YUBZ®

*Why You Busy?*

**YUBZ Retro Handset for Mobile Phone**
**Radiation Test by Intertek®**
**Test Summary**

Professional product test report from Intertek® has verified that YUBZ® Retro Handset for Mobile Phone **reduce the radiation received by the mobile phone user by over 96%.**

The test simulates the two situations using mobile phone with or without the retro handset. The radiation received by the left head is measured in terms of the Specific Absorption Rate (SAR), defined as "the rate of radiofrequency energy absorption per unit mass at a point on an absorbing body."

**Specific Absorption Rate Summary**

| Frequency Band | Channel | SAR 10g of Mobile Phone (W/kg) | SAR 10g of YUBZ Retro Handset (W/kg) | **% of Radiation Reduced** |
|---|---|---|---|---|
| GSM900 | Lower | 0.350 | 0.011 | **96.9%** |
| GSM900 | Middle | 0.337 | 0.012 | **96.4%** |
| GSM900 | Higher | 0.226 | 0.006 | **97.3%** |
| GSM1800 | Lower | 0.133 | 0.002 | **98.5%** |
| GSM1800 | Middle | 0.178 | 0.000 | **99.9%** |
| GSM1800 | Higher | 0.213 | 0.001 | **99.5%** |

# SAR TEST REPORT

## No. SH08110271-001

| | | |
|---|---|---|
| Applicant | : | Top Creation (Asia) Ltd.<br>14/F, Fortis Tower, 77 Gloucester Road, Hong Kong |
| Manufacturer | : | Top Creation (Asia) Ltd.<br>14/F, Fortis Tower, 77 Gloucester Road, Hong Kong |
| Equipment | : | YUBZ TALK MOBILE |
| Type/Model | : | YUBZ TALK MOBILE |

SUMMARY

The equipment complies with the requirements according to the following standard(s) or specification:

**FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)** Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

**EN50360: 2001:** Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz - 3 GHz)

**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

**EN50361: 2001:** Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz)

Date of issue: Nov 18, 2008

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## Content

SUMMARY ..... 1
1. GENERAL INFORMATION ..... 3
1.1 Description of Equipment Under Test (EUT) ..... 3
1.2 Description of Test Facility ..... 4
2. TEST SPECIFICATIONS ..... 5
2.1 Standards or specification ..... 5
2.2 Instrument list ..... 5
3. SAR DEFINITION ..... 6
4. SAR MEASUREMENT SYSTEM ..... 7
5. SAR EXPOSURE LIMITS ..... 11
6. TEST RESULTS ..... 12
APPENDIX I TEST SETUP ..... 41
APPENDIX II PHOTOGRAPH OF EUT ..... 43
APPENDIX III PHOTOGRAPH OF AUXILIARY DEVICE ..... 44

# 1. GENERAL INFORMATION

## 1.1 Description of Equipment Under Test (EUT)

| | |
|---|---|
| Equipment: | YUBZ TALK MOBILE |
| Type/model: | YUBZ TALK MOBILE |
| Rating: | The EUT is a passive device working together with an auxiliary device, such as mobile phone, laptop PC and etc. |
| Test Frequency: | GSM 900/1800 |
| Device Category: | Portable |
| RF Exposure Environment: | Uncontrolled |
| Description of EUT: | The EUT is a passive device working together with an auxiliary device, such as mobile phone, laptop PC and etc. Here the EUT was connected to mobile phone NOKIA 6680.RM-36. Both EUT and the mobile phone were assessed SAR to find the effect of using the EUT to decrease SAR. |

Ambient conditions:

| Items | Required | Actual |
|---|---|---|
| Temperature (° C) | 18-25 | 20 |
| Humidity (% RH) | 30-70 | 43 |

| | |
|---|---|
| Date of sample receipt: | Nov 10, 2008 |
| Date of test: | Nov 10, 2008 ~ Nov 12, 2008 |



## 1.2 Description of Test Facility

☒ Name: Intertek Testing Service Shanghai Limited
Address: Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone: 86 21 61278200
Telefax: 86 21 54262353

Subcontractor :

☒ Name: Shanghai Institute of Measurement Technology
Address: 716 Yishan Road, Shanghai 200233, P.R. China
Telephone: 86 21 64700066

☐ Name: Jiangsu Electronic Products Supervision and Inspection Institute
Address: No. 10, Geixiang, Zhongqiao, Wuxi, P.R. China
Telephone: 0510-5140037

## 2. TEST SPECIFICATIONS

### 2.1 Standards or specification

FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01) Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

EN50360: 2001: Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz - 3 GHz)

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

EN50361: 2001: Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz)

### 2.2 Instrument list

| | |
|---|---|
| PC | Dell (Pentium IV 2.4GHz, SN:X10-23533) |
| Network Emulator | Rohde&Schwarz (CMU200, SN:105894) |
| Voltmeter | Keithley (2000, SN:1000572) |
| Synthetizer | Rohde&Schwarz (SML_03, SN:101868) |
| Amplifier | Bonn (BLMA, SN:10800) |
| Power Meter | Rohde&Schwarz (NRVD, SN:101066) |
| Probe | Antennessa (SN:SN_1205_EP_42) |
| Phantom | Antennessa (SN:SN_36_05_SAM25) |
| Liquid | SIMT (Last Calibration:2008.10.21) |



## 3. SAR definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 1-1).

**Equation 1-1**
**SAR Mathematical Equation**

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho\, dv}\right)$$

**SAR is expressed in units of Watts per Kilogram (W/kg).**

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

- σ = conductivity of the tissue-simulating material (S/m)
- ρ = mass density of the tissue-simulating material (kg/m$^3$)
- E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

## 4. SAR Measurement System

Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar system consists of the following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The following figure shows the system.

COMOSAR bench

The mobile phone under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 10 g mass.

### II.1. Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2 mm +/- 0,2 mm. It enables the dosimetric evaluation of left and right hand phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

### II.2. Probe

For the measurements the Specific Dosimetric E-Field Probe SSE5 with following specifications is used.

