TCC
Nokia

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

# SAR Compliance Test Report

| | | | |
|---|---|---|---|
| **Test report no.:** | Bej_SAR_0647_01 | **Date of report:** | 2006-11-22 |
| **Template version:** | 4.0 | **Number of pages:** | 42 |
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| **Responsible test engineer:** | Liang Dong | **Product contact person:** | Jukka Pekkala |
| **Measurements made by:** | Liang Dong | | |
| **Tested device:** | RM-222 | | |
| **FCC ID:** | PPIRM-222 | **IC:** | 661U-RM222 |
| **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 Technique

**Documentation:** The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.

**Test results:** **The tested device complies with the requirements in respect of all parameters subject to the test.** The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.

**Date and signatures:**

For the contents:

Liang Dong

Digitally signed by Liang Dong
DN: CN = Liang Dong, C = CN, O = nokia, OU = CertT
Date: 2006.11.24 16:34:12 +08'00'

CONTENTS

# 1. SUMMARY OF SAR TEST REPORT

## 1.1 Test Details

| | |
|---|---|
| Period of test | 2006-11-20 to 2006-11-22 |
| SN, HW and SW numbers of tested device | SN: 004400\93\163700\1, HW: 0365, SW: 3.92, DUT: 50393 |
| Batteries used in testing | BL-4C, DUT: 50386, 50385 |
| Headsets used in testing | HS-47, DUT: 50388 |
| 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) | Radiated power | Position | Measured SAR value (1g avg) | Scaled* SAR value (1g avg) | SAR limit (1g avg) | Result |
|---|---|---|---|---|---|---|---|
| GSM850 | 190 / 836.6 | 30.2 dBm ERP | Left, Cheek | 0.682 W/kg | **0.76 W/kg** | 1.6 W/kg | PASSED |
| 2-slot GPRS1900 | 512 / 1850.2 | 28.8 dBm EIRP | Right, Tilt | 0.630 W/kg | **0.71 W/kg** | 1.6 W/kg | PASSED |

### 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 |
|---|---|---|---|---|---|---|---|
| GSM850 | 128 / 824.2 | 29.7 dBm ERP | 2.2 cm | 0.549 W/kg | **0.61 W/kg** | 1.6 W/kg | PASSED |
| 2-slot GPRS1900 | 810 / 1909.8 | 28.0 dBm EIRP | 2.2 cm | 0.327 W/kg | **0.37 W/kg** | 1.6 W/kg | PASSED |

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

### 1.2.3 Maximum Drift

| Maximum drift covered by 12% scaling up of the SAR values | Maximum drift during measurements |
|---|---|
| 0.5dB | 0.28 dB |

### 1.2.4 Measurement Uncertainty

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

## 2. DESCRIPTION OF THE DEVICE UNDER TEST

| | |
|---|---|
| Device category | Portable |
| Exposure environment | General population / uncontrolled |

| Modes and Bands of Operation | GSM | GPRS | EGPRS | BT |
|---|---|---|---|---|
| | 850 / 1900 | 850 / 1900 | 850 / 1900 | |
| Modulation Mode | GMSK | GMSK | GMSK / 8PSK | GFSK |
| Duty Cycle | 1/8 | 1/8 to 2/8 | 1/8 to 2/8 | |
| Transmitter Frequency Range (MHz) | 824 - 849<br>1850 - 1910 | 824 - 849<br>1850 - 1910 | 824 - 849<br>1850 - 1910 | 2402-2480 |

Outside of USA and Canada, the transmitter of the device is capable of operating also in 1800 MHz band, which is not part of this filing.

This device has Push to Talk capability for use at the ear. Therefore, SAR for multi 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 antennas.

# 3. TEST CONDITIONS

## 3.1 Temperature and Humidity

| | |
|---|---|
| Ambient temperature (°C): | 20.5 to 22.8 |
| Ambient humidity (RH %): | 21 to 33 |

## 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(s) 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 |
|---|---|---|---|
| DAE 3 | 480 | 12 months | 2007-09 |
| E-field Probe ET3DV6 | 1650 | 12 months | 2007-03 |
| Dipole Validation Kit, D850V2 | 4d005 | 24 months | 2008-03 |
| 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 | 8648C | 3847M00258 | 12 months | 2007-06 |
| Call Tester | CMU200 | 835352/008 | - | - |
| Amplifier | AR 5SIG4M3 | 302339 | 12 months | 2007-06 |
| RF Network Analyzer | 8753ES | My40002096 | 12 months | 2007-06 |
| Call Tester | CMU200 | 100359 | - | - |
| Dielectric Probe Kit | 85070C | 01033717 | - | - |
| Power Meter | Aligent E4419B | My41291520 | 12 months | 2007-06 |
| Power Sensor | Agilent 8482A | US37295411 | 12 months | 2007-06 |

### 4.1.1 Isotropic E-field Probe Type ET3DV6

| | |
|---|---|
| **Construction** | Symmetrical design with triangular core<br>Built-in optical fiber for surface detection system<br>Built-in shielding against static charges<br>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)<br>± 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<br>Tip length: 16 mm<br>Body diameter: 12 mm<br>Tip diameter: 6.8 mm<br>Distance from probe tip to dipole centers: 2.7 mm |
| **Application** | General dosimetry up to 3 GHz<br>Compliance tests of mobile phones<br>Fast automatic scanning in arbitrary phantoms |

## 4.2 Phantoms

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

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

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

## 4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 - 2003 and FCC Supplement C to OET Bulletin 65. All tests were carried out using simulants

whose dielectric parameters were within ± 5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

The depth of the tissue simulant was 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 recipe(s) were used for Head and Body tissue stimulant(s):

**800MHz band**

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

**1900MHz band**

| Ingredient | Head (% by weight) | Body (% by weight) |
|---|---|---|
| Deionised Water | 54.88 | 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] |
|---|---|---|---|---|---|
| | | | $\varepsilon_r$ | $\sigma$ [S/m] | |
| | Reference result | 2.36 | 42.1 | 0.94 | |
| | ± 10% window | 2.12 – 2.60 | | | |
| 835 | 2006-11-20 | 2.34 | 41.6 | 0.90 | 20.7 |
| | Reference result | 10.1 | 38.7 | 1.47 | |
| | ± 10% window | 9.1 – 11.1 | | | |
| 1900 | 2006-11-22 | 9.34 | 40.4 | 1.42 | 20.5 |

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] |
|---|---|---|---|---|
| | | $\varepsilon_r$ | $\sigma$ [S/m] | |
| | Recommended value | 41.5 | 0.90 | |
| | ± 5% window | 39.4 – 43.6 | 0.86 – 0.95 | |
| 836 | 2006-11-20 | 41.6 | 0.89 | 20.7 |
| | Recommended value | 40.0 | 1.40 | |
| | ± 5% window | 38.0 – 42.0 | 1.33 – 1.47 | |
| 1880 | 2006-11-22 | 40.4 | 1.40 | 20.5 |

**Body tissue simulant measurements**

| *f* [MHz] | Description | Dielectric Parameters | | Temp [°C] |
|---|---|---|---|---|
| | | $\varepsilon_r$ | $\sigma$ [S/m] | |
| | Recommended value | 55.2 | 0.97 | |
| | ± 5% window | 52.4 – 58.0 | 0.92 – 1.02 | |
| 836 | 2006-11-20 | 54.9 | 0.99 | 21.0 |
| | Recommended value | 53.3 | 1.52 | |
| | ± 5% window | 50.6 – 56.0 | 1.44 – 1.60 | |
| 1880 | 2006-11-22 | 53.0 | 1.51 | 21.7 |

# 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.

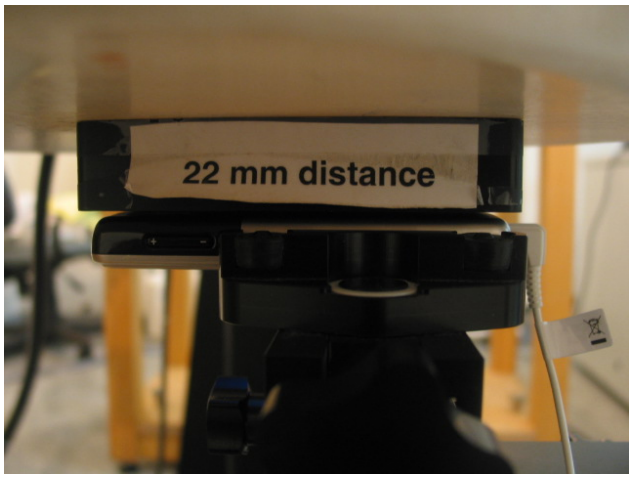



Photo of the device positioned for Body SAR measurement.
The spacer was removed for the tests.

