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# SAR Test Report: PY7FD022011

| | | | |
|---|---|---|---|
| **Document number:** | EAB-06:018378 Uen Rev B | **Date of report:** | 2006-06-15 |
| **Testing laboratory:** | Ericsson EMF Research Laboratory<br>Ericsson AB<br>Torshamnsgatan 23<br>SE-164 80 Stockholm<br>Sweden | **Company/Client:** | Lars Melin<br>Sony Ericsson Mobile Communications AB<br>Torshamnsgatan 27<br>Box 64<br>SE-164 94 Kista<br>Sweden |
| **Tests performed by:** | Martin Siegbahn | **Date of tests:** | Jan 13 – Feb 24, Mar 20-22, 2006 |
| **Manufacturer and market name(s) of device:** | Sony Ericsson P990i | | |
| **Testing has been performed in accordance with:** | IEEE Standard 1528, IEC 62209-1, FCC OET Bulletin 65 Supplement C | | |
| **Test results:** | The tested device complies with the requirements in respect of all parameters subject to the test. | | |
| **Additional information:** | This report presents the results for the GSM/GPRS1900, WLAN and Bluetooth modes. The test report EAB-06:010931 contains the results for all the frequency bands and modes used by the tested device. | | |

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## 1 Table of Contents

***Test report summary***

*The table below summarizes the SAR measurement results obtained for the PY7FD022011 mobile phone model. The results show that the maximum SAR values are below the applicable SAR limit of 1.6 W/kg (1g) and thus the PY7FD022011 mobile phone is in compliance with the appropriate RF exposure standards and recommendations.*

| ***Mode*** | ***Maximum $SAR_{1g}$ (W/kg)*** | ***Maximum $SAR_{1g}$ for simultaneous operation with WLAN (W/kg)*** |
|---|---|---|
| *GSM1900 (Head)* | *0.30* | ***0.51*** |
| *GSM1900 (Body)* | *0.56* | *0.59* |
| *GPRS(2TX)1900 (Body)* | *0.76* | ***0.79*** |
| *WLAN (Head)* | *0.21* | - |
| *WLAN (Body)* | *0.03* | - |

## 2 General information

The tests reported in this document have been performed in accordance with the SAR measurement standards IEC 62209-1 [1], IEEE Standard 1528 [2] and the FCC Supplement C [3]. The purpose of the tests was to verify that the tested device is in compliance with the appropriate RF exposure standards, recommendations and limits [3-4].

## 3 Device under test

The table below summarizes the technical data for the tested device. Photographs of the device are presented in Appendix 1.

| | |
|---|---|
| **Device model** | Type Number FAD-3022011-BV; FCC ID PY7FD022011; IC 4170B-FD022011 |
| **Serial number of tested unit** | ALR0000KNM |
| **Mode** | GSM/GPRS(2TX)1900<br>WLAN 802.11b |
| **GPRS Class** | B |
| **Antenna** | Internal |
| **Maximum output power level[1] (dBm)** | GSM1900: 30.5, GPRS(2TX)1900: 29.0<br>WLAN: 13.0<br>Bluetooth: 4.0 |
| **Duty cycle** | 1:8 (GSM), 1:4 (GPRS), 1 (WLAN) |
| **Transmitter frequency range (MHz)** | GSM1900: 1850.2-1909.8 |
| **WLAN frequency range (MHz)** | 2412-2462 |
| **Hardware status** | Pre-production FP2.1 |
| **Software** | CXC162037 R1A070<br>CXC162058 R4D01<br>CXC162036 R1A72 |
| **Tested accessories** | Stereo headset HPM-61<br>Bluetooth headset HBH-20 |

1 Output power level of the phone model at the antenna port for the maximum power setting. This equals the nominal output power level plus the factory variation.

# 4 Test equipment

## 4.1 Dosimetric system

The SAR measurements were made using the DASY4 professional near-field scanner by Schmid & Partner Engineering AG that was installed in December 2002. The total SAR assessment uncertainty (k=1) of the system is ±10.9% for 1g SAR assessments and 10.7% for 10g SAR assessments. The corresponding extended uncertainties (k=2) are ±21.9% and ±21.4%, respectively. The equipment list is given below. In Appendix 5-7 calibration parameters for the SAR test probes are listed.

| Description | Asset number | Calibration due date |
|---|---|---|
| DAE3 | S/N 304 | 2006-10-20 |
| DAE3 | S/N 422 | 2006-05-20 |
| E-field probe, ET3DV6 | S/N 1394 | 2006-10-24 |
| E-field probe, ET3DV6 | S/N 1582 | 2006-09-27 |
| E-field probe, ES3DV3 | S/N 3062 | 2007-01-20 |
| Dipole validation kit, D1900V2 | S/N 510 | NA |
| Dipole validation kit, D2440V2 | S/N 705 | NA |
| SAM Phantom | S/N TP-1004 | NA |
| SAM Phantom | S/N TP-1204 | NA |

## 4.2 Additional equipment

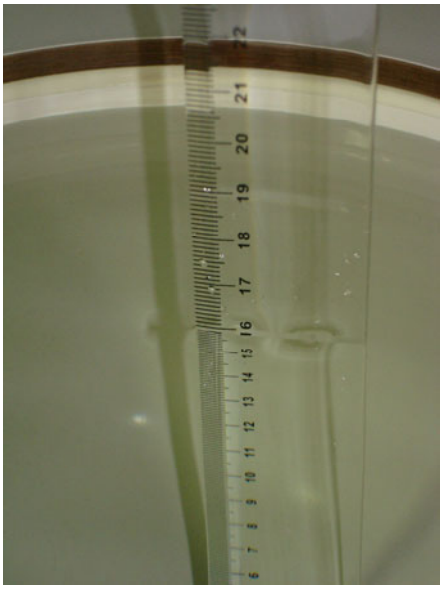
| Description | Asset number | Calibration due date |
|---|---|---|
| Signal generator, R&S SMHU58 | S/N 843863/034 | 2006-12-10 |
| Dielectric probe kit, HP 85070C | S/N US99360060 | NA |
| Network analyzer, HP 8752C | S/N 3410A03732 | 2006-10-25 |
| Power meter, R&S NRVS | S/N 848888/052 | 2006-05-24 |
| Power sensor, R&S NRV-Z5 | S/N 849895/030 | 2006-05-24 |
| Digital radio tester, Yokogawa VC200 | S/N 27D113561 | 2006-03-01[2] |
| Digital radio tester, R&S CMU200 | S/N 107639 | 2006-05-01 |
| Thermometer, EBRO TFX-392SKWT | S/N 10130918 | 2006-10-17 |
| Thermo/Hygrometer, Testo 608-H2 | S/N 60013082 | 2006-02-03[2] |

[2] This equipment was taken out of service at the due date and the other listed equipment was then used instead.

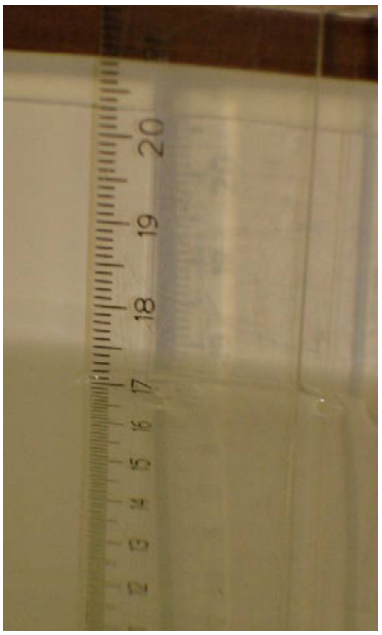
## 5 Electrical parameters of the tissue simulating liquids

The parameters of the tissue simulating liquids were measured with the dielectric probe kit prior to the SAR measurement and the results are shown in the table below. Specified standard values for the permittivity and the conductivity are given in [1-3]. The measured values are within 5% of the standard values. The mass density of the liquid entered into the DASY4 program was 1000 kg/m$^3$. The depth of the tissue simulating liquid was larger than 15 cm as shown in the figures below.

| f (MHz) | Liquid type | Measured/Specification | $\varepsilon_r$ | $\sigma$ (S/m) |
|---|---|---|---|---|
| 1900 | Head tissue | Measured | 39.8-41[3] | 1.42-1.44[3] |
| | | Specified value | 40.0 | 1.40 |
| | | Difference (%) | 0/+3 | +1/+3 |
| 1900 | Body tissue (muscle) | Measured | 50.9 | 1.53 |
| | | Specified value | 53.3 | 1.52 |
| | | Difference (%) | -5 | +1 |
| 2450 | Head tissue | Measured | 38.0 | 1.89 |
| | | Specified value | 39.2 | 1.80 |
| | | Difference (%) | -3 | +5 |
| 2450 | Body tissue (muscle) | Measured | 50.9-51.0[3] | 2.05-2.06[3] |
| | | Specified value | 52.7 | 1.95 |
| | | Difference (%) | -3/-3 | +5/+5 |

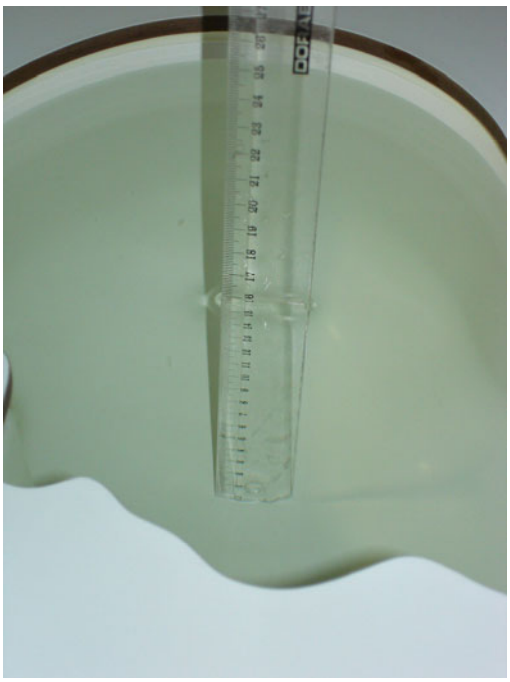


Measured level of 1900 MHz head tissue simulating liquid in phantom

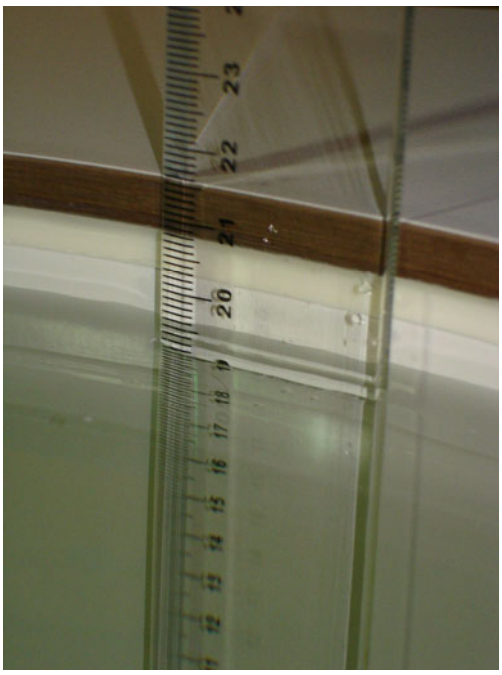


Measured level of 1900 MHz muscle tissue simulating liquid in phantom

[3] Measurements were conducted over several days and the parameters were in the stated range.