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 5 mm



- Distance between probe tip and sensor center : 2.5 mm
- Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than +/- 1mm).
- Probe linearity : <0.25 dB
- Axial Isotropy : <0.25 dB
- Spherical Isotropy : <0.50 dB
- Calibration range : 835 to 2500 MHz for head & body simulating liquid
- Angle between probe axis (evaluation axis) and suface normal line : less than 30°

### II.3. Measurement procedure

The following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16 mm * 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors can not directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8 * 4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

### II.4 Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimise measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values.
The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1 mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

## II.5. UNCERTAINTY ASSESSMENT

The following table includes the uncertainty table of the IEEE 1528 The values are determined by Antennessa.

UNCERTAINTY EVALUATION FOR HANDSET SAR TEST

| a | b | c | d | e= f(d,k) | f | g | h= c*f/e | i= c*g/e | k |
|---|---|---|---|---|---|---|---|---|---|
| Uncertainty Component | Sec. | Tol (+- %) | Prob. Dist. | Div. | Ci (1g) | Ci (10g) | 1g Ui (+-%) | 10g Ui (+-%) | Vi |
| **Measurement System** | | | | | | | | | |
| Probe calibration | E.2.1 | 6.0 | N | 1 | 1 | 1 | 6.0 | 6.0 | ∞ |
| Axial Isotropy | E.2.2 | 2.5 | R | $\sqrt{3}$ | $(1-Cp)^{1/2}$ | $(1-Cp)^{1/2}$ | 1.0 | 1.0 | ∞ |
| Hemispherical Isotropy | E.2.2 | 4.0 | R | $\sqrt{3}$ | $\sqrt{Cp}$ | $\sqrt{Cp}$ | 1.6 | 1.6 | ∞ |
| Boundary effect | E.2.3 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| Linearity | E.2.4 | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.9 | 2.9 | ∞ |
| System detection limits | E.2.5 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | E.2.6 | 0.5 | N | 1 | 1 | 1 | 0.5 | 0.5 | ∞ |
| Reponse Time | E.2.7 | 0.2 | R | $\sqrt{3}$ | 1 | 1 | 0.1 | 0.1 | ∞ |
| Integration Time | E.2.8 | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.2 | 1.2 | ∞ |
| RF ambient Conditions | E.6.1 | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| Probe positioner Mechanical Tolerance | E.6.2 | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.2 | 1.2 | ∞ |
| Probe positioning with respect to Phantom Shell | E.6.3 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation | E.5.2 | 1.5 | R | $\sqrt{3}$ | 1 | 1 | 0.9 | 0.9 | ∞ |
| **Test sample Related** | | | | | | | | | |
| Test sample positioning | E.4.2.1 | 1.5 | N | 1 | 1 | 1 | 1.5 | 1.5 | N-1 |
| Device Holder Uncertainty | E.4.1.1 | 5.0 | N | 1 | 1 | 1 | 5.0 | 5.0 | |
| Output power Variation - SAR drift measurement | 6.6.2 | 4.7 | R | $\sqrt{3}$ | 1 | 1 | 2.7 | 2.7 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| Phantom Uncertainty (Shape and thickness tolerances) | E.3.1 | 4.0 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid conductivity - deviation from target value | E.3.2 | 1.7 | R | $\sqrt{3}$ | 0.64 | 0.43 | 0.6 | 0.4 | ∞ |
| Liquid conductivity - measurement uncertainty | E.3.3 | 2.5 | N | 1 | 0.64 | 0.43 | 1.6 | 1.1 | M |
| Liquid permitivity - deviation from target value | E.3.2 | 2.9 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.0 | 0.8 | ∞ |
| Liquid permitivity - measurement uncertainty | E.3.3 | 2.5 | N | 1 | 0.6 | 0.49 | 1.5 | 1.2 | M |
| Combined Standard Uncertainty | | | RSS | | | | 9.8 | 9.7 | |
| Expanded Uncertainty (95% Confidence interval) | | | k | | | | 19.1 | 19.0 | |



UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK

| a | b | c | d | e= f(d,k) | f | g | h= c*f/e | i= c*g/e | k |
|---|---|---|---|---|---|---|---|---|---|
| Uncertainty Component | Sec. | Tol (+- %) | Prob. Dist. | Div. | Ci (1g) | Ci (10g) | 1g Ui (+-%) | 10g Ui (+-%) | Vi |
| **Measurement System** | | | | | | | | | |
| Probe calibration | E.2.1 | 6.0 | N | 1 | 1 | 1 | 6.0 | 6.0 | ∞ |
| Axial Isotropy | E.2.2 | 2.5 | R | $\sqrt{3}$ | $(1-Cp)^{1/2}$ | $(1-Cp)^{1/2}$ | 1.0 | 1.0 | ∞ |
| Hemispherical Isotropy | E.2.2 | 4.0 | R | $\sqrt{3}$ | $\sqrt{Cp}$ | $\sqrt{Cp}$ | 1.6 | 1.6 | ∞ |
| Boundary effect | E.2.3 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| Linearity | E.2.4 | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.9 | 2.9 | ∞ |
| System detection limits | E.2.5 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | E.2.6 | 0.5 | N | 1 | 1 | 1 | 0.5 | 0.5 | ∞ |
| Reponse Time | E.2.7 | 0.2 | R | $\sqrt{3}$ | 1 | 1 | 0.1 | 0.1 | ∞ |
| Integration Time | E.2.8 | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.2 | 1.2 | ∞ |
| RF ambient Conditions | E.6.1 | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| Probe positioner Mechanical Tolerance | E.6.2 | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.2 | 1.2 | ∞ |
| Probe positioning with respect to Phantom Shell | E.6.3 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation | E.5.2 | 1.5 | R | $\sqrt{3}$ | 1 | 1 | 0.9 | 0.9 | ∞ |
| **Dipole** | | | | | | | | | |
| Dipole axis to liquid Distance | 8,E.4.2 | 1.0 | N | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | N-1 |
| Input power and SAR drift measurement | 8,6.6.2 | 4.7 | R | $\sqrt{3}$ | 1 | 1 | 2.7 | 2.7 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| Phantom Uncertainty (Shape and thickness tolerances) | E.3.1 | 4.0 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid conductivity - deviation from target value | E.3.2 | 1.7 | R | $\sqrt{3}$ | 0.64 | 0.43 | 0.6 | 0.4 | ∞ |
| Liquid conductivity - measurement uncertainty | E.3.3 | 2.5 | N | 1 | 0.64 | 0.43 | 1.6 | 1.1 | M |
| Liquid permitivity - deviation from target value | E.3.2 | 2.9 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.0 | 0.8 | ∞ |
| Liquid permitivity - measurement uncertainty | E.3.3 | 2.5 | N | 1 | 0.6 | 0.49 | 1.5 | 1.2 | M |
| Combined Standard Uncertainty | | | RSS | | | | 8.3 | 8.2 | |
| Expanded Uncertainty (95% Confidence interval) | | | k | | | | 16.2 | 16.0 | |

