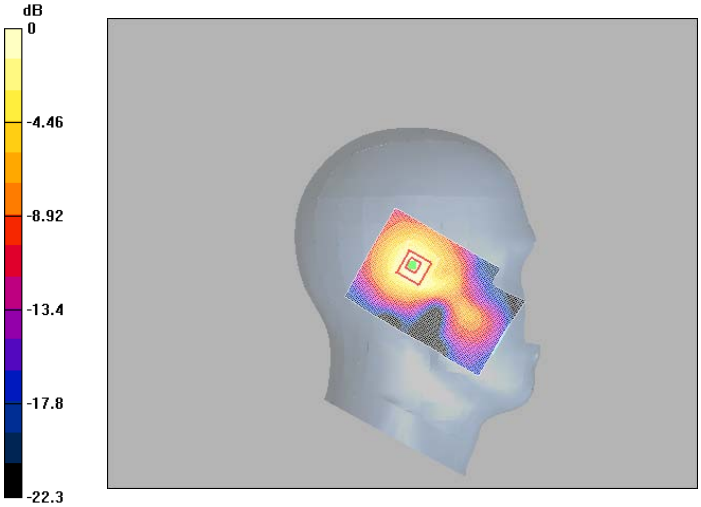


0 dB = 0.460mW/g

Date: 2004-11-13
Test Laboratory: Nokia China
Liquid Temperature: 22.5°C
DUT Type:RM-30
Program Name: EGPRS 1900, left side, worst case extrapolation, cheek position, HW3057
Communication System: EGPRS1900; Frequency: 1910 MHz;Duty Cycle: 1:4.2
Medium parameters used: f = 1910 MHz; σ = 1.5 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1; ;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Touch position - high, Dut0800/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 11.6 V/m; Power Drift = -0.2 dB
Maximum value of SAR (interpolated) = 0.276 mW/g

Touch position - high, Dut0800/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.6 V/m; Power Drift = -0.2 dB
Maximum value of SAR (measured) = 0.295 mW/g
Peak SAR (extrapolated) = 0.549 W/kg
SAR(1 g) = 0.270 mW/g; SAR(10 g) = 0.142 mW/g

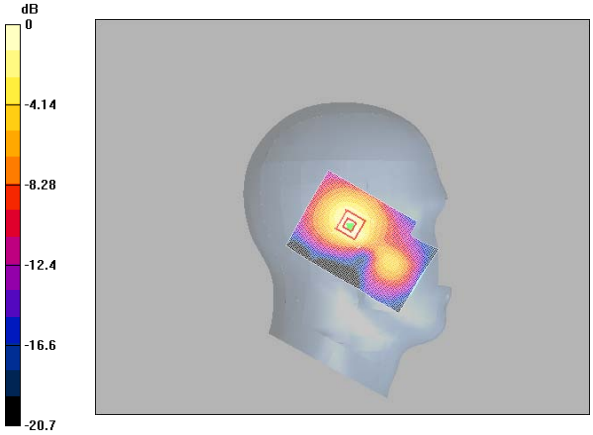


0 dB = 0.295mW/g

Date: 2004-11-13
Test Laboratory: Nokia China
Liquid Temperature: 22.4°C
DUT Type: RM-30
Program Name: EGPRS 1900, left side, worst case extrapolation, cheek position, HW3058
Communication System: EGPRS1900; Frequency: 1910 MHz;Duty Cycle: 1:4.2
Medium parameters used: f = 1910 MHz; σ = 1.5 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(5.36, 5.36, 5.36); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Touch position - high, Dut0824/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 8.54 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.211 mW/g

Touch position - high, Dut0824/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.54 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.224 mW/g
Peak SAR (extrapolated) = 0.459 W/kg
SAR(1 g) = 0.210 mW/g; SAR(10 g) = 0.108 mW/g

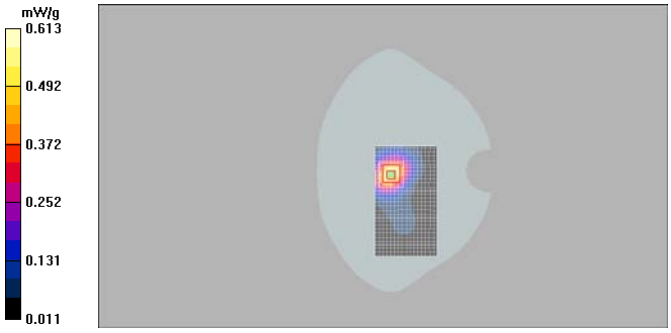


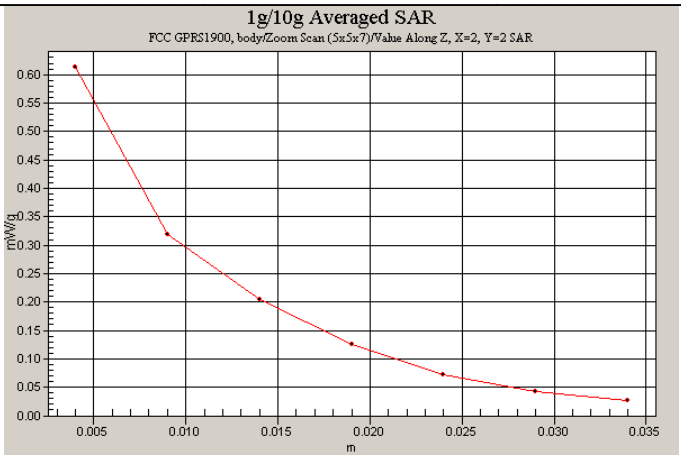
0 dB = 0.224mW/g

Date: 2004-10-29
Test Laboratory: Nokia China
Liquid Temperature: 22.8°C
DUT Type: RM-30
Program Name: GPRS1900, body, worst case extrapolation, with HS-8, HW3057
Communication System: GPRS1900; Frequency: 1910 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1910 MHz; σ = 1.62 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(4.73, 4.73, 4.73); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1; ;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Body - high, with headset/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 15.1 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 0.613 mW/g

Body - high, with headset/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.1 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 0.613 mW/g
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.312 mW/g

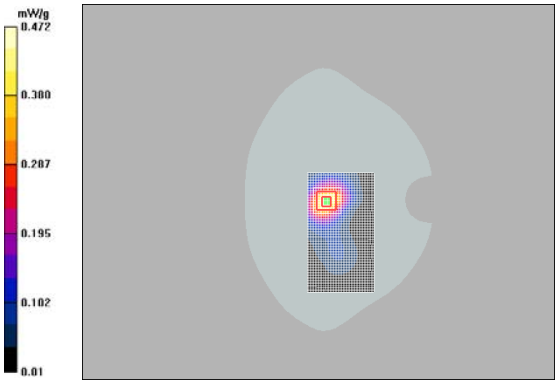




Date: 2004-10-29
Test Laboratory: Nokia China
Liquid Temperature: 22.9°C
DUT Type:RM-30
Program Name: GPRS1900, body, worst case extrapolation, with HS-8, HW3058
Communication System: GPRS1900; Frequency: 1910 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1910 MHz; σ = 1.62 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1650; ConvF(4.73, 4.73, 4.73); Calibrated: 3/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn481; Calibrated: 3/15/2004
- Phantom: SAM1;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Body - high, with HS-8/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 14.5 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.476 mW/g

Body - high, with HS-8/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 14.5 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.472 mW/g
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.450 mW/g; SAR(10 g) = 0.243 mW/g



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

Please see file: ET3DV6-SN1650.pdf

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

Please see file: D1900-head&body.pdf