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

## 7. RESULTS

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

**850MHz Head SAR results**

| Mode | Test configuration | | SAR, averaged over 1g (W/kg) | | |
|---|---|---|---|---|---|
| | | | Ch 128 824.2 MHz | Ch 190 836.6 MHz | Ch 251 848.8 MHz |
| GSM | Power | | 29.7 dBm | 30.2 dBm | 30.2 dBm |
| | Left | Cheek | 0.623 | **0.682** | 0.473 |
| | | Tilt | - | 0.417 | - |
| | Right | Cheek | - | 0.635 | - |
| | | Tilt | - | 0.511 | - |
| 2-slot GPRS | Power | | 25.7 dBm | 26.6 dBm | 27.0 dBm |
| | Left | Cheek | - | 0.592 | - |
| 2-slot 8PSK EGPRS | Power | | 22.6 dBm | 21.8 dBm | 24.9 dBm |
| | Left | Cheek | - | 0.284 | - |
| GSM | Left Cheek, BT active | | - | 0.643 | - |

**1900MHz Head SAR results**

| Mode | Test configuration | | SAR, averaged over 1g (W/kg) | | |
|---|---|---|---|---|---|
| | | | Ch 512 1850.2 MHz | Ch 661 1880.0 MHz | Ch 810 1909.8 MHz |
| GSM | Power | | 31.5 dBm | 29.3 dBm | 29.2 dBm |
| | Left | Cheek | - | 0.214 | - |
| 2-slot GPRS | Power | | 28.8 dBm | 28.9 dBm | 28.0 dBm |
| | Left | Cheek | - | 0.243 | - |
| | | Tilt | - | 0.382 | - |
| | Right | Cheek | - | 0.433 | - |
| | | Tilt | **0.597** | 0.453 | 0.474 |
| 2-slot 8PSK EGPRS | Power | | 27.7 dBm | 26.0 dBm | 27.6 dBm |
| | Right | Tilt | 0.416 | - | - |
| 2-slot GPRS | Right Tilt, BT active | | **0.630** | - | - |

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

**850MHz Body SAR results**

| Mode | Test configuration | SAR, averaged over 1g (W/kg) | | |
|---|---|---|---|---|
| | | Ch 128 824.2 MHz | Ch 190 836.6 MHz | Ch 251 848.8 MHz |
| GSM | Power | 29.7 dBm | 30.2 dBm | 30.2 dBm |
| | Without headset | **0.530** | 0.497 | 0.357 |
| | Headset HS-47 | 0.397 | 0.419 | 0.251 |
| GSM | Without headset, BT active | **0.549** | - | - |

**1900MHz Body SAR results**

| Mode | Test configuration | SAR, averaged over 1g (W/kg) | | |
|---|---|---|---|---|
| | | Ch 512 1850.2 MHz | Ch 661 1880.0 MHz | Ch 810 1909.8 MHz |
| 2-slot GPRS | Power | 28.8 dBm | 28.9 dBm | 28.0 dBm |
| | Without headset | 0.247 | 0.286 | 0.303 |
| | Headset HS-47 | 0.242 | 0.262 | **0.327** |
| 2-slot GPRS | Headset HS-47, BT active | - | - | 0.289 |

Plots of the Measurement scans are given in Appendix B.

## APPENDIX A: SYSTEM CHECKING SCANS

Date/Time: 2006-11-20 9:50:34 AM

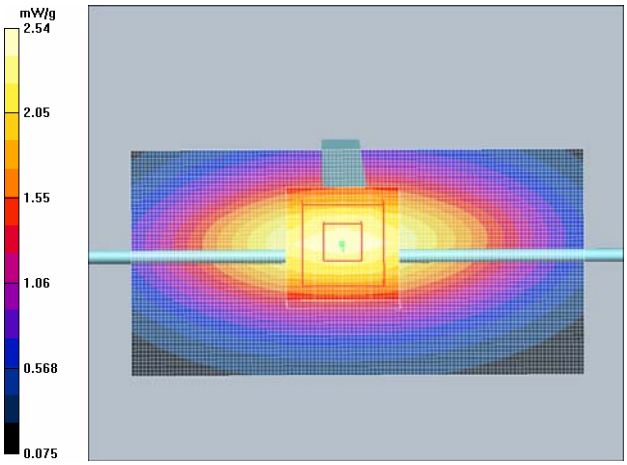
Test Laboratory: Nokia China
**Type: D835V2; Serial: 4d005**

Communication System: Continuous Wave
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Head 900; Medium Notes: Medium Temperature: t=20.7 C
Medium parameters used: f = 835 MHz; $\sigma$ = 0.897 mho/m; $\varepsilon_r$ = 41.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.91, 6.91, 6.91); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**d=15mm, Pin=250mW/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.54 mW/g

**d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 53.0 V/m
Peak SAR (extrapolated) = 3.50 W/kg
**SAR(1 g) = 2.34 mW/g**
**SAR(10 g) = 1.52 mW/g**
**Power Drift = -0.080 dB**
Maximum value of SAR (measured) = 2.53 mW/g



Date/Time: 2006-11-22 9:24:28 AM

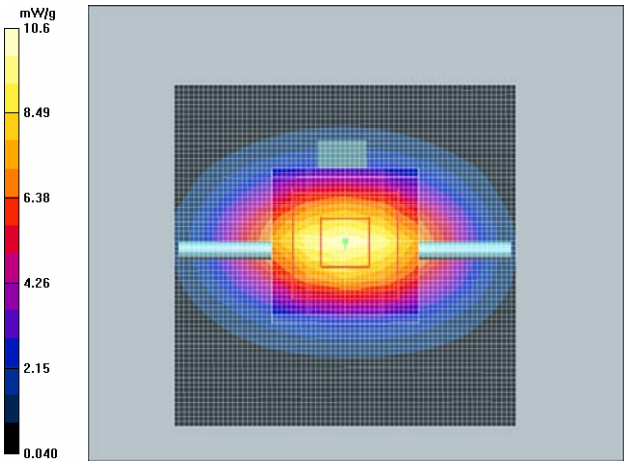
Test Laboratory: Nokia China
**Type: D1900V2; Serial: D1900V2 - SN:547**

Communication System: Continuous Wave
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: Head 1900; Medium Notes: Medium Temperature: t=20.5 C
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 40.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(5.17, 5.17, 5.17); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**d=10mm, Pin=250mW/Area Scan (71x71x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 10.6 mW/g

**d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 89.8 V/m
Peak SAR (extrapolated) = 16.3 W/kg
**SAR(1 g) = 9.34 mW/g**
**SAR(10 g) = 4.89 mW/g**
**Power Drift = 0.012 dB**
Maximum value of SAR (measured) = 10.5 mW/g



## APPENDIX B: MEASUREMENT SCANS

Date/Time: 2006-11-20 10:30:18 AM

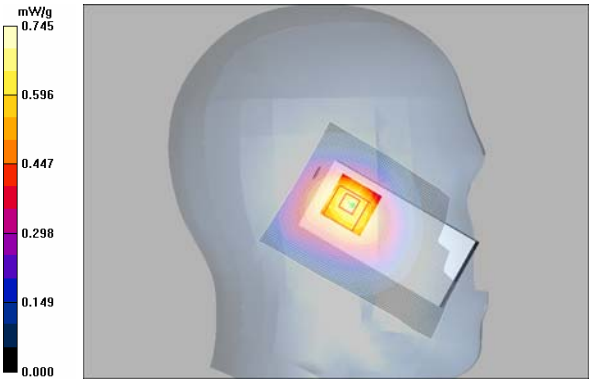
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

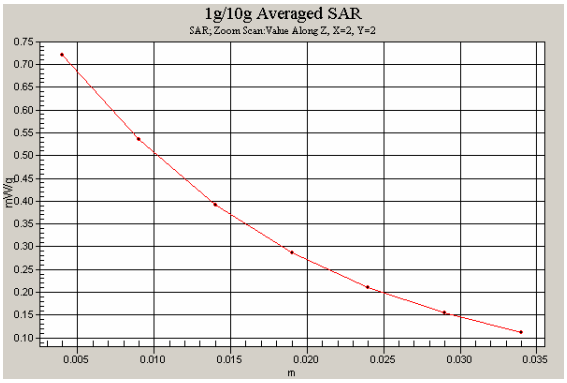
Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=20.7 C
Medium parameters used: f = 837 MHz; $\sigma$ = 0.898 mho/m; $\varepsilon_r$ = 41.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.91, 6.91, 6.91); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - Middle/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.745 mW/g

**Cheek position - Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 26.1 V/m
Peak SAR (extrapolated) = 1.00 W/kg
**SAR(1 g) = 0.682 mW/g**
**SAR(10 g) = 0.479 mW/g**
**Power Drift = -0.170 dB**
Maximum value of SAR (measured) = 0.720 mW/g



Date/Time: 2006-11-20 11:06:19 AM

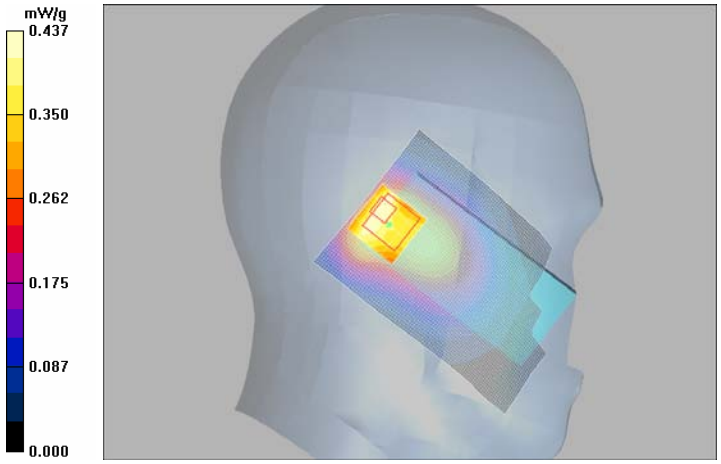
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=20.7 C
Medium parameters used: f = 837 MHz; $\sigma$ = 0.898 mho/m; $\varepsilon_r$ = 41.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.91, 6.91, 6.91); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - Middle/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.437 mW/g