## 5. SAR Exposure Limits

5.1. FCC Supplement C, and comply with ANSI/IEEE C95.1-1992 "Uncontrolled Environments" limits:

**Limits for General Population/Uncontrolled Exposure (W/kg)**

| Type Exposure | Uncontrolled Environment Limit |
|---|---|
| Spatial Peak SAR (1g cube tissue for brain or body) | 1.60 W/kg |
| Spatial Average SAR (whole body) | 0.08 W/kg |
| Spatial Peak SAR (10g for hands, feet, ankles and wrist) | 4.00 W/kg |

5.2. EN 50360 basic restriction as specified in Council Recommendation1999/519/EC:

**Basic restrictions for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz)**

| Frequency range | Magnetic flux density (mT) | Current density (mA/m²) (rms) | Whole body average SAR (W/kg) | Localised SAR (head and trunk) (W/kg) | Localised SAR (limbs) (W/kg) | Power density, S (W/m²) |
|---|---|---|---|---|---|---|
| 0 Hz | 40 | — | — | — | — | — |
| >0-1 Hz | — | 8 | — | — | — | — |
| 1-4 Hz | — | 8/f | — | — | — | — |
| 4-1 000 Hz | — | 2 | — | — | — | — |
| 1 000 Hz-100 kHz | — | f/500 | — | — | — | — |
| 100 kHz-10 MHz | — | f/500 | 0,08 | 2 | 4 | — |
| 10 MHz-10 GHz | — | — | 0,08 | 2 | 4 | — |
| 10-300 GHz | — | — | — | — | — | 10 |



## 6. Test Results

System verification

| Frequency Band | Channel | SAR 10g of Dipole | SAR 1g of Dipole |
|---|---|---|---|
| GSM900 | middle | 7.072 | 11.017 |
| GSM1800 | middle | 20.127 | 38.067 |

SAR Test Results Summary

| Frequency Band | Channel | SAR 10g of mobile | SAR 10g of EUT | SAR 1g of mobile | SAR 1g of EUT |
|---|---|---|---|---|---|
| GSM900 | lower | 0.350 | 0.011 | 0.510 | 0.019 |
| GSM900 | middle | 0.337 | 0.012 | 0.495 | 0.020 |
| GSM900 | higher | 0.226 | 0.006 | 0.332 | 0.011 |
| GSM1800 | lower | 0.133 | 0.002 | 0.229 | 0.003 |
| GSM1800 | middle | 0.178 | 0.000 | 0.302 | 0.000 |
| GSM1800 | higher | 0.213 | 0.001 | 0.384 | 0.003 |

*Note: the data above was derived from testing at left head position.*

# MEASUREMENT 1

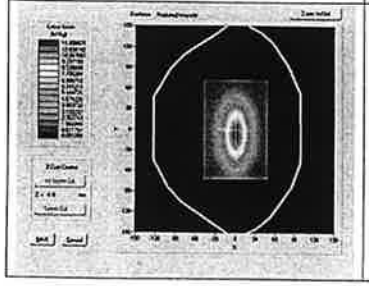
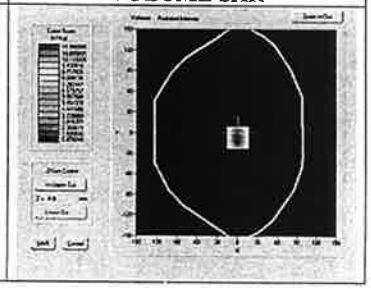
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | surf_sam_plan.txt |
| **Phantom** | Validation plane |
| **Device Position** | Dipole |
| **Band** | GSM900 |
| **Channels** | Middle |
| **Signal** | CW |

## B. SAR Measurement Results

Middle Band SAR (Channel 38):

| | |
|---|---|
| **Frequency (MHz)** | 897.599976 |
| **Relative permitivity (real part)** | 41.275002 |
| **Relative permitivity (imaginary part)** | 19.700100 |
| **Conductivity (S/m)** | 0.982378 |
| **Variation (%)** | -0.490000 |

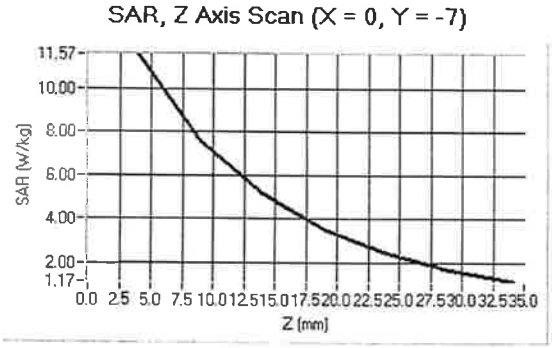
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=0.00, Y=-7.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 7.071628 |
| **SAR 1g (W/Kg)** | 11.016925 |

**Z Axis Scan**



# MEASUREMENT 2

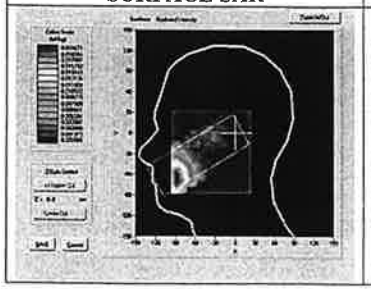
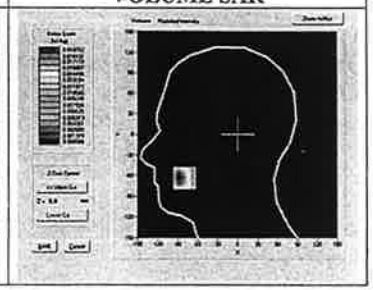
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM900 |
| **Channels** | Low |
| **Signal** | TDMA |