Measured level of 2450 MHz head tissue simulating liquid in phantom



Measured level of 2450 MHz muscle tissue simulating liquid in phantom

## 6 SAR system performance check

System performance checks for the DASY4 were conducted before the SAR measurements with the D1900V2 and D2440V2 dipole kits and the obtained results are displayed in the table below. The results are within 10% of the reference values [2][5]. Evaluations prior to the SAR testing showed that the maximum SAR system noise was below 2 mW/kg, which is below the standard requirements. The temperature of the test facility during the system performance checks was in the range 20°C to 25°C.

| f (MHz) | Tissue | Measured/ Reference | SAR 1g (W/kg) | SAR 10g (W/kg) | $\varepsilon_r$ | $\sigma$ (S/m) | Liquid temp (°C) | Date |
|---|---|---|---|---|---|---|---|---|
| 1900 | Head | Measured | 43.0 | 22.5 | 40.6 | 1.43 | 21.9 | 2006-01-25 |
| | | Reference [2] | 39.7 | 20.5 | 40.0 | 1.40 | - | - |
| | | Difference (%) | +8 | +10 | +1 | +2 | - | - |
| 1900 | Body | Measured | 43.5 | 22.9 | 50.9 | 1.53 | 22.9 | 2006-02-02 |
| | | Reference [5] | 40.4 | 21.1 | 53.3 | 1.52 | - | - |
| | | Difference (%) | +8 | +9 | -5 | +1 | - | - |
| 2450 | Head | Measured | 57.0 | 26.3 | 38.0 | 1.89 | 23.8 | 2006-02-21 |
| | | Reference [2] | 52.4 | 24.0 | 39.2 | 1.80 | - | - |
| | | Difference (%) | +9 | +10 | -3 | +5 | - | - |

## 7 DASY4 uncertainty budget according to IEEE 1528

| Uncertainty Component | Uncer. (%) | Prob Dist. | Div. | $C_i$ (1g) | $C_i$ (10g) | Std. Unc. (1g) | Std. Unc. (10g) | $(v_i)$ $v_{eff}$ |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe Calibration | ±5.9 | N | 1 | 1 | 1 | ±5.9 | ±5.9 | ∞ |
| Axial Isotropy | ±4.7 | R | √3 | 0.7 | 0.7 | ±1.9 | ±1.9 | ∞ |
| Hemispherical Isotropy | ±9.6 | R | √3 | 0.7 | 0.7 | ±3.9 | ±3.9 | ∞ |
| Boundary Effect | ±1.0 | R | √3 | 1 | 1 | ±0.6 | ±0.6 | ∞ |
| Linearity | ±4.7 | R | √3 | 1 | 1 | ±2.7 | ±2.7 | ∞ |
| System Detection Limits | ±1.0 | R | √3 | 1 | 1 | ±0.6 | ±0.6 | ∞ |
| Readout Electronics | ±0.3 | N | 1 | 1 | 1 | ±0.3 | ±0.3 | ∞ |
| Response Time | ±0.8 | R | √3 | 1 | 1 | ±0.5 | ±0.5 | ∞ |
| Integration Time | ±2.6 | R | √3 | 1 | 1 | ±1.5 | ±1.5 | ∞ |
| RF Ambient Noise | ±3.0 | R | √3 | 1 | 1 | ±1.7 | ±1.7 | ∞ |
| RF Ambient Reflections | ±3.0 | R | √3 | 1 | 1 | ±1.7 | ±1.7 | ∞ |
| Probe Positioner | ±0.4 | R | √3 | 1 | 1 | ±0.2 | ±0.2 | ∞ |
| Probe Positioning | ±2.9 | R | √3 | 1 | 1 | ±1.7 | ±1.7 | ∞ |
| Max. SAR Evaluation | ±1.0 | R | √3 | 1 | 1 | ±0.6 | ±0.6 | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ±2.9 | N | 1 | 1 | 1 | ±2.9 | ±2.9 | 145 |
| Device Holder | ±3.6 | N | 1 | 1 | 1 | ±3.6 | ±3.6 | 5 |
| Power Drift | ±5.0 | R | √3 | 1 | 1 | ±2.9 | ±2.9 | ∞ |
| **Phantom and Setup** | | | | | | | | |
| Phantom uncertainty | ±4.0 | R | √3 | 1 | 1 | ±2.3 | ±2.3 | ∞ |
| Liquid conductivity (target) | ±5.0 | R | √3 | 0.64 | 0.43 | ±1.8 | ±1.2 | ∞ |
| Liquid conductivity (meas) | ±2.5 | N | 1 | 0.64 | 0.43 | +1.6 | +1.1 | ∞ |
| Liquid Permittivity (target) | ±5.0 | R | √3 | 0.6 | 0.49 | ±1.8 | ±1.4 | ∞ |
| Liquid Permittivity (meas) | ±2.5 | N | 1 | 0.6 | 0.49 | ±1.8 | ±1.2 | ∞ |
| Combined standard uncertainty | | | | | | ±10.9 | ±10.7 | 387 |
| **Extended standard uncertainty (k=2)** | | | | | | **±21.9** | **±21.4** | |

This table presents the worst-case uncertainty budget for DASY4 assessed according to IEEE 1528 and is valid for the frequency range 300 MHz – 3 GHz.

## 8 Test results

The tables in this section show the measured 1g and 10g averaged SAR for the device and the corresponding values normalized to the maximum output power level. A digital radio tester was used to control the device during the SAR measurements. For the WLAN mode, the transmission from the device was setup via a separate WLAN access point. The phone was supplied with a fully charged battery for the tests. The temperature of the test facility during the tests was in the range 20 to 25°C. During the tests, the temperature of the tissue simulating liquid was within ±2°C from the liquid temperature at system performance check.

The device was tested on the right-hand phantom (corresponding to the right side of the head) and the left-hand phantom for the cheek and tilt phone positions in the middle of the transmit band, corresponding to the traffic channel 661 for GSM1900 and channel 6 for WLAN. In Appendix 2, pictures of the device when positioned on the right-hand phantom are shown. Tests were performed with the flip opened, closed and removed. For the flip configuration and phone position giving the highest SAR result, the device was then also tested at the lowest and the highest frequencies of the transmit bands corresponding to the traffic channels 512 and 810 for GSM1900 and channels 1 and 11 for WLAN. Finally, for the position and frequency giving the highest SAR result in each band, tests were performed with the Bluetooth transmitter turned on.

The device was also tested in body worn positions. Tests were performed for a 15 mm separation between the device and the flat phantom, with the stereo headset attached for speech mode and without headset for data mode (GPRS). In Appendix 2, pictures of the device when positioned under the flat section of the phantom are shown.

The device can operate simultaneously in WLAN mode with the GSM speech and GPRS data modes and the multi-mode SAR results for these configurations are presented in the final part of this section.

### 8.1 Results for the GSM1900 mode (head)

| Configuration | Hand side | Phone position | f (MHz) | Measured output power (dBm) | Measured (W/kg) | | Normalized to max power, 30.5 dBm (W/kg) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $SAR_{1g}$ | $SAR_{10g}$ | $SAR_{1g}$ | $SAR_{10g}$ |
| Flip Closed | Left | Cheek | 1880.0 | 30.4 | 0.21 | 0.12 | 0.21 | 0.12 |
| | | Tilt | 1880.0 | 30.4 | 0.21 | 0.12 | 0.21 | 0.12 |
| | Right | Cheek | 1880.0 | 30.4 | 0.16 | 0.10 | 0.17 | 0.10 |
| | | Tilt | 1880.0 | 30.4 | 0.17 | 0.10 | 0.17 | 0.10 |
| Flip Open | Left | Cheek | 1880.0 | 30.4 | 0.21 | 0.12 | 0.21 | 0.12 |
| | | Tilt | 1880.0 | 30.4 | 0.19 | 0.11 | 0.19 | 0.12 |
| | Right | Cheek | 1880.0 | 30.4 | 0.17 | 0.11 | 0.18 | 0.11 |
| | | Tilt | 1880.0 | 30.4 | 0.14 | 0.09 | 0.15 | 0.09 |
| Flip Removed | Left | Cheek | 1850.2 | 30.4 | 0.22 | 0.13 | 0.23 | 0.13 |
| | | | 1880.0 | 30.4 | 0.23 | 0.13 | 0.24 | 0.13 |
| | | | 1909.8 | 30.3 | 0.28 | 0.16 | 0.30 | 0.17 |
| | | Tilt | 1880.0 | 30.4 | 0.18 | 0.11 | 0.18 | 0.11 |
| | Right | Cheek | 1880.0 | 30.4 | 0.17 | 0.12 | 0.18 | 0.12 |
| | | Tilt | 1880.0 | 30.4 | 0.15 | 0.08 | 0.15 | 0.09 |
| Flip Removed, Bluetooth on | Left | Cheek | 1909.8 | 30.3 | 0.29 | 0.16 | **0.30** | **0.17** |

Appendix 4 (a-d) shows the SAR distributions giving the maximum 1g SAR for the phone positions cheek and tilt at the right and left-hand phantoms.