**Tilt position - Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 20.6 V/m
Peak SAR (extrapolated) = 0.688 W/kg
**SAR(1 g) = 0.417 mW/g**
**SAR(10 g) = 0.282 mW/g**
**Power Drift = 0.138 dB**
Maximum value of SAR (measured) = 0.471 mW/g



Date/Time: 2006-11-20 11:21:06 AM

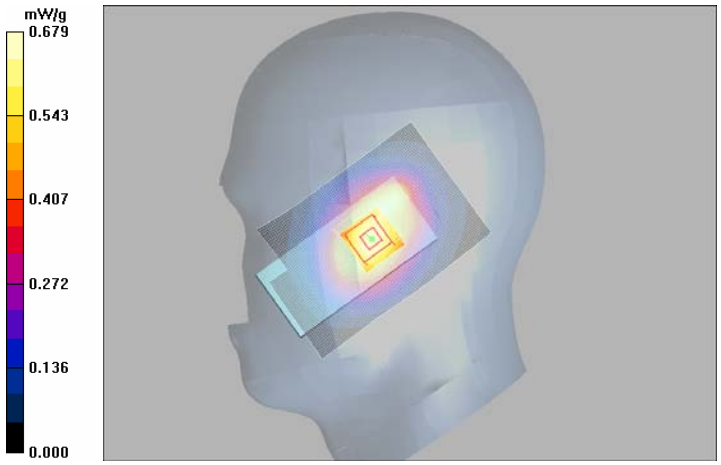
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=20.7 C
Medium parameters used: f = 837 MHz; $\sigma$ = 0.898 mho/m; $\varepsilon_r$ = 41.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.91, 6.91, 6.91); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - Middle/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.679 mW/g

**Cheek position - Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 23.5 V/m
Peak SAR (extrapolated) = 0.907 W/kg
**SAR(1 g) = 0.635 mW/g**
**SAR(10 g) = 0.449 mW/g**
**Power Drift = -0.078 dB**
Maximum value of SAR (measured) = 0.680 mW/g



Date/Time: 2006-11-20 11:35:39 AM

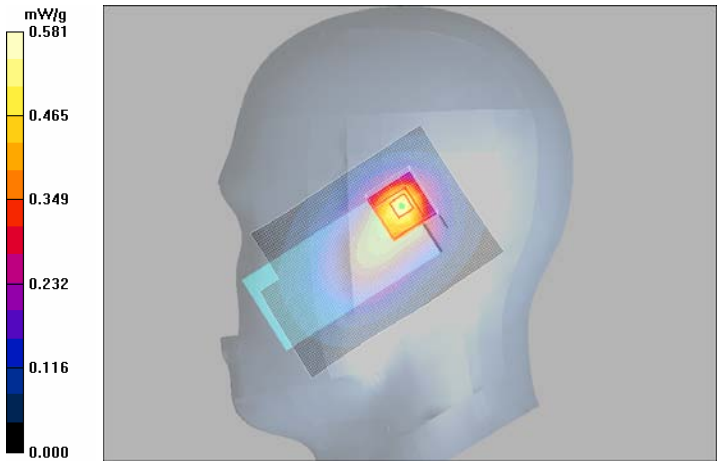
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=20.7 C
Medium parameters used: f = 837 MHz; $\sigma$ = 0.898 mho/m; $\varepsilon_r$ = 41.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.91, 6.91, 6.91); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - Middle/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.581 mW/g

**Tilt position - Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 23.2 V/m
Peak SAR (extrapolated) = 0.994 W/kg
**SAR(1 g) = 0.511 mW/g**
**SAR(10 g) = 0.306 mW/g**
**Power Drift = 0.077 dB**
Maximum value of SAR (measured) = 0.568 mW/g



Date/Time: 2006-11-20 10:48:05 AM

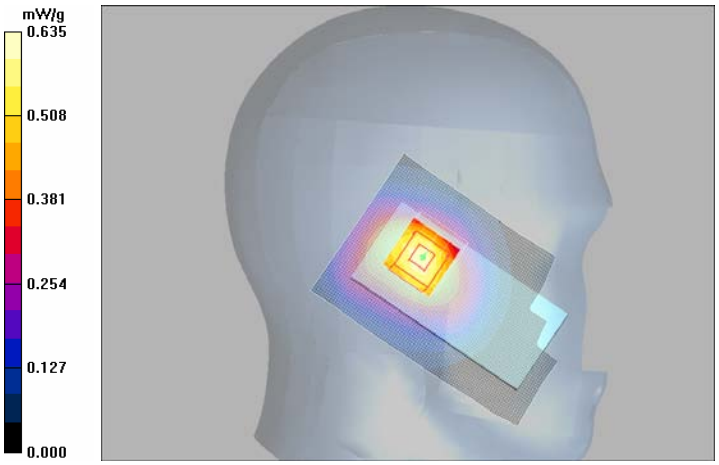
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Head 850; Medium Notes: Medium Temperature: t=20.7 C
Medium parameters used: f = 837 MHz; $\sigma$ = 0.898 mho/m; $\varepsilon_r$ = 41.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.91, 6.91, 6.91); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - Middle/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.635 mW/g

**Cheek position - Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 24.3 V/m
Peak SAR (extrapolated) = 0.868 W/kg
**SAR(1 g) = 0.592 mW/g**
**SAR(10 g) = 0.415 mW/g**
**Power Drift = -0.135 dB**
Maximum value of SAR (measured) = 0.627 mW/g



Date/Time: 2006-11-20 1:20:53 PM

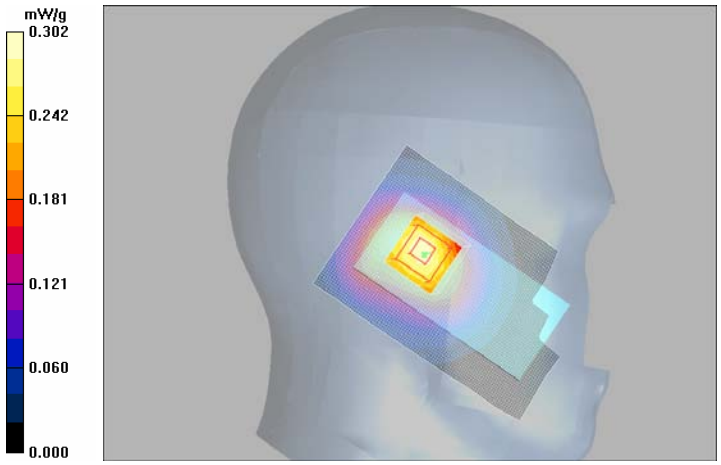
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: 2-slot EGPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.2
Medium: Head 850; Medium Notes: Medium Temperature: t=20.7 C
Medium parameters used: f = 837 MHz; $\sigma$ = 0.898 mho/m; $\varepsilon_r$ = 41.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.91, 6.91, 6.91); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - Middle/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.302 mW/g

**Cheek position - Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.0 V/m
Peak SAR (extrapolated) = 0.393 W/kg
**SAR(1 g) = 0.284 mW/g**
**SAR(10 g) = 0.201 mW/g**
**Power Drift = -0.036 dB**
Maximum value of SAR (measured) = 0.307 mW/g



Date/Time: 2006-11-20 1:05:18 PM

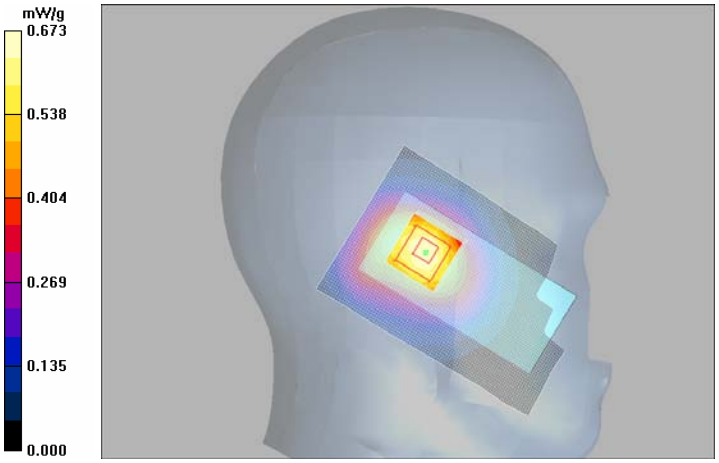
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Head 850; Medium Notes: Medium Temperature: t=20.7 C
Medium parameters used: f = 837 MHz; $\sigma$ = 0.898 mho/m; $\varepsilon_r$ = 41.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.91, 6.91, 6.91); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - Middle - BT active/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.673 mW/g