## B. SAR Measurement Results

Lower Band SAR (Channel 975):

| | |
|---|---|
| **Frequency (MHz)** | 880.200012 |
| **Relative permitivity (real part)** | 41.452999 |
| **Relative permitivity (imaginary part)** | 19.633949 |
| **Conductivity (S/m)** | 0.960100 |
| **Variation (%)** | -1.010000 |

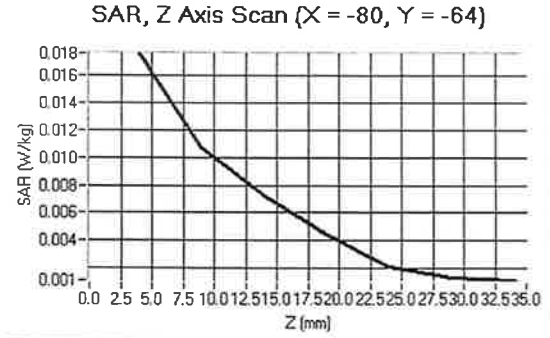
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-80.00, Y=-64.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.011471 |
| **SAR 1g (W/Kg)** | 0.018918 |

**Z Axis Scan**



# MEASUREMENT 3

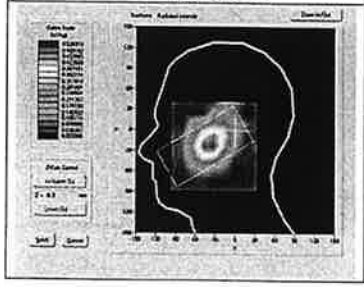
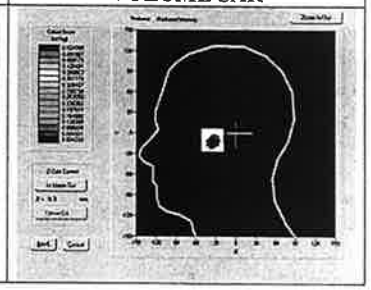
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM900 |
| **Channels** | Low |
| **Signal** | TDMA |

## B. SAR Measurement Results

Lower Band SAR (Channel 975):

| | |
|---|---|
| **Frequency (MHz)** | 880.200012 |
| **Relative permitivity (real part)** | 41.452999 |
| **Relative permitivity (imaginary part)** | 19.633949 |
| **Conductivity (S/m)** | 0.960100 |
| **Variation (%)** | -0.950000 |

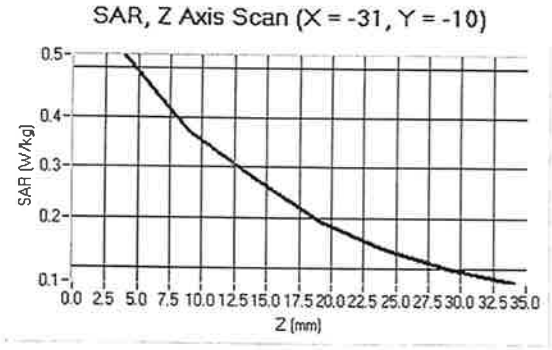
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-31.00, Y=-10.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.350236 |
| **SAR 1g (W/Kg)** | 0.509554 |

**Z Axis Scan**



# MEASUREMENT 4

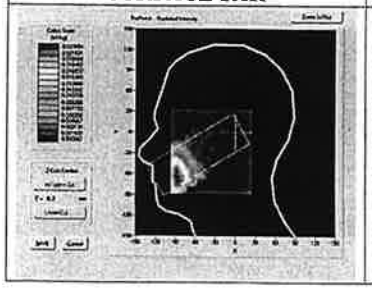
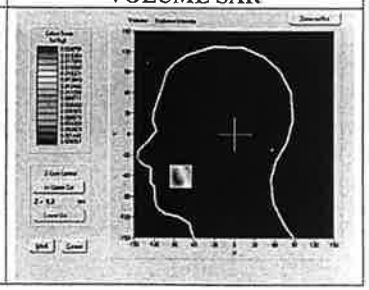
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM900 |
| **Channels** | Middle |
| **Signal** | TDMA |

## B. SAR Measurement Results

Middle Band SAR (Channel 38):

| | |
|---|---|
| **Frequency (MHz)** | 897.599976 |
| **Relative permitivity (real part)** | 41.275002 |
| **Relative permitivity (imaginary part)** | 19.700100 |
| **Conductivity (S/m)** | 0.982378 |
| **Variation (%)** | -2.570000 |

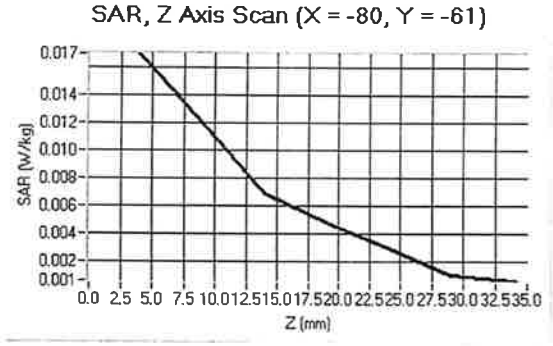
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-80.00, Y=-61.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.011908 |
| **SAR 1g (W/Kg)** | 0.019620 |

**Z Axis Scan**



# MEASUREMENT 5

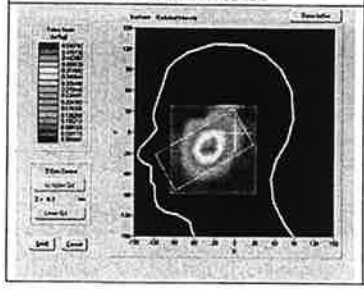
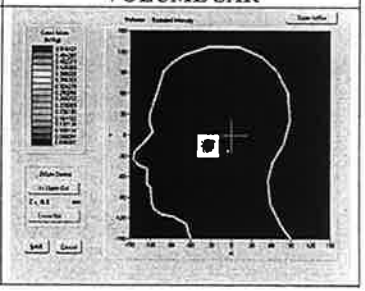
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM900 |
| **Channels** | Middle |
| **Signal** | TDMA |