### 8.2 Results for the GSM1900 mode (body)

| Separation | Configuration/ Accessory | Phone position (Front/Back towards the phantom) | f (MHz) | Measured output power (dBm) | Measured (W/kg) | | Normalized to max power, 30.5 dBm (W/kg) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $SAR_{1g}$ | $SAR_{10g}$ | $SAR_{1g}$ | $SAR_{10g}$ |
| 15mm between the device and the flat phantom, | Flip Closed, Stereo headset attached | Front | 1880.0 | 30.4 | 0.03 | 0.02 | 0.03 | 0.02 |
| | | Back | 1850.2 | 30.4 | 0.33 | 0.20 | 0.34 | 0.20 |
| | | | 1880.0 | 30.4 | 0.41 | 0.24 | 0.42 | 0.24 |
| | | | 1909.8 | 30.3 | 0.50 | 0.29 | 0.52 | 0.30 |
| | Flip Removed, Stereo headset attached | Front | 1880.0 | 30.4 | 0.05 | 0.03 | 0.05 | 0.03 |
| | | Back | 1880.0 | 30.4 | 0.40 | 0.24 | 0.41 | 0.24 |
| | Flip Closed Bluetooth on | Back | 1909.8 | 30.3 | 0.54 | 0.32 | **0.56** | **0.33** |

Appendix 4 (e) shows the maximum SAR distribution for the flat section of the phantom giving the maximum 1g SAR of 0.54 W/kg and the maximum 10g averaged SAR of 0.32 W/kg at 1900 MHz (body).

### 8.3 Results for the GPRS(2TX)1900 mode (body)

| Separation | Configuration/ Accessory | Phone position (Front/Back towards the phantom) | f (MHz) | Measured output power (dBm) | Measured (W/kg) | | Normalized to max power, 29.0 dBm (W/kg) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $SAR_{1g}$ | $SAR_{10g}$ | $SAR_{1g}$ | $SAR_{10g}$ |
| 15mm between the device and the flat phantom | Flip Closed | Front | - | - | - | - | - | - |
| | | Back | 1850.2 | 29.1 | 0.42 | 0.25 | 0.41 | 0.25 |
| | | | 1880.0 | 29.1 | 0.52 | 0.31 | 0.51 | 0.30 |
| | | | 1909.8 | 29.1 | 0.73 | 0.43 | 0.71 | 0.42 |
| | Flip Removed | Front | - | - | - | - | - | - |
| | | Back | 1850.2 | 29.1 | 0.46 | 0.28 | 0.45 | 0.27 |
| | | | 1880.0 | 29.1 | 0.56 | 0.34 | 0.55 | 0.33 |
| | | | 1909.8 | 29.1 | 0.78 | 0.46 | 0.76 | 0.45 |
| | Flip Removed Bluetooth on | Back | 1909.8 | 29.1 | 0.78 | 0.46 | **0.76** | **0.45** |

Appendix 4 (f) shows the maximum SAR distribution for the flat section of the phantom giving the maximum 1g SAR of 0.78 W/kg and the maximum 10g averaged SAR of 0.46 W/kg.

### 8.4 Results for the WLAN mode (head)

| Configuration | Hand side | Phone position | f (MHz) | Measured average/ peak output power (dBm) | Measured (W/kg) | | Normalized to max power, 13 dBm (W/kg) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $SAR_{1g}$ | $SAR_{10g}$ | $SAR_{1g}$ | $SAR_{10g}$ |
| Flip Closed | Left | Cheek | 2437.0 | 12.7/18.39 | 0.04 | 0.02 | 0.04 | 0.02 |
| | | Tilt | 2437.0 | 12.7/18.39 | 0.02 | 0.01 | 0.02 | 0.01 |
| | Right | Cheek | 2437.0 | 12.7/18.39 | 0.05 | 0.03 | 0.05 | 0.03 |
| | | Tilt | 2437.0 | 12.7/18.39 | 0.02 | 0.01 | 0.02 | 0.01 |
| Flip Open | Left | Cheek | 2437.0 | 12.7/18.39 | 0.09 | 0.05 | 0.09 | 0.05 |
| | | Tilt | 2437.0 | 12.7/18.39 | 0.02 | 0.01 | 0.02 | 0.01 |
| | Right | Cheek | 2412.0 | 13.2/18.39 | 0.18 | 0.09 | 0.17 | 0.08 |
| | | | 2437.0 | 12.7/18.39 | 0.20 | 0.09 | 0.21 | 0.10 |
| | | | 2462.0 | 13.1/18.26 | 0.22 | 0.10 | **0.21** | **0.10** |
| | | Tilt | 2437.0 | 12.7/18.39 | 0.03 | 0.01 | 0.03 | 0.01 |
| Flip Removed | Left | Cheek | 2437.0 | 12.7/18.39 | 0.07 | 0.04 | 0.08 | 0.04 |
| | | Tilt | 2437.0 | 12.7/18.39 | 0.02 | 0.01 | 0.02 | 0.01 |
| | Right | Cheek | 2437.0 | 12.7/18.39 | 0.12 | 0.06 | 0.13 | 0.07 |
| | | Tilt | 2437.0 | 12.7/18.39 | 0.03 | 0.01 | 0.03 | 0.01 |

Appendix 4 (g-j) shows the maximum SAR distributions giving the maximum 1g SAR for the phone positions cheek and tilt at the right and left-hand phantoms.

### 8.5 Results for the WLAN mode (body)

| Separation | Configuration/ Accessory | Phone position (Front/Back towards the phantom) | f (MHz) | Measured average/ peak output power (dBm) | Measured (W/kg) | | Normalized to max average power, 13 dBm (W/kg) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $SAR_{1g}$ | $SAR_{10g}$ | $SAR_{1g}$ | $SAR_{10g}$ |
| 15mm between the device and the flat phantom | Flip Closed | Front | 2437.0 | 12.7/18.39 | 0.01 | 0.01 | 0.02 | 0.01 |
| | | Back | 2437.0 | 12.7/18.39 | 0.02 | 0.01 | 0.02 | 0.01 |
| | Flip Removed | Front | 2412.0 | 13.2/18.39 | 0.02 | 0.01 | 0.02 | 0.01 |
| | | | 2437.0 | 12.7/18.39 | 0.03 | 0.02 | **0.03** | **0.02** |
| | | | 2462.0 | 13.1/18.26 | 0.03 | 0.02 | 0.03 | 0.02 |
| | | Back | 2437.0 | 12.7/18.39 | 0.01 | 0.01 | 0.01 | 0.01 |

Appendix 4 (k) shows the maximum SAR distribution for the flat section of the phantom giving the maximum 1g SAR of 0.03 W/kg and the maximum 10g averaged SAR of 0.02 W/kg at 2437.0 MHz.

### 8.6 Multi-mode maximum SAR

The multi-mode maximum SAR values given in the table below is the sum of the maximum SAR for modes that can be used simultaneously. Note, even though simultaneous operation of WLAN and Bluetooth is not possible, the SAR values that have been used for the summation are the maximum values for each mode regardless if Bluetooth was activated or not. Summation of maximum SAR for obtaining multi-mode SAR is according to the multi-band SAR assessment procedure denoted “alternative 1”in the draft international standard IEC 62209-2 [6]. The summation is conducted for the maximum SAR values for each mode, regardless if the values were obtained for different test configurations, and will then represent a conservative multi-mode SAR.

| **Usage position** | **Modes** | **Normalized to max power for both modes** | |
|---|---|---|---|
| | | **$SAR_{1g}$** | **$SAR_{10g}$** |
| Head | GSM1900 & WLAN | 0.51 | 0.27 |
| Body | GSM1900 & WLAN | 0.59 | 0.35 |
| | GPRS(2TX)1900 & WLAN | 0.79 | 0.47 |

## 9 Conclusion

The results above show that the maximum SAR for the PY7FD022011 mobile phone is below the applicable SAR limits. Consequently, the PY7FD022011 mobile phone model is in compliance with the appropriate RF exposure standards and recommendations.

## 10 References

[1] IEC 62209-1, International Standard, “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Humans models, instrumentation, and procedures – Part 1: Procedure to determine the Specific Absorption Rate (SAR) for hand-held mobile devices used in close proximity of the ear (frequency range of 300 MHz to 3 GHz)”, IEC, February, 2005.

[2] IEEE, Standard 1528, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.”, The Institute for Electrical and Electronics Engineers (IEEE) Inc., June 2003

[3] FCC, "Evaluating Compliance with FCC Guidelines from Human Exposure To Radiofrequency Electromagnetic Fields", Supplement C Edition 01-01 to OET Bulletin 65 Edition 97-01, June 2001.

[4] ANSI/IEEE C95.1-1999, “Safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz”, The Institute of Electrical and Electronics Engineers Inc., New York, 1999.

[5] Lennart Hamberg, “Calculation of reference SAR values for system performance checks with muscle tissue simulating liquid”, Ericsson wide internal, Report, EAB/TF-03:090, Rev B, February 2006.

[6] IEC 62209-2, Draft, “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Humans models, instrumentation, and procedures – Part 2: Procedure to determine the Specific Absorption Rate (SAR) for devices used in close proximity of the body (frequency range of 30 MHz to 6 GHz)”, December, 2005.