**Cheek position - Middle - BT active/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 25.2 V/m
Peak SAR (extrapolated) = 0.897 W/kg
**SAR(1 g) = 0.643 mW/g**
**SAR(10 g) = 0.454 mW/g**
**Power Drift = -0.019 dB**
Maximum value of SAR (measured) = 0.684 mW/g



Date/Time: 2006-11-22 9:45:05 AM

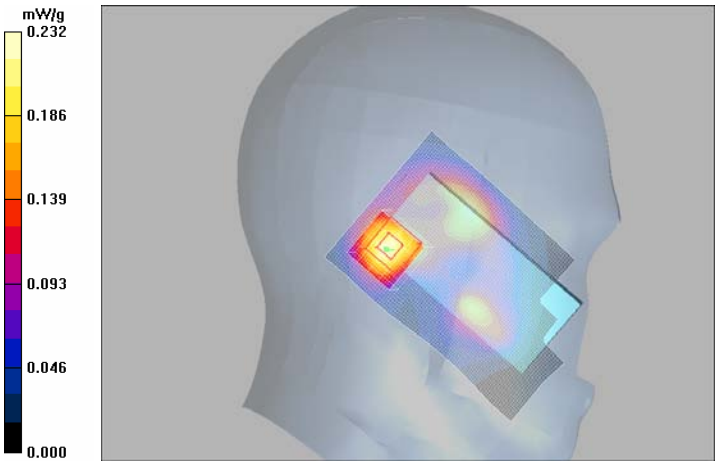
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: GSM 1900
Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Head 1900; Medium Notes: Medium Temperature: t=20.5 C
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 40.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(5.17, 5.17, 5.17); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - Middle/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.232 mW/g

**Cheek position - Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.52 V/m
Peak SAR (extrapolated) = 0.361 W/kg
**SAR(1 g) = 0.214 mW/g**
**SAR(10 g) = 0.119 mW/g**
**Power Drift = 0.209 dB**
Maximum value of SAR (measured) = 0.236 mW/g



Date/Time: 2006-11-22 10:01:48 AM

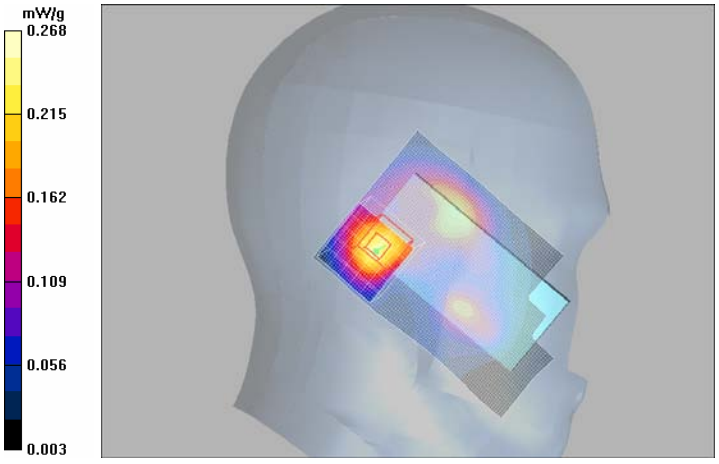
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=20.5 C
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 40.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(5.17, 5.17, 5.17); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - Middle/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.244 mW/g

**Cheek position - Middle/Zoom Scan (6x6x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.3 V/m
Peak SAR (extrapolated) = 0.421 W/kg
**SAR(1 g) = 0.243 mW/g**
**SAR(10 g) = 0.134 mW/g**
**Power Drift = 0.277 dB**
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) = 0.268 mW/g



Date/Time: 2006-11-22 11:02:51 AM

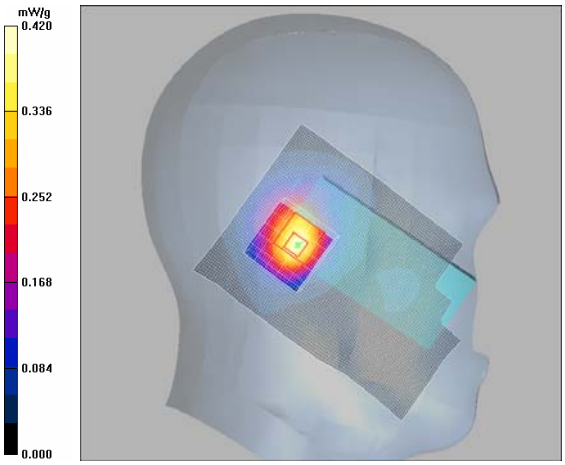
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=20.5 C
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 40.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(5.17, 5.17, 5.17); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - Middle/Area Scan (71x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.420 mW/g

**Tilt position - Middle/Zoom Scan (6x6x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.3 V/m
Peak SAR (extrapolated) = 0.656 W/kg
**SAR(1 g) = 0.382 mW/g**
**SAR(10 g) = 0.212 mW/g**
**Power Drift = -0.133 dB**
Maximum value of SAR (measured) = 0.426 mW/g



Date/Time: 2006-11-22 11:22:19 AM

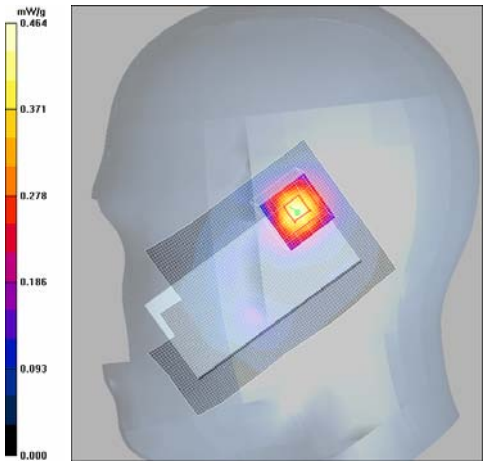
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: 2-slot GPRS1900
Frequency: 1880 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=20.5 C
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 40.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(5.17, 5.17, 5.17); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek position - Middle/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.464 mW/g

**Cheek position - Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 13.2 V/m
Peak SAR (extrapolated) = 0.823 W/kg
**SAR(1 g) = 0.433 mW/g**
**SAR(10 g) = 0.216 mW/g**
**Power Drift = 0.005 dB**
Maximum value of SAR (measured) = 0.498 mW/g



Date/Time: 2006-11-22 12:30:34 PM

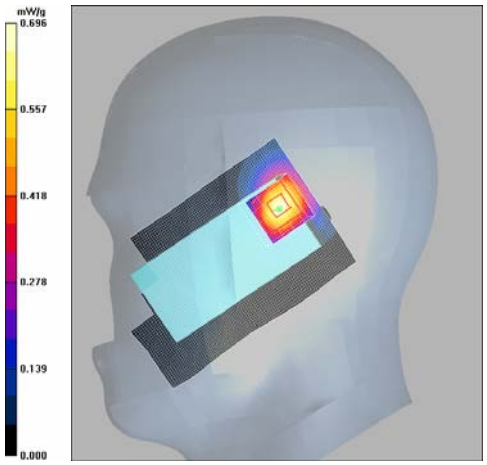
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: 2-slot GPRS1900
Frequency: 1850.2 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=20.5 C
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 40.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(5.17, 5.17, 5.17); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - Low/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.696 mW/g

**Tilt position - Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 21.8 V/m
Peak SAR (extrapolated) = 1.07 W/kg
**SAR(1 g) = 0.597 mW/g**
**SAR(10 g) = 0.314 mW/g**
**Power Drift = -0.239 dB**
Maximum value of SAR (measured) = 0.683 mW/g



Date/Time: 2006-11-22 1:25:10 PM

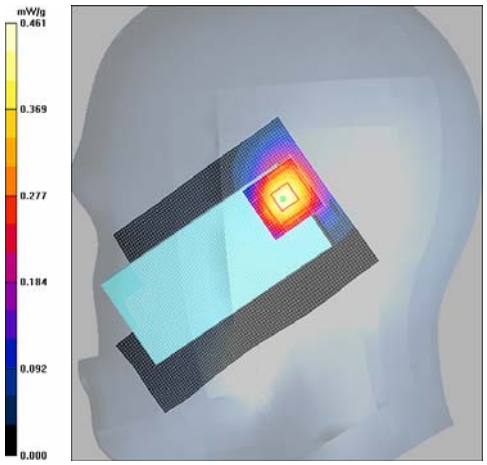
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: 2-slot EGPRS1900
Frequency: 1850.2 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=20.5 C
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 40.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(5.17, 5.17, 5.17); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - Low/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.461 mW/g

**Tilt position - Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 18.0 V/m
Peak SAR (extrapolated) = 0.742 W/kg
**SAR(1 g) = 0.416 mW/g**
**SAR(10 g) = 0.218 mW/g**
**Power Drift = -0.240 dB**
Maximum value of SAR (measured) = 0.473 mW/g



Date/Time: 2006-11-22 1:07:19 PM

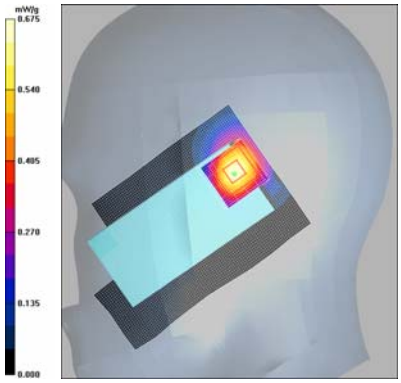
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