## B. SAR Measurement Results

Middle Band SAR (Channel 38):

| | |
|---|---|
| **Frequency (MHz)** | 897.599976 |
| **Relative permitivity (real part)** | 41.275002 |
| **Relative permitivity (imaginary part)** | 19.700100 |
| **Conductivity (S/m)** | 0.982378 |
| **Variation (%)** | -0.350000 |

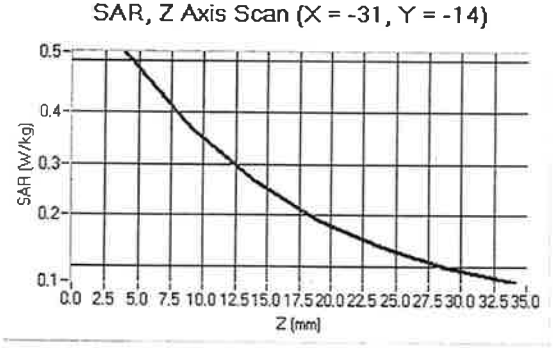
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-31.00, Y=-14.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.336630 |
| **SAR 1g (W/Kg)** | 0.495493 |

**Z Axis Scan**



# MEASUREMENT 6

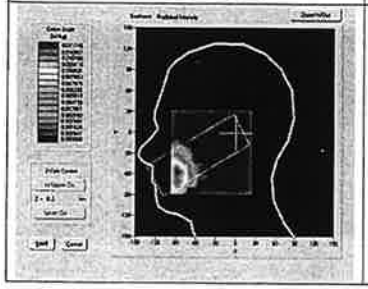
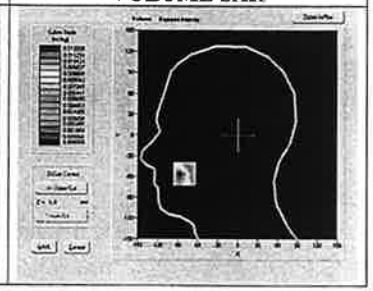
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM900 |
| **Channels** | High |
| **Signal** | TDMA |

## B. SAR Measurement Results

Higher Band SAR (Channel 124):

| | |
|---|---|
| **Frequency (MHz)** | 914.799988 |
| **Relative permitivity (real part)** | 41.075001 |
| **Relative permitivity (imaginary part)** | 19.788300 |
| **Conductivity (S/m)** | 1.005685 |
| **Variation (%)** | 2.780000 |

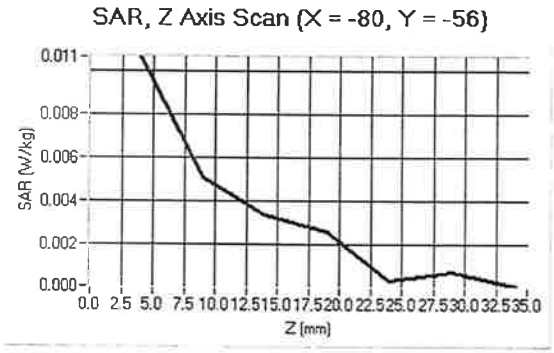
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-80.00, Y=-56.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.006332 |
| **SAR 1g (W/Kg)** | 0.011243 |

**Z Axis Scan**



# MEASUREMENT 7

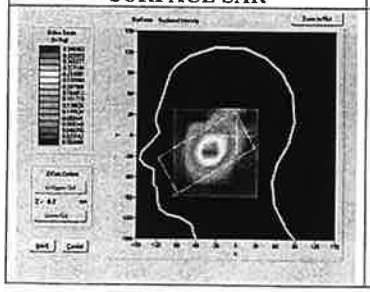
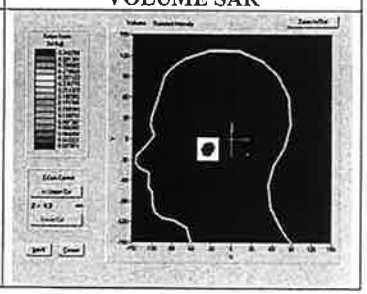
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM900 |
| **Channels** | High |
| **Signal** | TDMA |

## B. SAR Measurement Results

Higher Band SAR (Channel 124):

| | |
|---|---|
| **Frequency (MHz)** | 914.799988 |
| **Relative permitivity (real part)** | 41.075001 |
| **Relative permitivity (imaginary part)** | 19.788300 |
| **Conductivity (S/m)** | 1.005685 |
| **Variation (%)** | -0.620000 |

| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |

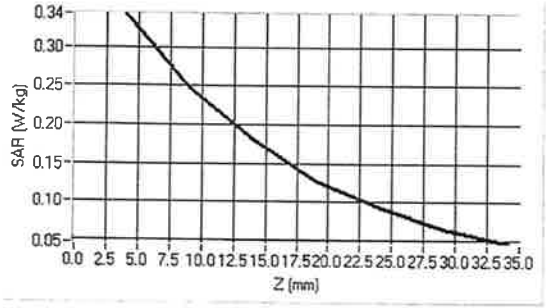


**Maximum location: X=-31.00, Y=-14.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.226055 |
| **SAR 1g (W/Kg)** | 0.331950 |

**Z Axis Scan**

SAR, Z Axis Scan (X = -31, Y = -14)