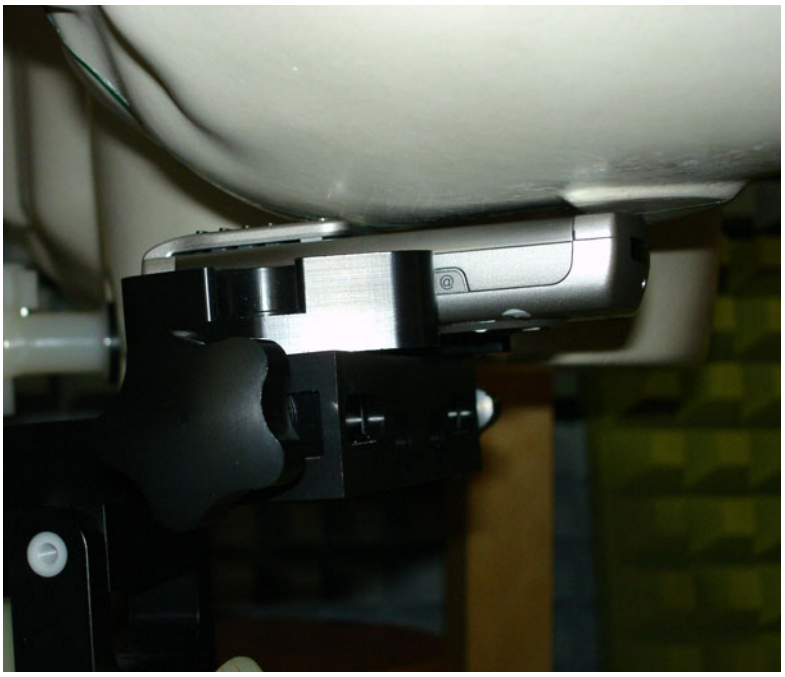
**APPENDIX 1: Photographs of the DUT**


**(a) Front view of the tested device**


**(b) Back and Side views of the tested device**

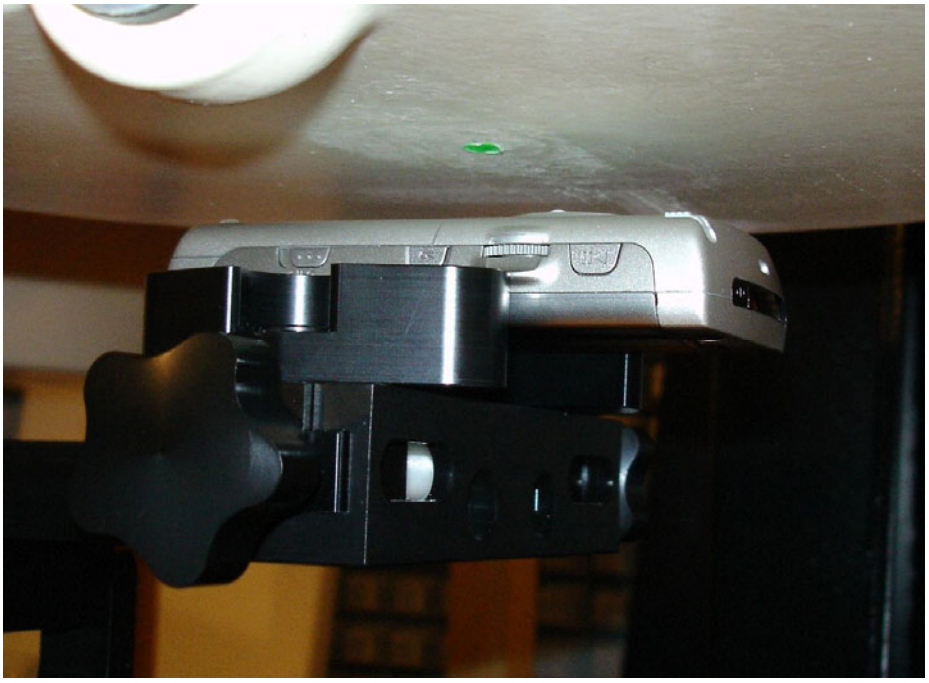

**(c) Battery used with the tested device**

**APPENDIX 2: Photographs of the DUT when positioned for SAR measurements**



**(a) Device on head phantom in the cheek position with the flip closed.**

**(b) Device on head phantom in the tilt position with the flip open.**



**(c) Device on flat section of the phantom. The separation was 15 mm between the device and the flat phantom.**

**APPENDIX 3: SAR distribution plots for the system performance checks**

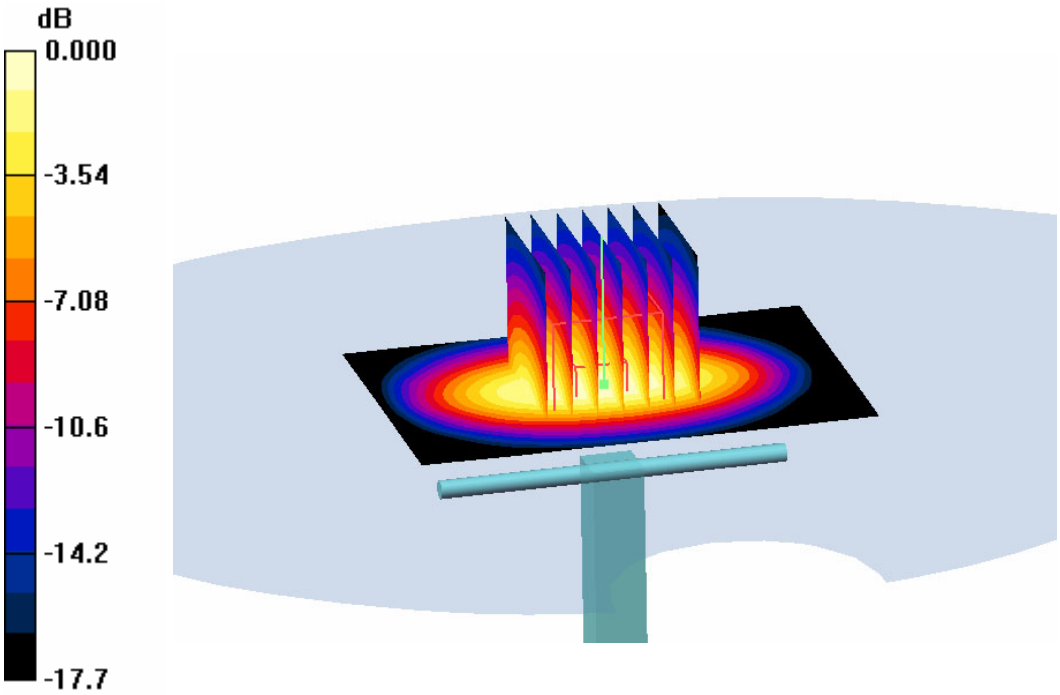
**System performance check at 1900 MHz conducted January 25th**

Date/Time: 2006-01-25 15:55:55

-Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
-Medium: Head 1900 MHz; $\sigma$ = 1.43 mho/m; $\varepsilon_r$ = 40.6; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1394; ConvF(5.12, 5.12, 5.12)
-Electronics: DAE3 Sn304
-Phantom: SAM 2
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**d=10mm, Pin=251mW/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 12.3 mW/g
**d=10mm, Pin=251mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.4 V/m; Power Drift = -0.034 dB
Peak SAR (extrapolated) = 19.2 W/kg
**SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.67 mW/g**
Maximum value of SAR (measured) = 12.3 mW/g




0 dB = 12.3mW/g

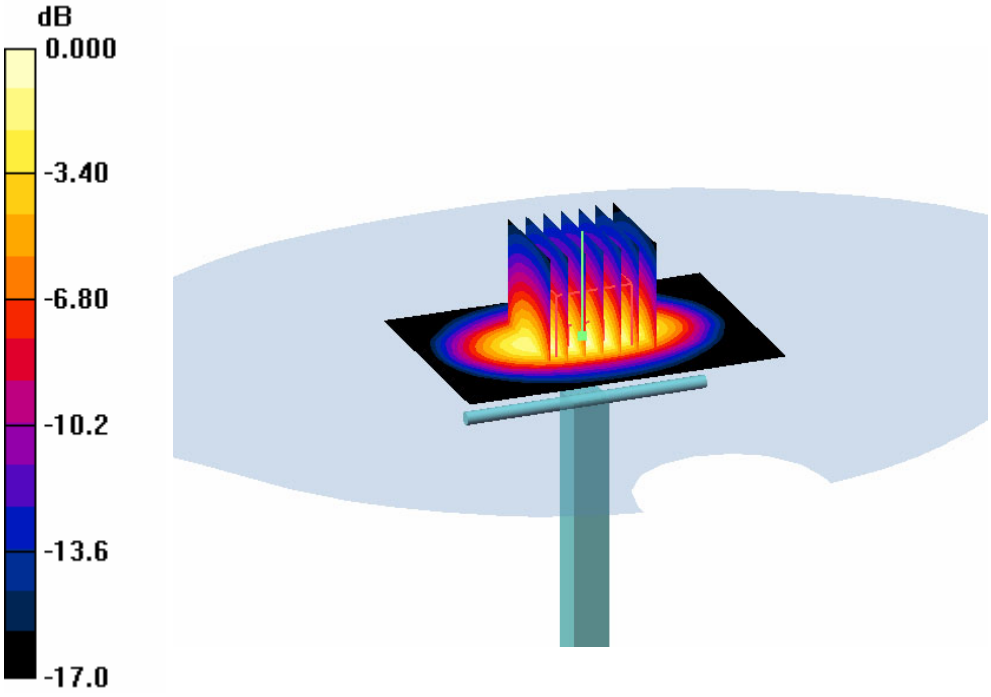
**System performance check at 1900 MHz conducted February 2nd**

Date/Time: 2006-02-02 10:00:11

-Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
-Medium: Muscle 1900 MHz; $\sigma$ = 1.53 mho/m; $\varepsilon_r$ = 50.9; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ES3DV3 - SN3062; ConvF(4.39, 4.39, 4.39)
-Electronics: DAE3 Sn422
-Phantom: SAM 2
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**d=10mm, Pin=248.05mW/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 12.6 mW/g
**d=10mm, Pin=248.05mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.4 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 19.1 W/kg
**SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.67 mW/g**
Maximum value of SAR (measured) = 12.3 mW/g