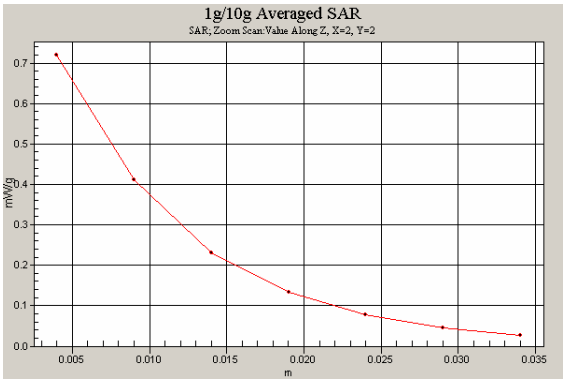
Communication System: 2-slot GPRS1900
Frequency: 1850.2 MHz; Duty Cycle: 1:4.2
Medium: Head 1900; Medium Notes: Medium Temperature: t=20.5 C
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 40.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(5.17, 5.17, 5.17); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt position - Low - BT active/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.675 mW/g

**Tilt position - Low - BT active/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 21.9 V/m
Peak SAR (extrapolated) = 1.14 W/kg
**SAR(1 g) = 0.630 mW/g**
**SAR(10 g) = 0.328 mW/g**
**Power Drift = -0.051 dB**
Maximum value of SAR (measured) = 0.719 mW/g



Date/Time: 2006-11-20 2:10:22 PM

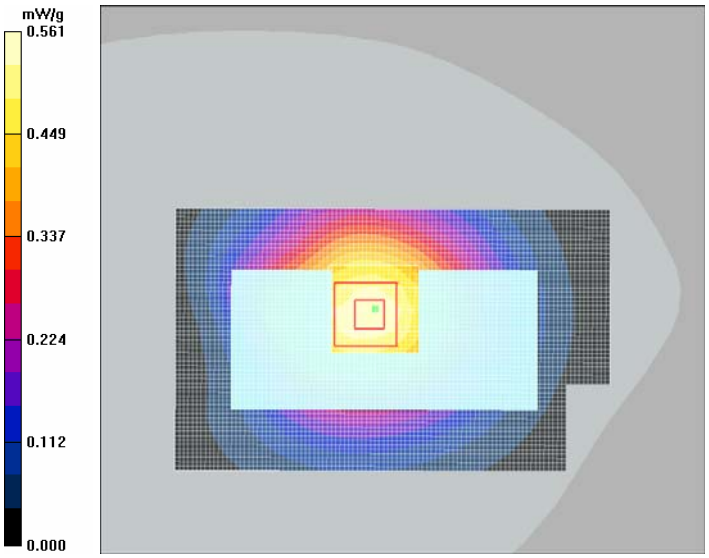
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: GSM850
Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.0 C
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.972 mho/m; $\varepsilon_r$ = 55; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.52, 6.52, 6.52); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Body - Low - No Accessory/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.561 mW/g

**Body - Low - No Accessory/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 14.7 V/m
Peak SAR (extrapolated) = 0.683 W/kg
**SAR(1 g) = 0.530 mW/g**
**SAR(10 g) = 0.388 mW/g**
**Power Drift = -0.033 dB**
Maximum value of SAR (measured) = 0.564 mW/g



Date/Time: 2006-11-20 1:58:47 PM

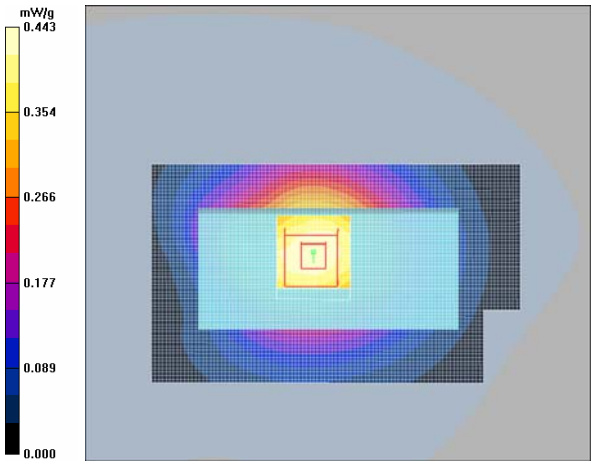
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: GSM850
Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.0 C
Medium parameters used: f = 837 MHz; $\sigma$ = 0.987 mho/m; $\varepsilon_r$ = 54.8; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.52, 6.52, 6.52); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Body - Middle - HS-47/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.443 mW/g

**Body - Middle - HS-47/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 13.4 V/m
Peak SAR (extrapolated) = 0.537 W/kg
**SAR(1 g) = 0.419 mW/g**
**SAR(10 g) = 0.306 mW/g**
**Power Drift = -0.230 dB**
Maximum value of SAR (measured) = 0.444 mW/g



Date/Time: 2006-11-20 3:20:55 PM

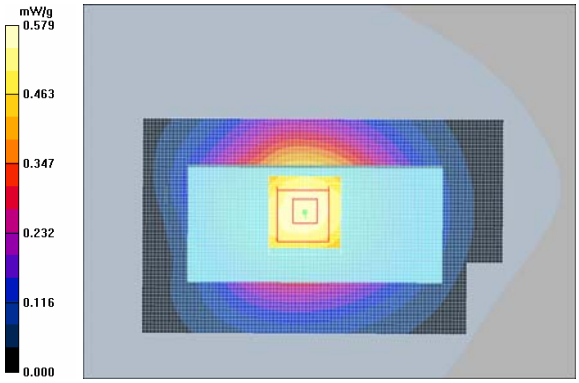
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

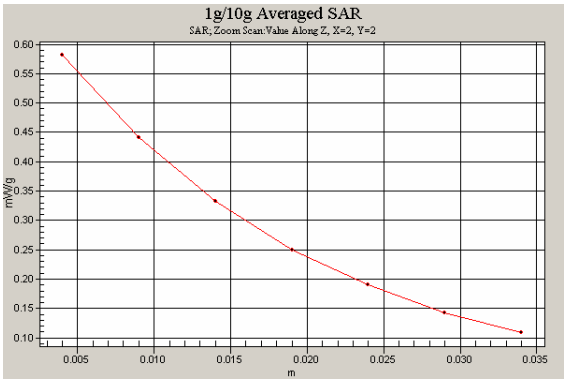
Communication System: GSM850
Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Medium: Body 850; Medium Notes: Medium Temperature: t= 21.0 C
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.972 mho/m; $\varepsilon_r$ = 55; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(6.52, 6.52, 6.52); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM1; Type: SAM; Serial: TP-1097
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Body - Low - No Accessory - BT active/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.579 mW/g

**Body - Low - No Accessory - BT active/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.0 V/m
Peak SAR (extrapolated) = 0.713 W/kg
**SAR(1 g) = 0.549 mW/g**
**SAR(10 g) = 0.402 mW/g**
**Power Drift = 0.008 dB**
Maximum value of SAR (measured) = 0.581 mW/g



Date/Time: 2006-11-22 3:43:42 PM

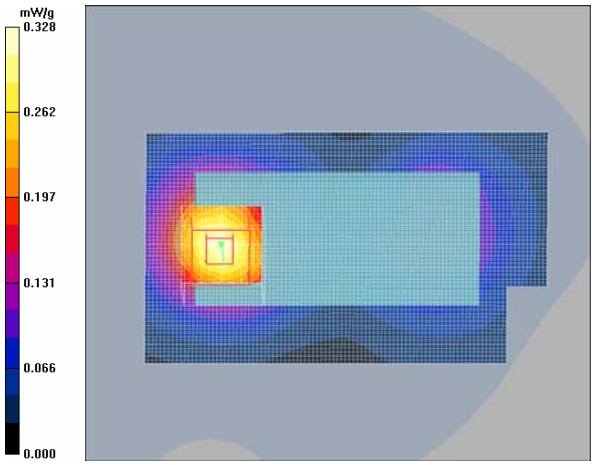
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: 2-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.7 C
Medium parameters used: f = 1910 MHz; $\sigma$ = 1.55 mho/m; $\varepsilon_r$ = 52.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(4.64, 4.64, 4.64); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Body - High - No Accessory/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.328 mW/g

**Body - High - No Accessory/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.3 V/m
Peak SAR (extrapolated) = 0.471 W/kg
**SAR(1 g) = 0.303 mW/g**
**SAR(10 g) = 0.188 mW/g**
**Power Drift = 0.043 dB**
Maximum value of SAR (measured) = 0.330 mW/g



Date/Time: 2006-11-22 3:31:57 PM

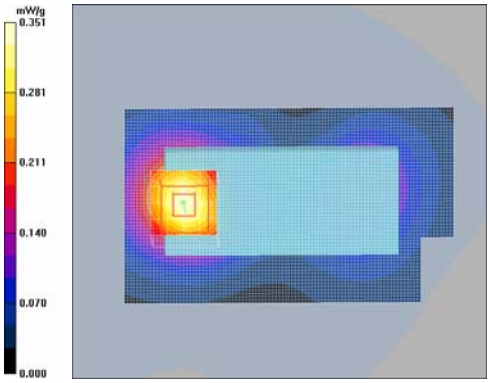
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