# MEASUREMENT 8

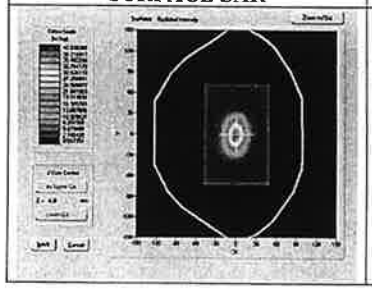
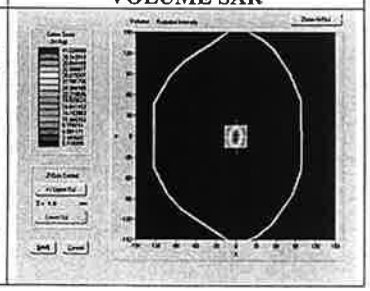
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | surf_sam_plan.txt |
| **Phantom** | Validation plane |
| **Device Position** | Dipole |
| **Band** | GSM1800 |
| **Channels** | Middle |
| **Signal** | CW |

## B. SAR Measurement Results

Middle Band SAR (Channel 698):

| | |
|---|---|
| **Frequency (MHz)** | 1747.400024 |
| **Relative permitivity (real part)** | 39.396999 |
| **Relative permitivity (imaginary part)** | 14.180250 |
| **Conductivity (S/m)** | 1.376587 |
| **Variation (%)** | -0.970000 |

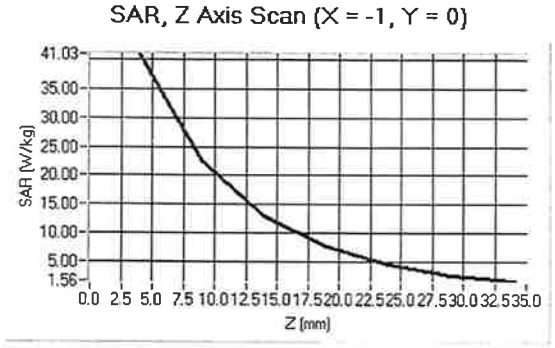
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-1.00, Y=0.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 20.127405 |
| **SAR 1g (W/Kg)** | 38.067303 |

**Z Axis Scan**



# MEASUREMENT 9

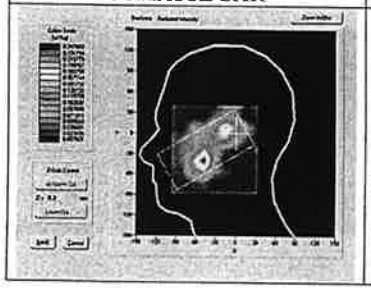
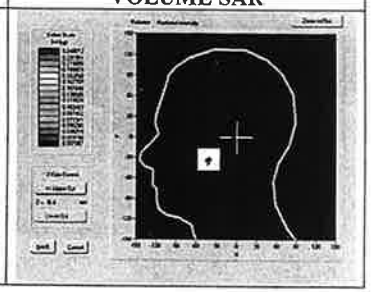
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM1800 |
| **Channels** | Low |
| **Signal** | TDMA |

## B. SAR Measurement Results

Lower Band SAR (Channel 512):

| | |
|---|---|
| **Frequency (MHz)** | 1710.199951 |
| **Relative permitivity (real part)** | 39.443001 |
| **Relative permitivity (imaginary part)** | 14.179200 |
| **Conductivity (S/m)** | 1.347182 |
| **Variation (%)** | -1.390000 |

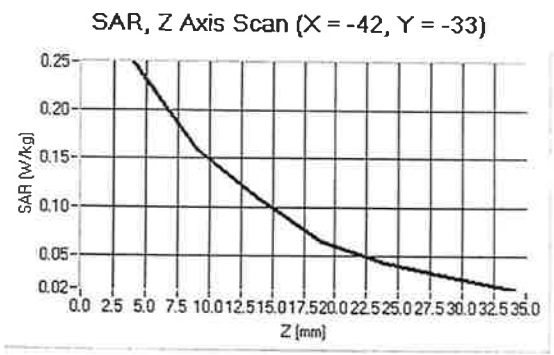
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-42.00, Y=-33.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.132797 |
| **SAR 1g (W/Kg)** | 0.229332 |

**Z Axis Scan**



# MEASUREMENT 10

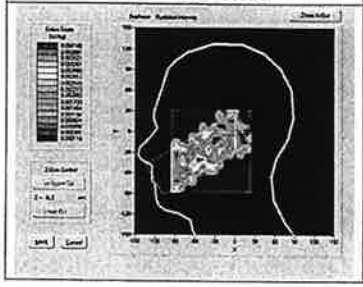
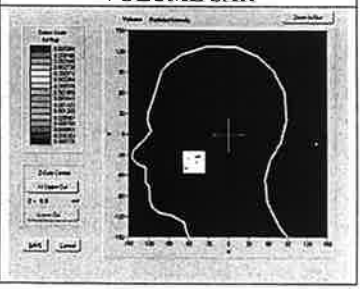
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Check |
| **Band** | GSM1800 |
| **Channels** | Low |
| **Signal** | TDMA |

## B. SAR Measurement Results

Lower Band SAR (Channel 512):

| | |
|---|---|
| **Frequency (MHz)** | 1710.199951 |
| **Relative permitivity (real part)** | 39.443001 |
| **Relative permitivity (imaginary part)** | 14.179200 |
| **Conductivity (S/m)** | 1.347182 |
| **Variation (%)** | -4.080000 |

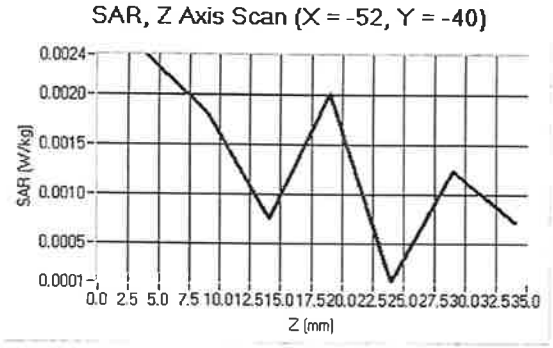
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-52.00, Y=-40.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.001559 |
| **SAR 1g (W/Kg)** | 0.002949 |

**Z Axis Scan**



# MEASUREMENT 11

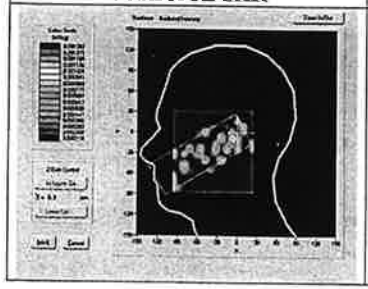
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM1800 |
| **Channels** | Middle |
| **Signal** | TDMA |