0 dB = 12.3mW/g

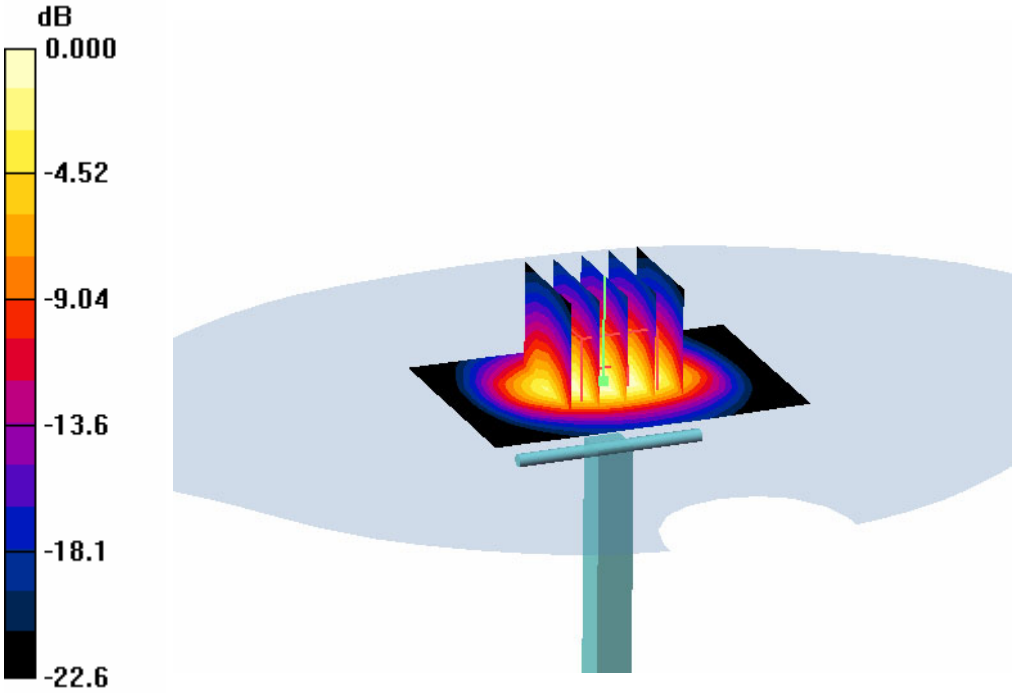
**System performance check at 2450 MHz conducted February 21st**

Date/Time: 2006-02-21 13:14:17

-Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
-Medium: Head 2450 MHz; $\sigma$ = 1.89 mho/m; $\varepsilon_r$ = 38; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1582; ConvF(4.35, 4.35, 4.35)
-Electronics: DAE3 Sn422
-Phantom: SAM 2
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**d=10mm, Pin=249mW/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.6 mW/g
**d=10mm, Pin=249mW/Zoom Scan (5x5x7) Mechanical (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 91.9 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 30.8 W/kg
**SAR(1 g) = 14.2 mW/g; SAR(10 g) = 6.54 mW/g**
Maximum value of SAR (measured) = 16.0 mW/g




0 dB = 16.0mW/g

**APPENDIX 4: SAR distribution plots**

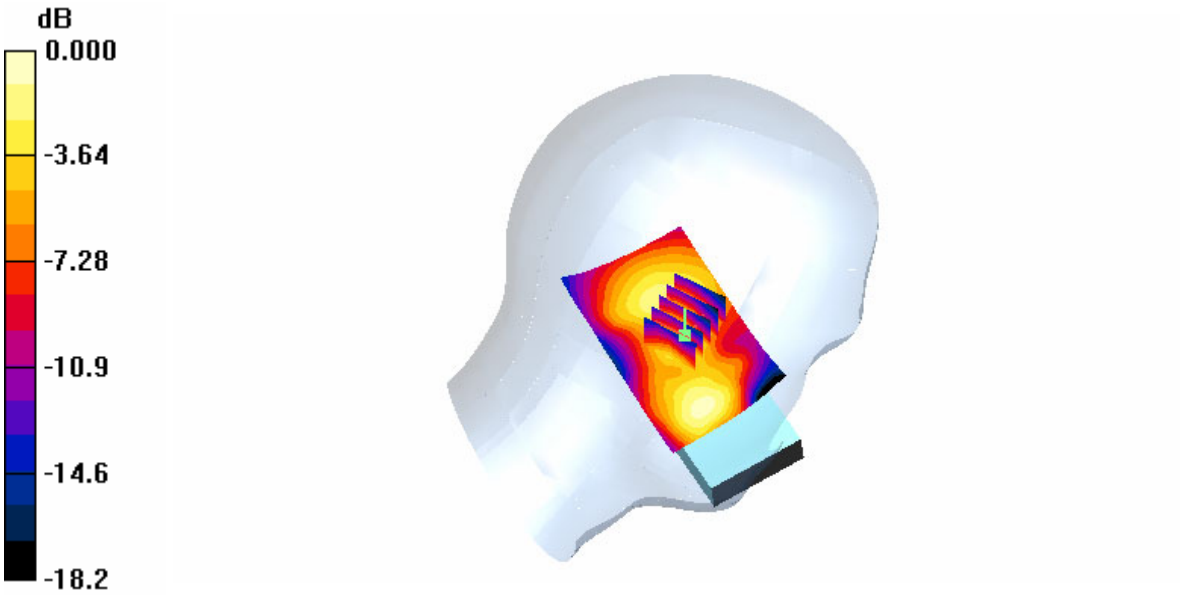
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-01-27 13:56:23

-Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
-Medium: Head 1900 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 39.8; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1394; ConvF(5.12, 5.12, 5.12)
-Electronics: DAE3 Sn304
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek High BT/Area Scan (81x51x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.326 mW/g
**Cheek High BT/Zoom Scan 5x5x7 (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 0.470 W/kg
**SAR(1 g) = 0.29 mW/g; SAR(10 g) = 0.16 mW/g**
Maximum value of SAR (measured) = 0.322 mW/g




0 dB = 0.322mW/g

**(a) Distribution of SAR in the GSM1900 mode giving the maximum 1g SAR in the left hand side phantom for the cheek position**

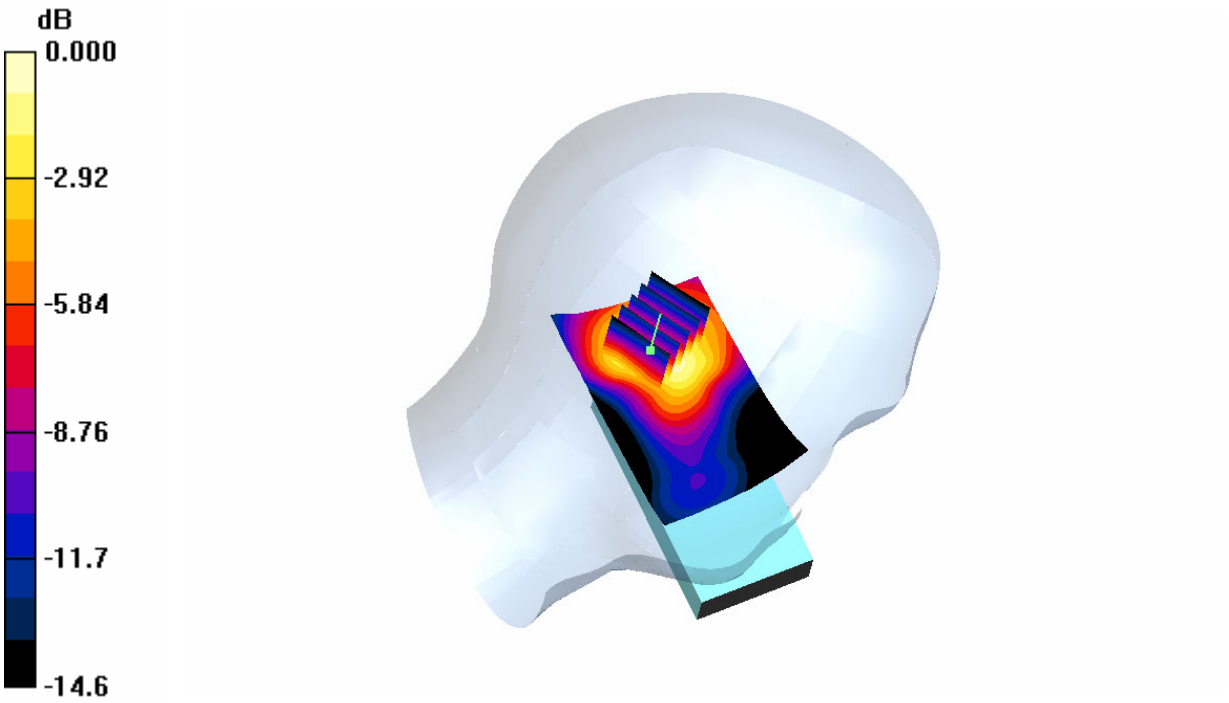
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-01-26 15:03:10

-Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
-Medium: Head 1900 MHz; $\sigma$ = 1.44 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1394; ConvF(5.12, 5.12, 5.12)
-Electronics: DAE3 Sn304
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt Mid/Area Scan (81x51x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.220 mW/g
**Tilt Mid/Zoom Scan 5x5x7 (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 0.355 W/kg
**SAR(1 g) = 0.21 mW/g; SAR(10 g) = 0.12 mW/g**
Maximum value of SAR (measured) = 0.229 mW/g




0 dB = 0.229mW/g

**(b) Distribution of SAR in the GSM1900 mode giving the maximum 1g SAR in the left hand side phantom for the tilt position**

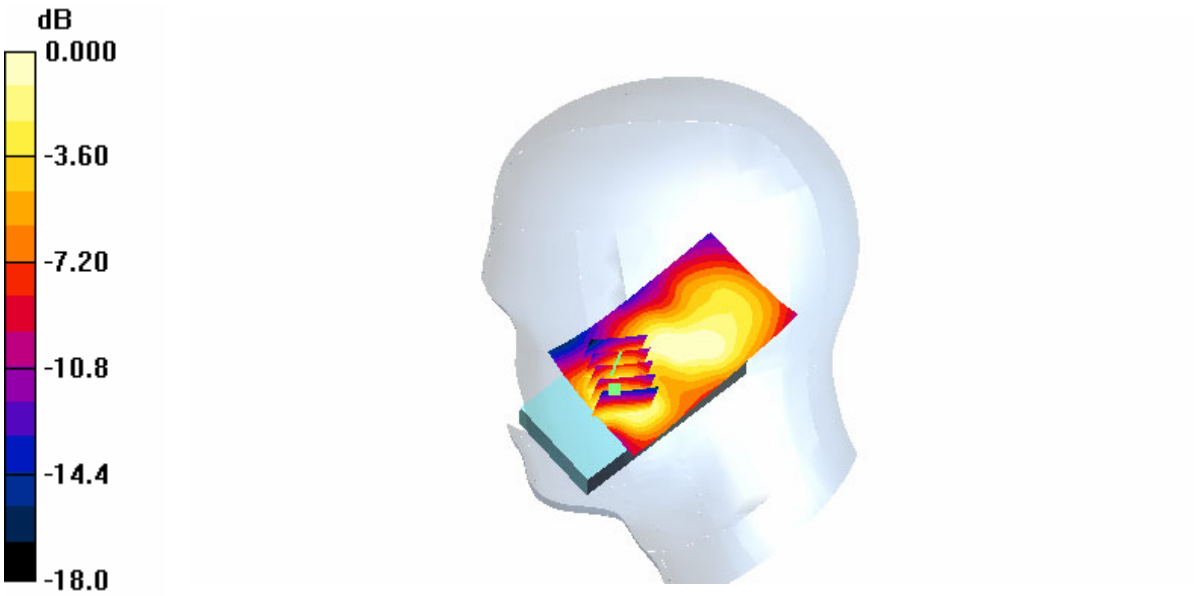
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-01-26 13:34:18

-Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
-Medium: Head 1900 MHz; $\sigma$ = 1.44 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1394; ConvF(5.12, 5.12, 5.12)
-Electronics: DAE3 Sn304
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek Mid/Area Scan (81x51x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.216 mW/g
**Cheek Mid/Zoom Scan 5x5x7 (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.26 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 0.240 W/kg
**SAR(1 g) = 0.17 mW/g; SAR(10 g) = 0.12 mW/g**
Maximum value of SAR (measured) = 0.186 mW/g




0 dB = 0.186mW/g

**(c) Distribution of SAR in the GSM1900 mode giving the maximum 1g SAR in the right hand side phantom for the cheek position**

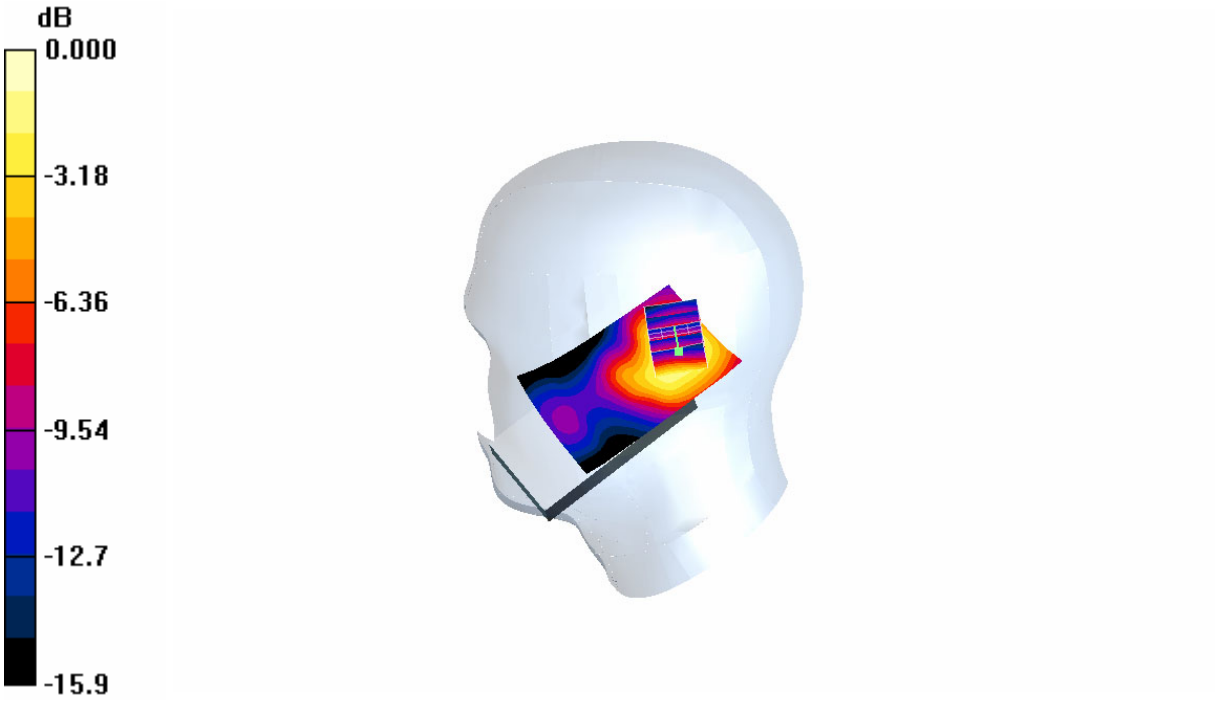
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-01-26 16:11:18

-Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
-Medium: Head 1900 MHz; $\sigma$ = 1.44 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1394; ConvF(5.12, 5.12, 5.12)
-Electronics: DAE3 Sn304
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt Mid/Area Scan (81x51x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.169 mW/g
**Tilt Mid/Zoom Scan 5x5x7 (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.21 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 0.275 W/kg
**SAR(1 g) = 0.17 mW/g; SAR(10 g) = 0.10 mW/g**
Maximum value of SAR (measured) = 0.182 mW/g




0 dB = 0.182mW/g

**(d) Distribution of SAR in the GSM1900 mode giving the maximum 1g SAR in the right hand side phantom for the tilt position.**

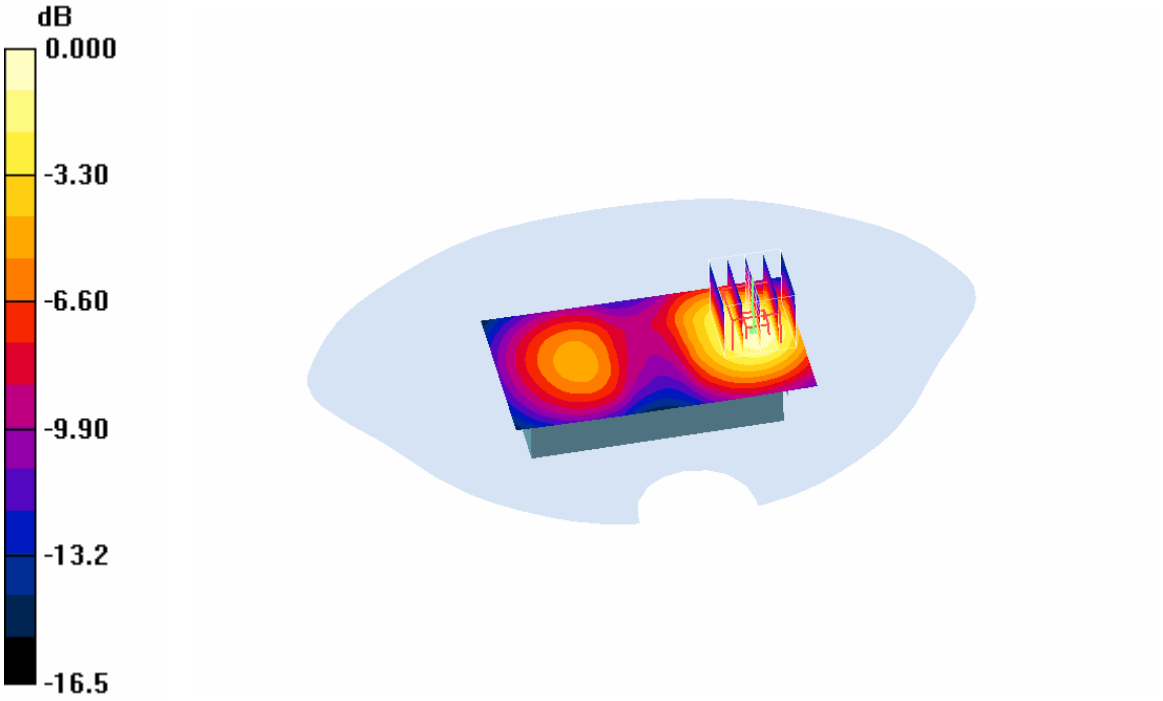
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-02-02 14:37:42

-Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
-Medium: Muscle 1900 MHz; $\sigma$ = 1.53 mho/m; $\varepsilon_r$ = 50.9; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ES3DV3 - SN3062; ConvF(4.39, 4.39, 4.39)
-Electronics: DAE3 Sn422
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Back to Phantom High BT/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.615 mW/g
**Back to Phantom High BT/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.90 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 0.844 W/kg
**SAR(1 g) = 0.54 mW/g; SAR(10 g) = 0.32 mW/g**
Maximum value of SAR (measured) = 0.595 mW/g




0 dB = 0.595mW/g

**(e) Distribution of maximum SAR in GSM1900 mode with muscle tissue simulating liquid giving the maximum 1g and 10g averaged SAR. Measured against the flat section of the phantom with the back of the device facing the phantom and with a 15 mm separation between the device and the phantom.**

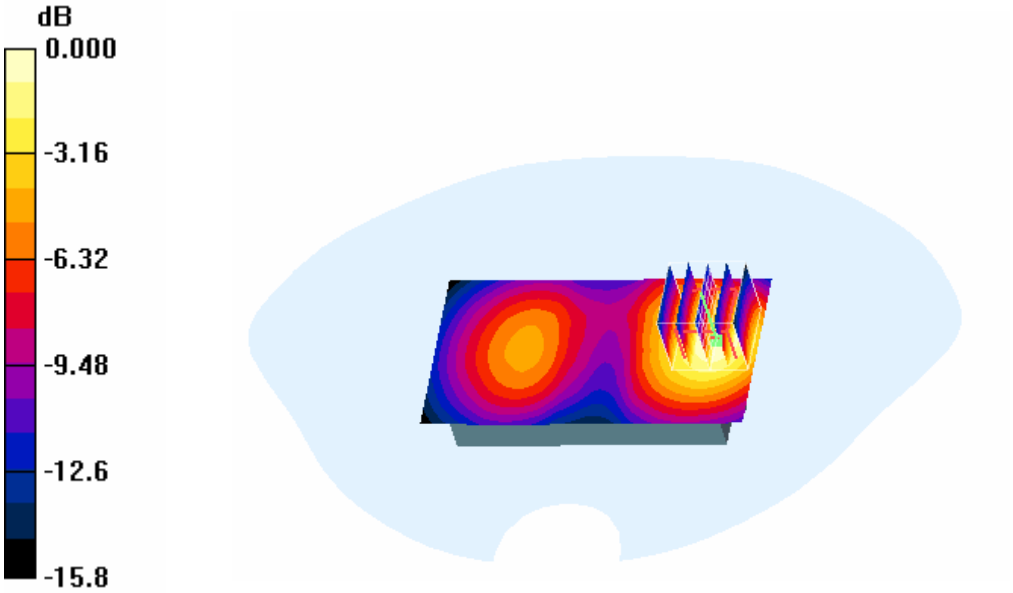
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-02-02 16:54:48