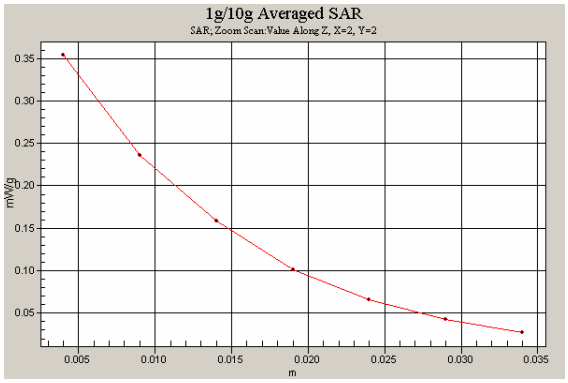
Communication System: 2-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.7 C
Medium parameters used: f = 1910 MHz; $\sigma$ = 1.55 mho/m; $\varepsilon_r$ = 52.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(4.64, 4.64, 4.64); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Body - High - HS-47/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.351 mW/g

**Body - High - HS-47/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.0 V/m
Peak SAR (extrapolated) = 0.497 W/kg
**SAR(1 g) = 0.327 mW/g**
**SAR(10 g) = 0.203 mW/g**
**Power Drift = 0.027 dB**
Maximum value of SAR (measured) = 0.354 mW/g



Date/Time: 2006-11-22 3:57:35 PM

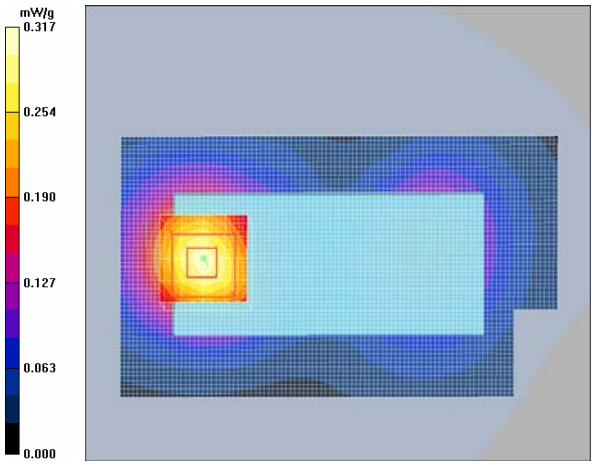
Test Laboratory: Nokia China
**Type: RM-222 ; Serial: 004400/93/163700/1**

Communication System: 2-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:4.2
Medium: Body 1900; Medium Notes: Medium Temperature: t=21.7 C
Medium parameters used: f = 1910 MHz; $\sigma$ = 1.55 mho/m; $\varepsilon_r$ = 52.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1650; Probe Notes:
- ConvF(4.64, 4.64, 4.64); Calibrated: 2006-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn480; Calibrated: 2006-09-19
- Phantom: SAM2; Type: SAM; Serial: TP-1099
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Body - High - HS-47 - BT active/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.317 mW/g

**Body - High - HS-47 - BT active/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.0 V/m
Peak SAR (extrapolated) = 0.438 W/kg
**SAR(1 g) = 0.289 mW/g**
**SAR(10 g) = 0.179 mW/g**
**Power Drift = -0.049 dB**
Maximum value of SAR (measured) = 0.314 mW/g



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

E-field probe ET3DV6, SN: 1650
See the next three pages

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

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

Accredited by the Swiss Federal Office of Metrology and Accreditation
**The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates**

**Accreditation No.: SCS 108**

**Client** **Nokia Beijing TCC**

**Certificate No: ET3-1650_Mar06**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | ET3DV6 - SN:1650 |
| Calibration procedure(s) | QA CAL-01.v5 and QA CAL-12.v4<br>Calibration procedure for dosimetric E-field probes |
| Calibration date: | March 22, 2006 |
| Condition of the calibrated item | In Tolerance |

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter E4419B | GB41293874 | 3-May-05 (METAS, No. 251-00466) | May-06 |
| Power sensor E4412A | MY41495277 | 3-May-05 (METAS, No. 251-00466) | May-06 |
| Power sensor E4412A | MY41498087 | 3-May-05 (METAS, No. 251-00466) | May-06 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 11-Aug-05 (METAS, No. 251-00499) | Aug-06 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 3-May-05 (METAS, No. 251-00467) | May-06 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 11-Aug-05 (METAS, No. 251-00500) | Aug-06 |
| Reference Probe ES3DV2 | SN: 3013 | 2-Jan-06 (SPEAG, No. ES3-3013_Jan06) | Jan-07 |
| DAE4 | SN: 654 | 2-Feb-06 (SPEAG, No. DAE4-654_Feb06) | Feb-07 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| RF generator HP 8648C | US3642U01700 | 4-Aug-99 (SPEAG, in house check Nov-05) | In house check: Nov-07 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (SPEAG, in house check Nov-05) | In house check: Nov 06 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Katja Pokovic | Technical Manager | |
| Approved by: | Fin Bomholt | R&D Director | |

Issued: March 22, 2006

# DASY - Parameters of Probe: ET3DV6 SN:1650

## Sensitivity in Free Space[A] Diode Compression[B]

| | | | | |
|---|---|---|---|---|
| NormX | **1.88** ± 10.1% | $\mu V/(V/m)^2$ | DCP X | **95** mV |
| NormY | **1.86** ± 10.1% | $\mu V/(V/m)^2$ | DCP Y | **95** mV |
| NormZ | **1.84** ± 10.1% | $\mu V/(V/m)^2$ | DCP Z | **95** mV |

## Sensitivity in Tissue Simulating Liquid (Conversion Factors)

**Please see Page 8.**

## Boundary Effect

**TSL** **900 MHz** **Typical SAR gradient: 5 % per mm**

| Sensor Center to Phantom Surface Distance | | **3.7 mm** | **4.7 mm** |
|---|---|---|---|
| $SAR_{be}$ [%] | Without Correction Algorithm | 7.8 | 4.3 |
| $SAR_{be}$ [%] | With Correction Algorithm | 0.1 | 0.2 |

**TSL** **1750 MHz** **Typical SAR gradient: 10 % per mm**

| Sensor Center to Phantom Surface Distance | | **3.7 mm** | **4.7 mm** |
|---|---|---|---|
| $SAR_{be}$ [%] | Without Correction Algorithm | 6.4 | 3.5 |
| $SAR_{be}$ [%] | With Correction Algorithm | 0.1 | 0.2 |

## Sensor Offset

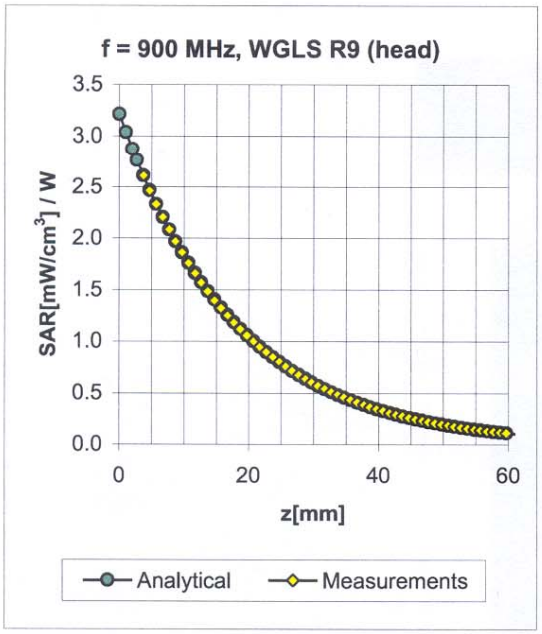
| | |
|---|---|
| Probe Tip to Sensor Center | **2.7** mm |

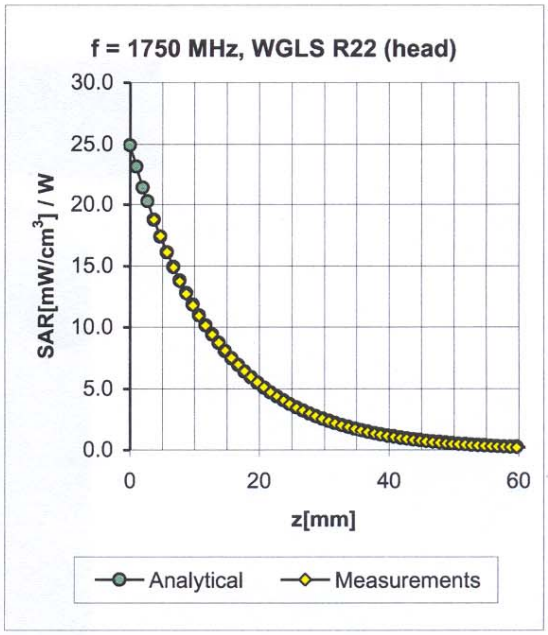
**The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.**

[A] The uncertainties of NormX,Y,Z do not affect the $E^2$-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