## B. SAR Measurement Results

Middle Band SAR (Channel 698):

| | |
|---|---|
| **Frequency (MHz)** | 1747.400024 |
| **Relative permitivity (real part)** | 39.396999 |
| **Relative permitivity (imaginary part)** | 14.180250 |
| **Conductivity (S/m)** | 1.376587 |
| **Variation (%)** | -2.560000 |

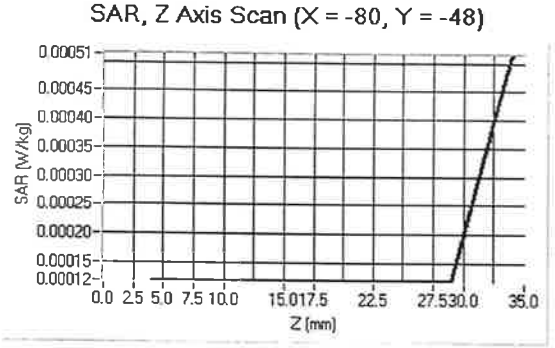
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-80.00, Y=-48.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.000295 |
| **SAR 1g (W/Kg)** | 0.000376 |

**Z Axis Scan**



# MEASUREMENT 12

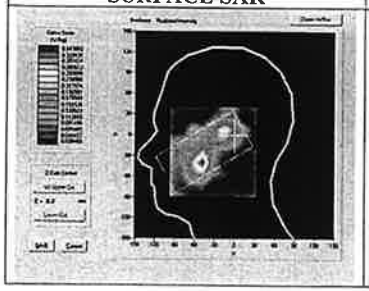
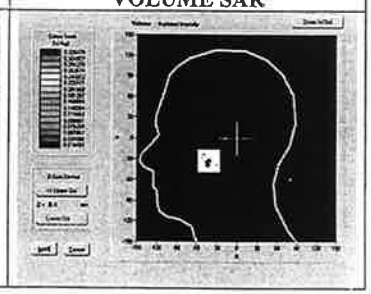
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM1800 |
| **Channels** | Middle |
| **Signal** | TDMA |

## B. SAR Measurement Results

Middle Band SAR (Channel 698):

| | |
|---|---|
| **Frequency (MHz)** | 1747.400024 |
| **Relative permitivity (real part)** | 39.396999 |
| **Relative permitivity (imaginary part)** | 14.180250 |
| **Conductivity (S/m)** | 1.376587 |
| **Variation (%)** | -4.700000 |

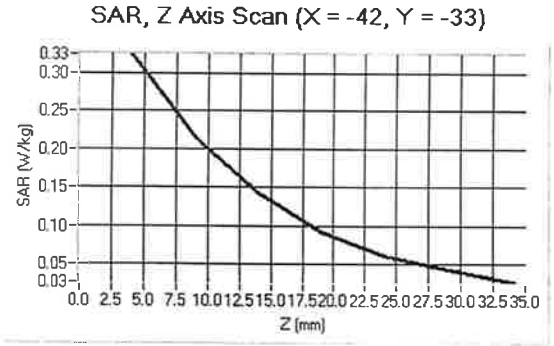
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-42.00, Y=-33.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.177952 |
| **SAR 1g (W/Kg)** | 0.301999 |

**Z Axis Scan**



# MEASUREMENT 13

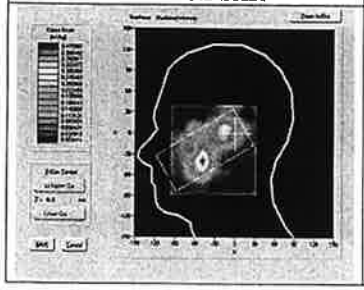
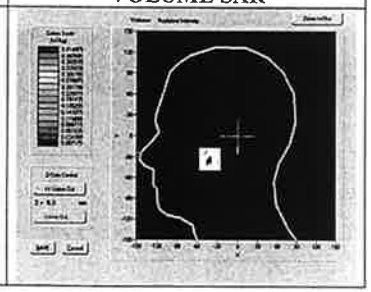
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM1800 |
| **Channels** | High |
| **Signal** | TDMA |

## B. SAR Measurement Results

Higher Band SAR (Channel 885):

| | |
|---|---|
| **Frequency (MHz)** | 1784.800049 |
| **Relative permitivity (real part)** | 39.374001 |
| **Relative permitivity (imaginary part)** | 14.219100 |
| **Conductivity (S/m)** | 1.409903 |
| **Variation (%)** | -1.630000 |

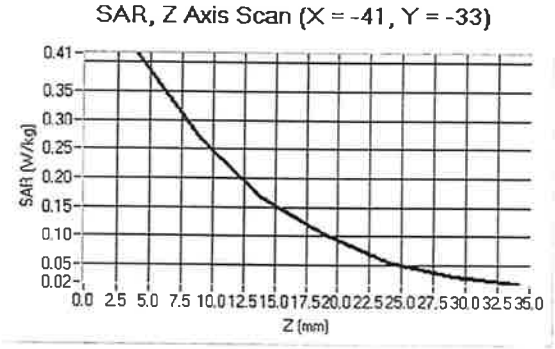
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-41.00, Y=-33.00**

| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.213298 |
| **SAR 1g (W/Kg)** | 0.384194 |

**Z Axis Scan**



# MEASUREMENT 14

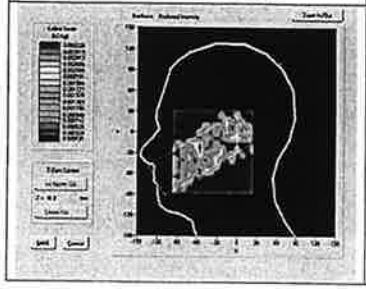
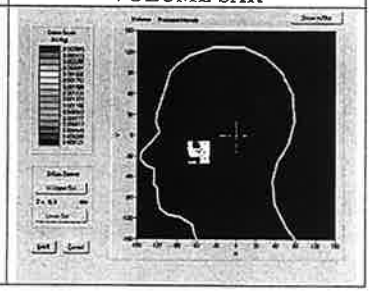
## A. Experimental conditions.