-Communication System: GPRS(2TX)1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.1
-Medium: Muscle 1900 MHz; $\sigma$ = 1.53 mho/m; $\varepsilon_r$ = 50.9; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ES3DV3 - SN3062; ConvF(4.39, 4.39, 4.39)
-Electronics: DAE3 Sn422
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Back to Phantom High BT/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.895 mW/g
**Back to Phantom High BT/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.26 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 1.22 W/kg
**SAR(1 g) = 0.78 mW/g; SAR(10 g) = 0.46 mW/g**
Maximum value of SAR (measured) = 0.860 mW/g




0 dB = 0.860mW/g

**(f) Distribution of maximum SAR in GPRS(2TX)1900 mode with muscle tissue simulating liquid giving the maximum 1g and 10g averaged SAR. Measured against the flat section of the phantom with the back of the device facing the phantom and with a 15 mm separation between the device and the phantom.**

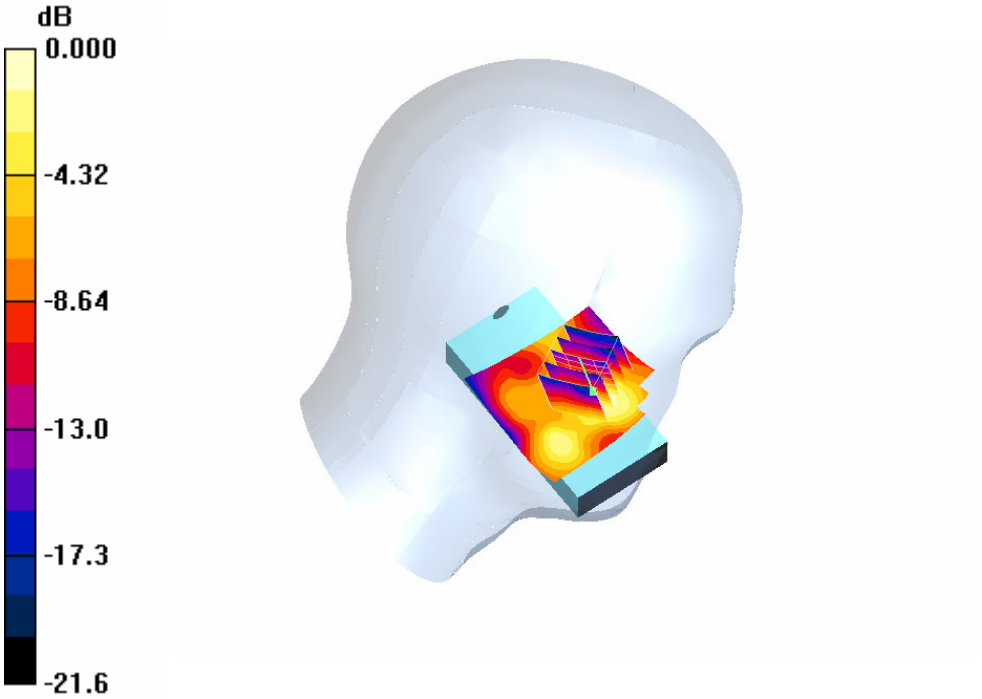
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-02-22 16:09:33

-Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
-Medium: Head 2450 MHz; $\sigma$ = 1.89 mho/m; $\varepsilon_r$ = 38; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1582; ConvF(4.35, 4.35, 4.35)
-Electronics: DAE3 Sn422
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek Mid/Area Scan (81x81x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.096 mW/g
**Cheek Mid/Zoom Scan 5x5x7 (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.53 V/m; Power Drift = -0.034 dB
Peak SAR (extrapolated) = 0.150 W/kg
**SAR(1 g) = 0.09 mW/g; SAR(10 g) = 0.05 mW/g**
Maximum value of SAR (measured) = 0.098 mW/g




0 dB = 0.098mW/g

**(g) Distribution of maximum SAR in WLAN mode giving the maximum 1g and 10g averaged SAR. Measured against the left hand side phantom for the cheek phone position.**

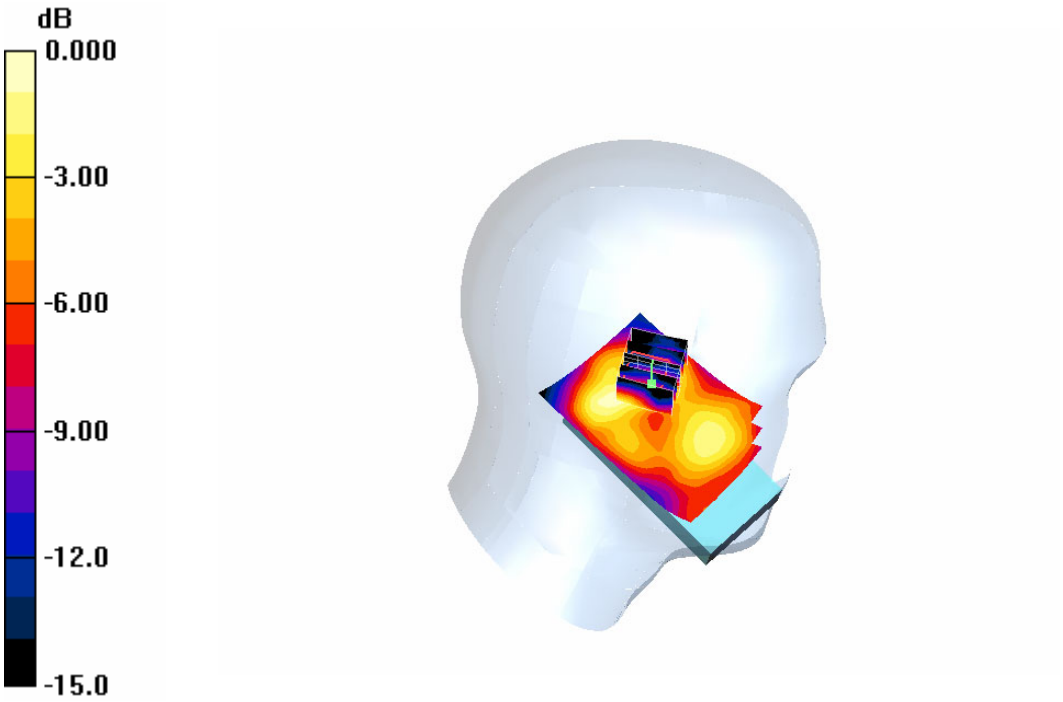
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-02-22 16:27:53

-Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
-Medium: Head 2450 MHz; $\sigma = 1.89$ mho/m; $\varepsilon_r = 38$; $\rho = 1000$ kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1582; ConvF(4.35, 4.35, 4.35)
-Electronics: DAE3 Sn422
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt Mid/Area Scan (121x81x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.023 mW/g
**Tilt Mid/Zoom Scan 5x5x7 (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.89 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 0.042 W/kg
**SAR(1 g) = 0.02 mW/g; SAR(10 g) = 0.01 mW/g**
Maximum value of SAR (measured) = 0.024 mW/g




0 dB = 0.024mW/g

**(h) Distribution of maximum SAR in WLAN mode giving the maximum 1g and 10g averaged SAR. Measured against the left hand side phantom for the tilt phone position.**

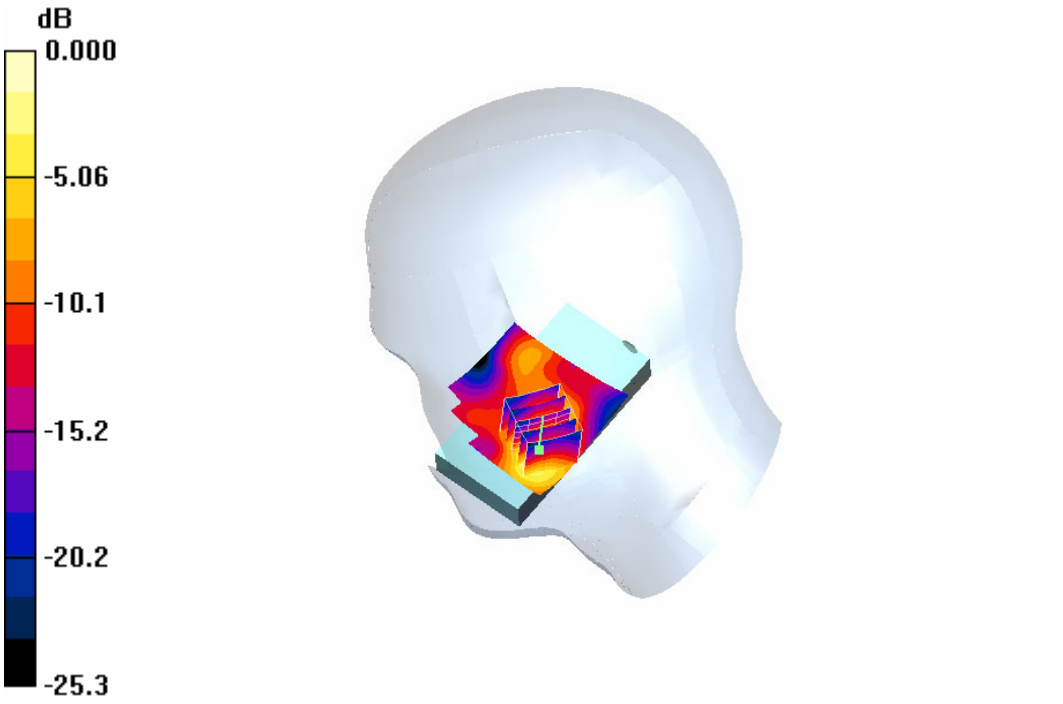
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-02-22 17:24:42

-Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1
-Medium: Head 2450 MHz; $\sigma$ = 1.89 mho/m; $\varepsilon_r$ = 38; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1582; ConvF(4.35, 4.35, 4.35)
-Electronics: DAE3 Sn422
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Cheek High/Area Scan (81x81x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.265 mW/g
**Cheek High/Zoom Scan 5x5x7 (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.66 V/m; Power Drift = 0.137 dB
Peak SAR (extrapolated) = 0.395 W/kg
**SAR(1 g) = 0.22 mW/g; SAR(10 g) = 0.10 mW/g**
Maximum value of SAR (measured) = 0.257 mW/g




0 dB = 0.257mW/g

**(i) Distribution of maximum SAR in WLAN mode giving the maximum 1g and 10g averaged SAR. Measured against the right hand side phantom for the cheek phone position.**

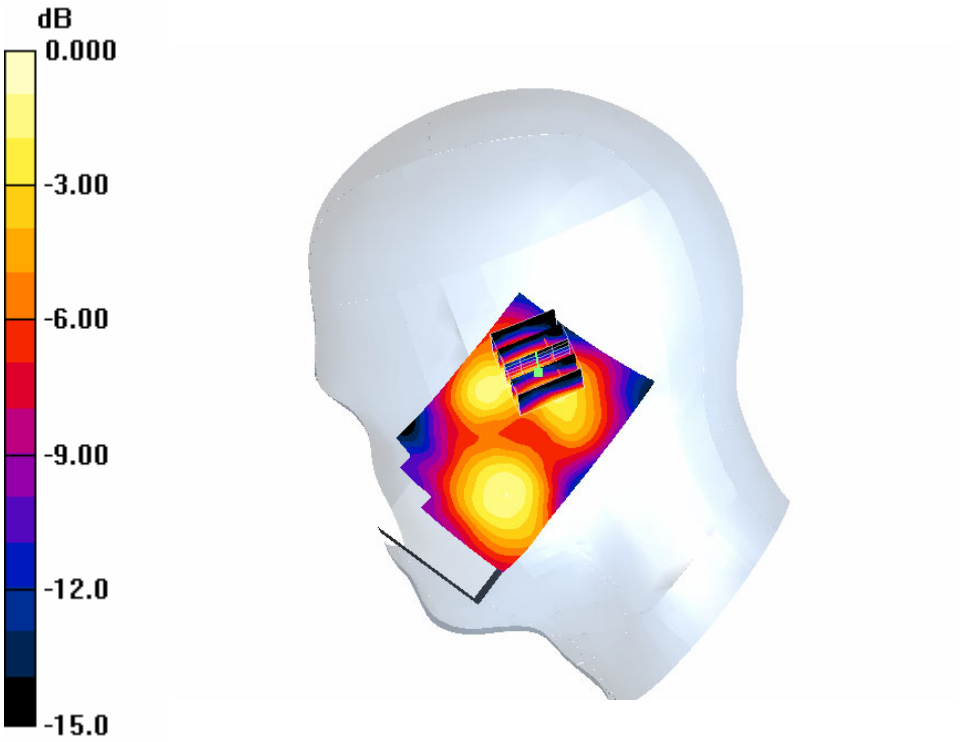
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-02-22 15:48:46

-Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
-Medium: Head 2450 MHz; $\sigma$ = 1.89 mho/m; $\varepsilon_r$ = 38; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1582; ConvF(4.35, 4.35, 4.35)
-Electronics: DAE3 Sn422
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Tilt Mid/Area Scan (121x81x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.028 mW/g
**Tilt Mid/Zoom Scan 5x5x7 (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.33 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.047 W/kg
**SAR(1 g) = 0.02 mW/g; SAR(10 g) = 0.01 mW/g**
Maximum value of SAR (measured) = 0.028 mW/g




0 dB = 0.028mW/g

**(j) Distribution of maximum SAR in WLAN mode giving the maximum 1g and 10g averaged SAR. Measured against the right hand side phantom for the tilt phone position.**

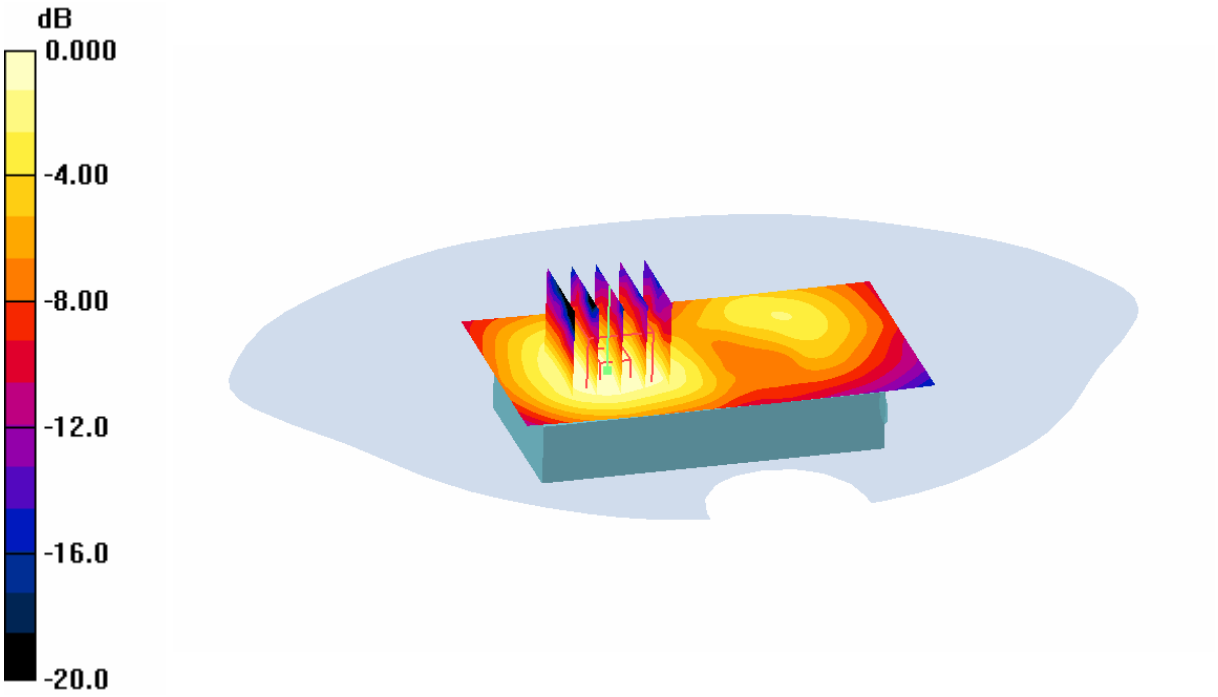
**DUT: PY7FD022011; Type: Mobile Terminal; Serial: ALR0000KNM**

Date/Time: 2006-02-23 16:59:16

-Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
-Medium: Muscle 2450 MHz; $\sigma$ = 2.05 mho/m; $\varepsilon_r$ = 51; $\rho$ = 1000 kg/m$^3$

DASY4 Configuration:
-Probe: ET3DV6 - SN1582; ConvF(4.13, 4.13, 4.13)
-Electronics: DAE3 Sn422
-Phantom: SAM 2; ;
-Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

**Front to Phantom Mid/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.027 mW/g
**Front to Phantom Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.10 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.047 W/kg
**SAR(1 g) = 0.03 mW/g; SAR(10 g) = 0.02 mW/g**
Maximum value of SAR (measured) = 0.026 mW/g




0 dB = 0.026mW/g

**(k) Distribution of maximum SAR in WLAN mode giving the maximum 1g SAR. Measured against the flat section of the phantom with the front of the device facing the phantom and with a 15 mm separation between the device and the phantom.**

**APPENDIX 5: Probe calibration parameters for ET3DV6, SN: 1394**

**Diode compression**

| Parameter | Value in mV |
|---|---|
| DCP X | 94 |
| DCP Y | 94 |
| DCP Z | 94 |

**Sensitivity in free space:**

| Parameter | Value in $\mu V/(V/m)^2$ |
|---|---|
| Norm X | 1.92 |
| Norm Y | 2.03 |
| Norm Z | 1.66 |

**Sensitivity in tissue simulating liquid**

Head 1800 MHz / 1900MHz; $\varepsilon_r$=40 ± 5%, $\sigma$=1.40± 5% S/m.

| Parameter | Value |
|---|---|
| ConvF X | 5.12 |
| ConvF Y | 5.12 |
| ConvF Z | 5.12 |

**Probe tip to sensor center:** 2.7 mm

**Optical Surface Detection:** 1.3 ± 0.2 mm

**APPENDIX 6: Probe calibration parameters for ET3DV6, SN: 1582**

**Diode compression**

| Parameter | Value in mV |
|---|---|
| DCP X | 93 |
| DCP Y | 93 |
| DCP Z | 93 |

**Sensitivity in free space:**

| Parameter | Value in $\mu V/(V/m)^2$ |
|---|---|
| Norm X | 2.00 |
| Norm Y | 1.98 |
| Norm Z | 2.02 |

**Sensitivity in tissue simulating liquid**

Head 2450 MHz; $\varepsilon_r$=39.2 ± 5%, $\sigma$=1.80± 5% S/m.

| Parameter | Value |
|---|---|
| ConvF X | 4.35 |
| ConvF Y | 4.35 |
| ConvF Z | 4.35 |

Muscle 2450 MHz; $\varepsilon_r$=52.7 ± 5%, $\sigma$=1.95± 5% S/m.

| Parameter | Value |
|---|---|
| ConvF X | 4.13 |
| ConvF Y | 4.13 |
| ConvF Z | 4.13 |

**Probe tip to sensor center:** 2.7 mm

**Optical Surface Detection:** 1.3 ± 0.2 mm

**APPENDIX 7: Probe calibration parameters for ET3DV6, SN: 3062**

**Diode compression**

| Parameter | Value in mV |
|---|---|
| DCP X | 96 |
| DCP Y | 96 |
| DCP Z | 96 |

**Sensitivity in free space:**

| Parameter | Value in $\mu V/(V/m)^2$ |
|---|---|
| Norm X | 1.18 |
| Norm Y | 1.24 |
| Norm Z | 1.08 |

**Sensitivity in tissue simulating liquid**

Muscle 1900 MHz; $\varepsilon_r$=53.3 ± 5%, $\sigma$=1.52± 5% S/m.

| Parameter | Value |
|---|---|
| ConvF X | 4.39 |
| ConvF Y | 4.39 |
| ConvF Z | 4.39 |

**Probe tip to sensor center:** 2 mm