# Conversion Factor Assessment




| f [MHz] | Validity [MHz][c] | TSL | Permittivity | Conductivity | Alpha | Depth | ConvF Uncertainty |
|---|---|---|---|---|---|---|---|
| 450 | ± 50 / ± 100 | Head | 43.5 ± 5% | 0.87 ± 5% | 0.27 | 3.21 | 7.13 ± 13.3% (k=2) |
| 835 | ± 50 / ± 100 | Head | 41.5 ± 5% | 0.90 ± 5% | 0.52 | 1.85 | 6.91 ± 11.0% (k=2) |
| 900 | ± 50 / ± 100 | Head | 41.5 ± 5% | 0.97 ± 5% | 0.46 | 1.99 | 6.66 ± 11.0% (k=2) |
| 1750 | ± 50 / ± 100 | Head | 40.1 ± 5% | 1.37 ± 5% | 0.46 | 2.66 | 5.45 ± 11.0% (k=2) |
| 1900 | ± 50 / ± 100 | Head | 40.0 ± 5% | 1.40 ± 5% | 0.55 | 2.43 | 5.17 ± 11.0% (k=2) |
| 1950 | ± 50 / ± 100 | Head | 40.0 ± 5% | 1.40 ± 5% | 0.53 | 2.50 | 5.13 ± 11.0% (k=2) |
| 2450 | ± 50 / ± 100 | Head | 39.2 ± 5% | 1.80 ± 5% | 0.58 | 2.10 | 4.57 ± 11.8% (k=2) |
| | | | | | | | |
| 450 | ± 50 / ± 100 | Body | 56.7 ± 5% | 0.94 ± 5% | 0.24 | 4.07 | 7.64 ± 13.3% (k=2) |
| 835 | ± 50 / ± 100 | Body | 55.2 ± 5% | 0.97 ± 5% | 0.48 | 2.01 | 6.52 ± 11.0% (k=2) |
| 900 | ± 50 / ± 100 | Body | 55.0 ± 5% | 1.05 ± 5% | 0.45 | 2.11 | 6.19 ± 11.0% (k=2) |
| 1750 | ± 50 / ± 100 | Body | 53.4 ± 5% | 1.49 ± 5% | 0.63 | 2.40 | 4.84 ± 11.0% (k=2) |
| 1900 | ± 50 / ± 100 | Body | 53.3 ± 5% | 1.52 ± 5% | 0.77 | 2.13 | 4.64 ± 11.0% (k=2) |
| 1950 | ± 50 / ± 100 | Body | 53.3 ± 5% | 1.52 ± 5% | 0.83 | 2.00 | 4.63 ± 11.0% (k=2) |
| 2450 | ± 50 / ± 100 | Body | 52.7 ± 5% | 1.95 ± 5% | 0.60 | 2.12 | 4.25 ± 11.8% (k=2) |

[c] **The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.**

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

835MHz dipole, SN: 4d005
1900MHz dipole, SN: 547
See the next six pages

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

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

Accredited by the Swiss Federal Office of Metrology and Accreditation
**The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates**

**Accreditation No.: SCS 108**

**Client** **Nokia Beijing TCC**

**Certificate No: D835V2-4d005_Mar06**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D835V2 - SN: 4d005 |
| Calibration procedure(s) | QA CAL-05.v6<br>Calibration procedure for dipole validation kits |
| Calibration date: | March 15, 2006 |
| Condition of the calibrated item | In Tolerance |

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter EPM-442A | GB37480704 | 04-Oct-05 (METAS, No. 251-00516) | Oct-06 |
| Power sensor HP 8481A | US37292783 | 04-Oct-05 (METAS, No. 251-00516) | Oct-06 |
| Reference 20 dB Attenuator | SN: 5086 (20g) | 11-Aug-05 (METAS, No 251-00498) | Aug-06 |
| Reference 10 dB Attenuator | SN: 5047.2 (10r) | 11-Aug-05 (METAS, No 251-00498) | Aug-06 |
| Reference Probe ET3DV6 | SN 1507 | 28-Oct-05 (SPEAG, No. ET3-1507_Oct05) | Oct-06 |
| DAE4 | SN 601 | 15-Dec-05 (SPEAG, No. DAE4-601_Dec05) | Dec-06 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (SPEAG, in house check Oct-05) | In house check: Oct-07 |
| RF generator Agilent E4421B | MY41000675 | 11-May-05 (SPEAG, in house check Nov-05) | In house check: Nov-07 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (SPEAG, in house check Nov-05) | In house check: Nov-06 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Judith Müller | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: March 16, 2006

## DASY4 Validation Report for Head TSL

Date/Time: 15.03.2006 14:15:36

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d005**

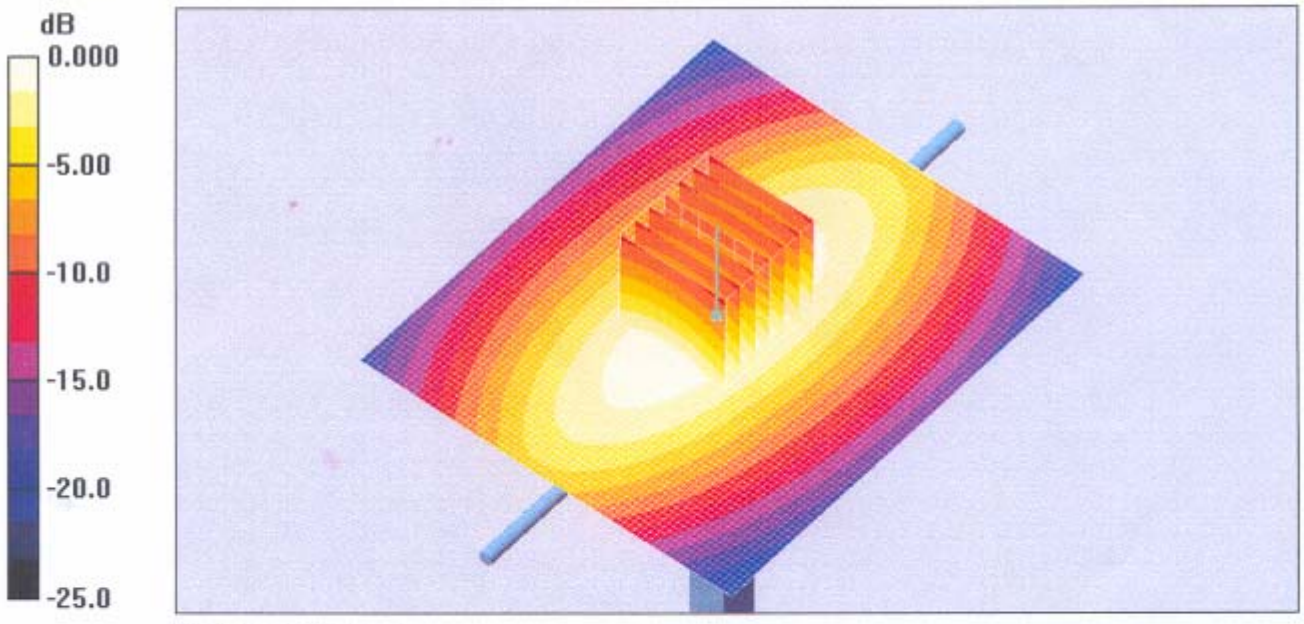
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 835 MHz; $\sigma$ = 0.942 mho/m; $\varepsilon_r$ = 42.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

**Pin = 250 mW; d = 10 mm/Area Scan (71x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.53 mW/g

**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.1 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 3.52 W/kg
**SAR(1 g) = 2.36 mW/g; SAR(10 g) = 1.53 mW/g**
Maximum value of SAR (measured) = 2.55 mW/g




0 dB = 2.55mW/g

## DASY4 Validation Report for Body TSL

Date/Time: 01.03.2006 16:19:55

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d005**

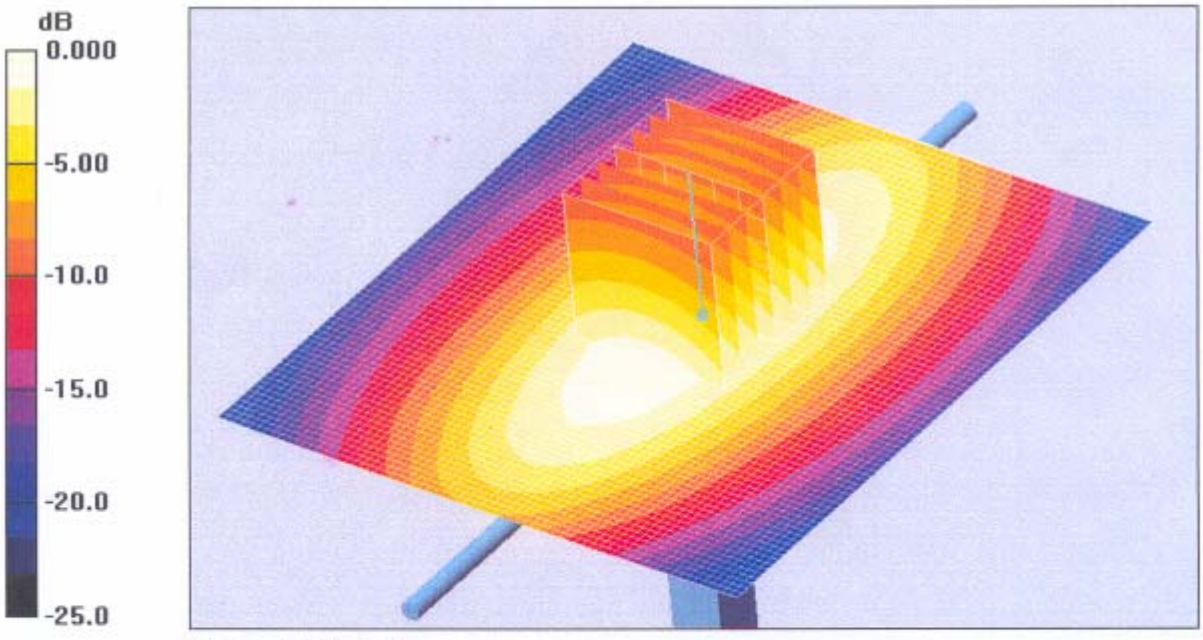
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL U10;
Medium parameters used: f = 835 MHz; $\sigma$ = 0.99 mho/m; $\varepsilon_r$ = 56.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.84, 5.84, 5.84); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 5; Postprocessing SW: SEMCAD, V1.8 Build 160