| | |
|---|---|
| **Phantom File** | zinf15.txt (-1000<=X<=-1000, -1000<=Y<=-1000 |
| **Phantom** | Left head |
| **Device Position** | Cheek |
| **Band** | GSM1800 |
| **Channels** | High |
| **Signal** | TDMA |

## B. SAR Measurement Results

Higher Band SAR (Channel 885):

| | |
|---|---|
| **Frequency (MHz)** | 1784.800049 |
| **Relative permitivity (real part)** | 39.374001 |
| **Relative permitivity (imaginary part)** | 14.219100 |
| **Conductivity (S/m)** | 1.409903 |
| **Variation (%)** | -3.490000 |

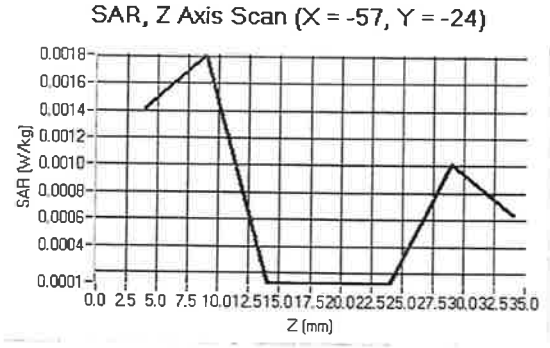
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |



**Maximum location: X=-57.00, Y=-24.00**

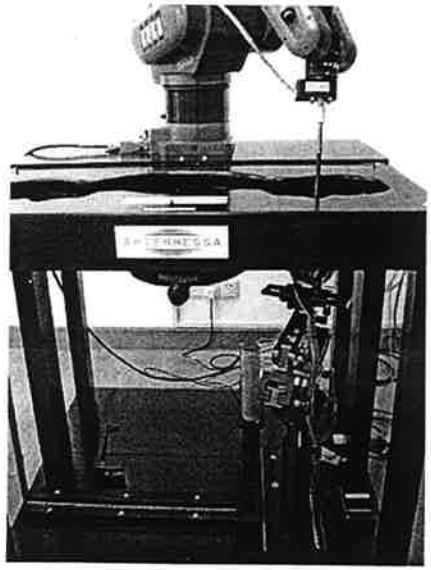
| | |
|---|---|
| **SAR 10g (W/Kg)** | 0.001143 |
| **SAR 1g (W/Kg)** | 0.002607 |

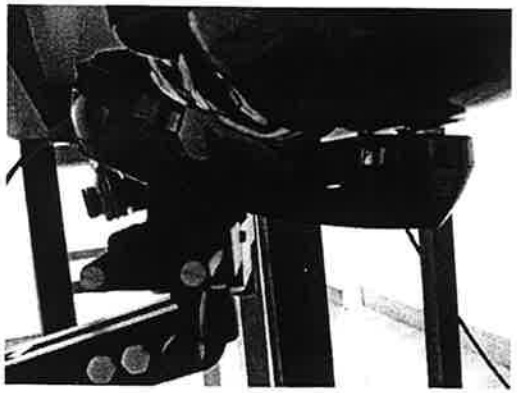
**Z Axis Scan**



## Appendix I Test Setup

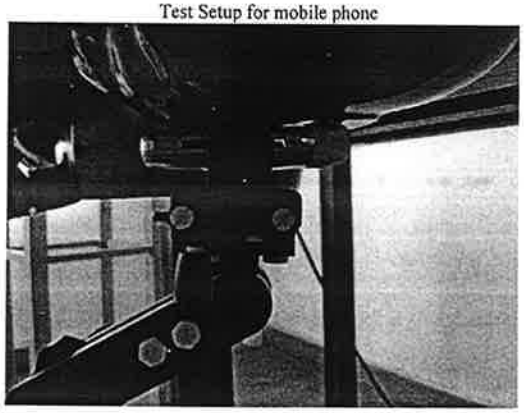
Test Setup for EUT



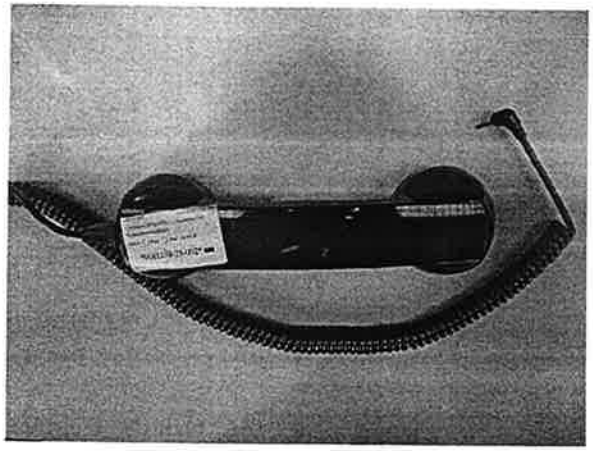


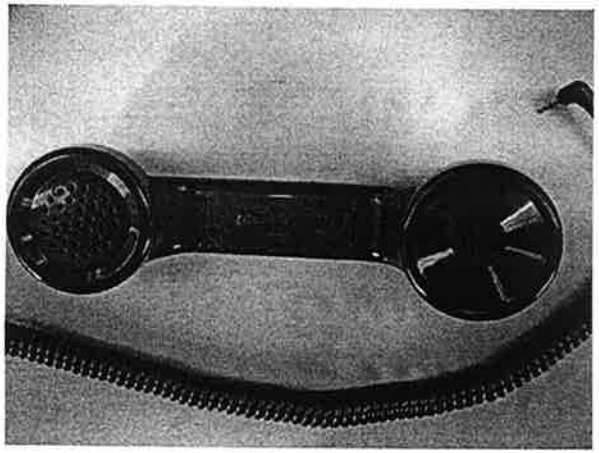


Test Setup for mobile phone



## Appendix II Photograph of EUT







## Appendix III Photograph of Auxiliary device