**Pin = 250 mW; d = 10 mm/Area Scan (71x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.61 mW/g

**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.3 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 3.44 W/kg
**SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.6 mW/g**
Maximum value of SAR (measured) = 2.60 mW/g




0 dB = 2.60mW/g

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

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

Accredited by the Swiss Federal Office of Metrology and Accreditation
**The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates**

**Accreditation No.: SCS 108**

**Client** **Nokia TCC Beijing**

**Certificate No: D1900V2-547_Sep05**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D1900V2 - SN: 547 |
| Calibration procedure(s) | QA CAL-05.v6<br>Calibration procedure for dipole validation kits |
| Calibration date: | September 27, 2005 |
| Condition of the calibrated item | In Tolerance |

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter EPM E442 | GB37480704 | 12-Oct-04 (METAS, No. 251-00412) | Oct-05 |
| Power sensor HP 8481A | US37292783 | 12-Oct-04 (METAS, No. 251-00412) | Oct-05 |
| Reference 20 dB Attenuator | SN: 5086 (20g) | 11-Aug-05 (METAS, No 251-00498) | Aug-06 |
| Reference 10 dB Attenuator | SN: 5047.2 (10r) | 11-Aug-05 (METAS, No 251-00498) | Aug-06 |
| Reference Probe ET3DV6 | SN 1507 | 26-Oct-04 (SPEAG, No. ET3-1507_Oct04) | Oct-05 |
| DAE4 | SN 601 | 07-Jan-05 (SPEAG, No. DAE4-601_Jan05) | Jan-06 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (SPEAG, in house check Oct-03) | In house check: Oct-05 |
| RF generator R&S SML-03 | 100698 | 27-Mar-02 (SPEAG, in house check Dec-03) | In house check: Dec-05 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (SPEAG, in house check Nov-04) | In house check: Nov 05 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Mike Meili | Laboratory Technician | M. Meili |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: September 27, 2005

Date/Time: 23.09.2005 12:58:27

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL 1900 MHz;
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.47 mho/m; $\varepsilon_r$ = 38.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

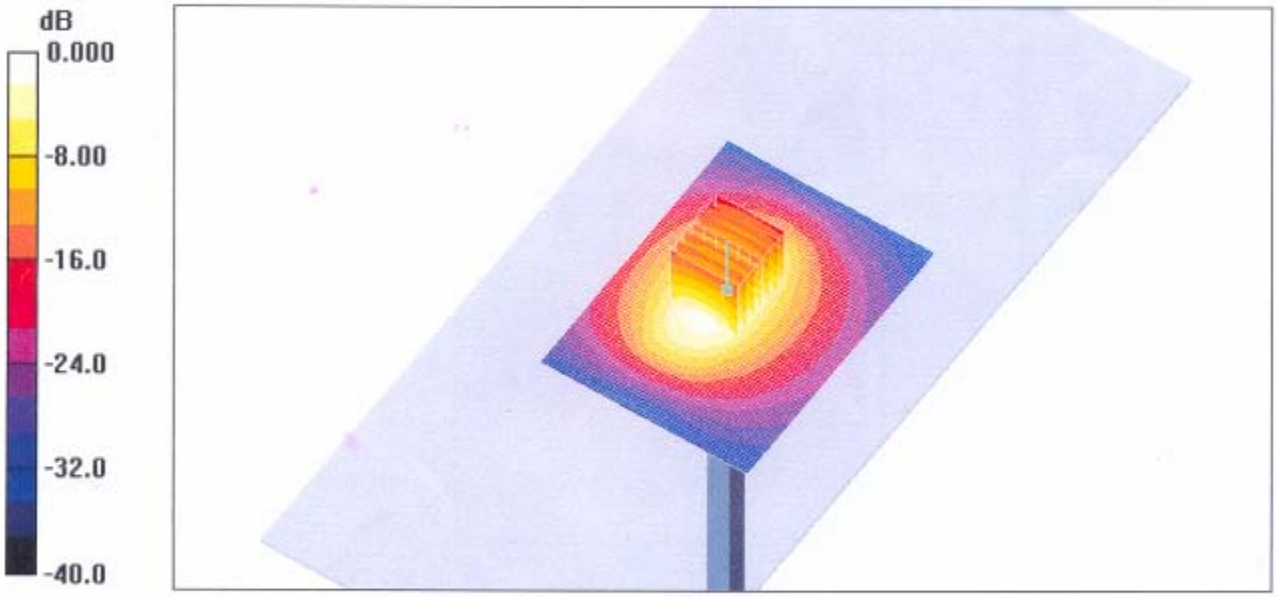
- Probe: ET3DV6 - SN1507; ConvF(4.96, 4.96, 4.96); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

## Pin = 250 mW; d = 10 mm/Area Scan (61x81x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.1 mW/g

## Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.0 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 17.3 W/kg
**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.29 mW/g**
Maximum value of SAR (measured) = 11.3 mW/g




0 dB = 11.3mW/g

## DASY4 Validation Report for Body TSL

Date/Time: 27.09.2005 12:11:20

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL 1900 MHz;
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.59 mho/m; $\varepsilon_r$ = 53.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

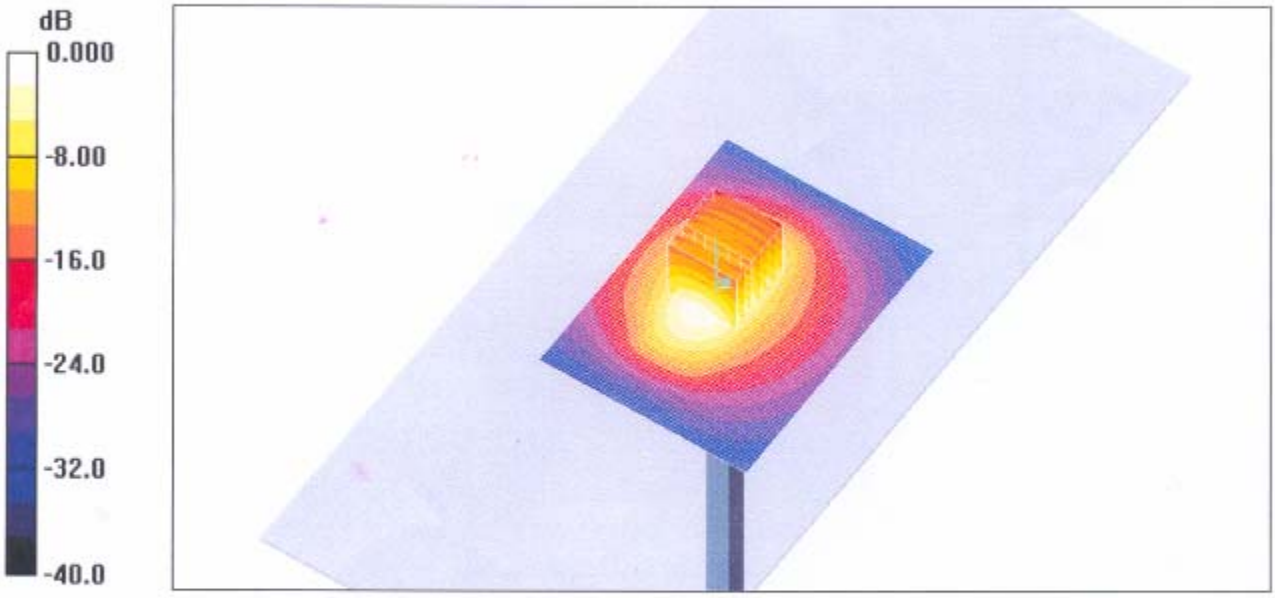
- Probe: ET3DV6 - SN1507; ConvF(4.43, 4.43, 4.43); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

### Pin = 250 mW; d = 10 mm/Area Scan (61x81x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.0 mW/g

### Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.1 V/m; Power Drift = 0.040 dB
Peak SAR (extrapolated) = 16.3 W/kg
**SAR(1 g) = 9.81 mW/g; SAR(10 g) = 5.23 mW/g**
Maximum value of SAR (measured) = 11.1 mW/g




0 dB = 11.1mW/g